

P GVCRR EXHIBIT 1009

PART 4



US006425035C1

(12) **EX PARTE REEXAMINATION CERTIFICATE (5472nd)**
United States Patent
Hoese et al. (10) **Number: US 6,425,035 C1**
 (45) **Certificate Issued: *Aug. 8, 2006**

- (54) **STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE**
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- (75) **Inventors: Geoffrey H. Hoese, Austin, TX (US); Jeffrey T. Russell, Cibolo, TX (US)**
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- (73) **Assignee: Crossworlds Software, Burlingame, CA (US)**

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Reexamination Request:
 No. 90/007,125, Jul. 19, 2004
 No. 90/007,317, Nov. 23, 2004

Reexamination Certificate for:
 Patent No.: **6,425,035**
 Issued: **Jul. 23, 2002**
 Appl. No.: **09/965,335**
 Filed: **Sep. 27, 2001**

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(*) **Notice:** This patent is subject to a terminal disclaimer.

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Related U.S. Application Data

(63) Continuation of application No. 09/354,682, filed on Jul. 15, 1999, now Pat. No. 6,421,753, which is a continuation of application No. 09/001,799, filed on Dec. 31, 1997, now Pat. No. 5,941,972.

(Continued)

Primary Examiner—Dov Popovici

- (51) **Int. Cl.**
G06F 13/00 (2006.01)
- (52) **U.S. Cl.** **710/315; 710/2; 710/8; 710/36; 710/105; 710/305; 710/308; 711/112**
- (58) **Field of Classification Search** **710/1-5, 710/8-13, 36-38, 105, 100, 101, 305-316; 711/100, 112, 113; 714/42**
 See application file for complete search history.

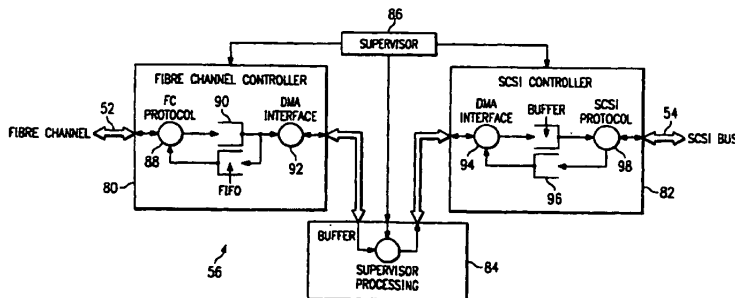
(57) **ABSTRACT**

A storage router (56) and storage network (50) provide virtual local storage on remote SCSI storage devices (60, 62, 64) to Fiber Channel devices. A plurality of Fiber Channel devices, such as workstations (58), are connected to a Fiber Channel transport medium (52), and a plurality of SCSI storage devices (60, 62, 64) are connected to a SCSI bus transport medium (54). The storage router (56) interfaces between the Fiber Channel transport medium (52) and the SCSI bus transport medium (54). The storage router (56) maps between the workstations (58) and the SCSI storage devices (60, 62, 64) and implements access, controls for storage space on the SCSI storage devices (60, 62, 64). The storage router (56) then allows access from the workstations (58) to the SCSI storage devices (60, 62, 64) using native low level, block protocol in accordance with the mapping and the access controls.

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1
EX PARTE
REEXAMINATION CERTIFICATE
ISSUED UNDER 35 U.S.C. 307

NO AMENDMENTS HAVE BEEN MADE TO
THE PATENT

2
AS A RESULT OF REEXAMINATION, IT HAS BEEN
DETERMINED THAT:

5 The patentability of claims 1-14 is confirmed.

* * * * *

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
CERTIFICATE OF SERVICE UNDER 37 C.F.R. 1.248	Atty. Docket No. CROSS1123-17 CROSS1123-19
Applicant Geoffrey B. Hoese, et al.	
Reexamination Control No. 90/007,125 90/007,317	Date Filed 07/19/2004 11/23/2004
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Chen, Alan

Applicant hereby serves the Comments on Statement of Reasons for Patentability and/or Confirmation in the above referenced case to:

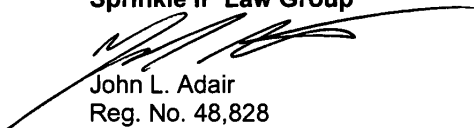
Larry E. Severin
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As per 35 U.S.C. §1.248 service is made via first class mail, certified, R.R.R. on October 7, 2005.

Respectfully submitted,

Sprinkle IP Law Group



John L. Adair
Reg. No. 48,828

Dated: October 7, 2005

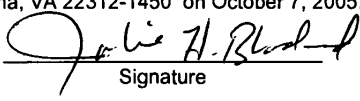
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Enclosures

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
Comments On Statement of Reasons for Patentability and/or Confirmation	Atty. Docket No. CROSS1123-17 CROSS1123-19
Applicants Goeffrey B. Hoese, et al.	
Reexamination Control No. 90/007,125 90/007,317	Date Filed 07/19/2004 11/23/2004
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Chen, Alan

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Certificate of Mailing Under 37 C.F.R. §1.8	
I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22312-1450 on October 7, 2005.	
 Signature	
Julie H. Blackard Printed Name	

Applicants appreciate the Examiner's confirmation of Claims 1-14 of United States Patent No. 6,425,035. Applicants submit the record as a whole makes evident the reasons for allowance and that there are additional reasons for patentability not enumerated by the Examiner. While Applicants agree with the Examiner's reasons for patentability to the extent such reasons are consistent with the record as a whole (as Applicants understand them to be), Applicants do not acquiesce or agree to any characterization of the claims that place unwarranted limitations or interpretations upon the claims, especially to the extent such limitations or interpretations are inconsistent with the claim language, specification or prior prosecution history in this case.

Attorney Docket No.
CROSS1123-17
CROSS1123-19

Customer ID: 44654
90/007,125
90/007,317

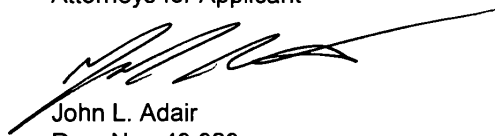
2

These "Comments on Statement of Reasons for Patentability and/or Confirmation" was served via First Class Mail, Certified, R.R.R. on October 7, 2005 to Larry E. Severin of Wang, Hartmann & Gibbs, PC, 1301 Dove Street, #1050, Newport Beach, CA 92660 and to William A. Blake of Jones, Tullar & Cooper, PC, P.O. Box 2226 Eads Station, Alexandria, VA 22202

The Director of the U.S. Patent and Trademark Office is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 50-3183 of Sprinkle IP Law Group.

Respectfully submitted,

Sprinkle IP Law Group
Attorneys for Applicant



John L. Adair
Reg. No. 48,828

Date: October 7, 2005

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Tel. (512) 637-9223
Fax. (512) 371-9088



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UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/007,125 <i>9/007317</i>	07/19/2004	6425035	I006-8910	2298
44654	7590	09/23/2005	EXAMINER	
SPRINKLE IP LAW GROUP 1301 W. 25TH STREET SUITE 408 AUSTIN, TX 78705			<i>CHEN, ALAN</i>	
			ART UNIT	PAPER NUMBER
			<i>2182</i>	
DATE MAILED: 09/23/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
Address: ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
90/007,317 <i>90/6071215</i>	11/23/2004	6425035	HOESE1/WAB

Larry E. Severin
Wang, Hartman & Gibbs, PC
1301 Dove Street
Suite 1050
Newport Beach, CA 92660

EXAMINER

CHEN, ALAN

ART UNIT	PAPER
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2182

DATE MAILED: *9-23-05*

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

CC: SPRINKLE IP LAW GROUP
1301 W. 25th Street
Suite 408
Austin, TX 78705

Notice of Intent to Issue Ex Parte Reexamination Certificate	Control No. 90/007,125 merged w/ 90/007,317	Patent Under Reexamination 6425035	
	Examiner Alan S. Chen	Art Unit 2182	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

1. Prosecution on the merits is (or remains) closed in this *ex parte* reexamination proceeding. This proceeding is subject to reopening at the initiative of the Office or upon petition. Cf. 37 CFR 1.313(a). A Certificate will be issued in view of
 - (a) Patent owner's communication(s) filed: 22 July 2005.
 - (b) Patent owner's late response filed: _____.
 - (c) Patent owner's failure to file an appropriate response to the Office action mailed: _____.
 - (d) Patent owner's failure to timely file an Appeal Brief (37 CFR 41.31).
 - (e) Other: _____.

Status of *Ex Parte* Reexamination:

 - (f) Change in the Specification: Yes No
 - (g) Change in the Drawing(s): Yes No
 - (h) Status of the Claim(s):
 - (1) Patent claim(s) confirmed: 1-14.
 - (2) Patent claim(s) amended (including dependent on amended claim(s)): _____
 - (3) Patent claim(s) cancelled: _____.
 - (4) Newly presented claim(s) patentable: _____.
 - (5) Newly presented cancelled claims: _____.
2. Note the attached statement of reasons for patentability and/or confirmation. Any comments considered necessary by patent owner regarding reasons for patentability and/or confirmation must be submitted promptly to avoid processing delays. Such submission(s) should be labeled: "Comments On Statement of Reasons for Patentability and/or Confirmation."
3. Note attached NOTICE OF REFERENCES CITED (PTO-892).
4. Note attached LIST OF REFERENCES CITED (PTO-1449 or PTO/SB/08).
5. The drawing correction request filed on _____ is: approved disapproved.
6. Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some* c) None of the certified copies have
 - been received.
 - not been received.
 - been filed in Application No. _____.
 - been filed in reexamination Control No. _____.
 - been received by the International Bureau in PCT Application No. _____.

* Certified copies not received: _____.
7. Note attached Examiner's Amendment.
8. Note attached Interview Summary (PTO-474).
9. Other: _____.

cc: Requester (if third party requester)
U.S. Patent and Trademark Office
PTOL-469 (Rev.9-04)

Notice of Intent to Issue Ex Parte Reexamination Certificate

Part of Paper No 09022005

Copied from 90007125 on 10/07/2005

REEXAMINATION

REASONS FOR PATENTABILITY / CONFIRMATION

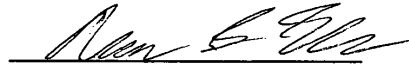
Reexamination Control No. 90/007,125 merged w/ Attachment to Paper No. 09022005.

901007317

Art Unit 2182.

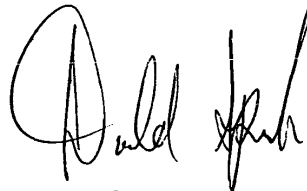
Claims 1-14 are allowed.

The prior art disclosed by the patent owner and cited by the Examiner fail to teach or suggest, alone or in combination, all the limitations of the independent claims (claims 1, 7 and 11), particularly the map/mapping feature which is a one-to-one correspondence, as given in a simple table, the map physically resident on a router, whereby the router forms the connection between two separate entities over different transport mediums, such that neither entity determines where data is to be sent, but rather, the router solely dictates where the data will be sent; also the "NLLBP" feature referring to a fundamental low level protocol defined by a specification/standard that is well known to one of ordinary skill in the art, where the NLLBP is used at the router for communications with both the first and second transport medium. The SCSI protocol/standard is considered a NLLBP. TCP/IP, e.g., used in Ethernet communications, however, is not considered to be a NLLBP.



(Examiner's Signature)

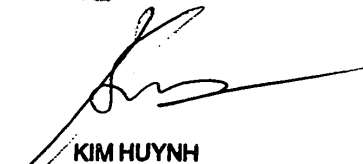
PTOL-476 (Rev. 03-98)



DONALD SPARKS
SUPERVISORY PATENT EXAMINER




DOV POPOVICI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100



KIM HUYNH
PRIMARY EXAMINER

Copied from 90007125 on 10/07/2005

Reexamination 	Application/Control No. 90/007125 merged w/ 90/007317	Applicant(s)/Patent Under Reexamination 6425035
	Certificate Date	Certificate Number

Requester Correspondence Address: <input type="checkbox"/> Patent Owner <input type="checkbox"/> Third Party
[Empty space for address details]


LITIGATION REVIEW <input checked="" type="checkbox"/>	ASC (examiner initials)	9/19/05 (date)
Case Name		Director Initials
Crossroads Systems, (Texas), Inc v. Dot Hill Systems Western District of Texas (03-CV-754)		

COPENING OFFICE PROCEEDINGS	
TYPE OF PROCEEDING	NUMBER
1. Reexamination merged	90/007317
2.	
3.	
4.	



U.S. Patent and Trademark Office

DOC. CODE RXFILJKT

Copied from 90007125 on 10/07/2005

Issue Classification 	Application/Control No.	Applicant(s)/Patent under Reexamination	
	90/007,125 merged w/ 90/007,317	6425035	
	Examiner	Art Unit	
	Alan S. Chen	2182	

ISSUE CLASSIFICATION											
ORIGINAL					CROSS REFERENCE(S)						
CLASS	SUBCLASS				CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					
710	315				710	2	8	36	105	305	308
INTERNATIONAL CLASSIFICATION					711	112					
G	0	6	F	13/00							
				/							
				/							
				/							
				/							


 (Assistant Examiner) (Date)	 DOV POPOVICI SUPERVISORY PATENT EXAMINER (Supervisory Patent Examiner) (Date)	Total Claims Allowed: 14 <table border="1"> <tr> <td>O.G. Print Claim(s)</td> <td>O.G. Print Fig.</td> </tr> <tr> <td>1</td> <td>5</td> </tr> </table>	O.G. Print Claim(s)	O.G. Print Fig.	1	5
O.G. Print Claim(s)	O.G. Print Fig.					
1	5					

<input checked="" type="checkbox"/> Claims renumbered in the same order as presented by applicant		<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47							
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3	3		33		63		93		123		153		183
4	4		34		64		94		124		154		184
5	5		35		65		95		125		155		185
6	6		36		66		96		126		156		186
7	7		37		67		97		127		157		187
8	8		38		68		98		128		158		188
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	30		60		90		120		150		180		210

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Part of Paper No. 09022005

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Search Notes		Application No. F.317.	Applicant(s)
		90/007,125 <i>Merged with</i>	6425035
		Examiner	Art Unit
		Fritz M Fleming	2182

SEARCHED			
Class	Subclass	Date	Examiner
710	1-5, 8-13, 36-38, 105, 100, 101, 125	1/21/05	FWF
711	100, 112, 113	1/21/05	FWF
714	42	1/21/05	FWF
710	305-316		
<i>updated</i>	<i>draw</i>	5/20/05	FWF
<i>updated</i>		9/16/05	ASL

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner
<i>updated</i>	<i>see search history products</i>	9/16/05	ASL

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
EAST SEARCH NOTES	1/21/05	FWF
NPL SEARCH: SCSI, FC, Fibre Channel, storage, block level, native ATM	1/21/05	FWF
EAST SCSI ARRAY DMA FIFO	5/20/05	FWF
<i>updated</i> IEEE Xplore, Google Scholar, Fibre Channel, native, SCSI	9/16/05	ASL

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Index of Claims		Application No.	Applicant(s)	
		90/007,125 merged with 7,317	6425035	
		Examiner	Art Unit	
		Fritz M Fleming	2182	

√ Rejected	- (Through numeral) Cancelled	N Non-Elected	A Appeal
= Allowed	+ Restricted	I Interference	O Objected

Claim		Date		Claim		Date		Claim		Date	
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Part of Paper No. 01212005

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S4	35	@ad<"19971231" and fibre adj channel near SCSI	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/22 08:46
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Search History 9/6/05 2:32:06 PM Page 1

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Search History 9/6/05 2:32:06 PM Page 2

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S32	70	@ad<"19971231" and virtual near storage and SCSI	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/30 14:49

Search History 9/6/05 2:32:06 PM Page 3

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S35	1	"6425035".pn. and remote and map	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/09/05 18:18
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S37	1	"6425035".pn. and remote and map and maps and mapping and native	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/09/05 18:55

Access DB# 166173

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name Pinchus Laufer Examiner #: 73139 Date: 09/19/05
 Art Unit: NONE Phone Number 2-3599 Serial Number None
 Mail Box Location: Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: _____

Inventors (please provide full names): _____

Earliest Priority Filing Date: _____

**For Sequence Searches Only* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.*

6425035

*****		*****	
STAFF USE ONLY	Type of Search	Vendors and cost where applicable	
Searcher: <u>Shirelle Green</u>	Sequence (#) _____	<u>STN</u>	_____
Searcher Phone #: <u>272-3487</u>	AA Sequence (#) _____	Dialog	_____
Searcher Location: <u>4B28</u>	Structure (#) _____	<u>Questel/Orbit</u>	<u>11.80</u>
Date Searcher Picked Up: <u>9/19</u>	Bibliographic _____	WEST	_____
Date Completed: <u>9/19</u>	Litigation <input checked="" type="checkbox"/>	<u>Lexis/Nexis</u>	_____
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Online Time: <u>15</u>	Other _____	Other (specify) <u>Courtlink 28.00</u>	_____

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BY:.....

1 of 1 DOCUMENT

UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT

6425035

[Link to Claims Section](#)

July 23, 2002

Storage router and method for providing virtual local storage

REEXAM-LITIGATE: July 19, 2004 - Reexamination requested by Natu J. Patel, Wang & Patel, Reexamination No. 90/007,125 (O.G. August 31, 2004) Ex. Gp: 2111

November 23, 2004 - Reexamination requested by William Blake, Jones Tullar & Cooper, Reexamination No. 90/007,317 (O.G. January 11, 2005) Ex. Gp: 2182

NOTICE OF LITIGATION

Crossroads Systems (Texas), Inc., a Texas Corporation v. Dot Hill Systems Corporation, a Delaware corporation, Filed October 17, 2003, D.C. W.D. Texas, Doc. No. A-03-CA-754-55

INVENTOR: Hoese, Geoffrey B. - Austin, Texas; Russell, Jeffrey T. - Cibolo, Texas

APPL-NO: 965335 (09)

FILED-DATE: September 27, 2001

GRANTED-DATE: July 23, 2002

ASSIGNEE-AT-ISSUE: Crossroads Systems, Inc., Austin, Texas, 02

ENGLISH-ABST:

A storage router (56) and storage network (50) provide virtual local storage on remote SCSI storage devices (60, 62, 64) to Fiber Channel devices. A plurality of Fiber Channel devices, such as workstations (58), are connected to a Fiber Channel transport medium (52), and a plurality of SCSI storage devices (60, 62, 64) are connected to a SCSI bus transport medium (54). The storage router (56) interfaces between the Fibre Channel transport medium (52) and the SCSI bus transport medium (54). The storage router (56) maps between the workstations (58) and the SCSI storage devices (60, 62, 64) and implements access controls for storage space on the SCSI storage devices (60, 62, 64). The storage router (56) then allows access from the workstations (58) to the SCSI storage devices (60, 62, 64) using native low level, block protocol in accordance with the mapping and the access controls.

PARENT-PAT-INFO:

RELATED APPLICATIONS

This application claims the benefit of the filing date of U.S. patent application Ser. No. 09/354,682 by inventors Geoffrey B. Hoese and Jeffrey T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on Jul. 15, 1999, which is a continuation of U.S. patent application Ser. No. 091001,799, filed on Dec. 31, 1997, now U.S. Pat. No. 5,941,972, and hereby incorporates these applications by reference in their entireties as if they had been fully set forth herein.

LEXIS-NEXIS
Library: PATENTS
File: ALL

No Documents Found!

No documents were found for your search terms
"6425035 or 6,425,035"

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LEXIS-NEXIS
Library: PATENTS
File: CASES

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Library: PATENTS
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1 of 2 DOCUMENTS

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October 22, 2003 Wednesday

LENGTH: 74 words

HEADLINE: CRDS Files Patent Infringement Suit Against HILL

DATELINE: Ridgeland, MS

BODY:

...not been served with the Complaint. The suit alleges patent infringement by Dot Hill of United States Patent Nos. 5,941,972 and 6,425,035, relating to storage routers and methods for providing virtual local storage.

LEXIS-NEXIS
Library: PATENTS
File: CURNEWS

2 of 2 DOCUMENTS

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October 22, 2003 Wednesday

SECTION: FINANCIAL NEWS

LENGTH: 446 words

HEADLINE: Dot Hill Systems Announces Complaint Filed By Crossroads Systems

DATELINE: CARLSBAD, Calif. Oct. 22

BODY:

...not been served with the Complaint. The suit alleges patent infringement by Dot Hill of United States Patent Nos. 5,941,972 and 6,425,035, relating to storage routers and methods for providing virtual local storage.

?us6425035/pn

** SS 1: Results 1

Search statement 2

?prt full nonstop legalall

1/1 PLUSPAT - (C) QUESTEL-ORBIT- image
PN - US2002010812 A1 20020124 [US20020010812]
PN2 - US6425035 B2 20020723 [US6425035]
TI - (A1) Storage router and method for providing virtual local storage
PA - (B2) CROSSROADS SYS INC (US)
PA0 - Crossroads Systems, Inc., Austin TX [US]
PA2 - (B2) CROSSROADS SYS INC (US)
IN - (A1) HOESE GEOFFREY B (US); RUSSELL JEFFRY T (US)
AP - US96533501 20010927 [2001US-0965335]
FD - Continuation of: US5941972
PR - US96533501 20010927 [2001US-0965335]
- US35468299 19990715 [1999US-0354682]
- US179997 19971231 [1997US-0001799]
IC - (A1) G06F-003/00
EC - G06F-013/40D2
PCL - ORIGINAL (O) : 710105000; CROSS-REFERENCE (X) : 710008000 710036000
710310000
DT - Corresponding document
CT - US5748924; US5768623; US5809328; US5812754; US5835496; US5848251;
US5935260; US5941972; US5959994; US6041381; US6055603; US6065087;
US6075863; US6098149; US6118766; US6148004; US6185203; US6209023;
US6230218; US6341315; US6343324
STG - (A1) Utility Patent Application published on or after January 2, 2001
STG2- (B2) U.S. Patent (with pre-grant pub.) after Jan. 2, 2001
AB - A storage router (56) and storage network (50) provide virtual local
storage on remote SCSI storage devices (60, 62, 64) to Fiber Channel
devices. A plurality of Fiber Channel devices, such as workstations
(58), are connected to a Fiber Channel transport medium (52), and a
plurality of SCSI storage devices (60, 62, 64) are connected to a SCSI
bus transport medium (54). The storage router (56) interfaces between
the Fibre Channel transport medium (52) and the SCSI bus transport
medium (54). The storage router (56) maps between the workstations
(58) and the SCSI storage devices (60, 62, 64) and implements access
controls for storage space on the SCSI storage devices (60, 62, 64).
The storage router (56) then allows access from the workstations (58)
to the SCSI storage devices (60, 62, 64) using native low level, block
protocol in accordance with the mapping and the access controls.
UP - 2002-05

1/1 LGST - (C) EPO
PN - US2002010812 A1 20020124 [US20020010812]
- US6425035 B2 20020723 [US6425035]
AP - US96533501 20010927 [2001US-0965335]
ACT - 20030826 US/CC-A
CERTIFICATE OF CORRECTION
- 20040831 US/RR-A [+]
REQUEST FOR REEXAMINATION FILED
EFFECTIVE DATE: 20040719
- 20050111 US/RR-A [+]
REQUEST FOR REEXAMINATION FILED
EFFECTIVE DATE: 20041123
UP - 2005-05

.1/1 CRXX - (C) CLAIMS/RRX

PN - 6,425,035 A 20020723 [US6425035]
PA - Crossroads Systems Inc
ACT - 20040719 REEXAMINATION REQUESTED
ISSUE DATE OF O.G.: 20040831
REEXAMINATION REQUEST NUMBER: 90/007125
Natu J. Patel, Wang & Patel, Newport Beach, CA

- 20041123 REEXAMINATION REQUESTED
ISSUE DATE OF O.G.: 20050111
REEXAMINATION REQUEST NUMBER: 90/007317
William Blake, Jones Tullar & Cooper, Alexandria, VA

US District Court Civil Docket

**U.S. District - Texas Western
(Austin)**

1:03cv754

Crossroads Systems (v. Dot Hill Systems Cor

This case was retrieved from the court on Monday, September 19, 2005

Date Filed: 10/17/2003	Class Code: PATTRD
Assigned To: Honorable Sam Sparks	Closed: no
Referred To:	Statute: 28:1338
Nature of suit: Patent (830)	Jury Demand: Both
Cause: Patent Infringement	Demand Amount: \$0
Lead Docket: None	NOS Description: Patent
Other Docket: None	
Jurisdiction: Federal Question	

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Date	#	Proceeding Text
10/17/2003	--	Case assigned to Honorable Sam Sparks (sh) [Entry date 10/20/03]
10/17/2003	1	Complaint filed. Filing Fee: \$ 150.00 Receipt # 357883 (Pages: 5) (sh) [Entry date 10/20/03]
10/17/2003	--	Court file forwarded to Judge Sparks (gr) [Entry date 10/21/03]
10/17/2003	--	Notified Commissioner of Patents and Trademarks of filing complaint for patent infringement (gr) [Entry date 10/21/03]
10/17/2003	--	AO 120 forwarded to the Commissioner of Patents and Trademarks. (mc2) [Entry date 03/23/04]
10/23/2003	--	Summons issued for Dot Hill Systems Cor (gr) [Entry date 10/23/03]
10/23/2003	--	Summons issued for Dot Hill Systems Cor (gr) [Entry date 10/24/03]
11/03/2003	2	Return of service executed as to Dot Hill Systems Cor on 10/27/03 (td) [Entry date 11/04/03]
12/01/2003	3	Motion by Dot Hill Systems Cor for atty. Daniel S. Mount to appear pro hac vice (gr) [Entry date 12/02/03]
12/01/2003	4	Motion by Dot Hill Systems Cor for atty, Lara J. Hodgson to appear pro hac vice (gr) [Entry date 12/02/03]
12/01/2003	5	Motion by Dot Hill Systems Cor for atty, Alfredo A. Bismonte to appear pro hac vice (gr) [Entry date 12/02/03]
12/01/2003	6	Motion by Crossroads Systems (, Dot Hill Systems Cor to extend time to answer or otherwise respond, including motions under Rule 12 of the Fed. R (gr) [Entry date 12/02/03]
12/03/2003	7	Order granting motion for atty. Daniel S. Mount to appear pro hac vice [3-1] signed by Honorable Sam Sparks (gr) [Entry date 12/03/03]
12/03/2003	8	Order granting motion for atty, Lara J. Hodgson to appear pro hac vice [4-1] signed by Honorable Sam Sparks (gr) [Entry date 12/03/03]
12/03/2003	9	Order granting motion for atty, Alfredo A. Bismonte to appear pro hac vice [5-1] signed by Honorable Sam Sparks (gr) [Entry date 12/03/03]
12/04/2003	10	Order granting motion to extend time to answer or otherwise respond, including motions under Rule 12 of the Fed. R; until 12/17/03 [6-1] signed by Honorable Sam Sparks (gr) [Entry date 12/04/03]
12/15/2003	11	Motion by Crossroads Systems (for atty. John E. Giust to appear pro hac vice (gr) [Entry date 12/16/03]
12/15/2003	12	Motion by Crossroads Systems (for atty. Matthew C. Bernstein to appear pro hac vice (gr) [Entry date 12/16/03]
12/15/2003	13	Motion by Crossroads Systems (for atty John Allcock to appear pro hac vice (gr) [Entry date

- 12/16/2003 17 Answer to complaint and counterclaim by Dot Hill Systems Cor against Crossroads Systems (gr) [Entry date 12/17/03]
- 12/17/2003 14 Order granting motion for atty John Allcock to appear pro hac vice [13-1] signed by Honorable Sam Sparks (gr) [Entry date 12/17/03]
- 12/17/2003 15 Order granting motion for atty. John E. Giust to appear pro hac vice [11-1] signed by Honorable Sam Sparks (gr) [Entry date 12/17/03]
- 12/17/2003 16 Order granting motion for atty. Matthew C. Bernstein to appear pro hac vice [12-1] signed by Honorable Sam Sparks (gr) [Entry date 12/17/03]
- 01/05/2004 18 Reply by Crossroads Systems to Dot Hill Systems Corp counterclaim [17-2] (gr) [Entry date 01/06/04]
- 01/09/2004 19 Motion by Dot Hill Systems Cor for atty, John F. Sweeney to appear pro hac vice (gr) [Entry date 01/12/04]
- 01/09/2004 20 Motion by Dot Hill Systems Cor for atty, Kurt E. Richter to appear pro hac vice (gr) [Entry date 01/12/04]
- 01/09/2004 21 Motion by Dot Hill Systems Cor for atty. William S. Feiler to appear pro hac vice (gr) [Entry date 01/12/04]
- 01/13/2004 22 Order granting motion for atty. William S. Feiler to appear pro hac vice [21-1] signed by Honorable Sam Sparks (gr) [Entry date 01/13/04]
- 01/13/2004 23 Order granting motion for atty, Kurt E. Richter to appear pro hac vice [20-1] signed by Honorable Sam Sparks (gr) [Entry date 01/13/04]
- 01/13/2004 24 Order granting motion for atty, John F. Sweeney to appear pro hac vice [19-1] signed by Honorable Sam Sparks (gr) [Entry date 01/13/04]
- 01/29/2004 25 Motion by Dot Hill Systems Cor for atty Natu J. Patel to appear pro hac vice (gr) [Entry date 01/29/04]
- 01/29/2004 26 Motion by Dot Hill Systems Cor for atty. Jason B. Witten to appear pro hac vice (gr) [Entry date 01/29/04]
- 01/29/2004 27 Order granting motion for atty Natu J. Patel to appear pro hac vice [25-1] signed by Honorable Sam Sparks (gr) [Entry date 01/30/04]
- 01/29/2004 28 Order granting motion for atty. Jason B. Witten to appear pro hac vice [26-1] signed by Honorable Sam Sparks (gr) [Entry date 01/30/04]
- 01/30/2004 29 Amended Certificate of service to James B. Witten's Application to Appear Pro Hac Vice for Dot Hill Systems Cor (gr) [Entry date 02/02/04]
- 01/30/2004 30 Amended Certificate of service to Patel's Application to Appear Pro Hac Vice for Dot Hill Systems Cor (gr) [Entry date 02/02/04]
- 02/02/2004 -- Pro hac vice fee paid by John F. Sweeney with Amount: \$ 25.00 Receipt # 359220 (gr) [Entry date 02/09/04]
- 02/02/2004 -- Pro hac vice fee paid by William S. Feiler with Amount: \$ 25.00 Receipt # 359221 (gr) [Entry date 02/09/04]
- 02/02/2004 -- Pro hac vice fee paid by Kurt E. Richter with Amount: \$ 25.00 Receipt # 359222 (gr) [Entry date 02/09/04]
- 02/03/2004 -- Pro hac vice fee paid by Natu J. Patel with Amount: \$ 25.00 Receipt # 359298 (gr) [Entry date 02/09/04]
- 02/03/2004 -- Pro hac vice fee paid by Jason Brian Witten with Amount: \$ 25.00 Receipt # 359299 (gr) [Entry date 02/09/04]
- 02/09/2004 31 Order set scheduling conf. hearing for 2:00 2/18/04 in Courtroom 2, 1st floor signed by Honorable Sam Sparks (gr) [Entry date 02/09/04]
- 02/17/2004 32 Notice of attorney appearance for Dot Hill Systems Cor - notice of substitution of attorneys (Natu J. Patel, Jason B. Witten and local counsel, Travis Barton, in place of Daniel S. Mount (mc2) [Entry date 02/17/04]
- 02/17/2004 33 Joint Pretrial disclosures filed by Crossroads Systems (, Dot Hill Systems Cor (mc2) [Entry date 02/19/04]
- 02/18/2004 34 Minutes of proceedings for hearing on all pending matters conducted on 2/18/04 by Judge Sparks. Court Reporter: Lily Reznik. (mc2) [Entry date 02/19/04]
- 02/18/2004 -- Miscellaneous hearing on all pending matters held; parties agree to Karl Bayer as special master. (mc2) [Entry date 02/19/04] [Edit date 02/19/04]
- 02/18/2004 -- Oral order by Honorable Sam Sparks , setting miscellaneous hearing - Markman hearing before special master, Karl Bayer, - for 7/2/04 (mc2) [Entry date 02/19/04]
- 02/20/2004 35 Advisory to the court filed by Crossroads Systems (, Dot Hill Systems Cor - notice of nonopposition to

appointment of Karl Bayer as special master. (mc2) [Entry date 02/23/04]
 02/23/2004 -- Case referred to Karl Bayer as special master (mc2) [Entry date 02/24/04]
 02/23/2004 36 Order referring case to Karl Bayer, Special Master..., signed by Honorable Sam Sparks (mc2) [Entry date 02/24/04]
 02/23/2004 37 Order setting miscellaneous hearing - Markman Hearing - for 9:00 7/2/04..., signed by Honorable Sam Sparks (mc2) [Entry date 02/24/04]
 02/24/2004 38 Motion by Dot Hill Systems Cor for Franklin E. Gibbs to appear pro hac vice (mc2) [Entry date 02/26/04]
 02/24/2004 39 Amended Certificate of service by Dot Hill Systems Cor re application to appear pro hac vice of Franklin Gibbs. (mc2) [Entry date 02/26/04]
 02/25/2004 40 Order granting motion for Franklin E. Gibbs to appear pro hac vice [38-1] signed by Honorable Sam Sparks (mc2) [Entry date 02/26/04]
 03/02/2004 41 Joint motion by Crossroads Systems (, Dot Hill Systems Cor for protective order (mc2) [Entry date 03/05/04]
 03/08/2004 42 Order granting joint motion for protective order [41-1]. Agreed Protective Order filed & signed by Honorable Sam Sparks (td) [Entry date 03/09/04]
 03/08/2004 43 Order regarding sealed documents signed by Honorable Sam Sparks (td) [Entry date 03/09/04]
 03/08/2004 44 Motion by Crossroads Systems for leave to file first amended cmp (cmp attached to motion) (td) [Entry date 03/09/04]
 03/22/2004 45 Motion by Dot Hill Systems Cor to substitute attorney - Natu Patel and Jason Witten in place of the law firm of Mount & Stoelker (mc2) [Entry date 03/23/04]
 03/22/2004 46 Response by Dot Hill Systems Cor in opposition to motion for leave to file first amended cmp [44-1] (mc2) [Entry date 03/23/04]
 03/24/2004 47 Notice of filing by Crossroads Systems - concise statement of alleged infringement. (mc2) [Entry date 03/25/04]
 03/24/2004 48 Order granting motion for leave to file first amended cmp [44-1] signed by Honorable Sam Sparks (mc2) [Entry date 03/25/04]
 03/24/2004 49 Amended complaint by Crossroads Systems, amending complaint [1-1] (Pages: 7) (mc2) [Entry date 03/25/04]
 04/05/2004 50 Order granting motion to substitute attorney - Natu Patel and Jason Witten in place of the law firm of Mount & Stoelker [45-1] Natu J. Patel, Jason Brian Witten added signed by Honorable Sam Sparks (mm1) [Entry date 04/05/04]
 04/07/2004 51 Supplemental Concise Statments of Alleged Infringement filed by Crossroads Systems (Re: file notice [47-1] (rg1) [Entry date 04/08/04]
 04/07/2004 52 Stipulation filed by Crossroads Systems (, Dot Hill Systems Cor for leave for Dot Hill Systems Corp. to file a third party complaint against Falconstor. (mc2) [Entry date 04/08/04]
 04/08/2004 53 Notice of filing Concise Statement of why the Accused Products Do Not Infringe by Dot Hill Systems Cor (rg) [Entry date 04/12/04]
 04/12/2004 54 Order re opposition response [46-1], that defendants may object in motion for partial summary judgment..., signed by Honorable Sam Sparks (mc2) [Entry date 04/13/04]
 04/12/2004 -- Pro hac vice fee paid by Franklin E. Gibbs with Amount: \$ 25.00, Receipt # 359723. (mc2) [Entry date 04/13/04]
 04/13/2004 55 Answer by Dot Hill Systems Cor to amended complaint; jury demand (rg) [Entry date 04/14/04]
 04/13/2004 55 Amended counterclaim by Dot Hill Systems Cor: counterclaim [17-2] (rg) [Entry date 04/14/04]
 04/20/2004 56 Supplement filed by Dot Hill Systems Cor Re: file notice [53-1] (mc2) [Entry date 04/21/04]
 04/23/2004 57 First Amended Answer by Dot Hill Systems Cor to amended complaint; jury demand and counterclaim against plaintiff. (mc2) [Entry date 04/23/04] [Edit date 04/23/04]
 04/29/2004 58 Motion by Dot Hill Systems Cor for Larry E. Severin to appear pro hac vice (sm) [Entry date 04/29/04]
 04/30/2004 59 Amended answer by Crossroads Systems (to counterclaim [17-2] (td) [Entry date 04/30/04]
 04/30/2004 -- Letter/Correspondence by attorney for FalconStor, George B. Butts, regarding: stipulation for leave for Dot Hill Systems Corp. to file a third party complaint against FalconStor. Copy to Court 4/30/04. (mc2) [Entry date 05/03/04]
 05/03/2004 60 Order granting motion for Larry E. Severin to appear pro hac vice [58-1] signed by Honorable Sam Sparks (mc2) [Entry date 05/03/04]
 05/03/2004 61 Order granting stipulation [52-1], that Dot Hill Systems Corp. is granted leave to file a third party complaint against FalconStor, signed by Honorable Sam Sparks (mc2) [Entry date 05/03/04]

05/03/2004 62 Transcript filed for date of 2/18/04 (Proceedings Transcribed: scheduling conference) (Court Reporter: Lily Reznik.) (mc2) [Entry date 05/03/04]

05/05/2004 63 Minutes of proceedings for telephone conference conducted on 5/5/04 by Judge Sparks. Court Reporter: Lily Reznik. (mc2) [Entry date 05/06/04]

05/05/2004 -- Tele-conference held in chambers; Court resets Markman hearing to 8/30, 31, 2004, referred to Special Master for conference call and appropriate rescheduling of tutorial and briefing. (mc2) [Entry date 05/06/04]

05/05/2004 -- Miscellaneous hearing - Markman hearing - resetting on 8/30/04 (order on scheduling to follow by Special Master). (mc2) [Entry date 05/06/04]

05/06/2004 64 Order resetting Markmak hearing for 9:00 8/30/04, ..., signed by Honorable Sam Sparks (mc2) [Entry date 05/06/04]

05/06/2004 65 Third-party complaint by Dot Hill Systems Cor against FalconStor Software (mc2) [Entry date 05/07/04]

05/06/2004 66 Notice of filing by Dot Hill Systems Cor - corporate disclosure. (mc2) [Entry date 05/07/04]

05/06/2004 -- Summons issued for FalconStor Software (mc2) [Entry date 05/07/04]

05/07/2004 67 Return of service executed as to FalconStor Software on 5/6/04 (mc2) [Entry date 05/10/04]

05/25/2004 68 Answer by FalconStor Software to third-party complaint [65-1] (mc2) [Entry date 05/26/04]

05/25/2004 68 Crossclaim by FalconStor Software against Crossroads Systems (mc2) [Entry date 05/26/04]

05/26/2004 -- Sent letter to attorneys for Falconstor, Elliott and Stiefel, re bar status. (mc2) [Entry date 05/26/04]

05/26/2004 69 Motion by Crossroads Systems to halt Dod Hill's spoliation of evidence, and to compel production of Dot Hill's emails (with attached declaration of Tracy L. McCreight submitted and maintained under seal). (mc2) [Entry date 05/26/04] [Edit date 05/26/04]

05/26/2004 70 Motion by Crossroads Systems (to seal declaration of Tracy L. McCreight in support of plaintiff's motion to halt Dot Hill's spoliation of evidence and to compel production of Dot Hill's emails (mc2) [Entry date 05/26/04]

05/27/2004 71 Motion by FalconStor Software for Aaron Stiefel to appear pro hac vice (mc2) [Entry date 05/27/04]

05/27/2004 72 Motion by FalconStor Software for Mark J. Schildkraut to appear pro hac vice (mc2) [Entry date 05/27/04]

05/27/2004 73 Motion by FalconStor Software for Stephen J. Elliott to appear pro hac vice (mc2) [Entry date 05/27/04]

05/28/2004 74 Order granting motion for Aaron Stiefel to appear pro hac vice [71-1] signed by Honorable Sam Sparks (mc2) [Entry date 06/01/04]

05/28/2004 75 Order granting motion for Mark J. Schildkraut to appear pro hac vice [72-1] signed by Honorable Sam Sparks (mc2) [Entry date 06/01/04]

05/28/2004 76 Order granting motion for Stephen J. Elliott to appear pro hac vice [73-1] signed by Honorable Sam Sparks (mc2) [Entry date 06/01/04]

06/04/2004 77 Advisory to the court filed by Crossroads Systems (- notice of withdrawal of its motion to halt Dot Hill's sp[oliation of evidence and to compel production of Dod Hill's emails (mc2) [Entry date 06/07/04]

06/04/2004 -- Withdrawal motion to halt Dod Hill's spoliation of evidence [69-1], motion to compel production of Dot Hill's emails [69-2] (mc2) [Entry date 06/07/04]

06/07/2004 -- Pro hac vice fee paid by Aaron Stiefel, Stephen J. Elliott, Mark J. Schildkraut with Amount: \$ 75.00, Receipt # 360516. (mc2) [Entry date 06/09/04]

06/08/2004 -- Pro hac vice fee paid by Larry E Severin with Amount: \$ 25.00, Receipt # 360528. (mc2) [Entry date 06/09/04]

06/10/2004 78 Motion by Crossroads Systems (to extend time to answer or otherwise respond (to FalconStor's Rule 14 claims) (mc2) [Entry date 06/10/04]

06/10/2004 79 Order granting motion to extend time to answer or otherwise respond (to FalconStor's Rule 14 claims) [78-1] until 6/28/04, signed by Honorable Sam Sparks (mc2) [Entry date 06/14/04]

06/16/2004 80 Order granting motion to seal declaration of Tracy L. McCreight in support of plaintiff's motion to halt Dot Hill's spoliation of evidence and to compel production of Dot Hill's emails [70-1] signed by Honorable Sam Sparks (mc2) [Entry date 06/16/04]

06/16/2004 81 Order mootng motion to compel production of Dot Hill's emails [69-2] signed by Honorable Sam Sparks (mc2) [Entry date 06/16/04]

06/18/2004 82 Order granting motion to extend time to answer or otherwise respond (to FalconStor's Rule 14 claims) [78-1] until 6/28/04, signed by Honorable Sam Sparks (mc2) [Entry date 06/21/04]

06/28/2004 87 Answer by Crossroads Systems (to crossclaim [68-1] (mc2) [Entry date 06/29/04]

06/28/2004 87 Counterclaim by Crossroads Systems against FalconStor Software (mc2) [Entry date 06/29/04]

06/29/2004 83 Motion by Dot Hill Systems Cor for leave to file - to exceed page limit in motion for summary judgment... (mc2) [Entry date 06/29/04]

06/29/2004 84 Unopposed Motion by Dot Hill Systems Cor to seal exhibits 14 and 17 accompanying Dot Hill's motion for summary judgment... (mc2) [Entry date 06/29/04]

06/29/2004 85 Motion by Dot Hill Systems Cor for summary judgment that U.S. Patent No. 6,425,035 and U.S. Patent No. 5,941,972 are invalid pursuant to 35 USC Sec. 102 and/or 103 in view of prior development of Digital Equipment Corp HSZ70 controller (with attached exhibits 14 and 17 submitted and maintained under seal) (mc2) [Entry date 06/29/04]

06/29/2004 86 Motion by Dot Hill Systems Cor request for judicial notice in support of its motion for summary judgment... (mc2) [Entry date 06/29/04]

06/30/2004 88 Order granting motion for leave to file - to exceed page limit in motion for summary judgment... [83-1] signed by Honorable Sam Sparks (mc2) [Entry date 06/30/04]

06/30/2004 89 Motion by Crossroads Systems for Joseph P. Reid to appear pro hac vice (mc2) [Entry date 07/01/04]

06/30/2004 90 Motion by Dot Hill Systems Cor for leave to file - to supplement documents filed in support of its motion for summary judgment that U.S. Patent No. 6,425,035 and U.S. Patent No. 5,941,972 are invalid (with attached Exhibit A to Exhibit 4 of Dot Hill's summary judgment motion submitted and maintained under seal) (mc2) [Entry date 07/01/04] [Edit date 07/01/04]

06/30/2004 91 Unopposed Motion by Dot Hill Systems Cor to seal Exhibit A to Exhibit 4 accompanying Dot Hill's motion for summary judgment that U.S. Patent No. 6,425,035 and U.S. Patent No. 5,941,972 are invalid... (mc2) [Entry date 07/01/04]

07/01/2004 92 Order granting motion to seal exhibits 14 and 17 accompanying Dot Hill's motion for summary judgment... [84-1] signed by Honorable Sam Sparks (mc2) [Entry date 07/01/04]

07/02/2004 93 Motion by Crossroads Systems to extend time to respond to DOT Hill Systems Corp's msg (td) [Entry date 07/06/04]

07/06/2004 94 Order granting motion for Joseph P. Reid to appear pro hac vice [89-1] signed by Honorable Sam Sparks (mc2) [Entry date 07/07/04]

07/07/2004 95 Order granting motion to seal Exhibit A to Exhibit 4 accompanying Dot Hill's motion for summary judgment that U.S. Patent No. 6,425,035 and U.S. Patent No. 5,941,972 are invalid... [91-1] signed by Honorable Sam Sparks (mc2) [Entry date 07/07/04]

07/09/2004 96 Order granting motion to extend time to respond to DOT Hill Systems Corp's msg [93-1] until 11 days after last of depositions of Ellen Lary, Richard Lary, and Diana Hsueh-Ying Shen is completed, signed by Honorable Sam Sparks (mc2) [Entry date 07/09/04]

07/09/2004 -- Pro hac vice fee paid by Joseph P. Reid with Amount: \$ 25.00, Receipt # 360959. (mc2) [Entry date 07/12/04]

07/16/2004 97 Notice of filing of Joint Submission of Preliminary Claim Chart by Crossroads Systems (, Dot Hill Systems Cor, FalconStor Software (dm) [Entry date 07/20/04]

07/19/2004 98 Answer by FalconStor Software to counterclaim [87-1] (mc2) [Entry date 07/21/04]

07/19/2004 98 Counterclaim by FalconStor Software against Crossroads Systems (mc2) [Entry date 07/21/04]

07/21/2004 99 Order that Dot Hill Systems retrieve from chambers posthaste boxes of reexamination petition delivered on 7/21/04, signed by Honorable Sam Sparks (mc2) [Entry date 07/21/04]

07/28/2004 100 Answer by Crossroads Systems to counterclaim [98-1] (mc2) [Entry date 07/29/04]

07/28/2004 101 Opening claim construction Brief by Dot Hill Systems Cor, FalconStor Software (mc2) [Entry date 07/29/04]

07/28/2004 102 Joint motion by Crossroads Systems, Dot Hill Systems Cor, FalconStor Software for leave to file Markman briefs in excess of page limit (mc2) [Entry date 07/29/04]

07/28/2004 103 Markman Brief by Crossroads Systems (mc2) [Entry date 07/29/04]

07/30/2004 104 Order granting joint motion for leave to file Markman briefs in excess of page limit [102-1] signed by Honorable Sam Sparks (mc2) [Entry date 08/02/04]

08/03/2004 105 Motion by Crossroads Systems to compel production of documents from Dot Hill (with attached declaration of Matthew Bernstein in support of motion filed under seal) (mc2) [Entry date 08/04/04]

08/03/2004 106 Unopposed Motion by Crossroads Systems to seal declaration of Matthew C. Bernstein in support of its motion to compel production of documents (mc2) [Entry date 08/04/04]

08/03/2004 107 Unopposed Motion by Crossroads Systems for leave to file motion to compel in excess of page limit (mc2) [Entry date 08/04/04]

08/04/2004 108 Advisory to the court filed by Dot Hill Systems Cor - notice of change of firm name; new name: Wang, Hartmann & Gibbs, P.C. (mc2) [Entry date 08/05/04]

08/04/2004	109	Order granting motion for leave to file motion to compel in excess of page limit [107-1] signed by Honorable Sam (mc2) [Entry date 08/05/04]
08/10/2004	110	Motion by Crossroads Systems (for (Barry K. Shelton) to appear pro hac vice (dm) [Entry date 08/12/04]
08/11/2004	111	Order granting motion for (Barry K. Shelton) to appear pro hac vice [110-1] signed by Honorable Sam Sparks (dm) [Entry date 08/12/04]
08/11/2004	112	Responsive Claim Construction Brief of Dot Hill Systems Cor, FalconStor Software (dm) [Entry date 08/12/04]
08/11/2004	113	Exhibits in support of the responsive claim construction brief of Dot Hill Systems Cor, FalconStor Software (dm) [Entry date 08/12/04]
08/11/2004	114	Joint motion by Crossroads Systems (, Dot Hill Systems Cor for leave to file responsive Markman brief in excess of page limit (dm) [Entry date 08/13/04]
08/11/2004	115	Response by Crossroads Systems (to Dot Hill Systems Corporation's Claim Construction brief [112-1] (dm) [Entry date 08/13/04]
08/16/2004	116	Opposition of Dot Hill Systems Corporation to Crossroads' motion to compel production of documents (with attached declaration of Matthew Bernstein in support of motion filed under seal) [105-1] (dm) [Entry date 08/17/04]
08/16/2004	117	Order granting motion to seal declaration of Matthew C. Bernstein in support of its motion to compel production of documents [106-1] signed by Honorable Sam Sparks (dm) [Entry date 08/17/04]
08/17/2004	--	Pro hac vice fee paid by Barry K. Shelton with Amount: \$ 25.00 Receipt # 361508 (dm) [Entry date 08/25/04]
08/18/2004	118	Order granting joint motion for leave to file responsive Markman brief in excess of page limit [114-1] signed by Honorable Sam Sparks (dm) [Entry date 08/18/04]
08/23/2004	119	Order granting motion for leave to file - to supplement documents filed in support of its motion for summary judgment that U.S. Patent No. 6,425,035 and U.S. Patent No. 5,941,972 are invalid [90-1] signed by Honorable Sam Sparks (dm) [Entry date 08/24/04]
08/24/2004	120	Motion by Crossroads Systems (for leave to file second amended complaint (dm) [Entry date 08/25/04]
08/24/2004	--	Received Stipulation and Order of Dismissal of Claims between Crossroads Systems (Texas), Inc. and Falconstor Software, inc. (dm) [Entry date 08/25/04]
08/27/2004	121	Order Motion hearing on motion to compel production of documents from Dot Hill (with attached declaration of Matthew Bernstein in support of motion filed under seal) [105-1] for 9:00 9/9/04 signed by Honorable Sam Sparks (dm) [Entry date 08/30/04]
08/27/2004	123	Order granting motion for leave to file second amended complaint [120-1], therefore ordered that plaintiff Crossroads Systems second amended complaint for patent infringement shall be deemed filed, served and effective as of the date below... signed by Honorable Sam Sparks (dm) [Entry date 08/30/04]
08/27/2004	124	Unopposed Motion by Crossroads Systems (for leave to file reply brief in support of motion to compel in excess of page limit (dm) [Entry date 08/30/04]
08/27/2004	125	Crossroads Systems Inc's Reply brief in support of its Motion to Compel the Production of Documents . (dm) [Entry date 08/30/04]
08/27/2004	126	Motion by Crossroads Systems (to seal declaration of Tracy L. McCreight in support of Crossroads Systems Inc.'s reply brief in support of its motion to compel the production of documents (dm) [Entry date 08/30/04]
08/27/2004	127	Sealed document, declaration of Tracy L. McCreight in support of Crossroads systems Inc.'s reply brief in support of its motion to compel the production of documents, placed in vault (dm) [Entry date 08/30/04]
08/27/2004	122	Stipulation an Order of Dismissal of Claims between Crossroads Systems Inc. and Falconstor Software, Inc. signed by Honorable Sam Sparks (dm) [Entry date 08/30/04]
08/30/2004	128	Minutes of proceedings for Markman Hearing conducted on August 30, 2004 by Judge Sparks. Court Reporter: Lily Reznik (dm) [Entry date 09/01/04] [Edit date 09/02/04]
08/30/2004	--	Miscellaneous hearing (Markman Hearing) held, parties announce ready, statements and arguments of counsel heard, testimony heard on behalf on plaintiff/defendant, witnesses sworn, evidence submitted on behalf of plaintiff/defendant, court exhibit filed, parties rest, closing argument heard, recommendations, special master will review evidence and submit draft to parties, invite briefs and submit final recommendation prior to December, parties to provide Ms. Sims with prosecution history when it becomes available. (dm) [Entry date 09/01/04]
08/30/2004	129	Minutes of proceedings for miscellaneous hearing conducted on August 30, 2004 by Judge Bayer. Court Reporter: no transcript made (dm) [Entry date 09/01/04] [Edit date 09/02/04]

08/30/2004 -- Miscellaneous hearing held, tutorial held in courtroom in absence of record (dm) [Entry date 09/01/04]

08/30/2004 130 Combined Witness and Exhibit List by Crossroads Systems (, Dot Hill Systems Cor (dm) [Entry date 09/01/04] [Edit date 09/02/04]

08/30/2004 -- Exhibits by Dot Hill Systems Cor (dm) [Entry date 09/20/04]

08/30/2004 -- Exhibits by Crossroads Systems (, Dot Hill Systems Cor (dm) [Entry date 09/20/04]

08/31/2004 131 Stipulated definitions of claim terms filed by Crossroads Systems (, Dot Hill Systems Cor (dm) [Entry date 09/01/04] [Edit date 09/02/04]

09/03/2004 132 Motion by Dot Hill Systems Cor for (Richard Franklin Cauley) to appear pro hac vice (dm) [Entry date 09/07/04]

09/03/2004 133 Notice of Stipulation regarding Dot Hill Systems Corp.'s Axis Storage Manager and RAIDarPS Products filed by Crossroads Systems (, Dot Hill Systems Cor (dm) [Entry date 09/07/04]

09/03/2004 -- Pro hac vice fee paid by Richard Franklin Cauley with Amount: \$ 25.00 receipt #361713 (mc1) [Entry date 09/13/04]

09/07/2004 134 Order granting motion to seal declaration of Tracy L. McCreight in support of Crossroads Systems Inc.'s reply brief in support of its motion to compel the production of documents [126-1] signed by Honorable Sam Sparks (mc2) [Entry date 09/07/04]

09/07/2004 135 Order granting motion for leave to file reply brief in support of motion to compel in excess of page limit [124-1] signed by Honorable Sam Sparks (mc2) [Entry date 09/07/04]

09/09/2004 136 Minutes of proceedings for Motion hearing conducted on September 9, 2004 by Judge Sparks. Court Reporter: Lily Reznik (dm) [Entry date 09/09/04]

09/09/2004 -- Motion hearing held on following motion: Crossroads Systems Motion to Compel #105, parties announce ready, pro hac motion granted for Richard F. Cauley, statements and arguments of counsel heard, motions granted in part, supplemental briefs due by 5:00pm on October 1, responses due by 5:00pm on Oct. 15, written order forthcoming, court permits deposition of Ms. Greenburg (dm) [Entry date 09/10/04]

09/10/2004 137 Order granting motion for (Richard Franklin Cauley) to appear pro hac vice [132-1] signed by Honorable Sam Sparks (dm) [Entry date 09/10/04]

09/10/2004 138 Transcript filed for dates of 8/30/04 (Proceedings Transcribed: Markman Hearing before Special Master Karl Bayer) (Court Reporter: L. Reznik) (mc1) [Entry date 09/13/04]

09/13/2004 139 Answer by Dot Hill Systems Cor to amended complaint; jury demand (mc1) [Entry date 09/14/04]

09/13/2004 140 Amended counterclaim by Dot Hill Systems Cor : counterclaim [17-2] (mc1) [Entry date 09/14/04]

09/14/2004 141 Transcript filed for date of 9/9/04 (Proceedings Transcribed: motion to compel hearing) (Court Reporter: Lily Reznik.) (mc2) [Entry date 09/14/04]

09/14/2004 142 Order granting in part, denying in part motion to compel production of documents from Dot Hill [105-1], and that the parties have until 5:00 p.m. on 10/1/04 to file any post-Markman hearing briefs, and they have until 5:00 p.m. on 10/15/04 to file any responses thereto, signed by Honorable Sam Sparks (mc2) [Entry date 09/14/04]

09/14/2004 143 Stipulation and Order regarding Dot Hill Systems Corporation's Axis Storage Manager and RAIDarPS Products, signed by Honorable Sam Sparks (mc2) [Entry date 09/14/04]

09/15/2004 -- Received Stipulation of Dismissal of Dot Hill System Corporation's Claims against Falconstor Software, inc. (dm) [Entry date 09/16/04]

09/17/2004 144 Stipulation of dismissal of Dot Hill System Corporation's claims against Falconstor Software, Inc. (dm) [Entry date 09/20/04]

09/17/2004 145 Motion and order by Crossroads Systems and Dot Hill Systems (regarding Crossroad's response deadline and Dot Hill Systems Cor reply deadline with respect to Dot Hill's pending motion for summary judgment (dm) [Entry date 09/20/04]

09/20/2004 146 Motion by Crossroads Systems (to compel the testimony of Diana Shen, Ellen Lary, and Richard Lary (dm) [Entry date 09/21/04]

09/20/2004 147 Motion by Crossroads Systems (to seal declaration of Barry K. Shelton in support of Crossroads Systems (Texas) Inc.'s motion to compel the testimony of Diana Shen, Ellen Lary, and Richard Lary (dm) [Entry date 09/21/04]

09/20/2004 148 Sealed document (Declaration of Barry K. Shelton in Support of Crossroads Systems (Texas), Inc.'s motion to compel the testimony of Diana Shen, Ellen Lary, and Richard Lary), placed in vault (dm) [Entry date 09/21/04]

09/23/2004 149 Order granting motion re: Crossroads' response deadline and Dot Hill's reply deadline with respect to Dot Hill's pending motion for summary judgment [145-1] signed by Honorable Sam Sparks (dm) [Entry date 09/23/04]

- 09/23/2004 150 Order granting motion to seal declaration of Barry K. Shelton in support of Crossroads Systems (Texas) Inc.'s motion to compel the testimony of Diana Shen, Ellen Lary, and Richard Lary [147-1] signed by Honorable Sam Sparks (dm) [Entry date 09/23/04]
- 09/27/2004 151 Motion by Dot Hill Systems Cor to exceed page limits for its motion for bifurcation of liability and damages/willfulness issues and brief in support thereof (dm) [Entry date 09/28/04]
- 09/27/2004 152 Motion by Dot Hill Systems Cor for bifurcation of liability and damages/willfulness issues, and brief in support thereof (dm) [Entry date 09/28/04]
- 09/27/2004 153 Response by Crossroads Systems (in opposition to motion for summary judgment that U.S. Patent No. 6,425,035 and U.S. Patent No. 5,941,972 are invalid pursuant to 35 USC Sec. 102 and/or 103 in view of prior development of Digital Equipment Corp HSZ70 controller (with attached exhibits 14 and 17 submitted and maintained under seal) [85-1] (dm) [Entry date 09/28/04]
- 09/27/2004 154 Motion by Crossroads Systems (for leave to file opposition to Dot Hill's motion for summary judgment that U.S. patent no. 6,425,035 and U.S. patent no. 5,941,972 are invalid pursuant to U.S. C. 102 and/or 103 in view of the prior development of the digital equipment corporation HSZ70 controller in excess of page limit (dm) [Entry date 09/28/04]
- 09/27/2004 155 Unopposed Motion by Crossroads Systems (to seal: Declaration of Barry K. Shelton in support of Crossroads Systems' opposition to Dot Hill's motion for summary judgment that U.S. patent no. 6,425,035 and U.S. patent no. 5,941,972 are invalid pursuant to U.S. C. 102 and/or 103 in view of the prior development of the digital equipment corporation HSZ70 controller (dm) [Entry date 09/28/04]
- 09/27/2004 156 Sealed document, Declaration of Barry K. Shelton in support of Crossroads Systems' opposition to Dot Hill's motion for summary judgment that U.S. patent no. 6,425,035 and U.S. patent no. 5,941,972 are invalid pursuant to U.S.C. 102 and/or 103 in view of the prior development of the digital equipment corporation HSZ70 controller, placed in vault (dm) [Entry date 09/28/04]
- 09/28/2004 157 Advisory to the court of certification of the Greenberg law firm, filed by Dot Hill Systems Cor (dm) [Entry date 09/29/04]
- 09/28/2004 158 Advisory to the court of certification of Morgan & Finnegan LLP, filed by Dot Hill Systems Cor (dm) [Entry date 09/29/04]
- 09/29/2004 159 Order granting motion to exceed page limits for its motion for bifurcation of liability and damages/willfulness issues and brief in support thereof [151-1] signed by Honorable Sam Sparks (dm) [Entry date 09/29/04]
- 09/29/2004 160 Motion by Dot Hill Systems Cor for (Natu J. Patel) to withdraw as attorney for defendant Dot Hill Systems Corporation (dm) [Entry date 10/01/04]
- 09/30/2004 161 Response by Dot Hill Systems Cor in opposition to motion to compel the testimony of Diana Shen, Ellen Lary, and Richard Lary [146-1] (dm) [Entry date 10/01/04]
- 09/30/2004 162 Motion by Dot Hill Systems Cor to file under seal: declaration of Jason B. Witten in support of Dot Hills' opposition to crossroads' motion to compel the testimony of Diana Shen, Ellen Lary and Richard Lary (dm) [Entry date 10/01/04]
- 09/30/2004 163 Motion by Dot Hill Systems Cor for leave to file opposition to motion to compel the testimony of Diana Shen, Ellen Lary, and Richard Lary in excess of page limit (dm) [Entry date 10/01/04]
- 09/30/2004 176 Sealed document, declaration of Jason B. Witten in support of Dot Hills' Opposition to Crossroads' motion to compel the testimony of Diana Shen, Ellen Lary and Richard Lary, placed in vault (dm) [Entry date 10/05/04]
- 10/01/2004 164 Response by Crossroads Systems (to amended counterclaim for declaratory judgment of noninfringement, invalidity and inequitable conduct [140-1] (dm) [Entry date 10/05/04]
- 10/01/2004 165 Motion by Dot Hill Systems Cor for leave to file Post Markman hearing claim construction brief of Dot Hill Systems Corporation in excess of page limit (dm) [Entry date 10/05/04]
- 10/01/2004 166 Motion by Dot Hill Systems Cor for leave to file under seal: declaration of Jason B. Witten in support of post markman hearing claim construction brief of Dot Hill Systems (dm) [Entry date 10/05/04]
- 10/01/2004 167 Sealed document, declaration of Jason B. Witten in support of post markman hearing claim construction brief of Dot Hill Systems corporation, placed in vault (dm) [Entry date 10/05/04]
- 10/01/2004 168 Post-Hearing Markman Brief by Crossroads Systems (dm) [Entry date 10/05/04]
- 10/01/2004 169 Declaration of Barry K. Shelton in support of Crossroads Systems' post-hearing Markman Brief (doc. #176) (dm) [Entry date 10/05/04]
- 10/01/2004 170 Unopposed Motion by Crossroads Systems (for leave to file Crossroads Systems Inc.'s corrected opposition to Dot Hill Systems Corp's motion for summary judgment for invalidity of U.S. patent nos. 6,423,035 and 5,941,972 (dm) [Entry date 10/05/04]
- 10/01/2004 171 Motion by Crossroads Systems (for leave to file corrected opposition to Dot Hill's motion for summary judgment... (dm) [Entry date 10/05/04]
- 10/01/2004 172 Motion by Crossroads Systems (to file under seal: declaration of Barry K. Shelton in support of Crossroads systems' corrected opposition to Dot Hill's motion for summary judgment... (dm) [Entry

- date 10/05/04]
- 10/01/2004 173 Motion by Crossroads Systems (for leave to file declaration of Barry K. Shelton in support of Crossroads Systems Inc.'s corrected opposition to Dot Hill Systems Corporation's motion for summary judgment for invalidity of U.S. patent nos. 6,423,035 and 5,941,972 (dm) [Entry date 10/05/04]
- 10/01/2004 174 Declaration of Barry K. Shelton (in support of motion to file under seal: declaration of Barry K. Shelton in support of Crossroads systems' corrected opposition to Dot Hill's motion for summary judgment... [172-1] (dm) [Entry date 10/05/04]
- 10/01/2004 175 Post Markman Hearing Claim Construction Brief by Dot Hill Systems Cor (dm) [Entry date 10/05/04]
- 10/04/2004 177 Order granting motion for leave to file opposition to motion to compel the testimony of Diana Shen, Ellen Lary, and Richard Lary in excess of page limit [163-1] signed by Honorable Sam Sparks (dm) [Entry date 10/05/04]
- 10/05/2004 178 Order granting motion for leave to file Post Markman hearing claim construction brief of Dot Hill Systems Corporation in excess of page limit [165-1] signed by Honorable Sam Sparks (dm) [Entry date 10/06/04]
- 10/05/2004 179 Order granting motion for leave to file corrected opposition to Dot Hill's motion for summary judgment... [171-1] signed by Honorable Sam Sparks (dm) [Entry date 10/06/04]
- 10/05/2004 180 Order granting motion for (Natu J. Patel) to withdraw as attorney [160-1] (Terminated attorney Natu J. Patel for Dot Hill Systems Cor, attorney Natu J. Patel for Dot Hill Systems Cor, attorney Natu J. Patel for Dot Hill Systems Cor signed by Honorable Sam Sparks (dm) [Entry date 10/06/04]
- 10/05/2004 181 Order granting motion to file under seal: declaration of Jason B. Witten in support of Dot Hills' opposition to crossroads' motion to compel the testimony of Diana Shen, Ellen Lary and Richard Lary [162-1] signed by Honorable Sam Sparks (dm) [Entry date 10/06/04]
- 10/05/2004 182 Order granting filing of declaration of Barry K. Shelton in support of Crossroads Systems corrected opposition... [174-1] signed by Honorable Sam Sparks (dm) [Entry date 10/06/04]
- 10/05/2004 183 Order granting motion for leave to file Crossroads Systems Inc.'s corrected opposition to Dot Hill Systems Corp's motion for summary judgment for invalidity of U.S. patent nos. 6,423,035 and 5,941,972 [170-1] signed by Honorable Sam Sparks (dm) [Entry date 10/06/04]
- 10/05/2004 184 Order granting motion for leave to file declaration of Barry K. Shelton in support of Crossroads Systems Inc.'s corrected opposition to Dot Hill Systems Corporation's motion for summary judgment for invalidity of U.S. patent nos. 6,423,035 and 5,941,972 [173-1] signed by Honorable Sam Sparks (dm) [Entry date 10/06/04]
- 10/05/2004 185 Order granting motion for leave to file under seal: declaration of Jason B. Witten in support of post markman hearing claim construction brief of Dot Hill Systems [166-1] signed by Honorable Sam Sparks (dm) [Entry date 10/06/04]
- 10/05/2004 186 Response by Crossroads Systems (in opposition to motion for summary judgment that U.S. Patent No. 6,425,035 and U.S. Patent No. 5,941,972 are invalid pursuant to 35 USC Sec. 102 and/or 103 in view of prior development of Digital Equipment Corp HSZ70 controller (with attached exhibits 14 and 17 submitted and maintained under seal) [85-1] (dm) [Entry date 10/06/04]
- 10/05/2004 -- Mooted motions motion to file under seal: declaration of Barry K. Shelton in support of Crossroads systems' corrected opposition to Dot Hill's motion for summary judgment... [172-1], motion granted in order (doc. #184) (dm) [Entry date 01/28/05]
- 10/08/2004 187 Motion by Crossroads Systems (for leave to file its opposition to Dot Hill's motion for bifurcation of liability and damages/willfulness issues in excess of page limit (dm) [Entry date 10/12/04]
- 10/08/2004 188 Response by Crossroads Systems (in opposition to motion for bifurcation of liability and damages/willfulness issues, and brief in support thereof [152-1] (dm) [Entry date 10/12/04]
- 10/12/2004 189 Motion by Dot Hill Systems Cor for leave to file motion to stay in excess of page limit (dm) [Entry date 10/12/04]
- 10/12/2004 190 Motion by Dot Hill Systems Cor to stay (dm) [Entry date 10/12/04]
- 10/12/2004 191 Declaration of Jason B. Witten by Dot Hill Systems Cor in support of motion to stay or administratively terminate [190-1] (dm) [Entry date 10/12/04]
- 10/12/2004 192 Order granting motion for leave to file opposition to Dot Hill's motion for summary judgment that U.S. patent no. 6,425,035 and U.S. patent no. 5,941,972 are invalid pursuant to U.S. C. 102 and/or 103 in view of the prior development of the digital equipment corporation HSZ70 controller in excess of page limit [154-1] signed by Honorable Sam Sparks (dm) [Entry date 10/12/04]
- 10/12/2004 193 Order granting motion to seal: Declaration of Barry K. Shelton in support of Crossroads Systems' opposition to Dot Hill's motion for summary judgment that U.S. patent no. 6,425,035 and U.S. patent no. 5,941,972 are invalid pursuant to U.S. C. 102 and/or 103 in view of the prior development of the digital equipment corporation HSZ70 controller [155-1] signed by Honorable Sam Sparks (dm) [Entry date 10/13/04]
- 10/12/2004 194 Response by Crossroads Systems (in support of motion to compel the testimony of Diana Shen, Ellen

- Lary, and Richard Lary [146-1] (dm) [Entry date 10/13/04]
- 10/12/2004 195 Declaration of Barry K. Shelton by Crossroads Systems (in support of reply in support of its motion to compel... [194-1] (dm) [Entry date 10/13/04]
- 10/12/2004 196 Motion by Crossroads Systems (for leave to file its reply in support of its motion to compel the testimony of Diana Shen, Ellen Lary, and Richard Lary in excess of page limit (dm) [Entry date 10/13/04]
- 10/13/2004 197 Emergency Motion by Dot Hill Systems Cor to compel testimony of Crossroads' expert Paul Hodges (dm) [Entry date 10/13/04]
- 10/13/2004 198 Motion by Dot Hill Systems Cor for leave to appear by telephone at hearing on Dot Hill's emergency motion to compel testimony of Crossroads' expert Paul Hodges (dm) [Entry date 10/13/04]
- 10/13/2004 199 Amended emergency motion by Dot Hill Systems Cor : to compel amending motion to compel testimony of Crossroads' expert Paul Hodges [197-1] (dm) [Entry date 10/14/04]
- 10/13/2004 200 Order granting motion for leave to file motion to stay in excess of page limit [189-1] signed by Honorable Sam Sparks (dm) [Entry date 10/14/04]
- 10/13/2004 201 Order granting motion for leave to file its opposition to Dot Hill's motion for bifurcation of liability and damages/willfulness issues in excess of page limit [187-1] signed by Honorable Sam Sparks (dm) [Entry date 10/14/04]
- 10/13/2004 202 Order set miscellaneous hearing on all pending matters at 1:30 10/15/04 signed by Honorable Sam Sparks (dm) [Entry date 10/14/04]
- 10/14/2004 203 Order granting motion for leave to file its reply in support of its motion to compel the testimony of Diana Shen, Ellen Lary, and Richard Lary in excess of page limit [196-1] signed by Honorable Sam Sparks (dm) [Entry date 10/14/04]
- 10/14/2004 204 Response by Crossroads Systems (in opposition to motion to compel testimony of Crossroads' expert Paul Hodges [197-1], amended motion to compel [199-1] (dm) [Entry date 10/15/04]
- 10/14/2004 205 Declaration of Barry K. Shelton by Crossroads Systems (in support of opposition to Dot Hill's emergency motion to compel testimony of Crossroads' expert Paul Hodges [204-1] (dm) [Entry date 10/15/04]
- 10/14/2004 206 Response by Dot Hill Systems Cor in support of motion for bifurcation of liability and damages/willfulness issues, and brief in support thereof [152-1] (dm) [Entry date 10/15/04]
- 10/14/2004 207 Order granting motion for leave to appear by telephone at hearing on Dot Hill's emergency motion to compel testimony of Crossroads' expert Paul Hodges [198-1] signed by Honorable Sam Sparks (dm) [Entry date 10/15/04]
- 10/15/2004 208 Reply by Dot Hill Systems Cor to response to motion to compel testimony of Crossroads' expert Paul Hodges [197-1], amended motion to compel [199-1] (dm) [Entry date 10/15/04]
- 10/15/2004 209 Motion by Dot Hill Systems Cor for leave to file responsive brief to Crossroads' post-hearing markman brief in excess of page limit (dm) [Entry date 10/15/04]
- 10/15/2004 210 Responsive Brief by Dot Hill Systems Cor regarding: Crossroads' post-hearing markman brief [168-1] (dm) [Entry date 10/15/04]
- 10/15/2004 211 Minutes of proceedings for misc. hearing conducted on 10/15/04 by Judge Sparks. Court Reporter: Lily Reznik (dm) [Entry date 10/18/04]
- 10/15/2004 -- Miscellaneous hearing (on all pending matters) held, parties announce ready, statements and arguments of counsel heard, motion granted #146, motion denied #190, 152, and 199, written order forthcoming (dm) [Entry date 10/18/04]
- 10/15/2004 212 Motion by Crossroads Systems (for leave to file its reply to post markman hearing claim construction brief of Dot Hill Systems Corporation in excess of page limit (dm) [Entry date 10/18/04]
- 10/15/2004 213 Motion by Crossroads Systems (to file under seal: reply to post markman hearing claim construction brief of Dot Hill Systems Corporation (dm) [Entry date 10/18/04]
- 10/15/2004 214 Sealed document, Crossroads Systems Inc.'s reply to post markman hearing claim construction brief of Dot Hill Systems, placed in vault (dm) [Entry date 10/18/04]
- 10/15/2004 215 Motion by Crossroads Systems (to seal declaration of Barry K. Shelton in support of Crossroads Systems Inc.'s reply to post markman hearing claim construction brief of Dot Hill Systems Corporation (dm) [Entry date 10/18/04]
- 10/15/2004 216 Sealed document, declaration of Barry K. Shelton in support of Crossroads Systems Inc.'s reply to post markman hearing claim construction brief of Dot Hill Systems Corporation, placed in vault (dm) [Entry date 10/18/04]
- 10/18/2004 217 Order granting motion for leave to file its reply to post markman hearing claim construction brief of Dot Hill Systems Corporation in excess of page limit [212-1] signed by Honorable Sam Sparks (dm) [Entry date 10/19/04]
- 10/18/2004 218 Order granting motion for leave to file responsive brief to Crossroads' post-hearing markman brief in

excess of page limit [209-1] signed by Honorable Sam Sparks (dm) [Entry date 10/19/04]

10/18/2004 219 Order denying amended motion to compel [199-1] denying motion for bifurcation of liability and damages/willfulness issues, and brief in support thereof [152-1] denying motion to stay [190-1] granting motion to compel the testimony of Diana Shen, Ellen Lary, and Richard Lary [146-1] signed by Honorable Sam Sparks (dm) [Entry date 10/19/04]

10/18/2004 -- Mooted motions motion to compel testimony of Crossroads' expert Paul Hodges [197-1] (dm) [Entry date 10/19/04]

10/19/2004 220 Motion by Crossroads Systems (for (J. Eric Elliff) to appear pro hac vice (dm) [Entry date 10/20/04]

10/20/2004 221 Order granting motion for (J. Eric Elliff) to appear pro hac vice [220-1] signed by Honorable Sam Sparks (td) [Entry date 10/21/04]

10/20/2004 222 Order granting motion to seal declaration of Barry K. Shelton in support of Crossroads Systems Inc.'s reply to post markman hearing claim construction brief of Dot Hill Systems Corporation [215-1] signed by Honorable Sam Sparks (td) [Entry date 10/21/04]

10/20/2004 223 Order granting motion to file under seal: reply to post markman hearing claim construction brief of Dot Hill Systems Corporation [213-1] signed by Honorable Sam Sparks (td) [Entry date 10/21/04]

10/25/2004 -- Pro hac vice fee paid byJ. Eric Elliff with Amount: \$ 25.00 Receipt # 362493 (dm) [Entry date 11/03/04]

11/09/2004 224 Motion by Dot Hill Systems Cor for leave to file reply to opposition to motion for summary judgment that U.S. patent no. 6,425,035 and U.S. patent no. 5,941,972 are invalid.. (dm) [Entry date 11/15/04]

11/09/2004 225 Motion by Dot Hill Systems Cor to seal declaration of Jason B. Witten in support of Dot Hill's reply to opposition to motion for summary judgment that U.S. patent no. 6,425,035 and U.S. patent no. 5,941,972 are invalid.. (dm) [Entry date 11/15/04]

11/09/2004 226 Reply Brief by Dot Hill Systems Cor regarding: motion for summary judgment that U.S. Patent No. 6,425,035 and U.S. Patent No. 5,941,972 are invalid pursuant to 35 USC Sec. 102 and/or 103 in view of prior development of Digital Equipment Corp HSZ70 controller (with attached exhibits 14 and 17 submitted and maintained under seal) [85-1] (dm) [Entry date 11/15/04]

11/09/2004 227 Declaration of Jason B. Witten by Dot Hill Systems Cor in support of motion for summary judgment that U.S. Patent No. 6,425,035 and U.S. Patent No. 5,941,972 are invalid pursuant to 35 USC Sec. 102 and/or 103 in view of prior development of Digital Equipment Corp HSZ70 controller (with attached exhibits 14 and 17 submitted and maintained under seal) [85-1] (dm) [Entry date 11/15/04]

11/10/2004 228 Order granting motion for leave to file reply to opposition to motion for summary judgment that U.S. patent no. 6,425,035 and U.S. patent no. 5,941,972 are invalid.. [224-1] signed by Honorable Sam Sparks (dm) [Entry date 11/15/04]

11/12/2004 229 Motion by Dot Hill Systems Cor for leave to file corrected reply brief in support of Dot Hill's motion for summary judgment that U.S. patent no. 6,425,035 and U.S. patent no. 5,941,972 are invalid... (dm) [Entry date 11/15/04]

11/15/2004 230 Order granting motion to seal declaration of Jason B. Witten in support of Dot Hill's reply to opposition to motion for summary judgment that U.S. patent no. 6,425,035 and U.S. patent no. 5,941,972 are invalid.. [225-1] signed by Honorable Sam Sparks (dm) [Entry date 11/16/04]

11/16/2004 231 Order granting motion for leave to file corrected reply brief in support of Dot Hill's motion for summary judgment that U.S. patent no. 6,425,035 and U.S. patent no. 5,941,972 are invalid... [229-1] signed by Honorable Sam Sparks (dm) [Entry date 11/16/04]

11/24/2004 232 Motion by Crossroads Systems (for leave to file a surreply in opposition to DOT Hill Systems Corp.'s motion for summary judgment for invalidity of U.S. Patent # 6,423,035 and 5,941,972 (received Surreply and declaration) (mc1) [Entry date 11/29/04]

11/30/2004 233 Order granting motion for leave to file a surreply in opposition to DOT Hill Systems Corp.'s motion for summary judgment for invalidity of U.S. Patent # 6,423,035 and 5,941,972 [232-1] signed by Honorable Sam Sparks (mc2) [Entry date 11/30/04]

11/30/2004 234 Surreply - Response by Crossroads Systems (to motion for summary judgment that U.S. Patent No. 6,425,035 and U.S. Patent No. 5,941,972 are invalid pursuant to 35 USC Sec. 102 and/or in view of prior development of Digital Equipment Corp controller [85-1] (mc2) [Entry date 11/30/04]

12/02/2004 235 Motion by Dot Hill Systems Cor for leave to file Dot Hill's response to Crossroads' surreply in support of Dot Hill's motion for summary judgment (dm) [Entry date 12/06/04]

12/02/2004 236 Motion by Dot Hill Systems Cor for leave to file Dot Hill's response to Crossroads' surreply in support of Dot Hill's motion for summary judgment (dm) [Entry date 12/06/04]

12/02/2004 237 Response by Dot Hill Systems Cor to Crossroads' surreply in support of Dot Hill's motion for summary judgment [234-1] (dm) [Entry date 12/06/04]

12/10/2004 238 Order granting motion for leave to file Dot Hill's response to Crossroads' surreply in support of Dot Hill's motion for summary judgment [236-1] signed by Honorable Sam Sparks (dm) [Entry date

12/13/04]

12/10/2004 239 Order granting motion for leave to file Dot Hill's response to Crossroads' surreply in support of Dot Hill's motion for summary judgment [235-1] signed by Honorable Sam Sparks (dm) [Entry date 12/13/04]

01/05/2005 240 Notice of attorney appearance for Crossroads Systems (, by John Michael Guaragna (mc2) [Entry date 01/06/05] [Edit date 01/06/05]

01/05/2005 242 Motion by Crossroads Systems (for Raymond W. Mort, III to appear pro hac vice (mc2) [Entry date 01/06/05]

01/06/2005 241 Advisory to the court filed by Crossroads Systems (- notice of change of firm name and removal of counsel for plaintiff. (mc2) [Entry date 01/06/05]

01/07/2005 243 Order granting motion for Raymond W. Mort, III to appear pro hac vice [242-1] signed by Honorable Sam Sparks (dm) [Entry date 01/10/05]

01/13/2005 -- Pro hac vice fee paid by Raymond W. Mort with Amount: \$ 25.00 Receipt # 363826 (dm) [Entry date 01/18/05]

01/19/2005 244 Motion by Crossroads Systems (for Darius C. Gambino to appear pro hac vice (dm) [Entry date 01/20/05]

01/21/2005 245 Report and recommendation of Special Master Karl Bayer regarding United States Patent Nos. 5,941,972 and 6,425,035 B2 (dm) [Entry date 01/24/05]

01/25/2005 246 Order granting motion for Darius C. Gambino to appear pro hac vice [244-1] signed by Honorable Sam Sparks (dm) [Entry date 01/25/05]

01/26/2005 -- Acknowledgment receipt by Alan Albright magistrate report and recommendations (dm) [Entry date 01/26/05]

01/26/2005 -- Acknowledgment receipt by Raymond Mort, John Guaragna, Barry Shelton & Tacy McCreight magistrate report and recommendations (dm) [Entry date 01/26/05]

01/27/2005 -- Acknowledgment receipt of Dot Hill Systems Cor magistrate report and recommendations (td) [Entry date 01/28/05]

01/27/2005 -- Pro hac vice fee paid by Darius C. Gambino with Amount: \$ 25.00 Receipt # 364027 (dm) [Entry date 02/07/05]

01/28/2005 -- Acknowledgment receipt of Dot Hill Systems Cor magistrate report and recommendations (Morgan & Finnegan) (td) [Entry date 01/28/05]

01/31/2005 247 Stipulation and Order regarding the deadline to file objections to special master's report and recommendation regarding the construction of claims in U.S. patent ... filed by Crossroads Systems (, Dot Hill Systems Cor (dm) [Entry date 02/02/05]

01/31/2005 -- Acknowledgment receipt by J. Eric Elliff magistrate report and recommendations (dm) [Entry date 02/08/05]

01/31/2005 -- Acknowledgment receipt by Franklin Gibbs, Jason Witten, Larry Severin & Richard Cauley, magistrate report and recommendations (dm) [Entry date 02/08/05]

01/31/2005 -- Acknowledgment receipt by Valerie Greenberg, magistrate report and recommendations (dm) [Entry date 02/08/05]

01/31/2005 -- Acknowledgment receipt by Joseph Reid, Matthew Bernstein, John Guist & John Allcock, magistrate report and recommendations (dm) [Entry date 02/08/05]

02/04/2005 248 Ordered that the deadline to file and serve objections to the Special Master's Report and Recommendation is Monday, February 14, 2005 and it is further ordered that the parties' Stipulation and Order regarding the deadline to file objections to the Special Mater's Report and Recommendation [#247], which the Court construes as a motion to amend the Markman scheduling order is Denied in all other respects... signed by Honorable Sam Sparks (dm) [Entry date 02/04/05]

02/04/2005 -- Acknowledgment receipt of Darius Gambino magistrate report and recommendations (dm) [Entry date 02/08/05]

02/14/2005 249 Joint Stipulation regarding deposition limits filed by Crossroads Systems (, Dot Hill Systems Cor (mc2) [Entry date 02/14/05]

02/14/2005 250 Unopposed Motion by Dot Hill Systems Cor for leave to file Dot Hill's objections to Special Master's Report and Recommendation in excess of page limit (mc2) [Entry date 02/14/05]

02/14/2005 251 Objections to report and recommendations [245-1] by Dot Hill Systems Cor (mc2) [Entry date 02/14/05]

02/17/2005 252 Motion by Dot Hill Systems Cor for Peter O. Huang to appear pro hac vice (dm) [Entry date 02/22/05]

02/22/2005 253 Response by Crossroads Systems (to report & recommendation objection [251-1] (dm) [Entry date 02/23/05]

02/22/2005 254 Order granting motion for leave to file Dot Hill's objections to Special Master's Report and

- 03/03/2005 255 Recommendation in excess of page limit [250-1] signed by Honorable Sam Sparks (dm) [Entry date 02/23/05]
- 03/03/2005 255 Motion by Crossroads Systems (for Alan D. Albright, Barry K. Shelton, John E. Guist, Matthew C. Bernstein, Joseph Reid, and Tracy L. McCreight to withdraw as attorney (dm) [Entry date 03/04/05]
- 03/03/2005 256 Motion by Dot Hill Systems Cor for a limited six month abatement (dm) [Entry date 03/07/05]
- 03/04/2005 257 Order striking motion for Peter O. Huang to appear pro hac vice [252-1] signed by Honorable Sam Sparks (dm) [Entry date 03/07/05]
- 03/07/2005 258 Motion by Dot Hill Systems Cor for Peter O. Huang to appear pro hac vice (dm) [Entry date 03/08/05]
- 03/08/2005 259 Order granting motion for Alan D. Albright, Barry K. Shelton, John E. Guist, Matthew C. Bernstein, Joseph Reid, and Tracy L. McCreight to withdraw as attorney [255-1] (Terminated attorney Alan D Albright for Crossroads Systems (, attorney John E. Giust for Crossroads Systems (, attorney Matthew C. Bernstein for Crossroads Systems (, attorney Joseph P. Reid for Crossroads Systems (, attorney Joseph P. Reid for Crossroads Systems (, attorney Alan D Albright for Crossroads Systems (, attorney Tracy L. McCreight for Crossroads Systems (, attorney John E. Giust for Crossroads Systems (, attorney Matthew C. Bernstein for Crossroads Systems (, attorney Joseph P. Reid for Crossroads Systems (, attorney Alan D Albright for Crossroads Systems (, attorney Tracy L. McCreight for Crossroads Systems (, attorney John E. Giust for Crossroads Systems (, attorney Matthew C. Bernstein for Crossroads Systems (, attorney Joseph P. Reid for Crossroads Systems (, attorney Alan D Albright for Crossroads Systems (, attorney John E. Giust for Crossroads Systems (, attorney Matthew C. Bernstein for Crossroads Systems (, attorney Barry K. Shelton for Crossroads Systems (, attorney Joseph P. Reid for Crossroads Systems (, attorney Matthew C. Bernstein for Crossroads Systems (, attorney John E. Giust for Crossroads Systems (, attorney Tracy L. McCreight for Crossroads Systems (, attorney Alan D Albright for Crossroads Systems (signed by Honorable Sam Sparks (dm) [Entry date 03/08/05]
- 03/09/2005 260 Order granting motion for Peter O. Huang to appear pro hac vice [258-1] signed by Honorable Sam Sparks (dm) [Entry date 03/09/05]
- 03/11/2005 261 Order Motion hearing motion for a limited six month abatement [256-1] for 2:00 3/17/05, motion request for judicial notice in support of its motion for summary judgment... [86-1] for 2:00 3/17/05, motion for summary judgment that U.S. Patent No. 6,425,035 and U.S. Patent No. 5,941,972 are invalid pursuant to 35 USC Sec. 102 and/or 103 in view of prior development of Digital Equipment Corp HSZ70 controller (with attached exhibits 14 and 17 submitted and maintained under seal) [85-1] for 2:00 3/17/05 signed by Honorable Sam Sparks (dm) [Entry date 03/14/05]
- 03/11/2005 -- Pro hac vice fee paid by Peter O. Huang with Amount: \$ 25.00 Receipt # 379646 (dm) [Entry date 03/17/05]
- 03/14/2005 262 Response by Crossroads Systems (in opposition to motion for a limited six month abatement [256-1] (dm) [Entry date 03/16/05]
- 03/14/2005 263 Motion by Dot Hill Systems Cor for leave to supplement its motion for a limited six month abatement (dm) [Entry date 03/16/05]
- 03/14/2005 264 Declaration of John M. Guaragna by Crossroads Systems (in support of in opposition response [262-1] (dm) [Entry date 03/16/05]
- 03/15/2005 265 Transcript filed for dates of October 15, 2004 (Proceedings Transcribed: all pending matters) (Court Reporter: Lily Reznik) (dm) [Entry date 03/16/05]
- 03/17/2005 -- Miscellaneous hearing on all pending matters held, case will be stayed for 90 days after April 7, 2005, plaintiff to copy the patent office, at the end of 90 day period parties will proceed with discovery, etc. (dm) [Entry date 03/18/05]
- 03/17/2005 266 Minutes of proceedings for motions hearing conducted on March 17, 2005 by Judge Sparks. Court Reporter: Lily Reznik (dm) [Entry date 03/18/05]
- 03/22/2005 267 Order granting motion for leave to supplement its motion for a limited six month abatement [263-1], granting in part, denying in part motion for a limited six month abatement [256-1], dismissing motion request for judicial notice in support of its motion for summary judgment... [86-1], dismissing motion for summary judgment that U.S. Patent No. 6,425,035 and U.S. Patent No. 5,941,972 are invalid pursuant to 35 USC Sec. 102 and/or 103 in view of prior development of Digital Equipment Corp HSZ70 controller (with attached exhibits 14 and 17 submitted and maintained under seal) [85-1] signed by Honorable Sam Sparks (dm) [Entry date 03/23/05]
- 03/28/2005 268 Transcript filed for dates of March 17, 2005 (Proceedings Transcribed: All Pending Matters) (Court Reporter: Lily Reznik) (dm) [Entry date 03/29/05]
- 04/12/2005 269 Letter/Correspondence submitted by Crossroads Systems (regarding: compliance with Court's March 22, 2005 order requesting that plaintiff file a copy of that order in the reexamination proceedings involving the patents-in-suit. (dm) [Entry date 04/13/05]
- 06/20/2005 270 Motion by Dot Hill Systems Cor for continued limited abatement (dm) [Entry date 06/21/05]
- 06/20/2005 271 Declaration of Richard F. Cauley in support of Dot Hill Systems Corporation's motion for continued limited abatement [270-1] (dm) [Entry date 06/21/05]

07/01/2005 272 Response by Crossroads Systems (in opposition to motion for continued limited abatement [270-1] (dm) [Entry date 07/05/05]

07/01/2005 273 Declaration of John M. Guaragna by Crossroads Systems (in support of opposition response [272-1] (dm) [Entry date 07/05/05]

07/07/2005 274 Response by Dot Hill Systems Cor in support of motion for continued limited abatement [270-1] (dm) [Entry date 07/08/05]

07/13/2005 275 Order set hearing on all pending matters at 2:00 7/21/05 signed by Honorable Sam Sparks (dm) [Entry date 07/14/05]



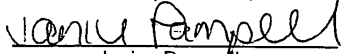
07/21/2005 -- Motion hearing held for the following motions: [270-1], announcements made, statements of counsel heard. After consideration, the Court agrees to continue the stay for 60 days. (dm) [Entry date 07/22/05]

07/21/2005 276 Minutes of proceedings for motions hearing conducted on July 21, 2005 by Judge Sparks. Court Reporter: Lily Reznik (dm) [Entry date 07/22/05]

07/26/2005 277 Order granting in part, denying in part motion for continued limited abatement [270-1], this case is stayed for an additional 60 days from the date of this order to afford the USPTO an opportunity to issue a final determination on the status of the claims of the patents-in-suit... signed by Honorable Sam Sparks (dm) [Entry date 07/26/05]

07/27/2005 278 Transcript filed for dates of July 21, 2005 (Proceedings Transcribed: Hearing on pending matters) (Court Reporter: Lily Reznik) (dm) [Entry date 07/28/05]

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*** THIS DATA IS FOR INFORMATIONAL PURPOSES ONLY ***


IN THE UNITED STATES PATENT AND TRADEMARK OFFICE		
SUBMISSION OF REFERENCES TO COMPLETE RECORD BY APPLICANTS	Atty. Docket No. (Opt.) CROSS1123-17 CROSS1123-19	
 <p>71338 U.S. PTO  09/12/05</p>	Applicants Geoffrey B. Hoese et al.	
	Application Number 90/007,125 90/007,317	Filed 07/19/2004 07/19/2004
	For Storage Router and Method for Providing Virtual Local Storage	
	Group Art Unit 2182	Examiner Alan Chen
	Certification Under 37 C.F.R. §1.8	
I hereby certify that this document is being deposited with the United States Postal Service as First Class Mail in a box addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313 on September 8, 2005.  Janice Pampell		

Commissioner for Patents
 P.O. Box 1450
 Alexandria, VA 22313

To complete the record, Applicants respectfully submit hard copies of references previously submitted on CD-ROM with an IDS dated March 23, 2005 (the "March 23 IDS"). This submission is made simply to complete the file record and is not a new IDS as the references were already provided on CD-ROM and reviewed by Examiner Fritz Fleming (a copy of the March 23 IDS was initialed by Examiner Fleming indicating that he reviewed the references).

Respectfully submitted,

Sprinkle IP Law Group
 Attorneys for Applicants


 John L. Adair
 Reg. No. 48,828

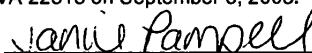
Dated: September 8, 2005
 1301 W. 25th Street, Suite 408
 Austin, TX 78705
 T. 512-637-9220 / F. 512-371-9088

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
SUBMISSION OF REFERENCES TO COMPLETE RECORD BY APPLICANTS	Atty. Docket No. (Opt.) CROSS1123-17 CROSS1123-19



Applicants Geoffrey B. Hoese et al.	
Application Number 90/007,125 90/007,317	Filed 07/19/2004 07/19/2004
For Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Alan Chen

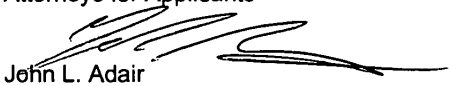
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

<u>Certification Under 37 C.F.R. §1.8</u>
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Respectfully submitted,

Sprinkle IP Law Group
Attorneys for Applicants


John L. Adair
Reg. No. 48,828

Dated: September 8, 2005
1301 W. 25th Street, Suite 408
Austin, TX 78705
T. 512-637-9220 / F. 512-371-9088

RC - exam

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
Statement of Substance of Examiner Interview	Atty. Docket No. CROSS1123-17 CROSS1123-19
Applicants Geoffrey B. Hoese, et al.	
Reexamination Control No. 90/007,125 90/007,317	Date Filed 07/19/2004
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Chen, Alan
Confirmation Number: 2304	Patent No. 6,425,035



Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

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<i>Julie H. Blackard</i> Signature	
JULIE H. BLACKARD Printed Name	

This paper is to summarize the interview conducted with Examiner Alan Chen on August 9, 2005 with Applicants' representatives including Messrs. Sprinkle, Adair and Griswold.

Attorney Docket No.

CROSS1123-17

CROSS1123-19

90/007,125

90/007,317

Customer ID: 44654

Summary

On August 9, 2005, Messrs. Steve Sprinkle, John Adair and Robert Griswold, Jr. met with Examiner Alan Chen for a personal interview. During the interview, the prior art cited in the Office Action Dated May 24, 2005, United States Patent 6,425,035 and the Reply to Office Action Under Ex Parte Reexamination Dated July 22, 2005 (the "July 22 Reply") submitted in the above referenced case were considered. No additional exhibits were shown or demonstrations conducted.

Applicants' representatives and Examiner Chen discussed claims 1, 7 and 11 of the 90/007,125 and 90/007,317 merged reexamination and Applicants' representatives summarized the July 22 Reply. In discussing the arguments of the July 22 Reply, Applicants' representatives reviewed the Spring and Oeda prior art references and discussed the terms "mapping", "access controls" and "remote". No agreement was reached.

This Summary was served via Certified Mail, R.R.R. on September 1, 2005 to:

Larry E. Severin
Wang, Hartmann & Gibbs, PC
1301 Dove Street, #1050
Newport Beach, CA 92660

William A. Blake
Jones, Tullar & Cooper, PC
P.O. Box 2226 Eads Station
Alexandria, VA

The Director of the U.S. Patent and Trademark Office is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 50-3183 of Sprinkle IP Law Group.

Respectfully submitted,

Sprinkle IP Law Group
Attorneys for Applicant



John L. Adair
Reg. No. 48,828

Date: September 1, 2005
1301 W. 25th Street, Suite 408
Austin, TX 78705
Tel. (512) 637-9223
Fax. (512) 371-9088



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
CERTIFICATE OF SERVICE	Atty Docket No. CROSS1123-17 CROSS1123-19
Mail Stop Patent Application Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450 Sir:	Application Nos. 90/007,125 filed 07/19/2004 90/007,317 filed 11/23/2004
	Applicant: Geoffrey B. Hoese
	Title: STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

I hereby certify that the attached Statement of Substance of Examiner Interview ("Statement") is being deposited with the U.S. Postal Service as First Class Mail to the Director of the U.S. Patent Office, P.O. Box 1450, Alexandria, VA 22313 on September 1, 2005. Applicant hereby states a copy of the Notification is also being served, via first class mail (Certified, R.R.R.), on:

Larry E. Severin
 Wang, Hartmann & Gibbs, PC
 1301 Dove Street, #1050
 Newport Beach, CA 92660


and

William A. Blake
 Jones, Tullar & Cooper, PC
 P.O. Box 2226 Eads Station
 Alexandria, VA 22202

As per 35 U.S.C. §1.248 service is made via first class mail (Certified, R.R.R.) on September 1, 2005.

Respectfully submitted,

Sprinkle IP Law Group


 John L. Adair
 Reg. No. 48,828

Dated: September 1, 2005

1301 W. 25th Street, Suite 408
 Austin, Texas 78705
 Tel. (512) 637-9223
 Fax. (512) 371-9088

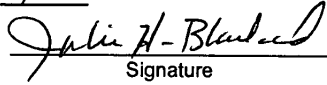

Enclosures



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
Statement of Substance of Examiner Interview	Atty. Docket No. CROSS1123-17 CROSS1123-19
Applicants Geoffrey B. Hoese, et al.	
Reexamination Control No. 90/007,125 90/007,317	Date Filed 07/19/2004
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Chen, Alan
Confirmation Number: 2304	Patent No. 6,425,035

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail to Addressee (Label No. EV616963290US) in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22312-1450 on <u>9-1-05</u>	
 Signature	
 Printed Name	

This paper is to summarize the interview conducted with Examiner Alan Chen on August 9, 2005 with Applicants' representatives including Messrs. Sprinkle, Adair and Griswold.

Summary

On August 9, 2005, Messrs. Steve Sprinkle, John Adair and Robert Griswold, Jr. met with Examiner Alan Chen for a personal interview. During the interview, the prior art cited in the Office Action Dated May 24, 2005, United States Patent 6,425,035 and the Reply to Office Action Under Ex Parte Reexamination Dated July 22, 2005 (the "July 22 Reply") submitted in the above referenced case were considered. No additional exhibits were shown or demonstrations conducted.

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Newport Beach, CA 92660

William A. Blake
Jones, Tullar & Cooper, PC
P.O. Box 2226 Eads Station
Alexandria, VA

The Director of the U.S. Patent and Trademark Office is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 50-3183 of Sprinkle IP Law Group.

Respectfully submitted,

Sprinkle IP Law Group
Attorneys for Applicant



John L. Adair
Reg. No. 48,828

Date: September 1, 2005
1301 W. 25th Street, Suite 408
Austin, TX 78705
Tel. (512) 637-9223
Fax. (512) 371-9088



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
CERTIFICATE OF SERVICE	Atty Docket No. CROSS1123-17 CROSS1123-19
Mail Stop Patent Application Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450 Sir:	Application Nos. 90/007,125 filed 07/19/2004 90/007,317 filed 11/23/2004
	Applicant: Geoffrey B. Hoese
	Title: STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

I hereby certify that the attached Statement of Substance of Examiner Interview ("Statement") is being deposited with the U.S. Postal Service as First Class Mail to the Director of the U.S. Patent Office, P.O. Box 1450, Alexandria, VA 22313 on September 1, 2005. Applicant hereby states a copy of the Notification is also being served, via first class mail (Certified, R.R.R.), on:

Larry E. Severin
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 1301 Dove Street, #1050
 Newport Beach, CA 92660


and

William A. Blake
 Jones, Tullar & Cooper, PC
 P.O. Box 2226 Eads Station
 Alexandria, VA 22202

As per 35 U.S.C. §1.248 service is made via first class mail (Certified, R.R.R.) on September 1, 2005.

Respectfully submitted,

Sprinkle IP Law Group


 John L. Adair
 Reg. No. 48,828

Dated: September 1, 2005

1301 W. 25th Street, Suite 408
 Austin, Texas 78705
 Tel. (512) 637-9223
 Fax. (512) 371-9088

Enclosures



**UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office**

Address: ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
90/007,125 90/007317	07/19/2004	6425035	1006-8910

Larry E. Severin
Wang, Hartman & Gibbs, PC
1301 Dove Street
Suite 1050
Newport Beach, CA 92660

EXAMINER

ART UNIT	PAPER
2182	

DATE MAILED: 08/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

CC: SPRINKLE IP LAW GROUP
1301 W. 25th Street
Suite 408
Austin, TX 78705

Ex Parte Reexamination Interview Summary	Control No.	Patent Under Reexamination	
	90/007,125 <i>merged with 90/00817</i>	6425035	
	Examiner	Art Unit	
	Alan S. Chen	2182	

All participants (USPTO personnel, patent owner, patent owner's representative):

(1) Alan S. Chen (3) John Adair
 (2) Steve Sprinkle (4) Robert Griswold

Date of Interview: 24 August 2005

Type: a) Telephonic b) Video Conference
 c) Personal (copy given to: 1) patent owner 2) patent owner's representative)

Exhibit shown or demonstration conducted: d) Yes e) No.
 If Yes, brief description: _____

Agreement with respect to the claims f) was reached. g) was not reached. h) N/A.
 Any other agreement(s) are set forth below under "Description of the general nature of what was agreed to..."


Claim(s) discussed: N/A.

Identification of prior art discussed: _____

Description of the general nature of what was agreed to if an agreement was reached, or any other comments:
Examiner pointed out items of merit in references, applicant's representatives described how claims are differentiate from references.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims patentable, if available, must be attached. Also, where no copy of the amendments that would render the claims patentable is available, a summary thereof must be attached.)

A FORMAL WRITTEN RESPONSE TO THE LAST OFFICE ACTION MUST INCLUDE PATENT OWNER'S STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. (See MPEP § 2281). IF A RESPONSE TO THE LAST OFFICE ACTION HAS ALREADY BEEN FILED, THEN PATENT OWNER IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE TO PROVIDE THE MANDATORY STATEMENT OF THE SUBSTANCE OF THE INTERVIEW (37 CFR 1.560(b)). THE REQUIREMENT FOR PATENT OWNER'S STATEMENT CAN NOT BE WAIVED. EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).



 Examiner's signature, if required

cc: Requester (if third party requester)



**UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office**

Address: ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
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90/007,125 <i>90/007,317</i>	07/19/2004	6425035	1006-8910
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Larry E. Severin
Wang, Hartman & Gibbs, PC
1301 Dove Street
Suite 1050
Newport Beach, CA 92660

EXAMINER

CHEN, ALAN

ART UNIT	PAPER
----------	-------

2182

DATE MAILED: *08-22-05*

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

CC: SPRINKLE IP LAW GROUP
1301 W. 25th Street
Suite 408
Austin, TX 78705

Ex Parte Reexamination Interview Summary	Control No. 90/007,125 <i>merged w/ 90/007,317</i>	Patent Under Reexamination 6425035
	Examiner Alan S. Chen	Art Unit 2182

All participants (USPTO personnel, patent owner, patent owner's representative):

(1) Alan S. Chen (3) _____

(2) Mr. Sprinkle (4) _____

Date of Interview: 22 August 2005

Type: a) Telephonic b) Video Conference
 c) Personal (copy given to: 1) patent owner 2) patent owner's representative

Exhibit shown or demonstration conducted: d) Yes e) No.
 If Yes, brief description: _____

Agreement with respect to the claims f) was reached. g) was not reached. h) N/A.
 Any other agreement(s) are set forth below under "Description of the general nature of what was agreed to..."

Claim(s) discussed: N/A.

Identification of prior art discussed: N/A.

Description of the general nature of what was agreed to if an agreement was reached, or any other comments:
Mr. Sprinkle went over litigation/prosecution history of the patents under reexam. citing support for the lack of evidence for obviousness based on the quality and quantity of reviewers/examiners that have worked on this case. Examiner states he will put that into consideration but needs to conduct his own unbiased search/consideration in judging patentability. Examiner cites references which is not of the prior art of record that he is currently considering. Mr. Sprinkle states he would respond with feedback on them within the week.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims patentable, if available, must be attached. Also, where no copy of the amendments that would render the claims patentable is available, a summary thereof must be attached.)

A FORMAL WRITTEN RESPONSE TO THE LAST OFFICE ACTION MUST INCLUDE PATENT OWNER'S STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. (See MPEP § 2281). IF A RESPONSE TO THE LAST OFFICE ACTION HAS ALREADY BEEN FILED, THEN PATENT OWNER IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE TO PROVIDE THE MANDATORY STATEMENT OF THE SUBSTANCE OF THE INTERVIEW (37 CFR 1.560(b)). THE REQUIREMENT FOR PATENT OWNER'S STATEMENT CAN NOT BE WAIVED. EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).

cc: Requester (if third party requester)

Alan S. Chen
 Examiner's signature, if required



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/007,317 <i>901007125</i>	11/23/2004	6425035	HOESE1/WAB	1634
44654	7590 08/09/2005		EXAMINER	
SPRINKLE IP LAW GROUP 1301 W. 25TH STREET SUITE 408 AUSTIN, TX 78705			<i>Chen, ALAN</i>	
			ART UNIT	PAPER NUMBER

2182

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.



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APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
90/007,317 <i>90/007,125</i>	11/23/2004	6425035	HOESE1/WAB

Larry E. Severin
Wang, Hartman & Gibbs, PC
1301 Dove Street
Suite 1050
Newport Beach, CA 92660

EXAMINER

Chen, ALAN

ART UNIT	PAPER
----------	-------

2182

DATE MAILED: *08-09-05*

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

CC: SPRINKLE IP LAW GROUP
1301 W. 25th Street
Suite 408
Austin, TX 78705

Ex Parte Reexamination Interview Summary	Control No. 90/007,125 ; 90/007,317	Patent Under Reexamination 6425035	
	Examiner Alan Chen	Art Unit 2182	

All participants (USPTO personnel, patent owner, patent owner's representative):

- (1) Alan Chen (3) John Adair
 (2) Steven Sprinkle (4) Robert Griswold

Date of Interview: 08/09/05

Type: a) Telephonic b) Video Conference
 c) Personal (copy given to: 1) patent owner 2) patent owner's representative)

Exhibit shown or demonstration conducted: d) Yes e) No.
 If Yes, brief description: _____

Agreement with respect to the claims f) was reached. g) was not reached. h) N/A.
 Any other agreement(s) are set forth below under "Description of the general nature of what was agreed to..."

Claim(s) discussed: 1, 7 and 11.

Identification of prior art discussed: Spring and Oeda.

Description of the general nature of what was agreed to if an agreement was reached, or any other comments:
reviewed prior art to Spring and Oeda; deliberated over specific terms claimed, e.g., "mapping", "access control" and "remote".

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims patentable, if available, must be attached. Also, where no copy of the amendments that would render the claims patentable is available, a summary thereof must be attached.)

A FORMAL WRITTEN RESPONSE TO THE LAST OFFICE ACTION MUST INCLUDE PATENT OWNER'S STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. (See MPEP § 2281). IF A RESPONSE TO THE LAST OFFICE ACTION HAS ALREADY BEEN FILED, THEN PATENT OWNER IS GIVEN ONE MONTH FROM THIS INTERVIEW DATE TO PROVIDE THE MANDATORY STATEMENT OF THE SUBSTANCE OF THE INTERVIEW (37 CFR 1.560(b)). THE REQUIREMENT FOR PATENT OWNER'S STATEMENT CAN NOT BE WAIVED. EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).



cc: Requester (if third party requester)

Examiner's signature, if required

PTOL-413A (05-04)
 Approved for use through 07/31/2005. OMB 0651-0031
 U.S. Patent and Trademark Office U.S. DEPARTMENT OF COMMERCE

Applicant Initiated Interview Request Form

Application No.: 90/007,317
90/007,125 First Named Applicant: Hoese
 Examiner: Chen, Alan Art Unit: 2182 Status of Application: non-final office action

Tentative Participants:
 (1) Alan Chen (2) John Adair
 (3) Steven Sprinkle (4) Robert Griswold

Proposed Date of Interview: August 9, 2005 Proposed Time: 2:00 (AM/PM)

Type of Interview Requested:
 (1) Telephonic (2) Personal (3) Video Conference

Exhibit To Be Shown or Demonstrated: YES NO
 If yes, provide brief description: _____

Issues To Be Discussed

Issues (Rej., Obj., etc)	Claims/ Fig. #s	Prior Art	Discussed	Agreed	Not Agreed
(1) <u>Rej</u>	<u>Claim 1</u>	<u>Spring, Oeda, Tibbe</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) <u>Rej</u>	<u>Claim 7</u>	<u>"</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(3) <u>Rej</u>	<u>Claim 11</u>	<u>"</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(4) _____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Continuation Sheet Attached

Brief Description of Arguments to be Presented:
Spring, Oeda and Tibbe do not provide access from hosts to remote storage using NLLRP. Spring, Oeda and Tibbe do not teach wrapping or access controls as discussed in reply dated 7/12/05. References from related exam cases, including Cause, Cummings and DeKoning, do not address missing factors of Spring and Oeda.

An interview was conducted on the above-identified application on _____

NOTE: This form should be completed by applicant and submitted to the examiner in advance of the interview (see MPEP § 713.01).
 This application will not be delayed from issue because of applicant's failure to submit a written record of this interview. Therefore, applicant is advised to file a statement of the substance of this interview (37 CFR 1.133(b)) as soon as possible.

 Applicant/Applicant's Representative Signature

 Examiner/SPE Signature

John Adair
 Typed/Printed Name of Applicant or Representative

48,828
 Registration Number, if applicable

This collection of information is required by 37 CFR 1.133. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 21 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

512 677-1220

64660 U.S. PTO



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
CERTIFICATE OF SERVICE UNDER 37 C.F.R. 1.248	Atty. Docket No. CROSS1123-17 CROSS1123-19
Applicant Geoffrey B. Hoese, et al.	
Reexamination Control No. 90/007,125 90/007,317	Date Filed 07/19/2004 11/23/2004
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Fleming, Fritz

Applicant hereby serves the Reply to Office Action Under *Ex Parte* Reexamination Dated 05/24/05 in the above referenced case to:


Larry E. Severin
Wang, Hartmann & Gibbs, PC
1301 Dove Street, #1050
Newport Beach, CA 92660

William A. Blake
Jones, Tullar & Cooper, PC
P.O. Box 2226 Eads Station
Alexandria, VA 22202

As per 35 U.S.C. §1.248 service is made via first class mail on **July 22, 2005**

Respectfully submitted,

Sprinkle IP Law Group


John L. Adair
Reg. No. 48,828

Dated: July 22, 2005


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Fax. (512) 371-9088

Enclosures

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
REPLY TO OFFICE ACTION UNDER <i>EX PARTE</i> REEXAMINATION DATED 05/24/05	Atty. Docket No. CROSS1123-17 CROSS1123-19
Applicants Goeffrey B. Hoese, et al.	
Reexamination Control Nos. 90/007,125 90/007,317	Date Filed 07/19/2004 01/23/2004
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Fleming, Fritz

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Certificate of Mailing Under 37 C.F.R. §1.10
I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail to Addressee (<i>Label No. EV734539513US</i>) in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22312-1450 on July 22, 2005 .
 Julie Blackard

In response to the Official Action mailed May 24, 2005 (the "May 24 Office Action"), Applicant respectfully requests the Examiner reconsider the rejections of the Claims in the Re-Examination of U.S. Patent 6,425,035 (the "'035 Patent") in view of this reply.

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IN THE CLAIMS:

1. A storage router for providing virtual local storage on remote storage devices to devices, comprising:
 - a buffer providing memory work space for the storage router;
 - a first controller operable to connect to and interface with a first transport medium;
 - a second controller operable to connect to and interface with a second transport medium; and
 - a supervisor unit coupled to the first controller, the second controller and the buffer, the supervisor unit operable to map between devices connected to the first transport medium and the storage devices, to implement access controls for storage space on the storage devices and to process data in the buffer to interface between the first controller and the second controller to allow access from devices connected to the first transport medium to the storage devices using native low level, block protocols.
2. The storage router of claim 1, wherein the supervisor unit maintains an allocation of subsets of storage space to associated devices connected to the first transport medium, wherein each subset is only accessible by the associated device connected to the first transport medium.
3. The storage router of claim 2, wherein the devices connected to the first transport medium comprise workstations.
4. The storage router of claim 2, wherein the storage devices comprise hard disk drives.
5. The storage router of claim 1, wherein the first controller comprises:
 - a first protocol unit operable to connect to the first transport medium;
 - a first-in-first-out queue coupled to the first protocol unit; and
 - a direct memory access (DMA) interface coupled to the first-in-first-out queue and to the buffer.
6. The storage router of claim 1, wherein the second controller comprises:
 - a second protocol unit operable to connect to the second transport medium;
 - an internal buffer coupled to the second protocol unit; and

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a direct memory access (DMA) interface coupled to the internal buffer and to the buffer of the storage router.

7. A storage network, comprising:

a first transport medium;

a second transport medium;

a plurality of workstations connected to the first transport medium;

a plurality of storage devices connected to the second transport medium; and

a storage router interfacing between the first transport medium and the second transport medium, the storage router providing virtual local storage on the storage devices to the workstations and operable:

to map between the workstations and the storage devices;

to implement access controls for storage space on the storage devices; and

to allow access from the workstations to the storage devices using native low level, block protocol in accordance with the mapping and access controls.

8. The storage network of claim 7, wherein the access controls include an allocation of subsets of storage space to associated workstations, wherein each subset is only accessible by the associated workstation.

9. The storage network of claim 7, wherein the storage devices comprise hard disk drives.

10. The storage network of claim 7, wherein the storage router comprises:

a buffer providing memory work space for the storage router;

a first controller operable to connect to and interface with the first transport medium, the first controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer;

a second controller operable to connect to and interface with the second transport medium, the second controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer; and

a supervisor unit coupled to the first controller, the second controller and the buffer, the supervisor unit operable:

to map between devices connected to the first transport medium and the storage devices, to implement the access controls for storage space on the storage devices and to process

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data in the buffer to interface between the first controller and the second controller to allow access from workstations to storage devices.

11. A method for providing virtual local storage on remote storage devices connected to one transport medium to devices connected to another transport medium, comprising:
 - interfacing with a first transport medium;
 - interfacing with a second transport medium;
 - mapping between devices connected to the first transport medium and the storage devices and implementing access controls for storage space on the storage devices;
 - and
 - allowing access from devices connected to the first transport medium to the storage devices using native low level, block protocols.
12. The method of claim 11, wherein mapping between devices connected to the first transport medium and the storage devices includes allocating subsets of storage space to associated devices connected to the first transport medium, wherein each subset is only accessible by the associated device connected to the first transport medium.
13. The method of claim 12, wherein the devices connected to the first transport medium comprise workstations.
14. The method of claim 12, wherein the storage devices comprise hard disk drives.

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TABLE OF CONTENTS FOR RESPONSE TO REJECTIONS

- I. Rejections Under 35 U.S.C. § 103
 - A. Introduction
 - B. Background of the Invention
 - C. Overview of Claim 1
 - D. “Remote Storage Devices” and “Allowing Access...Using NLLBPs” -
Neither Spring nor Oeda Teaches or Suggests the Limitations of Remote Storage Devices and
Allowing Access to the Remote Storage Devices Using NLLBP
 - 1. “Remote” Requires at Least One Serial Transport Medium
 - 2. Spring’s SCSI-to-SCSI System Does Not Provide Remote Storage
Devices
 - 3. Spring’s Ethernet-to-SCSI System Does Not Allow Access using
NLLBP
 - 4. Similarly, Oeda Fails to Provide Remote Storage Devices and
Allowing Access to the Remote Storage Devices Using NLLBP
 - 5. Summary: Allowing Access to Remote Storage Devices Using NLLBP
 - E. “Map” – Neither Spring or Oeda Teaches or Suggests Mapping Between
Devices Connected to the First Transport Medium and the Storage Devices
 - 1. “Map” - A Representation of the Devices on the First Transport
Medium and the Storage Devices

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2. Neither Spring nor Oeda Teaches or Suggests a Map

F. "Access Controls" – Neither Spring nor Oeda Teaches or Suggests
Implementing Access Controls

1. Implementing Access Controls

2. Spring Does Not Implement Access Controls

3. Oeda Does Not Teach or Suggest Access Controls

4. The Ethernet Based Configuration of Oeda Does Not Teach or
Suggest Any Form of Access Controls for Remote Storage

G. The Combination of Oeda and Spring Does Not Teach or Suggest the
Present Invention

H. The Jibbe Reference Does Not Address the Deficiencies of Spring and
Oeda

I. Summary: There is No *Prima Facie* Case of Obviousness

II. Conclusion

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I. Rejections Under 35 U.S.C. §103

A. Introduction

Claims 1-14 of the '035 Patent are variously rejected under 35 U.S.C. §103(a) as being unpatentable over United Kingdom Patent Application Publication No. UK GB 2297636 ("Spring") in view of United States Patent No. (5,634,111) ("Oeda") and further in view of United States Patent No. 5,345,565 ("Jibbe").

In order to establish a prima facie case of obviousness, the Examiner must show: that the prior art references teach or suggest all of the claim limitations; that there is some suggestion or motivation in the references (or within the knowledge of one of ordinary skill in the art) to modify or combine the references; and that there is a reasonable expectation of success. M.P.E.P. 2142, 2143; In re Vaeck, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). As detailed more fully below, Applicants respectfully submit that independent Claim 1, independent Claim 7 and independent Claim 11 of the '035 Patent are not rendered obvious by Spring, Oeda or Jibbe as the references do not teach or suggest all of the claim limitations. More particularly, the references do not teach or suggest, neither individually or in combination: i) providing virtual local storage on remote storage devices and allowing access from devices connected to a first transport medium to the remote storage using native low level block protocols (NLLBP) in conjunction with; ii) mapping between devices connected to the first transport medium and the storage devices; and in conjunction with iii) implementing access controls. None of the prior art, alone or in combination, teaches or suggests all of these claimed elements.

B. Background of the Invention

The '035 Patent is directed to an efficient storage router and method of routing data over a network from devices (e.g., host computers) on one side of the storage router to remote storage devices on the other side of the storage router using low level, block storage protocols or NLLBPs. Even though the storage devices are located remotely over the network from the host computers, the storage devices are virtualized so as to appear to the host computer as locally-attached storage devices. The invention of the '035 Patent further provides the security feature of providing access controls in order to control which storage devices (or portions thereof) any particular host computer can access; this access controls feature is implemented by mapping host devices to the remote storage devices to which a host device has access. By

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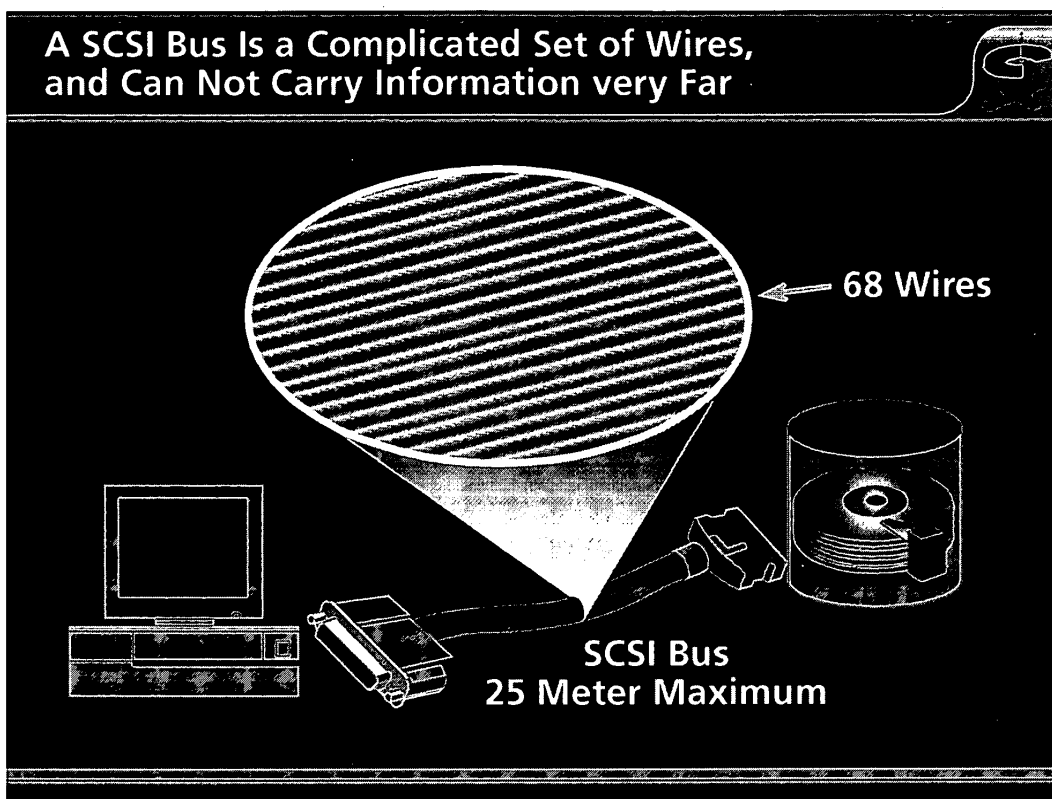
allowing a host device access only to those virtualized storage devices (or portions of storage devices) to which it is mapped, the invention of the '035 Patent can prevent unauthorized or unintended access by that host device to other remote storage devices in the network. Thus, the present invention provides a networked storage solution that connects hosts to remotely attached storage devices that appear locally attached, provides the security feature of controlling access to the remote storage devices using a map, and allows the host computers to access the remote storage devices over the network at the speeds and efficiencies facilitated by the use of NLLBPs.

As shown in the examples discussed in the Spring and Oeda prior art (discussed more fully below), prior to the present invention, host computers would access storage devices either i) locally via a parallel bus such as a SCSI bus or ii) remotely over a network using network protocols. However, both of these prior art systems had limitations that the invention of the '035 Patent overcomes. For storage systems with locally attached storage devices attached via SCSI buses, a SCSI-to-SCSI routing device provided access between host computers on one side of the SCSI-SCSI routing device to local storage on the other side of the SCSI-SCSI routing device. Because a SCSI bus was used on each side of the SCSI-to-SCSI routing device, a computer could access a storage device using a NLLBP, which facilitates the obtaining of information from the storage device in a fast and efficient manner (i.e., without the overhead associated with typical network file servers). However, a SCSI bus is a complicated set of parallel wires that cannot carry data a very long distance. This limitation is illustrated in Graphic 1 below. Note that color copies of Graphics 1-5 are attached in Exhibit A for the convenience of the Examiner.

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Graphic 1

Thus, a major shortcoming of any such SCSI-to-SCSI routing device or method was that the storage devices must typically be within approximately 25 meters of the host computer that needs to have access to the storage devices. Indeed, due to the costs associated with these complicated SCSI buses, most SCSI buses were significantly shorter (typically less than 12 meters) in actual installations. As the '035 Patent states "typical storage transport mediums provide for a relatively small number of devices to be attached over relatively short distances." See, '035 Patent, col. 1, lines 23-25.

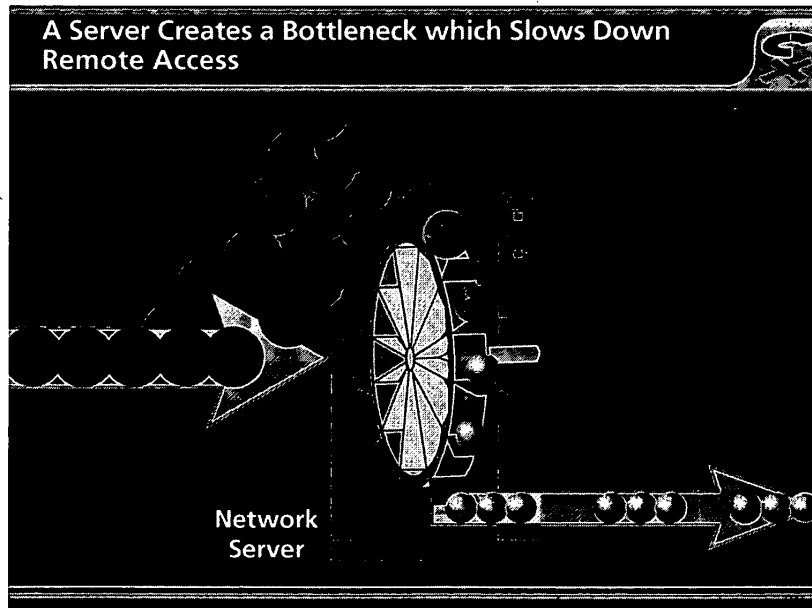
Modern computer storage systems, however, need networks connecting multiple computers to each other and to remote storage locations that are significantly distant from the host computers that access the remote storage. As discussed above, this is not possible with a SCSI bus because of the distance limitation of the SCSI bus. In typical prior art systems (including those of Spring and Oeda as will be discussed below), to overcome the inability of a SCSI-to-SCSI system to provide remote storage (as discussed an NLLBP cannot be sent a long

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distance over a SCSI bus), workstations were connected to a network server using a distance-capable network transport medium and a network protocol such as Ethernet. See, '035 Patent Background, col. 1, lines 47-54. A problem with this prior art solution was that the network server creates a bottleneck which slows down remote access because, at least in part, the computer or workstation needs to create something called a "network protocol" to send the data over the distance-capable transport medium. The problem with this prior art method for transmitting a storage NLLBP over a network to a remote storage device is that it takes the computer time to create a network protocol and it takes the server time to re-construct a native low level block protocol from that network protocol. Thus, the introduction of a network server into the system creates a bottleneck which slows down access to remote storage devices. Graphic 2, shown below, depicts one aspect of that bottleneck with the large balls intended to depict network protocols and the smaller balls intended to depict native low level block protocols. Although Graphic 2 only graphically depicts the problems in one direction (from the host computer through the server to the remote storage devices), the problems exist going both directions. In other words, the same type of bottleneck occurs in reverse when the data returns to the computer from the remote storage device through the server.

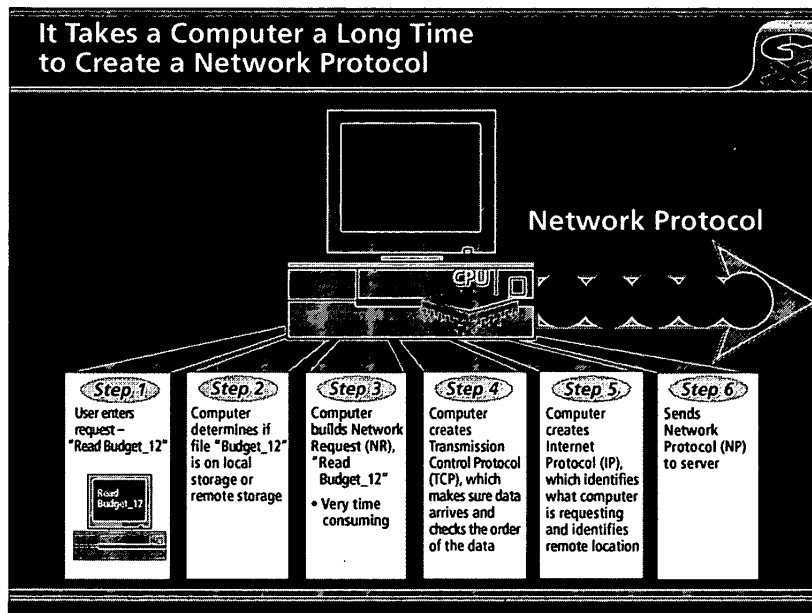


Graphic 2

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As shown in Graphic 2, for prior art systems that provided hosts access to remote storage, a workstation first had to translate requests into higher level network protocols in order to communicate with the network server, and the network server would then translate the requests into low level requests (e.g., NLLBPs) for transmitting to the storage device(s). It takes a computer a long time to create a network protocol. Graphic 3, shown below, describes in general terms steps involved when a computer needs to access remote storage through a server, and has to create a network protocol to achieve that access. Similar steps occur when the computer wants to write data to the remote storage device.



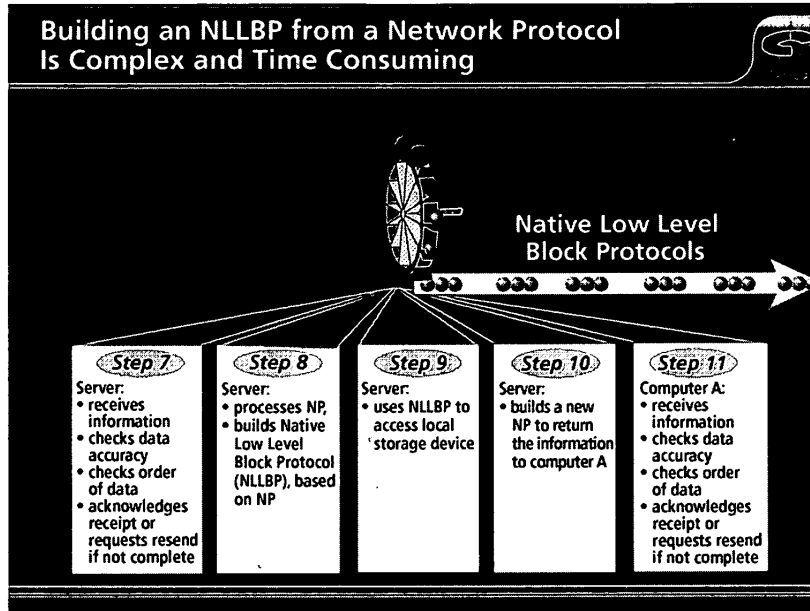
Graphic 3

As illustrated in Graphic 4 below, the process the server goes through to build a NLLBP from a network protocol is also complex and time consuming. Graphic 4 describes in general terms steps involved in building a native low level block protocol from a network protocol. The native low level block protocol is then used to access a local storage device. The return of the data from the remote storage device to the host computer also involves the same complex steps. On the return path, the server needs to build a network protocol from the NLLBP it receives from the storage device. In addition, the computer needs to process that the network

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protocol to get the information by essentially repeating the steps shown in Graphic 3 above in reverse.



Graphic 4

Thus, prior to the present invention, those wishing to implement centralized storage at a remote location for networked devices were typically forced to use a relatively slow network server solution that required the use of higher level network protocols. These prior art systems did not provide remote storage that could be accessed at the speeds achieved by using an NLLBP from the hosts to the storage devices.

The present invention overcomes the deficiencies of these prior art systems allowing hosts to access remote storage devices at significantly distant, remote locations using a NLLBP. The use of the Fibre Channel protocol, for example, allows storage devices to be located in excess of 10 kilometers away from the workstations using a serial transport medium as opposed to the parallel transport medium of a SCSI bus. However, unlike an Ethernet file server system, a storage router connected using a Fibre Channel transport medium can allow access from the host computer to the remote storage devices using NLLBPs without having to create higher level network protocols. Because Fibre Channel supports the use of NLLBPs, the hosts can access the remote storage devices at greater speeds than can be achieved using

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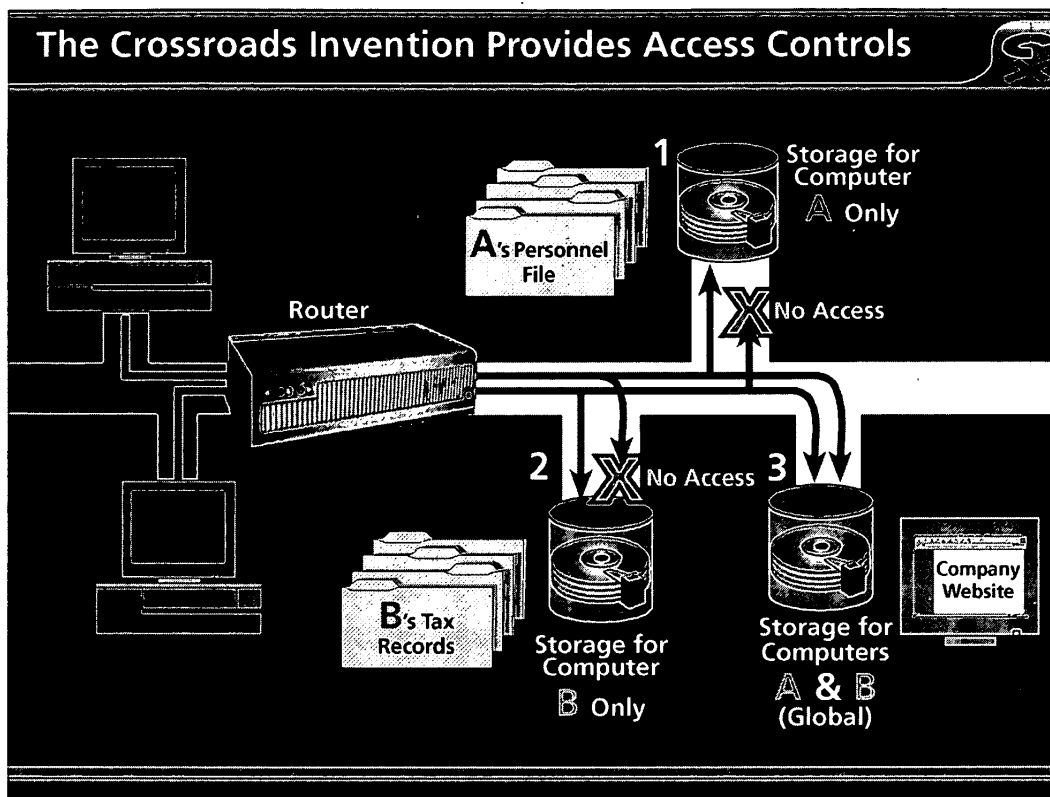
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higher-level network protocols. The present invention thus routes NLLBPs to the remote storage devices without involving a network server that requires the use of higher-level network protocols. This allows remote storage, but does away with the time consuming and complex steps of creating and processing higher-level network protocols at a server. Consequently, both distance and speed can be achieved, without sacrificing one for the other as required by prior art solutions.

