P GVCRR EXHIBIT 1009

PART 4

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(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

- (75) Inventors: Geoffrey H. Hoese, Austin, TX (US); Jeffry T. Russell, Cibolo, TX (US)
- (73) Assignee: Crossworlds Software, Burlingame, CA (US)

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

(*) Notice:

This patent is subject to a terminal dis-

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.
- (51) **Int. Cl. G06F 13/00** (2006.01)

See application file for complete search history.

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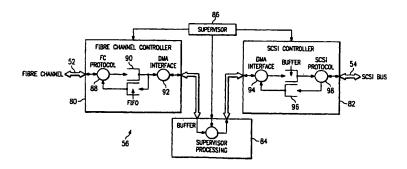
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Primary Examiner-Dov Popovici

(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 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.



US 6,425,035 C1

Page 2

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Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 5 of 324

US 6,425,035 C1

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

NO AMENDMENTS HAVE BEEN MADE TO THE PATENT

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

The patentability of claims 1–14 is confirmed.

* * * * *

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IN THE UNITED STATE	S PATENT AND TRA	DEMARK OFFICE				
	CERTIFICATE OF SERVICE UNDER 37 C.F.R. 1.248					
	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 Local Storage	Method for Providing Virtual				
	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 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, 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	S PATENT AND TRADEN	MARK OFFICE
Comments On Statement of Reand/or Confirm	Atty. Docket No. CROSS1123-17 CROSS1123-19	
	Applicants Goeffrey B. Hoese, et	al.
	Reexamination Control 90/007,125 90/007,317	No. Date Filed 07/19/2004 11/23/2004
	Title Storage Router and M Local Storage	lethod for Providing Virtual
	Group Art Unit	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.

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 9 of 324

Attorney Docket No. CROSS1123-17 CROSS1123-19

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

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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

1301 W. 25th Street, Suite 408

Austin, TX 78705 Tel. (512) 637-9223 Fax. (512) 371-9088

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 10 of 324



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.usplo.gov

APPLICATION NO.	O. FILING DATE FIRST NAMED INVENTOR		ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/007,125 80/007317	07/19/2004	6425035	I006-8910	2298
44654 75	90 09/23/2005		EXAM	INER
SPRINKLE IP 1301 W. 25TH	LAW GROUP STREET		CHEN, ALAI	1
SUITE 408			ART UNIT	PAPER NUMBER
AUSTIN, TX	78705	·	2182	
			DATE MAIL ED: 09/23/2005	:

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

PTO-90C (Rev. 10/03)



Patent and Trademark Office Page 11 of 324

Address: ASSISTANT COMMISSIONER FOR PATENTS

Washington, D.C. 20231

APPLICATION NO. FILING DATE FIRST NAMED INVENTOR / PATENT IN REEXAMINATION

90/007,317 11/23/2004 6425035 HOESEI/WAB

EXAMINED

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

CHEN, ALAN

ARTUNIT PAPER

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

PTO-90C (Rev.3-98)

Case 1:13-cv-00895-SS Document 31-	16 Filed 04/09/14 Pa	ge 12 of 324
	Control No.	Patent Under Reexamination
Notice of Intent to Issue	90/007,125 marged w/ 10/00/317	6425035
Ex Parte Reexamination Certificate	Examiner	Art Unit
	Alan S. Chen	2182
The MAILING DATE of this communication appears o		
1. ☑ Prosecution on the ments is (or remains) closed in this subject to reopening at the initiative of the Office or up issued in view of (a) ☑ Patent owner's communication(s) filed: 22 Ju (b) ☐ Patent owner's late response filed: (c) ☐ Patent owner's failure to file an appropriate re (d) ☐ Patent owner's failure to timely file an Appeal (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 dependence) (3) Patent claim(s) cancelled: (4) Newly presented claim(s) patentable:	pon petition. Cf. 37 CFR 1.3 Ily 2005. esponse to the Office action Brief (37 CFR 41.31). dent on amended claim(s)):	313(a). A Certificate will be mailed:
 (5) Newly presented cancelled claims: 2. Note the attached statement of reasons for patentabil necessary by patent owner regarding reasons for pate to avoid processing delays. Such submission(s) shoul Patentability and/or Confirmation." 	entability and/or confirmatior Id be labeled: "Comments O	n must be submitted promptly
3. Note attached NOTICE OF REFERENCES CITED (P	TO-892).	
4. Note attached LIST OF REFERENCES CITED (PTO-	1449 or PTO/SB/08).	
5. The drawing correction request filed on is:	approved \square disapprove	d.
6. Acknowledgment is made of the priority claim under 3 a) All b) Some* c) None of the certif been received. not been received. been filed in Application No. been filed in reexamination Control No. been received by the International Burea	fied copies have	
* 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 P	arte Reexamination Certificate	Part of Paper No 09022005

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REEXAMINATION

REASONS FOR PATENTABILITY / CONFIRMATION

Reexamination Control No. 90/007,125 mergel of Attachment to Paper No. 09022005.

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 refering 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 Ethemet communications, however, is not considered to be a NLLBP.

PTOL-476 (Rev. 03-98)

DONALD SPARKS
SUPERVISORY PATENT EXAMINER

(Examiner's Signature)

SUPERVISORY PATENT EXAMINER TECHNOLOGY CENTER 2100

KIM HUYNH PRIMARY EXAMINER

Case 1:13-cv-00895-SS Reexamination	Document 31-16 Application/Control No 90/007125 newsed and 90 Certificate Date	Filed 04/09/14 Page 14 of 3 Applicant(s)/Patent Under Reexamination 6425035 Certificate Number	24				
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Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 15 of 324

Issue Classification Application/Control No. Applicant(s)/Patent under Reexamination

90/007,125 אייקפל על 90/007311 6425035

Examiner Art Unit

Alan S. Chen 2182

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Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 18 of 324

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	3	@ad<"20010927" and (fibre adj channel near router) same SCSI	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/22 08:44
S2	0	@ad<"19971231" and (fibre adj channel near router) same SCSI	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/22 08:44
S3	111	@ad<"19971231" and fibre adj channel same SCSI	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/22 08:45
\$4 	35	@ad<"19971231" and fibre adj channel near SCSI	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/22 08:46
S5 _.	1	S4 and router	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/22 08:45
S6	7	@ad<"19971231" and fibre adj channel adj SCSI	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/22 09:02
S7	0	@ad<"19971231" and "fibre channel protocol for SCSI"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/22 09:02
S8	14	@ad<"19971231" and FCP and SCSI and fibre adj channel	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/22 09:07
_\$10	. 1	S8 and router	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/22 09 :03

Search History 9/6/05 2:32:06 PM Page 1
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Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 19 of 324

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	S11	3	S8 and RAID	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/22 09:18
	S13	39	@ad<"20010927" and network adj attached adj storage and Fibre adj channel near scsi	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/22 09:19
	S14	19	S13 and router	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/22 09:19
	S15	0	@ad<"19971231" and network adj attached adj storage and Fibre adj channel near scsi	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/09/03 14:23
-	S16	1	@ad<"19971231" and Fibre adj channel same scsi same router	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/22 09:58
	S18	8	@ad<"19971231" and ancor.asn.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/22 09:59
	S19	0	@ad<"19971231" and ancor.asn. and SCSI	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/22 09:59
	S20	. 0	@ad<"19971231" and ancor.asn. and Fibre	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/22 09:59
	S21	0	@ad<"19971231" and emerson near steven.inv.	US-PGPUB; USPAT; EPO; JPO; DERWENT;	OR	OFF.	2005/08/22 10:05
	S22	4	@ad<"19971231" and SCSI near2 FCP	IBM_TDB US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/30 14:19

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Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 20 of 324

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S23	139	@ad<"19971231" and fibre adj channel and SCSI	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/30 14:48	٠.
S24	58	S23 and map\$5	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/30 14:21	
S25	14	S23 and LUN	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/30 14:21	
S26	11	S24 and LUN	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/30 14:23	
S27	0	S24 and virtual near local near storage	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/30 14:22	
S28	0	S23 and virtual near local near storage	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/30 14:22	
S29	8	S23 and router	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/30 14:23	
S30	0.	@ad<"19971231" and virtual adj local adj storage and SCSI and remote	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR .	OFF	2005/08/30 14:49	
S31	0	@ad<"19971231" and virtual adj local adj storage and SCSI	US-PGPUB; USPAT; EPO; JPO;	OR	OFF	2005/08/30 14:49	
S32	70	@ad<"19971231" and virtual near	DERWENT; IBM_TDB US-PGPUB;	OR	OFF	2005/08/30 14:49	
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Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 21 of 324

S33	. 8	S32 and remote	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/08/30 14:49
S34	5	@ad<"19971231" and router same fiber adj channel	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2005/09/05 12:11
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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SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name	Pinchus Laufer	Examiner #:	<u>73139</u>	Date:	<u>09/19/05</u>		
Art Unit: NONE	_Phone Number <u>2-359</u>	9 Serial Nun	nber <u>None</u>	2			
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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, Jeffry 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 Jeffry 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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Click "Edit Search" to return to the search form and modify your search.

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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.

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?us6425035/pn
  ** SS 1: Results 1
 Search statement
?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)
PAO - 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]
     - (A1) G06F-003/00
     - G06F-013/40D2
 PCL - ORIGINAL (O): 710105000; CROSS-REFERENCE (X): 710008000 710036000
        710310000
     - Corresponding document
     - US5748924; US5768623; US5809328; US5812754; US5835496; US5848251;
        US5935260; US5941972; US5959994; US6041381; US6055603; US6065087;
        US6075863; US6098149; US6118766; US6148004; US6185203; US6209023;
        US6230218; US6341315; US6343324
 STG - (Al) 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
     - 2005-05
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·1/1 CRXX - (C) CLAIMS/RRX

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 29 of 324

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

Assigned To: Honorable Sam Sparks

Referred To:

Nature of suit: Patent (830)

Cause: Patent Infringement Lead Docket: None

Other Docket: None

Class Code: PATTRD

Closed: no

Statute: 28:1338 Jury Demand: Both

Demand Amount: \$0

NOS Description: Patent

Jurisdiction: Federal Question

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https://courtlink.lexisnexis.com/ShowDocket.aspx

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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

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		12/16/03]
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 byFranklin E. Gibbs with Amount: \$ 25.00, Receipt # 359723. (mc2) [Entry date 04/13/04]
04/13/2004	55	Answer by Dot Hill System's 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 hald 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 byAaron 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 byLarry 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 mooting 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 msj (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 msj [93-1] until 11 days after last of depositions of Ellen Lary, Richard Lary, and Diana Hsuesh-Ying Shen is completed, signed by Honorable Sam Sparks (mc2) [Entry date 07/09/04]
07/09/2004		Pro hac vice fee paid byJoseph 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 byBarry 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 Frankklin 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 byRichard 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 Frankklin 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 noinfringement, 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]
1 0/08/2004	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 by]. 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 byRaymond 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 byDarius 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

Recommendation in excess of page limit [250-1] signed by Honorable Sam Sparks (dm) [Entry date 02/23/05] 3/03/2005 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 (fine [Entry date 03/07/05] 3/03/2005 257 Motion by Dot Hill Systems Cor for a limited six month abatement (dm) [Entry date 03/07/05] 3/03/2005 258 Motion by Dot Hill Systems Cor for Peter O. Huang to appear pro hac vice (252-1) signed by Honorable Sam Sparks (dm) [Entry date 03/07/05] 3/08/2005 259 Motion by Dot Hill Systems Cor for Peter O. Huang to appear pro hac vice (dm) [Entry date 03/08/05] 3/08/2005 259 Motion by Dot Hill Systems (a thoright, Barry K. Shelton, John E. Guist, Matthew C. Bernstein, Joseph R. Ped for Crossroads Systems (a totorney) John E. Guist, Matthew C. Bernstein, Joseph R. Ped for Crossroads Systems (a totorney) Alan D. Albright for Crossroad Systems (a totorney) Alan D. Albright for Crossroads Systems (a totor			
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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 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 byPeter 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] 03/15/2005 264 Declaration of John M. Guaragna by Crossroads Systems (in support of in opposition response [262-1] (dm) [Entry date 03/16/05] 03/17/2005	03/08/2005	259	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 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 John E. Giust for Crossroads Systems (, attorney John E. Giust for Crossroads Systems (, attorney Matthew C. Bernstein for Crossroads Systems (, attorney Matthew C. Bernstein for Crossroads Systems (, attorney Matthew C. Bernstein for Crossroads Systems (, attorney John E. Giust for Crossroads Systems (, attorney Matthew C. Bernstein for Crossroads Systems (, attorney John E. Giust for Crossroads Systems (, attorney Matthew C. Bernstein for Crossroads Systems (, attorney John E. Giust for Crossroads Systems (, attorney Matthew C. Bernstein for Crossroads Systems (, attorney John E. Giust for Crossroads Systems (, attorney Matthew C. Bernstein for Crossroads Systems (, attorney John E. Giust for Crossroads Systems (, attorney John E. Giust for Crossroads Systems (, attorney Alan D Albright for Crossroads Systems (, at
request for judicial notice in support of its motion for summary judgment. 186-1] 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] 03/14/2005	03/09/2005	260	
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06/20/2005 271 Declaration of Richard F. Cauley in support of Dot Hill Systems Corporation's motion for continued	04/12/2005	269	22, 2005 order requesting that plaintiff file a copy of that order in the reexamination proceedings
	06/20/2005	270	Motion by Dot Hill Systems Cor for continued limited abatement (dm) [Entry date 06/21/05]
	06/20/2005	271	

Lexis Nexis Court Littlese 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 58 of 29

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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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

SUBMISSION OF REFERENCES TO COMPLETE RECORD
BY APPLICANTS

Atty. Docket No. (Opt.) CROSS1123-17 CROSS1123-19



71338 U.S. PTO

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

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

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

NetApp Ex. 1009, pg. 684

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 60 of 324

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

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,

Janice Pampell

Sprinkle IP Law Group Attorneys for Applicants

Jefin L. Adair

Reg. No. 48,828

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 Statement of Substance of Examiner Interview Atty. Docket No. CROSS1123-17 CROSS1123-19 Applicants Geoffrey B. Hoese, et al. Reexamination Control No. Date Filed 90/007,125 07/19/2004 90/007,317 Title Storage Router and Method for Providing Virtual **Local Storage** Group Art Unit Examiner 2182 Chen, Alan Confirmation Number: Patent No. 2304 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 2-1-0.5

 $\bigcap_{i} J_{i} \mathcal{I} \mathcal{I}$

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.

CROSS1123-17 CROSS1123-19

2

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

Customer ID: 44654

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 _____, 2005 1301 W. 25th Street, Suite 408

Austin, TX 78705 Tel. (512) 637-9223 Fax. (512) 371-9088 Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 63 of 324



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF SERVICE

Atty Docket No. CROSS1123-17 CROSS1123-19

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

Mail Stop Patent Application Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450

Sir:

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

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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. Date Filed 90/007,125 07/19/2004 90/007,317 Title Storage Router and Method for Providing Virtual **Local Storage** Examiner **Group Art Unit** 2182 Chen, Alan

Confirmation Number:

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

Dear Sir:

Certificate of Mailing Under 37 C.F.R. §1.10

Patent No.

6,425,035

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 9-1-05

2304

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.

2

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

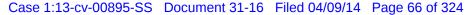
John L. Adair

Reg. No. 48,828

Date: September / , 2005 1301 W. 25th Street, Suite 408

Austin, TX 78705 Tel. (512) 637-9223

Fax. (512) 371-9088



SEP 0 6 2005

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF SERVICE

Atty Docket No. CROSS1123-17 CROSS1123-19

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

Mail Stop Patent Application Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450

Sir:

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

dohn 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

Case 1:13-cv-00895-SS Document 31 NFTE 184 A 469 DEP ARPINEN POR COMMERCE



Patent and Trademark Office

Address: ASSISTANT COMMISSIONER FOR PATENTS

Washington, D.C. 20231

APPLICATION NO. FILING DATE FIRST NAMED INVENTOR / ATTORNEY DOCKET NO. CONTROL NO. PATENT IN REEXAMINATION 1006-8910 90/007,125 07/19/2004 6425035 90/007317 **EXAMINER** Larry E. Severin Wang, Hartman & Gibbs, PC 1301 Dove Street **Suite 1050 PAPER ART UNIT** Newport Beach, CA 92660 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

PTO-90C (Rev.3-98)

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 68 of 324 Control No. Patent Under Reexamination 90/007,125 merged with Ex Parte Reexamination Interview Summary 6425035 90100317 Art Unit Examiner 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 If Yes, brief description: ___ Agreement with respect to the claims f) was reached. g) was not reached. g) 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). cc: Requester (if third party requester) Examiner's signature, if required

U.S. Patent and Trademark Office PTOL-474 (Rev. 04-01)

Ex Parte Reexamination Interview Summary

Paper No. 08232005

Case 1:13-cv-00895-SS Document 31 16 FED 84 A469 64 AREMEN 9 6 COMMERCE



Patent and Trademark Office

Address: ASSISTANT COMMISSIONER FOR PATENTS

Washington, D.C. 20231

ATTORNEY DOCKET NO. APPLICATION NO. FILING DATE FIRST NAMED INVENTOR / CONTROL NO. PATENT IN REEXAMINATION 1006-8910 90/007,125 07/19/2004 6425035 90/007,317 **EXAMINER** Larry E. Severin CHEN, HLAN Wang, Hartman & Gibbs, PC 1301 Dove Street **Suite 1050 ART UNIT PAPER** Newport Beach, CA 92660 2182

DATE MAILED: 08 -22-05

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PTO-90C (Rev.3-98)

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 70 of 324

	Control No.	Patent Under Reexamination	
Ex Parte Reexamination Interview Summary	90/007,125 AA/007177	6425035	
•	Examiner 90/007317	Art Unit	
	Alan S. Chen	2182	
All participants (USPTO personnel, patent owner, patent o	wner's representative):		
(1) <u>Alan S, Chan</u>	(3)		
(2) <u>Mr. Sprinkla</u>	(4)		
Date of Interview: <u>22 August 2005</u>			
Type: a)⊠ Telephonic b) Video Conference c) Personal (copy given to: 1) patent owne	r 2)⊡ patent owner's repre	esentative)	
Exhibit shown or demonstration conducted: d) Yes If Yes, brief description:	e)□ No.		
Agreement with respect to the claims 1) was reached. Any other agreement(s) are set forth below under "Description of the control of the claims of the claim	g) was not reached. h) to of the general nature of w	☐ N/A. vhat was agreed to"	
Claim(s) discussed: <u>N/A</u> .			
Identification of prior an discussed: N/A.			
Mr. Sprinkle went over litigation/prosecution history of the obviousness based on the quality and quantity of reviewe he will put that into consideration but needs to conduct his Examiner cites references which is not of the prior art of mould respond with feedback on them within the week. (A fuller description, if necessary, and a copy of the amen patentable, if available, must be attached. Also, where no patentable is available, a summary thereof must be attached.	rs/examiners that have worked own unbiased search/conside ecord that he is currently considerate which the examiner as copy of the amendments that	on this case, examiner states bration in judging patentability, idening, Mr. Sprinkle states he	
A FORMAL WRITTEN RESPONSE TO THE LAST OFFIC STATEMENT OF THE SUBSTANCE OF THE INTERVIE' LAST OFFICE ACTION HAS ALREADY BEEN FILED. THE INTERVIEW DATE TO PROVIDE THE MANDATORY ST (37 CFR 1.580(b)). THE REQUIREMENT FOR PATENT OF TIME ARE GOVERNED BY 37 CFR 1.550(c).	W. (See MPEP § 2281). IF A HEN PATENT OWNER IS GIV ATEMENT OF THE SUBSTA	RESPONSE TO THE VEN ONE MONTH FROM THIS NCE OF THE INTERVIEW	
cc: Requester (if third party requester)		nature, if required	
U.S. Patent and Trademark Office	ination Interview Summary	Paper No. 08222005	

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 71 of 324



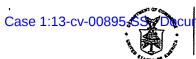
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/007.317 11/23/2004 6425035			HOESE1/WAB	1634
44654 759	90 08/09/2005	EXAMINER		
SPRINKLE IP 1301 W. 25TH S	LAW GROUP STREET	Chen, ALAN		
SUITÉ 408			ART UNIT	PAPER NUMBER
AUSTIN, TX	78705	2182		
		•	DATE MAILED: 08/09/2005	5

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PTO-90C (Rev. 10/03)



CUMPATERIAND TRACEMENT OF COMMERCE Page 72 of 324

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

APPLICATION NO. FILING DATE FIRST NAMED INVENTOR / PATENT IN REEXAMINATION

90/007,317 11/23/2004 6425035 HOESE1/WAB

40/007,125

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

PAPER

2182

ART UNIT

DATE MAILED: 08-09-05

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PTO-90C (Rev.3-98)

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Patent Under Reexamination Control No. 6425035 Ex Parte Reexamination Interview Summary 90/007,125 ; 90/007,317 Art Unit 2182 Alan Chen All participants (USPTO personnel, patent owner, patent owner's representative): (3) John Adair (1) Alan Chen (2) Steven Sprinkle (4) Robert Griswold Date of Interview: 88/59/05 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 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

U.S. Patent and Trademark Office PTOL-474 (Rev. 04-01)

Ex Parte Reexamination Interview Summary

Paper No. 080905

JUL-29-2005 FRI 08:59 AM Sprinkle IP Law Group

FAX NO. 5123719088

P. 01/01

PTOL-413A (09-04)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office U.S. DEPARTMENT OF COMMERCE Applicant Initiated Interview Request Form 901007,317 First Named Applicant: Hoese Application No.: Art Unit: 2182 Status of Application: And office Examiner: Chen, Alan Tentative Participants: (1) Akn Chen Robert Cris wold Proposed Time: 2 (AM/KM) Proposed Date of Interview: Type of Interview Requested: (3) | | Video Conference (1) [] Telephonic (2) [4 Personal [4-NO Exhibit To Be Shown or Demonstrated: [] YES If yes, provide brief description: Issues To Be Discussed Not Agreed Discussed Agreed Claims/ Issues (Rej., Obj., etc) Fig. #s Prior Art Sping, Oda, J. bhe [] [] [] [] [] [] [] Claim 11 [] [] [] Continuation Sheet Attached Brief Description of Arguments to be Presented: and Jibbe do not wand agrees from do not teach unoppoint or acre Commings and footunated and Dekoning 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)) Applicant/Applicant's Representative Signature Examiner/SPE Signature ADAIR Typed/Printed Name of Applicant or Representative 49, 828
Registration Number, if applicable

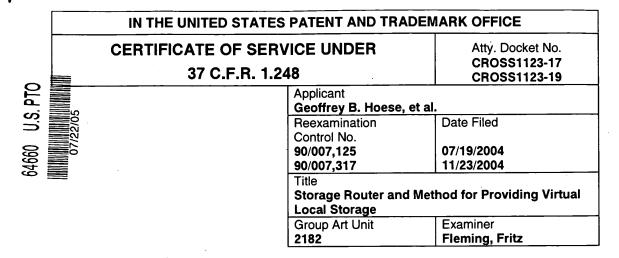
This collection of information is required by 37 CFR 1.133. The information is required to obtain or retain a benefit by the public which is to file (and by the USFTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take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

PAGE 1/1* RCVD AT 7/29/2005 10:57:46 AM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/29 * DNIS:2734143 * CSID:5123719088 * DURATION (mm-ss):00-46

12 677-922





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

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 REPLY TO OFFICE ACTION UNDER EX PARTE Atty. Docket No. . CROSS1123-17 **REEXAMINATION DATED 05/24/05** CROSS1123-19 **Applicants** Goeffrey B. Hoese, et al. Reexamination Control Nos. Date Filed 90/007,125 07/19/2004 01/23/2004 90/007,317 Title Storage Router and Method for Providing Virtual Local Storage **Group Art Unit** Examiner

2182

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

Dear Sir:

Certificate of Mailing Under 37 C.F.R. §1.10

Fleming, Fritz

I hereby certify that this correspondence is being deposited with the United States Postal Service as Express Mail to Addressee (*Label No. EV734539513US*) in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandna, 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.

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

2

IN THE CLAIMS:

- 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

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

3

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

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

4

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.

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

5

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

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

6

- 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
- 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

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

7

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

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 83 of 324

Attorney Docket No. CROSS1123-17 and CROSS1123-19

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

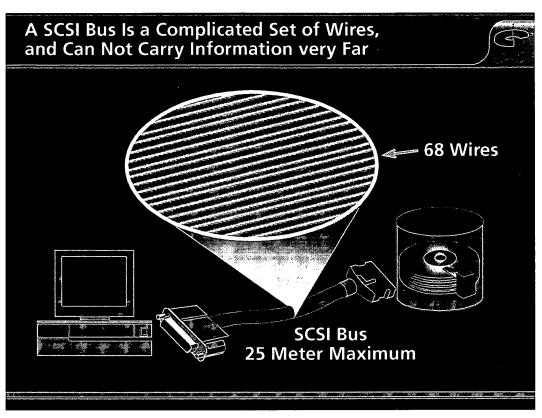
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allowing a host device access only to those virtualized storage devices (or portions of storage devices) to which it is mapped, the invention of the '035 Patent can prevent unauthorized or unintended access by that host device to other remote storage 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.

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

9



Graphic 1

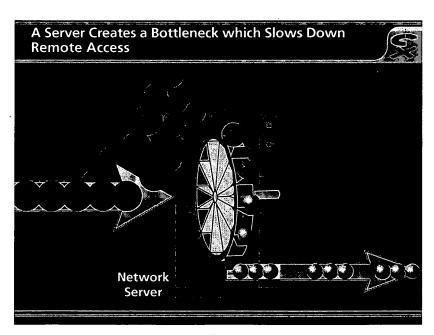
Thus, a major shortcoming of any such SCSI-to-SCSI routing device or method was that the storage devices must typically be within approximately 25 meters of the host computer that needs to have access to the storage devices. Indeed, due to the costs associated with these complicated SCSI buses, most 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

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

10

distance over a SCSI bus), workstations were connected to a network server using a distancecapable 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 protócols. 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.

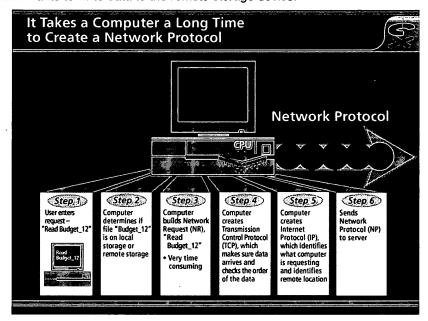


Graphic 2

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

11

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.



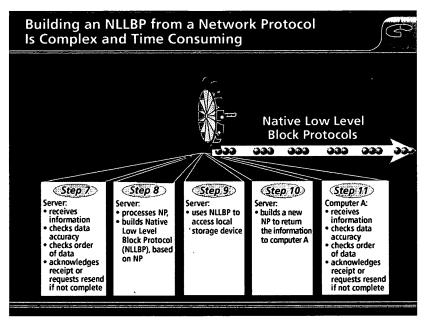
Graphic 3

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

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

12

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

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

13

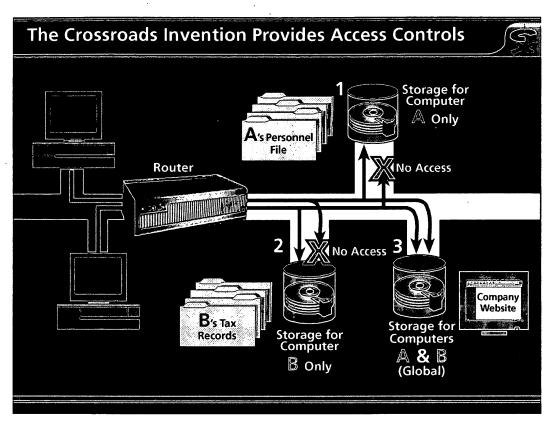
higher-level network protocols. The present invention thus routes NLLBPs to the remote storage devices without involving a network server that requires the use of higher-level network protocols. This allows remote storage, but does away with the time consuming and complex steps of creating and processing 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.

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

14



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.

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

15

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 <u>providing virtual local storage on remote storage devices</u> 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 <u>remote</u> storage devices" and "a supervisor unit . . . operable to . . . map between devices connected to the first transport

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

16

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

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

17

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 sere 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

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

18

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.

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.

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

19

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

The system of Spring does not provide virtual local storage on <u>remote</u> 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.

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

20

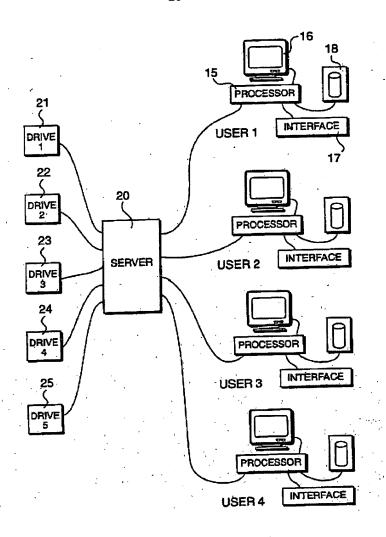


FIGURE 1 of Spring

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,

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

21

and page 10, lines 1-5. In 1995, the year of Spring's filling, 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.

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

22

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 <u>network server to allow access between workstations and remote storage devices</u>, 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-00-CA-248-JN, the Federal

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

23

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.

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

24

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

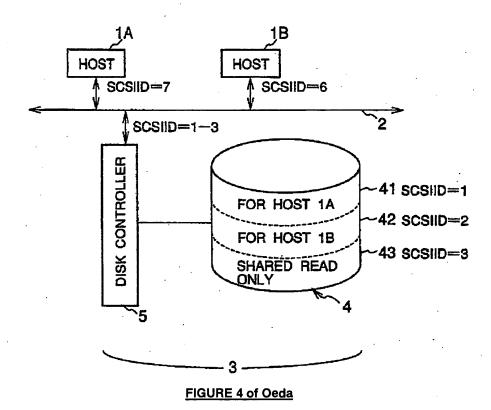
Customer ID: 44654 90/007,125 90/007,317

25

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.



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

26

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.