In addition to providing the ability to locate host computers remotely at significant distances from storage devices, modern storage systems need to provide security between the host computers and the remote storage. In addition, since the host computers are remotely located physically from the storage devices, it is advantageous to provide this security in a centralized manner. In other words, it is desirable to provide a centralized control mechanism that controls each host computer's access so that each host can only access particular remote storage devices (or portions thereof). In prior art systems, the ability to provide such a security mechanism in a networked system connecting hosts to remote storage devices using NLLBPs without simply did not exist.

In addition to providing hosts access to remote storage devices over a network using NLLBPs, the invention of the '035 Patent provides such a security feature. The invention of the '035 Patent contains a map that maps the host computers to the remote storage devices by associating each host computer with some or all of the remote storage devices on the other side of the storage router. The invention of the '035 Patent implements access controls by using the map to allow each host access to only the specific storage to which the host is mapped. In this manner, the invention of the '035 Patent implements access controls to limit each computer's access to a specific subset of storage devices or sections of a storage device on the other side of the storage router. Put another way, the access controls provide the capability to permit or deny each computer access to a particular storage device, a set of storage devices or portions of a single storage device or devices (or any combination thereof). By assigning storage devices or portions thereof to particular computer workstations, the present invention prevents each computer workstations from overwriting or modifying data in storage assigned to another computer workstation. This access controls feature is illustrated below in Graphic 5.



Graphic 5

For the example of Graphic 5, host computer A is mapped to remote storage device 1, host computer B is mapped to remote storage device B and both A and B are mapped to remote storage device 3. Using this map, the invention of the '035 implements access controls by allowing host computer A to access either remote storage device 1 or 3 (e.g., allow host computer A to read or write data to or from storage devices 1 or 3) and by preventing host computer A from accessing remote storage device 2 (e.g., only allowing host computer B to read or write data to storage device 2 in the example of Graphic 5). By mapping between host devices and storage devices (or portions thereof), the invention of the '035 Patent can ensure that requests from host computer A are only directed to the storage devices that are assigned to computer A. This allows the security feature of access controls to be implemented while still allowing the host computers to access the storage devices using an NLLBP.

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In summary, the invention of the '035 Patent provides a networked storage solution that combines the ability to allow access from host computers to remote storage devices using NLLBPs with the ability to control access between host computers and the remote storage devices. Thus, the invention of the '035 Patent provides the advantages of 1) remote storage devices that appear to the host as locally attached, but that actually reside at remote distances from the host computers, 2) access to these remote storage devices at the speed and efficiency associated with using NLLBPs, and 3) data security by controlling the access of each host to the remote storage. None of the prior art cited by the Examiner, alone or in combination, teaches or suggests a system that provides access from host computers (or other device connected to the first transport medium) to remote storage devices using an NLLBP, while implementing access controls in accordance with a map.

C. Overview of Claim 1

The Examiner rejected independent Claim 1 as being unpatentable over Spring in view of Oeda and Jibbe. Applicants will focus on Claim 1 in discussing how the present invention differs from the cited art.

Claim 1 recites:

A storage router for providing virtual local storage on remote storage devices to devices, comprising:
a buffer providing memory work space for the storage router;
a first controller operable to connect to and interface with a first transport medium;
a second controller operable to connect to and interface with a second transport medium; and
a supervisor unit coupled to the first controller, the second controller and the buffer, the supervisor unit operable to map between devices connected to the first transport medium and the storage devices, to implement access controls for storage space on the storage devices and to process data in the buffer to interface between the first controller and the second controller to allow access from devices connected to the first transport medium to the storage devices using native low level, block protocols. [Emphasis Added].

Claim 1 includes “providing virtual local storage on remote storage devices” and “a supervisor unit . . . operable to . . . map between devices connected to the first transport

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medium and the storage devices, to implement access controls for storage space on the storage devices and . . . to allow access from devices connected to the first transport medium to the storage devices using native low level, block protocols.” Claim 11 similarly includes providing virtual local storage on “remote storage devices” while claim 7 is a network containing a router that connects hosts to storage devices through transport mediums. Claims 1, 7 and 11 include features of mapping between devices on one transport medium (e.g., workstations) to the storage devices, implementing access controls and allowing access from devices connected to the first transport medium (e.g., workstations) to the storage devices using a NLLBP. The present invention as recited in Claim 1 thus enables computers to access remote storage devices without the overhead of high level protocols and file systems typically required by network servers (i.e., using NLLBP) while providing the security measure of access controls.

As will be discussed more fully below, the systems of Spring and Oeda, in contrast to the invention of the '035 Patent, either do not provide remote access to storage devices or, for embodiments of those systems that may be able to provide remote access to storage devices, require the use of higher level network protocols (and therefore cannot allow access to the remote storage devices using NLLBPs). Thus, these references suffer the shortcomings of exactly the type of prior art the present invention was designed to overcome in that they are either limited in distance or require time consuming translations between higher level network protocols and NLLBPs. Moreover, as will also be discussed more fully below, Spring and Oeda fail to disclose mapping and access controls as discussed below.

D. “Remote Storage Devices” and “Allowing Access . . . Using NLLBPs” - Neither Spring nor Oeda Teaches or Suggests the Limitations of Remote Storage Devices and Allowing Access to the Remote Storage Devices Using NLLBP

Examiner Fleming relies on Spring as showing virtual local storage on a remote storage device and both Spring and Oeda as showing the ability to allow access from devices connected to a first transport medium to a remote storage device using NLLBP. Applicants respectfully submit, however, both Spring and Oeda exhibit the shortcomings of the prior art solutions that the present invention specifically overcomes. Namely, the solutions in both Spring and Oeda require a choice between local (not remote) storage that can be accessed using a NLLBP or using slower high level network protocols to access remote storage (can't

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allow access using NLLBP); neither Spring or Oeda provides a solution that allows access to remote storage devices using NLLBP.

1. "Remote" Requires at Least One Serial Transport Medium

Claim 1, as discussed above, provides virtual local storage on remote storage devices. A "remote storage device" is a storage device that is connected indirectly using at least one serial network transport medium to allow for storage devices to be significantly remote from the host computers. This definition is supported by both the Specification of the '035 Patent and by the claim construction recommended by the Special Master in currently stayed *Crossroads v. Dot Hill Systems Corporation*, Western District of Texas, Civil Action No. A-03-CA-754-SS (the "Dot Hill Litigation").

As described above, prior art solutions that allowed access from hosts to storage devices using a NLLBP used SCSI-to-SCSI routing devices. In this case, both data transport media were limited distance parallel buses (SCSI is a parallel, distance-limited bus). The present invention overcomes the deficiencies of these prior art systems allowing hosts to access centralized, remote storage devices at "significantly remote positions" using a NLLBP. See, '035 Patent, col. 2, lines 27-32. The use of the Fibre Channel protocol (a serial protocol) allows the remote storage devices to be located at distances up to and "even in excess of 10 kilometers" from the workstations. See, '035 Patent, col. 2, lines 31-33. The claimed invention of the '035 Patent provides the "ability to centralize local storage for networked workstation without any cost in speed or overhead" so that each workstation can have access to "its virtual local storage as if it were locally connected" despite potentially being at a great distance from the storage devices. See, '035 Patent col. 2, lines 27-31. In the invention of the '035 Patent, networked hosts are thus connected to storage devices over at least one significant distance-capable link, such as Fibre Channel.

As the Fibre Channel example just presented, and the other examples provided in the '035 Patent illustrate, the ability to have remote storage devices is achieved through the use of at least one serial transport medium between the workstations and the storage devices. It is the serial interconnect that allows for attachment over large distances and, hence, the ability to provide remote storage. See, '035 Patent, col. 1, lines 29-36. Even in the SCSI initiator to SCSI target configuration discussed in the '035 Patent, there is a third Fibre Channel transport medium (i.e., a serial transport medium) between the two storage routers to extend the distance between the workstations and storage devices to provide the capability for having remote

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storage. See, '035 Patent col. 6, lines 19-31.¹ The serial transport medium is necessary for remote storage because parallel SCSI buses alone are severely limited in distance and cannot provide connectivity to remote storage devices in the manner of the present invention.

The definition of "remote" as requiring at least one serial transport medium is further supported by the fact that in the on-going *Crossroads v. Dot Hill Systems Corporation*, Western District of Texas, Civil Action No. A-03-CA-754-SS litigation (the "Dot Hill Litigation"), Special Master Bayer recommended to the Court that "remote" be construed to mean "indirectly connected through **at least one serial network transport medium**" (emphasis added). The pertinent portions of the Report and Recommendation of the Special Master Regarding United States Patent Nos., 5,941,972 and 6,425,035 B2 (the "Report") are attached hereto as Exhibit

B. Special Master Bayer was commissioned by the Court in the Dot Hill Litigation to conduct a Markman hearing and provide recommendations to the Court as to how the claims of the '035 Patent should be interpreted. Special Master Bayer filed his recommendations in the Report after reviewing the initial Markman briefs submitted by both Dot Hill and Crossroads, conducting a Markman hearing (on August 30, 2004), and reviewing post-Markman briefs and reply briefs. After careful review and analysis, Special Master Bayer concluded that "remote" meant "indirectly connected through at least one serial network transport medium". Thus, at least one of the transport mediums (either the one connecting workstations to the storage router or the one connecting the storage router to the storage devices) recited in independent Claims 1 and 11 must be serial (e.g., cannot be parallel SCSI). This definition of "remote" is consistent with the idea that the invention of the '035 Patent allows for the storage devices to be at "significantly remote positions" of up to and "even in excess of 10 kilometers" from the hosts accessing those storage devices. The at least one serial connection allows for networked workstations to connect to storage remotely, while a parallel SCSI connection simply cannot.

¹ In this unclaimed configuration, there are two "back to back" FC-SCSI routers. Workstations are connected to the first router by a SCSI bus and storage devices are connected to the second router by a SCSI bus. The two routers are connected by a Fibre Channel transport medium.

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2. Spring's SCSI-to-SCSI System Does Not Provide Remote Storage Devices

The system of Spring does not provide virtual local storage on remote storage devices. Instead, Spring teaches a system in which a server emulates local drives as local SCSI removable drives to a set of workstations. See, Spring, page 3, lines 1-5. Workstations access the emulated SCSI removable drives as if they were locally attached removable SCSI drives. See, Spring, page 10, lines 1-3. Because the drives appear as removable drives, the SCSI dismount command can be used to free media for use by other workstations. See, Spring, page 10, lines 16-25. As an example, in the context of a workgroup that works on large files, such as graphics, this allows one user to mount the virtual drive containing a particular image at the user's workstation, work on the image, save the image, and then dismount the virtual media. Another user can then mount virtual media and edit the media. This obviates the need to share physical media such as CD's or tapes while coordinating operations between various workstations.

The invention of Spring is illustrated in FIGURE 1 of Spring, reproduced below.

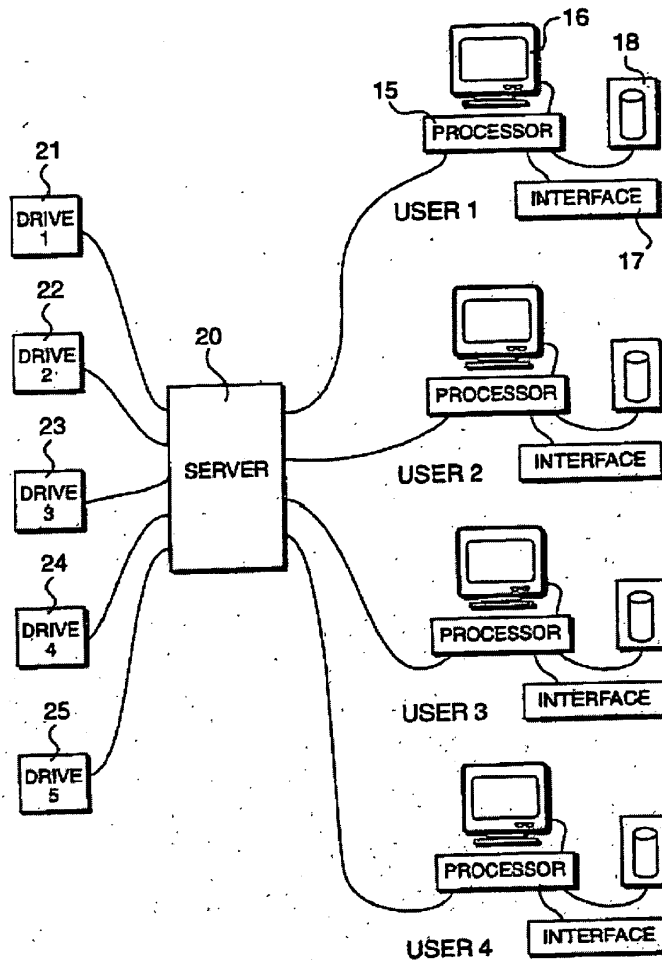


FIGURE 1 of Spring

As shown, the hosts 16 connect via a parallel SCSI bus to server 20 which is further connected to storage devices 21-25. It is clear from the Specification of Spring that the physical drives to which the data is written and from which the data is read are connected using a direct connection, specifically SCSI. Spring repeatedly mentions that the disk drives are implemented in accordance with the RAID 5 configuration. See e.g., Spring, page 6, lines 1-4,

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and page 10, lines 1-5. In 1995, the year of Spring's filing, RAID 5 systems predominately if not exclusively used SCSI drives.² More significantly, Spring stresses that the differences between the emulated drives and physical drives are that the emulated SCSI drives are smaller than the physical drives and the emulated SCSI drives appear as removable while the physical drives are fixed drives. See, Spring, page 8, lines 18-23. Spring does not differentiate the SCSI emulated drives from the physical drives based on protocol and provides no ability to convert between storage protocols. Furthermore, this passage indicates that the physical drives are physically fixed and remain permanently in place. *Id.* Accordingly, Examiner Fleming stated that the system of Spring provides access from the USERS (i.e., host computers) through the server and to the disk drives using SCSI. See, May 24 Office Action, page 7 ("SCSI . . . is used from the USER to the storage router to the disc drives").

The Spring SCSI-to-SCSI system, such as that shown in FIGURE 1 of Spring, does not use at least one serial data transport medium and does not provide the capability to locate storage devices at significant distances from the workstations. There is simply no distance-capable storage link in the system of Spring as Spring relies on distance-limited SCSI interfaces. Indeed, Spring recognizes the inability of SCSI interfaces to provide a distance-capable link stating "a large number of workstations may be provided relatively close to server 20, in which case conventional SCSI interfaces may be employed." See, Spring, page 7, lines 10-12 (emphasis added). Thus, the SCSI-to-SCSI system of Spring does not provide virtual local storage on "remote storage devices" as it lacks at least one distance-capable serial transport medium.

3. Spring's Ethernet-to-SCSI System Does Not Allow Access using NLLBP

While the Spring SCSI-to-SCSI system of FIGURE 1 does not provide for remote storage devices and cannot allow for significant physical distance between the hosts and storage devices, Spring does provide some insight as to how "remote" or physically distant storage devices could be incorporated into the Spring system. While acknowledging that parallel SCSI interfaces have "limited" range, Spring states that in order to create less limited distance separation from hosts to storage devices "in alternative embodiments it may be

² Similar to SCSI, other existing drive connections such as ATA and IDE were severely limited in distance.

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necessary to provide alternative connections, possibly via coaxial cables, so as to increase the distance between the server and the workstations". See Spring, page 7, lines 3-7. Spring goes on to state that "... in alternative arrangements, workstations may be distributed quite widely through a building, requiring more robust connection between the processor and server 20. It is envisaged that connections of this type should allow the workstation to be displaced from the server by distances in excess of 100 meters, having characteristics similar to high speed Ethernet links." See *Id.* at page 7, lines 12-17. As will be explained more fully below, this alternative embodiment to allow "remote" storage devices in Spring does not meet the claim limitation of "allowing access" between hosts and storage devices "using NLLBPs".

Independent Claim 1 of the '035 Patent not only recites that the storage devices are "remote", but also that the supervisor unit is operable to "allow access from devices connected to the first transport medium to the storage devices using native low level block protocols." Thus, the host computers connected to the first transport medium must be able to access the remote storage devices using a NLLBP. This ability to allow access from host computers to storage devices using a NLLBP, as recited in Claim 1, requires allowing access between the host and storage device(s) using a protocol (i.e., a set of rules) that does not involve the overhead of high level protocols and file systems typically required by network servers, as supported in the '035 Patent Specification and prior litigation interpreting this claim term.

As discussed above, in systems prior to the present invention, when making a request to storage through a network server to allow access between workstations and remote storage devices, a workstation first had to translate the requests from its file system protocols to higher level network protocols in order to communicate with the network server, and the network server would then translate them into low level requests to the storage device(s). In contrast, as described in the '035 Patent, allowing a host to access storage devices using a NLLBP provides a mechanism by which communication between the host and the storage devices can be accomplished faster because there is no need to translate from a network protocol to a NLLBP. See '035 Patent Specification, col. 1, lines 47-60, col. 2, lines 12-15 and 23-26, col. 3, lines 14-25 and col. 4, lines 17-25 (distinguishing an NLLBP from higher-level protocols by contrasting the invention of the '035 Patent (allowing access using NLLBP) to prior art solutions (which allowed access using network protocols requiring translation to NLLBP)). Further, in *Crossroads v. Chaparral Network Storage, Inc.*, Western District of Texas, Civil Action No. A-00-CA-217-SS (the "Chaparral Litigation") and *Crossroads Systems (Texas), Inc., v. Pathlight Technology, Inc.*, Western District of Texas, Civil Action No. A-00CA-248-JN, the Federal

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District Court issued a Joint Markman Order (the "Markman Order") interpreting "NLLBP" for the purposes of United States Patent No. 5,941,972 (the "'972 Patent", the parent to the '035 Patent) as follows: "a set of rules or standards that enable computers to exchange information and do not involve the overhead of high level protocols and file systems typically required by network servers." A copy of the Markman Order is attached hereto as Exhibit C. This construction and the validity of the '972 Patent was upheld by the Federal Circuit. A copy of the Federal Circuit decision affirming the decision of the lower court is attached hereto as Exhibit D. Thus, based on both the Specification of the '035 Patent and the Markman Order, an NLLBP is a protocol that enables the exchange of information without the overhead of high-level protocols and file systems typically required by network servers.

As claimed in the '035 Patent, allowing access from host devices to storage devices is done using NLLBPs. Using the example of a first transport medium of Fibre Channel ("FC") and second transport medium of SCSI, a FC workstation can communicate SCSI commands to a storage device using the FC protocol through the storage router. In this case, the storage router receives the FC-encapsulated SCSI commands on the FC transport medium, removes the FC encapsulation and forwards the SCSI commands to the storage devices on the SCSI data transport medium (provided the FC workstation is allowed to have such access as will be discussed more fully below). There is *no translation* of the commands from a higher level network protocol to a native, low level protocol. In other words, the storage router is not required to translate from a high level command (e.g., a file system command or function call with arguments) into a SCSI command. Rather, the storage router strips the FC layer off of the existing SCSI command and forwards the SCSI command to the storage device. Thus, when the FC host workstation is allowed to have access to the SCSI storage device, that access is accomplished using NLLBPs.

Thus, as recited in Claim 1, to "allow access from devices connected to the first transport medium to devices connected to the storage devices using native low level block protocols" requires allowing access from host computers to remote storage devices using NLLBP. Thus, due to the "remote" limitation, Claim 1 requires that at least one transport medium be a serial transport medium and due to the "NLLBP" limitation, the host computers must be allowed access to the remote storage devices using a protocol that does not involve the higher level overhead typically associated with network servers. Spring simply does not teach or suggest any system that will allow hosts to access remote storage devices using NLLBP.

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As discussed above, Spring does provide an alternative embodiment to its SCSI-to-SCSI embodiment of FIGURE 1 that can allow for hosts to be separated from storage devices by distances in excess of 100 meters. See, Spring, page 7, lines 3-17. (“... in alternative arrangements, workstations may be distributed quite widely through a building, requiring more robust connection between the processor and server 20. It is envisaged that connections of this type should allow the workstation to be displaced from the server by distances in excess of 100 meters, having characteristics similar to high speed Ethernet links”). The use of coaxial cable for Ethernet networks was common in 1995 (e.g., 10Base-2 and 10Base-5 Ethernet), however, these Ethernet networks required the use of high-level protocols to transmit information between a workstation and a network server. In Ethernet-to-SCSI systems such as that suggested in Spring, a workstation would first translate the request from its file system protocol to a “network protocol” (i.e., Ethernet protocol) and send the request to a network server. The network server would then translate the network protocol to a native low level protocol (i.e., SCSI) and send the low level request to the attached storage device. The problem with this type of system is exactly the problem that the ‘035 Patent described in the Background of the Invention and was designed to overcome. Namely, this type of system creates a bottleneck that slows down the access from the hosts to the remote storage devices. Because, NLLBPs cannot be sent over long distances using a SCSI bus, the workstation must create a network protocol to send requests over the Ethernet transport medium. It takes the workstation a long time to create a network protocol and takes the server time to translate the information sent according to the network protocol into a NLLBP (and visa versa when sending the information back from the storage device to the host). In such a system, data access times from the workstation to the devices are increased.

While Spring provides no guidance as to how the emulated removable SCSI drives would be accessed via Ethernet in the suggested alternative embodiment, at the time of Spring, one of ordinary skill in the art would have understood that access to remote storage via Ethernet required the use of a higher level network protocol and there no teaching or suggestion in Spring otherwise. Thus, it would be understood that the workstations of Spring use a higher level network protocol (e.g., an Ethernet file server protocol) that is then translated by the network server into a NLLBP before access to remote storage devices can be achieved. The system of Spring is exactly the type of system that the present invention was designed to overcome because the system of Spring does involve the overhead of high level protocols typically required by network servers and does require a translation of a network protocol into

SCSI commands at the network server when allowing workstations to make requests to and from storage devices. Therefore, Spring does not teach or suggest the limitation “to allow access from devices connected to the first transport medium to the [remote] storage devices using native low level, block protocols.” (emphasis added).

4. Similarly, Oeda Fails to Provide Remote Storage Devices and Allowing Access to the Remote Storage Devices Using NLLBP

Like Spring, Oeda discloses a SCSI-to-SCSI system of connecting a host computer to a storage device(s). See Oeda, FIGURES 1-5. FIGURE 4, illustrative of the Oeda system, is reproduced below.

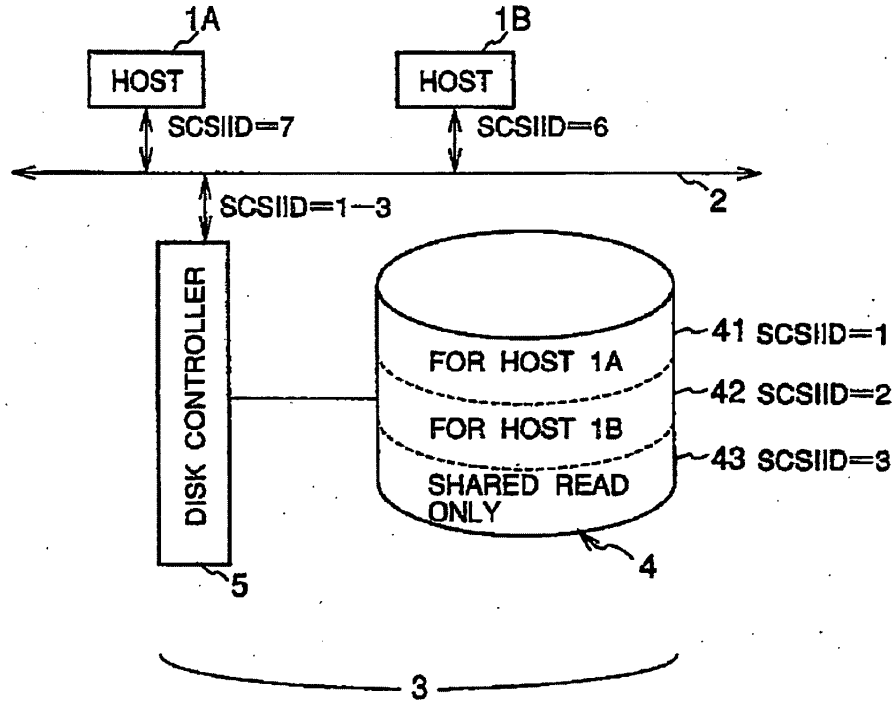


FIGURE 4 of Oeda

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Using the Example of FIGURE 4 of Oeda, a SCSI magnetic disk storage device 3 (including disk controller 5 and drive unit 4) is connected to two host computers through SCSI bus 2. Thus, hosts communicate to storage devices in this Oeda system using only parallel SCSI; there is no serial transport medium between the hosts and the disk storage device. Consequently, for the reasons discussed above regarding Spring, the Oeda storage device 3 of FIGURE 4 is not remote from the host computers as recited in the independent Claims of the '035 Patent.

Like Spring, Oeda also provides an alternative embodiment that has the capability to provide hosts access to remote storage as shown in FIGURE 6 of Oeda reproduced below. Like Spring, this Oeda embodiment also fails to allow access to remote storage devices using NLLBP.

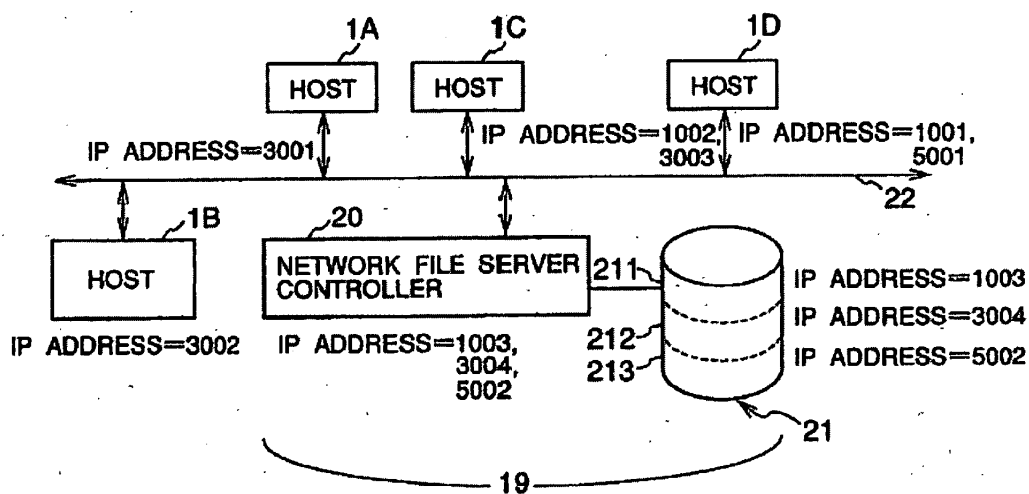


FIGURE 6 of Oeda

In FIGURE 6 of Oeda, Oeda replaces the SCSI bus 2 of FIGURE 4 with an Ethernet connection 22 and inserts into the system a network file server 19. See, Oeda, col. 9, lines 48-67 and FIGURE 6. As this embodiment of Oeda points out, access to remote storage devices required the use of higher-level network protocols and is not done using NLLBP. There is no teaching or suggestion in Oeda to the contrary. In fact, Oeda recognizes that a translation from the network protocol to a NLLBP must occur stating "host computer 1B must accept and deliver

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commands and data in which the differences of communication protocols for the SCSI bus 21 and Ethernet are considered.” See, Oeda, col. 9, lines 47-60 (describing replacing the SCSI bus of FIGURE 5 with a network such as Ethernet). Further in conjunction with FIGURE 6, Oeda describes that while this embodiment allows the storage device to be shared among hosts using different operating systems and network protocols, it still requires the use of high-level network protocols between the host computers and file server (e.g., the network protocols used by UNIX, MS-DOS and the general purpose computer to communicate via Ethernet). See, Oeda, col. 10, lines 22-68.

Again, these Ethernet-based systems of Oeda are precisely the types of systems that the present invention was designed to overcome because they **do** involve the overhead of high level network protocols typically required by network servers and they **do** require a translation of a network protocol into SCSI commands at the network server when allowing workstations to make requests to and from storage devices. Thus, similar to Spring, Oeda simply does not teach or suggest the limitation “to allow access from devices connected to the first transport medium to the [remote] storage devices using native low level, block protocols.” (emphasis added).

5. Summary – Allowing Access to Remote Storage Devices Using NLLBP

Neither Oeda or Spring, alone or in combination, teach or suggest allowing access from host devices to remote storage devices using NLLBPs. Spring teaches a SCSI-to-SCSI system in which workstations are connected to a network server via a SCSI bus. Spring does not disclose in this embodiment any distance capable serial transport medium, but simply the limited distance, parallel SCSI transport medium. Consequently, the SCSI-to-SCSI system of Spring does not allow access to “remote” storage devices as recited in Claims 1 and 11. In order to provide the ability to access remote storage devices, Spring introduces Ethernet connectivity (replacing the SCSI bus between the workstations and the server with an Ethernet connection) and higher-level network protocols. Because this Ethernet-to-SCSI embodiment of Spring requires the use of higher-level network protocols it does not “allow access from devices connected to the first transport medium to the [remote] storage devices using native low level, block protocols” as recited in Claims 1 and 11.

Similarly, Oeda teaches a SCSI based system and an Ethernet based system that suffer the same deficiencies as the systems of Spring. In the SCSI based system of Oeda, the storage device is also not indirectly connected to the host computer by at least one serial

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transport medium. Consequently, the magnetic storage device is not “remote” from the host computers. The Ethernet based systems of Oeda require the use of higher-level network protocols and, as in Spring, do not “allow access from devices connected to the first transport medium to the [remote] storage devices using native low level, block protocols.”

Thus, in Spring and Oeda, the storage devices are not remote and access to them from the host is not provided using NLLBPs. Rather, the storage devices are connected using limited distance parallel SCSI buses. In order to provide access to a remote storage device, a higher level network protocol must be introduced. That is, in order to allow the storage devices to become remote in Spring and Oeda, access is no longer provided from the workstations to the storage devices using a NLLBP.³ Applicants therefore respectfully submit that Spring and Oeda do not teach or suggest providing “virtual local storage on remote storage devices” and providing access “from a device connected to a first transport medium to the [remote] storage devices using native low level block protocols” as recited in independent Claim 1. As the cited references, alone or in combination, do not teach or suggest this feature of the present invention, Applicants respectfully request allowance of Claim 1. As will be discussed more fully below, these references certainly do not teach or suggest allowing access to remote storage devices in conjunction with mapping and access controls as claimed in the '035 Patent.

E. “Map” – Neither Spring nor Oeda Teaches or Suggests Mapping Between Devices Connected to the First Transport Medium and the Storage Devices

1. A Map Includes a Representation of the Devices on the First Transport Medium and the Storage Devices

Claim 1 recites a supervisor unit operable “to map between devices connected to the first transport medium and the storage devices.” Claims 7 and 11 contain similar features. Mapping between devices connected to the first transport medium and storage devices in the present application refers to a mapping between the workstations/host computers and storage devices such that a particular workstation/host computer on the first transport medium is associated with a storage device, storage devices or portion thereof on the second transport

³ Jibbe, a reference directed to a SCSI interface, simply does not address the issue of remote storage devices or allowing access to these remote storage devices using NLLBPs.

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medium. As discussed in the '035 Patent Specification, the mapping provides a correlation between devices on the first data transport medium and the storage devices through one or more steps. See, '035 Patent, col. 2, lines 9 – 12, col. 2, lines 20-21, and col. 8, line 61 – col. 9, line 5. In addition, the Federal District Court in the Chaparral and Pathlight Litigations defined the term “map” in its Markman Order as follows: “to create a path from a device on one side of the storage router to a device on the other side of the router, i.e., from a Fibre Channel device to a SCSI device (or vice-versa). A map contains a representation of devices on each side of the storage router, so that when a device on one side of the storage router wants to communicate to a device on the other side of the storage router, the storage router can connect the devices.” See, Markman Order, Exhibit C, page 12 (emphasis added). Thus, the mapping of the '035 Patent associates the host device(s) on the first transport medium with storage devices on the second transport medium to create a path between the host and the remote storage device (or portion thereof). For example, the map can include mapping a host workstation identifier (e.g., address or other identifier) and a virtual representation of a storage device (e.g., a virtual LUN), and potentially even further from the virtual representation of the storage device to a physical representation of the storage device (e.g., a physical LUN).

2. Neither Spring nor Oeda Teaches or Suggests a Map

As an initial matter, Examiner Fleming recognizes that Spring does not map between devices connected to the first transport medium and the storage devices as recited in Claim 1 (and likewise does not point to any place in Jibbe that teaches or suggests such a mapping). See, May 24 Office Action, page 7 (Spring “does not set forth a mapping between the workstations and the storage devices”). Instead, Examiner Fleming attempts to rely on Oeda to show mapping. See, May 24 Office Action, page 7 (“a mapping between workstations (in the form of HOSTs) and the assigned partitions (41-43) is clearly shown”). Oeda, however, does not teach mapping as recited in the '035 Patent because there is no “map” that contains a representation of a device on one side of the storage router and a representation of a storage device on the other side of the storage router so as to create a path to connect the device to the storage device (e.g., to connect the fibre channel host device to a SCSI storage device).

There is no map in Oeda that includes a representation of devices on one side of the disk controller and storage devices on the other side. Such a map is not necessary or used in Oeda, at least in part, because the Hosts are responsible for knowing which target SCSI IDs they can request and the disk controller processes target SCSI IDs without regard to the host

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that asserts the ID. Oeda discloses a host-based methodology to associate hosts with a storage partition and does not disclose a “map between devices connected to the first transport medium and the storage devices.” See Oeda, Col. 8, lines 9-13 (host computers are set by the operating system). In Oeda, SCSI IDs for target devices are processed by a SCSI control large-scale integrated circuit (“LSI”) as described in conjunction with FIGURE 7. The LSI contains n comparators and ID registers, with each register containing a SCSI ID for a target device. See Oeda, col. 5, lines 44-48. When a host computer requests a particular target, it does so in the “selection phase” by marking “true” the data line among the eight data lines of the SCSI bus which correspond to the SCSI ID number of the target. See *id.* at col. 5, lines 14-22. Each comparator compares the ID number asserted during the selection phase (e.g., the ID of the desired target) with the ID in the respective register and, if a match is made, generates an ID coincidence signal. See *id.* at col. 5, lines 48-51. Using the example of FIGURE 7, if a host asserts ID 1 on the SCSI bus, comparator 74 will compare the asserted ID to the contents of register 71, comparator 75 will compare the asserted ID to the contents of register 72 and comparator 76 will compare the asserted ID to the contents of register 73. Because the asserted ID matches the contents of register 71, comparator 74 will generate an ID coincidence signal, indicating that the host is requesting SCSI ID 1. The CPU will then process the subsequent commands and data to read data from or write data to the appropriate partition associated with SCSI ID 1 (e.g., partition 41). See, Oeda, col. 5, line 64 through col. 6, line 13. This process is done without regard to the host that actually asserted the SCSI ID 1 in the selection phase. Thus, whenever LSI receives SCSI ID 1 in the selection phase, it processes the corresponding command to read from or write to the appropriate partition regardless of the host device that asserted SCSI ID 1.

The Examiner cites Oeda at Column 7 lines 53-Column 8, line 30 for the proposition that Oeda shows a “map”, however, this reliance on Oeda is misplaced. In a multi-host environment, such as that depicted in FIGURE 4 of Oeda (shown above), each host is set beforehand by its operating system to only request specific SCSI ID’s. See Oeda, col. 8, lines 9-31. Put another way, the operating system sets each host to limit the target SCSI IDs that host can select during the SCSI selection phase. In the example of Oeda, Host 1A is configured by the operating system to request only SCSI ID 1 and SCSI ID 3 and Host 1B is configured by the operating system to request only SCSI ID 2 and SCSI ID 3. See Oeda, col. 7, lines 57-65. Oeda states that it is the operating system of the computer system that sets the host computers beforehand. See Oeda, col. 8, lines 9-13. After the OS sets the host computer

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selection configuration, when a particular host selects a particular target ID, for example target ID 1, the LSI of the disk controller identifies the appropriate partition (e.g., partition 41) as described in conjunction with the selection logic of FIGURE 7. Due to Oeda's method for using the operating system to set hosts, the disk controller does not have to (and does not) map host IDs to target SCSI IDs because only hosts configured to request target ID 1, will request ID 1 in the selection phase. Indeed, Oeda fully admits that it does not need or use such a map, stating "when disk controller 5 performs the exclusive control between an access from the host computer 1A and an access from the host computer 1B, it need not consider the difference of the device ID's (here SCSI ID's=7,6) *of the respective host computers 1A and 1B*, but it may merely judge pertinent ones of the device ID's (SCSI ID's=1, 2 and 3) of the respective partitions 41, 42, 43 selected by the host computer 1A and 1B." Oeda, col. 8, lines 20-30 (emphasis added).

Thus, in the Oeda host-based system, the *hosts* know which target SCSI IDs to request and therefore there is no need for a map at the disk controller that controls whether a particular host is mapped to (and can therefore access) a particular storage device (or portion of a storage device). In Oeda each host knows the storage device SCSI IDs it is permitted to access and makes requests only to those storage device IDs. When the disk controller receives a target SCSI ID from a host it directs commands and data to the partition associated with that requested target SCSI ID without regard to the host that made the request. In other words, the disk controller in Oeda does not consult any map to determine whether the host should be connected to the requested target SCSI ID; rather, if the disk controller of Oeda receives a request, it simply forwards it to the appropriate SCSI ID. There is simply no teaching or suggestion in Oeda that disk controller 5, or any other device in Oeda, maintain a "map" that contains a representation of host devices on one side of the disk controller and representations of storage devices on the other side of the disk controller as recited in the claims of the '035 Patent.

Thus, while Oeda does touch on the concept of setting host computer configuration by the operating system (see Oeda, col. 8, lines 9-13), it does not teach or suggest doing any form of "mapping" as claimed in the '035 Patent. For example, setting the host configuration to define which target SCSI IDs a host may request can be done by setting registers in the host's host bus adapter ("HBA"). This methodology entails setting flags in registers of the host HBA indicating which SCSI bus lines the host can or cannot set as true. Thus, each host would simply have a listing or set of flags that indicate which target SCSI IDs are available to that

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host, but not a map as recited in the '035 Patent that represents that host device itself or the storage devices (i.e., Host 1A does not map itself to storage devices, but simply contains a list or set of register settings indicating that the HBA can only assert true on the bus lines for target SCSI ID 1 and SCSI ID 3). Neither the disk controller nor the individual hosts in Oeda are operable to map between devices on the first transport medium and storage devices. Thus, the host-based configuration method discussed by Oeda does not teach or suggest a map as recited in the '035 Patent.

Furthermore, the mapping recited in the '035 Patent is between host devices connected to the first transport medium and the storage devices that are remote from the host devices. As discussed above, Oeda achieves remoteness through the introduction of Ethernet as discussed in conjunction with FIGURE 6 without the use of NLLBPs. In the Ethernet based system of Oeda, portions of storage are assigned IP addresses based on the operating system/network protocol that is allowed access that IP address and *not* the specific hosts that can access the storage. See, Oeda, col. 10, lines 14-22. Thus, for example, in FIGURE 6 of Oeda, partition 213 is assigned IP address 5002, which is accessible by MS-DOS based computers (i.e., any host computer that runs MS-DOS). In contrast to the invention claimed in the '035 Patent, there is no map between hosts devices and storage devices as the partitions of Oeda's Ethernet system are simply "held in correspondence with OS's and network protocols." See, Oeda, col. 10, lines 24-27. Once again, the Oeda system controller (network file server 19 in FIGURE 6) does not contain a map with representations of particular host computers associated with particular storage partitions, but rather Oeda simply reviews the incoming request to a partition, sees that the incoming request uses a network protocol compatible with the IP address, and allows the request to go to the storage partition without regard to which host sent the request. This is not, and Oeda therefore does not teach or suggest, a map containing a representation of the host devices associated with a representation of the remote storage devices as recited in the claims of the '035 Patent.

F. "Access Controls" – Neither Spring nor Oeda Teaches or Suggests Implementing Access Controls

1. Implementing Access Controls

Claim 1 recites a supervisor unit operable "to implement access controls for storage space on the storage devices and . . . to allow access from devices connected to the first

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transport medium to the storage devices using native low level, block protocols.” To implement access controls requires more than simply allowing a host to have access to a storage device. Implementing access controls is a security measure designed to prevent unauthorized access from workstations to particular storage devices or subsets of storage as claimed and described in the ‘035 Patent. When access controls are implemented, particular workstations may be permitted or denied access to particular storage devices or subsets of storage devices. See, e.g., FIGURE 3 of the ‘035 Patent and Graphic 5 above. The storage router uses access controls and routing “such that each workstation has controlled access to only the specified partition of [a storage device] which forms virtual local storage for the workstation. This access control allows security control of the specified data partitions.” See, ‘035 Patent, col. 4, lines 29-34. Further, according to the Markman Order, to “implement access controls” for storage space on the storage devices means to provide “controls which limit a computer’s access to a specific subset of storage devices or sections of a single storage device.” See, Markman Order, Exhibit C, page 6.

The access controls of the ‘035 Patent depend on the map discussed above to control access of devices on a first transport medium (e.g., workstations) to storage devices such that requests from devices connected to the first transport medium are directed to assigned virtual local storage on the storage devices. In other words, the storage to which each workstation is permitted access is controlled through the use of the map. See, ‘035 Patent, col. 4, lines 13-16 (“storage allocated to each . . . workstation 58 through the use of mapping tables or other mapping techniques”). Thus, “the router can . . . map, for each initiator, what storage access is available and what partition is being addressed by a particular request. In this manner, the storage space provided by [storage devices] can be allocated to [devices connected to the first transport medium]” See ‘035 Patent, col. 8, lines 67 – col. 9, line 5.

The access controls of Claim 1 thus permit or deny access from particular host devices connected to the first data transport medium to particular storage devices (or subsets thereof) according to a map that associates the host devices with the remote storage devices. The access controls are part of the configuration for routing commands according to the map from a device connected to the first transport medium to *defined* storage location(s) using NLLBPs (i.e., without requiring the overhead of high level protocols typically required by network servers). The access controls of the present invention thus limit access by workstations to storage devices or subsets of storage devices by allocating storage according to the map.

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2. Spring Does Not Implement Access Controls

Regarding Spring, Examiner Fleming stated:

Implementing of access controls is clearly described throughout the disclosure, especially noting that each USER has access to a large number of removable disc drives (see page 7, lines 18-27), thereby teaching the implementation of *some sort of access controls*, with the storage router (server 20) determining if the requested drive is available, and if so, granting access to the requesting workstation (see page 8, lines 10-17). Thus the access is ultimately controlled and allowed by the storage router (server 20). See, May 24 Office Action, page 6.

The passage of Spring cited by Examiner Fleming, namely page 8, lines 10-17, describes a conventional mechanism by which a server coordinates host access to SCSI drives, however this conventional mechanism is accomplished without access controls as defined in the '035 Patent as the coordination of host access described in Spring does not assign particular storage devices or portions thereof to particular workstations (or other device on the first transport medium). This conventional mechanism is not designed to limit any particular host from accessing any particular storage device, but rather to coordinate access to storage between hosts so as to avoid contention between hosts for the same storage. In the conventional mechanism described in Spring, when a workstation requests a logical disk drive, the server determines if the requested logical disk drive is available and if the logical disk drive is available, allows the workstation to access the logical disk drive. Under this scheme, any workstation can access the logical disk drive so long as the drive is available. In other words, Spring does not describe any mechanism that limits host access based on the ID of the host or which particular storage device the host wishes to access; rather, Spring simply uses a conventional SCSI mechanism to coordinate access based on storage device availability. There is simply no teaching or suggestion in Spring that the availability of the logical drive depends on the workstation requesting the drive and whether that particular workstation has been associated with that drive according to some mapping technique. In Spring, there is no map between the workstations of Spring and the emulated SCSI removable drives (as discussed above) that implements access controls to limit a particular workstations ability to access particular emulated SCSI removable drives.

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This lack of access controls is demonstrated by Spring's utilization of aspects of removable SCSI drives to coordinate operations between workstations and the fixed SCSI disks. As described above, server 20 in Spring presents large fixed disk drives as multiple, smaller SCSI removable disks. When a workstation wishes to access one of the emulated SCSI removable disks, the workstation will request the logical drive using conventional SCSI command. See, Spring, page 8, lines 4-8. The server will determine if the logical disk drive is available and, if so, will return data to the workstation regarding the logical disk drive including the fact that the logical drive is removable. See, Spring, page 8, lines 10-17. The workstation can then transfer data to the logical disk. See, Spring, page 9, lines 1-3. Once the data transfer is complete, the workstation will issue a SCSI DISMOUNT command to the emulated SCSI removable disk drive. See, Spring, page 10, lines 17-20. Server 20 "acts upon the dismount command by *releasing the logical drive such that it can be accessed by other workstations*." See, Spring, page 10, lines 24-25 (emphasis added). Thus, Spring is utilizing mechanisms to coordinate access between hosts and storage devices to make sure the storage devices is available.

However, in contrast to the invention of the '035 Patent, this methodology described in Spring does not limit access of particular workstations to specific assigned subsets of storage devices or portions thereof. Rather, any workstation can access any logical removable drive so long as that logical removable drive is not busy (i.e., is available). The use of the DISMOUNT command is to facilitate the coordination of operations of the multiple workstations that all have access to the same portions of the fixed disk drives, and *does not* prevent the access of particular workstations to specific portions of the fixed disk drives. There is simply no mechanism in Spring that prevents particular hosts from accessing particular storage. Spring thus teaches a system that *coordinates* access by multiple workstations to shared disk drives, not a system that permits or denies access by particular workstations to shared disk drives (i.e., Spring does not "limit a computer's access to specific subset of storage devices or sections of a single storage device"). Applicants respectfully submit that Spring as cited by Examiner Fleming does not teach access controls as defined by the '035 Patent. Accordingly, Applicants respectfully request allowance of Claims 1, 7 and 11 and the respective dependent Claims.

Moreover, the Ethernet based system of Spring does not teach or suggest providing access controls for storage devices that are accessed by host computers using a NLLBP. As discussed above, the Ethernet based system of Spring relies on higher level protocols to achieve remote storage. In fact, Spring provides no discussion as to how to implement access

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controls in its Ethernet methodology (e.g., there is no discussion how emulating removable SCSI drives are presented over Ethernet to a host or how the DISMOUNT command is processed over Ethernet). Indeed, while there are no access controls as defined by the '035 Patent disclosed in Spring's SCSI-to-SCSI implementation, there is no discussion of any mechanism to limit access for the barely mentioned Ethernet based system of Spring. Thus, Spring fails to teach or suggest implementing access controls from remote storage devices that are accessed by a host computer using an NLLBP. Accordingly, Applicants respectfully request allowance of Claims 1 and 11.

3. Oeda Does Not Teach or Suggest Access Controls

Claim 1 (and Claim 10) of the '035 Patent recites "a supervisor unit . . . operable to . . . implement access controls for storage space on the storage devices." Similarly, Claim 7 recites a storage router "to implement access controls for storage space on the storage devices." The supervisor unit of Claim 1 and storage router of Claim 7 are each clearly configured to connect between the data transport medium to which the host devices are connected and the data transport medium of the storage devices are connected to provide for centralized management of access controls, thus allowing the ability to centrally control and administer storage space. *See*, '035 Patent, col. 2, lines 33-38. Claim 11 further recites together "mapping between devices connected to the first transport medium and implementing access controls for storage space on the storage devices." The mapping and implementing access controls, as discussed above, are tied together as access controls are implemented to "cause certain requests from FC Initiators to be directed to assigned virtual local storage." *See*, '035 Patent, col. 8, lines 61-64. Again, access controls are performed by a device (supervisor unit/storage router) where mapping between devices on the first transport medium and the storage devices occurs, allowing for central control of storage space.

The SCSI-to-SCSI implementation of FIGURE 4 of Oeda does not provide for this type of access controls. In other words, there is no device in the system of FIGURE 4 of Oeda that manages storage space for hosts using mapping. Instead, in Oeda each host computer is set by the operating system to be assigned to a particular partition. Thus each host in Oeda contains flags, or other indications set beforehand, of the target SCSI bus lines corresponding to target SCSI IDs it can request so that each host can only request those target IDs (e.g., Host 1A is configured so that it can only send requests to SCSI ID 1 and SCSI ID 3). *See*, Oeda,

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col. 8, lines 9-14. Because Host 1A is configured not to request SCSI ID 2, it will not erroneously request partition 42. See, Oeda, col. 8, lines 14-16. The control of the SCSI IDs and therefore corresponding partitions that hosts can request thus occurs at *each of the hosts* and not at a supervisor unit/storage router or mapping as in the Claims 1, 7 and 11 of the '035 Patent.

In contrast to Oeda, Claims 1 and 7 of the '035 Patent require a supervisor unit or storage router that "implements access controls". In contrast, Oeda, has no supervisor unit or storage router connected between the hosts and remote storage devices that implements access controls. The disk controller 5 of Oeda as shown with reference to LSI 6 of FIGURE 7, simply forwards requests for a particular SCSI ID to the appropriate target. The disk controller does not process the host IDs, or perform any other mechanism to limit access of any particular host to any particular storage. The disk controller merely processes "pertinent ones of the device ID's (SCSI ID's=1, 2 and 3) of the respective partitions 41, 42, 43 selected by the host computer 1A and 1B." Oeda, col. 8, lines 20-30. Disk controller 5 is completely agnostic as to which host asserts a specific target ID as it is assumed in Oeda available target IDs are set beforehand at the hosts. Thus, disk controller 5 does not act as a storage router or supervisor unit that implements access controls for the storage space to limit a host's access to portions of the storage space.

Similarly, Oeda does not have a "mapping between devices connected to the first transport medium and the storage devices and implementing access control for storage space" as recited in Claim 11. In the '035 Patent, the implementation of access controls is accomplished in conjunction with the map which maps the host devices to the remote storage devices. As discussed above, neither the disk controller 5 of Oeda nor any other component of Oeda utilize a map that maps between devices connected to the first transport medium and the storage devices. There is, consequently, no component of Oeda that uses a map to provide for management of storage space by "mapping between devices connected to the first transport medium and the storage devices and implementing access controls for storage space." In other words, there is no teaching in Oeda of implementing access controls by providing a mapping of what storage access is available and what partition is being addressed by a particular request such that "the storage space provided by [storage devices] can be allocated to [devices connected to the first transport medium]" See '035 Patent, col. 8, lines 67 – col. 9, line 5.

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In Oeda, because the hosts are set to know which SCSI IDs they can request and any host (or other device) that asserts a particular SCSI target ID is granted access to the corresponding partition, there is simply no mechanism (e.g., supervisor unit, storage router or mapping) that limits each particular hosts' access to the storage device or particular partitions of the storage device. Therefore, Applicants respectfully request allowance of Claims 1, 7 and 11.

4. The Ethernet Based Configuration of Oeda Does Not Teach or Suggest Any Form of Access Controls For Remote Storage

As discussed previously, the storage devices for which access controls are provided are "remote storage devices" that are remote from the host devices requesting access. The portions of Oeda cited by the Examiner, namely those associated with of FIGURE 4, as allegedly providing access controls are discussed entirely within the context of a local, SCSI-to-SCSI storage implementation. While this host-based mechanism of Oeda is not the claimed access controls mechanism of the '035 Patent (as discussed above), Oeda provides no teaching or suggestion as to how even that host-based mechanism could be implemented for remote storage and, indeed, discards entirely that host-based storage allocation mechanism of FIGURE 4 when moving to the remote storage implementation of FIGURE 6.

As discussed above, Oeda introduces Ethernet to achieve remoteness. As shown in FIGURE 6, portions of storage are assigned IP addresses based on the operating system that can access that IP address, not the specific hosts that can access the storage. See, Oeda, col. 10, lines 14-22. Thus, for example, partition 213 is assigned IP address 5002, which is accessible by MS-DOS based computers. See, Oeda, col. 10, lines 37-39. Any computer that supports MS-DOS can access partition 213. See, Oeda, col. 10, lines 46-54 (explaining how the network file server handles requests to a particular IP address). The network file server does not provide any security to prevent hosts using the same operating system from accessing each other's data but simply forwards requests to a particular IP address to the proper storage.

While Oeda discloses providing remote storage, this is done using a higher level network protocol (not using NLLBP) without any access controls as claimed in the '035 Patent. Any computer using the same operating system and higher level network protocols can access the same partitions of storage. Oeda does not teach or suggest providing access controls for remote storage that is accessed by a host using NLLBP and, consequently, does not remedy

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the deficiencies of Spring. Applicants therefore respectfully request allowance of Claims 1 and 11.

G. The Combination of Oeda and Spring Does Not Teach or Suggest the Present Invention

Even assuming *arguendo* that Spring and Oeda can be combined as suggested by Examiner Fleming, these references in combination do not teach or suggest the present invention. If combined in a SCSI-to-SCSI system, the combination of Spring and Oeda fails to teach or suggest mapping and implementing access controls for the storage space or mapping and implementing access controls at a supervisor unit or storage router. For remote storage, both Spring and Oeda teach the use of higher level network protocols and neither teaches mapping between devices connected to the Ethernet transport medium and the remote storage devices or implementing access controls for the storage space on the remote storage devices. Thus, the combination of Spring and Oeda fails to disclose allowing access to remote storage using a NLLBP in conjunction with providing a mapping between devices connected to a first transport medium and remote storage in conjunction with implementing access controls for the remote storage devices.

H. The Jibbe Reference Does Not Address the Deficiencies of Spring and Oeda

Jibbe discloses a SCSI interface that is used to connect a host computer to a SCSI disk array. The interface of Jibbe allows a host computer to transfer operations to a number of disk drives configured as a RAID 1, 2, 3, 4, or 5 disk array. See, Jibbe, Abstract. There is simply no teaching or suggestion in Jibbe that the disk array should be attached by anything other than a local SCSI bus and consequently does not teach or suggest remote storage devices. Moreover, Examiner Fleming did not cite the Jibbe reference as showing, nor does the Jibbe reference appear to show, mapping between devices connected to the first transport medium and the storage devices, implementing access controls or allowing access from hosts to storage devices using NLLBP.

I. Summary: There is No *Prima Facie* Case of Obviousness

The '035 Patent provides a system and method which allows a host computer to access remote storage devices using an NLLBP, while mapping between the host computers and

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remote storage devices (or portions thereof) and implementing access controls for storage space on the remote storage devices. Spring and Oeda teach either local SCSI-to-SCSI systems that do not provide remote storage or Ethernet-to-SCSI systems that rely on higher level protocols. While the Examiner has attempted to point to access controls in Spring and access controls and mapping in Oeda, these references show neither access controls nor mapping. Moreover, the portions in Spring and Oeda relied on for mapping and access controls (which do not, in fact, show mapping and access controls as discussed above) only apply to the SCSI-to-SCSI local storage implementations and do not apply to the Ethernet-to-SCSI implementations of these references that allow for remote storage. Consequently, Spring and Oeda do not show a system or method that provides access from host computers to remote storage using NLLBP, while applying access controls that limit a host computer's access to specified portions of the remote storage, nor do they teach mapping between the host computers and the remote storage devices.

None of the additional art cited by the Examiner remedy the deficiencies of Oeda and Spring. Jibbe does not address the issue of remote storage, nor does Jibbe discuss access controls or mapping.

Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness for Claims 1-14 as the prior art references do not disclose, teach or suggest all of the claim limitations. Specifically, the prior art cited by Examiner Fleming does not teach or suggest: i) providing virtual local storage on remote storage devices and allowing access from devices connected to the first transport medium to the remote storage devices using a NLLBP; in conjunction with ii) mapping between devices on the first transport medium and the storage devices; in conjunction with iii) implementing access controls. While Examiner Fleming provided a thorough analysis of Spring and Oeda, these references simply fail to teach the claimed limitations. Furthermore, Jibbe does not make up for the deficiencies of Spring and Oeda. Accordingly, Applicants respectfully request allowance of Claims 1-14.

II. Conclusion

Applicants appreciate Examiner Fleming's consideration of the previous response and Examiner's interview when drafting the May 24 Office Action. Moreover, Applicants further appreciate Examiner Fleming's careful and detailed review of all of the submitted prior art and the issuance of a non-final office action. Applicants respectfully submit, however, that Claims

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1-14 are distinguishable from Spring, Oeda and Jibbe for the reasons stated herein. Therefore, Applicants respectfully request allowance of all claims subject to reexamination.

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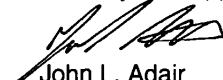
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 - pages of specification and/or sequence listing
 - and/or table
 - Doc Code: Artifact Artifact Type Code: S
 - content unspecified or combined
 - Doc Code: Artifact Artifact Type Code: U

- Stapled Set(s) Color Documents or B/W Photographs
Doc Code: Artifact Artifact Type Code: C

- Microfilm(s)
Doc Code: Artifact Artifact Type Code: F

- Video tape(s)
Doc Code: Artifact Artifact Type Code: V

- Model(s)
Doc Code: Artifact Artifact Type Code: M

- Bound Document(s)
Doc Code: Artifact Artifact Type Code: B

- Confidential Information Disclosure Statement or Other Documents marked Proprietary, Trade Secrets, Subject to Protective Order, Material Submitted under MPEP 724.02, etc.
Doc Code: Artifact Artifact Type Code X

- Other, description: _____
Doc Code: Artifact Artifact Type Code: Z

March 8, 2004

EXHIBIT B

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
AUSTIN DIVISION

FILED
AUSTIN DIVISION

2005 JA 21 AM 11:28

WESTERN DISTRICT OF TEXAS
U.S. CLERK'S OFFICE

BY: [Signature] DEPUTY

CROSSROAD SYSTEMS (TEXAS), INC.,
Plaintiff,

-vs-

Case No. A-03-CA-754-SS

DOT HILL SYSTEMS CORPORATION,
Defendant.

REPORT AND RECOMMENDATION OF THE SPECIAL MASTER
REGARDING UNITED STATES PATENT NOS. 5,941,972 and 6,425,035 B2

Attached hereto is the Special Master's Report and Recommendation to United States District Judge Sam Sparks regarding the construction of claims in United States Patent Nos. 5,941,972 ("the '972 patent") and 6,425,035 B2 ("the '035 patent").

The Special Master notes that during the course of the pre-hearing and post-hearing briefing as well as the *Markman* hearing itself, the parties reached agreement on certain terms initially identified as being in dispute. For instance, the parties' stipulated definition of the claim term "native low level, block protocol," which is the same in both patents, was incorporated into their Stipulated Definitions of Claim Terms [#131], filed with the Court on August 31, 2004. Also, although Crossroads initially identified the term "remote storage devices" in the '035 patent as one of the terms requiring the Court's construction, it has apparently abandoned that position since the parties' dispute over the meaning of "remote storage devices" may be resolved by the Court's construction of the word "remote" without the need for a separate construction of the entire phrase.

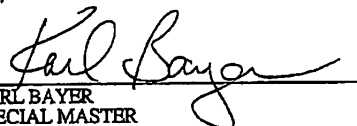
Additionally, in its post-hearing briefing, Crossroads stipulated to Dot Hill's definition of the term "allow access" in both patents based on the representations of Dot Hill's counsel at the hearing and in Dot Hill's briefing that the portion of Crossroads' proposed definition which was excluded by Dot Hill's definition—"preventing unauthorized communication"—is part of the definition of the phrase, "implementing access controls," which also appears in the patents. See

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Crossroads's Post-Hr'g *Markman* Br. at 8; Tr. of *Markman* Hr'g at 119:2-19; Dot Hill's Post-*Markman* Hr'g Claim Construction Br. at 22.

Proposed constructions for the remaining disputed terms are attached hereto. The parties may file written objections to the recommendations made in this report within ten (10) days from the date of their receipt of it pursuant to the Court's Order of February 23, 2004.

SIGNED this the 19th day of January 2005.


KARL BAYER
SPECIAL MASTER

Actual Claims Language	Crossroads' Proposed Construction	Crossroads' Evidence	Dot Hill's Proposed Construction	Dot Hill's Evidence	Special Master's Construction
<p>A storage router for providing virtual local storage on remote storage devices to devices, comprising a buffer providing memory work space for the storage router; a first controller operable to connect to and interface with a first transport medium;</p>	<p>Remote: "Indirectly connected through at least one serial network transport medium that encapsulates the native low-level block protocol."</p>	<p>Remote: Intrinsic: '035 patent: col. 1, ll. 23-36; col. 2, ll. 1-34; col. 5, ll. 46-48; col. 5, ll. 52-57; col. 6, ll. 19-31; col. 9, ll. 26-31. Extrinsic: Tr. 102:14-20; Rhyne Cross, Tr. 159:17-18; Rhyne Cross, Tr. 161:7-8; Rhyne Cross, Tr. 174:14-24; Tr. 180:5-14; Mr. Ervine's Notes, Shelton Decl. ISO Crossroads' Reply, Ex. 4.</p>	<p>Remote: Indirectly connected and capable of physical separation. NOTE: This is the definition of <i>remote</i>, but since this phrase appears only in the preamble to explain the context in which the storage router is used, it is not a limitation of this claim.</p>	<p>computer through a network)." (DHS Brief Ex. 10) Remote: Intrinsic: '035 Patent: Col. 1, lines 39-42 using the term "remote" to refer to storage which is not "local," and defining "local" as "a disk drive, tape drive, CD-ROM drive or other storage device contained within, or locally connected to the workstation." Col. 1, lines 63-67, describing storage capacity which is not local as "remote." Col. 2, line 32 "significantly remote" Extrinsic: <i>Webopedia</i> definition of "remote" (Last modified</p>	<p>Special Master's Construction</p>

Special Master's Proposed Construction of Disputed Terms			
Actual Claims Language	Crossroads' Proposed Construction	Crossroads' Evidence	Dot Hill's Proposed Construction
			<p>September 1, 1996) as "In networks, remote refers to files, devices, and other resources that are not connected directly to your workstation. Resources at your workstation are considered local" (DHS Brief Ex. 6)</p> <p><i>Webopedia</i> definition of "local" (Last modified September 1, 1996) as "In networks, local refers to files, devices, and other resources at your workstation. Resources located at other nodes on the network are remote." (DHS Brief Ex. 6)</p> <p>Deposition of inventor Hoese, pages 143, 146, 147, 154-155 confirming that "remote" is not a function of distance by stating "it appears to be that the intent was to describe the storage as</p>
			Special Master's Construction

Actual Claims Language	Crossroads' Proposed Construction	Crossroads' Evidence	Dot Hill's Proposed Construction	Dot Hill's Evidence	Special Master's Construction
				<p>not being directly connected as local storage would be, but to be connected remotely, as in across a network or other means." (DHS Brief Ex. 14)</p> <p>Deposition of inventor Russell pages 104-105 confirming that "remote" is not a function of distance by stating "And it might be right next to me or it could be, you know, across the country, but that would allow me to get at that remote storage." (DHS Brief Ex. 15)</p> <p>Declaration of Rhyne, paragraph 19, stating that "[t]he meaning of 'remote' in general and in the specific context of the Crossroads patents has nothing to do with the physical distance between a workstation</p>	

Actual Claims Language	Crossroads' Proposed Construction	Crossroads' Evidence	Dot Hill's Proposed Construction	Dot Hill's Evidence	Special Master's Construction
				<p>and a storage device, but rather has to do with the topological nature of the interconnection between those devices." (DHS Responsive Brief Ex. 18)</p> <p>Declaration of Rhyme, paragraph 27, stating that "[t]he common meaning of 'remote' is the opposite of 'local,' and does not carry a distance characteristic." (DHS Responsive Brief Ex. 18)</p> <p>Declaration of Hodges in Support of Crossroads' Opening Markman Brief (7/27/04), paragraph 9, stating that "The term 'local storage' typically refers to storage devices which are directly connected to the computer (as opposed to storage devices connected to a computer through a network). Local storage also</p>	

Special Master's Proposed Construction of Disputed Terms			
Actual Claims Language	Crossroads' Proposed Construction	Crossroads' Evidence	Dot Hill's Proposed Construction
			Dot Hill's Evidence
			Special Master's Construction
a second controller operable to connect to and interface with a second transport medium; and a supervisor unit coupled to the first controller, the second controller and the buffer, the supervisor unit operable to map between devices connected to the first transport medium and the storage devices,	Supervisor Unit: "A computer processing device programmed to process data in a buffer in order to map between device connected to a first transport medium and devices connected to a second transport medium which implements access controls."	Supervisor Unit: Intrinsic: '035 patent: col. 6, ll. 3-10; col. 9, ll. 22-31. Extrinsic: Hodges Direct, Tr. 36:3-37:9.	typically refers to storage devices which are located a very short distance from the computer, i.e. a few feet" (Crossroads' Brief) Markman hearing testimony of Rhyne at 15:3-15, showing that a definition of "remote" could be simply "indirectly connected." (Hearing Transcript)
			Supervisor Unit: A device comprising at least (1) a microprocessor, incorporating independent data and program memory spaces; and (2) associated logic required to implement a stand alone processing system and programmed to process data in a buffer in order to map between devices connected to a first transport medium and devices connected to a second transport medium and which implements access controls.
			Supervisor Unit: A microprocessor programmed to process data in a buffer in order to map between devices connected to the first transport medium and storage devices and which implements access controls.
			Supervisor Unit: Intrinsic: '035 Patent: Col. 5, lines 12-17, describing a Supervisor Unit that "comprises a microprocessor ..." Col. 1, lines 37-39 and col. 4, lines 39-40 equating a "computing device" with workstations. Compare '035 claims

EXHIBIT C

Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996) (explaining that intrinsic evidence is “the most significant source of the legally operative meaning of disputed claim language”). Not surprisingly, the starting point is always “the words of the claims themselves.” *Id.*; see also *Comark Communications, Inc. v. Harris Corp.*, 156 F.3d 1182, 1186 (Fed. Cir. 1998). The words of the claims are generally given their ordinary and customary meaning, unless the patentee intended to use a “special definition of the term clearly stated in the patent specification or file history.” *Vitronics*, 90 F.3d at 1582. Thus, the Court must review the specification and file history to determine whether the patentee intended to use any such “special” definitions. See *id.* The specification and file history may also be consulted as general guides for claim interpretation. See *Comark*, 156 F.3d at 1186.

The specification and file history, however, are not substitutes for the plain language of the claims. The specification is not meant to describe the full scope of the patent – it includes only a written description of the invention, sufficient to enable a person skilled in the art to make and use it, as well as the invention’s “best mode.” See 35 U.S.C. § 112. Thus, the claims may be broader than the specification, and generally should not be confined to the examples of the invention set forth in the specification. See *Comark*, 156 F.3d at 1187 (“Although the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims.”). Indeed, the Federal Circuit has repeatedly emphasized that “limitations from the specification are not to be read into the claims.” *Id.* at 1186.

In addition to examining the intrinsic evidence the Court may, in its discretion, receive extrinsic evidence regarding the proper construction of the patent’s terms. See *Key Pharmaceuticals*

v. Hercon Labs. Corp., 161 F.3d 709, 716 (Fed. Cir. 1998) (“[T]rial courts generally can hear expert testimony for background and education on the technology implicated by the presented claim construction issues, and trial courts have broad discretion in this regard.”). The plaintiff has provided an expert affidavit and the defendant has provided excerpts from several dictionaries as extrinsic evidence concerning the construction of the terms of the ‘972 patent.

II. “implements access controls for storage space on the SCSI storage devices”

This phrase is used in claims 1, 10 and 11 of the ‘972 patent. The parties dispute whether the phrase refers to “access controls” only for certain subsections of a divided SCSI storage device, or whether it also includes limiting access to entire undivided SCSI storage devices. The plaintiff argues the phrase includes both kinds of access controls; the defendants say the phrase refers only to access controls for various subsections within a single divided SCSI storage device. The defendants also argue the plaintiff’s construction is improper because, if adopted, it will result in the ‘972 patent being invalidated by prior art.

The plaintiff proposes the following definition: “provides controls which limit a computer’s access to a specific subset of storage devices or sections of a single storage device.” See Plaintiff’s Brief, at 20. The defendants propose the phrase should be defined as “partitions the storage space on each one of the SCSI storage devices and defines the accessibility of each resulting partition.” See Defendants’ Brief, Ex. 2. The Court agrees with the plaintiff.

The intrinsic evidence of the ‘972 patent shows the plaintiff’s invention is intended to restrict access both to subsections of a SCSI storage device, as well as to entire, undivided SCSI devices. First, the plain language of this phrase refers only to “storage space” and does not limit the space

only to subsections of a divided SCSI storage device. Second, Figure 3 of the '972 patent supports a broad reading of this phrase. Figure 3 shows three SCSI storage devices, two of which are undivided (60 and 64). The third device (62) is divided into four subsections of storage space. From the simple labeling on Figure 3, it is clear that the entire, undivided storage device (64) is meant to be accessed only by a single workstation (computer E). Thus, Figure 3 expressly shows that the plaintiff's invention contemplates using "access controls" for an entire, undivided storage device as well as for the divided subsections within a single storage device.¹ Third, the language of the specification expressly describes limiting access to an entire, undivided SCSI storage device. Specifically, in referring to Figure 3, the specification states "storage device 64 can be allocated as storage for the remaining workstation 58 (workstation E)." See '972 Patent, at 4:20 - 4:21. At the hearing, the defendants' counsel argued that, simply because Figure 3 describes this feature does not mean the feature was intended to be part of the claimed invention. The Court soundly rejects this argument. Figure 3 is meant to be an example of how the plaintiff's claimed invention can be implemented, and the specification clearly describes this figure as illustrating one implementation of the claimed invention. Adopting the defendants' argument would ignore a fundamental principle of claims construction, oft repeated in the defendants' brief and oral arguments, that the specification is "the single best guide to the meaning of a disputed term." See *Vitronics*, 90 F.3d at 1582. Finally, the defendants correctly point out that the specification also refers to the single, undivided storage device (64) as a "partition (i.e., logical storage definition)." See '972 Patent, at 4:44 - 4:47. Rather than compel the defendants' proposed construction, however, this language supports the plaintiff's

¹ Figure 3 also discloses – and the defendants do not dispute – that the plaintiff's invention contemplates limiting access to various subsections of the divided SCSI storage device (62).

argument at the hearing that a discrete unit of storage – whether an entire SCSI storage device or a subsection within that device – can be referred to as a “partition.”²

The defendants also argue that, even if the intrinsic evidence supports the plaintiff’s proposed definition, this definition is nonetheless improper because it would cause the ‘972 patent to read directly upon prior art (and therefore be invalid). It is true that “claims should be read in a way that avoids ensnaring prior art if it is possible to do so.” *Harris Corp. v. IXYS Corp.*, 114 F.3d 1149, 1153 (Fed. Cir. 1997). However, the defendants have not shown that the prior art at issue – the Lui patent – would be “ensnared” by adopting the plaintiff’s definition. Importantly, the Lui patent was part of the prior art expressly considered by the patent examiner before granting the ‘972 patent. The patent examiner apparently did not use the Lui patent to reject a single claim in the ‘972 patent. The patent examiner also did not issue an Office Action requiring the plaintiff to distinguish its invention from the Lui patent on access control (or any other) grounds. Although the Patent Office is not the model of efficiency or thoroughness, its failure to cite the Lui patent as potentially invalidating prior art creates a strong presumption that the Lui patent does not read upon the plaintiff’s claimed invention. In addition, it does not appear to the Court that the Lui patent reads upon the ‘972 claimed invention. While the Lui patent does disclose a system of Fibre Channel computers and SCSI storage devices, *see* Defendants’ Brief, Ex. 6, at 2:53 - 2:65, the similarities end there. The Lui patent concerns an invention of “bypass circuits” used to “prevent the failure of any device” in the system. *See id.*, at Abstract. The invention of the Lui patent is not concerned with the swift transfer of information across a router, and thus does not disclose techniques for mapping,

² The Court expressly notes, however, that it is not defining the term “partition” in this order, as that term is not used in the ‘972 claim language.

implementing access controls, or a memory buffer.³ At the hearing, the defendants' counsel suggested that Figure 2 of the Lui patent discloses the claimed invention of the '972 patent.

However, Figure 2 of the Lui patent is not a part of the Lui invention; rather it is an illustration of a "conventional" network system that the Lui invention allegedly improves upon. *See id.* at 3:66. The Court rejects the defendants' argument that "conventional" network systems also read directly upon the '972 claimed invention. The patent examiner may have let one piece of prior art slip by; he or she would not have missed a "conventional" network system directly applicable to the plaintiff's claimed invention.

In sum, the Court will adopt the plaintiff's proposed definition and construe the phrase "implements access controls" in the claims of the '972 patent to mean "provides controls which limit a computer's access to a specific subset of storage devices or sections of a single storage device."

III. "allocation of subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device"

The dispute here is essentially the same as in the preceding section. This phrase is used in claims 2, 8 and 12 of the '972 patent. As it did with the "implements access controls . . ." phrase, the plaintiff argues the "allocation . . ." phrase means that specific Fibre Channel devices can be allocated storage space on subsections of a single SCSI storage device and on entire, undivided SCSI storage devices. The defendants stick to their general argument on this issue, and contend the phrase

³ The defendants argue these features are "implicitly" found in the Lui specification and in any event were disclosed in other prior art. *See Defendants' Brief*, at 12 and n.1. The Court is not persuaded that these features are "implicitly" disclosed by the Lui patent, and the other prior art briefly referenced by the defendants makes no mention of combining that prior art with the invention of the Lui patent, or vice-versa.

means storage space can only be allocated on subsections of a single-divided SCSI storage device. Both parties agree this storage space, however it is defined, can only be accessed by the specified Fibre Channel device(s).

The plaintiff's proposed definition is "subsets of storage space are allocated to specific Fibre Channel devices." See Plaintiff's Brief, at 26. The defendants say the phrase should be defined to mean "one or more partitions that are only accessible by a single Fibre Channel device." See Defendants' Brief, Ex. 2. For the reasons discussed in the preceding section, the Court adopts the plaintiff's proposed construction.

IV. "supervisor unit"

This term is used in claims 1, 2 and 10 of the '972 patent. The plaintiff contends this term should be defined as "a microprocessor programmed to process data in a buffer in order to map between Fibre Channel devices and SCSI devices and which implements access controls." See Plaintiff's Brief, at 25. The defendants argue the term should be defined as "an Intel 80960RP processor" with several specific features. See Defendants' Brief, Ex. 2.

The defendants argue their construction is mandated by the means-plus-function analysis of § 112(6) of the Patent Act, because the claims of the '972 patent do not adequately describe the "supervisor unit" to be used. See Defendants' Brief, at 15-17. The plaintiff argues that § 112(6) does not apply because the term "means" is not used with the term "supervisor unit" and because the term "supervisor unit" is adequately described by other claim language in the '972 patent. See Plaintiff's *Markman* Exhibits, at 35-39.

Section 112(6) of the Patent Act provides that when a claim refers to the "means for" a

specific act, but fails to adequately describe these means, the means then must be defined by reference to the specification. *See* 35 U.S.C. § 112(6).⁴ If the claim language at issue does not include the term “means,” there is a presumption that the § 112(6) means-plus-function analysis does not apply. *See Al-Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308, 1318 (Fed. Cir. 1999) (“[W]hen an element of a claim does not use the term ‘means,’ treatment as a means-plus-function claim element is generally not appropriate.”). To overcome this presumption, the party seeking to apply § 112(6) must show the claim language at issue is purely functional and that other claim language does not adequately describe the disputed term. *See id.* (“[W]hen it is apparent that the element invokes purely functional terms, without the additional recital of specific structure or material for performing that function, the claim element may be a means-plus-function element despite the lack of express means-plus-function language.”). From a review of the claim language as a whole, the Court agrees with the plaintiff that the term “supervisor unit” is not purely functional, but refers instead to a device that can perform the tasks specifically listed in the claim language of the ‘972 patent. Specifically, claims 1, 2 and 10 of the ‘972 patent describe a “supervisor unit” that can: (1) maintain and map the configuration of networked Fibre Channel and SCSI storage devices; (2) include in this configuration an allocation of specific storage space to specific Fibre Channel devices; (3) implement access controls for the SCSI storage devices; and (4) process data in the storage router’s buffer to allow an exchange between the Fibre Channel and SCSI storage devices. *See* ‘972 Patent,

⁴ Section 112(6) reads as follows: “An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.” 35 U.S.C. § 112(6).

at Claims 1, 2 and 10. These are the same tasks described in the plaintiff's proposed definition. In addition, the specification expressly defines the "supervisor unit" as "a microprocessor" (a computer chip) and specifically as "a microprocessor for controlling operation of storage router 56 and to handle mapping and security access for requests between Fibre Channel 52 and SCSI bus 54." See *id.* at 5:7 - 5:10. However, neither the specification (nor the claim language) limits the '972 patent to the specific Intel computer chip referenced by the defendants. Although the defendants correctly point out that the Intel 80960 chip is the only computer chip expressly named in the '972 patent and the specification describes many features this chip, the defendants fail to note that the Intel 80960 chip is listed as only "one implementation" of the claimed invention's microprocessor. See '972 Patent, at 5:63. The defendants are attempting exactly what the Federal Circuit prohibits – to limit the claims to the preferred embodiment and examples of the specification. "This court has cautioned against limiting the claimed invention to preferred embodiments or specific examples in the specification." *Comark*, 156 F.3d at 1186 (quoting *Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 805 F.2d 1558, 1563 (Fed. Cir. 1988)). The Court will not use an example of "one implementation" in the specification to limit the plain language of the claims. Accordingly, the Court adopts the plaintiff's definition of "supervisor unit" and will construe that term as used in the claims of the '972 patent to mean "a microprocessor programmed to process data in a buffer in order to map between Fibre Channel devices and SCSI devices and which implements access controls."

V. "SCSI storage devices"

This term is used in claims 1, 4, 7, 9-11 and 14 of the '972 patent. The plaintiff argues that this term essentially needs no further definition because the term SCSI is so well-known in the industry, but proposes that the term can be further defined as "any storage device including, for

example, a tape drive, CD-ROM drive, or a hard disk drive that understands the SCSI protocol and can communicate using the SCSI protocol." See Plaintiff's Brief, at 18. The defendants argue the term should be defined as "any storage device that uses a SCSI standard and has a unique BUS:TARGET:LUN address." See Defendants' Brief, Ex. 2.

The Court agrees with the plaintiff. Essentially, the defendants contend their narrow definition should be used because it "comports with '972 specification" and its discussion of SCSI storage devices. See Defendant's Brief, at 14. However, the specification language referred to by the defendants is only one example of how the SCSI storage device addressing scheme "can" be represented. See '972 Patent, at 7:39. Again, the defendants are impermissibly trying to limit the claim language to an example given in the specification. See *Comark*, 156 F.3d at 1186-87. For the sake of extra clarity, the Court will adopt the plaintiff's proposed definition for this term.

VI. "process data in the buffer"

This phrase is used in claims 1 and 10 of the '972 patent. The plaintiff argues the phrase is adequately defined on its own and by the surrounding claim language. The defendants contend the phrase should be defined as "to manipulate data in the buffer in a manner to (a) achieve mapping between Fibre Channel and SCSI devices, and (b) apply access controls and routing functions." See Defendants' Brief, Ex. 2.

The plain language of claims 1 and 10 disclose that the supervisor unit (the microprocessor) processes data in the buffer "to interface between the Fibre Channel controller and the SCSI controller to allow access from Fibre Channel initiator devices to SCSI storage devices using the native low level, block protocol in accordance with the configuration." See '972 Patent, at Claims 1 and 10. This language adequately describes what it means to "process data in the buffer" for these

claims. Simply because the specification may use slightly different language to describe this "processing," *see id.* at 5:18 - 5:20, does not entitle the defendants to adopt the specification language over the plain language of the claims. The Court will not further define this phrase.

VII. "storage router"

This term is used in claims 1-7 and 10 of the '972 patent. The plaintiff argues the term needs no further definition for claims 1-6, and for claim 7 it should be defined as "a device which provides virtual local storage, maps, implements access controls, and allows access using native low level block protocols." *See Plaintiff's Brief*, at 27. The defendants contend the term should mean "a bridge device that connects a Fibre Channel link directly to a SCSI bus and enables the exchange of SCSI command set information between application clients on SCSI bus devices and the Fibre Channel links." *See Defendants' Brief*, Ex. 2.

The defendants do not make any argument for their proposed definition in their brief, and did not discuss the term at the July 25 hearing. In their notebook of exhibits presented at the hearing, the defendants include one page which supports their definition with a quote from the specification. *See Defendants' Markman Exhibits*, "Markman Presentation" Tab, at 22. This argument is disingenuous. The specification language quoted by the defendants is immediately followed by several sentences further defining "storage router." Indeed, the next sentence begins "Further, the storage router applies access controls . . ." *See '972 Patent*, at 5:30. The defendants' attempt to limit the term "storage router" to one of several descriptive sentences in the specification is not well-taken. In addition, the Court finds the term "storage router," as used in all claims of the '972 patent, is adequately described by the additional language of the claims, which discloses in detail the various functions and/or qualities of the storage router. The Court will not further define this term.

VIII. "map"

This term is used in claims 1, 7, 10 and 11 of the '972 patent. The plaintiff contends the term means "to create a path from a device on one side of the storage router to a device on the other side of the router, *i.e.* from a Fibre Channel device to a SCSI device (or vice-versa). A 'map' contains a representation of devices on each side of the storage router, so that when a device on one side of the storage router wants to communicate to a device on the other side of the storage router, the storage router can connect the devices." See Plaintiff's Brief, at 22. The defendants argue the term means "to translate addresses." See Defendants' Brief, Ex. 2.

In support of their definition, the defendants point only to a dictionary definition of "map." See Defendants' Brief, at 13 and Ex. 4. The plaintiff, on the other hand, cites to specific portions of the specification that support its definitions of map (both as a verb and a noun) as used in the claims of the '972 patent. See Plaintiff's Brief, at 22 (citing '972 Patent, at 1:66-2:5 and 6:65-7:6). Because intrinsic evidence is far more salient than a dictionary definition, and because the Court agrees that the specification language cited by the plaintiff supports its construction of the term "map," the Court will adopt the plaintiff's proposed definition of this term.

IX. "Fibre Channel protocol unit" and "SCSI protocol unit"

These terms are used in claims 5 and 6 of the '972 patent. The plaintiff contends these phrases should be defined as "a portion of the Fibre Channel controller which connects to the Fibre Channel transport medium" and "a portion of the SCSI controller which interfaces to the SCSI bus." See Plaintiff's Brief, at 27. The defendants say the terms mean "block and equivalents thereof that connects to the Fibre Channel transport medium" and "block and equivalents thereof that connects to the SCSI bus transport medium." See Defendants' Brief, Ex. 2.

The defendants argue the means-plus-function analysis of § 112(6) should apply here because the terms are well-known and are not defined in two dictionaries cited by the defendants. See Defendants' Brief, at 7-8, 14-15, Ex. 4 and Ex. 5. However, the defendants do not indicate how the term should be defined in reference to the specification, and in fact contend "the '972 specification fails to reveal any structure corresponding to the claimed function." See *id.* at 8 and 15. The defendants then propose the word "block" should be used to describe these terms because the "protocol units" are "simply depicted as a block within the diagram of Figure 5" of the '972 patent. See *id.* This reasoning is wholly unpersuasive. Simply because a figure in the patent physically depicts the protocol units in a block-like shape, it does not follow that the units should be defined as "blocks or equivalents thereof." Under that reasoning, the SCSI storage devices, which are physically depicted as cylinders in the '972 patent, could be defined simply as "cylinders, oil drums or monkey barrels, or equivalents thereof." As the plaintiff correctly points out, the language of claims 5 and 6 plainly states that the "protocol units" for both devices are part of the "controllers" for the devices, and are intended to "connect" the devices to various "transport media" (i.e., to various cables). See '972 Patent, at Claims 5 and 6. Accordingly, the Court adopts the plaintiff's definitions for these terms, and will construe the terms to mean "a portion of the Fibre Channel controller which connects to the Fibre Channel transport medium" and "a portion of the SCSI controller which interfaces to the SCSI bus."

X. "interface"

In their Joint Stipulation of Claim Construction, the parties claim the meaning of the term "interface" is in dispute. However, this phrase is not discussed in any of the parties' briefs, and neither side presented an argument at the July 25 hearing as to why the term is disputed. This term

has a standard and ordinary meaning—even to a federal judge—and the Court will not further define it.

XI. Undisputed Terms

Finally, in their Joint Stipulation of Claim Construction, the parties have stipulated to the construction of 17 other terms in the '972 patent. The Court will therefore adopt these stipulated constructions, solely for the purpose of this lawsuit.

Accordingly, the Court enters the following order:

IT IS ORDERED that the attached construction of the patent claims will be incorporated into any jury instructions given in this cause and will be applied by the Court in ruling on the issues raised in summary judgment.

SIGNED on this 26th day of July 2000.


UNITED STATES DISTRICT JUDGE

CONSTRUCTION OF CLAIMS
U.S. PATENT NO. 5,941,972

Disputed Terms

The phrase "implements access controls for storage space on the SCSI storage devices" means provides controls which limit a computer's access to a specific subset of storage devices or sections of a single storage device.

The phrase "allocation of subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device" means subsets of storage space are allocated to specific Fibre Channel devices.

A "supervisor unit" is a microprocessor programmed to process data in a buffer in order to map between Fibre Channel devices and SCSI devices and which implements access controls.

A "SCSI storage device" is any storage device including, for example, a tape drive, CD-ROM drive, or a hard disk drive that understands the SCSI protocol and can communicate using the SCSI protocol.

The term "map" means to create a path from a device on one side of the storage router to a device on the other side of the router, i.e. from a Fibre Channel device to a SCSI device (or vice-versa). A "map" contains a representation of devices on each side of the storage router, so that when a device on one side of the storage router wants to communicate with a device on the other side of the storage router, the storage router can connect the devices.

A "Fibre Channel protocol unit" is a portion of the Fibre Channel controller which connects to the Fibre Channel transport medium.

A "SCSI protocol unit" is a portion of the SCSI controller which interfaces to the SCSI bus.

Stipulated / Undisputed Terms

A "buffer" is a memory device that is utilized to temporarily hold data.

A "direct memory access (DMA) interface" is a device that acts under little or no microprocessor control to access memory for data transfer.

A "Fibre Channel" is a known high-speed serial interconnect, the structure and operation of which is described, for example, in Fibre Channel Physical and Signaling Interface (FC-PH), ANSI X3.230 Fibre Channel Arbitrated Loop (FC-AL), and ANSI X3.272 Fibre Channel Private Loop Direct Attach (FC-PLDA).

A "Fibre Channel controller" is a device that interfaces with a Fibre Channel transport medium.

A "Fibre Channel device" is any device, such as a computer, that understands Fibre Channel protocol and can communicate using Fibre Channel protocol.

"Fibre Channel protocol" is a set of rules that apply to Fibre Channel.

A "Fibre Channel transport medium" is a serial optical or electrical communications link that connects devices using Fibre Channel protocol.

A "first-in-first-out queue" is a multi-element data structure from which elements can be removed only in the same order in which they were inserted; that is, it follows a first in, first out (FIFO) constraint.

A "hard disk drive" is a well known magnetic storage media, and includes a SCSI hard disk drive.

An "initiator device" is a device that issues requests for data or storage.

"Maintain(ing) a configuration" means keep(ing) a modifiable setting of information.

A "native low level, block protocol" is a set of rules or standards that enable computers to exchange information and do not involve the overhead of high level protocols and file systems typically required by network servers.

A "SCSI" (Small Computer System Interface) is a high speed parallel interface that may be used to connect components of a computer system.

A "SCSI bus transport medium" is a cable consisting of a group of parallel wires (normally 66) that forms a communications path between a SCSI storage device and another device, such as a computer.

A "SCSI controller" is a device that interfaces with the SCSI bus transport medium.

"Virtual local storage" is a specific subset of overall data stored in storage devices that has the appearance and characteristics of local storage.

A "workstation" is a remote computing device that connects to the Fibre Channel, and may consist of a personal computer.

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EXHIBIT D

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NOTE: Pursuant to Fed. Cir. R. 47.6, this disposition is not citable as precedent. It is a public record. This disposition will appear in tables published periodically.

United States Court of Appeals for the Federal Circuit

02-1158

FILED

MAR 10 2003

CLERK, U.S. DISTRICT COURT
WESTERN DISTRICT OF TEXAS
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CROSSROADS SYSTEMS, (TEXAS), INC.,

Plaintiff-Appellee,

v.

CHAPARRAL NETWORK STORAGE, INC.,

Defendant-Appellant.

FILED
U.S. COURT OF APPEALS FOR
THE FEDERAL CIRCUIT

FEB 12 2003

JUDGMENT

JAN HORBALY
CLERK

ON APPEAL from the United States District Court for the Western District of Texas

In CASE NO(S). 00-CV-217 and 00-CV-621

This CAUSE having been heard and considered, it is

ORDERED and ADJUDGED: AFFIRMED. See Fed. Cir. R. 36

Per Curiam (NEWMAN, SCHALL, and DYK, Circuit Judges).

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UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

By: [Signature] Date: 3/15/03

ENTERED BY ORDER OF THE COURT

DATED: FEB 12 2003

[Signature]
Jan Horbaly, Clerk

ISSUED AS A MANDATE: MARCH 5, 2003

Costs Against Appellant:
Total \$97.35

186

03/17/2003 MON 12:47 PM (TV/RY NO 62761)



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/007,317 <i>90/007,125</i> 44654	11/23/2004 7590 05/24/2005	6425035	HOESEI/WAB	1634
SPRINKLE IP LAW GROUP 1301 W. 25TH STREET SUITE 408 AUSTIN, TX 78705			EXAMINER <i>Fleming, Feitz</i>	
			ART UNIT <i>2182</i>	PAPER NUMBER
DATE MAILED: 05/24/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office

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Washington, D.C. 20231

APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
90/007,317	11/23/2004	6425035	HOESE1/WAB

Larry E. Severin
Wang, Hartman & Gibbs, PC
1301 Dove Street
Suite 1050
Newport Beach, CA 92660

EXAMINER

Fleming, Fritz

ART UNIT	PAPER
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2182

DATE MAILED: 05/24/05

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Commissioner of Patents and Trademarks

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1301 W. 25th Street
Suite 408
Austin, TX 78705



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EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. 90/007,125. merged with 7,317.

PATENT NO. 6425035.

ART UNIT 2182.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Office Action in Ex Parte Reexamination	Control No. 90/007,125 merged with 7,317	Patent Under Reexamination 6425035	
	Examiner Fritz M. Fleming	Art Unit 2182	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

- a Responsive to the communication(s) filed on 06 April 2005. b This action is made FINAL.
 c A statement under 37 CFR 1.530 has not been received from the patent owner.

A shortened statutory period for response to this action is set to expire 2 month(s) from the mailing date of this letter. Failure to respond within the period for response will result in termination of the proceeding and issuance of an *ex parte* reexamination certificate in accordance with this action. 37 CFR 1.550(d). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c)**. If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. Notice of References Cited by Examiner, PTO-892. 3. Interview Summary, PTO-474.
 2. Information Disclosure Statement, PTO-1449. 4. _____.

Part II SUMMARY OF ACTION

- 1a. Claims 1-14 are subject to reexamination.
 1b. Claims _____ are not subject to reexamination.
 2. Claims _____ have been canceled in the present reexamination proceeding.
 3. Claims _____ are patentable and/or confirmed.
 4. Claims 1-14 are rejected.
 5. Claims _____ are objected to.
 6. The drawings, filed on 7/19/2004 are acceptable.
 7. The proposed drawing correction, filed on _____ has been (7a) approved (7b) disapproved.
 8. Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some* c) None of the certified copies have
 1 been received.
 2 not been received.
 3 been filed in Application No. _____.
 4 been filed in reexamination Control No. _____.
 5 been received by the International Bureau in PCT application No. _____.
 * See the attached detailed Office action for a list of the certified copies not received.
 9. Since the proceeding appears to be in condition for issuance of an *ex parte* reexamination certificate except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte* Quayle, 1935 C.D. 11, 453 O.G. 213.
 10. Other: _____

H. B. Smith
 H. B. SMITH
 PATENT EXAMINER
 GROUP 107

cc: Requester (if third party requester)

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Reexamination

1. In order to ensure full consideration of any amendments, affidavits or declarations, or other documents as evidence of patentability, such documents must be submitted in response to this Office action. Submissions after the next Office action, which is intended to be a final action, will be governed by the requirements of 37 CFR 1.116, which will be strictly enforced.

Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extension of time in *ex parte* reexamination proceedings are provided for in 37 CFR 1.550(c).

2. A shortened statutory period for response to this action is set to expire **2 months from the mailing date of this letter.**

1. The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a) to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving Patent No. 6,425,035 throughout the course of this reexamination proceeding. The third party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

2. Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

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It is to be noted that each independent claim (i.e. 1,7,11) has the phrase "using native low level, block protocols", which per the interview for 90/007127, distinguishes over the art of record used in the first office action. However, instead of being able to close out prosecution with this action, a new non-final action is being issued. This is due to the filing of the IDS after the mailing date of the first office action. Had this information, namely the Spring (UK GB 2297636), been filed prior to the first office action, these issues would have been taken into account in the first office action. Since there was no statement similar to that of 37 CFR 1.97(e), an action based solely upon art cited by the patent owner could have been made final, even when the claims are not amended (see below). Since the art cited by the patent owner led to the discovery of other references used in this rejection, this action cannot be made final, but does certainly delay a final action on the claimed subject matter.

MPEP 2171:

III. ART CITED BY PATENT OWNER DURING PROSECUTION

Where art is submitted in a prior art citation under 37 CFR 1.501 and/or 37 CFR 1.555 (an IDS filed in a reexamination is construed as a prior art citation) and the submission is not accompanied by a statement similar to that of 37 CFR 1.97(e), the examiner may use the art submitted and make the next Office action final whether or not the claims have been amended, provided that no other new ground of rejection is introduced by the examiner based on the new art not cited in the prior art citation. See MPEP § 706.07(a).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 7-9,11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spring (UK GB 2297636—Spring) in view of Oeda et al. (Oeda).

Starting with the independent claim 7, one finds an apparatus per Figure 1 comprising a plurality of user workstations (USER 1-4 each having 15-18), a corresponding plurality of first transport medium (un-numbered) connecting the USERS to the storage router (server 20), which in turn is connected to a plurality of storage

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devices in the form of drives 1-5 (21-25) via a corresponding set of second transport medium (again un-numbered). Thus the storage router (server 20) interfaces between the workstations and the storage devices, as shown in detail in Figure 2, wherein the processor 28 controls the USER interface circuits 26 and the disk drive interface circuits 27. The internal memory 29 provides programmed instructions for the processor 28. The storage router (server 20) is connected to each USER via a SCSI interface, and in turn to the emulated SCSI drive (drives 21-25). See for example, pages 5-7. Thus, an apparatus for providing virtual local storage (at drives 21-25) on remote storage devices (21-25 are remote from workstations 15/16) connected to one transport medium (the non-numbered connections from the shared file server 20 to the drives 21-25) to devices (workstations 15/16, of which 4 are shown) connected to another transport medium (the un-numbered connections between the workstations 15/16 and the file server 20) is shown in Figure 1. The method of providing virtual local storage is set forth at page 3, wherein it is disclosed that a method of storing data at a large storage volume which emulates (hence makes virtual) a plurality of removable disc drives (the local storage). See also page 10, lines 1-3, wherein step 34 describes a data transfer in which the local operating software **may read and write to logical drives as if they were local removable disc drives**, thereby anticipating the virtual local storage, as the drives themselves are remote to the users, but appear to the user's as the conventional local removable disc drives, and hence virtual local storage as logical drives emulate (i.e. virtual) the removable disc drives (the local storage). Thus the storage router (server 20) interfaces with the first and second transport medium and provides the

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virtual local storage to the USERS. There is a mention of a look up table (68) for each logical drive, but such is not the mapping between the workstations and storage devices as claimed, noting that USERS access logical drives. The implementing of access controls is clearly described throughout the disclosure, especially noting that each USER has access to a large number of removable disc drives (see page 7, lines 18-27), thereby teaching the implementation of some sort of access controls, with the storage router (server 20) determining if the requested drive is available, and if so, granting access to the requesting workstation (see page 8, lines 10-17). Thus the access is ultimately controlled and allowed by the storage router (server 20). All of this is done by native low level, block protocol (NLLBP), as the only protocol used from the USERS to the storage router and by the storage router (server 20) is that of the SCSI protocol, such being selected so that the storage router (server 20) will return data back to the USER via the SCSI protocol (page 8, lines 10-17), as the processor 15 (of a USER) issues commands over the SCSI interface (page 8 lines 4-9). Per page 12, lines 14-26, the local operating system of the USER (62) thinks it is accessing a conventional SCSI drive via communications over a conventional SCSI interface to the storage router SCSI interface (65), wherein the communication conforms to establish SCSI protocols without having to embed network software within the workstations. Furthermore, the server operating system (66) converts the SCSI sector definitions into physical data blocks for each logical drive, such that the server operating system (60) emulates an SCSI disc drive per Figure 5. Finally note that the storage router (server 20) grants access to an emulated logical disc drive (page 9, lines 17-19) via mount and dismount commands

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(pages 9 and 10) and that the storage router (server 20) has to keep track of user created blocks, such that the USER is presented with a user interface allowing existing logical drives to be selected as well as new logical drives to be defined (page 12, lines 9-13), all via the use of the SCSI NLLBP. Communications between the USERS and the storage router (server 20) is implemented using established protocols, preferred to be SCSI, which is in turn, the claimed use of the NLLBP, as this is used from the USER to the storage router to the disc drives. While look up tables and keeping track of USER blocks is mentioned, this does not set forth a mapping between the workstations and the storage devices, noting that Spring is using logical drives for the USERS.

In the same field of endeavor, Oeda et al. (Oeda) teaches that it is old and well known per Figure 4 to have a plurality of HOSTs (i.e. 1A,B) connected to a SCSI bus (2), which is then in turn connected to a disk controller (5) and a disk drive unit (4). Per Figure 4, it is clearly shown that the disk drive (4) is divided into subsets mapped to the HOSTs, wherein HOST 1A is only allowed to access its partition (41), HOST 1B is only allowed to access its partition (42), and either HOST is granted a shared read only access to the shared partition (43). The partitions (41-43) are assigned to the HOSTs as is shown, with the purpose of the assigned partitions avoiding erroneous partition access and data destruction (column 7, line 53-column 8, line 30). Thus a mapping between workstations (in the form of HOSTs) and the assigned partitions (41-43) is clearly shown, such that a HOST 1A can only request partitions 41 and 43 (the implementing of storage area access controls), and is prevented from erroneously accessing the Host 1B partition 42 (see column 8, lines 13-16), which is the ultimate

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allowing of access to only those partitions of the storage area for which access control has been mapped. Furthermore, the disk controller (5 and functioning as a storage router) performs exclusive control between the HOSTs and the drive per Figure 2, wherein the SCSI CONTROL LSI has the ID REGISTERS (71-73) which contains the DEVICE IDs and thus compares the requested device ID by a HOST to the stored IDs and grants or denies access based upon the mapping of Figure 4. Since each partition has a SCSI ID, each partition is seen as a logical drive (and can be assigned different logical unit numbers – LUNs – column 6, lines 34-37), as the HOST sees three separate disk storage devices. The protocol used is that of the SCSI standard, with the 7 phases set forth at column 5, again showing that access from the HOSTs to the storage router (i.e. the disk controller 5 as it performs the mapping, access controls, and granting of access) to the disk drive unit (4) is exclusively SCSI, thus exhibiting the use of a NLLBP as claimed.

Therefore it would have been obvious to one having ordinary skill in the art at the time that the invention was made to modify Spring 636 in view of Oeda for the express purpose of providing a plurality of USERS/HOSTs mapped and controlled access to assigned partitions in order to avoid erroneous disk access and data destruction. In combination, each USER/HOST is granted access to only its subset partition (i.e. logical disk) to which it is mapped. The USERS are a plurality of workstations, and the storage devices are a plurality of disc drives, noting that Oeda supports an array of drives (17) divided into partitions (171-173) such that it performs as a RAID, as does SPRING '636, with each device seen by a HOST independent from one another (Oeda columns 6 and

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7). Thus when combined, the plurality of disc drives are divided into partitions mapped to specific USERS/HOSTs, so that access is controlled and granted via the mapping, performed by the storage router (the combined server 20 and disk controller 5).

As far as claims 11-14 are concerned, the method limitations are rendered obvious by the combined teachings of Spring '636 in view of Oeda. For example, the preamble to claim 11 sets forth "one" and "another" transport medium, while the body of the claim only refers to "first" and "second" medium, which only enumerates the medium, but does not require them as being different. Combined, Spring '636 in view of Oeda sets forth the method by which the USERS/HOSTs are interfaced with the disk drives (storage) such that the storage router (the combined teachings of the server 20 and the disk controller 5) provides the claimed mapping, implementing of the access controls, and the allowing access using only the SCSI protocol, which is a NLLBP.

7. Claims 1-6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spring '636 in view of Oeda as applied to claims 7-9 and 11-14 above, and further in view of Jibbe et al. (Jibbe).

Spring '636 in view of Oeda set forth the use of a storage router to provide mapping, access control and access granting of USER/HOST requests to the storage disks. Per Spring '636, the server (20) has interfaces (26,27), a CPU (28) connected to the interfaces, and a memory for CPU instructions (29), using SCSI protocol (a NLLBP) end to end. See Figure 2. Per Oeda, the disk controller (5) provides mapping and access control and granting based upon the SCSI CONTROL LSI (6) and the ID REGISTERS (71-73) from the HOSTs (1A,B) to the disk(s) (either 4 or the array17)

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using the SCSI protocol (a NLLBP) end to end. What is lacking is the specific detail of the SCSI HOST to SCSI DISK controller.

In the same field of endeavor, Jibbe teaches that it is old and well known to use a SCSI-SCSI controller for HOST to disk array access. See for example, Figure 1, which sets forth the use of a microprocessor (51) coupled to the HOST SCSI interface controller 14 and the SCSI disk drive interface controllers (31-35), such that the microprocessor controls the interfaces (column 4, lines 1-9). The SCSI Array Data Path Chip (ADP 10) interconnects the SCSI data bus (16) with the SCSI data busses (21-25), and is also under the control of the microprocessor controller (51). The DMA FIFO BLOCK 70 holds data received from the host until the array is ready to accept it and to hold data from the disk array until the host is ready to accept it (column 5, lines 14-21). The DMA interface (14) is coupled to the FIFO (70) as well as the first protocol unit (SCSI adapter 14), such that the HOST SCSI adapter (i.e. a first controller) is operable to pull data from and place data into the FIFO (70), with the second controllers (SCSI interfaces 31-35) operable to pull data from and place data into the FIFO (70), under the control of the supervisory unit (microprocessor 51) and its bus (53) that couples it to the interface controllers (14 and 31-35). The memory (36) is a 64kByte SRAM that provides memory workspace during read/modify/write operations of RAID 5 and is also coupled to the microprocessor/supervisor (51) via the ADP (10). Thus the memory (36) and the FIFO (70) provide memory work space for the array controller and allows the microprocessor/supervisor (51) to process data stored therein to allow a HOST to interface with the disk storage. It is also expressly taught that the data path architecture

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can be constructed with ESDI, IPI or EISA devices rather than with SCSI devices (column 11, lines 40-43). In summary, Jibbe teaches a supervisor unit 51 coupled to first and second controllers (14 and 31-35), an ADP (10) and buffers (36 and 70), such that the supervisory unit controls the controllers and buffers and the ADP for the express purpose of configurability between RAID 1,3-5 levels, as well as the use of the FIFO buffers for holding data until the host/disk drives are ready. The Host DMA interface (14) is coupled to the SCSI controller (14) and the FIFO buffers/queues (70/101-105) and the buffer (36—internal to the Figure 1 disk array controller).

Therefore it would have been obvious to one having ordinary skill in the art at the time that the invention was made to modify Spring '636 in view of Oeda by the teachings of Jibbe in order to provide for increased RAID functionality via the SCSI disk array controller details, which in turn provide for configurability between various RAID levels (certainly desirable as both Spring '636 and Oeda are concerned with various RAID levels), as well as the ability to buffer data until the host/disks are ready. The combination is proper as Spring '636 and Oeda use SCSI controllers between the host and disk(s) and RAID configurations. Spring '636 even lays out the same basic functionality as Jibbe's array controller in the storage router (server 20), with the required ability to interface with the host and disks via the SCSI protocol. Oeda also provides host to disk interfacing with mapping, access control and access granting in a SCSI protocol environment. It is also to be noted that claims 5 and 6 each depend from claim 1, and thus the single DMA interface of Jibbe that is coupled to the SCSI controller (14) and the disk drive controllers (31-35) meets the claims, because at most,

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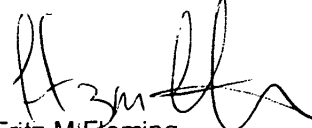
Page 12

only one DMA interface is needed at a time via the claim structure. Thus Jibbe provides the details of a SCSI disk array controller needed by Spring '636 and Oeda, and the combined teachings of Spring '636 and Oeda and Jibbe render the claims obvious per the above analysis.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fritz M. Fleming whose telephone number is 571-272-4145. The examiner can normally be reached on M-F, 0600-1500.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Gaffin can be reached on 571-272-4146. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Any fax should be sent to the CRU at 571-273-0100.

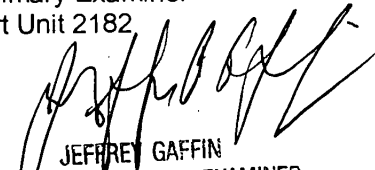
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Fritz M Fleming
Primary Examiner
Art Unit 2182

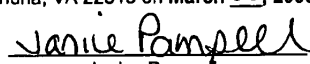
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*PROCESSED
1707/2013*


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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
INFORMATION DISCLOSURE STATEMENT BY APPLICANTS	
Atty. Docket No. (Opt.) CROSS1123-17 CROSS1123-19	
Applicants Geoffrey B. Hoese et al.	
Application Number 90/007,125 90/007,317	Filed 07/19/2004 07/19/2004
For Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Fleming, Fritz M.
Certification Under 37 C.F.R. §1.8	
I hereby certify that this document is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313 on March <u>23</u> , 2005.	
 Janice Pampell	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

Applicants respectfully request, pursuant to 37 C.F.R. §§ 1.555, 1.56, 1.97 and 1.98, that the art listed on the attached SBO8-A and SBO8-B forms be considered and cited in the examination of the above-identified reexamination application. Since the present Application was filed after June 30, 2003, a copy of any U.S. Patent and any U.S. Patent Application Publications cited on the attached SBO8-A form is not being submitted with this Information Disclosure Statement pursuant to the waiver of 37 C.F.R. S 1.98(a)(2)(i) by the U.S. Patent and Trademark Office. Several documents are included on the enclosed CD-Rom for the convenience of the Examiner. If the Examiner would like hard copies of these documents, we will gladly provide them.

Furthermore, pursuant to 37 C.F.R. §§ 1.97(g) and (h), no representation is made that a search has been made or that this art is material to patentability of the present application. Applicants respectfully submit that the claims of Applicants' above-referenced patent is patentably distinguishable from these references. Applicants respectfully request consideration of these references. The Commissioner is hereby authorized to charge any fees due, or refund any credit, to Deposit Account No. 50-3183 of Sprinkle IP Law Group for any fee under 37 C.F.R. §1.17.

Respectfully submitted,
Sprinkle IP Law Group
Attorneys for Applicants


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PTO/SB/08A (04-03)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT			Application Number	90/007,125 & 90/007,317	
			Filing Date	07/19/2004	
			First Named Inventor	Hoese, Geoffrey	
			Group Art Unit	2182	
			Examiner Name	Fleming, Fritz M.	
Sheet	1	OF	2	Attorney Docket Number	CROSS1123-17 & CROSS1123-19

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		B3	JP 8-230895		09/10/1996	Kikuchi, et al.	
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PUR	B9	WO 98/36357		1998			
Examiner Signature <i>H. J. M. [Signature]</i>				Date Considered	5/23/2005		

PTO/SB/08B (08-00)

FORM PTO 1449 US Department of Commerce Patent and Trademark Office			Application Number	90/007,125 & 90/007,317	
			Filing Date	July 19, 2004	
			First Named Inventor	Hoese, Geoffrey	
			Group Art Unit	2182	
			Examiner Name	Fleming, Fritz M.	
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	C2	Burskey, Dave "New Serial I/Os Speed Storage Subsystems" February 6, 1996			
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	C5	Raidtec FibreArray and Raidtec FlexArray UltraRAID Systems", Windows IT PRO Article, October 1997.			
	C6	DIGITAL Storage Works, HSZ70 Array Controller, HSOF Version 7.0 EK-HSZ70-CG. A01, Digital Equipment Corporation, Maynard, Massachusetts.			
	C7	DIGITAL StorageWorks, Using Your HSZ70 Array Controller in a SCSI Controller Shelf (DS-BA356-M Series), User's Guide, pp. 1-1 through A-5 with index, January 1998.			
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	C31	Office Action in Ex Parte Reexamination 90/007,123, mailed 0207/05.	
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		Copies of the following are on the attached CD-Rom	
	C33	Defendant's First Supplemental Trial Exhibit List, Crossroads Systems, Inc., v. Chaparral Network Storage, Inc., C.A. No. A-00CA-217-SS (W.D. Tex. 2001). (CD-Rom) .	
	C34	Defendant's Third Supplemental Trial Exhibit List, Crossroads Systems, Inc. v. Pathlight Technology, Inc., C.A. No. A-00CA-248-SS (W.D. Tex. 2001) (CD-Rom) .	
	C35	Defendant's Trial Exhibits, Crossroads Systems, Inc. v. Pathlight Technology, Inc., C.A. No. A-00CA-248-SS (W.D. Tex. 2001). (CD-Rom) .	
	C36	Defendants' Trial Exhibits, Crossroads Systems, Inc., v. Chaparral Network Storage, Inc., C.A. No. A-00CA-217-SS (W.D. Tex. 2001). (CD-Rom) .	
	C37	Defendant Chaparral Network Storage, Inc.'s First Supplemental Trial Exhibit List (D1 through D271) (CD-ROM Chaparral Exhibits ExList_Def) .	9/2/2001
	C38	Defendant Pathlight Technology Inc.'s Third Supplemental Trial Exhibit List (CD-ROM Pathlight Exhibits ExList_Def).	
	C39	Plaintiff's Fourth Amended Trail Exhibit List, Crossroads Systems, Inc. v. Chaparral Network Storage, Inc, C.A. No. A-00CA-217-SS (W.D. Tex. 2001) (CD-Rom) .	9/11/2001
	C40	Plaintiff's Revised Trial Exhibit List, Crossroads Systems, Inc. v. Pathlight Technology, Inc., C.A. No. A-00CA-248-SS (W.D. Tex. 2001). (CD-Rom) .	
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	C50	Press Release- Symbios Logic to Demonstrate Strong Support for Fibre Channel at Fall Comdex (Engelbrecht 12 (LSI 2785-86)) (CD-ROM Chaparral Exhibits D016).	11/13/1996
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	C71	Data Book- AIC-7895 PCI Bus Master Single Chip SCSI Host Adapter (Davies Ex 1 (CNS 182944-64)) (CD-ROM Chaparral Exhibits D046).	5/21/1996
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	C81	Hardware Schematics for the Fibre Channel Daughtercard Coronado (Kalwitz Ex 4 (CNS 181639-648)) (CD-ROM Chaparral Exhibits D056).	}
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	C87	HPFC-5000 Tachyon User's Manual, First Edition (PTI 172419-839) (CD-ROM Chaparral Exhibits D084).	5/1/1996
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C91	VBAR Volume Backup and Restore (CRDS 12200-202) (CD-ROM Chaparral Exhibits D099).	}	
C92	Preliminary Product Literature for Infinity Commstor's Fibre Channel to SCSI Protocol Bridge (Smith Ex 11; Quisenberry Ex 31 (SPLO 428-30)) (CD-ROM Chaparral Exhibits D143).	8/19/1996	
Pur	C93	Letter dated 7/12/96 from J. Boykin to B. Smith re: Purchase Order for Evaluation Units from Crossroads (Smith Ex 24) CRDS 8556-57) (CD-ROM Chaparral Exhibits D144).	7/12/1996

DF	C94	CrossPoint 4100 Fibre Channel to SCSI Router Preliminary Datasheet (Hulsey Ex 9 (CRDS 16129-130)) (CD-ROM Chaparral Exhibits D145).	11/1/1996
	C95	CrossPoint 4400 Fibre Channel to SCSI Router Preliminary Datasheet (Bardach Ex. 9, Quisenberry Ex 33 (CRDS 25606-607)) (CD-ROM Chaparral Exhibits D153).	11/1/1996
	C96	Fax Dated 07/22/96 from L. Petti to B. Smith re: Purchase Order from Data General for FC2S Fibre to Channel SCSI Protocol Bridge Model 11 (Smith Ex 25; Quisenberry Ex 23; Bardach Ex 11 (CRDS 8552-55; 8558)) (CD-ROM Chaparral Exhibits D155).	
	C97	Email Dated 12/20/96 from J. Boykin to B. Smith re: Purchase Order for Betas in February and March (Hoese Ex 16, Quisenberry Ex 25; Bardach Ex 12 (CRDS 13644-650)) (CD-ROM Chaparral Exhibits D156).	
	C98	Infinity Commstor Fibre Channel Demo for Fall Comdex, 1996 (Hoese Ex 15, Bardach Ex 13 (CRDS 27415)) (CD-ROM Chaparral Exhibits D157).	
	C99	Fax Dated 12/19/96 from B. Bardach to T. Rarich re: Purchase Order Information (Bardach Ex. 14; Smith Ex 16 (CRDS 4460)) (CD-ROM Chaparral Exhibits D158).	
	C100	Miscellaneous Documents Regarding Comdex (Quisenberry Ex 2 (CRDS 27415-465)) (CD-ROM Chaparral Exhibits D165).	
	C101	CrossPoint 4100 Fibre Channel to SCSI Router Preliminary Datasheet (Quisenberry) Ex 3 (CRDS 4933-34) (CD-ROM Chaparral Exhibits D166) (CD-ROM Chaparral Exhibits D166).	
	C102	CrossPoint 4400 Fibre to Channel to SCSI Router Preliminary Datasheet; Crossroads Company and Product Overview (Quisenberry Ex 4 (CRDS 25606; 16136)) (CD-ROM Chaparral Exhibits D167).	
	C103	Crossroads Purchase Order Log (Quisenberry Ex 9 (CRDS 14061-062)) (CD-ROM Chaparral Exhibits D172).	
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	C107	Symbios Logic – Hardware Functional Specification for the Symbios Logic Series 3 Fibre Channel Disk Array Controller Model 3701 (Engelbrecht Ex 3 (LSI-1659-1733)) (CD-ROM Pathlight Exhibits D074).	
	C108	Report of the Working Group on Storage I/O for Large Scale Computing; Department of Computer Science Duke University: CS-1996-21 (PTI 173330-347). (CD-ROM Pathlight Exhibits D098).	
	C109	Brian Allison's 1999 Third Quarter Sales Plan (PDX 38)CNS 022120-132)) (CD-ROM Pathlight Exhibits D201).	6/5/2001
Pup	C110	Brooklyn SCSI-SCSI Intelligent External RAID Bridge Definition Phase External Documentation (CD-ROM Pathlight Exhibits D129).	
Examiner Signature		<i>ftzm</i>	Date Considered
			5/23/2005

Notice of References Cited	Application/Control No. 90/007,125 merged with 7,317		Applicant(s)/Patent Under Reexamination 6425035	
	Examiner Fritz M. Fleming		Art Unit 2182	Page 1 of 1

U.S. PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
A	US-5,345,565 A	09-1994	Jibbe et al.	710/316
B	US-5,634,111	05-1997	Oeda et al.	711/153
C	US-			
D	US-			
E	US-			
F	US-			
G	US-			
H	US-			
I	US-			
J	US-			
K	US-			
L	US-			
M	US-			


FOREIGN PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
N					
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Q					
R					
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T					

NON-PATENT DOCUMENTS

*	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
U	
V	
W	
X	


*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes 	Application No. <i>F.317.</i>		Applicant(s)
	90/007,125 <i>Merged with</i>		6425035
	Examiner		Art Unit
	Fritz M Fleming		2182

SEARCHED			
Class	Subclass	Date	Examiner
710	1-5, 8-13, 36-38, 105, 100, 101, 125	1/21/05	FWF
711	100, 112, 113	1/21/05	FWF
714	42	1/21/05	FWF
710	305-316		
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<i>updated</i>	<i>class</i>	<i>5/20/05</i>	<i>FWF</i>

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
EAST SEARCH NOTES	1/21/05	FWF
NPL SEARCH: SCSI, FC, Fibre Channel, storage, block level, native ATM	1/21/05	FWF
EAST SCSI ARRAY DMA FIFO	5/20/05	FWF

Index of Claims 	Application No.		Applicant(s)	
	90/007,125 <i>merged with 7,317</i>		6425035	
	Examiner		Art Unit	
	Fritz M Fleming		2182	

√	Rejected
=	Allowed

-	(Through numeral) Cancelled
+	Restricted

N	Non-Elected
I	Interference

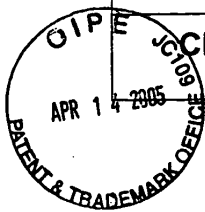
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
CHANGE OF POWER OF ATTORNEY AND CORRESPONDENCE ADDRESS	
Atty. Docket No. CROSS1123-19	
Applicant Geoffrey B. Hoese, et al.	
Application Number 90/007,317	Date Filed 11-23-2004
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Fleming, Fritz

Applicant hereby served the attached Revocation and Power of Attorney and Change of Mailing Address on Third Party Requesters at the address listed below:

Larry E. Severin
Wang, Hartmann & Gibbs, PC
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And

William A. Blake
Jones, Tullar & Cooper, PC
P.O. Box 2226 Eads Station
Alexandria, VA 22202

As per 35 U.S.C. §1.248 service was made via first class mail on April 8, 2005.

Respectfully submitted,

Sprinkle IP Law Group

John L. Adair
Reg. No. 48,828

Dated: April 8, 2005

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Enclosures

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
REVOCATION AND POWER OF ATTORNEY AND CHANGE OF MAILING ADDRESS	Atty. Docket No. CROSS1123-19
Applicants Geoffrey B. Hoese. et al.	
Application No. 90/007,317	Filing Date 11/23/2004
For Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Fleming, Fritz
Confirmation No. 1634	



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I hereby state I am authorized to act on behalf of Crossroads Systems, Inc.

Respectfully submitted,

Crossroads Systems, Inc.

Dated: April 7, 2005

By:
Robert Sims, President & CEO

APR-08-2005 FRI 11:45 AM Sprinkle IP Law Group

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P. 01



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FAX COVER SHEET

TO:	U.S. Patent Office	Fax#:	703-872-9306
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P. 02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
REVOCATION AND POWER OF ATTORNEY AND CHANGE OF MAILING ADDRESS	Atty. Docket No. CROSS1123-19
Applicants Geoffrey B. Hoese, et al.	
Application No. 90/007,317	Filing Date 11/23/2004
For Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Fleming, Fritz
Confirmation No. 1634	

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STEVEN R. SPRINKLE
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Registration No. 48,828
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Austin, Texas 78705
Attn: Steven Sprinkle
Tel. (512) 637.9220 / Fax (512) 371.9088

I hereby state I am authorized to act on behalf of Crossroads Systems, Inc.

Respectfully submitted,

Crossroads Systems, Inc.

Dated: April 7, 2005

By: *[Signature]*
Robert Sims, President & CEO

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
CERTIFICATE OF SERVICE UNDER 37 C.F.R. 1.248	Atty. Docket No. CROSS1123-17 CROSS1123-19
Applicant Geoffrey B. Hoese, et al.	
Reexamination Control No. 90/007,125 90/007,317	Date Filed 07/19/2004 11/23/2004
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Fleming, Fritz

Applicant hereby serves the Reply to Office Action Under *Ex Parte* Reexamination Dated 02/07/05 in the above referenced case to:

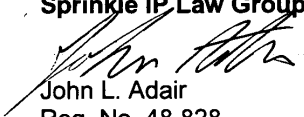
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1301 Dove Street, #1050
Newport Beach, CA 92660

William A. Blake
Jones, Tullar & Cooper, PC
P.O. Box 2226 Eads Station
Alexandria, VA 22202

As per 35 U.S.C. §1.248 service is made via first class mail on April 6, 2005.

Respectfully submitted,

Sprinkle IP Law Group


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Dated: April 6, 2005

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
REPLY TO OFFICE ACTION UNDER <i>EX PARTE</i> REEXAMINATION DATED 02/07/05	Atty. Docket No. CROSS1123-17 CROSS1123-19
Applicants Geoffrey B. Hoese, et al.	
Reexamination Control Number 90/007,125 90/007,317	Date Filed 07/19/2004 11/23/2004
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Fleming, Fritz
Confirmation Number: 2298	Patent No. 6,425,035

6548 U.S. PTO



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 Signature	
JULIE H. BLACKARD Printed Name	

In response to the Official Action mailed February 7, 2005, Applicant respectfully requests the Examiner reconsider the rejections of the Claims in the Re-Examination of U.S. Patent 6,425,035 (the "035 Patent") in view of the this reply.

IN THE CLAIMS:

1. A storage router for providing virtual local storage on remote storage devices to devices, comprising:

a buffer providing memory work space for the storage router;
a first controller operable to connect to and interface with a first transport medium;
a second controller operable to connect to and interface with a second transport medium; and
a supervisor unit coupled to the first controller, the second controller and the buffer, the supervisor unit operable to map between devices connected to the first transport medium and the storage devices, to implement access controls for storage space on the storage devices and to process data in the buffer to interface between the first controller and the second controller to allow access from devices connected to the first transport medium to the storage devices using native low level, block protocols.

2. The storage router of claim 1, wherein the supervisor unit maintains an allocation of subsets of storage space to associated devices connected to the first transport medium; wherein each subset is only accessible by the associated device connected to the first transport medium.

3. The storage router of claim 2, wherein the devices connected to the first transport medium comprise workstations.

4. The storage router of claim 2, wherein the storage devices comprise hard disk drives.

5. The storage router of claim 1, wherein the first controller comprises:
a first protocol unit operable to connect to the first transport medium;
a first-in-first-out queue coupled to the first protocol unit; and
a direct memory access (DMA) interface coupled to the first-in-first-out queue and to the buffer.

6. The storage router of claim 1, wherein the second controller comprises:
a second protocol unit operable to connect to the second transport medium;
an internal buffer coupled to the second protocol unit; and

a direct memory access (DMA) interface coupled to the internal buffer and to the buffer of the storage router.

7. A storage network, comprising:
a first transport medium;
a second transport medium;
a plurality of workstations connected to the first transport medium;
a plurality of storage devices connected to the second transport medium; and
a storage router interfacing between the first transport medium and the second transport medium, the storage router providing virtual local storage on the storage devices to the workstations and operable:
to map between the workstations and the storage devices;
to implement access controls for storage space on the storage devices; and
to allow access from the workstations to the storage devices using native low level, block protocol in accordance with the mapping and access controls.

8. The storage network of claim 7, wherein the access controls include an allocation of subsets of storage space to associated workstations, wherein each subset is only accessible by the associated workstation.

9. The storage network of claim 7, wherein the storage devices comprise hard disk drives.

10. The storage network of claim 7, wherein the storage router comprises:
a buffer providing memory work space for the storage router;
a first controller operable to connect to and interface with the first transport medium, the first controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer;
a second controller operable to connect to and interface with the second transport medium, the second controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer; and
a supervisor unit coupled to the first controller, the second controller and the buffer, the supervisor unit operable:

to map between devices connected to the first transport medium and the storage devices, to implement the access controls for storage space on the storage devices and to process data in the buffer to interface between the first controller and the second controller to allow access from workstations to storage devices.

11. A method for providing virtual local storage on remote storage devices connected to one transport medium to devices connected to another transport medium, comprising:
 - interfacing with a first transport medium;
 - interfacing with a second transport medium;
 - mapping between devices connected to the first transport medium and the storage devices and implementing access controls for storage space on the storage devices;
 - and
 - allowing access from devices connected to the first transport medium to the storage devices using native low level, block protocols.

12. The method of claim 11, wherein mapping between devices connected to the first transport medium and the storage devices includes allocating subsets of storage space to associated devices connected to the first transport medium, wherein each subset is only accessible by the associated device connected to the first transport medium.

13. The method of claim 12, wherein the devices connected to the first transport medium comprise workstations.

14. The method of claim 12, wherein the storage devices comprise hard disk drives.

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Using NLLBP
 - 3. Petal Does Not Disclose "Mapping Between Devices Connected To The First Transport Medium And The Storage Devices"
 - 4. Petal Does Not Disclose Implementing "Access Controls"
 - a. Implementing Access Controls Requires Allowing Access
Using NLLBPs
 - b. Petal Is Not An Anticipatory Reference Because Petal Does Not Enable Access Controls
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Using NLLBP
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 - 5. Claim 8
 - 6. Summary

- II. Rejections Under 35 U.S.C. § 103
- A. Introduction
- B. Claim 1

1. Overview of Claim 1
 2. Petal Does Not Disclose "Allow[ing] Access" From A Workstation
Using NLLBP
 3. Petal Does Not Disclose a "Map" Between Devices On The First
Transport Medium and Storage Devices
 4. Petal Does Not Disclose, Teach or Suggest the "Access Controls"
Limitation Of Claim 1
 5. There Is No Showing That The Remainder Of The References
Contain The Limitations Missing From Petal
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REMARKS

Applicants appreciate the time taken by the Examiner to review the claims under reexamination and the thoroughness of the remarks provided by the Examiner in the Office Action mailed February 7, 2005. The '035 Patent has been carefully reviewed in light of that Office Action. Based on that review and the remarks made below, Applicants respectfully request reconsideration and favorable action in this case.

I. Rejections Under 35 U.S.C. §102(b)**A. Introduction**

Claims 7-9 and 11-14 are rejected under 35 U.S.C. 102(b) as being anticipated by "Petal: Distributed Virtual Disks" ("Petal").

Anticipation under § 102 requires that "each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference." See, *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 621, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown and the elements must be arranged as required by the claim. See, *Richardson v. Suzuki Motor Co.* 868 F.2d 1226, 1236, 9 USPQ 2d 1913, 1920 (Fed. Cir. 1989) and *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990). See also, MPEP 2131. However, a reference must be enabling to be anticipatory. See, *Amgen, Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1354, 65 USPQ2d 1385, 1416 (Fed. Cir. 2003) ("A claimed invention cannot be anticipated by a prior art reference if the allegedly anticipatory disclosures cited as prior art are not enabled").

As detailed more fully below, Applicants respectfully submit that neither independent Claim 7 nor independent Claim 11 is anticipated (or rendered obvious) by Petal, as Petal does not disclose, teach or suggest certain limitations of these claims, including: i) allowing devices (e.g., workstations) connected to a first data transport medium to access storage devices using native low level block protocols, ii) mapping between devices (e.g., workstations) connected to the first transport medium and the storage devices and iii) implementing access controls.

B. Claims 11-14

The Examiner devoted a large portion of the Office Action to Claim 11. Accordingly, Applicants will first show how Claim 11 differs from the Petal reference cited by the Examiner, and then address the other Claims.

1. Overview of Claim 11

Claim 11 recites:

A method for providing virtual local storage on remote storage devices connected to one transport medium to devices connected to another transport medium, comprising:
interfacing with a first transport medium;
interfacing with a second transport medium;
mapping between devices connected to the first transport medium and the storage devices and that implements access controls for storage space on the storage devices; and
allowing access from devices connected to the first transport medium to the storage devices using native low level block protocols. [emphasis added].

Claim 11 includes the limitations of (i) “mapping between devices connected to a first transport medium and storage devices”, (ii) “implement[ing] access controls” and (iii) “allowing access from devices connected to the first transport medium to the storage devices using native low level block protocols”. These features of the present invention allow a host (e.g., workstation) connected to the first transport medium (e.g., Fibre Channel (FC)) to access only that portion (or portions) of the storage devices associated with that particular host. These features also allow a host (or hosts) to communicate with storage devices using only native low level block protocols (“NLLBPs”).

2. Petal Does Not Disclose “Allowing Access” From A Workstation Using NLLBP

Claim 11, as discussed above, recites “allowing access from devices connected to the first transport medium to the storage device using native low level block protocols.” The “devices connected to the first transport medium” may comprise computer workstations in one exemplary embodiment of the present invention. A NLLBP is a protocol that enables workstations and network servers to exchange information with storage devices without the overhead of high-level protocols and file systems typically required by network servers. As explained below, this definition for NLLBP is supported by both the Specification of the '035 Patent, and the judicial interpretation of a similar limitation by Judge Sparks of the U.S. District Court for the Western District of Texas (an interpretation upheld on appeal by the Court of Appeals for the Federal Circuit).

In systems prior to the present invention, when a computer workstation would make a storage request to a storage device (e.g., disk drive) through a network server, the workstation

first had to translate the request from its file system protocols to higher level network protocols to communicate with the network server. The network server then would translate these high level protocols into low level requests to the storage device(s). See '035 Patent Specification, col. 1, lines 50-60 and col. 3, lines 14-15 (distinguishing an NLLBP from higher-level protocols by contrasting the present invention to prior art solutions). This high level to low level translation wastes valuable time and makes the access of information occur at a much slower rate. See '035 Patent Specification, col. 1, lines 50-60.

Further, in *Crossroads v. Chaparral Network Storage, Inc.*, Western District of Texas, Civil Action No. A-00-CA-217-SS and *Crossroads Systems (Texas), Inc., v. Pathlight Technology, Inc.*, Western District of Texas, Civil Action No. A-00CA-248-JN (collectively, the "Chaparral Litigation"), the U.S. District Court for the Western District of Texas issued a Joint Markman Order (the "Markman Order") interpreting the term NLLBP for the purposes of United States Patent No. 5,941,972 (the "'972 Patent"), the parent of the '035 Patent, as follows:

a set of rules or standards that enable computers to exchange information and do not involve the overhead of high level protocols and file systems typically required by network servers.

A copy of the Markman Order is attached hereto as Exhibit A. This construction, and the validity of the '972 Patent, was upheld by the Federal Circuit on appeal. A copy of the Federal Circuit decision affirming the decision of the lower court is attached hereto as Exhibit B. Thus, based on the Markman Order, an NLLBP is a protocol that enables computers to exchange information without the overhead of high-level protocols and file systems typically required by network servers.

As discussed in the '035 Patent, allowing access from host devices (e.g., workstations) to storage devices is done using NLLBPs in the present invention. Using the example of a first transport medium of Fibre Channel ("FC") and second transport medium of Small Computer System Interface ("SCSI"), a FC-connected workstation can communicate low level SCSI commands directly to a storage device using NLLBPs. For this example, the present invention accomplishes this by encapsulating the low level SCSI commands in an FC 'wrapper' or 'layer.' The specification of the '035 Patent discusses an exemplary embodiment where a Fibre Channel attached initiator (e.g., a workstation) issues SCSI-3 FCP commands, and an associated SCSI target storage device operates on a SCSI-2 protocol (See '753, col. 6, lines 33-45). In this case, a storage router connected between the host device and the storage device receives the FC-encapsulated low level SCSI commands, removes the FC

encapsulation, and forwards the low level SCSI commands to the storage devices (provided the workstation is allowed to have such access, as will be discussed more fully below). In this example, there is no translation of the commands from a higher level protocol to a low level protocol. In other words, the storage router is not required to translate some high level command from the workstation (e.g., a file system command, or function call with arguments) into a low level SCSI command. Rather, the storage router simply strips the FC 'layer' off of the existing SCSI command, and forwards the SCSI command to the storage device without any high-to-low level translation (because no such high level to low level translation is needed). Thus, when a host workstation is allowed to have access to a storage device, that access is accomplished using only NLLBPs.

Petal, on the other hand, discloses a system in which Petal clients (i.e., workstations) send higher-level protocol commands to the Petal Server that, in turn, transforms these higher-level, higher overhead commands into low-level SCSI commands that are forwarded to the storage devices (i.e., at least one high level to low level translation takes place between the workstation and the storage device). Petal clients are configured with a Petal device driver in the kernel layer of the Petal client. See, *Petal* page 88, col. 2, section 3. Higher level applications (i.e., user space applications) see virtual disks (representations of the storage devices) through the Unix File System. See *Petal*, page 90, col. 1, section 3.2. When a Petal client wishes to access a storage device behind the Petal server, the client issues a file system command to the virtual disk which is passed through the class layer to the Petal device driver (i.e., the kernel layer process for accessing the virtual disk). The Petal device driver then issues a remote procedure call ("RPC") using the User Datagram Protocol ("UDP") to the Petal server to read or write data. See, *Id* at page 88, col. 2, section 3 (describing the RPC interface) and page 89, col. 1, section 3.1 (describing handling read and write requests). The Petal device driver acts as a filter driver to translate the command to the virtual disk seen by the user space application into an RPC that is sent out in UDP packets.

An RPC is a well known mechanism in networked operating systems and is essentially a function call to the Petal Server. In issuing an RPC, a client will provide a server with the appropriate arguments in a UDP packet so that the server can perform some process. The Petal Server performs a transformation when receiving the RPC in the UDP packet by processing the RPC in the UDP packet to execute the called process and generate the appropriate low level SCSI READ and WRITE commands. Thus, the Petal client uses the traditional network mechanism of issuing a higher level command (e.g., an RPC in a UDP

packet) to the network server that the network server processes to call a function. The Petal server must execute the appropriate function to transform the information in the UDP packets to the appropriate low level SCSI command.

Thus, the Petal system does not allow the client (i.e., workstation) to access the storage devices using an NLLBP. Instead, the Petal client uses a scheme in which high level file system commands to virtual disks are translated into RPCs which are packaged in UDP packets and transported to the Petal server for transformation into low level commands. Unlike the NLLBP commands described and claimed in the '035 Patent, these RPC in UDP packets contain additional higher level overhead and require transformation to low level SCSI commands at the Petal Server. As noted above, the Petal server executes the called procedure to translate the RPC in UDP to the appropriate low level SCSI command.

The process of Petal therefore requires first creating an RPC, and then encapsulating the RPC in UDP at the Petal client, and further executing a procedure to transform the RPC in UDP to a low level SCSI command. Consequently, while the Examiner has pointed out various portions of Petal that discuss using block-level (i.e., low level) storage protocols (e.g., SCSI commands), it is only in the context of the time period after high level RPCs have been transformed to low level SCSI commands. The system of Petal is the type of system that the present invention was designed to overcome, because the system of Petal does involve the overhead of high level protocols (i.e., RPCs) typically required by network servers (i.e., RPCs), and requires a transformation of the high level protocols into low level SCSI commands at the Petal server.

Therefore, Petal does not disclose, teach or suggest a system for "allowing access from devices connected to the first transport medium to the storage devices using native low level, block protocols," as recited in independent Claim 11.

3. Petal Does Not Disclose "Mapping Between Devices Connected To The First Transport Medium And The Storage Devices"

Claim 11 also recites "mapping between devices connected to the first transport medium and the storage devices." Mapping between devices connected to the first transport medium and storage devices in the present invention refers to a mapping between the workstations and storage devices such that a particular workstation on the first transport medium is associated with a storage device, storage devices, or portions thereof, on the second transport medium. As discussed in the '035 Patent Specification, the mapping provides a correlation between

devices on the first data transport medium (e.g., workstations) and the storage devices through one or more steps. See, '035 Patent col. 1, lines 6 through col. 2, line 5 and col. 8, lines 67 – col. 9, line 5.