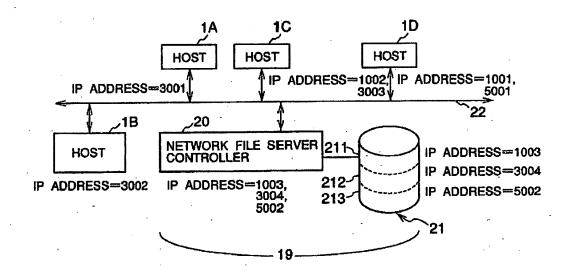


FIGURE 6 of Oeda

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

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

27

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 <u>do</u> involve the overhead of high level network protocols typically required by network servers and they <u>do</u> 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 <u>using native low level</u>, <u>block protocols</u>." (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

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

28

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 <u>remote</u> 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

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.

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

29

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

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

30

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

NetApp Ex. 1009, pg. 730

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

31

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

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

32

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

Attorney Docket No. CROSS1123-17 and CROSS1123-19

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

33

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 <u>assigned</u> 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.

Attorney Docket No. CROSS1123-17 and CROSS1123-19 Customer ID: 44654 90/007,125 90/007,317

34

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.

Attorney Docket No. CROSS1123-17 and CROSS1123-19 Customer ID: 44654 90/007,125 90/007,317

35

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, 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

Attorney Docket No. CROSS1123-17 and CROSS1123-19

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

36

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,

Attorney Docket No. CROSS1123-17 and CROSS1123-19

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

37

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.

Attorney Docket No. CROSS1123-17 and CROSS1123-19 90/007,125 90/007,317

38

In Oeda, because the hosts are set to know which SCSI IDs they can request and <u>any</u> 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. <u>Any</u> 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

Attorney Docket No. CROSS1123-17 and CROSS1123-19

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

39

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 Attorney Docket No. CROSS1123-17 and CROSS1123-19

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

40

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

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 116 of 324

Attorney Docket No. CROSS1123-17 and CROSS1123-19

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

41

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.

This Reply was served via First Class Mail on July 22, 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: July 22, 2005

1301 W. 25th Street, Suite 408

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March 8	, 2004

EXHIBIT B

IN THE UNITED STATES DISTRICT COURTISTIN DIVISION FOR THE WESTERN DISTRICT OF TEXAS
AUSTIN DIVISION 2005 JA 21 AR11: 28

CROSSROAD SYSTEMS (TEXAS), INC., Plaintiff,

-VS-

WESTERN BIG THE SOFT OF THE STATE OF THE STA

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

245

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 121 of 324

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 1944 day of January 2005.

KARL BAYER SPECIAL MASTER

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Actual Claims Language	Crossroads' Proposed Construction	Crossroads* Byidence	Dot Hill's Proposed Construction	Dot Hill's Evidence	Dot Hill's Proposed Dot Hill's Evidence Special Mater's Construction Construction
				computer through a network)." (DHS Brief Ex. 10)	
A storage router for providing virtual local storage on	Remote:	Remote:	Remote:	Remote:	Remote:
remote storage devices to	at least one serial network	Intrinsic:	canable of physical	Intrinsic	Indirectly connected through at
devices, comprising:	transport medium that	'035 patent:	separation.	'035 Patent:	medium
a buffer providing memory	encapsulates the native low-	col. 1, 11. 23-36;	•	Col. 1, lines 39-42 using	
work space for the storage	level block protocol."	col. 2, 11. 1-34;	NOTE: This is the definition	the term "remote" to	
router; a first controller		col. 5, 11. 46-48;	of remote, but since this	refer to storage which is	-
operable to connect to and		col. 5, 11. 52-57;	phrase appears only in the	not "local," and defining	
interface with a first transport		col. 6, Il. 19-31;	preamble to explain the	"local" as "a disk drive,	
medium;		col. 9, 11. 26-31.	context in which the storage	tape drive, CD-ROM	
			router is used, it is not a	drive or other storage	
		Extrinsic:	limitation of this claim.	device contained within,	
		Tr. 102:14-20;		or locally connected to	
		Rhyne Cross, Tr. 159:17-18; Rhyne Cross Tr. 161-7-8:	-	the workstation."	
		Rhyne Cross, Tr. 174:14-24:		Col 1 lines 63-67	
		Tr. 180:5-14:		describing storage	
		Mr. Erwine's Notes, Shelton		canacity which is not	
		Decl. ISO Crossroads' Reply,		local as "remote."	
		Ex. 4.		:	
				Col. 2, line 32	
				significantly remote	
		-		Extrinsic:	
		-		Webopedia definition of "remote" (Last modified	•

9

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 123 of 324

Dot Hill's Evidence Special Master's Construction	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)	Webopedla definition of "local" (Last modified September 1, 1996) as "In networks, local refers	to files, devices, and other resources at your workstation. Resources	the network are remote (DHS Brief Ex. 6)	Deposition of inventor Hoese, pages 143, 146, 147, 154,155 confirming	that "remote" is not a function of distance by
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		Crossroads' Evidence Construction and a storage device, but rather has to do with the topological nature of the interconnection between those devices." (DHS Responsive Brief Ex. 18) Declaration of Rhyne, paragraph 27, stating that "ITJhe common meaning of 'remote' is the opposite of 'local,' and does not carry a distance characteristic." (DHS Responsive Brief Ex. 18) Declaration of Rhyne, paragraph 27, stating that "The common meaning of 'remote' is the opposite of 'local,' and does not carry a distance characteristic." (DHS Responsive Brief Ex. 18) Declaration of Hodges in Support of Crossroads' Opening Markman Brief (1727/04), parting Markman Br	and a storage device, but rather has to do with the topological ursture of the interconnection between those devices." (DHS Responsive Brief Bx. 18) Declaration of Rhyne, paragraph 27, stating that "I'lle common meaning of 'remote' is the opposite of 'local,' and does not carry a distance characteristic." (DHS Responsive Brief Bx. 18) Declaration of Hodges in Support of Crossroads' Opening Markman Brief (7/27/04), paragraph 9, p	Special Master's Construction
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one-mesonescenterene en menorene en menorene en menoren en menoren en menoren en menoren en menoren en menoren Special Master's Proposed Construction of Disputed Terms	Special Master's Construction		A device comprising at least	(1) a microprocessor, incorporating independent data		13or (2) associated logic required to 3 a implement a stand alone		and programmed to process data and in a buffer in order to map		ing first transport medium and devices connected to a second	transport medium and which	implements access controls.
	Dot Hill's Evidence	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:	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.	Commerce 1035 claims
ตมแมมงการสเทาควรและสมาคมรมกระยาค nstruction of Disputed Terms	4 4		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.					
Special Master's Proposed Co	Actual Claims Language Crossroads' Proposed Crossroads' Evidence Dot Hill's Proposed Construction		Supervisor Onic:	Intrinsic: '035 patent:	col. 6, 11. 3-10;	col. 9; II. 22-31.	Extrinsic:	Hodges Direct, Tr. 36:3-37:9.				
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\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$	Actual Claims Language		a second connoller 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,		

NetApp Ex. 1009, pg. 751

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EXHIBIT C

UNITED STATES DISTRICT COURT WESTERN DISTRICT OF TEXAS AUSTIN DIVISION

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Crossroads systems, (Texas), Inc. §

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CHAPARRAL NETWORK STORAGE, INC.

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CROSSROADS SYSTEMS, (TEXAS), INC. § &

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NO. A 00 CA 248 SS

PATHLIGHT TECHNOLOGY, INC.

ORDER

BE IT REMEMBERED that on the 25th day of July 2000 the Court, in accordance with Marionan 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

21

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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

-2-

v. Hercon Eabs. 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

. 3.

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. 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

-4:

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."

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 ensuaring 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 construc 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 Chanel 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

-7-

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 7, 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

-9-

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.

VL "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

- 10 -

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.

VIL "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.

1-1--

VIII. "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

This term is used in claims 1, 7, 10 and 11 of the '972 patent. The plaintiff contends the term

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.

- 12 -

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 impersuasive. 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

-13

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 4 day of July 2000.

UNITED STATES DISTRICT JUDGE

- 14

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).

15

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.

- 16 -

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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.

CLERK, US. DISTRICT COURT
WESTERN DISTRICT CO

02-1158

FILED

MAR I 0 2003

CLERK, U.S. DISTRICT COURT
WESTERN DISTRICT OF TEXAS

CROSSROADS SYSTEMS, (TEXAS), INC.,

Plaintiff-Appellee,

CHAPARRAL NETWORK STORAGE, INC.,

Defendant-Appellant.

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

FEB 1 2 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).

ENTERED BY ORDER OF THE COURT

ATED FEB 1 2 2003

Jan Horbally, Clerk

ISSUED AS A MANDATE: MARCH 5, 2003

Costs Against Appellant: Total \$97.35

186

03/17/2003 MON 12-47 [TY/PY NO 6279

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 147 of 324



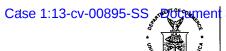
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.	
90/007,317	11/23/2004	6425035	HOESE1/WAB	1634	
, ,	590 05/24/2005		EXAM	INER	
SPRINKLE II 1301 W. 25TH	P LAW GROUP STREET		Fleming, Feitz		
SUITE 408	011001		ART UNIT	PAPER NUMBER	
AUSTIN, TX	78705		2182		
			DATE MAILED: 05/24/2009		

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

PTO-90C (Rev. 10/03)



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FILING DATE FIRST NAMED INVENTOR / ATTORNEY DOCKET NO. APPLICATION NO./ PATENT IN REEXAMINATION CONTROL 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

2182

DATE MAILED: 05/24/05

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EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. <u>90/007,125</u>. merged with 1, 317.

PATENT NO. <u>6425035</u>.

ART UNIT <u>2182</u>.

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)

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 150 of 324

			Control No. 90/007,125 mersed with 7,317	Patent Under Reexamination 6425035					
Offic	e A	ction in Ex Parte Reexamination	Examiner Fritz M. Fleming	Art Unit 2182					
	T	he MAILING DATE of this communication appe	ears on the cover sheet with the co	rrespondence address					
	Responsive to the communication(s) filed on <u>06 April 2005</u> . b This action is made FINAL. A statement under 37 CFR 1.530 has not been received from the patent owner.								
Failure to certificate If the per	res e in a riod f	statutory period for response to this action is set to pond within the period for response will result in taccordance with this action. 37 CFR 1.550(d). Export of the control of the cont	ermination of the proceeding and iss XTENSIONS OF TIME ARE GOVER	uance of an <i>ex parte</i> reexamination NED BY 37 CFR 1.550(c).					
Part I	THE	FOLLOWING ATTACHMENT(S) ARE PART OF	THIS ACTION:						
1.	\boxtimes	Notice of References Cited by Examiner, PTO-89	32. 3. Interview Summa	iry, PTO-474.					
2.	\boxtimes	Information Disclosure Statement, PTO-1449.	4. 🔲						
Part II	SUN	MMARY OF ACTION							
1a.	\boxtimes	Claims <u>1-14</u> are subject to reexamination.							
1b.		Claims are not subject to reexamination.							
2.		Claims have been canceled in the present	t reexamination proceeding.						
3.		Claims are patentable and/or confirmed.							
4.	\boxtimes	Claims <u>1-14</u> are rejected.							
5.		Claims are objected to.							
6.	\boxtimes	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 ur	nder 35 U.S.C. § 119(a)-(d) or (f).						
		a) All b) Some* c) None of the cer	tified copies have						
		1☐ been received.							
		2 not been received.							
		3 been filed in Application No							
		4 been filed in reexamination Control No	<u></u> .						
		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 matters, prosecution as to the merits is closed in 11, 453 O.G. 213.	for issuance of an ex parte reexamin in accordance with the practice under	nation certificate except for formal Ex parte Quayle, 1935 C ₁ D.					
10.		Other:	,	Burtos					
				Phillip toppe GACUL Lan					
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cc: Requ	ester	(if third party requester)							

U.S. Patent and Trademark Office PTOL-466 (Rev. 04-01)

Office Action in Ex Parte Reexamination

Application/Control Number: 90/007,125 Marged with 7,317

Page 2

Art Unit: 2182

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.

Application/Control Number: 90/007,125 Mersel with 7,317

Page 3

Art Unit: 2182

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

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

Application/Control Number: 90/007,125 Margid with 7,317

Page 4

Art Unit: 2182

(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 negatived 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 having15-18), 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

Application/Control Number: 90/007,125 Mary d with 7.317

Art Unit: 2182

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

Page 5

Application/Control Number: 90/007,125 Married with 7,317

Page 6

Art Unit: 2182

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

Application/Control Number: 90/007,125 Mr 1,317

Page 7

Art Unit: 2182

(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 (41), HOST 1B is only access to the shared 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

Application/Control Number: 90/007,125 Merged with 7,317

Page 8

Art Unit: 2182

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 a 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

Application/Control Number: 90/007,125 introduction with 7.317 Page 9

Art Unit: 2182

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)

Application/Control Number: 90/007,125 Mergad with 7,317

Page 10

Art Unit: 2182

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 Application/Control Number: 90/007,125 Marged with 7,317

Page 11

Art Unit: 2182

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,

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 161 of 324

Application/Control Number: 90/007,125 Margal with 7,317

Page 12

Art Unit: 2182

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.

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).

Primary Examiner Art Unit 2182.

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PRICHUS M. LAUFER, PH.D.).")

PRICHUS M. LAUFER, PH.D.).")

PROGRAM EXAMINER

TOTAL PROGRAM CRITTER 2100

PERVISORY PATENT EXAMINER TECHNOLOGY CENTER 2100

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

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.

Janice Pampeli

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: March 23, 2005 1301 W. 25th Street, Suite 408 Austin, TX 78705

T. 512-637-9220 / F. 512-371-9088

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STATEMENT BY APPLICANT				ICANT	First Named Inventor		Hoese, Geoffrey	
					Group Art Unit		2182	
					Examiner Name		Fleming, Fritz M.	
Sheet 1 OF 2		Attorney Docket N	umber	CROSS1123-17 & CROSS1123-19				
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PTO/SB/08B (08-00)

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_	_	ommerc			First Named Inventor	Hoese, Geoffrey			
P	atent and	l Tradem	ark	Office		2182			
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+	C32	European Office Action issued April 1, 2004 in Application No.	
1	002	98966104.6-2413	
		Copies of the following are on the attached CD-Rom	
1	C33	Defendant's First Supplemental Trial Exhibit List, Crossroads Systems,	
/		Inc., v. Chaparral Network Storage, Inc., C.A. No. A-00CA-217-SS	\
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	C34	Defendant's Third Supplemental Trial Exhibit List, Crossroads	· /
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}	CSS	Technology, Inc., C.A. No. A-00CA-248-SS (W.D. Tex. 2001). (CD-	\
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	C36	Defendants' Trial Exhibits, Crossroads Systems, Inc., v. Chaparral	
.		Network Storage, Inc., C.A. No. A-00CA-217-SS (W.D. Tex. 2001).	1.
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	C37	Defendant Chaparral Network Storage, Inc.'s First Supplemental Trial	9/2/2001
1		Exhibit List (D1 through D271) (CD-ROM Chaparral Exhibits	
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		Notice of Reference	s Chea		Examiner		Art Unit	Page 1 of 1
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	С	US-						
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A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)

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U.S. Patent and Trademark Office PTO-892 (Rev. 01-2001)

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Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 171 of 324

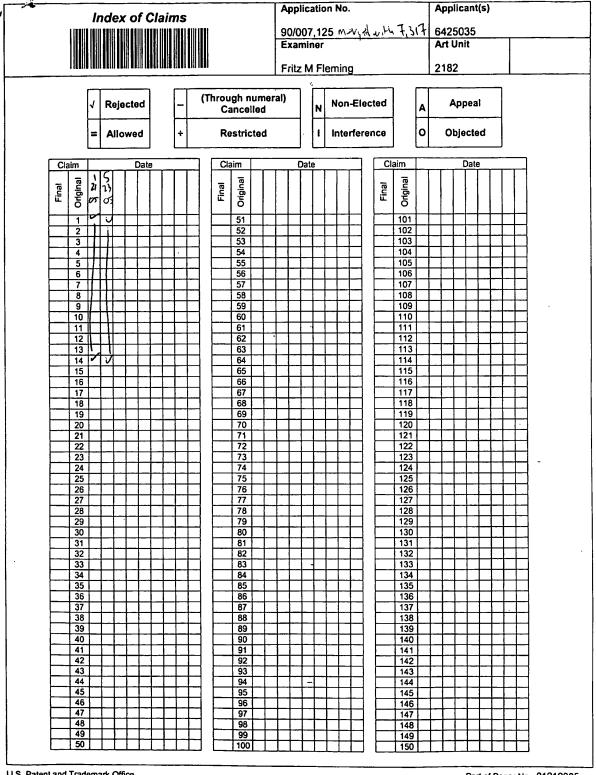
Search Notes	Application No. 7,317.	Applicant(s)
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710	1-5,8-13, 36-38,105, 100,101, 12-1-1	1/21/05	بس <i>:</i>	
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SEARCH NOTES				
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Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 173 of 324

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE CHANGE OF POWER OF ATTORNEY AND Atty. Docket No. CROSS1123-19 CORRESPONDENCE ADDRESS **Applicant** Geoffrey B. Hoese, et al. **Date Filed Application Number** 11.03-0004 90/007,317 Title Storage Router and Method for Providing Virtual **Local Storage Group Art Unit** Examiner 2182 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 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 was made via first class mail on April 8, 2005.

Respectfully submitted,

Sprinkle IP Law Group

John L. Ádair Reg. No. 48,828

Dated: April 5, 2005

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Enclosures

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 174 of 324

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. Filing Date 90/007,317 11/23/2004 For Storage Router and Method for Providing Virtual Local Storage Examiner Group Art Unit 2182 Fleming, Fritz Confirmation No.

1634

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

Dear Sir:

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e tamine

Crossroads Systems, Inc., 100% owner of the above-identified patent application, as evidenced by the Assignment recorded in the parent application 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 aboveidentified Patent and to transact all business in the Patent and Trademark Office connected therewith.

> STEVEN R. SPRINKLE JOHN ADAIR ARI AKMAL

Registration No. 40,825 Registration No. 48,828 Registration No. 51,388

Direct all telephone calls and correspondence to:

Customer No. 44654 SPRINKLE IP LAW GROUP 1301 W. 25th Street, Suite 408 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

Robert Sims, President & CEO

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

FAX NO. 5123719088

P. 01



P.O. Box 684767 Austin, Texas 78768-4767 [o] 512.637.9220 ក្រ 512.371.9088

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Gi Aq 90 Fo Si	ATTORNEY AND DDRESS	Atty, Docket No. CROSS1123-19
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S	eoffrey B. Hoese. et al. pplication No. 0/007,317	Filing Date 11/23/2004
	For Storage Router and Method for Providing Virtual Local Storage	
	Group Art Unit	Examiner Fleming, Fritz
	confirmation No. 634	
	Certification U	nder 37 C.F.R. §1.8
Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450	Patent Office, COMMISSIONER	nd Is being transmitted to the U.S. FOR PATENTS via facsimile on Company of Pampell
Dear Sir:		

Crossroads Systems, Inc., 100% owner of the above-identified patent application, as evidenced by the Assignment recorded in the parent application 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 JOHN ADAIR ARI AKMAL Registration No. 40,825 Registration No. 48,828 Registration No. 51,388

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

Respectfully submitted,

Crossroads Systems, Inc.

Dated: Apr:\\ 7 _____, 2005

Robert Sims, President & CEO

.PAGE 2/2 * RCVD AT 4/8/2005 1:45:40 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-1/2 * DNIS:8729306 * CSID:5123719088 * DURATION (mm-ss):01-00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF SERVICE UNDER Atty. Docket No. CROSS1123-17

37 C.F.R. 1.248

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

Donly to

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

Respectfully submitted,

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Enclosures

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

REPLY TO OFFICE ACTION UNDER EX PARTE REEXAMINATION DATED 02/07/05

Atty. Docket No. CROSS1123-17 CROSS1123-19

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Applicants Geoffrey B. Hoese, et al. Reexamination Control Date Filed Number 90/007,125 07/19/2004 90/007,317 11/23/2004 Title Storage Router and Method for Providing Virtual **Local Storage** Group Art Unit Examiner 2182 Fleming, Fritz Confirmation Number: Patent No. 2298 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 No. **EV616964321US** in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22312-1450 on april 1,2005

Signature

Sulle H. Blackary

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.

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 179 of 324

Attorney Docket No. CROSS1123-17 CROSS1123-19 Customer ID: 44654 90/007,125 90/007,317

2

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.
- 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

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 180 of 324

Attorney Docket No. CROSS1123-17 CROSS1123-19 Customer ID: 44654 90/007,125 90/007,317

3

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.
- 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:

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 181 of 324

Attorney Docket No. CROSS1123-17 CROSS1123-19 Customer ID: 44654 90/007,125 90/007.317

4

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.

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 182 of 324

Attorney Docket No. CROSS1123-17 CROSS1123-19 Customer ID: 44654 90/007,125 90/007,317

5

TABLE OF CONTENTS

- I. Rejections Under 35 U.S.C. § 102(b)
 - A. Introduction
 - B. Claims 11-14
 - 1. Overview of Claim 11
 - 2. Petal Does Not Disclose "Allowing Access" From A Workstation

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

- c. There Is No Disclosure or Teaching In Petal That The
- 'Security' Referenced Therein Would Allow Access Using NLLBP
 - Petal Does Not Render The Access Controls Limitation of

Claim 11 Obvious

- 5. Claim 12
- 6. Summary
- C. Claims 7-10
 - 1. Overview of Claim 7
 - 2. Petal Does Not Disclose "Allow[ing] Access" From A Workstation

Using NLLBP

3. Petal Does Not Disclose a "Map" Between Workstations And

Storage Devices

- 4. Petal Does Not Provide Access Through "Access Controls"
- 5. Claim 8
- 6. Summary
- II. Rejections Under 35 U.S.C. § 103
 - A. Introduction
 - B. Claim 1

CROSS1123-17 CROSS1123-19

R

- 1. Overview of Claim 1
- 2. Petal Does Not Disclose "Allow[ing] Access" From A Workstation

90/007,317

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

- C. Claim 2
- D. Claims 3-6 and 10
- E. Summary
- III. Conclusion

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 184 of 324

Attorney Docket No. CROSS1123-17 CROSS1123-19 Customer ID: 44654 90/007,125 90/007,317

7

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.

Attorney Docket No. CROSS1123-17 CROSS1123-19 Page 185 of 324 Customer ID: 44654 90/007,125 90/007,317

8

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

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 186 of 324

Attorney Docket No. CROSS1123-17 CROSS1123-19 Customer ID: 44654 90/007,125 90/007,317

9

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

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 187 of 324

Attorney Docket No. CROSS1123-17 CROSS1123-19 Page 187 of 324 Customer ID: 44654 90/007,125 90/007,317

10

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 higherlevel, 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

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 188 of 324

Attorney Docket No. CROSS1123-17 CROSS1123-19 Customer ID: 44654 90/007,125 90/007,317

11

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 <u>does not</u> 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 <u>does</u> 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 <u>using native low level</u>, <u>block protocols</u>," 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

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 189 of 324

Attorney Docket No. CROSS1123-17 CROSS1123-19 Customer ID: 44654 90/007,125 90/007,317

12

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:

Attorney-Docket No. CROSS1123-17 CROSS1123-19

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

13

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, <u>not</u> 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

Attorney Docket No. CROSS1123-17 CROSS1123-19 Customer ID: 44654 90/007,125 90/007,317

14

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.

Attorney Docket No. CROSS1123-17 CROSS1123-19 Customer ID: 44654 90/007,125 90/007,317

15

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,

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 193 of 324

Attorney Docket No. CROSS1123-17 CROSS1123-19 Customer ID: 44654 90/007,125 90/007,317

16

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.

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 194 of 324

Attorney Docket No. CROSS1123-17 CROSS1123-19

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

17

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

Attorney Docket No. CROSS1123-17 CROSS1123-19 Customer ID: 44654 90/007,125 90/007,317

18

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

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".

Attorney Docket No. CROSS1123-17 CROSS1123-19 Customer ID: 44654 90/007,125 90/007.317

19

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 <u>not</u> a "mapping" between workstations and storage devices.

Attorney Docket No. CROSS1123-17 CROSS1123-19 Customer ID: 44654 90/007,125 90/007,317

20

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.

Attorney Docket No. CROSS1123-17 CROSS1123-19 Customer ID: 44654 90/007,125 90/007.317

21

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

Attorney Docket No. CROSS1123-17 CROSS1123-19

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

22

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.

Attorney Docket No. CROSS1123-17 CROSS1123-19 Customer ID: 44654 90/007,125 90/007,317

23

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, <u>not</u> 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.

Attorney Docket No. CROSS1123-17 CROSS1123-19 Customer ID: 44654 90/007,125 90/007,317

24

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 an 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

Attorney Docket No. CROSS1123-17 CROSS1123-19

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

25

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

Attorney Docket No. CROSS1123-17 CROSS1123-19 Customer ID: 44654 90/007,125 90/007,317

26

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 Reg. No. 48,828

Date: April 6, 2005

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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.

CLERK, U/S. DISTRICT COURT
WESTERN DISTRICT C

02-1158

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CLERK, U.S. DISTRICT COURT
WESTERN DISTRICT OF TEXAS

CROSSROADS SYSTEMS, (TEXAS), INC.,

Plaintiff-Appellee,

CHAPARRAL NETWORK STORAGE, INC.,

Defendant-Appellant.

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

FEB 1 2 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)

ENTERED BY ORDER OF THE COURT

DATED: FEB 1 2 2003

Jan Horbaly, Cler

ISSUED AS A MANDATE: MARCH 5, 2003

Costs Against Appellant:
Total \$97.3

186

03/17/2003 MON 12:47 ITY/RY NO 62731

UNITED STATES DISTRICT COURT WESTERN DISTRICT OF TEXAS AUSTIN DIVISION

§ § FILED

CROSSROADS SYSTEMS, (TEXAS), INC. §

v

By CLERIES OF

CHAPARRAL NETWORK STORAGE, INC.

CROSSROADS SYSTEMS, (TEXAS), INC. §

VS.

NO. A 00 CA 248 SS

PATHLIGHT TECHNOLOGY, INC.

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

21

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OFFICE OF PETITIONS

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

-2-

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

- 3 -

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. 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."

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 ensuaring 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,

-5-

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 Chanel 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

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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

- 9 -

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

- 10 -

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.

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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.

- 12 -

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

13

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 24 day of July 2000.

WARN STATES DISTRICT JUDGE

- 14 -

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).

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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.

- 16 -

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE **NOTIFICATION UNDER 37 C.F.R. 1.565** Atty. Docket No. CROSS1123-17 **NOTIFICATION OF STAY** CROSS1123-19 Applicant Geoffrey B. Hoese, et al. **Application Number** Date Filed 90/007,125 07/19/2004 90/007,317 11/23/2004 Title Storage Router and Method for Providing Virtual

Local Storage Examiner

Group Art Unit

2182 Confirmation Number:

2298 and 1634

Certificate of Mailing Under 37 C.F.R. §1.8

Fleming, Fritz, M.

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 March 30, 2005

unice tampe Janice Pampell

P.O. Box 1450 Alexandria, VA 22313-1450

Commissioner for Patents

Dear Sir:

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 Appln. No. 90/007,125 Appln. 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 20, 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 **1**, 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 2005 HR. 22 PM 2: 03
AUSTIN DIVISION

U.S. CLERK'S OFFICE

CROSSROADS SYSTEMS (TEXAS), INC.,
Plaintiff,

BY: AF

-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.

267

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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.

-2

03/23/2005 WED 15:52 [TX/RX NO 6412]

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:

justice will permit;

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

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

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

03/23/2005 WED 15:52 [TX/RX NO 6412]

IN THE UNITE	IN THE UNITED STATES PATENT AND TRADEMARK OFFICE			
	OF SERVICE UNDER C.F.R. 1.248	Atty. Docket No. CROSS1123-17 CROSS1123-19		
	Applicant Geoffrey B. Hoese, et	al.		
4660 U.S. PTO	Application Number 90/007,125 90/007,317	Date Filed 07/19/2004 07/19/2004		
03/25/05	Title Storage Router and M Local Storage	lethod for Providing Virtual		
	Group Art Unit	Examiner Fleming, Fritz		

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

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Tel. (512) 637-9220 Fax. (512) 371-9088

Enclosures

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE Atty. Docket No. (Opt.) CROSS1123-17 INFORMATION DISCLOSURE STATEMENT BY APPLICANTS CROSS1123-19 **Applicants** Geoffrey B. Hoese et al. Application Number Filed 90/007,125 07/19/2004 90/007,317 07/19/2004 For Storage Router and Method for Providing Virtual Local Storage Group Art Unit Examiner 2182 Fleming, Fritz M. Certification Under 37 C.F.R. §1.8 Commissioner for Patents P.O. Box 1450 I hereby certify that this document is being deposited with the United States Postal Service as First Class Mail in an Alexandria, VA 22313 envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 223,13 on March 2, 2005. Janice Pampell

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) 90/007,125 & 90/007,317 Application Number INFORMATION DISCLOSURE 07/19/2004 Filing Date STATEMENT BY APPLICANT Hoese, Geoffrey First Named Inventor 2182 Group Art Unit **Examiner Name** Fleming, Fritz M. OF CROSS1123-17 & 2 **Sheet** 1 Attorney Docket Number CROSS1123-19 **U.S. PATENT DOCUMENTS** Pages, Columns, Lines Where Relevant Examiner Document Number Name of Patentee or Initials **Publication Date** Cite Applicant of Cited Document MM-DD-YYYY 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** 09/22/1987 Blevins, et al. 4,695,948 **A4** 4,751,635 06/14/1988 Kret **A5** 4,864,532 Reeve, et al. 09/05/1989 A6 Chang, et al. 4,947,367 08/07/1990 **A7** 5,072,378 12/10/1991 Manka **A8** Row, et al. 5,163,131 11/10/1992 **A9** 5,239,632 08/24/1993 Larner A10 Blount, et al. 5,239,643 08/24/1993 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 07/09/1996 Bridges, et al. 5.535,352 A18 Amini, et al. 5,581,714 12/03/1996 A19 5,596,562 06/21/1997 Chen A20 5,596,736 01/21/1997 Kerns A21 5,598,541 Malladi 01/28/1997 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.