In the Chaparral Litigation, the U.S. District Court for the Western District of Texas adopted the definition that a “map” contains a representation of a device on one side of the storage router to a storage device on the other side (e.g., from a Fibre Channel host device to a SCSI storage device). See, Markman Order, Exhibit A, page 12. The mapping of the '035 Patent associates the host device(s) on the first transport medium (e.g., workstations) with storage devices on the second transport medium. Thus, the mapping can include mapping from a host workstation identifier (e.g., address or other identifier) to a virtual representation of a storage device (e.g., a virtual Logical Unit Number (LUN)), and potentially even further from the virtual representation of the storage device to a physical representation of the storage device (e.g., a physical LUN).

It should be expressly understood that the ‘mapping’ of the present invention is not identical to the concept of “virtualization.” In virtualization, a storage device (or portion thereof) is presented with a particular logical address to the hosts or workstations. While it is clear that the present invention can include virtualization as part of the mapping (e.g., the map can include the mapping from a virtual representation of the storage (virtual LUN) to a physical representation of the storage (physical LUN)), such virtualization is not, in and of itself, a mapping between devices on the first and second data transport media as defined in the '035 Patent. See, '035 Patent, col. 8, line 65-67. In fact, this type of virtualization was available in a number of RAID systems at the time Petal was written. Virtualization does not require that representations of workstations on one side of the storage router be mapped to a storage device(s) on the other side of the storage router.

Petal does not disclose, teach or suggest a map that maps between devices connected to the first transport medium (e.g., workstations) and storage devices connected to the second transport medium as recited in Claim 11 of the '035 Patent. In Petal there is simply no map that associates host devices (i.e., the Petal clients) with the storage devices or representations of the storage devices. At best, Petal teaches “virtualization” of storage devices. In other words, Petal discusses a virtual to physical mapping of the storage devices rather than a mapping from the device making a request (e.g., workstation) to the storage device for which the request is intended. Petal states:

The basic problem is to translate virtual addresses of the form <virtual-disk-identifier, offset> to physical addresses of the form <server-identifier, disk-identifier, disk-offset>.

See Petal, page 85-86, sections 2.1-2.3 and Figure 4 (entitled "Virtual to Physical Mapping").

In Petal, a virtual disk directory of virtual disks is mapped to a global directory which is mapped to physical disks. *Id.* A client workstation provides a virtual disk identity which is translated into a global map identifier. *Id.* The global map determines the server responsible for translating the given offset. *Id.* The physical map of the specified server translates the global map identifier and offset to a physical disk and an offset within that disk. See *Id.*, page 86, col. 1, section 2.1. Thus, the mapping of Petal only represents the virtualization mapping of storage devices and does not correlate or associate the storage devices (either virtual or physical) to particular Petal clients (e.g., workstations) on the other side of the Petal server. In fact, the virtualization-type mapping described in Petal is simply a description of the virtualization technique generally used in RAID systems at the time of Petal.

The Examiner correctly points out that, in Petal, a disk identifier used by clients to reference a particular virtual disk is "mapped" to a physical identifier. However, this is simply virtualization-type mapping. There is no correspondence (or map) made from the Petal clients to the storage devices (or portions thereof) behind the Petal Server. Put another way, there is no mechanism disclosed in Petal to perform the function of mapping a particular client workstation to a particular storage device (or portion). Consequently, Petal teaches a virtualization scheme, not a "mapping between devices connected to the first transport medium and storage devices" as recited in Claim 11 of the '035 Patent.

4. Petal Does Not Disclose Implementing "Access Controls"

a. Implementing Access Controls Requires Allowing Access Using

NLLBPs

Claim 11 recites "implementing access controls" which requires allowing access using NLLBPs. As described in the '035 Patent, "access controls" are a particular form of security measure designed to prevent unauthorized access to particular storage devices or portions of storage devices by certain workstations. When "access controls" are implemented, particular workstations may be permitted access to particular storage devices or subsets of storage devices. See, e.g., FIGURE 3 of the '035 Patent (permitting access from particular workstations to undivided storage devices as well as divided subsections within a single storage

device). According to the previously mentioned Markman Order, “access controls” means “providing controls which limit a computer’s access to specific subset of storage devices or sections of a single storage device.” See, Markman Order, Exhibit A, page 6.

The “access controls” of the ‘035 Patent allow access using a NLLBP such that requests from devices connected to the first transport medium (e.g., workstations) are directed to assigned virtual local storage on the storage devices. See, col. 8, lines 61-65. The ‘035 Patent recites:

The router can...map, for each initiator, what storage access is available and what partition is being addressed by a particular request. In this manner, the storage space provided by [storage devices] can be allocated to [devices connected to the first transport medium] to provide virtual local storage...

See ‘035 Patent, col. 8, lines 67 – col. 9, line 5.

Thus, the “access controls” described in the ‘035 Patent are device-centric in that they permit or deny access from particular devices connected to the first data transport medium (e.g., workstations) to particular storage devices (or subsets thereof) according to the map. The access controls are thus part of the configuration for routing commands from a device connected to the first transport medium to *defined* storage location(s) using NLLBPs (i.e., without requiring the overhead of high level protocols typically required by network servers) according to the map.

b. Petal Is Not an Anticipatory Reference Because Petal Does Not Enable Access Controls

In rejecting the limitation of “implementing access controls” the Examiner points to Petal, page 90, col. 2, section 4, which states in pertinent part:

...currently we do not provide any special support for protecting a client’s data from other clients; however, it would not be difficult to provide security on a per virtual disk basis.

Applicants submit, however, that the statement “it would not be difficult to provide security on a per virtual disk basis,” without more, does not enable security on per virtual disk basis in the UDP environment of Petal. UDP is primarily a broadcast protocol in which the computer issuing a UDP communication typically places UDP packets on a network without regard to the device that receives the packets.

Petal provides no support as to how to implement its “security on a per virtual disk basis” for UDP broadcast packets communicated over an ATM transport medium. For example, a common security method in packet based networks is the use of access control lists (“ACLs”). While ACLs may be used to entirely block UDP communications (e.g., as in a firewall), Petal provides no suggestions on how to implement ACLs in a UDP environment to limit access to a portion of a server file system (e.g., a particular virtual disk). As Petal provides no support for providing security in the UDP/ATM environment, Applicants respectfully submit that Petal does not enable security and therefore cannot anticipate the limitation of “access controls” recited in Claim 11.

c. There Is No Disclosure or Teaching In Petal That The ‘Security’ Referenced Therein Would Allow Access Using NLLBP

Even though the Petal article states that “it would not be difficult to provide security on a per virtual disk basis” there is no teaching or suggestion as to how such security would be provided. Certainly, there is no teaching or suggestion in Petal that a ‘security’ feature could be implemented to allow access using an NLLBP. It simply is unclear what type or manner of ‘security’ Petal references. For example, security can be a simple password-based security scheme, or something much more complex.

Moreover, even if security were implemented in Petal, there is no teaching or suggestion that such security would be implemented to allow access using a NLLBP. It would appear that any security implemented would be on top of the high level RPC over UDP scheme of Petal. Again, this would appear to require the high-level protocols and would not provide access using an NLLBP. Thus, even if security were applied to the system of Petal, this does not suggest access controls that allow access using an NLLBP.

d. Petal Does Not Render The Access Controls Limitation Of Claim 11

Obvious

Applicants note that that a non-enabling reference may qualify as prior art for the purpose of obviousness under 35 U.S.C. §103. See, *Symbol Technologies, Inc. v. Opticon*, 935 F.2d. 1569, 1578 (Fed. Cir. 1991) (“while a reference must enable someone to practice the invention in order to anticipate under §102(b), a non-enabling reference may qualify as prior art for the purpose of determining obviousness under §103(a)”). However, even if the rejection of “implementing access controls” is read as an obviousness type rejection under 35 U.S.C. §103,

Applicants assert that the rejection must fail because Petal, at best, only makes it 'obvious to try' some unspecified form of security.

"An 'obvious-to-try' situation exists when a general disclosure may pique the scientist's curiosity, such that further investigation might be done as the result of the disclosure, but the disclosure itself does not contain a sufficient teaching of how to obtain the desired result, or that the claimed result would be obtained if certain direction were followed." *In re Eli Lilly & Company*, 902 F.2d 943, 945, 14 USPQ.2d 1741 (Fed Cir. 1990). "Obvious-to-try", however, is not the standard for obviousness under §103. See, *In Re O'Farrell*, 853 F.2d 894, 902, 7 USPQ.2d 1673 (Fed. Cir. 1988). For example, the statement in a patent that "the user of the external field canceling method . . . can allow for gradient fields to be produced with greatly reduced problems" provided only general guidance as to the form of the claimed invention and how to achieve it but did not provide sufficient guidance to render the claimed invention obvious. See, *In Re Roemer*, 258 F.3d, 1303, 1309-10, 59 USPQ.2d 1527 (Fed. Cir. 2001). Similarly, the Petal reference does not provide sufficient guidance as to what is meant by "security" or how to implement such a "security" feature; and certainly does not provide any guidance on how to implement "access controls" as recited in Claim 11 of the '035 Patent.

At best, the statement in Petal that "currently we do not provide any special support for protecting a client's data from other clients; however, it would not be difficult to provide security on a per virtual disk basis" is an invitation-to-try to implement some unspecified security feature on a per virtual disk basis. The statement does not provide any teaching or suggestion as to how the security feature would be achieved, much less how "access controls" to allow access using NLLBPs would be achieved. Thus, while it may be 'obvious-to-try' some unspecified security feature based on the above-cited statement, one is left completely in the dark as to how such security would be achieved.

Moreover, the Examiner has not pointed to any art or other evidence in the record such that one of ordinary skill in the art would have a reasonable expectation of success in implementing the claimed "access controls" to allow access using an NLLBP in a UDP/ATM environment to limit access to a particular virtual disk. If the Examiner is relying on his own knowledge that one of skill in the art would know how to implement "access controls" to allow access using an NLLBP on a per virtual disk basis in the Petal environment, then Applicants respectfully request that the Examiner provide an affidavit detailing the data on which the Examiner relies for this position, or alternatively allow Claim 11. See 37 CFR 1.107(b) and MPEP 707.05.

5. Claim 12

Claim 12 depends from Claim 11 and recites that “the mapping between devices connected to the first transport medium and the storage devices includes allocating subsets of storage space to associated devices connected to the first transport medium, wherein each subset is only accessible by the associated device connected to the first transport medium.”

Thus, in Claim 12, hosts on the first transport medium are allocated storage devices (or subsets of storage devices) in the mapping such that the allocated storage only is accessible by those associated hosts on the first transport medium. In other words, storage is allocated to specific hosts on the first transport medium. This is supported by the Markman Order in which the court adopted the construction that “allocation of subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device” means that subsets of storage are allocated to specific fibre channel devices for purposes of the ‘972 Patent. See, Markman Order, Exhibit A, pages 6-7.

As discussed above in more detail, the mapping of Petal does not allocate storage to particular Petal clients, but simply provides a mapping between a virtual disk identification and physical disk identification. Consequently, Petal does not anticipate Claim 12.

6. Summary

In sum, Petal fails to teach: (1) “allowing access from devices connected to the first transport medium to the storage device using native low level block protocols,” (2) “mapping between devices connected to the first transport medium and the storage devices” and (3) “implementing access controls.”

Instead, Petal teaches a system in which high level RPC calls in UDP packets must be transformed into low-level SCSI commands by the Petal server. Further, there is no disclosure, teaching or suggestion in Petal that clients on one side of the Petal server should be mapped to storage devices on the other side of the Petal server. Moreover, access controls to allow access using NLLBPs are not disclosed, taught or suggested in Petal nor is any other security method. At most, Petal suggests that it would be ‘obvious-to-try’ adding an undefined security measure, without providing any direction as to how to do so with a reasonable expectation of success. Therefore, Applicants submit that Petal does not anticipate (or render obvious) the

present invention as recited in Claim 11, and respectfully requests allowance of such claim. Applicants also respectfully request allowance of Claims 12-14 as representing further limitations on Claim 11.

C. Claims 7-10

Applicants respectfully submit that independent Claim 7 is distinguishable from Petal for similar reasons as discussed above with reference to Claim 11, as well as additional reasons. For completeness, the Applicants will review the differences discussed above with respect to Claim 11, but for the sake of brevity will summarize the explanations of these differences rather than repeating entire arguments already presented.

1. Overview of Claim 7

Claim 7 recites:

A storage network, comprising:
a first transport medium;
a second transport medium;
a plurality of workstations connected to the first transport medium;
a plurality of storage devices connected to the second transport medium; and
a storage router interfacing between the first transport medium and the second transport medium, the storage router providing virtual local storage on the storage devices to the workstations and operable:
to map between the workstations and the storage devices;
to implement access controls for storage space on the storage devices; and
to allow access from the workstations to the storage devices using native low level, block protocol in accordance with the mapping and access controls.

Claim 7, thus, specifies a "storage router" that maps between workstations and storage devices, implements access controls and allows access from workstations to the storage devices using NLLBP in accordance with the mapping and access controls. As with Claim 11, Applicants submit that the system of Petal does not disclose, teach or suggest i) "allow[ing] access from the workstations to the storage devices" using NLLBP, ii) "map[ping] between the workstations and the storage devices, and iii) "implement[ing] access controls".

2. Petal Does Not Disclose “Allow[ing] Access” From A Workstation Using NLLBP

The present invention, in accordance with Claim 7, allows workstations to access storage devices using a NLLBP. A NLLBP, as discussed above, is a set of rules or standards that enable computers to exchange information and do not involve the overhead of high level protocols and file systems typically required by network servers. Thus, the workstations described in Claim 7 can access the claimed storage devices using low level NLLBP commands which have not been translated from high level commands.

Petal, on the other hand, teaches a system in which a Petal client issues high level commands as RPCs in UDP packets, where the RPC calls a function of the Petal server Unix operating system. The Petal server must transform the high level RPC in UDP into a low level SCSI command by implementing the called procedure to generate the appropriate SCSI command(s). Petal, thus, uses a traditional RPC scheme that involves the overhead of high level protocols typically required by traditional network servers. Consequently, the Petal server does not allow the Petal clients to access the storage devices using an NLLBP.

3. Petal Does Not Disclose a “Map” Between Workstations And Storage Devices

The storage router of Claim 7 maps between workstations connected to the first transport medium on one side of the storage router and the storage devices located on the other side of the storage router. This mapping is more than mere virtualization as the storage router associates workstations with particular storage devices or subsets of storage devices.

Petal does not disclose, teach or suggest a map that associates particular devices connected to the first transport medium with particular storage devices (or subsets thereof). Rather, Petal teaches that a virtual to physical mapping (i.e., virtualization of the storage device) takes place. There is, however, no correspondence made between the clients and storage devices (or portions thereof) in the mapping of Petal; i.e., there is no mechanism disclosed to say “this client maps to that storage device” on the other side of the Petal server. Consequently, Petal teaches a virtualization scheme not a “mapping” between workstations and storage devices.

4. Petal Does Not Provide Access Through “Access Controls”

As discussed above with respect to Claim 11, the sole statement in Petal relevant to access controls is “currently we do not provide any special support for protecting a client’s data from other clients; however, it would not be difficult to provide security on a per virtual disk basis,” does not in fact disclose or teach “access controls” in any anticipatory manner. This statement provides, at best, a suggestion that it is ‘obvious-to-try’ an undefined security measure in the UDP/ATM system of Petal. Applicants therefore submit that Petal does not disclose, teach or suggest a supervisor unit that implements “access controls.”

5. Claim 8

Claim 8 depends from Claim 7 and recites that the access controls “include an allocation of subsets of storage space to associated workstations, wherein each subset is only accessible by the associated workstation.” Thus, the claimed access controls allocate subsets of storage to particular workstations. Applicants respectfully submit that Petal does not teach this feature of Claim 8 as Petal does not describe or suggest allocating storage or subsets of storage to particular clients.

6. Summary

Petal fails to disclose, teach or suggest a storage router which performs the functions of i) “allow[ing] access from the workstations to the storage devices” using NLLBP, ii) “map[ping] between the workstations and the storage devices, and iii) “implement[ing] access controls.”

Instead, Petal teaches a Petal server that transforms higher level RPC calls in UDP packets to generate low-level SCSI commands for communicating with storage devices. Also, there is no disclosure, teaching or suggestion that the Petal server should map clients on one side of the Petal server to storage devices on the other side of the Petal server. Moreover, Petal does not disclose or suggest providing “access controls” as claimed, nor any other security method. At most, it is suggested that it would be ‘obvious-to-try’ adding security without providing any direction as to how to do so with a reasonable expectation of success. Therefore, Applicants submit that Petal does not anticipate or render obvious the present invention as recited in Claim 7, and respectfully requests allowance of Claim 7. Applicants also respectfully request allowance of Claims 8-10 as representing further limitations on Claim 7.

II. Rejections Under 35 U.S.C. §103

A. Introduction

Claims 1-6 and 10 are rejected under 35 U.S.C. §103(a) as being unpatentable over Petal in view of Quam, Cummings, Crouse et al., and Pisello et al.

As discussed above, with reference to independent Claims 7 and 11, Petal fails to disclose, teach or suggest i) “allow[ing] access from the workstations to the storage devices” using NLLBP, ii) “map[ping] between the workstations and the storage devices, and iii) “implement[ing] access controls.”

In order to establish a *prima facie* case of obviousness, the Examiner must show: that (1) the prior art references teach or suggest all of the claim limitations, (2) that there is some suggestion or motivation in the references (or within the knowledge of one of ordinary skill in the art) to modify or combine the references and (3) that there is a reasonable expectation of success. M.P.E.P. 2142, 2143; In re Vaeck, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). The Examiner must explain with reasonable specificity at least one rejection – otherwise, the Examiner has failed procedurally to establish a *prima facie* case of obviousness. M.P.E.P. 2142; Ex parte Blanc, 13 U.S.P.Q.2d 1383 (Bd. Pat. Application. & Inter. 1989). When the motivation to combine the teachings of the references is not immediately apparent, it is the duty of the Examiner to explain why the combination of the teachings is proper. Ex parte Skinner, 2 U.S.P.Q.2d 1788, 1790 (Bd. Pat. App. & Inter. 1986).

Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness as the references do not disclose, teach or suggest all of the claim limitations of Claims 1-6 and 10. More particularly, the references do not disclose, teach or suggest a “supervisor unit” operable to i) “map between devices connected to the first transport medium and the storage devices,” ii) “implement access controls for the storage space on the storage devices” and iii) “allow access from devices connected to the first transport medium to the storage devices using a NLLBP.” Furthermore, Applicants submit that one of ordinary skill in the art would not be motivated to combine Petal with Quam, Cummings, Crouse or Pisello.

B. Claim 1

In rejecting Claim 1, the Examiner relies on the previously discussed rejections under 35 U.S.C. §102(b) to identify where various features of Claim 1 are found in the Petal reference. Applicants respectfully submit, however, that several of the features of Claim 1 which are

rejected under Petal are not disclosed, taught or suggested by the reference, as discussed above with respect to Claims 7 and 11. Again, for the sake of brevity the Applicants will summarize the previously presented arguments rather than repeating them in their entirety.

1. Overview of Claim 1

Claim 1 recites:

A storage router for providing virtual local storage on remote storage devices to devices, comprising:
a buffer providing memory work space for the storage router;
a first controller operable to connect to and interface with a first transport medium;
a second controller operable to connect to and interface with a second transport medium; and
a supervisor unit coupled to the first controller, the second controller and the buffer, the supervisor unit operable to map between devices connected to the first transport medium and the storage devices, to implement access controls for storage space on the storage devices and to process data in the buffer to interface between the first controller and the second controller to allow access from devices connected to the first transport medium to the storage devices using native low level, block protocols.

Thus, Claim 1 recites a “storage router” with a “supervisor unit” operable to i) “map between devices connected to the first transport medium and the storage devices,” ii) “implement access controls for storage space on the storage devices,” and iii) “allow access from devices connected to the first transport medium the storage devices using NLLBP.” As discussed above, these claimed features of the present invention allow each host connected to the first transport medium to access some portion of storage on the storage devices associated with that host using an NLLBP.

2. Petal Does Not Disclose “Allow[ing] Access” From A Workstation Using NLLBP

The present invention, in accordance with Claim 1, allows workstations (or other host devices) to access storage devices using an NLLBP. An NLLBP, as discussed above is a set of rules or standards that enable computers to exchange information and do not involve the overhead of high level protocols and file systems typically required by network servers. Thus, the devices of Claim 1 connected to the first data transport protocol can access the storage devices using commands that do not require translation from a high level protocol to a low-level protocol.

The Examiner again relies on Petal for the rejection of this limitation of Claim 1. Petal, however, teaches a system in which a Petal client issues high level commands as an RPC in UDP packets. The RPC subsequently calls a function of the Petal server Unix operating system. The Petal server must then transform the RPC in UDP to generate the appropriate SCSI READ/WRITE commands. Thus, Petal uses a traditional RPC scheme that, like the prior art systems the invention of the '035 Patent was designed to overcome, involves the overhead of high level protocols typically used by traditional network servers. Consequently, the Petal server does not allow the Petal clients to access the storage devices using an NLLBP. Thus, Petal does not (and cannot) show a "supervisor unit" operable to "allow access from devices connected to the first transport medium the storage devices" using NLLBPs.

Moreover, the Examiner does not particularly point out where this feature of the present invention can be found in the other references. Therefore, Applicants respectfully request that the Examiner allow Claim 1.

3. Petal Does Not Disclose a "Map" Between Devices On The First Transport Medium and Storage Devices

The "supervisor unit" of Claim 1 maps between devices located on one side of the storage router and the storage devices located on the other side of the storage router. This mapping is more than mere virtualization as the supervisor unit associates workstations or other devices on one side of the storage router with particular storage devices.

The Examiner again relies on Petal in rejecting this limitation of Claim 1. Applicants respectfully submit, however, that Petal does not disclose, teach or suggest a unit that maps between devices connected to the first transport medium and storage devices connected to the second transport medium. Rather, Petal teaches that a virtual to physical mapping of the storage itself (i.e., virtualization of the storage devices). There is no association made between the clients and storage devices (or portions thereof) in the mapping of Petal. In other words, there is no mechanism disclosed to say "this client device maps to that storage device" on the other side of the Petal server). Consequently, Petal teaches a virtualization scheme, not a mapping between workstations and storage devices.

Applicants further submit that Examiner has not pointed out where this feature of the present invention can be found in the other references and therefore has not made out a *prima facie* case of obviousness. Therefore, Applicants respectfully request withdrawal of the rejection and allowance of Claim 1.

4. Petal Does Not Disclose, Teach or Suggest The “Access Controls” Limitation Of Claim 1

As discussed above, the statement in Petal that “currently we do not provide any special support for protecting a client’s data from other clients; however, it would not be difficult to provide security on a per virtual disk basis” is, at best, an ‘invitation to try’ to a security feature, and not necessarily providing “access controls” to allow access using NLLBPs on a per virtual disk basis. The statement does not by itself provide any teaching or suggestion as to how the “access controls” recited in Claim 1 can be achieved.

Thus, while it may have been ‘obvious-to-try’ a security feature based on the above-cited statement, one of ordinary skill in the art is left completely in the dark as to how such security feature would be achieved, much less how one would achieve “access controls” using NLLBPs as recited in Claim 1. As the cited case law points out, an invitation to try a feature is not enough in and of itself to render a claimed invention obvious.

Moreover, the Examiner has not pointed to any art or other evidence on the record such that one of skill in the art would have a reasonable expectation of success in implementing access controls for a UDP/ATM environment.

5. There Is No Showing That The Remainder Of The References Contain The Limitations Missing From Petal

The Examiner relies on Quam, Cummings, Crouse and Pisello in rejecting protocol and hardware specific features of the claimed invention. Applicants note, however, that the Examiner has not pointed out where these cited references make up for the deficiencies of Petal with respect to allowing access from a device connected to the first transport media to a storage device using a NLLBP, mapping, and access controls. As these features are not disclosed or taught in Petal, as discussed above, and are not pointed to in the other references, the burden of making out a *prima facie* case of obviousness has not been met. Therefore, Applicants respectfully request allowance of Claim 1.

C. Claim 2

Applicants respectfully submit that Claim 2 depends from Claim 1 and represents further limitations thereon. With respect to Claim 2, the claim recites that the “supervisor unit” “maintains and allocation of subsets of storage space to associated devices connected to the

first transport medium, wherein each subset is only accessible by the associated device connected to the first transport medium.” As discussed above in conjunction with Claims 8 and 12, the access controls allocate subsets of storage to particular devices on the first transport medium (e.g., workstations). Applicants respectfully submit that Petal does not disclose, teach or suggest this feature of Claim 2 as Petal does not describe or suggest allocating storage devices or subsets of storage devices to particular clients. Therefore, Applicants respectfully request allowance of Claim 2.

D. Claims 3-6 and 10

Applicants respectfully submit that Claims 3-6 and 10 depend directly or indirectly from Claims 1 and 7, respectively. Therefore, Applicants respectfully request allowance of these claims as representing further limitations on the respective independent claims and any intervening claims.

E. Summary: There is No *Prima Facie* Showing of Obviousness

Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness for Claims 1-6 and 10 as the prior art references do not disclose, teach or suggest all of the claim limitations. Specifically, the prior art cited by the Examiner does not appear to teach a “supervisor unit” that is operable to i) “map between devices connected to the first transport medium and the storage devices,” ii) to “implement access controls for the storage space on the storage devices” and iii) to “allow access from devices connected to the first transport medium to the storage devices using a NLLBP.” While the Examiner has provided a detailed discussion of Petal to attempt to show where these features are found, Applicants respectfully submit that Petal does not disclose or teach the claimed limitations, as discussed above in relation to the § 102 rejections. Furthermore, the remaining cited references (Quam, Cummings, Crouse and Pisello) do not make up for the deficiencies in Petal. Accordingly, Applicants respectfully request allowance of Claims 1-6 and 10.

III. Conclusion

Applicants appreciate the Examiner’s diligence in issuing thorough office actions in multiple reexamination cases so quickly. Applicants respectfully submit, however, that Claims 7-9 and 11-14 are distinguishable from the prior art Petal reference, and that Claims 1-6 and 10

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are distinguishable from the Petal, Quam, Cummings, Crouse and Pisello references.

Therefore, Applicants respectfully request allowance of all claims subject to reexamination.

Applicant has now made an earnest attempt to place this case in condition for allowance. Other than as explicitly set forth above, this reply does not include an acquiescence to statements, assertions, assumptions, conclusions, or any combination thereof in the Office Action.

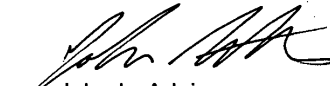
For the foregoing reasons and for other reasons clearly apparent, Applicant respectfully requests full allowance of Claims 1-14. The Examiner is encouraged to telephone the undersigned at the number listed below for any questions or issues that arise during this procedure, and specifically for discussion and/or prompt action in the event any issues remain.

This Reply was served via First Class Mail on April 6, 2005 to Larry E. Severin, Wang, Hartmann & Gibbs, PC, 1301 Dove Street #1050, Newport Beach, CA 92660 and William A. Blake, Jones, Tullar & Cooper, PC, P.O. Box 2226 EADS Station, Alexandria, VA 22202.

The Director of the U.S. Patent and Trademark Office is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 50-3183 of Sprinkle IP Law Group.

Respectfully submitted,

Sprinkle IP Law Group
Attorneys for Applicant



John L. Adair
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MAR 10 2003

CLERK, U.S. DISTRICT COURT
WESTERN DISTRICT OF TEXAS
BY [Signature]
DEPUTY CLERK

NOTE: Pursuant to Fed. Cir. R. 47.6, this disposition is not citable as precedent. It is a public record. This disposition will appear in tables published periodically.

United States Court of Appeals for the Federal Circuit

02-1158

FILED

MAR 10 2003

CLERK, U.S. DISTRICT COURT
WESTERN DISTRICT OF TEXAS
BY [Signature]
DEPUTY CLERK

CROSSROADS SYSTEMS, (TEXAS), INC.,

Plaintiff-Appellee,

v.

CHAPARRAL NETWORK STORAGE, INC.,

Defendant-Appellant.

FILED
U.S. COURT OF APPEALS FOR
THE FEDERAL CIRCUIT

FEB 12 2003

JUDGMENT

JAN HORBALY
CLERK

ON APPEAL from the United States District Court for the Western District of Texas

In CASE NO(S). 00-CV-217 and 00-CV-621

This CAUSE having been heard and considered, it is

ORDERED and ADJUDGED: AFFIRMED. See Fed. Cir. R. 36

Per Curiam (NEWMAN, SCHALL, and DYK, Circuit Judges).

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UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

By: [Signature] Date: 3/5/03

ENTERED BY ORDER OF THE COURT

DATED: FEB 12 2003

[Signature]
Jan Horbaly, Clerk

ISSUED AS A MANDATE: MARCH 5, 2003

Costs Against Appellant:
Total \$97.35

186

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF TEXAS
AUSTIN DIVISION

FILED

JUL 27 2000

U. S. DISTRICT COURT
BY CLERK'S OFFICE
DEPUTY

CROSSROADS SYSTEMS, (TEXAS), INC. §

vs. §

CHAPARRAL NETWORK §
STORAGE, INC. §

NO. A 00 CA 217 SS

CROSSROADS SYSTEMS, (TEXAS), INC. §

vs. §

PATHLIGHT TECHNOLOGY, INC. §

NO. A 00 CA 248 SS

ORDER

BE IT REMEMBERED that on the 25th day of July 2000 the Court, in accordance with *Markman v. Westview Instruments, Inc.*, 52 F.3d 967 (Fed. Cir. 1995), *aff'd*, 116 S. Ct. 1384 (1996), held a hearing at which the parties appeared by representation of counsel and made oral arguments on their proposed claims construction. At the hearing, the parties presented a Joint Stipulation of Claim Construction, indicating that the parties have agreed upon the definitions for seventeen terms and/or phrases in U.S. Patent No. 5,941,972 ("the '972 patent"), and that only ten terms and/or phrases in the '972 patent remain in dispute. After considering the briefs, the case file as a whole, and the applicable law, the Court enters the following opinion and order.

I. Standard for Claims Construction

The construction of claims, or the definition of the terms used in the claims, is a matter of law for the Court. When adopting a claim construction, the Court should first consider the intrinsic evidence, which includes the claims, the specification, and the prosecution history. *See Vitronics*

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Corp. v. Conceptor, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996) (explaining that intrinsic evidence is “the most significant source of the legally operative meaning of disputed claim language”). Not surprisingly, the starting point is always “the words of the claims themselves.” *Id.*; see also *Comark Communications, Inc. v. Harris Corp.*, 156 F.3d 1182, 1186 (Fed. Cir. 1998). The words of the claims are generally given their ordinary and customary meaning, unless the patentee intended to use a “special definition of the term clearly stated in the patent specification or file history.” *Vitronics*, 90 F.3d at 1582. Thus, the Court must review the specification and file history to determine whether the patentee intended to use any such “special” definitions. See *id.* The specification and file history may also be consulted as general guides for claim interpretation. See *Comark*, 156 F.3d at 1186.

The specification and file history, however, are not substitutes for the plain language of the claims. The specification is not meant to describe the full scope of the patent – it includes only a written description of the invention, sufficient to enable a person skilled in the art to make and use it, as well as the invention’s “best mode.” See 35 U.S.C. § 112. Thus, the claims may be broader than the specification, and generally should not be confined to the examples of the invention set forth in the specification. See *Comark*, 156 F.3d at 1187 (“Although the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims.”). Indeed, the Federal Circuit has repeatedly emphasized that “limitations from the specification are not to be read into the claims.” *Id.* at 1186.

In addition to examining the intrinsic evidence the Court may, in its discretion, receive extrinsic evidence regarding the proper construction of the patent’s terms. See *Key Pharmaceuticals*

v. Hercon Labs. Corp., 161 F.3d 709, 716 (Fed. Cir. 1998) (“[T]rial courts generally can hear expert testimony for background and education on the technology implicated by the presented claim construction issues, and trial courts have broad discretion in this regard.”). The plaintiff has provided an expert affidavit and the defendant has provided excerpts from several dictionaries as extrinsic evidence concerning the construction of the terms of the ‘972 patent.

II. “implements access controls for storage space on the SCSI storage devices”

This phrase is used in claims 1, 10 and 11 of the ‘972 patent. The parties dispute whether the phrase refers to “access controls” only for certain subsections of a divided SCSI storage device, or whether it also includes limiting access to entire undivided SCSI storage devices. The plaintiff argues the phrase includes both kinds of access controls; the defendants say the phrase refers only to access controls for various subsections within a single divided SCSI storage device. The defendants also argue the plaintiff’s construction is improper because, if adopted, it will result in the ‘972 patent being invalidated by prior art.

The plaintiff proposes the following definition: “provides controls which limit a computer’s access to a specific subset of storage devices or sections of a single storage device.” *See* Plaintiff’s Brief, at 20. The defendants propose the phrase should be defined as “partitions the storage space on each one of the SCSI storage devices and defines the accessibility of each resulting partition.” *See* Defendants’ Brief, Ex. 2. The Court agrees with the plaintiff.

The intrinsic evidence of the ‘972 patent shows the plaintiff’s invention is intended to restrict access both to subsections of a SCSI storage device, as well as to entire, undivided SCSI devices. First, the plain language of this phrase refers only to “storage space” and does not limit the space

only to subsections of a divided SCSI storage device. Second, Figure 3 of the '972 patent supports a broad reading of this phrase. Figure 3 shows three SCSI storage devices, two of which are undivided (60 and 64). The third device (62) is divided into four subsections of storage space. From the simple labeling on Figure 3, it is clear that the entire, undivided storage device (64) is meant to be accessed only by a single workstation (computer E). Thus, Figure 3 expressly shows that the plaintiff's invention contemplates using "access controls" for an entire, undivided storage device as well as for the divided subsections within a single storage device.¹ Third, the language of the specification expressly describes limiting access to an entire, undivided SCSI storage device. Specifically, in referring to Figure 3, the specification states "storage device 64 can be allocated as storage for the remaining workstation 58 (workstation E)." See '972 Patent, at 4:20 - 4:21. At the hearing, the defendants' counsel argued that, simply because Figure 3 describes this feature does not mean the feature was intended to be part of the claimed invention. The Court soundly rejects this argument. Figure 3 is meant to be an example of how the plaintiff's claimed invention can be implemented, and the specification clearly describes this figure as illustrating one implementation of the claimed invention. Adopting the defendants' argument would ignore a fundamental principle of claims construction, oft repeated in the defendants' brief and oral arguments, that the specification is "the single best guide to the meaning of a disputed term." See *Vitronics*, 90 F.3d at 1582. Finally, the defendants correctly point out that the specification also refers to the single, undivided storage device (64) as a "partition (i.e., logical storage definition)." See '972 Patent, at 4:44 - 4:47. Rather than compel the defendants' proposed construction, however, this language supports the plaintiff's

¹ Figure 3 also discloses – and the defendants do not dispute – that the plaintiff's invention contemplates limiting access to various subsections of the divided SCSI storage device (62).

argument at the hearing that a discrete unit of storage – whether an entire SCSI storage device or a subsection within that device – can be referred to as a “partition.”²

The defendants also argue that, even if the intrinsic evidence supports the plaintiff’s proposed definition, this definition is nonetheless improper because it would cause the ‘972 patent to read directly upon prior art (and therefore be invalid). It is true that “claims should be read in a way that avoids ensnaring prior art if it is possible to do so.” *Harris Corp. v. IXYS Corp.*, 114 F.3d 1149, 1153 (Fed. Cir. 1997). However, the defendants have not shown that the prior art at issue – the Lui patent – would be “ensnared” by adopting the plaintiff’s definition. Importantly, the Lui patent was part of the prior art expressly considered by the patent examiner before granting the ‘972 patent. The patent examiner apparently did not use the Lui patent to reject a single claim in the ‘972 patent. The patent examiner also did not issue an Office Action requiring the plaintiff to distinguish its invention from the Lui patent on access control (or any other) grounds. Although the Patent Office is not the model of efficiency or thoroughness, its failure to cite the Lui patent as potentially invalidating prior art creates a strong presumption that the Lui patent does not read upon the plaintiff’s claimed invention. In addition, it does not appear to the Court that the Lui patent reads upon the ‘972 claimed invention. While the Lui patent does disclose a system of Fibre Channel computers and SCSI storage devices, *see* Defendants’ Brief, Ex. 6, at 2:53 - 2:65, the similarities end there. The Lui patent concerns an invention of “bypass circuits” used to “prevent the failure of any device” in the system. *See id.*, at Abstract. The invention of the Lui patent is not concerned with the swift transfer of information across a router, and thus does not disclose techniques for mapping,

² The Court expressly notes, however, that it is not defining the term “partition” in this order, as that term is not used in the ‘972 claim language.

implementing access controls, or a memory buffer.³ At the hearing, the defendants' counsel suggested that Figure 2 of the Lui patent discloses the claimed invention of the '972 patent.

However, Figure 2 of the Lui patent is not a part of the Lui invention; rather it is an illustration of a "conventional" network system that the Lui invention allegedly improves upon. *See id.* at 3:66. The Court rejects the defendants' argument that "conventional" network systems also read directly upon the '972 claimed invention. The patent examiner may have let one piece of prior art slip by; he or she would not have missed a "conventional" network system directly applicable to the plaintiff's claimed invention.

In sum, the Court will adopt the plaintiff's proposed definition and construe the phrase "implements access controls" in the claims of the '972 patent to mean "provides controls which limit a computer's access to a specific subset of storage devices or sections of a single storage device."

III. "allocation of subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device"

The dispute here is essentially the same as in the preceding section. This phrase is used in claims 2, 8 and 12 of the '972 patent. As it did with the "implements access controls . . ." phrase, the plaintiff argues the "allocation . . ." phrase means that specific Fibre Channel devices can be allocated storage space on subsections of a single SCSI storage device and on entire, undivided SCSI storage devices. The defendants stick to their general argument on this issue, and contend the phrase

³ The defendants argue these features are "implicitly" found in the Lui specification and in any event were disclosed in other prior art. *See Defendants' Brief*, at 12 and n.1. The Court is not persuaded that these features are "implicitly" disclosed by the Lui patent, and the other prior art briefly referenced by the defendants makes no mention of combining that prior art with the invention of the Lui patent, or vice-versa.

means storage space can only be allocated on subsections of a single divided SCSI storage device. Both parties agree this storage space, however it is defined, can only be accessed by the specified Fibre Channel device(s).

The plaintiff's proposed definition is "subsets of storage space are allocated to specific Fibre Channel devices." See Plaintiff's Brief, at 26. The defendants say the phrase should be defined to mean "one or more partitions that are only accessible by a single Fibre Channel device." See Defendants' Brief, Ex. 2. For the reasons discussed in the preceding section, the Court adopts the plaintiff's proposed construction.

IV. "supervisor unit"

This term is used in claims 1, 2 and 10 of the '972 patent. The plaintiff contends this term should be defined as "a microprocessor programmed to process data in a buffer in order to map between Fibre Channel devices and SCSI devices and which implements access controls." See Plaintiff's Brief, at 25. The defendants argue the term should be defined as "an Intel 80960RP processor" with several specific features. See Defendants' Brief, Ex. 2.

The defendants argue their construction is mandated by the means-plus-function analysis of § 112(6) of the Patent Act, because the claims of the '972 patent do not adequately describe the "supervisor unit" to be used. See Defendants' Brief, at 15-17. The plaintiff argues that § 112(6) does not apply because the term "means" is not used with the term "supervisor unit" and because the term "supervisor unit" is adequately described by other claim language in the '972 patent. See Plaintiff's *Markman* Exhibits, at 35-39.

Section 112(6) of the Patent Act provides that when a claim refers to the "means for" a

specific act, but fails to adequately describe these means, the means then must be defined by reference to the specification. See 35 U.S.C. § 112(6).⁴ If the claim language at issue does not include the term “means,” there is a presumption that the § 112(6) means-plus-function analysis does not apply. See *Al-Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308, 1318 (Fed. Cir. 1999) (“[W]hen an element of a claim does not use the term ‘means,’ treatment as a means-plus-function claim element is generally not appropriate.”). To overcome this presumption, the party seeking to apply § 112(6) must show the claim language at issue is purely functional and that other claim language does not adequately describe the disputed term. See *id.* (“[W]hen it is apparent that the element invokes purely functional terms, without the additional recital of specific structure or material for performing that function, the claim element may be a means-plus-function element despite the lack of express means-plus-function language.”). From a review of the claim language as a whole, the Court agrees with the plaintiff that the term “supervisor unit” is not purely functional, but refers instead to a device that can perform the tasks specifically listed in the claim language of the ‘972 patent. Specifically, claims 1, 2 and 10 of the ‘972 patent describe a “supervisor unit” that can: (1) maintain and map the configuration of networked Fibre Channel and SCSI storage devices; (2) include in this configuration an allocation of specific storage space to specific Fibre Channel devices; (3) implement access controls for the SCSI storage devices; and (4) process data in the storage router’s buffer to allow an exchange between the Fibre Channel and SCSI storage devices. See ‘972 Patent,

⁴ Section 112(6) reads as follows: “An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.” 35 U.S.C. § 112(6).

at Claims 1, 2 and 10. These are the same tasks described in the plaintiff's proposed definition. In addition, the specification expressly defines the "supervisor unit" as "a microprocessor" (a computer chip) and specifically as "a microprocessor for controlling operation of storage router 56 and to handle mapping and security access for requests between Fibre Channel 52 and SCSI bus 54." See *id.* at 5:7 - 5:10. However, neither the specification (nor the claim language) limits the '972 patent to the specific Intel computer chip referenced by the defendants. Although the defendants correctly point out that the Intel 80960 chip is the only computer chip expressly named in the '972 patent and the specification describes many features this chip, the defendants fail to note that the Intel 80960 chip is listed as only "one implementation" of the claimed invention's microprocessor. See '972 Patent, at 5:63. The defendants are attempting exactly what the Federal Circuit prohibits – to limit the claims to the preferred embodiment and examples of the specification. "This court has cautioned against limiting the claimed invention to preferred embodiments or specific examples in the specification." *Comark*, 156 F.3d at 1186 (quoting *Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 805 F.2d 1558, 1563 (Fed. Cir. 1988)). The Court will not use an example of "one implementation" in the specification to limit the plain language of the claims. Accordingly, the Court adopts the plaintiff's definition of "supervisor unit" and will construe that term as used in the claims of the '972 patent to mean "a microprocessor programmed to process data in a buffer in order to map between Fibre Channel devices and SCSI devices and which implements access controls."

V. "SCSI storage devices"

This term is used in claims 1, 4, 7, 9-11 and 14 of the '972 patent. The plaintiff argues that this term essentially needs no further definition because the term SCSI is so well-known in the industry, but proposes that the term can be further defined as "any storage device including, for

example, a tape drive, CD-ROM drive, or a hard disk drive that understands the SCSI protocol and can communicate using the SCSI protocol." See Plaintiff's Brief, at 18. The defendants argue the term should be defined as "any storage device that uses a SCSI standard and has a unique BUS:TARGET:LUN address." See Defendants' Brief, Ex. 2.

The Court agrees with the plaintiff. Essentially, the defendants contend their narrow definition should be used because it "comports with '972 specification" and its discussion of SCSI storage devices. See Defendant's Brief, at 14. However, the specification language referred to by the defendants is only one example of how the SCSI storage device addressing scheme "can" be represented. See '972 Patent, at 7:39. Again, the defendants are impermissibly trying to limit the claim language to an example given in the specification. See *Comark*, 156 F.3d at 1186-87. For the sake of extra clarity, the Court will adopt the plaintiff's proposed definition for this term.

VI. "process data in the buffer"

This phrase is used in claims 1 and 10 of the '972 patent. The plaintiff argues the phrase is adequately defined on its own and by the surrounding claim language. The defendants contend the phrase should be defined as "to manipulate data in the buffer in a manner to (a) achieve mapping between Fibre Channel and SCSI devices, and (b) apply access controls and routing functions." See Defendants' Brief, Ex. 2.

The plain language of claims 1 and 10 disclose that the supervisor unit (the microprocessor) processes data in the buffer "to interface between the Fibre Channel controller and the SCSI controller to allow access from Fibre Channel initiator devices to SCSI storage devices using the native low level, block protocol in accordance with the configuration." See '972 Patent, at Claims 1 and 10. This language adequately describes what it means to "process data in the buffer" for these

claims. Simply because the specification may use slightly different language to describe this “processing,” *see id.* at 5:18 - 5:20, does not entitle the defendants to adopt the specification language over the plain language of the claims. The Court will not further define this phrase.

VII. “storage router”

This term is used in claims 1-7 and 10 of the ‘972 patent. The plaintiff argues the term needs no further definition for claims 1-6, and for claim 7 it should be defined as “a device which provides virtual local storage, maps, implements access controls, and allows access using native low level block protocols.” *See* Plaintiff’s Brief, at 27. The defendants contend the term should mean “a bridge device that connects a Fibre Channel link directly to a SCSI bus and enables the exchange of SCSI command set information between application clients on SCSI bus devices and the Fibre Channel links.” *See* Defendants’ Brief, Ex. 2.

The defendants do not make any argument for their proposed definition in their brief, and did not discuss the term at the July 25 hearing. In their notebook of exhibits presented at the hearing, the defendants include one page which supports their definition with a quote from the specification. *See* Defendants’ *Markman* Exhibits, “Markman Presentation” Tab, at 22. This argument is disingenuous. The specification language quoted by the defendants is immediately followed by several sentences further defining “storage router.” Indeed, the next sentence begins “Further, the storage router applies access controls” *See* ‘972 Patent, at 5:30. The defendants’ attempt to limit the term “storage router” to one of several descriptive sentences in the specification is not well-taken. In addition, the Court finds the term “storage router,” as used in all claims of the ‘972 patent, is adequately described by the additional language of the claims, which discloses in detail the various functions and/or qualities of the storage router. The Court will not further define this term.

VIII. "map"

This term is used in claims 1, 7, 10 and 11 of the '972 patent. The plaintiff contends the term means "to create a path from a device on one side of the storage router to a device on the other side of the router, *i.e.* from a Fibre Channel device to a SCSI device (or vice-versa). A 'map' contains a representation of devices on each side of the storage router, so that when a device on one side of the storage router wants to communicate to a device on the other side of the storage router, the storage router can connect the devices." *See Plaintiff's Brief*, at 22. The defendants argue the term means "to translate addresses." *See Defendants' Brief*, Ex. 2.

In support of their definition, the defendants point only to a dictionary definition of "map." *See Defendants' Brief*, at 13 and Ex. 4. The plaintiff, on the other hand, cites to specific portions of the specification that support its definitions of map (both as a verb and a noun) as used in the claims of the '972 patent. *See Plaintiff's Brief*, at 22 (citing '972 Patent, at 1:66-2:5 and 6:65-7:6). Because intrinsic evidence is far more salient than a dictionary definition, and because the Court agrees that the specification language cited by the plaintiff supports its construction of the term "map," the Court will adopt the plaintiff's proposed definition of this term.

IX. "Fibre Channel protocol unit" and "SCSI protocol unit"

These terms are used in claims 5 and 6 of the '972 patent. The plaintiff contends these phrases should be defined as "a portion of the Fibre Channel controller which connects to the Fibre Channel transport medium" and "a portion of the SCSI controller which interfaces to the SCSI bus." *See Plaintiff's Brief*, at 27. The defendants say the terms mean "block and equivalents thereof that connects to the Fibre Channel transport medium" and "block and equivalents thereof that connects to the SCSI bus transport medium." *See Defendants' Brief*, Ex. 2.

The defendants argue the means-plus-function analysis of § 112(6) should apply here because the terms are well-known and are not defined in two dictionaries cited by the defendants. *See* Defendants' Brief, at 7-8, 14-15, Ex. 4 and Ex. 5. However, the defendants do not indicate how the term should be defined in reference to the specification, and in fact contend "the '972 specification fails to reveal any structure corresponding to the claimed function." *See id.* at 8 and 15. The defendants then propose the word "block" should be used to describe these terms because the "protocol units" are "simply depicted as a block within the diagram of Figure 5" of the '972 patent. *See id.* This reasoning is wholly unpersuasive. Simply because a figure in the patent physically depicts the protocol units in a block-like shape, it does not follow that the units should be defined as "blocks or equivalents thereof." Under that reasoning, the SCSI storage devices, which are physically depicted as cylinders in the '972 patent, could be defined simply as "cylinders, oil drums or monkey barrels, or equivalents thereof." As the plaintiff correctly points out, the language of claims 5 and 6 plainly states that the "protocol units" for both devices are part of the "controllers" for the devices, and are intended to "connect" the devices to various "transport media" (*i.e.*, to various cables). *See* '972 Patent, at Claims 5 and 6. Accordingly, the Court adopts the plaintiff's definitions for these terms, and will construe the terms to mean "a portion of the Fibre Channel controller which connects to the Fibre Channel transport medium" and "a portion of the SCSI controller which interfaces to the SCSI bus."

X. "interface"

In their Joint Stipulation of Claim Construction, the parties claim the meaning of the term "interface" is in dispute. However, this phrase is not discussed in any of the parties' briefs, and neither side presented an argument at the July 25 hearing as to why the term is disputed. This term

has a standard and ordinary meaning – even to a federal judge – and the Court will not further define it.

XI. Undisputed Terms

Finally, in their Joint Stipulation of Claim Construction, the parties have stipulated to the construction of 17 other terms in the '972 patent. The Court will therefore adopt these stipulated constructions, solely for the purpose of this lawsuit.

Accordingly, the Court enters the following order:

IT IS ORDERED that the attached construction of the patent claims will be incorporated into any jury instructions given in this cause and will be applied by the Court in ruling on the issues raised in summary judgment.

SIGNED on this 26th day of July 2000.


UNITED STATES DISTRICT JUDGE

CONSTRUCTION OF CLAIMS
U.S. PATENT NO. 5,941,972

Disputed Terms

The phrase “implements access controls for storage space on the SCSI storage devices” means provides controls which limit a computer’s access to a specific subset of storage devices or sections of a single storage device.

The phrase “allocation of subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device” means subsets of storage space are allocated to specific Fibre Channel devices.

A “supervisor unit” is a microprocessor programmed to process data in a buffer in order to map between Fibre Channel devices and SCSI devices and which implements access controls.

A “SCSI storage device” is any storage device including, for example, a tape drive, CD-ROM drive, or a hard disk drive that understands the SCSI protocol and can communicate using the SCSI protocol.

The term “map” means to create a path from a device on one side of the storage router to a device on the other side of the router, *i.e.* from a Fibre Channel device to a SCSI device (or vice-versa). A “map” contains a representation of devices on each side of the storage router, so that when a device on one side of the storage router wants to communicate with a device on the other side of the storage router, the storage router can connect the devices.

A “Fibre Channel protocol unit” is a portion of the Fibre Channel controller which connects to the Fibre Channel transport medium.

A “SCSI protocol unit” is a portion of the SCSI controller which interfaces to the SCSI bus.

Stipulated / Undisputed Terms

A “buffer” is a memory device that is utilized to temporarily hold data.

A “direct memory access (DMA) interface” is a device that acts under little or no microprocessor control to access memory for data transfer.

A “Fibre Channel” is a known high-speed serial interconnect, the structure and operation of which is described, for example, in Fibre Channel Physical and Signaling Interface (FC-PH), ANSI X3.230 Fibre Channel Arbitrated Loop (FC-AL), and ANSI X3.272 Fibre Channel Private Loop Direct Attach (FC-PLDA).

A "Fibre Channel controller" is a device that interfaces with a Fibre Channel transport medium.

A "Fibre Channel device" is any device, such as a computer, that understands Fibre Channel protocol and can communicate using Fibre Channel protocol.

"Fibre Channel protocol" is a set of rules that apply to Fibre Channel.

A "Fibre Channel transport medium" is a serial optical or electrical communications link that connects devices using Fibre Channel protocol.

A "first-in-first-out queue" is a multi-element data structure from which elements can be removed only in the same order in which they were inserted; that is, it follows a first in, first out (FIFO) constraint.

A "hard disk drive" is a well known magnetic storage media, and includes a SCSI hard disk drive.

An "initiator device" is a device that issues requests for data or storage.

"Maintain(ing) a configuration" means keep(ing) a modifiable setting of information.

A "native low level, block protocol" is a set of rules or standards that enable computers to exchange information and do not involve the overhead of high level protocols and file systems typically required by network servers.

A "SCSI" (Small Computer System Interface) is a high speed parallel interface that may be used to connect components of a computer system.

A "SCSI bus transport medium" is a cable consisting of a group of parallel wires (normally 68) that forms a communications path between a SCSI storage device and another device, such as a computer.

A "SCSI controller" is a device that interfaces with the SCSI bus transport medium.

"Virtual local storage" is a specific subset of overall data stored in storage devices that has the appearance and characteristics of local storage.

A "workstation" is a remote computing device that connects to the Fibre Channel, and may consist of a personal computer.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
NOTIFICATION UNDER 37 C.F.R. 1.565 NOTIFICATION OF STAY	Atty. Docket No. CROSS1123-17 CROSS1123-19
Applicant Geoffrey B. Hoese, et al.	
Application Number 90/007,125 90/007,317	Date Filed 07/19/2004 11/23/2004
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Fleming, Fritz, M.
Confirmation Number: 2298 and 1634	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

<u>Certificate of Mailing Under 37 C.F.R. §1.8</u>
I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22312-1450 on <u>March 30</u> , 2005
<i>Janice Pampell</i> Janice Pampell

This notification is filed for the sole purpose to inform the Examiner of status of ongoing litigation involving United States Patent No. 5,941,972 (the "972 Patent") and United States Patent No. 6,425,035 (the "035 Patent").

Attorney Docket No.
CROSS1123-17
CROSS1123-19

Customer No. 44654
Appl. No. 90/007,125
Appl. No. 90/007,317

2

ONGOING LITIGATION

Attached hereto as Exhibit "A" is a March 17, 2005 Order from the United States District Court for the Western District of Texas. The Court ordered Crossroads to file a copy of this Order with the U.S. Patent Office in the reexamination proceedings involving U.S. Patents 5,941,972 and 6,425,035 B2.

This notification was served via first class mail on March 30, 2005 to:

Larry E. Severin
Wang, Hartmann & Gibbs, PC
1301 Dove Street, #1050
Newport Beach, CA 92660

and

William A. Blake
Jones, Tullar & Cooper, PC
P.O. Box 2226 Eads Station
Alexandria, VA 22202

Respectfully submitted,

Sprinkle IP Law Group
Attorneys for Applicant



John L. Adair
Reg. No. 48,828

Date: March 30, 2005
1301 W. 25th Street
Suite 408
Austin, Texas 78705
Tel. (512) 637-9220
Fax. (512) 371-9088

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
AUSTIN DIVISION

FILED
AUSTIN DIVISION

2005 MR 22 PM 2:03

WESTERN DISTRICT OF TEXAS
U.S. CLERK'S OFFICE

BY: AF
DEPUTY

CROSSROADS SYSTEMS (TEXAS), INC.,
Plaintiff,

-vs-

Case No. A-03-CA-754-SS

DOT HILL SYSTEMS CORPORATION,
Defendant.

ORDER

BE IT REMEMBERED on the 17th day of March 2005, the Court called the above-styled cause for hearing on Defendant's Motion for a Limited Six-Month Abatement [#256]. Having considered the motion and response, the relevant law, the case file as a whole, and the arguments of counsel at the hearing, the Court now enters the following:

In this action, Plaintiff Crossroads Systems (Texas), Inc. ("Crossroads") sues Defendant Dot Hill Systems Corporation ("Dot Hill") for infringing the claims of two of its patents, United States Patent No. 5,941,972, entitled "Storage Router and Method for Providing Virtual Local Storage," and United States Patent No. 6,425,035 B2, which bears the same title and is a continuation of the '972 patent. Dot Hill now seeks a stay of the proceedings in this case based on reexaminations of the patents-in-suit that are currently taking place in the United States Patents and Trademark Office ("USPTO"). The Court has previously declined to stay this action because of its inability to predict the amount of time it will take the USPTO to conclude its reexamination proceedings.

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*SS
MR*

03/23/2005 WED 15:52 [TX/RX NO 6412]

However, the Court is now advised the USPTO has issued an initial office action canceling all of the claims of the patents-in-suit. Although the uncertainty about the length of time it will take the USPTO to make a final determination on the claims of the patents-in-suit remains, the Court finds it appropriate to enter a short stay of the case to give it an opportunity to do so. After all, if the USPTO ultimately cancels all of the claims in the patents, Crossroads would no longer have a basis for its infringement allegations. *Slip Track Sys., Inc. v. Metal Lite, Inc.*, 159 F.3d 1337, 1341 (Fed. Cir. 1998) (noting that a stay may be justified when “the outcome of the reexamination would be likely to assist the court in determining patent validity and, if the claims were canceled in the reexamination, would eliminate the need to try the infringement issue.”). Moreover, if the reexamination proceedings were to result in an amendment of the patent claims, the issues raised by the claim construction proceedings and pending motion for summary judgment could be substantially altered.

Thus, the Court agrees with Dot Hill that under the circumstances, a stay is justified in this case. Bearing in mind Crossroads’s interest in moving this case forward, however, the Court declines to stay this case indefinitely, or even for six months, as requested. Instead, the Court considers it appropriate to stay the case from now until ninety (90) days following April 7, 2005 (the date on which Crossroads must file its answer to the USPTO’s initial office action in the reexamination proceedings). The Court finds this period of time strikes the appropriate balance between the general interest in affording the USPTO an opportunity to reach a final determination on the status of the claims of the patents-in-suit, and the plaintiff’s interest in moving the case forward.

Because the Court is convinced there is an appreciable probability that the issues in the now-pending motion for summary judgment will no longer require resolution by the Court at the conclusion of the reexamination proceedings, the Court will dismiss the motion without prejudice to the filing of a renewed motion for summary judgment on any and all live issues remaining at the conclusion of the stay.¹

In accordance with the foregoing:

IT IS ORDERED that Defendant's Motion for Leave to Supplement its Motion for a Limited Six-Month Abatement [#263] is GRANTED;

IT IS FURTHER ORDERED that Defendant's Motion for a Limited Six-Month Abatement [#256] is GRANTED IN PART and DENIED IN PART as set forth herein;

IT IS FURTHER ORDERED that this case is STAYED until July 5, 2005;

IT IS FURTHER ORDERED that Plaintiff Crossroads shall file a copy of this order in the reexamination proceedings involving the patents-in-suit so that the USPTO may assign those proceedings as high a priority as the law, practicability, and justice will permit;

IT IS FURTHER ORDERED that Plaintiff Crossroads shall notify the Court of the status of the reexamination proceedings within ten (10) days of either the

¹ The Court notes the parties have already filed substantial amounts of paper with respect to the summary judgment issues. The Court also notes the parties have a tendency to submit duplicate copies of evidentiary submissions already on file whenever they file a new pleading. Since the file in this case appears to be growing unnecessarily thick, the Court would advise the parties of the following. In the event either the evidence or the arguments contained in the parties' now-moot summary judgment pleadings remain relevant to the issues in this case at the conclusion of the stay, the parties should feel free to incorporate them by specific reference in any post-stay pleadings they may ultimately file with the Court.

conclusion of the stay, or the date on which the USPTO issues a final determination in the reexamination proceedings, if a conclusion is reached prior to the expiration of the stay; and

IT IS FINALLY ORDERED that Defendant's Motion for Summary Judgment that U.S. Patent No. 6,425,035 and U.S. Patent No. 5,941,972 are Invalid Pursuant to 35 U.S.C. § 102 and/or 103 in View of the Prior Development of Digital Equipment Corporation HSZ70 Controller [#85] and Defendant's Request for Judicial Notice in Support of its Motion for Summary Judgment [#86] are DISMISSED WITHOUT PREJUDICE to refiling as set forth herein.

SIGNED this the 22nd day of March 2005.



SAM SPARKS
UNITED STATES DISTRICT JUDGE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
CERTIFICATE OF SERVICE UNDER 37 C.F.R. 1.248	Atty. Docket No. CROSS1123-17 CROSS1123-19
Applicant Geoffrey B. Hoese, et al.	
Application Number 90/007,125 90/007,317	Date Filed 07/19/2004 07/19/2004
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Fleming, Fritz

4660 U.S. PTO



Applicant hereby serves the Information Disclosure Statement, SBO8A and SBO8B forms, copies of references A1-A59, B1-B9 and C1-C32 and copies of References C33-C110, which are located on the attached CD-Rom, in the above referenced case to:

Larry E. Severin
Wang, Hartmann & Gibbs, PC
1301 Dove Street, #1050
Newport Beach, CA 92660

William A. Blake
Jones, Tullar & Cooper, PC
P.O. Box 2226 Eads Station
Alexandria, VA 22202

As per 35 U.S.C. §1.248 service is made via first class mail on March 23, 2005.

Respectfully submitted,

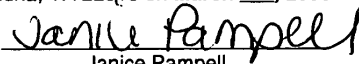
Sprinkle IP Law Group


John L. Adair
Reg. No. 48,828

Dated: March 23 2005

1301 W. 25th Street, Suite 408
Austin, Texas 78705
Tel. (512) 637-9220
Fax. (512) 371-9088

Enclosures

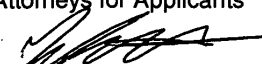
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
INFORMATION DISCLOSURE STATEMENT BY APPLICANTS	
Atty. Docket No. (Opt.) CROSS1123-17 CROSS1123-19	
Applicants Geoffrey B. Hoese et al.	
Application Number 90/007,125 90/007,317	Filed 07/19/2004 07/19/2004
For Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Fleming, Fritz M.
<u>Certification Under 37 C.F.R. §1.8</u>	
I hereby certify that this document is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313 on <u>March 25</u> , 2005.	
 Janice Pampell	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

Applicants respectfully request, pursuant to 37 C.F.R. §§ 1.555, 1.56, 1.97 and 1.98, that the art listed on the attached SBO8-A and SBO8-B forms be considered and cited in the examination of the above-identified reexamination application. Since the present Application was filed after June 30, 2003, a copy of any U.S. Patent and any U.S. Patent Application Publications cited on the attached SBO8-A form is not being submitted with this Information Disclosure Statement pursuant to the waiver of 37 C.F.R. S 1.98(a)(2)(i) by the U.S. Patent and Trademark Office. Several documents are included on the enclosed CD-Rom for the convenience of the Examiner. If the Examiner would like hard copies of these documents, we will gladly provide them.

Furthermore, pursuant to 37 C.F.R. §§ 1.97(g) and (h), no representation is made that a search has been made or that this art is material to patentability of the present application. Applicants respectfully submit that the claims of Applicants' above-referenced patent is patentably distinguishable from these references. Applicants respectfully request consideration of these references. The Commissioner is hereby authorized to charge any fees due, or refund any credit, to Deposit Account No. 50-3183 of Sprinkle IP Law Group for any fee under 37 C.F.R. §1.17.

Respectfully submitted,
Sprinkle IP Law Group
Attorneys for Applicants


John L. Adair
Reg. No. 48,828

Dated: 7/23/05
1301 W. 25th Street, Suite 408
Austin, TX 78705
T. 512-637-9220 / F. 512-371-9088

PTO/SB/08A (04-03)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number		90/007,125 & 90/007,317	
				Filing Date		07/19/2004	
				First Named Inventor		Hoese, Geoffrey	
				Group Art Unit		2182	
				Examiner Name		Fleming, Fritz M.	
Sheet	1	OF	2	Attorney Docket Number		CROSS1123-17 & CROSS1123-19	
U.S. PATENT DOCUMENTS							
Examiner Initials	Cite No.	Document Number		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines Where Relevant Passages or Figures Appear	
		Number	Kind Code (if known)				
	A1	3,082,406		03/19/1963	L.D. Stevens		
	A2	4,092,732		05/30/1978	Ouchi		
	A3	4,695,948		09/22/1987	Blevins, et al.		
	A4	4,751,635		06/14/1988	Kret		
	A5	4,864,532		09/05/1989	Reeve, et al.		
	A6	4,947,367		08/07/1990	Chang, et al.		
	A7	5,072,378		12/10/1991	Manka		
	A8	5,163,131		11/10/1992	Row, et al.		
	A9	5,239,632		08/24/1993	Larner		
	A10	5,239,643		08/24/1993	Blount, et al.		
	A11	5,257,386		10/26/1993	Saito		
	A12	5,347,384		09/13/1994	McReynolds, et al.		
	A13	5,414,820		10/09/1995	McFarland, et al.		
	A14	5,423,044		06/06/1995	Sutton, et al.		
	A15	5,465,382		11/07/1995	Day, III, et al.		
	A16	5,530,845		06/25/1996	Hiatt, et al.		
	A17	5,535,352		07/09/1996	Bridges, et al.		
	A18	5,581,714		12/03/1996	Amini, et al.		
	A19	5,596,562		06/21/1997	Chen		
	A20	5,596,736		01/21/1997	Kerns		
	A21	5,598,541		01/28/1997	Malladi		
	A22	5,680,556		10/21/1997	Begun, et al.		
	A23	5,701,491		12/23/1997	Dunn, et al.		
	A24	5,712,976		01/27/1998	Falcon, et al.		
	A25	5,729,705		03/17/1998	Weber		
	A26	5,743,847		04/28/1998	Nakamura, et al.		
	A27	5,751,975		05/12/1998	Gillespie, et al.		
	A28	5,774,683		06/30/1998	Gulick		
	A29	5,845,107		12/01/1998	Fisch, et al.		
	A30	5,857,080		10/05/1999	Jander, et al.		
	A31	5,864,653		01/26/1999	Tavallaei, et al.		
	A32	5,867,648		02/02/1999	Foth, et al.		

FORM PTO 1449 US Department of Commerce Patent and Trademark Office			Application Number	90/007,125 & 90/007,317	
			Filing Date	July 19, 2004	
			First Named Inventor	Hoese, Geoffrey	
			Group Art Unit	2182	
			Examiner Name	Fleming, Fritz M.	
Sheet	1	of	6	Atty Docket Number	CROSS1123-17 & CROSS1123-19
Examiner Initials	Cite No.	OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS			Date
	C1	Black Box, SCSI Fiberoptic Extender, Single-Ended, Product Insert, 2 pages, 1996.			6/18/05
	C2	Burskey, Dave "New Serial I/Os Speed Storage Subsystems" February 6, 1996			
	C3	CRD-5500, RAID DISK ARRAY CONTROLLER Product Insert, pp. 1-5			
	C4	CRD-5500, SCSI RAID CONTROLLER OEM Manual, Rev. 1.3, February 26, 1996, pp. 1-54.			
	C5	Raidtec FibreArray and Raidtec FlexArray UltraRAID Systems", Windows IT PRO Article, October 1997.			
	C6	DIGITAL Storage Works, HSZ70 Array Controller, HSOF Version 7.0 EK-HSZ70-CG. A01, Digital Equipment Corporation, Maynard, Massachusetts.			
	C7	DIGITAL StorageWorks, Using Your HSZ70 Array Controller in a SCSI Controller Shelf (DS-BA356-M Series), User's Guide, pp. 1-1 through A-5 with index, January 1998.			
	C8	DIGITAL StorageWorks HSZ270 Array Controller HSOF Version 7.0 EK-HSZ270-RM. A01. CLI Reference Manual			
	C9	DIGITAL StorageWorks HSG80 Array Controller ACS Version 8.0 (User's Guide) 1/98			
	C10	DIGITAL StorageWorks HSZ70 Array Controller HSOF Version 7.0 EK-HSZ70-SV. A01			
	C11	Emerson, "Ancor Communications: Performance evaluation of switched fibre channel I/O system using--FCP for SCSI" February 1995, IEEE, pp. 479-484.			
	C12	IBM Technical Publication: Magstar and IBM 3590 High Performance Tape Subsystem Technical Guide, November 1996, pp. 1-269.			
	C13	Guide to Sharing and Partitioning IBM Tape Library Dataservers, November 1996, IBM, International Technical Support Organization, San Jose Center			
	C14	Misc. Reference Manual Pages, SunOS 5.09.			
	C15	Block-Based Distributed File Systems, Anthony J. McGregor, July 1997.			
	C16	InfoServer 150VXT Photograph			
	C17	Pictures of internal components of the InfoServer 150, taken from http://bindarydinosaurs.couk/Museum/Digital/infoserver/infoserver.php in Nov. 2004.			
	C18	Simplest Migration to Fibre Channel Technology			
	C19	Compaq StorageWorks HSG80 Array Controller ACS Version 8.3 (Maintenance and Service Guide) 11/98			
	C20	Compaq StorageWorks HSG80 Array Controller ACS Version 8.3 (Configuration and CLI Reference Guide) 11/98			
	C21	Office Action dated 01/21/03 for 10/174,720 (CROSS1120-8).			
	C22	Office Action dated 02/27/01 for 09/354,682 (CROSS1120-1).			

	C23	Office Action dated 08/11/00 for 09/354,682 (CROSS1120-1).	
	C24	Office Action dated 12/16/99 for 09/354,682 (CROSS1120-1).	
	C25	Office Action dated 11/06/02 for 10/023,786 (CROSS1120-4).	
	C26	Office Action dated 01/21/03 for 10/081,110 (CROSS1120-5).	
	C27	Office Action dated 1/27/2005 in 10/658,163 (CROSS1120-13)	
	C28	Office Action in Ex Parte Reexamination 90/007,127, mailed 0207/05.	
	C29	Office Action in Ex Parte Reexamination 90/007,126, mailed 0207/05.	
	C30	Office Action in Ex Parte Reexamination 90/007,124, mailed 0207/05.	
	C31	Office Action in Ex Parte Reexamination 90/007,123, mailed 0207/05.	
	C32	European Office Action issued April 1, 2004 in Application No. 98966104.6-2413	
		Copies of the following are on the attached CD-Rom	
	C33	Defendant's First Supplemental Trial Exhibit List, Crossroads Systems, Inc., v. Chaparral Network Storage, Inc., C.A. No. A-00CA-217-SS (W.D. Tex. 2001). (CD-Rom) .	
	C34	Defendant's Third Supplemental Trial Exhibit List, Crossroads Systems, Inc. v. Pathlight Technology, Inc., C.A. No. A-00CA-248-SS (W.D. Tex. 2001) (CD-Rom) .	
	C35	Defendant's Trial Exhibits, Crossroads Systems, Inc. v. Pathlight Technology, Inc., C.A. No. A-00CA-248-SS (W.D. Tex. 2001). (CD-Rom) .	
	C36	Defendants' Trial Exhibits, Crossroads Systems, Inc., v. Chaparral Network Storage, Inc., C.A. No. A-00CA-217-SS (W.D. Tex. 2001). (CD-Rom) .	
	C37	Defendant Chaparral Network Storage, Inc.'s First Supplemental Trial Exhibit List (D1 through D271) (CD-ROM Chaparral Exhibits ExList_Def) .	9/2/2001
	C38	Defendant Pathlight Technology Inc.'s Third Supplemental Trial Exhibit List (CD-ROM Pathlight Exhibits ExList_Def).	
	C39	Plaintiff's Fourth Amended Trail Exhibit List, Crossroads Systems, Inc. v. Chaparral Network Storage, Inc, C.A. No. A-00CA-217-SS (W.D. Tex. 2001) (CD-Rom) .	9/11/2001
	C40	Plaintiff's Revised Trial Exhibit List, Crossroads Systems, Inc. v. Pathlight Technology, Inc., C.A. No. A-00CA-248-SS (W.D. Tex. 2001). (CD-Rom) .	
	C41	Plaintiff's Trial Exhibits, Crossroads Systems, Inc. v. Chaparral Networks Storage, Inc., C.A. No. A-00CA-217-SS (W.D. Tex. 2001). (CD-Rom) .	
	C42	Plaintiff's Fourth Amended Trail Exhibit List (CD-ROM Chaparral Exhibits ExList_Plaintiff).	9/11/2001
	C43	Plaintiff's Revised Trail Exhibit List (CD-ROM Pathlight Exhibits ExList_Plaintiff).	
	C44	Trail Transcripts, Crossroads Systems, Inc. v. Chaparral Network Storage, Inc., C.A. No. A-00CA-217-SS (W.D. Tex. 2001) (CD-Rom) .	
	C45	Trail Transcripts, Crossroads Systems, Inc. v. Pathlight Technology, Inc., C.A. No. A-00CA-248-SS (W.D. Tex. 2001). (CD-Rom) .	
	C46	Trial Exhibits and Transcripts, Crossroads v. Chaparral, Civil Action No. A-00CA-21755, W.D. Tex. 2000 (CD-Rom and hard copy printouts) .	
	C47	Snively, "Sun Microsystem Computer Corporation: Implementing a fibre optic channel SCSI transport" 1994 IEEE, February 28, 1994, pp. 78-82.	
	C48	Datasheet for CrossPoint 4100 Fibre Channel to SCSI Router (Dedek Ex 41 (ANCT 117-120)) (CD-ROM Chaparral Exhibits D012) .	

C49	Symbios Logic- Software Interface Specification Series 3 SCSI RAID Controller Software Release 02.xx (Engelbrecht Ex 2 (LSI 1421-1658)) (CD-ROM Chaparral Exhibits D013).	12/3/1997
C50	Press Release- Symbios Logic to Demonstrate Strong Support for Fibre Channel at Fall Comdex (Engelbrecht 12 (LSI 2785-86)) (CD-ROM Chaparral Exhibits D016).	11/13/1996
C51	OEM Datasheet on the 3701 Controller (Engelbrecht 13 (LSI 01837-38)) (CD-ROM Chaparral Exhibits D017).	6/17/1905
C52	Nondisclosure Agreement Between Adaptec and Crossroads Dated 10/17/96 (Quisenberry Ex 25 (CRDS 8196)) (CD-ROM Chaparral Exhibits D020).	10/17/1996
C53	Organizational Presentation on the External Storage Group (Lavan Ex 1 (CNS 182242-255)) (CD-ROM Chaparral Exhibits D021).	4/11/1996
C54	Bridge. C, Bridge Between SCSI-2 and SCSI-3 FCP (Fibre Channel Protocol) (CD-ROM Chaparral Exhibits P214).	
C55	Bridge Phase II Architecture Presentation (Lavan Ex 2 (CNS 182287-295)) (CD-ROM Chaparral Exhibits D022).	4/12/1996
C56	Attendees/Action Items from 4/12/96 Meeting at BTC (Lavan Ex 3 (CNS 182241)) (CD-ROM Chaparral Exhibits D023).	4/12/1996
C57	Brooklyn Hardware Engineering Requirements Documents, Revision 1.4 (Lavan Ex 4 (CNS 178188-211)) (CD-ROM Chaparral Exhibits D024) by Pecone.	5/26/1996
C58	Brooklyn Single-Ended SCSI RAID Bridge Controller Hardware OEM Manual, Revision 2.1 (Lavan EX 5 (CNS 177169-191)) (CD-ROM Chaparral Exhibits D025).	3/21/1996
C59	Coronado Hardware Engineering Requirements Document, Revision 0.0 (Lavan Ex 7 (CNS 176917-932)) (CD-ROM Chaparral Exhibits D027) by O'Dell.	9/30/1996
C60	ESS/FPG Organization (Lavan Ex 8 (CNS 178639-652)) (CD-ROM Chaparral Exhibits D028).	12/6/1996
C61	Adaptec MCS ESS Presents: Intelligent External I/O Raid Controllers "Bridge" Strategy (Lavan Ex 9 (CNS 178606-638)). (CD-ROM Chaparral Exhibits D029).	2/6/1996
C62	AEC-7313 Fibre Channel Daughter Board (for Brooklyn) Engineering Specification, Revision 1.0 (Lavan Ex 10 (CNS 176830-850)) (CD-ROM Chaparral Exhibits D030).	2/27/1997
C63	Bill of Material (Lavan Ex 14 (CNS 177211-214)) (CD-ROM Chaparral Exhibits D034).	7/24/1997
C64	AEC-. 4412B, AEC-7412/B2 External RAID Controller Hardware OEM Manual, Revision 2.0 (Lavan Ex 15 (CNS 177082-123)) (CD-ROM Chaparral Exhibits D035).	6/27/1997
C65	Coronado II, AEC-7312A Fibre Channel Daughter (for Brooklyn) Hardware Specification, Revision 1.2 (Lavan Ex 16 (CNS 177192-210)) (CD-ROM Chaparral Exhibits D037) by Tom Yang.	7/18/1997
C66	AEC-4412B, AEC7412/3B External RAID Controller Hardware OEM Manual, Revision 3.0. (Lavan Ex 17 (CNS 177124-165)) (CD-ROM Chaparral Exhibits D036).	8/25/1997
C67	Memo Dated 8/15/97 to AEC-7312A Evaluation Unit Customers re: B001 Release Notes (Lavan Ex 18 (CNS 182878-879)) (CD-ROM Chaparral Exhibits D038).	8/15/1997
C68	Brooklyn Main Board (AES-0302) MES Schedule (Lavan Ex 19 (CNS 177759-763)) (CD-ROM Chaparral Exhibits D039).	2/11/1997
C69	News Release-Adaptec Adds Fibre Channel Option to its External RAID Controller Family (Lavan Ex 20 (CNS 182932-934)) (CD-ROM Chaparral Exhibits D040).	5/6/1997

C70	AEC-4412B/7412B User's Guide, Rev. A (Lavan Ex 21) (CD-ROM Chaparral Exhibits D041).	6/19/1905
C71	Data Book- AIC-7895 PCI Bus Master Single Chip SCSI Host Adapter (Davies Ex 1 (CNS 182944-64)) (CD-ROM Chaparral Exhibits D046).	5/21/1996
C72	Data Book- AIC-1160 Fibre Channel Host Adapter ASIC (Davies Ex 2 (CNS 181800-825)) (CD-ROM Chaparral Exhibits D047).	6/18/1905
C73	Viking RAID Software (Davies Ex 3 (CNS 180969-181026)) (CD-ROM Chaparral Exhibits D048).	6/18/1905
C74	Header File with Structure Definitions (Davies Ex 4 (CNS 180009-018)) (CD-ROM Chaparral Exhibits D049).	8/8/1996
C75	C++ SourceCode for the SCSI Command Handler (Davies Ex 5 (CNS 179136-168)) (CD-ROM Chaparral Exhibits D050).	8/8/1996
C76	Header File Data Structure (Davies Ex 6 (CNS 179997-180008)) (CD-ROM Chaparral Exhibits D051).	1/2/1997
C77	SCSI Command Handler (Davies Ex 7 (CNS 179676-719)) (CD-ROM Chaparral Exhibits D052).	1/2/1997
C78	Coronado: Fibre Channel to SCSI Intelligent RAID Controller Product Brief (Kalwitz Ex 1 (CNS 182804-805)) (CD-ROM Chaparral Exhibits D053).	
C79	Bill of Material (Kalwitz Ex 2 (CNS 181632-633)) (CD-ROM Chaparral Exhibits D054).	3/17/1997
C80	Emails Dated 1/13-3/31/97 from P. Collins to Mo re: Status Reports (Kalwitz Ex 3 (CNS 182501-511)) (CD-ROM Chaparral Exhibits D055).	
C81	Hardware Schematics for the Fibre Channel Daughtercard Coronado (Kalwitz Ex 4 (CNS 181639-648)) (CD-ROM Chaparral Exhibits D056).	
C82	Adaptec Schematics re AAC-340 (Kalwitz Ex 14 CNS 177215-251)) (CD-ROM Chaparral Exhibits D057).	
C83	Bridge Product Line Review (Manzanares Ex 3 (CNS 177307-336)) (CD-ROM Chaparral Exhibits D058).	
C84	AEC Bridge Series Products-Adaptec External Controller RAID Products Pre-Release Draft, v.6 (Manzanares Ex 4 (CNS 174632-653)). (CD-ROM Chaparral Exhibits D059).	10/28/1997
C85	Hewlett-Packard Roseville Site Property Pass for Brian Smith (Dunning Ex 14 (HP 489)) (CD-ROM Chaparral Exhibits D078).	11/7/1996
C86	Distribution Agreement Between Hewlett-Packard and Crossroads (Dunning Ex 15 (HP 326-33)) (CD-ROM Chaparral Exhibits D079).	
C87	HPFC-5000 Tachyon User's Manuel, First Edition (PTI 172419-839) (CD-ROM Chaparral Exhibits D084).	5/1/1996
C88	X3T10 994D - (Draft) Information Technology: SCSI-3 Architecture Model, Rev. 1.8 (PTI 165977) (CD-ROM Chaparral Exhibits D087).	
C89	X3T10 Project 1047D: Information Technology- SCSI-3 Controller Commands (SCC), Rev, 6c (PTI 166400-546) (CD-ROM Chaparral Exhibits D088).	9/3/1996
C90	X3T10 995D- (Draft) SCSI-3 Primary Commands, Rev. 11 (Wanamaker Ex 5 (PTI 166050-229)) (CD-ROM Chaparral Exhibits D089).	11/13/1996
C91	VBAR Volume Backup and Restore (CRDS 12200-202) (CD-ROM Chaparral Exhibits D099).	
C92	Preliminary Product Literature for Infinity Commstor's Fibre Channel to SCSI Protocol Bridge (Smith Ex 11; Quisenberry Ex 31 (SPLO 428-30)) (CD-ROM Chaparral Exhibits D143).	8/19/1996
C93	Letter dated 7/12/96 from J. Boykin to B. Smith re: Purchase Order for Evaluation Units from Crossroads (Smith Ex 24) CRDS 8556-57) (CD-ROM Chaparral Exhibits D144).	7/12/1996

	C94	CrossPoint 4100 Fibre Channel to SCSI Router Preliminary Datasheet (Hulsey Ex 9 (CRDS 16129-130)) (CD-ROM Chaparral Exhibits D145).	11/1/1996
	C95	CrossPoint 4400 Fibre Channel to SCSI Router Preliminary Datasheet (Bardach Ex. 9, Quisenberry Ex 33 (CRDS 25606-607)) (CD-ROM Chaparral Exhibits D153).	11/1/1996
	C96	Fax Dated 07/22/96 from L. Petti to B. Smith re: Purchase Order from Data General for FC2S Fibre to Channel SCSI Protocol Bridge Model 11 (Smith Ex 25; Quisenberry Ex 23; Bardach Ex 11 (CRDS 8552-55; 8558)) (CD-ROM Chaparral Exhibits D155).	
	C97	Email Dated 12/20/96 from J. Boykin to B. Smith re: Purchase Order for Betas in February and March (Hoese Ex 16, Quisenberry Ex 25; Bardach Ex 12 (CRDS 13644-650)) (CD-ROM Chaparral Exhibits D156).	
	C98	Infinity Commstor Fibre Channel Demo for Fall Comdex, 1996 (Hoese Ex 15, Bardach Ex 13 (CRDS 27415)) (CD-ROM Chaparral Exhibits D157).	
	C99	Fax Dated 12/19/96 from B. Bardach to T. Rarich re: Purchase Order Information (Bardach Ex. 14; Smith Ex 16 (CRDS 4460)) (CD-ROM Chaparral Exhibits D158).	
	C100	Miscellaneous Documents Regarding Comdex (Quisenberry Ex 2 (CRDS 27415-465)) (CD-ROM Chaparral Exhibits D165).	
	C101	CrossPoint 4100 Fibre Channel to SCSI Router Preliminary Datasheet (Quisenberry) Ex 3 (CRDS 4933-34) (CD-ROM Chaparral Exhibits D166) (CD-ROM Chaparral Exhibits D166).	
	C102	CrossPoint 4400 Fibre to Channel to SCSI Router Preliminary Datasheet; Crossroads Company and Product Overview (Quisenberry Ex 4 (CRDS 25606; 16136)) (CD-ROM Chaparral Exhibits D167).	
	C103	Crossroads Purchase Order Log (Quisenberry Ex 9 (CRDS 14061-062)) (CD-ROM Chaparral Exhibits D172).	
	C104	RAID Manager 5 with RDAC 5 for UNIX V.4 User's Guide (LSI-01854) (CD-ROM Chaparral Exhibits P062).	9/1/1996
	C105	Letter dated May 12, 1997 from Alan G. Leal to Barbara Bardach enclosing the original OEM License and Purchase Agreement between Hewlett-Packard Company and Crossroads Systems, Inc. (CRDS 02057) (CD-ROM Chaparral Exhibits P130).	
	C106	CR4x00 Product Specification (CRDS 43929) (CD-ROM Chaparral Exhibits P267).	6/1/1998
	C107	Symbios Logic – Hardware Functional Specification for the Symbios Logic Series 3 Fibre Channel Disk Array Controller Model 3701 (Engelbrecht Ex 3 (LSI-1659-1733)) (CD-ROM Pathlight Exhibits D074).	
	C108	Report of the Working Group on Storage I/O for Large Scale Computing; Department of Computer Science Duke University: CS-1996-21 (PTI 173330-347). (CD-ROM Pathlight Exhibits D098).	
	C109	Brian Allison's 1999 Third Quarter Sales Plan (PDX 38)CNS 022120-132)) (CD-ROM Pathlight Exhibits D201).	6/5/2001
	C110	Brooklyn SCSI-SCSI Intelligent External RAID Bridge Definition Phase External Documentation (CD-ROM Pathlight Exhibits D129).	
Examiner Signature		Date Considered	

ARTIFACT SHEET

Enter artifact number below. Artifact number is application number + artifact type code (see list below) + sequential letter (A, B, C ...). The first artifact folder for an artifact type receives the letter A, the second B, etc.. Examples: 59123456PA, 59123456PB, 59123456ZA, 59123456ZB

90/007317 ZA (3/25/05)

Indicate quantity of a single type of artifact received but not scanned. Create individual artifact folder/box and artifact number for each Artifact Type.

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|--------------------------|---------------------------------|--------------------------|
| <input type="checkbox"/> | computer program listing | <input type="checkbox"/> |
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| | pages of specification | |
| | and/or sequence listing | <input type="checkbox"/> |
| | and/or table | |
| | Doc Code: Artifact | Artifact Type Code: S |
| | content unspecified or combined | <input type="checkbox"/> |
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Stapled Set(s) Color Documents or B/W Photographs:
Doc Code: Artifact Artifact Type Code: C

Microfilm(s)
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Other, description: **1 sheet of colored NPL (C16)**
Doc Code: Artifact Artifact Type Code: Z

March 8, 2004

ARTIFACT SHEET

Enter artifact number below. Artifact number is application number + artifact type code (see list below) + sequential letter (A, B, C ...). The first artifact folder for an artifact type receives the letter A, the second B, etc.. Examples: 59123456PA, 59123456PB, 59123456ZA, 59123456ZB

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	Doc Code: Computer	Artifact Type Code: P
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	and/or sequence listing	<input type="checkbox"/>
	and/or table	
	Doc Code: Artifact	Artifact Type Code: S
	content unspecified or combined	<input checked="" type="checkbox"/>
	Doc Code: Artifact	Artifact Type Code: U <u>(1 CD of References C33-C110)</u>

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Doc Code: Artifact Artifact Type Code: Z

March 8, 2004



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/007,317	11/23/2004	6425035	HOESE1/WAB	1634
25094	7590	03/17/2005	EXAMINER	
DLA PIPER RUDNICK GRAY CARY US, LLP 2000 University Avenue E. Palo Alto, CA 94303-2248			<i>Fleming, Fritz</i>	
			ART UNIT	PAPER NUMBER
			<i>2182</i>	

DATE MAILED: 03/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office

Address: ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
90/007,317	11/23/2004	6425035	HOESE1/WAB

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1301 Dove Street, #1050
Newport Beach, CA 92660

EXAMINER

Fleming, Fritz

ART UNIT	PAPER
2182	

2182

DATE MAILED: 03/17/05

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

CC: DLA PIPER RUDNICK GRAY CARY US, LLP
2000 University Avenue
E. Palo Alto, CA 94303-22489



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office

Address: ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
90/007,317	11/23/2004	6425035	HOESE1/WAB

William A. Blake
JONES, TULLAR & COOPER, PC
P.O. Box 2226 Eads Station
Alexandria, VA 22202

EXAMINER

Fleming, Fritz

ART UNIT	PAPER
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2182

DATE MAILED: 03/17/05

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

CC: DLA PIPER RUDNICK GRAY CARY US, LLP
2000 University Avenue
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UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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Alexandria, VA 22313-1450
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**FOR FIRST THIRD PARTY
REQUESTER**

William A. Blake)
Jones, Tullar & Cooper, PC)
P.O. Box 2226 Eads Station)
Alexandria, Virginia 22202)

**FOR SECOND THIRD PARTY
REQUESTER**

In re Hoeser et al.)
Reexamination Proceeding)
Control No. 90/007,125)
Filed: July 19, 2004)
For: U.S. Patent No. 6,425,035)

**DECISION *SUA SPONTE*,
MERGING REEXAMINATION
PROCEEDINGS**

In re Hoeser et al.)
Reexamination Proceeding)
Control No. 90/007,317)
Filed: November 23, 2004)
For: U.S. Patent No. 6,425,035)

The above noted reexamination proceedings are before the Director of Technology Center 2100 for consideration of merger of the proceedings under 37 CFR § 1.565(c).

BACKGROUND

1. Patent No. 6,425,035 issued on July 23, 2002.

Reexamination Proceeding Control No. 90/007,125
Reexamination Proceeding Control No. 90/007,317
Decision Merging Reexamination Proceedings

2

'7125 Proceeding

2. A first request for reexamination, Control No. 90/007,125 ('7125) was filed by the Third Party Requester on July 19, 2004.
3. Reexamination was ordered in the '7125 reexamination proceeding on September 22, 2004.
4. A Notification of litigation under 37 C.F.R. §1.565 filed by Patent Owner was received in the USPTO on December 13, 2004.
5. A Notification of concurrent proceedings under 37 C.F.R. §1.565 filed by Patent Owner was received in the USPTO on January 14, 2005.
6. A revocation and appointment of attorneys was filed on December 8, 2004.
7. A first Office action was mailed on February 7, 2005.
8. A Change of correspondence address for third party requester was filed on February 24, 2005.

'7317 Proceeding

9. A second request for reexamination, Control No. 90/007,317 ('7317) was filed by another Third Party Requester on November 23, 2004.
10. Reexamination was ordered in the '7317 reexamination proceeding on December 16, 2004.
11. A Notification of concurrent proceedings under 37 C.F.R. §1.565 filed by Patent Owner was received in the USPTO on January 14, 2005.

DISCUSSION

37 CFR § 1.565(c) states:

“If reexamination is ordered while a prior reexamination is pending, the reexamination proceedings will be consolidated and result in the issuance of a single certificate under section 1.570.”

Reexamination Proceeding Control No. 90/007,125
Reexamination Proceeding Control No. 90/007,317
Decision Merging Reexamination Proceedings

3

DECISION

I. Merger of Proceedings

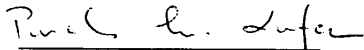
In accordance with 37 CFR 1.565(c), the '7125 and '7317 reexamination proceedings are merged. The merged proceeding will be conducted in accordance with the following guidelines and requirements.

II. Requirement for Same Amendments in all Proceedings

The Patent Owner is required to maintain the same claims and specification in both files.

III. Conduct of Merged Proceeding

All papers mailed by the Office will take the form of a single action which applies to all proceedings. All papers issued by the Office or filed by the patent owner will contain the identifying data for both files and will be physically entered in each reexamination file. All papers filed by the patent owner must consist of a single response, filed in duplicate, each bearing an original signature, for entry into each file. All papers filed by the patent owner must be served on the requester and requester will be sent copies of all papers mailed by the Office.



Pinchus M. Laufer
Special Programs Examiner
Technology Center 2100
Computer Architecture, Software, and Information Security
(571) 272-3599

cc: DLA Piper Rudnick Gray Cary US, LLP
Attn: Mark Berrier
2000 University Avenue
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
NOTIFICATION UNDER 37 C.F.R. 1.565	Atty. Docket No. CROSS1123-19
Applicant Geoffrey B. Hoese, et al.	
Application Number 90/007,317	Date Filed 11/23/2004
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Fleming, Fritz, M.
Confirmation Number: 1634	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Certificate of Mailing Under 37 C.F.R. §1.8

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22312-1450 on January 11, 2005

Janice Pampell
Janice Pampell

Dear Sir:

This notification is filed for the sole purpose to inform the Examiner of prior and concurrent litigation and reexamination proceedings involving United States Patent No. 6,425,035 (the "035 Patent") as required under 35 CFR 1.565. This is not and should not be construed as a submission under 35 CFR 1.530 as it does not discuss why the subject matter as claimed in these patents is not anticipated nor rendered obvious.

ONGOING LITIGATION AND CONCURRENT REEXAMINATION PROCEEDINGS

Currently, there is ongoing litigation in which Dot Hill Systems Corporation's ("Dot Hill") RAID controller products are accused of infringing and '035 Patent. See, *Crossroads Systems, Inc. v. Dot Hill Systems Corporation*, Western District of Texas, Case Number A-03-CV-754(SS). This litigation is pending.

Additionally, the '035 application is currently subject to reexamination under Reexamination Control No. 90/007,125.

This notification was served via first class mail on **January 7th, 2005** on William A. Blake, Jones, Tullar & Cooper, PC, P.O. Box 2266, Eads Station, Arlington, VA 22202.

Respectfully submitted,

Sprinkle IP Law Group
Attorneys for Applicant



John L. Adair
Reg. No. 48,828

Date: January 7, 2005
1301 W. 25th Street
Suite 408
Austin, Texas 78705
Tel. (512) 637-9220
Fax. (512) 371-9088



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
CERTIFICATE OF SERVICE UNDER 37 C.F.R. 1.248	Atty. Docket No. CROSS1123-19
Applicant Geoffrey B. Hoese, et al.	
Application Number 90/007,317	Date Filed 11/23/2004
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Fleming, Fritz, M.
Confirmation Number: 1634	


Applicant hereby serves the Notification Under 37 C.F.R. 1.565 in the above referenced case to:

William A. Blake
Jones, Tullar & Cooper, PC
P.O. Box 2266
Eads Station
Arlington, VA 22202

As per 35 U.S.C. §1.248 service is made via first class mail on **January 7th, 2005.**



Respectfully submitted,

Sprinkle IP Law Group


John L. Adair
Reg. No. 48,828

Dated: January 7, 2005
1301 W. 25th Street, Suite 408
Austin, Texas 78705
Tel. (512) 637-9220
Fax. (512) 371-9088

Enclosures

R examination  	Control No. 90/007,317	Applicant(s)
	Certificate Date	Certificate Number

Requester	Correspondence Address:	<input type="checkbox"/> Patent Owner	<input checked="" type="checkbox"/> Third Party
William A. Blake JONES, TULLAR & COOPER, PC P.O. Box 2266 Eads Station Arlington, VA 22202			

LITIGATION REVIEW <input checked="" type="checkbox"/>	<i>FWF</i> (examiner initials)	12/16/2004 (date)
Case Name		Director Initials
Crossroads Systems (TX), Inc, A Texas Corporation, v. Dot Hill Systems Corp, a DE Corp, filed October 17, 2003, D.C. W.D. TEXAS, Doc. No. A-03-CA-754-SS		

COPENDING OFFICE PROCEEDINGS	
TYPE OF PROCEEDING	NUMBER
1.	
2.	
3.	
4.	

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/007,317	11/23/2004	6425035	HOESEI/WAB	1634

25094 7590 12/16/2004
 GRAY, CARY, WARE & FREIDENRICH LLP
 2000 University Avenue
 E. Palo Alto, CA 94303-2248

EXAMINER

Fleming, Fritz M.

ART UNIT PAPER NUMBER

2182

DATE MAILED: 12/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Order Granting / Denying Request For Ex Parte Reexamination	Control No.	Patent Under Reexamination	
	90/007,317	6425035	
	Examiner	Art Unit	
	Fritz M Fleming	2182	

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

The request for *ex parte* reexamination filed 23 November 2004 has been considered and a determination has been made. An identification of the claims, the references relied upon, and the rationale supporting the determination are attached.

Attachments: a) PTO-892, b) PTO-1449, c) Other: _____

1. The request for *ex parte* reexamination is GRANTED.

RESPONSE TIMES ARE SET AS FOLLOWS:

For Patent Owner's Statement (Optional): TWO MONTHS from the mailing date of this communication (37 CFR 1.530 (b)). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).**

For Requester's Reply (optional): TWO MONTHS from the **date of service** of any timely filed Patent Owner's Statement (37 CFR 1.535). **NO EXTENSION OF THIS TIME PERIOD IS PERMITTED.** If Patent Owner does not file a timely statement under 37 CFR 1.530(b), then no reply by requester is permitted.

2. The request for *ex parte* reexamination is DENIED.

This decision is not appealable (35 U.S.C. 303(c)). Requester may seek review by petition to the Commissioner under 37 CFR 1.181 within ONE MONTH from the mailing date of this communication (37 CFR 1.515(c)). **EXTENSION OF TIME TO FILE SUCH A PETITION UNDER 37 CFR 1.181 ARE AVAILABLE ONLY BY PETITION TO SUSPEND OR WAIVE THE REGULATIONS UNDER 37 CFR 1.183.**

In due course, a refund under 37 CFR 1.26 (c) will be made to requester:

- a) by Treasury check or,
- b) by credit to Deposit Account No. _____, or
- c) by credit to a credit card account, unless otherwise notified (35 U.S.C. 303(c)).



Fritz M Fleming
Primary Examiner
Art Unit: 2182

cc:Requester (if third party requester)

Application/Control Number: 90/007,317
Art Unit: 2182

Page 2

Reexamination

1. A substantial new question of patentability affecting claims 1-14 of United States Patent Number 6,425,035 is raised by the request for *ex parte* reexamination.

Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that *ex parte* reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extensions of time in *ex parte* reexamination proceedings are provided for in 37 CFR 1.550(c).

- The threshold for determining whether or not to grant a re-examination is set forth in MPEP 2242, quoted below:

For "a substantial new question of patentability" to be present, it is only necessary that: (>A<) the prior art patents and/or printed publications raise a substantial question of patentability regarding at least one claim, i.e., the teaching of the (prior art) patents and printed publications is such that a reasonable examiner would consider the teaching to be important in deciding whether or not the claim is patentable; and (*>B<) the same question of patentability as to the claim has not been decided by the Office in a previous examination >or pending reexamination< of the patent or in a final holding of invalidity by the Federal Courts in a decision on the merits involving the claim. It is not necessary that a "prima facie" case of unpatentability exist as to the claim in order for "a substantial new question of patentability" to be present as to the claim. Thus, "a substantial new question of patentability" as to a patent claim could be present even if the examiner would not necessarily reject the claim as either fully anticipated by, or obvious in view of, the prior >art< patents or printed publications. As to the importance of the difference between "a substantial new question of patentability" and a "prima facie" case of unpatentability see generally In re Etter, 756 F.2d 852, 857 n.5, 225 USPQ 1, 4 n.5 (Fed. Cir. 1985).*

Application/Control Number: 90/007,317
Art Unit: 2182

Page 3

Thus it is clear, that a granting of a re-examination does not necessarily mean that a prima facie case of unpatentability exists, just that the teachings be important when deciding claim patentability.

- The manner in which the art is to be applied in the request is discussed in MPEP 2217, quoted below:

The third sentence of 35 U.S.C. 302 indicates that the "request must set forth the pertinency and manner of applying cited prior art to every claim for which reexamination is requested." 37 CFR 1.510(b)(2) requires that the request include "[a]n identification of every claim for which reexamination is requested, and a detailed explanation of the pertinency and manner of applying the cited prior art to every claim for which reexamination is requested." If the request is filed by the patent owner, the request for reexamination may also point out how claims distinguish over cited prior art.

Where substantial new questions of patentability are presented under 35 U.S.C. 102(f) or (g), the prior invention of another must be disclosed in a patent or printed publication. Substantial new questions of patentability may also be presented under 35 U.S.C. 103 which are based on the above indicated portions of 35 U.S.C. 102. Substantial new questions of patentability may be found under 35 U.S.C. 102(f) / 103 or 102(g) / 103 based on the prior invention of another disclosed in a patent or printed publication if the reference invention and the claimed invention were not commonly owned at the time the claimed invention was made. See, 35 U.S.C. 103(c) and MPEP § 706.02(l). See MPEP § 706.02(l)(1) for information pertaining to references which qualify as prior art under 35 U.S.C. 102(e)/103.

The mere citation of new patents or printed publications without an explanation does not comply with 37 CFR 1.510(b)(2). Requester must present an explanation of how the cited patents or printed publications are applied to all claims which requester considers to merit reexamination. This not only sets forth the requester's position to the Office, but also to the patent owner (where the patent owner is not the requester).

Application/Control Number: 90/007,317
Art Unit: 2182

Page 4

Given the above, requestor has, at a threshold minimum, provided a substantial new question of patentability via the citing of the InfoServer 100 System Operations Guide. Per the submitted document, such qualifies as a competent reference, given its publication date of 1990. Page 1-1 does clearly state that the InfoServer 100 is a virtual disk server that is not a file server, thereby not imposing a file system on the virtual disks and allowing each host system to use its own native file system. Page 1-2 does explicitly mention that a single disk can be subdivided into several partitions, each of which can be served to the network independently, while appearing to be whole disks to remote client systems and be used as though they were local hard disks. Per Figure 1-3, the InfoServer is connected on one hand to the ETHERNET (a LAN network) and on the other hand to the CDs (with SCSI-A/B busses per page 2-7). Partitions are created per page 3-8. LAD and LAST protocols are discussed at page 2-2, even though the LAST protocol does not provide any routing functions and uses multicast address feature to establish connections to the disks. Service is created per page 3-10 with the ability to select NOPASSWORD. Furthermore, the LANCE document sets forth on-chip DMA, as further shown in Johnson. However, the photos per InfoServer 150VXT (the other reference is the InfoServer 150 and not InfoServer 150VXT, difference not elaborated by requestor), are of such quality as to not clearly show anything, much less the Am7990 chip, as such is simply not clearly discernable. The DP5380 chip material does show an intent to couple with a DMA controller. Thus the above teachings were not present in the prosecution of the application that became the Hoese et al. Patent 6,425,035 and there is a further substantial likelihood that a reasonable examiner would

Application/Control Number: 90/007,317
Art Unit: 2182

Page 5

consider these teachings important in deciding whether or not the claims are patentable.

Accordingly, the InfoServer 100 publication raises a substantial new question of patentability as to claims 1-14, which question has not been decided in a previous examination of the Hoese et al. Patent. Thus claims 1-14 will be re-examined.

2. The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a) to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving Patent No. 6,425,035 throughout the course of this reexamination proceeding. The third party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.


3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fritz M Fleming whose telephone number is 703-308-1483. The examiner can normally be reached on M-F, 0600-1500.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Gaffin can be reached on 703-308-3301. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

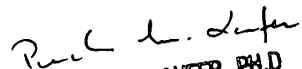
Application/Control Number: 90/007,317
Art Unit: 2182

Page 6

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Fritz M. Fleming
Primary Examiner
Art Unit 2182

fmf


ROCHUS M. LAUFER, PH.D
SPECIAL PROGRAM EXAMINER
TECHNOLOGY CENTER 2100

PTO/SB/08b (08-03)

Approved for use through 06/30/2006. OMB 0651-0031
 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Substitute for form 1449B/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(Use as many sheets as necessary)</i>		Application Number	Patent No. 6,425,035
		Filing Date	Issue Date 07/23/2002
		First Named Inventor	HOESE
		Art Unit	2182
		Examiner Name	FLEMING, FRITZ M.
		Attorney Docket Number	HOESE1/WAB
Sheet	1	of	1

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
F.F.	1	"InfoServer 100 System Operations Guide", First Edition, Digital Equipment Corporation, 1990	
F.F.	2	S.P. Joshi, "Ethernet controller chip interfaces with variety of 16-bit processors," Electronic Design, Hayden Publishing Co., Inc., Rochelle Park, NJ, Oct. 14, 1982, pp193-200	
F.F.	3	"DP5380 Asynchronous SCSI Interface", National Semiconductor Corporation, Arlington, TX, May 1989, pp. 1-32	
F.F.	4	Johnson, D.B., et al., "The Peregrine High Performance RPC System", Software--Practice & Experience, 23(2):201-221, Feb. 1993	
F.F.	5	"InfoServer 150--Installation and Owner's Guide", EK-INFSV-OM-001, Digital Equipment Corporation, Maynard, Massachusetts 1991, Chapters 1 and 2	
F.F.	6	Pictures of internal components of the InfoServer 150, taken from http://www.binarydinosaurs.couk/Museum/Digital/infoserver/infoserver.php in Nov. 2004	

Examiner Signature	<i>Fritz M. Fleming</i>	Date Considered	12/16/2004
--------------------	-------------------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.
¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.
 This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

1 of 1 DOCUMENT

UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT

6425035

[Link to Claims Section](#)

July 23, 2002

Storage router and method for providing virtual local storage

REEXAM-LITIGATE: July 19, 2004 - Reexamination requested by Natu J. Patel, Wang & Patel, Reexamination No. 90/007,125 (O.G. August 31, 2004) Ex. Gp: 2111

NOTICE OF LITIGATION

Crossroads Systems (Texas), Inc., a Texas Corporation v. Dot Hill Systems Corporation, a Delaware corporation, Filed October 17, 2003, D.C. W.D. Texas, Doc. No. A-03-CA-754-55

INVENTOR: Hoese, Geoffrey B. - Austin, Texas; Russell, Jeffry T. - Cibolo, Texas

CERT-CORRECTION: August 26, 2003 - a Certificate of Correction was issued for this patent (O.G. September 16, 2003)

APPL-NO: 965335 (09)

FILED-DATE: September 27, 2001

GRANTED-DATE: July 23, 2002

ASSIGNEE-AT-ISSUE: Crossroads Systems, Inc., Austin, Texas, 02

ENGLISH-ABST:

A storage router (56) and storage network (50) provide virtual local storage on remote SCSI storage devices (60, 62, 64) to Fiber Channel devices. A plurality of Fiber Channel devices, such as workstations (58), are connected to a Fiber Channel transport medium (52), and a plurality of SCSI storage devices (60, 62, 64) are connected to a SCSI bus transport medium (54). The storage router (56) interfaces between the Fibre Channel transport medium (52) and the SCSI bus transport medium (54). The storage router (56) maps between the workstations (58) and the SCSI storage devices (60, 62, 64) and implements access controls for storage space on the SCSI storage devices (60, 62, 64). The storage router (56) then allows access from the workstations (58) to the SCSI storage devices (60, 62, 64) using native low level, block protocol in accordance with the mapping and the access controls.

LEXIS-NEXIS
Library: PATENTS
File: ALL

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No documents were found for your search (6,425,035 or 6425035).
Click the "Edit Search" button below to try again. You may want to try one or more of the following:

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File: CASES

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1 of 2 DOCUMENTS

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October 22, 2003 Wednesday

LENGTH: 74 words

HEADLINE: CRDS Files Patent Infringement Suit Against HILL

DATELINE: Ridgeland, MS

BODY:

...Crossroads Systems Inc. (CRDS) on October 17, 2003. Dot Hill has not been served with the Complaint. The suit alleges patent infringement by Dot Hill of United States Patent Nos. 5,941,972 and 6,425,035, relating to storage routers and methods for providing virtual local storage.

LEXIS-NEXIS
Library: NEWS
File: CURNEWS

2 of 2 DOCUMENTS

Copyright 2003 PR Newswire Association, Inc.
PR Newswire

October 22, 2003 Wednesday

SECTION: FINANCIAL NEWS

LENGTH: 446 words

HEADLINE: Dot Hill Systems Announces Complaint Filed By Crossroads Systems

DATELINE: CARLSBAD, Calif. Oct. 22

BODY:

...Texas by Crossroads Systems on October 17, 2003. Dot Hill has not been served with the Complaint. The suit alleges patent infringement by Dot Hill of United States Patent Nos. 5,941,972 and 6,425,035, relating to storage routers and methods for providing virtual local storage.

?us6425035/pn

** SS 1: Results 1

Search statement 2

?prt full nonstop legalall

1/1 PLUSPAT - (C) QUESTEL-ORBIT- image
PN - US2002010812 A1 20020124 [US20020010812]
PN2 - US6425035 B2 20020723 [US6425035]
TI - (A1) Storage router and method for providing virtual local storage
PA - (B2) CROSSROADS SYSTEMS INC (US)
PA0 - Crossroads Systems, Inc., Austin TX [US]
PA2 - (B2) CROSSROADS SYSTEMS INC (US)
IN - (A1) HOESE GEOFFREY B (US); RUSSELL JEFFRY T (US)
AP - US96533501 20010927 [2001US-0965335]
FD - Continuation of: US5941972
PR - US96533501 20010927 [2001US-0965335]
- US35468299 19990715 [1999US-0354682]
- US179997 19971231 [1997US-0001799]
IC - (A1) G06F-003/00
EC - G06F-013/40D2
PCL - ORIGINAL (O) : 710105000; CROSS-REFERENCE (X) : 710008000 710036000
710310000
DT - Corresponding document
CT - US5748924; US5768623; US5809328; US5812754; US5835496; US5848251;
US5935260; US5941972; US5959994; US6041381; US6055603; US6065087;
US6075863; US6098149; US6118766; US6148004; US6185203; US6209023;
US6230218; US6341315; US6343324
STG - (A1) Utility Patent Application published on or after January 2, 2001
STG2- (B2) U.S. Patent (with pre-grant pub.) after Jan. 2, 2001
AB - A storage router (56) and storage network (50) provide virtual local
storage on remote SCSI storage devices (60, 62, 64) to Fiber Channel
devices. A plurality of Fiber Channel devices, such as workstations
(58), are connected to a Fiber Channel transport medium (52), and a
plurality of SCSI storage devices (60, 62, 64) are connected to a SCSI
bus transport medium (54). The storage router (56) interfaces between
the Fibre Channel transport medium (52) and the SCSI bus transport
medium (54). The storage router (56) maps between the workstations
(58) and the SCSI storage devices (60, 62, 64) and implements access
controls for storage space on the SCSI storage devices (60, 62, 64).
The storage router (56) then allows access from the workstations (58)
to the SCSI storage devices (60, 62, 64) using native low level, block
protocol in accordance with the mapping and the access controls.
UP - 2002-05

1/1 LGST - (C) EPO
PN - US2002010812 A1 20020124 [US20020010812]
- US6425035 B2 20020723 [US6425035]
AP - US96533501 20010927 [2001US-0965335]
ACT - 20030826 US/CC-A
CERTIFICATE OF CORRECTION
- 20040831 US/RR-A [+]
REQUEST FOR REEXAMINATION FILED
EFFECTIVE DATE: 20040719
UP - 2004-37

1/1 CRXX - (C) CLAIMS/RRX
PN - 6,425,035 A 20020723 [US6425035]

PA - Crossroads Systems Inc
ACT - 20040719 REEXAMINATION REQUESTED
ISSUE DATE OF O.G.: 20040831
REEXAMINATION REQUEST NUMBER: 90/007125
Natu J. Patel, Wang & Patel, Newport Beach, CA



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REEXAM CONTROL NUMBER	FILING OR 371 (c) DATE	PATENT NUMBER
90/007,317	11/23/2004	6425035

CONFIRMATION NO. 1634

William A Blake
JONES TULLAR & COOPER, PC
P.O. Box 2266 Eads Station
Arlington, VA 22202



OC000000014721173

Date Mailed: 12/10/2004

NOTICE OF REEXAMINATION REQUEST FILING DATE

(Third Party Requester)

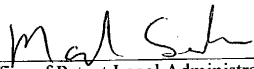
Requester is hereby notified that the filing date of the request for reexamination is 11/23/2004, the date the required fee of \$2,520 was received.

A decision on the request for reexamination will be mailed within three months from the filing date of the request for reexamination. (See 37 CFR 1.515(a)).

A copy of the Notice is being sent to the person identified by the requester as the patent owner. Further patent owner correspondence will be the latest attorney or agent of record in the patent file. (See 37 CFR 1.33). Any paper filed should include a reference to the present request for reexamination (by Reexamination Control Number).

cc: Patent Owner

25094
GRAY, CARY, WARE & FREIDENRICH LLP
2000 University Avenue
E. Palo Alto, CA 94303-2248


Office of Patent Legal Administration
Central Reexamination Unit ((571) 272-7750; FAX (571)273-0100
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REEXAM CONTROL NUMBER	FILING OR 371 (c) DATE	PATENT NUMBER
90/007,317	11/23/2004	6425035

CONFIRMATION NO. 1634

25094
GRAY, CARY, WARE & FREIDENRICH LLP
2000 University Avenue
E. Palo Alto, CA 94303-2248

REEXAM ASSIGNMENT NOTICE



OC000000014721174

Date Mailed: 12/10/2004

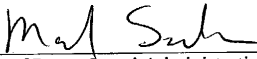
NOTICE OF ASSIGNMENT OF REEXAMINATION REQUEST

The above-identified request for reexamination has been assigned to Art Unit 2111. All future correspondence to the proceeding should be identified by the control number listed above and directed to the assigned Art Unit.

A copy of this Notice is being sent to the latest attorney or agent of record in the patent file or to all owners of record. (See 37 CFR 1.33(c)). If the addressee is not, or does not represent, the current owner, he or she is required to forward all communications regarding this proceeding to the current owner(s). An attorney or agent receiving this communication who does not represent the current owner(s) may wish to seek to withdraw pursuant to 37 CFR 1.36 in order to avoid receiving future communications. If the address of the current owner(s) is unknown, this communication should be returned within the request to withdraw pursuant to Section 1.36.

cc: Third Party Requester(if any)

William A Blake
JONES TULLAR & COOPER, PC
P.O. Box 2266 Eads Station
Arlington, VA 22202


 Office of Patent Legal Administration
 Central Reexamination Unit (571) 272-7750; FAX (571)273-0100
 THREE - OFFICE COPY



Patent Assignment Abstract of Title

Total Assignments: 3

Application #: 09001799 **Filing Dt:** 12/31/1997 **Patent #:** 5941972 **Issue Dt:** 08/24/1999

PCT #: NONE

Publication #: NONE

Pub Dt:

Inventors: GEOFFREY B. HOESE, JEFFRY T. RUSSELL

Title: STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

Assignment: 1

Reel/Frame:	Received:	Recorded:	Mailed:	Pages:
008929/0290	02/06/1998	12/31/1997	03/19/1998	4

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignors: HOESE, GEOFFREY B.

Exec Dt: 12/22/1997

RUSSELL, JEFFRY T.

Exec Dt: 12/22/1997

Assignee: CROSSROADS SYSTEMS, INC.

9390 RESEARCH BLVD., SUITE II-300
AUSTIN, TEXAS 78759

Correspondent: BAKER & BOTTS, L.L.P.

ANTHONY E. PETERMAN
2001 ROSS AVENUE
DALLAS, TX 75201-2980

Assignment: 2

Reel/Frame:	Received:	Recorded:	Mailed:	Pages:
011284/0218	12/05/2000	11/16/2000	02/05/2001	8

Conveyance: SECURITY AGREEMENT

Assignor: CROSSWORLDS SOFTWARE, INC.

Exec Dt: 06/30/2000

Assignee: SILICON VALLEY BANK

LOAN DOCUMENTATION HG150
3003 TASMAN DR
SANTA CLARA, CALIFORNIA 95054

Correspondent: SILICON VALLEY BANK

JACQUELYN LE
LOAN DOCUMENTATION HG150
3003 TASMAN DR.
SANTA CLARA, CA 95054

Assignment: 3

Reel/Frame:	Received:	Recorded:	Mailed:	Pages:
012785/0083	04/17/2002	04/03/2002	06/12/2002	2

Conveyance: RELEASE

Assignor: SILICON VALLEY BANK

Exec Dt: 03/20/2002

Assignee: CROSSWORLDS SOFTWARE

577 AIRPORT BOULEVARD, SUITE 300
BURLINGAME, CALIFORNIA 94010

Correspondent: SILICON VALLEY BANK

MICHELLE GIANNINI
LOAN DOCUMENTATION HA155
3003 TASMAN DR.
SANTA CLARA, CALIFORNIA 95054

Search Results as of: 12/9/2004 4:04:59 P.M.

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Web interface last modified: Oct. 5, 2002



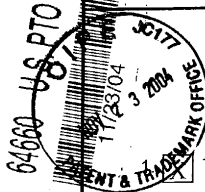
Reexam #

PTO/SB/57 (09-04)
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(Also referred to as FORM PTO-1465)

REQUEST FOR EX PARTE REEXAMINATION TRANSMITTAL FORM



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Alexandria, VA 22313-1450

Attorney Docket No.: HOESE1/WAB

Date: 11/23/2004

This is a request for *ex parte* reexamination pursuant to 37 CFR 1.510 of patent number 6,425,035 issued 07/23/2002. The request is made by:

patent owner. third party requester.

64660 U.S. PTO
90007317



2. The name and address of the person requesting reexamination is:

William A. Blake, Jones, Tullar & Cooper, PC

P.O. Box 2266 Eads Station

Arlington, VA 22202

3. a. A check in the amount of \$2,520.00 is enclosed to cover the reexamination fee, 37 CFR 1.20(c)(1);

b. The Director is hereby authorized to charge the fee as set forth in 37 CFR 1.20(c)(1) to Deposit Account No. (submit duplicative copy for fee processing); or

c. Payment by credit card. Form PTO-2038 is attached.

4. Any refund should be made by check or credit to Deposit Account No. 37 CFR 1.26(c). If payment is made by credit card, refund must be to credit card account.

5. A copy of the patent to be reexamined having a double column format on one side of a separate paper is enclosed. 37 CFR 1.510(b)(4)

6. CD-ROM or CD-R in duplicate, Computer Program (Appendix) or large table
 Landscape Table on CD

7. Nucleotide and/or Amino Acid Sequence Submission
If applicable, items a. - c. are required.

a. Computer Readable Form (CRF)

b. Specification Sequence Listing on:

- i. CD-ROM (2 copies) or CD-R (2 copies); or
- ii. paper

c. Statements verifying identity of above copies

8. A copy of any disclaimer, certificate of correction or reexamination certificate issued in the patent is included.

9. Reexamination of claim(s) 1-14 is requested.

10. A copy of every patent or printed publication relied upon is submitted herewith including a listing thereof on Form PTO/SB/08, PTO-1449, or equivalent.

12/06/2004 NSALDANA 00000000 90007317

11. An English language translation of all necessary and pertinent non-English language patents and/or printed publications is included.

[Page 1 of 2]

BI FC:1A12

2520.00.00

This collection of information is required by 37 CFR 1.510. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop Ex Parte Reexam, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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PTO/SB/57 (09-04)

Approved for use through 04/30/2007. OMB 0651-0033
U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

12. The attached detailed request includes at least the following items:

a. A statement identifying each substantial new question of patentability based on prior patents and printed publications. 37 CFR 1.510(b)(1)

b. An identification of every claim for which reexamination is requested, and a detailed explanation of the pertinency and manner of applying the cited art to every claim for which reexamination is requested. 37 CFR 1.510(b)(2)

13. A proposed amendment is included (only where the patent owner is the requester). 37 CFR 1.510(e)

14. a. It is certified that a copy of this request (if filed by other than the patent owner) has been served in its entirety on the patent owner as provided in 37 CFR 1.33(c).
The name and address of the party served and the date of service are:

Steven Sprinkle

Sprinkle IP Law Group, PO Box 684767

Austin, TX, 78768-4767

Date of Service: November 23, 2004 ; or

b. A duplicate copy is enclosed since service on patent owner was not possible.

15. Correspondence Address: Direct all communication about the reexamination to:

The address associated with Customer Number:

OR

Firm or Individual Name William A. Blake

Address Jones, Tullar & Cooper, PC
P.O. Box 2266 Eads Station

City <u>Arlington</u>	State <u>VA</u>	Zip <u>22202</u>
Country		
Telephone <u>703-415-1500</u>	Fax <u>703-415-1508</u>	

16. The patent is currently the subject of the following concurrent proceeding(s):

a. Copending reissue Application No. _____

b. Copending reexamination Control No. 90/007,125

c. Copending Interference No. _____

d. Copending litigation styled: _____

Crossroads Systems, Inc. v. Dot Hill Systems Corporation, USDC for Western District of

Texas, Case No. A-03-CV-754(SS)

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William A. Blake 11-23-2004
Authorized Signature Date

William A. Blake 30548 For Patent Owner Requester
Typed/Printed Name Registration No. For Third Party Requester

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent No. : 6,425,035
Date of Issue : July 23, 2002
Name of Patentee : Geoffrey B. Hoese et al.
Title of Invention : STORAGE ROUTER AND METHOD FOR PROVIDING
VIRTUAL LOCAL STORAGE

Mail Stop Ex Parte Reexam
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST FOR REEXAMINATION
[35 U.S.C. §302 et seq., 37 C.F.R. §1.510]

Sir:

Reexamination under 35 U.S.C. §§302-307 and 37 C.F.R §1.510 is requested of United States Patent No. 6,425,035, which issued on July 23, 2002, to Geoffrey B. Hoese and Jeffry T. Russell (hereinafter "Hoese").

At least one request for reexamination has recently been granted for the above-referenced Hoese patent, this being Reexamination Control No. 90/007,125 filed July 19, 2004 (the "Pending Request"). Since the Pending Request has just recently been granted less than 60 days ago, it is believed proper to merge the present request with it. See MPEP §2283 and 37 C.F.R §1.565.

I. Claims For Which Reexamination Is Requested

Reexamination is requested of claims 1-14 (all claims) of the Hoese patent in view of the following prior art publications. These publications are listed in the attached Form PTO/SB/08B and copies of each are enclosed:

1) "InfoServer 100 System Operations Guide," First Edition, Digital Equipment Corporation, 1990 (hereinafter "IS100");

2) S. P. Joshi, "Ethernet controller chip interfaces with variety of 16-bit processors," *Electronic Design*, Hayden Publishing Company, Inc., Rochelle Park, NJ, October 14, 1982, pp. 193-200 (hereinafter "LANCE"); and

3) "DP5380 Asynchronous SCSI Interface", National Semiconductor Corporation, Arlington, TX, May 1989, pp. 1-32 (hereinafter "DP5380")

In addition, the following documents are submitted in support of the arguments made for obviousness under 35 U.S.C. §103. These documents are also listed in the attached Form PTO/SB/08B:

4) Johnson, D.B., et al., "The Peregrine High Performance RPC System," *Software -- Practice & Experience* , 23(2):201-221, February 1993 (hereinafter "Johnson")

5) "InfoServer 150 -- Installation and Owner's Guide", EK-INFSV-OM-001, Digital Equipment Corporation, Maynard, Massachusetts 1991, chapters 1 and 2 (hereinafter "IS150 Manual").

6) Pictures of internal components of the InfoServer 150, taken from <http://www.binarydinosaurs.co.uk/Museum/Digital/infoserver/infoserver.php> (hereinafter "IS150 Photos") in November 2004.

II. Substantial New Questions Of Patentability Raised By The Newly Cited Prior Art (37 C.F.R 1.510(b)(1))

The following substantial new questions of patentability are raised by the newly cited prior art documents. These documents have not been previously made of record either during the prosecution of the Hoese patent or in the Pending Request. A detailed analysis of each new question of patentability is set forth in the next section.

A. Claims 1-4, 7-9 and 11-14 of Hoese are unpatentable 35 U.S.C. §102 as being fully anticipated under by the prior art IS100 document.

B. Claim 5 of Hoese is unpatentable under 35 U.S.C. §103 as being obvious over the IS100 prior art document in view of the LANCE document.

C. Claim 6 is unpatentable under 35 U.S.C. §103 as being obvious over the IS100 prior art document in view of the DP5380 document.

D. Claim 10 of Hoese is unpatentable under 35 U.S.C. §103 as being obvious over the prior art documents IS100, LANCE and DP5380.

III. Detailed Explanation Of The Pertinency Of The Cited Prior Art (37 C.F.R. §1.510(b) (2))

A. Claims 1-4, 7-9 and 11-14 of Hoese are fully anticipated under 35 U.S.C. §102 by the prior art IS100 document. Claims 1-4, 7-9 and 11-14 are set forth in the charts that follow with an explanation as to how the IS100 document meets all the recited claim elements.

Hoese, claim 1

IS100

<p>“1. A storage router for providing virtual local storage on remote storage devices to devices, comprising:”</p>	<p>(IS100 at p.1-1 describes the Digital Equipment Corporation (DEC) InfoServer 100 as a "virtual disk server" that serves sets of logical blocks to an Ethernet network-connected server. It is also said at pp. 2-1 to 2-2 of IS100 that the InfoServer 100 provides "access to the virtual disks it serves to the local-area network (LAN) via the Local Area Disk (LAD) and Local Area Storage Transport (LAST) protocols".)</p>
<p>“a buffer providing memory work space for the storage router;”</p>	<p>(IS100 at p.3-64 refers to a "pool" of memory whose pool size is displayed on request and that the pool being memory is made available to the running software, for use in serving disks.)</p>
<p>“a first controller operable to connect to and interface with a first transport medium;”</p>	<p>(IS100 at p.1-3 shows the InfoServer 100 connected to an Ethernet LAN segment, thus the InfoServer 100 inherently had an Ethernet Network Interface Controller (NIC). The InfoServer 100 also responded to commands such as SHOW ETHERNET which display the status and traffic statistics for the Ethernet interface. See IS100 p.3-47.)</p>
<p>“a second controller operable to connect to and interface with a second transport medium; and”</p>	<p>(IS100 at pp. 2-7 and 2-8 refer to two SCSI buses, one internal and one external. Pp. 3-44 through 3-46 of IS100 describe a SHOW DEVICE command which displays the status of storage devices attached to the IS100 via the SCSI buses.)</p>
<p>“a supervisor unit coupled to the first controller, the second controller and the buffer, the supervisor unit operable”</p>	<p>(The InfoServer 100 provided connectivity between an Ethernet interface and disks connected to a interface. See IS100 p.1-1 and Fig. 1-1.)</p>
<p>“to map between devices connected to the first transport medium and the storage devices,”</p>	<p>(The storage space of the storage devices is addressed as "partitions" through the CREATE PARTITION command. See IS100 pp. 3-7 and 3-8. The partitions are mappings from a partition name to portions of the storage devices.)</p>
<p>“to implement access controls for storage space on the storage devices and”</p>	<p>(The devices or partitions are then made available to connected devices as "SERVICES" via the CREATE SERVICE</p>

	command which includes an optional "access control password". See IS100 p. 3-10. The password feature thus serves as an access control.)
"to process data in the buffer to interface between the first controller and the second controller"	(The "pool" is used for servicing disk requests that originate from the network. See IS100 p.3-64.)
"to allow access from devices connected to the first transport medium to the storage devices using native low level, block protocols."	(At IS100 p. 1-1 it is said that each host can use its own "native file system" to access the InfoServer 100. In particular, the LAD protocol provides a mechanism for reading and writing logical disk blocks independent from any underlying file system. See also IS100 p. 2-2.)

Hoese, claim 2

IS100

"2. The storage router of claim 1, wherein the supervisor unit maintains an allocation of subsets of storage space to associated devices connected to the first transport medium, wherein each subset is only accessible by the associated device connected to the first transport medium."	(The InfoServer 100 partitions maintain a mapping between portions of the storage space and the partition name. Each service is accessible only to clients that have access to the associated password. A particular service can also be restricted to a single client at a time. See IS100 pp. 3-9 through 3-12, "READERS" and "WRITERS" parameters, for example.)
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Hoese, claim 3

IS100

"3. The storage router of claim 2, wherein the devices connected to the first transport medium comprise workstations."	(Workstations as well as PCs and VAXes are connected are to the Ethernet port on the InfoServer 100. See IS100, Figure 1-1 on p. 1-3.)
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Hoese, claim 4

IS100

"4. The storage router of claim 2, wherein the storage devices comprise hard disk drives."	(IS100 at p. 3-45 illustrates an example of the output of the "SHOW DEVICE" command -- note that the output is a list of connected devices that includes "hard disk" drives.)
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Hoese, claim 7

IS100

<p>“7. A storage network, comprising:”</p> <p>“a first transport medium;”</p> <p>“a second transport medium;”</p> <p>“a plurality of workstations connected to the first transport medium;”</p>	<p>(Similar to claim 1.</p> <p>IS100 at p.1-3 shows the InfoServer 100 connected to an Ethernet LAN segment, thus the InfoServer 100 inherently had an Ethernet Network Interface Controller (NIC). The InfoServer 100 also responded to commands such as SHOW ETHERNET which display the status and traffic statistics for the Ethernet interface. <u>See</u> IS100 p.3-47.</p> <p>IS100 at pp. 2-7 and 2-8 refer to two SCSI buses, one internal and one external. IS100 at pp. 3-44 through 3-46 of IS100 describe a SHOW DEVICE command which displays the status of devices attached to the IS100 via the SCSI buses.</p> <p>Workstations as well as PCs and VAXes are connected are to the Ethernet port on the InfoServer 100. <u>See</u> IS100, Figure 1-1 on p. 1-3.)</p>
<p>“a plurality of storage devices connected to the second transport medium; and”</p>	<p>(Figure 1-1 on p. 1-3 of IS100 shows multiple disks connected to the InfoServer 100 -- see also the example output from the SHOW DEVICE command at IS100 p.3-45 showing that multiple disks devices are connected.)</p>
<p>“a storage router interfacing between the first transport medium and the second transport medium, the storage router providing virtual local storage on the storage devices to the workstations and operable:”</p>	<p>(Similar to claim 1 - the InfoServer 100 "routes" disk requests from Ethernet-connected devices to the virtual disks named as services which are then mapped to partitions to SCSI-attached disks. A "router" is anything that connects the two "transport medium(s)". <u>See</u> IS100 p.1-1)</p>
<p>“to map between the workstations and the storage devices;”</p>	<p>(Similar to claim 1. The storage space of the storage devices is addressed as "partitions" through the CREATE</p>

<p>“to implement access controls for storage space on the storage devices; and”</p> <p>“to allow access from the workstations to the storage devices using native low level, block protocol in accordance with the mapping and access controls.”</p>	<p>PARTITION command. <u>See</u> IS100 pp. 3-7 and 3-8. The partitions are mappings from a partition name to portions of the storage devices.</p> <p>The devices or partitions are then made available to connected devices as "SERVICES" via the CREATE SERVICE command which includes an optional "access control password". <u>See</u> IS100 p. 3-10. The password feature thus serves as an access control.</p> <p>At IS100 p. 1-1 it is said that each host can use its own "native file system" to access the InfoServer 100. In particular, the LAD protocol provides a mechanism for reading and writing logical disk blocks independent from any underlying file system. <u>See</u> also IS100 p. 2-2.) (At IS100 p. 1-1 it is said that each host can use its own "native file system" to access the InfoServer 100. In particular, the LAD protocol provides a mechanism for reading and writing logical disk blocks independent from any underlying file system. <u>See</u> also IS100 p. 2-2.)</p>
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Hoese, claim 8

IS100

<p>“8. The storage network of claim 7, wherein the access controls include an allocation of subsets of storage space to associated workstations, wherein each subset is only accessible by the associated workstation.”</p>	<p>(Same as claim 2.)</p>
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Hoese, claim 9

IS100

<p>“9. The storage network of claim 7, wherein the storage devices comprise hard disk drives.”</p>	<p>(Same as claim 4.)</p>
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Hoese, claim 11

IS100

<p>“11. A method for providing virtual local storage on remote storage devices connected to one transport medium to devices connected to another transport medium, comprising:”</p>	<p>(Same as claim 1. IS100 at p.1-1 describes the Digital Equipment InfoServer 100 as a "virtual disk server" that serves sets of logical blocks to an Ethernet network-connected server. It is also said at pp. 2-1 to 2-2 of IS100 that the InfoServer 100 provides "access to the virtual disks it serves to the local-area network (LAN) via the Local Area Disk (LAD) and Local Area Storage Transport (LAST) protocols".</p>
<p>“interfacing with a first transport medium;”</p>	<p>IS100 at p.1-3 shows the InfoServer 100 connected to an Ethernet LAN segment, thus the InfoServer 100 inherently had an Ethernet Network Interface Controller (NIC).</p>
<p>“interfacing with a second transport medium;”</p>	<p>IS100 at pp. 2-7 and 2-8 refer to two SCSI buses, one internal and one external. Pp. 3-44 through 3-46 of IS100 describe a SHOW DEVICE command which displays the status of storage devices attached to the IS100 via the SCSI buses.)</p>
<p>“mapping between devices connected to the first transport medium and the storage devices”</p>	<p>The storage space of the storage devices is addressed as "partitions" through the CREATE PARTITION command. See IS100 pp. 3-7 and 3-8. The partitions are mappings from a partition name to portions of the storage devices.</p>
<p>“and that implements access controls for storage space on the storage devices; and”</p>	<p>The devices or partitions are then made available to connected devices as "SERVICES" via the CREATE SERVICE command which includes an optional "access control password". See IS100 p. 3-10. The password feature thus serves as an access control.</p>

<p>“allowing access from devices connected to the first transport medium to the storage devices using native low level, block protocols.”</p>	<p>At IS100 p. 1-1 it is said that each host can use its own "native file system" to access the InfoServer 100. In particular, the LAD protocol provides a mechanism for reading and writing logical disk blocks independent from any underlying file system. <u>See</u> also IS100 p. 2-2.)</p>
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Hoese, claim 12

IS100

<p>“12. The method of claim 11, wherein mapping between devices connected to the first transport medium and the storage devices includes allocating subsets of storage space to associated devices connected to the first transport medium, wherein each subset is only accessible by the associated device connected to the first transport medium.”</p>	<p>(Same as claim 2.)</p>
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Hoese, claim 13

IS100

<p>“13. The method of claim 12, wherein the devices connected to the first transport medium comprise workstations.”</p>	<p>(Same as claim 3.)</p>
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Hoese, claim 14

IS100

<p>“14. The method of claim 12, wherein the storage devices comprise hard disk drives”</p>	<p>(Same as claim 4.)</p>
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B. Claim 5 of Hoese is unpatentable under 35 U.S.C. §103 as being obvious over the IS100 prior art document in view of the LANCE document.

Claim 5 depends from claim 1 and adds additional features. These additional features are found in an Ethernet integrated circuit known as the Advanced Micro Devices (AMD) Am7990,

as described in the LANCE document. A chart listing the correspondence of these claim features appears below.

It would have been obvious to one of skill in the art at the time of filing the Hoese patent to combine the teachings of the IS100 document and the LANCE document, for several reasons. First, textbooks such as Johnson suggested, circa 1993, that "DMA is a common feature of modern Ethernet controllers" (see Johnson, p. 3). Second, there is evidence that such a combination had actually been made in the prior art. The IS150 Manual describes the InfoServer 150, a second generation version of the IS100 which was introduced by Digital Equipment Corporation no later than the end of 1991. The IS150 Photos show an internal photograph of the InfoServer 150, and an Am7990 chip was clearly part of that product.

Claim 5 of Hoese reads on the prior art as quoted below:

"5. The storage router of claim 1, wherein the first controller comprises:"	(The Am7990 chip provided Ethernet access and used FIFOs and DMA as integral components. See LANCE pp. 193-200)
"a first protocol unit operable to connect to the first transport medium;"	(The Am7990 controller's "primary task is to carry out the basic Ethernet protocol functions". LANCE, p. 193, bottom left column)
"a first-in-first-out queue coupled to the first protocol unit; and"	("The ring behaves like a wraparound FIFO storage register". LANCE, pp. 195.)
"a direct memory access (DMA) interface coupled to the first-in-first-out queue and to the buffer."	(The Am7990 also provided an internal DMA interface to the FIFO ring buffers as well as a BCON bit used to program different DMA modes of the Am7990. LANCE at pp. 195-197. Also see p. 200, top right hand column, where an overflow error is reported if an internal FIFO of LANCE fills and cannot be emptied because of an abnormal latency in servicing a DMA request.)

C. Claim 6 is unpatentable under 35 U.S.C. §103 as being obvious over the prior art document IS100 in view of the DP5380 prior art document. A claim chart listing the correspondence between claim 6 and these documents appear below. It would have been obvious to combine the teachings of the IS100 and DP5380 documents. Indeed, there is evidence that such a combination had actually been made long before the filing date of the Hoese patent. As is evidenced by the IS150 Manual and the IS150 Photos, an "NCR5380" chip was part of the Digital Equipment Corporation InfoServer 150 no later than the end of 1991. The NCR5380 chip is pin and program compatible with the DP5380 chip, as described on the first page of the DP5380 document.

Claim 6 of Hoese reads on the prior art as quoted below:

"6. The storage router of claim 1, wherein the second controller comprises:"	(The DP5380 chip is a SCSI controller. See DP5380, p. 1.)
"a second protocol unit operable to connect to the second transport medium;"	(The DP5380 has a SCSI controller that receives and transmits data to and from a SCSI bus. See DP5380 generally.)
"an internal buffer coupled to the second protocol unit; and"	(The DP5380 has internal data input and data output registers. DP5380, p. 3, Figure 2, "ASI block diagram".)
"a direct memory access (DMA) interface coupled to the internal buffer and to the buffer of the storage router."	(The DP5380 also had a DMA mode of operation. See DP5380, p.1 and the description of the DMA send, DMA target, and DMA initiator registers at p.9; see also the description of the non-block mode DMA, block mode DMA, and pseudo-DMA modes at pp. 11-12.)



D. Claim 10 of Hoese is considered to be unpatentable under 35 U.S.C. §103 as being obvious in view of prior art documents IS100, LANCE and DP5380. A claim chart listing the correspondence between claim 10 and these documents appears below.

It would have been obvious to combine the teachings of the IS100, LANCE and DP5380 documents. Indeed, there is evidence that such a combination had actually been made long before the filing date of the Hoese patent. As is evidenced by the IS150 Manual and the IS150 Photos, an "Am7990" and an "NCR5380" chip were part of the Digital Equipment Corporation InfoServer 150 no later than the end of 1991. The Am7990 is described in the LANCE document. The NCR5380 chip is pin and program compatible with the DP5380 chip, as described on the first page of the DP5380 document.

Claim 10 of Hoese reads on the prior art as quoted below:

<p>"10. The storage network of claim 7, wherein the storage router comprises:"</p> <p>"a buffer providing memory work space for the storage router;"</p>	<p>(IS100 at p.3-64 refers to a "pool" of memory whose pool size is displayed on request and that the pool being memory is made available to the running software, for use in serving disks.)</p>
<p>"a first controller operable to connect to and interface with the first transport medium, the first controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer;"</p>	<p>(The LANCE document describes the Am7990, which was an Ethernet controller that had a DMA interface. The reference in the claim to "pull outgoing data" is considered to be a reference to the functions of the DMA interface. See also the discussion of claim 5 above.)</p>
<p>"a second controller operable to connect to and interface with the second transport medium, the second controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer; and"</p>	<p>(The DP5380 describes a SCSI controller that had a DMA interface. The reference to "pull outgoing data" is considered to be a reference to the DMA interface functions. See also the discussion of claim 6 above.)</p>

<p>“a supervisor unit coupled to the first controller, the second controller and the buffer, the supervisor unit operable:</p>	<p>(Same as claim 1. The InfoServer 100 internal processor provided connectivity between the first and second controller to process data in the buffer, in other words, it receives data from the Ethernet interface and stores it on the disks connected to the SCSI interface.</p>
<p>to map between devices connected to the first transport medium and the storage devices,</p>	<p>Mapping is provided by the PARTITION and SERVICES commands. <u>See</u> IS100, p. 2-6, section 2.5.2, pp. 3-7 through 3-12, p. 3-27 and pp. 3-40 through 3.43.). The storage space of the storage devices is addressed by the network devices as "partitions" through the CREATE PARTITION command. <u>See</u> IS100 pp. 3-7 and 3-8.</p>
<p>to implement the access controls for storage space on the storage devices and</p>	<p>The devices or partitions are then made available to connected devices as "SERVICES" via the CREATE SERVICE command which includes an optional "access control password". <u>See</u> IS100 p. 3-10. The password feature thus serves as an access control.</p>
<p>to process data in the buffer to interface between the first controller and the second controller to allow access from workstations to storage devices.”</p>	<p>At IS100 p. 1-1 it is said that each host can use its own "native file system" to access the InfoServer 100. In particular, the LAD protocol provides a mechanism for reading and writing logical disk blocks independent from any underlying file system. <u>See</u> also IS100 p. 2-2)</p>

IV. Conclusion

The prior art documents referred to above were not considered during prosecution of the Hoese patent, nor have they been cited in the Pending Request, Reexamination Control No. 90/007,125 filed July 19, 2004. Further, these prior art documents are more pertinent to the subject matter of Hoese than any prior art reference which were previously cited during



prosecution of the Hoese patent. It is clear from the foregoing discussion that substantial new questions of patentability have been raised by this previously unconsidered prior art and that claims 1-14 in Hoese are unpatentable over this prior art. Accordingly, it is respectfully requested that this request for reexamination of the Hoese patent be granted.

Respectfully submitted,

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Date: November 23, 2004



(12) **United States Patent**
 Hoese et al.

(10) Patent No.: **US 6,425,035 B2**
 (45) Date of Patent: ***Jul. 23, 2002**

(54) **STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE**

(75) Inventors: **Geoffrey B. Hoese, Austin; Jeffrey T. Russell, Cibolo, both of TX (US)**

(73) Assignee: **Crossroads Systems, Inc., Austin, TX (US)**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

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(21) Appl. No.: **09/965,335**

(22) Filed: **Sep. 27, 2001**

Related U.S. Application Data

(63) Continuation of application No. 09/354,682, filed on Jul. 15, 1999, which is a continuation of application No. 09/001,799, filed on Dec. 31, 1997, now Pat. No. 5,941,972.

(51) Int. Cl.⁷ **G06F 13/00**

(52) U.S. Cl. **710/129; 710/128; 710/8; 710/36; 710/105**

(58) Field of Search **710/1-5, 8-13, 710/36-38, 105, 100-101, 126-131; 711/100, 112, 113; 714/42**

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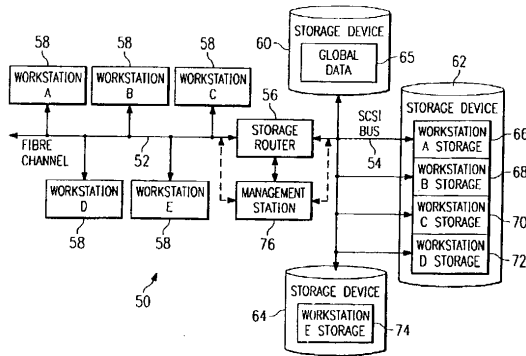
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 (74) *Attorney, Agent, or Firm*—Gray Cary Ware & Friedrich LLP

(57) **ABSTRACT**

A storage router (56) and storage network (50) provide virtual local storage on remote SCSI storage devices (60, 62, 64) to Fiber Channel devices. A plurality of Fiber Channel devices, such as workstations (58), are connected to a Fiber Channel transport medium (52), and a plurality of SCSI storage devices (60, 62, 64) are connected to a SCSI bus transport medium (54). The storage router (56) interfaces between the Fiber Channel transport medium (52) and the SCSI bus transport medium (54). The storage router (56) maps between the workstations (58) and the SCSI storage devices (60, 62, 64) and implements access controls for storage space on the SCSI storage devices (60, 62, 64). The storage router (56) then allows access from the workstations (58) to the SCSI storage devices (60, 62, 64) using native low level, block protocol in accordance with the mapping and the access controls.

14 Claims, 2 Drawing Sheets

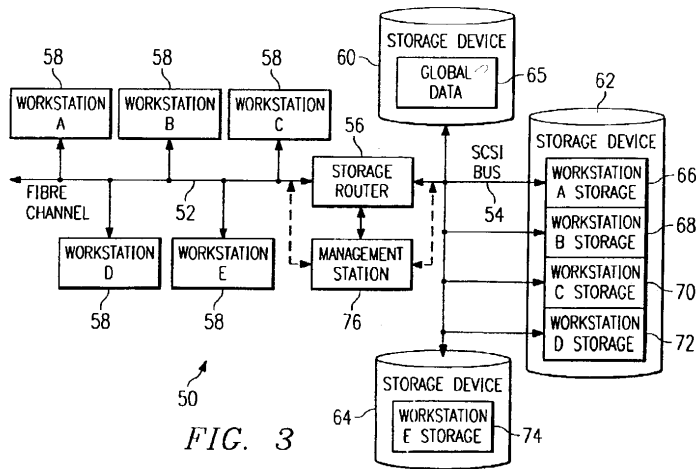
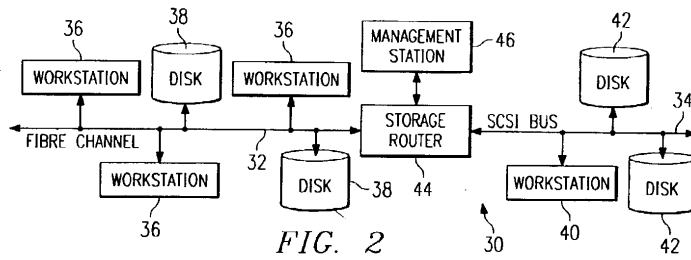
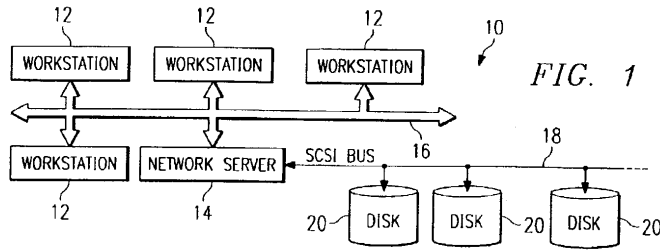


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Sheet 1 of 2

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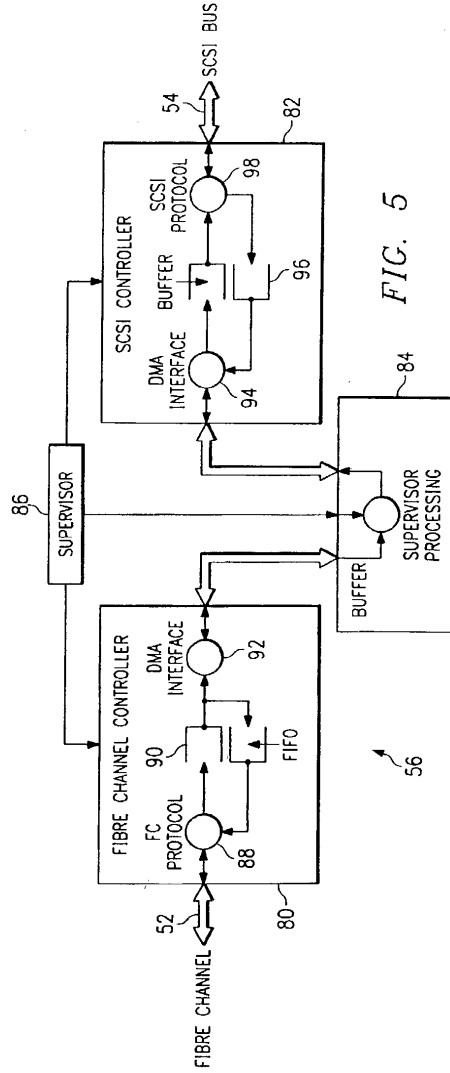
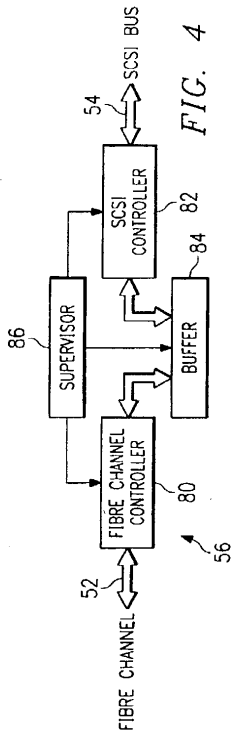


FIG. 4

FIG. 5

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1 2

STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

RELATED APPLICATIONS

This application claims the benefit of the filing date of U.S. patent application Ser. No. 09/354,682 by inventors Geoffrey B. Hoese and Jeffrey T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on Jul. 15, 1999, which is a continuation of U.S. patent application Ser. No. 09/1001,799, filed on Dec. 31, 1997, now U.S. Pat. No. 5,941,972, and hereby incorporates these applications by reference in their entireties as if they had been fully set forth herein.

TECHNICAL FIELD OF THE INVENTION

This invention relates in general to network storage devices, and more particularly to a storage router and method for providing virtual local storage on remote SCSI storage devices to Fiber Channel devices.

BACKGROUND OF THE INVENTION

Typical storage transport mediums provide for a relatively small number of devices to be attached over relatively short distances. One such transport medium is a Small Computer System Interface (SCSI) protocol, the structure and operation of which is generally well known as is described, for example, in the SCSI-1, SCSI-2 and SCSI-3 specifications. High speed serial interconnects provide enhanced capability to attach a large number of high speed devices to a common storage transport medium over large distances. One such serial interconnect is Fibre Channel, the structure and operation of which is described, for example, in Fiber Channel Physical and Signaling Interface (FC-PH), ANSI X3.230 Fiber Channel Arbitrated Loop (FC-AL), and ANSI X3.272 Fiber Channel Private Loop Direct Attach (FC-PLDA).

Conventional computing devices, such as computer workstations, generally access storage locally or through network interconnects. Local storage typically consists of a disk drive, tape drive, CD-ROM drive or other storage device contained within, or locally connected to the workstation. The workstation provides a file system structure, that includes security controls, with access to the local storage device through native low level, block protocols. These protocols map directly to the mechanisms used by the storage device and consist of data requests without security controls. Network interconnects typically provide access for a large number of computing devices to data storage on a remote network server. The remote network server provides file system structure, access control, and other miscellaneous capabilities that include the network interface. Access to data through the network server is through network protocols that the server must translate into low level requests to the storage device. A workstation with access to the server storage must translate its file system protocols into network protocols that are used to communicate with the server. Consequently, from the perspective of a workstation, or other computing device, seeking to access such server data, the access is much slower than access to data on a local storage device.

SUMMARY OF THE INVENTION

In accordance with the present invention, a storage router and method for providing virtual local storage on remote SCSI storage devices to Fiber Channel devices are disclosed that provide advantages over conventional network storage devices and methods.

According to one aspect of the present invention, a storage router and storage network provide virtual local storage on remote SCSI storage devices to Fiber Channel devices. A plurality of Fiber Channel devices, such as workstations, are connected to a Fiber Channel transport medium, and a plurality of SCSI storage devices are connected to a SCSI bus transport medium. The storage router interfaces between the Fiber Channel transport medium and the SCSI bus transport medium. The storage router maps between the workstations and the SCSI storage devices and implements access controls for storage space on the SCSI storage devices. The storage router then allows access from the workstations to the SCSI storage devices using native low level, block protocol in accordance with the mapping and the access controls.

According to another aspect of the present invention, virtual local storage on remote SCSI storage devices is provided to Fiber Channel devices. A Fibre Channel transport medium and a SCSI bus transport medium are interfaced with. A configuration is maintained for SCSI storage devices connected to the SCSI bus transport medium. The configuration maps between Fiber Channel devices and the SCSI storage devices and implements access controls for storage space on the SCSI storage devices. Access is then allowed from Fiber Channel initiator devices to SCSI storage devices using native low level, block protocol in accordance with the configuration.

A technical advantage of the present invention is the ability to centralize local storage for networked workstations without any cost of speed or overhead. Each workstation access its virtual local storage as if it work locally connected. Further, the centralized storage devices can be located in a significantly remote position even in excess of ten kilometers as defined by Fibre Channel standards.

Another technical advantage of the present invention is the ability to centrally control and administer storage space for connected users without limiting the speed with which the users can access local data. In addition, global access to data, backups, virus scanning and redundancy can be more easily accomplished by centrally located storage devices.

A further technical advantage of the present invention is providing support for SCSI storage devices as local storage for Fiber Channel hosts. In addition, the present invention helps to provide extended capabilities for Fiber Channel and for management of storage subsystems.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the present invention and the advantages thereof may be acquired by referring to the following description taken in conjunction with the accompanying drawings, in which like reference numbers indicate like features, and wherein:

FIG. 1 is a block diagram of a conventional network that provides storage through a network server;

FIG. 2 is a block diagram of one embodiment of a storage network with a storage router that provides global access and routing;

FIG. 3 is a block diagram of one embodiment of a storage network with a storage router that provides virtual local storage;

FIG. 4 is a block diagram of one embodiment of the storage router of FIG. 3; and

FIG. 5 is a block diagram of one embodiment of data flow within the storage router of FIG. 4.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 is a block diagram of a conventional network, indicated generally at 10, that provides access to storage

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through a network server. As shown, network 10 includes a plurality of workstations 12 interconnected with a network server 14 via a network transport medium 16. Each workstation 12 can generally comprise a processor, memory, input/output devices, storage devices and a network adapter as well as other common computer components. Network server 14 uses a SCSI bus 18 as a storage transport medium to interconnect with a plurality of storage devices 20 (tape drives, disk drives, etc.). In the embodiment of FIG. 1, network transport medium 16 is an network connection and storage devices 20 comprise hard disk drives, although there are numerous alternate transport mediums and storage devices.

In network 10, each workstation 12 has access to its local storage device as well as network access to data on storage devices 20. The access to a local storage device is typically through native low level, block protocols. On the other hand, access by a workstation 12 to storage devices 20 requires the participation of network server 14 which implements a file system and transfers data to workstations 12 only through high level file system protocols. Only network server 14 communicates with storage devices 20 via native low level, block protocols. Consequently, the network access by workstations 12 through network server 14 is slow with respect to their access to local storage. In network 10, it can also be a logistical problem to centrally manage and administer local data distributed across an organization, including accomplishing tasks such as backups, virus scanning and redundancy.

FIG. 2 is a block diagram of one embodiment of a storage network, indicated generally at 30, with a storage router that provides global access and routing. This environment is significantly different from that of FIG. 1 in that there is no network server involved. In FIG. 2, a Fiber Channel high speed serial transport 32 interconnects a plurality of workstations 36 and storage devices 38. A SCSI bus storage transport medium interconnects workstations 40 and storage devices 42. A storage router 44 then serves to interconnect these mediums and provide devices on either medium global, transparent access to devices on the other medium. Storage router 44 routes requests from initiator devices on one medium to target devices on the other medium and routes data between the target and the initiator. Storage router 44 can allow initiators and targets to be on either side. In this manner, storage router 44 enhances the functionality of Fiber Channel 32 by providing access, for example, to legacy SCSI storage devices on SCSI bus 34. In the embodiment of FIG. 2, the operation of storage router 44 can be managed by a management station 46 connected to the storage router via a direct serial connection.

In storage network 30, any workstation 36 or workstation 40 can access any storage device 38 or storage device 42 through native low level, block protocols, and vice versa. This functionality is enabled by storage router 44 which routes requests and data as a generic transport between Fiber Channel 32 and SCSI bus 34. Storage router 44 uses tables to map devices from one medium to the other and distributes requests and data across Fiber Channel 32 and SCSI bus 34 without any security access controls. Although this extension of the high speed serial interconnect provided by Fiber Channel 32 is beneficial, it is desirable to provide security controls in addition to extended access to storage devices through a native low level, block protocol.

FIG. 3 is a block diagram of one embodiment of a storage network, indicated generally at 50, with a storage router that provides virtual local storage. Similar to that of FIG. 2, storage network 50 includes a Fiber Channel high speed

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serial interconnect 52 and a SCSI bus 54 bridged by a storage router 56. Storage router 56 of FIG. 3 provides for a large number of workstations 58 to be interconnected on a common storage transport and to access common storage devices 60, 62 and 64 through native low level, block protocols.

According to the present invention, storage router 56 has enhanced functionality to implement security controls and routing such that each workstation 58 can have access to a specific subset of the overall data stored in storage devices 60, 62 and 64. This specific subset of data has the appearance and characteristics of local storage and is referred to herein as virtual local storage. Storage router 56 allows the configuration and modification of the storage allocated to each attached workstation 58 through the use of mapping tables or other mapping techniques.

As shown in FIG. 3, for example, storage device 60 can be configured to provide global data 65 which can be accessed by all workstations 58. Storage device 62 can be configured to provide partitioned subsets 66, 68, 70 and 72, where each partition is allocated to one of the workstations 58 (workstations A, B, C and D). These subsets 66, 68, 70 and 72 can only be accessed by the associated workstation 58 and appear to the associated workstation 58 as local storage accessed using native low level, block protocols. Similarly, storage device 64 can be allocated as storage for the remaining workstation 58 (workstation E).

Storage router 56 combines access control with routing such that each workstation 58 has controlled access to only the specified partition of storage device 62 which forms virtual local storage for the workstation 58. This access control allows security control for the specified data partitions. Storage router 56 allows this allocation of storage devices 60, 62 and 64 to be managed by a management station 76. Management station 76 can connect directly to storage router 56 via a direct connection or, alternately, can interface with storage router 56 through either Fiber Channel 52 or SCSI bus 54. In the latter case, management station 76 can be a workstation or other computing device with special rights such that storage router 56 allows access to mapping tables and shows storage devices 60, 62 and 64 as they exist physically rather than as they have been allocated.

The environment of FIG. 3 extends the concept of a single workstation having locally connected storage devices to a storage network 50 in which workstations 58 are provided virtual local storage in a manner transparent to workstations 58. Storage router 56 provides centralized control of what each workstation 58 sees as its local drive, as well as what data it sees as global data accessible by other workstations 58. Consequently, the storage space considered by the workstation 58 to be its local storage is actually a partition (i.e., logical storage definition) of a physically remote storage device 60, 62 or 64 connected through storage router 56. This means that similar requests from workstations 58 for access to their local storage devices produce different accesses to the storage space on storage devices 60, 62 and 64. Further, no access from a workstation 58 is allowed to the virtual local storage of another workstation 58.

The collective storage provided by storage devices 60, 62 and 64 can have blocks allocated by programming means within storage router 56. To accomplish this function, storage router 56 can include routing tables and security controls that define storage allocation for each workstation 58. The advantages provided by implementing virtual local storage in centralized storage devices include the ability to do collective backups and other collective administrative func-

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tions more easily. This is accomplished without limiting the performance of workstations 58 because storage access involves native low level, block protocols and does not involve the overhead of high level protocols and file systems required by network servers.

FIG. 4 is a block diagram of one embodiment of storage router 56 of FIG. 3. Storage router 56 can comprise a Fiber Channel controller 80 that interfaces with Fiber Channel 52 and a SCSI controller 82 that interfaces with SCSI bus 54. A buffer 84 provides memory work space and is connected to both Fiber Channel controller 80 and to SCSI controller 82. A supervisor unit 86 is connected to Fiber Channel controller 80, SCSI controller 82 and buffer 84. Supervisor unit 86 comprises a microprocessor for controlling operation of storage router 56 and to handle mapping and security access for requests between Fiber Channel 52 and SCSI bus 54.

FIG. 5 is a block diagram of one embodiment of data flow within storage router 56 of FIG. 4. As shown, data from Fiber Channel 52 is processed by a Fibre Channel (FC) protocol unit 88 and placed in a FIFO queue 90. A direct memory access (DMA) interface 92 then takes data out of FIFO queue 90 and places it in buffer 84.

Supervisor unit 86 processes the data in buffer 84 as represented by supervisor processing 93. This processing involves mapping between Fiber Channel 52 and SCSI bus 54 and applying access controls and routing functions. A DMA interface 94 then pulls data from buffer 84 and places it into a buffer 96. A SCSI protocol unit 98 pulls data from buffer 96 and communicates the data on SCSI bus 54. Data flow in the reverse direction, from SCSI bus 54 to Fiber Channel 52, is accomplished in a reverse manner.

The storage router of the present invention is a bridge device that connects a Fiber Channel link directly to a SCSI bus and enables the exchange of SCSI command set information between application clients on SCSI bus devices and the Fiber Channel links. Further, the storage router applies access controls such that virtual local storage can be established in remote SCSI storage devices for workstations on the Fiber Channel link. In one embodiment, the storage router provides a connection for Fiber Channel links running the SCSI Fiber Channel Protocol (FCP) to legacy SCSI devices attached to a SCSI bus. The Fiber Channel topology is typically an Arbitrated Loop (FC_{AL}).

In part, the storage router enables a migration path to Fiber Channel based, serial SCSI networks by providing connectivity for legacy SCSI bus devices. The storage router can be attached to a Fiber Channel Arbitrated Loop and a SCSI bus to support a number of SCSI devices. Using configuration settings, the storage router can make the SCSI bus devices available on the Fiber Channel network as FCP logical units. Once the configuration is defined, operation of the storage router is transparent to application clients. In this manner, the storage router can form an integral part of the migration to new Fibre Channel based networks while providing a means to continue using legacy SCSI devices.

In one implementation (not shown), the storage router can be a rack mount or free standing device with an internal power supply. The storage router can have a Fibre Channel and SCSI port, and a standard, detachable power cord can be used, the FC connector can be a copper DB9 connector, and the SCSI connector can be a 68-pin type. Additional modular jacks can be provided for a serial port and a 802.3 10Base-T port, i.e. twisted pair Ethernet, for management access. The SCSI port of the storage router can support SCSI direct and sequential access target devices and can support SCSI

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initiators, as well. The Fiber Channel port can interface to SCSI-3 FCP enabled devices and initiators.

To accomplish its functionality, one implementation of the storage router uses: a Fiber Channel interface based on the HEWLETT-PACKARD TACHYON HPFC-5000 controller and a GLM media interface; an Intel 80960RP processor, incorporating independent data and program memory spaces, and associated logic required to implement a stand alone processing system; and a serial port for debug and system configuration. Further, this implementation includes a SCSI interface supporting Fast-20 based on the SYMBIOS 53C8xx series SCSI controllers, and an operating system based upon the WIND RIVERS SYSTEMS VXWORKS or IXWORKS kernel, as determined by design. In addition, the storage router includes software as required to control basic functions of the various elements, and to provide appropriate translations between the FC and SCSI protocols.

The storage router has various modes of operation that are possible between FC and SCSI target and initiator combinations. These modes are: FC Initiator to SCSI Target, SCSI Initiator to FC Target, SCSI Initiator to SCSI Target, and FC Initiator to FC Target. The first two modes can be supported concurrently in a single storage router device are discussed briefly below. The third mode can involve two storage router devices back to back and can serve primarily as a device to extend the physical distance beyond that possible via a direct SCSI connection. The last mode can be used to carry FC protocols encapsulated on other transmission technologies (e.g. ATM, SONET), or to act as a bridge between two FC loops (e.g. as a two port fabric).

The FC Initiator to SCSI Target mode provides for the basic configuration of a server using Fiber Channel to communicate with SCSI targets. This mode requires that a host system have an FC attached device and associated device drivers and software to generate SCSI-3 FCP requests. This system acts as an initiator using the storage router to communicate with SCSI target devices. The SCSI devices supported can include SCSI-2 compliant direct or sequential access (disk or tape) devices. The storage router serves to translate command and status information and transfer data between SCSI-3 FCP and SCSI-2, allowing the use of standard SCSI-2 devices in a Fibre Channel environment.

The SCSI Initiator to FC Target mode provides for the configuration of a server using SCSI-2 to communicate with Fiber Channel targets. This mode requires that a host system has a SCSI-2 interface and driver software to control SCSI-2 target devices. The storage router will connect to the SCSI-2 bus and respond as a target to multiple target IDs. Configuration information is required to identify the target IDs to which the bridge will respond on the SCSI-2 bus. The storage router then translates the SCSI-2 requests to SCSI-3 FCP requests, allowing the use of FC devices with a SCSI host system. This will also allow features such as a tape device acting as an initiator on the SCSI bus to provide full support for this type of SCSI device.

In general, user configuration of the storage router will be needed to support various functional modes of operation. Configuration can be modified, for example, through a serial port or through an Ethernet port via SNMP (simple network management protocol) or a Telnet session. Specifically, SNMP manageability can be provided via an 802.3 Ethernet interface. This can provide for configuration changes as well as providing statistics and error information. Configuration can also be performed via TELNET or RS-232 interfaces

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with menu driven command interfaces. Configuration information can be stored in a segment of flash memory and can be retained across resets and power off cycles. Password protection can also be provided.

In the first two modes of operation, addressing information is needed to map from FC addressing to SCSI addressing and vice versa. This can be 'hard' configuration data, due to the need for address information to be maintained across initialization and partial reconfigurations of the Fiber Channel address space. In an arbitrated loop configuration, user configured addresses will be needed for AL_PAs in order to insure that known addresses are provided between loop reconfigurations.

With respect to addressing, FCP and SCSI 2 systems employ different methods of addressing target devices. Additionally, the inclusion of a storage router means that a method of translating device IDs needs to be implemented. In addition, the storage router can respond to commands without passing the commands through to the opposite interface. This can be implemented to allow all generic FCP and SCSI commands to pass through the storage router to address attached devices, but allow for configuration and diagnostics to be performed directly on the storage router through the FC and SCSI interfaces.

Management commands are those intended to be processed by the storage router controller directly. This may include diagnostic, mode, and log commands as well as other vendor-specific commands. These commands can be received and processed by both the FCP and SCSI interfaces, but are not typically bridged to the opposite interface. These commands may also have side effects on the operation of the storage router, and cause other storage router operations to change or terminate.

A primary method of addressing management commands through the FCP and SCSI interfaces can be through peripheral device type addressing. For example, the storage router can respond to all operations addressed to logical unit (LUN) zero as a controller device. Commands that the storage router will support can include INQUIRY as well as vendor-specific management commands. These are to be generally consistent with SCC standard commands.

The SCSI bus is capable of establishing bus connections between targets. These targets may internally address logical units. Thus, the prioritized addressing scheme used by SCSI subsystems can be represented as follows: BUS:TARGET:LOGICAL_UNIT. The BUS identification is intrinsic in the configuration, as a SCSI initiator is attached to only one-bus. Target addressing is handled by bus arbitration from information provided to the arbitrating device. Target addresses are assigned to SCSI devices directly, though some means of configuration, such as a hardware jumper, switch setting, or device specific software configuration. As such, the SCSI protocol provides only logical unit addressing within the Identify message. Bus and target information is implied by the established connection.

Fiber Channel devices within a fabric are addressed by a unique port identifier. This identifier is assigned to a port during certain well-defined states of the FC protocol. Individual ports are allowed to arbitrate for a known, user defined address. If such an address is not provided, or if arbitration for a particular user address fails, the port is assigned a unique address by the FC protocol. This address is generally not guaranteed to be unique between instances. Various scenarios exist where the AL_PA of a device will change, either after power cycle or loop reconfiguration.

The FC protocol also provides a logical unit address field within command structures to provide addressing to devices

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internal to a port. The FCP_CMD payload specifies an eight byte LUN field. Subsequent identification of the exchange between devices is provided by the FQXID (Fully Qualified Exchange ID).

FC ports can be required to have specific addresses assigned. Although basic functionality is not dependent on this, changes in the loop configuration could result in disk targets changing identifiers with the potential risk of data corruption or loss. This configuration can be straightforward, and can consist of providing the device a loop-unique ID (AL_PA) in the range of "01h" to "EFh." Storage routers could be shipped with a default value with the assumption that most configurations will be using single storage routers and no other devices requesting the present ID. This would provide a minimum amount of initial configuration to the system administrator. Alternately, storage routers could be defaulted to assume any address so that configurations requiring multiple storage routers on a loop would not require that the administrator assign a unique ID to the additional storage routers.

Address translation is needed where commands are issued in the cases FC Initiator to SCSI Target and SCSI Initiator to FC Target. Target responses are qualified by the FQXID and will retain the translation acquired at the beginning of the exchange. This prevents configuration changes occurring during the course of execution of a command from causing data or state information to be inadvertently misdirected. Configuration can be required in cases of SCSI Initiator to FC Target, as discovery may not effectively allow for FCP targets to consistently be found. This is due to an FC arbitrated loop supporting addressing of a larger number of devices than a SCSI bus and the possibility of FC devices changing their AL_PA due to device insertion or other loop initialization.

In the direct method, the translation to BUS:TARGET:LUN of the SCSI address information will be direct. That is, the values represented in the FCP LUN field will directly map to the values in effect on the SCSI bus. This provides a clean translation and does not require SCSI bus discovery. It also allows devices to be dynamically added to the SCSI bus without modifying the address map. It may not allow for complete discovery by FCP initiator devices, as gaps between device addresses may halt the discovery process. Legacy SCSI device drivers typically halt discovery on a target device at the first unoccupied LUN, and proceed to the next target. This would lead to some devices not being discovered. However, this allows for hot plugged devices and other changes to the loop addressing.

In the ordered method, ordered translation requires that the storage router perform discovery on reset, and collapses the addresses on the SCSI bus to sequential FCP LUN values. Thus, the FCP LUN values 0-N can represent N+1 SCSI devices, regardless of SCSI address values, in the order in which they are isolated during the SCSI discovery process. This would allow the FCP initiator discovery process to identify all mapped SCSI devices without further configuration. This has the limitation that hot-plugged devices will not be identified until the next reset cycle. In this case, the address may also be altered as well.

In addition to addressing, according to the present invention, the storage router provides configuration and access controls that cause certain requests from FC Initiators to be directed to assigned virtual local storage partitioned on SCSI storage devices. For example, the same request for LUN 0 (local storage) by two different FC Initiators can be directed to two separate subsets of storage. The storage

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router can use tables to map, for each initiator, what storage access is available and what partition is being addressed by a particular request. In this manner, the storage space provided by SCSI storage devices can be allocated to FC initiators to provide virtual local storage as well as to create any other desired configuration for secured access.

Although the present invention has been described in detail, it should be understood that various changes, substitutions, and alterations can be made hereto without departing from the spirit and scope of the invention as defined by the appended claims.

What is claimed is:

1. A storage router for providing virtual local storage on remote storage devices to devices, comprising:

a buffer providing memory work space for the storage router;

a first controller operable to connect to and interface with a first transport medium;

a second controller operable to connect to and interface with a second transport medium; and

a supervisor unit coupled to the first controller, the second controller and the buffer, the supervisor unit operable to map between devices connected to the first transport medium and the storage devices, to implement access controls for storage space on the storage devices and to process data in the buffer to interface between the first controller and the second controller to allow access from devices connected to the first transport medium to the storage devices using native low level, block protocols.

2. The storage router of claim 1, wherein the supervisor unit maintains an allocation of subsets of storage space to associated devices connected to the first transport medium, wherein each subset is only accessible by the associated device connected to the first transport medium.

3. The storage router of claim 2, wherein the devices connected to the first transport medium comprise workstations.

4. The storage router of claim 2, wherein the storage devices comprise hard disk drives.

5. The storage router of claim 1, wherein the first controller comprises:

a first protocol unit operable to connect to the first transport medium;

a first-in-first-out queue coupled to the first protocol unit; and

a direct memory access (DMA) interface coupled to the first-in-first-out queue and to the buffer.

6. The storage router of claim 1, wherein the second controller comprises:

a second protocol unit operable to connect to the second transport medium;

an internal buffer coupled to the second protocol unit; and

a direct memory access (DMA) interface coupled to the internal buffer and to the buffer of the storage router.

7. A storage network, comprising:

a first transport medium;

a second transport medium;

a plurality of workstations connected to the first transport medium;

a plurality of storage devices connected to the second transport medium; and

a storage router interfacing between the first transport medium and the second transport medium, the storage router providing virtual local storage on the storage devices to the workstations and operable:

to map between the workstations and the storage devices;

to implement access controls for storage space on the storage devices; and

to allow access from the workstations to the storage devices using native low level, block protocol in accordance with the mapping and access controls.

8. The storage network of claim 7, wherein the access controls include an allocation of subsets of storage space to associated workstations, wherein each subset is only accessible by the associated workstation.

9. The storage network of claim 7, wherein the storage devices comprise hard disk drives.

10. The storage network of claim 7, wherein the storage router comprises:

a buffer providing memory work space for the storage router;

a first controller operable to connect to and interface with the first transport medium, the first controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer;

a second controller operable to connect to and interface with the second transport medium, the second controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer; and

a supervisor unit coupled to the first controller, the second controller and the buffer, the supervisor unit operable to map between devices connected to the first transport medium and the storage devices, to implement the access controls for storage space on the storage devices and to process data in the buffer to interface between the first controller and the second controller to allow access from workstations to storage devices.

11. A method for providing virtual local storage on remote storage devices connected to one transport medium to devices connected to another transport medium, comprising:

interfacing with a first transport medium;

interfacing with a second transport medium;

mapping between devices connected to the first transport medium and the storage devices and that implements access controls for storage space on the storage devices; and

allowing access from devices connected to the first transport medium to the storage devices using native low level, block protocols.

12. The method of claim 11, wherein mapping between devices connected to the first transport medium and the storage devices includes allocating subsets of storage space to associated devices connected to the first transport medium, wherein each subset is only accessible by the associated device connected to the first transport medium.

13. The method of claim 12, wherein the devices connected to the first transport medium comprise workstations.

14. The method of claim 12, wherein the storage devices comprise hard disk drives.

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router can use tables to map, for each initiator, what storage access is available and what partition is being addressed by a particular request. In this manner, the storage space provided by SCSI storage devices can be allocated to FC initiators to provide virtual local storage as well as to create 5 any other desired configuration for secured access.

Although the present invention has been described in detail, it should be understood that various changes, substitutions, and alterations can be made hereto without departing from the spirit and scope of the invention as defined by the appended claims. 10

What is claimed is:

1. A storage router for providing virtual local storage on remote storage devices to devices, comprising:

a buffer providing memory work space for the storage router; 15

a first controller operable to connect to and interface with a first transport medium;

a second controller operable to connect to and interface with a second transport medium; and 20

a supervisor unit coupled to the first controller, the second controller and the buffer, the supervisor unit operable to map between devices connected to the first transport medium and the storage devices, to implement access controls for storage space on the storage devices and to process data in the buffer to interface between the first controller and the second controller to allow access from devices connected to the first transport medium to the storage devices using native low level, block protocols. 25

2. The storage router of claim 1, wherein the supervisor unit maintains an allocation of subsets of storage space to associated devices connected to the first transport medium, wherein each subset is only accessible by the associated device connected to the first transport medium. 35

3. The storage router of claim 2, wherein the devices connected to the first transport medium comprise workstations.

4. The storage router of claim 2, wherein the storage devices comprise hard disk drives. 40

5. The storage router of claim 1, wherein the first controller comprises:

a first protocol unit operable to connect to the first transport medium; 45

a first-in-first-out queue coupled to the first protocol unit; and

a direct memory access (DMA) interface coupled to the first-in-first-out queue and to the buffer.

6. The storage router of claim 1, wherein the second controller comprises: 50

a second protocol unit operable to connect to the second transport medium;

an internal buffer coupled to the second protocol unit; and a direct memory access (DMA) interface coupled to the internal buffer and to the buffer of the storage router. 55

7. A storage network, comprising:

a first transport medium; 60

a second transport medium;

a plurality of workstations connected to the first transport medium;

a plurality of storage devices connected to the second transport medium; and

a storage router interfacing between the first transport medium and the second transport medium, the storage router providing virtual local storage on the storage devices to the workstations and operable: 5

to map between the workstations and the storage devices;

to implement access controls for storage space on the storage devices; and

to allow access from the workstations to the storage devices using native low level, block protocol in accordance with the mapping and access controls.

8. The storage network of claim 7, wherein the access controls include an allocation of subsets of storage space to associated workstations, wherein each subset is only accessible by the associated workstation. 10

9. The storage network of claim 7, wherein the storage devices comprise hard disk drives.

10. The storage network of claim 7, wherein the storage router comprises: 20

a buffer providing memory work space for the storage router;

a first controller operable to connect to and interface with the first transport medium, the first controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer;

a second controller operable to connect to and interface with the second transport medium, the second controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer; and

a supervisor unit coupled to the first controller, the second controller and the buffer, the supervisor unit operable: to map between devices connected to the first transport medium and the storage devices, to implement the access controls for storage space on the storage devices and to process data in the buffer to interface between the first controller and the second controller to allow access from workstations to storage devices. 25

11. A method for providing virtual local storage on remote storage devices connected to one transport medium to devices connected to another transport medium, comprising:

interfacing with a first transport medium; 45

interfacing with a second transport medium;

mapping between devices connected to the first transport medium and the storage devices and that implements access controls for storage space on the storage devices; and

allowing access from devices connected to the first transport medium to the storage devices using native low level, block protocols.

12. The method of claim 11, wherein mapping between devices connected to the first transport medium and the storage devices includes allocating subsets of storage space to associated devices connected to the first transport medium, wherein each subset is only accessible by the associated device connected to the first transport medium. 50

13. The method of claim 12, wherein the devices connected to the first transport medium comprise workstations.

14. The method of claim 12, wherein the storage devices comprise hard disk drives. 55

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UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 6,425,035 B2
DATED : July 23, 2002
INVENTOR(S) : Geoffry B. Hoese et al.

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 10,
Line 47, delete "that implements" and insert -- implementing --

Signed and Sealed this
Twenty-sixth Day of August, 2003



JAMES E. ROGAN
Director of the United States Patent and Trademark Office

PTO/SB/08b (08-03)

Approved for use through 06/30/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Substitute for form 1449B/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)			Complete if Known		
			Application Number	Patent No. 6,425,035	
			Filing Date	Issue Date 07/23/2002	
			First Named Inventor	HOESE	
			Art Unit		
			Examiner Name		
Sheet	1	of	1	Attorney Docket Number	HOESE1/WAB

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
	1	"InfoServer 100 System Operations Guide", First Edition, Digital Equipment Corporation, 1990	
	2	S.P. Joshi, "Ethernet controller chip interfaces with variety of 16-bit processors," Electronic Design, Hayden Publishing Co., Inc., Rochelle Park, NJ, Oct. 14, 1982. pp193-200	
	3	"DP5380 Asynchronous SCSI Interface", National Semiconductor Corporation, Arlington, TX, May 1989, pp. 1-32	
	4	Johnson, D.B., et al., "The Peregrine High Performance RPC System", Software--Practice & Experience, 23(2):201-221, Feb. 1993	
	5	"InfoServer 150--Installation and Owner's Guide", EK-INFSV-OM-001, Digital Equipment Corporation, Maynard, Massachusetts 1991, Chapters 1 and 2	
	6	Pictures of internal components of the InfoServer 150, taken from http://www.binarydinosaurs.couk/Museum/Digital/infoserver/infoserver.php in Nov. 2004	

Examiner Signature		Date Considered	
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.
¹Applicant's unique citation designation number (optional). ²Applicant is to place a check mark here if English language Translation is attached.
 This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.


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Application Number 	Application No. 90/007,317	Applicant(s) 6425035	
	Examiner	Art Unit 2111	

U.S. Patent and Trademark Office


Part of Paper No. 1



<p>Index of Claims</p> 	<p>Application No. 90/007,317</p>	<p>Applicant(s) 6425035</p>
	<p>Examiner</p>	<p>Art Unit 2111</p>



<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>√</td><td>Rejected</td></tr> <tr><td>=</td><td>Allowed</td></tr> </table>	√	Rejected	=	Allowed	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>-</td><td>(Through numeral) Cancelled</td></tr> <tr><td>+</td><td>Restricted</td></tr> </table>	-	(Through numeral) Cancelled	+	Restricted	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>N</td><td>Non-Elected</td></tr> <tr><td>I</td><td>Interference</td></tr> </table>	N	Non-Elected	I	Interference	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>A</td><td>Appeal</td></tr> <tr><td>O</td><td>Objected</td></tr> </table>	A	Appeal	O	Objected
√	Rejected																		
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-	(Through numeral) Cancelled																		
+	Restricted																		
N	Non-Elected																		
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O	Objected																		

Claim		Date		Claim		Date		Claim		Date	
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Issue Classification 	Application No. 90/007,317	Applicant(s) 6425035	
	Examiner	Art Unit 2111	

ISSUE CLASSIFICATION									
ORIGINAL				CROSS REFERENCE(S)					
CLASS	SUBCLASS			CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
710	105								
INTERNATIONAL CLASSIFICATION									
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			/						
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(Assistant Examiner) (Date)				Total Claims Allowed: O.G. Print Claim(s) O.G. Print Fig.					
(Legal Instruments Examiner) (Date)									

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant										<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47	
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
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	2		32		62		92		122		152		182		212
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	30		60		90		120		150		180		210		240

 Reexamination 	Control No. 90/007,317	Applicant(s)
	Certificate Date	Certificate Number

Requester	Correspondence Address:	<input type="checkbox"/> Patent Owner	<input checked="" type="checkbox"/> Third Party
William A. Blake JONES, TULLAR & COOPER, PC P.O. Box 2266 Eads Station Arlington, VA 22202			

LITIGATION REVIEW <input type="checkbox"/>		
	(examiner initials)	(date)
	Case Name	Director Initials

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Bib Data Sheet

CONFIRMATION NO. 1634

SERIAL NUMBER 90/007,317	FILING OR 371(c) DATE 11/23/2004 RULE	CLASS 710	GROUP ART UNIT 2111	ATTORNEY DOCKET NO. HOESE1/WAB	
APPLICANTS 6425035, Residence Not Provided; Crossroads Systems Inc.(Owner), Austin, TX; William A Blake(3rd. Pty. Req.), Arlington, VA; William A Blake, Arlington, VA					
** CONTINUING DATA ***** This application is a REX of 09/965,335 09/27/2001 PAT 6,425,035 which is a CON of 09/354,682 07/15/1999 PAT 6,421,753 which is a CON of 09/001,799 12/31/1997 PAT 5,941,972					
** FOREIGN APPLICATIONS *****					
Foreign Priority claimed <input type="checkbox"/> yes <input type="checkbox"/> no		STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS 14	INDEPENDENT CLAIMS 3
35 USC 119 (a-d) conditions met <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> Met after Allowance					
Verified and Acknowledged		Examiner's Signature _____		Initials _____	
ADDRESS 25094					
TITLE STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE					
FILING FEE RECEIVED 2520	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		





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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/007,125	07/19/2004	6425035	I006-8910	2298
44654	7590	02/07/2005	EXAMINER	
SPRINKLE IP LAW GROUP 1301 W. 25TH STREET SUITE 408 AUSTIN, TX 78705			ART UNIT	PAPER NUMBER

DATE MAILED: 02/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

RECEIVED By: JP

FEB 14 2005

Docketed By: _____
Date Docketed: _____
Attorney: _____
C/M No: CROSSING 17



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EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. 90/007,125.

PATENT NO. 6425035.

ART UNIT 2182.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

PTOL-465 (Rev.07-04)

Office Action in Ex Parte Reexamination	Control No. 90/007,125	Patent Under Reexamination 6425035	
	Examiner Fritz M Fleming	Art Unit 2182	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

- a Responsive to the communication(s) filed on _____. b This action is made FINAL.
 c A statement under 37 CFR 1.530 has not been received from the patent owner.

A shortened statutory period for response to this action is set to expire 2 month(s) from the mailing date of this letter. Failure to respond within the period for response will result in termination of the proceeding and issuance of an *ex parte* reexamination certificate in accordance with this action. 37 CFR 1.550(d). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).** If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

- | | |
|---|---|
| 1. <input checked="" type="checkbox"/> Notice of References Cited by Examiner, PTO-892. | 3. <input type="checkbox"/> Interview Summary, PTO-474. |
| 2. <input checked="" type="checkbox"/> Information Disclosure Statement, PTO-1449. | 4. <input type="checkbox"/> _____. |

Part II SUMMARY OF ACTION

- 1a. Claims 1-14 are subject to reexamination.
 1b. Claims _____ are not subject to reexamination.
 2. Claims _____ have been canceled in the present reexamination proceeding.
 3. Claims _____ are patentable and/or confirmed.
 4. Claims 1-14 are rejected.
 5. Claims _____ are objected to.
 6. The drawings, filed on 7-19-2204 are acceptable.
 7. The proposed drawing correction, filed on _____ has been (7a) approved (7b) disapproved.
 8. Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some* c) None of the certified copies have
 1 been received.
 2 not been received.
 3 been filed in Application No. _____.
 4 been filed in reexamination Control No. _____.
 5 been received by the International Bureau in PCT application No. _____.
 * See the attached detailed Office action for a list of the certified copies not received.
 9. Since the proceeding appears to be in condition for issuance of an *ex parte* reexamination certificate except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte* Quayle, 1935 C.D. 11, 453 O.G. 213.
 10. Other: _____

cc: Requester (if third party requester)

Notice of References Cited	Application/Control No. 90/007,125	Applicant(s)/Patent Under Reexamination 6425035	
	Examiner Fritz M Fleming	Art Unit 2182	Page 1 of 1

U.S. PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
A	US-5,394,526 A	02-1995	Crouse et al.	709/219
B	US-			
C	US-			
D	US-			
E	US-			
F	US-			
G	US-			
H	US-			
I	US-			
J	US-			
K	US-			
L	US-			
M	US-			

FOREIGN PATENT DOCUMENTS

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
N					
O					
P					
Q					
R					
S					
T					

NON-PATENT DOCUMENTS

*	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
U	Systems Architectures Using Fibre Channel, Roger Cummings, Twelfth IEE Symposium on Mass Storage Systems, copyright 1993 IEEE. Pages 251-256.
V	Fibre Channel and ATM: The Physical Layers, Jerry Quam, WESCON/94, published 27-29 September 1994. Pages 648-652.
W	Petal: Distributed Virtual Disks, Edward K. Lee and Chandramohan A. Thekkath, ACM SIGPLAN Notices, Volume 31, Issue 9, September 1996, pages 84-92.
X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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Reexamination

1. The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a) to apprise the Office of any litigation activity, or other prior or concurrent proceeding, involving Patent No. 6,425,035 throughout the course of this reexamination proceeding. The third party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 7-9,11-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Petal: Distributed Virtual Disks ("Petal").

Petal is competent art under 102(b) as its publication date is September 1996, more than one year prior to effective filing date (12/31/1997) of the instant patent.

Addressing claim 11 (the broadest independent claim), Petal provides virtual local storage (page 5, section 3, "This allows clients to access Petal virtual disks just like local disks." And page 7, section 3.2 "Petal provides clients with a large virtual disk that is available to all clients on the network.") in the form of the Figure 1 virtual disks in the form of Figure 6 SCSI disks (connected to one transport medium—SCSI) to devices connected to another transport medium in the form of the Petal clients connected to the

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Digital ATM Network. The method is shown to interface to the first transport medium (Digital ATM Network for the clients) and the second transport medium (SCSI for the disks) per Figure 6 via the overall Petal Virtual Disk storage servers of the Figure 2 physical view, which provides the actual interface between the two media. A mapping is shown per Figure 4 and the virtual to physical mapping and the section 2 discussion. Page 3 shows the 3 step mapping process to translate a client supplied virtual disk identifier into a global map identifier, to a given offset, to the physical mapping at the actual disk. Thus there is a mapping of the client devices to the storage devices in order to use the storage space. As far as "implements access controls for storage space on the storage devices" is concerned, this limitation is very broad in that it provides no specifics as to exactly what these controls are to be. Given this, page 7, column 2 sets forth "We currently do not provide any special support for protecting a client's data from other clients; however, it would not be difficult to provide security on a per virtual disk basis.", which is anticipatory, as this teaches an implementation of security access controls on a per virtual disk basis, if and when desired. Thus there is a clear teaching of an implementation of a security access control per virtual disk basis by protecting a client's data from other clients. Given a plain reading of this passage, it clearly teaches that a client is only able to access its own virtual disk. Finally, this access is allowed from the client devices to the storage devices "using native, low level, block protocols", as page 7, section 4, column 2 provides "Petal provides a disk-like interface that allows clients to read and write blocks of data." Section 3.2 provides "In all cases but one, the file system level performance of the Petal virtual disk is

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comparable to locally attached disks.” Section 3, column 2, page 5 sets forth that access to the disks is provided using the UNIX raw disk interface. Page 1, column 2+, sets forth the concept of a “lower level service” and “block level storage system” and “An additional benefit is that the block-level interface is useful for supporting heterogeneous clients and client applications”. Section 2, column 1, page 2 explicitly sets forth “As shown in Figure 2, Petal consists of a pool of distributed storage servers that cooperatively implement a single, block level storage system. Clients view the storage system as a collection of virtual disks “ which anticipates the breadth of the claim language, as it only requires the use of “native, low level, block protocols.” Also note page 8, column 2, which clearly states “Petal provides block level rather than a file level interface.” Finally, page 1, column 1, sets forth specifically “To a Petal client, this collection appears as a highly available block-level storage system that provides large abstract containers called virtual disks. A virtual disk is globally accessible to all Petal clients on the network. A client can create a virtual disk on demand to tap the entire capacity and performance of the underlying physical resources.” Thus the reference anticipates the native, low level, block protocols, as the clients view the storage as block level and hence access it using such protocols accordingly. Per claim 12, anticipation is provided by the previously mentioned “for protecting a client’s data from other clients...to provide security on a per virtual disk basis.” As a client creates a virtual disk, and such can be kept private from other clients, then each virtual disk, which is a subset of the entire storage, is only accessible by that client to which it is mapped. Per claim 13, workstations are the clients. Per claim 14, hard disk drives are the storage devices.

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Turning to claims 7-9, claim 7 adds a storage router interfacing the media. When viewed per the Figures, Petal provides a storage router via the mapping of Figure 4. Figure 4 provides for the mapping and thus the storage routing of the translation of the client supplied virtual disk identifier to the actual physical disk. Per column 2, section 2, clients maintain minimal high level mapping information so as to properly route read and write requests to the "most appropriate" server. Thus "routing" is used to get the mapping from the client to the actual disk, and the mapping of Figure 4, which is the Petal servers taken as a whole, thus meeting the claimed "storage router" limitation. It is to be noted that the "storage router" is not further defined in any sort of a structural manner, therefore the Petal servers acting per Figure 4, anticipate what is claimed. Also note that claim 7 only requires "and operable", "to map", and "to implement" and "to allow", all of which are provided by the "storage router" of the Petal system, interpreted to be all of the Petal system of Figure 6, absent the disks. Thus the access is allowed via block level protocols in accordance with the mapping and access controls.

Note that the "to allow" and "allowing" limitations of claims 7/11 are very broad. Claim 7 only requires that the "storage router" be "operable" "to allow access...using ..." without further specifying how or what "uses" these protocols. As the Petal system uses a block-level interface and blocks of data are read and written (i.e. section 3.1), the native, low-level block protocols are used, at least to the extent claimed. The same applies to the limitations of claim 11. Note also that per section 3, that both the Petal servers and clients run Digital Unix, so that the client is able to access Petal virtual disks just like local disks, which per section 4, page 7, column 2 results in "Petal provides a

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disk-like interface that allows clients to read and write blocks of data", and per section 6, column 2, page 8 has "Petal provides a block level rather than a file level interface.", thereby teaching the use of native, low level, block protocol. Finally, not section 1, which reads "A Petal virtual disk is a container that provides a sparse 64-bit byte storage space. AS with ordinary magnetic disks, data are read and written to Petal virtual disks in blocks", thereby providing for clear anticipation of what is claimed.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-4 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petal in view of Quam and Cummings and Crouse et al.

Petal, as discussed in detail above, teaches a storage router for providing local storage on remote storage devices, but does not detail a buffer or supervisor connected to the two controllers. Note that the network used to connect the clients to the virtual local storage is an ATM protocol based network.

Quam, as a whole, compares and contrasts ATM to Fibre Channel. Per pages 651-2, "Fibre Channel vs. ATM", it is clearly taught that Fibre-channel is better suited is better suited for a channel where large blocks of data are transferred between users, while ATM is suited for high speed switching with low latency.

Cummings, as a whole, teaches the use of Fibre-Channel so that the Disk Array and Tape Library are accessed using the same protocols (e.g. SCSI) as if they were connected to the user's local workstation, such that remote disk storage is regarded as private and can be accessed at the same level of performance and with comparable latency as any local disk, per pages 253-254 and Figure 2.

Finally, Crouse et al. show the specifics of a UNIX running network data server 14, that provides an interface between a Fibre Channel network 12b and the SCSI storage 46. Thus, per Figures 3 and 4, note a first controller 54 operable to connect to the Fibre Channel medium 12b, a second controller 68 connected to the SCSI bus and

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Art Unit: 2182

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storage, with a buffer 64 providing memory work space to facilitate block transfers. A supervisor unit is seen as 60, to include the device microprocessor of Figure 4, and is thus operably coupled to both controllers 54 and 68, so that block oriented I/O operations can be carried out at maximum transfer rates to and from the storage 16, the controller 68, the buffer 64, the processor 54, and network 12.

Therefore it would have been obvious to one having ordinary skill in the art at the time that the invention was made to modify Petal per the teachings of Quam, Cummings and Crouse et al. for the express purpose of using Fibre-Channel in place of ATM to take advantage of Fibre-Channel's ability to better transfer large blocks of data, to then use the Fibre Channel to obtain the same advantages of Petal in the form of Fibre Channel's ability to access a disk array using a SCSI protocol as if they were attached to the local workstation with access and latency comparable to local disk access per Cummings, with the specifics of controllers and buffer and supervisor running on a UNIX based network data server in order to carry out block transfers at maximum transfer rates per Crouse et al.

8. Claims 5,6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petal in view of Quam and Cummings and Crouse et al. as applied to claims 1-4 and 10 above, and further in view of Pisello et al.

Petal in view of Quam and Cummings and Crouse et al. set forth the specifics of the Fibre-Channel to SCSI interface to include DMA transfers at both controllers at 66, but lacking the FIFO queue and the internal buffer.

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Pisello et al., in the same art of network to SCSI interfacing, shows a supervisor 44 coupled to the first controller 38 and the second controller 42, with a FIFO queue RAM buffer 48 that is coupled to the first controller 38 and a second controller 42 when the other buffer 40 has data on its way through 42 onto bus 30. See column 3, lines 28-44. The purpose is to provide a direct connection for a SCSI device to a LAN/network, thereby precluding another LAN server, which is consistent with the teachings of the other references.

Therefore it would have been obvious to one having ordinary skill in the art at the time that the invention was made to modify the teachings of Petal in view of Quam and Cummings and Crouse et al. by the teachings of Pisello et al. for the purpose allowing for a direct connection of a SCSI device to the network, with the ability to queue SCSI data in a FIFO buffer. Thus combined, the buffers 48 and 40 of Pisello et al. interact with the DMA of Crouse et al. coupled thereto, in order to maximize transfer rates while directly coupling the first and second protocol units 54/60 of Crouse et al. to their respective transport media. Thus the DMA interfaces 66 of Crouse et al. are analogously coupled to the buffers of Pisello et al. for the purpose of being able to queue SCSI data.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fritz M Fleming whose telephone number is 571-272-4145. The examiner can normally be reached on M-F, 0600-1500.

Application/Control Number: 90/007,125
Art Unit: 2182

Page 10

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Gaffin can be reached on 571-272-4146. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Fritz M. Fleming
Primary Examiner
Art Unit 2182

fmf



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
90/007,317 901007,125	11/23/2004	6425035	HOESE1/WAB

44654
SPRINKLE IP LAW GROUP
1301 W. 25TH STREET
SUITE 408
AUSTIN, TX 78705

CONFIRMATION NO. 1634

OC000000015765945

OC000000015765945

Date Mailed: 04/18/2005

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/08/2005.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

RECEIVED By: JP

APR 21 2005

Docketed By: JP
Date Docketed: 4/21/05
Attorney: _____
C/M No. _____

Michelle R Eason

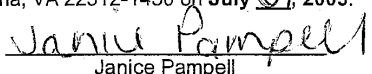
MICHELLE R EASON
3921 (571) 272-4231

ATTORNEY/APPLICANT COPY

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
NOTIFICATION UNDER 37 C.F.R. 1.565	Atty. Docket No. CROSS1123-17 CROSS1123-19
Applicant Geoffrey B. Hoese, et al.	
Application Number 90/007,125 90/007,317	Date Filed 07/19/2004 01/23/2004
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 7590	Examiner Fleming, Fritz
Confirmation Number: 2298	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Certificate of Mailing Under 37 C.F.R. §1.8
I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22312-1450 on July 29, 2005.
 Janice Pampell

This notification is filed for the sole purpose to inform the Examiner of status of concurrent litigation involving United States Patent No. 5,941,972 (the "972 Patent") and United States Patent No. 6,425,035 (the "035 Patent").

Attorney Docket No.
90/007,125; 90/007,317

CROSS 13-17; CROSS1123-19
Customer ID: 44654

2

ONGOING LITIGATION

Attached hereto as Exhibit A is a July 26, 2005 Order from the United States District Court for Western District of Texas in the stayed litigation *Crossroads v. Dot Hill Systems Corporation*, Western District of Texas, Civil Action No. A-03-CA-754-SS.

This Submission was served via First Class Mail on July 28, 2005 to:

Larry E. Severin
Wang, Hartmann & Gibbs, PC
1301 Dove Street, #1050
Newport Beach, CA 92660

William A. Blake
Jones, Tullar & Cooper, PC
P.O. Box 2226 Eads Station
Alexandria, VA

Respectfully submitted,

Sprinkle IP Law Group
Attorneys for Applicant



John L. Adair
Reg. No. 48,828

Date: July 28, 2005
1301 W. 25th Street
Suite 408
Austin, Texas 78705
Tel. (512) 637-9220
Fax. (512) 371-9088

EXHIBIT A

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
AUSTIN DIVISION

FILED

2005 JUL 26 AM 9: 22

CLERK OF DISTRICT COURT
WESTERN DISTRICT OF TEXAS

BY 

CROSSROADS SYSTEMS (TEXAS), INC.,
Plaintiff,

-vs-

Case No. A-03-CA-754-SS

DOT HILL SYSTEMS CORPORATION,
Defendant.

ORDER

BE IT REMEMBERED on the 21st day of July 2005, the Court called the above-styled cause for a hearing on Defendant's Motion for a Continued Limited Abatement [#270]. Having considered the motion and response, the relevant law, the case file as a whole, and the arguments of counsel at the hearing, the Court now confirms its oral announcements with the following written orders:

IT IS ORDERED that Defendant's Motion for a Continued Limited Abatement [#270] is GRANTED IN PART in that this case is STAYED for an additional 60 days from the date of this order to afford the USPTO an opportunity to issue a final determination on the status of the claims of the patents-in-suit; and

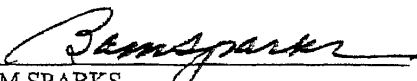
IT IS FURTHER ORDERED that Plaintiff Crossroads shall notify the Court of the status of the reexamination proceedings within ten (10) days of either the conclusion of the

277

07/26/2005 TUE 15:55 [TX/RX NO 6848]

stay, or the date on which the USPTO issues a final determination in the reexamination proceedings, if a conclusion is reached prior to the expiration of the stay.

SIGNED this the 25th day of July 2005.


SAM SPARKS
UNITED STATES DISTRICT JUDGE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
CERTIFICATE OF MAILING BY "EXPRESS MAIL"	Atty Docket No. CROSS1123-17 CROSS1123-19
Mail Stop Patent Application Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450 Sir:	Application Nos. 90/007,125 filed 07/19/2004 90/007,317 filed 11/23/2004
	Applicant: Geoffrey B. Hoese
	Title: STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

I hereby certify that the attached Applicant Initiated Interview Request Form is being transmitted to Examiner Alan Chen of the U.S. Patent Office via facsimile to fax number: 571-273-4143. Applicant hereby states a copy of the Applicant Initiated Interview Request Form is also being served, via first class mail, on:

Larry E. Severin
Wang, Hartmann & Gibbs, PC
1301 Dove Street, #1050
Newport Beach, CA 92660


and

William A. Blake
Jones, Tullar & Cooper, PC
P.O. Box 2226 Eads Station
Alexandria, VA 22202

As per 35 U.S.C. §1.248 service is made via first class mail on July 29, 2005.

Respectfully submitted,

Sprinkle IP Law Group


John L. Adair
Reg. No. 48,828

Dated: July 29, 2005

1301 W. 25th Street, Suite 408
Austin, Texas 78705
Tel. (512) 637-9223
Fax. (512) 371-9088

Enclosures

Applicant Initiated Interview Request Form

Application No.: 90/007,317
90 1007,125 First Named Applicant: Hoese
 Examiner: Chen, Alan Art Unit: 2182 Status of Application: non-final office
action

Tentative Participants:

- (1) Alan Chen (2) John ADAIR
 (3) Steven Sprinkle (4) Robert Griswold

Proposed Date of Interview: August 9, 2005 Proposed Time: 2:00 (AM/PM)

Type of Interview Requested:

- (1) Telephonic (2) Personal (3) Video Conference

Exhibit To Be Shown or Demonstrated: YES NO

If yes, provide brief description: _____

Issues To Be Discussed

Issues (Rej., Obj., etc)	Claims/ Fig. #s	Prior Art	Discussed	Agreed	Not Agreed
(1) <u>Rej</u>	<u>Claim 1</u>	<u>Spring, Cecla, Jibbe</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) <u>Rej</u>	<u>Claim 7</u>	<u>"</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(3) <u>Rej</u>	<u>Claim 11</u>	<u>"</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(4) _____	_____	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Continuation Sheet Attached

Brief Description of Arguments to be Presented:

Spring, Cecla and Jibbe do not provide access from hosts to remote storage using NLLRP. Spring,
Cecla and Jibbe do not teach mapping or access controls as discussed in reply dated 7/22/05.
References from related reexam cases, including Cruise, Cummings and DeKoning do not address missing
features of Spring and Cecla.

An interview was conducted on the above-identified application on _____.
NOTE: This form should be completed by applicant and submitted to the examiner in advance of the interview
 (see MPEP § 713.01).

This application will not be delayed from issue because of applicant's failure to submit a written record of this
 interview. Therefore, applicant is advised to file a statement of the substance of this interview (37 CFR 1.133(b))
 as soon as possible.

[Signature]
 Applicant/Applicant's Representative Signature

 Examiner/SPE Signature

John ADAIR
 Typed/Printed Name of Applicant or Representative

48,828
 Registration Number, if applicable

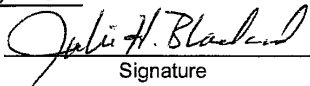
This collection of information is required by 37 CFR 1.133. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 21 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
Statement of Substance of Examiner Interview	Atty. Docket No. CROSS1123-17 CROSS1123-19
Applicants Geoffrey B. Hoese, et al.	
Reexamination Control No. 90/007,125 90/007,317	Date Filed 07/19/2004
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Chen, Alan
Confirmation Number: 2304	Patent No. 6,425,035

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Certificate of Mailing Under 37 C.F.R. §1.10
I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail to Addressee (Label No. EV616963290US) in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22312-1450 on <u>9-1-05</u>
 Signature
<u>JULIE H. BLACKARD</u> Printed Name

This paper is to summarize the interview conducted with Examiner Alan Chen on August 22, 2005 with Applicants' representative Mr. Steve Sprinkle.

Attorney Docket No.
CROSS1123-17
CROSS1123-19

90/007,125
90/007,317
Customer ID: 44654

2

Summary

On August 22, 2005, Mr. Steve Sprinkle held a telephone conference with Examiner Alan Chen to determine the status of prosecution. During the interview, Mr. Sprinkle discussed the prior prosecution and litigation of the patents under reexamination. Mr. Sprinkle also summarized the previous reviews of the patent. Examiner Chen stated that he would consider these indications of nonobviousness, but needed to complete his own search and consideration of patentability. Examiner Chen cited several references not currently of record that he was considering. No agreement was reached.

This Summary was served via Certified Mail, R.R.R. on September 1, 2005 to:

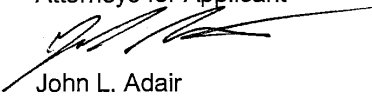
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1301 Dove Street, #1050
Newport Beach, CA 92660

William A. Blake
Jones, Tullar & Cooper, PC
P.O. Box 2226 Eads Station
Alexandria, VA

The Director of the U.S. Patent and Trademark Office is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 50-3183 of Sprinkle IP Law Group.

Respectfully submitted,

Sprinkle IP Law Group
Attorneys for Applicant


John L. Adair
Reg. No. 48,828

Date: September 1, 2005
1301 W. 25th Street, Suite 408
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Tel. (512) 637-9223
Fax. (512) 371-9088

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
CERTIFICATE OF SERVICE	Atty Docket No. CROSS1123-17 CROSS1123-19
Mail Stop Patent Application Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450 Sir:	Application Nos. 90/007,125 filed 07/19/2004 90/007,317 filed 11/23/2004
	Applicant: Geoffrey B. Hoese
	Title: STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

I hereby certify that the attached Statement of Substance of Examiner Interview ("Statement") is being deposited with the U.S. Postal Service as First Class Mail to the Director of the U.S. Patent Office, P.O. Box 1450, Alexandria, VA 22313 on September 1, 2005. Applicant hereby states a copy of the Notification is also being served, via first class mail (Certified, R.R.R.), on:

Larry E. Severin
Wang, Hartmann & Gibbs, PC
1301 Dove Street, #1050
Newport Beach, CA 92660

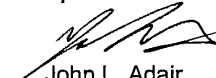
and

William A. Blake
Jones, Tullar & Cooper, PC
P.O. Box 2226 Eads Station
Alexandria, VA 22202

As per 35 U.S.C. §1.248 service is made via first class mail (Certified, R.R.R.) on September 1, 2005.

Respectfully submitted,

Sprinkle IP Law Group


John L. Adair
Reg. No. 48,828

Dated: September 1, 2005

1301 W. 25th Street, Suite 408
Austin, Texas 78705
Tel. (512) 637-9223
Fax. (512) 371-9088

Enclosures



US007934041B2

(12) **United States Patent**
Hoese et al.

(10) **Patent No.:** US 7,934,041 B2
 (45) **Date of Patent:** Apr. 26, 2011

- (54) **STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE**
- (75) Inventors: **Geoffrey B. Hoese**, Austin, TX (US);
Jeffrey T. Russell, Cibolo, TX (US)
- (73) Assignee: **Crossroads Systems, Inc.**, Austin, TX (US)
- (*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

- (21) Appl. No.: **12/690,592**
- (22) Filed: **Jan. 20, 2010**
- (65) **Prior Publication Data**
 US 2010/0121993 A1 May 13, 2010

Related U.S. Application Data

- (63) Continuation of application No. 12/552,885, filed on Sep. 2, 2009, which is a continuation of application No. 11/851,724, filed on Sep. 7, 2007, now Pat. No. 7,689,754, which is a continuation of application No. 11/442,878, filed on May 30, 2006, now abandoned, which is a continuation of application No. 11/353,826, filed on Feb. 14, 2006, now Pat. No. 7,340,549, which is a continuation of application No. 10/658,163, filed on Sep. 9, 2003, now Pat. No. 7,051,147, which is a continuation of application No. 10/081,110, filed on Feb. 22, 2002, now Pat. No. 6,789,152, which is a continuation of application No. 09/354,682, filed on Jul. 15, 1999, now Pat. No. 6,421,753, which is a continuation of application No. 09/001,799, filed on Dec. 31, 1997, now Pat. No. 5,941,972.

- (51) **Int. Cl.**
G06F 13/00 (2006.01)
G06F 3/00 (2006.01)

- (52) **U.S. Cl.** 710/305; 710/11; 709/258
 (58) **Field of Classification Search** 710/1-5, 710/8-13, 36-38, 126-131, 250, 305; 709/258; 714/42; 711/110-113
 See application file for complete search history.

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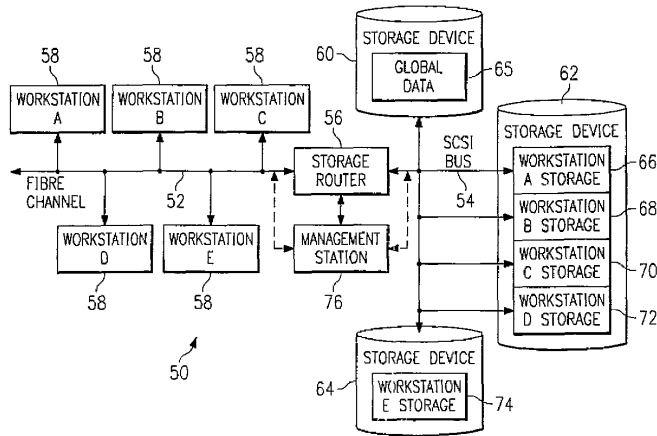
Primary Examiner — Christopher B Shin

(74) *Attorney, Agent, or Firm* — Sprinkle IP Law Group

(57) **ABSTRACT**

A storage router and storage network provide virtual local storage on remote storage devices. A plurality of devices are connected to a first transport medium. In one embodiment, a storage router maintains a map to allocate storage space on the remote storage devices to devices connected to the first transport medium by associating representations of the devices connected to the first transport medium with representations of storage space on the remote storage devices. The storage router controls access from the devices connected to the first transport medium to the storage space on the remote storage devices in accordance with the map and allows access from devices connected to the first transport medium to the remote storage devices using native low level block protocol.

53 Claims, 2 Drawing Sheets



US 7,934,041 B2

Page 2

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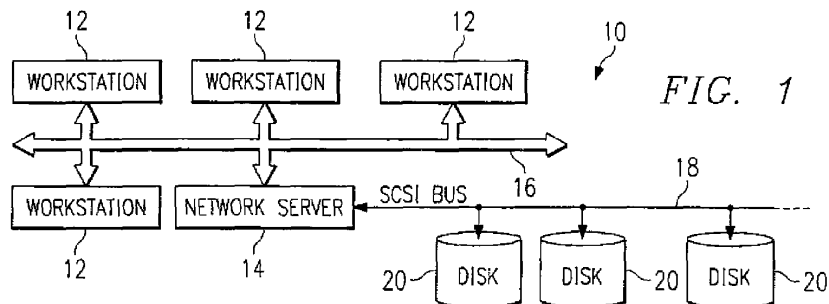


FIG. 1

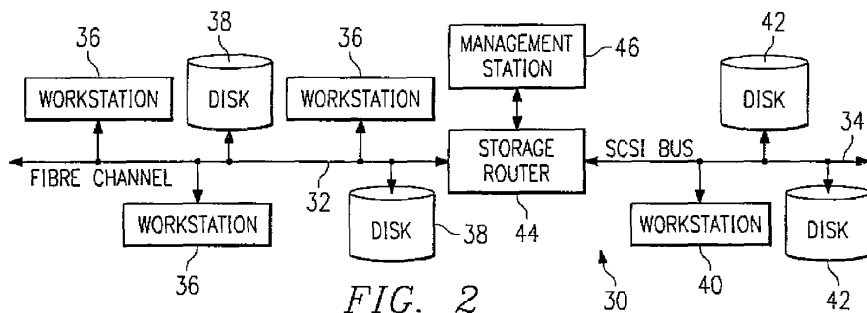


FIG. 2

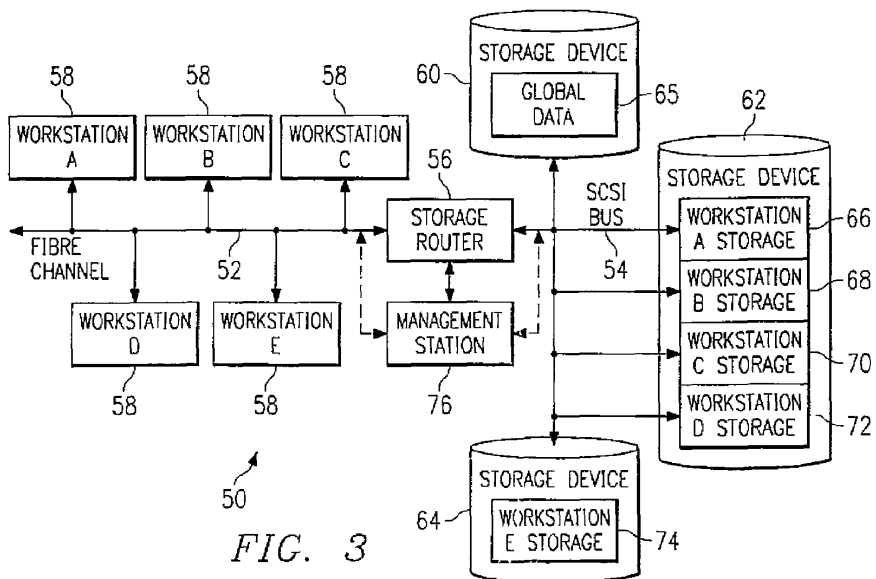
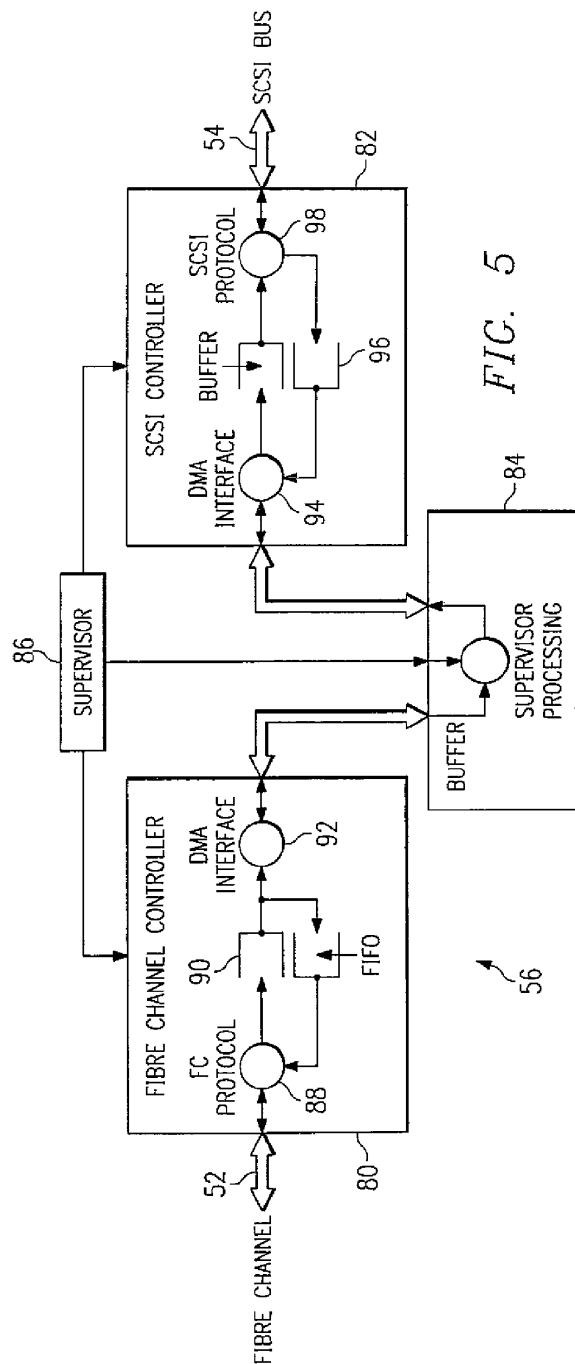
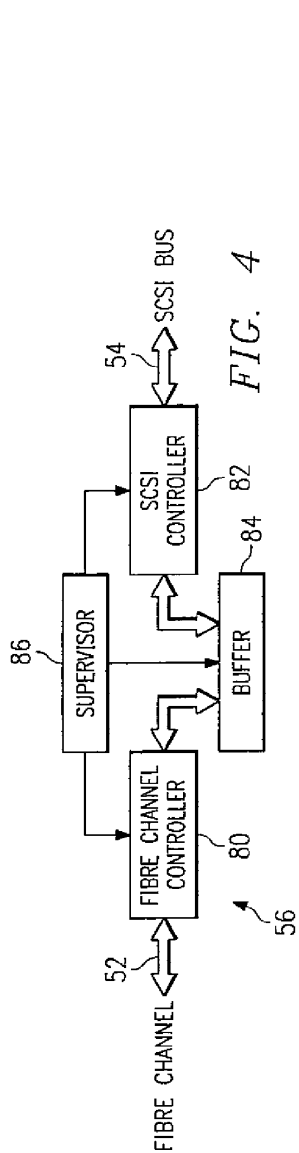


FIG. 3



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STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

This application is a continuation of, and claims a benefit of priority under 35 U.S.C. 120 of the filing date of U.S. patent application Ser. No. 12/552,885 entitled "Storage Router and Method for Providing Virtual Local Storage" filed Sep. 2, 2009, which is a continuation of and claims the benefit of priority of U.S. application Ser. No. 11/851,724 entitled "Storage Router and Method for Providing Virtual Local Storage" filed Sep. 7, 2007, now U.S. Pat. No. 7,689,754 issued Mar. 30, 2010, which is a continuation of and claims the benefit of priority of U.S. patent application Ser. No. 11/442,878 entitled "Storage Router and Method for Providing Virtual Local Storage" filed May 30, 2006, now abandoned, which is a continuation of and claims the benefit of priority of U.S. patent application Ser. No. 11/353,826 entitled "Storage Router and Method for Providing Virtual Local Storage" filed on Feb. 14, 2006, now U.S. Pat. No. 7,340,549 issued Mar. 4, 2008, which is a continuation of and claims the benefit of priority of U.S. patent application Ser. No. 10/658,163 entitled "Storage Router and Method for Providing Virtual Local Storage" filed on Sep. 9, 2003 now U.S. Pat. No. 7,051,147 issued May 23, 2006, which is a continuation of and claims the benefit of priority of U.S. patent application Ser. No. 10/081,110 by inventors Geoffrey B. Hoese and Jeffery T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on Feb. 22, 2002, now U.S. Pat. No. 6,789,152 issued on Sep. 7, 2004, which in turn is a continuation of and claims benefit of priority of U.S. application Ser. No. 09/354,682 by inventors Geoffrey B. Hoese and Jeffrey T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on Jul. 15, 1999, now U.S. Pat. No. 6,421,753 issued on Jul. 16, 2002, which in turn is a continuation of and claims benefit of priority of U.S. patent application Ser. No. 09/001,799, filed on Dec. 31, 1997, now U.S. Pat. No. 5,941,972 issued on Aug. 24, 1999, and hereby incorporates these applications and patents by reference in their entireties as if they had been fully set forth herein.

TECHNICAL FIELD OF THE INVENTION

This invention relates in general to network storage devices, and more particularly to a storage router and method for providing virtual local storage on remote SCSI storage devices to Fibre Channel devices.

BACKGROUND OF THE INVENTION

Typical storage transport mediums provide for a relatively small number of devices to be attached over relatively short distances. One such transport medium is a Small Computer System Interface (SCSI) protocol, the structure and operation of which is generally well known as is described, for example, in the SCSI-1, SCSI-2 and SCSI-3 specifications. High speed serial interconnects provide enhanced capability to attach a large number of high speed devices to a common storage transport medium over large distances. One such, serial interconnect is Fibre Channel, the structure and operation of which is described, for example, in Fibre Channel Physical and Signaling Interface (FC-PH), ANSI X3.230 Fibre Channel Arbitrated Loop (FC-AL), and ANSI X3.272 Fibre Channel Private Loop Direct Attach (FC-PLDA).

Conventional computing devices, such as computer workstations, generally access storage locally or through network interconnects. Local storage typically consists of a disk drive,

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tape drive, CD-ROM drive or other storage device contained within, or locally connected to the workstation. The workstation provides a file system structure that includes security controls, with access to the local storage device through native low level block protocols. These protocols map directly to the mechanisms used by the storage device and consist of data requests without security controls. Network interconnects typically provide access for a large number of computing devices to data storage on a remote network server. The remote network server provides file system structure, access control, and other miscellaneous capabilities that include the network interface. Access to data through the network server is through network protocols that the server must translate into low level requests to the storage device. A workstation with access to the server storage must translate its file system protocols into network protocols that are used to communicate with the server. Consequently, from the perspective of a workstation, or other computing device, seeking to access such server data, the access is much slower than access to data on a local storage device.

SUMMARY OF THE INVENTION

In accordance with the present invention, a storage router and method for providing virtual local storage on remote SCSI storage devices to Fibre Channel devices are disclosed that provide advantages over conventional network storage devices and methods.

According to one aspect of the present invention, a storage router and storage network provide virtual local storage on remote SCSI storage devices to Fibre Channel devices. A plurality of Fibre Channel devices, such as workstations, are connected to a Fibre Channel transport medium, and a plurality of SCSI storage devices are connected to a SCSI bus transport medium. The storage router interfaces between the Fibre Channel transport medium and the SCSI bus transport medium. The storage router maps between the workstations and the SCSI storage devices and implements access controls for storage space on the SCSI storage devices. The storage router then allows access from the workstations to the SCSI storage devices using native low level, block protocol in accordance with the mapping and the access controls.

According to another aspect of the present invention, virtual local storage on remote SCSI storage devices is provided to Fibre Channel devices. A Fibre Channel transport medium and a SCSI bus transport medium are interfaced with. A configuration is maintained for SCSI storage devices connected to the SCSI bus transport medium. The configuration maps between Fibre Channel devices and the SCSI storage devices and implements access controls for storage space on the SCSI storage devices. Access is then allowed from Fibre Channel initiator devices to SCSI storage devices using native low level, block protocol in accordance with the configuration.

A technical advantage of the present invention is the ability to centralize local storage for networked workstations without any cost of speed or overhead. Each workstation accesses its virtual local storage as if it were locally connected. Further, the centralized storage devices can be located in a significantly remote position even in excess of ten kilometers as defined by Fibre Channel standards.

Another technical advantage of the present invention is the ability to centrally control and administer storage space for connected users without limiting the speed with which the users can access local data. In addition, global access to data, backups, virus scanning and redundancy can be more easily accomplished by centrally located storage devices.

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A further technical advantage of the present invention is providing support for SCSI storage devices as local storage for Fibre Channel hosts. In addition, the present invention helps to provide extended capabilities for Fibre Channel and for management of storage subsystems.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the present invention and the advantages thereof may be acquired by referring to the following description taken in conjunction with the accompanying drawings, in which like reference numbers indicate like features, and wherein:

FIG. 1 is a block diagram of a conventional network that provides storage through a network server;

FIG. 2 is a block diagram of one embodiment of a storage network with a storage router that provides global access and routing;

FIG. 3 is a block diagram of one embodiment of a storage network with a storage router that provides virtual local storage;

FIG. 4 is a block diagram of one embodiment of the storage router of FIG. 3; and

FIG. 5 is a block diagram of one embodiment of data flow within the storage router of FIG. 4.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 is a block diagram of a conventional network, indicated generally at 10, that provides access to storage through a network server. As shown, network 10 includes a plurality of workstations 12 interconnected with a network server 14 via a network transport medium 16. Each workstation 12 can generally comprise a processor, memory, input/output devices, storage devices and a network adapter as well as other common computer components. Network server 14 uses a SCSI bus 18 as a storage transport medium to interconnect with a plurality of storage devices 20 (tape drives, disk drives, etc.). In the embodiment of FIG. 1, network transport medium 16 is a network connection and storage devices 20 comprise hard disk drives, although there are numerous alternate transport mediums and storage devices.

In network 10, each workstation 12 has access to its local storage device as well as network access to data on storage devices 20. The access to a local storage device is typically through native low level, block protocols. On the other hand, access by a workstation 12 to storage devices 20 requires the participation of network server 14 which implements a file system and transfers data to workstations 12 only through high level file system protocols. Only network server 14 communicates with storage devices 20 via native low level, block protocols. Consequently, the network access by workstations 12 through network server 14 is slow with respect to their access to local storage. In network 10, it can also be a logistical problem to centrally manage and administer local data distributed across an organization, including accomplishing tasks such as backups, virus scanning and redundancy.

FIG. 2 is a block diagram of one embodiment of a storage network, indicated generally at 30, with a storage router that provides global access and routing. This environment is significantly different from that of FIG. 1 in that there is no network server involved. In FIG. 2, a Fibre Channel high speed serial transport 32 interconnects a plurality of workstations 36 and storage devices 38. A SCSI bus storage transport medium interconnects workstations 40 and storage devices 42. A storage router 44 then serves to interconnect these mediums and provide devices on either medium global, trans-

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parent access to devices on the other medium. Storage router 44 routes requests from initiator devices on one medium to target devices on the other medium and routes data between the target and the initiator. Storage router 44 can allow initiators and targets to be on either side. In this manner, storage router 44 enhances the functionality of Fibre Channel 32, by providing access, for example, to legacy SCSI storage devices on SCSI bus 34. In the embodiment of FIG. 2, the operation of storage router 44 can be managed by a management station 46 connected to the storage router via a direct serial connection.

In storage network 30, any workstation 36 or workstation 40 can access any storage device 38 or storage device 42 through native low level, block protocols, and vice versa. This functionality is enabled by storage router 44 which routes requests and data as a generic transport between Fibre Channel 32 and SCSI bus 34. Storage router 44 uses tables to map devices from one medium to the other and distributes requests and data across Fibre Channel 32 and SCSI bus 34 without any security access controls. Although this extension of the high speed serial interconnect provided by Fibre Channel is beneficial, it is desirable to provide security controls in addition to extended access to storage devices through a native low level, block protocol.

FIG. 3 is a block diagram of one embodiment of a storage network, indicated generally at 50, with a storage router that provides virtual local storage. Similar to that of FIG. 2, storage network 50 includes a Fibre Channel high speed serial interconnect 52 and a SCSI bus 54 bridged by a storage router 56. Storage router 56 of FIG. 3 provides for a large number of workstations 58 to be interconnected on a common storage transport and to access common storage devices 60, 62 and 64 through native low level, block protocols.

According to the present invention, storage router 56 has enhanced functionality to implement security controls and routing such that each workstation 58 can have access to a specific subset of the overall data stored in storage devices 60, 62 and 64. This specific subset of data has the appearance and characteristics of local storage and is referred to herein as virtual local storage. Storage router 56 allows the configuration and modification of the storage allocated to each attached workstation 58 through the use of mapping tables or other mapping techniques.

As shown in FIG. 3, for example, storage device 60 can be configured to provide global data 65 which can be accessed by all workstations 58. Storage device 62 can be configured to provide partitioned subsets 66, 68, 70 and 72, where each partition is allocated to one of the workstations 58 (workstations A, B, C and D). These subsets 66, 68, 70 and 72 can only be accessed by the associated workstation 58 and appear to the associated workstation 58 as local storage accessed using native low level, block protocols. Similarly, storage device 64 can be allocated as storage for the remaining workstation 58 (workstation E).

Storage router 56 combines access control with routing such that each workstation 58 has controlled access to only the specified partition of storage device 62 which forms virtual local storage for the workstation 58. This access control allows security control for the specified data partitions. Storage router 56 allows this allocation of storage devices 60, 62 and 64 to be managed by a management station 76. Management station 76 can connect directly to storage router 56 via a direct connection or, alternately, can interface with storage router 56 through either Fibre Channel 52 or SCSI bus 54. In the latter case, management station 76 can be a workstation or other computing device with special rights such that storage

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router 56 allows access to mapping tables and shows storage devices 60, 62 and 64 as they exist physically rather than as they have been allocated.

The environment of FIG. 3 extends the concept of single workstation having locally connected storage devices to a storage network 50 in which workstations 58 are provided virtual local storage in a manner transparent to workstations 58. Storage router 56 provides centralized control of what each workstation 58 sees as its local drive, as well as what data it sees as global data accessible by other workstations 58. Consequently, the storage space considered by the workstation 58 to be its local storage is actually a partition (i.e., logical storage definition) of a physically remote storage device 60, 62 or 64 connected through storage router 56. This means that similar requests from workstations 58 for access to their local storage devices produce different accesses to the storage space on storage devices 60, 62 and 64. Further, no access from a workstation 58 is allowed to the virtual local storage of another workstation 58.

The collective storage provided by storage devices 60, 62 and 64 can have blocks allocated by programming means within storage router 56. To accomplish this function, storage router 56 can include routing tables and security controls that define storage allocation for each workstation 58. The advantages provided by implementing virtual local storage in centralized storage devices include the ability to do collective backups and other collective administrative functions more easily. This is accomplished without limiting the performance of workstations 58 because storage access involves native low level, block protocols and does not involve the overhead of high level protocols and file systems required by network servers.

FIG. 4 is a block diagram of one embodiment of storage router 56 of FIG. 3. Storage router 56 can comprise a Fibre Channel controller 80 that interfaces with Fibre Channel 52 and a SCSI controller 82 that interfaces with SCSI bus 54. A buffer 84 provides memory work space and is connected to both Fibre Channel controller 80 and to SCSI controller 82. A supervisor unit 86 is connected to Fibre Channel controller 80, SCSI controller 82 and buffer 84. Supervisor unit 86 comprises a microprocessor for controlling operation of storage router 56 and to handle mapping and-security access for requests between Fibre Channel 52 and SCSI bus 54.

FIG. 5 is a block diagram of one embodiment of data flow within storage router 56 of FIG. 4. As shown, data from Fibre Channel 52 is processed by a Fibre Channel (FC) protocol unit 88 and placed in a FIFO queue 90. A direct memory access (DMA) interface 92 then takes data out of FIFO queue 90 and places it in buffer 84. Supervisor unit 86 processes the data in buffer 84 as represented by supervisor processing 93. This processing involves mapping between Fibre Channel 52 and SCSI bus 54 and applying access controls and routing functions. A DMA interface 94 then pulls data from buffer 84 and places it into a buffer 96. A SCSI protocol unit 98 pulls data from buffer 96 and communicates the data on SCSI bus 54. Data flow in the reverse direction, from SCSI bus 54 to Fibre Channel 52, is accomplished in a reverse manner.

The storage router of the present invention is a bridge device that connects a Fibre Channel link directly to a SCSI bus and enables the exchange of SCSI command set information between application clients on SCSI bus devices and the Fibre Channel links. Further, the storage router applies access controls such that virtual local storage can be established in remote SCSI storage devices for workstations on the Fibre Channel link. In one embodiment, the storage router provides a connection for Fibre Channel links running the SCSI Fibre

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Channel Protocol (FCP) to legacy SCSI devices attached to a SCSI bus. The Fibre Channel topology is typically an Arbitrated Loop (FC_AL).

In part, the storage router enables a migration path Fibre Channel based, serial SCSI networks by providing connectivity for legacy SCSI bus devices. The storage router can be attached to a Fibre Channel Arbitrated Loop and a SCSI bus to support a number of SCSI devices. Using configuration settings, the storage router can make the SCSI bus devices available on the Fibre Channel network as FCP logical units. Once the configuration is defined, operation of the storage router is transparent to application clients. In this manner, the storage router can form an integral part of the migration to new Fibre Channel based networks while providing a means to continue using legacy SCSI devices.

In one implementation (not shown), the storage router can be a rack mount or free standing device with an internal power supply. The storage router can have a Fibre Channel and SCSI port, and a standard, detachable power cord can be used, the FC connector can be a copper DB9 connector, and the SCSI connector can be a 68-pin type. Additional modular jacks can be provided for a serial port and an 802.3 10 BaseT port, i.e. twisted pair Ethernet, for management access. The SCSI port of the storage router can support SCSI direct and sequential access target devices and can support SCSI initiators, as well. The Fibre Channel port can interface to SCSI-3 FCP enabled devices and initiators.

To accomplish its functionality, one implementation of the storage router uses: a Fibre Channel interface based on the HEWLETT-PACKARD TACHYON HPFC-5000 controller and a GLM media interface; an Intel 80960RP processor, incorporating independent data and program memory spaces, and associated logic required to implement a stand alone processing system; and a serial port for debug and system configuration. Further, this implementation includes a SCSI interface supporting Fast-20 based on the SYMBIOS 53C8xx series SCSI controllers, and an operating system based upon the WIND RIVERS SYSTEMS VXWORKS or IXWORKS kernel, as determined by design. In addition, the storage router includes software as required to control basic functions of the various elements, and to provide appropriate translations between the FC and SCSI protocols.

The storage router has various modes of operation that are possible between FC and SCSI target and initiator combinations. These modes are: FC Initiator to SCSI Target; SCSI Initiator to FC Target; SCSI Initiator to SCSI Target; and FC Initiator to FC Target. The first two modes can be supported concurrently in a single storage router device and are discussed briefly below. The third mode can involve two storage router devices back to back and can serve primarily as a device to extend the physical distance beyond that possible via a direct SCSI connection. The last mode can be used to carry FC protocols encapsulated on other transmission technologies (e.g. ATM, SONET), or to act as a bridge between two FC loops (e.g. as a two port fabric).

The FC Initiator to SCSI Target mode provides for the basic configuration of a server using Fibre Channel to communicate with SCSI targets. This mode requires that a host system have an FC attached device and associated device drivers and software to generate SCSI-3 FCP requests. This system acts as an initiator using the storage router to communicate with SCSI target devices. The SCSI devices supported can include SCSI-2 compliant direct or sequential access (disk or tape) devices. The storage router serves to translate command and status information and transfer data between SCSI-3 FCP and SCSI-2, allowing the use of standard SCSI-2 devices in a Fibre Channel environment.

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The SCSI Initiator to FC Target mode provides for the configuration of a server using SCSI-2 to communicate with Fibre Channel targets. This mode requires that a host system has a SCSI-2 interface and driver software to control SCSI-2 target devices. The storage router will connect to the SCSI-2 bus and respond as a target to multiple target IDs. Configuration information is required to identify the target IDs to which the bridge will respond on the SCSI-2 bus. The storage router then translates the SCSI-2 requests to SCSI-3 FCP requests, allowing the use of FC devices with a SCSI host system. This will also allow features such as a tape device acting as an initiator on the SCSI bus to provide full support for this type of SCSI device.

In general, user configuration of the storage router will be needed to support various functional modes of operation. Configuration can be modified, for example, through a serial port or through an Ethernet port via SNMP (simple network management protocol) or the Telnet session. Specifically, SNMP manageability can be provided via a B02.3 Ethernet interface. This can provide for configuration changes as well as providing statistics and error information. Configuration can also be performed via TELNET or RS-232 interfaces with menu driven command interfaces. Configuration information can be stored in a segment of flash memory and can be retained across resets and power off cycles. Password protection can also be provided.

In the first two modes of operation, addressing information is needed to map from FC addressing to SCSI addressing and vice versa. This can be 'hard' configuration data, due to the need for address information to be maintained across initialization and partial reconfigurations of the Fibre Channel address space. In an arbitrated loop configuration, user configured addresses will be needed for AL_PAs in order to insure that known addresses are provided between loop reconfigurations.

With respect to addressing, FCP and SCSI 2 systems employ different methods of addressing target devices. Additionally, the inclusion of a storage router means that a method of translating device IDs needs to be implemented. In addition, the storage router can respond to commands without passing the commands through to the opposite interface. This can be implemented to allow all generic FCP and SCSI commands to pass through the storage router to address attached devices, but allow for configuration and diagnostics to be performed directly on the storage router through the FC and SCSI interfaces.

Management commands are those intended to be processed by the storage router controller directly. This may include diagnostic, mode, and log commands as well as other vendor-specific commands. These commands can be received and processed by both the FOP and SCSI interfaces, but are not typically bridged to the opposite interface. These commands may also have side effects on the operation of the storage router, and cause other storage router operations to change or terminate.

A primary method of addressing management commands through the FCP and SCSI interfaces can be through peripheral device type addressing. For example, the storage router can respond to all operations addressed to logical unit (LUN) zero as a controller device. Commands that the storage router will support can include INQUIRY as well as vendor-specific management commands. These are to be generally consistent with SCC standard commands.

The SCSI bus is capable of establishing bus connections between targets. These targets may internally address logical units. Thus, the prioritized addressing scheme used by SCSI subsystems can be represented as follows: BUS:TARGET:

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LOGICAL UNIT. The BUS identification is intrinsic in the configuration, as a SCSI initiator is attached to only one bus. Target addressing is handled by bus arbitration from information provided to the arbitrating device. Target addresses are assigned to SCSI devices directly through some means of configuration, such as a hardware jumper, switch setting, or device specific software configuration. As such, the SCSI protocol provides only logical unit addressing within the Identify message. Bus and target information is implied by the established connection.

Fibre Channel devices within a fabric are addressed by a unique port identifier. This identifier is assigned to a port during certain well-defined states of the FC protocol. Individual ports are allowed to arbitrate for a known, user defined address. If such an address is not provided, or if arbitration for a particular-user address fails, the port is assigned a unique address by the FC protocol. This address is generally not guaranteed to be unique between instances. Various scenarios exist where the AL-PA of a device will change, either after power cycle or loop reconfiguration.

The FC protocol also provides a logical unit address field within command structures to provide addressing to devices internal to a port. The FCP_CMD payload specifies an eight byte LUN field. Subsequent identification of the exchange between devices is provided by the FQXID (Fully Qualified Exchange ID).

FC ports can be required to have specific addresses assigned. Although basic functionality is not dependent on this, changes in the loop configuration could result in disk targets changing identifiers with the potential risk of data corruption or loss. This configuration can be straightforward, and can consist of providing the device a loop-unique ID (AL_PA) in the range of "01h" to "EFh." Storage routers could be shipped with a default value with the assumption that most configurations will be using single storage routers and no other devices requesting the present ID. This would provide a minimum amount of initial configuration to the system administrator. Alternately, storage routers could be defaulted to assume any address so that configurations requiring multiple storage routers on a loop would not require that the administrator assign a unique ID to the additional storage routers.

Address translation is needed where commands are issued in the cases FC Initiator to SCSI Target and SCSI Initiator to FC Target. Target responses are qualified by the FQXID and will retain the translation acquired at the beginning of the exchange. This prevents configuration changes occurring during the course of execution of a command from causing data or state information to be inadvertently misdirected. Configuration can be required in cases of SCSI Initiator to FC Target, as discovery may not effectively allow for FCP targets to consistently be found. This is due to an FC arbitrated loop supporting addressing of a larger number of devices than a SCSI bus and the possibility of FC devices changing their AL_PA due to device insertion or other loop initialization.

In the direct method, the translation to BUS:TARGET: LUN of the SCSI address information will be direct. That is, the values represented in the FCP LUN field will directly map to the values in effect on the SCSI bus. This provides a clean translation and does not require SCSI bus discovery. It also allows devices to be dynamically added to the SCSI bus without modifying the address map. It may not allow for complete discovery by FCP initiator devices, as gaps between device addresses may halt the discovery process. Legacy SCSI device drivers typically halt discovery on a target device at the first unoccupied LUN, and proceed to the next target.

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This would lead to some devices not being discovered. However, this allows for hot plugged devices and other changes to the loop addressing.

In the ordered method, ordered translation requires that the storage router perform discovery on reset, and collapses the addresses on the SCSI bus to sequential FSP LUN values. Thus, the FCP LUN values 0-N can represent N+1 SCSI devices, regardless of SCSI address values, in the order in which they are isolated during the SCSI discovery process. This would allow the FCP initiator discovery process to identify all mapped SCSI devices without further configuration. This has the limitation that hot-plugged devices will not be identified until the next reset cycle. In this case, the address may also be altered as well.

In addition to addressing, according to the present invention, the storage router provides configuration and access controls that cause certain requests from FC Initiators to be directed to assigned virtual local storage partitioned on SCSI storage devices. For example, the same request for LUN 0 (local storage) by two different FC Initiators can be directed to two separate subsets of storage. The storage router can use tables to map, for each initiator, what storage access is available and what partition is being addressed by a particular request. In this manner, the storage space provided by SCSI storage devices can be allocated to FC initiators to provide virtual local storage as well as to create any other desired configuration for secured access.

Although the present invention has been described in detail, it should be understood that various changes, substitutions, and alterations can be made hereto without departing from the spirit and scope of the invention as defined by the appended claims.

What is claimed is:

1. A storage router for providing virtual local storage on remote storage devices, comprising:
 - a first controller operable to interface with a first transport medium, wherein the first medium is a serial transport media; and
 - a processing device coupled to the first controller, wherein the processing device is configured to:
 - maintain a map to allocate storage space on the remote storage devices to devices connected to the first transport medium by associating representations of the devices connected to the first transport medium with representations of storage space on the remote storage devices, wherein each representation of a device connected to the first transport medium is associated with one or more representations of storage space on the remote storage devices;
 - control access from the devices connected to the first transport medium to the storage space on the remote storage devices in accordance with the map; and
 - allow access from devices connected to the first transport medium to the remote storage devices using native low level block protocol.
2. The storage router of claim 1, wherein the map associates a representation of storage space on the remote storage devices with multiple devices connected to the first transport medium.
3. The storage router of claim 1, wherein the storage space on the remote storage devices comprises storage space on multiple remote storage devices.
4. The storage router of claim 1, wherein the map associates a representation of a device connected to the first transport medium with a representation of an entire storage space of at least one remote storage device.

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5. The storage router of claim 1, wherein the map resides at the storage router and is maintained at the storage router.

6. The storage router of claim 1, wherein the native low level block protocol is received at the storage router via the first transport medium and the processing device uses the received native low level block protocol to allow the devices connected to the first transport medium access to storage space specifically allocated to them in the map.

7. The storage router of claim 1, wherein the storage router is configured to receive commands according to a first low level block protocol from the device connected to the first transport medium and forward commands according to a second low level block protocol to the remote storage devices.

8. The storage router of claim 7, wherein the first low level block protocol is an FCP protocol and the second low level block protocol is a protocol other than FCP.

9. The storage router of claim 1, wherein the map comprises one or more tables.

10. The storage router of claim 1, wherein the virtual local storage is provided to the devices connected to the first transport medium in a manner that is transparent to the devices and wherein the storage space allocated to the devices connected to the first transport medium appears to the devices as local storage.

11. The storage router of claim 1, wherein the storage router provides centralized control of what the devices connected to the first transport medium see as local storage.

12. The storage router of claim 1, wherein the representations of storage space comprise logical unit numbers that represent a subset of storage on the remote storage devices.

13. The storage router of claim 12, wherein the storage router is operable to route requests to the same logical unit number from different devices connected to the first transport medium to different subsets of storage space on the remote storage devices.

14. The storage router of claim 1, wherein the representations of devices connected to the first transport medium are unique identifiers.

15. The storage router of claim 14, wherein the unique identifiers are world wide names.

16. The storage router of claim 1, wherein the storage router is configured to allow modification of the map in a manner transparent to and without involvement of the devices connected to the first transport medium.

17. The storage router of claim 1, wherein the processing device is a microprocessor.

18. The storage router of claim 1, wherein the processing device is a microprocessor and associated logic to implement a stand-alone processing system.

19. The storage router of claim 1, wherein the first transport medium is a fibre channel transport medium and further comprising a second transport medium connected to the remote storage devices that is a fibre channel transport medium.

20. A storage network comprising:

- a set of devices connected a first transport medium, wherein the first transport medium;
- a set of remote storage devices connected to a second transport medium;
- a storage router connected to the serial transport medium;
- a storage router connected to the first transport medium and second transport medium to provide virtual local storage on the remote storage devices, the storage router configured to:
 - maintain a map to allocate storage space on the remote storage devices to devices connected to the first transport medium by associating representations of the devices connected to the first transport medium with

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representations of storage space on the remote storage devices, wherein each representation of a device connected to the first transport medium is associated with one or more representations of storage space on the remote storage devices;

control access from the devices connected to the first transport medium to the storage space on the remote storage devices in accordance with the map; and allow access from devices connected to the first transport medium to the remote storage devices using native low level block protocol.

21. The storage network of claim 20, wherein the map associates a representation of storage space on the remote storage devices with multiple devices connected to the first transport medium.

22. The storage network of claim 20, wherein the storage space on the remote storage devices comprises storage space on multiple remote storage devices.

23. The storage network of claim 20, wherein the map associates a representation of a device connected to the first transport medium with a representation of an entire storage space of at least one remote storage device.

24. The storage network of claim 20, wherein the map resides at the storage router and is maintained at the storage router.

25. The storage network of claim 20, wherein the native low level block protocol is received at the storage router via the first transport medium and the storage router uses the received native low level block protocol to allow the devices connected to the first transport medium access to storage space specifically allocated to them in the map.

26. The storage router of claim 20, wherein the storage router is configured to receive commands according to a first low level block protocol from the device connected to the first transport medium and forward commands according to a second low level block protocol to the remote storage devices.

27. The storage network of claim 20, wherein the first low level block protocol is an FCP protocol and the second low level block protocol is a protocol other than FCP.

28. The storage network of claim 20, wherein the map comprises one or more tables.

29. The storage network of claim 20, wherein the virtual local storage is provided to the devices connected to the first transport medium in a manner that is transparent to the devices and wherein the storage space allocated to the devices connected to the first transport medium appears to the devices as local storage.

30. The storage network of claim 20, wherein the storage router provides centralized control of what the devices connected to the first transport medium see as local storage.

31. The storage network of claim 20, wherein the representations of storage space comprise logical unit numbers that represent a subset of storage on the remote storage devices.

32. The storage network of claim 31, wherein the storage router is operable to route requests to the same logical unit number from different devices connected to the first transport medium to different subsets of storage space on the remote storage devices.

33. The storage network of claim 20, wherein the representations of devices connected to the first transport medium are unique identifiers.

34. The storage network of claim 33, wherein the unique identifiers are world wide names.

35. The storage network of claim 20, wherein the storage router is configured to allow modification of the map in a

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manner transparent to and without involvement of the devices connected to the first transport medium.

36. The storage network of claim 20, wherein the first transport medium is a fibre channel transport medium and the second transport medium is a fibre channel transport medium.

37. A method for providing virtual local storage on remote storage devices comprising:

connecting a storage router between a set of devices connected to a first transport medium and a set of remote storage devices, wherein the first transport medium is a serial transport medium;

maintaining a map at the storage router to allocate storage space on the remote storage devices to devices connected to the first transport medium by associating representations of the devices connected to the first transport medium with representations of storage space on the remote storage devices, wherein each representation of a device connected to the first transport medium is associated with one or more representations of storage space on the remote storage devices;

controlling access from the devices connected to the first transport medium to the storage space on the remote storage devices in accordance with the map; and

allowing access from devices connected to the first transport medium to the remote storage devices using native low level block protocol.

38. The method of claim 37, wherein the map associates a representation of storage space on the remote storage devices with multiple devices connected to the first transport medium.

39. The method of claim 37, wherein the storage space on the remote storage devices comprises storage space on multiple remote storage devices.

40. The method of claim 37, wherein the map associates a representation of a device connected to the first transport medium with a representation of an entire storage space of at least one remote storage device.

41. The method of claim 37, wherein the map resides at the storage router and is maintained at the storage router.

42. The method of claim 37, further comprising: receiving the native low level block protocol at the storage router via the first transport medium;

using the received native low level block protocol at the storage router to allow the devices connected to the first transport medium access to storage space specifically allocated to them in the map.

43. The method of claim 37, further comprising receiving commands at the storage router according to a first low level block protocol from the device connected to the first transport medium and forwarding commands according to a second low level block protocol to the remote storage devices.

44. The method of claim 43, wherein the first low level block protocol is an FCP protocol and the second low level block protocol is a protocol other than FCP.

45. The method of claim 37, wherein the map comprises one or more tables.

46. The method of claim 37, wherein the virtual local storage is provided to the devices connected to the first transport medium in a manner that is transparent to the devices and wherein the storage space allocated to the devices connected to the first transport medium appears to the devices as local storage.

47. The method of claim 37, wherein the storage router provides centralized control of what the devices connected to the first transport medium see as local storage.

48. The method of claim 37, wherein the representations of storage space comprise logical unit numbers that represent a subset of storage on the remote storage devices.

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49. The method of claim **48**, wherein the storage router is operable to route requests to the same logical unit number from different devices connected to the first transport medium to different subsets of storage space on the remote storage devices.

50. The method of claim **37**, wherein the representations of devices connected to the first transport medium are unique identifiers.

51. The method of claim **50**, wherein the unique identifiers are world wide names.

52. The method of claim **51**, wherein the storage router is configured to allow modification of the map in a manner

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transparent to and without involvement of the devices connected to the first transport medium.

53. The method of claim **1** wherein connecting the storage router between a set of devices connected to a first transport medium and a set of remote storage devices further comprises connecting the storage router between a first fibre channel transport medium and a second fibre channel transport medium.

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(12) **United States Patent**
Hoese et al.

(10) **Patent No.:** **US 7,934,041 B2**
 (45) **Date of Patent:** **Apr. 26, 2011**

- (54) **STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE**
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- (*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.
- (21) Appl. No.: **12/690,592**
- (22) Filed: **Jan. 20, 2010**
- (65) **Prior Publication Data**
 US 2010/0121993 A1 May 13, 2010

(52) **U.S. Cl.** **710/305; 710/11; 709/258**
 (58) **Field of Classification Search** 710/1-5,
 710/8-13, 36-38, 126-131, 250, 305; 709/258;
 714/42; 711/110-113
 See application file for complete search history.

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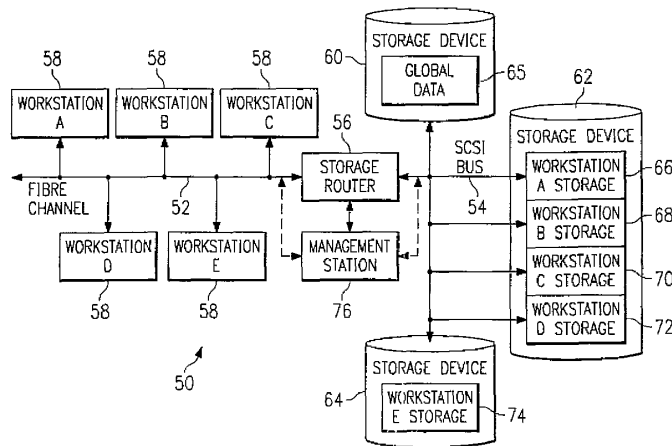
Related U.S. Application Data

- (63) Continuation of application No. 12/552,885, filed on Sep. 2, 2009, which is a continuation of application No. 11/851,724, filed on Sep. 7, 2007, now Pat. No. 7,689,754, which is a continuation of application No. 11/442,878, filed on May 30, 2006, now abandoned, which is a continuation of application No. 11/353,826, filed on Feb. 14, 2006, now Pat. No. 7,340,549, which is a continuation of application No. 10/658,163, filed on Sep. 9, 2003, now Pat. No. 7,051,147, which is a continuation of application No. 10/081,110, filed on Feb. 22, 2002, now Pat. No. 6,789,152, which is a continuation of application No. 09/354,682, filed on Jul. 15, 1999, now Pat. No. 6,421,753, which is a continuation of application No. 09/001,799, filed on Dec. 31, 1997, now Pat. No. 5,941,972.
- (51) **Int. Cl.**
G06F 13/00 (2006.01)
G06F 3/00 (2006.01)

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(57) **ABSTRACT**
 A storage router and storage network provide virtual local storage on remote storage devices. A plurality of devices are connected to a first transport medium. In one embodiment, a storage router maintains a map to allocate storage space on the remote storage devices to devices connected to the first transport medium by associating representations of the devices connected to the first transport medium with representations of storage space on the remote storage devices. The storage router controls access from the devices connected to the first transport medium to the storage space on the remote storage devices in accordance with the map and allows access from devices connected to the first transport medium to the remote storage devices using native low level block protocol.

53 Claims, 2 Drawing Sheets



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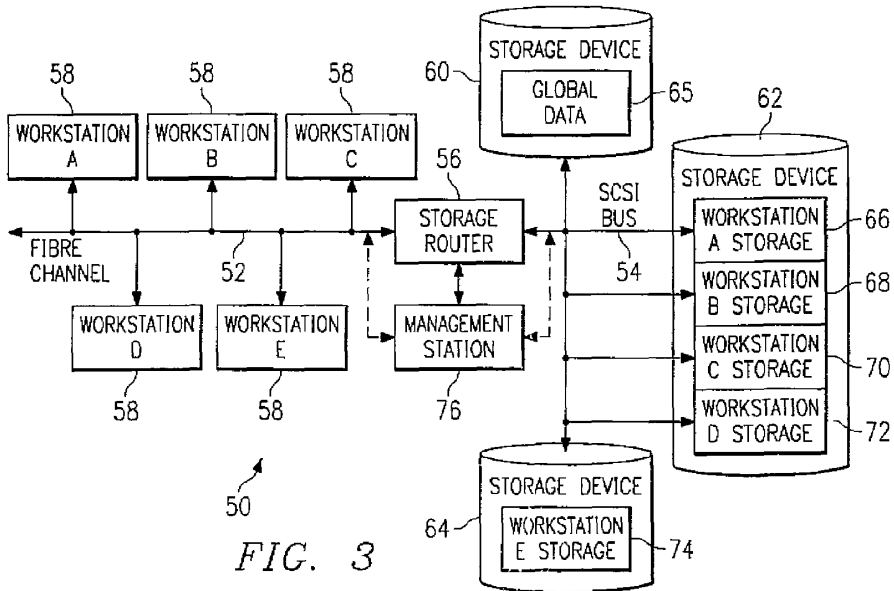
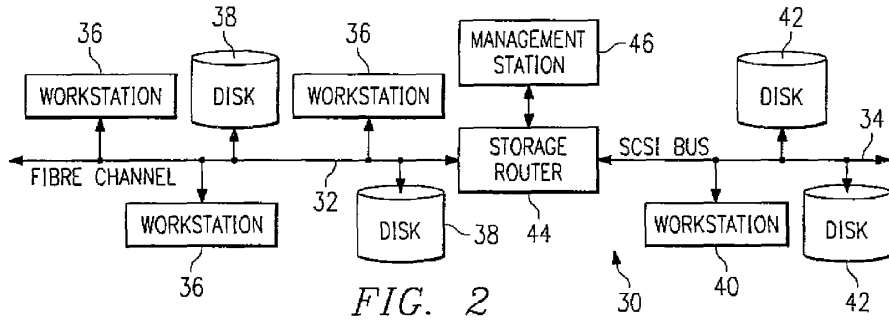
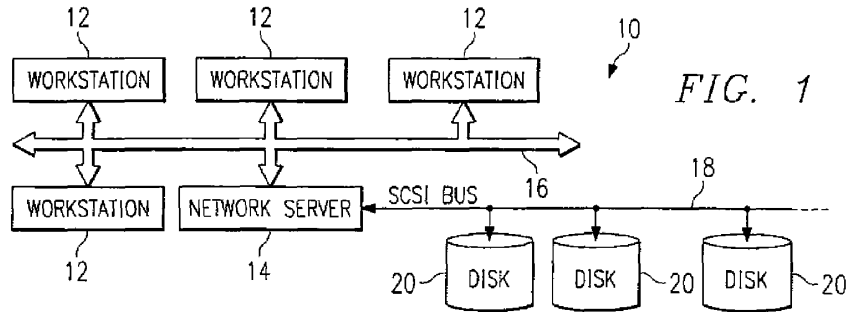
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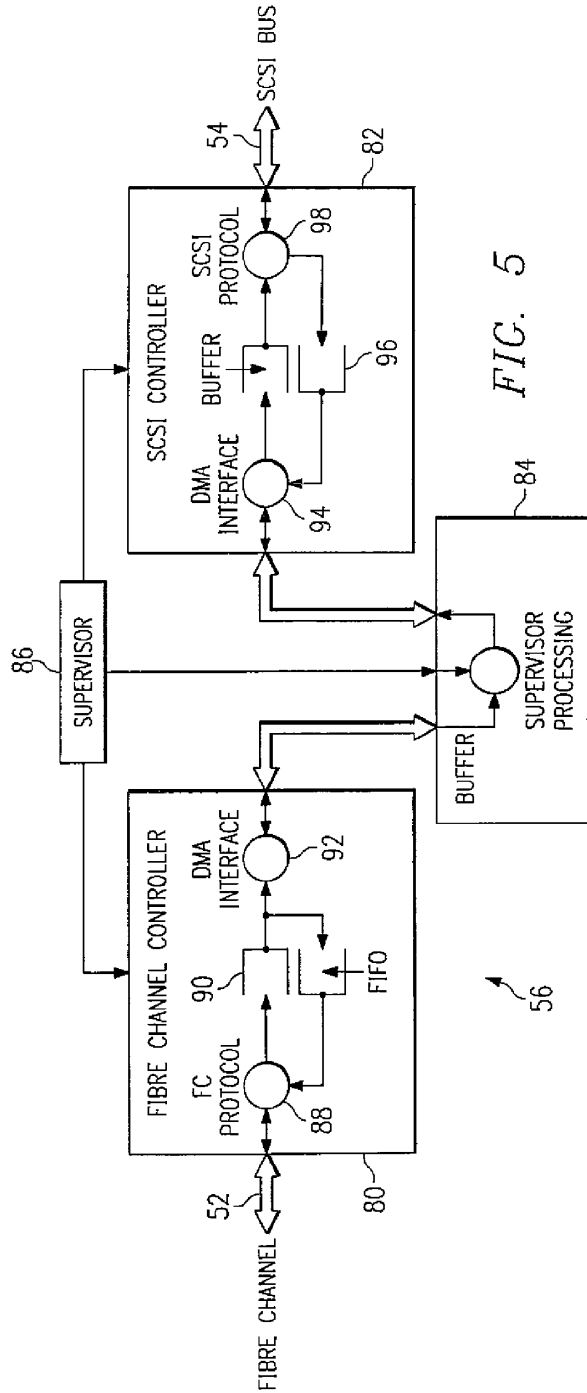
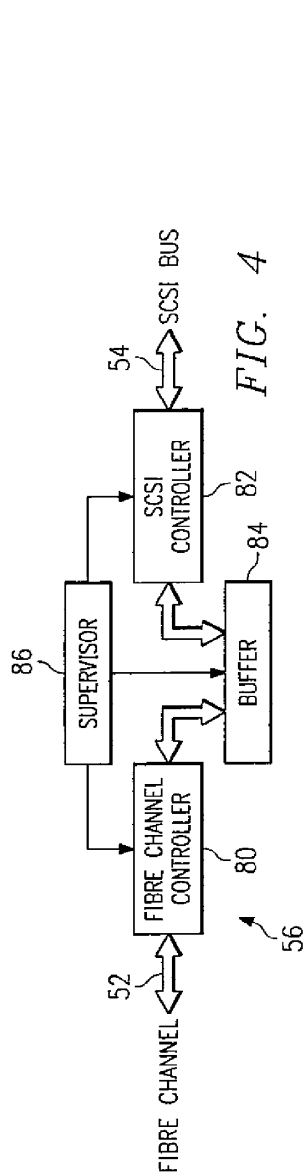
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STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

This application is a continuation of, and claims a benefit of priority under 35 U.S.C. 120 of the filing date of U.S. patent application Ser. No. 12/552,885 entitled "Storage Router and Method for Providing Virtual Local Storage" filed Sep. 2, 2009, which is a continuation of and claims the benefit of priority of U.S. application Ser. No. 11/851,724 entitled "Storage Router and Method for Providing Virtual Local Storage" filed Sep. 7, 2007, now U.S. Pat. No. 7,689,754 issued Mar. 30, 2010, which is a continuation of and claims the benefit of priority of U.S. patent application Ser. No. 11/442,878 entitled "Storage Router and Method for Providing Virtual Local Storage" filed May 30, 2006, now abandoned, which is a continuation of and claims the benefit of priority of U.S. patent application Ser. No. 11/353,826 entitled "Storage Router and Method for Providing Virtual Local Storage" filed on Feb. 14, 2006, now U.S. Pat. No. 7,340,549 issued Mar. 4, 2008, which is a continuation of and claims the benefit of priority of U.S. patent application Ser. No. 10/658,163 entitled "Storage Router and Method for Providing Virtual Local Storage" filed on Sep. 9, 2003 now U.S. Pat. No. 7,051,147 issued May 23, 2006, which is a continuation of and claims the benefit of priority of U.S. patent application Ser. No. 10/081,110 by inventors Geoffrey B. Hoese and Jeffery T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on Feb. 22, 2002, now U.S. Pat. No. 6,789,152 issued on Sep. 7, 2004, which in turn is a continuation of and claims benefit of priority of U.S. application Ser. No. 09/354,682 by inventors Geoffrey B. Hoese and Jeffery T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on Jul. 15, 1999, now U.S. Pat. No. 6,421,753 issued on Jul. 16, 2002, which in turn is a continuation of and claims benefit of priority of U.S. patent application Ser. No. 09/001,799, filed on Dec. 31, 1997, now U.S. Pat. No. 5,941,972 issued on Aug. 24, 1999, and hereby incorporates these applications and patents by reference in their entireties as if they had been fully set forth herein.

TECHNICAL FIELD OF THE INVENTION

This invention relates in general to network storage devices, and more particularly to a storage router and method for providing virtual local storage on remote SCSI storage devices to Fibre Channel devices.

BACKGROUND OF THE INVENTION

Typical storage transport mediums provide for a relatively small number of devices to be attached over relatively short distances. One such transport medium is a Small Computer System Interface (SCSI) protocol, the structure and operation of which is generally well known as is described, for example, in the SCSI-1, SCSI-2 and SCSI-3 specifications. High speed serial interconnects provide enhanced capability to attach a large number of high speed devices to a common storage transport medium over large distances. One such, serial interconnect is Fibre Channel, the structure and operation of which is described, for example, in Fibre Channel Physical and Signaling Interface (FC-PH), ANSI X3.230 Fibre Channel Arbitrated Loop (FC-AL), and ANSI X3.272 Fibre Channel Private Loop Direct Attach (FC-PLDA).

Conventional computing devices, such as computer workstations, generally access storage locally or through network interconnects. Local storage typically consists of a disk drive,

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tape drive, CD-ROM drive or other storage device contained within, or locally connected to the workstation. The workstation provides a file system structure that includes security controls, with access to the local storage device through native low level block protocols. These protocols map directly to the mechanisms used by the storage device and consist of data requests without security controls. Network interconnects typically provide access for a large number of computing devices to data storage on a remote network server. The remote network server provides file system structure, access control, and other miscellaneous capabilities that include the network interface. Access to data through the network server is through network protocols that the server must translate into low level requests to the storage device. A workstation with access to the server storage must translate its file system protocols into network protocols that are used to communicate with the server. Consequently, from the perspective of a workstation, or other computing device, seeking to access such server data, the access is much slower than access to data on a local storage device.

SUMMARY OF THE INVENTION

In accordance with the present invention, a storage router and method for providing virtual local storage on remote SCSI storage devices to Fibre Channel devices are disclosed that provide advantages over conventional network storage devices and methods.

According to one aspect of the present invention, a storage router and storage network provide virtual local storage on remote SCSI storage devices to Fibre Channel devices. A plurality of Fibre Channel devices, such as workstations, are connected to a Fibre Channel transport medium, and a plurality of SCSI storage devices are connected to a SCSI bus transport medium. The storage router interfaces between the Fibre Channel transport medium and the SCSI bus transport medium. The storage router maps between the workstations and the SCSI storage devices and implements access controls for storage space on the SCSI storage devices. The storage router then allows access from the workstations to the SCSI storage devices using native low level, block protocol in accordance with the mapping and the access controls.

According to another aspect of the present invention, virtual local storage on remote SCSI storage devices is provided to Fibre Channel devices. A Fibre Channel transport medium and a SCSI bus transport medium are interfaced with. A configuration is maintained for SCSI storage devices connected to the SCSI bus transport medium. The configuration maps between Fibre Channel devices and the SCSI storage devices and implements access controls for storage space on the SCSI storage devices. Access is then allowed from Fibre Channel initiator devices to SCSI storage devices using native low level, block protocol in accordance with the configuration.

A technical advantage of the present invention is the ability to centralize local storage for networked workstations without any cost of speed or overhead. Each workstation accesses its virtual local storage as if it were locally connected. Further, the centralized storage devices can be located in a significantly remote position even in excess of ten kilometers as defined by Fibre Channel standards.

Another technical advantage of the present invention is the ability to centrally control and administer storage space for connected users without limiting the speed with which the users can access local data. In addition, global access to data, backups, virus scanning and redundancy can be more easily accomplished by centrally located storage devices.

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A further technical advantage of the present invention is providing support for SCSI storage devices as local storage for Fibre Channel hosts. In addition, the present invention helps to provide extended capabilities for Fibre Channel and for management of storage subsystems.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the present invention and the advantages thereof may be acquired by referring to the following description taken in conjunction with the accompanying drawings, in which like reference numbers indicate like features, and wherein:

FIG. 1 is a block diagram of a conventional network that provides storage through a network server;

FIG. 2 is a block diagram of one embodiment of a storage network with a storage router that provides global access and routing;

FIG. 3 is a block diagram of one embodiment of a storage network with a storage router that provides virtual local storage;

FIG. 4 is a block diagram of one embodiment of the storage router of FIG. 3; and

FIG. 5 is a block diagram of one embodiment of data flow within the storage router of FIG. 4.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 is a block diagram of a conventional network, indicated generally at 10, that provides access to storage through a network server. As shown, network 10 includes a plurality of workstations 12 interconnected with a network server 14 via a network transport medium 16. Each workstation 12 can generally comprise a processor, memory, input/output devices, storage devices and a network adapter as well as other common computer components. Network server 14 uses a SCSI bus 18 as a storage transport medium to interconnect with a plurality of storage devices 20 (tape drives, disk drives, etc.). In the embodiment of FIG. 1, network transport medium 16 is a network connection and storage devices 20 comprise hard disk drives, although there are numerous alternate transport mediums and storage devices.

In network 10, each workstation 12 has access to its local storage device as well as network access to data on storage devices 20. The access to a local storage device is typically through native low level, block protocols. On the other hand, access by a workstation 12 to storage devices 20 requires the participation of network server 14 which implements a file system and transfers data to workstations 12 only through high level file system protocols. Only network server 14 communicates with storage devices 20 via native low level, block protocols. Consequently, the network access by workstations 12 through network server 14 is slow with respect to their access to local storage. In network 10, it can also be a logistical problem to centrally manage and administer local data distributed across an organization, including accomplishing tasks such as backups, virus scanning and redundancy.

FIG. 2 is a block diagram of one embodiment of a storage network, indicated generally at 30, with a storage router that provides global access and routing. This environment is significantly different from that of FIG. 1 in that there is no network server involved. In FIG. 2, a Fibre Channel high speed serial transport 32 interconnects a plurality of workstations 36 and storage devices 38. A SCSI bus storage transport medium interconnects workstations 40 and storage devices 42. A storage router 44 then serves to interconnect these mediums and provide devices on either medium global, trans-

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parent access to devices on the other medium. Storage router 44 routes requests from initiator devices on one medium to target devices on the other medium and routes data between the target and the initiator. Storage router 44 can allow initiators and targets to be on either side. In this manner, storage router 44 enhances the functionality of Fibre Channel 32, by providing access, for example, to legacy SCSI storage devices on SCSI bus 34. In the embodiment of FIG. 2, the operation of storage router 44 can be managed by a management station 46 connected to the storage router via a direct serial connection.

In storage network 30, any workstation 36 or workstation 40 can access any storage device 38 or storage device 42 through native low level, block protocols, and vice versa. This functionality is enabled by storage router 44 which routes requests and data as a generic transport between Fibre Channel 32 and SCSI bus 34. Storage router 44 uses tables to map devices from one medium to the other and distributes requests and data across Fibre Channel 32 and SCSI bus 34 without any security access controls. Although this extension of the high speed serial interconnect provided by Fibre Channel is beneficial, it is desirable to provide security controls in addition to extended access to storage devices through a native low level, block protocol.

FIG. 3 is a block diagram of one embodiment of a storage network, indicated generally at 50, with a storage router that provides virtual local storage. Similar to that of FIG. 2, storage network 50 includes a Fibre Channel high speed serial interconnect 52 and a SCSI bus 54 bridged by a storage router 56. Storage router 56 of FIG. 3 provides for a large number of workstations 58 to be interconnected on a common storage transport and to access common storage devices 60, 62 and 64 through native low level, block protocols.

According to the present invention, storage router 56 has enhanced functionality to implement security controls and routing such that each workstation 58 can have access to a specific subset of the overall data stored in storage devices 60, 62 and 64. This specific subset of data has the appearance and characteristics of local storage and is referred to herein as virtual local storage. Storage router 56 allows the configuration and modification of the storage allocated to each attached workstation 58 through the use of mapping tables or other mapping techniques.

As shown in FIG. 3, for example, storage device 60 can be configured to provide global data 65 which can be accessed by all workstations 58. Storage device 62 can be configured to provide partitioned subsets 66, 68, 70 and 72, where each partition is allocated to one of the workstations 58 (workstations A, B, C and D). These subsets 66, 68, 70 and 72 can only be accessed by the associated workstation 58 and appear to the associated workstation 58 as local storage accessed using native low level, block protocols. Similarly, storage device 64 can be allocated as storage for the remaining workstation 58 (workstation E).

Storage router 56 combines access control with routing such that each workstation 58 has controlled access to only the specified partition of storage device 62 which forms virtual local storage for the workstation 58. This access control allows security control for the specified data partitions. Storage router 56 allows this allocation of storage devices 60, 62 and 64 to be managed by a management station 76. Management station 76 can connect directly to storage router 56 via a direct connection or, alternately, can interface with storage router 56 through either Fibre Channel 52 or SCSI bus 54. In the latter case, management station 76 can be a workstation or other computing device with special rights such that storage

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router 56 allows access to mapping tables and shows storage devices 60, 62 and 64 as they exist physically rather than as they have been allocated.

The environment of FIG. 3 extends the concept of single workstation having locally connected storage devices to a storage network 50 in which workstations 58 are provided virtual local storage in a manner transparent to workstations 58. Storage router 56 provides centralized control of what each workstation 58 sees as its local drive, as well as what data it sees as global data accessible by other workstations 58. Consequently, the storage space considered by the workstation 58 to be its local storage is actually a partition (i.e., logical storage definition) of a physically remote storage device 60, 62 or 64 connected through storage router 56. This means that similar requests from workstations 58 for access to their local storage devices produce different accesses to the storage space on storage devices 60, 62 and 64. Further, no access from a workstation 58 is allowed to the virtual local storage of another workstation 58.

The collective storage provided by storage devices 60, 62 and 64 can have blocks allocated by programming means within storage router 56. To accomplish this function, storage router 56 can include routing tables and security controls that define storage allocation for each workstation 58. The advantages provided by implementing virtual local storage in centralized storage devices include the ability to do collective backups and other collective administrative functions more easily. This is accomplished without limiting the performance of workstations 58 because storage access involves native low level, block protocols and does not involve the overhead of high level protocols and file systems required by network servers.

FIG. 4 is a block diagram of one embodiment of storage router 56 of FIG. 3. Storage router 56 can comprise a Fibre Channel controller 80 that interfaces with Fibre Channel 52 and a SCSI controller 82 that interfaces with SCSI bus 54. A buffer 84 provides memory work space and is connected to both Fibre Channel controller 80 and to SCSI controller 82. A supervisor unit 86 is connected to Fibre Channel controller 80, SCSI controller 82 and buffer 84. Supervisor unit 86 comprises a microprocessor for controlling operation of storage router 56 and to handle mapping and-security access for requests between Fibre Channel 52 and SCSI bus 54.