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Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 231 of 324

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Patent and Trademark Office				Office	First Named Inventor	Hoese, Geoffrey	
					Group Art Unit	2182	
			-		Examiner Name	Fleming, Fritz M.	
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Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 233 of 324

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	C32	European Office Action issued April 1, 2004 in Application No.	
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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).	
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	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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	C42	Plaintiff's Fourth Amended Trail Exhibit List (CD-ROM Chaparral Exhibits ExList_Plaintiff).	9/11/2001
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	C44	Trail Transcripts, 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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Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 234 of 324

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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
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
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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
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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
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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 I9 (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

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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
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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 I (CNS 182804-805)) (CD-ROM Chaparral Exhibits D053).	
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_ 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

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 236 of 324

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	11/1/1996
	(Bardach Ex. 9, Quisenberry Ex 33 (CRDS 25606-607)) (CD-ROM	
	Chaparral Exhibits D153).	
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	
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	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	
033	Information (Bardach Ex. 14; Smith Ex 16 (CRDS 4460)) (CD-ROM	
·	Chaparral Exhibits D158).	
C100	Miscellaneous Documents Regarding Comdex (Quisenberry Ex 2	
0.00	(CRDS 27415-465)) (CD-ROM Chaparral Exhibits D165).	
C101	CrossPoint 4100 Fibre Channel to SCSI Router Preliminary Datasheet	
0101	(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	
0102	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-	
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C104	RAID Manager 5 with RDAC 5 for UNIX V.4 User's Guide (LSI-01854)	9/1/1996
0.04	(CD-ROM Chaparral Exhibits P062).	0/1/1000
C105	Letter dated May 12, 1997 from Alan G. Leal to Barbara Bardach	
0.00	enclosing the original OEM License and Purchase Agreement	
	between Hewlett-Package Company and Crossroads Systems, Inc.	
	(CRDS 02057) (CD-ROM Chaparral Exhibits P130).	
C106	CR4x00 Product Specification (CRDS 43929) (CD-ROM Chaparral	6/1/1998
0.00	Exhibits P267).	3, 1, 1000
C107	Symbios Logic – Hardware Functional Specification for the Symbios	
0.01	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	
3.33	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-	6/5/2001
3.35	132)) (CD-ROM Pathlight Exhibits D201).	
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)

Indicat	te quantity of a single type of artifact received but not scanned. Create individual artifaction
folder/	box and artifact number for each Artifact Type.
	CD(s) containing: computer program listing Doc Code: Computer pages of specification Artifact Type Code: P
	and/or sequence listing and/or table
	Doc Code: Artifact content unspecified or combined 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 Type Code: C
	Microfilm(s) Doc Code: Artifact Type Code: F
	Video tape(s) Doc Code: Artifact Type Code: V
	Model(s) Doc Code: Artifact Type Code: M
	Bound Document(s): Doc Code: 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: 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

90/007317 UA (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. CD(s) containing: computer program listing Doc Code: Computer Artifact Type Code: P pages of specification and/or sequence listing

Artifact Type Code: S

	content unspecified or Doc Code: Artifact	Artifact Type Code: U (1 CD of References C33-C11)
	Stapled Set(s) Color D Doc Code: Artifact	Pocuments or B/W Photographs: 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
	Proprietary, Trade Sec MPEP 724.02, etc.	on Disclosure Statement or Other Documents marked rets, Subject to Protective Order, Material Submitted under
· · ·	Doc Code: Artifact	Artifact Type Code X
	Other, description: Doc Code: Artifact	Artifact Type Code: Z

March 8, 2004

and/or table Doc Code: Artifact

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 239 of 324



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 Alexandra, Virginia 22313-1450 www.uspto.gov

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		EXAM	INER
	R RUDNICK GRAY CAR	Y US, LLP	Fleming, Fi	itz
	, CA 94303-2248		ART UNIT	PAPER NUMBER
			2182	
			DATE MAIL ED: 02/17/2006	•

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

PTO-90C (Rev. 10/03)

Case 1:13-cv-00895-SS Programent WNITED STATES/DEPLAREMENT 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	6425035 HOESE	HOESE1/WAB
		EXAMINER		
	MANN & GIBBS, PC			
1301 Dove Street, #10 Newport Beach, CA 9		:	ART UNIT	PAPER
			2102	

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

PTO-90C (Rev.3-98)



Case 1:13-cv-00895-SS POWERCE 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	
				EXAMINER
William A. Blake JONES, TULLAR &			F	Fleming, Fritz
P.O. Box 2226 Eads S Alexandiria, VA 2220			ART UNIT	PAPER

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 94303-2248

PTO-90C (Rev.3-98)



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents United States Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450 www.uspto.gov

Steven R. Sprinkle Sprinkle Law Group 1301 W. 25 th Street Suite 408 Austin, Texas 78705)))	FOR OWNER
Larry E. Severin Wang, Hartmann & Gibbs, PC 1301 Dove Street, #1050 Newport Beach, California 92660)))	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 Hoese 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 Hoese 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

Purch le dufer

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

E. Palo Alto, California 94303-2248



Case 1:13-cv-00895-\$S Document 31-16 Filed 04/09/14 Page 245/01/324 XAM

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

Examiner

2182

Fleming, Fritz, M.

Confirmation Number:

1634

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 //__,2005

Janice Pampell

Dear Sir:

P.O. Box 1450

Commissioner for Patents

Alexandria, VA 22313-1450

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.

Attorney Docket No. CROSS1123-19

CROSS1123-19 Customer ID: 44654

ONGOING LITIGATION AND CONCURRENT REEXAMINATION PROCEEDINGS

2

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 7/1, 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, 200 1301 W. 25th Street Suite 408 Austin, Texas 78705 Tel. (512) 637-9220 Fax. (512) 371-9088 Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 247 of 324

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

Title
Storage Router and Method for Providing Virtual
Local Storage

Group Art Unit
2182

Confirmation Number:

Applicant hereby serves the Notification Under 37 C.F.R. 1.565 in the above referenced case to:

1634

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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 3**//, **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

BADE

R examination	Control No.	7	Applicant(s)
	90/007,317 Certificate D	ate (Certificat Number
		.	Soldingat (40Hibe)
Requester Correspondence Ad	dress:	Patent Owner	"⊠aThird Party
William A. Blake			
JONES, TULLAR & COOPER, PC P.O. Box 2266 Eads Station			
Arlington, VA 22202		:	
	<u> </u>		
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LITIGATION REVIEW 🔀	examiner initials)		14/16/2009
Case (rossroads Suffers (TX)	Name Lear A-Toxas	Corporation,	Director Initials
Crossroads Systems (TX). Dot Hill Systems Curp, a DEC. D. C. W. D. Texas, Duc. No.	A-03-14	tober 17,200	** ***
D. C. W. D. 17245, UCC. NO.	<u> </u>	7719 33	
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TYPE OF PROCEEDIN	IG .		NUMBER
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U.S. Patent and Trademark Office

NetApp Ex. 1009, pg. 873

DOC. CODE RXFILJKT

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 249 of 324



United States Patent and Trademark Office

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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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		EXAM	INER
GRAY, CARY, WARE & FREIDENRICH LLP 2000 University Avenue		Fleming, F	Fleming, FRitz M.	
	E. Palo Alto, CA 94303-2248		ART UNIT	PAPER NUMBER
2.7.20.7.00, 2. 0.7.000 == 1.			2182	
		DATE MAILED: 12/16/2004		

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

PTO-90C (Rev. 10/03)

	C ntr I No.	Patent Under Reexamination	
-	90/007,317	6425035	
Order Granting / Denying Request For	Examiner	Art Unit	
Ex Parte Reexamination	Fritz M Fleming	2182	
	Fritz ivi Fleming	2102	
The MAILING DATE of this communication app	ears on the cover sheet with the	e correspondence address	
The request for <i>ex parte</i> reexamination filed <u>23</u> has been made. An identification of the claims, determination are attached.			
Attachments: a) PTO-892, b) PT	⁻ O-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) Dy Treasury check or,			
b) Dy credit to Deposit Account No, or			
c) Dy credit to a credit card account, unless otherwise notified (35 U.S.C. 303(c)).			
	Prim	MFleming ary Examiner Init: 2182	
	AITO	nn. 2102	

cc:Requester (if third party requester)
U.S. Patent and Trademark Office
PTOL-471 (Rev. 04-01)

Office Action in Ex Parte Reexamination

Part of Paper No. 12162004

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

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

Page 4

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).

FritzM/Fleming
Primary Examiner
Art Unit 2182

fmf

PACKUS M. LAUFER, PH.D.
PROGRAM EXAMINER
PECIAL PROGRAM EXAMINER
2100

PTO/SB/08b (08-03)
Approved for use through 06/30/2008. OMB 0651-0031
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 contains a valid OMB control number.

Substitute for form 1449B/PTO					Complete if Known
				Application Number	Patent No. 6,425,035
	RMATION D	•		Filing Date	Issue Date 07/23/2002
STAT	STATEMENT BY APPLICANT			First Named Inventor	HOESE
	. :			Art Unit	2182
	(Use as many sheets as necessary)			Examiner Name	FLEMING, FRITZ M.
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.		
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", SoftwarePractice & Experience, 23(2):201-221, Feb. 1993		
F.F.	5	"InfoServer 150Installation 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	Jutz m. fleming	Date Considered	12/16/2004

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

[&]quot;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. Confidentially 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.

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.

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Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 258 of 324

No Documents Found!

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 $http://www.lexis.com/research/zeroans?_m=31a41fb31e3f0b512688ae898bf3df43&docnum=1&wchp=dG... 12/14/04$

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 259 of 324

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12/14/04

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 <u>6,425,035</u>, relating to storage routers and methods for providing virtual local storage.

LEXIS-NEXIS
Library: NEWS

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:

...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 <u>6,425,035</u>, relating to storage routers and methods for providing virtual local storage.

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?us6425035/pn
 ** SS 1: Results 1
 Search statement
?prt full nonstop legalall
 1/1 PLUSPAT - (C) QUESTEL-ORBIT- image
 PN - US2002010812 A1 20020124 [US20020010812]
 PN2 - US6425035 B2 20020723 [US6425035]
 TI - (Al) Storage router and method for providing virtual local storage
 PA - (B2) CROSSROADS SYSTEMS INC (US)
 PAO - 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
    - G06F-013/40D2
 PCL - ORIGINAL (O): 710105000; CROSS-REFERENCE (X): 710008000 710036000
       710310000
 DT - Corresponding document
     - 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
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PN - 6,425,035 A 20020723 [US6425035]

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 263 of 324

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

Page 1 of 1



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UNITED STATES DEPARTMENT OF COMMERCE United States Patent and Trademark Office Address COMMISSIONER FOR PATENTS ED. Box 1430 ED. Box 1430 www.upubo.gov

REEXAM CONTROL NUMBER

FILING OR 371 (c) DATE

PATENT NUMBER

90/007,317

11/23/2004

6425035

CONFIRMATION NO. 1634

OC000000014721173

William A Blake JONES TULLAR & COOPER, PC P.O. Box 2266 Eads Station Arlington, VA 22202

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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Page 1 of 1



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REEXAM CONTROL NUMBER FILING OR 371 (c) DATE PATENT NUMBER

90/007,317

11/23/2004

6425035

25094 GRAY, CARY, WARE & FREIDENRICH LLP 2000 University Avenue E. Palo Alto, CA 94303-2248 CONFIRMATION NO. 1634
REEXAM ASSIGNMENT NOTICE
**OC00000014721174*

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

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Patent Assignment Abstract of Title

Total Assignments: 3

Application #: <u>09001799</u> **Filing Dt:** 12/31/1997 **Patent #:** <u>5941972</u> **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:
 008929/0290
 Received:
 Recorded:
 Mailed:
 Pages:

 12/31/1997
 03/19/1998
 4

Exec Dt: 12/22/1997

Exec Dt: 03/20/2002

Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

Assignors: HOESE, GEOFFREY B. Exec Dt: 12/22/1997

RUSSELL, JEFFRY T.

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:
 011284/0218
 Received:
 Recorded:
 Mailed:
 Pages:

 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:
 012785/0083
 Received:
 Recorded:
 Mailed:
 Pages:

 04/17/2002
 04/03/2002
 06/12/2002
 2

Conveyance: RELEASE

Assignor: SILICON VALLEY BANK

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

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 267 of 324

Search Results as of: 12/9/2004 4:04:59 P.M.

If you have any comments or questions concerning the data displayed, contact OPR / Assignments at 703-308-9723 Web interface last modified: Oct. 5, 2002

سيأ والمالاة

eexaw) 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. (Also referred to as FORM PTO-1465) REQUEST FOR EX PARTE REEXAMINATION TRANSMITTAL FORM Address to: Mail Stop Ex Parte Reexam Attorney Docket No.: HOESEI/WAB **Commissioner for Patents** P.O. Box 1450 Alexandria, VA 22313-1450 Date: 11/23/2004 This is a request for ex parte reexamination pursuant to 37 CFR 1.510 of patent number $\frac{6,425,035}{1000}$ issued $\frac{07/23/2002}{10000}$. The request is made by: 64660 U.S. PTO 90007317 X third party requester. patent owner. 2. X 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 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) (submit duplicative copy for fee processing); or to Deposit Account No. c. Payment by credit card. Form PTO-2038 is attached. Any refund should be made by $\overline{\mathbb{X}}$ check or $\overline{\mathbb{Q}}$ credit to Deposit Account No. 37 CFR 1.26(c). If payment is made by credit card, refund must be to credit card account. 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) CD-ROM or CD-R in duplicate, Computer Program (Appendix) or large table 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. D paper c. Statements verifying identity of above copies 8. | X | A copy of any disclaimer, certificate of correction or reexamination certificate issued in the patent is included. 1-14 9. X Reexamination of claim(s) 10. X 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. 12/05/2004 MSALDANA 00000008 90007317 An English language translation of all necessary and pertinent non-English language patents and/or printed 11. publications is included.

[Page 1 of 2]
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 USP 10 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 [Page 1 of 2] ADDRESS. SEND TO: Mail Stop Ex Parte Reexam, 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.

المناء المناه

en la	U.S. Pa	atent and Trademark	Office: U.S. DEPAR	PTO/SB/57 (09-04) /30/2007. OMB 0651-0033 RTMENT OF COMBRECE	
	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. X The attached detailed request includes at least the following items:					
a. A statement identifying each substantial new ques publications. 37 CFR 1.510(b)(1) b. An identification of every claim for which reexamin and manner of applying the cited art to every claim.	nation is reque	ested, and a det	ailed explanatio	n of the pertinency	
13. A proposed amendment is included (only where the					
14. X 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 pa	itent owner wa	as not possible.			
15. Correspondence Address: Direct all communication abou	t the reexami	nation to:	,		
The address associated with Customer Number:	The address associated with Customer Number:				
OR Firm or Wall A DLL					
X Individual Name William A. Blake					
Jones, Tullar & Cooper, PC P.O. Box 2266 Eads Station					
City Arlington	State	VA	Zip	22202	
Country					
Telephone 703-415-1500	Fax 703-	415-1508			
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)					
WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038. Warning					
William A. Blake		30548	☐ For Patent	Owner Requester	
, Typed/Printed Name	Reg	gistration No.		Party Requester	

[Page 2 of 2]

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

"1. A storage router for providing virtual local storage on remote storage devices to devices, comprising:"	(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".)
"a buffer providing memory work space for	(IS100 at p.3-64 refers to a "pool" of
the storage router;"	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.)
"a first controller operable to connect to	(IS100 at p.1-3 shows the InfoServer 100
and interface with a first transport	connected to an Ethernet LAN segment,
medium;"	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.)
"a second controller operable to connect to	(IS100 at pp. 2-7 and 2-8 refer to two SCSI
and interface with a second transport	buses, one internal and one external. Pp. 3-
medium; and"	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.)
"a supervisor unit coupled to the first	(The InfoServer 100 provided connectivity
controller, the second controller and the	between an Ethernet interface and disks
buffer, the supervisor unit operable"	connected to a interface. See IS100 p.1-1
	and Fig. 1-1.)
"to map between devices connected to the	(The storage space of the storage devices is
first transport medium and the storage	addressed as "partitions" through the
devices,"	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.)
"to implement access controls for storage	(The devices or partitions are then made
space on the storage devices and"	available to connected devices as
	"SERVICES" via the CREATE SERVICE

"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."	command which includes an optional "access control password". See IS100 p. 3-10. The password feature thus serves as an access control.) (The "pool" is used for servicing disk requests that originate from the network. See IS100 p.3-64.) (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 InfoServer 100 partitions maintain a the supervisor unit maintains an allocation mapping between portions of the storage of subsets of storage space to associated space and the partition name. Each service devices connected to the first transport is accessible only to clients that have medium, wherein each subset is only access to the associated password. A accessible by the associated device particular service can also be restricted to a connected to the first transport medium." single client at a time. See IS100 pp. 3-9 through 3-12, "READERS" and "WRITERS" parameters, for example.)

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.)
------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------

Hoese, claim 4

"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.)
--------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Hoese, claim 7

"7. A storage network, comprising:"	(0: 1)
7. A storage network, comprising:"	(Similar to claim 1.
"a first transport medium;"	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.
"a second transport medium;"	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.
"a plurality of workstations connected to the first transport medium;"	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.)
"a plurality of storage devices connected to the second transport medium; and"	(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.)
"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:"	(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)". See IS100 p.1-1)
"to map between the workstations and the storage devices;"	(Similar to claim 1. 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. "to implement access controls for storage The devices or partitions are then made space on the storage devices; and" 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. "to allow access from the workstations to At IS100 p. 1-1 it is said that each host can the storage devices using native low level, use its own "native file system" to access block protocol in accordance with the the InfoServer 100. In particular, the LAD mapping and access controls." protocol provides a mechanism for reading and writing logical disk blocks independent from any underlying file system. See 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. See also IS100 p. 2-2.) Hoese, claim 8 IS100

"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."

Hoese, claim 9

IS100

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

(Same as claim 2.)

disk drives."

7

Hoese, claim 11

"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:"	(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".
"interfacing with a first transport medium;"	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).
"interfacing with a second transport medium;"	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.)
"mapping between devices connected to the first transport medium and the storage devices"	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.
"and that implements access controls for storage space on the storage devices; and"	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.

"allowing 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 12	IS100
, 	15100
"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."	(Same as claim 2.)
Hoese, claim 13	IS100
"13. The method of claim 12, wherein the devices connected to the first transport medium comprise workstations."	(Same as claim 3.)
Hoese, claim 14	IS100

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.

(Same as claim 4.)

"14. The method of claim 12, wherein the

storage devices comprise hard disk drives"

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" "a direct memory access (DMA) interface coupled to the first-in-first-out queue and to the buffer."	("The ring behaves like a wraparound FIFO storage register". LANCE, pp. 195.) (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 DP5380 chip is a SCSI controller.
the second controller comprises:"	See DP5380, p. 1.)
"a second protocol unit operable to connect	(The DP5380 has a SCSI controller that
to the second transport medium;"	receives and transmits data to and from a
	SCSI bus. See DP5380 generally.)
"an internal buffer coupled to the second	(The DP5380 has internal data input and
protocol unit; and"	data output registers. DP5380, p. 3, Figure
	2, "ASI block diagram".)
"a direct memory access (DMA) interface	(The DP5380 also had a DMA mode of
coupled to the internal buffer and to the	operation. See DP5380, p.1 and the
buffer of the storage router."	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:

"10. The storage network of claim 7, wherein the storage router comprises:"	
"a buffer providing memory work space for the storage router;"	(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.)
"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;"	(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.)
"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"	(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.)

"a supervisor unit coupled to the first controller, the second controller and the buffer, the supervisor unit operable:	(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.
to map between devices connected to the first transport medium and the storage devices,	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.
to implement the access controls for storage space on the storage devices and	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.
to process data in the buffer to interface between the first controller and the second controller to allow access from	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

IV. Conclusion

workstations to storage devices."

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

IS100 p. 2-2)

protocol provides a mechanism for reading and writing logical disk blocks independent from any underlying file system. <u>See</u> also 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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(54)	STORAGE ROUTER AND METHOD FOR
	PROVIDING VIRTUAL LOCAL STORAGE

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- (73) Assignee: Crossroads Systems, Inc., Austin, TX
- (*) 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 dis-claimer.

- (21) Appl. No.: 09/965,335
- (22) Filed: Sep. 27, 2001

Related U.S. Application Data

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.

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	710/36-38, 105, 100-101, 126-131, 711/100,
	112, 113, 714/42

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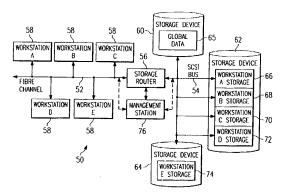
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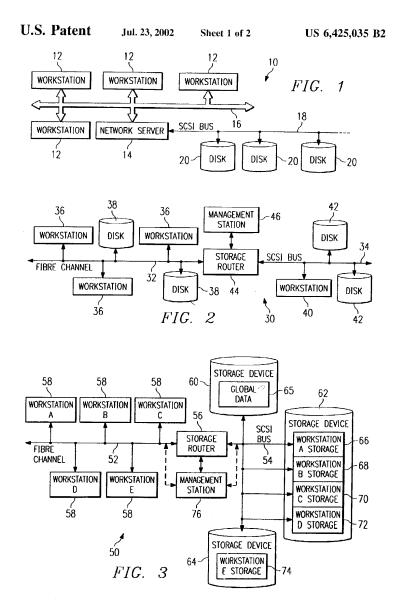
Primary Examiner—Christopher B. Shin (74) Attorney, Agent, or Firm—Gray Cary Ware & Friedrich LLP

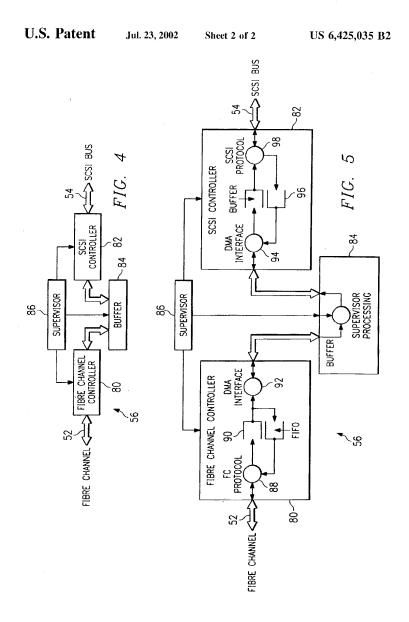
ABSTRACT

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 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. and the access controls.

14 Claims, 2 Drawing Sheets







US 6,425,035 B2

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 Jeffry 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.

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 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 opera-tion 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. 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 45 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 proto-cols that the server must translate into low level requests to the storage device. A workstation with access to the server the storage device. A workstand 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. 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 65 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 maps between the workstations and the SCSI storage devices and implements 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 the SCSI storage devices and the SCSI storage devices is provided to Fiber Channel initiation 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

oance win 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

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

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. 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

FIG. 3 is a block diagram of one embodiment of a storage network with a storage router that provides virtual local

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

NetApp Ex. 1009, pg. 912

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, menory, input/output devices, storage devices and a network adapter as well as other common computer components. Network server 14 uses a SCS1 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, uctwork 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.

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 scrial 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 5 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 6 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 protocols.

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 20, with a storage router that 65 provides virtual local storage. Similar to that of FIG. 2, storage network 50 includes a Fiber 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 that 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 manping techniques.

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 F1G, 3 extends the concept of a single

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 of 0,62 or 64 connected through storage router 56. This means that similar requests from workstations 58 for accesses to their local storage devices fronduce different accesses to the storage space on storage devices 60, 62 and 64. Firther, no access from a workstation 58 is allowed to the virtual local storage of another workstation 58.

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-

NetApp Ex. 1009, pg. 913

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.

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 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 compresses 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 in buffer 84.

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.

Channel \$2, 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_AI).

is typically an Arbitrated Loop (PC_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 Fiber 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 of 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 mochular jacks can be provided for a serial port and a 802.3 10BascT port, i.e. twisted pair Ethernet, for management access. The 65 CSI port of the storage router an support SCSI direct and sequential access target devices and can support SCSI

initiators, as well. The Fiber Channel port can interface to SCSI-3 FCP enabled devices and initiators.

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 53CSxx 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 clements, and to provide appropriate translations between the FC and SCSI neterols.

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 bedoet hose between the storage router devices bedoet hose kand 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. AIM, SONET), or to act as a bridge between two FC loops (e.g. as a two port fabric).

(e.g. AIM, 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 cau 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 occided 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.

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 Chanel 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 ECD and ECSL 2 across

reconigurations. 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 IFCP 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-LOGICAI 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 arbitation 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 unessage. Bus and target information is implied by the established connection.

Fiber Channel devices within a fabric are addressed by a

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

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 Initator 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:TAR-GETLUN 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.

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. ON 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 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 1.UN 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 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 ¹⁰ defined by the appended claims.

What is claimed is:

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

- a buffer providing memory work space for the storage 15
- a first controller operable to connect to and interface with a first trausport medium;
- a second controller operable to connect to and interface 20 router comprises: 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 25 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 pro-
- 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 25 device connected to the first transport medium.

 3. The storage router of claim 2, wherein the devices connected to the first transport medium comprise worksta-
- 4. The storage router of claim 2, wherein the storage 40 devices comprise hard disk drives.
- 5. The storage router of claim 1, wherein the first con-
- 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;
- 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 55
- 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
- a plurality of storage devices connected to the second transport medium; and

- 10 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
- 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 accessions.
- sible 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
- a buffer providing memory work space for the storage
- 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 control-ler 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.
- II. 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 storage devices includes antocating 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

NetApp Ex. 1009, pg. 916

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

tocols.

remote storage devices to devices, comprising:

- a buffer providing memory work space for the storage
- a first controller operable to connect to and interface with a first trausport medium;
- a second controller operable to connect to and interface $\ _{20}$ 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 25 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 pro-
- 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,
- associated device conflicted or in this transport medium, wherein each subset is only accessible by the associated 35 device connected to the first transport medium.

 3. The storage router of claim 2, wherein the devices connected to the first transport medium comprise worksta-
- 4. The storage router of claim 2, wherein the storage 40
- 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
- a first-in-first-out queue coupled to the first protocol unit;
- 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 55
- a direct memory access (DMA) interface coupled to the internal huffer 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
- a plurality of storage devices connected to the second transport medium; and

- 10 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
- to implement access controls for storage space on the storage devices; and
- to allow access from the workstations to the storage
- or anow 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.
- The storage network of claim 7, wherein the storage devices comprise hard disk drives.
- 10. The storage network of claim 7, wherein the storage
- 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 control-ler 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 made 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 ovices connected to the lirist 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 constant to the first transport medium.
- nected 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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NetApp Ex. 1009, pg. 917

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:

 $\frac{Column\ 10,}{\text{Line}\ 47,\ delete\ "that\ implements"}\ and\ insert\ --\ implementing\ --$

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 06/3/2006, OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Substitute fo	or form 1449B/PTO			Complete if Known			
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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.	T²
	1	"InfoServer 100 System Operations Guide", First Edition, Digital Equipment Corporation, 1990	
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	5	"InfoServer 150Installation 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	

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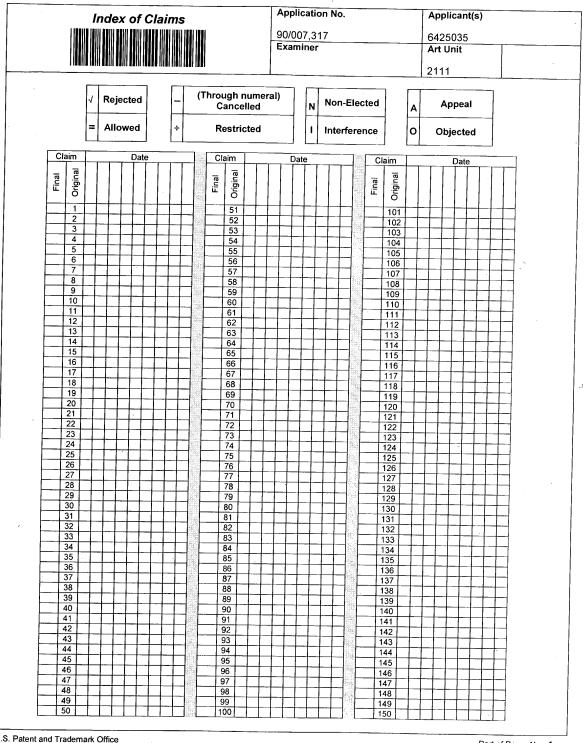
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1Applicant's unique citation designation number (optional).
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Reexamination	Control No. 90/007,317 Certificate D		licant(s) tificate Number
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William A. Blake JONES, TULLAR & COOPER, PC P.O. Box 2266 Eads Station Arlington, VA 22202			
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Page 1 of 1



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UNITED STATES DEPARTMENT OF COMMERCE United States Patent and Trademark Office Address COMMISSIONER FOR PATENTS P.O. Box 1459 Alexandra, Vignia 22313-1450 www.upub.gov

Bib Data Sheet

CONFIRMATION NO. 1634

SERIAL NUMBE 90/007,317			GROUP ART UNIT		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 35 USC 119 (a-d) condi met Verified and Acknowledged	litions yes no no Met aft	ter STATE OR COUNTRY	SHEET DRAWI		MS	NDEPENDENT CLAIMS 3			
ADDRESS 25094									
TITLE STORAGE ROUTE	ER AND METHOD FOR PR	ROVIDING VIRTUAL LO	OCAL ST	ORAGE					
RECEIVED NO	EES: Authority has been givo. oto charge/creofor following:	edit DEPOSIT ACCOU	NT tin	All Fees 1.16 Fees (1.17 Fees (ne) 1.18 Fees (1.1	Proces	sing Ext. of			

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 301 of 324



United States Patent and Trademark Office

UNITED STATES DEPARTMENT OF COMMERCE United States Patent and Trademark Office Address: COMMISSIONER FOR PATENTS P.O. Box 1430 Alexandra, Virginia 22313-1450 www.uspio.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/007,125	07/19/2004	6425035	1006-8910	2298
44654	7590 02/07/2005		EXAM	INER
	IP LAW GROUP			
1301 W. 25T SUUTE 408	H STREET		ART UNIT	PAPER NUMBER
AUSTIN, TY	ζ 78705	•	-	
			D 1 ME 3 (1 H ED 00/07/000	

DATE MAILED: 02/07/2005

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

FEB 1 4 2005

Docketed By
Date Docketed:
Attorney
C/M No. 2005 1108 14

PTO-90C (Rev. 10/03)

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 302 of 324



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents United States Patent and Trademark Office P.O. B0x1450 Alexandria, VA 22313-1450

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(THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS)

Natu J. Patel WANG & PATEL, PC 1301 Dove Street, Suite 1050 Newport Beach, CA 92660

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)

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 303 of 324

	Control No. 90/007,125	Patent Under Reexamination 6425035		
Office Action in Ex Parte Reexamination	Examiner Fritz M Fleming	Art Unit 2182		
The MAILING DATE of this communication appe	ears on the cover sheet with the co	rrespondence address		
a☐ Responsive to the communication(s) filed on c☒ A statement under 37 CFR 1.530 has not been received f	b☐ This action is made FINAL. rom the patent owner.			
A shortened statutory period for response to this action is set to Failure to respond within the period for response will result in to certificate in accordance with this action. 37 CFR 1.550(d). EX If the period for response specified above is less than thirty (30 will be considered timely.	ermination of the proceeding and issuer	ED BY 37 CFR 1.550(c).		
Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF	THIS ACTION:	•		
1. Notice of References Cited by Examiner, PTO-89	3. Interview Summa	ry, PTO-474.		
2. X Information Disclosure Statement, PTO-1449.	4. 🗌			
Part II SUMMARY OF ACTION				
1a. ⊠ Claims <u>1-14</u> are subject to reexamination.				
1b. Claims are not subject to reexamination.	•			
2. Claims have been canceled in the presen	t reexamination proceeding.			
3. Claims _ are patentable and/or confirmed.				
4. ⊠ Claims <u>1-14</u> are rejected.	, , , , , , , , , , , , , , , , , , ,			
5. Claims are objected to.	•			
6. X 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 un	der 35 U.S.C. § 119(a)-(d) or (f).			
a) ☐ All b) ☐ Some* c) ☐ None of the certi	fied 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				
* See the attached detailed Office action for a list				
9. Since the proceeding appears to be in condition matters, prosecution as to the merits is closed i 11, 453 O.G. 213.	n for issuance of an ex parte reexamin n accordance with the practice under	nation certificate except for formal Ex parte Quayle, 1935 C.D.		
10.				
cc: Requester (if third party requester)				

U.S. Palent and Trademark Office PTOL-466 (Rev. 04-01)

Office Action in Ex Parte Reexamination

Part of Paper No. 01212005

		Case 1:13-cv-008			Application/	· · · · · · · · · · · · · · · · · · ·		pplicant(s)/Pater	
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Notice of References Cited				Examiner			rt Unit	Page 1 of 1	
					Fritz M Flen	ning	2	182	1 490 1 01 1
L				U.S. P	ATENT DOCUM	MENTS			
*		Document Number Country Code-Number-Kind Code	Date MM-YYYY			Name			Classification
	Α	US-5,394,526 A	02-1995	Crous	e et al.				709/219
	В	US-							
	С	US-							
	D	US-							
	Е	US							
	F	US-							
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*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)						<u> </u>	
	U	Systems Architectures Using Fibre Channel, Roger Cummings, Twelfth IEE Symposium on Mass Storage Systems, co 1993 IEEE. Pages 251-256.							
	V	Fibre Channel and ATM: The	nd ATM: The Physical Layers, Jerry Quam, WESCON/94, published 27-29 September 1994. Pages 648-652					4. Pages 648-652.	
	w	W Petal: Distributed Virtual Disks, Edward K. Lee and Chandramohan A. Thekkath, ACM SIGPLAN Notices, Volume 31, September 1996, pages 84-92.						Volume 31, Issue 9,	
	1,			2					

U.S. Palent and Trademark Office PTO-892 (Rev. 01-2001)

v1-2001) Notice of References Cited

Part of Paper No. 01212005

Art Unit: 2182

Page 2

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

Art Unit: 2182

Page 3

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

Art Unit: 2182

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.

Page 4

Art Unit: 2182

Page 5

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

Art Unit: 2182

Page 6

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 negatived 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

Art Unit: 2182

Page 7

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

Art Unit: 2182

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 claims1-4 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.

Page 8

Art Unit: 2182

Page 9

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.

Case 1:13-cv-0089<u>5-</u>SS Document 31-16 Filed 04/09/<u>14</u> Page 313 of 324

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 FO. DOX 1450 Alexandria, Viginia 22313-1450 www.uspio.gov

FIRST NAMED APPLICANT ATTY. DOCKET NO./TITLE APPLICATION NUMBER FILING OR 371 (c) DATE 6425035 90/007,317 کرارده اه ۹ 11/23/2004

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:

APR 2 1 2005

Docketed By: Date Docketed:

Attorney. C/M No. -

MICHELLE R EASON 3921 (571) 272-4231

ATTORNEY/APPLICANT COPY

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 315 of 324

IN THE UNITED STAT	ES PATENT AND TRADE	WARK OFFICE	
NOTIFICATION UNDER 37 C.F.R. 1.565		Atty. Docket No. CROSS1123-17 CROSS1123-19	
	Applicant Geoffrey B. Hoese, et Application Number 90/007,125 90/007,317	al. Date Filed 07/19/2004 01/23/2004	
	Title Storage Router and M Local Storage Group Art Unit	lethod for Providing Virtual	
	7590 Confirmation Number: 2298	Fleming, Fritz	

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

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").

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 316 of 324

Attorney Docket No. 90/007,125; 90/007,317

CROSS 23-17; 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 25 AM 9: 22

WESTE TEXAS

CROSSROADS SYSTEMS (TEXAS), INC., Plaintiff,

-ys-

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]

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 319 of 324

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 25² 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 Application Nos. 90/007,125 filed 07/19/2004 90/007,317 filed 11/23/2004 Applicant: **Mail Stop Patent Application** Commissioner for Patents Geoffrey B. Hoese Title: P.O. Box 1450 Alexandria, VA 22313-1450 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

Sir:

PTOL-413A (09-04)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Applicant Initiated Interview Request Form					
Application No.: 90 1007, 125 First Named Applicant: Hoese Examiner: Chen, Alan Art Unit: 2182 Status of Application: non-final office					
Tentative Participant (1) Alan Chen	Tentative Participants: (1) Alan Chen (2) John Andre (3) Steven Sprintle (4) Robert Gris wold				
(3) Steven Sprin	nkle	(4) Robert Gris	uold		
Proposed Date of Interview: Agust 9, 2005 Proposed Time: 2-00 (AM/PM)					
Type of Interview Requested: (1) [] Telephonic (2) [4] Personal (3) [] Video Conference					
Exhibit To Be Shown or Demonstrated: [] YES [4-NO If yes, provide brief description:					
		Issues To Be Disc	ussed		
Issues (Rej., Obj., etc)	Claims/ Fig. #s	Prior	Discussed	Agreed	Not Agreed
(1) Rej	Claim	Art Spring, Orda, J.bbe	[]	[]	[]
(2) <u>Rej</u>	Clarm 7		[]	[]	[]
(3) <u>Rej</u>	Claim 11	- 1)	[]	[]	[]
(4)	t Attached		[]	[].	[]
Brief Description of Arguments to be Presented: Spring Only and J. bbe do not providences from hosts to remote storage using NLLBP. Soring.					
and Jube do not	teach mapping	or access controls de	discussed in	reply dated	7122/05
References from related reexam cases, including Crosse, Commings and Dekoning do not address missing fearures of Spring and Occase.					
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's Representative Signature Examiner/SPE Signature					
Tony ApAiR Typed/Printed Name of Applicant or Representative					
•					
Registration 1	2 <i>8</i> Number, if appli	cable			

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.

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 322 of 324

IN THE UNITE	D STATES PATENT AND TRADEMAR	K OFFICE
Statement of Substa	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 Metho Local Storage	od for Providing Virtual
	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 9-1-05

This paper is to summarize the interview conducted with Examiner Alan Chen on August 22, 2005 with Applicants' representative Mr. Steve Sprinkle.

Case 1:13-cv-00895-SS Document 31-16 Filed 04/09/14 Page 323 of 324

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:

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

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



(12) United States Patent Hoese et al.

US 7,934,041 B2 (10) Patent No.: (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); Jeffry T. Russell, Cibolo, TX (US)

Assignee: Crossroads Systems, Inc., Austin, TX

Subject to any disclaimer, the term of this (*) Notice: patent is extended or adjusted under 35

U.S.C. 154(b) by 0 days.

(21) Appl. No.: 12/690,592

Filed: Jan. 20, 2010 (22)

(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) $\textbf{(58)} \quad \textbf{Field of Classification Search} \ \dots \dots \ 710/1-5,$

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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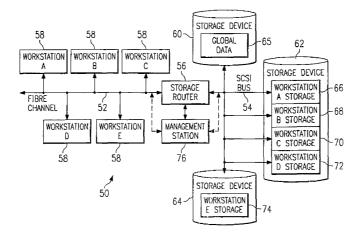
(Continued)

Primary Examiner — Christopher B Shin (74) Attorney, Agent, or Firm — Sprinkle IP Law Group

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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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).

Plaintiff's Fourth Amended Trial Exhibit List, Crossroads Systems, Inc. v. Chaparral Network Storage, Inc, C.A. No. A-00CA-217-SS (W.D. Tex. 2001) (CD-Rom).

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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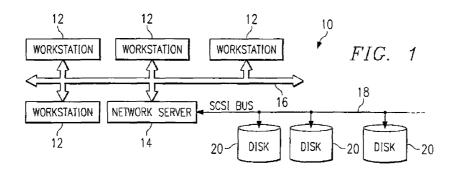
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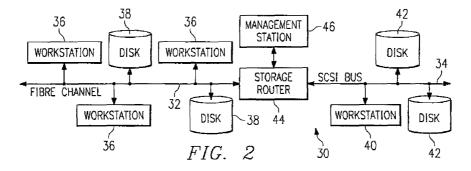
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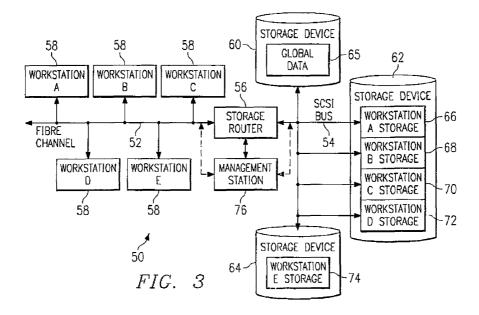
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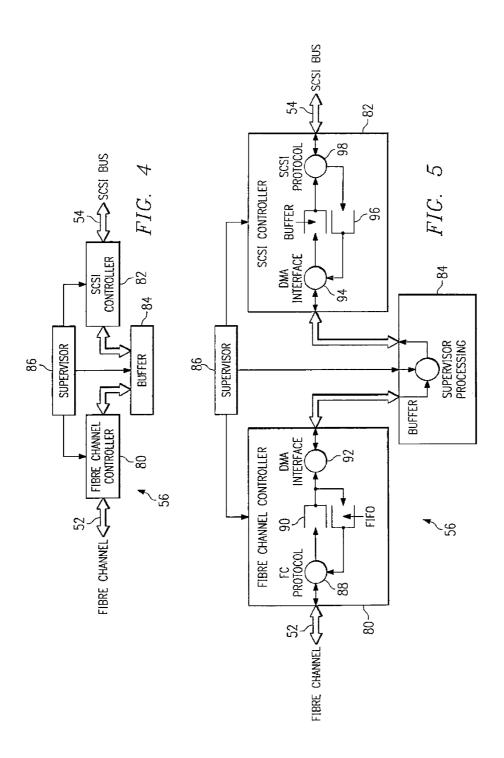
US 7,934,041 B2







U.S. Patent Apr. 26, 2011 Sheet 2 of 2 US 7,934,041 B2



1

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 10 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 20 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 benefit of priority of 25 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 30 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 35 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 45 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, 55 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 60 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,

2

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.

3

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 30 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 35 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 40 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 45 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 62. A storage router 44 then serves to interconnect these mediums and provide devices on either medium global, trans-

4

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 SC3 lbus 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 F).

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

5

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 35 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 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 50 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 55 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 60 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 65 Channel link. In one embodiment, the storage router provides a connection for Fibre Channel links running the SCSI Fibre

6

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 an 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 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. 15 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 20 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 45 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 65 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.

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 5 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 30 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 35 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 40 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 55 native low level block protocol.
- 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.

10

- 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.
- $1\overline{5}$. 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

11

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 20 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 25 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 35 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 45 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

12

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.

NetApp Ex. 1009, pg. 963

Case 1:13-cv-00895-SS Document 31-17 Filed 04/09/14 Page 15 of 15

US 7,934,041 B2

13

- **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

14

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.

(54) STORAGE ROUTER AND METHOD FOR

PROVIDING VIRTUAL LOCAL STORAGE

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G06F 3/00 (2006.01)

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(52) **U.S. Cl.** 710/305; 710/11; 709/258

See application file for complete search history.

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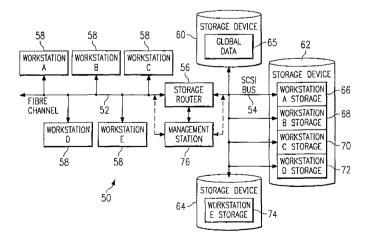
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57) ABSTRACT

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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US 7,934,041 B2

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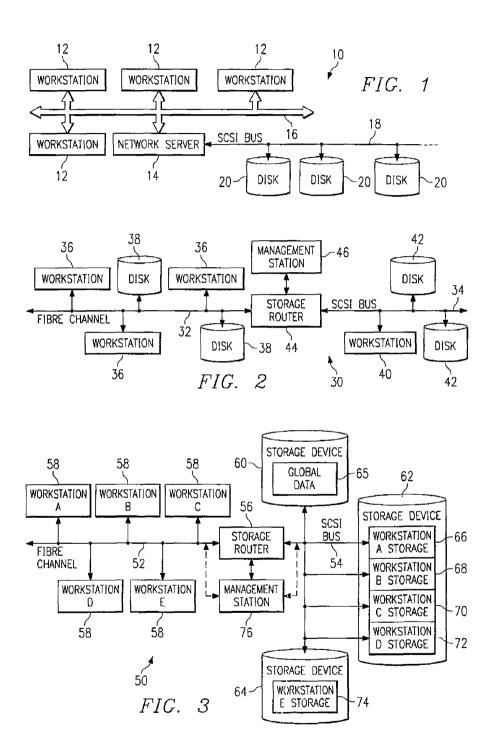
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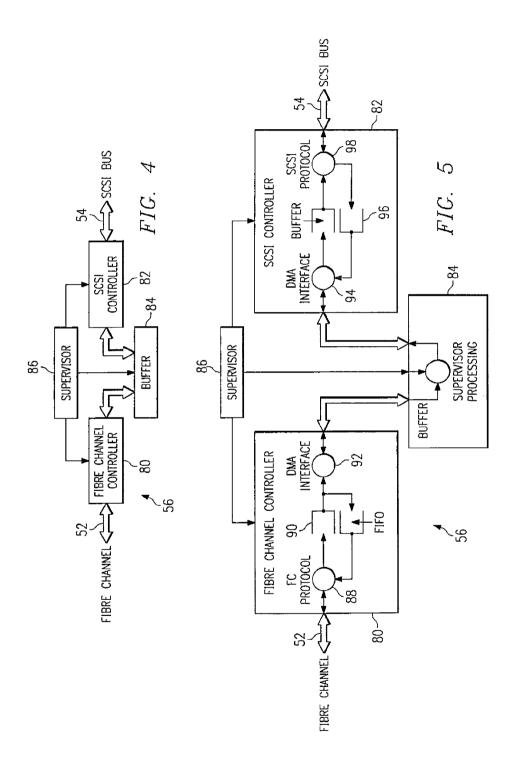
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U.S. Patent Apr. 26, 2011 Sheet 2 of 2 US 7,934,041 B2



1 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 aban-1 doned, 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 20 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 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 30 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 35 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 45 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, 55 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 60 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 work- 65 stations, generally access storage locally or through network interconnects. Local storage typically consists of a disk drive,

2

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 continuation of and claims the benefit of benefit of priority of 25 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 40 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 configura-

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.

US 7.934.041 B2

3

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 10 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

FIG. 3 is a block diagram of one embodiment of a storage network with a storage router that provides virtual local stor- 20

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 30 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 35 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 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 45 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 com- 50 municates 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 55 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 65 42. A storage router 44 then serves to interconnect these mediums and provide devices on either medium global, trans-

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 15 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 transport medium 16 is a network connection and storage 40 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

5

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 advan-2 tages 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 level, block protocols and does not involve the overhead of high level protocols and file systems required by network

FIG. 4 is a block diagram of one embodiment of storage router 56 of FIG. 3. Storage router 56 can comprise a Fibre 3 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 40 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 45 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 50 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 55 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 60 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 65 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 Arbi-

6

trated 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 an 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 of workstations 58 because storage access involves native low 30 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.

US 7.934.041 B2

7

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 1 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. 1: 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 20 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 protec- 25 tion 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 initial- 30 ization 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 40 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 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 50 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 60 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 65 units. Thus, the prioritized addressing scheme used by SCSI subsystems can be represented as follows: BUS:TARGET:

8

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

Address translation is needed where commands are issued performed directly on the storage router through the FC and 45 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 5 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 25 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 30 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 35 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 40 identifiers are world wide names the processing device is configured to:

 16. The storage router of cla
 - 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 55 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.

10

- 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

11

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 $_{20}$ 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 25 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 onnected 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 45 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:
 - 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.

13

- **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

14

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.

* * * * :

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 18 of 225

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,934,041 B2 Page 1 of 1

APPLICATION NO. : 12/690592 DATED : April 26, 2011

INVENTOR(S) : Geoffrey B. Hoese et al.

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

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 19 of 225

PTO/SB/05 (07-07)

Under the Pape	erwork Reduction Act of 1995, no pe	rsons are required to re	U.S. Patent and spond to a collection of it	Tradema	rk Office, U.S. DEP	06/30/2010. OMB 0651-0032 ARTMENT OF COMMERCE a valid OMB control number.		
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Prior application information: Examiner Unknown Art Unit: 2181								
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(Print/Type)	John L. Adair				_(Attorney/Agent			

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.

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NetApp Ex. 1009, pg. 983

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 20 of 225

ATTORNEY DOCKET NO. CROSS1120-33

PATENT APPLICATION CUSTOMER NO. 44654

1

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.

PATENT APPLICATION CUSTOMER NO. 44654

2

[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,

PATENT APPLICATION CUSTOMER NO. 44654

3

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.

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 23 of 225

ATTORNEY DOCKET NO. CROSS1120-33

PATENT APPLICATION CUSTOMER NO. 44654

4

- [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.

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 24 of 225

ATTORNEY DOCKET NO. CROSS1120-33

PATENT APPLICATION CUSTOMER NO. 44654

5

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.

PATENT APPLICATION CUSTOMER NO. 44654

6

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.

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

PATENT APPLICATION CUSTOMER NO. 44654

7

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.

- 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

PATENT APPLICATION CUSTOMER NO. 44654

8

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).
- 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

PATENT APPLICATION CUSTOMER NO. 44654

9

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.
- [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.

PATENT APPLICATION CUSTOMER NO. 44654

10

- 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.

PATENT APPLICATION CUSTOMER NO. 44654

11

- [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 an 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

PATENT APPLICATION CUSTOMER NO. 44654

12

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

PATENT APPLICATION CUSTOMER NO. 44654

13

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

PATENT APPLICATION CUSTOMER NO. 44654

14

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 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

PATENT APPLICATION CUSTOMER NO. 44654

15

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.
- [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

PATENT APPLICATION CUSTOMER NO. 44654

16

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.
- [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.

PATENT APPLICATION CUSTOMER NO. 44654

17

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.

PATENT APPLICATION CUSTOMER NO. 44654

18

- 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.

PATENT APPLICATION CUSTOMER NO. 44654

19

- 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

PATENT APPLICATION CUSTOMER NO. 44654

20

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.

PATENT APPLICATION CUSTOMER NO. 44654

21

- 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:

PATENT APPLICATION CUSTOMER NO. 44654

22

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;

PATENT APPLICATION CUSTOMER NO. 44654

23

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.

PATENT APPLICATION CUSTOMER NO. 44654

24

- 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.

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 44 of 225

ATTORNEY DOCKET NO. CROSS1120-33

PATENT APPLICATION CUSTOMER NO. 44654

25

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.

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 45 of 225

Electronic Patent Application Fee Transmittal					
Application Number:					
Filing Date:					
Title of Invention:	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORA			JAL LOCAL STORAGE	
First Named Inventor/Applicant Name:	Geo	offrey B. Hoese			
Filer:	Joh	n L. Adair/Delia Na	rvaiz		
Attorney Docket Number:	CRC)SS1120-33			
Filed as Large Entity					
Utility under 35 USC 111(a) Filing Fees					
Description		Fee Code	Quantity	Amount	Sub-Total in USD(\$)
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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			1716		
Miscellaneous-Filing:					
Petition:					

Case 1:13-cv-00895-SS Document Description	Fee Code	04/09/14 Quantity	Page 46 of 2 Amount	Sub-Total in USD(\$)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
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	Tot	al in USD	(\$)	2806

Case 1:13-cv-00895-SS Docur Electronic Ac	nent 31-18 Filed 04/09/14 Page 47 of 225 knowledgement 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
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Application Type:	Utility under 35 USC 111(a)

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Payment was successfully received in RAM	\$2806
RAM confirmation Number	3127
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	Specification		1	1	16
	Claims		17	2	24
	Abstract		25	2	25
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Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 50 of 225 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			
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Attorney Docket Number:	CROSS1120-33			
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Filing Date:				
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Information:					
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	Specification		1	1	16
	Claims		17		24
	Abstract		25	2	25
Warnings:			1		

Information: Case 1:13-cv-00895-SS						
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Warnings:	Warnings:					
Information:						
		Total Files Size (in bytes):	5.	41181		

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE			
CERTIFICATE OF TRANSMISSION VIA EFS-WEB SYSTEM Atty Docket No. CROSS1120-33			
In the Application of:			
	Geoffrey B. Hoese		
Mail Stop: Patent Application	Date Filed:		
Commissioner for Patents	Herewith		
P.O. Box 1450	Title:		
Alexandria, VA 22313-1450	_	Method for Providing Virtual cal Storage	
Dear Sir:			

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

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 54 of 225

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE Atty. Docket No. **IDENTIFICATION OF CHANGE IN POWER OF ATTORNEY** CROSS1120-33 UNDER 37 C.F.R. 1.63(d)(4) Applicant Geoffrey B. Hoese, et al. Application Number Date Filed January Unknown 2010 Title Storage Router and Method for Providing Virtual Local Storage Confirmation Number: Group Art Unit

Unknown

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 transmitted to the U.S. Patent and Trademark Office via the EFS-Web filling system on January 20, 2010

Delia Narvaiz

Unknown

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

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 55 of 225

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 Austin, Texas, 78705 Tel. (512) 637-9220

Fax. (512) 317-9088

EXHIBIT "A"

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 57 of 225



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE United States Patent and Trademark Office Address: COMMISSIONER FOR PATENTS Post 1450 Alexandria, Virginia 22313-1450 www.uspio.gov

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

ase 1:13-cv-00895-SS Docum	nt 31-18 Filed 04/09/14 Page 5	58 of 225 COV
IN TI ITED ST.	ES PATENT AND TRADE OFF	119111
REVOCATION AND POWE CHANGE OF MAIL	, ,	Docket No. (Open of ROSS1120-13
OTTANGE OF THE SE	Applicants Geoffrey B Hoese, et. al.	
	Application Number Filed 10/658,163 9/9/200	3
	For STORAGE ROUTER AND METHOD FO	R PROVIDING
	VIRTUAL LOCAL STORAGE Group Art Unit Examin 2186 Unknow	
	Confirmation No. 5675	
	Certification Under 37 C.F.F	
Commissioner for Patents P.O. Box 1450	I hereby certify that this document is being transmi	itted to COMMISSIONER, 2004.
Alexandria, VA 22313-1450	Kuntt AlVII	<u> </u>
Dear Sir:	Reynetto Del	lau
all previous Powers of Attorney and all of the firm of SPRINKLE IP LAW GF	nber 31, 1997 on Reel/Frame: 8929/02 points the following attorneys under C UP, to prosecute the above-identified P Trademark Office connected therewith	ustomer No. 44654, Patent and to
STEVEN R. SPRIN JOHN ADAIR ARI AKMAL	E Registration No. 40,825 Registration No. 48,828 Registration No. 51,388	
Direct all tele	hone calls and correspondence to:	
	Customer No. 44654 PRINKLE IP LAW GROUP P.O. Box 684767 ustin, TX 78768-4767 Attn: Steven Sprinkle 637.9220 / Fax (512) 371.9088	
I hereby state I am authorized to act	n behalf of Crossroads Systems, Inc	<u>, </u>
	Respectfully submitted,	
	Crossroads-Systems, In	nc. 1
Dated: 8/11 , 2004	By: Robert Sims, Pyeside	ent & CEO

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 3



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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

A Commence of the commence of

CONFIRMATION NO. 5675 *OC00000018039068* *OC00000018039068*

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.

PECEIVED By: 01

Dockeled By

Date Dockeled:
Attorney

C/M No.

2100 (571) 272-3594

ATTORNEY/APPLICANT COPY

1

Сору From Parent

DECLARATION AND POWER OF ATTORNEY

As the i	below named invento	or, I declare that	• •
My resid	dence, post office	address and citiz	enship are as
stated below	next to my name, t	hat I believe I a	m the
original, fir	st and joint inven	tor of the subjec	t matter which
is claimed ar	nd for which a pate	ent is sought on t	he invention
or design ent	itled STORAGE ROUT	ER AND METHOD FOR	PROVIDING
VIRTUAL LOCAL	STORAGE, the spec	ification of which	h (check one):
	X is attached her	eto; or	
	was filed on	as	
Apr	olication Serial No	and	was
ame	nded on	(if applicab	le);
that I have r	eviewed and unders	tand the contents	of the
above-identif	ied specification,	including the cla	aims, as
amended by an	y amendment referr	ed to above; and	that I "
acknowledge t	he duty to disclos	e to the U.S. Pate	ent and
Trademark Off	ice all informatio	n known to me to 1	be material to
patentability	as defined in 37	C.F.R. § 1.56.	
I hereby	claim foreign pri	ority benefits un	der 35 U.S.C.
§ 119 of any	foreigm applicatio	n(s) for patent o	r inventor's
certificate l	isted below and ha	ve also identifie	d below any
foreign appli	cation(s) for pate	nt or inventor's	certificate
having a fili	ng date before tha	t of the applicat	ion on which
priority is c	laimed:		<i>.</i>
			Priority
Number	Country	Date Filed	Claimed (Yes) (No)
3 5 m beren po qu		ئەل بايدىنى ئ ى	3108/ INO/
None.			

2

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:

Application
Serial Number Date Filed Status

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
Bradley P. Williams	Reg.	No.	40,227
Terry J. Stalford	Reg.	No.	39,522
Christopher W. Kennerly	Reg.	No.	40,675
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

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:

Direct Telephone Calls To:

 Baker & Botts, L.L.P.
 Anthony E. Peterman

 2001 Ross Avenue
 at (512) 322-2599

 Dallas, Texas 75201-2980
 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.