FIG. 5 is a block diagram of one embodiment of data flow within storage router 56 of FIG. 4. As shown, data from Fibre Channel 52 is processed by a Fibre Channel (FC) protocol unit 88 and placed in a FIFO queue 90. A direct memory access (DMA) interface 92 then takes data out of FIFO queue 90 and places it in buffer 84. Supervisor unit 86 processes the data in buffer 84 as represented by supervisor processing 93. This processing involves mapping between Fibre Channel 52 and SCSI bus 54 and applying access controls and routing functions. A DMA interface 94 then pulls data from buffer 84 and places it into a buffer 96. A SCSI protocol unit 98 pulls data from buffer 96 and communicates the data on SCSI bus 54. Data flow in the reverse direction, from SCSI bus 54 to Fibre Channel 52, is accomplished in a reverse manner.

The storage router of the present invention is a bridge device that connects a Fibre Channel link directly to a SCSI bus and enables the exchange of SCSI command set information between application clients on SCSI bus devices and the Fibre Channel links. Further, the storage router applies access controls such that virtual local storage can be established in remote SCSI storage devices for workstations on the Fibre Channel link. In one embodiment, the storage router provides a connection for Fibre Channel links running the SCSI Fibre

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Channel Protocol (FCP) to legacy SCSI devices attached to a SCSI bus. The Fibre Channel topology is typically an Arbitrated Loop (FC_AL).

In part, the storage router enables a migration path Fibre Channel based, serial SCSI networks by providing connectivity for legacy SCSI bus devices. The storage router can be attached to a Fibre Channel Arbitrated Loop and a SCSI bus to support a number of SCSI devices. Using configuration settings, the storage router can make the SCSI bus devices available on the Fibre Channel network as FCP logical units. Once the configuration is defined, operation of the storage router is transparent to application clients. In this manner, the storage router can form an integral part of the migration to new Fibre Channel based networks while providing a means to continue using legacy SCSI devices.

In one implementation (not shown), the storage router can be a rack mount or free standing device with an internal power supply. The storage router can have a Fibre Channel and SCSI port, and a standard, detachable power cord can be used, the FC connector can be a copper DB9 connector, and the SCSI connector can be a 68-pin type. Additional modular jacks can be provided for a serial port and an 802.3 10 BaseT port, i.e. twisted pair Ethernet, for management access. The SCSI port of the storage router can support SCSI direct and sequential access target devices and can support SCSI initiators, as well. The Fibre Channel port can interface to SCSI-3 FCP enabled devices and initiators.

To accomplish its functionality, one implementation of the storage router uses: a Fibre Channel interface based on the HEWLETT-PACKARD TACHYON HPFC-5000 controller and a GLM media interface; an Intel 80960RP processor, incorporating independent data and program memory spaces, and associated logic required to implement a stand alone processing system; and a serial port for debug and system configuration. Further, this implementation includes a SCSI interface supporting Fast-20 based on the SYMBIOS 53C8xx series SCSI controllers, and an operating system based upon the WIND RIVERS SYSTEMS VXWORKS or IXWORKS kernel, as determined by design. In addition, the storage router includes software as required to control basic functions of the various elements, and to provide appropriate translations between the FC and SCSI protocols.

The storage router has various modes of operation that are possible between FC and SCSI target and initiator combinations. These modes are: FC Initiator to SCSI Target; SCSI Initiator to FC Target; SCSI Initiator to SCSI Target; and FC Initiator to FC Target. The first two modes can be supported concurrently in a single storage router device and are discussed briefly below. The third mode can involve two storage router devices back to back and can serve primarily as a device to extend the physical distance beyond that possible via a direct SCSI connection. The last mode can be used to carry FC protocols encapsulated on other transmission technologies (e.g. ATM, SONET), or to act as a bridge between two FC loops (e.g. as a two port fabric).

The FC Initiator to SCSI Target mode provides for the basic configuration of a server using Fibre Channel to communicate with SCSI targets. This mode requires that a host system have an FC attached device and associated device drivers and software to generate SCSI-3 FCP requests. This system acts as an initiator using the storage router to communicate with SCSI target devices. The SCSI devices supported can include SCSI-2 compliant direct or sequential access (disk or tape) devices. The storage router serves to translate command and status information and transfer data between SCSI-3 FCP and SCSI-2, allowing the use of standard SCSI-2 devices in a Fibre Channel environment.

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The SCSI Initiator to FC Target mode provides for the configuration of a server using SCSI-2 to communicate with Fibre Channel targets. This mode requires that a host system has a SCSI-2 interface and driver software to control SCSI-2 target devices. The storage router will connect to the SCSI-2 bus and respond as a target to multiple target IDs. Configuration information is required to identify the target IDs to which the bridge will respond on the SCSI-2 bus. The storage router then translates the SCSI-2 requests to SCSI-3 FCP requests, allowing the use of FC devices with a SCSI host system. This will also allow features such as a tape device acting as an initiator on the SCSI bus to provide full support for this type of SCSI device.

In general, user configuration of the storage router will be needed to support various functional modes of operation. Configuration can be modified, for example, through a serial port or through an Ethernet port via SNMP (simple network management protocol) or the Telnet session. Specifically, SNMP manageability can be provided via a B02.3 Ethernet interface. This can provide for configuration changes as well as providing statistics and error information. Configuration can also be performed via TELNET or RS-232 interfaces with menu driven command interfaces. Configuration information can be stored in a segment of flash memory and can be retained across resets and power off cycles. Password protection can also be provided.

In the first two modes of operation, addressing information is needed to map from FC addressing to SCSI addressing and vice versa. This can be "hard" configuration data, due to the need for address information to be maintained across initialization and partial reconfigurations of the Fibre Channel address space. In an arbitrated loop configuration, user configured addresses will be needed for AL_PAs in order to insure that known addresses are provided between loop reconfigurations.

With respect to addressing, FCP and SCSI 2 systems employ different methods of addressing target devices. Additionally, the inclusion of a storage router means that a method of translating device IDs needs to be implemented. In addition, the storage router can respond to commands without passing the commands through to the opposite interface. This can be implemented to allow all generic FCP and SCSI commands to pass through the storage router to address attached devices, but allow for configuration and diagnostics to be performed directly on the storage router through the FC and SCSI interfaces.

Management commands are those intended to be processed by the storage router controller directly. This may include diagnostic, mode, and log commands as well as other vendor-specific commands. These commands can be received and processed by both the FOP and SCSI interfaces, but are not typically bridged to the opposite interface. These commands may also have side effects on the operation of the storage router, and cause other storage router operations to change or terminate.

A primary method of addressing management commands though the FCP and SCSI interfaces can be through peripheral device type addressing. For example, the storage router can respond to all operations addressed to logical unit (LUN) zero as a controller device. Commands that the storage router will support can include INQUIRY as well as vendor-specific management commands. These are to be generally consistent with SCC standard commands.

The SCSI bus is capable of establishing bus connections between targets. These targets may internally address logical units. Thus, the prioritized addressing scheme used by SCSI subsystems can be represented as follows: BUS:TARGET:

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LOGICAL UNIT. The BUS identification is intrinsic in the configuration, as a SCSI initiator is attached to only one bus. Target addressing is handled by bus arbitration from information provided to the arbitrating device. Target addresses are assigned to SCSI devices directly through some means of configuration, such as a hardware jumper, switch setting, or device specific software configuration. As such, the SCSI protocol provides only logical unit addressing within the Identify message. Bus and target information is implied by the established connection.

Fibre Channel devices within a fabric are addressed by a unique port identifier. This identifier is assigned to a port during certain well-defined states of the FC protocol. Individual ports are allowed to arbitrate for a known, user defined address. If such an address is not provided, or if arbitration for a particular-user address fails, the port is assigned a unique address by the FC protocol. This address is generally not guaranteed to be unique between instances. Various scenarios exist where the AL-PA of a device will change, either after power cycle or loop reconfiguration.

The FC protocol also provides a logical unit address field within command structures to provide addressing to devices internal to a port. The FCP_CMD payload specifies an eight byte LUN field. Subsequent identification of the exchange between devices is provided by the FQXID (Fully Qualified Exchange ID).

FC ports can be required to have specific addresses assigned. Although basic functionality is not dependent on this, changes in the loop configuration could result in disk targets changing identifiers with the potential risk of data corruption or loss. This configuration can be straightforward, and can consist of providing the device a loop-unique ID (AL_PA) in the range of "01h" to "EFh." Storage routers could be shipped with a default value with the assumption that most configurations will be using single storage routers and no other devices requesting the present ID. This would provide a minimum amount of initial configuration to the system administrator. Alternately, storage routers could be defaulted to assume any address so that configurations requiring multiple storage routers on a loop would not require that the administrator assign a unique ID to the additional storage routers.

Address translation is needed where commands are issued in the cases FC Initiator to SCSI Target and SCSI Initiator to FC Target. Target responses are qualified by the FQXID and will retain the translation acquired at the beginning of the exchange. This prevents configuration changes occurring during the course of execution of a command from causing data or state information to be inadvertently misdirected. Configuration can be required in cases of SCSI Initiator to FC Target, as discovery may not effectively allow for FCP targets to consistently be found. This is due to an FC arbitrated loop supporting addressing of a larger number of devices than a SCSI bus and the possibility of FC devices changing their AL-PA due to device insertion or other loop initialization.

In the direct method, the translation to BUS:TARGET: LUN of the SCSI address information will be direct. That is, the values represented in the FCPLUN field will directly map to the values in effect on the SCSI bus. This provides a clean translation and does not require SCSI bus discovery. It also allows devices to be dynamically added to the SCSI bus without modifying the address map. It may not allow for complete discovery by FCP initiator devices, as gaps between device addresses may halt the discovery process. Legacy SCSI device drivers typically halt discovery on a target device at the first unoccupied LUN, and proceed to the next target.

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This would lead to some devices not being discovered. However, this allows for hot plugged devices and other changes to the loop addressing.

In the ordered method, ordered translation requires that the storage router perform discovery on reset, and collapses the addresses on the SCSI bus to sequential FSP LUN values. Thus, the FCP LUN values 0-N can represent N+1 SCSI devices, regardless of SCSI address values, in the order in which they are isolated during the SCSI discovery process. This would allow the FCP initiator discovery process to identify all mapped SCSI devices without further configuration. This has the limitation that hot-plugged devices will not be identified until the next reset cycle. In this case, the address may also be altered as well.

In addition to addressing, according to the present invention, the storage router provides configuration and access controls that cause certain requests from FC Initiators to be directed to assigned virtual local storage partitioned on SCSI storage devices. For example, the same request for LUN 0 (local storage) by two different FC Initiators can be directed to two separate subsets of storage. The storage router can use tables to map, for each initiator, what storage access is available and what partition is being addressed by a particular request. In this manner, the storage space provided by SCSI storage devices can be allocated to FC initiators to provide virtual local storage as well as to create any other desired configuration for secured access.

Although the present invention has been described in detail, it should be understood that various changes, substitutions, and alterations can be made hereto without departing from the spirit and scope of the invention as defined by the appended claims.

What is claimed is:

1. A storage router for providing virtual local storage on remote storage devices, comprising:

a first controller operable to interface with a first transport medium, wherein the first medium is a serial transport media; and

a processing device coupled to the first controller, wherein the processing device is configured to:

maintain a map to allocate storage space on the remote storage devices to devices connected to the first transport medium by associating representations of the devices connected to the first transport medium with representations of storage space on the remote storage devices, wherein each representation of a device connected to the first transport medium is associated with one or more representations of storage space on the remote storage devices;

control access from the devices connected to the first transport medium to the storage space on the remote storage devices in accordance with the map; and allow access from devices connected to the first transport medium to the remote storage devices using native low level block protocol.

2. The storage router of claim 1, wherein the map associates a representation of storage space on the remote storage devices with multiple devices connected to the first transport medium.

3. The storage router of claim 1, wherein the storage space on the remote storage devices comprises storage space on multiple remote storage devices.

4. The storage router of claim 1, wherein the map associates a representation of a device connected to the first transport medium with a representation of an entire storage space of at least one remote storage device.

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5. The storage router of claim 1, wherein the map resides at the storage router and is maintained at the storage router.

6. The storage router of claim 1, wherein the native low level block protocol is received at the storage router via the first transport medium and the processing device uses the received native low level block protocol to allow the devices connected to the first transport medium access to storage space specifically allocated to them in the map.

7. The storage router of claim 1, wherein the storage router is configured to receive commands according to a first low level block protocol from the device connected to the first transport medium and forward commands according to a second low level block protocol to the remote storage devices.

8. The storage router of claim 7, wherein the first low level block protocol is an FCP protocol and the second low level block protocol is a protocol other than FCP.

9. The storage router of claim 1, wherein the map comprises one or more tables.

10. The storage router of claim 1, wherein the virtual local storage is provided to the devices connected to the first transport medium in a manner that is transparent to the devices and wherein the storage space allocated to the devices connected to the first transport medium appears to the devices as local storage.

11. The storage router of claim 1, wherein the storage router provides centralized control of what the devices connected to the first transport medium see as local storage.

12. The storage router of claim 1, wherein the representations of storage space comprise logical unit numbers that represent a subset of storage on the remote storage devices.

13. The storage router of claim 12, wherein the storage router is operable to route requests to the same logical unit number from different devices connected to the first transport medium to different subsets of storage space on the remote storage devices.

14. The storage router of claim 1, wherein the representations of devices connected to the first transport medium are unique identifiers.

15. The storage router of claim 14, wherein the unique identifiers are world wide names.

16. The storage router of claim 1, wherein the storage router is configured to allow modification of the map in a manner transparent to and without involvement of the devices connected to the first transport medium.

17. The storage router of claim 1, wherein the processing device is a microprocessor.

18. The storage router of claim 1, wherein the processing device is a microprocessor and associated logic to implement a stand-alone processing system.

19. The storage router of claim 1, wherein the first transport medium is a fibre channel transport medium and further comprising a second transport medium connected to the remote storage devices that is a fibre channel transport medium.

20. A storage network comprising:

a set of devices connected a first transport medium, wherein the first transport medium;

a set of remote storage devices connected to a second transport medium;

a storage router connected to the serial transport medium;

a storage router connected to the first transport medium and second transport medium to provide virtual local storage on the remote storage devices, the storage router configured to:

maintain a map to allocate storage space on the remote storage devices to devices connected to the first transport medium by associating representations of the devices connected to the first transport medium with

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representations of storage space on the remote storage devices, wherein each representation of a device connected to the first transport medium is associated with one or more representations of storage space on the remote storage devices;

control access from the devices connected to the first transport medium to the storage space on the remote storage devices in accordance with the map; and

allow access from devices connected to the first transport medium to the remote storage devices using native low level block protocol.

21. The storage network of claim 20, wherein the map associates a representation of storage space on the remote storage devices with multiple devices connected to the first transport medium.

22. The storage network of claim 20, wherein the storage space on the remote storage devices comprises storage space on multiple remote storage devices.

23. The storage network of claim 20, wherein the map associates a representation of a device connected to the first transport medium with a representation of an entire storage space of at least one remote storage device.

24. The storage network of claim 20, wherein the map resides at the storage router and is maintained at the storage router.

25. The storage network of claim 20, wherein the native low level block protocol is received at the storage router via the first transport medium and the storage router uses the received native low level block protocol to allow the devices connected to the first transport medium access to storage space specifically allocated to them in the map.

26. The storage router of claim 20, wherein the storage router is configured to receive commands according to a first low level block protocol from the device connected to the first transport medium and forward commands according to a second low level block protocol to the remote storage devices.

27. The storage network of claim 20, wherein the first low level block protocol is an FCP protocol and the second low level block protocol is a protocol other than FCP.

28. The storage network of claim 20, wherein the map comprises one or more tables.

29. The storage network of claim 20, wherein the virtual local storage is provided to the devices connected to the first transport medium in a manner that is transparent to the devices and wherein the storage space allocated to the devices connected to the first transport medium appears to the devices as local storage.

30. The storage network of claim 20, wherein the storage router provides centralized control of what the devices connected to the first transport medium see as local storage.

31. The storage network of claim 20, wherein the representations of storage space comprise logical unit numbers that represent a subset of storage on the remote storage devices.

32. The storage network of claim 31, wherein the storage router is operable to route requests to the same logical unit number from different devices connected to the first transport medium to different subsets of storage space on the remote storage devices.

33. The storage network of claim 20, wherein the representations of devices connected to the first transport medium are unique identifiers.

34. The storage network of claim 33, wherein the unique identifiers are world wide names.

35. The storage network of claim 20, wherein the storage router is configured to allow modification of the map in a

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manner transparent to and without involvement of the devices connected to the first transport medium.

36. The storage network of claim 20, wherein the first transport medium is a fibre channel transport medium and the second transport medium is a fibre channel transport medium.

37. A method for providing virtual local storage on remote storage devices comprising:

- connecting a storage router between a set of devices connected to a first transport medium and a set of remote storage devices, wherein the first transport medium is a serial transport medium;
- maintaining a map at the storage router to allocate storage space on the remote storage devices to devices connected to the first transport medium by associating representations of the devices connected to the first transport medium with representations of storage space on the remote storage devices, wherein each representation of a device connected to the first transport medium is associated with one or more representations of storage space on the remote storage devices;
- controlling access from the devices connected to the first transport medium to the storage space on the remote storage devices in accordance with the map; and
- allowing access from devices connected to the first transport medium to the remote storage devices using native low level block protocol.

38. The method of claim 37, wherein the map associates a representation of storage space on the remote storage devices with multiple devices connected to the first transport medium.

39. The method of claim 37, wherein the storage space on the remote storage devices comprises storage space on multiple remote storage devices.

40. The method of claim 37, wherein the map associates a representation of a device connected to the first transport medium with a representation of an entire storage space of at least one remote storage device.

41. The method of claim 37, wherein the map resides at the storage router and is maintained at the storage router.

42. The method of claim 37, further comprising:

- receiving the native low level block protocol at the storage router via the first transport medium;
- using the received native low level block protocol at the storage router to allow the devices connected to the first transport medium access to storage space specifically allocated to them in the map.

43. The method of claim 37, further comprising receiving commands at the storage router according to a first low level block protocol from the device connected to the first transport medium and forwarding commands according to a second low level block protocol to the remote storage devices.

44. The method of claim 43, wherein the first low level block protocol is an FCP protocol and the second low level block protocol is a protocol other than FCP.

45. The method of claim 37, wherein the map comprises one or more tables.

46. The method of claim 37, wherein the virtual local storage is provided to the devices connected to the first transport medium in a manner that is transparent to the devices and wherein the storage space allocated to the devices connected to the first transport medium appears to the devices as local storage.

47. The method of claim 37, wherein the storage router provides centralized control of what the devices connected to the first transport medium see as local storage.

48. The method of claim 37, wherein the representations of storage space comprise logical unit numbers that represent a subset of storage on the remote storage devices.

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49. The method of claim **48**, wherein the storage router is operable to route requests to the same logical unit number from different devices connected to the first transport medium to different subsets of storage space on the remote storage devices.

50. The method of claim **37**, wherein the representations of devices connected to the first transport medium are unique identifiers.

51. The method of claim **50**, wherein the unique identifiers are world wide names.

52. The method of claim **51**, wherein the storage router is configured to allow modification of the map in a manner

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transparent to and without involvement of the devices connected to the first transport medium.

53. The method of claim **1** wherein connecting the storage router between a set of devices connected to a first transport medium and a set of remote storage devices further comprises connecting the storage router between a first fibre channel transport medium and a second fibre channel transport medium.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 7,934,041 B2
APPLICATION NO. : 12/690592
DATED : April 26, 2011
INVENTOR(S) : Geoffrey B. Hoese et al.

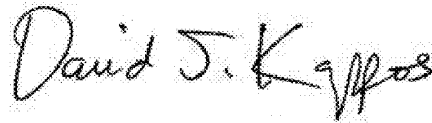
Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Claim 20: Col. 10 line 56 should read -

A set of devices connected --to-- a first transport medium, wherein the first transport medium --is a serial transport medium--;

Signed and Sealed this
Thirteenth Day of September, 2011

A handwritten signature in black ink that reads "David J. Kappos". The signature is written in a cursive style with a large initial "D".

David J. Kappos
Director of the United States Patent and Trademark Office

PTO/SB/05 (07-07)
 Approved for use through 06/30/2010. OMB 0651-0032
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UTILITY PATENT APPLICATION TRANSMITTAL <i>(Only for new nonprovisional applications under 37 CFR 1.53(b))</i>	<i>Attorney Docket No.</i>	CROSS1120-33
	<i>First Inventor</i>	Geoffrey B. Hoese
	<i>Title</i>	Storage Router and Method for...
	<i>Express Mail Label No.</i>	N/A

APPLICATION ELEMENTS <i>See MPEP chapter 600 concerning utility patent application contents.</i>	ADDRESS TO: Commissioner for Patents P.O. Box 1450 Alexandria VA 22313-1450
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1. <input checked="" type="checkbox"/> Fee Transmittal Form (e.g., PTO/SB/17) <i>(Submit an original and a duplicate for fee processing)</i> 2. <input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. 3. <input checked="" type="checkbox"/> Specification [Total Pages <u>25</u>] Both the claims and abstract must start on a new page <i>(For information on the preferred arrangement, see MPEP 608.01(a))</i> 4. <input checked="" type="checkbox"/> Drawing(s) (35 U.S.C. 113) [Total Sheets <u>2</u>] 5. Oath or Declaration [Total Sheets <u>4</u>] a. <input type="checkbox"/> Newly executed (original or copy) b. <input checked="" type="checkbox"/> A copy from a prior application (37 CFR 1.63(d)) <i>(for continuation/divisional with Box 18 completed)</i> i. <input type="checkbox"/> DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b). 6. <input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76 7. <input type="checkbox"/> CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix) <input type="checkbox"/> Landscape Table on CD 8. Nucleotide and/or Amino Acid Sequence Submission <i>(if applicable, items a. - c. are required)</i> a. <input type="checkbox"/> Computer Readable Form (CRF) b. <input type="checkbox"/> Specification Sequence Listing on: i. <input type="checkbox"/> CD-ROM or CD-R (2 copies); or ii. <input type="checkbox"/> Paper c. <input type="checkbox"/> Statements verifying identity of above copies	ACCOMPANYING APPLICATION PARTS 9. <input type="checkbox"/> Assignment Papers (cover sheet & document(s)) Name of Assignee _____ 10. <input type="checkbox"/> 37 CFR 3.73(b) Statement <input type="checkbox"/> Power of Attorney <i>(when there is an assignee)</i> 11. <input type="checkbox"/> English Translation Document (if applicable) 12. <input type="checkbox"/> Information Disclosure Statement (PTO/SB/08 or PTO-1449) <input type="checkbox"/> Copies of citations attached 13. <input type="checkbox"/> Preliminary Amendment 14. <input type="checkbox"/> Return Receipt Postcard (MPEP 503) <i>(Should be specifically itemized)</i> 15. <input type="checkbox"/> Certified Copy of Priority Document(s) <i>(if foreign priority is claimed)</i> 16. <input type="checkbox"/> Nonpublication Request under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent. 17. <input checked="" type="checkbox"/> Other: Cert. of Transmission and Identification of _____ _____ Change in Power of Attorney
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18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:


Continuation Divisional Continuation-in-part (CIP) of prior application No.: 12/552,885.....

Prior application information: Examiner Unknown Art Unit: 2181

19. CORRESPONDENCE ADDRESS

The address associated with Customer Number: 44654 OR Correspondence address below

Name			
Address			
City	State	Zip Code	
Country	Telephone	Email	

Signature		Date	January 20, 2010
Name (Print/Type)	John L. Adair	Registration No. (Attorney/Agent)	48,828

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.
 If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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STORAGE ROUTER AND METHOD FOR PROVIDING
VIRTUAL LOCAL STORAGE

TECHNICAL FIELD OF THE INVENTION

[0001] This application is a continuation of, and claims a benefit of priority under 35 U.S.C. 120 of the filing date of U.S. Patent Application Serial No. 12/552,885 entitled "Storage Router and Method for Providing Virtual Local Storage" filed 09/02/2009, which is a continuation of and claims the benefit of priority of U.S. Application Serial No. 11/851,724 entitled "Storage Router and Method for Providing Virtual Local Storage" filed 09/07/2007, which is a continuation of and claims the benefit of priority of U.S. Patent Application Serial No. 11/442,878 entitled "Storage Router and Method for Providing Virtual Local Storage" filed 09/07/2007, which is a continuation of and claims the benefit of priority of U.S. Patent Application Serial No. 11/353,826 entitled "Storage Router and Method for Providing Virtual Local Storage" filed on 02/14/2006, now U.S. Patent No. 7,340,549 issued 03/04/2008, which is a continuation of and claims the benefit of priority of U.S. Patent Application Serial No. 10/658,163 entitled "Storage Router and Method for Providing Virtual Local Storage" filed on 09/09/2003 now U.S. Patent No. 7,051,147 issued 05/23/2006, which is a continuation of and claims the benefit of benefit of priority of U.S. Patent Application Serial No. 10/081,110 by inventors Geoffrey B. Hoese and Jeffery T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on 02/22/2002, now U.S. Patent No. 6,789,152 issued on 09/07/2004, which in turn is a continuation of and claims benefit of priority of U.S. Application No. 09/354,682 by inventors Geoffrey B. Hoese and Jeffrey T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on 07/15/1999, now U.S. Patent No. 6,421,753 issued on 07/16/2002, which in turn is a continuation of and claims benefit of priority of U.S. Patent Application Serial No. 09/001,799, filed on 12/31/1997, now U.S. Patent No. 5,941,972 issued on 08/24/1999, and hereby incorporates these applications and patents by reference in their entireties as if they had been fully set forth herein.

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[0002] This invention relates in general to network storage devices, and more particularly to a storage router and method for providing virtual local storage on remote SCSI storage devices to Fibre Channel devices.

BACKGROUND OF THE INVENTION

[0003] Typical storage transport mediums provide for a relatively small number of devices to be attached over relatively short distances. One such transport medium is a Small Computer System Interface (SCSI) protocol, the structure and operation of which is generally well known as is described, for example, in the SCSI-1, SCSI-2 and SCSI-3 specifications. High speed serial interconnects provide enhanced capability to attach a large number of high speed devices to a common storage transport medium over large distances. One such serial interconnect is Fibre Channel, the structure and operation of which is described, for example, in Fibre Channel Physical and Signaling Interface (FC-PH), ANSI X3.230 Fibre Channel Arbitrated Loop (FC-AL), and ANSI X3.272 Fibre Channel Private Loop Direct Attach (FC-PLDA).

[0004] Conventional computing devices, such as computer workstations, generally access storage locally or through network interconnects. Local storage typically consists of a disk drive, tape drive, CD-ROM drive or other storage device contained within, or locally connected to the workstation. The workstation provides a file system structure that includes security controls, with access to the local storage device through native low level block protocols. These protocols map directly to the mechanisms used by the storage device and consist of data requests without security controls. Network interconnects typically provide access for a large number of computing devices to data storage on a remote network server. The remote network server provides file system structure, access control, and other miscellaneous capabilities that include the network interface. Access to data through the network server is through network protocols that the server must translate into low level requests to the storage device. A workstation with access to the server storage must translate its file system protocols into network protocols that are used to communicate with the server. Consequently,

from the perspective of a workstation, or other computing device, seeking to access such server data, the access is much slower than access to data on a local storage device.

SUMMARY OF THE INVENTION

- [0005] In accordance with the present invention, a storage router and method for providing virtual local storage on remote SCSI storage devices to Fibre Channel devices are disclosed that provide advantages over conventional network storage devices and methods.
- [0006] According to one aspect of the present invention, a storage router and storage network provide virtual local storage on remote SCSI storage devices to Fibre Channel devices. A plurality of Fibre Channel devices, such as workstations, are connected to a Fibre Channel transport medium, and a plurality of SCSI storage devices are connected to a SCSI bus transport medium. The storage router interfaces between the Fibre Channel transport medium and the SCSI bus transport medium. The storage router maps between the workstations and the SCSI storage devices and implements access controls for storage space on the SCSI storage devices. The storage router then allows access from the workstations to the SCSI storage devices using native low level, block protocol in accordance with the mapping and the access controls.
- [0007] According to another aspect of the present invention, virtual local storage on remote SCSI storage devices is provided to Fibre Channel devices. A Fibre Channel transport medium and a SCSI bus transport medium are interfaced with. A configuration is maintained for SCSI storage devices connected to the SCSI bus transport medium. The configuration maps between Fibre Channel devices and the SCSI storage devices and implements access controls for storage space on the SCSI storage devices. Access is then allowed from Fibre Channel initiator devices to SCSI storage devices using native low level, block protocol in accordance with the configuration.

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[0008] A technical advantage of the present invention is the ability to centralize local storage for networked workstations without any cost of speed or overhead. Each workstation accesses its virtual local storage as if it were locally connected. Further, the centralized storage devices can be located in a significantly remote position even in excess of ten kilometers as defined by Fibre Channel standards.

[0009] Another technical advantage of the present invention is the ability to centrally control and administer storage space for connected users without limiting the speed with which the users can access local data. In addition, global access to data, backups, virus scanning and redundancy can be more easily accomplished by centrally located storage devices.

[0010] A further technical advantage of the present invention is providing support for SCSI storage devices as local storage for Fibre Channel hosts. In addition, the present invention helps to provide extended capabilities for Fibre Channel and for management of storage subsystems.

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BRIEF DESCRIPTION OF THE DRAWINGS

- [0011] A more complete understanding of the present invention and the advantages thereof may be acquired by referring to the following description taken in conjunction with the accompanying drawings, in which like reference numbers indicate like features, and wherein:
- [0012] FIGURE 1 is a block diagram of a conventional network that provides storage through a network server;
- [0013] FIGURE 2 is a block diagram of one embodiment of a storage network with a storage router that provides global access and routing;
- [0014] FIGURE 3 is a block diagram of one embodiment of a storage network with a storage router that provides virtual local storage;
- [0015] FIGURE 4 is a block diagram of one embodiment of the storage router of FIGURE 3; and
- [0016] FIGURE 5 is a block diagram of one embodiment of data flow within the storage router of FIGURE 4.

DETAILED DESCRIPTION OF THE INVENTION

[0017] FIGURE 1 is a block diagram of a conventional network, indicated generally at 10, that provides access to storage through a network server. As shown, network 10 includes a plurality of workstations 12 interconnected with a network server 14 via a network transport medium 16. Each workstation 12 can generally comprise a processor, memory, input/output devices, storage devices and a network adapter as well as other common computer components. Network server 14 uses a SCSI bus 18 as a storage transport medium to interconnect with a plurality of storage devices 20 (tape drives, disk drives, etc.). In the embodiment of FIGURE 1, network transport medium 16 is a network connection and storage devices 20 comprise hard disk drives, although there are numerous alternate transport mediums and storage devices.

[0018] In network 10, each workstation 12 has access to its local storage device as well as network access to data on storage devices 20. The access to a local storage device is typically through native low level, block protocols. On the other hand, access by a workstation 12 to storage devices 20 requires the participation of network server 14 which implements a file system and transfers data to workstations 12 only through high level file system protocols. Only network server 14 communicates with storage devices 20 via native low level, block protocols. Consequently, the network access by workstations 12 through network server 14 is slow with respect to their access to local storage. In network 10, it can also be a logistical problem to centrally manage and administer local data distributed across an organization, including accomplishing tasks such as backups, virus scanning and redundancy.

[0019] FIGURE 2 is a block diagram of one embodiment of a storage network, indicated generally at 30, with a storage router that provides global access and routing. This environment is significantly different from that of FIGURE 1 in that there is no network server involved. In FIGURE 2, a Fibre Channel high speed serial transport 32 interconnects a plurality of workstations 36 and storage devices 38. A SCSI bus storage transport medium interconnects workstations 40 and storage

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devices 42. A storage router 44 then serves to interconnect these mediums and provide devices on either medium global, transparent access to devices on the other medium. Storage router 44 routes requests from initiator devices on one medium to target devices on the other medium and routes data between the target and the initiator. Storage router 44 can allow initiators and targets to be on either side. In this manner, storage router 44 enhances the functionality of Fibre Channel 32, by providing access, for example, to legacy SCSI storage devices on SCSI bus 34. In the embodiment of FIGURE 2, the operation of storage router 44 can be managed by a management station 46 connected to the storage router via a direct serial connection.

[0020] In storage network 30, any workstation 36 or workstation 40 can access any storage device 38 or storage device 42 through native low level, block protocols, and vice versa. This functionality is enabled by storage router 44 which routes requests and data as a generic transport between Fibre Channel 32 and SCSI bus 34. Storage router 44 uses tables to map devices from one medium to the other and distributes requests and data across Fibre Channel 32 and SCSI bus 34 without any security access controls. Although this extension of the high speed serial interconnect provided by Fibre Channel is beneficial, it is desirable to provide security controls in addition to extended access to storage devices through a native low level, block protocol.

[0021] FIGURE 3 is a block diagram of one embodiment of a storage network, indicated generally at 50, with a storage router that provides virtual local storage. Similar to that of FIGURE 2, storage network 50 includes a Fibre Channel high speed serial interconnect 52 and a SCSI bus 54 bridged by a storage router 56. Storage router 56 of FIGURE 3 provides for a large number of workstations 58 to be interconnected on a common storage transport and to access common storage devices 60, 62 and 64 through native low level, block protocols.

[0022] According to the present invention, storage router 56 has enhanced functionality to implement security controls and routing such that each workstation 58 can

have access to a specific subset of the overall data stored in storage devices 60, 62 and 64. This specific subset of data has the appearance and characteristics of local storage and is referred to herein as virtual local storage. Storage router 56 allows the configuration and modification of the storage allocated to each attached workstation 58 through the use of mapping tables or other mapping techniques.

[0023] As shown in FIGURE 3, for example, storage device 60 can be configured to provide global data 65 which can be accessed by all workstations 58. Storage device 62 can be configured to provide partitioned subsets 66, 68, 70 and 72, where each partition is allocated to one of the workstations 58 (workstations A, B, C and D). These subsets 66, 68, 70 and 72 can only be accessed by the associated workstation 58 and appear to the associated workstation 58 as local storage accessed using native low level, block protocols. Similarly, storage device 64 can be allocated as storage for the remaining workstation 58 (workstation E).

[0024] Storage router 56 combines access control with routing such that each workstation 58 has controlled access to only the specified partition of storage device 62 which forms virtual local storage for the workstation 58. This access control allows security control for the specified data partitions. Storage router 56 allows this allocation of storage devices 60, 62 and 64 to be managed by a management station 76. Management station 76 can connect directly to storage router 56 via a direct connection or, alternately, can interface with storage router 56 through either Fibre Channel 52 or SCSI bus 54. In the latter case, management station 76 can be a workstation or other computing device with special rights such that storage router 56 allows access to mapping tables and shows storage devices 60, 62 and 64 as they exist physically rather than as they have been allocated.

[0025] The environment of FIGURE 3 extends the concept of single workstation having locally connected storage devices to a storage network 50 in which workstations

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58 are provided virtual local storage in a manner transparent to workstations 58. Storage router 56 provides centralized control of what each workstation 58 sees as its local drive, as well as what data it sees as global data accessible by other workstations 58. Consequently, the storage space considered by the workstation 58 to be its local storage is actually a partition (i.e., logical storage definition) of a physically remote storage device 60, 62 or 64 connected through storage router 56. This means that similar requests from workstations 58 for access to their local storage devices produce different accesses to the storage space on storage devices 60, 62 and 64. Further, no access from a workstation 58 is allowed to the virtual local storage of another workstation 58.

[0026] The collective storage provided by storage devices 60, 62 and 64 can have blocks allocated by programming means within storage router 56. To accomplish this function, storage router 56 can include routing tables and security controls that define storage allocation for each workstation 58. The advantages provided by implementing virtual local storage in centralized storage devices include the ability to do collective backups and other collective administrative functions more easily. This is accomplished without limiting the performance of workstations 58 because storage access involves native low level, block protocols and does not involve the overhead of high level protocols and file systems required by network servers.

[0027] FIGURE 4 is a block diagram of one embodiment of storage router 56 of FIGURE 3. Storage router 56 can comprise a Fibre Channel controller 80 that interfaces with Fibre Channel 52 and a SCSI controller 82 that interfaces with SCSI bus 54. A buffer 84 provides memory work space and is connected to both Fibre Channel controller 80 and to SCSI controller 82. A supervisor unit 86 is connected to Fibre Channel controller 80, SCSI controller 82 and buffer 84. Supervisor unit 86 comprises a microprocessor for controlling operation of storage router 56 and to handle mapping and-security access for requests between Fibre Channel 52 and SCSI bus 54.

- [0028] FIGURE 5 is a block diagram of one embodiment of data flow within storage router 56 of FIGURE 4. As shown, data from Fibre Channel 52 is processed by a Fibre Channel (FC) protocol unit 88 and placed in a FIFO queue 90. A direct memory access (DMA) interface 92 then takes data out of FIFO queue 90 and places it in buffer 84. Supervisor unit 86 processes the data in buffer 84 as represented by supervisor processing 93. This processing involves mapping between Fibre Channel 52 and SCSI bus 54 and applying access controls and routing functions. A DMA interface 94 then pulls data from buffer 84 and places it into a buffer 96. A SCSI protocol unit 98 pulls data from buffer 96 and communicates the data on SCSI bus 54. Data flow in the reverse direction, from SCSI bus 54 to Fibre Channel 52, is accomplished in a reverse manner.
- [0029] The storage router of the present invention is a bridge device that connects a Fibre Channel link directly to a SCSI bus and enables the exchange of SCSI command set information between application clients on SCSI bus devices and the Fibre Channel links. Further, the storage router applies access controls such that virtual local storage can be established in remote SCSI storage devices for workstations on the Fibre Channel link. In one embodiment, the storage router provides a connection for Fibre Channel links running the SCSI Fibre Channel Protocol (FCP) to legacy SCSI devices attached to a SCSI bus. The Fibre Channel topology is typically an Arbitrated Loop (FC_AL).
- [0030] In part, the storage router enables a migration path Fibre Channel based, serial SCSI networks by providing connectivity for legacy SCSI bus devices. The storage router can be attached to a Fibre Channel Arbitrated Loop and a SCSI bus to support a number of SCSI devices. Using configuration settings, the storage router can make the SCSI bus devices available on the Fibre Channel network as FCP logical units. Once the configuration is defined, operation of the storage router is transparent to application clients. In this manner, the storage router can form an integral part of the migration to new Fibre Channel based networks while providing a means to continue using legacy SCSI devices.

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- [0031] In one implementation (not shown), the storage router can be a rack mount or free standing device with an internal power supply. The storage router can have a Fibre Channel and SCSI port, and a standard, detachable power cord can be used, the FC connector can be a copper DB9 connector, and the SCSI connector can be a 68-pin type. Additional modular jacks can be provided for a serial port and an 802.3 10BaseT port, i.e. twisted pair Ethernet, for management access. The SCSI port of the storage router can support SCSI direct and sequential access target devices and can support SCSI initiators, as well. The Fibre Channel port can interface to SCSI-3 FCP enabled devices and initiators.
- [0032] To accomplish its functionality, one implementation of the storage router uses: a Fibre Channel interface based on the HEWLETT-PACKARD TACHYON HPFC-5000 controller and a GLM media interface; an Intel 80960RP processor, incorporating independent data and program memory spaces, and associated logic required to implement a stand alone processing system; and a serial port for debug and system configuration. Further, this implementation includes a SCSI interface supporting Fast-20 based on the SYMBIOS 53C8xx series SCSI controllers, and an operating system based upon the WIND RIVERS SYSTEMS VXWORKS or IXWORKS kernel, as determined by design. In addition, the storage router includes software as required to control basic functions of the various elements, and to provide appropriate translations between the FC and SCSI protocols.
- [0033] The storage router has various modes of operation that are possible between FC and SCSI target and initiator combinations. These modes are: FC Initiator to SCSI Target; SCSI Initiator to FC Target; SCSI Initiator to SCSI Target; and FC Initiator to FC Target. The first two modes can be supported concurrently in a single storage router device and are discussed briefly below. The third mode can involve two storage router devices back to back and can serve primarily as a device to extend the physical distance beyond that possible via a direct SCSI connection. The last mode can be used to carry FC protocols encapsulated on

other transmission technologies (e.g. ATM, SONET), or to act as a bridge between two FC loops (e.g. as a two port fabric).

- [0034] The FC Initiator to SCSI Target mode provides for the basic configuration of a server using Fibre Channel to communicate with SCSI targets. This mode requires that a host system have an FC attached device and associated device drivers and software to generate SCSI-3 FCP requests. This system acts as an initiator using the storage router to communicate with SCSI target devices. The SCSI devices supported can include SCSI-2 compliant direct or sequential access (disk or tape) devices. The storage router serves to translate command and status information and transfer data between SCSI-3 FCP and SCSI-2, allowing the use of standard SCSI-2 devices in a Fibre Channel environment.
- [0035] The SCSI Initiator to FC Target mode provides for the configuration of a server using SCSI-2 to communicate with Fibre Channel targets. This mode requires that a host system has a SCSI-2 interface and driver software to control SCSI-2 target devices. The storage router will connect to the SCSI-2 bus and respond as a target to multiple target IDs. Configuration information is required to identify the target IDs to which the bridge will respond on the SCSI-2 bus. The storage router then translates the SCSI-2 requests to SCSI-3 FCP requests, allowing the use of FC devices with a SCSI host system. This will also allow features such as a tape device acting as an initiator on the SCSI bus to provide full support for this type of SCSI device.
- [0036] In general, user configuration of the storage router will be needed to support various functional modes of operation. Configuration can be modified, for example, through a serial port or through an Ethernet port via SNMP (simple network management protocol) or the Telnet session. Specifically, SNMP manageability can be provided via a B02.3 Ethernet interface. This can provide for configuration changes as well as providing statistics and error information. Configuration can also be performed via TELNET or RS-232 interfaces with menu driven command interfaces. Configuration information can be stored in a

segment of flash memory and can be retained across resets and power off cycles. Password protection can also be provided.

- [0037] In the first two modes of operation, addressing information is needed to map from FC addressing to SCSI addressing and vice versa. This can be 'hard' configuration data, due to the need for address information to be maintained across initialization and partial reconfigurations of the Fibre Channel address space. In an arbitrated loop configuration, user configured addresses will be needed for AL_PAs in order to insure that known addresses are provided between loop reconfigurations.
- [0038] With respect to addressing, FCP and SCSI 2 systems employ different methods of addressing target devices. Additionally, the inclusion of a storage router means that a method of translating device IDs needs to be implemented. In addition, the storage router can respond to commands without passing the commands through to the opposite interface. This can be implemented to allow all generic FCP and SCSI commands to pass through the storage router to address attached devices, but allow for configuration and diagnostics to be performed directly on the storage router through the FC and SCSI interfaces.
- [0039] Management commands are those intended to be processed by the storage router controller directly. This may include diagnostic, mode, and log commands as well as other vendor-specific commands. These commands can be received and processed by both the FOP and SCSI interfaces, but are not typically bridged to the opposite interface. These commands may also have side effects on the operation of the storage router, and cause other storage router operations to change or terminate.
- [0040] A primary method of addressing management commands though the FCP and SCSI interfaces can be through peripheral device type addressing. For example, the storage router can respond to all operations addressed to logical unit (LUN) zero as a controller device. Commands that the storage router will support can

include INQUIRY as well as vendor-specific management commands. These are to be generally consistent with SCC standard commands.

- [0041] The SCSI bus is capable of establishing bus connections between targets. These targets may internally address logical units. Thus, the prioritized addressing scheme used by SCSI subsystems can be represented as follows:
BUS:TARGET:LOGICAL UNIT. The BUS identification is intrinsic in the configuration, as a SCSI initiator is attached to only one bus. Target addressing is handled by bus arbitration from information provided to the arbitrating device. Target addresses are assigned to SCSI devices directly through some means of configuration, such as a hardware jumper, switch setting, or device specific software configuration. As such, the SCSI protocol provides only logical unit addressing within the Identify message. Bus and target information is implied by the established connection.
- [0042] Fibre Channel devices within a fabric are addressed by a unique port identifier. This identifier is assigned to a port during certain well-defined states of the FC protocol. Individual ports are allowed to arbitrate for a known, user defined address. If such an address is not provided, or if arbitration for a particular-user address fails, the port is assigned a unique address by the FC protocol. This address is generally not guaranteed to be unique between instances. Various scenarios exist where the AL-PA of a device will change, either after power cycle or loop reconfiguration.
- [0043] The FC protocol also provides a logical unit address field within command structures to provide addressing to devices internal to a port. The FCP_CMD payload specifies an eight byte LUN field. Subsequent identification of the exchange between devices is provided by the FQXID (Fully Qualified Exchange ID).
- [0044] FC ports can be required to have specific addresses assigned. Although basic functionality is not dependent on this, changes in the loop configuration could

result in disk targets changing identifiers with the potential risk of data corruption or loss. This configuration can be straightforward, and can consist of providing the device a loop-unique ID (AL_PA) in the range of "01h" to "EFh." Storage routers could be shipped with a default value with the assumption that most configurations will be using single storage routers and no other devices requesting the present ID. This would provide a minimum amount of initial configuration to the system administrator. Alternately, storage routers could be defaulted to assume any address so that configurations requiring multiple storage routers on a loop would not require that the administrator assign a unique ID to the additional storage routers.

[0045] Address translation is needed where commands are issued in the cases FC Initiator to SCSI Target and SCSI Initiator to FC Target. Target responses are qualified by the FQXID and will retain the translation acquired at the beginning of the exchange. This prevents configuration changes occurring during the course of execution of a command from causing data or state information to be inadvertently misdirected. Configuration can be required in cases of SCSI Initiator to FC Target, as discovery may not effectively allow for FCP targets to consistently be found. This is due to an FC arbitrated loop supporting addressing of a larger number of devices than a SCSI bus and the possibility of FC devices changing their AL-PA due to device insertion or other loop initialization.

[0046] In the direct method, the translation to BUS:TARGET:LUN of the SCSI address information will be direct. That is, the values represented in the FCP LUN field will directly map to the values in effect on the SCSI bus. This provides a clean translation and does not require SCSI bus discovery. It also allows devices to be dynamically added to the SCSI bus without modifying the address map. It may not allow for complete discovery by FCP initiator devices, as gaps between device addresses may halt the discovery process. Legacy SCSI device drivers typically halt discovery on a target device at the first unoccupied LUN, and proceed to the next target. This would lead to some devices not being

discovered. However, this allows for hot plugged devices and other changes to the loop addressing.

[0047] In the ordered method, ordered translation requires that the storage router perform discovery on reset, and collapses the addresses on the SCSI bus to sequential FSP LUN values. Thus, the FCP LUN values 0-N can represent N+1 SCSI devices, regardless of SCSI address values, in the order in which they are isolated during the SCSI discovery process. This would allow the FCP initiator discovery process to identify all mapped SCSI devices without further configuration. This has the limitation that hot-plugged devices will not be identified until the next reset cycle. In this case, the address may also be altered as well.

[0048] In addition to addressing, according to the present invention, the storage router provides configuration and access controls that cause certain requests from FC Initiators to be directed to assigned virtual local storage partitioned on SCSI storage devices. For example, the same request for LUN 0 (local storage) by two different FC Initiators can be directed to two separate subsets of storage. The storage router can use tables to map, for each initiator, what storage access is available and what partition is being addressed by a particular request. In this manner, the storage space provided by SCSI storage devices can be allocated to FC initiators to provide virtual local storage as well as to create any other desired configuration for secured access.

[0049] Although the present invention has been described in detail, it should be understood that various changes, substitutions, and alterations can be made hereto without departing from the spirit and scope of the invention as defined by the appended claims.

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WHAT IS CLAIMED IS:

1. A storage router for providing virtual local storage on remote storage devices, comprising:
 - a first controller operable to interface with a first transport medium, wherein the first medium is a serial transport media; and
 - a processing device coupled to the first controller, wherein the processing device is configured to:
 - maintain a map to allocate storage space on the remote storage devices to devices connected to the first transport medium by associating representations of the devices connected to the first transport medium with representations of storage space on the remote storage devices, wherein each representation of a device connected to the first transport medium is associated with one or more representations of storage space on the remote storage devices;
 - control access from the devices connected to the first transport medium to the storage space on the remote storage devices in accordance with the map; and
 - allow access from devices connected to the first transport medium to the remote storage devices using native low level block protocol.
2. The storage router of Claim 1, wherein the map associates a representation of storage space on the remote storage devices with multiple devices connected to the first transport medium.
3. The storage router of Claim 1, wherein the storage space on the remote storage devices comprises storage space on multiple remote storage devices.
4. The storage router of Claim 1, wherein the map associates a representation of a device connected to the first transport medium with a representation of an entire storage space of at least one remote storage device.
5. The storage router of Claim 1, wherein the map resides at the storage router and is maintained at the storage router.

6. The storage router of Claim 1, wherein the native low level block protocol is received at the storage router via the first transport medium and the processing device uses the received native low level block protocol to allow the devices connected to the first transport medium access to storage space specifically allocated to them in the map.

7. The storage router of Claim 1, wherein the storage router is configured to receive commands according to a first low level block protocol from the device connected to the first transport medium and forward commands according to a second low level block protocol to the remote storage devices.

8. The storage router of Claim 7, wherein the first low level block protocol is an FCP protocol and the second low level block protocol is a protocol other than FCP.

9. The storage router of Claim 1, wherein the map comprises one or more tables.

10. The storage router of Claim 1, wherein the virtual local storage is provided to the devices connected to the first transport medium in a manner that is transparent to the devices and wherein the storage space allocated to the devices connected to the first transport medium appears to the devices as local storage.

11. The storage router of Claim 1, wherein the storage router provides centralized control of what the devices connected to the first transport medium see as local storage.

12. The storage router of Claim 1, wherein the representations of storage space comprise logical unit numbers that represent a subset of storage on the remote storage devices.

13. The storage router of Claim 12, wherein the storage router is operable to route requests to the same logical unit number from different devices connected to the first transport medium to different subsets of storage space on the remote storage devices.

14. The storage router of Claim 1, wherein the representations of devices connected to the first transport medium are unique identifiers.

15. The storage router of Claim 14, wherein the unique identifiers are world wide names.

16. The storage router of Claim 1, wherein the storage router is configured to allow modification of the map in a manner transparent to and without involvement of the devices connected to the first transport medium.

17. The storage router of Claim 1, wherein the processing device is a microprocessor.

18. The storage router of Claim 1, wherein the processing device is a microprocessor and associated logic to implement a stand-alone processing system.

19. The storage router of Claim 1, wherein the first transport medium is a fibre channel transport medium and further comprising a second transport medium connected to the remote storage devices that is a fibre channel transport medium.

20. A storage network comprising:
a set of devices connected a first transport medium, wherein the first transport medium;
a set of remote storage devices connected to a second transport medium;
a storage router connected to the serial transport medium;
a storage router connected to the first transport medium and second transport medium to provide virtual local storage on the remote storage devices, the storage router configured to:
maintain a map to allocate storage space on the remote storage devices to devices connected to the first transport medium by associating representations of the devices connected to the first transport medium with representations of storage space on the remote storage devices, wherein each representation of a device connected to the first transport medium is associated with one or more representations of storage space on the remote storage devices;
control access from the devices connected to the first transport medium to the storage space on the remote storage devices in accordance with the map; and

allow access from devices connected to the first transport medium to the remote storage devices using native low level block protocol.

21. The storage network of Claim 20, wherein the map associates a representation of storage space on the remote storage devices with multiple devices connected to the first transport medium.

22. The storage network of Claim 20, wherein the storage space on the remote storage devices comprises storage space on multiple remote storage devices.

23. The storage network of Claim 20, wherein the map associates a representation of a device connected to the first transport medium with a representation of an entire storage space of at least one remote storage device.

24. The storage network of Claim 20, wherein the map resides at the storage router and is maintained at the storage router.

25. The storage network of Claim 20, wherein the native low level block protocol is received at the storage router via the first transport medium and the storage router uses the received native low level block protocol to allow the devices connected to the first transport medium access to storage space specifically allocated to them in the map.

26. The storage router of Claim 20, wherein the storage router is configured to receive commands according to a first low level block protocol from the device connected to the first transport medium and forward commands according to a second low level block protocol to the remote storage devices.

27. The storage network of Claim 20, wherein the first low level block protocol is an FCP protocol and the second low level block protocol is a protocol other than FCP.

28. The storage network of Claim 20, wherein the map comprises one or more tables.

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29. The storage network of Claim 20, wherein the virtual local storage is provided to the devices connected to the first transport medium in a manner that is transparent to the devices and wherein the storage space allocated to the devices connected to the first transport medium appears to the devices as local storage.

30. The storage network of Claim 20, wherein the storage router provides centralized control of what the devices connected to the first transport medium see as local storage.

31. The storage network of Claim 20, wherein the representations of storage space comprise logical unit numbers that represent a subset of storage on the remote storage devices.

32. The storage network of Claim 31, wherein the storage router is operable to route requests to the same logical unit number from different devices connected to the first transport medium to different subsets of storage space on the remote storage devices.

33. The storage network of Claim 20, wherein the representations of devices connected to the first transport medium are unique identifiers.

34. The storage network of Claim 33, wherein the unique identifiers are world wide names.

35. The storage network of Claim 20, wherein the storage router is configured to allow modification of the map in a manner transparent to and without involvement of the devices connected to the first transport medium.

36. The storage network of Claim 20, wherein the first transport medium is a fibre channel transport medium and the second transport medium is a fibre channel transport medium.

37. A method for providing virtual local storage on remote storage devices comprising:

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connecting a storage router between a set of devices connected to a first transport medium and a set of remote storage devices, wherein the first transport medium is a serial transport medium;

maintaining a map at the storage router to allocate storage space on the remote storage devices to devices connected to the first transport medium by associating representations of the devices connected to the first transport medium with representations of storage space on the remote storage devices, wherein each representation of a device connected to the first transport medium is associated with one or more representations of storage space on the remote storage devices;

controlling access from the devices connected to the first transport medium to the storage space on the remote storage devices in accordance with the map; and

allowing access from devices connected to the first transport medium to the remote storage devices using native low level block protocol.

38. The method of Claim 37, wherein the map associates a representation of storage space on the remote storage devices with multiple devices connected to the first transport medium.

39. The method of Claim 37, wherein the storage space on the remote storage devices comprises storage space on multiple remote storage devices.

40. The method of Claim 37, wherein the map associates a representation of a device connected to the first transport medium with a representation of an entire storage space of at least one remote storage device.

41. The method of Claim 37, wherein the map resides at the storage router and is maintained at the storage router.

42. The method of Claim 37, further comprising:
receiving the native low level block protocol at the storage router via the first transport medium;

using the received native low level block protocol at the storage router to allow the devices connected to the first transport medium access to storage space specifically allocated to them in the map.

43. The method of Claim 37, further comprising receiving commands at the storage router according to a first low level block protocol from the device connected to the first transport medium and forwarding commands according to a second low level block protocol to the remote storage devices.

44. The method of Claim 43, wherein the first low level block protocol is an FCP protocol and the second low level block protocol is a protocol other than FCP.

45. The method of Claim 37, wherein the map comprises one or more tables.

46. The method of Claim 37, wherein the virtual local storage is provided to the devices connected to the first transport medium in a manner that is transparent to the devices and wherein the storage space allocated to the devices connected to the first transport medium appears to the devices as local storage.

47. The method of Claim 37, wherein the storage router provides centralized control of what the devices connected to the first transport medium see as local storage.

48. The method of Claim 37, wherein the representations of storage space comprise logical unit numbers that represent a subset of storage on the remote storage devices.

49. The method of Claim 48, wherein the storage router is operable to route requests to the same logical unit number from different devices connected to the first transport medium to different subsets of storage space on the remote storage devices.

50. The method of Claim 37, wherein the representations of devices connected to the first transport medium are unique identifiers.

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51. The method of Claim 50, wherein the unique identifiers are world wide names.

52. The method of Claim 51, wherein the storage router is configured to allow modification of the map in a manner transparent to and without involvement of the devices connected to the first transport medium.

53. The method of Claim 1 wherein connecting the storage router between a set of devices connected to a first transport medium and a set of remote storage devices further comprises connecting the storage router between a first fibre channel transport medium and a second fibre channel transport medium.

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STORAGE ROUTER AND METHOD FOR
PROVIDING VIRTUAL LOCAL STORAGE

ABSTRACT OF THE DISCLOSURE

[0050] A storage router and storage network provide virtual local storage on remote storage devices. A plurality of devices are connected to a first transport medium. In one embodiment, a storage router maintains a map to allocate storage space on the remote storage devices to devices connected to the first transport medium by associating representations of the devices connected to the first transport medium with representations of storage space on the remote storage devices. The storage router controls access from the devices connected to the first transport medium to the storage space on the remote storage devices in accordance with the map and allows access from devices connected to the first transport medium to the remote storage devices using native low level block protocol.

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE		
First Named Inventor/Applicant Name:		Geoffrey B. Hoese		
Filer:		John L. Adair/Delia Narvaiz		
Attorney Docket Number:		CROSS1120-33		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility application filing	1011	1	330	330
Utility Search Fee	1111	1	540	540
Utility Examination Fee	1311	1	220	220
Pages:				
Claims:				
Claims in excess of 20	1202	33	52	1716
Miscellaneous-Filing:				
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				2806

Electronic Acknowledgement Receipt

EFS ID:	6845953
Application Number:	12690592
International Application Number:	
Confirmation Number:	8115
Title of Invention:	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE
First Named Inventor/Applicant Name:	Geoffrey B. Hoese
Customer Number:	44654
Filer:	John L. Adair/Delia Narvaiz
Filer Authorized By:	John L. Adair
Attorney Docket Number:	CROSS1120-33
Receipt Date:	20-JAN-2010
Filing Date:	
Time Stamp:	16:24:15
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 2806
RAM confirmation Number	3127
Deposit Account	503183
Authorized User	
<p>The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)</p>	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)					
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	CROSS1120-33_Cert_Transmission.pdf	23572 7d03f1dc62be0e2f8f6d2793f0af2a9d51a966	no	1
Warnings:					
Information:					
2	Miscellaneous Incoming Letter	CROSS1120-33_Id_chg_POA.pdf	153882 c7162bfecceb5044f313e4c768dc96c5d5951a60	no	6
Warnings:					
Information:					
3	Oath or Declaration filed	CROSS1120-33_Declaration_of_parent.pdf	125807 c84a7ce304d738dabf74ae001585566f64a8a261	no	4
Warnings:					
Information:					
4	Drawings-only black and white line drawings	CROSS1120-33_Drawings.pdf	36044 f06f4160ea11d04338498da87a96713f1652c97b	no	2
Warnings:					
Information:					
5	Transmittal of New Application	CROSS1120-33_Transmittal.pdf	75251 bcbbc251aa07bf22f000918791a0e6c8517fdac9	no	1
Warnings:					
Information:					
6		CROSS1120-33_Application.pdf	89877 516836a9c3cb832e9c0eeec0634652871cfb45e3a	yes	25
Multipart Description/PDF files in .zip description					
Document Description		Start	End		
Specification		1	16		
Claims		17	24		
Abstract		25	25		
Warnings:					

Information:					
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Warnings:					
Information:					
Total Files Size (in bytes):			541181		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

Electronic Acknowledgement Receipt

EFS ID:	6845953
Application Number:	12690592
International Application Number:	
Confirmation Number:	8115
Title of Invention:	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE
First Named Inventor/Applicant Name:	Geoffrey B. Hoese
Customer Number:	44654
Filer:	John L. Adair/Delia Narvaiz
Filer Authorized By:	John L. Adair
Attorney Docket Number:	CROSS1120-33
Receipt Date:	20-JAN-2010
Filing Date:	
Time Stamp:	16:24:15
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 2806
RAM confirmation Number	3127
Deposit Account	503183
Authorized User	
<p>The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)</p>	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)					
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	CROSS1120-33_Cert_Transmission.pdf	23572 7d03f1dc62be0e2f8f6d2793f0af2a9d51a966	no	1
Warnings:					
Information:					
2	Miscellaneous Incoming Letter	CROSS1120-33_Id_chg_POA.pdf	153882 c7162bfecceb5044f313e4c768dc96c5d5951a60	no	6
Warnings:					
Information:					
3	Oath or Declaration filed	CROSS1120-33_Declaration_of_parent.pdf	125807 c84a7ce304d738dabf74ae001585566f648a261	no	4
Warnings:					
Information:					
4	Drawings-only black and white line drawings	CROSS1120-33_Drawings.pdf	36044 f06f4160ea11d04338498da87a96713f1652c97b	no	2
Warnings:					
Information:					
5	Transmittal of New Application	CROSS1120-33_Transmittal.pdf	75251 bcbbc251aa07b22f000918791a0e6c8517fdac9	no	1
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6		CROSS1120-33_Application.pdf	89877 516836a9c3cb832e9c0e0e0634652871cfb45e3a	yes	25
Multipart Description/PDF files in .zip description					
Document Description			Start	End	
Specification			1	16	
Claims			17	24	
Abstract			25	25	
Warnings:					

Information:					
7	Fee Worksheet (PTO-875)	fee-info.pdf	36748	no	2
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Warnings:					
Information:					
Total Files Size (in bytes):				541181	
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
CERTIFICATE OF TRANSMISSION VIA EFS-WEB SYSTEM	Atty Docket No. CROSS1120-33
Mail Stop: Patent Application Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450 Dear Sir:	In the Application of: Geoffrey B. Hoese
	Date Filed: Herewith
	Title: Storage Router and Method for Providing Virtual Local Storage

I hereby certify that the attached Utility Patent Application Transmittal Form, Declaration (copy from parent), Identification of Change in Power of Attorney Under 37 CFR 1.63(d)(4), Continuation Patent Application and copies of Drawings (2 sheets) are being deposited electronically using the United States Patent Office EFS-Web System on January 20, 2010

Respectfully submitted,

Sprinkle IP Law Group

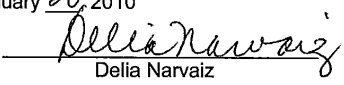


Delia Narvaiz

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
IDENTIFICATION OF CHANGE IN POWER OF ATTORNEY UNDER 37 C.F.R. 1.63(d)(4)	
Atty. Docket No. CROSS1120-33	
Applicant Geoffrey B. Hoese, et al.	
Application Number Unknown	Date Filed January __, 2010
Title Storage Router and Method for Providing Virtual Local Storage	
Confirmation Number: Unknown	Group Art Unit Unknown

Commissioner for Patents
 P.O. Box 1450
 Alexandria, VA 22313-1450

Dear Sir:

<u>Certificate of Transmission Under 37 C.F.R. § 1.8</u>
I hereby certify that this correspondence is being transmitted to the U.S. Patent and Trademark Office via the EFS-Web filing system on January <u>20</u> , 2010  Delia Narvaiz

The above-referenced application is a continuation application of and claims priority from U.S. Patent Application No. 12/552,885 filed on 09/02/2009 ("Prior Application"). The power of attorney and correspondence address were changed during the prosecution of the Prior Application. 37 C.F.R. 1.63(d)(4) states:

Where the power of attorney or correspondence address was changed during the prosecution of the prior application, the change in power of attorney or correspondence address must be identified in the continuation or divisional application. Otherwise, the Office may not recognize in the continuation or divisional application the change of power of attorney or correspondence address during the prosecution of the prior application.

As evidenced by Exhibit A submitted herewith, during the prosecution of Prior Application, the power of attorney was changed to attorneys under Customer No. 44654, all of the firm of Sprinkle IP Law Group, and the correspondence address was changed to:

Customer No. 44654
 Sprinkle IP Law Group
 1301 W. 25th Street, Suite 408
 Austin, Texas 78705

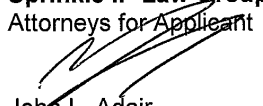
ATTORNEY DOCKET NO.
CROSS1120-33

Patent Application
Customer ID: 44654

Please recognize these changes in U.S. instant application. Please call the undersigned with any question you may have regarding this matter.

Respectfully submitted,

Sprinkle IP Law Group
Attorneys for Applicant


John L. Adair
Reg. No. 48,828

Dated: *Jan 20, 2010*

1301 W. 25th Street, Suite 408
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EXHIBIT “A”



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/552,885	09/02/2009	Geoffrey B. Hoese	CROSS1120-30

CONFIRMATION NO. 5484

POA ACCEPTANCE LETTER

44654
SPRINKLE IP LAW GROUP
1301 W. 25TH STREET
SUITE 408
AUSTIN, TX 78705



Date Mailed: 09/22/2009

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/02/2009.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/bcao/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

COPY FROM Patent

IN THE UNITED STATES PATENT AND TRADE MARK OFFICE	
REVOCATION AND POWER OF ATTORNEY AND CHANGE OF MAILING ADDRESS	Atty. Docket No. (Optional) CROSS1120-13
Applicants Geoffrey B Hoese, et. al.	
Application Number 10/658,163	Filed 9/9/2003
For STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE	
Group Art Unit 2186	Examiner Unknown
Confirmation No. 5675	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Certification Under 37 C.F.R. §1.8	
I hereby certify that this document is being transmitted to COMMISSIONER FOR PATENTS via facsimile on <u>8-17</u> , 2004.	
<u>Reynette Deveau</u> Signed Name	
<u>Reynette Deveau</u> Printed Name	

Crossroads Systems, Inc., 100% owner of the above-identified patent application, as evidenced by the Assignment recorded on December 31, 1997 on Reel/Frame: 8929/0290, hereby revokes all previous Powers of Attorney and appoints the following attorneys under Customer No. 44654, all of the firm of SPRINKLE IP LAW GROUP, to prosecute the above-identified Patent and to transact all business in the Patent and Trademark Office connected therewith.

STEVEN R. SPRINKLE	Registration No. 40,825
JOHN ADAIR	Registration No. 48,828
ARI AKMAL	Registration No. 51,388

Direct all telephone calls and correspondence to:

Customer No. 44654
SPRINKLE IP LAW GROUP
P.O. Box 684767
Austin, TX 78768-4767
Attn: Steven Sprinkle
Tel. (512) 637.9220 / Fax (512) 371.9088

I hereby state I am authorized to act on behalf of CROSSROADS SYSTEMS, INC.

Respectfully submitted,

Crossroads Systems, Inc.

Dated: 8/11, 2004

By: [Signature]
Robert Sims, President & CEO



UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/658,163	09/09/2003	Geoffrey B. Hoese	CROSS1120-13

44654
SPRINKLE IP LAW GROUP
1301 W. 25TH STREET
SUITE 408
AUSTIN, TX 78705

CONFIRMATION NO. 5675
OC000000018039068
OC000000018039068

Date Mailed: 02/10/2006

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

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The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

RECEIVED BY: JP


FEB 21 2006

Docketed By: _____

Date Docketed: _____

Attorney: _____

C/M No: _____


ALBERTINA L. JACKSON
2100 (571) 272-3594

ATTORNEY/APPLICANT COPY

Copy
From
Parent

DECLARATION AND POWER OF ATTORNEY

As the below named inventor, I declare that:

My residence, post office address and citizenship are as stated below next to my name, that I believe I am the original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention or design entitled STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE, the specification of which (check one):

 X is attached hereto; or
 was filed on as
Application Serial No. and was
amended on (if applicable);

that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above; and that I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to me to be material to patentability as defined in 37 C.F.R. § 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application(s) for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

<u>Number</u>	<u>Country</u>	<u>Date Filed</u>	<u>Priority Claimed (Yes) (No)</u>
---------------	----------------	-------------------	------------------------------------

None.

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application(s) in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to me to be material to patentability as defined in 37 C.F.R. § 1.56 which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

<u>Application</u> <u>Serial Number</u>	<u>Date Filed</u>	<u>Status</u>
--	-------------------	---------------

None.

I hereby appoint:

Jerry W. Mills	Reg. No. 23,005
Robert M. Chiaviello, Jr.	Reg. No. 32,461
Ann C. Livingston	Reg. No. 32,479
William N. Hulsey III	Reg. No. 33,402
Thomas R. Felger	Reg. No. 28,842
Charles S. Fish	Reg. No. 35,870
Wei Wei Jeang	Reg. No. 33,305
Kevin J. Meek	Reg. No. 33,738
Anthony E. Peterman	Reg. No. 38,270
Barton E. Showalter	Reg. No. 38,302
David G. Wille	Reg. No. 38,363
Philip W. Woo	Reg. No. 39,880
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Terry J. Stalford	Reg. No. 39,522
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Daniel P. Stewart	Reg. No. 41,332
Roger J. Fulghum	Reg. No. 39,678
Rodger L. Tate	Reg. No. 27,399
Scott F. Partridge	Reg. No. 28,142
James B. Arpin	Reg. No. 33,470
James Remenick	Reg. No. 36,902

AUS01:123882.1

ATTORNEY DOCKET
064113.0103

3

Jay B. Johnson	Reg. No. 38,193
Christopher C. Campbell	Reg. No. 37,291
Stacy B. Margolies	Reg. No. 39,760
Robert W. Holland	Reg. No. 40,020
Steven R. Sprinkle	Reg. No. 40,825

all of the firm of Baker & Botts, L.L.P., my attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith, and to file and prosecute any international patent applications filed thereon before any international authorities.

Send Correspondence To:

Baker & Botts, L.L.P.
2001 Ross Avenue
Dallas, Texas 75201-2980

Direct Telephone Calls To:

Anthony E. Peterman
at (512) 322-2599
Atty. Docket No. 064113.0103

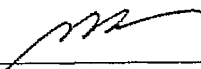
I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

AUS01:123882.1

Full name of the first inventor

Geoffrey B. Hoese

Inventor's signature



Date

12/22/97

Residence (City, County, State)

Austin, Travis County,
Texas

Citizenship

United States of America

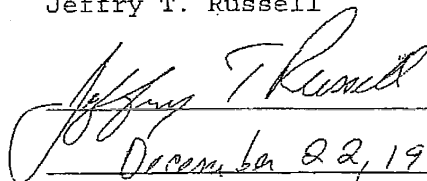
Post Office Address

1904 Ann Arbor Avenue
Austin, Texas 78704

Full name of the second inventor

Jeffrey T. Russell

Inventor's signature



Date

December 22, 1997

Residence (City, County, State)

Cibolo, Guadalupe County,
Texas

Citizenship

United States of America

Post Office Address

205 Kariba Cove
Cibolo, Texas 78108

1/2

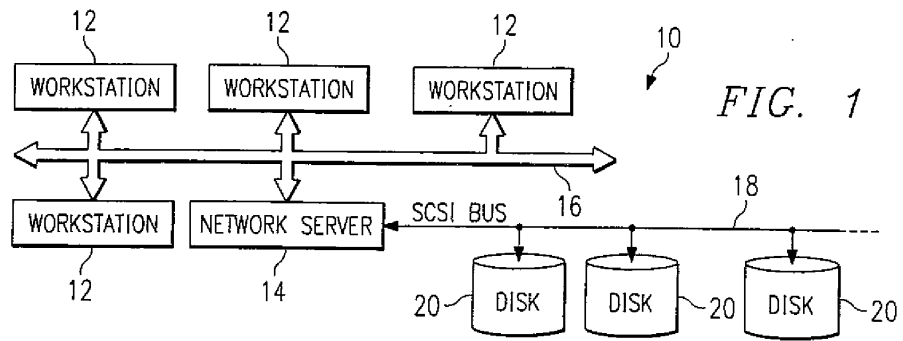


FIG. 1

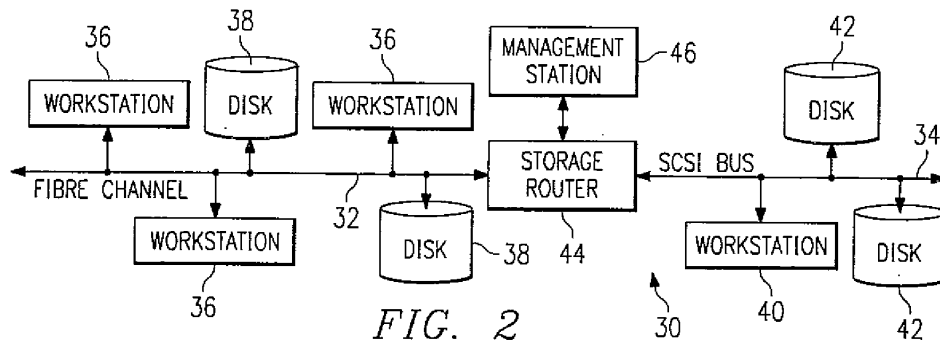


FIG. 2

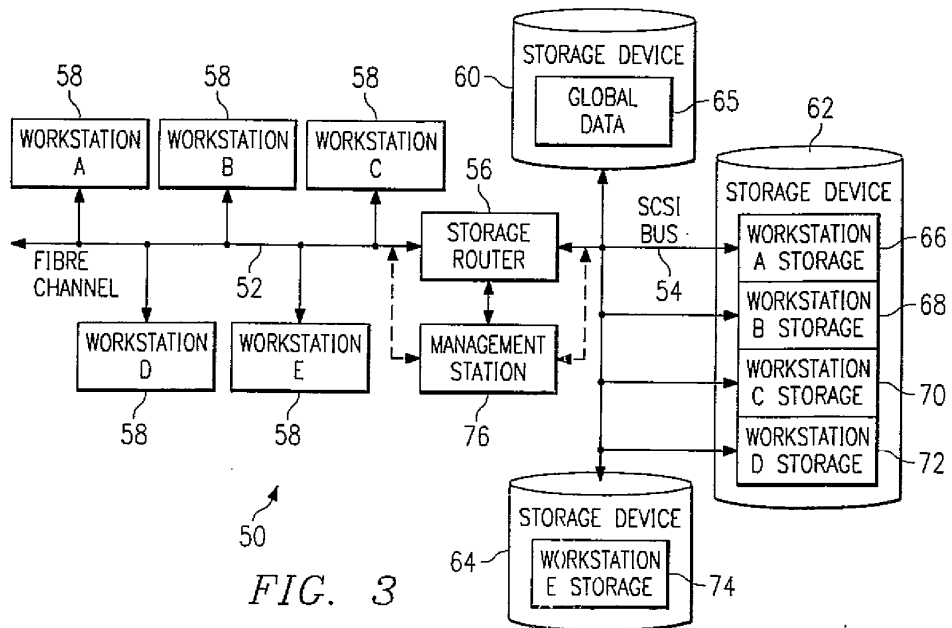
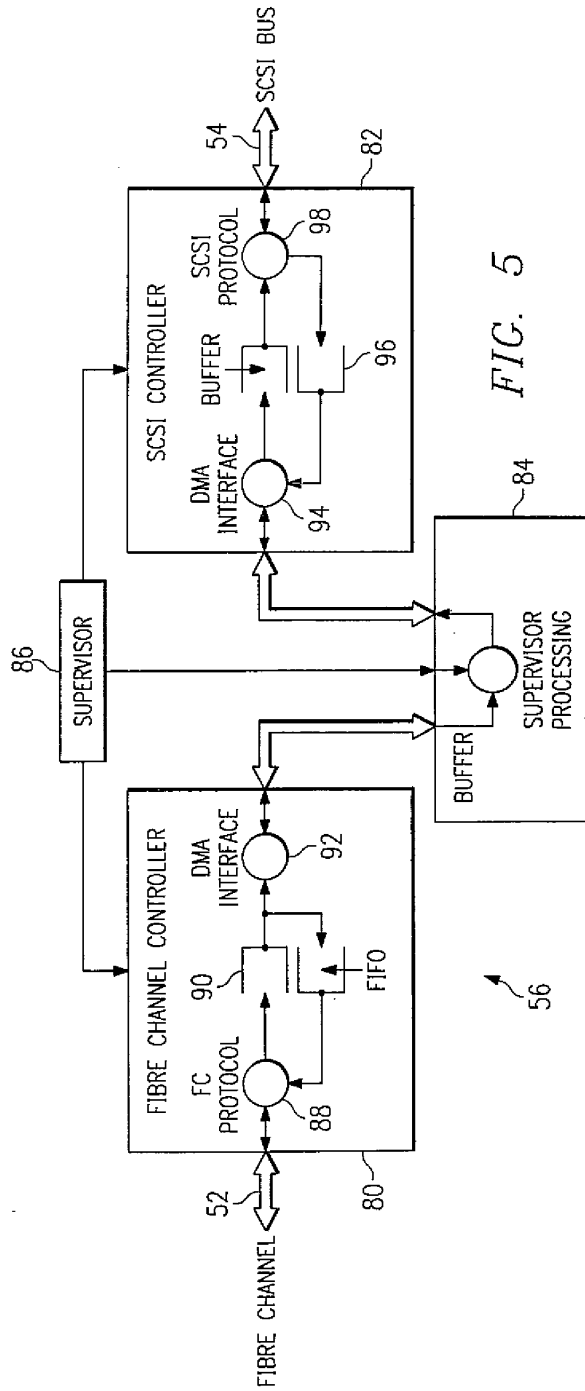
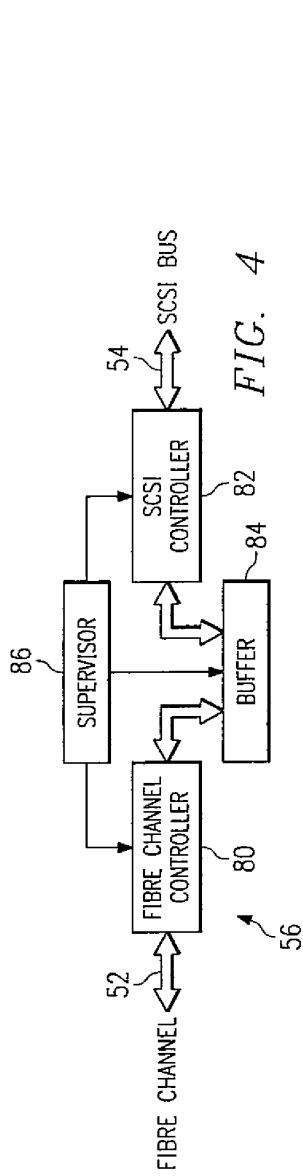


FIG. 3



Date: 01/20/10

Approved for use through 7/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 12/690,592					
APPLICATION AS FILED – PART I (Column 1) (Column 2)					SMALL ENTITY		OR	OTHER THAN SMALL ENTITY		
	FOR	NUMBER FILED	NUMBER EXTRA		RATE (\$)	FEE (\$)		RATE (\$)	FEE (\$)	
	BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A			N/A	330	
	SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A		N/A			N/A	540	
	EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A			N/A	220	
	TOTAL CLAIMS (37 CFR 1.16(i))	53	minus 20 =	33	x\$26		OR	x\$52	1716	
	INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 =	*	x\$110			x\$220		
	APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$260 (\$130 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR								
	MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				195			390		
					TOTAL			TOTAL	2806	
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED – PART II (Column 1) (Column 2) (Column 3)					SMALL ENTITY		OR	OTHER THAN SMALL ENTITY		
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	X =		OR	X =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X =		OR	X =	
	Application Size Fee (37 CFR 1.16(s))					N/A		OR	N/A	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	X =		OR	X =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X =		OR	X =	
	Application Size Fee (37 CFR 1.16(s))					N/A		OR	N/A	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	
<p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.</p> <p>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".</p> <p>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".</p> <p>The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.</p>										

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
12/690,592	01/20/2010	2111	2806	CROSS1120-33	53	3

CONFIRMATION NO. 8115

FILING RECEIPT

44654
 SPRINKLE IP LAW GROUP
 1301 W. 25TH STREET
 SUITE 408
 AUSTIN, TX 78705



Date Mailed: 02/03/2010

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Geoffrey B. Hoese, Austin, TX;
 Jeffry T. Russell, Cibolo, TX;

Power of Attorney: The patent practitioners associated with Customer Number 44654

Domestic Priority data as claimed by applicant

This application is a CON of 12/552,885 09/02/2009
 which is a CON of 11/851,724 09/07/2007
 which is a CON of 11/442,878 05/30/2006 ABN *
 which is a CON of 11/353,826 02/14/2006 PAT 7,340,549
 which is a CON of 10/658,163 09/09/2003 PAT 7,051,147
 which is a CON of 10/081,110 02/22/2002 PAT 6,789,152
 which is a CON of 09/354,682 07/15/1999 PAT 6,421,753
 which is a CON of 09/001,799 12/31/1997 PAT 5,941,972
 (*)Data provided by applicant is not consistent with PTO records.

Foreign Applications

If Required, Foreign Filing License Granted: 02/02/2010

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/690,592**

Projected Publication Date: 05/13/2010

Non-Publication Request: No

Early Publication Request: No

Title

STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

Preliminary Class

710

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/690,592	01/20/2010	Geoffrey B. Hoese	CROSS1120-33

CONFIRMATION NO. 8115

POA ACCEPTANCE LETTER

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SPRINKLE IP LAW GROUP
1301 W. 25TH STREET
SUITE 408
AUSTIN, TX 78705



Date Mailed: 02/03/2010

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This is in response to the Power of Attorney filed 01/20/2010.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/abirhanc/

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/690,592	01/20/2010	Geoffrey B. Hoese	CROSS1120-33

CONFIRMATION NO. 8115

PUBLICATION NOTICE

44654
 SPRINKLE IP LAW GROUP
 1301 W. 25TH STREET
 SUITE 408
 AUSTIN, TX 78705



Title: STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

Publication No.: US-2010-0121993-A1

Publication Date: 05/13/2010

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publicly available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

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Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	12/690,592
				Filing Date	01/20/2010
				First Named Inventor	Geoffrey B. Hoese
				Group Art Unit	2111
				Examiner Name	Unknown
Sheet	1	of	9	Attorney Docket Number	CROSS1120-33

U.S. PATENT DOCUMENTS

Examiner Initials	Cite No.	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines Where Relevant Passages or Figures Appear
		Number-Kind Code (if known)			
	A1	3,082,406	3/19/1963	L. D. Stevens	
	A2	4,092,732	5/30/1978	Ouchi	
	A3	4,170,415	10/9/1979	Lemeszewsky, et al.	
	A4	4,415,970	11/15/1983	Swenson, et al.	
	A5	4,455,605	6/19/1984	Cormier, et al.	
	A6	4,504,927	3/12/1985	Callan	
	A7	4,533,996	8/6/1985	Gartung, et al.	
	A8	4,573,152	2/25/1986	Greene, et al.	
	A9	4,603,380	7/29/1986	Easton, et al.	
	A10	4,620,295	10/28/1986	Aiden, Jr.	
	A11	4,644,462	2/17/1987	Matsubara, et al.	
	A12	4,695,948	9/22/1987	Blevins, et al.	
	A13	4,697,232	9/29/1987	Brunelle, et al.	
	A14	4,715,030	12/22/1987	Koch, et al.	
	A15	4,751,635	6/14/1988	Kret	
	A16	4,787,028	11/22/1988	Finforck, et al.	
	A17	4,807,180	2/21/1989	Takeuchi, et al.	
	A18	4,811,278	3/7/1989	Bean, et al.	
	A19	4,821,179	4/11/1989	Jensen, et al.	
	A20	4,825,406	4/25/1989	Bean, et al.	
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				First Named Inventor	Geoffrey B. Hoese	
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				Examiner Name	Unknown	
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		Group Art Unit	2111	
		Examiner Name	Unknown	
Sheet 3 of 9	Atty Docket Number	CROSS1120-33		
Examiner Initials	Cite No.	OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS		Date
	C47	Office Action in Ex Parte Reexamination 90/007,127, mailed February 7, 2005.		2/7/2005
	C48	Office Action in Ex Parte Reexamination 90/007,125, mailed February 7, 2005.		2/7/2005
	C49	Office Action in Ex Parte Reexamination 90/007,126, mailed February 7, 2005.		2/7/2005
	C50	Office Action in Ex Parte Reexamination 90/007,124, mailed February 7, 2005.		2/7/2005
	C51	Office Action in Ex Parte Reexamination 90/007,123, mailed February 7, 2005.		2/7/2005
	C52	European Office Action issued April 1, 2004 in Application No. 98966104.6-2413		4/1/2004
	C53	Office Action dated 1/27/2005 in 10/658,163 (CROSS1120-13)		1/27/2005
	C54	DIGITAL "System Support Addendum", SSA 40.78.01-A, AE-PNZJB-TE, pgs 1-3		4/1/1993
	C55	DIGITAL "Software Product Description", SSA 40.78.01, AE-PNZJB-TE, pgs 1-3		4/1/1993
	C56	DIGITAL EQUIPMENT CORPORATION, "InfoServer 100 Installation and Owner's Guide", Order Number EK-DIS1K-IN-001, First Edition		10/1/1990
	C57	DIGITAL EQUIPMENT CORPORATION, "InfoServer 100 System Operation Guide", Order Number EK-DIS1K-UG-001, First Edition, pgs i-Index 5		10/1/1990
	C58	ELLIOTT, "Working Draft American National Standard, Project T10/1562-D, Revision 5, pgs. i-432		7/9/2003
	C59	SATRAN, "Standards-Track," May 2001, iSCSI, pgs. 9-87		11/1/2000
	C60	SATRAN, et al. "IPS Internet Draft, iSCSI, pgs 1-8		11/1/2000
	C61	APT TECHNOLOGIES, INC., "Serial ATA: High Speed Serialized AT Attachment", Rev. 1.0a, pgs. 1-310		1/7/2003
	C63	Defendant's First Supplemental Trial Exhibit List, Crossroads Systems, Inc., v. Chaparral Network Storage, Inc., C.A. No. A-00CA-217-SS (W.D. Tex. 2001). (CD-Rom)		
	C64	Defendant's Third Supplemental Trial Exhibit List, Crossroads Systems, Inc. v. Pathlight Technology, Inc., C.A. No. A-00CA-248-SS (W.D. Tex. 2001) (CD-Rom)		
	C65	Plaintiff's Fourth Amended Trail Exhibit List, Crossroads Systems, Inc. v. Chaparral Network Storage, Inc, C.A. No. A-00CA-217-SS (W.D. Tex. 2001) (CD-Rom)		
	C66	Plaintiff's Revised Trial Exhibit List, Crossroads Systems, Inc. v. Pathlight Technology, Inc., C.A. No. A-00CA-248-SS (W.D. Tex. 2001). (CD-Rom)		
	C67	Trail Transcripts, Crossroads Systems, Inc. v. Chaparral Network Storage, Inc., C.A. No. A-00CA-217-SS (W.D. Tex. 2001) Day 1 -5 (CD-Rom)		
	C68	Trail Transcripts, Crossroads Systems, Inc. v. Pathlight Technology, Inc., C.A. No. A-00CA-248-SS (W.D. Tex. 2001). Day 1-4 (CD-Rom)		
Examiner Signature				Date Considered

INFORMATION DISCLOSURE STATEMENT			Application Number	12/690,592	
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			First Named Inventor	Geoffrey B. Hoese	
			Group Art Unit	2111	
			Examiner Name	Unknown	
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Examiner Initials	Cite No.	OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS			Date
	C72	Datasheet for CrossPoint 4100 Fibre Channel to SCSI Router (Dedek Ex 41 (ANCT 117-120)) (CD-ROM Chaparral Exhibits D012)			
	C73	Symbios Logic- Software Interface Specification Series 3 SCSI RAID Controller Software Release 02.xx (Engelbrecht Ex 2 (LSI 1421-1658)) (CD-ROM Chaparral Exhibits D013)			12/3/1997
	C74	Press Release- Symbios Logic to Demonstrate Strong Support for Fibre Channel at Fall Comdex (Engelbrecht 12 (LSI 2785-86)) (CD-ROM Chaparral Exhibits D016)			11/13/1996
	C75	OEM Datasheet on the 3701 Controller (Engelbrecht 13 (LSI 01837-38)) (CD-ROM Chaparral Exhibits D017)			6/17/1905
	C76	Nondisclosure Agreement Between Adaptec and Crossroads Dated 10/17/96 (Quisenberry Ex 25 (CRDS 8196)) (CD-ROM Chaparral Exhibits D020)			10/17/1996
	C77	Organizational Presentation on the External Storage Group (Lavan Ex 1 (CNS 182242-255)) (CD-ROM Chaparral Exhibits D021)			4/11/1996
	C78	Bridge Phase II Architecture Presentation (Lavan Ex 2 (CNS 182287-295)) (CD-ROM Chaparral Exhibits D022)			4/12/1996
	C79	Bridge. C, Bridge Between SCSI-2 and SCSI-3 FCP (Fibre Channel Protocol) (CD-ROM Chaparral Exhibits P214)			
	C80	Attendees/Action Items from 4/12/96 Meeting at BTC (Lavan Ex 3 (CNS 182241)) (CD-ROM Chaparral Exhibits D023)			4/12/1996
	C81	Brooklyn Hardware Engineering Requirements Documents, Revision 1.4 (Lavan Ex 4 (CNS 178188-211)) (CD-ROM Chaparral Exhibits D024) by Pecone			5/26/1996
	C82	Brooklyn Single-Ended SCSI RAID Bridge Controller Hardware OEM Manual, Revision 2.1 (Lavan EX 5 (CNS 177169-191)) (CD-ROM Chaparral Exhibits D025)			3/2/1996
	C83	Coronado Hardware Engineering Requirements Document, Revision 0.0 (Lavan Ex 7 (CNS 176917-932)) (CD-ROM Chaparral Exhibits D027) by O'Dell			9/30/1996
	C84	ESS/FPG Organization (Lavan Ex 8 (CNS 178639-652)) (CD-ROM Chaparral Exhibits D028)			12/6/1996
	C85	Adaptec MCS ESS Presents: Intelligent External I/O Raid Controllers "Bridge" Strategy (Lavan Ex 9 (CNS 178606-638)). (CD-ROM Chaparral Exhibits D029)			2/6/1996
	C86	AEC-7313 Fibre Channel Daughter Board (for Brooklyn) Engineering Specification, Revision 1.0 (Lavan Ex 10 (CNS 176830-850)) (CD-ROM Chaparral Exhibits D030)			2/27/1997
	C87	Bill of Material (Lavan Ex 14 (CNS 177211-214)) (CD-ROM Chaparral Exhibits D034)			7/24/1997
	C88	AEC-. 4412B, AEC-7412/B2 External RAID Controller Hardware OEM Manual, Revision 2.0 (Lavan Ex 15 (CNS 177082-123)) (CD-ROM Chaparral Exhibits D035)			6/27/1997
Examiner Signature					Date Considered

INFORMATION DISCLOSURE STATEMENT			Application Number	12/690,592	
			Filing Date	01/20/2010	
			First Named Inventor	Geoffrey B. Hoese	
			Group Art Unit	2111	
			Examiner Name	Unknown	
Sheet	5	of	9	Atty Docket Number	CROSS1120-33
Examiner Initials	Cite No.	OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS			Date
	C89	Coronado II, AEC-7312A Fibre Channel Daughter (for Brooklyn) Hardware Specification, Revision 1.2 (Lavan Ex 16 (CNS 177192-210)) (CD-ROM Chaparral Exhibits D036) by Tom Yang			7/18/1997
	C90	AEC-4412B, AEC7412/3B External RAID Controller Hardware OEM Manual, Revision 3.0. (Lavan Ex 17 (CNS 177124-165)) (CD-ROM Chaparral Exhibits D037)			8/25/1997
	C91	Memo Dated 8/15/97 to AEC-7312A Evaluation Unit Customers re: B001 Release Notes (Lavan Ex 18 (CNS 182878-879)) (CD-ROM Chaparral Exhibits D038)			8/15/1997
	C92	Brooklyn Main Board (AES-0302) MES Schedule (Lavan Ex 19 (CNS 177759-763)) (CD-ROM Chaparral Exhibits D039)			2/11/1997
	C93	News Release-Adaptec Adds Fibre Channel Option to its External RAID Controller Family (Lavan Ex 20 (CNS 182932-934)) (CD-ROM Chaparral Exhibits D040)			5/6/1997
	C94	AEC-4412B/7412B User's Guide, Rev. A (Lavan Ex 21) (CD-ROM Chaparral Exhibits D041)			6/19/1905
	C95	Data Book- AIC-7895 PCI Bus Master Single Chip SCSI Host Adapter (Davies Ex 1 (CNS 182944-64)) (CD-ROM Chaparral Exhibits D046)			5/21/1996
	C96	Data Book- AIC-1160 Fibre Channel Host Adapter ASIC (Davies Ex 2 (CNS 181800-825)) (CD-ROM Chaparral Exhibits D047)			6/18/1905
	C97	Viking RAID Software (Davies Ex 3 (CNS 180969-181026)) (CD-ROM Chaparral Exhibits D048)			6/18/1905
	C98	Header File with Structure Definitions (Davies Ex 4 (CNS 180009-018)) (CD-ROM Chaparral Exhibits D049)			8/8/1996
	C99	C++ SourceCode for the SCSI Command Handler (Davies Ex 5 (CNS 179136-168)) (CD-ROM Chaparral Exhibits D050)			8/8/1996
	C100	Header File Data Structure (Davies Ex 6 (CNS 179997-180008)) (CD-ROM Chaparral Exhibits D051)			1/2/1997
	C101	SCSI Command Handler (Davies Ex 7 (CNS 179676-719)) (CD-ROM Chaparral Exhibits D052)			1/2/1997
	C102	Coronado: Fibre Channel to SCSI Intelligent RAID Controller Product Brief (Kalwitz Ex 1 (CNS 182804-805)) (CD-ROM Chaparral Exhibits D053)			
	C103	Bill of Material (Kalwitz Ex 2 (CNS 181632-633)) (CD-ROM Chaparral Exhibits D054)			3/17/1997
	C104	Emails Dated 1/13-3/31/97 from P. Collins to Mo re: Status Reports (Kalwitz Ex 3 (CNS 182501-511)) (CD-ROM Chaparral Exhibits D055)			
	C105	Hardware Schematics for the Fibre Channel Daughtercard Coronado (Kalwitz Ex 4 (CNS 181639-648)) (CD-ROM Chaparral Exhibits D056)			
Examiner Signature					Date Considered

INFORMATION DISCLOSURE STATEMENT		Application Number	12/690,592
		Filing Date	01/20/2010
		First Named Inventor	Geoffrey B. Hoese
		Group Art Unit	2111
		Examiner Name	Unknown
Sheet	6	of	9
		Atty Docket Number	CROSS1120-33
Examiner Initials	Cite No.	OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS	Date
	C106	Adaptec Schematics re AAC-340 (Kalwitz Ex 14 CNS 177215-251)) (CD-ROM Chaparral Exhibits D057)	
	C107	Bridge Product Line Review (Manzanares Ex 3 (CNS 177307-336)) (CD-ROM Chaparral Exhibits D058)	
	C108	AEC Bridge Series Products-Adaptec External Controller RAID Products Pre-Release Draft, v.6 (Manzanares Ex 4 (CNS 174632-653)). (CD-ROM Chaparral Exhibits D059)	10/28/1997
	C109	Hewlett-Packard Roseville Site Property Pass for Brian Smith (Dunning Ex 14 (HP 489) (CD-ROM Chaparral Exhibits D078)	11/7/1996
	C110	Distribution Agreement Between Hewlett-Packard and Crossroads (Dunning Ex 15 (HP 326-33) (CD-ROM Chaparral Exhibits D079)	
	C111	HPFC-5000 Tachyon User's Manuel, First Edition (PTI 172419-839) (CD-ROM Chaparral Exhibits D084)	5/1/1996
	C112	X3T10 994D - (Draft) Information Technology: SCSI-3 Architecture Model, Rev. 1.8 (PTI 165977) (CD-ROM Chaparral Exhibits D087)	
	C113	X3T10 Project 1047D: Information Technology- SCSI-3 Controller Commands (SCC), Rev, 6c (PTI 166400-546) (CD-ROM Chaparral Exhibits D088)	9/3/1996
	C114	X3T10 995D- (Draft) SCSI-3 Primary Commands, Rev. 11 (Wanamaker Ex 5 (PTI 166050-229)) (CD-ROM Chaparral Exhibits D089)	11/13/1996
	C115	VBAR Volume Backup and Restore (CRDS 12200-202) (CD-ROM Chaparral Exhibits D099)	
	C116	Preliminary Product Literature for Infinity Commstor's Fibre Channel to SCSI Protocol Bridge (Smith Ex 11; Quisenberry Ex 31 (SPLO 428-30) (CD-ROM Chaparral Exhibits D143)	8/19/1996
	C117	Letter dated 7/12/96 from J. Boykin to B. Smith re: Purchase Order for Evaluation Units from Crossroads (Smith Ex 24) CRDS 8556-57) (CD-ROM Chaparral Exhibits D144)	7/12/1996
	C118	CrossPoint 4100 Fibre Channel to SCSI Router Preliminary Datasheet (Hulsey Ex 9 (CRDS 16129-130)) (CD-ROM Chaparral Exhibits D145)	11/1/1996
	C119	CrossPoint 4400 Fibre Channel to SCSI Router Preliminary Datasheet (Bardach Ex. 9, Quisenberry Ex 33 (CRDS 25606-607)) (CD-ROM Chaparral Exhibits D153)	11/1/1996
	C120	Fax Dated 07/22/96 from L. Petti to B. Smith re: Purchase Order from Data General for FC2S Fibre to Channel SCSI Protocol Bridge Model 11 (Smith Ex 25; Quisenberry Ex 23; Bardach Ex 11 (CRDS 8552-55; 8558) (CD-ROM Chaparral Exhibits D155)	7/22/1996
	C121	Email Dated 12/20/96 from J. Boykin to B. Smith re: Purchase Order for Betas in February and March (Hoese Ex 16, Quisenberry Ex 25; Bardach Ex 12 (CRDS 13644-650) (CD-ROM Chaparral Exhibits D156)	12/20/1996
	C122	Infinity Commstor Fibre Channel Demo for Fall Comdex, 1996 (Hoese Ex 15, Bardach Ex 13 (CRDS 27415) (CD-ROM Chaparral Exhibits D157)	
Examiner Signature		Date Considered	

INFORMATION DISCLOSURE STATEMENT		Application Number	12/690,592
		Filing Date	01/20/2010
		First Named Inventor	Geoffrey B. Hoese
		Group Art Unit	2111
		Examiner Name	Unknown
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		Atty Docket Number	CROSS1120-33
Examiner Initials	Cite No.	OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS	Date
	C123	Fax Dated 12/19/96 from B. Bardach to T. Rarich re: Purchase Order Information (Bardach Ex. 14; Smith Ex 16 (CRDS 4460)) (CD-ROM Chaparral Exhibits D158)	12/19/1996
	C124	Miscellaneous Documents Regarding Comdex (Quisenberry Ex 2 (CRDS 27415-465)) (CD-ROM Chaparral Exhibits D165)	
	C125	CrossPoint 4100 Fibre Channel to SCSI Router Preliminary Datasheet (Quisenberry) Ex 3 (CRDS 4933-34) (CD-ROM Chaparral Exhibits D166) (CD-ROM Chaparral Exhibits D166)	
	C126	CrossPoint 4400 Fibre to Channel to SCSI Router Preliminary Datasheet; Crossroads Company and Product Overview (Quisenberry Ex 4 (CRDS 25606; 16136)) (CD-ROM Chaparral Exhibits D167)	
	C127	Crossroads Purchase Order Log (Quisenberry Ex 9 (CRDS 14061-062)) (CD-ROM Chaparral Exhibits D172)	
	C128	RAID Manager 5 with RDAC 5 for UNIX V.4 User's Guide (LSI-01854) (CD-ROM Chaparral Exhibits P062)	9/1/1996
	C129	Letter dated May 12, 1997 from Alan G. Leal to Barbara Bardach enclosing the original OEM License and Purchase Agreement between Hewlett-Packard Company and Crossroads Systems, Inc. (CRDS 02057) (CD-ROM Chaparral Exhibits P130)	
	C130	CR4x00 Product Specification (CRDS 43929) (CD-ROM Chaparral Exhibits P267)	6/1/1998
	C131	Symbios Logic – Hardware Functional Specification for the Symbios Logic Series 3 Fibre Channel Disk Array Controller Model 3701 (Engelbrecht Ex 3 (LSI-1659-1733)) (CD-ROM Pathlight Exhibits D074)	
	C132	Report of the Working Group on Storage I/O for Large Scale Computing; Department of Computer Science Duke University: CS-1996-21 (PTI 173330-347). (CD-ROM Pathlight Exhibits D098)	
	C133	Brian Allison's 1999 Third Quarter Sales Plan (PDX 38)CNS 022120-132)) (CD-ROM Pathlight Exhibits D201)	6/5/2001
	C134	Brooklyn SCSI-SCSI Intelligent External RAID Bridge Definition Phase External Documentation ((CD-ROM Pathlight Exhibits D129)	
	C135	StorageWorks HSx70 System Specification by Steve Sicola dated 6/11/96 4:57pm, Revision 4.	6/11/1996
	C136	ANSI TR X3.xxx-199x, Revision 9 of X3-991D. Draft Proposed X3 Technical Report - Small Computer System Interface - 3 Generic Packetized Protocol (SCSI-GPP). Computer and Business Equipment Manufacturers Assoc.	
	C137	Enterprise Systems Connection (ESON) Implementation Guide, July 1996, IBM International Technical Support Organization, Poughkeepsie Center	7/1/1996
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Sheet	8	of	9	Atty Docket Number	CROSS1120-33
Examiner Initials	Cite No.	OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS			Date
	C138	Digital Delivers Industry-Leading Enterprise-Class Storage Solutions. StorageWorks Family Provides Easiest Path to Fibre Channel. Three pages by Company News Oncall dated 09/09/04			9/9/2004
	C139	American National Standard for Information Technology – Fibre Channel Protocol for SCSI. ANSI X3.269-1996			6/18/1905
	C140	F1710A File Control Unit and F6493 Array Disk Subsystem by Hitoshi Matsushima, Shojiro Okada and Tetsuro Kudo.			2/3/1995
	C141	The Legend of AMDAHL by Jeffrey L. Rodengen (5 pages)			
	C142	Office Action dated February 6, 2007 from the Japanese Patent Office regarding related application No. 526873/2000.			2/6/2007
	C143	InfoServer 100 System Operation Guide, Order Number EK-DIS1K-UG-001			
	C144	iNFOsERVER 100 Installation and Owner's Guide, Order Number EK-DIS1K-IN-001			
	C145	Software Product Description: Product Name: InfoServer 100 Software, Version 1.1 SPD 38.59.00			11/1/1991
	C146	Software Product Description: Product Name: InfoServer Client for ULTRIX, Version 1.1, SPD 40.78.01			4/1/1993
	C147	Draft Proposed American National Standard. X3.269-199X, Revision 012. Information System - dpANS Fibre Channel Protocol fo SCSI.			12/4/1995
	C148	Impactdata Launches Breakthrough Architecture for Network Storage.			11/13/1996
	C149	Impactdata..News Release: Impactdata Introduces New Storage Architecture for High Performance Computing. 2 Pages.			11/12/1996
	C150	Impactdata..News Release: Impactdata's Network Peripheral Adapter (NPA) Pushes Technology Envelope of Data Storage Management in High-Speed Computing Environments. 2 Pages.			11/12/1996
	C151	Impactdata..News Release: Impactdata and Storage Concepts Announce Integration of FibreRAID II Storage Solution with Impactdata's Distributed Storage Node Architecture (DSNA). 2 pages.			11/18/1996
	C152	Impactdata..News Release: Breece Hill Libraries Now Able to Attach Directly to High Speed Networks Peripheral Adapter from Impactdata. 2 Pages.			11/20/1996
	C153	Impactdata - DSNA Questions and Answers. 22 Pages.			
	C154	Impactdata - Network Storage Solutions. 4 pages.			
	C155	Network Storage Building Blocks. 2 Pages.			
	C156	Impactdata - NPA (Network Peripheral Interface). 4 Pages			
	C157	Impactdata - CPI (Common Peripheral Interfae). 2 Pages			
	C158	Impactdata - SNC (Storage Node Controller). 2 Pages			
	C159	Impactdata - DSNA (Distributed Storage Node Architecture) Protocol. 2 Pages			
	C160	Impactdata - DS-50. 2 Pages			
	C161	Impactdata - Corporate Fact Sheet. 1 Page			
Examiner Signature				Date Considered	

INFORMATION DISCLOSURE STATEMENT				Application Number	12/690,592
				Filing Date	01/20/2010
				First Named Inventor	Geoffrey B. Hoese
				Group Art Unit	2111
				Examiner Name	Unknown
Sheet	9	of	9	Atty Docket Number	CROSS1120-33
Examiner Initials	Cite No.	OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS			Date
	C162	Raider-5 "Disk Array Manual for the UltraSCSI Controller". Part No. 261-0013-002. 191 Pages			
	C163	Impactdata - White Paper: Distributed Storage Node Architecture (DSNA). January, 1997			01/97
	C164	Impactdata - DSNA Distributed Storage Node Architecture "Reference Guide". 44 Pages			
	C165	F1710 Logic Specification			
	C166	Translation of Final Office Action issued in JP 526873/2000 mailed 05/14/08. 4 Pages.			5/14/2008
	C167	Office Action issued in USPA 11/851,837 dated 12/22/08, Hoese, 7 pages			12/22/2008
	C168	English Translation of Japanese Laid-Open Publication No. 5-181609. 9 pgs.			7/23/1993
	C169	English Translation of Japanese Laid-Open Publication No. 7-20994. 57 pgs			1/24/1995
	C170	F1710 File Control Unit (FCU) Logical Specifications. 11 Pages			12/9/1997
Examiner Signature				Date Considered	

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Atty. Docket No. (Opt.) CROSS1120-33
	Applicant Geoffrey B. Hoese, et al.
Application Number 12/690,592	Filed 01/20/2010
For Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2111	Examiner Unknown
Confirmation Number: 8115	



Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Certification of Transmission Under 37 C.F.R. 1.8	
I hereby certify that this correspondence is being deposited with the U.S. Postal Service as First Class Mail in a box addressed to The Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22312-1450 on <u>5-21</u> ²⁰¹⁰	
<i>[Signature]</i>	
Signature	
<u>PAUL HAYGOOD</u>	
Printed Name	

Dear Sir,

Applicant respectfully requests, pursuant to 37 C.F.R. §§ 1.56, 1.97 and 1.98, that the information listed on the attached SB08A/B form(s) be considered and cited in the examination of the above-identified application. A copy of U.S. Patent(s) and U.S. Patent Application Publication(s) listed on the attached SB08A form is not being submitted with this Information Disclosure Statement pursuant to the waiver of 37 C.F.R. § 1.98(a)(2)(i) by the U.S. Patent and Trademark Office. A copy of foreign patent documents as well as the information listed on the attached SB08B form is enclosed for the convenience of the Examiner.

This Information Disclosure Statement is being submitted within three months of the filing date of a national application other than a continued prosecution application under 37 C.F.R. § 1.53(d).

This Information Disclosure Statement is being submitted within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application;

This Information Disclosure Statement is being submitted before the mailing of a first Office action on the merits; or

This Information Disclosure Statement is being submitted before the mailing of a first Office action after the filing of a request for continued examination under 37 C.F.R. § 1.114.

This Information Disclosure Statement is being submitted after the period specified in 37 C.F.R. § 1.97(b) and before the mailing date of any of a final action under 37 C.F.R. § 1.113, a notice of allowance under 37 C.F.R. § 1.311, or an action that otherwise closes prosecution in the application, and is accompanied by one of:

- The statement specified in 37 C.F.R. § 1.97(e); or
- The fee set forth in 37 C.F.R. § 1.17(p). Applicant hereby authorizes the Commissioner to deduct the amount of \$180 from Deposit Account No. 50-3183 of Sprinkle IP Law Group for the filing fee of this Information Disclosure Statement.

This Information Disclosure Statement is being submitted after the period specified in 37 C.F.R. § 1.97(c) and on or before payment of the issue fee and is accompanied by:

- The statement specified in 37 C.F.R. § 1.97(e); and
- The fee set forth in 37 C.F.R. § 1.17(p). Applicant hereby authorizes the Commissioner to deduct the amount of \$180 from Deposit Account No. 50-3183 of Sprinkle IP Law Group for the filing fee of this Information Disclosure Statement.

Pursuant to 37 C.F.R. § 1.97(e), Applicant hereby states:

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of the information disclosure statement.

Furthermore, pursuant to 37 C.F.R. §§ 1.97(g) and (h), no representation is made that a search has been made or that this information is material to patentability of the present application.

ATTORNEY DOCKET NO.
CROSS1120-33

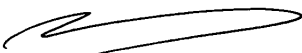
Customer No. 44654
Serial No. 12/690,592

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Applicant respectfully submits that the claims of Applicant's above-referenced patent application are patentably distinguishable from the listed information.

Respectfully submitted,

Sprinkle IP Law Group
Attorneys for Applicant



John L. Adair
Reg. No. 48,828

Dated: 5-13-2010

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INFORMATION DISCLOSURE STATEMENT				Application Number	12/690,592
				Filing or 371 (c) Date:	January 20, 2010
				First Named Inventor	Geoffrey B. Hoese
				Group Art Unit	2182
				Examiner Name	Unknown
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NON PATENT LITERATURE DOCUMENTS					
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published			T²
	C171	American National Standard for Information Systems: Fibre Channel -- Cross-Point Switch Fabric Topology (FC-XS); X3T11/Project 959D/Rev 1.30. 114 pgs.			6/17/1994
Examiner Signature				Date Considered	

Electronic Acknowledgement Receipt

EFS ID:	7781273
Application Number:	12690592
International Application Number:	
Confirmation Number:	8115
Title of Invention:	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE
First Named Inventor/Applicant Name:	Geoffrey B. Hoese
Customer Number:	44654
Filer:	John L. Adair/Betty Caldwell
Filer Authorized By:	John L. Adair
Attorney Docket Number:	CROSS1120-33
Receipt Date:	09-JUN-2010
Filing Date:	20-JAN-2010
Time Stamp:	17:18:03
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		CROSS1120-33_IDS_06-09-10.pdf	115678 51aa5fa515cd40221bf9b52d7d5acc2729951a66	yes	3

Multipart Description/PDF files in .zip description					
Document Description			Start	End	
Transmittal Letter			1	2	
Information Disclosure Statement (IDS) Filed (SB/08)			3	3	
Warnings:					
Information:					
2	NPL Documents	CROSS1120_Ref_C171.pdf	3613973	no	114
			d445cf43c5f3deb791444e7c7cc7f749b39c b156		
Warnings:					
Information:					
Total Files Size (in bytes):			3729651		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Atty. Docket No. (Opt.) CROSS1120-33
Applicant Geoffrey B. Hoese	
Application Number 12/690,592	Filing or 371 (c) Date: January 20, 2010
For STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE	
Group Art Unit 2182	Examiner Unknown
Confirmation Number: 8115	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir,

Certification of Transmission Under 37 C.F.R. 1.8
I hereby certify that this correspondence is being transmitted to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22312-1450 via the U.S. Patent and Trademark Office Electronic Filing System (EFS-Web) on <u>June 9</u> 2010. <i>Betty Caldwell</i> Betty Caldwell

Applicant respectfully requests, pursuant to 37 C.F.R. §§ 1.56, 1.97 and 1.98, that the information listed on the attached SB08A/B form(s) be considered and cited in the examination of the above-identified application. A copy of U.S. Patent(s) and U.S. Patent Application Publication(s) listed on the attached SB08A form is not being submitted with this Information Disclosure Statement pursuant to the waiver of 37 C.F.R. § 1.98(a)(2)(i) by the U.S. Patent and Trademark Office. A copy of foreign patent documents as well as the information listed on the attached SB08B form is enclosed for the convenience of the Examiner.

This Information Disclosure Statement is being submitted within three months of the filing date of a national application other than a continued prosecution application under 37 C.F.R. § 1.53(d).

This Information Disclosure Statement is being submitted within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application;

This Information Disclosure Statement is being submitted before the mailing of a first Office action on the merits; or

This Information Disclosure Statement is being submitted before the mailing of a first Office action after the filing of a request for continued examination under 37 C.F.R. § 1.114.

This Information Disclosure Statement is being submitted after the period specified in 37 C.F.R. § 1.97(b) and before the mailing date of any of a final action under 37 C.F.R. § 1.113, a notice of allowance under 37 C.F.R. § 1.311, or an action that otherwise closes prosecution in the application, and is accompanied by one of:

- The statement specified in 37 C.F.R. § 1.97(e); or
- The fee set forth in 37 C.F.R. § 1.17(p). Applicant hereby authorizes the Commissioner to deduct the amount of \$180 from Deposit Account No. 50-3183 of Sprinkle IP Law Group for the filing fee of this Information Disclosure Statement.

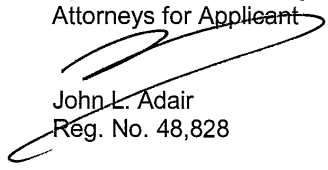
This Information Disclosure Statement is being submitted after the period specified in 37 C.F.R. § 1.97(c) and on or before payment of the issue fee and is accompanied by:

- The statement specified in 37 C.F.R. § 1.97(e); and
- The fee set forth in 37 C.F.R. § 1.17(p). Applicant hereby authorizes the Commissioner to deduct the amount of \$180 from Deposit Account No. 50-3183 of Sprinkle IP Law Group for the filing fee of this Information Disclosure Statement.

Applicant does not believe any fees are due for filing this Information Disclosure Statement; however, if Applicant is in error, the Director is hereby authorized to deduct any and all appropriate fees from Deposit Account 50-3183 of Sprinkle IP Law Group. Applicant respectfully submits that the claims of Applicant's above-referenced patent application are patentably distinguishable from the listed information.

Respectfully submitted,

Sprinkle IP Law Group
Attorneys for Applicant


John L. Adair
Reg. No. 48,828

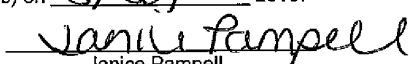
Dated: June 8

1301 W. 25th Street, Suite 408
Austin, Texas 78705
Tel. (512) 637-9220
Fax. (512) 317-9088

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Atty. Docket No. (Opt.) CROSS1120-33
Applicant Geoffrey B. Hoese	
Application Number 12/690,592	Filing or 371 (c) Date: January 20, 2010
For STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE	
Group Art Unit 2182	Examiner Unknown
Confirmation Number: 8115	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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 Janice Pampell

Applicant respectfully requests, pursuant to 37 C.F.R. §§ 1.56, 1.97 and 1.98, that the information listed on the attached SB08A/B form(s) be considered and cited in the examination of the above-identified application. A copy of U.S. Patent(s) and U.S. Patent Application Publication(s) listed on the attached SB08A form is not being submitted with this Information Disclosure Statement pursuant to the waiver of 37 C.F.R. § 1.98(a)(2)(i) by the U.S. Patent and Trademark Office. A copy of foreign patent documents as well as the information listed on the attached SB08B form is enclosed for the convenience of the Examiner.

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- This Information Disclosure Statement is being submitted within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application;
- This Information Disclosure Statement is being submitted before the mailing of a first Office action on the merits; or
- This Information Disclosure Statement is being submitted before the mailing of a first Office action after the filing of a request for continued examination under 37 C.F.R. § 1.114.

This Information Disclosure Statement is being submitted after the period specified in 37 C.F.R. § 1.97(b) and before the mailing date of any of a final action under 37 C.F.R. § 1.113, a notice of allowance under 37 C.F.R. § 1.311, or an action that otherwise closes prosecution in the application, and is accompanied by one of:

- The statement specified in 37 C.F.R. § 1.97(e); or
- The fee set forth in 37 C.F.R. § 1.17(p). Applicant hereby authorizes the Commissioner to deduct the amount of \$180 from Deposit Account No. 50-3183 of Sprinkle IP Law Group for the filing fee of this Information Disclosure Statement.

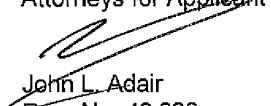
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- The statement specified in 37 C.F.R. § 1.97(e); and
- The fee set forth in 37 C.F.R. § 1.17(p). Applicant hereby authorizes the Commissioner to deduct the amount of \$180 from Deposit Account No. 50-3183 of Sprinkle IP Law Group for the filing fee of this Information Disclosure Statement.

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Respectfully submitted,

Sprinkle IP Law Group
Attorneys for Applicant


John L. Adair
Reg. No. 48,828

Dated: Aug 20, 2010

1301 W. 25th Street, Suite 408
Austin, Texas 78705
Tel. (512) 637-9220
Fax. (512) 317-9088

INFORMATION DISCLOSURE STATEMENT				Application Number	12/690,592
				Filing or 371 (c) Date:	January 20, 2010
				First Named Inventor	Geoffrey B. Hoese
				Group Art Unit	2182
				Examiner Name	Unknown
Sheet	1	of	1	Atty Docket Number	CROSS1120-33
NON PATENT LITERATURE DOCUMENTS					
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published			T²
	C172	QUESTIONING Mailed 06/08/2010 from JP Patent Application 526873/2000. 8 pages			06/08/10
	C173	Office Action Mailed 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 pgs.			08/17/10
Examiner Signature				Date Considered	

Electronic Acknowledgement Receipt

EFS ID:	8262176
Application Number:	12690592
International Application Number:	
Confirmation Number:	8115
Title of Invention:	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE
First Named Inventor/Applicant Name:	Geoffrey B. Hoese
Customer Number:	44654
Filer:	John L. Adair/Janice Pampell
Filer Authorized By:	John L. Adair
Attorney Docket Number:	CROSS1120-33
Receipt Date:	20-AUG-2010
Filing Date:	20-JAN-2010
Time Stamp:	17:26:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no				
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed (SB/08)	CROSS1120-33_IDS_Filed_08-20-10.pdf	78419 ca3556359c8fac70e9f21e47262198ec9535b507	no	3
Warnings:					
Information:					

This is not an USPTO supplied IDS fillable form					
2	NPL Documents	CROSS1120_Ref_C172.pdf	197554	no	8
			f69f3813c29e318b796f0f186ce0dd9b5f3b5d4		
Warnings:					
Information:					
3	NPL Documents	CROSS1120_Ref_C173.pdf	175870	no	7
			2f518144450f3e34d8d4f7cab7ea31971be6085		
Warnings:					
Information:					
			Total Files Size (in bytes):	451843	
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/690,592	01/20/2010	Geoffrey B. Hoese	CROSS1120-33	8115
44654	7590	09/10/2010	EXAMINER	
SPRINKLE IP LAW GROUP 1301 W. 25TH STREET SUITE 408 AUSTIN, TX 78705			SHIN, CHRISTOPHER B	
			ART UNIT	PAPER NUMBER
			2181	
			MAIL DATE	DELIVERY MODE
			09/10/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Interview Summary	Application No.	Applicant(s)	
	12/690,592	HOESE ET AL.	
	Examiner	Art Unit	
	Christopher B. Shin	2181	

All participants (applicant, applicant's representative, PTO personnel):

(1) Christopher B. Shin. (3)_____.

(2) John L. Adair. (4)_____.

Date of Interview: 30 August 2010.

Type: a) Telephonic b) Video Conference
 c) Personal [copy given to: 1) applicant 2) applicant's representative]

Exhibit shown or demonstration conducted: d) Yes e) No.
 If Yes, brief description: _____.

Claim(s) discussed: 1-53.

Identification of prior art discussed: _____.

Agreement with respect to the claims f) was reached. g) was not reached. h) N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: In order to move the case in condition for allowance & to be consistent with the all of the related/parent cases/specification, the applicant agreed to amend the claims to clearly recite that the claimed mediums (i.e., the first and second medims) are not the same mediums, but the protocols used on such mediums can be the same or different protocol types. Therefore, the native low level block protocols are used between different mediums that may use the same or different protocol types is consistent with the related cases and specification. In other words, one of the medium is remote, separate & different from the other medium.. The applicant also agreed to amend & update the RELATED APPLICATIONS of the specification; & the applicant agreed to file Terminal Disclaimer against all of the Related Applications.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

	/Christopher B Shin/ Primary Examiner, Art Unit 2181
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Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/690,592	01/20/2010	Geoffrey B. Hoese	CROSS1120-33	8115
44654	7590	09/10/2010	EXAMINER	
SPRINKLE IP LAW GROUP 1301 W. 25TH STREET SUITE 408 AUSTIN, TX 78705			SHIN, CHRISTOPHER B	
			ART UNIT	PAPER NUMBER
			2181	
			MAIL DATE	DELIVERY MODE
			09/10/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	12/690,592	HOESE ET AL.	
	Examiner	Art Unit	
	Christopher B. Shin	2181	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-53 is/are pending in the application.
 - 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-53 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 - Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 - Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 - 1. Certified copies of the priority documents have been received.
 - 2. Certified copies of the priority documents have been received in Application No. _____.
 - 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date Multiple Sheets.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____.
- 5) Notice of Informal Patent Application
- 6) Other: _____.

Application/Control Number: 12/690,592
Art Unit: 2181

Page 2

DETAILED ACTION

Interview with agreement reached

1. An Agreement was reached during the interview conducted with John L. Adair on August 30, 2010 (See the interview Record). The examiner thanks the applicant for very helpful discussions & cooperation to make the case in condition for allowance. As can be seen from the plurality of related cases, the allowable subject matter over the prior art of record was identified and reached. In order to move the case in condition for allowance & to be consistent with the all of the related/parent cases/specification, the applicant agreed to amend the claims to clearly recite that the claimed mediums (i.e., the first and second mediums) are not the same mediums, but the protocols used on such mediums can be the same or different protocol types. Therefore, the native low level block protocols are used between different mediums that may use the same or different protocol types is consistent with the related cases and specification. In other words, one of the medium is remote, separate & different from the other medium. The applicant also agreed to amend & update the RELATED APPLICATIONS of the specification; & the applicant agreed to file Terminal Disclaimer against all of the Related Applications. For the above reasons, the examiner implicitly gives rejection as follows.

Double Patenting/Allowable Subject Matter

2. After careful consideration of the present claims and in relation to all of the parent and/or related application, the examiner finds the claimed invention allowable over the

Application/Control Number: 12/690,592

Page 3

Art Unit: 2181

prior art of records (i.e., prior art of records of the parent & related cases). However, the present claimed invention does not overcome the Double patenting rejections against the parent and related patent/applications. The following interview was conducted with the applicant and the agreement was reached.

Interview/Double Patenting Rejection

3. On August 30, 2010, a telephonic interview was conducted and the applicant agreed to file additional Terminal Disclaimer against all of the remaining related pending applications and allowed applications. During the interview, the examiner kindly asks the applicant to make sure that the present and pending applications to be consistent with the related reexamination applications.

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

- a. Since the applicant agreed with the examiner regarding the Double Patenting rejection, the details of the rejection will be omitted.

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b. The examiner kindly asks the applicant for help on identifying all of the related applications, if the examiner inadvertently makes a mistake.

5. Claims 1-53 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims of all of the related Patent/Applications as follows. Although the conflicting claims are not identical, they are not patentably distinct from each other because the related applications claim subject matter that are substantially identical to the present claimed invention. The following are the list of the related cases:

6. Claims 1-53 are rejected on the ground of nonstatutory double patenting over claims of U. S. Patent/Applications of all the related cases, since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

7. Examiner kindly asks applicant's help for identifying all the related cases (i.e., all the parent and child cases) and submitting T.D. to make the case in condition for

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allowance. Further more, the applicant should also submit IDS with all the related prior art of record.

Specification

8. The disclosure is objected to because of the following informalities:

As agreed by the applicant, the RELATED APPLICATIONS sections should be updated.