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 63 of 225 PATENT ATTORNEY DOCKET 064113.0103

4

Full name of the first inventor

Geoffrey B. Hoese

Inventor's signature

Date

Residence (City, County, State)

Austin, Travis County, Texas

Citizenship

United States of America

Post Office Address

1904 Ann Arbor Avenue Austin, Texas 78704

Jeffry T. Russell

Full name of the second inventor

Inventor's signature

Date

Residence (City, County, State)

Cibolo, Guadalupe County,

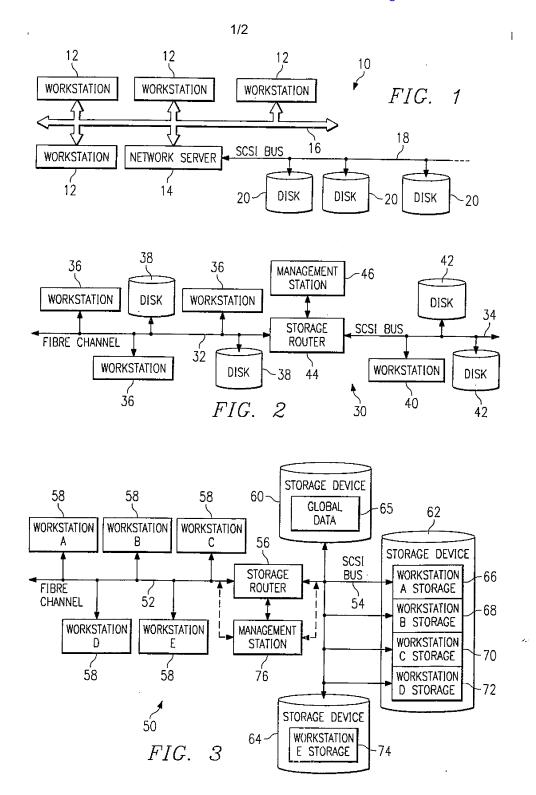
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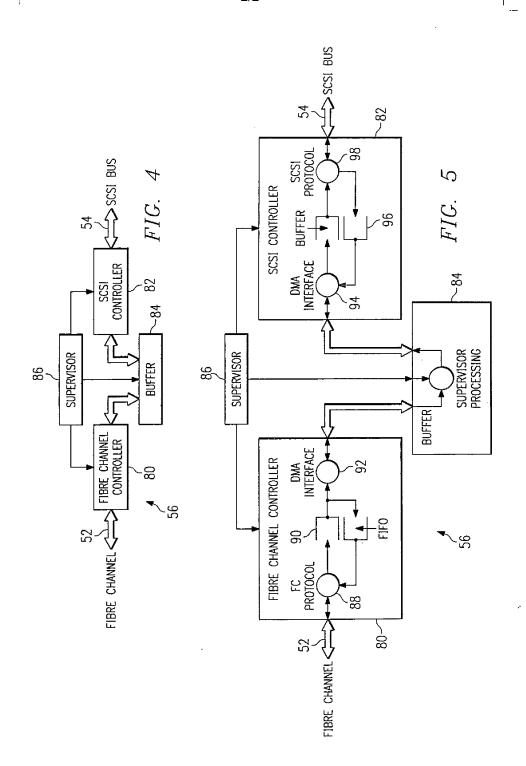
Citizenship

United States of America

Post Office Address

205 Kariba Cove Cibolo, Texas 78108





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 Pagerwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Un		NT APPLICA	ATION		are required to respo RMINATION REC D-875		ilection of i		pplicatio	n or Docket Number 1690,592	
	AP	PLICATION		ED – PART olumn 1)	(Column 2)		SMALL E	NTITY	OR	OTHER SMALL	
	FOR		NII IA	MBER FILED	NUMBER EXTRA	R	ATE (\$)	FEE (\$)		RATE (\$)	FEE (\$)
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ΆΙ	VINATION FEE FR 1.16(o), (p), or			N/A	N/A		N/A			N/A	220
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ı	• • • • • • • • • • • • • • • • • • • •	e Fee (37 CFR	,	ENDENT CLAIM	(27.0ED 4.46(i))	<u> </u>			00	N/A	
	FIRST PRESENT	ATION OF MULT	IPLE DEF	ENDENT CLAIM	(37 CFR 1.16()))	TOTA	N/A		OR	N/A TOTAL	
						ADD'T			OR	ADD'T FEE	
		(Column 1)		(Column 2)	(Column 3)				OR		
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	R/	ATE (\$)	ADDI- TIONAL FEE (\$)		RATE (\$)	ADDI- TIONAL FEE (\$)
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	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=		OR	x =	
		e Fee (37 CFR	``								
	FIRST PRESENT	ATION OF MULT	IPLE DEF	ENDENT CLAIM	(37 CFR 1.16(j))		N/A		OR	N/A	
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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. Paten 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.



United States Patent and Trademark Office

UNITED STATES DEPARTMENT OF COMMERCE United States Patent and Trademark Office Address COMMISSIONER FOR PATENTS PO. Box 1459 Alexandria, Vingnia 22313-1450 www.uspto.gov

APPLICATION	FILING or	GRP ART				
NUMBER	371(c) DATE	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

^CC00000039986152

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

page 1 of 3

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.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

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

page 2 of 3

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 Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, 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).

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 70 of 225



United States Patent and Trademark Office

UNITED STATES DEPARTMENT OF COMMERCE United States Patent and Trademark Office Address COMMISSIONER FOR PATENTS PC. Box 1450 Alexandra, Vignia 22313-1450 www.uppto.gov

APPLICATION NUMBER

FILING OR 371(C) DATE 01/20/2010

FIRST NAMED APPLICANT Geoffrey B. Hoese

ATTY. DOCKET NO./TITLE

12/690,592

CROSS1120-33

CONFIRMATION NO. 8115 POA ACCEPTANCE LETTER

44654 SPRINKLE IP LAW GROUP 1301 W. 25TH STREET SUITE 408 AUSTIN, TX 78705

Date Mailed: 02/03/2010

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

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.

/abirhane/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 71 of 225



United States Patent and Trademark Office

UNITED STATES DEPARTMENT OF COMMERCE UNITED STATES DEPARTMENT OF COMMI United States Patent and Trademark Office Address COMMISSIONER FOR PATENTS PO Box 1450 Alexandria, Virgania 22313-1450 www.uspto.gov

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.

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page 1 of 1

		1/2	RADEMARKO	7	Applic	cation Number	12/690,	592
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			Application Number	12/690,592					
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		ROM Chaparral Exhibits	D144)		7/12/1996				
	C118	CrossPoint 4100 Fibre (Channel to SCSI Router Pr	eliminary Datasheet	44/4/4000				
	0115	(Hulsey Ex 9 (CRDS 16	129-130)) (CD-ROM Chap Channel to SCSI Router Pr	arrai Exhibits D145)	11/1/1996				
	C119	(Bardach Ex. 9 Quisent	perry Ex 33 (CRDS 25606	607)) (CD-ROM					
		Chaparral Exhibits D153	3)		11/1/1996				
	C120	Fax Dated 07/22/96 from	n L. Petti to B. Smith re: P	urchase Order from					
		Data General for FC2S	Fibre to Channel SCSI Pro	tocoi Bridge Model 11	1				
		(Smith Ex 25; Quisenberry Ex 23; Bardach Ex 11 (CRDS 8552-55; 8558) (CD-ROM Chaparral Exhibits D155)							
	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)							
	0400	Ex 12 (CRDS 13644-65	Channel Demo for Fall Co	mdey 1996 (Hossa Ev	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)							
		, <u></u>							
Examiner Sig	nature	<u> </u>		Date Considered					

					Application Number	12/690,592			
	INFOF	RMAT	TIC	ON	Filing Date	01/20/2010			
	DISC	OSI	UR	₹F	First Named Inventor	Geoffrey B. Hoese			
	STAT				Group Art Unit	2111			
	SIA	LIVIL	_17	•	Examiner Name Unknown				
Sheet 7		1	of	9	Atty Docket Number	CROSS1120-33			
Examiner	Cite No.	OT	HE	R PRIOR ART	NON PATENT LITERA	TURE DOCUMENTS	Date		
Initials	C123	Fax D	ate	d 12/19/96 fror	n B. Bardach to T. Rarich i	e: Purchase Order			
		Inform	natio	on (Bardach Ex	c. 14; Smith Ex 16 (CRDS -	4460)) (CD-ROM	42/40/4006		
		Chapa	arra	I Exhibits D158	3) 1 D	isanharry Ev 2 (CDDS	12/19/1996		
	C124	27415	Aliscellaneous Documents Regarding Comdex (Quisenberry Ex 2 (CRDS 17415-465)) (CD-ROM Chaparral Exhibits D165)						
	C125	Cross	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	Cross	Poi	nt 4400 Fibre t	o Channel to SCSI Router	Preliminary Datasheet;			
	0120	Cross	Crossroads Company and Product Overview (Quisenberry Ex 4 (CRDS						
		25606	25606; 16136)) (CD-ROM Chaparral Exhibits D167)						
	C127	Cross	Crossroads Purchase Order Log (Quisenberry Ex 9 (CRDS 14061-062))						
		(CD-R	(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)						
	C129	Letter dated May 12, 1997 from Alan G. Leal to Barbara Bardach					9/1/1996		
	0123	enclos	enclosing the original OEM License and Purchase Agreement between						
		Hewle	Hewlett-Package Company and Crossroads Systems, Inc. (CRDS 02057)						
		(CD-F	RON	I Chaparral Ex	hibits P130)	2010			
	C130	CR4xi Exhib			ication (CRDS 43929) (CD	-ROM Chaparral	6/1/1998		
-	C131	Symb	ios	Logic - Hardw	are Functional Specification	n for the Symbios Logic			
1		Series	s 3	Fibre Channel	Disk Array Controller Mode	el 3701 (Engelbrecht Ex			
	1	3 (LSI	<u>I-16</u>	559-1733) (CD-	ROM Pathlight Exhibits DO	0/4)			
	C132	Repoi	rt of	t the vvorking C	Group on Storage I/O for La er Science Duke University	rge Scale Computing, · CS-1996-21 (PTI			
		17333	30-3	347) (CD-RON	Pathlight Exhibits D098)	. 00 1000 21 (1 11			
	C133	Brian	Alli	son's 1999 Thi	rd Quarter Sales Plan (PD	X 38)CNS 022120-			
		132))	(CI	D-ROM Pathlig	ht Exhibits D201)		6/5/2001		
	C134	Brook	dyn nai	SCSI-SCSI Int	telligent External RAID Brid n ((C D-ROM Pathlight Exh	lge Definition Phase bits D129)			
-	C135	Stora	aeV	Vorks HSx70 S	system Specification by Ste	eve Sicola dated 6/11/96	6/11/1996		
	0,00	4:57p	StorageWorks HSx70 System Specification by Steve Sicola dated 6/11/96 4:57pm, Revision 4.						
	C136				Revision 9 of X3-991D. D				
		Techr	nica	al Report - Sma	III Computer System Interfa	ace - 3 Generic			
			Packetized Protocol (SCSI-GPP). Computer and Business Equipment Manufacturers Assoc.						
	C137	Fnter	nris	se Systems Co	nnection (ESON) Impleme	ntation Guide, July 1996,			
1	5137	IBM I	nte	rnational Techr	nical Support Organization	Poughkeepsie Center	7/1/1996		
						Date Considered			
Examiner Si	gnature	<u> </u>				Date Considered			

		· · · · · · · · · · · · · · · · · · ·	Application Number	12/690,592					
	NFOF	RMATION	Filing Date	01/20/2010					
		LOSURE	First Named Inventor	Geoffrey B. Hoese					
			Group Art Unit	2111					
	SIA	TEMENT	Examiner Name	Unknown					
Sheet 8		of 9	<u> </u>	CROSS1120-33	····				
			Atty Docket Number						
Examiner Initials	Cite No.	OTHER PRIOR ART	NON PATENT LITERAT	URE DOCUMENTS	Date				
	C138	StorageWorks Family P	-Leading Enterprise-Class S rovides Easiest Path to Fibr						
		pages by Company Nev	vs Oncall dated 09/09/04		9/9/2004				
	C139	American National Stan Protocol for SCSI. ANS	6/18/1905						
	C140	F1710A File Control Un Matsushima, Shojiro Ok	2/3/1995						
	C141		by Jeffrey L. Rodengen (5						
	C142		ruary 6, 2007 from the Japa	nese Patent Office	2/6/2007				
		regarding related applic	regarding related application No. 526873/2000. InfoServer 100 System Operation Guide, Order Number EK-DIS1K-UG-						
	C143	001							
	C144	iNFOsERVER 100 Insta DIS1K-IN-001							
	C145	Version 1.1 SPD 38.59.	11/1/1991						
	C146	ULTRIX, Version 1.1, S	4/1/1993						
	C147	Draft Proposed America Information System - dp	12/4/1995						
	C148		11/13/1996						
	C149	Architecture for High Pe	ase: Impactdata Introduces erformance Computing. 2 F	Pages.	11/12/1996				
	C150	ImpactdataNews Rele	ase: Impactdata's Network I	Peripheral Adapter					
		(NPA) Pusnes Technolo	ogy Envelope of Data Storag Environments. 2 Pages.	ge Management in	11/12/1996				
	C151	Impactdata News Rele	ase: Impactdata and Storag	e Concepts Announce					
	0131	Integration of FibreRAID Storage Node Architect	DII Storage Solution with Im	pactdata's Distributed	11/18/1996				
	C152	ImpactdataNews Rele	ase: Breece Hill Libraries N	low Able to Attach					
		Directly to High Speed I Pages.	Networks Peripheral Adapte	r from Impactdata. 2	11/20/1996				
	C153	Impactdata - DSNA Que	estions and Answers. 22 Pa	ages.					
	C154	Impactdata - Network S	torage Solutions. 4 pages.						
	C155				<u> </u>				
	C156		vork Peripheral Interface).		<u> </u>				
	C157	Impactdata - CPI (Common Peripheral Interfae). 2 Pages							
	C158	Impactdata - SNC (Storage Node Controller). 2 Pages							
	C159	Impactdata - DSNA (Dis Pages	stributed Storage Node Arch	nitecture) Protocol. 2					
	C160	Impactdata - DS-50. 2	Pages	-					
	C161								
Examiner Si				Date Considered					

			Application Number	12/690,592	
INFORMATION DISCLOSURE STATEMENT			Filing Date	01/20/2010 Geoffrey B. Hoese 2111	
			First Named Inventor		
			Group Art Unit		
	OIA		Examiner Name	Unknown	
Sheet 9 of 9			Atty Docket Number	CROSS1120-33	
Examiner Initials	Cite No.				Date
Initials	C162	Raider-5 "Disk Array 0013-002. 191 Page	Manual for the UltraSCSI Co	ntroller". Part No. 261-	
	C163	Impactdata - White F January, 1997	Paper: Distributed Storage No		01/97
	C164 Impactdata - DSNA Distributed Storage Node Architecture "Reference Guide". 44 Pages				
	C165	F1710 Logic Specification			
	C166	Translation of Final 0 05/14/08.	Office Action issued in JP 526	873/2000 mailed	
		4 Pages.			5/14/2008
	C167	Office Action issued in USPA 11/851,837 dated 12/22/08, Hoese, 7 pages			
	C168	pgs.			
	C169	English Translation o	of Japanese Laid-Open Public	cation No. 7-20994. 57	1/24/1995
	C170	F1710 File Control U	Init (FCU) Logical Specification	ons. 11 Pages	12/9/1997
Examiner Si	gnature			Date Considered	



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 Filed 01/20/2010 12/690,592 For Storage Router and Method for Providing Virtual Local Storage Examiner **Group Art Unit** Unknown 2111 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 _

HAKGOOD 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 X first Office action on the merits; or

Page 2 of 3

	This Info	formation Disclosure Statement is being submitted before the mailing of a
first Office act	ion afte	er the filing of a request for continued examination under 37 C.F.R
§ 1.114.		
	This In	formation 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 unde
37 C.F.R. § 1.1	113, a r	notice of allowance under 37 C.F.R. § 1.311, or an action that otherwise
closes prosecu	tion in t	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.
		nformation 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:		
1		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 Informatio
		Disclosure Statement.
Pursuai		C.F.R. § 1.97(e), Applicant hereby states:
		That each item of information contained in the information disclosur
		ited in any communication from a foreign patent office in a counterpa
foreign applica	tion no	t more than three months prior to the filing of the information disclosur
statement; or		
		That no item of information contained in the information disclosur
		in a communication from a foreign patent office in a counterpart foreign
		the knowledge of the person signing the certification after makin
		o item of information contained in the information disclosure statemen
		lividual designated in 37 C.F.R. § 1.56(c) more than three months prior t
-		ation disclosure statement.
Further	more, p	oursuant to 37 C.F.R. §§ 1.97(g) and (h), no representation is made that

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.

Page 3 of 3

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

1301 W. 25th Street, Suite 408 Austin, Texas 78705 Tel. (512) 637-9220 Fax. (512) 317-9088

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 93 of 225

					Application Numb	er	12/690,592	
	INFO			_	Filing or 371 (c) Da	ate:	January 20, 2010	
	DISC	CLOS	UF	RE	First Named Inven	tor	Geoffrey B. Hoese	
	STA	TEM	E١	ΙΤ	Group Art Unit		2182	
					Examiner Name		Unknown	
Sheet 1 of 1					Atty Docket Numb	er	CROSS1120-33	
				NON PAT	ENT LITERATURE DOC	UMENT	TS .	
Examiner Initials	Cite No.			ook, magazine, joι	CAPITAL LETTERS), title of rnal, serial, symposium, cata publisher, city and/or countr	log, etc.)	date, page(s), volume-issue	T ²
C171 American National Standa Cross-Point Switch Fabric 1.30. 114 pgs.				int Switch Fab				6/17/1994
Examiner	Signature					D	ate Considered	

	nent 31-18 Filed 04/09/14 Page 94 of 225 Knowledgement 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 wi	th Payment	no					
File Listin	g:						
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 51aa5fa515cd40221bf9b52d7d5acc272995 1a66	yes	3		

	Case 1:13-cv-00895-SS _{Multipart} Description/PDF files in .zip description 95 of 225									
	Document De	Start	Start End							
	Transmittal	1								
	Information Disclosure Stater	Information Disclosure Statement (IDS) Filed (SB/08)								
Warnings:										
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2	NPL Documents	CROSS1120 Ref C171.pdf	3613973	no	114					
	THE DOCUMENTS	CN0551120_NCI_C171.pui	d445cf43c5f3deb791444e7c7cc7f749b39c b156		11-7					
Warnings:										
Informatio	n:									
		Total Files Size (in bytes)	37	29651						

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.

IN THE UNITED STA	TES PATENT AND TRADEMA	ARK OFFICE
INFORMATION DISCLOS	SURE STATEMENT	Atty. Docket No. (Opt.)
BY APPLIC	CANT	CROSS1120-33
	Applicant Geoffrey B. Hoese	
	Application Number	Filing or 371 (c) Date:
	12/690,592	January 20, 2010
	For STORAGE ROUTER AND METHO	OD FOR PROVIDING VIRTUAL
	LOCAL STORAGE	
	Group Art Unit	Examiner
	2182 Confirmation Number:	Unknown
	8115	
	Certification of Transmis	sion Under 37 C.F.R. 1.8
Commissioner for Patents	I hereby certify that this correspon	
P.O. Box 1450	Commissioner for Patents, P.O. I 1450 via the U.S. Patent, and T	rademark Office Electronic Filing
Alexandria, VA 22313-1450	System (EFS-Web) on	
	1000ty Co	aldwell
Dear Sir,	betty C	aldwell
Applicant respectfully request	s, pursuant to 37 C.F.R. §§ 1	56 1 07 and 1 08 that the
information listed on the attached SB		
of the above-identified application.	·	• •
Publication(s) listed on the attached	•	
Disclosure Statement pursuant to the	• • • •	
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 Examir	ner.
☐ This Information Disclo	osure Statement is being subn	nitted within three months of
the filing date of a national applicatio	n other than a continued prose	ecution application under 37
C.F.R. § 1.53(d).		
☐ This Information Disclo	osure Statement is being subn	nitted within three months of
the date of entry of the national sta		
application;	•	•
	osure Statement is being subm	nitted before the mailing of a
first Office action on the merits; or	3	······································
	osure Statement is being subn	nitted before the mailing of a
first Office action after the filing of	·	-
§ 1.114.	Ta Toquost for continued Ex	anmadon ander or O.P.A.
3 1.114.		

5.1.5 5 5 7 <u>7 5</u> 5 5 5	Pa	ge 2 of 2	3311a1 143. 127000,002
specified in 37 C.F.	.R. § 1.97(b) and before	e the mailing date of	submitted after the period any of a final action under , or an action that otherwise
closes prosecution ir	n the application, and is	accompanied by one o	f:
	The statement specifie	ed in 37 C.F.R. § 1.97(e	e); or
	The fee set forth in 37	C.F.R. § 1.17(p). App	olicant hereby authorizes the
	Commissioner to ded	uct the amount of \$18	0 from Deposit Account No.
	50-3183 of Sprinkle I	P Law Group for the	filing fee of this Information
	Disclosure Statement.		
		_	submitted after the period
specified in 37 C.F.F	R. § 1.97(c) and on or b	efore payment of the is	sue fee and is accompanied
by:			
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			olicant hereby authorizes the
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	Disclosure Statement.	P Law Gloup for the	filing fee of this Information
Applicant do		es are due for filing	this Information Disclosure
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			e IP Law Group. Applicant
			nced patent application are
-	hable from the listed inf	•	
. , ,		Respectfully submitted	,
		Sprinkle IP Law Grou	р
		Attorneys for Applicant	
		John L. Adair Reg. No. 48,828	
エ	8	11eg. 110. 40,020	
Dated: June	0		
1301 W. 25 th Street, Austin, Texas 7870			

Tel. (512) 637-9220 Fax. (512) 317-9088

IN THE UNITED STA	TES PATENT AND TRADEMA	RK OFFICE			
NFORMATION DISCLOSURE STATEMENT BY APPLICANT Atty. Docket No. (Opt.) CROSS1120-33					
BY APPLIC	CANT	CROSS1120-33			
	Applicant Geoffrey B. Hoese				
	Application Number 12/690,592	Filing or 371 (c) Date: January 20, 2010			
	For STORAGE ROUTER AND METHO LOCAL STORAGE				
	Group Art Unit 2182	Examiner Unknown			
	Confirmation Number: 8115				
	Certification of Transmis	ssion Under 37 C.F.R. 1.8			
Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450	I hereby certify that this correspon	ndence is being transmitted to the Box 1450, Alexandria, VA 22312- rademark Office Electronic Filing			
Dear Sir,	Janice	Pampell 7			
Applicant respectfully request	s, pursuant to 37 C.F.R. §§ 1	.56, 1.97 and 1.98, that the			
information listed on the attached SB					
of the above-identified application.					
Publication(s) listed on the attached					
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 Exami	ner.			
☐ This Information Discl	osure Statement is being subr	mitted within three months of			
the filing date of a national application	on other than a continued pros	ecution application under 37			
C.F.R. § 1.53(d).					
☐ This Information Discl	osure Statement is being subr	mitted within three months of			
the date of entry of the national sta	age as set forth in 37 C.F.R	. § 1.491 in an international			
application;					
This Information Discl	osure Statement is being subr	mitted before the mailing of a			
first Office action on the merits; or					
This Information Discl	osure Statement is being subr	mitted before the mailing of a			
first Office action after the filing of	f a request for continued ex	xamination under 37 C.F.R.			

§ 1.114.

Page 2 of 2

Ш	Inis I	nformation Disclosure Statement is being submitted after the period
specified in 3	7 C.F.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 prosec	ution 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 I	nformation Disclosure Statement is being submitted after the period
specified in 37	7 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.
A !!	مملم لحمد	an not bolieve any foca are due for filing this Information Disclosure

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:

1301 W. 25th Street, Suite 408

Austin, Texas 78705 Tel. (512) 637-9220 Fax. (512) 317-9088

C172 QUESTIONING Mailed 06/08/2010 from JP Patent Application 526873/2000. 8 pages 06/08							T.	Application Number		12/690,592		_	
Sheet 1 of 1 Atty Docket Number CROSS1120-33 NON PATENT LITERATURE DOCUMENTS 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 C172 QUESTIONING Mailed 06/08/2010 from JP Patent Application 526873/2000. 8 pages C173 Office Action Mailed 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17/2010 in U.S. Serial No. 11/947/2010							L	<u> </u>	_	January 20, 2010			
Sheet 1 of 1 Atty Docket Number CROSS1120-33 NON PATENT LITERATURE DOCUMENTS 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 C172 QUESTIONING Mailed 06/08/2010 from JP Patent Application 526873/2000. 8 pages C173 Office Action Mailed 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17		DISC	CLOS	SUF	RE		L	First Named Inventor		Geoffrey B. Hoese	Se		
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 C172 QUESTIONING Mailed 06/08/2010 from JP Patent Application 526873/2000. 8 pages C173 Office Action Mailed 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17		STA	TEN	IEN	ΙT			Group Art Unit		2182			
NON PATENT LITERATURE DOCUMENTS 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 C172 QUESTIONING Mailed 06/08/2010 from JP Patent Application 06/08		_						Examiner Name		Unknown			
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 C172 QUESTIONING Mailed 06/08/2010 from JP Patent Application 526873/2000. 8 pages C173 Office Action Mailed 08/17/2010 in U.S. Serial No. 11/947,499 to Hoese. 6 08/17	Sheet	1		of		1		Atty Docket Number		CROSS1120-33			
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	ent 31-18 Filed 04/09/14 Page 101 of 225 knowledgement 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	ile Listing:					
Document Number	Document Description		File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS)	CR	OSS1120-33_IDS_Filed_08-2	78419	no	3
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Warnings:						
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2	NPL Documents	CROSS1120 Ref C172.pdf	197554	no	8
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3	NPL Documents	CROSS1120 Ref C173.pdf	175870	no	7
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Total Files Size (in bytes):				51843	

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.

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 103 of 225



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.usplo.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/690,592	90,592 01/20/2010 Geoffrey B. Hoese		CROSS1120-33	8115
44654 SPRINKLE IP	7590 09/10/201 LAW GROUP	0	EXAM	IINER
1301 W. 25TH SUITE 408			SHIN, CHRI	STOPHER B
AUSTIN, TX 7	8705		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.

PTOL-90A (Rev. 04/07)

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 104 of 225

	Application No.	Applicant(s)	
Interview Summary	12/690,592	HOESE ET AL.	
interview Summary	Examiner	Art Unit	
	Christopher B. Shin	2181	
All participants (applicant, applicant's representative, PTO	personnel):		
1) <u>Christopher B. Shin</u> .	(3)		
2) <u>John L. Adair</u> .	(4)		
Date of Interview: 30 August 2010.			
Type: a)⊠ Telephonic b)□ Video Conference c)□ Personal [copy given to: 1)□ applicant 2	2)∏ applicant's representative	•]	
Exhibit shown or demonstration conducted: d) Yes If Yes, brief description:	e) No.		
Claim(s) discussed: <u>1-53</u> .			
Identification of prior art discussed:			
Agreement with respect to the claims f)⊠ was reached. g)│ was not reached. h)│ N	I/A.	
Substance of Interview including description of the general reached, or any other comments: In order to move the case of the related/parent cases/specification, the applicant agreemediums (i.e., the first and second mediums) are not the same be the same or different protocol types. Therefore, the national mediums that may use the same or different protocol types other words, one of the medium is remote, separate & different words, one of the medium is remote, separate & different amend & update the RELATED APPLICATIONS of the special possibility of the special meritage of the separate and the second medium is remote, separate & different words, one of the medium is remote, separate & different words, one of the medium is remote, separate & different words, one of the medium is remote, separate & different words, one of the separate & different words, one of the medium is remote, separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of the separate & different words, one of different words, one of different words, one of different words, one of different words, one of different words, one of different words, one of different words, one of different words, one of different words, one of different words, one of different words, one of different words, one of different wo	e in condition for allowance & ed to amend the claims to cle me mediums, but the protocols we low level block protocols are is consistent with the related rent from the other medium crification; & the applicant agre ments which the examiner agroup of the amendments that with.) ACTION MUST INCLUDE THE last Office action has already OF ONE MONTH OR THIRTY ERVIEW SUMMARY FORM, RVIEW. See Summary of Rec	to be consistent variy recite that the sused on such me used between a cases and specificate applicant also seed to file Terminared would render to been filed, APPLY DAYS FROM TIWHICHEVER IS	with the all eclaimed rediums can different ication. In congreed to all rediums can different ication. In congreed to all reduced the claims claims
2 Patent and Tradamark Office	Primary Examiner, Art Unit 2181		

 U.S. Patent and Trademark Office
 PTOL-413 (Rev. 04-03)
 Interview Summary
 Paper No. 20100908

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 105 of 225 Summary of Record of Interview Requirements

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

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.

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 106 of 225



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.usplo.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 SPRINKLE IP	7590 09/10/201 LAW GROUP	0	EXAM	IINER
1301 W. 25TH SUITE 408			SHIN, CHRI	STOPHER B
AUSTIN, TX 7	8705		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.

PTOL-90A (Rev. 04/07)

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 107 of 225

	Application No.	Applicant(s)					
	12/690,592	HOESE ET AL.					
Office Action Summary	Examiner	Art Unit					
	Christopher B. Shin	2181					
The MAILING DATE of this communication app Period for Reply	ears on the cover sheet with the c	orrespondence address					
A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(\$) 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							
	_· action is non-final.						
3)☐ Since this application is in condition for allowar		secution as to the merits is					
closed in accordance with the practice under E							
Disposition of Claims							
4) Claim(s) <u>1-53</u> is/are pending in the application.							
4a) Of the above claim(s) is/are withdraw	vn from consideration.						
5) Claim(s) is/are allowed.							
6)⊠ Claim(s) <u>1-53</u> is/are rejected.							
7) Claim(s) is/are objected to.							
8) Claim(s) are subject to restriction and/o	r election requirement.						
Application Papers							
9)☐ The specification is objected to by the Examine	r.						
10)☐ The drawing(s) filed on is/are: a)☐ acc	epted or b)□ objected to by the E	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 correct	ion is required if the drawing(s) is obj	ected to. See 37 CFR 1.121(d).					
11)☐ The oath or declaration is objected to by the Ex	aminer. 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 a) All b) Some * c) None of: 1. Certified copies of the priority document		-(d) or (f).					
2. Certified copies of the priority document3. Copies of the certified copies of the priority	• • • • • • • • • • • • • • • • • • • •						
application from the International Bureau	ı (PCT Rule 17.2(a)).						
* See the attached detailed Office action for a list	of the certified copies not receive	d.					
Attachment(s)							
1) Notice of References Cited (PTO-892)	4) Interview Summary						
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 3) Information Disclosure Statement(s) (PTO/SB/08) 	Paper No(s)/Mail Da 5) Notice of Informal Pa						
Paper No(s)/Mail Date <u>Multiple Sheets</u> .	6) Other:						

U.S. Patent and Trademark Office PTOL-326 (Rev. 08-06)

Office Action Summary

Part of Paper No./Mail Date 20100909

Application/Control Number: 12/690,592 Page 2

Art Unit: 2181

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 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. 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).

Since the applicant agreed with the examiner regarding the Double
 Patenting rejection, the details of the rejection will be omitted.

Application/Control Number: 12/690,592

Art Unit: 2181

or Number.

Page 4

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

Application/Control Number: 12/690,592

Page 5

Art Unit: 2181

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 Thruogh 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.