Appropriate correction is required.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher B. Shin whose telephone number is 571-272-4159. The examiner can normally be reached on Monday Through Friday 6:30AM to 3:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kindred Alford can be reached on 571-272-4037. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Christopher B Shin/
Primary Examiner, Art Unit 2181

CS

Search Notes

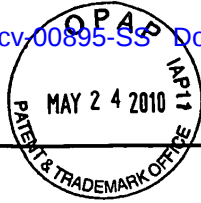


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12/690,592	HOESE ET AL.	
Examiner	Art Unit	
Christopher B. Shin	2181	

SEARCHED			
Class	Subclass	Date	Examiner
710	1-5,8-13,36-38,126-131	8/30/2010	CS
710	250, 305-	8/30/2010	CS
709	258	8/30/2010	CS
714	42	8/30/2010	CS
711	110-113	8/30/2010	CS

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner
710	305,11		
709	258		

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
PLUS from the parent cases	8/30/2010	CS
PALM- for double patenting	8/30/2010	CS
EAST (See notes for parent)	8/30/2010	CS
PARETN & RELATED CASES REVIEWED FOR THE ALLOWANCE	8/30/2010	CS
Reviewed IDS	8/30/2010	CS



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Examiner Signature	/Christopher Shin/			Date Considered	08/26/2010

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Examiner Signature	/Christopher Shin/			Date Considered	08/26/2010

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				Filing Date	01/20/2010	
				First Named Inventor	Geoffrey B. Hoese	
				Group Art Unit	2111	
				Examiner Name	Unknown	
Sheet	8	of	8	Attorney Docket Number	CROSS1120-33	
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		Examiner Name	Unknown		
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		First Named Inventor	Geoffrey B. Hoese	
		Group Art Unit	2111	
		Examiner Name	Unknown	
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		Filing Date	01/20/2010
		First Named Inventor	Geoffrey B. Hoese
		Group Art Unit	2111
		Examiner Name	Unknown
Sheet 3 of 9	Atty Docket Number	CROSS1120-33	
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Examiner Signature	/Christopher Shin/		Date Considered 08/26/2010

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			Group Art Unit	2111		
			Examiner Name	Unknown		
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Examiner Initials	Cite No.	OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS			Date	
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	C73	Symbios Logic- Software Interface Specification Series 3 SCSI RAID Controller Software Release 02.xx (Engelbrecht Ex 2 (LSI 1421-1658)) (CD-ROM Chaparral Exhibits D013)			12/3/1997	
	C74	Press Release- Symbios Logic to Demonstrate Strong Support for Fibre Channel at Fall Comdex (Engelbrecht 12 (LSI 2785-86)) (CD-ROM Chaparral Exhibits D016)			11/13/1996	
	C75	OEM Datasheet on the 3701 Controller (Engelbrecht 13 (LSI 01837-38)) (CD-ROM Chaparral Exhibits D017)			6/17/1905	
	C76	Nondisclosure Agreement Between Adaptec and Crossroads Dated 10/17/96 (Quisenberry Ex 25 (CRDS 8196)) (CD-ROM Chaparral Exhibits D020)			10/17/1996	
	C77	Organizational Presentation on the External Storage Group (Lavan Ex 1 (CNS 182242-255)) (CD-ROM Chaparral Exhibits D021)			4/11/1996	
	C78	Bridge Phase II Architecture Presentation (Lavan Ex 2 (CNS 182287-295)) (CD-ROM Chaparral Exhibits D022)			4/12/1996	
	C79	Bridge. C, Bridge Between SCSI-2 and SCSI-3 FCP (Fibre Channel Protocol) (CD-ROM Chaparral Exhibits P214)				
	C80	Attendees/Action Items from 4/12/96 Meeting at BTC (Lavan Ex 3 (CNS 182241)) (CD-ROM Chaparral Exhibits D023)			4/12/1996	
	C81	Brooklyn Hardware Engineering Requirements Documents, Revision 1.4 (Lavan Ex 4 (CNS 178188-211)) (CD-ROM Chaparral Exhibits D024) by Pecone			5/26/1996	
	C82	Brooklyn Single-Ended SCSI RAID Bridge Controller Hardware OEM Manual, Revision 2.1 (Lavan EX 5 (CNS 177169-191)) (CD-ROM Chaparral Exhibits D025)			3/2/1996	
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	C84	ESS/FPG Organization (Lavan Ex 8 (CNS 178639-652)) (CD-ROM Chaparral Exhibits D028)			12/6/1996	
	C85	Adaptec MCS ESS Presents: Intelligent External I/O Raid Controllers "Bridge" Strategy (Lavan Ex 9 (CNS 178606-638)). (CD-ROM Chaparral Exhibits D029)			2/6/1996	
	C86	AEC-7313 Fibre Channel Daughter Board (for Brooklyn) Engineering Specification, Revision 1.0 (Lavan Ex 10 (CNS 176830-850)) (CD-ROM Chaparral Exhibits D030)			2/27/1997	
	C87	Bill of Material (Lavan Ex 14 (CNS 177211-214)) (CD-ROM Chaparral Exhibits D034)			7/24/1997	
	C88	AEC-. 4412B, AEC-7412/B2 External RAID Controller Hardware OEM Manual, Revision 2.0 (Lavan Ex 15 (CNS 177082-123)) (CD-ROM Chaparral Exhibits D035)			6/27/1997	
Examiner Signature		/Christopher Shin/			Date Considered	08/26/2010

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Sheet 5 of 9			First Named Inventor	Geoffrey B. Hoese
			Group Art Unit	2111
Examiner Name			Unknown	
			Atty Docket Number	CROSS1120-33
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	C90	AEC-4412B, AEC7412/3B External RAID Controller Hardware OEM Manual, Revision 3.0. (Lavan Ex 17 (CNS 177124-165)) (CD-ROM Chaparral Exhibits D037)	8/25/1997	
	C91	Memo Dated 8/15/97 to AEC-7312A Evaluation Unit Customers re: B001 Release Notes (Lavan Ex 18 (CNS 182878-879)) (CD-ROM Chaparral Exhibits D038)	8/15/1997	
	C92	Brooklyn Main Board (AES-0302) MES Schedule (Lavan Ex 19 (CNS 177759-763)) (CD-ROM Chaparral Exhibits D039)	2/11/1997	
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	C94	AEC-4412B/7412B User's Guide, Rev. A (Lavan Ex 21) (CD-ROM Chaparral Exhibits D041)	6/19/1905	
	C95	Data Book- AIC-7895 PCI Bus Master Single Chip SCSI Host Adapter (Davies Ex 1 (CNS 182944-64)) (CD-ROM Chaparral Exhibits D046)	5/21/1996	
	C96	Data Book- AIC-1160 Fibre Channel Host Adapter ASIC (Davies Ex 2 (CNS 181800-825)) (CD-ROM Chaparral Exhibits D047)	6/18/1905	
	C97	Viking RAID Software (Davies Ex 3 (CNS 180969-181026)) (CD-ROM Chaparral Exhibits D048)	6/18/1905	
	C98	Header File with Structure Definitions (Davies Ex 4 (CNS 180009-018)) (CD-ROM Chaparral Exhibits D049)	8/8/1996	
	C99	C++ SourceCode for the SCSI Command Handler (Davies Ex 5 (CNS 179136-168)) (CD-ROM Chaparral Exhibits D050)	8/8/1996	
	C100	Header File Data Structure (Davies Ex 6 (CNS 179997-180008)) (CD-ROM Chaparral Exhibits D051)	1/2/1997	
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	C102	Coronado: Fibre Channel to SCSI Intelligent RAID Controller Product Brief (Kalwitz Ex 1 (CNS 182804-805)) (CD-ROM Chaparral Exhibits D053)		
	C103	Bill of Material (Kalwitz Ex 2 (CNS 181632-633)) (CD-ROM Chaparral Exhibits D054)	3/17/1997	
	C104	Emails Dated 1/13-3/31/97 from P. Collins to Mo re: Status Reports (Kalwitz Ex 3 (CNS 182501-511)) (CD-ROM Chaparral Exhibits D055)		
	C105	Hardware Schematics for the Fibre Channel Daughtercard Coronado (Kalwitz Ex 4 (CNS 181639-648)) (CD-ROM Chaparral Exhibits D056)		
Examiner Signature		/Christopher Shin/	Date Considered	08/26/2010

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	C107	Bridge Product Line Review (Manzanares Ex 3 (CNS 177307-336)) (CD-ROM Chaparral Exhibits D058)			
	C108	AEC Bridge Series Products-Adaptec External Controller RAID Products Pre-Release Draft, v.6 (Manzanares Ex 4 (CNS 174632-653)). (CD-ROM Chaparral Exhibits D059)		10/28/1997	
	C109	Hewlett-Packard Roseville Site Property Pass for Brian Smith (Dunning Ex 14 (HP 489) (CD-ROM Chaparral Exhibits D078)		11/7/1996	
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	C111	HPFC-5000 Tachyon User's Manuel, First Edition (PTI 172419-839) (CD-ROM Chaparral Exhibits D084)		5/1/1996	
	C112	X3T10 994D - (Draft) Information Technology: SCSI-3 Architecture Model, Rev. 1.8 (PTI 165977) (CD-ROM Chaparral Exhibits D087)			
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	C117	Letter dated 7/12/96 from J. Boykin to B. Smith re: Purchase Order for Evaluation Units from Crossroads (Smith Ex 24) CRDS 8556-57) (CD-ROM Chaparral Exhibits D144)		7/12/1996	
	C118	CrossPoint 4100 Fibre Channel to SCSI Router Preliminary Datasheet (Hulsey Ex 9 (CRDS 16129-130)) (CD-ROM Chaparral Exhibits D145)		11/1/1996	
	C119	CrossPoint 4400 Fibre Channel to SCSI Router Preliminary Datasheet (Bardach Ex. 9, Quisenberry Ex 33 (CRDS 25606-607)) (CD-ROM Chaparral Exhibits D153)		11/1/1996	
	C120	Fax Dated 07/22/96 from L. Petti to B. Smith re: Purchase Order from Data General for FC2S Fibre to Channel SCSI Protocol Bridge Model 11 (Smith Ex 25; Quisenberry Ex 23; Bardach Ex 11 (CRDS 8552-55; 8558) (CD-ROM Chaparral Exhibits D155)		7/22/1996	
	C121	Email Dated 12/20/96 from J. Boykin to B. Smith re: Purchase Order for Betas in February and March (Hoese Ex 16, Quisenberry Ex 25; Bardach Ex 12 (CRDS 13644-650) (CD-ROM Chaparral Exhibits D156)		12/20/1996	
	C122	Infinity Commstor Fibre Channel Demo for Fall Comdex, 1996 (Hoese Ex 15, Bardach Ex 13 (CRDS 27415) (CD-ROM Chaparral Exhibits D157)			
Examiner Signature		/Christopher Shin/		Date Considered	08/26/2010

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S./

INFORMATION DISCLOSURE STATEMENT		Application Number	12/690,592
		Filing Date	01/20/2010
		First Named Inventor	Geoffrey B. Hoese
		Group Art Unit	2111
		Examiner Name	Unknown
Sheet	7	of	9
		Atty Docket Number	CROSS1120-33
Examiner Initials	Cite No.	OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS	Date
	C123	Fax Dated 12/19/96 from B. Bardach to T. Rarich re: Purchase Order Information (Bardach Ex. 14; Smith Ex 16 (CRDS 4460)) (CD-ROM Chaparral Exhibits D158)	12/19/1996
	C124	Miscellaneous Documents Regarding Comdex (Quisenberry Ex 2 (CRDS 27415-465)) (CD-ROM Chaparral Exhibits D165)	
	C125	CrossPoint 4100 Fibre Channel to SCSI Router Preliminary Datasheet (Quisenberry) Ex 3 (CRDS 4933-34) (CD-ROM Chaparral Exhibits D166) (CD-ROM Chaparral Exhibits D166)	
	C126	CrossPoint 4400 Fibre to Channel to SCSI Router Preliminary Datasheet; Crossroads Company and Product Overview (Quisenberry Ex 4 (CRDS 25606; 16136)) (CD-ROM Chaparral Exhibits D167)	
	C127	Crossroads Purchase Order Log (Quisenberry Ex 9 (CRDS 14061-062)) (CD-ROM Chaparral Exhibits D172)	
	C128	RAID Manager 5 with RDAC 5 for UNIX V.4 User's Guide (LSI-01854) (CD-ROM Chaparral Exhibits P062)	9/1/1996
	C129	Letter dated May 12, 1997 from Alan G. Leal to Barbara Bardach enclosing the original OEM License and Purchase Agreement between Hewlett-Packard Company and Crossroads Systems, Inc. (CRDS 02057) (CD-ROM Chaparral Exhibits P130)	
	C130	CR4x00 Product Specification (CRDS 43929) (CD-ROM Chaparral Exhibits P267)	6/1/1998
	C131	Symbios Logic – Hardware Functional Specification for the Symbios Logic Series 3 Fibre Channel Disk Array Controller Model 3701 (Engelbrecht Ex 3 (LSI-1659-1733)) (CD-ROM Pathlight Exhibits D074)	
	C132	Report of the Working Group on Storage I/O for Large Scale Computing; Department of Computer Science Duke University: CS-1996-21 (PTI 173330-347). (CD-ROM Pathlight Exhibits D098)	
	C133	Brian Allison's 1999 Third Quarter Sales Plan (PDX 38)CNS 022120-132)) (CD-ROM Pathlight Exhibits D201)	6/5/2001
	C134	Brooklyn SCSI-SCSI Intelligent External RAID Bridge Definition Phase External Documentation ((CD-ROM Pathlight Exhibits D129)	
	C135	StorageWorks HSx70 System Specification by Steve Sicola dated 6/11/96 4:57pm, Revision 4.	6/11/1996
	C136	ANSI TR X3.xxx-199x, Revision 9 of X3-991D. Draft Proposed X3 Technical Report - Small Computer System Interface - 3 Generic Packetized Protocol (SCSI-GPP). Computer and Business Equipment Manufacturers Assoc.	
	C137	Enterprise Systems Connection (ESON) Implementation Guide, July 1996, IBM International Technical Support Organization, Poughkeepsie Center	7/1/1996
Examiner Signature	/Christopher Shin/		Date Considered 08/26/2010

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S./

INFORMATION DISCLOSURE STATEMENT		Application Number	12/690,592	
		Filing Date	01/20/2010	
		First Named Inventor	Geoffrey B. Hoese	
		Group Art Unit	2111	
		Examiner Name	Unknown	
Sheet 8	of 9	Atty Docket Number	CROSS1120-33	
Examiner Initials	Cite No.	OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS		Date
	C138	Digital Delivers Industry-Leading Enterprise-Class Storage Solutions. StorageWorks Family Provides Easiest Path to Fibre Channel. Three pages by Company News Oncall dated 09/09/04		9/9/2004
	C139	American National Standard for Information Technology – Fibre Channel Protocol for SCSI. ANSI X3.269-1996		6/18/1905
	C140	F1710A File Control Unit and F6493 Array Disk Subsystem by Hitoshi Matsushima, Shojiro Okada and Tetsuro Kudo.		2/3/1995
	C141	The Legend of AMDAHL by Jeffrey L. Rodengen (5 pages)		
	C142	Office Action dated February 6, 2007 from the Japanese Patent Office regarding related application No. 526873/2000.		2/6/2007
	C143	InfoServer 100 System Operation Guide, Order Number EK-DIS1K-UG-001		
	C144	iNFOsERVER 100 Installation and Owner's Guide, Order Number EK-DIS1K-IN-001		
	C145	Software Product Description: Product Name: InfoServer 100 Software, Version 1.1 SPD 38.59.00		11/1/1991
	C146	Software Product Description: Product Name: InfoServer Client for ULTRIX, Version 1.1, SPD 40.78.01		4/1/1993
	C147	Draft Proposed American National Standard. X3.269-199X, Revision 012. Information System - dpANS Fibre Channel Protocol fo SCSI.		12/4/1995
	C148	Impactdata Launches Breakthrough Architecture for Network Storage.		11/13/1996
	C149	Impactdata..News Release: Impactdata Introduces New Storage Architecture for High Performance Computing. 2 Pages.		11/12/1996
	C150	Impactdata..News Release: Impactdata's Network Peripheral Adapter (NPA) Pushes Technology Envelope of Data Storage Management in High-Speed Computing Environments. 2 Pages.		11/12/1996
	C151	Impactdata..News Release: Impactdata and Storage Concepts Announce Integration of FibreRAID II Storage Solution with Impactdata's Distributed Storage Node Architecture (DSNA). 2 pages.		11/18/1996
	C152	Impactdata..News Release: Breece Hill Libraries Now Able to Attach Directly to High Speed Networks Peripheral Adapter from Impactdata. 2 Pages.		11/20/1996
	C153	Impactdata - DSNA Questions and Answers. 22 Pages.		
	C154	Impactdata - Network Storage Solutions. 4 pages.		
	C155	Network Storage Building Blocks. 2 Pages.		
	C156	Impactdata - NPA (Network Peripheral Interface). 4 Pages		
	C157	Impactdata - CPI (Common Peripheral Interfae). 2 Pages		
	C158	Impactdata - SNC (Storage Node Controller). 2 Pages		
	C159	Impactdata - DSNA (Distributed Storage Node Architecture) Protocol. 2 Pages		
	C160	Impactdata - DS-50. 2 Pages		
	C161	Impactdata - Corporate Fact Sheet. 1 Page		
Examiner Signature		/Christopher Shin/	Date Considered	08/26/2010

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INFORMATION DISCLOSURE STATEMENT		Application Number	12/690,592		
		Filing Date	01/20/2010		
		First Named Inventor	Geoffrey B. Hoese		
		Group Art Unit	2111		
		Examiner Name	Unknown		
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Examiner Initials	Cite No.	OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS		Date	
	C162	Raider-5 "Disk Array Manual for the UltraSCSI Controller". Part No. 261-0013-002. 191 Pages			
	C163	Impactdata - White Paper: Distributed Storage Node Architecture (DSNA). January, 1997		01/97	
	C164	Impactdata - DSNA Distributed Storage Node Architecture "Reference Guide". 44 Pages			
	C165	F1710 Logic Specification			
	C166	Translation of Final Office Action issued in JP 526873/2000 mailed 05/14/08. 4 Pages.		5/14/2008	
	C167	Office Action issued in USPA 11/851,837 dated 12/22/08, Hoese, 7 pages		12/22/2008	
	C168	English Translation of Japanese Laid-Open Publication No. 5-181609. 9 pgs.		7/23/1993	
	C169	English Translation of Japanese Laid-Open Publication No. 7-20994. 57 pgs		1/24/1995	
	C170	F1710 File Control Unit (FCU) Logical Specifications. 11 Pages		12/9/1997	
Examiner Signature	/Christopher Shin/		Date Considered	08/26/2010	

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	Type	Hits	Search Text	DBs
1	IS&R	6	((("7340549") or ("7051147") or ("6789152") or ("6421753") or ("5941972") or ("20080307444")).PN.	US-PG PUB; USPAT
2	BRS	175	crossroads.as.	US-PG PUB; USPAT; USO CR; FPRS; EPO; JPO; DERWENT; IBM_TDB
3	BRS	21357	geoffrey.in.	US-PG PUB; USPAT; USO CR; FPRS; EPO; JPO; DERWENT; IBM_TDB
4	BRS	119	storage and S2	US-PG PUB; USPAT; USO CR; FPRS; EPO; JPO; DERWENT; IBM_TDB
5	BRS	84	router and S5	US-PG PUB; USPAT; USO CR; FPRS; EPO; JPO; DERWENT; IBM_TDB
6	BRS	176	crossroads.as.	US-PG PUB; USPAT; USO CR; FPRS; EPO; JPO; DERWENT; IBM_TDB
7	BRS	21454	geoffrey.in.	US-PG PUB; USPAT; USO CR; FPRS; EPO; JPO; DERWENT; IBM_TDB
8	BRS	24	S7 and S8	US-PG PUB; USPAT; USO CR; FPRS; EPO; JPO; DERWENT; IBM_TDB
9	IS&R	3	((("7051147") or ("6738854") or ("6425035")).PN.	US-PG PUB; USPAT

	Time Stamp	Comments	Error Definition	Errors	Ref #
1	2010/07/22 15:13				S1
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3	2010/07/22 15:15				S3
4	2010/07/22 15:15				S5
5	2010/07/22 15:15				S6
6	2010/08/25 15:35				S7
7	2010/08/25 15:35				S8
8	2010/08/25 15:35				S9
9	2010/09/08 12:21				S10

INFORMATION DISCLOSURE STATEMENT				Application Number	12/690,592
				Filing or 371 (c) Date:	January 20, 2010
				First Named Inventor	Geoffrey B. Hoese
				Group Art Unit	2182
				Examiner Name	Unknown
Sheet	1	of	1	Atty Docket Number	CROSS1120-33
NON PATENT LITERATURE DOCUMENTS					
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published			T²
	C172	QUESTIONING Mailed 06/08/2010 from JP Patent Application 526873/2000. 8 pages			06/08/10
	C173	Office Action Mailed 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 pgs.			08/17/10
Examiner Signature	/Christopher Shin/			Date Considered	09/09/2010

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S./

INFORMATION DISCLOSURE STATEMENT				Application Number	12/690,592
				Filing or 371 (c) Date:	January 20, 2010
				First Named Inventor	Geoffrey B. Hoese
				Group Art Unit	2182
				Examiner Name	Unknown
Sheet	1	of	1	Atty Docket Number	CROSS1120-33
NON PATENT LITERATURE DOCUMENTS					
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published			T²
	C171	American National Standard for Information Systems: Fibre Channel -- Cross-Point Switch Fabric Topology (FC-XS); X3T11/Project 959D/Rev 1.30. 114 pgs.			6/17/1994
Examiner Signature	/Christopher Shin/			Date Considered	08/26/2010

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BIB DATA SHEET

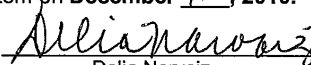
CONFIRMATION NO. 8115

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.	
12/690,592	01/20/2010	710	2181	CROSS1120-33	
APPLICANTS Geoffrey B. Hoese, Austin, TX; Jeffry T. Russell, Cibolo, TX;					
** CONTINUING DATA ***** This application is a CON of 12/552,885 09/02/2009 which is a CON of 11/851,724 09/07/2007 PAT 7,689,754 which is a CON of 11/442,878 05/30/2006 ABN * which is a CON of 11/353,826 02/14/2006 PAT 7,340,549 which is a CON of 10/658,163 09/09/2003 PAT 7,051,147 which is a CON of 10/081,110 02/22/2002 PAT 6,789,152 which is a CON of 09/354,682 07/15/1999 PAT 6,421,753 which is a CON of 09/001,799 12/31/1997 PAT 5,941,972 (*)Data provided by applicant is not consistent with PTO records.					
** FOREIGN APPLICATIONS *****					
** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 02/02/2010					
Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Verified and /CHRISTOPHER B SHIN/ Acknowledged _____ Examiner's Signature	<input type="checkbox"/> Met after Allowance _____ Initials	STATE OR COUNTRY TX	SHEETS DRAWINGS 2	TOTAL CLAIMS 53	INDEPENDENT CLAIMS 3
ADDRESS SPRINKLE IP LAW GROUP 1301 W. 25TH STREET SUITE 408 AUSTIN, TX 78705 UNITED STATES					
TITLE STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE					
FILING FEE RECEIVED 2806	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit	

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
REPLY TO OFFICE ACTION DATED 09/10/2010	Atty. Docket No. CROSS1120-33
Applicant Geoffrey B. Hoese	
Application Number 12/690,592	Date Filed 01/20/10
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2181	Examiner Shin, Christopher
Confirmation Number: 8115	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Certificate of Transmission Under 37 C.F.R. § 1.8
I hereby certify that this correspondence is being deposited electronically with the U.S. Patent and Trademark Office using the United States Patent and Trademark Office's EFS-Web system on December 10, 2010 .
 Delia Narvaiz

In response to the Official Action mailed September 10, 2010, Applicant respectfully requests the Examiner reconsider the rejections of the Claims in view of this reply.

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IN THE SPECIFICATION:

Please replace paragraph [0001] with the following paragraph.

[0001] This application is a continuation of, and claims a benefit of priority under 35 U.S.C. 120 of the filing date of U.S. Patent Application Serial No. 12/552,885 entitled "Storage Router and Method for Providing Virtual Local Storage" filed 09/02/2009, which is a continuation of and claims the benefit of priority of U.S. Application Serial No. 11/851,724 entitled "Storage Router and Method for Providing Virtual Local Storage" filed 09/07/2007, now U.S. Patent No. 7,689,754 issued 03/30/2010, which is a continuation of and claims the benefit of priority of U.S. Patent Application Serial No. 11/442,878 entitled "Storage Router and Method for Providing Virtual Local Storage" filed 09/07/2007, now abandoned, which is a continuation of and claims the benefit of priority of U.S. Patent Application Serial No. 11/353,826 entitled "Storage Router and Method for Providing Virtual Local Storage" filed on 02/14/2006, now U.S. Patent No. 7,340,549 issued 03/04/2008, which is a continuation of and claims the benefit of priority of U.S. Patent Application Serial No. 10/658,163 entitled "Storage Router and Method for Providing Virtual Local Storage" filed on 09/09/2003 now U.S. Patent No. 7,051,147 issued 05/23/2006, which is a continuation of and claims the benefit of benefit of priority of U.S. Patent Application Serial No. 10/081,110 by inventors Geoffrey B. Hoese and Jeffery T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on 02/22/2002, now U.S. Patent No. 6,789,152 issued on 09/07/2004, which in turn is a continuation of and claims benefit of priority of U.S. Application No. 09/354,682 by inventors Geoffrey B. Hoese and Jeffery T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on 07/15/1999, now U.S. Patent No. 6,421,753 issued on 07/16/2002, which in turn is a continuation of and claims benefit of priority of U.S. Patent Application Serial No. 09/001,799, filed on 12/31/1997, now U.S. Patent No. 5,941,972 issued on 08/24/1999, and hereby incorporates these applications and patents by reference in their entireties as if they had been fully set forth herein.

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IN THE CLAIMS:

Please amend the claims as follows:

1. (Original) A storage router for providing virtual local storage on remote storage devices, comprising:
 - a first controller operable to interface with a first transport medium, wherein the first medium is a serial transport media; and
 - a processing device coupled to the first controller, wherein the processing device is configured to:
 - maintain a map to allocate storage space on the remote storage devices to devices connected to the first transport medium by associating representations of the devices connected to the first transport medium with representations of storage space on the remote storage devices, wherein each representation of a device connected to the first transport medium is associated with one or more representations of storage space on the remote storage devices;
 - control access from the devices connected to the first transport medium to the storage space on the remote storage devices in accordance with the map; and
 - allow access from devices connected to the first transport medium to the remote storage devices using native low level block protocol.
2. (Original)The storage router of Claim 1, wherein the map associates a representation of storage space on the remote storage devices with multiple devices connected to the first transport medium.
3. (Original)The storage router of Claim 1, wherein the storage space on the remote storage devices comprises storage space on multiple remote storage devices.
4. (Original)The storage router of Claim 1, wherein the map associates a representation of a device connected to the first transport medium with a representation of an entire storage space of at least one remote storage device.

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5. (Original)The storage router of Claim 1, wherein the map resides at the storage router and is maintained at the storage router.

6. (Original)The storage router of Claim 1, wherein the native low level block protocol is received at the storage router via the first transport medium and the processing device uses the received native low level block protocol to allow the devices connected to the first transport medium access to storage space specifically allocated to them in the map.

7. (Original)The storage router of Claim 1, wherein the storage router is configured to receive commands according to a first low level block protocol from the device connected to the first transport medium and forward commands according to a second low level block protocol to the remote storage devices.

8. (Original)The storage router of Claim 7, wherein the first low level block protocol is an FCP protocol and the second low level block protocol is a protocol other than FCP.

9. (Original)The storage router of Claim 1, wherein the map comprises one or more tables.

10. (Original)The storage router of Claim 1, wherein the virtual local storage is provided to the devices connected to the first transport medium in a manner that is transparent to the devices and wherein the storage space allocated to the devices connected to the first transport medium appears to the devices as local storage.

11. (Original)The storage router of Claim 1, wherein the storage router provides centralized control of what the devices connected to the first transport medium see as local storage.

12. (Original)The storage router of Claim 1, wherein the representations of storage space comprise logical unit numbers that represent a subset of storage on the remote storage devices.

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13. (Original)The storage router of Claim 12, wherein the storage router is operable to route requests to the same logical unit number from different devices connected to the first transport medium to different subsets of storage space on the remote storage devices.

14. (Original)The storage router of Claim 1, wherein the representations of devices connected to the first transport medium are unique identifiers.

15. (Original)The storage router of Claim 14, wherein the unique identifiers are world wide names.

16. (Original)The storage router of Claim 1, wherein the storage router is configured to allow modification of the map in a manner transparent to and without involvement of the devices connected to the first transport medium.

17. (Original)The storage router of Claim 1, wherein the processing device is a microprocessor.

18. (Original)The storage router of Claim 1, wherein the processing device is a microprocessor and associated logic to implement a stand-alone processing system.

19. (Original)The storage router of Claim 1, wherein the first transport medium is a fibre channel transport medium and further comprising a second transport medium connected to the remote storage devices that is a fibre channel transport medium.

20. (Original)A storage network comprising:
a set of devices connected a first transport medium, wherein the first transport medium;
a set of remote storage devices connected to a second transport medium;
a storage router connected to the serial transport medium;
a storage router connected to the first transport medium and second transport medium to provide virtual local storage on the remote storage devices, the storage router configured to:
maintain a map to allocate storage space on the remote storage devices to devices connected to the first transport medium by associating representations of the devices connected to the first transport medium with representations of storage space on the remote

storage devices, wherein each representation of a device connected to the first transport medium is associated with one or more representations of storage space on the remote storage devices;

control access from the devices connected to the first transport medium to the storage space on the remote storage devices in accordance with the map; and

allow access from devices connected to the first transport medium to the remote storage devices using native low level block protocol.

21. (Original)The storage network of Claim 20, wherein the map associates a representation of storage space on the remote storage devices with multiple devices connected to the first transport medium.

22. (Original)The storage network of Claim 20, wherein the storage space on the remote storage devices comprises storage space on multiple remote storage devices.

23. (Original)The storage network of Claim 20, wherein the map associates a representation of a device connected to the first transport medium with a representation of an entire storage space of at least one remote storage device.

24. (Original)The storage network of Claim 20, wherein the map resides at the storage router and is maintained at the storage router.

25. (Original)The storage network of Claim 20, wherein the native low level block protocol is received at the storage router via the first transport medium and the storage router uses the received native low level block protocol to allow the devices connected to the first transport medium access to storage space specifically allocated to them in the map.

26. (Original)The storage router of Claim 20, wherein the storage router is configured to receive commands according to a first low level block protocol from the device connected to the first transport medium and forward commands according to a second low level block protocol to the remote storage devices.

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27. (Original)The storage network of Claim 20, wherein the first low level block protocol is an FCP protocol and the second low level block protocol is a protocol other than FCP.

28. (Original)The storage network of Claim 20, wherein the map comprises one or more tables.

29. (Original)The storage network of Claim 20, wherein the virtual local storage is provided to the devices connected to the first transport medium in a manner that is transparent to the devices and wherein the storage space allocated to the devices connected to the first transport medium appears to the devices as local storage.

30. (Original)The storage network of Claim 20, wherein the storage router provides centralized control of what the devices connected to the first transport medium see as local storage.

31. (Original)The storage network of Claim 20, wherein the representations of storage space comprise logical unit numbers that represent a subset of storage on the remote storage devices.

32. (Original)The storage network of Claim 31, wherein the storage router is operable to route requests to the same logical unit number from different devices connected to the first transport medium to different subsets of storage space on the remote storage devices.

33. (Original)The storage network of Claim 20, wherein the representations of devices connected to the first transport medium are unique identifiers.

34. (Original)The storage network of Claim 33, wherein the unique identifiers are world wide names.

35. (Original)The storage network of Claim 20, wherein the storage router is configured to allow modification of the map in a manner transparent to and without involvement of the devices connected to the first transport medium.

36. (Original)The storage network of Claim 20, wherein the first transport medium is a fibre channel transport medium and the second transport medium is a fibre channel transport medium.

37. (Original)A method for providing virtual local storage on remote storage devices comprising:

connecting a storage router between a set of devices connected to a first transport medium and a set of remote storage devices, wherein the first transport medium is a serial transport medium;

maintaining a map at the storage router to allocate storage space on the remote storage devices to devices connected to the first transport medium by associating representations of the devices connected to the first transport medium with representations of storage space on the remote storage devices, wherein each representation of a device connected to the first transport medium is associated with one or more representations of storage space on the remote storage devices;

controlling access from the devices connected to the first transport medium to the storage space on the remote storage devices in accordance with the map; and

allowing access from devices connected to the first transport medium to the remote storage devices using native low level block protocol.

38. (Original)The method of Claim 37, wherein the map associates a representation of storage space on the remote storage devices with multiple devices connected to the first transport medium.

39. (Original)The method of Claim 37, wherein the storage space on the remote storage devices comprises storage space on multiple remote storage devices.

40. (Original)The method of Claim 37, wherein the map associates a representation of a device connected to the first transport medium with a representation of an entire storage space of at least one remote storage device.

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41. (Original)The method of Claim 37, wherein the map resides at the storage router and is maintained at the storage router.

42. (Original)The method of Claim 37, further comprising:
receiving the native low level block protocol at the storage router via the first transport medium;

using the received native low level block protocol at the storage router to allow the devices connected to the first transport medium access to storage space specifically allocated to them in the map.

43. (Original)The method of Claim 37, further comprising receiving commands at the storage router according to a first low level block protocol from the device connected to the first transport medium and forwarding commands according to a second low level block protocol to the remote storage devices.

44. (Original)The method of Claim 43, wherein the first low level block protocol is an FCP protocol and the second low level block protocol is a protocol other than FCP.

45. (Original)The method of Claim 37, wherein the map comprises one or more tables.

46. (Original)The method of Claim 37, wherein the virtual local storage is provided to the devices connected to the first transport medium in a manner that is transparent to the devices and wherein the storage space allocated to the devices connected to the first transport medium appears to the devices as local storage.

47. (Original)The method of Claim 37, wherein the storage router provides centralized control of what the devices connected to the first transport medium see as local storage.

48. (Original)The method of Claim 37, wherein the representations of storage space comprise logical unit numbers that represent a subset of storage on the remote storage devices.

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12/690,592
Customer ID: 44654

49. (Original)The method of Claim 48, wherein the storage router is operable to route requests to the same logical unit number from different devices connected to the first transport medium to different subsets of storage space on the remote storage devices.

50. (Original)The method of Claim 37, wherein the representations of devices connected to the first transport medium are unique identifiers.

51. (Original)The method of Claim 50, wherein the unique identifiers are world wide names.

52. (Original)The method of Claim 51, wherein the storage router is configured to allow modification of the map in a manner transparent to and without involvement of the devices connected to the first transport medium.

53. (Original)The method of Claim 1 wherein connecting the storage router between a set of devices connected to a first transport medium and a set of remote storage devices further comprises connecting the storage router between a first fibre channel transport medium and a second fibre channel transport medium.

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INTERVIEW SUMMARY

On August 30, 2010, John L. Adair and Examiner Shin held a telephonic interview regarding United States Patent Application Serial No. 11/947,499 (the "499 Application"), United States Patent Application Serial No. 11/980,909 (the "909 Application"), United States Patent Application Serial No. 12/552,885 and United States Patent Application Serial No. 12/552,913 and United States Patent Application No. 12/690,592 (the '592 Application). Applicant pointed out the transport mediums could be the same or different types of transport mediums and, for example, that i) the specification describes a Fibre Channel-to-Fibre Channel mode of operation and ii) issued United States Patent No. 7,051,147 claims a Fibre Channel-to-Fibre Channel system. Applicant also pointed out that other patents have issued that recite first and second transport mediums without requiring that the transport mediums use different protocols. The Examiner agreed that in the various cases, while the transport mediums may be different (e.g., separated by a storage router in the case of Claim 1 of the '499 Application), the transport mediums can use the same or different protocols and the 'low level block protocol' in the same medium types is consistent with the parent patents/specifications.

Furthermore, in the August 30, 2010 interview, Applicant pointed out that the term "remote" was construed to mean "indirectly connected through at least one serial network transport medium" (emphasis added). Crossroads v. Dot Hill Systems Corporation, Western District of Texas, Civil Action No. A-03-CA-754-SS. Therefore, the recitation of "remote" in various claims of the related applications addresses the fact that the transport mediums are different so that storage is indirectly connected to hosts (e.g., through a storage router in the case of Claim 1 of the '499 Application). Applicant agreed to review the claims of the related applications and specifically to amend the claims of the '909 Application to clarify that the storage devices are remote from the hosts. While Applicant and the Examiner discussed the other related cases generally, they did not discuss specific claims.

To the extent the Examiner's statement that one transport medium is "remote, separate and different" may be interpreted to mean anything different than that the transport mediums are different/separate so that storage is indirectly connected to hosts (e.g., through a storage router in the case of Claim 1 of the '499 Application) and that at least one of the transport mediums is a serial transport medium, Applicant disagrees with such an interpretation. As pointed out in the interview, the transport mediums can be the same type of transport mediums or different types of transport mediums.

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Applicant agreed to file an updated terminal disclaimer and amend the Related Applications section as needed.

REMARKS

Applicant appreciates the time taken by the Examiner to review Applicant's present application. This application has been carefully reviewed in light of the Official Action mailed September 10, 2010. Applicant respectfully requests reconsideration and favorable action in this case.

Double Patenting Rejection

Claims 1-53 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims of U.S. Patent Nos. 7,051,147, 5,941,972, 7,340,549, 7,689,754, 7,552,266, 7,694,058, 6,421,753, 6,425,036, 6,425,035, 6,789,152, 6,738,854 and 6,763,419 and were provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over U.S. Patent Application Nos. 11/980,909, 11/947,499, 12/220,431, 12/552,807, 12/552,885, 12/552,913, 12/910,431, 12/910,375, 12/910,476 and 12/910,515. Applicant is including with this reply a timely filed terminal disclaimer in compliance with 37 C.F.R. § 1.321(c). U.S. Patent Nos. 7,051,147, 5,941,972, 7,340,549, 7,689,754, 7,552,266, 7,694,058, 6,421,753, 6,425,036, 6,425,035, 6,789,152, 6,738,854 and 6,763,419 and U.S. Patent Application Nos. 11/980,909, 11/947,499, 12/220,431, 12/552,807, 12/552,885, 12/552,913, 12/910,431, 12/910,375, 12/910,476 and 12/910,515 and the current Application are commonly owned. Accordingly, withdrawal of this rejection is respectfully requested.

Specification

The specification was objected to for informalities. An amended paragraph [0001] is submitted to update the related applications. Accordingly, withdrawal of this objection is requested.

IDS REFERENCES

Applicant filed information disclosure statements (IDS) citing the related art of record in the present application on May 21, 2010, June 9, 2010 and August 20, 2010. The Applicant notes that the Office Action mailed September 10, 2010 was accompanied by a copy of the listing of references, with an indication by the Examiner to indicate what references cited therein were considered.

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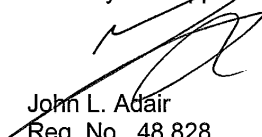
Conclusion

Applicant has now made an earnest attempt to place this case in condition for allowance. Other than as explicitly set forth above, this reply does not include an acquiescence to statements, assertions, assumptions, conclusions, or any combination thereof in the Office Action. For the foregoing reasons and for other reasons clearly apparent, Applicant respectfully requests full allowance of Claims 1-53. The Examiner is invited to telephone the undersigned at the number listed below for prompt action in the event any issues remain.

The Director of the U.S. Patent and Trademark Office is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 50-3183 of Sprinkle IP Law Group.

Respectfully submitted,

Sprinkle IP Law Group
Attorneys for Applicant



John L. Adair
Reg. No. 48,828

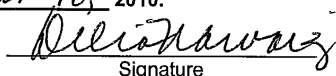
Date: December 10, 2010

1301 W. 25th Street, Suite 408
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Fax. (512) 371-9088

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
Terminal Disclaimer	Atty. Docket No. CROSS1120-33
Applicant Geoffrey B. Hoese, et al.	
Application Number 12/690,592	Date Filed 09/02/2009
Title STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE	
Group Art Unit 2181	Examiner SHIN, Christopher B.
Confirmation Number: 5330	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Certificate of Mailing
I hereby certify that this correspondence is being filed via electronically using the U.S. Patent Office EFS-Web system on <u>December 10, 2010</u> .
 Signature
<u>Delia Narvaiz</u> Printed Name

Crossroads Systems, Inc., the owner of one hundred percent (100%) interest in the instant application, except as provided below:

i) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. § 154 and 173 of U.S. Patent No. 5,941,972. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. § 154 and 173 of U.S. Patent No. 5,941,972, in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term.

ii) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. § 154 and 173 of U.S. Patent No. 6,421,753 as presently shortened by terminal disclaimer. In making the above disclaimer, the owner does not disclaim the terminal part of any patent

granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. § 154 and 173 of U.S. Patent No. 6,421,753, as presently shortened by terminal disclaimer, in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as presently shortened by terminal disclaimer.

iii) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. § 154 and 173, as presently shortened by terminal disclaimer, of U.S. Patent No. 6,425,036. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. § 154 and 173 of U.S. Patent No. 6,425,036, as presently shortened by terminal disclaimer, in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term, as presently shortened by any terminal disclaimer.

iv) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. § 154 and 173, as presently shortened by terminal disclaimer, of U.S. Patent No. 6,425,035. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. § 154 and 173 of U.S. Patent No. 6,425,035, as presently shortened by terminal disclaimer, in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term, as presently shortened by any terminal disclaimer.

v) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. § 154 and 173, as presently shortened by terminal disclaimer, of U.S. Patent No. 6,789,152. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. § 154 and 173 of U.S. Patent No. 6,789,152, as presently shortened by terminal disclaimer, in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term, as presently shortened by any terminal disclaimer.

vi) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. § 154 and 173, as presently shortened by terminal disclaimer, of U.S. Patent No. 6,738,854. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. § 154 and 173 of U.S. Patent No. 6,738,854, as presently shortened by terminal disclaimer, in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term, as presently shortened by any terminal disclaimer.

vii) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. § 154 and 173, as presently shortened by terminal disclaimer, of U.S. Patent No. 6,763,419. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. § 154 and 173 of U.S. Patent No. 6,763,419, as presently shortened by terminal disclaimer, in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by

a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term, as presently shortened by any terminal disclaimer.

viii) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. § 154 and 173, as presently shortened by terminal disclaimer, of U.S. Patent No. 7,051,147. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. § 154 and 173 of U.S. Patent No. 7,051,147, as presently shortened by terminal disclaimer, in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term, as presently shortened by any terminal disclaimer.

ix) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. § 154 and 173, as presently shortened by terminal disclaimer, of U.S. Patent No. 7,340,549. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. § 154 and 173 of U.S. Patent No. 7,340,549, as presently shortened by terminal disclaimer, in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term, as presently shortened by any terminal disclaimer.

x) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. § 154 and 173, as presently shortened by terminal disclaimer, of U.S. Patent No. 7,689,754. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. § 154 and 173 of U.S. Patent No. 7,689,754, as presently

shorted by terminal disclaimer, in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term, as presently shortened by any terminal disclaimer.

xi) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. § 154 and 173, as presently shortened by terminal disclaimer, of U.S. Patent No. 7,552,266. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. § 154 and 173 of U.S. Patent No. 7,552,266, as presently shortened by terminal disclaimer, in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term, as presently shortened by any terminal disclaimer.

xii) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. § 154 and 173, as presently shortened by terminal disclaimer, of U.S. Patent No. 7,694,058. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. § 154 and 173 of U.S. Patent No. 7,694,058, as presently shortened by terminal disclaimer, in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term, as presently shortened by any terminal disclaimer.

xiii) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term of any patent granted on United States Patent Application No. 11/947,499 as defined in 35 U.S.C.

§ 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 11/947,499. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full term as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 11/947,499, in the event that any such patent granted on the co-pending application: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.

xiv) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term of any patent granted on United States Patent Application No. 12/220,431 as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 12/220,431. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full term as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 12/220,431, in the event that any such patent granted on the co-pending application: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.

xv) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term of any patent granted on United States Patent Application No. 11/980,909 as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 11/980,909. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would

extend to the expiration date of the full term as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 11/980,909, in the event that any such patent granted on the co-pending application: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.

xvi) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term of any patent granted on United States Patent Application No. 12/552,885 as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 12/552,885. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full term as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 12/552,885, in the event that any such patent granted on the co-pending application: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.

xvii) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term of any patent granted on United States Patent Application No. 12/552,913 as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 12/552,913. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full term as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 12/552,913, in the event that any such patent granted on the co-pending

application: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.

xviii) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term of any patent granted on United States Patent Application No. 12/552,807 as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 12/552,807. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full term as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 12/552,807, in the event that any such patent granted on the co-pending application: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.

xix) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term of any patent granted on United States Patent Application No. 12/910,375 as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 12/910,375. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full term as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 12/910,375, in the event that any such patent granted on the co-pending application: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is

in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant

xx) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term of any patent granted on United States Patent Application No. 12/910,431 as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 12/910,431. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full term as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 12/910,431, in the event that any such patent granted on the co-pending application: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant.

xxi) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term of any patent granted on United States Patent Application No. 12/910,476 as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 12/910,476. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full term as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 12/910,476, in the event that any such patent granted on the co-pending application: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant

xxii) The terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term of any patent granted on United States Patent Application No. 12/910,515 as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 12/910,515. In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full term as defined in 35 U.S.C. § 154 and 173 as shortened by any terminal disclaimer filed prior to the grant of any patent on United States Patent Application No. 12/910,515, in the event that any such patent granted on the co-pending application: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as shortened by any terminal disclaimer filed prior to its grant

The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it, the above-referenced patents and the above-referenced co-pending applications are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

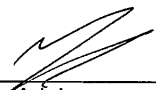
Check box 1, 2, 3, or 4 as appropriate.

1. For submission on behalf of an organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the organization.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

- * Statement under 37 C.R.F. 3.73(b) is required if terminal disclaimer is signed by the assignee (owner). Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

2. The undersigned is an attorney or agent of record.
3. Terminal disclaimer fee under 37 C.F.R. 1.20(d) included.
4. Terminal disclaimer fee under 37 C.F.R. 1.20(d). The Commissioner is hereby authorized to deduct \$130.00 representing the above-noted filing fee from Deposit Account. No. 50-3183 of Sprinkle IP Law Group. The Commissioner is hereby further authorized to deduct any deficiencies or credit any overpayments regarding this application from the same account.



John L. Adair
Reg. No. 48,828

12-10-10

Dated

Electronic Patent Application Fee Transmittal				
Application Number:	12690592			
Filing Date:	20-Jan-2010			
Title of Invention:	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE			
First Named Inventor/Applicant Name:	Geoffrey B. Hoese			
Filer:	John L. Adair/Delia Narvaiz			
Attorney Docket Number:	CROSS1120-33			
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Statutory or terminal disclaimer	1814	1	140	140
Total in USD (\$)				140

Electronic Acknowledgement Receipt

EFS ID:	9010738
Application Number:	12690592
International Application Number:	
Confirmation Number:	8115
Title of Invention:	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE
First Named Inventor/Applicant Name:	Geoffrey B. Hoese
Customer Number:	44654
Filer:	John L. Adair/Delia Narvaiz
Filer Authorized By:	John L. Adair
Attorney Docket Number:	CROSS1120-33
Receipt Date:	10-DEC-2010
Filing Date:	20-JAN-2010
Time Stamp:	15:14:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 140
RAM confirmation Number	1520
Deposit Account	503183
Authorized User	
<p>The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)</p>	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)					
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		CROSS1120-33_ROA_121010.pdf	537418 <small>6e59822f22b7f74971f7d6964bbad6891bd3029</small>	yes	14
Multipart Description/PDF files in .zip description					
Document Description			Start	End	
Amendment/Req. Reconsideration-After Non-Final Reject			1	1	
Specification			2	2	
Claims			3	10	
Applicant summary of interview with examiner			11	12	
Applicant Arguments/Remarks Made in an Amendment			13	14	
Warnings:					
Information:					
2	Terminal Disclaimer Filed	CROSS1120-33_TD.pdf	616456 <small>66a9e07300ed52edbfdf6d6c196c0f077829d7245</small>	no	11
Warnings:					
Information:					
3	Fee Worksheet (PTO-875)	fee-info.pdf	30397 <small>2ccb2d240efe13efaf583b68a7c5d6a2d45dcd56</small>	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			1184271		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

INFORMATION DISCLOSURE STATEMENT				Application Number	12/690,592
				Filing or 371 (c) Date:	January 20, 2010
				First Named Inventor	Geoffrey B. Hoese
				Group Art Unit	2182
				Examiner Name	Unknown
Sheet	1	of	1	Atty Docket Number	CROSS1120-33
NON PATENT LITERATURE DOCUMENTS					
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published			T²
	C174	Office Action Mailed 09/13/10 in U.S. Serial No. 11/980,909			09/13/10
	C175	Office Action Mailed 09/13/10 in U.S. Serial No. 12/552,807			09/13/10
	C176	Office Action Mailed 09/15/10 in U.S. Serial No. 12/552,885			09/15/10
	C177	Office Action Mailed 09/23/10 in U.S. Serial No. 12/552,913			09/23/10
Examiner Signature				Date Considered	

Electronic Patent Application Fee Transmittal				
Application Number:	12690592			
Filing Date:	20-Jan-2010			
Title of Invention:	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE			
First Named Inventor/Applicant Name:	Geoffrey B. Hoese			
Filer:	John L. Adair/Delia Narvaiz			
Attorney Docket Number:	CROSS1120-33			
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
Total in USD (\$)				180

Electronic Acknowledgement Receipt

EFS ID:	9013238
Application Number:	12690592
International Application Number:	
Confirmation Number:	8115
Title of Invention:	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE
First Named Inventor/Applicant Name:	Geoffrey B. Hoese
Customer Number:	44654
Filer:	John L. Adair/Delia Narvaiz
Filer Authorized By:	John L. Adair
Attorney Docket Number:	CROSS1120-33
Receipt Date:	10-DEC-2010
Filing Date:	20-JAN-2010
Time Stamp:	16:54:55
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 180
RAM confirmation Number	3549
Deposit Account	503183
Authorized User	
<p>The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)</p>	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)					
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		CROSS1120-33_IDS_121010.pdf	118713 b9af1228e38ca950f0f660b2fb2cf207db61d73	yes	3
Multipart Description/PDF files in .zip description					
Document Description			Start	End	
Transmittal Letter			1	2	
Information Disclosure Statement (IDS) Filed (SB/08)			3	3	
Warnings:					
Information:					
2	NPL Documents	CROSS1120_Ref_C174.pdf	164812 5039095bedf7274716acd9b4726e1ccedc cb4ca	no	7
Warnings:					
Information:					
3	NPL Documents	CROSS1120_Ref_C175.pdf	163965 8fcd974da4623a8ebce94e62a091e0e52cc0 c2cd	no	7
Warnings:					
Information:					
4	NPL Documents	CROSS1120_Ref_C176.pdf	165757 21708767ba58acd885ba4bd417d71084fd c1459	no	7
Warnings:					
Information:					
5	NPL Documents	CROSS1120_Ref_C177.pdf	166395 aa9f5ef1eb835af156987ab4f3546f0a206b a1	no	7
Warnings:					
Information:					
6	Fee Worksheet (PTO-875)	fee-info.pdf	30513 8e4cf3ec5a4643d4172cc328ca8997c2447b 57d1	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			810155		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

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National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

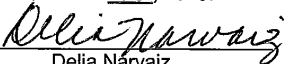
New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Atty. Docket No. (Opt.) CROSS1120-33
Applicant Geoffrey B. Hoese	
Application Number 12/690,592	Filing or 371 (c) Date: January 20, 2010
For STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE	
Group Art Unit 2181	Examiner Shin, Christopher
Confirmation Number: 8115	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir,

Certification of Transmission Under 37 C.F.R. 1.8
I hereby certify that this correspondence is being transmitted to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22312-1450 via the U.S. Patent and Trademark Office Electronic Filing System (EFS-Web) on December 10, 2010 .
 Delia Narvaiz

Applicant respectfully requests, pursuant to 37 C.F.R. §§ 1.56, 1.97 and 1.98, that the information listed on the attached SB08A/B form(s) be considered and cited in the examination of the above-identified application. A copy of U.S. Patent(s) and U.S. Patent Application Publication(s) listed on the attached SB08A form is not being submitted with this Information Disclosure Statement pursuant to the waiver of 37 C.F.R. § 1.98(a)(2)(i) by the U.S. Patent and Trademark Office. A copy of foreign patent documents as well as the information listed on the attached SB08B form is enclosed for the convenience of the Examiner.

This Information Disclosure Statement is being submitted within three months of the filing date of a national application other than a continued prosecution application under 37 C.F.R. § 1.53(d).

This Information Disclosure Statement is being submitted within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application;

This Information Disclosure Statement is being submitted before the mailing of a first Office action on the merits; or

This Information Disclosure Statement is being submitted before the mailing of a first Office action after the filing of a request for continued examination under 37 C.F.R. § 1.114.

This Information Disclosure Statement is being submitted after the period specified in 37 C.F.R. § 1.97(b) and before the mailing date of any of a final action under 37 C.F.R. § 1.113, a notice of allowance under 37 C.F.R. § 1.311, or an action that otherwise closes prosecution in the application, and is accompanied by one of:

- The statement specified in 37 C.F.R. § 1.97(e); or
- The fee set forth in 37 C.F.R. § 1.17(p). Applicant hereby authorizes the Commissioner to deduct the amount of \$180 from Deposit Account No. 50-3183 of Sprinkle IP Law Group for the filing fee of this Information Disclosure Statement.

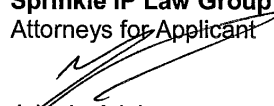
This Information Disclosure Statement is being submitted after the period specified in 37 C.F.R. § 1.97(c) and on or before payment of the issue fee and is accompanied by:

- The statement specified in 37 C.F.R. § 1.97(e); and
- The fee set forth in 37 C.F.R. § 1.17(p). Applicant hereby authorizes the Commissioner to deduct the amount of \$180 from Deposit Account No. 50-3183 of Sprinkle IP Law Group for the filing fee of this Information Disclosure Statement.

Applicant does not believe any fees are due for filing this Information Disclosure Statement; however, if Applicant is in error, the Director is hereby authorized to deduct any and all appropriate fees from Deposit Account 50-3183 of Sprinkle IP Law Group. Applicant respectfully submits that the claims of Applicant's above-referenced patent application are patentably distinguishable from the listed information.

Respectfully submitted,

Sprinkle IP Law Group
Attorneys for Applicant


John L. Adair
Reg. No. 48,828

Dated: December 10, 2010

1301 W. 25th Street, Suite 408
Austin, Texas 78705
Tel. (512) 637-9220
Fax. (512) 317-9088

PTO/SB/06 (07-06)

Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 12/690,592		Filing Date 01/20/2010		<input type="checkbox"/> To be Mailed				
APPLICATION AS FILED – PART I						OTHER THAN						
(Column 1)		(Column 2)		SMALL ENTITY <input type="checkbox"/>		OR		SMALL ENTITY				
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)					
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A			N/A						
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A			N/A						
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A			N/A						
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	minus 20 =	*	X \$ =		OR	X \$ =						
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =			X \$ =						
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).											
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>												
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL						
APPLICATION AS AMENDED – PART II						OTHER THAN						
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY		
AMENDMENT	12/10/2010	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)		
	Total <small>(37 CFR 1.16(i))</small>	* 53	Minus	** 53	= 0	X \$ =		OR	X \$52=	0		
	Independent <small>(37 CFR 1.16(h))</small>	* 3	Minus	***3	= 0	X \$ =		OR	X \$220=	0		
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>								OR			
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>								OR			
			TOTAL ADD'L FEE			TOTAL ADD'L FEE	0					
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY		
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)		
	Total <small>(37 CFR 1.16(i))</small>	*	Minus	**	=	X \$ =		OR	X \$ =			
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	=	X \$ =		OR	X \$ =			
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>								OR			
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>								OR			
			TOTAL ADD'L FEE			TOTAL ADD'L FEE						
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.												
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".												
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".												
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.												

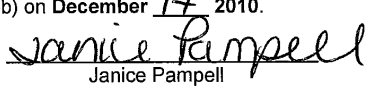
Legal Instrument Examiner:
/MARQUITA D. JONES/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Atty. Docket No. (Opt.) CROSS1120-33
Applicant Geoffrey B. Hoese	
Application Number 12/690,592	Filing or 371 (c) Date: 01/20/2010
For Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2181	Examiner Shin, Christopher
Confirmation Number: 8115	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir,

<u>Certification of Transmission Under 37 C.F.R. 1.8</u>
I hereby certify that this correspondence is being transmitted to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22312-1450 via the U.S. Patent and Trademark Office Electronic Filing System (EFS-Web) on December <u>17</u> 2010.
 Janice Pampell

Applicant respectfully requests, pursuant to 37 C.F.R. §§ 1.56, 1.97 and 1.98, that the information listed on the attached SB08B form be considered and cited in the examination of the above-identified application. A copy of the information listed on the attached SB08B form is enclosed for the convenience of the Examiner.

This Information Disclosure Statement is being submitted within three months of the filing date of a national application other than a continued prosecution application under 37 C.F.R. § 1.53(d).

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This Information Disclosure Statement is being submitted before the mailing of a first Office action after the filing of a request for continued examination under 37 C.F.R. § 1.114.

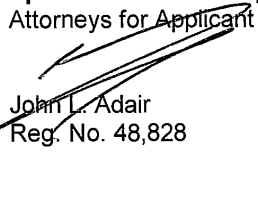
This Information Disclosure Statement is being submitted after the period specified in 37 C.F.R. § 1.97(b) and before the mailing date of any of a final action under 37 C.F.R. § 1.113, a notice of allowance under 37 C.F.R. § 1.311, or an action that otherwise closes prosecution in the application, and is accompanied by one of:

- The statement specified in 37 C.F.R. § 1.97(e); or
- The fee set forth in 37 C.F.R. § 1.17(p). Applicant hereby authorizes the Commissioner to deduct the amount of \$180 from Deposit Account No. 50-3183 of Sprinkle IP Law Group for the filing fee of this Information Disclosure Statement.
- This Information Disclosure Statement is being submitted after the period specified in 37 C.F.R. § 1.97(c) and on or before payment of the issue fee and is accompanied by:
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Respectfully submitted,

Sprinkle IP Law Group
Attorneys for Applicant


John L. Adair
Reg. No. 48,828

Dated: Dec. 15, 2010

1301 W. 25th Street, Suite 408
Austin, Texas 78705
Tel. (512) 637-9220
Fax. (512) 317-9088

INFORMATION DISCLOSURE STATEMENT		Application Number	12/690,592
		Filing or 371 (c) Date:	January 20, 2010
		First Named Inventor	Geoffrey B. Hoese
		Group Art Unit	2181
		Examiner Name	Shin, Christopher
Sheet	1	of	1
		Atty Docket Number	CROSS1120-33
NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published	T ²
	C179	Office Action Mailed 12/02/10 in U.S. Serial No. 12/910,375	12/2/2010
	C180	Office Action Mailed 12/03/10 in U.S. Serial No. 12/910,431	12/3/2010
	C181	Office Action Mailed 12/03/10 in U.S. Serial No. 12/910,515	12/3/2010
Examiner Signature		Date Considered	

Electronic Patent Application Fee Transmittal				
Application Number:	12690592			
Filing Date:	20-Jan-2010			
Title of Invention:	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE			
First Named Inventor/Applicant Name:	Geoffrey B. Hoese			
Filer:	John L. Adair/Janice Pampell			
Attorney Docket Number:	CROSS1120-33			
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
Total in USD (\$)				180

Electronic Acknowledgement Receipt

EFS ID:	9062027
Application Number:	12690592
International Application Number:	
Confirmation Number:	8115
Title of Invention:	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE
First Named Inventor/Applicant Name:	Geoffrey B. Hoese
Customer Number:	44654
Filer:	John L. Adair/Janice Pampell
Filer Authorized By:	John L. Adair
Attorney Docket Number:	CROSS1120-33
Receipt Date:	17-DEC-2010
Filing Date:	20-JAN-2010
Time Stamp:	14:07:18
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 180
RAM confirmation Number	322
Deposit Account	503183
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees) Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed (SB/08)	CROSS1120-33_IDS_Filed_12-17-10.pdf	109107 80a5654afdcd449d01308e69e23ef5e486995055	no	3
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
2	NPL Documents	CROSS1120_Ref_C179.pdf	252415 ec33ebb937f62aea15cec67f0d4e7d15e2959906	no	7
Warnings:					
Information:					
3	NPL Documents	CROSS1120_Ref_C180.pdf	254399 845fbb723c26af4bb2f4aace8f061856a612c5a2	no	7
Warnings:					
Information:					
4	NPL Documents	CROSS1120_Ref_C181.pdf	218169 5781d9e2b8edee132dd11ed8d451ded236d11aa8	no	6
Warnings:					
Information:					
5	Fee Worksheet (PTO-875)	fee-info.pdf	30500 614355e9e496790e3524127de0actbbaecd6c165	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			864590		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

44654 7590 01/10/2011
 Sprinkle IP Law Group
 1301 W. 25th Street
 Site 408
 Austin, TX 78705

EXAMINER	
SHIN, CHRISTOPHER B	
ART UNIT	PAPER NUMBER
2181	
DATE MAILED: 01/10/2011	

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/690,592	01/20/2010	Geoffrey B. Hoese	CROSS1120-33	8115

TITLE OF INVENTION: STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	04/11/2011

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

44654 7590 01/10/2011

Sprinkle IP Law Group
 1301 W. 25th Street
 Site 408
 Austin, TX 78705

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/690,592	01/20/2010	Geoffrey B. Hoese	CROSS1120-33	8115

TITLE OF INVENTION: STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	04/11/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
SHIN, CHRISTOPHER B	2181	710-305000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
 Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
 "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
 (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
 (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)
 PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.
 (A) NAME OF ASSIGNEE _____ (B) RESIDENCE: (CITY and STATE OR COUNTRY) _____

Please check the appropriate assignee category or categories (will not be printed on the patent): Individual Corporation or other private group entity Government

4a. The following fee(s) are submitted:
 Issue Fee
 Publication Fee (No small entity discount permitted)
 Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)
 A check is enclosed.
 Payment by credit card. Form PTO-2038 is attached.
 The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)
 a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____
 Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/690,592	01/20/2010	Geoffrey B. Hoese	CROSS1120-33	8115
44654	7590	01/10/2011	EXAMINER	
Sprinkle IP Law Group 1301 W. 25th Street Site 408 Austin, TX 78705			SHIN, CHRISTOPHER B	
			ART UNIT	PAPER NUMBER
			2181	
DATE MAILED: 01/10/2011				

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
 (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability	Application No.	Applicant(s)	
	12/690,592	HOESE ET AL.	
	Examiner	Art Unit	
	Christopher B. Shin	2181	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--
 All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. This communication is responsive to the Amendment received December 10, 2010.
2. The allowed claim(s) is/are 1-53.
3. Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some* c) None of the:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) hereto or 2) to Paper No./Mail Date _____.
 - (b) including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.


Attachment(s)

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. <input type="checkbox"/> Notice of References Cited (PTO-892) 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date <u>Multiple Pages filed</u> 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material | <ol style="list-style-type: none"> 5. <input type="checkbox"/> Notice of Informal Patent Application 6. <input type="checkbox"/> Interview Summary (PTO-413), Paper No./Mail Date _____. 7. <input type="checkbox"/> Examiner's Amendment/Comment 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance 9. <input type="checkbox"/> Other _____. |
|--|---|

/Christopher B Shin/
 Primary Examiner, Art Unit 2181

INFORMATION DISCLOSURE STATEMENT		Application Number	12/690,592
		Filing or 371 (c) Date:	January 20, 2010
		First Named Inventor	Geoffrey B. Hoese
		Group Art Unit	2181
		Examiner Name	Shin, Christopher
Sheet	1	of	1
		Atty Docket Number	CROSS1120-33
NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published	T²
	C179	Office Action Mailed 12/02/10 in U.S. Serial No. 12/910,375	12/2/2010
	C180	Office Action Mailed 12/03/10 in U.S. Serial No. 12/910,431	12/3/2010
	C181	Office Action Mailed 12/03/10 in U.S. Serial No. 12/910,515	12/3/2010
Examiner Signature	/Christopher Shin/		Date Considered 12/17/2010

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S./

Issue Classification 	Application/Control No. 12/690,592	Applicant(s)/Patent under Reexamination HOESE ET AL.
	Examiner Christopher B. Shin	Art Unit 2181

ISSUE CLASSIFICATION													
ORIGINAL				INTERNATIONAL CLASSIFICATION									
CLASS		SUBCLASS		CLAIMED				NON-CLAIMED					
710		305		G	06	F	13	/00	G	06	F	3	/0
CROSS REFERENCES													
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)							/					/
710	11							/					/
709	258							/					/
								/					/
								/					/
								/					/
----- (Assistant Examiner) (Date)				/Christopher B Shin/ PRIMARY EXAMINER OF 2181				Total Claims Allowed: 53					
(Legal Instruments Examiner) (Date)				(Primary Examiner) (Date)				O.G. Print Claim(s) 1		O.G. Print Fig. 3			

<input checked="" type="checkbox"/> Claims renumbered in the same order as presented by applicant												<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47	
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original		
	1		31		61		91		121		151		181		211		
	2		32		62		92		122		152		182		212		
	3		33		63		93		123		153		183		213		
	4		34		64		94		124		154		184		214		
	5		35		65		95		125		155		185		215		
	6		36		66		96		126		156		186		216		
	7		37		67		97		127		157		187		217		
	8		38		68		98		128		158		188		218		
	9		39		69		99		129		159		189		219		
	10		40		70		100		130		160		190		220		
	11		41		71		101		131		161		191		221		
	12		42		72		102		132		162		192		222		
	13		43		73		103		133		163		193		223		
	14		44		74		104		134		164		194		224		
	15		45		75		105		135		165		195		225		
	16		46		76		106		136		166		196		226		
	17		47		77		107		137		167		197		227		
	18		48		78		108		138		168		198		228		
	19		49		79		109		139		169		199		229		
	20		50		80		110		140		170		200		230		
	21		51		81		111		141		171		201		231		
	22		52		82		112		142		172		202		232		
	23		53		83		113		143		173		203		233		
	24		54		84		114		144		174		204		234		
	25		55		85		115		145		175		205		235		
	26		56		86		116		146		176		206		236		
	27		57		87		117		147		177		207		237		
	28		58		88		118		148		178		208		238		
	29		59		89		119		149		179		209		239		
	30		60		90		120		150		180		210		240		

	Type	Hits	Search Text	DBs
1	S&R	6	((("7340549") or ("7051147") or ("6789152") or ("6421753") or ("5941972") or ("20080307444")).PN.	US-PG PUB; USPAT

	Time Stamp	Comments	Error Definition	Errors	Ref #
1	2010/07/22 15:13				S1


12/17/10, EAST Version: 2.4.2.1

INFORMATION DISCLOSURE STATEMENT				Application Number	12/690,592
				Filing or 371 (c) Date:	January 20, 2010
				First Named Inventor	Geoffrey B. Hoese
				Group Art Unit	2182
				Examiner Name	Unknown
Sheet	1	of	1	Atty Docket Number	CROSS1120-33
NON PATENT LITERATURE DOCUMENTS					
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published			T²
	C174	Office Action Mailed 09/13/10 in U.S. Serial No. 11/980,909			09/13/10
	C175	Office Action Mailed 09/13/10 in U.S. Serial No. 12/552,807			09/13/10
	C176	Office Action Mailed 09/15/10 in U.S. Serial No. 12/552,885			09/15/10
	C177	Office Action Mailed 09/23/10 in U.S. Serial No. 12/552,913			09/23/10
Examiner Signature	/Christopher Shin/			Date Considered	12/17/2010

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S./

INFORMATION DISCLOSURE STATEMENT		Application Number	12/690,592
		Filing or 371 (c) Date:	January 20, 2010
		First Named Inventor	Geoffrey B. Hoese
		Group Art Unit	2181
		Examiner Name	Shin, Christopher
Sheet	1	of	1
		Atty Docket Number	CROSS1120-33
NON PATENT LITERATURE DOCUMENTS			
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published	T ²
	C179	Office Action Mailed 12/02/10 in U.S. Serial No. 12/910,375	12/2/2010
	C180	Office Action Mailed 12/03/10 in U.S. Serial No. 12/910,431	12/3/2010
	C181	Office Action Mailed 12/03/10 in U.S. Serial No. 12/910,515	12/3/2010
Examiner Signature	/Christopher Shin/		Date Considered
			01/02/2011

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S./

Application Number 	Application/Control No. 12/690,592	Applicant(s)/Patent under Reexamination HOESE ET AL.	
Document Code - DISQ		Internal Document – DO NOT MAIL	

TERMINAL DISCLAIMER	<input type="checkbox"/> APPROVED	<input checked="" type="checkbox"/> DISAPPROVED
Date Filed : 12/10/10	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:
Td has wrong filling date it should be 1/20/10 not 9/2/09. Jean Proctor

U.S. Patent and Trademark Office

INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	12/690,592	
				Filing Date	01/20/2010	
				First Named Inventor	Geoffrey B. Hoese	
				Group Art Unit	2111	
				Examiner Name	Unknown	
Sheet	7	of	9	Attorney Docket Number	CROSS1120-33	
U.S. PATENT DOCUMENTS						
Examiner Initials	Cite No.	Document Number		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines Where Relevant Passages or Figures Appear
		Number-Kind Code (if known)				
	A189	6,260,120		7/10/2001	Blumenau, et al.	
	A190	6,268,789		7/31/2001	Diamant, et al.	
	A191	6,308,247		10/23/2001	Ackerman	
	A192	6,330,629		12/11/2001	Kondo, et al.	
	A193	6,330,687		12/11/2001	Griffith	
	A194	6,341,315		1/22/2002	Arroyo, et al.	
	A195	6,343,324		1/29/2002	Hubis, et al.	
	A196	6,363,462		3/26/2002	Bergsten	
	A197	6,401,170		6/4/2002	Griffith, et al.	
	A198	6,421,753		7/16/2002	Hoese, et al.	
	A199	6,425,035		7/23/2002	Hoese, et al.	
	A200	6,425,036		7/23/2002	Hoese, et al.	
Change(s) applied to document, /A.E.M./ 3/17/2011	A201	6,425,052		6/23/2002	Hashemi	
	A202	6,453,345		9/17/2002	Trcka, et al.	
	A203	6,484,245		11/19/2002	Sanada, et al.	
	A204	6,529,996		3/4/2003	Nguyen, et al.	
	A205	6,547,576		4/15/2003	Peng, et al.	
	A206	6,560,750		5/6/2003	Chien, et al.	
	A207	6,563,701		5/13/2003	Peng, et al.	
	A208	6,775,693		8/10/2004	Adams	
	A209	6,792,602		9/14/2004	Lin, et al.	
	A210	6,820,212		11/16/2004	Duchesne, et al.	
	A211	6,854,027		2/8/2005	Hsu, et al.	
	A212	6,862,637		3/1/2005	Stupar	
	A213	6,874,043		3/29/2005	Treggiden	
	A214	6,874,100		3/29/2005	Rauscher	
	A215	6,910,083		6/21/2005	Hsu, et al.	
	A216	7,065,076		6/20/2006	Nemazie	
	A217	7,127,668		10/24/2006	McBryde, et al.	
	A218	7,133,965		11/7/2006	Chien	
Examiner Signature	/Christopher Shin/				Date Considered	08/26/2010

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S./

INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	12/690,592		
				Filing Date	01/20/2010		
				First Named Inventor	Geoffrey B. Hoese		
				Group Art Unit	2111		
				Examiner Name	Unknown		
Sheet	4	of	9	Attorney Docket Number	CROSS1120-33		
U.S. PATENT DOCUMENTS							
Examiner Initials	Cite No.	Document Number		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines Where Relevant Passages or Figures Appear	
		Number-Kind Code (if known)					
	A99	5,581,724		12/3/1996	Belsan et al.		
	A100	5,596,562		01/21/1997	Chen		
	A101	5,596,736		1/21/1997	Kerns		
	A102	5,598,541		1/28/1997	Malladi		
	A103	5,613,082		3/18/1997	Brewer, et al.		
	A104	5,621,902		4/15/1997	Cases, et al.		
	A105	5,632,012		5/20/1997	Belsan, et al.		
	A106	5,634,111		5/27/1997	Oeda, et al.		
	A107	5,638,518		6/10/1997	Malladi		
	A108	5,642,515		6/24/1997	Jones, et al.		
	A109	5,659,756		8/19/1997	Hefferon, et al.		
	A110	5,664,107		9/2/1997	Chatwanni, et al.		
	A111	5,680,556		10/21/1997	Begun, et al.		
	A112	5,684,800		11/4/1997	Dobbins, et al.		
	A113	5,701,491		12/23/1997	Dunn, et al.		
	A114	5,712,976		1/27/1998	Falcon, et al.		
	A115	5,727,218		3/10/1998	Hotchkin		
	A116	5,729,705		3/17/1998	Weber		
	A117	5,743,847		4/28/1998	Nakamura, et al.		
	A118	5,748,924		5/5/1998	Llorens, et al.		
	A119	5,571,971 5,751,971		5/12/1998	Dobbins, et al.		
	A120	5,751,975		5/12/1998	Gillespie, et al.		
	A121	5,764,931		6/9/1998	Schmahl, et al.		
	A122	5,768,623		6/16/1998	Judd, et al.		
	A123	5,774,683		6/30/1998	Gulick		
	A124	5,778,411		7/7/1998	DeMoss		
	A125	5,781,715		7/14/1998	Sheu		
	A126	5,802,278		9/1/1998	Isfeld, et al.		
	A127	5,805,816		9/8/1998	Picazo, Jr., et al.		
	A128	5,805,920		9/8/1998	Sprenkle, et al.		
Examiner Signature				/Christopher Shin/		Date Considered	08/26/2010

Change(s) applied
to document,
/A.F.M./
3/17/2011

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S./

INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	12/690,592	
				Filing Date	01/20/2010	
				First Named Inventor	Geoffrey B. Hoese	
				Group Art Unit	2111	
				Examiner Name	Unknown	
Sheet	2	of	9	Attorney Docket Number	CROSS1120-33	
U.S. PATENT DOCUMENTS						
Examiner Initials	Cite No.	Document Number		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines Where Relevant Passages or Figures Appear
		Number-Kind Code (if known)				
	A39	5,212,785		5/18/1993	Powers, et al.	
	A40	5,214,778		5/25/1993	Glider, et al.	
	A41	5,226,143		7/6/1993	Baird, et al.	
	A42	5,239,632		8/24/1993	Larner	
	A43	5,239,643		8/24/1993	Blount, et al.	
	A44	5,239,654		8/24/1993	Ing-Simmons, et al.	
	A45	5,247,638		9/21/1993	O'Brien, et al.	
	A46	5,247,692		9/21/1993	Fujimura	
	A47	5,257,386		10/26/1993	Saito	
	A48	5,297,262		3/22/1994	Cox, et al.	
	A49	5,301,290		4/5/1994	Tetzlaff, et al.	
	A50	5,315,657		5/24/1994	Abadi, et al.	
	A51	5,317,693		5/31/1994	Elko, et al.	
	A52	5,331,673		7/19/1994	Elko, et al.	
	A53	5,347,384		9/13/1994	McReynolds, et al.	
	A54	5,355,453		10/11/1994	Glider, et al.	
	A55	5,361,347		11/1/1994	Glider, et al.	
	A56	5,367,646		11/22/1994	Pardillos, et al.	
	A57	5,379,385		1/3/1995	Shomler	
	A58	5,379,398		1/3/1995	Cohn, et al.	
	A59	5,388,243		2/7/1995	Glider, et al.	
	A60	5,388,246		2/7/1995	Kasi	
	A61	5,394,402		2/28/1995	Ross, et al.	
	A62	5,394,526		2/28/1995	Crouse et al.	
	A63	5,396,596		3/7/1995	Hashemi, et al.	
	A64	5,403,639		4/4/1995	Belsan, et al.	
Change(s) applied to document, /A.E.M./ 3/17/2011	A65	5,410,667		4/25/1995	Belsan, et al.	
	A66	5,410,697		4/25/1995	Baird, et al.	
	A67	5,414,820		05/10/9/1995	McFarland, et al.	
	A68	5,416,915		5/16/1995	Mattson, et al.	
Examiner Signature	/Christopher Shin/				Date Considered	08/26/2010

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /C.S./

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
 or **Fax** **(571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

44654 7590 01/10/2011
 Sprinkle IP Law Group
 1301 W. 25th Street
 Site 408
 Austin, TX 78705

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
 I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Janice Pampell	(Depositor's name)
<i>Janice Pampell</i>	(Signature)
March 21, 2011	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/690,592	01/20/2010	Geoffrey B. Hoese	CROSS1120-33	8115

TITLE OF INVENTION: STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	04/11/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
SHIN, CHRISTOPHER B	2181	710-305000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
 Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
 "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list
 (1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
 (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1	Sprinkle IP Law
2	Group
3	

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)
 PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Crossroads Systems, Inc.
 (B) RESIDENCE: (CITY and STATE OR COUNTRY) Austin, TX

Please check the appropriate assignee category or categories (will not be printed on the patent): Individual Corporation or other private group entity Government

4a. The following fee(s) are submitted:
 Issue Fee
 Publication Fee (No small entity discount permitted)
 Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)
 A check is enclosed.
 Payment by credit card. Form PTO-2038 is attached.
 The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 50-3183 (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)
 a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
 b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature: *Ari G. Akmal* Date: 3/21/11
 Typed or printed name: Ari G. Akmal Registration No. 51,388

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

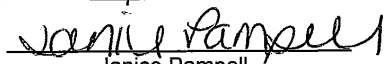
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
AMENDMENT UNDER 37 CFR 1.312	Atty. Docket No. (Opt.) CROSS1120-33
Applicants: Geoffrey B. Hoese	
Application Number 12/690,592	Filed 01/20/2010
For: Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2181	Confirmation Number: 8115

Mail Stop: Issue Fee

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

Dear Sir:

Certification Under 37 C.F.R. §1.10
I hereby certify that this correspondence is being deposited electronically with the U.S. Patent and Trademark Office using the United States Patent and Trademark Office's EFS-Web system on <u>3/21/11</u>
 Janice Pampell

A Notice of Allowance and Fee(s) Due was issued by the Examiner on January 10, 2011. The Applicant therefore respectfully requests that the Examiner enter the following amendment under 37 CFR 1.312. While Applicant understands that entry of an Amendment after the notice of allowance is a matter of discretion and not of right, Applicant respectfully requests that the Examiner consider and enter the following changes to the specification.

Attorney Docket No.
CROSS1120-33

12/690,592
Customer ID: 44654

2

Please amend the application as follows:

IN THE SPECIFICATION

Following the title, please replace the first paragraph of page one the following paragraph:

[0001] [0001] This application is a continuation of, and claims a benefit of priority under 35 U.S.C. 120 of the filing date of U.S. Patent Application Serial No. 12/552,885 entitled "Storage Router and Method for Providing Virtual Local Storage" filed 09/02/2009, which is a continuation of and claims the benefit of priority of U.S. Application Serial No. 11/851,724 entitled "Storage Router and Method for Providing Virtual Local Storage" filed 09/07/2007, now U.S. Patent No. 7,689,754 issued 03/30/2010, which is a continuation of and claims the benefit of priority of U.S. Patent Application Serial No. 11/442,878 entitled "Storage Router and Method for Providing Virtual Local Storage" filed 05/30/2006, now abandoned, which is a continuation of and claims the benefit of priority of U.S. Patent Application Serial No. 11/353,826 entitled "Storage Router and Method for Providing Virtual Local Storage" filed on 02/14/2006, now U.S. Patent No. 7,340,549 issued 03/04/2008, which is a continuation of and claims the benefit of priority of U.S. Patent Application Serial No. 10/658,163 entitled "Storage Router and Method for Providing Virtual Local Storage" filed on 09/09/2003 now U.S. Patent No. 7,051,147 issued 05/23/2006, which is a continuation of and claims the benefit of benefit of priority of U.S. Patent Application Serial No. 10/081,110 by inventors Geoffrey B. Hoese and Jeffery T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on 02/22/2002, now U.S. Patent No. 6,789,152 issued on 09/07/2004, which in turn is a continuation of and claims benefit of priority of U.S. Application No. 09/354,682 by inventors Geoffrey B. Hoese and Jeffery T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on 07/15/1999, now U.S. Patent No. 6,421,753 issued on 07/16/2002, which in turn is a continuation of and claims benefit of priority of U.S. Patent Application Serial No. 09/001,799, filed on 12/31/1997, now U.S. Patent No. 5,941,972 issued on 08/24/1999, and hereby incorporates these applications and patents by reference in their entireties as if they had been fully set forth herein.

Attorney Docket No.
CROSS1120-33

12/690,592
Customer ID: 44654

3

REMARKS

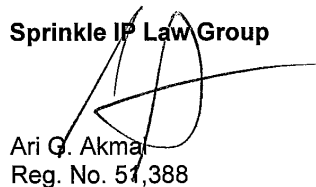
Applicants appreciate the time taken by the Examiner to review the present amendment.

Applicant submits that the priority information in the new paragraph above was recognized by the United States Patent and Trademark office as shown by its inclusion in the official filing receipt. It is respectfully submitted that the amendment does not affect the merits of the application and is proper subject matter for an Amendment Under 37 CFR 1.312. The Applicant therefore respectfully requests entry of the amendment.

The Commissioner is hereby authorized to charge any deficiencies or credit any overpayment to Deposit Account No. 50-3183.

Respectfully submitted,

Sprinkle IP Law Group


Ari G. Akmal
Reg. No. 51,388

Dated: March 21, 2011

1301 W. 25th Street, Suite 408
Austin, Texas 78705
Tel. 512-637-9220
Fax. 512-371-9088

Electronic Patent Application Fee Transmittal				
Application Number:	12690592			
Filing Date:	20-Jan-2010			
Title of Invention:	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE			
First Named Inventor/Applicant Name:	Geoffrey B. Hoese			
Filer:	Ari G. Akmal/Janice Pampell			
Attorney Docket Number:	CROSS1120-33			
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1510	1510
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1810

Electronic Acknowledgement Receipt

EFS ID:	9696893
Application Number:	12690592
International Application Number:	
Confirmation Number:	8115
Title of Invention:	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE
First Named Inventor/Applicant Name:	Geoffrey B. Hoese
Customer Number:	44654
Filer:	Ari G. Akmal/Janice Pampell
Filer Authorized By:	Ari G. Akmal
Attorney Docket Number:	CROSS1120-33
Receipt Date:	21-MAR-2011
Filing Date:	20-JAN-2010
Time Stamp:	11:47:44
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 1810
RAM confirmation Number	8781
Deposit Account	503183
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees) Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

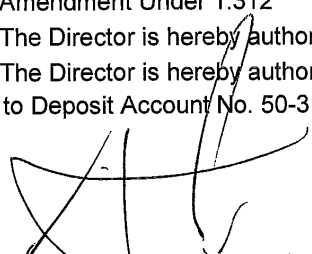
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	CROSS1120-33_Transmittal_of_Payment_of_Issue_Fee.pdf	38692 0ed3d30a44ed45ee1cf37580d97b0bbad11eb3ba	no	1
Warnings:					
Information:					
2	Issue Fee Payment (PTO-85B)	CROSS1120-33_PTOL-85.pdf	96691 2081e8bddfd0c06c1b420644747322b881b52ec5	no	1
Warnings:					
Information:					
3	Amendment after Notice of Allowance (Rule 312)	CROSS1120-33_Amendment_Under_312.pdf	104947 3146295b48db3e23309885ba8408b8a8cf7cd713	no	3
Warnings:					
Information:					
4	Fee Worksheet (PTO-875)	fee-info.pdf	31982 35c157186b5d2bc9d857dba7280faf1357b9fdc8	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			272312		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

TRANSMITTAL OF PAYMENT OF ISSUE FEE (LARGE Entity) 37 C.F.R. 1.311)				Docket No. CROSS1120-33
Applicant(s) Geoffrey B. Hoese				
Application No. 12/690,592	Filing Date 01/20/2010	Examiner SHIN, Christopher B.	Group Art Unit 2181	Confirmation No. 8115
Title: STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE				

**Mail Stop: Issue Fee
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450**

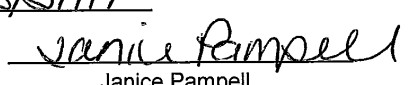
Transmitted herewith are the following items in reference to the above-identified application:

- Issue Fee Transmittal Form PTOL-85
- Issue Fee: \$1,510.00
- Publication Fee \$300.00
- Amendment Under 1.312
- The Director is hereby authorized to charge Deposit Account No. 50-3183 of Sprinkle IP Law Group.
- The Director is hereby authorized to charge any deficiencies or credit any overpayments to Deposit Account No. 50-3183 of Sprinkle IP Law Group.



Ari G. Akmal
Reg. No. 48,828

Customer No. 44654
Sprinkle IP Law Group
1301 W. 25th Street, Suite 408
Austin, Texas 78705
Tel. (512) 637-9220
Fax. (512) 371-9088

<u>Certificate of Transmission Under 37 C.F.R. § 1.8</u>
I hereby certify that this correspondence is being deposited electronically with the U.S. Patent and Trademark Office using the United States Patent and Trademark Office's EFS-Web system on <u>3/20/11</u>
 _____ Janice Pampell



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/690,592	01/20/2010	Geoffrey B. Hoese	CROSS1120-33	8115
44654	7590	03/23/2011	EXAMINER	
Sprinkle IP Law Group 1301 W. 25th Street Suite 408 Austin, TX 78705			SHIN, CHRISTOPHER B	
			ART UNIT	PAPER NUMBER
			2181	
			MAIL DATE	DELIVERY MODE
			03/23/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Response to Rule 312 Communication	Application No.	Applicant(s)
	12/690,592	HOESE ET AL.
	Examiner	Art Unit

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

1. The amendment filed on 21 March 2011 under 37 CFR 1.312 has been considered, and has been:
- a) entered.
 - b) entered as directed to matters of form not affecting the scope of the invention.
 - c) disapproved because the amendment was filed after the payment of the issue fee.
 Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue.
 - d) disapproved. See explanation below.
 - e) entered in part. See explanation below.

Timothy Caldwell
Publishing Division



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P. O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/690,592	04/26/2011	7934041	CROSS1120-33	8115

44654 7590 04/06/2011
Sprinkle IP Law Group
1301 W. 25th Street
Suite 408
Austin, TX 78705

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

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APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Geoffrey B. Hoese, Austin, TX;
Jeffrey T. Russell, Cibolo, TX;

PTO/SB/44 (09/07)

Approved for use through 08/31/2013. OMB 0651-0033

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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(Also Form PTO-1050)

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

Page 1 of 1

PATENT NO. **7,934,041**

APPLICATION NO.: **12/690,592**

ISSUE DATE: **04/26/2011**

INVENTOR(S): **Geoffrey B. Hoese, et al.**

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Claim 20:

A set of devices connected --to-- a first transport medium, wherein the first transport medium --is a serial transport medium--;

MAILING ADDRESS OF SENDER:

Customer No. 44654
Sprinkle IP Law Group
1301 W. 25th Street, Suite 408
Austin, Texas 78705
Tel. (512) 637-9220
Fax. (512) 371-9088

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Electronic Patent Application Fee Transmittal				
Application Number:	12690592			
Filing Date:	20-Jan-2010			
Title of Invention:	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE			
First Named Inventor/Applicant Name:	Geoffrey B. Hoese			
Filer:	John L. Adair/Janice Pampell			
Attorney Docket Number:	CROSS1120-33			
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Certificate of correction	1811	1	100	100
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				100

Electronic Acknowledgement Receipt

EFS ID:	10490129
Application Number:	12690592
International Application Number:	
Confirmation Number:	8115
Title of Invention:	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE
First Named Inventor/Applicant Name:	Geoffrey B. Hoese
Customer Number:	44654
Filer:	John L. Adair/Janice Pampell
Filer Authorized By:	John L. Adair
Attorney Docket Number:	CROSS1120-33
Receipt Date:	11-JUL-2011
Filing Date:	20-JAN-2010
Time Stamp:	15:20:53
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 100
RAM confirmation Number	1837
Deposit Account	503183
Authorized User	
<p>The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)</p> <p>Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)</p>	


File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	CROSS1120-33_Transmittal_Letter.pdf	34484 225180843b7e05f6c5ae82d25f3193d2f695d6d	no	1
Warnings:					
Information:					
2	Request for Certificate of Correction	CROSS1120-33_Certificate_of_Correction.pdf	31604 39defa7b887e73ea1a92b03836649154ba03f765	no	1
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30191 d67fb2524c07f8c4b91d8088e775d1e1c54d8dc	no	2
Warnings:					
Information:					
Total Files Size (in bytes):				96279	
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
TRANSMITTAL LETTER	Atty. Docket No. CROSS1120-33
Applicant Geoffrey B. Hoese, et al.	
Application No. 12/690,592	Filing Date 01/20/2010
Patent Number 7,934,041	Issue Date 04/26/2011
For Storage Router and Method for Providing Virtual Local Storage	
Confirmation No. 8115	

Attention: Certificate of Correction Branch
Office of Patent Publication
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Certificate of Mailing Under 37 C.F.R. 1.8

I hereby certify that this correspondence is being deposited with the U.S. Patent Office using the United States Patent and Trademark Office's EFS-Web system on 7-11-11

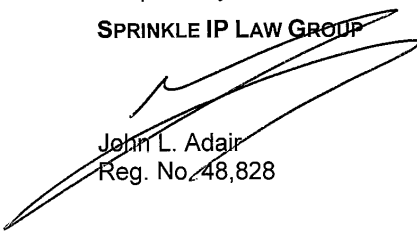

Janice Pampell

Dear Sir:

Transmitted herewith for filing in the above-identified Patent is a Certificate of Correction. The error noted on the Certificate of Correction is on the part of the Applicant. The Commissioner is hereby authorized to charge the appropriate fee against Deposit Account No. 50-3183 of Sprinkle IP Law Group.

Respectfully submitted,

SPRINKLE IP LAW GROUP


John L. Adair
Reg. No. 48,828

Date: 7-8, 2011

Sprinkle IP Law Group
1301 W. 25th Street
Suite 408
Austin, Texas 78705
Tel. (512) 637-9225
Fax. (512) 371-9088

SPE RESPONSE FOR CERTIFICATE OF CORRECTION

DATE : 7/19/2011

TO SPE OF : ART UNIT 2181

SUBJECT : Request for Certificate of Correction for Appl. No.: 12/690592 Patent No.: 7934041 B2

CofC mailroom date: 7/11/2011

Please respond to this request for a certificate of correction within 7 days.

FOR IFW FILES:

Please review the requested changes/corrections as shown in the **COCIN** document(s) in the IFW application image. No new matter should be introduced, nor should the scope or meaning of the claims be changed.

Please complete the response (see below) and forward the completed response to scanning using document code **COCX**.

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Randolph Square – 9D10-A
Palm Location 7580**

Note: _____

Virginia Tolbert

**Certificates of Correction Branch
(571) 272-0460**

Thank You For Your Assistance

The request for issuing the above-identified correction(s) is hereby:

Note your decision on the appropriate box.

- Approved** All changes apply.
- Approved in Part** Specify below which changes **do not** apply.
- Denied** State the reasons for denial below.

Comments: _____

_____ **SPE** _____ **Art Unit**

SPE RESPONSE FOR CERTIFICATE OF CORRECTION

DATE : 7/19/2011
 TO SPE OF : ART UNIT 2181
 SUBJECT : Request for Certificate of Correction for Appl. No.: 12/690592 Patent No.: 7934041 B2
 CofC mailroom date: 7/11/2011

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Certificates of Correction Branch
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Approved

All changes apply.

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Specify below which changes **do not** apply.

Denied

State the reasons for denial below.

Comments: _____

Robert W. Kent 2181
SPE Art Unit

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,934,041 B2
APPLICATION NO. : 12/690592
DATED : April 26, 2011
INVENTOR(S) : Geoffrey B. Hoese et al.

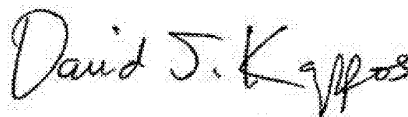
Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Claim 20: Col. 10 line 56 should read -

A set of devices connected --to-- a first transport medium, wherein the first transport medium --is a serial transport medium--;


Signed and Sealed this
Thirteenth Day of September, 2011



David J. Kappos
Director of the United States Patent and Trademark Office

Form PTO-1595 (Rev. 01-09)
OMB No. 0651-0027 (exp. 02/28/2009)

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1. Name of conveying party(ies) Geoffrey B. Hoese Jeffry T. Russell Additional name(s) of conveying party(ies) attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	2. Name and address of receiving party(ies) Name: <u>Crossroads Systems, Inc.</u> Internal Address: _____ Street Address: <u>9390 Research Blvd.,</u> <u>Suite II-300</u> City: <u>Austin</u> State: <u>Texas</u> Country: <u>USA</u> Zip: <u>78759</u> Additional name(s) & address(es) attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
3. Nature of conveyance/Execution Date(s): Execution Date(s) <u>December 22, 1997</u> <input checked="" type="checkbox"/> Assignment <input type="checkbox"/> Merger <input type="checkbox"/> Security Agreement <input type="checkbox"/> Change of Name <input type="checkbox"/> Joint Research Agreement <input type="checkbox"/> Government Interest Assignment <input type="checkbox"/> Executive Order 9424, Confirmatory License <input type="checkbox"/> Other _____	4. Application or patent number(s): <input type="checkbox"/> This document is being filed together with a new application. A. Patent Application No.(s) <u>12/690,592 (CROSS1120-33)</u> B. Patent No.(s) Additional numbers attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
5. Name and address to whom correspondence concerning document should be mailed: Name: <u>Sprinkle IP Law Group (Cust. No. 44654)</u> Internal Address: _____ Street Address: <u>1301 W. 25th Street, Suite 408</u> City: <u>Austin</u> State: <u>Texas</u> Zip: <u>78705</u> Phone Number: <u>512-637-9220</u> Fax Number: <u>512-371-9088</u> Email Address: _____	6. Total number of applications and patents involved: <u>1</u> 7. Total fee (37 CFR 1.21(h) & 3.41) \$ <u>40.00</u> <input checked="" type="checkbox"/> Authorized to be charged to deposit account <input type="checkbox"/> Enclosed <input type="checkbox"/> None required (government interest not affecting title)
9. Signature: <div style="text-align: center;">  _____ Signature </div> <div style="text-align: right;"> <u>3-10-11</u> _____ Date </div> <div style="text-align: center; margin-top: 10px;"> <u>Ari G. Akmal (Reg. No. 51,388)</u> Name of Person Signing </div>	8. Payment Information Deposit Account Number: <u>503183</u> Authorized User Name: <u>Ari G. Akmal</u> Total number of pages including cover sheet, attachments, and documents: 3

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ASSIGNMENT

WHEREAS, we, the undersigned inventors of residence as listed, have invented certain new and useful improvements as below entitled, for which application for United States Letters Patent is made, said application having been executed on the date set forth below; and

WHEREAS, Crossroads Systems, Inc. (hereinafter referred to as "Assignee"), a Texas corporation, with its principal address at 9390 Research Blvd., Suite II-300, Austin, Texas 78759, desires to acquire our entire right, title and interest in and to the invention, and in and to the said application and any Letters Patent that may issue thereon;

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, we assign to Assignee, all right, title and interest in and to the said invention and in and to the said application and all patents which may be granted therefor, and all divisions, reissues, continuations, continuations-in-part and extensions thereof; and we authorize and request the Commissioner of Patents and Trademarks to issue all patents for said invention, or patents resulting therefrom, insofar as our interests are concerned, to Assignee.

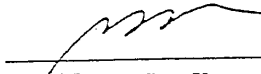
We also assign to Assignee, all right, title and interest in and to the invention disclosed in said application throughout the world, including the right to file applications and obtain patents, utility models, industrial models and designs for said invention in its own name throughout the world, including all rights to publish cautionary notices reserving ownership of said invention and all rights to register said invention in appropriate registries; and we further agree to execute any and all powers of attorney, applications, assignments, declarations, affidavits, and any other papers in connection therewith necessary to perfect such right, title and interest in Assignee.

We will communicate to Assignee any facts known to us respecting any improvements; and, at the expense of Assignee, we will testify in any legal proceedings, sign all lawful papers, execute all divisional, continuation, continuation-in-part, reissue and substitute applications, make lawful oaths and declarations, and generally do everything possible to vest title in Assignee and to aid Assignee to obtain and enforce proper protection for said invention in all countries.

This Assignment shall be binding on the parties' successors, assigns and legal representatives.

Title of Invention: STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

Signature of first Inventor:
Inventor's Name:



Geoffrey B. Hoese

Residence (City, County, State)

Austin, Travis County,
Texas

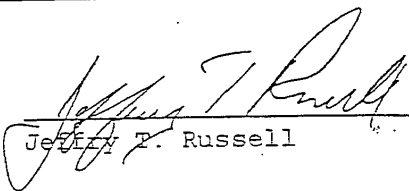
Date:

12/22/97

Date Application Executed:

12/22/97

Signature of second Inventor:
Inventor's Name:



Jeffrey T. Russell

Residence (City, County, State)

Cibolo, Guadalupe County,
Texas

Date:

December 22, 1997

Date Application Executed:

December 22, 1997



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UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND
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MARCH 31, 2011

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SPRINKLE IP LAW GROUP
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RECORDATION DATE: 03/16/2011

REEL/FRAME: 025990/0714
NUMBER OF PAGES: 3

BRIEF: ASSIGNMENT OF ASSIGNOR'S INTEREST (SEE DOCUMENT FOR DETAILS).
DOCKET NUMBER: CROSS1120-33

ASSIGNOR:

HOESE, GEOFFREY B.

DOC DATE: 12/22/1997

ASSIGNOR:

RUSSELL, JEFFRY T.

DOC DATE: 12/22/1997

ASSIGNEE:

CROSSROADS SYSTEMS, INC.
9390 RESEARCH BLVD.
SUITE II-300
AUSTIN, TEXAS 78759

025990/0714 PAGE 2

APPLICATION NUMBER: 12690592 FILING DATE: 01/20/2010
PATENT NUMBER: ISSUE DATE:
TITLE: STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL
STORAGE

TONYA LEE, EXAMINER
ASSIGNMENT SERVICES BRANCH
PUBLIC RECORDS DIVISION

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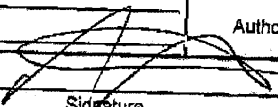
Form PTO-1595 (Rev. 01-09)
 OMB No. 0651-0027 (exp. 02/28/2009)

03/16/2011

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3. Nature of conveyance/Execution Date(s): Execution Date(s) <u>December 22, 1997</u> <input checked="" type="checkbox"/> Assignment <input type="checkbox"/> Merger <input type="checkbox"/> Security Agreement <input type="checkbox"/> Change of Name <input type="checkbox"/> Joint Research Agreement <input type="checkbox"/> Government Interest Assignment <input type="checkbox"/> Executive Order 9424, Confirmatory License <input type="checkbox"/> Other _____		4. Application or patent number(s): <input type="checkbox"/> This document is being filed together with a new application. A. Patent Application No.(s) <u>12/690,592 (CROSS1120-33)</u> B. Patent No.(s) Additional numbers attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
5. Name and address to whom correspondence concerning document should be mailed: Name: <u>Sprinkle IP Law Group (Cust. No. 44654)</u> Internal Address: _____ Street Address: <u>1301 W. 25th Street, Suite 408</u> City: <u>Austin</u> State: <u>Texas</u> Zip: <u>78705</u> Phone Number: <u>512-637-9220</u> Fax Number: <u>512-371-9088</u> Email Address: _____		6. Total number of applications and patents involved: <u>1</u> 7. Total fee (37 CFR 1.21(h) & 3.41) \$ <u>40.00</u> <input checked="" type="checkbox"/> Authorized to be charged to deposit account <input type="checkbox"/> Enclosed <input type="checkbox"/> None required (government interest not affecting title)	
9. Signature:  Signature Ari G. Akmal (Reg. No. 51,388)		8. Payment Information Deposit Account Number: <u>503183</u> Authorized User Name: <u>Ari G. Akmal</u> Date: <u>3/16/11</u> Total number of pages including cover sheet, attachments, and documents: <u>3</u>	

CH \$40.00 503183 12690592

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US007051147B2

(12) **United States Patent**
Hoese et al.

(10) **Patent No.:** US 7,051,147 B2
 (45) **Date of Patent:** *May 23, 2006

(54) **STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE**

(75) **Inventors:** **Geoffrey B. Hoese**, Austin, TX (US);
Jeffry T. Russell, Cibolo, TX (US)

(73) **Assignee:** **Crossroads Systems, Inc.**, Austin, TX (US)

(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) **Appl. No.:** 10/658,163

(22) **Filed:** Sep. 9, 2003

(65) **Prior Publication Data**
 US 2004/0054838 A1 Mar. 18, 2004

Related U.S. Application Data

(63) Continuation of application No. 10/081,110, filed on Feb. 22, 2002, now Pat. No. 6,789,152, which is a continuation of application No. 09/354,682, filed on Jul. 15, 1999, now Pat. No. 6,421,753, which is a continuation of application No. 09/001,799, filed on Dec. 31, 1997, now Pat. No. 5,941,972.

(51) **Int. Cl.**
G06F 13/00 (2006.01)
 (52) **U.S. Cl.** 710/305; 710/11; 709/258
 (58) **Field of Classification Search** 710/1-5, 710/8-13, 22-28, 104-105, 305-306, 325, 710/250, 126-131, 36-38; 709/250, 258; 714/42; 711/112, 113, 110

See application file for complete search history.

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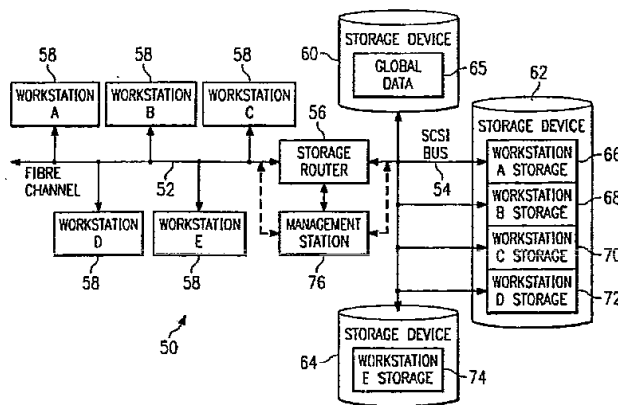
(Continued)

Primary Examiner—Christopher Shin
 (74) *Attorney, Agent, or Firm*—Sprinkle IP Law Group

(57) **ABSTRACT**

A storage router and storage network provide virtual local storage on remote storage devices to Fiber Channel devices. A plurality of Fiber Channel devices, such as workstations, are connected to a Fiber Channel transport medium, and a plurality of storage devices are connected to a second Fiber Channel transport medium. The storage router interfaces between the Fiber Channel transport media. The storage router maps between the workstations and the storage devices and implements access controls for storage space on the storage devices. The storage router then allows access from the workstations to the storage devices using native low level, block protocol in accordance with the mapping and the access controls.

39 Claims, 2 Drawing Sheets



US 7,051,147 B2

Page 2

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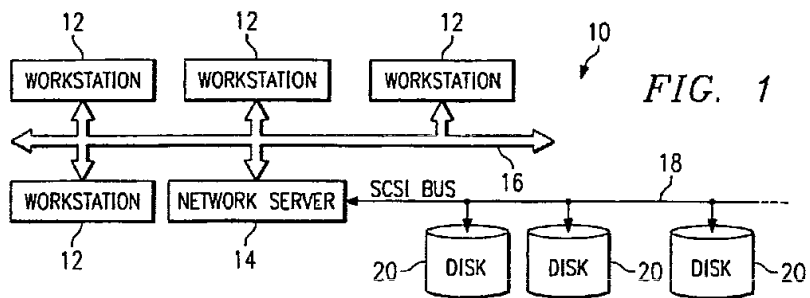


FIG. 1

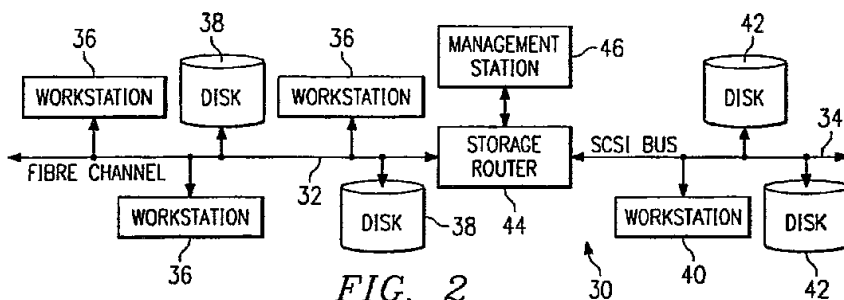


FIG. 2

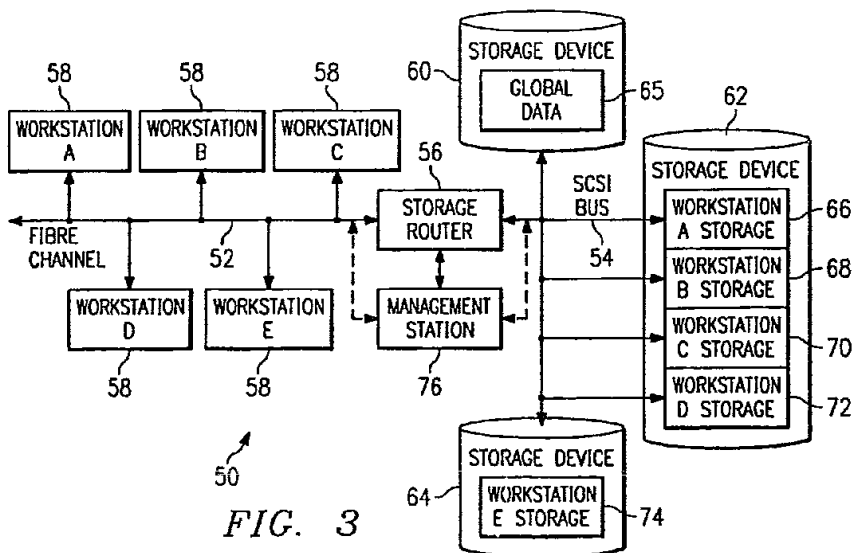
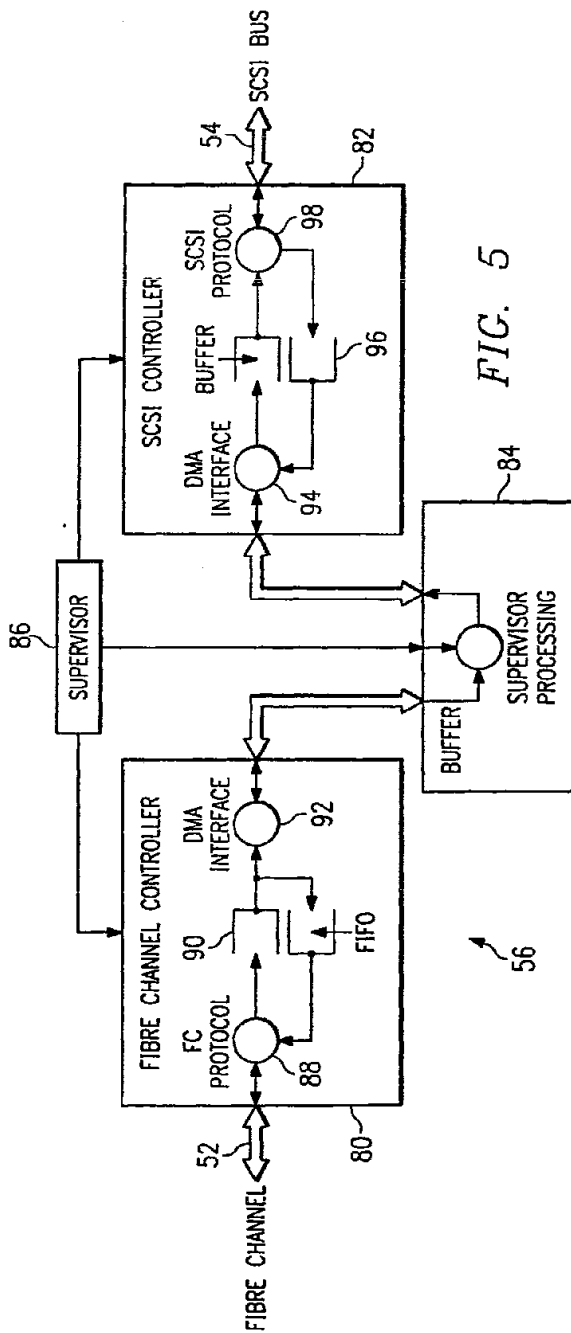
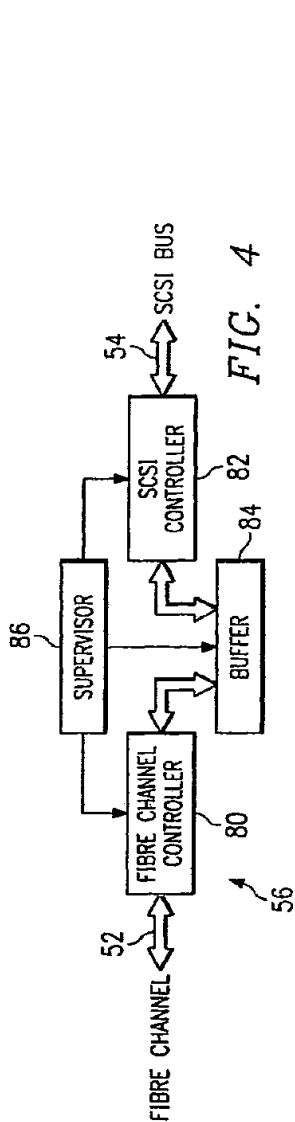


FIG. 3



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STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

RELATED APPLICATIONS

This application is a continuation of and claims the benefit of the filing dates of U.S. patent application Ser. No. 10/081,110 by inventors Geoffrey B. Hoese and Jeffrey T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on Feb. 22, 2002, now U.S. Pat. No. 6,789,152 which in turn is a continuation of U.S. application Ser. No. 09/354,682 by inventors Geoffrey B. Hoese and Jeffrey T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on Jul. 15, 1999, now U.S. Pat. No. 6,421,753, which in turn is a continuation of U.S. patent application Ser. No. 09/001,799, filed on Dec. 31, 1997, now U.S. Pat. No. 5,941,972, and hereby incorporates these applications by reference in their entireties as if they had been fully set forth herein.

TECHNICAL FIELD OF THE INVENTION

This invention relates in general to network storage devices, and more particularly to a storage router and method for providing virtual local storage on remote SCSI storage devices to Fibre Channel devices.

BACKGROUND OF THE INVENTION

Typical storage transport mediums provide for a relatively small number of devices to be attached over relatively short distances. One such transport medium is a Small Computer System Interface (SCSI) protocol, the structure and operation of which is generally well known as is described, for example, in the SCSI-1, SCSI-2 and SCSI-3 specifications. High speed serial interconnects provide enhanced capability to attach a large number of high speed devices to a common storage transport medium over large distances. One such serial interconnect is Fibre Channel, the structure and operation of which is described, for example, in *Fibre Channel Physical and signaling Interface (FC-PH)*, ANSI X3.230 *Fibre Channel Arbitrated Loop (FC-AL)*, and ANSI X3.272 *Fibre Channel Private Loop Direct Attach (FC-PLDA)*.

Conventional computing devices, such as computer workstations, generally access storage locally or through network interconnects. Local storage typically consists of a disk drive, tape drive, CD-ROM drive or other storage device contained within, or locally connected to the workstation. The workstation provides a file system structure, that includes security controls, with access to the local storage device through native low level, block protocols. These protocols map directly to the mechanisms used by the storage device and consist of data requests without security controls. Network interconnects typically provide access for a large number of computing devices to data storage on a remote network server. The remote network server provides file system structure, access control, and other miscellaneous capabilities that include the network interface. Access to data through the network server is through network protocols that the server must translate into low level requests to the storage device. A workstation with access to the server storage must translate its file system protocols into network protocols that are used to communicate with the server. Consequently, from the perspective of a workstation, or other computing device, seeking to access such server data, the access is much slower than access to data on a local storage device.

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SUMMARY OF THE INVENTION

In accordance with the present invention, a storage router and method for providing virtual local storage on remote SCSI storage devices to Fibre Channel devices are disclosed that provide advantages over conventional network storage devices and methods.

According to one aspect of the present invention, a storage router and storage network provide virtual local storage on remote SCSI storage devices to Fibre Channel devices. A plurality of Fibre Channel devices, such as workstations, are connected to a Fibre Channel transport medium, and a plurality of SCSI storage devices are connected to a SCSI bus transport medium. The storage router interfaces between the Fibre Channel transport medium and the SCSI bus transport medium. The storage router maps between the workstations and the SCSI storage devices and implements access controls for storage space on the SCSI storage devices. The storage router then allows access from the workstations to the SCSI storage devices using native low level, block protocol in accordance with the mapping and the access controls.

According to another aspect of the present invention, virtual local storage on remote SCSI storage devices is provided to Fibre Channel devices. A Fibre Channel transport medium and a SCSI bus transport medium are interfaced with. A configuration is maintained for SCSI storage devices connected to the SCSI bus transport medium. The configuration maps between Fibre Channel devices and the SCSI storage devices and implements access controls for storage space on the SCSI storage devices. Access is then allowed from Fibre Channel initiator devices to SCSI storage devices using native low level, block protocol in accordance with the configuration.

A technical advantage of the present invention is the ability to centralize local storage for networked workstations without any cost of speed or overhead. Each workstation access its virtual local storage as if it work locally connected. Further, the centralized storage devices can be located in a significantly remote position even in excess of ten kilometers as defined by Fibre Channel standards.

Another technical advantage of the present invention is the ability to centrally control and administer storage space for connected users without limiting the speed with which the users can access local data. In addition, global access to data, backups, virus scanning and redundancy can be more easily accomplished by centrally located storage devices.

A further technical advantage of the present invention is providing support for SCSI storage devices as local storage for Fibre Channel hosts. In addition, the present invention helps to provide extended capabilities for Fibre Channel and for management of storage subsystems.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the present invention and the advantages thereof may be acquired by referring to the following description taken in conjunction with the accompanying drawings, in which like reference numbers indicate like features, and wherein:

FIG. 1 is a block diagram of a conventional network that provides storage through a network server;

FIG. 2 is a block diagram of one embodiment of a storage network with a storage router that provides global access and routing;

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FIG. 3 is a block diagram of one embodiment of a storage network with a storage router that provides virtual local storage;

FIG. 4 is a block diagram of one embodiment of the storage router of FIG. 3; and

FIG. 5 is a block diagram of one embodiment of data flow within the storage router of FIG. 4.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 is a block diagram of a conventional network, indicated generally at 10, that provides access to storage through a network server. As shown, network 10 includes a plurality of workstations 12 interconnected with a network server 14 via a network transport medium 16. Each workstation 12 can generally comprise a processor, memory, input/output devices, storage devices and a network adapter as well as other common computer components. Network server 14 uses a SCSI bus 18 as a storage transport medium to interconnect with a plurality of storage devices 20 (tape drives, disk drives, etc.). In the embodiment of FIG. 1, network transport medium 16 is an network connection and storage devices 20 comprise hard disk drives, although there are numerous alternate transport mediums and storage devices.

In network 10, each workstation 12 has access to its local storage device as well as network access to data on storage devices 20. The access to a local storage device is typically through native low level, block protocols. On the other hand, access by a workstation 12 to storage devices 20 requires the participation of network server 14 which implements a file system and transfers data to workstations 12 only through high level file system protocols. Only network server 14 communicates with storage devices 20 via native low level, block protocols. Consequently, the network access by workstations 12 through network server 14 is slow with respect to their access to local storage. In network 10, it can also be a logistical problem to centrally manage and administer local data distributed across an organization, including accomplishing tasks such as backups, virus scanning and redundancy.

FIG. 2 is a block diagram of one embodiment of a storage network, indicated generally at 30, with a storage router that provides global access and routing. This environment is significantly different from that of FIG. 1 in that there is no network server involved. In FIG. 2, a Fibre Channel high speed serial transport 32 interconnects a plurality of workstations 36 and storage devices 38. A SCSI bus storage transport medium interconnects workstations 40 and storage devices 42. A storage router 44 then serves to interconnect these mediums and provide devices on either medium global, transparent access to devices on the other medium. Storage router 44 routes requests from initiator devices on one medium to target devices on the other medium and routes data between the target and the initiator. Storage router 44 can allow initiators and targets to be on either side. In this manner, storage router 44 enhances the functionality of Fibre Channel 32 by providing access, for example, to legacy SCSI storage devices on SCSI bus 34. In the embodiment of FIG. 2, the operation of storage router 44 can be managed by a management station 46 connected to the storage router via a direct serial connection.

In storage network 30, any workstation 36 or workstation 40 can access any storage device 38 or storage device 42 through native low level, block protocols, and vice versa. This functionality is enabled by storage router 44 which

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routes requests and data as a generic transport between Fibre Channel 32 and SCSI bus 34. Storage router 44 uses tables to map devices from one medium to the other and distributes requests and data across Fibre Channel 32 and SCSI bus 34 without any security access controls. Although this extension of the high speed serial interconnect provided by Fibre Channel 32 is beneficial, it is desirable to provide security controls in addition to extended access to storage devices through a native low level, block protocol.

FIG. 3 is a block diagram of one embodiment of a storage network, indicated generally at 50, with a storage router that provides virtual local storage. Similar to that of FIG. 2, storage network 50 includes a Fibre Channel high speed serial interconnect 52 and a SCSI bus 54 bridged by a storage router 56. Storage router 56 of FIG. 3 provides for a large number of workstations 58 to be interconnected on a common storage transport and to access common storage devices 60, 62 and 64 through native low level, block protocols.

According to the present invention, storage router 56 has enhanced functionality to implement security controls and routing such that each workstation 58 can have access to a specific subset of the overall data stored in storage devices 60, 62 and 64. This specific subset of data has the appearance and characteristics of local storage and is referred to herein as virtual local storage. Storage router 56 allows the configuration and modification of the storage allocated to each attached workstation 58 through the use of mapping tables or other mapping techniques.

As shown in FIG. 3, for example, storage device 60 can be configured to provide global data 65 which can be accessed by all workstations 58. Storage device 62 can be configured to provide partitioned subsets 66, 68, 70 and 72, where each partition is allocated to one of the workstations 58 (workstations A, B, C and D). These subsets 66, 68, 70 and 72 can only be accessed by the associated workstation 58 and appear to the associated workstation 58 as local storage accessed using native low level, block protocols. Similarly, storage device 64 can be allocated as storage for the remaining workstation 58 (workstation E).

Storage router 56 combines access control with routing such that each workstation 58 has controlled access to only the specified partition of storage device 62 which forms virtual local storage for the workstation 58. This access control allows security control for the specified data partitions. Storage router 56 allows this allocation of storage devices 60, 62 and 64 to be managed by a management station 76. Management station 76 can connect directly to storage router 56 via a direct connection or, alternately, can interface with storage router 56 through either Fibre Channel 52 or SCSI bus 54. In the latter case, management station 76 can be a workstation or other computing device with special rights such that storage router 56 allows access to mapping tables and shows storage devices 60, 62 and 64 as they exist physically rather than as they have been allocated.

The environment of FIG. 3 extends the concept of a single workstation having locally connected storage devices to a storage network 50 in which workstations 58 are provided virtual local storage in a manner transparent to workstations 58. Storage router 56 provides centralized control of what each workstation 58 sees as its local drive, as well as what data it sees as global data accessible by other workstations 58. Consequently, the storage space considered by the workstation 58 to be its local storage is actually a partition (i.e., logical storage definition) of a physically remote storage device 60, 62 or 64 connected through storage router 56. This means that similar requests from workstations 58 for

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access to their local storage devices produce different accesses to the storage space on storage devices 60, 62 and 64. Further, no access from a workstation 58 is allowed to the virtual local storage of another workstation 58.

The collective storage provided by storage devices 60, 62 and 64 can have blocks allocated by programming means within storage router 56. To accomplish this function, storage router 56 can include routing tables and security controls that define storage allocation for each workstation 58. The advantages provided by implementing virtual local storage in centralized storage devices include the ability to do collective backups and other collective administrative functions more easily. This is accomplished without limiting the performance of workstations 58 because storage access involves native low level, block protocols and does not involve the overhead of high level protocols and file systems required by network servers.

FIG. 4 is a block diagram of one embodiment of storage router 56 of FIG. 3. Storage router 56 can comprise a Fibre Channel controller 80 that interfaces with Fibre Channel 52 and a SCSI controller 82 that interfaces with SCSI bus 54. A buffer 84 provides memory work space and is connected to both Fibre Channel controller 80 and to SCSI controller 82. A supervisor unit 86 is connected to Fibre Channel controller 80, SCSI controller 82 and buffer 84. Supervisor unit 86 comprises a microprocessor for controlling operation of storage router 56 and to handle mapping and security access for requests between Fibre Channel 52 and SCSI bus 54.

FIG. 5 is a block diagram of one embodiment of data flow within storage router 56 of FIG. 4. As shown, data from Fibre Channel 52 is processed by a Fibre Channel (FC) protocol unit 88 and placed in a FIFO queue 90. A direct memory access (DMA) interface 92 then takes data out of FIFO queue 90 and places it in buffer 84. Supervisor unit 86 processes the data in buffer 84 as represented by supervisor processing 93. This processing involves mapping between Fibre Channel 52 and SCSI bus 54 and applying access controls and routing functions. A DMA interface 94 then pulls data from buffer 84 and places it into a buffer 96. A SCSI protocol unit 98 pulls data from buffer 96 and communicates the data on SCSI bus 54. Data flow in the reverse direction, from SCSI bus 54 to Fibre Channel 52, is accomplished in a reverse manner.

The storage router of the present invention is a bridge device that connects a Fibre Channel link directly to a SCSI bus and enables the exchange of SCSI command set information between application clients on SCSI bus devices and the Fibre Channel links. Further, the storage router applies access controls such that virtual local storage can be established in remote SCSI storage devices for workstations on the Fibre Channel link. In one embodiment, the storage router provides a connection for Fibre Channel links running the SCSI Fibre Channel Protocol (FCP) to legacy SCSI devices attached to a SCSI bus. The Fibre Channel topology is typically an Arbitrated Loop (FC_{AL}).

In part, the storage router enables a migration path to Fibre Channel based, serial SCSI networks by providing connectivity for legacy SCSI bus devices. The storage router can be attached to a Fibre Channel Arbitrated Loop and a SCSI bus to support a number of SCSI devices. Using configuration settings, the storage router can make the SCSI bus devices available on the Fibre Channel network as FCP logical units. Once the configuration is defined, operation of the storage router is transparent to application clients. In this manner, the storage router can form an integral part of the

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migration to new Fibre Channel based networks while providing a means to continue using legacy SCSI devices.

In one implementation (not shown), the storage router can be a rack mount or free standing device with an internal power supply. The storage router can have a Fibre Channel and SCSI port, and a standard, detachable power cord can be used, the FC connector can be a copper DB9 connector, and the SCSI connector can be a 68-pin type. Additional modular jacks can be provided for a serial port and a 802.3 10BaseT port, i.e. twisted pair Ethernet, for management access. The SCSI port of the storage router can support SCSI direct and sequential access target devices and can support SCSI initiators, as well. The Fibre Channel port can interface to SCSI-3 FCP enabled devices and initiators.

To accomplish its functionality, one implementation of the storage router uses: a Fibre Channel interface based on the HEWLETT-PACKARD TACHYON HPFC-5000 controller and a GLM media interface; an Intel 80960RP processor, incorporating independent data and program memory spaces, and associated logic required to implement a stand alone processing system; and a serial port for debug and system configuration. Further, this implementation includes a SCSI interface supporting Fast-20 based on the SYMBIOS 53C8xx series SCSI controllers, and an operating system based upon the WIND RIVERS SYSTEMS VXWORKS or IXWORKS kernel, as determined by design. In addition, the storage router includes software as required to control basic functions of the various elements, and to provide appropriate translations between the FC and SCSI protocols.

The storage router has various modes of operation that are possible between FC and SCSI target and initiator combinations. These modes are: FC Initiator to SCSI Target; SCSI Initiator to FC Target; SCSI Initiator to SCSI Target; and FC Initiator to FC Target. The first two modes can be supported concurrently in a single storage router device are discussed briefly below. The third mode can involve two storage router devices back to back and can serve primarily as a device to extend the physical distance beyond that possible via a direct SCSI connection. The last mode can be used to carry FC protocols encapsulated on other transmission technologies (e.g. ATM, SONET), or to act as a bridge between two FC loops (e.g. as a two port fabric).

The FC Initiator to SCSI Target mode provides for the basic configuration of a server using Fibre Channel to communicate with SCSI targets. This mode requires that a host system have an FC attached device and associated device drivers and software to generate SCSI-3 FCP requests. This system acts as an initiator using the storage router to communicate with SCSI target devices. The SCSI devices supported can include SCSI-2 compliant direct or sequential access (disk or tape) devices. The storage router serves to translate command and status information and transfer data between SCSI-3 FCP and SCSI-2, allowing the use of standard SCSI-2 devices in a Fibre Channel environment.

The SCSI Initiator to FC Target mode provides for the configuration of a server using SCSI-2 to communicate with Fibre Channel targets. This mode requires that a host system has a SCSI-2 interface and driver software to control SCSI-2 target devices. The storage router will connect to the SCSI-2 bus and respond as a target to multiple target IDs. Configuration information is required to identify the target IDs to which the bridge will respond on the SCSI-2 bus. The storage router then translates the SCSI-2 requests to SCSI-3 FCP requests, allowing the use of FC devices with a SCSI host system. This will also allow features such as a tape

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device acting as an initiator on the SCSI bus to provide full support for this type of SCSI device.

In general, user configuration of the storage router will be needed to support various functional modes of operation. Configuration can be modified, for example, through a serial port or through an Ethernet port via SNMP (simple network management protocol) or a Telnet session. Specifically, SNMP manageability can be provided via an 802.3 Ethernet interface. This can provide for configuration changes as well as providing statistics and error information. Configuration can also be performed via TELNET or RS-232 interfaces with menu driven command interfaces. Configuration information can be stored in a segment of flash memory and can be retained across resets and power off cycles. Password protection can also be provided.

In the first two modes of operation, addressing information is needed to map from FC addressing to SCSI addressing and vice versa. This can be 'hard' configuration data, due to the need for address information to be maintained across initialization and partial reconfigurations of the Fibre Channel address space. In an arbitrated loop configuration, user configured addresses will be needed for AL_PAs in order to insure that known addresses are provided between loop reconfigurations.

With respect to addressing, FCP and SCSI 2 systems employ different methods of addressing target devices. Additionally, the inclusion of a storage router means that a method of translating device IDs needs to be implemented. In addition, the storage router can respond to commands without passing the commands through to the opposite interface. This can be implemented to allow all generic FCP and SCSI commands to pass through the storage router to address attached devices, but allow for configuration and diagnostics to be performed directly on the storage router through the FC and SCSI interfaces.

Management commands are those intended to be processed by the storage router controller directly. This may include diagnostic, mode, and log commands as well as other vendor-specific commands. These commands can be received and processed by both the FCP and SCSI interfaces, but are not typically bridged to the opposite interface. These commands may also have side effects on the operation of the storage router, and cause other storage router operations to change or terminate.

A primary method of addressing management commands though the FCP and SCSI interfaces can be through peripheral device type addressing. For example, the storage router can respond to all operations addressed to logical unit (LUN) zero as a controller device. Commands that the storage router will support can include INQUIRY as well as vendor-specific management commands. These are to be generally consistent with SCC standard commands.

The SCSI bus is capable of establishing bus connections between targets. These targets may internally address logical units. Thus, the prioritized addressing scheme used by SCSI subsystems can be represented as follows: BUS:TARGET: LOGICAL UNIT. The BUS identification is intrinsic in the configuration, as a SCSI initiator is attached to only one bus. Target addressing is handled by bus arbitration from information provided to the arbitrating device. Target addresses are assigned to SCSI devices directly, though some means of configuration, such as a hardware jumper, switch setting, or device specific software configuration. As such, the SCSI protocol provides only logical unit addressing within the Identify message. Bus and target information is implied by the established connection.

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Fibre Channel devices within a fabric are addressed by a unique port identifier. This identifier is assigned to a port during certain well-defined states of the FC protocol. Individual ports are allowed to arbitrate for a known, user defined address. If such an address is not provided, or if arbitration for a particular user address fails, the port is assigned a unique address by the FC protocol. This address is generally not guaranteed to be unique between instances. Various scenarios exist where the AL-PA of a device will change, either after power cycle or loop reconfiguration.

The FC protocol also provides a logical unit address field within command structures to provide addressing to devices internal to a port. The FCP_CMD payload specifies an eight byte LUN field. Subsequent identification of the exchange between devices is provided by the FQXID (Fully Qualified Exchange ID).

FC ports can be required to have specific addresses assigned. Although basic functionality is not dependent on this, changes in the loop configuration could result in disk targets changing identifiers with the potential risk of data corruption or loss. This configuration can be straightforward, and can consist of providing the device a loop-unique ID (AL_PA) in the range of "01h" to "EFh." Storage routers could be shipped with a default value with the assumption that most configurations will be using single storage routers and no other devices requesting the present ID. This would provide a minimum amount of initial configuration to the system administrator. Alternately, storage routers could be defaulted to assume any address so that configurations requiring multiple storage routers on a loop would not require that the administrator assign a unique ID to the additional storage routers.

Address translation is needed where commands are issued in the cases FC Initiator to SCSI Target and SCSI Initiator to FC Target. Target responses are qualified by the FQXID and will retain the translation acquired at the beginning of the exchange. This prevents configuration changes occurring during the course of execution of a command from causing data or state information to be inadvertently misdirected. Configuration can be required in cases of SCSI Initiator to FC Target, as discovery may not effectively allow for FCP targets to consistently be found. This is due to an FC arbitrated loop supporting addressing of a larger number of devices than a SCSI bus and the possibility of FC devices changing their AL-PA due to device insertion or other loop initialization.

In the direct method, the translation to BUS:TARGET: LUN of the SCSI address information will be direct. That is, the values represented in the FCP LUN field will directly map to the values in effect on the SCSI bus. This provides a clean translation and does not require SCSI bus discovery. It also allows devices to be dynamically added to the SCSI bus without modifying the address map. It may not allow for complete discovery by FCP initiator devices, as gaps between device addresses may halt the discovery process. Legacy SCSI device drivers typically halt discovery on a target device at the first unoccupied LUN, and proceed to the next target. This would lead to some devices not being discovered. However, this allows for hot plugged devices and other changes to the loop addressing.

In the ordered method, ordered translation requires that the storage router perform discovery on reset, and collapses the addresses on the SCSI bus to sequential FCP LUN values. Thus, the FCP LUN values 0-N can represent N+1 SCSI devices, regardless of SCSI address values, in the order in which they are isolated during the SCSI discovery process. This would allow the FCP initiator discovery pro-

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cess to identify all mapped SCSI devices without further configuration. This has the limitation that hot-plugged devices will not be identified until the next reset cycle. In this case, the address may also be altered as well.

In addition to addressing, according to the present invention, the storage router provides configuration and access controls that cause certain requests from FC Initiators to be directed to assigned virtual local storage partitioned on SCSI storage devices. For example, the same request for LUN 0 (local storage) by two different FC Initiators can be directed to two separate subsets of storage. The storage router can use tables to map, for each initiator, what storage access is available and what partition is being addressed by a particular request. In this manner, the storage space provided by SCSI storage devices can be allocated to FC initiators to provide virtual local storage as well as to create any other desired configuration for secured access.

Although the present invention has been described in detail, it should be understood that various changes, substitutions, and alterations can be made hereto without departing from the spirit and scope of the invention as defined by the appended claims.

What is claimed is:

1. A storage router for providing virtual local storage on remote storage devices to a device, comprising:
 - a buffer providing memory work space for the storage router;
 - a first Fibre Channel controller operable to connect to and interface with a first Fibre Channel transport medium;
 - a second Fibre Channel controller operable to connect to and interface with a second Fibre Channel transport medium; and
 - a supervisor unit coupled to the first and second Fibre Channel controllers and the buffer, the supervisor unit operable:
 - to maintain a configuration for remote storage devices connected to the second Fibre Channel transport medium that maps between the device and the remote storage devices and that implements access controls for storage space on the remote storage devices; and
 - to process data in the buffer to interface between the first Fibre Channel controller and the second Fibre Channel controller to allow access from Fibre Channel initiator devices to the remote storage devices using native low level, block protocol in accordance with the configuration.
2. The storage router of claim 1, wherein the configuration maintained by the supervisor unit includes an allocation of subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device.
3. The storage router of claim 2, wherein the Fibre Channel devices comprise workstations.
4. The storage router of claim 2, wherein the remote storage devices comprise hard disk drives.
5. The storage router of claim 1, wherein each of the first Fibre Channel controller comprises:
 - a Fibre Channel (FC) protocol unit operable to connect to the Fibre Channel transport medium;
 - a first-in-first-out queue coupled to the Fibre Channel protocol unit; and
 - a direct memory access (DMA) interface coupled to the first-in-first-out queue and to the buffer.
6. A storage network, comprising:
 - a first Fibre Channel transport medium;
 - a second Fibre Channel transport medium;

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- a plurality of workstations connected to the first Fibre Channel transport medium;
- a plurality of storage devices connected to the second Fibre Channel transport medium; and
- a storage router interfacing between the first Fibre Channel transport medium and the second Fibre Channel transport medium, the storage router providing virtual local storage on the storage devices to the workstations and operable:
 - to map between the workstations and the storage devices;
 - to implement access controls for storage space on the storage devices; and
 - to allow access from the workstations to the storage devices using native low level, block protocol in accordance with the mapping and access controls.
7. The storage network of claim 6, wherein the access controls include an allocation of subsets of storage space to associated workstations, wherein each subset is only accessible by the associated workstation.
8. The storage network of claim 6, wherein the storage devices comprise hard disk drives.
9. The storage network of claim 6, wherein the storage router comprises:
 - a buffer providing memory work space for the storage router;
 - a first Fibre Channel controller operable to connect to and interface with the first Fibre Channel transport medium, the first Fibre Channel controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer;
 - a second Fibre Channel controller operable to connect to and interface with the second Fibre Channel transport medium, the second Fibre Channel controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer; and
 - a supervisor unit coupled to the first and second Fibre Channel controllers and the buffer, the supervisor unit operable:
 - to maintain a configuration for the storage devices that maps between workstations and storage devices and that implements the access controls for storage space on the storage devices; and
 - to process data in the buffer to interface between the first Fibre Channel controller and the second Fibre Channel controller to allow access from workstations to storage devices in accordance with the configuration.
10. A method for providing virtual local storage on remote storage devices to Fibre Channel devices, comprising:
 - interfacing with a first Fibre Channel transport medium;
 - interfacing with a second Fibre Channel transport medium;
 - maintaining a configuration for remote storage devices connected to the second Fibre Channel transport medium that maps between Fibre Channel devices and the remote storage devices and that implements access controls for storage space on the remote storage devices; and
 - allowing access from Fibre Channel initiator devices to the remote storage devices using native low level, block protocol in accordance with the configuration.
11. The method of claim 10, wherein maintaining the configuration includes allocating subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device.

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12. The method of claim 11, wherein the Fibre Channel devices comprise workstations.

13. The method of claim 11, wherein the remote storage devices comprise hard disk drives.

14. An apparatus for providing virtual local storage on a remote storage device to a device operating according to a Fibre Channel protocol, comprising:

a first controller operable to connect to and interface with a first transport medium, wherein the first transport medium is operable according to the Fibre Channel protocol;

a second controller operable to connect to and interface with a second transport medium, wherein the second transport medium is operable according to the Fibre Channel protocol; and

a supervisor unit coupled to the first controller and the second controller, the supervisor unit operable to control access from the device connected to the first transport medium to the remote storage device connected to the second transport medium using native low level, block protocols according to a map between the device and the remote storage device.

15. The apparatus of claim 14, wherein the supervisor unit is further operable to maintain a configuration wherein the configuration includes the map between the device and the remote storage device, and further wherein the map includes virtual LUNs that provide a representation of the storage device.

16. The apparatus of claim 15, wherein the map only exposes the device to LUNs that the device may access.

17. The apparatus of claim 14, wherein the supervisor unit is further operable to maintain a configuration including the map, wherein the map provides a mapping from a host device ID to a virtual LUN representation of the remote storage device to a physical LUN of the remote storage device.

18. The apparatus of claim 14, wherein the remote storage device further comprises storage space partitioned into virtual local storage for the device connected to the first transport medium.

19. The apparatus of claim 18, wherein the supervisor unit is further operable to prevent the device from accessing any storage on the remote storage device that is not part of a virtual local storage partition assigned to the device.

20. The apparatus of claim 14, wherein the first controller and the second controller further comprise a single controller.

21. A system for providing virtual local storage on remote storage devices, comprising:

a first controller operable to connect to and interface with a first transport medium operable according to a Fibre Channel protocol;

a second controller operable to connect to and interface with a second transport medium operable according to the Fibre Channel protocol;

at least one device connected to the first transport medium;

at least one storage device connected to the second transport medium; and

an access control device coupled to the first controller and the second controller, the access control device operable to:

map between the at least one device and a storage space on the at least one storage device; and

control access from the at least one device to the at least one storage device using native low level, block protocol in accordance with the map.

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22. The system of claim 21, wherein the access control device is further operable to maintain a configuration wherein the configuration includes the map between the at least one device and the at least one storage device, and further wherein the map includes virtual LUNs that provide a representation of the at least one storage device.

23. The system of claim 22, wherein the map only exposes the at least one device to LUNs that the at least one device may access.

24. The system of claim 21, wherein the access control device is further operable to maintain a configuration including the map, wherein the map provides a mapping from a host device ID to a virtual LUN representation of the at least one storage device to a physical LUN of the at least one storage device.

25. The system of claim 21, wherein the at least one storage device further comprises storage space partitioned into virtual local storage for the at least one device.

26. The system of claim 25, wherein the access control unit is further operable to prevent at least one device from accessing any storage on the at least one storage device that is not part of a virtual local storage partition assigned to the at least one device.

27. The system of claim 21, wherein the first controller and the second controller further comprise a single controller.

28. A method for providing virtual local storage on remote storage devices, comprising:

mapping between a device connected to a first transport medium and a storage device connected to a second transport medium, wherein the first transport medium and the second transport medium operate according to a Fibre Channel protocol;

implementing access controls for storage space on the storage device; and

allowing access from the device connected to the first transport medium to the storage device using native low level, block protocols.

29. The method of claim 28, further comprising maintaining a configuration wherein the configuration includes a map between the device and the one storage device, and further wherein the map includes virtual LUNs that provide a representation of the storage device.

30. The method of claim 29, wherein the map only exposes the device to LUNs that the device may access.

31. The method of claim 28, further comprising maintaining a configuration including a map from a host device ID to a virtual LUN representation of the storage device to a physical LUN of the storage device.

32. The method of claim 28, further comprising partitioning storage space on the storage device into virtual local storage for the device.

33. The method of claim 32, further comprising preventing the device from accessing any storage on the storage device that is not part of a virtual local storage partition assigned to the device.

34. A system for providing virtual local storage, comprising:

a host device;

a storage device remote from the host device, wherein the storage device has a storage space;

a first controller;

a second controller

a first transport medium operable according to a Fibre Channel protocol, wherein the first transport medium connects the host device to the first controller;

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a second transport medium operable according to the Fibre Channel protocol, wherein the second transport medium connects the second controller to the storage device;
a supervisor unit coupled to the first controller and the second controller, the supervisor unit operable to:
maintain a configuration that maps between the host device and at least a portion of the storage space on the storage device; and
implement access controls according to the configuration for the storage space on the storage device using native low level, block protocol.
35. The system of claim 34, wherein the supervisor unit is further operable to:
maintain a configuration that maps from the host device to a virtual representation of at least a portion of the storage space on the storage device to the storage device; and

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allow the host device to access only that portion of the storage space that is contained in the map.
36. The system of claim 35, wherein the configuration comprises a map from a host device ID to a virtual LUN representation of the storage device to a physical LUN of the storage device.
37. The system of claim 34, wherein the storage device further comprises storage space partitioned into virtual local storage for the host device.
38. The system of claim 37, wherein the supervisor unit is further operable to prevent the host device from accessing any storage on the storage device that is not part of a virtual local storage partition assigned to the host device.
39. The apparatus of claim 34, wherein the first controller and the second controller further comprise a single controller.

* * * * *



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(12) **United States Patent**
Hoese et al.

(10) **Patent No.:** US 7,051,147 B2
 (45) **Date of Patent:** *May 23, 2006

(54) **STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **10/658,163**

(22) Filed: **Sep. 9, 2003**

(65) **Prior Publication Data**

US 2004/0054838 A1 Mar. 18, 2004

Related U.S. Application Data

(63) Continuation of application No. 10/081,110, filed on Feb. 22, 2002, now Pat. No. 6,789,152, which is a continuation of application No. 09/354,682, filed on Jul. 15, 1999, now Pat. No. 6,421,753, which is a continuation of application No. 09/001,799, filed on Dec. 31, 1997, now Pat. No. 5,941,972.

(51) **Int. Cl.**
G06F 13/00 (2006.01)

(52) **U.S. Cl.** **710/305; 710/11; 709/258**

(58) **Field of Classification Search** 710/1-5, 710/8-13, 22-28, 104-105, 305-306, 325, 710/250, 126-131, 36-38; 709/250, 258; 714/42; 711/112, 113, 110

See application file for complete search history.

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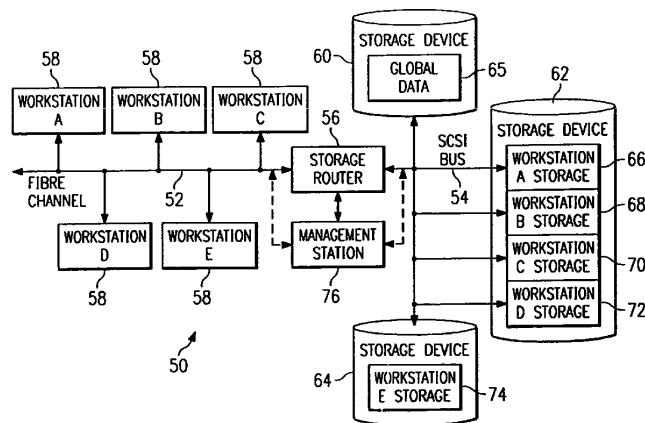
Primary Examiner—Christopher Shin

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(57) **ABSTRACT**

A storage router and storage network provide virtual local storage on remote storage devices to Fiber Channel devices. A plurality of Fiber Channel devices, such as workstations, are connected to a Fiber Channel transport medium, and a plurality of storage devices are connected to a second Fiber Channel transport medium. The storage router interfaces between the Fiber Channel transport media. The storage router maps between the workstations and the storage devices and implements access controls for storage space on the storage devices. The storage router then allows access from the workstations to the storage devices using native low level, block protocol in accordance with the mapping and the access controls.