Application/Control Number: 12/690,592

Page 6

Art Unit: 2181

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

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Search Notes									

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	Application/Control No.	Applicant(s)/Pate Reexamination	ent under
	12/690,592	HOESE ET AL.	
	Examiner	Art Unit	
	Christopher B. Shin	2181	

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PALM- for double patenting	8/30/2010	cs					
EAST (See notes for parent)	8/30/2010	cs					
PARETN & RELATED CASES REVIEWED FOR THE ALOWANCE	8/30/2010	CS					
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12/690,592 Application Number 01/20/2010 Filing Date INFORMATION DISCLOSURE Geoffrey B. Hoese First Named Inventor STATEMENT BY APPLICANT 2111 Group Art Unit Unknown **Examiner Name** CROSS1120-33 Attorney Docket Number 9 of 1

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C115 VBAR Volume Backup a	nd Restore (CRDS 12200	-202) (CD-ROM						
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C120 Fax Dated 07/22/96 from	L. Petti to B. Smith re: Pu	rchase Order from						
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	DISC				First Named Inventor	Geoffrey B. Hoese			
	STAT				Group Art Unit	2111			
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	C124		iscellaneous Documents Regarding Comdex (Quisenberry Ex 2 (CRDS 7415-465)) (CD-ROM Chaparral Exhibits D165)						
	C125	Cross	Poi	nt 4100 Fibre C	Channel to SCSI Router Pro	eliminary Datasheet			
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		Crossr	roa	ds Company ai	nd Product Overview (Quis M Chaparral Exhibits D167	enberry Ex 4 (CRDS			
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	DISC	LOS	UF	₹E		First Named Inventor	Geoffrey B. Hoese	
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						Examiner Name	Unknown	
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Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 132 of 225

	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
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Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 133 of 225

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8	2010/08/25 15:35				S9
9	2010/09/08 12:21				S10

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					Application Number	12/690,592		
	INFO	RMA	TIC	NC	Filing or 371 (c) Date:	January 20, 2010		
	DISC	CLOS	SUF	RE	First Named Inventor			
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					Examiner Name	Unknown		
Sheet 1 of 1 Atty Docket Number CROSS1120-33								
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	DISC	CLOS	SUF	RE		First Named Inventor	Geoffrey B. Hoese			
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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 www.uspto.gov

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CONFIRMATION NO. 8115

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IN THE UNITED STAT	ES PATENT AND TRADEM	ARK OFFICE
REPLY TO OFFICE ACTION	Atty. Docket No. CROSS1120-33	
	Applicant Geoffrey B. Hoese	
	Application Number 12/690,592	Date Filed 01/20/10
	Title Storage Router and Me Local Storage	ethod for Providing Virtual
	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.

<u>liaMuv</u> 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.

12/690,592 Customer ID: 44654

2

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 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.

3

12/690,592 Customer ID: 44654

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.

12/690,592 Customer ID: 44654

4

- 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.

Attorney Docket No. CROSS1120-33

12/690,592 Customer ID: 44654

- 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

12/690,592 Customer ID: 44654

6

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.

12/690,592 Customer ID: 44654

7

- 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.

Customer ID: 44654

12/690.592

8

- 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.

12/690,592 Customer ID: 44654

41. (Original)The method of Claim 37, wherein the map resides at the storage router and is maintained at the storage router.

9

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.

10

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.

11

12/690,592 Customer ID: 44654

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.

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 148 of 225

Attorney Docket No. CROSS1120-33

12/690,592 Customer ID: 44654

12

Applicant agreed to file an updated terminal disclaimer and amend the Related Applications section as needed.

NetApp Ex. 1009, pg. 1112

12/690,592 Customer ID: 44654

13

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.

14

12/690,592 Customer ID: 44654

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

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IN THE UNITED STATE	S PATENT AND TRADEMA	ARK OFFICE
Terminal Dis	claimer	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 ME VIRTUAL LOCAL STORAGE	THOD FOR PROVIDING
	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

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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

Attorney Docket: CROSS1120-33

2

Customer ID: 44654 Application No. 12/690,592

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 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.
- 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 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.

Attorney Docket: CROSS1120-33

3

Customer ID: 44654 Application No. 12/690,592

- 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 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.
- 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 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.
- 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 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

Attorney Docket: CROSS1120-33

Customer ID: 44654 Application No. 12/690,592

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 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.
- 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 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.
- 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

Attorney Docket: CROSS1120-33

5

Customer ID: 44654 Application No. 12/690,592

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 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.
- 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 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.
- 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.

6

Customer ID: 44654 Application No. 12/690,592

§ 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

Attorney Docket: CROSS1120-33

7

Customer ID: 44654 Application No. 12/690,592

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

8

Attorney Docket: CROSS1120-33

Customer ID: 44654 Application No. 12/690,592

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

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 159 of 225

Attorney Docket: CROSS1120-33

9

Customer ID: 44654 Application No. 12/690,592

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

Attorney Docket: CROSS1120-33

Customer ID: 44654 Application No. 12/690,592

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. The 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.

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 161 of 225

Attorney Docket: CROSS1120-33

11

Customer ID: 44654 Application No. 12/690,592

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 72-10 - 10 Dated

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 162 of 225

Electronic Patent Application Fee Transmittal								
Application Number:	126	590592						
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:								

Case 1:13-cv-00895-SS Document Description	31-18 Filed (Fee Code	04/09/14 Quantity	Page 163 of 2 Amount	Sub-Total in USD(\$)
Miscellaneous:				
Statutory or terminal disclaimer	1814	1	140	140
	Tot	al in USD	(\$)	140

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 164 of 225 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	

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 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge and Additional Fees legisles in Ser 37 Per Algerich 3.1-5 (Bocument upp) 1964 Page 165 of 225

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.	537418	yes	14		
		pdf	6e59822f22b7f7497f1f7d6964bbad6891b6 3029	,			
	Multip	oart Description/PDF files in	zip description				
	Document De	scription	Start	E	nd		
	Amendment/Req. Reconsiderati	ion-After Non-Final Reject	1		1		
	Specificat	Specification					
	Claims	3	1	10			
	Applicant summary of inte	11	1	12			
	Applicant Arguments/Remarks	Made in an Amendment	13	14			
Warnings:							
Information:							
2	Terminal Disclaimer Filed	CROSS1120-33_TD.pdf	616456	no	11		
		_ '	66a9e07300ed52edbfd6d6c196cff077829d 7245				
Warnings:				·			
Information:							
3	Fee Worksheet (PTO-875)	fee-info.pdf	30397	no	2		
	. 35 1121131131 (112 57 5)	2ccb2d240efe13efa583b68a4c5d6a2d45cf cd56	b2d240efe13efa583b68a4c5d6a2d45cf				
Warnings:							
Information:							
		Total Files Size (in bytes)	11	84271			

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.

1,1=0,51,4,51,01,1		Application Number		12/690,592					
DISCLOSURE					Filing or 371 (c) Date	e:	January 20, 2010		
					First Named Inventor		Geoffrey B. Hoese		
				•	Group Art Unit		2182	7	
					Examiner Name		Unknown		
Sheet	1	C	of	1	Atty Docket Number	r	CROSS1120-33		
				NON PATE	NT LITERATURE DOCU	MENT	s		
Examiner Initials	Cite No.			, magazine, jourr	CAPITAL LETTERS), title of the nal, serial, symposium, catalog ublisher, city and/or country w	g, etc.) d	late, page(s), volume-issue	T ²	
	C174	Office /	Actic	on Mailed 09	9/13/10 in U.S. Serial I	No. 1	1/980,909	09/13/10	
	C175	Office A	Office Action Mailed 09/13/10 in U.S. Serial No. 12/552,807						
	C176	Office Action Mailed 09/15/10 in U.S. Serial No. 12/552,885							
	C177	Office Action Mailed 09/23/10 in U.S. Serial No. 12/552,913						09/23/10	
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Examiner	Signature					Da	te Considered		

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 168 of 225

Electronic Patent Application Fee Transmittal									
Application Number:	12690592								
Filing Date:	20-Jan-2010								
Title of Invention:	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAG								
First Named Inventor/Applicant Name:	Geoffrey B. Hoese								
Filer:	John L. Adair/Delia Narvaiz								
Attorney Docket Number:	CR	OSS1120-33							
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:	Patent-Appeals-and-Interference:								
Post-Allowance-and-Post-Issuance:									
Extension-of-Time:									

Case 1:13-cv-00895-SS Document Description	31-18 Filed (Fee Code	04/09/14 Quantity	Page 169 of 2 Amount	Sub-Total in USD(\$)		
Miscellaneous:						
Submission- Information Disclosure Stmt	1806	1	180	180		
Total in USD (\$) 180						

	nent 31-18 Filed 04/09/14 Page 170 of 225 knowledgement 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	

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 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge and Additional Fees requires under 37 CF: RISERION 3.19 (Bocuments upply fees) 4 Page 171 of 225

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.	118713	1/05	3
'		pdf	b9af1228e38ca950f0fd60b2fb2fcf207db61 d73	yes	3
	Multip	art Description/PDF files in	zip description		
	Document Des	scription	Start	E	nd
	Transmittal l	Letter	1		2
	Information Disclosure Stater	nent (IDS) Filed (SB/08)	3		3
Warnings:					
Information:					
2	NPL Documents	CROSS1120_Ref_C174.pdf	164812	no	7
-	NI E Bocaments	CN0331120_NCI_C174.pdi	5039095bedf7274716acdd9b4726e1ccedc cb4ca	110	
Warnings:					
Information:					
3	NPL Documents	CROSS1120_Ref_C175.pdf	163965	no	7
	NI E Bocaments	CN0331120_NCI_C173.pdf	8fcd974da4623a8ebce94e62a091e0e52cc0 c2cd	110	
Warnings:					
Information:					
4	NPL Documents	CROSS1120_Ref_C176.pdf	165757	no	7
7	NFL Documents	Ch0331120_hei_C170.pui	21708767ba58acd885ba4bd417d71084f4d c1459	110	,
Warnings:					
Information:					
5	NPL Documents	CROSS1120_Ref_C177.pdf	166395	no	7
3	NFL Documents	Cn0331120_nei_C177.pui	aaf9f5ef1eb835af156987ab4f354f6f0a206b a1		,
Warnings:					
Information:					
6	Fee Worksheet (PTO-875)	fee-info.pdf	30513	no	2
		1.55 ///10/pd/	8e4cf3ec5a4643d4172cc328ca8997c2447b 57d1		
Warnings:					
Information:					
		Total Files Size (in bytes)	8	10155	

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

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New International Application Filed with the USPTO as a Receiving Office

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT Atty. Docket No. (Opt.) BY APPLICANT CROSS1120-33 Applicant Geoffrey B. Hoese Application Number Filing or 371 (c) Date: 12/690,592 January 20, 2010 For STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE Group Art Unit Examiner 2181 Shin, Christopher Confirmation Number: 8115 Certification of Transmission Under 37 C.F.R. 1.8 Commissioner for Patents I hereby certify that this correspondence is being transmitted to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22312-P.O. Box 1450 1450 via the U.S. Patent and Trademark Office Electronic Filing Alexandria, VA 22313-1450 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.

Page 2 of 2

This Information Disclosure Statement is being submitted after the period

specified in 3	37 C.F.I	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 prosec	ution in	the application, and is accompanied by one of:
		The statement specified in 37 C.F.R. § 1.97(e); or
	\boxtimes	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 I	nformation Disclosure Statement is being submitted after the period
specified in 3	7 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

 \boxtimes

1301 W. 25th Street, Suite 408 Austin, Texas 78705 Tel. (512) 637-9220 Fax. (512) 317-9088

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 175 of 225

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
to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Α	Application or Docket Number 12/690,592			ing Date 20/2010	To be Mailed	
APPLICATION AS FILED – PART I (Column 1) (Column 2)							SMALL ENTITY			OTHER THAN OR SMALL ENTITY		
	FOR		JMBER FIL		MBER EXTRA		RATE (\$)	FEE (\$)		RATE (\$)	FEE (\$)	
	BASIC FEE (37 CFR 1.16(a), (b),	or (c))	N/A		N/A		N/A		1	N/A		
	SEARCH FEE (37 CFR 1.16(k), (i), (i)	or (m))	N/A		N/A		N/A			N/A		
	EXAMINATION FE (37 CFR 1.16(o), (p),	Ε	N/A		N/A		N/A			N/A		
	ΓAL CLAIMS CFR 1.16(i))		mir	nus 20 = *			x \$ =		OR	x \$ =		
IND	EPENDENT CLAIM CFR 1.16(h))	S	m	inus 3 = *			x \$ =			x \$ =		
	APPLICATION SIZE (37 CFR 1.16(s))	sheet is \$25 additi	ts of pape 50 (\$125 ional 50 s	ation and drawing er, the applicatio for small entity) sheets or fraction a)(1)(G) and 37	n size fee due for each n thereof. See							
Ш	MULTIPLE DEPEN								l			
* If t	the difference in colu	umn 1 is less than	zero, ente	r "0" in column 2.			TOTAL			TOTAL		
	APPI	(Column 1)	AMEND	DED – PART II (Column 2)	(Column 3)		OTHER THAN SMALL ENTITY OR SMALL ENTITY					
LN:	12/10/2010	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)	
ME	Total (37 CFR 1.16(i))	* 53	Minus	** 53	= 0	1	x \$ =		OR	X \$52=	0	
AMENDMENT	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0		x \$ =		OR	X \$220=	0	
٨ME	Application Si	ze Fee (37 CFR 1	.16(s))									
 	FIRST PRESEN	NTATION OF MULTIP	LE DEPEN	DENT CLAIM (37 CFF	R 1.16(j))				OR			
							TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0	
		(Column 1)		(Column 2)	(Column 3)				_			
		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 \$ =		
AMENDMENT	Independent (37 CFR 1.16(h))	*	Minus	***	=		x \$ =		OR	x \$ =		
Ш	Application Si	ize Fee (37 CFR 1	.16(s))									
ΑM	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								OR			
							TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE		
** If	* 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.											

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 STA	TES PATENT AND TRADEMA	ARK OFFICE				
INFORMATION DISCLOS	SURE STATEMENT	Atty. Docket No. (Opt.)				
BY APPLIC	CANT	CROSS1120-33				
	Applicant Geoffrey B. Hoese					
	Application Number 12/690,592	Filing or 371 (c) Date: 01/20/2010				
	For Storage Router and Method Local Storage					
	Group Art Unit 2181	Examiner Shin, Christopher				
	Confirmation Number: 8115	•				
	Certification of Transmis	ssion Under 37 C.F.R. 1.8				
Commissioner for Patents P.O. Box 1450	Commissioner for Patents, P.O. 1450 via the U.S. Patent and 1	ndence is being transmitted to the Box 1450, Alexandria, VA 22312- rademark Office Electronic Filing				
Alexandria, VA 22313-1450	System (EFS-Web) on December 17 2010.					
Dear Sir,	JOUNUL TO MPELL 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). 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 Discle	osure Statement is being subr	nitted before the mailing of a				
first Office action after the filing o						
§ 1.114.						
This Information Disc specified in 37 C.F.R. § 1.97(b) an		any of a final action under				

closes prosecution in the application, and is accompanied by one of:

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 177 of 225

ATTORNEY DOCKET NO. CROSS1120-33

Disclosure Statement.

Page 2 of 2 The statement specified in 37 C.F.R. § 1.97(e); or X 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 \Box 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

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:

1301 W. 25th Street, Suite 408

Austin, Texas 78705 Tel. (512) 637-9220 Fax. (512) 317-9088 Customer No. 44654

Serial No. 12/690,592

					Application Number	12/690,592	
					Filing or 371 (c) Date:	January 20, 2010	
					First Named Inventor		
STATEMENT				Т	Group Art Unit	2181	
OTATEMENT.					Examiner Name	Shin, Christopher	
Sheet	1		of	1	Atty Docket Number	CROSS1120-33	
				NON PATE	NT LITERATURE DOCUMEN	ITS	
Examiner nitials	Cite No.			ok, magazine, journ	APITAL LETTERS), title of the arti al, serial, symposium, catalog, etc ublisher, city and/or country where	.) date, page(s), volume-issue	T ²
	C179	Office	Acti	on Mailed 12/0	2/10 in U.S. Serial No. 12/9	910,375	12/2/2010
	C180	Office	Acti	on Mailed 12/0	3/10 in U.S. Serial No. 12/9	12/3/2010	
	C181	Office	Acti	on Mailed 12/0	3/10 in U.S. Serial No. 12/9	910,515	12/3/2010
							
Examiner	Signature					Date Considered	

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 179 of 225

Electronic Patent Application Fee Transmittal									
Application Number:	12690592								
Filing Date:	20-Jan-2010								
Title of Invention:	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGI								
First Named Inventor/Applicant Name:	Geoffrey B. Hoese								
Filer:	John L. Adair/Janice Pampell								
Attorney Docket Number:	CR	OSS1120-33							
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:	Patent-Appeals-and-Interference:								
Post-Allowance-and-Post-Issuance:									
Extension-of-Time:									

Case 1:13-cv-00895-SS Document Description	31-18 Filed (Fee Code	04/09/14 Quantity	Page 180 of 2 Amount	Sub-Total in USD(\$)
Miscellaneous:				
Submission-Information Disclosure Stmt	1806	1	180	180
	Tot	al in USD	(\$)	180

	nent 31-18 Filed 04/09/14 Page 181 of 225 knowledgement 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)

File Listing	g:				
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS)	CROSS1120-33_IDS_Filed_12-1	109107	no	3
'	Filed (SB/08)	7-10.pdf	80a5654afdcd449d01308e69e23ef5e4869 95055		
Warnings:					
Information:					
This is not an U	SPTO supplied IDS fillable form				
2	NPL Documents	CROSS1120_Ref_C179.pdf	252415	no	7
_	μ		ec33ebb937f62aea15cec67f0d4e7d15e295 9906		
Warnings:					
Information:					
3	NPL Documents	CROSS1120_Ref_C180.pdf	254399	no	7
-			845fbb723c26af4bb2f4aece8f061856a612 c5a2		
Warnings:					
Information:					
4	NPL Documents	CROSS1120_Ref_C181.pdf	218169 no		6
		'	5781d9e2b8edee132dd11ed8d451ded236 d11aa8		
Warnings:					
Information:					
5	Fee Worksheet (PTO-875)	fee-info.pdf	30500	no	2
-			614355e9e496790e3524127de0acdbeaecd fc165		-
Warnings:	·				

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 Tradenuark Office Address: COMMISSIONER FOR PATENTS P.O. Box 1450 Alexandria, Virginia 22313-1450 www.uspio.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

44654

01/10/2011

Sprinkle IP Law Group 1301 W. 25th Street Site 408 Austin, TX 78705

EXAMINER SHIN, CHRISTOPHER B PAPER NUMBER 2181

DATE MAILED: 01/10/2011

AF	PLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/690 592 01/20/2010		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

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.

Page 1 of 3

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

Case 1:13-cv-00895-SSpARqqumqnt(8)1r1k3N5ijqqfr(A4/09/14 Page 185 of 225

Complete and send this form, together with applicable fee(s), to: 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 notificat	ions.	, -, (··,,				
CURRENT CORRESPONDE	ENCE ADDRESS (Note: Use Bl	ock 1 for any change of address)		pape	rs. Each additional	nailing can only be used a certificate cannot be used paper, such as an assignn of mailing or transmission.	for domestic mailings of the for any other accompanying ent or formal drawing, must
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Sprinkle IP Lav 1301 W. 25th Str Site 408	reet			I her State addre trans	eby certify that this es Postal Service wi essed to the Mail	ificate of Mailing or Trans Fee(s) Transmittal is bein th sufficient postage for fi Stop ISSUE FEE addres O (571) 273-2885, on the	ng deposited with the United irst class mail in an envelope s above, or being facsimile
Austin, TX 7870	5						(Depositor's name)
							(Signature)
							(Date)
APPLICATION NO.	FILING DATE		FIRST NAMED INVEN	TOR		ATTORNEY DOCKET NO.	CONFIRMATION NO.
12/690,592 TITLE OF INVENTION	01/20/2010 STORAGE ROUTER	AND METHOD FOR PR	Geoffrey B. Hoese COVIDING VIRTUAL		CAL STORAGE	CROSS1120-33	8115
APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE D	UE	PREV. PAID ISSUE	FEE TOTAL FEE(S) DU	E DATE DUE
nonprovisional	NO	\$1510	\$300		\$0	\$1810	04/11/2011
EXAM	INER	ART UNIT	CLASS-SUBCLASS				
SHIN, CHRIS	STOPHER B	2181	710-305000	_	'		
"Fee Address" indi PTO/SB/47; Rev 03-0 Number is required. 3. ASSIGNEE NAME AI PLEASE NOTE: Unl recordation as set forth (A) NAME OF ASSIG	ess an assignee is ident n in 37 CFR 3.11. Comp GNEE	"Indication form led. Use of a Customer A TO BE PRINTED ON fified below, no assignee letion of this form is NO	or agents OR, alter (2) the name of a sregistered attorney 2 registered patent listed, no name wil THE PATENT (print o data will appear on that a substitute for filing (B) RESIDENCE: (Co	nativ ingle or a attor I be p r typ ne pa g an a	e firm (having as a gent) and the name reeys or agents. If n printed. e) ttent. If an assigne tassignment. and STATE OR CO	member a 2s of up to o name is 3e is identified below, the DUNTRY)	document has been filed for
Please check the appropri	ate assignee category or	categories (will not be pr	rinted on the patent):	_	Individual 🖵 Cor	poration or other private g	roup entity 🖵 Government
4a. The following fee(s) a ☐ Issue Fee ☐ Publication Fee (N ☐ Advance Order - #	o small entity discount p		☐ A check is enclos☐ Payment by credi☐ The Director is he	ed. t card reby	d. Form PTO-2038	e the required fee(s), any o	
**	SMALL ENTITY state	ıs. See 37 CFR 1.27.		_	-	L ENTITY status. See 37 (-
NOTE: The Issue Fee and interest as shown by the r	d Publication Fee (if requecords of the United Sta	uired) will not be accepte tes Patent and Trademark	d from anyone other the Office.	an th	ne applicant; a regis	tered attorney or agent; or	the assignee or other party in
Authorized Signature					Date		
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Alexandria, Virginia 223	13-1450.					e public which is to file (a inutes to complete, includ inments on the amount of i rademark Office, U.S. De SEND TO: Commissione isplays a valid OMB contr	nd by the USPTO to process, ing gathering, preparing, and time you require to complete partment of Commerce, P.O. r for Patents, P.O. Box 1450, ol number.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 186 of 225



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.uspbo.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 7:	590 01/10/2011		EXAM	IINER
Sprinkle IP Law	prinkle IP Law Group		SHIN, CHRI	STOPHER B
1301 W. 25th Stre			ART UNIT	PAPER NUMBER
Site 408 Austin, TX 78705			2181 DATE MAILED: 01/10/201	1

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.

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 187 of 225

	Application No.	Applicant(s)				
Alakia a di Allamani ilika	12/690,592	HOESE ET AL.				
Notice of Allowability	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 rece	ived December 10, 2010.					
2. 🔀 The allowed claim(s) is/are <u>1-53</u> .						
a) All b) Some* c) None of the: 1. Certified copies of the priority documents have 2. Certified copies of the priority documents have 3. Copies of the certified copies of the priority documents have International Bureau (PCT Rule 17.2(a)). * Certified copies not received:	 Certified copies of the priority documents have been received. Certified copies of the priority documents have been received in Application No 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)). 					
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.						
 A SUBSTITUTE OATH OR DECLARATION must be subm INFORMAL PATENT APPLICATION (PTO-152) which give 						
 (a) ☐ including changes required by the Notice of Draftspers 1) ☐ hereto or 2) ☐ to Paper No./Mail Date (b) ☐ including changes required by the attached Examiner's Paper No./Mail Date 	. ☐ 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					
DEPOSIT OF and/or INFORMATION about the depo attached Examiner's comment regarding REQUIREMENT	sit of BIOLOGICAL MATERIAL n	nust be submitted. Note the				
Attachment(s)						
1. ☐ Notice of References Cited (PTO-892)	5. Notice of Informal P	atent Application				
2. Notice of Draftperson's Patent Drawing Review (PTO-948)	6. ☐ Interview Summary Paper No./Mail Dat					
3. 🛮 Information Disclosure Statements (PTO/SB/08),	7. Examiner's Amendn					
Paper No./Mail Date <u>Multiple Pages filed</u> 4. ☐ Examiner's Comment Regarding Requirement for Deposit	8. 🗌 Examiner's Stateme	nt of Reasons for Allowance				
of Biological Material	9. ☐ Other .					
	/Christopher B Shin/ Primary Examiner, Art I	Jnit 2181				

U.S. Patent and Trademark Office PTOL-37 (Rev. 08-06)

Notice of Allowability

Part of Paper No./Mail Date 20101217

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 188 of 225

Search Notes				

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	Application/Control No.	Applicant(s)/Pate Reexamination	ent under
	12/690,592	HOESE ET AL.	
	Examiner	Art Unit	
	Christopher B. Shin	2181	

	SEAR	CHED	
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	Subclass Date							
710	305,11	12/15/2010	cs						
709	258	12/15/2010	cs						

SEARCH NOT (INCLUDING SEARCH	ES STRATEGY)
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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 ALOWANCE	8/30/2010	CS
Reviewed IDS	8/30/2010	CS

					Application Number	12/690,592	
	INFO	RMA	\TI(ON	Filing or 371 (c) Date:	January 20, 2010	
	DISC	CLOS	SUF	RE	First Named Inventor	Geoffrey B. Hoese	
	STA	TEM	IEN	ΙΤ	Group Art Unit 2181		
					Examiner Name	Shin, Christopher	
Sheet	1		of	1	Atty Docket Number	CROSS1120-33	
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Examiner nitials	Cite No.	include the ite	e nam m (bo	ok, magazine, journ	CAPITAL LETTERS), title of the arti- ral, serial, symposium, catalog, etc ublisher, city and/or country where	.) date, page(s), volume-issue	T ²
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	C181	Office	e Act	ion Mailed 12/0	3/10 in U.S. Serial No. 12/9	910,515	12/3/2010
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Examiner	r Signature		/Ch	ristopher Shin/		Date Considered	12/17/2

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 190 of 225

 Classification

Application/Control No.	A
12/690.592	F
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Applicant(s)/Patent under Reexamination HOESE ET AL.

Examiner

Christopher B. Shin

Art Unit 2181

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		ORIGINAL	-			INTERNATIONAL CLASSIFICATION								
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 (Ass					/Christopher B Shin/ PRIMARY EXAMINER				Total Claims Allowed: 53				3	
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	7			37			67]		97			127		157		187
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	19			49			79]		109			139		169		199
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U.S. Patent and Trademark Office

Part of Paper No. 20101217

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 191 of 225

	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

12/17/10, EAST Version: 2.4.2.1

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 192 of 225

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Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 195 of 225

Application Number	Application/Co	ntrol No.	Applicant(s)/Patent under Reexamination HOESE ET AL.		
Document Code - DISQ		Internal D	ocument – DC	NOT MAIL	

TERMINAL DISCLAIMER	☐ APPROVED	☑ 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

	*			Application Number	12/690	592	
	INFORM	IATION DICCLOSI	.DE	Filing Date	01/20/2010 Geoffrey B. Hoese		
		IATION DISCLOSU		First Named Inventor			
	SIAIE	MENT BY APPLICA	ואו	Group Art Unit	2111		
			Ī	Examiner Name	Unkno	wn	
Sheet	7	of 9		Attorney Docket Number	CROS	S1120-33	
			U.S. PATEN	F DOCUMENTS			
Examiner		Document Number	Publication Date	i		Pages, Columns, Lines Where Relevant Passages or Figures	
Initials	No.	Number-Kind Code (if known)	MM-DD-YYYY			Appear	
	A189	6,260,120	7/10/200		au, et al.		
	A190	6,268,789	7/31/200		nt, et al.		
	A191	6,308,247	10/23/200		ckerman		
	A192	6,330,629	12/11/200		do, et al.		
	A193	6,330,687	12/11/200		Griffith		
	A194	6,341,315	1/22/200		yo, et al.		
	A195	6,343,324	1/29/200		ois, et al.		
<u> </u>	A196	6,363,462	3/26/200		Bergsten		
	A197	6,401,170	6/4/200		ith, et al.		
	A198	6,421,753	7/16/200	2 Hoe	se, et al.		
	A199	6,425,035	7/23/200		se, et al.		
ang <mark>e(s) app</mark>	A200	6,425,036	7/23/200		se, et al.		
document,	A201	6,425,052	0/23/200		Hashemi		
.E.M./	A202	6,453,345	9/17/200		ka, et al.		
7/2011	A203	6,484,245	11/19/200		da, et al.		
	A204	6,529,996	3/4/200		en, et al.		
<u> </u>	A205	6,547,576	4/15/200		ng, et al. en, et al.		
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	A208	6,775,693	8/10/200		in, et al.		
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	A216	7,065,076	ļ				
	A217	7,127,668	10/24/200		de, et al.		
	A218	7,133,965	11/7/200	06	Chien		
Examin Signatu	re	/Christopher S			sidered	08/26/2010	

						A	pplication Number	12/690	592	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT						F	iling Date	01/20/2010 Geoffrey B. Hoese 2111		
						F	irst Named Inventor			
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Sheet	4	(of	9		A	ttorney Docket Number	CROSS1120-33		
	<u> </u>				U.S. PATE	ENT	DOCUMENTS			
Examiner	Cite	Docur	nent_	Number	Publication		Name of Patentee or		Pages, Columns, Lines Who Relevant Passages or Figur	
Initials	No.	Number-Kir	nd Co	de (if known)	MM-DD-Y	YYY	Applicant of Cited Docume	ent	Appear	
	A99	5,581,72	24		12/3/1	996	Belsa	an et al.		
	A100	5,596,56	2		016/21/1	997		Chen		
	A101	5,596,73	6		1/21/1	997		Kerns		
	A102	5,598,54	1		1/28/1	997		Malladi		
	A103	5,613,08	32		3/18/1	997	Brewe	er, et al.		
	A104	5,621,90)2		4/15/1	997	Case	s, et al.		
	A105	5,632,01	2		5/20/1	997	Belsa	n, et al.		
	A106	5,634,11	1		5/27/1	997	Oed	a, et al.		
	A107	5,638,51	8		6/10/1	997		Malladi		
ge(s) appl	A108	5,642,51	5_		6/24/1	997	Jone	s, et al.		
tument,	A109	5,659,75	6		8/19/1	997	Heffero	n, et al.		
M./	A110	5,664,10)7		9/2/1	997	Chatwani	ni, et al.		
(2011	A111	5,680,55	6		10/21/1	997	Begu	ın, et al.		
	A112	5,684,80	0		11/4/1	997	Dobbin	ıs, et al.		
	A113	5,701,49	91		12/23/1	997	Dun	n, et al.		
	A114	5,712,97	76		1/27/1	998	Falco	n, et al.		
	A115	5,727,21	18		3/10/1	998	F	lotchkin		
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	A117	5,743,84			4/28/1					
	A118	5,748,92			5/5/1			ns, et al.		
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	A120	5,751,97	75		5/12/1	998	Gillesp	ie, et al.		
	A121	5,764,93	31		6/9/1	998	Schma	hl, et al.		
	A122	5,768,62	23_		6/16/1	998	Juc	ld, et al.		
	A123	5,774,68	33		6/30/1	998		Gulick		
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	A127	5,805,8	16		9/8/1	998	Picazo, J	lr., et al.		
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Examiner Signature			/Cł	nristopher Sh	in/		Date Consi	dered	08/26/2010	

	_			Applica	ation Number	12/690,	592
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Examiner	Cite	Document Number	Publication	Date	Name of Patentee of		Pages, Columns, Lines Wh Relevant Passages or Figu
Initials	No.	Number-Kind Code (if known)	MM-DD-Y	***	Applicant of Cited Docu	ment	Appear
	A39	5,212,785	5/18	3/1993	Power	s, et al.	
	A40	5,214,778	5/25	/1993	Glide	er, et al.	
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	A42	5,239,632	8/24	/1993		Larner	
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e(s) applie	A65	5,410,667	4/2	5/1995	Belsa	an, et al.	
ıment,	A66	5,410,697	4/2	5/1995	Bai	rd, et al.	
M./	A67	5,414,820	05 10/9	9/1995	McFarlar	nd, et al.	
011	A68	5,416,915	5/10	6/1995	Mattso	on, et al.	
Examiner		/Christopher Shir			Date Cons		08/26/2010

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 199 of 225

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
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(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 fees will feet to be a separate "FEE ADDRESS" for maintenance fees to the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the property of the pr

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APPLICATION NO.	FILING DATE		FIRST NAMED INVENTOR		ATTO	RNEY DOCKET NO.	CONFIRMATION NO.		
12/690,592	01/20/2010		Geoffrey B. Hoese		CROSS1120-33 8115				
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recordation as set for	th in 37 CFR 3.11. Com	pletion of this form is NO	data will appear on the p T a substitute for filing an	assignment.					
(A) NAME OF ASSI			(B) RESIDENCE: (CITY	and STATE OR	COUN	ΓRY)			
Crossroa	ds Systems,	Inc.	Austin, TX						
Please check the approp	riate assignee category o	r categories (will not be p	rinted on the patent):	Individual 🚨 C	Corporat	ion or other private gro	up entity Government		
4a. The following fee(s)	are submitted:	4	b. Payment of Fee(s): (Ple	ase first reapply a	ny pre	viously paid issue fee s	shown above)		
Issue Fee	are successive.		A check is enclosed.						
	No small entity discount	permitted)	Payment by credit ca	rd. Form PTO-203	8 is att	ached.			
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a Applicant clain	ns SMALL ENTITY sta	tus. See 37 CFR-1.27.	b. Applicant is no lo	nger claiming SMA	LLEN	TTITY status. See 37 CI	FR 1.27(g)(2).		
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IN THE UNITED STA	TES PATENT AND TRADE	MARK OFFICE	
AMENDMENT UNDE	R 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 Vi		
	Group Art Unit	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

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 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.