39 Claims, 2 Drawing Sheets



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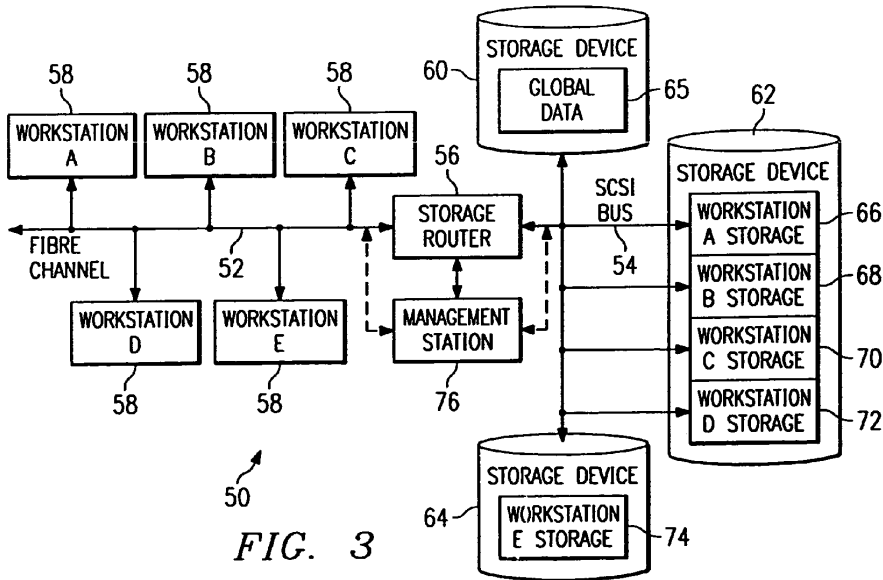
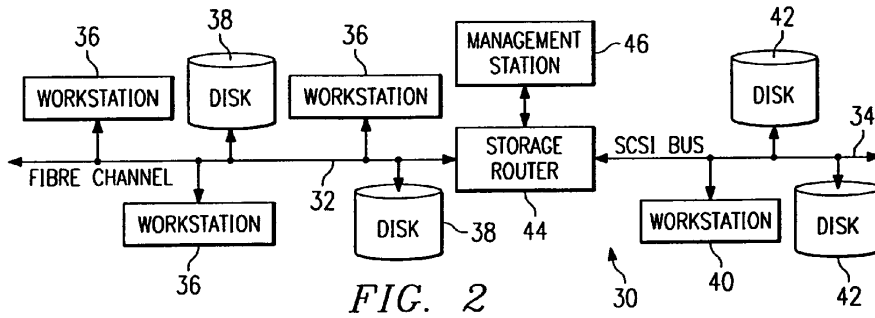
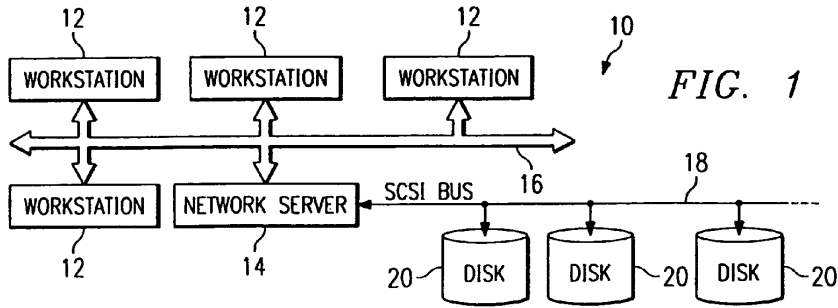
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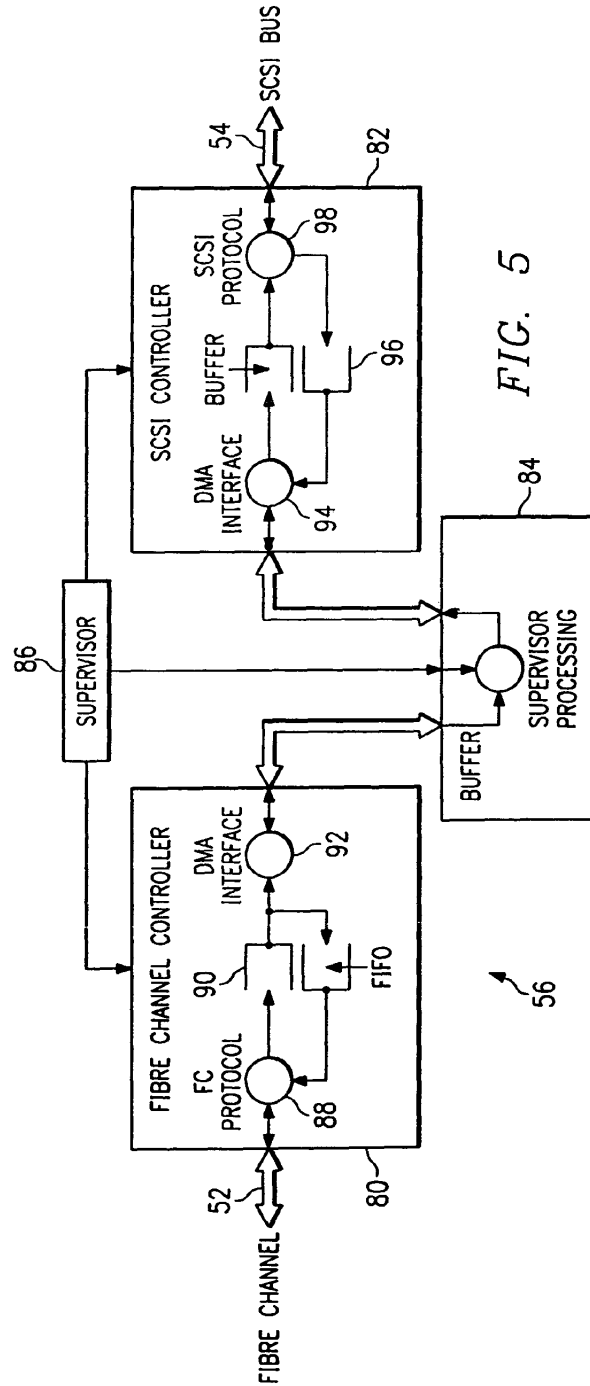
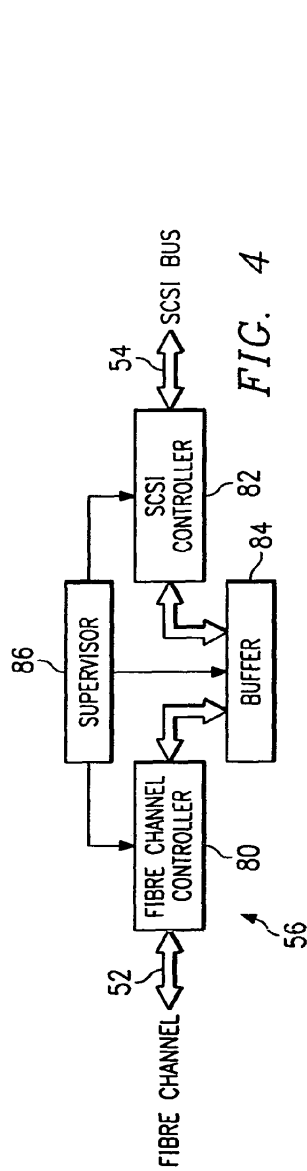
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STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

RELATED APPLICATIONS

This application is a continuation of and claims the benefit of the filing dates of U.S. patent application Ser. No. 10/081,110 by inventors Geoffrey B. Hoese and Jeffrey T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on Feb. 22, 2002, now U.S. Pat. No. 6,789,152 which in turn is a continuation of U.S. application Ser. No. 09/354,682 by inventors Geoffrey B. Hoese and Jeffrey T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on Jul. 15, 1999, now U.S. Pat. No. 6,421,753, which in turn is a continuation of U.S. patent application Ser. No. 09/001,799, filed on Dec. 31, 1997, now U.S. Pat. No. 5,941,972, and hereby incorporates these applications by reference in their entireties as if they had been fully set forth herein.

TECHNICAL FIELD OF THE INVENTION

This invention relates in general to network storage devices, and more particularly to a storage router and method for providing virtual local storage on remote SCSI storage devices to Fibre Channel devices.

BACKGROUND OF THE INVENTION

Typical storage transport mediums provide for a relatively small number of devices to be attached over relatively short distances. One such transport medium is a Small Computer System Interface (SCSI) protocol, the structure and operation of which is generally well known as is described, for example, in the SCSI-1, SCSI-2 and SCSI-3 specifications. High speed serial interconnects provide enhanced capability to attach a large number of high speed devices to a common storage transport medium over large distances. One such serial interconnect is Fibre Channel, the structure and operation of which is described, for example, in *Fibre Channel Physical and signaling Interface (FC-PH)*, ANSI X3.230 *Fibre Channel Arbitrated Loop (FC-AL)*, and ANSI X3.272 *Fibre Channel Private Loop Direct Attach (FC-PLDA)*.

Conventional computing devices, such as computer workstations, generally access storage locally or through network interconnects. Local storage typically consists of a disk drive, tape drive, CD-ROM drive or other storage device contained within, or locally connected to the workstation. The workstation provides a file system structure, that includes security controls, with access to the local storage device through native low level, block protocols. These protocols map directly to the mechanisms used by the storage device and consist of data requests without security controls. Network interconnects typically provide access for a large number of computing devices to data storage on a remote network server. The remote network server provides file system structure, access control, and other miscellaneous capabilities that include the network interface. Access to data through the network server is through network protocols that the server must translate into low level requests to the storage device. A workstation with access to the server storage must translate its file system protocols into network protocols that are used to communicate with the server. Consequently, from the perspective of a workstation, or other computing device, seeking to access such server data, the access is much slower than access to data on a local storage device.

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SUMMARY OF THE INVENTION

In accordance with the present invention, a storage router and method for providing virtual local storage on remote SCSI storage devices to Fibre Channel devices are disclosed that provide advantages over conventional network storage devices and methods.

According to one aspect of the present invention, a storage router and storage network provide virtual local storage on remote SCSI storage devices to Fibre Channel devices. A plurality of Fibre Channel devices, such as workstations, are connected to a Fibre Channel transport medium, and a plurality of SCSI storage devices are connected to a SCSI bus transport medium. The storage router interfaces between the Fibre Channel transport medium and the SCSI bus transport medium. The storage router maps between the workstations and the SCSI storage devices and implements access controls for storage space on the SCSI storage devices. The storage router then allows access from the workstations to the SCSI storage devices using native low level, block protocol in accordance with the mapping and the access controls.

According to another aspect of the present invention, virtual local storage on remote SCSI storage devices is provided to Fibre Channel devices. A Fibre Channel transport medium and a SCSI bus transport medium are interfaced with. A configuration is maintained for SCSI storage devices connected to the SCSI bus transport medium. The configuration maps between Fibre Channel devices and the SCSI storage devices and implements access controls for storage space on the SCSI storage devices. Access is then allowed from Fibre Channel initiator devices to SCSI storage devices using native low level, block protocol in accordance with the configuration.

A technical advantage of the present invention is the ability to centralize local storage for networked workstations without any cost of speed or overhead. Each workstation access its virtual local storage as if it work locally connected. Further, the centralized storage devices can be located in a significantly remote position even in excess of ten kilometers as defined by Fibre Channel standards.

Another technical advantage of the present invention is the ability to centrally control and administer storage space for connected users without limiting the speed with which the users can access local data. In addition, global access to data, backups, virus scanning and redundancy can be more easily accomplished by centrally located storage devices.

A further technical advantage of the present invention is providing support for SCSI storage devices as local storage for Fibre Channel hosts. In addition, the present invention helps to provide extended capabilities for Fibre Channel and for management of storage subsystems.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the present invention and the advantages thereof may be acquired by referring to the following description taken in conjunction with the accompanying drawings, in which like reference numbers indicate like features, and wherein:

FIG. 1 is a block diagram of a conventional network that provides storage through a network server;

FIG. 2 is a block diagram of one embodiment of a storage network with a storage router that provides global access and routing;

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FIG. 3 is a block diagram of one embodiment of a storage network with a storage router that provides virtual local storage;

FIG. 4 is a block diagram of one embodiment of the storage router of FIG. 3; and

FIG. 5 is a block diagram of one embodiment of data flow within the storage router of FIG. 4.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 is a block diagram of a conventional network, indicated generally at 10, that provides access to storage through a network server. As shown, network 10 includes a plurality of workstations 12 interconnected with a network server 14 via a network transport medium 16. Each workstation 12 can generally comprise a processor, memory, input/output devices, storage devices and a network adapter as well as other common computer components. Network server 14 uses a SCSI bus 18 as a storage transport medium to interconnect with a plurality of storage devices 20 (tape drives, disk drives, etc.). In the embodiment of FIG. 1, network transport medium 16 is an network connection and storage devices 20 comprise hard disk drives, although there are numerous alternate transport mediums and storage devices.

In network 10, each workstation 12 has access to its local storage device as well as network access to data on storage devices 20. The access to a local storage device is typically through native low level, block protocols. On the other hand, access by a workstation 12 to storage devices 20 requires the participation of network server 14 which implements a file system and transfers data to workstations 12 only through high level file system protocols. Only network server 14 communicates with storage devices 20 via native low level, block protocols. Consequently, the network access by workstations 12 through network server 14 is slow with respect to their access to local storage. In network 10, it can also be a logistical problem to centrally manage and administer local data distributed across an organization, including accomplishing tasks such as backups, virus scanning and redundancy.

FIG. 2 is a block diagram of one embodiment of a storage network, indicated generally at 30, with a storage router that provides global access and routing. This environment is significantly different from that of FIG. 1 in that there is no network server involved. In FIG. 2, a Fibre Channel high speed serial transport 32 interconnects a plurality of workstations 36 and storage devices 38. A SCSI bus storage transport medium interconnects workstations 40 and storage devices 42. A storage router 44 then serves to interconnect these mediums and provide devices on either medium global, transparent access to devices on the other medium. Storage router 44 routes requests from initiator devices on one medium to target devices on the other medium and routes data between the target and the initiator. Storage router 44 can allow initiators and targets to be on either side. In this manner, storage router 44 enhances the functionality of Fibre Channel 32 by providing access, for example, to legacy SCSI storage devices on SCSI bus 34. In the embodiment of FIG. 2, the operation of storage router 44 can be managed by a management station 46 connected to the storage router via a direct serial connection.

In storage network 30, any workstation 36 or workstation 40 can access any storage device 38 or storage device 42 through native low level, block protocols, and vice versa. This functionality is enabled by storage router 44 which

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routes requests and data as a generic transport between Fibre Channel 32 and SCSI bus 34. Storage router 44 uses tables to map devices from one medium to the other and distributes requests and data across Fibre Channel 32 and SCSI bus 34 without any security access controls. Although this extension of the high speed serial interconnect provided by Fibre Channel 32 is beneficial, it is desirable to provide security controls in addition to extended access to storage devices through a native low level, block protocol.

FIG. 3 is a block diagram of one embodiment of a storage network, indicated generally at 50, with a storage router that provides virtual local storage. Similar to that of FIG. 2, storage network 50 includes a Fibre Channel high speed serial interconnect 52 and a SCSI bus 54 bridged by a storage router 56. Storage router 56 of FIG. 3 provides for a large number of workstations 58 to be interconnected on a common storage transport and to access common storage devices 60, 62 and 64 through native low level, block protocols.

According to the present invention, storage router 56 has enhanced functionality to implement security controls and routing such that each workstation 58 can have access to a specific subset of the overall data stored in storage devices 60, 62 and 64. This specific subset of data has the appearance and characteristics of local storage and is referred to herein as virtual local storage. Storage router 56 allows the configuration and modification of the storage allocated to each attached workstation 58 through the use of mapping tables or other mapping techniques.

As shown in FIG. 3, for example, storage device 60 can be configured to provide global data 65 which can be accessed by all workstations 58. Storage device 62 can be configured to provide partitioned subsets 66, 68, 70 and 72, where each partition is allocated to one of the workstations 58 (workstations A, B, C and D). These subsets 66, 68, 70 and 72 can only be accessed by the associated workstation 58 and appear to the associated workstation 58 as local storage accessed using native low level, block protocols. Similarly, storage device 64 can be allocated as storage for the remaining workstation 58 (workstation E).

Storage router 56 combines access control with routing such that each workstation 58 has controlled access to only the specified partition of storage device 62 which forms virtual local storage for the workstation 58. This access control allows security control for the specified data partitions. Storage router 56 allows this allocation of storage devices 60, 62 and 64 to be managed by a management station 76. Management station 76 can connect directly to storage router 56 via a direct connection or, alternately, can interface with storage router 56 through either Fibre Channel 52 or SCSI bus 54. In the latter case, management station 76 can be a workstation or other computing device with special rights such that storage router 56 allows access to mapping tables and shows storage devices 60, 62 and 64 as they exist physically rather than as they have been allocated.

The environment of FIG. 3 extends the concept of a single workstation having locally connected storage devices to a storage network 50 in which workstations 58 are provided virtual local storage in a manner transparent to workstations 58. Storage router 56 provides centralized control of what each workstation 58 sees as its local drive, as well as what data it sees as global data accessible by other workstations 58. Consequently, the storage space considered by the workstation 58 to be its local storage is actually a partition (i.e., logical storage definition) of a physically remote storage device 60, 62 or 64 connected through storage router 56. This means that similar requests from workstations 58 for

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access to their local storage devices produce different accesses to the storage space on storage devices 60, 62 and 64. Further, no access from a workstation 58 is allowed to the virtual local storage of another workstation 58.

The collective storage provided by storage devices 60, 62 and 64 can have blocks allocated by programming means within storage router 56. To accomplish this function, storage router 56 can include routing tables and security controls that define storage allocation for each workstation 58. The advantages provided by implementing virtual local storage in centralized storage devices include the ability to do collective backups and other collective administrative functions more easily. This is accomplished without limiting the performance of workstations 58 because storage access involves native low level, block protocols and does not involve the overhead of high level protocols and file systems required by network servers.

FIG. 4 is a block diagram of one embodiment of storage router 56 of FIG. 3. Storage router 56 can comprise a Fibre Channel controller 80 that interfaces with Fibre Channel 52 and a SCSI controller 82 that interfaces with SCSI bus 54. A buffer 84 provides memory work space and is connected to both Fibre Channel controller 80 and to SCSI controller 82. A supervisor unit 86 is connected to Fibre Channel controller 80, SCSI controller 82 and buffer 84. Supervisor unit 86 comprises a microprocessor for controlling operation of storage router 56 and to handle mapping and security access for requests between Fibre Channel 52 and SCSI bus 54.

FIG. 5 is a block diagram of one embodiment of data flow within storage router 56 of FIG. 4. As shown, data from Fibre Channel 52 is processed by a Fibre Channel (FC) protocol unit 88 and placed in a FIFO queue 90. A direct memory access (DMA) interface 92 then takes data out of FIFO queue 90 and places it in buffer 84. Supervisor unit 86 processes the data in buffer 84 as represented by supervisor processing 93. This processing involves mapping between Fibre Channel 52 and SCSI bus 54 and applying access controls and routing functions. A DMA interface 94 then pulls data from buffer 84 and places it into a buffer 96. A SCSI protocol unit 98 pulls data from buffer 96 and communicates the data on SCSI bus 54. Data flow in the reverse direction, from SCSI bus 54 to Fibre Channel 52, is accomplished in a reverse manner.

The storage router of the present invention is a bridge device that connects a Fibre Channel link directly to a SCSI bus and enables the exchange of SCSI command set information between application clients on SCSI bus devices and the Fibre Channel links. Further, the storage router applies access controls such that virtual local storage can be established in remote SCSI storage devices for workstations on the Fibre Channel link. In one embodiment, the storage router provides a connection for Fibre Channel links running the SCSI Fibre Channel Protocol (FCP) to legacy SCSI devices attached to a SCSI bus. The Fibre Channel topology is typically an Arbitrated Loop (FC_AL).

In part, the storage router enables a migration path to Fibre Channel based, serial SCSI networks by providing connectivity for legacy SCSI bus devices. The storage router can be attached to a Fibre Channel Arbitrated Loop and a SCSI bus to support a number of SCSI devices. Using configuration settings, the storage router can make the SCSI bus devices available on the Fibre Channel network as FCP logical units. Once the configuration is defined, operation of the storage router is transparent to application clients. In this manner, the storage router can form an integral part of the

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migration to new Fibre Channel based networks while providing a means to continue using legacy SCSI devices.

In one implementation (not shown), the storage router can be a rack mount or free standing device with an internal power supply. The storage router can have a Fibre Channel and SCSI port, and a standard, detachable power cord can be used, the FC connector can be a copper DB9 connector, and the SCSI connector can be a 68-pin type. Additional modular jacks can be provided for a serial port and a 802.3 10BaseT port, i.e. twisted pair Ethernet, for management access. The SCSI port of the storage router can support SCSI direct and sequential access target devices and can support SCSI initiators, as well. The Fibre Channel port can interface to SCSI-3 FCP enabled devices and initiators.

To accomplish its functionality, one implementation of the storage router uses: a Fibre Channel interface based on the HEWLETT-PACKARD TACHYON HPFC-5000 controller and a GLM media interface; an Intel 80960RP processor, incorporating independent data and program memory spaces, and associated logic required to implement a stand alone processing system; and a serial port for debug and system configuration. Further, this implementation includes a SCSI interface supporting Fast-20 based on the SYMBIOS 53C8xx series SCSI controllers, and an operating system based upon the WIND RIVERS SYSTEMS VXWORKS or IXWORKS kernel, as determined by design. In addition, the storage router includes software as required to control basic functions of the various elements, and to provide appropriate translations between the FC and SCSI protocols.

The storage router has various modes of operation that are possible between FC and SCSI target and initiator combinations. These modes are: FC Initiator to SCSI Target; SCSI Initiator to FC Target; SCSI Initiator to SCSI Target; and FC Initiator to FC Target. The first two modes can be supported concurrently in a single storage router device are discussed briefly below. The third mode can involve two storage router devices back to back and can serve primarily as a device to extend the physical distance beyond that possible via a direct SCSI connection. The last mode can be used to carry FC protocols encapsulated on other transmission technologies (e.g. ATM, SONET), or to act as a bridge between two FC loops (e.g. as a two port fabric).

The FC Initiator to SCSI Target mode provides for the basic configuration of a server using Fibre Channel to communicate with SCSI targets. This mode requires that a host system have an FC attached device and associated device drivers and software to generate SCSI-3 FCP requests. This system acts as an initiator using the storage router to communicate with SCSI target devices. The SCSI devices supported can include SCSI-2 compliant direct or sequential access (disk or tape) devices. The storage router serves to translate command and status information and transfer data between SCSI-3 FCP and SCSI-2, allowing the use of standard SCSI-2 devices in a Fibre Channel environment.

The SCSI Initiator to FC Target mode provides for the configuration of a server using SCSI-2 to communicate with Fibre Channel targets. This mode requires that a host system has a SCSI-2 interface and driver software to control SCSI-2 target devices. The storage router will connect to the SCSI-2 bus and respond as a target to multiple target IDs. Configuration information is required to identify the target IDs to which the bridge will respond on the SCSI-2 bus. The storage router then translates the SCSI-2 requests to SCSI-3 FCP requests, allowing the use of FC devices with a SCSI host system. This will also allow features such as a tape

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device acting as an initiator on the SCSI bus to provide full support for this type of SCSI device.

In general, user configuration of the storage router will be needed to support various functional modes of operation. Configuration can be modified, for example, through a serial port or through an Ethernet port via SNMP (simple network management protocol) or a Telnet session. Specifically, SNMP manageability can be provided via an 802.3 Ethernet interface. This can provide for configuration changes as well as providing statistics and error information. Configuration can also be performed via TELNET or RS-232 interfaces with menu driven command interfaces. Configuration information can be stored in a segment of flash memory and can be retained across resets and power off cycles. Password protection can also be provided.

In the first two modes of operation, addressing information is needed to map from FC addressing to SCSI addressing and vice versa. This can be 'hard' configuration data, due to the need for address information to be maintained across initialization and partial reconfigurations of the Fibre Channel address space. In an arbitrated loop configuration, user configured addresses will be needed for AL_PAs in order to insure that known addresses are provided between loop reconfigurations.

With respect to addressing, FCP and SCSI 2 systems employ different methods of addressing target devices. Additionally, the inclusion of a storage router means that a method of translating device IDs needs to be implemented. In addition, the storage router can respond to commands without passing the commands through to the opposite interface. This can be implemented to allow all generic FCP and SCSI commands to pass through the storage router to address attached devices, but allow for configuration and diagnostics to be performed directly on the storage router through the FC and SCSI interfaces.

Management commands are those intended to be processed by the storage router controller directly. This may include diagnostic, mode, and log commands as well as other vendor-specific commands. These commands can be received and processed by both the FCP and SCSI interfaces, but are not typically bridged to the opposite interface. These commands may also have side effects on the operation of the storage router, and cause other storage router operations to change or terminate.

A primary method of addressing management commands through the FCP and SCSI interfaces can be through peripheral device type addressing. For example, the storage router can respond to all operations addressed to logical unit (LUN) zero as a controller device. Commands that the storage router will support can include INQUIRY as well as vendor-specific management commands. These are to be generally consistent with SCC standard commands.

The SCSI bus is capable of establishing bus connections between targets. These targets may internally address logical units. Thus, the prioritized addressing scheme used by SCSI subsystems can be represented as follows: BUS:TARGET: LOGICAL UNIT. The BUS identification is intrinsic in the configuration, as a SCSI initiator is attached to only one bus. Target addressing is handled by bus arbitration from information provided to the arbitrating device. Target addresses are assigned to SCSI devices directly, though some means of configuration, such as a hardware jumper, switch setting, or device specific software configuration. As such, the SCSI protocol provides only logical unit addressing within the Identify message. Bus and target information is implied by the established connection.

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Fibre Channel devices within a fabric are addressed by a unique port identifier. This identifier is assigned to a port during certain well-defined states of the FC protocol. Individual ports are allowed to arbitrate for a known, user defined address. If such an address is not provided, or if arbitration for a particular user address fails, the port is assigned a unique address by the FC protocol. This address is generally not guaranteed to be unique between instances. Various scenarios exist where the AL-PA of a device will change, either after power cycle or loop reconfiguration.

The FC protocol also provides a logical unit address field within command structures to provide addressing to devices internal to a port. The FCP_CMD payload specifies an eight byte LUN field. Subsequent identification of the exchange between devices is provided by the FQXID (Fully Qualified Exchange ID).

FC ports can be required to have specific addresses assigned. Although basic functionality is not dependent on this, changes in the loop configuration could result in disk targets changing identifiers with the potential risk of data corruption or loss. This configuration can be straightforward, and can consist of providing the device a loop-unique ID (AL_PA) in the range of "01h" to "EFh." Storage routers could be shipped with a default value with the assumption that most configurations will be using single storage routers and no other devices requesting the present ID. This would provide a minimum amount of initial configuration to the system administrator. Alternately, storage routers could be defaulted to assume any address so that configurations requiring multiple storage routers on a loop would not require that the administrator assign a unique ID to the additional storage routers.

Address translation is needed where commands are issued in the cases FC Initiator to SCSI Target and SCSI Initiator to FC Target. Target responses are qualified by the FQXID and will retain the translation acquired at the beginning of the exchange. This prevents configuration changes occurring during the course of execution of a command from causing data or state information to be inadvertently misdirected. Configuration can be required in cases of SCSI Initiator to FC Target, as discovery may not effectively allow for FCP targets to consistently be found. This is due to an FC arbitrated loop supporting addressing of a larger number of devices than a SCSI bus and the possibility of FC devices changing their AL-PA due to device insertion or other loop initialization.

In the direct method, the translation to BUS:TARGET: LUN of the SCSI address information will be direct. That is, the values represented in the FCP LUN field will directly map to the values in effect on the SCSI bus. This provides a clean translation and does not require SCSI bus discovery. It also allows devices to be dynamically added to the SCSI bus without modifying the address map. It may not allow for complete discovery by FCP initiator devices, as gaps between device addresses may halt the discovery process. Legacy SCSI device drivers typically halt discovery on a target device at the first unoccupied LUN, and proceed to the next target. This would lead to some devices not being discovered. However, this allows for hot plugged devices and other changes to the loop addressing.

In the ordered method, ordered translation requires that the storage router perform discovery on reset, and collapses the addresses on the SCSI bus to sequential FCP LUN values. Thus, the FCP LUN values 0-N can represent N+1 SCSI devices, regardless of SCSI address values, in the order in which they are isolated during the SCSI discovery process. This would allow the FCP initiator discovery pro-

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cess to identify all mapped SCSI devices without further configuration. This has the limitation that hot-plugged devices will not be identified until the next reset cycle. In this case, the address may also be altered as well.

In addition to addressing, according to the present invention, the storage router provides configuration and access controls that cause certain requests from FC Initiators to be directed to assigned virtual local storage partitioned on SCSI storage devices. For example, the same request for LUN 0 (local storage) by two different FC Initiators can be directed to two separate subsets of storage. The storage router can use tables to map, for each initiator, what storage access is available and what partition is being addressed by a particular request. In this manner, the storage space provided by SCSI storage devices can be allocated to FC initiators to provide virtual local storage as well as to create any other desired configuration for secured access.

Although the present invention has been described in detail, it should be understood that various changes, substitutions, and alterations can be made hereto without departing from the spirit and scope of the invention as defined by the appended claims.

What is claimed is:

1. A storage router for providing virtual local storage on remote storage devices to a device, comprising:

a buffer providing memory work space for the storage router;

a first Fibre Channel controller operable to connect to and interface with a first Fibre Channel transport medium;

a second Fibre Channel controller operable to connect to and interface with a second Fibre Channel transport medium; and

a supervisor unit coupled to the first and second Fibre Channel controllers and the buffer, the supervisor unit operable:

to maintain a configuration for remote storage devices connected to the second Fibre Channel transport medium that maps between the device and the remote storage devices and that implements access controls for storage space on the remote storage devices; and

to process data in the buffer to interface between the first Fibre Channel controller and the second Fibre Channel controller to allow access from Fibre Channel initiator devices to the remote storage devices using native low level, block protocol in accordance with the configuration.

2. The storage router of claim 1, wherein the configuration maintained by the supervisor unit includes an allocation of subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device.

3. The storage router of claim 2, wherein the Fibre Channel devices comprise workstations.

4. The storage router of claim 2, wherein the remote storage devices comprise hard disk drives.

5. The storage router of claim 1, wherein each of the first Fibre Channel controller comprises:

a Fibre Channel (FC) protocol unit operable to connect to the Fibre Channel transport medium;

a first-in-first-out queue coupled to the Fibre Channel protocol unit; and

a direct memory access (DMA) interface coupled to the first-in-first-out queue and to the buffer.

6. A storage network, comprising:

a first Fibre Channel transport medium;

a second Fibre Channel transport medium;

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a plurality of workstations connected to the first Fibre Channel transport medium;

a plurality of storage devices connected to the second Fibre Channel transport medium; and

a storage router interfacing between the first Fibre Channel transport medium and the second Fibre Channel transport medium, the storage router providing virtual local storage on the storage devices to the workstations and operable:

to map between the workstations and the storage devices;

to implement access controls for storage space on the storage devices; and

to allow access from the workstations to the storage devices using native low level, block protocol in accordance with the mapping and access controls.

7. The storage network of claim 6, wherein the access controls include an allocation of subsets of storage space to associated workstations, wherein each subset is only accessible by the associated workstation.

8. The storage network of claim 6, wherein the storage devices comprise hard disk drives.

9. The storage network of claim 6, wherein the storage router comprises:

a buffer providing memory work space for the storage router;

a first Fibre Channel controller operable to connect to and interface with the first Fibre Channel transport medium, the first Fibre Channel controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer;

a second Fibre Channel controller operable to connect to and interface with the second Fibre Channel transport medium, the second Fibre Channel controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer; and

a supervisor unit coupled to the first and second Fibre Channel controllers and the buffer, the supervisor unit operable:

to maintain a configuration for the storage devices that maps between workstations and storage devices and that implements the access controls for storage space on the storage devices; and

to process data in the buffer to interface between the first Fibre Channel controller and the second Fibre Channel controller to allow access from workstations to storage devices in accordance with the configuration.

10. A method for providing virtual local storage on remote storage devices to Fibre Channel devices, comprising:

interfacing with a first Fibre Channel transport medium;

interfacing with a second Fibre Channel transport medium;

maintaining a configuration for remote storage devices connected to the second Fibre Channel transport medium that maps between Fibre Channel devices and the remote storage devices and that implements access controls for storage space on the remote storage devices; and

allowing access from Fibre Channel initiator devices to the remote storage devices using native low level, block protocol in accordance with the configuration.

11. The method of claim 10, wherein maintaining the configuration includes allocating subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device.

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12. The method of claim 11, wherein the Fibre Channel devices comprise workstations.

13. The method of claim 11, wherein the remote storage devices comprise hard disk drives.

14. An apparatus for providing virtual local storage on a remote storage device to a device operating according to a Fibre Channel protocol, comprising:

a first controller operable to connect to and interface with a first transport medium, wherein the first transport medium is operable according to the Fibre Channel protocol;

a second controller operable to connect to and interface with a second transport medium, wherein the second transport medium is operable according to the Fibre Channel protocol; and

a supervisor unit coupled to the first controller and the second controller, the supervisor unit operable to control access from the device connected to the first transport medium to the remote storage device connected to the second transport medium using native low level, block protocols according to a map between the device and the remote storage device.

15. The apparatus of claim 14, wherein the supervisor unit is further operable to maintain a configuration wherein the configuration includes the map between the device and the remote storage device, and further wherein the map includes virtual LUNs that provide a representation of the storage device.

16. The apparatus of claim 15, wherein the map only exposes the device to LUNs that the device may access.

17. The apparatus of claim 14, wherein the supervisor unit is further operable to maintain a configuration including the map, wherein the map provides a mapping from a host device ID to a virtual LUN representation of the remote storage device to a physical LUN of the remote storage device.

18. The apparatus of claim 14, wherein the remote storage device further comprises storage space partitioned into virtual local storage for the device connected to the first transport medium.

19. The apparatus of claim 18, wherein the supervisor unit is further operable to prevent the device from accessing any storage on the remote storage device that is not part of a virtual local storage partition assigned to the device.

20. The apparatus of claim 14, wherein the first controller and the second controller further comprise a single controller.

21. A system for providing virtual local storage on remote storage devices, comprising:

a first controller operable to connect to and interface with a first transport medium operable according to a Fibre Channel protocol;

a second controller operable to connect to and interface with a second transport medium operable according to the Fibre Channel protocol;

at least one device connected to the first transport medium;

at least one storage device connected to the second transport medium; and

an access control device coupled to the first controller and the second controller, the access control device operable to:

map between the at least one device and a storage space on the at least one storage device; and

control access from the at least one device to the at least one storage device using native low level, block protocol in accordance with the map.

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22. The system of claim 21, wherein the access control device is further operable to maintain a configuration wherein the configuration includes the map between the at least one device and the at least one storage device, and further wherein the map includes virtual LUNs that provide a representation of the at least one storage device.

23. The system of claim 22, wherein the map only exposes the at least one device to LUNs that the at least one device may access.

24. The system of claim 21, wherein the access control device is further operable to maintain a configuration including the map, wherein the map provides a mapping from a host device ID to a virtual LUN representation of the at least one storage device to a physical LUN of the at least one storage device.

25. The system of claim 21, wherein the at least one storage device further comprises storage space partitioned into virtual local storage for the at least one device.

26. The system of claim 25, wherein the access control unit is further operable to prevent at least one device from accessing any storage on the at least one storage device that is not part of a virtual local storage partition assigned to the at least one device.

27. The system of claim 21, wherein the first controller and the second controller further comprise a single controller.

28. A method for providing virtual local storage on remote storage devices, comprising:

mapping between a device connected to a first transport medium and a storage device connected to a second transport medium, wherein the first transport medium and the second transport medium operate according to a Fibre Channel protocol;

implementing access controls for storage space on the storage device; and

allowing access from the device connected to the first transport medium to the storage device using native low level, block protocols.

29. The method of claim 28, further comprising maintaining a configuration wherein the configuration includes a map between the device and the one storage device, and further wherein the map includes virtual LUNs that provide a representation of the storage device.

30. The method of claim 29, wherein the map only exposes the device to LUNs that the device may access.

31. The method of claim 28, further comprising maintaining a configuration including a map from a host device ID to a virtual LUN representation of the storage device to a physical LUN of the storage device.

32. The method of claim 28, further comprising partitioning storage space on the storage device into virtual local storage for the device.

33. The method of claim 32, further comprising preventing the device from accessing any storage on the storage device that is not part of a virtual local storage partition assigned to the device.

34. A system for providing virtual local storage, comprising:

a host device;

a storage device remote from the host device, wherein the storage device has a storage space;

a first controller;

a second controller

a first transport medium operable according to a Fibre Channel protocol, wherein the first transport medium connects the host device to the first controller;

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a second transport medium operable according to the Fibre Channel protocol, wherein the second transport medium connects the second controller to the storage device;

a supervisor unit coupled to the first controller and the second controller, the supervisor unit operable to:

- maintain a configuration that maps between the host device and at least a portion of the storage space on the storage device; and
- implement access controls according to the configuration for the storage space on the storage device using native low level, block protocol.

35. The system of claim 34, wherein the supervisor unit is further operable to:

- maintain a configuration that maps from the host device to a virtual representation of at least a portion of the storage space on the storage device to the storage device; and

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allow the host device to access only that portion of the storage space that is contained in the map.

36. The system of claim 35, wherein the configuration comprises a map from a host device ID to a virtual LUN representation of the storage device to a physical LUN of the storage device.

37. The system of claim 34, wherein the storage device further comprises storage space partitioned into virtual local storage for the host device.

38. The system of claim 37, wherein the supervisor unit is further operable to prevent the host device from accessing any storage on the storage device that is not part of a virtual local storage partition assigned to the host device.

39. The apparatus of claim 34, wherein the first controller and the second controller further comprise a single controller.

* * * * *

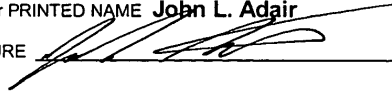
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PTO/SB/05 (2/98)

UTILITY PATENT APPLICATION TRANSMITTAL <small>(Only for nonprovisional applications under 37 CFR § 1.53(b))</small>		Attorney Docket No. CROSS1120-13	
		First Inventor or Application Identifier Geoffrey B. Hoese	
		Title Storage Router and Method for Providing Virtual Local Storage	
		Express Mail Label No. EV351125056US	
APPLICATION ELEMENTS See MPEP chapter 600 concerning utility patent application contents.		ADDRESS TO: Box Patent Application Assistant Commissioner for Patents Washington, D.C. 20231	
1. <input checked="" type="checkbox"/> Fee Transmittal for FY 2003 <small>(Submit an original and a duplicate for fee processing)</small>		6. <input type="checkbox"/> Microfiche Computer Program (Appendix)	
2. <input checked="" type="checkbox"/> Specification [Total Pages] 28 <small>(preferred arrangement set forth below)</small> <input checked="" type="checkbox"/> Descriptive Title of the Invention <input type="checkbox"/> Cross References to Related Applications <input type="checkbox"/> Statement Regarding Fed Sponsored R & D <input checked="" type="checkbox"/> Description of Related Art <input checked="" type="checkbox"/> Field of the Invention <input checked="" type="checkbox"/> Summary of the Invention <input checked="" type="checkbox"/> Brief Description of the Drawings (if filed) <input checked="" type="checkbox"/> Claim(s) <input checked="" type="checkbox"/> Abstract of the Disclosure		7. Nucleotide and Amino Acid Sequence Submission <small>(if applicable, all necessary)</small> a. <input type="checkbox"/> Computer-Readable Copy b. <input type="checkbox"/> Paper Copy (identical to computer copy) c. <input type="checkbox"/> Statement verifying identity of above copies	
3. <input checked="" type="checkbox"/> Drawing(s) (35 USC 113) [Total Sheets] 2		ACCOMPANYING APPLICATION PARTS 8. <input checked="" type="checkbox"/> Assignment Papers (cover sheet & document(s)) 9. <input type="checkbox"/> 37 CFR 3.73(b) Statement <input checked="" type="checkbox"/> Power of Attorney <small>(when there is an assignee)</small> 10. <input type="checkbox"/> English Translation Document (if applicable) 11. <input type="checkbox"/> Information Disclosure Statement (IDS)/PTO-1449 <input type="checkbox"/> Copies of IDS Citations 12. <input checked="" type="checkbox"/> Preliminary Amendment 13. <input checked="" type="checkbox"/> Return Receipt Postcard 14. <input checked="" type="checkbox"/> Small Entity <input type="checkbox"/> Statement filed in prior application. Status still proper and desired 15. <input type="checkbox"/> Certified Copy of Priority Document(s) <small>(if foreign priority is claimed)</small> 16. <input checked="" type="checkbox"/> Other: Certificate of Mailing; Revocation and Power of Attorney; Acceptance of Revocation and POA	
4. <input checked="" type="checkbox"/> Oath or Declaration (executed) [Total Pages] 4 a. <input type="checkbox"/> Newly executed (original or copy) b. <input checked="" type="checkbox"/> Copy from a prior application (37 CFR 1.63(d)) <small>(for continuation/divisional with Box 17 completed)</small> i. <input type="checkbox"/> DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b)			
5. <input checked="" type="checkbox"/> Incorporation By Reference (useable if box 4b is checked). The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered to be part of the disclosure of the accompanying application and is hereby incorporated by reference therein.			
17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information below and in a preliminary amendment <input checked="" type="checkbox"/> Continuation <input type="checkbox"/> Divisional <input type="checkbox"/> Continuation-In-Part (CIP) of prior Application No.: 10/081,110 Prior application information: Examiner Christopher B. Shin Group / Art Unit 2182			
<input type="checkbox"/> Claims the benefit of Provisional Application No. _____			
CORRESPONDENCE ADDRESS:			
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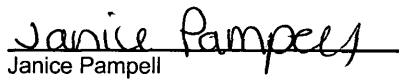
REGISTRATION NO. **48,828**
 DATE: **September 9, 2003**

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 103671-990000

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
CERTIFICATE OF MAILING BY "EXPRESS MAIL"	Atty Docket No. CROSS1120-13
Mail Stop: Patent Application Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313 Sir:	In the Application of: Geoffrey B. Hoese, et al.
	Date Filed: September 9, 2003
	Title: Storage Router and Method for Providing Virtual Local Storage

I hereby certify that the Preliminary Amendment, Utility Patent Application Transmittal Form, Fee Transmittal, Utility Patent Application from Parent Case, Declaration and Power of Attorney from Parent Case, Revocation and Power of Attorney from Parent Case, Acceptance of Revocation and Power of Attorney from Parent, Assignment and Recordation Cover Sheet from Parent, two (2) pages of Formal Drawings from Parent, filing fee and Postcard are being deposited with the United States Postal Service "EXPRESS MAIL Post Office to Addressee" service under 37 C.F.R. § 1.10, Mailing Label Certificate No. EV351125056US, on **September 9, 2003**, addressed to: Mail Stop: Patent Application, Commissioner for Patents, Alexandria, VA 22313.

Respectfully submitted,
Gray Cary Ware & Freidenrich LLP


 Janice Pampell

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FEE TRANSMITTAL for FY 2003		Complete if Known	
<small>Effective 01/01/2003. Patent fees are subject to annual revision.</small>		Application Number	Unknown
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27		Filing Date	September 9, 2003
		First Named Inventor	Geoffrey B. Hoese
TOTAL AMOUNT OF PAYMENT (\$) 714.00		Examiner Name	Unknown
		Art Unit	Unknown
		Attorney Docket No.	CROSS1120-13

METHOD OF PAYMENT (check all that apply)		FEE CALCULATION (continued)																																																																																																																																																																																					
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Deposit Account Number: 50-0456 Deposit Account Name: Gray Cary Ware & Freidenrich LLP		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Large Entity</th> <th colspan="2">Small Entity</th> <th rowspan="2">Fee Description</th> <th rowspan="2">Fee Paid</th> </tr> <tr> <th>Fee Code</th> <th>Fee (\$)</th> <th>Fee Code</th> <th>Fee (\$)</th> </tr> </thead> <tbody> <tr><td>1051</td><td>130</td><td>2051</td><td>65</td><td>Surcharge - late filing fee or oath</td><td></td></tr> <tr><td>1052</td><td>50</td><td>2052</td><td>25</td><td>Surcharge - late provisional filing fee or cover sheet</td><td></td></tr> <tr><td>1053</td><td>130</td><td>1053</td><td>130</td><td>Non-English specification</td><td></td></tr> <tr><td>1812</td><td>2,520</td><td>1812</td><td>2,520</td><td>For filing a request for <i>ex parte</i> reexamination</td><td></td></tr> <tr><td>1804</td><td>920*</td><td>1804</td><td>920*</td><td>Requesting publication of SIR prior to Examiner action</td><td></td></tr> <tr><td>1805</td><td>1,840*</td><td>1805</td><td>1,840*</td><td>Requesting publication of SIR after Examiner action</td><td></td></tr> <tr><td>1251</td><td>110</td><td>2251</td><td>55</td><td>Extension for reply within first month</td><td></td></tr> <tr><td>1252</td><td>410</td><td>2252</td><td>205</td><td>Extension for reply within second month</td><td></td></tr> <tr><td>1253</td><td>930</td><td>2253</td><td>465</td><td>Extension for reply within third month</td><td></td></tr> <tr><td>1254</td><td>1,450</td><td>2254</td><td>725</td><td>Extension for reply within fourth month</td><td></td></tr> <tr><td>1255</td><td>1,970</td><td>2255</td><td>985</td><td>Extension for reply within fifth month</td><td></td></tr> <tr><td>1401</td><td>320</td><td>2401</td><td>160</td><td>Notice of Appeal</td><td></td></tr> <tr><td>1402</td><td>320</td><td>2402</td><td>160</td><td>Filing a brief in support of an appeal</td><td></td></tr> <tr><td>1403</td><td>280</td><td>2403</td><td>140</td><td>Request for oral hearing</td><td></td></tr> <tr><td>1451</td><td>1,510</td><td>1451</td><td>1,510</td><td>Petition to institute a public use proceeding</td><td></td></tr> <tr><td>1452</td><td>110</td><td>2452</td><td>55</td><td>Petition to revive - unavoidable</td><td></td></tr> <tr><td>1453</td><td>1,300</td><td>2453</td><td>650</td><td>Petition to revive - unintentional</td><td></td></tr> <tr><td>1501</td><td>1,300</td><td>2501</td><td>650</td><td>Utility issue fee (or reissue)</td><td></td></tr> <tr><td>1502</td><td>470</td><td>2502</td><td>235</td><td>Design issue fee</td><td></td></tr> <tr><td>1503</td><td>630</td><td>2503</td><td>315</td><td>Plant issue fee</td><td></td></tr> <tr><td>1460</td><td>130</td><td>1460</td><td>130</td><td>Petitions to the Commissioner</td><td></td></tr> <tr><td>1807</td><td>50</td><td>1807</td><td>50</td><td>Processing fee under 37 CFR 1.17(q)</td><td></td></tr> <tr><td>1806</td><td>180</td><td>1806</td><td>180</td><td>Submission of Information Disclosure Stmt</td><td></td></tr> <tr><td>8021</td><td>40</td><td>8021</td><td>40</td><td>Recording each patent assignment per property (times number of properties)</td><td></td></tr> <tr><td>1809</td><td>750</td><td>2809</td><td>375</td><td>Filing a submission after final rejection (37 CFR § 1.129(a))</td><td></td></tr> <tr><td>1810</td><td>750</td><td>2810</td><td>375</td><td>For each additional invention to be examined (37 CFR § 1.129(b))</td><td></td></tr> <tr><td>1801</td><td>750</td><td>2801</td><td>375</td><td>Request for Continued Examination (RCE)</td><td></td></tr> <tr><td>1802</td><td>900</td><td>1802</td><td>900</td><td>Request for expedited examination of a design application</td><td></td></tr> </tbody> </table>				Large Entity		Small Entity		Fee Description	Fee Paid	Fee Code	Fee (\$)	Fee Code	Fee (\$)	1051	130	2051	65	Surcharge - late filing fee or oath		1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet		1053	130	1053	130	Non-English specification		1812	2,520	1812	2,520	For filing a request for <i>ex parte</i> reexamination		1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action		1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action		1251	110	2251	55	Extension for reply within first month		1252	410	2252	205	Extension for reply within second month		1253	930	2253	465	Extension for reply within third month		1254	1,450	2254	725	Extension for reply within fourth month		1255	1,970	2255	985	Extension for reply within fifth month		1401	320	2401	160	Notice of Appeal		1402	320	2402	160	Filing a brief in support of an appeal		1403	280	2403	140	Request for oral hearing		1451	1,510	1451	1,510	Petition to institute a public use proceeding		1452	110	2452	55	Petition to revive - unavoidable		1453	1,300	2453	650	Petition to revive - unintentional		1501	1,300	2501	650	Utility issue fee (or reissue)		1502	470	2502	235	Design issue fee		1503	630	2503	315	Plant issue fee		1460	130	1460	130	Petitions to the Commissioner		1807	50	1807	50	Processing fee under 37 CFR 1.17(q)		1806	180	1806	180	Submission of Information Disclosure Stmt		8021	40	8021	40	Recording each patent assignment per property (times number of properties)		1809	750	2809	375	Filing a submission after final rejection (37 CFR § 1.129(a))		1810	750	2810	375	For each additional invention to be examined (37 CFR § 1.129(b))		1801	750	2801	375	Request for Continued Examination (RCE)		1802	900	1802	900	Request for expedited examination of a design application	
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SUBMITTED BY		Complete (if applicable)			
Name (Print/Type)	John L. Adair	Registration No. (Attorney/Agent)	48,828	Telephone	512-457-7142
Signature		Date	September 9, 2003		

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This collection of information is required by 37 CFR 1.17 and 1.27. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Washington, DC 20231.

Gray CaryAU4113227.1

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Copy from Prior Application

STORAGE ROUTER AND METHOD FOR
PROVIDING VIRTUAL LOCAL STORAGE

TECHNICAL FIELD OF THE INVENTION

This invention relates in general to network storage devices, and more particularly to a storage router and method for providing virtual local storage on remote SCSI storage devices to Fibre Channel devices.

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BACKGROUND OF THE INVENTION

Typical storage transport mediums provide for a relatively small number of devices to be attached over relatively short distances. One such transport medium is a Small Computer System Interface (SCSI) protocol, the structure and operation of which is generally well known as is described, for example, in the SCSI-1, SCSI-2 and SCSI-3 specifications. High speed serial interconnects provide enhanced capability to attach a large number of high speed devices to a common storage transport medium over large distances. One such serial interconnect is Fibre Channel, the structure and operation of which is described, for example, in *Fibre Channel Physical and Signaling Interface (FC-PH)*, ANSI X3.230 *Fibre Channel Arbitrated Loop (FC-AL)*, and ANSI X3.272 *Fibre Channel Private Loop Direct Attach (FC-PLDA)*.

Conventional computing devices, such as computer workstations, generally access storage locally or through network interconnects. Local storage typically consists of a disk drive, tape drive, CD-ROM drive or other storage device contained within, or locally connected to the workstation. The workstation provides a file system structure, that includes security controls, with access to the local storage device through native low level, block protocols. These protocols map directly to the mechanisms used by the storage device and consist of data requests without security controls. Network interconnects typically provide access for a large number of computing

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devices to data storage on a remote network server. The
remote network server provides file system structure,
access control, and other miscellaneous capabilities that
include the network interface. Access to data through
5 the network server is through network protocols that the
server must translate into low level requests to the
storage device. A workstation with access to the server
storage must translate its file system protocols into
network protocols that are used to communicate with the
10 server. Consequently, from the perspective of a
workstation, or other computing device, seeking to access
such server data, the access is much slower than access
to data on a local storage device.

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SUMMARY OF THE INVENTION

In accordance with the present invention, a storage router and method for providing virtual local storage on remote SCSI storage devices to Fibre Channel devices are disclosed that provide advantages over conventional network storage devices and methods.

According to one aspect of the present invention, a storage router and storage network provide virtual local storage on remote SCSI storage devices to Fibre Channel devices. A plurality of Fibre Channel devices, such as workstations, are connected to a Fibre Channel transport medium, and a plurality of SCSI storage devices are connected to a SCSI bus transport medium. The storage router interfaces between the Fibre Channel transport medium and the SCSI bus transport medium. The storage router maps between the workstations and the SCSI storage devices and implements access controls for storage space on the SCSI storage devices. The storage router then allows access from the workstations to the SCSI storage devices using native low level, block protocol in accordance with the mapping and the access controls.

According to another aspect of the present invention, virtual local storage on remote SCSI storage devices is provided to Fibre Channel devices. A Fibre Channel transport medium and a SCSI bus transport medium are interfaced with. A configuration is maintained for SCSI storage devices connected to the SCSI bus transport medium. The configuration maps between Fibre Channel

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devices and the SCSI storage devices and implements
access controls for storage space on the SCSI storage
devices. Access is then allowed from Fibre Channel
initiator devices to SCSI storage devices using native
5 low level, block protocol in accordance with the
configuration.

A technical advantage of the present invention is
the ability to centralize local storage for networked
workstations without any cost of speed or overhead. Each
10 workstation access its virtual local storage as if it
work locally connected. Further, the centralized storage
devices can be located in a significantly remote position
even in excess of ten kilometers as defined by Fibre
Channel standards.

15 Another technical advantage of the present invention
is the ability to centrally control and administer
storage space for connected users without limiting the
speed with which the users can access local data. In
addition, global access to data, backups, virus scanning
20 and redundancy can be more easily accomplished by
centrally located storage devices.

A further technical advantage of the present
invention is providing support for SCSI storage devices
as local storage for Fibre Channel hosts. In addition,
25 the present invention helps to provide extended
capabilities for Fibre Channel and for management of
storage subsystems.

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BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the present invention and the advantages thereof may be acquired by referring to the following description taken in
5 conjunction with the accompanying drawings, in which like reference numbers indicate like features, and wherein:

FIGURE 1 is a block diagram of a conventional network that provides storage through a network server;

10 FIGURE 2 is a block diagram of one embodiment of a storage network with a storage router that provides global access and routing;

FIGURE 3 is a block diagram of one embodiment of a storage network with a storage router that provides virtual local storage;

15 FIGURE 4 is a block diagram of one embodiment of the storage router of FIGURE 3; and

FIGURE 5 is a block diagram of one embodiment of data flow within the storage router of FIGURE 4.

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DETAILED DESCRIPTION OF THE INVENTION

FIGURE 1 is a block diagram of a conventional network, indicated generally at 10, that provides access to storage through a network server. As shown, network 5 10 includes a plurality of workstations 12 interconnected with a network server 14 via a network transport medium 16. Each workstation 12 can generally comprise a processor, memory, input/output devices, storage devices and a network adapter as well as other common computer 10 components. Network server 14 uses a SCSI bus 18 as a storage transport medium to interconnect with a plurality of storage devices 20 (tape drives, disk drives, etc.). In the embodiment of FIGURE 1, network transport medium 16 is an network connection and storage devices 20 15 comprise hard disk drives, although there are numerous alternate transport mediums and storage devices.

In network 10, each workstation 12 has access to its local storage device as well as network access to data on storage devices 20. The access to a local storage device 20 is typically through native low level, block protocols. On the other hand, access by a workstation 12 to storage devices 20 requires the participation of network server 14 which implements a file system and transfers data to workstations 12 only through high level file system 25 protocols. Only network server 14 communicates with storage devices 20 via native low level, block protocols. Consequently, the network access by workstations 12 through network server 14 is slow with respect to their

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access to local storage. In network 10, it can Also be a
logistical problem to centrally manage and administer
local data distributed across an organization, including
accomplishing tasks such as backups, virus scanning and
5 redundancy.

FIGURE 2 is a block diagram of one embodiment of a
storage network, indicated generally at 30, with a
storage router that provides global access and routing.
This environment is significantly different from that of
10 FIGURE 1 in that there is no network server involved. In
FIGURE 2, a Fibre Channel high speed serial transport 32
interconnects a plurality of workstations 36 and storage
devices 38. A SCSI bus storage transport medium
interconnects workstations 40 and storage devices 42. A
15 storage router 44 then serves to interconnect these
mediums and provide devices on either medium global,
transparent access to devices on the other medium.
Storage router 44 routes requests from initiator devices
on one medium to target devices on the other medium and
20 routes data between the target and the initiator.
Storage router 44 can allow initiators and targets to be
on either side. In this manner, storage router 44
enhances the functionality of Fibre Channel 32 by
providing access, for example, to legacy SCSI storage
25 devices on SCSI bus 34. In the embodiment of FIGURE 2,
the operation of storage router 44 can be managed by a
management station 46 connected to the storage router via
a direct serial connection.

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In storage network 30, any workstation 36 or workstation 40 can access any storage device 38 or storage device 42 through native low level, block protocols, and vice versa. This functionality is enabled
5 by storage router 44 which routes requests and data as a generic transport between Fibre Channel 32 and SCSI bus 34. Storage router 44 uses tables to map devices from one medium to the other and distributes requests and data across Fibre Channel 32 and SCSI bus 34 without any
10 security access controls. Although this extension of the high speed serial interconnect provided by Fibre Channel 32 is beneficial, it is desirable to provide security controls in addition to extended access to storage devices through a native low level, block protocol.

15 FIGURE 3 is a block diagram of one embodiment of a storage network, indicated generally at 50, with a storage router that provides virtual local storage. Similar to that of FIGURE 2, storage network 50 includes a Fibre Channel high speed serial interconnect 52 and a
20 SCSI bus 54 bridged by a storage router 56. Storage router 56 of FIGURE 3 provides for a large number of workstations 58 to be interconnected on a common storage transport and to access common storage devices 60, 62 and 64 through native low level, block protocols.

25 According to the present invention, storage router 56 has enhanced functionality to implement security controls and routing such that each workstation 58 can have access to a specific subset of the overall data

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5 stored in storage devices 60, 62 and 64. This specific subset of data has the appearance and characteristics of local storage and is referred to herein as virtual local storage. Storage router 56 allows the configuration and modification of the storage allocated to each attached workstation 58 through the use of mapping tables or other mapping techniques.

10 As shown in FIGURE 3, for example, storage device 60 can be configured to provide global data 65 which can be accessed by all workstations 58. Storage device 62 can be configured to provide partitioned subsets 66, 68, 70 and 72, where each partition is allocated to one of the workstations 58 (workstations A, B, C and D). These subsets 66, 68, 70 and 72 can only be accessed by the associated workstation 58 and appear to the associated workstation 58 as local storage accessed using native low level, block protocols. Similarly, storage device 64 can be allocated as storage for the remaining workstation 58 (workstation E).

20 Storage router 56 combines access control with routing such that each workstation 58 has controlled access to only the specified partition of storage device 62 which forms virtual local storage for the workstation 58. This access control allows security control for the specified data partitions. Storage router 56 allows this allocation of storage devices 60, 62 and 64 to be managed by a management station 76. Management station 76 can connect directly to storage router 56 via a direct

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connection or, alternately, can interface with storage
router 56 through either Fibre Channel 52 or SCSI bus 54.
In the latter case, management station 76 can be a
workstation or other computing device with special rights
5 such that storage router 56 allows access to mapping
tables and shows storage devices 60, 62 and 64 as they
exist physically rather than as they have been allocated.

The environment of FIGURE 3 extends the concept of a
single workstation having locally connected storage
10 devices to a storage network 50 in which workstations 58
are provided virtual local storage in a manner
transparent to workstations 58. Storage router 56
provides centralized control of what each workstation 58
sees as its local drive, as well as what data it sees as
15 global data accessible by other workstations 58.
Consequently, the storage space considered by the
workstation 58 to be its local storage is actually a
partition (i.e., logical storage definition) of a
physically remote storage device 60, 62 or 64 connected
20 through storage router 56. This means that similar
requests from workstations 58 for access to their local
storage devices produce different accesses to the storage
space on storage devices 60, 62 and 64. Further, no
access from a workstation 58 is allowed to the virtual
25 local storage of another workstation 58.

The collective storage provided by storage devices
60, 62 and 64 can have blocks allocated by programming
means within storage router 56. To accomplish this

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function, storage router 56 can include routing tables and security controls that define storage allocation for each workstation 58. The advantages provided by implementing virtual local storage in centralized storage devices include the ability to do collective backups and other collective administrative functions more easily. This is accomplished without limiting the performance of workstations 58 because storage access involves native low level, block protocols and does not involve the overhead of high level protocols and file systems required by network servers.

FIGURE 4 is a block diagram of one embodiment of storage router 56 of FIGURE 3. Storage router 56 can comprise a Fibre Channel controller 80 that interfaces with Fibre Channel 52 and a SCSI controller 82 that interfaces with SCSI bus 54. A buffer 84 provides memory work space and is connected to both Fibre Channel controller 80 and to SCSI controller 82. A supervisor unit 86 is connected to Fibre Channel controller 80, SCSI controller 82 and buffer 84. Supervisor unit 86 comprises a microprocessor for controlling operation of storage router 56 and to handle mapping and security access for requests between Fibre Channel 52 and SCSI bus 54.

FIGURE 5 is a block diagram of one embodiment of data flow within storage router 56 of FIGURE 4. As shown, data from Fibre Channel 52 is processed by a Fibre Channel (FC) protocol unit 88 and placed in a FIFO queue

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90. A direct memory access (DMA) interface 92 then takes data out of FIFO queue 90 and places it in buffer 84. Supervisor unit 86 processes the data in buffer 84 as represented by supervisor processing 93. This processing
5 involves mapping between Fibre Channel 52 and SCSI bus 54 and applying access controls and routing functions. A DMA interface 94 then pulls data from buffer 84 and places it into a buffer 96. A SCSI protocol unit 98
10 pulls data from buffer 96 and communicates the data on SCSI bus 54. Data flow in the reverse direction, from SCSI bus 54 to Fibre Channel 52, is accomplished in a reverse manner.

The storage router of the present invention is a bridge device that connects a Fibre Channel link directly
15 to a SCSI bus and enables the exchange of SCSI command set information between application clients on SCSI bus devices and the Fibre Channel links. Further, the storage router applies access controls such that virtual local storage can be established in remote SCSI storage
20 devices for workstations on the Fibre Channel link. In one embodiment, the storage router provides a connection for Fibre Channel links running the SCSI Fibre Channel Protocol (FCP) to legacy SCSI devices attached to a SCSI bus. The Fibre Channel topology is typically an
25 Arbitrated Loop (FC_AL).

In part, the storage router enables a migration path to Fibre Channel based, serial SCSI networks by providing connectivity for legacy SCSI bus devices. The storage

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router can be attached to a Fibre Channel Arbitrated Loop and a SCSI bus to support a number of SCSI devices. Using configuration settings, the storage router can make the SCSI bus devices available on the Fibre Channel
5 network as FCP logical units. Once the configuration is defined, operation of the storage router is transparent to application clients. In this manner, the storage router can form an integral part of the migration to new Fibre Channel based networks while providing a means to
10 continue using legacy SCSI devices.

In one implementation (not shown), the storage router can be a rack mount or free standing device with an internal power supply. The storage router can have a Fibre Channel and SCSI port, and a standard, detachable
15 power cord can be used, the FC connector can be a copper DB9 connector, and the SCSI connector can be a 68-pin type. Additional modular jacks can be provided for a serial port and a 802.3 10BaseT port, i.e. twisted pair Ethernet, for management access. The SCSI port of the
20 storage router can support SCSI direct and sequential access target devices and can support SCSI initiators, as well. The Fibre Channel port can interface to SCSI-3 FCP enabled devices and initiators.

To accomplish its functionality, one implementation
25 of the storage router uses: a Fibre Channel interface based on the HEWLETT-PACKARD TACHYON HPFC-5000 controller and a GLM media interface; an Intel 80960RP processor, incorporating independent data and program memory spaces,

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and associated logic required to implement a stand alone processing system; and a serial port for debug and system configuration. Further, this implementation includes a SCSI interface supporting Fast-20 based on the SYMBIOS
5 53C8xx series SCSI controllers, and an operating system based upon the WIND RIVERS SYSTEMS VXWORKS or IXWORKS kernel, as determined by design. In addition, the storage router includes software as required to control basic functions of the various elements, and to provide
10 appropriate translations between the FC and SCSI protocols.

The storage router has various modes of operation that are possible between FC and SCSI target and initiator combinations. These modes are: FC Initiator to
15 SCSI Target; SCSI Initiator to FC Target; SCSI Initiator to SCSI Target; and FC Initiator to FC Target. The first two modes can be supported concurrently in a single storage router device are discussed briefly below. The third mode can involve two storage router devices
20 back to back and can serve primarily as a device to extend the physical distance beyond that possible via a direct SCSI connection. The last mode can be used to carry FC protocols encapsulated on other transmission technologies (e.g. ATM, SONET), or to act as a bridge
25 between two FC loops (e.g. as a two port fabric).

The FC Initiator to SCSI Target mode provides for the basic configuration of a server using Fibre Channel to communicate with SCSI targets. This mode requires

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that a host system have an FC attached device and associated device drivers and software to generate SCSI-3 FCP requests. This system acts as an initiator using the storage router to communicate with SCSI target devices.
5 The SCSI devices supported can include SCSI-2 compliant direct or sequential access (disk or tape) devices. The storage router serves to translate command and status information and transfer data between SCSI-3 FCP and SCSI-2, allowing the use of standard SCSI-2 devices in a
10 Fibre Channel environment.

The SCSI Initiator to FC Target mode provides for the configuration of a server using SCSI-2 to communicate with Fibre Channel targets. This mode requires that a host system has a SCSI-2 interface and driver software to
15 control SCSI-2 target devices. The storage router will connect to the SCSI-2 bus and respond as a target to multiple target IDs. Configuration information is required to identify the target IDs to which the bridge will respond on the SCSI-2 bus. The storage router then
20 translates the SCSI-2 requests to SCSI-3 FCP requests, allowing the use of FC devices with a SCSI host system. This will also allow features such as a tape device acting as an initiator on the SCSI bus to provide full support for this type of SCSI device.

25 In general, user configuration of the storage router will be needed to support various functional modes of operation. Configuration can be modified, for example, through a serial port or through an Ethernet port via

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SNMP (simple network management protocol) or a Telnet session. Specifically, SNMP manageability can be provided via an 802.3 Ethernet interface. This can provide for configuration changes as well as providing
5 statistics and error information. Configuration can also be performed via TELNET or RS-232 interfaces with menu driven command interfaces. Configuration information can be stored in a segment of flash memory and can be retained across resets and power off cycles. Password
10 protection can also be provided.

In the first two modes of operation, addressing information is needed to map from FC addressing to SCSI addressing and vice versa. This can be 'hard' configuration data, due to the need for address
15 information to be maintained across initialization and partial reconfigurations of the Fibre Channel address space. In an arbitrated loop configuration, user configured addresses will be needed for AL_PAs in order to insure that known addresses are provided between loop
20 reconfigurations.

With respect to addressing, FCP and SCSI 2 systems employ different methods of addressing target devices. Additionally, the inclusion of a storage router means that a method of translating device IDs needs to be
25 implemented. In addition, the storage router can respond to commands without passing the commands through to the opposite interface. This can be implemented to allow all generic FCP and SCSI commands to pass through the storage

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router to address attached devices, but allow for configuration and diagnostics to be performed directly on the storage router through the FC and SCSI interfaces.

Management commands are those intended to be processed by the storage router controller directly. This may include diagnostic, mode, and log commands as well as other vendor-specific commands. These commands can be received and processed by both the FCP and SCSI interfaces, but are not typically bridged to the opposite interface. These commands may also have side effects on the operation of the storage router, and cause other storage router operations to change or terminate.

A primary method of addressing management commands though the FCP and SCSI interfaces can be through peripheral device type addressing. For example, the storage router can respond to all operations addressed to logical unit (LUN) zero as a controller device. Commands that the storage router will support can include INQUIRY as well as vendor-specific management commands. These are to be generally consistent with SCC standard commands.

The SCSI bus is capable of establishing bus connections between targets. These targets may internally address logical units. Thus, the prioritized addressing scheme used by SCSI subsystems can be represented as follows: BUS:TARGET:LOGICAL UNIT. The BUS identification is intrinsic in the configuration, as a SCSI initiator is attached to only one bus. Target

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addressing is handled by bus arbitration from information provided to the arbitrating device. Target addresses are assigned to SCSI devices directly, though some means of configuration, such as a hardware jumper, switch setting, or device specific software configuration. As such, the SCSI protocol provides only logical unit addressing within the Identify message. Bus and target information is implied by the established connection.

Fibre Channel devices within a fabric are addressed by a unique port identifier. This identifier is assigned to a port during certain well-defined states of the FC protocol. Individual ports are allowed to arbitrate for a known, user defined address. If such an address is not provided, or if arbitration for a particular user address fails, the port is assigned a unique address by the FC protocol. This address is generally not guaranteed to be unique between instances. Various scenarios exist where the AL-PA of a device will change, either after power cycle or loop reconfiguration.

The FC protocol also provides a logical unit address field within command structures to provide addressing to devices internal to a port. The FCP_CMD payload specifies an eight byte LUN field. Subsequent identification of the exchange between devices is provided by the FQXID (Fully Qualified Exchange ID).

FC ports can be required to have specific addresses assigned. Although basic functionality is not dependent on this, changes in the loop configuration could result

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in disk targets changing identifiers with the potential risk of data corruption or loss. This configuration can be straightforward, and can consist of providing the device a loop-unique ID (AL_PA) in the range of "01h" to "EFh." Storage routers could be shipped with a default value with the assumption that most configurations will be using single storage routers and no other devices requesting the present ID. This would provide a minimum amount of initial configuration to the system administrator. Alternately, storage routers could be defaulted to assume any address so that configurations requiring multiple storage routers on a loop would not require that the administrator assign a unique ID to the additional storage routers.

Address translation is needed where commands are issued in the cases FC Initiator to SCSI Target and SCSI Initiator to FC Target. Target responses are qualified by the FQXID and will retain the translation acquired at the beginning of the exchange. This prevents configuration changes occurring during the course of execution of a command from causing data or state information to be inadvertently misdirected. Configuration can be required in cases of SCSI Initiator to FC Target, as discovery may not effectively allow for FCP targets to consistently be found. This is due to an FC arbitrated loop supporting addressing of a larger number of devices than a SCSI bus and the possibility of FC devices changing their AL-PA due to device insertion

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or other loop initialization.

In the direct method, the translation to
BUS:TARGET:LUN of the SCSI address information will be
direct. That is, the values represented in the FCP LUN
5 field will directly map to the values in effect on the
SCSI bus. This provides a clean translation and does not
require SCSI bus discovery. It also allows devices to be
dynamically added to the SCSI bus without modifying the
address map. It may not allow for complete discovery by
10 FCP initiator devices, as gaps between device addresses
may halt the discovery process. Legacy SCSI device
drivers typically halt discovery on a target device at
the first unoccupied LUN, and proceed to the next target.
This would lead to some devices not being discovered.
15 However, this allows for hot plugged devices and other
changes to the loop addressing.

In the ordered method, ordered translation requires
that the storage router perform discovery on reset, and
collapses the addresses on the SCSI bus to sequential FCP
20 LUN values. Thus, the FCP LUN values 0-N can represent
N+1 SCSI devices, regardless of SCSI address values, in
the order in which they are isolated during the SCSI
discovery process. This would allow the FCP initiator
discovery process to identify all mapped SCSI devices
25 without further configuration. This has the limitation
that hot-plugged devices will not be identified until the
next reset cycle. In this case, the address may also be
altered as well.

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In addition to addressing, according to the present invention, the storage router provides configuration and access controls that cause certain requests from FC Initiators to be directed to assigned virtual local storage partitioned on SCSI storage devices. For
5 example, the same request for LUN 0 (local storage) by two different FC Initiators can be directed to two separate subsets of storage. The storage router can use tables to map, for each initiator, what storage access is
10 available and what partition is being addressed by a particular request. In this manner, the storage space provided by SCSI storage devices can be allocated to FC initiators to provide virtual local storage as well as to create any other desired configuration for secured
15 access.

Although the present invention has been described in detail, it should be understood that various changes, substitutions, and alterations can be made hereto without departing from the spirit and scope of the invention as
20 defined by the appended claims.

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WHAT IS CLAIMED IS:

1. A storage router for providing virtual local storage on remote SCSI storage devices to Fibre Channel devices, comprising:

5 a buffer providing memory work space for the storage router;

a Fibre Channel controller operable to connect to and interface with a Fibre Channel transport medium;

10 a SCSI controller operable to connect to and interface with a SCSI bus transport medium; and

a supervisor unit coupled to the Fibre Channel controller, the SCSI controller and the buffer, the supervisor unit operable:

15 to maintain a configuration for SCSI storage devices connected to the SCSI bus transport medium that maps between Fibre Channel devices and SCSI storage devices and that implements access controls for storage space on the SCSI storage devices; and

20 to process data in the buffer to interface between the Fibre Channel controller and the SCSI controller to allow access from Fibre Channel initiator devices to SCSI storage devices using native low level, block protocol in accordance with the configuration.

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2. The storage router of Claim 1, wherein the configuration maintained by the supervisor unit includes an allocation of subsets of storage space to associated Fibre Channel devices, wherein each subset is only
5 accessible by the associated Fibre Channel device.

3. The storage router of Claim 2, wherein the Fibre Channel devices comprise workstations.

10 4. The storage router of Claim 2, wherein the SCSI storage devices comprise hard disk drives.

5. The storage router of Claim 1, wherein the Fibre Channel controller comprises:
15 a Fibre Channel (FC) protocol unit operable to connect to the Fibre Channel transport medium;
a first-in-first-out queue coupled to the Fibre Channel protocol unit; and
a direct memory access (DMA) interface coupled to
20 the first-in-first-out queue and to the buffer.

6. The storage router of Claim 1, wherein the SCSI controller comprises:
a SCSI protocol unit operable to connect to the SCSI
25 bus transport medium;
an internal buffer coupled to the SCSI protocol unit; and
a direct memory access (DMA) interface coupled to

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the internal buffer and to the buffer of the storage
router.

7. A storage network, comprising:

- 5 a Fibre Channel transport medium;
a SCSI bus transport medium;
a plurality of workstations connected to the Fibre
Channel transport medium;
a plurality of SCSI storage devices connected to the
10 SCSI bus transport medium; and
a storage router interfacing between the Fibre
Channel transport medium and the SCSI bus transport
medium, the storage router providing virtual local
storage on the SCSI storage devices to the workstations
15 and operable:
to map between the workstations and the SCSI
storage devices;
to implement access controls for storage space
on the SCSI storage devices; and
20 to allow access from the workstations to the
SCSI storage devices using native low level, block
protocol in accordance with the mapping and access
controls.

- 25 8. The storage network of Claim 7, wherein the
access controls include an allocation of subsets of
storage space to associated workstations, wherein each
subset is only accessible by the associated workstation.

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9. The storage network of Claim 7, wherein the SCSI storage devices comprise hard disk drives.

5 10. The storage network of Claim 7, wherein the storage router comprises:

a buffer providing memory work space for the storage router;

10 a Fibre Channel controller operable to connect to and interface with a Fibre Channel transport medium, the Fibre Channel controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer;

15 a SCSI controller operable to connect to and interface with a SCSI bus transport medium, the SCSI controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer; and

20 a supervisor unit coupled to the Fibre Channel controller, the SCSI controller and the buffer, the supervisor unit operable:

25 to maintain a configuration for the SCSI storage devices that maps between Fibre Channel devices and SCSI storage devices and that implements the access controls for storage space on the SCSI storage devices; and

to process data in the buffer to interface between the Fibre Channel controller and the SCSI

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controller to allow access from workstations to SCSI storage devices in accordance with the configuration.

11. A method for providing virtual local storage on remote SCSI storage devices to Fibre Channel devices, comprising:

interfacing with a Fibre Channel transport medium;
interfacing with a SCSI bus transport medium;
maintaining a configuration for SCSI storage devices connected to the SCSI bus transport medium that maps between Fibre Channel devices and the SCSI storage devices and that implements access controls for storage space on the SCSI storage devices; and

allowing access from Fibre Channel initiator devices to SCSI storage devices using native low level, block protocol in accordance with the configuration.

12. The method of Claim 11, wherein maintaining the configuration includes allocating subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device.

13. The method of Claim 12, wherein the Fibre Channel devices comprise workstations.

14. The method of Claim 12, wherein the SCSI storage devices comprise hard disk drives.

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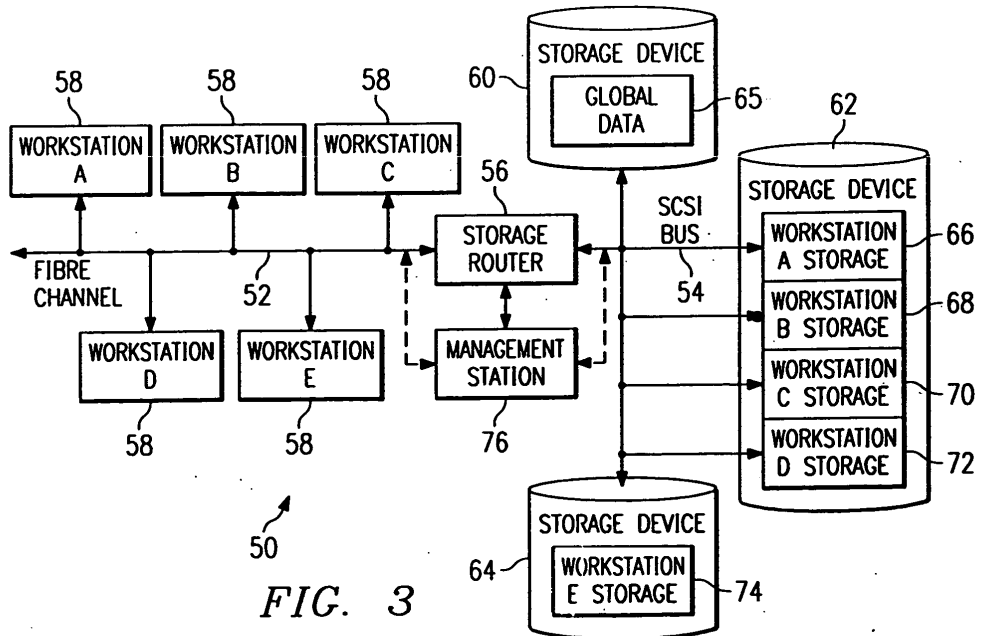
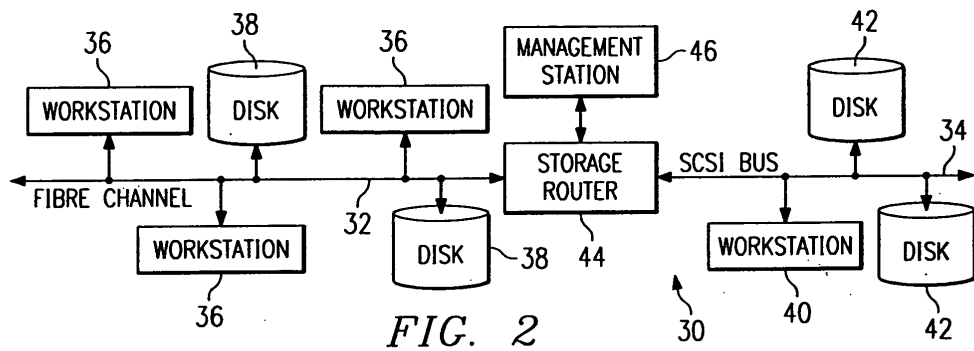
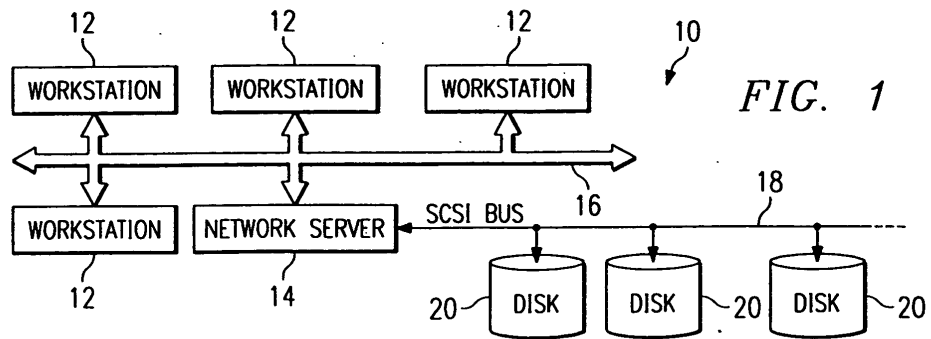
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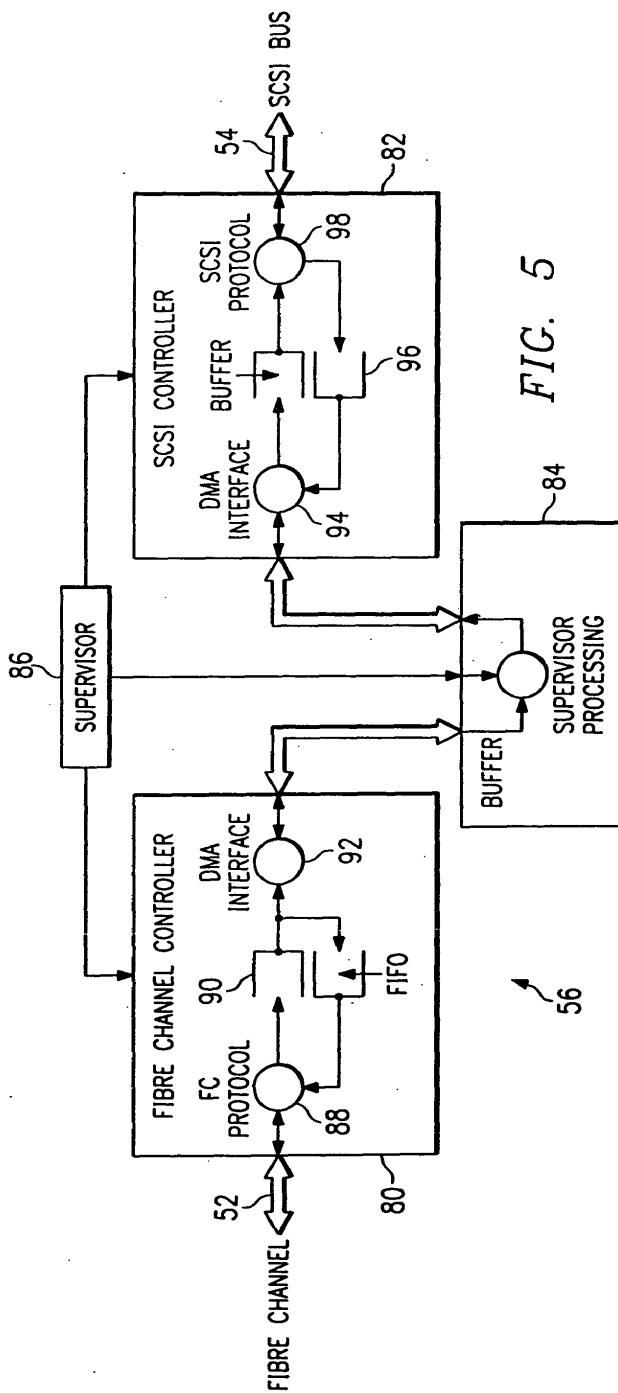
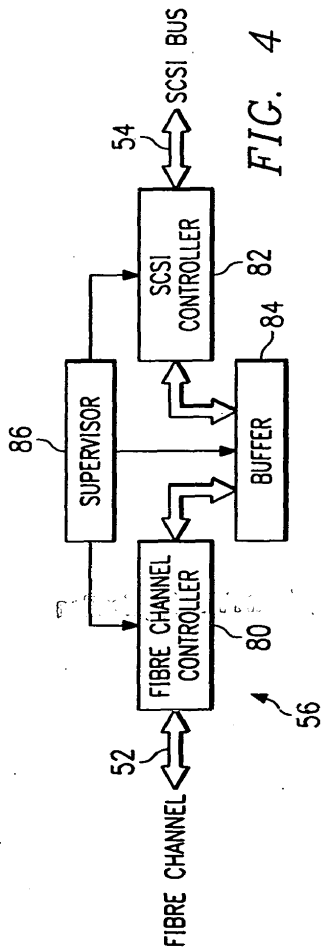
STORAGE ROUTER AND METHOD FOR
PROVIDING VIRTUAL LOCAL STORAGE

5 ABSTRACT OF THE DISCLOSURE

 A storage router (56) and storage network (50)
provide virtual local storage on remote SCSI storage
devices (60, 62, 64) to Fibre Channel devices. A
plurality of Fibre Channel devices, such as workstations
10 (58), are connected to a Fibre Channel transport medium
(52), and a plurality of SCSI storage devices (60, 62,
64) are connected to a SCSI bus transport medium (54).
The storage router (56) interfaces between the Fibre
Channel transport medium (52) and the SCSI bus transport
15 medium (54). The storage router (56) maps between the
workstations (58) and the SCSI storage devices (60, 62,
64) and implements access controls for storage space on
the SCSI storage devices (60, 62, 64). The storage
router (56) then allows access from the workstations (58)
20 to the SCSI storage devices (60, 62, 64) using native low
level, block protocol in accordance with the mapping and
the access controls.

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Copy from Prior Application

DECLARATION AND POWER OF ATTORNEY

As the below named inventor, I declare that:

My residence, post office address and citizenship are as stated below next to my name, that I believe I am the original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention or design entitled STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE, the specification of which (check one):

 X is attached hereto; or

_____ was filed on _____ as

Application Serial No. _____ and was

amended on _____ (if applicable);

that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above; and that I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to me to be material to patentability as defined in 37 C.F.R. § 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application(s) for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

<u>Number</u>	<u>Country</u>	<u>Date Filed</u>	<u>Priority Claimed (Yes) (No)</u>
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None.

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I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application(s) in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to me to be material to patentability as defined in 37 C.F.R. § 1.56 which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

<u>Application Serial Number</u>	<u>Date Filed</u>	<u>Status</u>
--------------------------------------	-------------------	---------------

None.

I hereby appoint:

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all of the firm of Baker & Botts, L.L.P., my attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith, and to file and prosecute any international patent applications filed thereon before any international authorities.

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Atty. Docket No. 064113.0103

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

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Full name of the first inventor

Geoffrey B. Hoese

Inventor's signature



Date

12/22/97

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Citizenship

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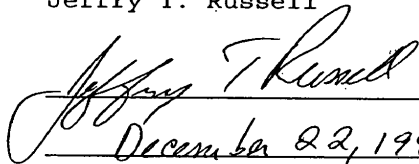
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Inventor's signature



Date

December 22, 1997

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United States of America

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FORM PTO-1595
 I-31-92

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 Patent and Trademark Office

To the Honorable Commissioner of Patents and Trademarks. Please record the attached original documents or copy thereof.

1. Name and Address of Conveying Party(ies):
 Geoffrey B. Hoese
 1904 Ann Arbor Avenue
 Austin, Texas 78704

Individual/Citizenship: United States of America

Additional name(s) of conveying party(ies) attached?
 Yes No

2. Name and Address of receiving Party(ies):
 Name: Crossroads Systems, Inc.
 Internal Address: Suite II-300
 Street Address: 9390 Research Blvd.
 City: Austin
 State/Zip: Texas 78759

3. Nature of conveyance:
 Assignment Merger
 Security Agreement Change of Name
 Other

Corporation/State Texas

Additional name(s) & address(es) attached? Yes No

4. Application number(s) or patent number(s):
 If this document is being filed together with a new application, the execution date of the application is: December 22, 1997

A. Additional Numbers attached? Yes No

B. Patent No.(s) Yes No

5. Name and address of party to whom correspondence concerning document should be mailed:
 Name: Anthony E. Peterman
 Internal Address: Baker & Botts, L.L.P.
 Street Address: 2001 Ross Avenue
 City/State/Zip: Dallas, Texas 75201-2980


6. Total number of applications and patents involved: 1

7. Total Fee (37 CFR 3.41): \$40.00
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9. Statement and signature.
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Anthony E. Peterman  December 31, 1997
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Page 2

Attorneys Docket: 064113.0103

Section 1 -Name of conveying parties

Additional names (individual)

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Cibolo, Texas 78108

United States of America

AUS01:124956.1

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ASSIGNMENT

WHEREAS, we, the undersigned inventors of residence as listed, have invented certain new and useful improvements as below entitled, for which application for United States Letters Patent is made, said application having been executed on the date set forth below; and

WHEREAS, Crossroads Systems, Inc. (hereinafter referred to as "Assignee"), a Texas corporation, with its principal address at 9390 Research Blvd., Suite II-300, Austin, Texas 78759, desires to acquire our entire right, title and interest in and to the invention, and in and to the said application and any Letters Patent that may issue thereon;

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, we assign to Assignee, all right, title and interest in and to the said invention and in and to the said application and all patents which may be granted therefor, and all divisions, reissues, continuations, continuations-in-part and extensions thereof; and we authorize and request the Commissioner of Patents and Trademarks to issue all patents for said invention, or patents resulting therefrom, insofar as our interests are concerned, to Assignee.

We also assign to Assignee, all right, title and interest in and to the invention disclosed in said application throughout the world, including the right to file applications and obtain patents, utility models, industrial models and designs for said invention in its own name throughout the world, including all rights to publish cautionary notices reserving ownership of said invention and all rights to register said invention in appropriate registries; and we further agree to execute any and all powers of attorney, applications, assignments, declarations, affidavits, and any other papers in connection therewith necessary to perfect such right, title and interest in Assignee.

We will communicate to Assignee any facts known to us respecting any improvements; and, at the expense of Assignee, we will testify in any legal proceedings, sign all lawful papers, execute all divisional, continuation, continuation-in-part, reissue and substitute applications, make lawful oaths and declarations, and generally do everything possible to vest title in Assignee and to aid Assignee to obtain and enforce proper protection for said invention in all countries.

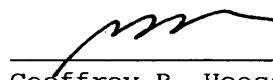
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This Assignment shall be binding on the parties' successors, assigns and legal representatives.

Title of Invention: STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

Signature of first Inventor:

Inventor's Name:


Geoffrey B. Hoese

Residence (City, County, State)

Austin, Travis County,
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Date:

12/22/97

Date Application Executed:

12/22/97

Signature of second Inventor:

Inventor's Name:


Jeffrey T. Russell

Residence (City, County, State)

Cibolo, Guadalupe County,
Texas

Date:

December 22, 1997

Date Application Executed:

December 22, 1997

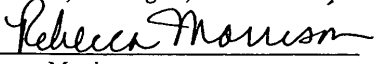
PATENT
Attorney Docket No.: CROSS-1120
(formerly 064113.0103)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Application of: Geoffrey B. Hoese, et al.
Serial No. 09/001799
Filing Date: December 31, 1997
Group Art No. Unknown
Title STORAGE ROUTER AND METHOD FOR PROVIDING
VIRTUAL LOCAL STORAGE

Copy from Prior Application

Assistant Commissioner of Patents
Washington, D.C. 20231

CERTIFICATION UNDER 37 CFR §1.8
I hereby certify that this documents is being deposited in the United States Postal Service as first class mail on the date identified below in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231

Rebecca Morrison
4-15-98
Date

REVOCATION OF POWER OF ATTORNEYS

AND

POWER OF ATTORNEY AND CHANGE OF MAILING ADDRESS

Sir:

Crossroads Systems, Inc., which is the assignee of record of 100% of the right, title and interest in the above-identified application, as evidenced by the Assignment enclosed herewith, hereby revokes all previous Powers of Attorney and appoints the following attorneys, all of the firm of Gray Cary Ware & Freidenrich, LLP, to prosecute the above-identified patent application and to transact all business in the Patent and Trademark Office connected therewith.

WILLIAM N. HULSEY III
STEPHEN E. REITER
GREGORY P. RAYMER
DAVID F. KLEINSMITH
BARRY N. YOUNG
TIMOTHY W. LOHSE
STANLEY H. KIM

Registration No. 33,402
Registration No. 31,192
Registration No. 36,647
Registration No. 40,050
Registration No. 27,774
Registration No. 35,255
Registration No. 40,047

Applicant(s): Geoffrey B. Hoese, et al.
Serial No.: 09/001799
Filed: December 31, 1997
Page 2

PATENT
Attorney Docket No.: 103671.991120
(formerly 064113.0103)

MARNIE WRIGHT BARNHORST
DARLENE W. HAYES
RAMSEY R. STEWART
STEVEN R. SPRINKLE
MICHAEL A. HOFF

Registration No. 36,740
Registration No. 33,899
Registration No. 38,322
Registration No. 40,825
Registration No. 40,018

We hereby state that we have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above.

We acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56(a).

Direct all telephone calls to WILLIAM N. HULSEY III at (512)
457-7040.

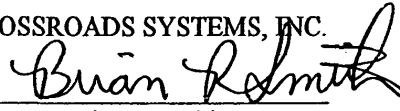
Address all correspondence to:

William N. Hulsey III
GARY CARY WARE & FREIDENRICH, LLP
100 Congress Avenue, Suite 1440
Austin, Texas 78701

Respectfully submitted,

CROSSROADS SYSTEMS, INC.

By:



Brian R. Smith

Chief Technical Officer

Date:

April 11, 1998

AUM001078.1
103671-991120

FORM PTO-1595
1-31-92

RECORDATION FORM COVER SHEET
PATENTS ONLY

U.S. DEPARTMENT OF COMMERCE
Patent and Trademark Office

To the Honorable Commissioner of Patents and Trademarks. Please record the attached original documents or copy thereof.

1. Name and Address of Conveying Party(ies):
Geoffrey B. Hoese
1904 Ann Arbor Avenue
Austin, Texas 78704
 Individual/Citizenship: United States of America
Additional name(s) of conveying party(ies) attached?
 Yes No

2. Name and Address of receiving Party(ies):
Name: Crossroads Systems, Inc.
Internal Address: Suite II-300
Street Address: 9390 Research Blvd.
City: Austin
State/Zip: Texas 78759

3. Nature of conveyance:
 Assignment Merger
 Security Agreement Change of Name
 Other

Corporation/State Texas

Execution Date: December 22, 1997

Additional name(s) & address(es) attached? Yes No

4. Application number(s) or patent number(s):
If this document is being filed together with a new application, the execution date of the application is: December 22, 1997

A. B. Patent No.(s) Yes No
Additional Numbers attached?

5. Name and address of party to whom correspondence concerning document should be mailed:
Name: Anthony E. Peterman
Internal Address: Baker & Botts, L.L.P.
Street Address: 2001 Ross Avenue
City/State/Zip: Dallas, Texas 75201-2980

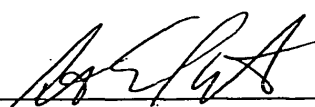
6. Total number of applications and patents involved: 1

7. Total Fee (37 CFR 3.41): \$40.00
 Enclosed
 Authorized to be charged to deposit account

8. Deposit account number:
(Attach Duplicate Copy of this page if paying by deposit account)

DO NOT USE THIS SPACE

9. Statement and signature.
To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document.

Anthony E. Peterman  December 31, 1997
Name of Person Signing Signature Date

Total number of pages including cover sheet 4

OMB No. 0651-0011 (exp. 4/94)

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Washington, D.C. 20231

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U.S. Patent and Trademark Office

Recordation Form Cover Sheet -Form PTO-1595 (01/31/92)

Patents Only

Page 2

Attorneys Docket: 064113.0103

Section 1 -Name of conveying parties

Additional names (individual)

**Jeffry T. Russell
205 Kariba Cove
Cibolo, Texas 78108**

United States of America

AUS01:124956.1

ASSIGNMENT

WHEREAS, we, the undersigned inventors of residence as listed, have invented certain new and useful improvements as below entitled, for which application for United States Letters Patent is made, said application having been executed on the date set forth below; and

WHEREAS, Crossroads Systems, Inc. (hereinafter referred to as "Assignee"), a Texas corporation, with its principal address at 9390 Research Blvd., Suite II-300, Austin, Texas 78759, desires to acquire our entire right, title and interest in and to the invention, and in and to the said application and any Letters Patent that may issue thereon;


NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, we assign to Assignee, all right, title and interest in and to the said invention and in and to the said application and all patents which may be granted therefor, and all divisions, reissues, continuations, continuations-in-part and extensions thereof; and we authorize and request the Commissioner of Patents and Trademarks to issue all patents for said invention, or patents resulting therefrom, insofar as our interests are concerned, to Assignee.

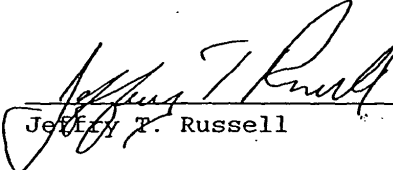
We also assign to Assignee, all right, title and interest in and to the invention disclosed in said application throughout the world, including the right to file applications and obtain patents, utility models, industrial models and designs for said invention in its own name throughout the world, including all rights to publish cautionary notices reserving ownership of said invention and all rights to register said invention in appropriate registries; and we further agree to execute any and all powers of attorney, applications, assignments, declarations, affidavits, and any other papers in connection therewith necessary to perfect such right, title and interest in Assignee.

We will communicate to Assignee any facts known to us respecting any improvements; and, at the expense of Assignee, we will testify in any legal proceedings, sign all lawful papers, execute all divisional, continuation, continuation-in-part, reissue and substitute applications, make lawful oaths and declarations, and generally do everything possible to vest title in Assignee and to aid Assignee to obtain and enforce proper protection for said invention in all countries.

This Assignment shall be binding on the parties' successors, assigns and legal representatives.

Title of Invention: STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

Signature of first Inventor: 
Inventor's Name: Geoffrey B. Hoese
Residence (City, County, State) Austin, Travis County, Texas
Date: 12/22/97
Date Application Executed: 12/22/97

Signature of second Inventor: 
Inventor's Name: Jeffrey T. Russell
Residence (City, County, State) Cibolo, Guadalupe County, Texas
Date: December 22, 1997
Date Application Executed: December 22, 1997

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
PRELIMINARY AMENDMENT	Atty. Docket No. CROSS1120-13
Applicants: Goeffrey B. Hoese, et al.	
Application Number Unknown	Filed September 9, 2003
For: Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit Unknown	Confirmation Number: Unknown

Mail Stop: Patent Application
 Commissioner for Patents
 Alexandria, VA 22313

<p align="center">Certification Under 37 C.F.R. §1.10</p> <p>I hereby certify that this document is being deposited with the United States Postal Service as Express Mail to Addressee in an envelope addressed to: Mail Stop: Patent Application, Commissioner for Patents, Alexandria, VA 22313 on September 9, 2003.</p> <p align="center"><i>Janice Pampell</i> Janice Pampell</p>

Dear Sir:

Please amend the application as follows:

IN THE SPECIFICATION

Following the title, please insert the following paragraph:

RELATED APPLICATIONS

This application is a continuation of and claims the benefit of the filing dates of U.S. Patent Application Serial No. 10/081,110 by inventors Geoffrey B. Hoese and Jeffry T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on February 22, 2002 which in turn is a continuation of U.S. Application No. 09/354,682 by inventors Geoffrey B. Hoese and Jeffry T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on July 15, 1999, now U.S. Patent No. 6,421,753, which in turn is a continuation of U.S. Patent Application Serial No. 09/001,799, filed on December 31, 1997, now U.S. Patent No. 5,941,972, and hereby incorporates these applications by reference in their entireties as if they had been fully set forth herein.

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 103671-990000

IN THE CLAIMS

1-14 Cancelled

15. (New) A storage router for providing virtual local storage on remote storage devices to a device, comprising:
a buffer providing memory work space for the storage router;
a first Fibre Channel controller operable to connect to and interface with a first Fibre Channel transport medium;
a second Fibre Channel controller operable to connect to and interface with a second Fibre Channel transport medium; and
a supervisor unit coupled to the first and second Fibre Channel controllers and the buffer, the supervisor unit operable:
to maintain a configuration for remote storage devices connected to the second Fibre Channel transport medium that maps between the device and the remote storage devices and that implements access controls for storage space on the remote storage devices; and
to process data in the buffer to interface between the first Fibre Channel controller and the second Fibre Channel controller to allow access from Fibre Channel initiator devices to the remote storage devices using native low level, block protocol in accordance with the configuration.

16. (New) The storage router of claim 15, wherein the configuration maintained by the supervisor unit includes an allocation of subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device.

17. (New) The storage router of claim 16, wherein the Fibre Channel devices comprise workstations.

18. (New) The storage router of claim 16, wherein the remote storage devices comprise hard disk drives.

19. (New) The storage router of claim 15, wherein each of the first Fibre Channel

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Customer ID: 25094

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controller comprises:

- a Fibre Channel (FC) protocol unit operable to connect to the Fibre Channel transport medium;
- a first-in-first-out queue coupled to the Fibre Channel protocol unit; and
- a direct memory access (DMA) interface coupled to the first-in-first-out queue and to the buffer.

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103671-990000

20. (New) A storage network, comprising:
a first Fibre Channel transport medium;
a second Fibre Channel transport medium;
a plurality of workstations connected to the first Fibre Channel transport medium;
a plurality of storage devices connected to the second Fibre Channel transport medium;

and

a storage router interfacing between the first Fibre Channel transport medium and the second Fibre Channel transport medium, the storage router providing virtual local storage on the storage devices to the workstations and operable:

to map between the workstations and the storage devices;
to implement access controls for storage space on the storage devices; and
to allow access from the workstations to the storage devices using native low level, block protocol in accordance with the mapping and access controls.

21. (New) The storage network of claim 20, wherein the access controls include an allocation of subsets of storage space to associated workstations, wherein each subset is only accessible by the associated workstation.

22. (New) The storage network of claim 20, wherein the storage devices comprise hard disk drives.

23. (New) The storage network of claim 20, wherein the storage router comprises:
a buffer providing memory work space for the storage router;
a first Fibre Channel controller operable to connect to and interface with the first Fibre Channel transport medium, the first Fibre Channel controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer;
a second Fibre Channel controller operable to connect to and interface with the second Fibre Channel transport medium, the second Fibre Channel controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer; and
a supervisor unit coupled to the first and second Fibre Channel controllers and the buffer, the supervisor unit operable:

to maintain a configuration for the storage devices that maps between workstations and storage devices and that implements the access controls for storage space on

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the storage devices; and

to process data in the buffer to interface between the first Fibre Channel controller and the second Fibre Channel controller to allow access from workstations to storage devices in accordance with the configuration.

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24. (New) A method for providing virtual local storage on remote storage devices to Fibre Channel devices, comprising:

- interfacing with a first Fibre Channel transport medium;
- interfacing with a second Fibre Channel transport medium;
- maintaining a configuration for remote storage devices connected to the second Fibre Channel transport medium that maps between Fibre Channel devices and the remote storage devices and that implements access controls for storage space on the remote storage devices;

and

- allowing access from Fibre Channel initiator devices to the remote storage devices using native low level, block protocol in accordance with the configuration.

25. (New) The method of claim 24, wherein maintaining the configuration includes allocating subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device.

26. (New) The method of claim 25, wherein the Fibre Channel devices comprise workstations.

27. (New) The method of claim 25, wherein the remote storage devices comprise hard disk drives.

28. (New) An apparatus for providing virtual local storage on a remote storage device to a device operating according to a Fibre Channel protocol, comprising:

a first controller operable to connect to and interface with a first transport medium, wherein the first transport medium is operable according to the Fibre Channel protocol;

a second controller operable to connect to and interface with a second transport medium, wherein the second transport medium is operable according to the Fibre Channel protocol; and

a supervisor unit coupled to the first controller and the second controller, the supervisor unit operable to control access from the device connected to the first transport medium to the remote storage device connected to the second transport medium using native low level, block protocols according to a map between the device and the remote storage device.

29. (New) The apparatus of Claim 28, wherein the supervisor unit is further operable to maintain a configuration wherein the configuration includes the map between the device and the remote storage device, and further wherein the map includes virtual LUNs that provide a representation of the storage device.

30. (New) The apparatus of Claim 29, wherein the map only exposes the device to LUNs that the device may access.

31. (New) The apparatus of Claim 28, wherein the supervisor unit is further operable to maintain a configuration including the map, wherein the map provides a mapping from a host device ID to a virtual LUN representation of the remote storage device to a physical LUN of the remote storage device.

32. (New) The apparatus of Claim 28, wherein the remote storage device further comprises storage space partitioned into virtual local storage for the device connected to the first transport medium.

33. (New) The apparatus of Claim 32, wherein the supervisor unit is further operable to prevent the device from accessing any storage on the remote storage device that is not part of a virtual local storage partition assigned to the device

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34. (New) The apparatus of Claim 28, wherein the first controller and the second controller further comprise a single controller.

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35. (New) A system for providing virtual local storage on remote storage devices, comprising:

a first controller operable to connect to and interface with a first transport medium operable according to a Fibre Channel protocol;

a second controller operable to connect to and interface with a second transport medium operable according to the Fibre Channel protocol;

at least one device connected to the first transport medium;

at least one storage device connected to the second transport medium; and

an access control device coupled to the first controller and the second controller, the access control device operable to:

map between the at least one device and a storage space on the at least one storage device; and

control access from the at least one device to the at least one storage device using native low level, block protocol in accordance with the map.

36. (New) The system of Claim 35, wherein the access control device is further operable to maintain a configuration wherein the configuration includes the map between the at least one device and the at least one storage device, and further wherein the map includes virtual LUNs that provide a representation of the at least one storage device.

37. (New) The system of Claim 36, wherein the map only exposes the at least one device to LUNs that the at least one device may access.

38. (New) The system of Claim 35, wherein the access control device is further operable to maintain a configuration including the map, wherein the map provides a mapping from a host device ID to a virtual LUN representation of the at least one storage device to a physical LUN of the at least one storage device.

39. (New) The system of Claim 35, wherein the at least one storage device further comprises storage space partitioned into virtual local storage for the at least one device.

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40. (New) The system of Claim 39, wherein the access control unit is further operable to prevent at least one device from accessing any storage on the at least one storage device that is not part of a virtual local storage partition assigned to the at least one device.

41. (New) The system of Claim 35, wherein the first controller and the second controller further comprise a single controller.

Gray Cary/AU/4113229.1
103671-990000

Attorney Docket No.
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Continuation Application
Customer ID: 25094

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42. (New) A method for providing virtual local storage on remote storage devices, comprising:

mapping between a device connected to a first transport medium and a storage device connected to a second transport medium, wherein the first transport medium and the second transport medium operate according to a Fibre Channel protocol;

implementing access controls for storage space on the storage device; and

allowing access from the device connected to the first transport medium to the storage device using native low level, block protocols.

43. (New) The method of Claim 42, further comprising maintaining a configuration wherein the configuration includes a map between the device and the one storage device, and further wherein the map includes virtual LUNs that provide a representation of the storage device.

44. (New) The method of Claim 43, wherein the map only exposes the device to LUNs that the device may access.

45. (New) The method of Claim 42, further comprising maintaining a configuration including a map from a host device ID to a virtual LUN representation of the storage device to a physical LUN of the storage device.

46. (New) The method of Claim 42, further comprising partitioning storage space on the storage device into virtual local storage for the device.

47. (New) The method of Claim 46, further comprising preventing the device from accessing any storage on the storage device that is not part of a virtual local storage partition assigned to the device.

48. (New) A system for providing virtual local storage, comprising:

a host device;

a storage device remote from the host device, wherein the storage device has a storage space;

a first controller;

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103671-990000

Attorney Docket No.
CROSS1120-13

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Customer ID: 25094

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a second controller

a first transport medium operable according to a Fibre Channel protocol, wherein the first transport medium connects the host device to the first controller;

a second transport medium operable according to the Fibre Channel protocol, wherein the second transport medium connects the second controller to the storage device;

a supervisor unit coupled to the first controller and the second controller, the supervisor unit operable to:

maintain a configuration that maps between the host device and at least a portion of the storage space on the storage device; and

implement access controls according to the configuration for the storage space on the storage device using native low level, block protocol.

49. (New) The system of Claim 48, wherein the supervisor unit is further operable to:

maintain a configuration that maps from the host device to a virtual representation of at least a portion of the storage space on the storage device to the storage device; and

allow the host device to access only that portion of the storage space that is contained in the map.

50. (New) The system of Claim 49, wherein the configuration comprises a map from a host device ID to a virtual LUN representation of the storage device to a physical LUN of the storage device.

51. (New) The system of Claim 48, wherein the storage device further comprises storage space partitioned into virtual local storage for the host device.

52. (New) The system of Claim 51, wherein the supervisor unit is further operable to prevent the host device from accessing any storage on the storage device that is not part of a virtual local storage partition assigned to the host device.

53. (New) The apparatus of Claim 48, wherein the first controller and the second controller further comprise a single controller.

Gray Cary\AU\4113229.1
103671-990000

Attorney Docket No.
CROSS1120-13

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Customer ID: 25094

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REMARKS

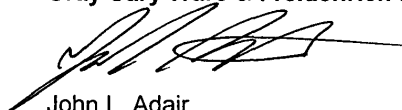
Applicants appreciate the time taken by the Examiner to review Applicants' present application.

Applicant has made an earnest attempt to place this case in condition for allowance. For the foregoing reasons, Applicant respectfully requests full allowance of Claims 15-53.

The Director of the USPTO is hereby authorized to charge any deficiencies or credit any overpayment to Deposit Account No. 50-0456 of Gray Cary Ware & Freidenrich LLP.

Respectfully submitted,

Gray Cary Ware & Freidenrich LLP



John L. Adair
Reg. No. 48,828

Dated: September 7, 2003

1221 South MoPac Expressway
Suite 400
Austin, TX 78746-6875
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Gray Cary\AU\4113229.1
103671-990000



Patent and Trademark Office
 Address: COMMISSIONER OF PATENTS AND TRADEMARKS
 Washington, D.C. 20231

SERIAL NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NO.
09/001799	12/31/97	HOESE	064113.0103

BAKER AND BOTTS
 2001 ROSS AVENUE
 DALLAS TX 75201-2980

EXAMINER

CHAN, EDDIE

ART UNIT PAPER NUMBER

2751

3

DATE MAILED: 07/10/98

This is in response to the Power of Attorney filed 04/20/98

- 1. The Power of Attorney to you in this application **has been revoked** by the applicant. Future correspondence will be mailed to the new address of record. 37 CFR 1.33.
- 2. The Power of Attorney to you in this application **has been revoked** by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record. (37 CFR 1.33).
- 3. The withdrawal as attorney in this application **has been accepted**. Future correspondence will be mailed to the new address of record. 37 CFR 1.33.

Kim Blatton 7033064129

This is a communication from the
 Patent and Trademark Office

Copy from Prior Application

- 4. The Power of Attorney in this application **is accepted**. Correspondence in this application will be mailed to the below-noted address as provided by 37 CFR 1.33.
- 5. The Power of Attorney in this application **is not accepted** for the reason(s) checked below:
 - a. The Power of Attorney is from an assignee and the Certificate required by 37 CFR 3.73 (b) has not been received.
 - b. The person signing for the assignee has omitted their empowerment to sign on behalf of the assignee.
 - c. The inventor(s) is without authority to appoint attorneys since the assignee has intervened as provided by 37 CFR 3.71.
 - d. The signature of _____, a co-inventor in this application, has been omitted. The Power of Attorney will be entered upon receipt of confirmation signed by said co-inventor.
 - e. The person(s) appointed in the Power of Attorney is not registered to practice before the U. S. Patent & Trademark Office.
 - f. The revocation is not signed by the applicant, the assignee of the entire interest, or one particular principal attorney having the authority to revoke.

WILLIAM N HULSEY III
 GARY CARY WARE & FREIDENRICH LLP
 100 CONGRESS AVENUE
 SUITE 1440
 AUSTIN TX 78701

Kim Blatton
 This is a communication from the
 Patent and Trademark Office

PATENT APPLICATION FEE DETERMINATION RECORD Effective January 1, 2003			Application or Docket Number <i>6058'03</i>		
CLAIMS AS FILED - PART I					
		(Column 1)	(Column 2)		
TOTAL CLAIMS		<i>39</i>			
FOR		NUMBER FILED	NUMBER EXTRA		
TOTAL CHARGEABLE CLAIMS		<i>39</i> minus 20=	*	<i>19</i>	
INDEPENDENT CLAIMS		<i>7</i> minus 3 =	*	<i>4</i>	
MULTIPLE DEPENDENT CLAIM PRESENT <input type="checkbox"/>					
* If the difference in column 1 is less than zero, enter "0" in column 2					
CLAIMS AS AMENDED - PART II					
		(Column 1)	(Column 2)	(Column 3)	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA
	Total	*	Minus	**	=
	Independent	*	Minus	***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>				
		(Column 1)	(Column 2)	(Column 3)	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA
	Total	*	Minus	**	=
	Independent	*	Minus	***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>				
		(Column 1)	(Column 2)	(Column 3)	
AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA
	Total	*	Minus	**	=
	Independent	*	Minus	***	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>				
<p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20." *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3." The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.</p>					

SMALL ENTITY TYPE <input type="checkbox"/>		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	375.00	OR	BASIC FEE	750.00
X\$ 9=	<i>121</i>	OR	X\$18=	
X42=	<i>58</i>	OR	X84=	
+140=		OR	+280=	
TOTAL	<i>714</i>	OR	TOTAL	

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X\$ 9=		OR	X\$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X\$ 9=		OR	X\$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X\$ 9=		OR	X\$18=	
X42=		OR	X84=	
+140=		OR	+280=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

09/11/2003 HDEHESS1 00000033 10658163

01 FC:2001	375.00 OP
02 FC:2201	168.00 OP
03 FC:2202	171.00 OP

PTO-1556
(5/87)

*U.S. Government Printing Office: 2002 — 489-267/69033

PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

Adjustment date: 12/12/2003 UEDUVIJE
11/28/2003 SDIRETA1 0000013 500456 10658163
01 FC:1051 130.00 CR

12/12/2003 UEDUVIJE 0000002 500456 10658163
01 FC:2051 65.00 DA

PTO-1556
(5/87)

*U.S. GPO: 2000-468-987/39595

2182



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Atty. Docket No. CROSS1120-13
Applicants: Geoffrey B. Hoese, et al.	
Application Number 10/658,163	Filed September 9, 2003
For: Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit Unknown	Confirmation Number Unknown
Application No. 10/658,163	Filing Date of Parent September 9, 2003
Group Art Unit of Parent 2182	Examiner of Parent Christopher Shin

RECEIVED
OCT. 22 2003
Technology Center 2100

Mail Stop: Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

Certification Under 37 C.F.R. §1.10

I hereby certify that this document is being deposited with the United States Postal Service as Express Mail to Addressee in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313 on **October 17, 2003**.

Laura McGuire

Applicants respectfully request, pursuant to 37 C.F.R. §§ 1.56, 1.97 and 1.98, that the art listed on the attached PTO/SB/08A form be considered and cited in the examination of the above-identified continuation application. Pursuant to 37 C.F.R. §§ 1.97(g) and (h), no representation is made that a search has been made or that this art is material to patentability of the present application. Applicants respectfully submit that the claims of Applicants' above-referenced patent application are patentably distinguishable from these references.

In the prosecution of United States Patent Application Serial Number 10/081,110 (the "110 Application"), the parent of the present application, Applicants submitted trial exhibits from *Crossroads Systems, Inc. v. Pathlight Technology, Inc.*, 1:00cv00248 (W.D. Tex.) (the "Pathlight Litigation") and *Crossroads Systems, Inc. v. Chaparral Network Storage, Inc.*, 1:00cv00217 (W.D. Tex.) (the "Chaparral litigation"). Several of these trial exhibits included United States and foreign patents. The Examiner requested that the Applicants separately list patent references from the trial exhibits. Accordingly, the attached PTO/SB/08A form includes, among other references, references that were previously submitted as part of the trial exhibits. To the extent that any of references A1-A16 were separately listed in the prosecution of the '110 Application, Applicants are submitting them again to comply with the Examiner's request to call out patents found the trial exhibits. The following summarizes the listed references for the convenience of the Examiner.

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103671-990004

References A1-A7 were each included in the exhibits from both the Chaparral litigation and the Pathlight litigation. References A9-11 and B1-B3 were included in the exhibits from the Chaparral litigation. References A8 and A12-A16 were included in the exhibits from the Pathlight litigation. Copies of references A1-A16 are included for the Examiner's convenience. Applicants note that in the Pathlight Litigation and the Chaparral litigation, Crossroads Systems Inc., asserted United States Patent Number 5,941,972 (the "'972 Patent") against the respective defendants. The Pathlight Litigation settled with a consent decree that the '972 Patent is valid.

References A19-A30 and A33-A46 were cited in an Office Action mailed January 21, 2003 in related United States Patent Application Serial Number 10/174,720. Copies of references A19-A30 and A33-A46 are enclosed.

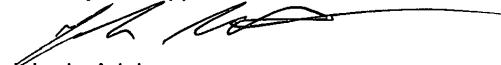
Reference A47 was cited in the Notice of Allowance for United States Patent Application Serial Number 10/174,720. A copy of reference A47 is enclosed for the Examiner's convenience.

Additional references include A17-A18, A31-A32, B4, C1-C3. Copies of these references are included for the convenience of the Examiner.

While Applicants believe no fees are due, if any fees are due, the Commissioner is hereby authorized to charge Deposit Account No. 50-0456 of Gray Cary Ware & Freidenrich LLP.

Respectfully submitted,

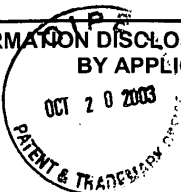
Gray Cary Ware & Freidenrich LLP
Attorneys for Applicants

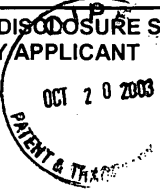


John L. Adair
Reg. No. 48,828

Dated: October 16, 2003

1221 S. MoPac Expressway, Suite 400
Austin, Texas 78746
Tel. (512) 457-7142
Fax. (512) 457-7001

INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	10/658,163		
				Filing Date	September 9, 2003		
				First Named Inventor	Geoffrey Hoese		
				Group Art Unit	Unknown		
				Examiner Name	Unknown		
Sheet	1	of	3	Attorney Ref. Number	CROSS1120-13 Technology Center 2100		
U.S. PATENT DOCUMENTS							
Examiner Initials	Cite No.	Document Number		Publication Date	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines Where Relevant Passages or Figures Appear	
		Number	Kind Code (if known)	MM-DD-YYYY			
	A1	5,748,924	--	05/05/98	Llorens, et al.		
	A2	5,768,623	--	06/16/98	Judd, et al.		
	A3	5,809,328	--	09/15/98	Nogales, et al.		
	A4	5,812,754	--	09/22/98	Lui, et al.		
	A5	5,835,496	--	11/10/98	Yeung, et al.		
	A6	5,848,251	--	12/08/98	Lomelino, et al.		
	A7	5,941,972	--	08/24/99	Hoese, et al.		
	A8	6,041,381	--	03/21/00	Hoese		
	A9	6,145,006	--	11/07/00	Vishlitsky et al.		
	A10	6,219,771	B1	04/17/01	Kikuchi et al.		
	A11	6,260,120	B1	07/10/01	Blumenau et al.		
	A12	3,082,406	--	03/19/63	L.D. Stevens		
	A13	4,092,732	--	05/30/78	Ouchi		
	A14	4,947,367	--	08/07/90	Chang et al.		
	A15	5,072,378	--	12/10/91	Manka		
	A16	5,465,382	--	11/07/95	Day, III et al.		
	A17	5,947,530	--	10/26/99	Young		
	A18	6,529,996	B1	03/04/03	Nguyen et al.		
FOREIGN PATENT DOCUMENTS							
Examiner Initials	Cite No.	Country Code	Number	Kind Code (if known)	Publication Date	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines Where Relevant Passages or Figures Appear
					MM-DD-YYYY (Number 43)		
	B1	EP	0827059	A2	03/04/98	NEC Corporation	
	B2	JP	8-230895	--	09/10/96	Kikuchi et al.	
	B3	WO	99/34297	A1	07/08/99	Crossroads Systems, Inc.	
	B4	EP	0810 530	A2	12/03/97	Sun Microsystems, Inc.	
Examiner Signature				Date Considered			

INFORMATION DISCLOSURE STATEMENT BY APPLICANT 				Application Number	Unknown	
				Filing Date	Herewith	
				First Named Inventor	Geoffrey Hoese RECEIVED	
				Group Art Unit	Unknown OCT 22 2003	
				Examiner Name	Unknown	
Sheet	2	of	3	Attorney Ref. Number	CROSS1120-10 Technology Center 2100	
U.S. PATENT DOCUMENTS						
Examiner Initials	Cite No.	Document Number		Publication Date MM-DD- YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines Where Relevant Passages or Figures Appear
		Number	Kind Code (if known)			
	A19	5,864,653	--	01/26/99	Tavallaei et al.	
	A20	6,070,253	--	05/30/00	Tavallaei et al.	
	A21	5,884,027	--	03/16/99	Garbus et al.	
	A22	6,131,119	--	10/10/00	Fukui	
	A23	5,729,705	--	03/17/98	Weber	
	A24	5,751,975	--	05/12/98	Gillespie et al.	
	A25	5,680,556	--	10/21/97	Begun et al.	
	A26	5,581,714	--	12/03/96	Amini et al.	
	A27	5,774,683	--	06/30/98	Gulick	
	A28	6,330,629	B1	12/11/01	Kondo et al.	
	A29	5,845,107	--	12/01/98	Fisch et al.	
	A30	4,695,948	--	09/22/87	Blevins et al.	
	A31	5,598,541	--	01/28/97	Malladi	
	A32	5,163,131	--	11/10/92	Row et al.	
	A33	5,414,820	--	10/09/95	McFarland et al.	
	A34	5,857,080	--	01/05/99	Jander et al.	
	A35	5,941,969	--	08/24/99	Ram et al.	
	A36	6,223,266	B1	04/24/01	Sartore	
	A37	5,991,797	--	11/23/99	Futral et al.	
	A38	5,257,386	--	10/26/93	Saito	
	A39	5,701,491	--	12/23/97	Dunn et al.	
Examiner Signature				Date Considered		

Gray Cary/AU4115816.1
103671-990004

11-24-03

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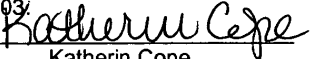
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
PETITION TO MAKE SPECIAL BECAUSE OF ACTUAL INFRINGEMENT PURSUANT TO 37 C.F.R. § 1.102 AND M.P.E.P. 708.02(II)	Atty. Docket No. (Opt.) CROSS1120-13
Applicant Geoffrey B. Hoese, et al.	
Application Number 10/658,163	Filed September 9, 2003
For Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit Unknown	Examiner Unknown
Confirmation Number: Unknown	

11/26/2003 SDIRETA1 00000013 500456 10658163
01 FC:1051 130.00 DA

Via Facsimile (703) 306-5404 and Express Mail

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

<u>Certificate of Mailing Under 37 C.F.R. 1.10</u>
I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail No. EV351127304US in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on November 21, 2003.
 Katherin Cope

SNH0EJ27T5EVA3

Applicants submit this Petition to the Commissioner under 37 C.F.R. § 1.102 and M.P.E.P. 708.02(II) to make special and advance the examination of the above-identified application because of actual infringement. Applicants submit that this Petition meets all of the requirements of 37 C.F.R. § 1.102 and M.P.E.P. 708.02(II) for a grantable petition.

This petition is accompanied by a Declaration by Robert Griswold in Support of the Petition to Make Special Because of Actual Infringement. If a further showing in support of this Petition is deemed necessary, Applicants invite the Examiner to call the undersigned to obtain the required showing.

Applicants hereby file this petition to make special and request that this petition be granted and that the application be allowed.

Applicants point out that the references which are believed to be the most closely related to the subject matter encompassed by the claims are already of record in the parent applications.

Gray Cary\AU4117803.1
103671-990004

Attorney Docket No.
CROSS1120-13

10/658,163
Customer ID: 25094

2

Authorization is hereby given to deduct \$130.00 from Deposit Account No. 50-0456 of Gray Cary Ware & Freidenrich LLP representing the filing fee for this petition to make special because of actual infringement, as set forth in 37 C.F.R. § 1.17(h). While no other fees are believed due, authorization is given to charge any additional fees or credit any overpayments in connection with this petition to Deposit Account No. 50-0456.

In view of this petition, in the event that there remain matters to be resolved in this application, the Examiner is invited to call the undersigned so that a prompt disposition of the application can be achieved.

Respectfully submitted,

Gray Cary Ware & Freidenrich LLP



John L. Adair
Registration No. 48,828

Dated: November 21, 2003

1221 South MoPac Expressway, Suite 400
Austin, Texas 78746
Telephone: (512) 457-7142
Facsimile: (512) 457-7001

Gray Cary\AU\4117803.1
103671-990004

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Atty. Docket No. (Opt.) CROSS1120-13
Applicants Geoffrey B. Hoese, et al.	
Application Number 10/658,163	Filed September 9, 2003
For STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE	
Group Art Unit 2186	Examiner Unknown



Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

<u>Certificate of Mailing</u>
I hereby certify that this correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on <u>Jan 30</u> 2004.
 Laura M. McGuire

Applicants respectfully request, pursuant to 37 C.F.R. §§ 1.56, 1.97 and 1.98, that the art listed on the attached SB08A and SB08B forms be considered and cited in the examination of the above-identified application. A copy of the art is enclosed for the convenience of the Examiner. Furthermore, pursuant to 37 C.F.R. §§ 1.97(g) and (h), no representation is made that a search has been made or that this art is material to patentability of the present application.

Applicants respectfully submit that the claims of Applicants' above-referenced patent application are patentably distinguishable from these references.

Respectfully submitted,

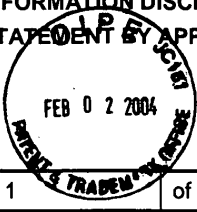
Gray Cary Ware & Freidenrich LLP
Attorneys for Applicant

John L. Adair
Reg. No. 48,828

Dated: 1/28/04
1221 S. MoPac Expressway, Suite 400
Austin, Texas 78746
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Fax. (512) 457-7001

AJM4121177.1
103671-990004

PTO/SB/08A (04-03)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT 				Application Number	10/658,163
				Filing Date	September 9, 2003
				First Named Inventor	Geoffrey B. Hoese, et al.
				Group Art Unit	2186
				Examiner Name	Unknown
Sheet	1	of	1	Attorney Docket Number	CROSS1120-13
NON-PATENT LITERATURE DOCUMENTS					
	C1	DIGITAL StorageWorks, Using Your HSZ70 Array Controller in a SCSI Controller Shelf (DS-BA356-M Series), <i>User's Guide</i> , pp. 1-1 through A-5 with index, January 1998.			
	C2	DIGITAL StorageWorks, HSZ70 Array Controller HSOF Version 7.0 (EK-HSZ70-CG.A01) <i>Configuration Manual</i> , pp. 1-2 through G15 with index, July 1997.			
	C3	DIGITAL Storageworks, HSZ70 Array Controller HSOF Version 7.0, <i>CLI Reference Manual</i> , pp. 1-156, July 1997.			
Examiner Signature				Date Considered	

Gray Cary\AU4121174.1
103671990004



USPTO COPY OF REFERENCES SUBMITTED IN IDS

Application Number	10/658,163
Filing Date	September 9, 2003
First Named Inventor	Geoffrey B. Hoese, et al.
Group/Art Unit	2186
Examiner Name	Unknown
Attorney Docket Number	CROSS1120-13

Gray Cary\AU\4121188.1
103671-990004

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Atty. Docket No. (Opt.) CROSS1120-13
Applicants Geoffrey B. Hoese, et al.	
Application Number 10/658,163	Filed September 9, 2003
For STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE	
Group Art Unit 2186	Examiner Unknown



Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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I hereby certify that this correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on <u>APRIL 9</u> 2004.
 Laura M. McGuire

Applicants respectfully request, pursuant to 37 C.F.R. §§ 1.56, 1.97 and 1.98, that the art listed on the attached SB08A and SB08B forms be considered and cited in the examination of the above-identified application. A copy of the art is enclosed for the convenience of the Examiner. Furthermore, pursuant to 37 C.F.R. §§ 1.97(g) and (h), no representation is made that a search has been made or that this art is material to patentability of the present application.

Applicants respectfully submit that the claims of Applicants' above-referenced patent application are patentably distinguishable from these references.

Respectfully submitted,

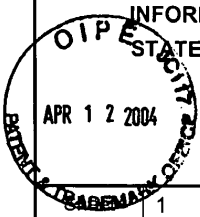
Gray Cary Ware & Freidenrich LLP
Attorneys for Applicant

John L. Adair
Reg. No. 48,828

Dated: April 5, 04
1221 S. MoPac Expressway, Suite 400
Austin, Texas 78746
Tel. (512) 457-7142
Fax. (512) 457-7001

AU4125641.2
103671-990004

PTO/SB/08B (04-03)


INFORMATION DISCLOSURE STATEMENT BY APPLICANT 		Application Number	10/658,163	
		Filing Date	September 9, 2003	
		First Named Inventor	Geoffrey B. Hoese, et al.	
		Group Art Unit	2186	
		Examiner Name	Unknown	
1	of	1	Attorney Docket Number	CROSS1120-13
NON-PATENT LITERATURE DOCUMENTS				
	C4	CRD-5500, SCSI RAID CONTROLLER Users Manual, Rev. 1.3, November 21, 1996, pp. 1-92.		
	C5	Black Box, SCSI Fiberoptic Extender, Single-Ended, Product Insert, 2 pages, 1996.		
	C6	CRD-5500, SCSI RAID CONTROLLER OEM Manual, Rev. 1.3, February 26, 1996, pp. 1-54.		
	C7	CRD-5500, RAID DISK ARRAY CONTROLLER Product Insert, pp. 1-5.		
	C8	IBM Technical publication: Guide to Sharing and Partitioning IBM Tape Library Dataservers, November 1996, pp. 1-256.		
	C9	IBM Technical publication: Magstar and IBM 3590 High Performance Tape Subsystem Technical Guide, November 1996, pp. 1-269.		
Examiner Signature		Date Considered		

Gray Cary/AU4125651.1
103671990004

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	Atty. Docket No. (Opt.) CROSS1120-13
Applicants Geoffrey B. Hoese, et al.	
Application Number 10/658,163	Filed September 9, 2003
For STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE	
Group Art Unit 2186	Examiner Unknown



Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

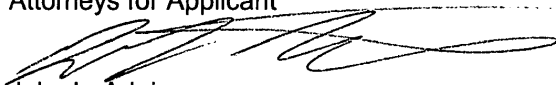
Certificate of Mailing
I hereby certify that this correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on <u>APRIL 29</u> , 2004.
 Laura M. McGuire

Applicants respectfully request, pursuant to 37 C.F.R. §§ 1.56, 1.97 and 1.98, that the art listed on the attached SB08A form be considered and cited in the examination of the above-identified application. A copy of the art is enclosed for the convenience of the Examiner. Furthermore, pursuant to 37 C.F.R. §§ 1.97(g) and (h), no representation is made that a search has been made or that this art is material to patentability of the present application.

Applicants respectfully submit that the claims of Applicants' above-referenced patent application are patentably distinguishable from these references.

Respectfully submitted,

Gray Cary Ware & Freidenrich LLP
Attorneys for Applicant



John L. Adair
Reg. No. 48,828

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Austin, Texas 78746
Tel. (512) 457-7142
Fax. (512) 457-7001

AUW126769.1
103671-990004

PTO/SB/08A (04-03)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT		Application Number		10/658,163		
		Filing Date		September 9, 2003		
		First Named Inventor		Geoffrey B. Hoese, et al.		
		Group Art Unit		2186		
		Examiner Name		Unknown		
Sheet	of 1	Attorney Docket Number		CROSS1120-13		
U.S. PATENT DOCUMENTS						
Examiner Initials	Cite No.	Document Number		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	
		Number	Kind Code (if known)			
		US-6219771	B1	04/17/2001	Kikuchi et al.	
		US-				
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		US-				
Examiner Initials	Cite No.	FOREIGN PATENT DOCUMENTS			Publication Date MM-DD-YYYY (Number 43)	Name of Patentee or Applicant of Cited Document
		Country Code	Number	Kind Code (if known)		
Examiner Signature					Date Considered	

Gray Cary\AU4126770.1
103671990004

05/18/04 17:36 FAX 512 457 7070

GRAY CARY-AUSTIN

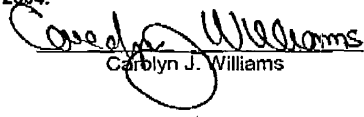
002

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE		MAY 18 2004
Supplement to Petition to Make Special Filed 11/21/03		Atty. Docket No. CROSS1120-13
Applicants: Goeffrey B. Hoese, et al.		
Application Number 10/658,163	Filed September 9, 2003	
For: Storage Router and Method for Providing Virtual Local Storage		
Group Art Unit	Confirmation Number:	

OFFICIAL

Via Facsimile 703-872-9306
 Mail Stop: Patent Application
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, VA 22313

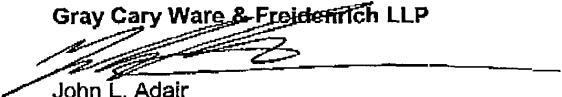
<u>Certification Under 37 C.F.R. §1.18</u>
I hereby certify that this correspondence is being facsimile transmitted to the United States Patent and Trademark Office on May 18, 2004.
 Carolyn J. Williams

Dear Sir:

On May 18, 2004, Geoffrey Gaifin of the United States Patent Trademark Office informed applicants that the Petition to Make Special Because of Actual Infringement Pursuant to 37 C.F.R. 1.102 and MPEP 708.02(II) (the "Petition") filed in the above referenced application on November 21, 2003 did not include a referenced Declaration of Robert Griswold in Support of the Petition to Make Special Because of Actual Infringement (the "Declaration"). According to Applicants' files, the Declaration was included with the Petition. For convenience, Applicants are hereby enclosing a copy of the Declaration

Respectfully submitted,

Gray Cary Ware & Freidenrich LLP


 John L. Adair
 Reg. No. 48,828

Dated: May 18, 2004

1221 South MoPac Expressway
 Suite 400
 Austin, TX 78746-6875
 Tel. (512) 457-7142
 Fax. (512) 457-7001

Gray Cary\ALJM128082.1
 103671-990004

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PAGE 2/4 * RCVD AT 5/18/2004 6:38:43 PM [Eastern Daylight Time] * SVR:USPTO-EFXXRF-1/0 * DNIS:8729306 * CSID:512 457 7070 * DURATION (mm-ss):01-10

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May 18, 2004

FAX TRANSMISSION COVER SHEET

To: Commissioner for Patents

Telephone:

Fax Number:

703-872-9306

From: John L. Adair
512-457-7142

Client-Matter Number:

103671.990004
CROSS1120-13

Re: Supplement to Petition to Make Special Filed 11/21/03

Pages: - 4 - (including this form)

Originals: will be mailed will not be mailed

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Fax Operator/Ext.

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AUSTIN LA JOLLA SACRAMENTO SAN DIEGO SAN FRANCISCO SEATTLE SILICON VALLEY WASHINGTON, DC

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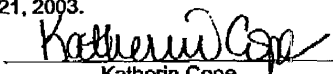
003

COPY

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
DECLARATION BY ROBERT GRISWOLD IN SUPPORT OF PETITION TO MAKE SPECIAL BECAUSE OF ACTUAL INFRINGEMENT	Atty. Docket No. (Opt.) CROSS1120-13
Applicant Geoffrey B. Hoese, et al.	
Application Number 10/658,163	Filed September 9, 2003
For Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit Unknown	Examiner Unknown
Confirmation Number: Unknown	

VIA FACSIMILE (703) 306-5404 and Express Mail

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Certificate of Mailing Under 37 C.F.R. 1.10
I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail No. EV351127304US in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on November 21, 2003.
 Katherin Cope

Dear Sir:

I, Robert Griswold, Vice President of Technology and Information and Chief Technologist of Crossroads Systems, Inc. (assignee of the above-referenced application) do hereby make the following declarations:

- The present application (United States Application Number 10/658,163) is an application filed September 9, 2001 as a continuation of U.S. Application Number 10/081,110, which in turn is a continuation of U.S. Application No. 09/354,682, now U.S. Patent No. 6,421,753, which in turn is a continuation of U.S. Application No. 09/001,799, now U.S. Patent No. 5,941,972.
- The present application includes, among others, claims to a storage router for providing virtual local storage on remote storage devices across two fibre channel transport media.
- I have become aware that an infringing device is currently on the market.

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PAGE 3/4 * RCVD AT 5/18/2004 6:38:43 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:512 457 7070 * DURATION (mm-ss):01-10

05/18/04 17:37 FAX 512 457 7070

GRAY CARY-AUSTIN

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Attorney Docket No.
CROSS1120-13

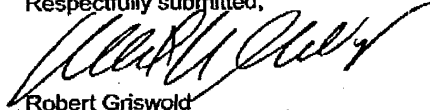
10/658,163
Customer ID: 25094

2

4. I have made a rigid comparison of the infringing device with the storage router claims of the present application and it is my opinion that at least one of the claims is unquestionably infringed.

5. I have a good knowledge of the pertinent art.

Respectfully submitted,



Robert Griswold
Vice President of Technology and Information
Chief Technologist
Crossroads Systems, Inc.

Date: November 21, 2003.

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Gray CaryAU4117814.1
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John L. Adair
GRAY, CARY, WARE & FREIDENRICH LLP
2000 University Avenue
E. Palo Alto CA 94303-2248

NOV 26 2004

DIRECTOR OFFICE
TECHNOLOGY CENTER 2100

In re Application of:
Goeffrey B. HOESE et al.
Application No. 10/658,163
Filed: September 9, 2003
For: STORAGE ROUTER AND METHOD FOR
PROVIDING VIRTUAL LOCAL
STORAGE

DECISION ON PETITION TO
MAKE SPECIAL UNDER
M.P.E.P. §708.02(II):
INFRINGEMENT

This is a decision on the petition, filed November 21, 2003, under 37 C.F.R. § 1.102(d) and M.P.E.P. §708.02(II): Infringement, to make the above-identified application special.

The petition is **GRANTED**.

A grantable petition under 37 C.F.R. § 1.102(d), and M.P.E.P. § 708.02, Section II, must be accompanied by payment of the fee under 37 C.F.R. § 1.17(h) and a statement under 37 C.F.R. § 1.102 by the applicant or assignee or statements by an attorney/agent registered to practice before the Patent and Trademark Office that (A) there is an infringing device or product actually on the market or method in use; (B) a *rigid comparison* of the alleged infringing device, product, or method with the claims of the application has been made, and that, in his or her opinion, some of the claims are **unquestionably infringed**; and (C) he or she has made or caused to be made a careful and thorough search of the prior art or has a good knowledge of the prior art. Applicant must provide one copy of each of the *references deemed most closely related* to the subject matter encompassed by the claims.