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 IF Law Group

Ari Q. Akma Reg. No. 51,388

Dated: March 1, 2011

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

Tel. 512-637-9220 Fax. 512-371-9088

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 203 of 225

Electronic Patent Application Fee Transmittal					
Application Number:	12690592				
Filing Date:	20	-Jan-2010			
Title of Invention:	ST	STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE			
First Named Inventor/Applicant Name:	Ge	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
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Case 1:13-cv-00895-SS Document Description	31-18 Filed Fee Code	04/09/14 Quantity	Page 204 of 2 Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
	Tot	al in USD	(\$)	1810

	Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 205 of 225 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
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The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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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	no	1
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2	Issue Fee Payment (PTO-85B)	CROSS1120-33 PTOL-85.pdf	96691	no	1
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Information:					
3	Amendment after Notice of Allowance	CROSS1120-33_Amendment_U	104947	no	3
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Warnings:					

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.

Docket No. TRANSMITTAL OF PAYMENT OF ISSUE FEE (LARGE Entity) 37 C.F.R. 1.311) CROSS1120-33 Applicant(s) Geoffrey B. Hoese Examiner Confirmation No. Filing Date Group Art Unit Application No. 01/20/2010 SHIN, Christopher B. 2181 8115 12/690,592 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:

\boxtimes	Issue Fe	e Tran	smittal	Form	PTOL	-85
\sim	1334616	CIIGI	Jiiiiiiiiiii			\sim

- 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

Certificate of Transmission Under 37 C.F.R. § 1.8

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Janice Pampell

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 208 of 225



UNITED STATES PATENT AND TRADEMARK OFFICE

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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO. FILING DATE		DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.	
12/690,592 01/20/2010		2010	Geoffrey B. Hoese	CROSS1120-33	8115	
44654 7590 03/23/2011 Sprinkle IP Law Group		03/23/2011		EXAMINER		
	1301 W. 25th S				SHIN, CHRIS	STOPHER B
	Suite 408 Austin, TX 787	705			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.

PTOL-90A (Rev. 04/07)

 -		Application No.	Applicant(s)
_		12/690,592	HOESE ET AL.
Respo	onse to Rule 312 Communication	Examiner	Art Unit
	The MAILING DATE of this communication a	appears on the cover she	et with the correspondence address –
		4 240 haa haaa aa aa idaa	ddbb
	amendment filed on <u>21 March 2011</u> under 37 CFR entered.	1.312 has been considere	a, and has been.
b) 🔲	entered as directed to matters of form not affecting	g the scope of the inventio	n.
c) 🗆	disapproved because the amendment was filed at Any amendment filed after the date the issue for and the required fee to withdraw the application	ee is paid must be accomp	
d) 🔲	disapproved. See explanation below.		
e) 🔲	entered in part. See explanation below.		
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			4 . 1 6.11 41
			Timothy Caldwell Publishing Division
,			Publishing Division

U.S. Patent and Trademark Office PTOL-271 (Rev. 04-01)

Reponse to Rule 312 Communication

Part of Paper No. 20110323

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 210 of 225



UNITED STATES PATENT AND TRADEMARK OFFICE

04/06/2011

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

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 Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Geoffrey B. Hoese, Austin, TX; Jeffry T. Russell, Cibolo, TX;

IR103 (Rev. 10/09)

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 ond to a collection of information unless it displays a valid OMB control number.

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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 Group1301 W. 25th Street, Suite 408
Austin, Texas 78705
Tel. (512) 637-9220
Fax. (512) 371-9088

This form is estimated to take 1.0 hour to complete. Time will vary depending upon the needs of the individual case. Any comment on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, D.C. 20231

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 212 of 225

Electronic Patent Application Fee Transmittal					
Application Number:	126	590592			
Filing Date:	20-	-Jan-2010			
Title of Invention:	STO	ORAGE ROUTER ANI	D METHOD FO	R PROVIDING VIRTU	JAL 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:					

Case 1:13-cv-00895-SS Document Description	31-18 Filed (Fee Code	04/09/14 Quantity	Page 213 of 2 Amount	Sub-Total in USD(\$)
Miscellaneous:				
	Tot	al in USD	(\$)	100

	Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 214 of 225 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	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	CROSS1120-33_Transmittal_Let	34484	no 1	
·	Miscellaricous meaning ecter	ter.pdf			•
Warnings:					
Information:					
2	Request for Certificate of Correction	CROSS1120-33_Certificate_of_	31604	no	1
-	nequestror certificate or confection	Correction.pdf	39defa7b887e73ea1a92b03836649154ba0 3f765		
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30191	no	2
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Warnings:			1	'	
Information:					
		Total Files Size (in bytes):	9	5279	

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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.

IN THE UNITED STATES	IN THE UNITED STATES PATENT AND TRADEMA			
TRANSMITTAL L	TRANSMITTAL LETTER			
	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 an Virtual Local Stora	d Method for Providing		
	Confirmation No. 8115			

Attention: Certificate of Correction Branch Office of Patent Publication 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. Patent Office using the United States Patent and Trademark Office's EFS-Web system on _¬-/-/____

Janice Pampell

Janice Pampell

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

DATE	1/19/2/11	OR CERTIFICATE OF CORRECTION
TO SPE OF	: ART UNIT 2/8/	_
SUBJECT		ction for Appl. No.: <u>12/690592</u> Patent No.: <u>7934041</u>
	•	CofC mailroom date: 7/11/2011
Please resp	ond to this request for a cer	rtificate of correction within 7 days.
FOR IFW FI		
tne i⊩vv app	ew the requested changes/o dication image. No new ma the claims be changed.	corrections as shown in the COCIN document(s) in atter should be introduced, nor should the scope or
Please compusing docum	plete the response (see bel nent code COCX.	ow) and forward the completed response to scanning
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Please revie	ew the requested changes/o	corrections as shown in the attached certificate of (see below) and forward it with the file to:
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Note:		Virginia Tolbert
Note:		
Note:		Certificates of Correction Branch
	For Your Assistance	
Thank You The reques		Certificates of Correction Branch
Thank You The reques Note your decision	t for issuing the above-ide	Certificates of Correction Branch (571) 272-0460
Thank You The reques Note your decision	t for issuing the above-ide on the appropriate box.	Certificates of Correction Branch (571) 272-0460 entified correction(s) is hereby:
Thank You The reques Note your decision	t for issuing the above-ide on the appropriate box. Approved	Certificates of Correction Branch (571) 272-0460 entified correction(s) is hereby: All changes apply. Specify below which changes do not apply.
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Thank You The reques Note your decision	t for issuing the above-ide on the appropriate box. Approved Approved in Part	Certificates of Correction Branch (571) 272-0460 entified correction(s) is hereby: All changes apply. Specify below which changes do not apply. State the reasons for denial below.
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DATE	7/19/2011	OR CERTIFICATE OF CORRECTION
TO SPE OF	: ART UNIT 2/8/	_
SUBJECT		ction for Appl. No.: <u>12/690592</u> Patent No.: <u>7934041</u>
		CofC mailroom date: 7/1/2011
Please resp	ond to this request for a ce	rtificate of correction within 7 days.
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tne i⊩vv app	w the requested changes/o dication image. No new ma the claims be changed.	corrections as shown in the COCIN document(s) in atter should be introduced, nor should the scope or
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The request Note your decision	t for issuing the above-ide on the appropriate box. Approved Approved in Part Denied	entified correction(s) is hereby: All changes apply. Specify below which changes do not apply.

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 219 of 225

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,934,041 B2 Page 1 of 1

APPLICATION NO. : 12/690592

DATED : April 26, 2011

INVENTOR(S) : Geoffrey B. Hoese et al.

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

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	ise record the attached documents or the new address(es) below.
Name of conveying party(ies)	2. Name and address of receiving party(ies)
	Name: Crossroads Systems, Inc.
Geoffrey B. Hoese Jeffry T. Russell	Internal Address:
Johny T. Maccon	
Additional name(s) of conveying party(ies) attached? Yes X No	
3. Nature of conveyance/Execution Date(s):	Street Address: 9390 Research Blvd.,
Execution Date(s) December 22, 1997	Suite II-300
Assignment Merger	City: Austin
Security Agreement Change of Name	Olty,Austin
Joint Research Agreement	State:Texas
Government Interest Assignment	Country: USA Zip: 78759
Executive Order 9424, Confirmatory License	odulity.
Other	Additional name(s) & address(es) attached? Yes No
5. Name and address to whom correspondence	ttached? Yes No 6. Total number of applications and patents
concerning document should be mailed:	involved:_1
Name: Sprinkle IP Law Group (Cust. No. 44654)	7. Total fee (37 CFR 1.21(h) & 3.41) \$ 40.00
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The second print of process	Authorized to be charged to deposit account
Street Address: 1301 W. 25th Street, Suite 408	Enclosed
	None required (government interest not affecting title)
City: Austin	8. Payment Information
State: Texas Zip: 78705	
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Fax Number: 512-371-9088	
Email Address:	Authorized User Name: Ari G. Akmal
9. Signature:	3.10/1
Signature	Date
Ari G. Akmal (Reg. No. 51,388) Name of Person Signing	Total number of pages including cover sheet, attachments, and documents:
Name of Person Signing	Annah annah bilanta and da annah an

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Mail Stop Assignment Recordation Services, Director of the USPTO, P.O.Box 1450, Alexandria, V.A. 22313-1450

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 221 of 225

ASSTGNMENT

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.

Case 1:13-cv-00895-SS Document 31-18 Filed 04/09/14 Page 222 of 225

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)	Texas
. Date	12/22/97
Date:	12/27/57
Date Application Executed:	12/29/1
	Malle Thulf
Signature of second Inventor: Inventor's Name:	Jeffy P. Russell
	Jeffey P. Russell Cibolo, Guadalupe County, Texas

Date Application Executed:



UNITED STATES PATENT AND TRADEMARK OFFICE

UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

MARCH 31, 2011

PTAS . . .

SPRINKLE IP LAW GROUP 1301 W. 25TH STREET SUITE 408 AUSTIN TX 78705



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PLEASE REVIEW ALL INFORMATION CONTAINED ON THIS NOTICE. THE INFORMATION CONTAINED ON THIS RECORDATION NOTICE REFLECTS THE DATA PRESENT IN THE PATENT AND TRADEMARK ASSIGNMENT SYSTEM. IF YOU SHOULD FIND ANY ERRORS OR HAVE QUESTIONS CONCERNING THIS NOTICE, YOU MAY CONTACT THE EMPLOYEE WHOSE NAME APPEARS ON THIS NOTICE AT 571-272-3350. PLEASE SEND REQUEST FOR CORRECTION TO: U.S. PATENT AND TRADEMARK OFFICE, MAIL STOP: ASSIGNMENT SERVICES BRANCH, P.O. BOX 1450, ALEXANDRIA, VA 22313.

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

P.O. Box 1450, Alexandria, Virginia 22313-1450 - www.uspto.gov

**USPTO Case 1:13-cv-00895/55/2010 Thield \$1-18 PAGE 04/09914 PAGE 224 07225 TO:SPRINKLE IP LAW GROUP IPANY:1301 W. 25TH STREET

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

TO:SPRINKLE IP LAW GROUP (PANY:1301 W. 25TH STREET

MAR-16-2011 WED 12:42 PM

FAX NO.

P. 02

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PATENTS ONLY				
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Name of conveying party(ies)	2. Name and address of receiving party(ies)			
Geoffrey B. Hoese	Name: Crossroads Systems, Inc.			
Jeffry T. Russell	Internal Address:			
Additional name(s) of conveying party(ies) attached? Yes 🔀 N				
3. Nature of conveyance/Execution Date(s):	Street Address: 9390 Research Blvd.			
Execution Date(s) December 22, 1997	Suite II-300			
Security Agreement Change of Name	City: Austin			
☐ Joint Research Agreement☐ Government Interest Assignment	State: Texas			
Executive Order 9424, Confirmatory License	Country: USA Zip: 78759			
Other				
4 4 4 12 - 41	Additional name(s) & address(es) attached? Yes No			
A. Patent Application No.(s)	document is being filed together with a new application. B. Patent No.(s)			
12/690,592 (CROSS1120-33)				
(3.10031120-33)				
Additional numbers atta	ached? Yes No			
5. Name and address to whom correspondence	6. Total number of applications and patents			
concerning document should be mailed: Name: Sprinkle IP Law Group (Cust. No. 44654)	involved: 1			
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Street Address: 1301 W. 25th Street, Suite 408	Enclosed			
Oh. North	None required (government interest not affecting title)			
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*May 23, 2006

(12) United States Patent Hoese et al.

STORAGE ROUTER AND METHOD FOR

(75) Inventors: Geoffrey B. Hoese, Austin, TX (US); Jeffry T. Russell, Cibolo, TX (US)

PROVIDING VIRTUAL LOCAL STORAGE

(73) Assignee: Crossroads Systems, Inc., Austin, TX (US)

(*) Notice: Subject to any d

(54)

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

See application file for complete search history.

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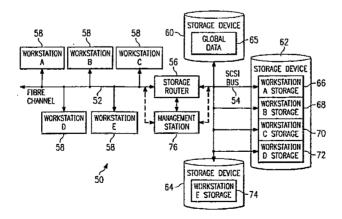
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Primary Examiner—Christopher Shin (74) Attorney, Agent, or Firm—Sprinkle IP Law Group

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 media. 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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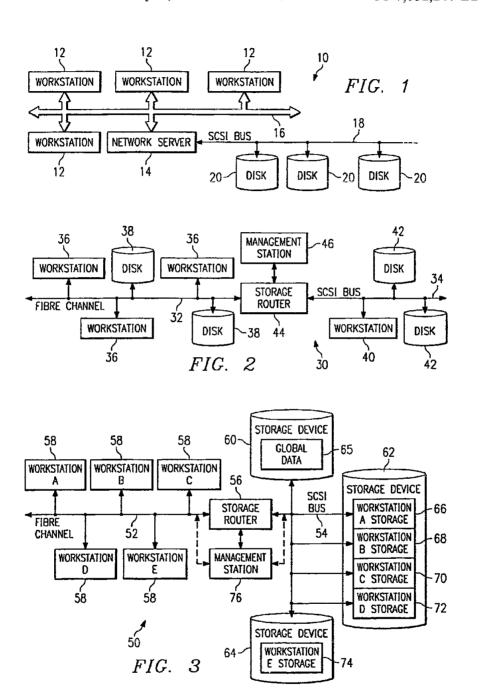
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U.S. Patent

May 23, 2006

Sheet 1 of 2

US 7,051,147 B2

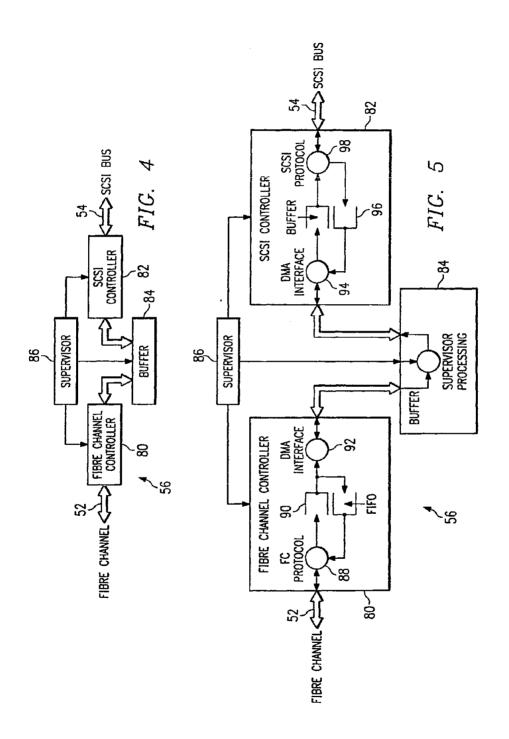


U.S. Patent

May 23, 2006

Sheet 2 of 2

US 7,051,147 B2



1

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 Jeffry T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on Feb. 22, 2002, now U.S. Pat. 10 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 Jeffry 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 15 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 25 storage devices to Fibre Channel devices.

BACKGROUND OF THE INVENTION

Typical storage transport mediums provide for a relatively 30 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. 35 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 40 Flysical 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 45 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 55 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 60 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, 65 the access is much slower than access to data on a local storage device

2

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;

1

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 20 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 25 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, 30 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, 35 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 40 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 4 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 55 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 embodi- 60 ment 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

4

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

i

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 15 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 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 so 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 of 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 65 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 10BaseT port, i.e. twisted pair Ethernet, for management access. The SCSI port of the storage router an 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 protocools.

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 state 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 or 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 suse 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

7

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 5 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 10 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 sunits. Thus, the prioritized addressing scheme used by SCSI 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.

8

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.

40 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 15 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:

- 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 30 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 40 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 50 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 55 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;

- 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 'ransport 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.

11

- 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 5 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 10 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 20 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 35 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 45 and the second controller further comprise a single controller.
- ${\bf 21}.\,A$ system for providing virtual local storage on remote storage devices, comprising:
- a first controller operable to connect to and interface with 50
 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 60 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 65 one storage device using native low level, block protocol in accordance with the map.

12

- 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.
 - ${\bf 34}.$ 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;

13

- a second transport medium operable according to the Fibre Channel protocol, wherein the second transport medium connects the second controller to the storage
- 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 configura- 10 tion 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:
 - 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.
- 36. The system of claim 35, wherein the configuration comprises a map from a host device ID to a virtual LUN a supervisor unit coupled to the first controller and the 5 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 maintain a configuration that maps from the host device to 15 and the second controller further comprise a single control-



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(12) United States Patent Hoese et al.

(54) STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

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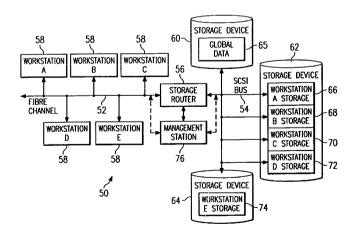
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(57)ABSTRACT

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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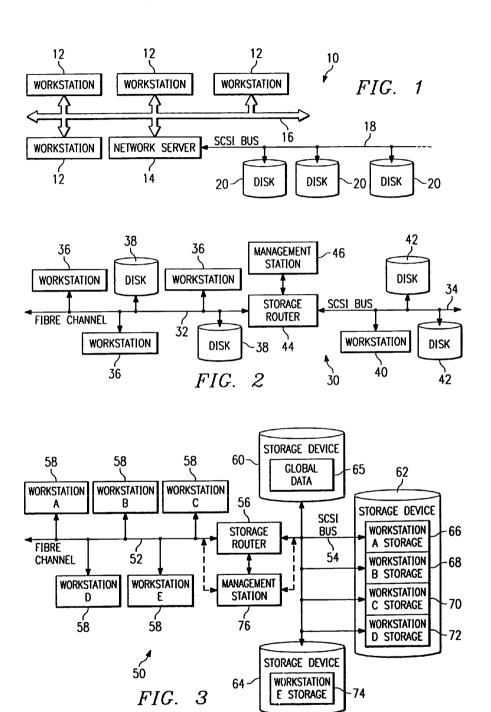
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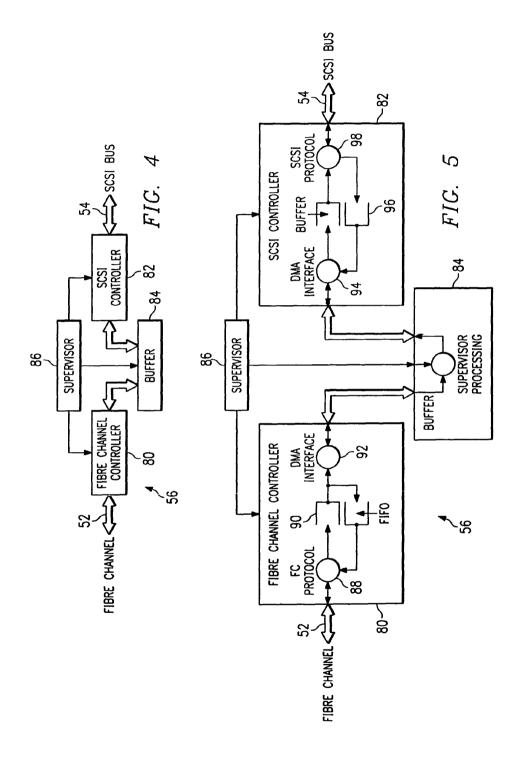
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U.S. Patent May 23, 2006 Sheet 1 of 2 US 7,051,147 B2



May 23, 2006



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 Jeffry T. Russell, entitled "Storage Router and Method for Providing Virtual Local Storage" filed on Feb. 22, 2002, now U.S. Pat. 10 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 Jeffry 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 15 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 25 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. 35 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 40 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 45 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 50 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 55 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 60 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, 65 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 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:

3

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 1s 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 25 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 4 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 50 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 55 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 6 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 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

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 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 60 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 65 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 10BaseT port, i.e. twisted pair Ethernet, for management access. The SCSI port of the storage router an 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 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).

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

NetApp Ex. 1009, pg. 1215

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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 55 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 65 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-

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 15 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 30 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 40 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 50 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 55 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;

- 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.

NetApp Ex. 1009, pg. 1217

1

- 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 10 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 25 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 35
- 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 45 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 50 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 60 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 65 one storage device using native low level, block protocol in accordance with the map.

- 12
- 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;

13

- 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 5 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 15 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
- 39. The apparatus of claim 34, wherein the first controller and the second controller further comprise a single controller

* * * * *

Case 1:13-cv-00895-SS__Document 31-20 Filed 04/09/14 Page 17 of 253 Please type a plus sign (+) inside this box + PTO/SB/05 (2/98) UTILITY Attorney Docket No. CROSS1120-13 PATENT APPLICATION First Inventor or Application Identifier Geoffrey B. Hoese TRANSMITTAL Title Storage Router and Meth df r Providing Virtual (Only for nonprovisional applications under 37 CFR § 1.53(b)) Express Mail Label No. EV351125056US **Box Patent Application APPLICATION ELEMENTS** ADDRESS TO: Assistant Commissioner for Patents See MPEP chapter 600 concerning utility patent application contents. Washington, D.C. 20231 1. Fee Transmittal for FY 2003 Microfiche Computer Program (Appendix) 6. (Submit an original and a duplicate for fee processing) Nucleotide and Amino Acid Sequence Submission Specification 2. [Total Pages] 7. X 28 (preferred arrangement set forth below) (if applicable, all necessary) Computer-Readable Copy Descriptive Title of the Invention ☐ Cross References to Related Applications Paper Copy (identical to computer copy) b. Statement Regarding Fed Sponsored R & D Statement verifying identity of above copies Description of Related Art □ Field of the Invention Summary of the Invention □ Brief Description of the Drawings (if filed) ACCOMPANYING APPLICATION PARTS Abstract of the Disclosure 8. Assignment Papers (cover sheet & document(s)) Power of Attorney X 9. Statement (when there is an assignee) Drawing(s) (35 USC 113) [Total Sheets] English Translation Document (if applicable) 10. 2 Oath or Declaration (executed) 11. 4 Statement (IDS)/PTO-1449 [Total Pages] Newly executed (original or copy) X 12. **Preliminary Amendment** Copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional with Box 17 completed) X X 13. Return Receipt Postcard **DELETION OF INVENTOR(S)** Statement filed in prior application, Small X 14. Status still proper and desired Signed statement attached deleting Entity inventor(s) named in the prior application, Certified Copy of Priority Document(s) 15. see 37 CFR 1.63(d)(2) and 1.33(b) Incorporation By Reference (useable if box 4b is checked). Other: Certificate of Mailing; Revocation and 5. 16. The entire disclosure of the prior application, from Power of Attorney; Acceptance of which a copy of the oath or declaration is supplied Revocation and POA 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 10/081,110 X Continuation Divisional Continuation-In-Part (CIP) of prior Application No.: Prior application information: Examiner Christopher B. Shin Group / Art Unit 2182 Claims the benefit of Provisional Application No. **CORRESPONDENCE ADDRESS:** Gray Cary Ware & Freidenrich LLP Customer No. : 1221 South MoPac Expressway, Suite 400 Austin, TX 78746-6875 Tel. (512) 457-7142 25094 Fax. (512) 457-7001 TYPED OF PRINTED NAME John L. Adair REGISTRATION NO. 48,828 SIGNATURE DATE: September ________, 2003

Gray Cary\AU\4113226.1 103671-990000

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE **CERTIFICATE OF MAILING BY "EXPRESS MAIL"** Atty Docket No. CROSS1120-13 In the Application of: Geoffrey B. Hoese, et al. Date Filed: Mail Stop: Patent Application Commissioner for Patents September 9, 2003 P.O. Box 1450 Title: Alexandria, VA 22313 Storage Router and Method for Providing Virtual **Local Storage** Sir:

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

Janiel Pampels

Janiel Pampels

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0	FEE TRANSMITTAL for FY 2003 Effective 01/01/2003. Patent fees are subject to annual revision. Applicant claims small entity status. See 37 CFR 1.27		Complete if Known						
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	ਰੂ Effective 01/01/2003. Patent fees are subject to annual revision.		First Named Inventor	Geoffrey B. Hoese					
			Examiner Name	Unknown					
Ø	Applicant claims small entity	status. See 37 CFR 1.27	Art Unit	Unknown					
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METHOD OF PAYMENT (check all that apply)	FEE CALCULATION (continued)					
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Denosit	1051	130	2051	65	Surcharge - late filing fee or cath	
Account Name Gray Cary Ware & Freidenrich LLP	1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
The Commissioner is authorized to: (check all that apply)	1053	130	1053	130	Non-English specification	
	1812	2,520	1812	2,520	For filing a request for ex parte reexamination	
☐ Charge any additional fee(s) during the pendency of this application	1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
Charge fee(s) indicated below, except for filling fee	1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
to the above-identified deposit account.	1251	110	2251	55	Extension for reply within first month	
FEE CALCULATION	1252	410	2252	205	Extension for reply within second month	
1. BASIC FILING FEE	1253	930	2253	465	Extension for reply within third month	
Large Entity Small Entity	1254	1,450	2254	725	Extension for reply within fourth month	
Fee Fee Fee Fee <u>Fee Description</u> Code (\$) Code (\$) Fee Paid	1255	1,970	2255	985	Extension for reply within fifth month	
1001 750 2001 375 Utility filing fee 375.00	1401	320	2401	160	Notice of Appeal	
1002 330 2002 165 Design filing fee	1402	320	2402	160	Filing a brief in support of an appeal	
1003 520 2003 260 Plant filing fee 1004 750 2004 375 Reissue filing fee	1403	280	2403	140	Request for oral hearing	
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		110	2452	55	Petition to revive - unavoidable	
SUBTOTAL (1) (\$) 375.00	1453	1,300	2453	650	Petition to revive - unintentional	
2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE Fee from	1501	1,300	2501	650	Utility issue fee (or reissue)	
Extra Claims below Fee Paid Total Claims 39 -20** = 19 X 9 = 171.00	1502	470	2502	235	Design issue fee	
Independent 7 -3**= 4 X 42 = 168.00	1503	630	2503	315	Plant issue fee	
Claims	1460	130	1460	130	Petitions to the Commissioner	
Multiple Dependent X =	1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
Large Entity Small Entity	1806	180	1806	180	Submission of Information Disclosure Stmt	
Fee Fee Fee Fee Fee Description Code (\$) Code (\$)	8021	40	8021	40	Recording each patent assignment per	
1202 18 2202 9 Claims in excess of 20	1809	750	2809	375	property (times number of properties) Filing a submission after final rejection (37 CFR § 1.129(a))	
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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	1/2//			Date	September _ 5_ , 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. SC. 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.