Applicant's submission meets all the criteria set out above. Accordingly, the Petition is **GRANTED**.

The application file is being forwarded to the Examiner of Record for expedited examination.

Vincent N. Trans
Special Program Examiner
Technology Center 2100
Computer Architecture, Software, and
Information Security
571-272-3613

10658163

PLUS Search Results for S/N 10658163, Searched January 12, 2005

The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present. PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

5941972	5991844	5263139	5950203
6041381	6101559	5283828	5948075
6421753	6148326	5289589	5964848
6425035	6154802	5313589	5987627
6425036	6247040	5357614	5996030
6446141	6249831	5394526	6029209
6738854	6321298	5454098	6029227
6763419	6493772	5493547	6044411
6772290	6534716	5497476	6065096
6772308	6557049	5515239	6078979
6772309	6591310	5546550	6092154
6789152	6608819	5555390	6105092
6118776	6697875	5560016	6122723
6151331	6757694	5564024	6141712
6185203	6763409	5572659	6157962
6199112	6766412	5611057	6161104
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6704809	5805920	5628014	6199194
6061360	6816917	5634111	6216202
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6243829	5396596	5696968	6385706
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5848251	5210855	5935260	6769021
5898828	5241508	5938747	6775702

10658163_CLS

Most Frequently Occurring Classifications of Patents Returned
From A Search of 10658163 on January 12, 2005

Original Classifications

10	711/114
7	710/1
7	710/5
7	711/112
5	710/305
5	710/312
4	709/226
4	710/302
4	710/8
4	711/163
4	711/164
4	714/6
3	370/351
3	707/10
3	710/100
3	710/104
3	710/19
3	710/315
3	711/162
2	370/455
2	707/205
2	709/219
2	709/250
2	710/15
2	710/2
2	710/301
2	710/306
2	710/316
2	710/62
2	710/74
2	711/133
2	711/153
2	714/4
2	714/42

Cross-Reference Classifications

15	711/114
10	711/112
8	710/5
8	714/6
7	710/33
7	711/170
7	711/173

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6 707/204
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6 710/74
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3 711/165
3 711/209
3 714/7
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Combined Classifications

25 711/114
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2 725/93
2 725/97

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- Drafts
- Pending
- Active
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- Saved
 - S1: (8) ("6789152") or ("6421753") or ("5941972") or ("6219771") or ("5491812") or ("
 - S2: (47) ("5941972") or ("6041381") or ("6421753") or ("6425035") or ("6425036") or
 - S3: (50) ("5991844") or ("6101559") or ("6148326") or ("6154802") or ("6247040") or
 - S4: (99) ("5263139") or ("5283828") or ("5289589") or ("5313589") or ("5357614") or
 - S5: (196) S2 S3 S4
 - S6: (19691) (fiber fibre) near5 channel\$3
 - S7: (97) S5 and S6
 - S8: (717) network near9 server near9 map\$4
 - S9: (19691) (fiber fibre) near5 channel\$3
 - S10: (22676) S8 with S9
 - S11: (0) S8 with S9
 - S12: (139) (disk stor\$4 medium) with S8
 - S13: (136) S9 with map\$4
 - S14: (59) lun near9 virtual
 - S15: (14710) storage near9 map\$4
 - S16: (19) S9 with S15
 - S18: (1) S9 with S17
 - S17: (409) fabric with map\$4
- Favorites
- Tagged (3)
- UDC
- Queue
- Trash

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	U	Document ID	Issue Date	Pages	Title	Current OR	Current XRef	Retrieval Classif
1	<input type="checkbox"/>	US 6842840 B1	20050111	16	Controller which determines presence of memory in a node of a data	711/172	365/185.05; 365/236;	Reohr, Jr.;
2	<input checked="" type="checkbox"/>	US 6834324 B1	20041221	13	System and method for virtual tape volumes	711/111	710/305; 711/203;	Wood; Ro
3	<input checked="" type="checkbox"/>	US 6834311 B2	20041221	22	Method, system, and program for enabling communication between	709/245	370/352; 370/355;	Rao; Ragh
4	<input checked="" type="checkbox"/>	US 6834139 B1	20041221		Link discovery and verification procedure using loopback	385/24	370/216; 370/222;	Prairie; Da
5	<input checked="" type="checkbox"/>	US 6831916 B1	20041214		Host-fabric adapter and method of connecting a host system to a	370/359	370/389; 370/429;	Parthasar
6	<input checked="" type="checkbox"/>	US 6829405 B1	20041207		Reconfigurable optical add-drop multiplexer	385/24	385/17	Wachsm
7	<input checked="" type="checkbox"/>	US 6829254 B1	20041207		Method and apparatus for providing efficient application-level switching	370/535	370/466	Rajahalm
8	<input checked="" type="checkbox"/>	US 6821385 B2	20041123		Method of manufacture of tissue	162/109	162/116;	Burazin; M

80



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UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,163	09/09/2003	Geoffrey B. Hoese	CROSS1120-13	5675
25094	7590	01/27/2005	EXAMINER	
DLA PIPER RUDNICK GRAY CARY US, LLP 2000 University Avenue E. Palo Alto, CA 94303-2248			SHIN, CHRISTOPHER B	
			ART UNIT	PAPER NUMBER
			2182	
DATE MAILED: 01/27/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/658,163	Applicant(s) HOESE ET AL.	
	Examiner Christopher B Shin	Art Unit 2182	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on ____.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 15-53 is/are pending in the application.

4a) Of the above claim(s) ____ is/are withdrawn from consideration.

5) Claim(s) ____ is/are allowed.

6) Claim(s) 15-53 is/are rejected.

7) Claim(s) ____ is/are objected to.

8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 09 September 2003 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.

2. Certified copies of the priority documents have been received in Application No. ____.

3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____.
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>2,4 & 5/2004</u> .	6) <input type="checkbox"/> Other: ____.

Application/Control Number: 10/658,163
Art Unit: 2182

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DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the gist of the claimed limitation regarding the first & second mediums being a Fibre Channel protocol type, without adding any new matter, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.
2. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Application/Control Number: 10/658,163
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3. The drawings are objected to under 37 CFR 1.83(a) because they fail to show the claimed limitation regarding the first & second mediums being a Fibre Channel protocol type, without adding any new matter, as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Application/Control Number: 10/658,163
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Page 4

Specification

4. The abstract of the disclosure is objected to because the gist of the present claimed invention regarding the first & second transport mediums being a Fibre Channel protocol is not accurately disclosed by the abstract. Correction is required. See MPEP § 608.01(b).

5. The disclosure is objected to because of the following informalities: the entire disclosure does not accurately disclose the gist of the present claimed invention regarding the first & second transport medium being Fibre Channel protocol type. This applies to all of the sections of the disclosure.

Appropriate correction is required.

Unclear Claimed Definition

6. IN an attempt to expedite prosecution, numerous telephone interview attempts were made to clarify the following questions on January 18th, 19th, & 20th of 2005 to the attorney of record, but the examiner was unable to reach the attorney.

7. After careful consideration of the present claims 15-53, the examiner would like the applicant to clearly and explicitly define the following terms/questions in two parts.

- a. First part-clear and explicit indented definition of the following terms in accordance with the support of the specification; and
- b. Second part-detailed sections of the specifications that supports the following terms which the applicant relies on for the support of the claims 15-53.
 - i. "mapping";

Application/Control Number: 10/658,163

Page 5

Art Unit: 2182

- ii. native low level, block protocols; and
 - iii. first transport & second transport medium being both Fibre Channel Protocol.
- c. The applicant's cooperation would be greatly appreciated. Failure to respond answer may cause delay and/or improper interpretation of the present claims.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 15-53 are rejected under 35 U.S.C. 112, first paragraph, because the best mode contemplated by the inventor has not been disclosed. Evidence of concealment of the best mode is based upon the fact that the disclosure does not clearly disclose any details of the present claims regarding the first & second mediums being both Fibre Channel transport as a whole.

10. Claims 15-53 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The disclosure does not clearly disclose any details of the present claims regarding the first & second mediums being both Fibre Channel transport as a whole.

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11. Claims 15-53 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The disclosure does not clearly disclose any details of the present claims regarding the first & second mediums being both Fibre Channel transport as a whole is critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

12. Claims 15-53 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the first and second mediums being different types of transport medium as disclosed in the specification, does not reasonably provide enablement for the details of the present claims regarding the first & second mediums being both Fibre Channel transport as a whole. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to support the invention commensurate in scope with these claims.

Double Patenting Rejection

13. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

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Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

14. Claim 15-53 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-14 of U.S. Patent No. 5,941,972.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the 972 patent claims a subject matter that are substantially identical to the present claimed invention.

15. Claim 15-53 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-14 of U.S. Patent No. 6,425,035.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the 035 patent claims a subject matter that are substantially identical to the present claimed invention.

16. Claim 15-53 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-23 of U.S. Patent No. 6,738,854.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the 972 patent claims a subject matter that are substantially identical to the present claimed invention.

17. Claim 15-53 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-10 of U.S. Patent No. 6,763,419

Although the conflicting claims are not identical, they are not patentably distinct from each other because the 419 patent claims a subject matter that are substantially identical to the present claimed invention.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher B Shin whose telephone number is 571-272-4159. The examiner can normally be reached on 6:30-5:00 M,Tu,Th,F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey Gaffin can be reached on 703-308-3301. The fax phone number for the organization where this application or proceeding is assigned is 571-272-4146

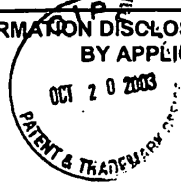
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Christopher Shin
Primary Examiner
Of 2182

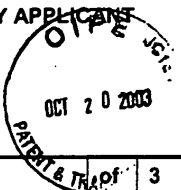


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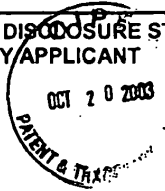
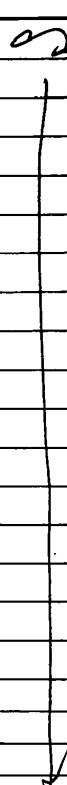
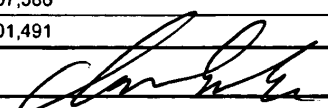
PTO/SB/08A (04-03)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT 				Application Number		10/658,163	
				Filing Date		September 9, 2003	
				First Named Inventor		Geoffrey Hoese RECEIVED	
				Group Art Unit		Unknown OCT 22 2003	
				Examiner Name		Unknown	
Sheet	1	of	3	Attorney Ref. Number		CROSS1120-13 Technology Center 2100	
U.S. PATENT DOCUMENTS							
Examiner Initials	Cite No.	Document Number			Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines Where Relevant Passages or Figures Appear
		Number	Kind Code (if known)				
	A1	5,748,924	--		05/05/98	Llorens, et al.	
	A2	5,768,623	--		06/16/98	Judd, et al.	
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	B3	WO	99/34297	A1	07/08/99	Crossroads Systems, Inc.	
	B4	EP	0810 530	A2	12/03/97	Sun Microsystems, Inc.	
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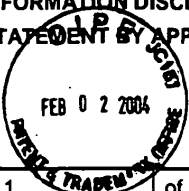

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		Group Art Unit		Unknown Technology Center 2100		
		Examiner Name		Unknown		
Sheet	3	Attorney Ref. Number		CROSS1120-10		
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<i>[Handwritten mark]</i>	A40	5,347,384	--	09/13/94	McReynolds et al.	
<i>[Handwritten arrow pointing down]</i>	A41	5,423,044	--	06/06/95	Sutton et al.	
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	A49	6,134,617	--	10/17/00	Weber	
	A50	6,073,209	--	06/06/00	Bergsten	
Examiner Signature		<i>[Handwritten Signature]</i>		Date Considered	<i>1-18-05</i>	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT			Application Number	Unknown			
			Filing Date	Herewith			
			First Named Inventor	Geoffrey Hoese RECEIVED			
			Group Art Unit	Unknown OCT 22 2003			
			Examiner Name	Unknown			
Sheet	2	of	3	Attorney Ref. Number	CROSS1120-16 Technology Center 2100		
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		Number	Kind Code (if known)				
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PTO/SB/08A (04-03)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT 		Applicati n Number	10/658,163		
		Filing Date	September 9, 2003		
		First Named Inventor	Geoffrey B. Hoese, et al.		
		Group Art Unit	2186		
		Examiner Name	Unknown		
Sheet	1	of	1	Attorney Docket Number	CROSS1120-13
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	C1	DIGITAL StorageWorks, Using Your HSZ70 Array Controller in a SCSI Controller Shelf (DS-BA356-M Series), <i>User's Guide</i> , pp. 1-1 through A-5 with index, January 1998.			
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	C3	DIGITAL StorageWorks, HSZ70 Array Controller HSOF Version 7.0, <i>CLI Reference Manual</i> , pp. 1-156, July 1997.			
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PTO/SB/08A (04-03)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT			Application Number		10/658,163	
			Filing Date		September 9, 2003	
			First Named Inventor		Geoffrey B. Hoese, et al.	
			Group Art Unit		2186	
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		Number	Kind Code (if known)			
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Examiner Signature				Date Considered	1-18-05	

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Notice of References Cited	Application/Control No. 10/658,163	Applicant(s)/Patent Under Reexamination HOESE ET AL.	
	Examiner Christopher B Shin	Art Unit 2182	Page 1 of 1

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*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A US-6,421,753	07-2002	Hoese et al.	710/305
	B US-6,789,152	09-2004	Hoese et al.	710/305
	C US-6,763,419	07-2004	Hoese et al.	709/250
	D US-6,738,854	05-2004	Hoese et al.	710/305
	E US-6,425,035	07-2002	Hoese et al.	710/105
	F US-5,941,972	08-1999	Hoese et al.	710/315
	G US-6,185,203	02-2001	Berman, Stuart B.	370/351
	H US-5,978,379	11-1999	Chan et al.	370/403
	I US-6,000,020	12-1999	Chin et al.	711/162
	J US-			
	K US-			
	L US-			
	M US-			

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*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
	O				
	P				
	Q				
	R				
	S				
	T				

NON-PATENT DOCUMENTS

*	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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	V
	W
	X

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.



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CONFIRMATION NO. 5675

Bib Data Sheet

SERIAL NUMBER 10/658,163	FILING DATE 09/09/2003 RULE	CLASS 710	GROUP ART UNIT 2182	ATTORNEY DOCKET NO. CROSS1120-13
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APPLICANTS

Geoffrey B. Hoese, Austin, TX;

Jeffry T. Russell, Cibolo, TX;

** CONTINUING DATA *****

This application is a CON of 10/081,110 02/22/2002 PAT 6,789,152
 which is a CON of 09/354,682 07/15/1999 PAT 6,421,753
 which is a CON of 09/001,799 12/31/1997 PAT 5,941,972

** FOREIGN APPLICATIONS *****

IF REQUIRED, FOREIGN FILING LICENSE GRANTED
 ** 12/11/2003

** SMALL ENTITY **

Foreign Priority claimed 35 USC 119 (a-d) conditions met Verified and Acknowledged	<input type="checkbox"/> yes <input checked="" type="checkbox"/> no <input type="checkbox"/> yes <input checked="" type="checkbox"/> no <input checked="" type="checkbox"/> Met after Allowance Examiner's Signature: <i>[Signature]</i> Initials: <i>[Initials]</i>	STATE OR COUNTRY TX	SHEETS DRAWING 2	TOTAL CLAIMS 39	INDEPENDENT CLAIMS 7
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ADDRESS

25094
 DLA PIPER RUDNICK GRAY CARY US, LLP
 2000 University Avenue
 E. Palo Alto , CA
 94303-2248

TITLE

Storage router and method for providing virtual local storage

FILING FEE RECEIVED 779	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:	<input type="checkbox"/> All Fees
		<input type="checkbox"/> 1.16 Fees (Filing)
		<input type="checkbox"/> 1.17 Fees (Processing Ext. of time)
		<input type="checkbox"/> 1.18 Fees (Issue)
		<input type="checkbox"/> Other _____

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
INFORMATION DISCLOSURE STATEMENT BY APPLICANTS	Atty. Docket No. (Opt.) CROSS1120-13
Applicant Geoffrey B. Hoese, et al.	
Application Number 10/658,163	Date Filed 09/09/2003
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Shin, Christopher B.
Confirmation Number: 5675	
Certification Under 37 C.F.R. §1.8	
I hereby certify that this document is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313 on July <u>13</u> , 2005.	
<i>Janice Pampell</i> Janice Pampell	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

Applicants respectfully request, pursuant to 37 C.F.R. §§ 1.555, 1.56, 1.97 and 1.98, that the art listed on the attached SBO8-A and SBO8-B forms be considered and cited in the examination of the above-identified application. Since the present Application was filed after June 30, 2003, a copy of any U.S. Patent and any U.S. Patent Application Publications cited on the attached SBO8-A form is not being submitted with this Information Disclosure Statement pursuant to the waiver of 37 C.F.R. § 1.98(a)(2)(i) by the U.S. Patent and Trademark Office. Several documents are included on the enclosed CD-Rom, as well as hard copies for the convenience of the Examiner.

Furthermore, pursuant to 37 C.F.R. §§ 1.97(g) and (h), no representation is made that a search has been made or that this art is material to patentability of the present application. Applicants respectfully submit that the claims of Applicants' above-referenced patent is patentably distinguishable from these references. Applicants respectfully request consideration of these references. The Commissioner is hereby authorized to charge any fees due, or refund any credit, to Deposit Account No. 50-3183 of Sprinkle IP Law Group for any fee under 37 C.F.R. §1.17.

07/26/2005 CNGUYEN2 00000075 10658163

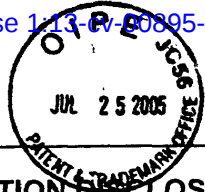
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Respectfully submitted,
Sprinkle IP Law Group
Attorneys for Applicants

[Signature]
John L. Adair
Reg. No. 48,828

Dated: July 13, 2005.
1301 W. 25th Street, Suite 408
Austin, TX 78705
T. 512-637-9220 / F. 512-371-9088



PTO/SB/08A (04-03)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number		10/658,163
				Filing Date		09/09/2003
				First Named Inventor		Hoese, Geoffrey
				Group Art Unit		2182
				Examiner Name		Shin, Christopher B.
Sheet	1	OF	4	Attorney Docket Number		CROSS1120-13
U.S. PATENT DOCUMENTS						
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			Group Art Unit	2182	
			Examiner Name	Shin, Christopher B.	
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				Group Art Unit	2182
				Examiner Name	Shin, Christopher B.
Sheet	7	of	7	Atty Docket Number	CROSS1120-13
Examiner Initials	Cite No.	OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS			Date
	C114	CrossPoint 4400 Fibre to Channel to SCSI Router Preliminary Datasheet; Crossroads Company and Product Overview (Quisenberry Ex 4 (CRDS 25606; 16136)) (CD-ROM Chaparral Exhibits D167).			
	C115	Crossroads Purchase Order Log (Quisenberry Ex 9 (CRDS 14061-062)) (CD-ROM Chaparral Exhibits D172).			
	C116	RAID Manager 5 with RDAC 5 for UNIX V.4 User's Guide (LSI-01854) (CD-ROM Chaparral Exhibits P062).			9/1/1996
	C117	Letter dated May 12, 1997 from Alan G. Leal to Barbara Bardach enclosing the original OEM License and Purchase Agreement between Hewlett-Packard Company and Crossroads Systems, Inc. (CRDS 02057) (CD-ROM Chaparral Exhibits P130).			
	C118	CR4x00 Product Specification (CRDS 43929) (CD-ROM Chaparral Exhibits P267).			6/1/1998
	C119	Symbios Logic – Hardware Functional Specification for the Symbios Logic Series 3 Fibre Channel Disk Array Controller Model 3701 (Engelbrecht Ex 3 (LSI-1659-1733) (CD-ROM Pathlight Exhibits D074).			
	C120	Report of the Working Group on Storage I/O for Large Scale Computing; Department of Computer Science Duke University: CS-1996-21 (PTI 173330-347). (CD-ROM Pathlight Exhibits D098).			
	C121	Brian Allison's 1999 Third Quarter Sales Plan (PDX 38) CNS 022120-132)) (CD-ROM Pathlight Exhibits D201).			6/5/2001
	C122	Brooklyn SCSI-SCSI Intelligent External RAID Bridge Definition Phase External Documentation (CD-ROM Pathlight Exhibits D129).			
Examiner Signature				Date Considered	

ARTIFACT SHEET

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	pages of specification	<input type="checkbox"/>
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	and/or table	
	Doc Code: Artifact	
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P. 01



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TO: U.S. Patent Office **Fax#:** 571/273-8300
FROM: Julie H. Blackard **Client Matter #:** CROSS1120-13
Legal Secretary
DATE: 07/26/05 **# of Pages:** 2
RE: Revocation and Power of Attorney

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PAGE 1/2 * RCVD AT 7/26/2005 10:36:24 AM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/26 * DNIS:2738300 * CSID:5123719088 * DURATION (mm-ss):01-10

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P. 02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
REVOCATION AND POWER OF ATTORNEY AND CHANGE OF MAILING ADDRESS	Atty. Docket No. (Opt.) CROSS1120-13
Applicants Geoffrey B Hoese, et. al.	RECEIVED CENTRAL FAX CENTER
Application Number 10/658,163	Filed 9/9/2003 JUL 26 2005
For STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE	
Group Art Unit 2186	Examiner Unknown
Confirmation No. 5675	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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Certification Under 37 C.F.R. §1.8	
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I hereby state I am authorized to act on behalf of **CROSSROADS SYSTEMS, INC.**

Respectfully submitted,

Crossroads Systems, Inc.

Dated: 8/11, 2004

By: *[Signature]*
Robert Sims, President & CEO

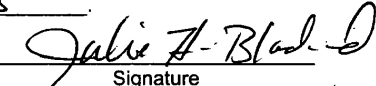
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
REPLY TO OFFICE ACTION DATED 01/27/2005	Atty. Docket No. CROSS1120-13



Applicant Geoffrey B. Hoese	
Application Number 10/658,163	Date Filed 09/09/2003
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Shin, Christopher B.
Confirmation Number: 5675	

Commissioner for Patents
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In response to the Official Action mailed January 27, 2005, Applicant respectfully requests the Examiner reconsider the rejections of the Claims in view of the this reply.

IN THE ABSTRACT:

Please amend the abstract as follows:

A storage router (56) and storage network (50) provide virtual local storage on remote SCSI storage devices (60, 62, 64) to Fiber Channel devices. A plurality of Fiber Channel devices, such as workstations (58), are connected to a Fiber Channel transport medium (52), and a plurality of SCSI storage devices (60, 62, 64) are connected to a SCSI bus second Fibre Channel transport medium (54). The storage router (56) interfaces between the Fiber Channel transport media medium (52) and the SCSI bus transport medium (54). The storage router (56) maps between the workstations (58) and the SCSI storage devices (60, 62, 64) and implements access controls for storage space on the SCSI storage devices (60, 62, 64). The storage router (56) then allows access from the workstations (58) to the SCSI storage devices (60, 62, 64) using native low level, block protocol in accordance with the mapping and the access controls.

IN THE CLAIMS:

Please amend the claims as follows. The claims are in the format as required by 35 C.F.R. § 1.121.

1-14 Cancelled

15. (Previously Presented) A storage router for providing virtual local storage on remote storage devices to a device, comprising:
a buffer providing memory work space for the storage router;
a first Fibre Channel controller operable to connect to and interface with a first Fibre Channel transport medium;
a second Fibre Channel controller operable to connect to and interface with a second Fibre Channel transport medium; and
a supervisor unit coupled to the first and second Fibre Channel controllers and the buffer, the supervisor unit operable:
to maintain a configuration for remote storage devices connected to the second Fibre Channel transport medium that maps between the device and the remote storage devices and that implements access controls for storage space on the remote storage devices; and
to process data in the buffer to interface between the first Fibre Channel controller and the second Fibre Channel controller to allow access from Fibre Channel initiator devices to the remote storage devices using native low level, block protocol in accordance with the configuration.

16. (Previously Presented) The storage router of claim 15, wherein the configuration maintained by the supervisor unit includes an allocation of subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device.

17. (Previously Presented) The storage router of claim 16, wherein the Fibre Channel devices comprise workstations.

18. (Previously Presented) The storage router of claim 16, wherein the remote storage devices comprise hard disk drives.

19. (Previously Presented) The storage router of claim 15, wherein each of the first Fibre Channel controller comprises:

- a Fibre Channel (FC) protocol unit operable to connect to the Fibre Channel transport medium;
- a first-in-first-out queue coupled to the Fibre Channel protocol unit; and
- a direct memory access (DMA) interface coupled to the first-in-first-out queue and to the buffer.

20. (Previously Presented) A storage network, comprising:

- a first Fibre Channel transport medium;
- a second Fibre Channel transport medium;
- a plurality of workstations connected to the first Fibre Channel transport medium;
- a plurality of storage devices connected to the second Fibre Channel transport medium;

and

a storage router interfacing between the first Fibre Channel transport medium and the second Fibre Channel transport medium, the storage router providing virtual local storage on the storage devices to the workstations and operable:

- to map between the workstations and the storage devices;
- to implement access controls for storage space on the storage devices; and
- to allow access from the workstations to the storage devices using native low level, block protocol in accordance with the mapping and access controls.

21. (Previously Presented) The storage network of claim 20, wherein the access controls include an allocation of subsets of storage space to associated workstations, wherein each subset is only accessible by the associated workstation.

22. (Previously Presented) The storage network of claim 20, wherein the storage devices comprise hard disk drives.

23. (Previously Presented) The storage network of claim 20, wherein the storage router comprises:

a buffer providing memory work space for the storage router;

a first Fibre Channel controller operable to connect to and interface with the first Fibre Channel transport medium, the first Fibre Channel controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer;

a second Fibre Channel controller operable to connect to and interface with the second Fibre Channel transport medium, the second Fibre Channel controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer; and

a supervisor unit coupled to the first and second Fibre Channel controllers and the buffer, the supervisor unit operable:

to maintain a configuration for the storage devices that maps between workstations and storage devices and that implements the access controls for storage space on the storage devices; and

to process data in the buffer to interface between the first Fibre Channel controller and the second Fibre Channel controller to allow access from workstations to storage devices in accordance with the configuration.

24. (Previously Presented) A method for providing virtual local storage on remote storage devices to Fibre Channel devices, comprising:

interfacing with a first Fibre Channel transport medium;

interfacing with a second Fibre Channel transport medium;

maintaining a configuration for remote storage devices connected to the second Fibre Channel transport medium that maps between Fibre Channel devices and the remote storage devices and that implements access controls for storage space on the remote storage devices; and

allowing access from Fibre Channel initiator devices to the remote storage devices using native low level, block protocol in accordance with the configuration.

25. (Previously Presented) The method of claim 24, wherein maintaining the configuration includes allocating subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device.

26. (Previously Presented) The method of claim 25, wherein the Fibre Channel devices comprise workstations.

27. (Previously Presented) The method of claim 25, wherein the remote storage devices comprise hard disk drives.

28. (Previously Presented) An apparatus for providing virtual local storage on a remote storage device to a device operating according to a Fibre Channel protocol, comprising:
a first controller operable to connect to and interface with a first transport medium, wherein the first transport medium is operable according to the Fibre Channel protocol;
a second controller operable to connect to and interface with a second transport medium, wherein the second transport medium is operable according to the Fibre Channel protocol; and
a supervisor unit coupled to the first controller and the second controller, the supervisor unit operable to control access from the device connected to the first transport medium to the remote storage device connected to the second transport medium using native low level, block protocols according to a map between the device and the remote storage device.

29. (Previously Presented) The apparatus of Claim 28, wherein the supervisor unit is further operable to maintain a configuration wherein the configuration includes the map between the device and the remote storage device, and further wherein the map includes virtual LUNs that provide a representation of the storage device.

30. (Previously Presented) The apparatus of Claim 29, wherein the map only exposes the device to LUNs that the device may access.

31. (Previously Presented) The apparatus of Claim 28, wherein the supervisor unit is further operable to maintain a configuration including the map, wherein the map provides a mapping from a host device ID to a virtual LUN representation of the remote storage device to a physical LUN of the remote storage device.

32. (Previously Presented) The apparatus of Claim 28, wherein the remote storage device further comprises storage space partitioned into virtual local storage for the device connected to the first transport medium.

33. (Previously Presented) The apparatus of Claim 32, wherein the supervisor unit is further operable to prevent the device from accessing any storage on the remote storage device that is not part of a virtual local storage partition assigned to the device

34. (Previously Presented) The apparatus of Claim 28, wherein the first controller and the second controller further comprise a single controller.

35. (Previously Presented) A system for providing virtual local storage on remote storage devices, comprising:

- a first controller operable to connect to and interface with a first transport medium operable according to a Fibre Channel protocol;

- a second controller operable to connect to and interface with a second transport medium operable according to the Fibre Channel protocol;

- at least one device connected to the first transport medium;

- at least one storage device connected to the second transport medium; and

- an access control device coupled to the first controller and the second controller, the access control device operable to:

- map between the at least one device and a storage space on the at least one storage device; and

- control access from the at least one device to the at least one storage device using native low level, block protocol in accordance with the map.

36. (Previously Presented) The system of Claim 35, wherein the access control device is further operable to maintain a configuration wherein the configuration includes the map between the at least one device and the at least one storage device, and further wherein the map includes virtual LUNs that provide a representation of the at least one storage device.

37. (Previously Presented) The system of Claim 36, wherein the map only exposes the at least one device to LUNs that the at least one device may access.

38. (Previously Presented) The system of Claim 35, wherein the access control device is further operable to maintain a configuration including the map, wherein the map provides a mapping from a host device ID to a virtual LUN representation of the at least one storage device to a physical LUN of the at least one storage device.

39. (Previously Presented) The system of Claim 35, wherein the at least one storage device further comprises storage space partitioned into virtual local storage for the at least one device.

40. (Previously Presented) The system of Claim 39, wherein the access control unit is further operable to prevent at least one device from accessing any storage on the at least one storage device that is not part of a virtual local storage partition assigned to the at least one device.

41. (Previously Presented) The system of Claim 35, wherein the first controller and the second controller further comprise a single controller.

42. (Previously Presented) A method for providing virtual local storage on remote storage devices, comprising:

mapping between a device connected to a first transport medium and a storage device connected to a second transport medium, wherein the first transport medium and the second transport medium operate according to a Fibre Channel protocol;

implementing access controls for storage space on the storage device; and

allowing access from the device connected to the first transport medium to the storage device using native low level, block protocols.

43. (Previously Presented) The method of Claim 42, further comprising maintaining a configuration wherein the configuration includes a map between the device and the one storage

device, and further wherein the map includes virtual LUNs that provide a representation of the storage device.

44. (Previously Presented) The method of Claim 43, wherein the map only exposes the device to LUNs that the device may access.

45. (Previously Presented) The method of Claim 42, further comprising maintaining a configuration including a map from a host device ID to a virtual LUN representation of the storage device to a physical LUN of the storage device.

46. (Previously Presented) The method of Claim 42, further comprising partitioning storage space on the storage device into virtual local storage for the device.

47. (Previously Presented) The method of Claim 46, further comprising preventing the device from accessing any storage on the storage device that is not part of a virtual local storage partition assigned to the device.

48. (Previously Presented) A system for providing virtual local storage, comprising:
a host device;
a storage device remote from the host device, wherein the storage device has a storage space;
a first controller;
a second controller
a first transport medium operable according to a Fibre Channel protocol, wherein the first transport medium connects the host device to the first controller;
a second transport medium operable according to the Fibre Channel protocol, wherein the second transport medium connects the second controller to the storage device;
a supervisor unit coupled to the first controller and the second controller, the supervisor unit operable to:
maintain a configuration that maps between the host device and at least a portion of the storage space on the storage device; and

implement access controls according to the configuration for the storage space on the storage device using native low level, block protocol.

49. (Previously Presented) The system of Claim 48, wherein the supervisor unit is further operable to:

maintain a configuration that maps from the host device to a virtual representation of at least a portion of the storage space on the storage device to the storage device; and

allow the host device to access only that portion of the storage space that is contained in the map.

50. (Previously Presented) The system of Claim 49, wherein the configuration comprises a map from a host device ID to a virtual LUN representation of the storage device to a physical LUN of the storage device.

51. (Previously Presented) The system of Claim 48, wherein the storage device further comprises storage space partitioned into virtual local storage for the host device.

52. (Previously Presented) The system of Claim 51, wherein the supervisor unit is further operable to prevent the host device from accessing any storage on the storage device that is not part of a virtual local storage partition assigned to the host device.

53. (Previously Presented) The apparatus of Claim 48, wherein the first controller and the second controller further comprise a single controller.

REMARKS

The Examiner requested that the Applicants clarify several terms in the claims and point out support for a system with two Fibre Channel transport media. Applicants appreciate the Examiner's efforts to expedite prosecution and address the Examiner's request for particular definitions and showings of support in the remarks provided below.

I. Objections to Drawings

The drawings stand objected to as failing to comply with 37 C.F.R. § 1.83(a) as not showing every feature of the invention specified in the claims because they do not show the claimed limitation regarding the first and second media being a Fibre Channel protocol type. Applicants note, however, that such a drawing is only required "where necessary for the understanding of the subject matter sought to be patented." As discussed in more detail below, the Specification discloses an implementation in which the initiator is a Fibre Channel initiator, the target is a Fibre Channel target. See Specification at page 15, lines 12-17. Specifically, the Specification states that the "storage router has various modes of operation that are possible between FC and SCSI target and initiator combinations. These modes are: FC Initiator to SCSI Target; SCSI Initiator to FC Target; SCSI Initiator to SCSI Target; **and FC Initiator to FC Target.**" *Id.* (emphasis added). The figures provided in the invention, along with the Specification, provide additional information relating to the invention in detail necessary to support this FC initiator to FC target embodiment. One of skill in the art would not require an additional drawing to understand that a workstation (or other initiator) can be connected to the storage router via Fibre Channel and a storage device (or other target) can be connected to the storage router via Fibre Channel. Therefore, Applicants submit that such a drawing showing a storage router connected to two Fibre Channel transport mediums is not necessary for an understanding of the invention and not required under 37 C.F.R. § 1.83(a). Accordingly, withdrawal of this rejection is respectfully requested.

II. Objection to Specification

The Examiner also objected to the Abstract and the Specification. Applicants have amended the Abstract to describe that the two transport media are Fibre Channel.

Furthermore, the Specification specifically discloses a Fibre Channel Initiator-to-Fibre Channel target mode at page 15, lines 12-17:

The storage router has various modes of operation that are possible between FC and SCSI target and initiator combinations. These modes are: FC Initiator to SCSI Target; SCSI Initiator to FC Target; SCSI Initiator to SCSI Target; **and FC Initiator to FC Target.** (Emphasis Added).

Thus, the Specification specifically recites that one embodiment of the invention is a FC initiator device and a FC target storage device. This FC initiator to FC storage device embodiment is entirely consistent with the recitations in claims 15-53.

In fact, the Specification goes further and discloses two additional particular embodiment of the Fibre Channel Initiator-to-Fibre Channel target mode at page 15, lines 17-25:

The first two modes can be supported concurrently in a single storage router device are discussed briefly below. The third mode can involve two storage router devices back to back and can serve primarily as a device to extend the physical distance beyond that possible via a direct SCSI connection. **The last [FC Initiator to FC Target] mode can be used to carry FC protocols encapsulated on other transmission technologies (e.g. ATM, SONET), or to act as a bridge between two FC loops (e.g. as a two port fabric).** (Emphasis Added).

This description clearly shows that the last mode (the FC initiator to FC target mode where both the transport medium to which a host is connected and the transport medium to which the storage device is connected is a Fibre Channel transport medium) can done in a variety of ways, including the examples recited where (1) the FC protocols are carried on other transmission technologies and (2) the storage router acts as a bridge between two FC loops. The Specification therefore discloses an invention that includes a FC initiator to FC target embodiment, along with two distinct examples of that embodiment. Therefore, Applicants respectfully request withdrawal of this objection.

III. Claim Term Definitions

The Examiner also requested the Applicant provide definitions for several claim terms. As the Examiner is aware, the claims in US Patent No. 5, 941, 972 have been interpreted by

the U.S. Federal District Court in the case *Crossroads v. Chaparral Network Storage, Inc.*, Western District of Texas, Civil Action No. A-00-CA-217-SS and *Crossroads Systems (Texas), Inc., v. Pathlight Technology, Inc.*, Western District of Texas, Civil Action No. A-00CA-248-JN (collectively, the "Chaparral Litigation"). In that case, the Federal District Court issued a Joint Markman Order (the "Markman Order") interpreting the terms "native, low level block protocol" and "map". Applicant will rely on both the Specification and this Markman Order in response to the Examiner's request to define these terms.

A. Native Low Level Block Protocol ("NLLBP")

The term "native low level block protocol" (or "NLLBP") is a protocol that enables computers to exchange information that does not involve the overhead of high level protocols and file systems typically required by network servers. This definition is supported in the Specification and prior litigation interpreting this claim term.

According to the invention, the host computers connected to the first transport medium are allowed to access the remote storage devices using a NLLBP. In systems prior to the present invention, when making a request to storage through a network server to allow access between workstations and remote storage devices, a workstation typically had to translate the requests from its file system protocols to higher level network protocols in order to communicate with the network server, and the network server would then translate them into low level requests to the storage device(s). In contrast, as described in the Specification, allowing a host to access storage devices using a NLLBP provides a mechanism by which communication between the host and the storage devices can be accomplished faster because there is no need to translate from a network protocol to a NLLBP. See Specification, page 2, line 17-page 3, line 13; page 7, line 17-26 (distinguishing an NLLBP from higher-level protocols by contrasting the present invention (allowing access using NLLBP) to prior art solutions (which allowed access using network protocols requiring translation to NLLBP)). Thus, the Specification points out that a native low level block protocol is one that does not involve the overhead of high level protocols used by network servers.

Furthermore, in the Chaparral Litigation the Federal District Court issued its Markman Order defining the term "NLLBP" as follows: "a set of rules or standards that enable computers to exchange information and do not involve the overhead of high level protocols and file systems typically required by network servers." A copy of the Markman Order is attached

hereto as Exhibit A. This construction and the validity of the '972 Patent was upheld by the Federal Circuit. A copy of the Federal Circuit decision affirming the decision of the lower court is attached hereto as Exhibit B. Thus, based on both the Specification and the Markman Order, an NLLBP is a protocol that enables computers to exchange of information without the overhead of high-level protocols and file systems typically required by network servers.

B. Mapping

The term "mapping" means to create a path from a host device on one side of the storage router to a device on the other side of the router where a map contains a representation of the devices on each side of the storage router, so that when a device on one side of the storage router wants to communicate to a device on the other side of the storage router, the storage router can connect the devices. This definition is supported by the Specification and prior litigation interpreting this claim term.

Mapping between devices connected to the first transport medium and storage devices in the present application refers to a mapping between the workstations/host computers and storage devices such that a particular workstation/host computer on the first transport medium is associated with a storage device, storage devices or portion thereof on the second transport medium. As discussed in the Specification, the mapping provides a correlation between devices on the first data transport medium and the storage devices through one or more steps, and can, for example, be implementing through the use of mapping tables. See, Specification, page 4, lines 15-21; page 4, line 28-page 5, line 6; page 9, lines 7-8, page 10, lines 4-7 and page 22, lines 8-11. Thus, the Specification points out that mapping provides a correlation between a host device and a storage device so as to create a path the storage router can use to connect the host device to the storage device.

Additionally, the Federal District Court in the Chaparral Litigation defined the term "map" in its Markman Order as follows: "to create a path from a device on one side of the storage router to a device on the other side of the router, i.e., from a Fibre Channel device to a SCSI device (or vice-versa). A map contains a representation of devices on each side of the storage router, so that when a device on one side of the storage router wants to communicate to a device on the other side of the storage router, the storage router can connect the devices." See, Markman Order, Exhibit A, page 12. Thus, the mapping of the present invention associates a representation of the host device(s) on the first transport medium with a

representation of the storage devices on the second transport medium to create a path between the hosts and the remote storage devices (or portion(s) thereof).

C. Support for Fibre Channel-to-Fibre Channel Implementation

As discussed above, the Specification discloses a Fibre Channel Initiator-to-Fibre Channel target mode. See, Specification, page 15, lines 12-25.

The storage router has various modes of operation that are possible between FC and SCSI target and initiator combinations. These modes are: FC Initiator to SCSI Target; SCSI Initiator to FC Target; SCSI Initiator to SCSI Target; **and FC Initiator to FC Target.** (Emphasis Added). The first two modes can be supported concurrently in a single storage router device are discussed briefly below. The third mode can involve two storage router devices back to back and can serve primarily as a device to extend the physical distance beyond that possible via a direct SCSI connection. **The last [FC Initiator to FC Target] mode can be used to carry FC protocols encapsulated on other transmission technologies (e.g. ATM, SONET), or to act as a bridge between two FC loops (e.g. as a two port fabric).** (Emphasis Added).

Thus, the Specification specifically recites that one embodiment of the invention is a FC initiator device and a FC target storage device. This FC initiator to FC storage device embodiment is entirely consistent with the recitations in claims 15-53.

IV. Rejections Under 35 U.S.C. §112

The Examiner rejected Claim 15-53 under 35 U.S.C. §112, first paragraph, because the Examiner asserts that i) the best mode contemplated by the inventor has not been disclosed and ii) the disclosure does not meet the enablement requirement. The basis for these rejections asserted by the Examiner is that the "disclosure does not clearly disclose any details of the present claims regarding the first and second media being both Fibre Channel transport as a whole."

As previously discussed, Applicants respectfully submit that an implementation having both a first Fibre Channel transport and a second Fibre Channel transport is disclosed at page 15, lines 12-25, as discussed above. This FC initiator to FC target mode represents one embodiment of the invention generally described in the remainder of the Specification and the Drawings. In addition, the Applicants went further and discussed two additional example implementations of this FC initiator to FC target mode embodiment: in one example

implementation, the Fibre Channel protocols can be encapsulated on other transmission technologies (e.g., ATM, SONET); in the other example implementation, the storage router acts as a bridge between two Fibre Channel loops (i.e., a first fibre channel transport medium and a second fibre channel transport medium). Contrary to the Examiner's assertion, Applicants respectfully submit that there is no evidence that the inventors concealed the best mode of connecting fibre channel transport media.

The Specification further provides support for implementing the configuration, mapping and access controls for Fibre Channel devices so as to enable one of ordinary skill in the art to practice the FC initiator to FC storage device embodiment of the invention. As one example, the Specification discusses the particulars of Fibre Channel devices, specifically stating:

Fibre Channel devices within a fabric are addressed by a unique port identifier. This identifier is assigned to a port during certain well-defined states of the FC protocol. Individual ports are allowed to arbitrate for a known, user defined address. If such an address is not provided, or if arbitration for a particular user address fails, the port is assigned a unique address by the FC protocol. This address is generally not guaranteed to be unique between instances. Various scenarios exist where the AL-PA of a device will change, either after power cycle or loop reconfiguration.

The FC protocol also provides a logical unit address field within command structures to provide addressing to devices internal to a port. The FCP CMD payload specifies an eight byte LUN field. Subsequent identification of the exchange between devices is provided by the FQXID (Fully Qualified Exchange ID). See, Specification, page 19, lines 9-25.

Thus, the Applicants described these addressing conventions in a manner that would enable one of ordinary skill in the art to implement them for Fibre Channel devices.

As another example relating to mapping, the Specification states that "mapping can be implemented through the use of mapping table or other mapping techniques." See, Specification, page 9, lines 7-8; page 10, lines 4-7. Based on the disclosed Fibre Channel addressing techniques, one of ordinary skill in the art would understand how to implement a table that maps Fibre Channel initiators to Fibre Channel storage devices or portions thereof. In yet another example, the Specification provides that access controls limit a computers access to specified storage devices or portions thereof. See, Specification, page 10, lines 20-24. The storage router can use tables to map, for each initiator, what storage access is

available and what partition is being addressed by a particular request. See, Specification page 22, lines 8-11. Based on the Fibre Channel addressing scheme, those in the art would understand how to use tables to map Fibre Channel initiators to Fibre Channel targets to control access by the Fibre Channel targets to assigned storage devices or portions thereof. Thus, in the Fibre Channel Initiator-to-Fibre Channel target embodiment, one of ordinary skill in the art would understand how to provide tables that map a representation of a Fibre Channel initiator device to a representation of a Fibre Channel target device and that cause requests from particular Fibre Channel Initiators to be directed (or not allowed to be directed) to particular storage.

The present application thus discloses i) a Fibre Channel initiator-to-Fibre Channel target mode of operation, ii) mapping achieved through, for example, tables and iii) access controls are implemented through mapping in an enabling manner. There is simply no evidence that the inventors concealed some better way of practicing the present invention. Based on the Specification, one of ordinary skill in the art would understand how to provide tables that map Fibre Channel initiator devices to a Fibre Channel target devices and that cause certain requests from a Fibre Channel Initiator to be directed to permitted storage, thus allowing the use of NLLBP from the Fibre Channel Initiator to the storage router and from the storage router to the Fibre Channel target. Applicants therefore respectfully request withdrawal of the Claim rejections.

V. Double Patenting Rejections

Claims 15-53 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-14 of U.S. Patent No. 5,941,972. Applicants are including with this reply a timely filed terminal disclaimer in compliance with 37 C.F.R. § 1.321(c). U.S. Patent No. 5,941,972 and the current Application are commonly owned. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 15-53 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-14 of U.S. Patent No. 6,425,035. Applicants are including with this reply a timely filed terminal disclaimer in compliance with 37 C.F.R. § 1.321(c). U.S. Patent No. 6,425,035 and the current Application are commonly owned. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 15-53 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-23 of U.S. Patent No. 6,738,854. Applicants are including with this reply a timely filed terminal disclaimer in compliance with 37 C.F.R. § 1.321(c). U.S. Patent No. 6,738,854 and the current Application are commonly owned. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 15-53 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-10 of U.S. Patent No. 6,763,419. Applicants are including with this reply a timely filed terminal disclaimer in compliance with 37 C.F.R. § 1.321(c). U.S. Patent No. 6,425,035 and the current Application are commonly owned. Accordingly, withdrawal of this rejection is respectfully requested.

VI. Conclusion

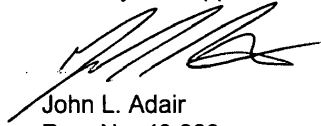
Applicants have now made an earnest attempt to place this case in condition for allowance. Other than as explicitly set forth above, this reply does not include acquiescence to statements, assertions, assumptions, conclusions, or any combination thereof in the Office Action. For the foregoing reasons and for other reasons clearly apparent, Applicant respectfully requests full allowance of the pending claims. The Examiner is invited to telephone the undersigned at the number listed below for prompt action in the event any issues remain.

An extension of three (3) months is requested and a Notification of Extension of Time Under 37 C.F.R. § 1.136 with the appropriate fee is enclosed herewith.

The Director of the U.S. Patent and Trademark Office is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 50-3183 of Sprinkle IP Law Group.

Respectfully submitted,

Sprinkle IP Law Group
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Exhibit A

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Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996) (explaining that intrinsic evidence is "the most significant source of the legally operative meaning of disputed claim language"). Not surprisingly, the starting point is always "the words of the claims themselves." *Id.*; see also *Comark Communications, Inc. v. Harris Corp.*, 156 F.3d 1182, 1186 (Fed. Cir. 1998). The words of the claims are generally given their ordinary and customary meaning, unless the patentee intended to use a "special definition of the term clearly stated in the patent specification or file history." *Vitronics*, 90 F.3d at 1582. Thus, the Court must review the specification and file history to determine whether the patentee intended to use any such "special" definitions. See *id.* The specification and file history may also be consulted as general guides for claim interpretation. See *Comark*, 156 F.3d at 1186.

The specification and file history, however, are not substitutes for the plain language of the claims. The specification is not meant to describe the full scope of the patent – it includes only a written description of the invention, sufficient to enable a person skilled in the art to make and use it, as well as the invention's "best mode." See 35 U.S.C. § 112. Thus, the claims may be broader than the specification, and generally should not be confined to the examples of the invention set forth in the specification. See *Comark*, 156 F.3d at 1187 ("Although the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims."). Indeed, the Federal Circuit has repeatedly emphasized that "limitations from the specification are not to be read into the claims." *Id.* at 1186.

In addition to examining the intrinsic evidence the Court may, in its discretion, receive extrinsic evidence regarding the proper construction of the patent's terms. See *Key Pharmaceuticals*

v. Harcon Labs. Corp., 161 F.3d 709, 716 (Fed. Cir. 1998) (“[T]rial courts generally can hear expert testimony for background and education on the technology implicated by the presented claim construction issues, and trial courts have broad discretion in this regard.”). The plaintiff has provided an expert affidavit and the defendant has provided excerpts from several dictionaries as extrinsic evidence concerning the construction of the terms of the ‘972 patent.

II. “implements access controls for storage space on the SCSI storage devices”

This phrase is used in claims 1, 10 and 11 of the ‘972 patent. The parties dispute whether the phrase refers to “access controls” only for certain subsections of a divided SCSI storage device, or whether it also includes limiting access to entire undivided SCSI storage devices. The plaintiff argues the phrase includes both kinds of access controls; the defendants say the phrase refers only to access controls for various subsections within a single divided SCSI storage device. The defendants also argue the plaintiff’s construction is improper because, if adopted, it will result in the ‘972 patent being invalidated by prior art.

The plaintiff proposes the following definition: “provides controls which limit a computer’s access to a specific subset of storage devices or sections of a single storage device.” See Plaintiff’s Brief, at 20. The defendants propose the phrase should be defined as “partitions the storage space on each one of the SCSI storage devices and defines the accessibility of each resulting partition.” See Defendants’ Brief, Ex. 2. The Court agrees with the plaintiff.

The intrinsic evidence of the ‘972 patent shows the plaintiff’s invention is intended to restrict access both to subsections of a SCSI storage device, as well as to entire, undivided SCSI devices. First, the plain language of this phrase refers only to “storage space” and does not limit the space

only to subsections of a divided SCSI storage device. Second, Figure 3 of the '972 patent supports a broad reading of this phrase. Figure 3 shows three SCSI storage devices, two of which are undivided (60 and 64). The third device (62) is divided into four subsections of storage space. From the simple labeling on Figure 3, it is clear that the entire, undivided storage device (64) is meant to be accessed only by a single workstation (computer E). Thus, Figure 3 expressly shows that the plaintiff's invention contemplates using "access controls" for an entire, undivided storage device as well as for the divided subsections within a single storage device.¹ Third, the language of the specification expressly describes limiting access to an entire, undivided SCSI storage device. Specifically, in referring to Figure 3, the specification states "storage device 64 can be allocated as storage for the remaining workstation 58 (workstation E)." See '972 Patent, at 4:20 - 4:21. At the hearing, the defendants' counsel argued that, simply because Figure 3 describes this feature does not mean the feature was intended to be part of the claimed invention. The Court soundly rejects this argument. Figure 3 is meant to be an example of how the plaintiff's claimed invention can be implemented, and the specification clearly describes this figure as illustrating one implementation of the claimed invention. Adopting the defendants' argument would ignore a fundamental principle of claims construction, oft repeated in the defendants' brief and oral arguments, that the specification is "the single best guide to the meaning of a disputed term." See *Vitronics*, 90 F.3d at 1582. Finally, the defendants correctly point out that the specification also refers to the single, undivided storage device (64) as a "partition (i.e., logical storage definition)." See '972 Patent, at 4:44 - 4:47. Rather than compel the defendants' proposed construction, however, this language supports the plaintiff's

¹ Figure 3 also discloses – and the defendants do not dispute – that the plaintiff's invention contemplates limiting access to various subsections of the divided SCSI storage device (62).

argument at the hearing that a discrete unit of storage – whether an entire SCSI storage device or a subsection within that device – can be referred to as a “partition.”²

The defendants also argue that, even if the intrinsic evidence supports the plaintiff’s proposed definition, this definition is nonetheless improper because it would cause the ‘972 patent to read directly upon prior art (and therefore be invalid). It is true that “claims should be read in a way that avoids ensnaring prior art if it is possible to do so.” *Harris Corp. v. IXYS Corp.*, 114 F.3d 1149, 1153 (Fed. Cir. 1997). However, the defendants have not shown that the prior art at issue – the Lui patent – would be “ensnared” by adopting the plaintiff’s definition. Importantly, the Lui patent was part of the prior art expressly considered by the patent examiner before granting the ‘972 patent. The patent examiner apparently did not use the Lui patent to reject a single claim in the ‘972 patent. The patent examiner also did not issue an Office Action requiring the plaintiff to distinguish its invention from the Lui patent on access control (or any other) grounds. Although the Patent Office is not the model of efficiency or thoroughness, its failure to cite the Lui patent as potentially invalidating prior art creates a strong presumption that the Lui patent does not read upon the plaintiff’s claimed invention. In addition, it does not appear to the Court that the Lui patent reads upon the ‘972 claimed invention. While the Lui patent does disclose a system of Fibre Channel computers and SCSI storage devices, *see* Defendants’ Brief, Ex. 6, at 2:53 - 2:65, the similarities end there. The Lui patent concerns an invention of “bypass circuits” used to “prevent the failure of any device” in the system. *See id.*, at Abstract. The invention of the Lui patent is not concerned with the swift transfer of information across a router, and thus does not disclose techniques for mapping,

² The Court expressly notes, however, that it is not defining the term “partition” in this order, as that term is not used in the ‘972 claim language.

implementing access controls, or a memory buffer.³ At the hearing, the defendants' counsel suggested that Figure 2 of the Lui patent discloses the claimed invention of the '972 patent.

However, Figure 2 of the Lui patent is not a part of the Lui invention; rather it is an illustration of a "conventional" network system that the Lui invention allegedly improves upon. See *id.* at 3:66. The Court rejects the defendants' argument that "conventional" network systems also read directly upon the '972 claimed invention. The patent examiner may have let one piece of prior art slip by; he or she would not have missed a "conventional" network system directly applicable to the plaintiff's claimed invention.

In sum, the Court will adopt the plaintiff's proposed definition and construe the phrase "implements access controls" in the claims of the '972 patent to mean "provides controls which limit a computer's access to a specific subset of storage devices or sections of a single storage device."

III. "allocation of subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device"

The dispute here is essentially the same as in the preceding section. This phrase is used in claims 2, 8 and 12 of the '972 patent. As it did with the "implements access controls . . ." phrase, the plaintiff argues the "allocation . . ." phrase means that specific Fibre Channel devices can be allocated storage space on subsections of a single SCSI storage device and on entire, undivided SCSI storage devices. The defendants stick to their general argument on this issue, and contend the phrase

³ The defendants argue these features are "implicitly" found in the Lui specification and in any event were disclosed in other prior art. See Defendants' Brief, at 12 and n.1. The Court is not persuaded that these features are "implicitly" disclosed by the Lui patent, and the other prior art briefly referenced by the defendants makes no mention of combining that prior art with the invention of the Lui patent, or vice-versa.

means storage space can only be allocated on subsections of a single divided SCSI storage device. Both parties agree this storage space, however it is defined, can only be accessed by the specified Fibre Channel device(s).

The plaintiff's proposed definition is "subsets of storage space are allocated to specific Fibre Channel devices." *See* Plaintiff's Brief, at 26. The defendants say the phrase should be defined to mean "one or more partitions that are only accessible by a single Fibre Channel device." *See* Defendants' Brief, Ex. 2. For the reasons discussed in the preceding section, the Court adopts the plaintiff's proposed construction.

IV. "supervisor unit"

This term is used in claims 1, 2 and 10 of the '972 patent. The plaintiff contends this term should be defined as "a microprocessor programmed to process data in a buffer in order to map between Fibre Channel devices and SCSI devices and which implements access controls." *See* Plaintiff's Brief, at 25. The defendants argue the term should be defined as "an Intel 80960RP processor" with several specific features. *See* Defendants' Brief, Ex. 2.

The defendants argue their construction is mandated by the means-plus-function analysis of § 112(6) of the Patent Act, because the claims of the '972 patent do not adequately describe the "supervisor unit" to be used. *See* Defendants' Brief, at 15-17. The plaintiff argues that § 112(6) does not apply because the term "means" is not used with the term "supervisor unit" and because the term "supervisor unit" is adequately described by other claim language in the '972 patent. *See* Plaintiff's *Markman* Exhibits, at 35-39.

Section 112(6) of the Patent Act provides that when a claim refers to the "means for" a

specific act, but fails to adequately describe these means, the means then must be defined by reference to the specification. See 35 U.S.C. § 112(6).⁴ If the claim language at issue does not include the term "means," there is a presumption that the § 112(6) means-plus-function analysis does not apply. See *Al-Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308, 1318 (Fed. Cir. 1999) ("[W]hen an element of a claim does not use the term 'means,' treatment as a means-plus-function claim element is generally not appropriate."). To overcome this presumption, the party seeking to apply § 112(6) must show the claim language at issue is purely functional and that other claim language does not adequately describe the disputed term. See *id.* ("[W]hen it is apparent that the element invokes purely functional terms, without the additional recital of specific structure or material for performing that function, the claim element may be a means-plus-function element despite the lack of express means-plus-function language."). From a review of the claim language as a whole, the Court agrees with the plaintiff that the term "supervisor unit" is not purely functional, but refers instead to a device that can perform the tasks specifically listed in the claim language of the '972 patent. Specifically, claims 1, 2 and 10 of the '972 patent describe a "supervisor unit" that can: (1) maintain and map the configuration of networked Fibre Channel and SCSI storage devices; (2) include in this configuration an allocation of specific storage space to specific Fibre Channel devices; (3) implement access controls for the SCSI storage devices; and (4) process data in the storage router's buffer to allow an exchange between the Fibre Channel and SCSI storage devices. See '972 Patent,

⁴ Section 112(6) reads as follows: "An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." 35 U.S.C. § 112(6).

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at Claims 1, 2 and 10. These are the same tasks described in the plaintiff's proposed definition. In addition, the specification expressly defines the "supervisor unit" as "a microprocessor" (a computer chip) and specifically as "a microprocessor for controlling operation of storage router 56 and to handle mapping and security access for requests between Fibre Channel 52 and SCSI bus 54." See *id.* at 5:7 - 5:10. However, neither the specification (nor the claim language) limits the '972 patent to the specific Intel computer chip referenced by the defendants. Although the defendants correctly point out that the Intel 80960 chip is the only computer chip expressly named in the '972 patent and the specification describes many features this chip, the defendants fail to note that the Intel 80960 chip is listed as only "one implementation" of the claimed invention's microprocessor. See '972 Patent, at 5:63. The defendants are attempting exactly what the Federal Circuit prohibits - to limit the claims to the preferred embodiment and examples of the specification. "This court has cautioned against limiting the claimed invention to preferred embodiments or specific examples in the specification." *Comark*, 156 F.3d at 1186 (quoting *Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 805 F.2d 1558, 1563 (Fed. Cir. 1986)). The Court will not use an example of "one implementation" in the specification to limit the plain language of the claims. Accordingly, the Court adopts the plaintiff's definition of "supervisor unit" and will construe that term as used in the claims of the '972 patent to mean "a microprocessor programmed to process data in a buffer in order to map between Fibre Channel devices and SCSI devices and which implements access controls."

V. "SCSI storage devices"

This term is used in claims 1, 4, 7, 9-11 and 14 of the '972 patent. The plaintiff argues that this term essentially needs no further definition because the term SCSI is so well-known in the industry, but proposes that the term can be further defined as "any storage device including, for

example, a tape drive, CD-ROM drive, or a hard disk drive that understands the SCSI protocol and can communicate using the SCSI protocol." See Plaintiff's Brief, at 18. The defendants argue the term should be defined as "any storage device that uses a SCSI standard and has a unique BUS:TARGET:LUN address." See Defendants' Brief, Ex. 2.

The Court agrees with the plaintiff. Essentially, the defendants contend their narrow definition should be used because it "comports with '972 specification" and its discussion of SCSI storage devices. See Defendant's Brief, at 14. However, the specification language referred to by the defendants is only one example of how the SCSI storage device addressing scheme "can" be represented. See '972 Patent, at 7:39. Again, the defendants are impermissibly trying to limit the claim language to an example given in the specification. See *Comark*, 156 F.3d at 1186-87. For the sake of extra clarity, the Court will adopt the plaintiff's proposed definition for this term.

VI. "process data in the buffer"

This phrase is used in claims 1 and 10 of the '972 patent. The plaintiff argues the phrase is adequately defined on its own and by the surrounding claim language. The defendants contend the phrase should be defined as "to manipulate data in the buffer in a manner to (a) achieve mapping between Fibre Channel and SCSI devices, and (b) apply access controls and routing functions." See Defendants' Brief, Ex. 2.

The plain language of claims 1 and 10 disclose that the supervisor unit (the microprocessor) processes data in the buffer "to interface between the Fibre Channel controller and the SCSI controller to allow access from Fibre Channel initiator devices to SCSI storage devices using the native low level, block protocol in accordance with the configuration." See '972 Patent, at Claims 1 and 10. This language adequately describes what it means to "process data in the buffer" for these

claims. Simply because the specification may use slightly different language to describe this "processing," *see id.* at 5:18 - 5:20, does not entitle the defendants to adopt the specification language over the plain language of the claims. The Court will not further define this phrase.

VII. "storage router"

This term is used in claims 1-7 and 10 of the '972 patent. The plaintiff argues the term needs no further definition for claims 1-6, and for claim 7 it should be defined as "a device which provides virtual local storage, maps, implements access controls, and allows access using native low level block protocols." *See Plaintiff's Brief*, at 27. The defendants contend the term should mean "a bridge device that connects a Fibre Channel link directly to a SCSI bus and enables the exchange of SCSI command set information between application clients on SCSI bus devices and the Fibre Channel links." *See Defendants' Brief*, Ex. 2.

The defendants do not make any argument for their proposed definition in their brief, and did not discuss the term at the July 25 hearing. In their notebook of exhibits presented at the hearing, the defendants include one page which supports their definition with a quote from the specification. *See Defendants' Markman Exhibits*, "Markman Presentation" Tab, at 22. This argument is disingenuous. The specification language quoted by the defendants is immediately followed by several sentences further defining "storage router." Indeed, the next sentence begins "Further, the storage router applies access controls . . ." *See '972 Patent*, at 5:30. The defendants' attempt to limit the term "storage router" to one of several descriptive sentences in the specification is not well-taken. In addition, the Court finds the term "storage router," as used in all claims of the '972 patent, is adequately described by the additional language of the claims, which discloses in detail the various functions and/or qualities of the storage router. The Court will not further define this term.

VIII. "map"

This term is used in claims 1, 7, 10 and 11 of the '972 patent. The plaintiff contends the term means "to create a path from a device on one side of the storage router to a device on the other side of the router, *i.e.* from a Fibre Channel device to a SCSI device (or vice-versa). A 'map' contains a representation of devices on each side of the storage router, so that when a device on one side of the storage router wants to communicate to a device on the other side of the storage router, the storage router can connect the devices." *See Plaintiff's Brief*, at 22. The defendants argue the term means "to translate addresses." *See Defendants' Brief*, Ex. 2.

In support of their definition, the defendants point only to a dictionary definition of "map." *See Defendants' Brief*, at 13 and Ex. 4. The plaintiff, on the other hand, cites to specific portions of the specification that support its definitions of map (both as a verb and a noun) as used in the claims of the '972 patent. *See Plaintiff's Brief*, at 22 (citing '972 Patent, at 1:66-2:5 and 6:65-7:6). Because intrinsic evidence is far more salient than a dictionary definition, and because the Court agrees that the specification language cited by the plaintiff supports its construction of the term "map," the Court will adopt the plaintiff's proposed definition of this term.

IX. "Fibre Channel protocol unit" and "SCSI protocol unit"

These terms are used in claims 5 and 6 of the '972 patent. The plaintiff contends these phrases should be defined as "a portion of the Fibre Channel controller which connects to the Fibre Channel transport medium" and "a portion of the SCSI controller which interfaces to the SCSI bus." *See Plaintiff's Brief*, at 27. The defendants say the terms mean "block and equivalents thereof that connects to the Fibre Channel transport medium" and "block and equivalents thereof that connects to the SCSI bus transport medium." *See Defendants' Brief*, Ex. 2.

The defendants argue the means-plus-function analysis of § 112(6) should apply here because the terms are well-known and are not defined in two dictionaries cited by the defendants. *See* Defendants' Brief, at 7-8, 14-15, Ex. 4 and Ex. 5. However, the defendants do not indicate how the term should be defined in reference to the specification, and in fact contend "the '972 specification fails to reveal any structure corresponding to the claimed function." *See id.* at 8 and 15. The defendants then propose the word "block" should be used to describe these terms because the "protocol units" are "simply depicted as a block within the diagram of Figure 5" of the '972 patent. *See id.* This reasoning is wholly unpersuasive. Simply because a figure in the patent physically depicts the protocol units in a block-like shape, it does not follow that the units should be defined as "blocks or equivalents thereof." Under that reasoning, the SCSI storage devices, which are physically depicted as cylinders in the '972 patent, could be defined simply as "cylinders, oil drums or monkey barrels, or equivalents thereof." As the plaintiff correctly points out, the language of claims 5 and 6 plainly states that the "protocol units" for both devices are part of the "controllers" for the devices, and are intended to "connect" the devices to various "transport media" (*i.e.*, to various cables). *See* '972 Patent, at Claims 5 and 6. Accordingly, the Court adopts the plaintiff's definitions for these terms, and will construe the terms to mean "a portion of the Fibre Channel controller which connects to the Fibre Channel transport medium" and "a portion of the SCSI controller which interfaces to the SCSI bus."

X. "interface"

In their Joint Stipulation of Claim Construction, the parties claim the meaning of the term "interface" is in dispute. However, this phrase is not discussed in any of the parties' briefs, and neither side presented an argument at the July 25 hearing as to why the term is disputed. This term

has a standard and ordinary meaning—even to a federal judge—and the Court will not further define it.

XI. Undisputed Terms

Finally, in their Joint Stipulation of Claim Construction, the parties have stipulated to the construction of 17 other terms in the '972 patent. The Court will therefore adopt these stipulated constructions, solely for the purpose of this lawsuit.

Accordingly, the Court enters the following order:

IT IS ORDERED that the attached construction of the patent claims will be incorporated into any jury instructions given in this cause and will be applied by the Court in ruling on the issues raised in summary judgment.

SIGNED on this 26th day of July 2000.


UNITED STATES DISTRICT JUDGE

**CONSTRUCTION OF CLAIMS
U.S. PATENT NO. 5,941,972**

Disputed Terms

The phrase "implements access controls for storage space on the SCSI storage devices" means provides controls which limit a computer's access to a specific subset of storage devices or sections of a single storage device.

The phrase "allocation of subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device" means subsets of storage space are allocated to specific Fibre Channel devices.

A "supervisor unit" is a microprocessor programmed to process data in a buffer in order to map between Fibre Channel devices and SCSI devices and which implements access controls.

A "SCSI storage device" is any storage device including, for example, a tape drive, CD-ROM drive, or a hard disk drive that understands the SCSI protocol and can communicate using the SCSI protocol.

The term "map" means to create a path from a device on one side of the storage router to a device on the other side of the router, *i.e.* from a Fibre Channel device to a SCSI device (or vice-versa). A "map" contains a representation of devices on each side of the storage router, so that when a device on one side of the storage router wants to communicate with a device on the other side of the storage router, the storage router can connect the devices.

A "Fibre Channel protocol unit" is a portion of the Fibre Channel controller which connects to the Fibre Channel transport medium.

A "SCSI protocol unit" is a portion of the SCSI controller which interfaces to the SCSI bus.

Stipulated / Undisputed Terms

A "buffer" is a memory device that is utilized to temporarily hold data.

A "direct memory access (DMA) interface" is a device that acts under little or no microprocessor control to access memory for data transfer.

A "Fibre Channel" is a known high-speed serial interconnect, the structure and operation of which is described, for example, in Fibre Channel Physical and Signaling Interface (FC-PH), ANSI X3.230 Fibre Channel Arbitrated Loop (FC-AL), and ANSI X3.272 Fibre Channel Private Loop Direct Attach (FC-PLDA).

A "Fibre Channel controller" is a device that interfaces with a Fibre Channel transport medium.

A "Fibre Channel device" is any device, such as a computer, that understands Fibre Channel protocol and can communicate using Fibre Channel protocol.

"Fibre Channel protocol" is a set of rules that apply to Fibre Channel.

A "Fibre Channel transport medium" is a serial optical or electrical communications link that connects devices using Fibre Channel protocol.

A "first-in-first-out queue" is a multi-element data structure from which elements can be removed only in the same order in which they were inserted; that is, it follows a first in, first out (FIFO) constraint.

A "hard disk drive" is a well known magnetic storage media, and includes a SCSI hard disk drive.

An "initiator device" is a device that issues requests for data or storage.

"Maintain(ing) a configuration" means keep(ing) a modifiable setting of information.

A "native low level, block protocol" is a set of rules or standards that enable computers to exchange information and do not involve the overhead of high level protocols and file systems typically required by network servers.

A "SCSI" (Small Computer System Interface) is a high speed parallel interface that may be used to connect components of a computer system.

A "SCSI bus transport medium" is a cable consisting of a group of parallel wires (normally 68) that forms a communications path between a SCSI storage device and another device, such as a computer.

A "SCSI controller" is a device that interfaces with the SCSI bus transport medium.

"Virtual local storage" is a specific subset of overall data stored in storage devices that has the appearance and characteristics of local storage.

A "workstation" is a remote computing device that connects to the Fibre Channel, and may consist of a personal computer.

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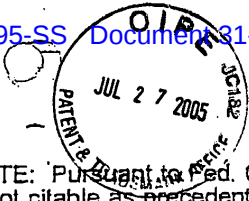
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Exhibit B



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CLERK, U.S. DISTRICT COURT
WESTERN DISTRICT OF TEXAS
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NOTE: Pursuant to Fed. Cir. R. 47.6, this disposition is not citable as precedent. It is a public record. This disposition will appear in tables published periodically.

United States Court of Appeals for the Federal Circuit

02-1158

FILED

MAR 10 2003

CLERK, U.S. DISTRICT COURT
WESTERN DISTRICT OF TEXAS
BY [Signature]
DEPUTY CLERK

CROSSROADS SYSTEMS, (TEXAS), INC.,

Plaintiff-Appellee,

v.

CHAPARRAL NETWORK STORAGE, INC.,

Defendant-Appellant.

FILED
U.S. COURT OF APPEALS FOR
THE FEDERAL CIRCUIT

FEB 12 2003

JUDGMENT

JAN HORBALY
CLERK

ON APPEAL from the United States District Court for
the Western District of Texas

In CASE NO(S). 00-CV-217 and 00-CV-621

This CAUSE having been heard and considered, it is

ORDERED and ADJUDGED: AFFIRMED. See Fed. Cir. R. 36

Per Curiam (NEWMAN, SCHALL, and DYK, Circuit Judges).

CERTIFIED COPY
I HEREBY CERTIFY THIS DOCUMENT
IS A TRUE AND CORRECT COPY
OF THE ORIGINAL ON FILE.

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

By: [Signature] Date: 3/5/03

ENTERED BY ORDER OF THE COURT

DATED: FEB 12 2003

[Signature]
Jan Horbaly, Clerk

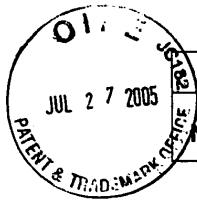
ISSUED AS A MANDATE: MARCH 5, 2003

Costs Against Appellant:
Total \$97.35

186

03/17/2003 MON 12:47 PM / BY NO 62781

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
NOTIFICATION OF EXTENSION OF TIME UNDER 37 C.F.R § 1.136	
Atty. Docket No. CROSS1120-13	
Applicant Geoffrey B. Hoese	
Application Number 10/658,163	Filed 09/09/2003
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Shin, Christopher B.
Confirmation No. 5675	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Certification Under 37 C.F.R. §1.10

I hereby certify that this document is being deposited with the United States Postal Service as Express Mail to Addressee (Label No. EV704312847US) in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA. 22312-1450 on July 27, 2005.

Julie H. Blackard
Julie H. Blackard

Applicant hereby takes an Extension of Time for responding to the Office Action date mailed January 27, 2005 for a period of three (3) month(s).

	<i>Small Entity</i>	<i>Large Entity</i>
<input type="checkbox"/> First Month	\$ 60.00	\$ 120.00
<input type="checkbox"/> Second Month	\$ 225.00	\$ 450.00
<input checked="" type="checkbox"/> Third Month	\$ 510.00	\$ 1,020.00
<input type="checkbox"/> Fourth Month	\$ 795.00	\$ 1,590.00
<input type="checkbox"/> Fifth Month	\$ 1,080.00	\$ 2,160.00
TOTAL	\$	\$1,020.00

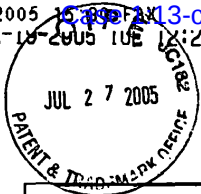
Enclosed is a check in the amount of **\$1,020.00** made payable to the Director of the U.S. Patent Office. If any fees are inadvertently omitted, additional fees are required, or if any amounts have been overpaid, please appropriately charge or credit those fees to Deposit Account No. 50-3183 of SPRINKLE IP LAW GROUP.

07/29/2005 CNGUYEN2 00000037 10658163
01 FC:1253 1020.00 OP

Respectfully submitted,
SPRINKLE IP LAW GROUP

John L. Adair
John L. Adair
Reg. No. 48,828

Date: July 27, 2005
1301 W. 25th Street, Suite 408
Austin, Texas 78705
(512) 637.9223 - Telephone
(512) 371.9088 - Facsimile




IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A PRIOR PATENT	Atty. Docket No. CROSS1120-13
Applicant Geoffrey B. Hesse	
Application Number 10/668,163	Date Filed 09/09/2003
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Shin, Christopher B.
Confirmation Number: 6675	

Commissioner for Patents
 P.O. Box 1450
 Alexandria, VA 22313-1450

Dear Sir:

07/29/2005 CNGUYEN2 00000037 10658163
 02 FC:1814 130.00 OP

Certificate of Mailing Under 37 C.F.R. 61.10	
I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail to Addressee in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22312-1450 on <u>7-27-05</u>	
 Signature	
JULIE H. BLACKARD Printed Name	

Crossroads Systems, Inc., owner of one hundred percent (100%) interest in the instant application, as evidenced by the assignment recorded on 12/21/1997 on Reel/Frame: 8929/0290, hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. § 154 to 156 and 173 of U.S. Patent No. 5,941,972, U.S. Patent No. 6,425,035, U.S. Patent No. 6,738,854 and/or U.S. Patent No. 6,763,419. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. § 154 to 156 and 173 of the prior patents, as presently

Attorney Docket:
CROSS1120-13

Customer ID: 44854
Application No. 10/658,183

2


shortened by any terminal disclaimer, in the event that it later expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check box 1, 2, 3, or 4 as appropriate.


1. For submission on behalf of an organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the organization.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

- * Statement under 37 C.F.R. 3.73(b) is required if terminal disclaimer is signed by the assignee (owner). Form PTO/SB/98 may be used for making this certification. See MPEP § 324.
2. The undersigned is an attorney or agent of record.
3. Terminal disclaimer fee under 37 C.F.R. 1.20(d) included.
4. Terminal disclaimer fee under 37 C.F.R. 1.20(d). The Commissioner is hereby authorized to deduct \$130.00 representing the above-noted filing fee from Deposit Account No. 50-3183 of Sprinkle IP Law Group. The Commissioner is hereby further authorized to deduct any deficiencies or credit any overpayments regarding this application from the same account.


Robert Sims
Title: *President CEO*

7/20/05
Dated

Application Number 	Application/Control No. 10/658,163	Applicant(s)/Patent under Reexamination HOESE ET AL.	
Document Code - DISQ		Internal Document – DO NOT MAIL	

TERMINAL DISCLAIMER	<input checked="" type="checkbox"/> APPROVED	<input type="checkbox"/> DISAPPROVED
Date Filed : 072705	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:
James R. Matthews

U.S. Patent and Trademark Office

10/658163

PATENT APPLICATION FEE DETERMINATION RECORD Effective January 1, 2003	Application or Docket Number 2013-03								
CLAIMS AS FILED - PART I (Column 1) (Column 2)									
TOTAL CLAIMS	39								
FOR	NUMBER FILED	NUMBER EXTRA							
TOTAL CHARGEABLE CLAIMS	39 minus 20=	* 19							
INDEPENDENT CLAIMS	7 minus 3=	* 4							
MULTIPLE DEPENDENT CLAIM PRESENT <input type="checkbox"/>									
* If the difference in column 1 is less than zero, enter "0" in column 2									
CLAIMS AS AMENDED - PART II (Column 1) (Column 2) (Column 3)		SMALL ENTITY TYPE <input type="checkbox"/> OR OTHER THAN SMALL ENTITY							
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE	FEE	OR	RATE	FEE	
	Total	* 39	Minus	** 39	=		BASIC FEE	750.00	
	Independent	* 7	Minus	*** 7	=		X\$ 9=	121	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>							X\$18=	
								X42=	18
							+140=		
					TOTAL		TOTAL		
					ADDIT. FEE		ADDIT. FEE		
(Column 1)		(Column 2)		(Column 3)					
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE	ADDI-TIONAL FEE	OR	RATE	ADDI-TIONAL FEE	
	Total	*	Minus	**	=		X\$ 9=	X\$18=	
	Independent	*	Minus	***	=		X42=	X84=	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>							+140=	+280=
						TOTAL		TOTAL	
					ADDIT. FEE		ADDIT. FEE		
(Column 1)		(Column 2)		(Column 3)					
AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE	ADDI-TIONAL FEE	OR	RATE	ADDI-TIONAL FEE	
	Total	*	Minus	**	=		X\$ 9=	X\$18=	
	Independent	*	Minus	***	=		X42=	X84=	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>							+140=	+280=
						TOTAL		TOTAL	
					ADDIT. FEE		ADDIT. FEE		
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20." *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3." The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.									

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APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/658,163	09/09/2003	Geoffrey B. Hoese	CROSS1120-13

CONFIRMATION NO. 5675

25094
DLA PIPER RUDNICK GRAY CARY US, LLP
2000 University Avenue
E. Palo Alto, CA 94303-2248



Date Mailed: 08/12/2005

NOTICE REGARDING POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/26/2005 . The Power of Attorney in this application is not accepted for the reason(s) listed below:

- The Power of Attorney is from an assignee and the Certificate required by 37 CFR 3.73(b) has not been received.



 BERHANU GIRUM
 PTOSS (703) 305-0677

OFFICE COPY

Please forward to Group Art Unit 2182

Amended Compact Discs

EXAMINER NOTE: THIS PAPER IS AN INTERNAL WORKSHEET ONLY. DO NOT ENCLOSE WITH ANY COMMUNICATION TO THE APPLICANT. ITS PURPOSE IS ONLY THAT OF AN AID IN HIGHLIGHTING A PARTICULAR PROBLEM IN A COMPACT DISC.

THE ATTACHED CD (COPY 1) HAS BEEN REVIEWED BY OIPE FOR COMPLIANCE WITH 37 CFR 1.52(E). **Please match this CD with the application listed below.**

Date: 8/16/2005
Serial No./Control No. 101658163
Reviewed By: K. SMITH Phone: 3089210 ext. 118

- The compact discs are readable and acceptable.
- Copy 1 and Copy 2 of the compact discs are not the same.
- The compact discs are unreadable.
- The files on the compact discs are not in ASCII.
- The compact discs contain at least one virus.
- Other NOT PROPER SUBJECT MATTER FOR CD

DFW



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A PRIOR PATENT	Atty. Docket No. CROSS1120-13
Applicant Geoffrey B. Hoese, et al.	
Application Number 10/658,163	Date Filed 09/09/2003
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Shin, Christopher B.
Confirmation Number: 5675	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Certificate of Mailing Under 37 C.F.R. §1.8

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313 on **October 28, 2005**.

Janice Pampell
Janice Pampell

Crossroads Systems, Inc., the owner of one hundred percent (100%) interest in the instant application, as evidenced by the Assignment Recorded on December 31, 1997 on Reel/Frame: 8929/0290 hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. § 154 to 156 and 173 of U.S. Patent Nos. 5,941,972, 6,421,753, 6,425,036, 6,425,035, 6,789,152, 6,738,854, and 6,763,419. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. § 154 to 156 and 173 of the prior patent, as presently shortened by any terminal disclaimer, in the event that it later: expires for failure to pay a

maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check box 1, 2, 3, or 4 as appropriate.

- 1. For submission on behalf of an organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the organization.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

* Statement under 37 C.R.F. 3.73(b) is required if terminal disclaimer is signed by the assignee (owner). Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

- 2. The undersigned is an attorney or agent of record.
- 3. Terminal disclaimer fee under 37 C.F.R. 1.20(d) included.
- 4. The Commissioner is hereby authorized to deduct any deficiencies or credit any overpayments regarding this application from deposit account 50-3183 of Sprinkle IP Law Group.



Steven Sprinkle

10/28/05
Dated



UNITED STATES PATENT AND TRADEMARK OFFICE

A

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,163	09/09/2003	Geoffrey B. Hoese	CROSS1120-13	5675
25094	7590	11/01/2005	EXAMINER SHIN, CHRISTOPHER B	
DLA PIPER RUDNICK GRAY CARY US, LLP 2000 University Avenue E. Palo Alto, CA 94303-2248			ART UNIT 2182	PAPER NUMBER

DATE MAILED: 11/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/658,163	HOESE ET AL.	
	Examiner	Art Unit	
	Christopher B Shin	2182	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 27 July 2005.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 15-53 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 15-53 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 09 September 2003 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) <input type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>07252005</u> .	6) <input type="checkbox"/> Other: _____

Application/Control Number: 10/658,163
Art Unit: 2182

Page 2

DETAILED ACTION

1. The amendment received July 27, 2005 has been entered and carefully considered. Claims 15-53 and the applicant's responses were carefully considered.

Interview/Double Patenting Rejection

2. On October 25, 2005, a telephonic interview was conducted and the applicant agreed to file additional Terminal Disclaimer against all of the remaining related pending applications and allowed applications. During the interview, the examiner also kindly asks the applicant to make sure that the present and pending applications to be consistent with the related reexamination applications.

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

a. Since the applicant agreed with the examiner regarding the Double Patenting rejection, the details of the rejection would be omitted.

Application/Control Number: 10/658,163
Art Unit: 2182

Page 3

b. The examiner kindly asks the applicant for help on identifying all of the related applications, if the examiner inadvertently makes a mistake. Claim15-53 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims of the related Patent/Applications as follows. Although the conflicting claims are not identical, they are not patentably distinct from each other because the related applications claim subject matter that are substantially identical to the present claimed invention. The following are the list of the related cases:

09/001,799; 09/354,682; 10/081,110; 10/081,114; 10/023,786;
10/081,110; 09/965,335; 10/174,720; 09/965,339; 10/081,082;
10/361,283; 10/638,955; 10/640,468; 10/658,163; 11/191,254;
90/007,123; 90/007,124; 90/007,125; 90/007,126; 90/007,127;&
90/007,327.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Application/Control Number: 10/658,163
Art Unit: 2182

Page 4

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher B. Shin whose telephone number is 571-272-4159. The examiner can normally be reached on 6:30-5:00 M,Tu,Th,F.

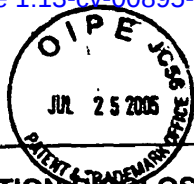
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Huynh can be reached on 571-272-4147. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CHRISTOPHER SHIN
PRIMARY EXAMINER
OF 2182

October 26, 2005
cbs





PTO/SB/08A (04-03)

INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	10/658,163	
				Filing Date	09/09/2003	
				First Named Inventor	Hoese, Geoffrey	
				Group Art Unit	2182	
				Examiner Name	Shin, Christopher B.	
Sheet	1	OF	4	Attorney Docket Number	CROSS1120-13	
U.S. PATENT DOCUMENTS						
Examiner Initials	Cite No.	Document Number		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines Where Relevant Passages or Figures Appear
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B2	JP	6301607				
B3	WO	98/36357		1998		
Examiner Signature				Date Considered	10-25-05	


PTO/SB/08B (08-00)

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		Filing Date	09/09/2003
		First Named Inventor	Geoffrey B. Hoese
		Group Art Unit	2182
		Examiner Name	Shin, Christopher B.
		Atty Docket Number	CROSS1120-13
Sheet	1	of	7
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	C5	CRD-5500 SCSI RAID Controller User's Manual CMD Technology, Inc. pp. 1-1 to 6-25, revised November 21, 1996.	11/21/1996
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			Filing Date	09/09/2003	
			First Named Inventor	Geoffrey B. Hoese	
			Group Art Unit	2182	
			Examiner Name	Shin, Christopher B.	
Sheet	2	of	7	Atty Docket Number	CROSS1120-13
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	C42	Reply to Office Action Under Ex Parte Reexamination Dated 02/02/07 for 90/007,127 filed on 04/06/05.			
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			Filing Date	09/09/2003		
			First Named Inventor	Geoffrey B. Hoese		
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			Examiner Name	Shin, Christopher B.		
Sheet	3	of	7	Atty Docket Number	CROSS1120-13	
Examiner Initials	Cite No.	OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			Date	
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	C51	European Office Action issued April 1, 2004 in Application No. 98966104.6-2413			4/1/2004	
	C52	Fiber Channel (FCS)/ATM Interworking: A Design Solution by Anzaloni, et al.				
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	C53	Defendant's First Supplemental Trial Exhibit List, Crossroads Systems, Inc., v. Chaparral Network Storage, Inc., C.A. No. A-00CA-217-SS (W.D. Tex. 2001). (CD-Rom) .				
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	C58	Trail Transcripts, Crossroads Systems, Inc. v. Chaparral Network Storage, Inc., C.A. No. A-00CA-217-SS (W.D. Tex. 2001) (CD-Rom) .				
C59	Trail Transcripts, Crossroads Systems, Inc. v. Pathlight Technology, Inc., C.A. No. A-00CA-248-SS (W.D. Tex. 2001). (CD-Rom) .					

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Sheet	4	of	7	Atty Docket Number	CROSS1120-13
Examiner Initials	Cite No.	OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			Date
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Sheet	6	of	7	Atty Docket Number	CROSS1120-13
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	C106	CrossPoint 4100 Fibre Channel to SCSI Router Preliminary Datasheet (Hulsey Ex 9 (CRDS 16129-130)) (CD-ROM Chaparral Exhibits D145).			11/1/1996
	C107	CrossPoint 4400 Fibre Channel to SCSI Router Preliminary Datasheet (Bardach Ex. 9, Quisenberry Ex 33 (CRDS 25606-607)) (CD-ROM Chaparral Exhibits D153).			11/1/1996
	C108	Fax Dated 07/22/96 from L. Petti to B. Smith re: Purchase Order from Data General for FC2S Fibre to Channel SCSI Protocol Bridge Model 11 (Smith Ex 25; Quisenberry Ex 23; Bardach Ex 11 (CRDS 8552-55; 8558) (CD-ROM Chaparral Exhibits D155).			
	C109	Email Dated 12/20/96 from J. Boykin to B. Smith re: Purchase Order for Betas in February and March (Hoese Ex 16, Quisenberry Ex 25; Bardach Ex 12 (CRDS 13644-650) (CD-ROM Chaparral Exhibits D156).			
	C110	Infinity Commstor Fibre Channel Demo for Fall Comdex, 1996 (Hoese Ex 15, Bardach Ex 13 (CRDS 27415) (CD-ROM Chaparral Exhibits D157).			
	C111	Fax Dated 12/19/96 from B. Bardach to T. Rarich re: Purchase Order Information (Bardach Ex. 14; Smith Ex 16 (CRDS 4460)) (CD-ROM Chaparral Exhibits D158).			
	C112	Miscellaneous Documents Regarding Comdex (Quisenberry Ex 2 (CRDS 27415-465)) (CD-ROM Chaparral Exhibits D165).			
	C113	CrossPoint 4100 Fibre Channel to SCSI Router Preliminary Datasheet (Quisenberry) Ex 3 (CRDS 4933-34) (CD-ROM Chaparral Exhibits D166) (CD-ROM Chaparral Exhibits D166).			

FORM PTO 1449 US Department of Commerce Patent and Trademark Office				Application Number	10/658,163
				Filing Date	09/09/2003
				First Named Inventor	Geoffrey B. Hoese
				Group Art Unit	2182
				Examiner Name	Shin, Christopher B.
Sheet	7	of	7	Atty Docket Number	CROSS1120-13
Examiner Initials	Cite No.	OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS			Date
	C114	CrossPoint 4400 Fibre to Channel to SCSI Router Preliminary Datasheet; Crossroads Company and Product Overview (Quisenberry Ex 4 (CRDS 25606; 16136)) (CD-ROM Chaparral Exhibits D167).			
	C115	Crossroads Purchase Order Log (Quisenberry Ex 9 (CRDS 14061-062)) (CD-ROM Chaparral Exhibits D172).			
	C116	RAID Manager 5 with RDAC 5 for UNIX V.4 User's Guide (LSI-01854) (CD-ROM Chaparral Exhibits P062).			9/1/1996
	C117	Letter dated May 12, 1997 from Alan G. Leal to Barbara Bardach enclosing the original OEM License and Purchase Agreement between Hewlett-Packard Company and Crossroads Systems, Inc. (CRDS 02057) (CD-ROM Chaparral Exhibits P130).			
	C118	CR4x00 Product Specification (CRDS 43929) (CD-ROM Chaparral Exhibits P267).			6/1/1998
	C119	Symbios Logic - Hardware Functional Specification for the Symbios Logic Series 3 Fibre Channel Disk Array Controller Model 3701 (Engelbrecht Ex 3 (LSI-1659-1733) (CD-ROM Pathlight Exhibits D074).			
	C120	Report of the Working Group on Storage I/O for Large Scale Computing; Department of Computer Science Duke University: CS-1996-21 (PTI 173330-347). (CD-ROM Pathlight Exhibits D098).			
	C121	Brian Allison's 1999 Third Quarter Sales Plan (PDX 38) CNS 022120-132)) (CD-ROM Pathlight Exhibits D201).			6/5/2001
	C122	Brooklyn SCSI-SCSI Intelligent External RAID Bridge Definition Phase External Documentation (CD-ROM Pathlight Exhibits D129).			
	Examiner Signature				Date Considered

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
REPLY TO OFFICE ACTION DATED 11/01/2005	Atty. Docket No. CROSS1120-13
Applicant Geoffrey B. Hoese	
Application Number 10/658,163	Date Filed 09/09/2003
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Shin, Christopher B.
Confirmation Number: 5675	

Commissioner for Patents
 P.O. Box 1450
 Alexandria, VA 22313-1450

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--

In response to the Official Action mailed November 1, 2005, Applicant respectfully requests the Examiner reconsider the rejections of the Claims in view of this reply.

IN THE CLAIMS:

Please amend the claims as follows. The claims are in the format as required by 35 C.F.R. § 1.121.

1-14 Cancelled

15. (Previously Presented) A storage router for providing virtual local storage on remote storage devices to a device, comprising:
a buffer providing memory work space for the storage router;
a first Fibre Channel controller operable to connect to and interface with a first Fibre Channel transport medium;
a second Fibre Channel controller operable to connect to and interface with a second Fibre Channel transport medium; and
a supervisor unit coupled to the first and second Fibre Channel controllers and the buffer, the supervisor unit operable:
to maintain a configuration for remote storage devices connected to the second Fibre Channel transport medium that maps between the device and the remote storage devices and that implements access controls for storage space on the remote storage devices; and
to process data in the buffer to interface between the first Fibre Channel controller and the second Fibre Channel controller to allow access from Fibre Channel initiator devices to the remote storage devices using native low level, block protocol in accordance with the configuration.

16. (Previously Presented) The storage router of claim 15, wherein the configuration maintained by the supervisor unit includes an allocation of subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device.

17. (Previously Presented) The storage router of claim 16, wherein the Fibre Channel devices comprise workstations.

18. (Previously Presented) The storage router of claim 16, wherein the remote storage devices comprise hard disk drives.

19. (Previously Presented) The storage router of claim 15, wherein each of the first Fibre Channel controller comprises:

- a Fibre Channel (FC) protocol unit operable to connect to the Fibre Channel transport medium;
- a first-in-first-out queue coupled to the Fibre Channel protocol unit; and
- a direct memory access (DMA) interface coupled to the first-in-first-out queue and to the buffer.

20. (Previously Presented) A storage network, comprising:

- a first Fibre Channel transport medium;
- a second Fibre Channel transport medium;
- a plurality of workstations connected to the first Fibre Channel transport medium;
- a plurality of storage devices connected to the second Fibre Channel transport medium;

and

a storage router interfacing between the first Fibre Channel transport medium and the second Fibre Channel transport medium, the storage router providing virtual local storage on the storage devices to the workstations and operable:

- to map between the workstations and the storage devices;
- to implement access controls for storage space on the storage devices; and
- to allow access from the workstations to the storage devices using native low level, block protocol in accordance with the mapping and access controls.

21. (Previously Presented) The storage network of claim 20, wherein the access controls include an allocation of subsets of storage space to associated workstations, wherein each subset is only accessible by the associated workstation.

22. (Previously Presented) The storage network of claim 20, wherein the storage devices comprise hard disk drives.

23. (Previously Presented) The storage network of claim 20, wherein the storage router comprises:

- a buffer providing memory work space for the storage router;
- a first Fibre Channel controller operable to connect to and interface with the first Fibre Channel transport medium, the first Fibre Channel controller further operable to pull outgoing

data from the buffer and to place incoming data into the buffer;

a second Fibre Channel controller operable to connect to and interface with the second Fibre Channel transport medium, the second Fibre Channel controller further operable to pull outgoing data from the buffer and to place incoming data into the buffer; and

a supervisor unit coupled to the first and second Fibre Channel controllers and the buffer, the supervisor unit operable:

to maintain a configuration for the storage devices that maps between workstations and storage devices and that implements the access controls for storage space on the storage devices; and

to process data in the buffer to interface between the first Fibre Channel controller and the second Fibre Channel controller to allow access from workstations to storage devices in accordance with the configuration.

24. (Previously Presented) A method for providing virtual local storage on remote storage devices to Fibre Channel devices, comprising:

interfacing with a first Fibre Channel transport medium;

interfacing with a second Fibre Channel transport medium;

maintaining a configuration for remote storage devices connected to the second Fibre Channel transport medium that maps between Fibre Channel devices and the remote storage devices and that implements access controls for storage space on the remote storage devices; and

allowing access from Fibre Channel initiator devices to the remote storage devices using native low level, block protocol in accordance with the configuration.

25. (Previously Presented) The method of claim 24, wherein maintaining the configuration includes allocating subsets of storage space to associated Fibre Channel devices, wherein each subset is only accessible by the associated Fibre Channel device.

26. (Previously Presented) The method of claim 25, wherein the Fibre Channel devices comprise workstations.

27. (Previously Presented) The method of claim 25, wherein the remote storage devices comprise hard disk drives.

28. (Previously Presented) An apparatus for providing virtual local storage on a remote storage device to a device operating according to a Fibre Channel protocol, comprising:
a first controller operable to connect to and interface with a first transport medium, wherein the first transport medium is operable according to the Fibre Channel protocol;
a second controller operable to connect to and interface with a second transport medium, wherein the second transport medium is operable according to the Fibre Channel protocol; and
a supervisor unit coupled to the first controller and the second controller, the supervisor unit operable to control access from the device connected to the first transport medium to the remote storage device connected to the second transport medium using native low level, block protocols according to a map between the device and the remote storage device.

29. (Previously Presented) The apparatus of Claim 28, wherein the supervisor unit is further operable to maintain a configuration wherein the configuration includes the map between the device and the remote storage device, and further wherein the map includes virtual LUNs that provide a representation of the storage device.

30. (Previously Presented) The apparatus of Claim 29, wherein the map only exposes the device to LUNs that the device may access.

31. (Previously Presented) The apparatus of Claim 28, wherein the supervisor unit is further operable to maintain a configuration including the map, wherein the map provides a mapping from a host device ID to a virtual LUN representation of the remote storage device to a physical LUN of the remote storage device.

32. (Previously Presented) The apparatus of Claim 28, wherein the remote storage device further comprises storage space partitioned into virtual local storage for the device connected to the first transport medium.

33. (Previously Presented) The apparatus of Claim 32, wherein the supervisor unit is further operable to prevent the device from accessing any storage on the remote storage device that is not part of a virtual local storage partition assigned to the device

34. (Previously Presented) The apparatus of Claim 28, wherein the first controller and the second controller further comprise a single controller.

35. (Previously Presented) A system for providing virtual local storage on remote storage devices, comprising:

- a first controller operable to connect to and interface with a first transport medium operable according to a Fibre Channel protocol;

- a second controller operable to connect to and interface with a second transport medium operable according to the Fibre Channel protocol;

- at least one device connected to the first transport medium;

- at least one storage device connected to the second transport medium; and

- an access control device coupled to the first controller and the second controller, the access control device operable to:

 - map between the at least one device and a storage space on the at least one storage device; and

 - control access from the at least one device to the at least one storage device using native low level, block protocol in accordance with the map.

36. (Previously Presented) The system of Claim 35, wherein the access control device is further operable to maintain a configuration wherein the configuration includes the map between the at least one device and the at least one storage device, and further wherein the map includes virtual LUNs that provide a representation of the at least one storage device.

37. (Previously Presented) The system of Claim 36, wherein the map only exposes the at least one device to LUNs that the at least one device may access.

38. (Previously Presented) The system of Claim 35, wherein the access control device is further operable to maintain a configuration including the map, wherein the map provides a mapping from a host device ID to a virtual LUN representation of the at least one storage device to a physical LUN of the at least one storage device.

39. (Previously Presented) The system of Claim 35, wherein the at least one storage device further comprises storage space partitioned into virtual local storage for the at least one device.

40. (Previously Presented) The system of Claim 39, wherein the access control unit is further operable to prevent at least one device from accessing any storage on the at least one storage device that is not part of a virtual local storage partition assigned to the at least one device.

41. (Previously Presented) The system of Claim 35, wherein the first controller and the second controller further comprise a single controller.

42. (Previously Presented) A method for providing virtual local storage on remote storage devices, comprising:

mapping between a device connected to a first transport medium and a storage device connected to a second transport medium, wherein the first transport medium and the second transport medium operate according to a Fibre Channel protocol;

implementing access controls for storage space on the storage device; and

allowing access from the device connected to the first transport medium to the storage device using native low level, block protocols.

43. (Previously Presented) The method of Claim 42, further comprising maintaining a configuration wherein the configuration includes a map between the device and the one storage device, and further wherein the map includes virtual LUNs that provide a representation of the storage device.

44. (Previously Presented) The method of Claim 43, wherein the map only exposes the device to LUNs that the device may access.

45. (Previously Presented) The method of Claim 42, further comprising maintaining a configuration including a map from a host device ID to a virtual LUN representation of the storage device to a physical LUN of the storage device.

46. (Previously Presented) The method of Claim 42, further comprising partitioning storage space on the storage device into virtual local storage for the device.

47. (Previously Presented) The method of Claim 46, further comprising preventing the device from accessing any storage on the storage device that is not part of a virtual local storage partition assigned to the device.

48. (Previously Presented) A system for providing virtual local storage, comprising:
a host device;
a storage device remote from the host device, wherein the storage device has a storage space;
a first controller;
a second controller
a first transport medium operable according to a Fibre Channel protocol, wherein the first transport medium connects the host device to the first controller;
a second transport medium operable according to the Fibre Channel protocol, wherein the second transport medium connects the second controller to the storage device;
a supervisor unit coupled to the first controller and the second controller, the supervisor unit operable to:
maintain a configuration that maps between the host device and at least a portion of the storage space on the storage device; and
implement access controls according to the configuration for the storage space on the storage device using native low level, block protocol.

49. (Previously Presented) The system of Claim 48, wherein the supervisor unit is further operable to:
maintain a configuration that maps from the host device to a virtual representation of at least a portion of the storage space on the storage device to the storage device; and
allow the host device to access only that portion of the storage space that is contained in the map.

50. (Previously Presented) The system of Claim 49, wherein the configuration comprises a map from a host device ID to a virtual LUN representation of the storage device to a physical LUN of the storage device.

51. (Previously Presented) The system of Claim 48, wherein the storage device further comprises storage space partitioned into virtual local storage for the host device.

52. (Previously Presented) The system of Claim 51, wherein the supervisor unit is further operable to prevent the host device from accessing any storage on the storage device that is not part of a virtual local storage partition assigned to the host device.

53. (Previously Presented) The apparatus of Claim 48, wherein the first controller and the second controller further comprise a single controller.

REMARKS

Applicant appreciates the time taken by the Examiner to review Applicant's present application. This application has been carefully reviewed in light of the Official Action mailed November 1, 2005. Applicant respectfully requests reconsideration and favorable action in this case.

Double Patenting Rejection

Applicant respectfully wishes to clarify that Applicant agreed that some aspects of the present invention are consistent with items addressed in issued applications and copending applications and reexaminations. Additionally Applicant agreed to submit a terminal disclaimer to obviate the Examiner's double patenting rejection. The submission of the terminal disclaimer is not an admission as to the propriety of the double patenting rejection. See, MPEP 804.02.

In the double patenting rejection, the Examiner listed the following related cases. To aid the Examiner, Applicant provides the following listing and status of each of the cases

09/001,799 issued as 5,941,972, under reexamination as 90/007,123 and 90/007,317
09/354,682 issued as 6,421,753, under reexamination as 90/007,124
09/081,110 issued as 6,789,152
10/081,114 now abandoned
10/023,786 now abandoned
09/965,335 issued as 6,425,035, under reexamination as 90/007,125
10/174,720 issued as 6,738,854, under reexamination as 90/007,127
09/965,339 issued as 6,425,036, under reexamination as 90/007,126
10/081,082 now abandoned
10/361,283 issued as 6,763,419
10/638,955 now abandoned
10/640,468 now abandoned
11/191,254 pending

Attorney Docket No.
CROSS1120-13

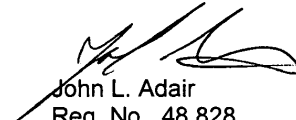
10/658,163
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11

The Director of the U.S. Patent and Trademark Office is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 50-3183 of Sprinkle IP Law Group.

Respectfully submitted,

Sprinkle IP Law Group
Attorneys for Applicant



John L. Adair
Reg. No. 48,828

Date: 12/14/05

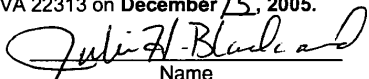
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A PRIOR PATENT	Atty. Docket No. CROSS1120-13
Applicant Geoffrey B. Hoese, et al.	
Application Number 10/658,163	Date Filed 09/09/2003
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Shin, Christopher B.
Confirmation Number: 5675	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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 Name JULIE H. BLACKARD

Crossroads Systems, Inc., the owner of one hundred percent (100%) interest in the instant application, as evidenced by the Assignment Recorded on December 31, 1997 on Reel/Frame: 8929/0290 hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application, which would extend beyond the expiration date of the full statutory term defined in 35 U.S.C. § 154 to 156 and 173 of U.S. Patent Nos. 5,941,972, 6,421,753, 6,425,036, 6,425,035, 6,789,152, 6,738,854, and 6,763,419 or shortened by any terminal disclaimer filed prior to the grant of any patent granted on co-pending Application Nos. 90/007,123, 90/007,124, 90/007,125, 90/007,126, 90/007,127, 11/191,254, and 90/007,317. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and any patent granted on the co-pending applications are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

12/21/2005 DEMMANU1 00000034 503183 10658163

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Attorney Docket:
CROSS1120-13

Customer ID: 44654
Application No. 10/658,163

2

In making the above disclaimer, the owner does not disclaim the terminal part of any patent granted on the instant application that would extend to the expiration date of the full statutory term as defined in 35 U.S.C. § 154 to 156 and 173 of the prior patent, as presently shortened by any terminal disclaimer, in the event that it later: expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.


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4. The Commissioner is hereby authorized to deduct the required fee, and/or any deficiencies or credit any overpayments regarding this application from deposit account 50-3183 of Sprinkle IP Law Group.



John L. Adair

12/15/05
Dated

Application Number 	Application/Control No. 10/658,163	Applicant(s)/Patent under Reexamination HOESE ET AL.	
Document Code - DISQ		Internal Document – DO NOT MAIL	

TERMINAL DISCLAIMER	<input checked="" type="checkbox"/> APPROVED	<input type="checkbox"/> DISAPPROVED
Date Filed : 122005	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:
James R. Matthews

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NOTICE OF ALLOWANCE AND FEE(S) DUE

25094 7590 01/20/2006
 DLA PIPER RUDNICK GRAY CARY US, LLP
 2000 University Avenue
 E. Palo Alto, CA 94303-2248

EXAMINER	
SHIN, CHRISTOPHER B	
ART UNIT	PAPER NUMBER
2182	
DATE MAILED: 01/20/2006	

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,163	09/09/2003	Geoffrey B. Hoese	CROSS1120-13	5675

TITLE OF INVENTION: STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$700	\$300	\$1000	04/20/2006

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

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(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,163	09/09/2003	Geoffrey B. Hoese	CROSS1120-13	5675

TITLE OF INVENTION: STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$700	\$300	\$1000	04/20/2006

EXAMINER	ART UNIT	CLASS-SUBCLASS
SHIN, CHRISTOPHER B	2182	710-001000

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 "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

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 PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE _____ (B) RESIDENCE: (CITY and STATE OR COUNTRY) _____

Please check the appropriate assignee category or categories (will not be printed on the patent): Individual Corporation or other private group entity Government

4a. The following fee(s) are enclosed:
 Issue Fee
 Publication Fee (No small entity discount permitted)
 Advance Order - # of Copies _____

4b. Payment of Fee(s):
 A check in the amount of the fee(s) is enclosed.
 Payment by credit card. Form PTO-2038 is attached.
 The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)
 a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.
 NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____
 Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,163	09/09/2003	Geoffrey B. Hoese	CROSS1120-13	5675
25094	7590	01/20/2006	EXAMINER	
DLA PIPER RUDNICK GRAY CARY US, LLP 2000 University Avenue E. Palo Alto, CA 94303-2248			SHIN, CHRISTOPHER B	
			ART UNIT	PAPER NUMBER
			2182	
DATE MAILED: 01/20/2006				

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
 (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571) 272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

Notice of Allowability	Application No.	Applicant(s)	
	10/658,163	HOESE ET AL.	
	Examiner	Art Unit	
	Christopher B. Shin	2182	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--
 All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. This communication is responsive to the AF received December 20, 2005.
2. The allowed claim(s) is/are 15-53.
3. Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some* c) None of the:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

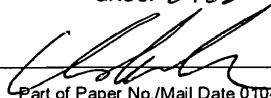
4. A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) hereto or 2) to Paper No./Mail Date _____.
 - (b) including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |

CHRISTOPHER B. SHIN
PRIMARY EXAMINER
GROUP 2182



AFB
CPW



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
REPLY TO OFFICE ACTION DATED 11/01/2005	Atty. Docket No. CROSS1120-13
Applicant Geoffrey B. Hoese	
Application Number 10/658,163	Date Filed 09/09/2003
Title Storage Router and Method for Providing Virtual Local Storage	
Group Art Unit 2182	Examiner Shin, Christopher B.
Confirmation Number: 5675	


Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

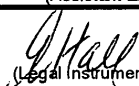

Certificate of Mailing Under 37 C.F.R. §1.8	
I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22312-1450 on <u>12-15-05</u> .	
<i>Julie H. Blackard</i> Signature	
JULIE H. BLACKARD Printed Name	

In response to the Official Action mailed November 1, 2005, Applicant respectfully requests the Examiner reconsider the rejections of the Claims in view of this reply.


OK
to
Anton
1-4-08

Issue Classification 	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/658,163	HOESE ET AL.	
	Examiner	Art Unit	
	Christopher B. Shin	2182	

ISSUE CLASSIFICATION										
ORIGINAL					CROSS REFERENCE(S)					
CLASS	SUBCLASS				CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
710	305				710	11				
INTERNATIONAL CLASSIFICATION					709	258				
G	0	6	F	13/00						
				/						
				/						
				/						
				/						

	CHRISTOPHER SHIN PRIMARY EXAMINER OF 2182	Total Claims Allowed: 21
_____ (Assistant Examiner) (Date)	 (Primary Examiner)	O.G. Print Claim(s) 1
 (Legal Instruments Examiner)	1-10-26 (Date)	O.G. Print Fig. 3

<input checked="" type="checkbox"/> Claims renumbered in the same order as presented by applicant										<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47	
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
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	2		32		62		92		122		152		182		
	3		33		63		93		123		153		183		
	4		34		64		94		124		154		184		
	5		35		65		95		125		155		185		
	6		36		66		96		126		156		186		
	7		37		67		97		127		157		187		
	8		38		68		98		128		158		188		
	9		39		69		99		129		159		189		
	10		40		70		100		130		160		190		
	11		41		71		101		131		161		191		
	12		42		72		102		132		162		192		
	13		43		73		103		133		163		193		
	14		44		74		104		134		164		194		
	15		45		75		105		135		165		195		
	16		46		76		106		136		166		196		
	17		47		77		107		137		167		197		
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	29		59		89		119		149		179		209		
	30		60		90		120		150		180		210		

Search Notes 	Application/Control No. 10/658,163	Applicant(s)/Patent under Reexamination HOESE ET AL.	
	Examiner Christopher B. Shin	Art Unit 2182	

SEARCHED			
Class	Subclass	Date	Examiner
710	1-5	10/24/2005	CBS
710	8-13	10/24/2005	CBS
710	22-28	10/24/2005	CBS
710	305-306	10/24/2005	CBS
710	250	10/24/2005	CBS
709	258	10/24/2005	CBS
714	42	10/24/2005	CBS
711	112,113	10/24/2005	CBS
711	110	10/24/2005	CBS
710	126-131	10/24/2005	CBS
710	36-38	10/24/2005	CBS

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner
710	305, 11	1/3/2006	CBS
709	258	1/3/2006	CBS

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
PLUS	1/12/2005	CBS
PALM - for double patenting	1/13/2005	CBS
EAST (USPAT, EPO, JPO, DERWENT, IBMTDB)	1/15/2005	CBS
PALM - for double patenting	10/24/2005	CBS
PARENT & RELATED CASES WERE REVIEWED FOR THE ALLOWANCE	10/24/2005	CBS
CHECKED WITH EXR CHAN ALLEN FOR ALL OF THE RELATED RE-EXAM CASES FOR THE ALLOWANCE	10/24/2005	CBS



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www.uspto.gov

APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/658,163	09/09/2003	Geoffrey B. Hoese	CROSS1120-13

44654
SPRINKLE IP LAW GROUP
1301 W. 25TH STREET
SUITE 408
AUSTIN, TX 78705

CONFIRMATION NO. 5675

OC000000018039068

OC000000018039068

Date Mailed: 02/10/2006

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/26/2005.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.


 ALBERTHA L JACKSON
 2100 (571) 272-3594

OFFICE COPY



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/658,163	09/09/2003	Geoffrey B. Hoese	CROSS1120-13

25094
DLA PIPER RUDNICK GRAY CARY US, LLP
2000 University Avenue
E. Palo Alto, CA 94303-2248

CONFIRMATION NO. 5675

OC00000018039055


OC000000018039055

Date Mailed: 02/10/2006

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY


This is in response to the Power of Attorney filed 07/26/2005.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).



 ALBERT HAL JACKSON
 2100 (571) 272-3594

OFFICE COPY

Issue Classification 	Application/Control No.		Applicant(s)/Patent under Reexamination	
	10/658,163		HOESE ET AL.	
	Examiner		Art Unit	
Christopher B. Shin		2182		

ISSUE CLASSIFICATION											
ORIGINAL				CROSS REFERENCE(S)							
CLASS	SUBCLASS			CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)						
710	305			710	11						
INTERNATIONAL CLASSIFICATION				709	258						
G	0	G	F	13/00							
				/							
				/							
				/							
				/							

(Assistant Examiner) (Date)		CHRISTOPHER SHIN PRIMARY EXAMINER OF 2182 <i>(Signature)</i> 1-4-06 (Date)		Total Claims Allowed: 21 <i>31</i>	
<i>(Signature)</i> 1-10-06 (Legal Instruments Examiner) (Date)				O.G. Print Claim(s)	O.G. Print Fig.
				1	3

Claims renumbered in the same order as presented by applicant CPA T.D. R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		31		61		91		121		151		181
	2		32		62		92		122		152		182
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	4		34		64		94		124		154		184
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	8		38		68		98		128		158		188
	9		39		69		99		129		159		189
	10		40		70		100		130		160		190
	11		41		71		101		131		161		191
	12		42		72		102		132		162		192
	13		43		73		103		133		163		193
	14		44		74		104		134		164		194
	15		45		75		105		135		165		195
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	22		52		82		112		142		172		202
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	25		55		85		115		145		175		205
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	27		57		87		117		147		177		207
	28		58		88		118		148		178		208
	29		59		89		119		149		179		209
	30		60		90		120		150		180		210

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Part of Paper No. 01042005

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail**

**Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571) 273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

25094 7590 01/20/2006
DLA PIPER RUDNICK GRAY CARY US, LLP
2000 University Avenue
E. Palo Alto, CA 94303-2248



Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Express
Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for **Express** class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

44654
Sprinkle IP Law Group
1301 W. 25th Street, Suite 408
Austin, Texas 78705

Stacy Sutton Kerby (Depositor's name)
Stacy Sutton Kerby (Signature)
March 14, 2006 (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,163	09/09/2003	Geoffrey B. Hoese	CROSS1120-13	5675

TITLE OF INVENTION: STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$700	\$300	\$1000	04/20/2006

EXAMINER	ART UNIT	CLASS-SUBCLASS
SHIN, CHRISTOPHER B	2182	710-001000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
 Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
 "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.
2. For printing on the patent front page, list
 (1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
 (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
- 1 Sprinkle IP Law Group
 2 _____
 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY) 03/16/2006 BABRAHA2 00000046 10658163

Crossroads Systems, Inc.

Austin, TX
 01 FC:1501 1400.00 DP
 02 FC:1504 300.00 DP
 03 FC:8001 3.00 DP

Please check the appropriate assignee category or categories (will not be printed on the patent): Individual Corporation or other private group entity Government

4a. The following fee(s) are enclosed:

- Issue Fee
 Publication Fee (No small entity discount permitted)
 Advance Order - # of Copies 1

4b. Payment of Fee(s):

- A check in the amount of the fee(s) is enclosed.
 Payment by credit card. Form PTO-2038 is attached.
 The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number 50-3183 (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

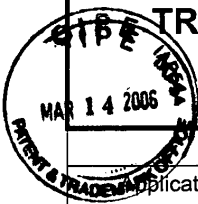
The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above. NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature [Signature]
 Typed or printed name John ADAIR

Date 3/14/06
 Registration No. 48,828

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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 TRANSMITTAL OF PAYMENT OF ISSUE FEE (LARGE Entity) 37 C.F.R. 1.311)				Docket No. CROSS1120-13	
				Applicant(s)	
Application No. 10/658,163	Filing Date 09/09/2003	Examiner Shin, Christopher B.	Group Art Unit 2182	Confirmation No. 5675	
Title:					

**Mail Stop: Issue Fee
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, VA 22313-1450**

Transmitted herewith are the following items in reference to the above-identified application:

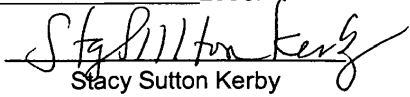
- Issue Fee Transmittal Form PTOL-85
- Issue Fee: \$1,400.00
- Publication Fee \$300.00
- Advanced Order - No. of Copies 1/ Fee \$3.00
- Letter to Official Draftsperson and Formal Drawings
- Postcard

- A check in the amount of \$1703.00 is attached
- The Director is hereby authorized to charge Deposit Account No. 50-3183 of Sprinkle IP Law Group the above-noted fee
- The Director is hereby authorized to charge any deficiencies or credit any overpayments to Deposit Account No. 50-3183 of Sprinkle IP Law Group.



 John L. Adair
 Reg. No. 48,828

Customer No. 44654
 Sprinkle IP Law Group
 1301 W. 25th Street, Suite 408
 Austin, Texas 78705
 Tel. (512) 637-9223
 Fax. (512) 371-9088

Certificate of Mailing Under 37 C.F.R. 1.10
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 Stacy Sutton Kerby



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371 (e) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/658,163	09/09/2003	Geoffrey B. Hoese	CROSS1120-13

44654
SPRINKLE IP LAW GROUP
1301 W. 25TH STREET
SUITE 408
AUSTIN, TX 78705



CONFIRMATION NO. 5675
OC000000018039068
OC000000018039068

Date Mailed: 02/10/2006

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 07/26/2005.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

RECEIVED BY: OP
FEB 21 2006
Docketed By: _____
Date Docketed: _____
Attorney: _____
C/M No: _____

ALBERTINA L. JACKSON
2100 (571) 272-3594

ATTORNEY/APPLICANT COPY

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
NOTIFICATION OF LARGE ENTITY STATUS	Atty. Docket No. CROSS1120-13
Applicant: Geoffrey B. Hoese, et al.	
Application No. 10/658,163	Filing Date: 09/09/2003
Patent No. 7,051,147	Issue Date 05/23/2006
For: Storage Router and Method for Providing Virtual Local Storage	
Group Art: 2182	Confirmation No. 5675

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

Dear Sir:

<p align="center">Certificate of Transmission Under 37 C.F.R. § 1.8</p> <p>I hereby certify that this correspondence is being deposited electronically with the U.S. Patent and Trademark Office using the United States Patent and Trademark Office's EFS-Web system on June <u>9</u>, 2008.</p> <p align="center"><i>Janice Pampell</i> Janice Pampell</p>

On review of the file for this matter, it appears that all the proper fees have been paid. While this notification may be redundant, we hereby submit this notification that the assignee of the above-referenced patent is a large entity.

While Applicant does not believe any further fees are due and owing, the Commissioner is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 50-3183 of Sprinkle IP Law Group.

Respectfully submitted,

Sprinkle IP Law Group

[Signature]
John L. Adair
Reg. No. 48,828

Dated: June 6, 2008

1301 W. 25th Street
Suite 408
Austin, TX 78705
Tel. 512-637-9220
Fax. 512-371-9088

Electronic Acknowledgement Receipt

EFS ID:	3421245
Application Number:	10658163
International Application Number:	
Confirmation Number:	5675
Title of Invention:	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE
First Named Inventor/Applicant Name:	Geoffrey B. Hoese
Customer Number:	44654
Filer:	John L. Adair/Janice Pampell
Filer Authorized By:	John L. Adair
Attorney Docket Number:	CROSS1120-13
Receipt Date:	09-JUN-2008
Filing Date:	09-SEP-2003
Time Stamp:	09:58:02
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no				
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	CROWSS1120-13_Notification_of_Large_Entity_Status.pdf	26724 019e69ee3825db37438f835876a6f39f03a3ce97	no	1
Warnings:					
Information:					

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

AO 120 (Rev. 2/99)

TO: Mail Stop 8 Director of the U.S. Patent & Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
---	--

In Compliance with 35 § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Northern District of California on the following Patents or Trademarks:

DOCKET NO. CV 08-05687 HRL	DATE FILED 12/19/2008	U.S. DISTRICT COURT 280 North First St, Rm 2112, San Jose, CA 95121
PLAINTIFF SYMANTEC CORPORATION		DEFENDANT CROSSROADS SYSTEMS INC.
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 <i>7 Exts pg. 2</i>		SEE ATTACHED COMPLAINT
2		
3		
4		
5		

In the above—entitled case, the following patent(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading		
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK	
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK Richard W. Wieking	(BY) DEPUTY CLERK Betty Walton	DATE December 19, 2008
-----------------------------	-----------------------------------	---------------------------

Copy 1—Upon initiation of action, mail this copy to Commissioner Copy 3—Upon termination of action, mail this copy to Commissioner
 Copy 2—Upon filing document adding patent(s), mail this copy to Commissioner Copy 4—Case file copy

1 LATHAM & WATKINS LLP
Mark A. Flagel (Bar No. 110635)
2 Yury Kapgan (Bar No. 218366)
355 South Grand Avenue
3 Los Angeles, California 90071-1560
Telephone: (213) 485-1234
4 Facsimile: (213) 891-8763

ORIGINAL
FILED

08 DEC 19 PM 5:00

RICHARD W. WIEKING
CLERK
U.S. DISTRICT COURT
NO. DIST. OF CA S.J.

5 LATHAM & WATKINS LLP
6 David A. Nelson, *pro hac vice pending*
Jennifer Bauer, *pro hac vice pending*
7 5800 Sears Tower
Chicago, IL 60606
8 Telephone: (312) 876-7700
9 Facsimile (312) 993-9767

E-filing

10 Attorneys for Plaintiff
11 Symantec Corporation

12 UNITED STATES DISTRICT COURT
13 NORTHERN DISTRICT OF CALIFORNIA
14 SAN JOSE DIVISION

15 SYMANTEC CORPORATION,
16 a Delaware Corporation,

17 Plaintiff,

18 v.

19 CROSSROADS SYSTEMS, INC.
a Texas Corporation

20 Defendant.

C08-05687 HRL
COMPLAINT FOR DECLARATORY
JUDGMENT

DEMAND FOR JURY TRIAL

21
22
23 COMPLAINT

24 Plaintiff Symantec Corporation ("Symantec") hereby pleads the following claims
25 for Declaratory Judgment against Defendant Crossroads Systems, Inc. ("Crossroads"), and
26 alleges as follows:
27
28

COPY

LATHAM & WATKINS
ATTORNEYS AT LAW
LOS ANGELES

COMPLAINT FOR
DECLARATORY JUDGMENT

FAXED

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PARTIES

1. Plaintiff Symantec is a Delaware Corporation with its principal place of business at 20330 Stevens Creek Boulevard, Cupertino, California 95014-2132.

2. On information and belief, Defendant Crossroads is a Texas Corporation with its principal place of business at 11000 MoPac Expressway, Austin, Texas, 78759.

JURISDICTION AND VENUE

3. The Court has subject matter jurisdiction over this action and the matter pleaded herein under 28 U.S.C. §§ 1331 and 1338(a) because the action arises under the Federal Declaratory Judgment Act, 28 U.S.C. § 2201 *et seq.*, and the Patent Act of the United States, 35 U.S.C. § 1, *et seq.*

4. Venue is proper in the United States District Court for the Northern District of California pursuant to 28 U.S.C. § 1391(b)(2) in that a substantial part of the acts giving rise to the claim occurred in this District, and Crossroads is subject to personal jurisdiction in this District.

INTRADISTRICT ASSIGNMENT

5. This action for a declaratory judgment of non-infringement and invalidity of patents is assigned on a district-wide basis under Civil L.R. 3-2(c).

GENERAL ALLEGATIONS

6. This action involves U.S. Patent No. 5,941,972 (“the ‘972 patent”) attached hereto as Exhibit A, U.S. Patent No. 6,425,035 (“the ‘035 patent”), attached hereto as Exhibit B, U.S. Patent No. 6,421,753 (“the ‘753 patent”), attached hereto as Exhibit C, U.S. Patent No. 6,763,419 (“the ‘419 patent”), attached hereto as Exhibit D, U.S. Patent No. 6,738,854 (“the ‘854 patent”), attached hereto as Exhibit E, U.S. Patent No. 6,789,152 (“the ‘152 patent”), attached hereto as Exhibit F, and U.S. Patent No. 7,051,147 (“the ‘147 patent”), attached hereto as Exhibit G (collectively “the patents-in-suit”). The ‘035, ‘753, ‘419, ‘854, ‘152 and ‘147 patents all claim priority to the ‘972 patent.

7. On August 26, 2004, Crossroads sent a letter to Veritas Software Corporation (“Veritas”) offering Veritas a license to the ‘972 and ‘035 patents in exchange, in part, for “a

1 royalty rate as a percentage of the net sales of [Veritas] products covered by the '972 or '035
2 Patents.”

3 8. Veritas requested Crossroads to provide Veritas with the basis for
4 Crossroads' assertions that any of the products or offerings of Veritas were covered by any
5 claims of the '972 and/or '035 patents. Crossroads indicated that it could not provide such
6 information to Veritas without a non-disclosure agreement in place. The parties discussed the
7 non-disclosure agreement for a short period, but did not ultimately reach such an agreement.
8 Veritas again requested Crossroads' basis for its claims. But the basis was never provided and
9 the parties had no further communication after the first quarter of 2005 until Crossroads suddenly
10 reappeared in December of 2008. In 2005, Symantec acquired Veritas.

11 9. On December 12, 2008, Crossroads sent a letter to Symantec offering a
12 license to the patents-in-suit for “any/all products, potentially including the various storage
13 foundation products acquired from Veritas” in exchange, in part, for “a running royalty on the
14 net sales of products using the patented access controls feature.”

15 10. Upon information and belief, Crossroads contends that one or more of
16 Symantec's products infringe one or more claims of the patents-in-suit and that those claims are
17 valid, although it still has provided Symantec with no basis for such contentions.

18 11. Symantec denies that any of its products infringe any claim of the patents-in-
19 suit, and also denies that the patents-in-suit are valid.

20 **FIRST CLAIM FOR RELIEF**

21 **Declaratory Relief Regarding Non-Infringement**

22 12. Symantec incorporates herein the allegations of paragraphs 1-11.

23 13. An actual and justiciable controversy exists between Plaintiff Symantec and
24 Defendant Crossroads as to the non-infringement of the patents-in-suit, which is evidenced by
25 Crossroads' allegations that Veritas' products, later acquired by Symantec, as well as other
26 Symantec products infringe valid claims of the patents-in-suit, and Symantec's allegations
27 herein.

28

1 14. Pursuant to the Federal Declaratory Judgment Act, 28 U.S.C. § 2201 *et seq.*,
2 Symantec requests the declaration of the Court that Symantec does not infringe and has not
3 infringed any claim of the patents-in-suit.

4 **SECOND CLAIM FOR RELIEF**

5 **Declaratory Relief Regarding Invalidity**

6 15. Symantec incorporates herein the allegations of paragraphs 1-11.

7 16. An actual and justiciable controversy exists between Plaintiff Symantec and
8 Defendant Crossroads as to the invalidity of the patents-in-suit, which is evidenced by
9 Crossroads' allegations that Veritas' products, later acquired by Symantec, as well as other
10 Symantec products infringe valid claims of the patents-in-suit, and Symantec's allegations
11 herein.

12 17. Pursuant to the Federal Declaratory Judgment Act, 28 U.S.C. § 2201 *et seq.*,
13 Symantec requests the declaration of the Court that the patents-in-suit are invalid under the
14 Patent Act, 35 U.S.C. §§ 41 *et seq.*, including but not limited to sections 102, 103, and 112.

15 **PRAYER FOR RELIEF**

16 WHEREFORE, Plaintiff Symantec respectfully requests that the Court enter
17 declaratory judgment as follows:

- 18 1. That Symantec does not infringe and has not infringed, directly or indirectly,
19 any of the patents-in-suit;
- 20 2. That the patents-in-suit are invalid;
- 21 3. That Crossroads, and all persons acting on its behalf or in concert with it, be
22 permanently enjoined and restrained from charging, orally or in writing, that any of the patents-
23 in-suit is infringed by Symantec, directly or indirectly;
- 24 4. That Symantec be awarded its costs, expenses and reasonable attorney fees in
25 this action; and
- 26 5. That Symantec be awarded such other and further relief as the Court may deem
27 appropriate.

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DEMAND FOR JURY TRIAL

Plaintiff Symantec respectfully demands a jury trial in this action.

Dated: December 19, 2008

LATHAM & WATKINS LLP

By Mark A. Fligel
Mark A. Fligel
Attorneys for Plaintiff
SYMANTEC CORPORATION

LATHAM & WATKINS
ATTORNEYS AT LAW
LOS ANGELES

COMPLAINT FOR
DECLARATORY JUDGMENT

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**United States
Patent and
Trademark Office**

Maintenance Fee Statement

09/26/2013 03:04 PM EDT

Patent Number: 7051147

Customer Number: 000000000

Sprinkle IP Law Group
1301 W. 25th Street
Suite 408
Austin TX 78705

According to the records of the U.S. Patent and Trademark Office (USPTO), the maintenance fee and any necessary surcharge have been timely paid for the patent listed below. The "PYMT DATE" column indicates the payment date (i.e., the date the payment was filed).

The payment shown below is subject to actual collection. If the payment is refused or charged back by a financial institution, the payment will be void and the maintenance fee and any necessary surcharge unpaid.

Direct any questions about this statement to: Mail Stop M Correspondence, Director of the USPTO, P.O.Box 1450, Alexandria, VA 22313-1450.

PATENT NUMBER	FEE AMT	SUR-CHARGE	PYMT DATE	U.S. PATENT APPLICATION NUMBER	PATENT ISSUE DATE	APPL. FILING DATE	PAYMENT YEAR	ENTITY STATUS	ATTY DKT NUMBER
7051147	\$3,600.00	\$0.00	09/26/13	10658163	05/23/06	09/09/03	08	LARGE	CROSS1120-13

[Click here](#) to obtain your Maintenance Fee Statement as a PDF.

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**United States
Patent and
Trademark Office**

Maintenance Fee Statement

11/20/2009 12:22 PM EST

Patent Number: 7051147

Customer Number: 000000

SPRINKLE IP LAW GROUP
1301 W. 25TH STREET
SUITE 408
AUSTIN TX 78705

According to the records of the U.S. Patent and Trademark Office (USPTO), the maintenance fee and any necessary surcharge have been timely paid for the patent listed below. The "PYMT DATE" column indicates the payment date (i.e., the date the payment was filed).

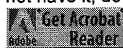
The payment shown below is subject to actual collection. If the payment is refused or charged back by a financial institution, the payment will be void and the maintenance fee and any necessary surcharge unpaid.

Direct any questions about this statement to: Mail Stop M Correspondence, Director of the USPTO, P.O. Box 1450, Alexandria, VA 22313-1450.

PATENT NUMBER	FEE AMT	SUR-CHARGE	PYMT DATE	U.S. PATENT APPLICATION NUMBER	PATENT ISSUE DATE	APPL. FILING DATE	PAYMENT YEAR	SMALL ENTITY?	ATTY DKT NUMBER
7,051,147	\$980.00	\$0.00	11/20/09	10/658,163	05/23/06	09/09/03	04	NO	CROSS1120-13

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UNITED STATES DEPARTMENT OF COMMERCE
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 Alexandria, Virginia 22313-1450
 www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,163	05/23/2006	7051147	CROSS1120-13	5675

44654 7590 05/03/2006
 SPRINKLE IP LAW GROUP
 1301 W. 25TH STREET
 SUITE 408
 AUSTIN, TX 78705

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
 (application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571) 272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (571) 272-4200.

APPLICANT(s) (up to 18 names are included below, see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Geoffrey B. Hoese, Austin, TX;
 Jeffrey T. Russell, Cibolo, TX;

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
REVOCATION AND POWER OF ATTORNEY AND CHANGE OF MAILING ADDRESS	Atty. Docket No. (Opt.) CROSS1120-13
Applicants Geoffrey B Hoese, et. al.	
Application Number 10/658,163	Filed 9/9/2003
For STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE	
Group Art Unit 2186	Examiner Unknown
Confirmation No. 5675	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Certification Under 37 C.F.R. §1.8	
I hereby certify that this document is being transmitted to COMMISSIONER FOR PATENTS via facsimile on <u>8-17</u> , 2004.	
<u>Reynetta Deveau</u> Signed Name	
<u>Reynetta Deveau</u> Printed Name	

Crossroads Systems, Inc., 100% owner of the above-identified patent application, as evidenced by the Assignment recorded on December 31, 1997 on Reel/Frame: 8929/0290, hereby revokes all previous Powers of Attorney and appoints the following attorneys under Customer No. 44654, all of the firm of SPRINKLE IP LAW GROUP, to prosecute the above-identified Patent and to transact all business in the Patent and Trademark Office connected therewith.

STEVEN R. SPRINKLE	Registration No. 40,825
JOHN ADAIR	Registration No. 48,828
ARI AKMAL	Registration No. 51,388

Direct all telephone calls and correspondence to:

Customer No. 44654
SPRINKLE IP LAW GROUP
P.O. Box 684767
Austin, TX 78768-4767
Attn: Steven Sprinkle
Tel. (512) 637.9220 / Fax (512) 371.9088

I hereby state I am authorized to act on behalf of **CROSSROADS SYSTEMS, INC.**

Respectfully submitted,

Crossroads-Systems, Inc.

Dated: 8/11, 2004

By: [Signature]
Robert Sims, President & CEO



UNITED STATES PATENT AND TRADEMARK OFFICE

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 United States Patent and Trademark Office
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APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
10/658,163	09/09/2003	Geoffrey B. Hoese	CROSS1120-13

CONFIRMATION NO. 5675

25094
 GRAY, CARY, WARE & FREIDENRICH LLP
 1221 SOUTH MOPAC EXPRESSWAY
 SUITE 400
 AUSTIN, TX 78746-6875



0000000012130740

Title: Storage router and method for providing virtual local storage

Publication No. US-2004-0054838-A1
Publication Date: 03/18/2004

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <http://pair.uspto.gov/>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at (703) 305-3028.

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 Initial Patent Examination Division (703) 308-1202



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APPL NO.	FILING OR 371 (c) DATE	ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	DRAWINGS	TOT CLMS	IND CLMS
10/658,163	09/09/2003	2186	779	CROSS1120-13	2	39	7

25094
 GRAY, CARY, WARE & FREIDENRICH LLP
 1221 SOUTH MOPAC EXPRESSWAY
 SUITE 400
 AUSTIN, TX 78746-6875

CONFIRMATION NO. 5675

FILING RECEIPT



OC00000011479527

Date Mailed: 12/12/2003

Receipt is acknowledged of this regular Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Filing Receipt Corrections, facsimile number 703-746-9195. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).**

Applicant(s)

Geoffrey B. Hoese, Austin, TX;
 Jeffry T. Russell, Cibolo, TX;

Domestic Priority data as claimed by applicant

This application is a CON of 10/081,110 02/22/2002
 which is a CON of 09/354,682 07/15/1999 PAT 6,421,753
 which is a CON of 09/001,799 12/31/1997 PAT 5,941,972

Foreign Applications

If Required, Foreign Filing License Granted: 12/11/2003

Projected Publication Date: 03/18/2004

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

Storage router and method for providing virtual local storage

Preliminary Class

711

**LICENSE FOR FOREIGN FILING UNDER
Title 35, United States Code, Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15**

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Office of Export Administration, Department of Commerce (15 CFR 370.10 (j)); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

**PROSECUTION FILE HISTORY SUMMARY
FOR U.S. PATENT NO. 6,425,035**

FOR CIVIL ACTION NOS.:

1:13-CV-00800-SS – Crossroads Systems, Inc. v. Dot Hill Systems, Corp.
1:13-CV-00895-SS – Crossroads Systems, Inc. v. Oracle Corporation
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