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PATENT APPLICATION

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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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PATENT APPLICATION

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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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PATENT APPLICATION

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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 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

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PATENT APPLICATION

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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 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.

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PATENT APPLICATION

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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 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;

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;

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

rigure 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 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

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PATENT APPLICATION

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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 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 FIGURE 1 in that there is no network server involved. 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 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.

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PATENT APPLICATION

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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 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 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.

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.

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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PATENT APPLICATION

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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 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).

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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PATENT APPLICATION

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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 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 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

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PATENT APPLICATION

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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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PATENT APPLICATION

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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 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

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PATENT APPLICATION

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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 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 10BaseT port, i.e. twisted pair Ethernet, for management access. The SCSI port of the storage router an 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,

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PATENT APPLICATION

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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 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

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PATENT APPLICATION

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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. 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 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

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PATENT APPLICATION

17

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

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PATENT APPLICATION

18

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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PATENT APPLICATION

19

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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PATENT APPLICATION ...

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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 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.

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PATENT APPLICATION

22

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.

PATENT APPLICATION

23

WHAT IS CLAIMED IS:

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 A storage router for providing virtual local storage on remote SCSI storage devices to Fibre Channel devices, comprising:

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;

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:

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

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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PATENT APPLICATION

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24

- 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.
- 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:
 - 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 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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PATENT APPLICATION

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the internal buffer and to the buffer of the storage router.

- 7. A storage network, comprising:
- 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 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 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

- 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.
- 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.

PATENT APPLICATION

26

- 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;
 - 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;
 - 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
 - a supervisor unit coupled to the Fibre Channel controller, the SCSI controller and the buffer, the supervisor unit operable:

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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PATENT APPLICATION.

27

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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PATENT APPLICATION

28

STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE

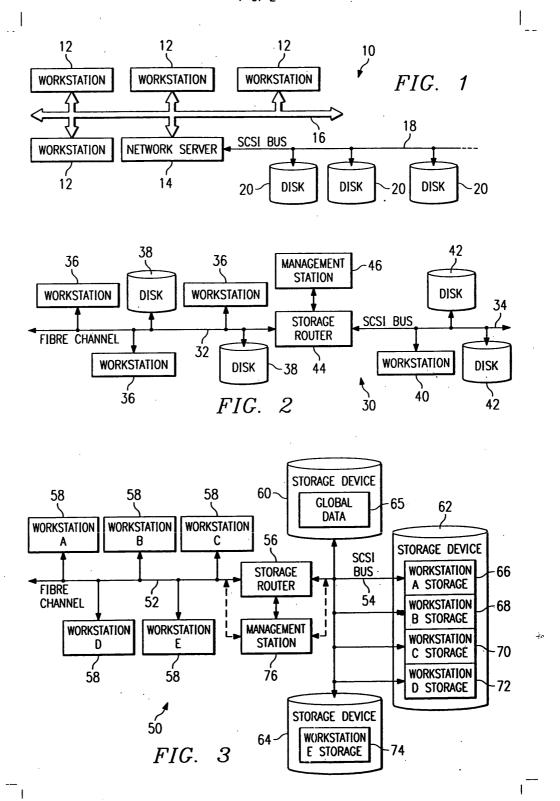
5 ABSTRACT OF THE DISCLOSURE

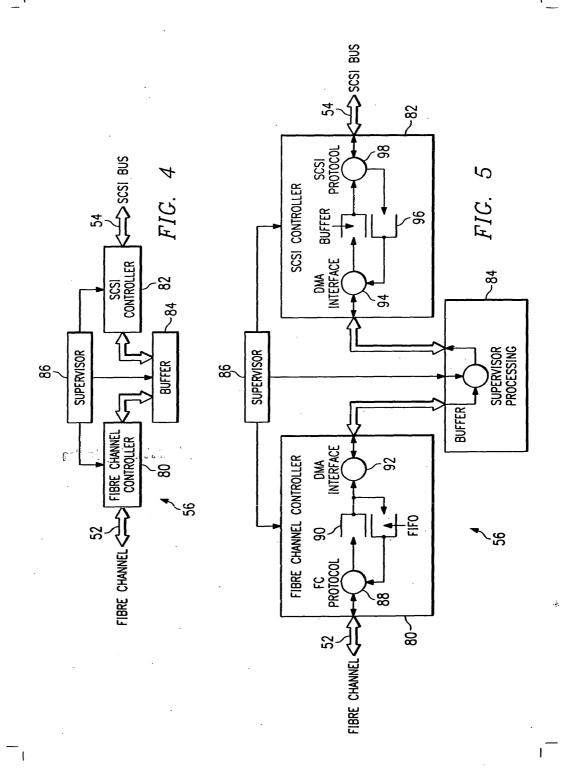
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A storage router (56) and storage network (50) provide virtual local storage on remote SCSI storage devices (60, 62, 64) to Fibre Channel devices. A plurality of Fibre Channel devices, such as workstations (58), are connected to a Fibre Channel transport 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 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.





PATENT

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

beated below here 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):			
<u>X</u> 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:			
Priority Date Claimed			
Number Country Filed (Yes) (No)			
None.			
•			
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PATENT

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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:

Application
Serial Number Date Filed Status

None.

I hereby appoint:

Jerry W. Mills	Reg.	No.	23,005
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AUS01:123882.1

PATENT

3

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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:	<u>Direct Telephone Calls To</u> :
Baker & Botts, L.L.P.	Anthony E. Peterman
2001 Ross Avenue	at (512) 322-2599
Dallas, Texas 75201-2980	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

PATENT

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Geoffrey B. Hoese

Inventor's signature

Date

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(AT: ORNEY'S DOCKET 064113:0103)895-SS Document 31-20 Filed 04/09/14 Page 54 of 253

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131,72	FORM COVER SHEET NTS ONLY	U.S. DEPARTMENT OF COMMERCE Patent and Trademark Office	
To the Honorable Commissioner of Patents and Trademark		original documents or copy thereof.	
Name and Address of Conveying Party(ies):	2. Name and Address of a		
Geoffrey B. Hoese	Name: Crossroads Systems, Inc.		
1904 Ann Arbor Avenue	Internal Address: Suite II-300		
Austin, Texas 78704		9390 Research Blvd.	
☐ Individual/Citizenship: <u>United States of America</u>		Austin	
Additional name(s) of conveying party(ies) attached? X Yes No	State/Zip	Texas 78759	
3. Nature of conveyance:			
X Assignment Merger Security Agreement Change of Name	■ Corporation/State		
Other	Additional name(s) & addr	ress(es) Yes X No	
Execution Date: December 22,1997	attached?		
4. Application number(s) or patent number(s):			
If this document is being filed together with a new application	, the execution date of the a	pplication is: <u>December 22, 1997</u>	
A.	B. Patent No.(s)		
Additional Numbers	attached?	Yes x No	
5. Name and address of party to whom correspondence	6. Total number of application	ations and patents involved: 1	
concerning document should be mailed:			
Name: Anthony E. Peterman	7. Total Fee (37 CFR 3.4	1): \$40.00	
Internal Address: Baker & Botts, L.L.P.	X Enclosed		
Street Address: 2001 Ross Avenue		to be charged to deposit account	
City/State/Zip Dallas, Texas 75201-2980	8. Deposit account numbe		
		y of this page if paying by deposit account)	
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 Statement and signature. To the best of my knowledge and belief, the foregoing inform 	ation is true and correct and	any attached copy is a true copy of the	
original document.	-01	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1	
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Anthony E. Peterman	4/8	December 31, 1997	
Name of Person Signing Signature	•	Date	
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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

ATTORNEY DOCKET N 79.

PATENT

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.

AUS01:123886.1

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 57 of 253

NT APPLICATION

2

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:

Date Application Executed:

12/22/97

12/22/97

Signature of second Inventor: Inventor's Name:

Residence (City, County, State)

entry z. Russell

Cibolo, Guadalupe County,

Texas

Date:

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

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

CERTIFICATION UNDER 37 CFR §1.8

envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231

Pahasas Marrison

Rebecca Morrison

4-15-98

Date

Assistant Commissioner of Patents

Washington, D.C. 20231

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	Registration No. 33,402
STEPHEN E. REITER	Registration No. 31,192
GREGORY P. RAYMER	Registration No. 36,647
DAVID F. KLEINSMITH	Registration No. 40,050
BARRY N. YOUNG	Registration No. 27,774
TIMOTHY W. LOHSE	Registration No. 35,255
STANLEY H. KIM	Registration No. 40,047

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 59 of 253

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 aboveidentified 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,

Chief Technical Officer

AU\4001078.1 103671-991120 (ATTORNEY'S DOCKET 064113.0103) FORM PTO-1595 Case 1.13-cv-00895-SS Document 31-20 Filed 04/09/14. DEPARTMENT OF COMMERCE Patent and Trademark Office RECORDATION FORM COVER SHEET 1-31-92 PATENTS ONLY To the Honorable Commissioner of Patents and Trademarks. Please record the attached original documents or copy thereof. 2. Name and Address of receiving Party(ies): 1. Name and Address of Conveying Party(ies): Crossroads Systems, Inc. Geoffrey B. Hoese 1904 Ann Arbor Avenue Suite II-300 Internal Address: Austin, Texas 78704 9390 Research Blvd. Street Address: United States of America □ Individual/Citizenship: ___ City: Austin Additional name(s) of conveying party(ies) attached? State/Zip Texas 78759 _ Yes _ No 3. Nature of conveyance: Assignment Merger □ Corporation/State _ Texas Change of Name Security Agreement Other Additional name(s) & address(es) No Yes Execution Date: December 22,1997 attached? 4. Application number(s) or patent number(s): B. Patent No.(s) A. Additional Numbers attached? Yes x No 6. Total number of applications and patents involved: 5. Name and address of party to whom correspondence concerning document should be mailed: 7. Total Fee (37 CFR 3.41): \$40.00 Name: Anthony E. Peterman Internal Address: Baker & Botts, L.L.P. Х Enclosed Authorized to be charged to deposit account Street Address: 2001 Ross Avenue 8. Deposit account number: City/State/Zip Dallas, Texas 75201-2980 (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. December 31, 1997 Anthony E. Peterman Signature Name of Person Signing Date Total number of pages including cover sheet OMB No. 0651-0011 (exp.4/94) Do not detach this portion Mail documents to be recorded with required cover sheet information: Commissioner of Patent and Trademarks **Box Assignments** Washington, D.C. 20231 ats regarding this burden esti ate to the U.S. Patent a

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 61 of 253

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.

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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)	Texas
Date:	12/22/97
Date Application Executed:	12/22/97
Signature of second Inventor:	Jelly Thulf
Inventor's Name:	Jethny 7. 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 Atty. Docket No. PRELIMINARY AMENDMENT CROSS1120-13 Applicants: Goeffrey B. Hoese, et al. Application Number Filed Unknown September 9, 2003 For: Storage Router and Method for Providing Virtual **Local Storage** Group Art Unit Confirmation Number: Unknown Unknown

Mail Stop: Patent Application

Commissioner for Patents Alexandria, VA 22313

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 in an envelope addressed to: Mail Stop: Patent Application, Commissioner for Patents, Alexandria, VA 22313 on September 7, 2003.

Janu Pampel

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.

Gray Cary\AU\4113229.1 103671-990000 Attorney Docket No. CROSS1120-13

Continuation Application
Customer ID: 25094

2

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 Gray Cary\AU\4113229.1 103671-990000

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 66 of 253

Attorney Docket No. CROSS1120-13

Continuation Application Customer ID: 25094

3

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.

Gray Cary\AU\4113229.1 103671-990000 Attorney Docket No. CROSS1120-13

Continuation Application Customer ID: 25094

4

- (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 Gray Cary\AU\4113229.1 103671-990000

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 68 of 253

Attorney Docket No. CROSS1120-13

Continuation Application Customer ID: 25094

5

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.

Gray Cary\AU\4113229.1 103671-990000 Attorney Docket No. CROSS1120-13

Continuation Application
Customer ID: 25094

6

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.

Gray Cary\AU\4113229.1 103671-990000 Attorney Docket No. CROSS1120-13

Continuation Application Customer ID: 25094

7

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

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 71 of 253

Attorney Docket No. CROSS1120-13

Continuation Application Customer ID: 25094

8

34. (New) The apparatus of Claim 28, wherein the first controller and the second controller further comprise a single controller.

Attorney Docket No. CROSS1120-13

Continuation Application Customer ID: 25094

9

- 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.

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 73 of 253

Attorney Docket No. CROSS1120-13

10

Continuation Application Customer ID: 25094

- 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.

Attorney Docket No. CROSS1120-13

Continuation Application Customer ID: 25094

11

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;

12

Attorney Docket No. CROSS1120-13

Continuation Application Customer ID: 25094

- 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.

Attorney Docket No. CROSS1120-13

Continuation Application Customer ID: 25094

13

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 ________, 2003

1221 South MoPac Expressway

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Case 1:13-cv-00895, SS, Document 31-20 Filed 04/09/14 Page 77 of 253 Address: COMMISSIONER OF PATENTS AND TRADEMARKS Washington, D.C. 20231

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*U.S. Government Printing Office: 2002 — 489-267/69033

PATENT	APPLICATION	SERIAL NO.	
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
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APPLICANT

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Applicants: Geomrey B. Ho	ese, et al.
Application Number	Filed
10/658,163	Septemb r 9, 2003
For:	
Storage Router and Metho	od for Providing Virtual
Local Storage	
Group Art Unit	Confirmation Number
Unknown	Unknown
Application No.	Filing Date of Parent
(10/658,163)	September 9, 2003
Group Art Unit of Parent	Examiner of Parent
2182	Christopher Shin

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.

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.

AU\4115815.1 103671-990004 ATTORNEY DOCKET NO September 31-20 Filed 04/09/14 Page 82 of 253 CROSS1120-13

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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

Dated: October //e, 2003

John L. Adair Reg. No. 48,828

1221 S. MoPac Expressway, Suite 400

Austin, Texas 78746 Tel. (512) 457-7142 Fax. (512) 457-7001

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Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 83 of 253

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<u> </u>	A1	5,748,924					05/0	5/98	Llorens, et al.			
	A2	5,768,623					06/1	6/98	Judd, et al.			
	A3	5,809,328					09/1	5/98	Nogales, et al.			
	A4	5,812,754					09/2	2/98	Lui, et al.			
	A5	5,835,496					11/1	0/98	Yeung, et al.			
	A6	5,848,251					12/0	8/98	Lomelino, et al.			
	A7	5,941,972					08/2	4/99	Hoese, et al.			
A-1-1-1	A8	6,041,381					03/2	1/00	Hoese			
	A9	6,145,006		ALL PROPERTY.			11/0	7/00	Vishlitsky et al.			
	A10	6,219,771		\$75(\$1) .		B1	04/1	7/01	Kikuchi et al.			
	A11	6,260,120				B1	07/1	0/01	Blumenau et al.			
	A12	3,082,406					03/1	9/63	L.D. Stevens			
	A13	4,092,732					05/3	0/78	Ouchi			
	A14	4,947,367					08/0	7/90	Chang et al.			
	A15	5,072,378					12/1	0/91	Manka			
	A16	5,465,382					11/0	7/95	Day, III et al.			
	A17	5,947,530					10/2	6/99	Young			
	A18	6,529,996				B1	03/0	4/03	Nguyen et al.			
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	B1	EP 082705	59			A2	 	04/98	NEC Corporation	_		
	B2	JP 8-23089	95				09/1	0/96	Kikuchi et al.			
	В3	WO 99/3429	97			A1	07/0	8/99	Crossroads Systems, Inc.			
	B4	EP 0810 53	0			A2	12/0	3/97	Sun Microsystems, Inc.			
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Gray Cary\AU4115816.1 103671990004

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	A19 5,864,653				01/2	6/99	Tavallaei et al.					
	A20	6,070,253					05/3	0/00	Tavallaei et al.			
	A21	5,884,027					03/1	6/99	Garbus et al.			
	A22	6,131,119					10/1	0/00	Fukui			
	A23	5,729,705					03/1	7/98	Weber			
<u> </u>	A24	5,751,975					05/1	2/98	Gillespie et al.			
	A25	5,680,556					10/2	1/97	Begun et al.			
	A26	5,581,714					12/0	3/96	Amini et al.			
	A27	5,774,683					06/3	0/98	Gulick			
	A28	6,330,629				B1	12/1	1/01	Kondo et al.			
	A29	5,845,107					12/0	1/98	Fisch et al.			
	A30	4,695,948					09/2	22/87	Blevins et al.			
	A31	5,598,541		-			01/2	8/97	Malladi			
	A32	5,163,131					11/1	0/92	Row et al.			
	A33	5,414,820					10/0	9/95	McFarland et al.			
	A34	5,857,080					01/0	5/99	Jander et al.			
-	A35	5,941,969					08/2	4/99	Ram et al.			
	A36	6,223,266				B1	04/2	24/01	Sartore			
	A37	5,991,797					11/2	23/99	Futral et al.			
	A38	5,257,386					 	6/93	Saito			
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-	A40	5,347,384				09/1	3/94	McReynolds et al.		
	A41	5,423,044				06/0	6/95	Sutton et al.		
	A42	5,239,643				08/2	24/93	Blount et al.		
	A43	5,712,976				01/2	7/98	Falcon, Jr. et al.		
	A44	5,596,736				01/2	1/97	Kerns		
	A45	6,141,737				10/3	1/00	Krantz et al.		
	A46	4,751,635				06/1	4/88	Kret		
	A47	5,596,562				06/2	1/97	Chen		
	A48	6,363,462			B1	03/2	6/02	Bergsten		
	A49	6,134,617				10/1	7/00	Weber		
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Gray Cary\AU\4115816.1 103671-990004





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 September 9, 2003

For

Storage Router and Method for Providing Virtual

Local Storage

Group Art Unit Examiner

Unknown

Unknown

Filed

Confirmation Number:

Unknown

Via Facsimile (703) 306-5404 and

10658163

Express Mail

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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 No. EV351127304US in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on November 21, 2003.

Katherin Cope

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\AU\4117803.1 103671-990004 Attorney Docket No. CROSS1120-13

2

10/658,163 Customer ID: 25094

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

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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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' abovereferenced 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

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Gray Cary\AU4121171.1 103671990004

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Application Number	10/658,163
Filing Date	September 9, 2003
FirstNamed/inventor	Geoffrey B. Hoese, et al.
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Examiner	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

APR 1 2 2004

Applicants
Geoffrey B. Hoese, et al.

Application Number | Filed |
10/658,163 | September 9, 2003

For | STORAGE ROUTER AND METHOD FOR PROVIDING VIRTUAL LOCAL STORAGE |
Group Art Unit | Examiner |
2186 | Unknown

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

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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' abovereferenced 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: //pnl / / // 1221 S. MoPac Expressway, Suite 400

Austin, Texas 78746 Tel. (512) 457-7142 Fax. (512) 457-7001

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Gray Cary\AU4125650.1 103671990004

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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

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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Laura M. (MgGuire

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' abovereferenced 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: //

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Austin, Texas 78746 Tel. (512) 457-7142 Fax. (512) 457-7001

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT WAN 0.3 2004 Sheet of 1					Appli	Application Number		PTO/SB/08A (04-0 10/658,163		
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Examiner	Cite	FOREIGN PATENT DOCUMENTS					1	Publication Date	Name of Patentee or Applicant of Cited	
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Gray Cary\AU4126770.1 103671990004 Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 97 of 253

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GRAY CARY-AUSTIN

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

MAY 1 8 2004

Supplement to Petition to Make Special Filed 11/21/03

Atty. Docket No. CROSS1120-13

Applicants: Goeffrey B. Hoese, et al. Application Number

Filed

September 9, 2003

10/658,163 For:

Storage Router and Method for Providing Virtual

Local Storage

Confirmation Number: Group Art Unit

Via Facsimile 703-872-9306 Mail Stop: Patent Application

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313

Dear Sir:

Certification Under 37 C.F.R. §1.18

I hereby certify that this correspondence is being facsimile transmitted to the United States Patent and Trademark Office on

May 18, 2004

On May 18, 2004, Geoffrey Gaffin 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 & Freidefifich 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\AU\4128082.1 103671-990004

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PAGE 2/4 * 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

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MAY 1 8 2004

1221 S. MoPac Expressway, Suite 400 Austin, TX 78746-6875 www.graycary.com O] 512-457-7142 F] 512-457-7001

FAX TRANSMISSION COVER SHEET

May 18, 2004

To:

Re:

Telephone:

Fax Number:

Commissioner for Patents

703-872-9306

From: John L. Adair Client-Matter Number:

103671.990004 CROSS1120-13

512-457-7142

Supplement to Petition to Make Special Filed 11/21/03

Pages: - 4 - (including this form)

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PAGE 1/4 * 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



IN THE UNITED STATES	PATENT AND TRADEMA	RK OFFICE	
DECLARATION BY ROBERT GRISV PETITION TO MAKE SPECIAL BE INFRINGEMEN	CAUSE OF ACTUAL	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	Examîner Unknown	

Unknown

VIA FACSIMILE (703) 306-5404 and

Express Mail

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 No. EV351127304US in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on November 21, 2003.

Katherin Cope

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:

- 1. 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.
- 2. 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.
 - 3. I have become aware that an infringing device is currently on the market.

Gray Cary\AU\4117814.1 103671-990004 BEST AVAILABLE COPY.

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

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 100 of 253

05/18/04 17:37 FAX 512 457 7070

GRAY CARY-AUSTIN

Attorney Docket No. CROSS1120-13

10/658,163 Customer ID: 25094

2

- I have made a rigid comparison of the infringing device with the storage router 4. claims of the present application and it is my opinion that at least one of the claims is unquestionably infringed.
 - 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 Cary\AU\4117814.1 103671-990004

PAGE 4/4 * 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



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NOV 2 6 2004

John L. Adair GRAY, CARY, WARE & FREIDENRICH LLP 2000 University Avenue E. Palo Alto CA 94303-2248

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

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 102 of 253

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.

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10658163_CLS Most Frequently Occurring Classifications of Patents Returned From A Search of 10658163 on January 12, 2005

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Original Classifications
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  7 711/112
  5 710/305
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  4 709/226
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Cross-Reference Classifications
15 711/114
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 8 710/5
 8 714/6
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Page 1

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Page 2

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Page 3

10658163_CLS

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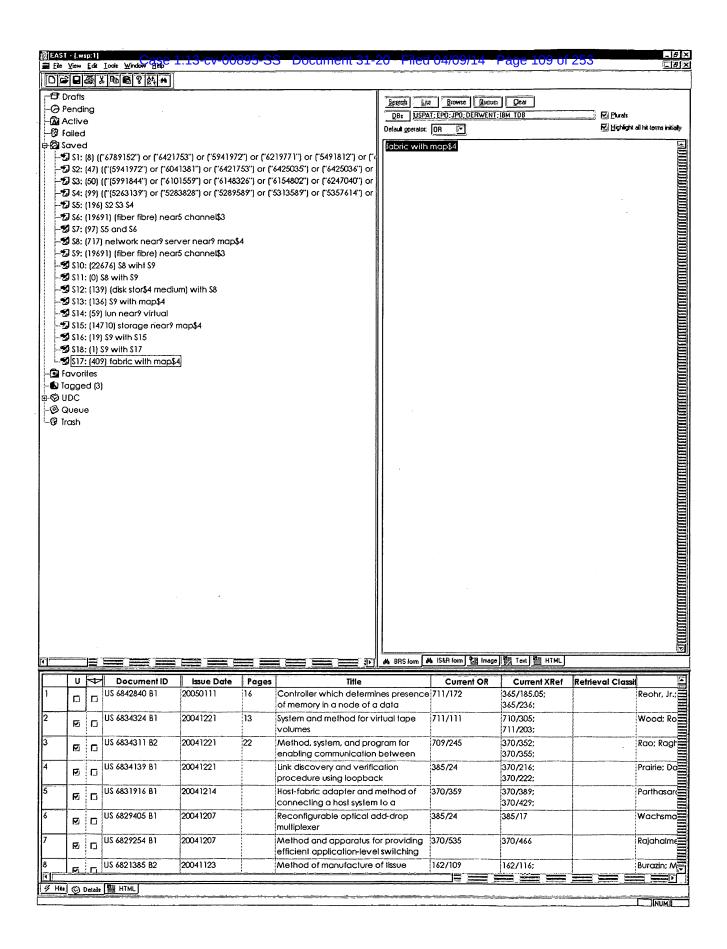
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United States Patent and Trademark Office



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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
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	R RUDNICK GRAY C	ARY US, LLP	SHIN, CHRIS	STOPHER B
	sity Avenue , CA 94303-2248		ART UNIT	PAPER NUMBER
	,		2182	
			DATE MAILED: 01/27/200	5

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

PTO-90C (Rev. 10/03)

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 111 of 253

	10 01 20 1 1100 0 1700711 1	4g0 111 01 200						
	Application No.	Applicant(s)						
Office Assistant Communication	10/658,163	HOESE ET AL.						
Office Action Summary	Examiner	Art Unit						
	Christopher B Shin	2182						
The MAILING DATE of this communication app Period for Reply	ears on the cover sh et with the c	orrespondence address						
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								
<u> </u>	action is non-final.							
3) Since this application is in condition for allowar closed in accordance with the practice under E								
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.							
Application Papers								
9) The specification is objected to by the Examine 10) The drawing(s) filed on <u>09 September 2003</u> is/a Applicant may not request that any objection to the Replacement drawing sheet(s) including the correct 11) The oath or declaration is objected to by the Ex	are: a) accepted or b) objec drawing(s) be held in abeyance. See ion is required if the drawing(s) is obj	e 37 CFR 1.85(a). jected to. See 37 CFR 1.121(d).						
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) Notice of References Cited (PTO-892) Notice of Draftsperson's Patent Drawing Review (PTO-948) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 2.4 & 5/2004.	4) Interview Summary Paper No(s)/Mail Da 5) Notice of Informal Po							

U.S. Patent and Trademark Office PTOL-326 (Rev. 1-04)

Office Action Summary

Part of Paper No./Mail Date 01212004

Art Unit: 2182

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.

Page 3

Art Unit: 2182

The drawings are objected to under 37 CFR 1.83(a) because they fail to show 3. 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 abevance.

Art Unit: 2182

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";

NetApp Ex. 1009, pg. 1317

Art Unit: 2182

. 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.

Art Unit: 2182

Claims 15-53 are rejected under 35 U.S.C. 112, first paragraph, as based on a 11. 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).

Claims 15-53 are rejected under 35 U.S.C. 112, first paragraph, because the 12. 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).

Page 7

Art Unit: 2182

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. Claim15-53 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. Claim15-53 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. Claim15-53 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. Claim15-53 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.

Art Unit: 2182

Page 8

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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January 21, 2005 CBS

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Part of Paper No. 01212004

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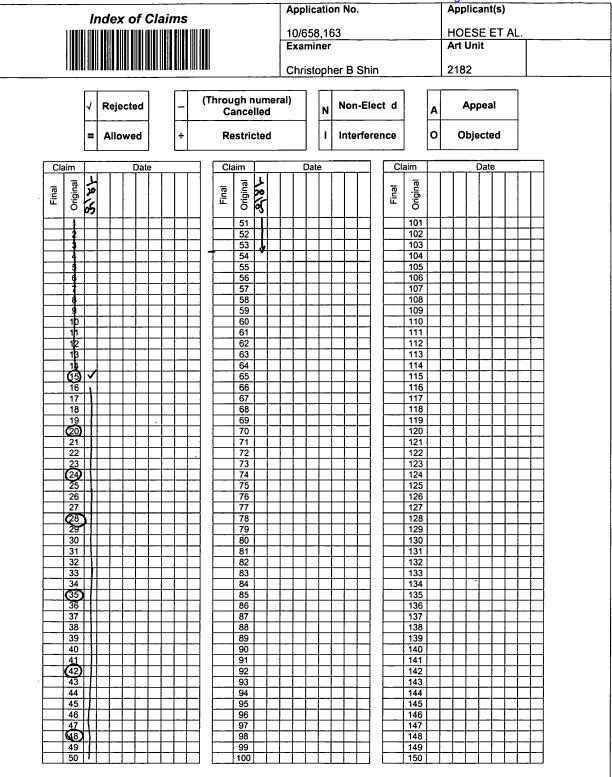
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UNITED STATES DEPARTMENT OF COMMERCE United States Patent and Trademark Office Address COMMISSIONER FOR PATENTS P.O. Dev 1450 Alexandra, Veginia 22313-1450 www.uspro.gov

BIBDATASHEET

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CONFIRMATION NO. 5675

SERIAL NUMBER 10/658,163	FILING DATE 09/09/2003 RULE	(CLASS 710	GRO	OUP ART L 2182	JNIT		RNEY DOCKET NO. DSS1120-13
APPLICANTS								
Geoffrey B. Hoe	ese, Austin, TX;							
Jeffry T. Russell	I, Cibolo, TX;							
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

INFORMATION DISCLOSURE STATEMENT BY APPLICANTS

Atty. Docket No. (Opt.) CROSS1120-13

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Applicant
Geoffrey B. Hoese, et al.

Application Number

Date Filed 09/09/2003

10/658,163Title

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 2005.

Janue Pampell

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.

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Respectfully submitted, Sprinkle IP Law Group Attorneys for Applicants

John L. Adair Reg. No. 48,828

Dated: July <u>/3</u>, 2005. 1301 W. 25th Street, Suite 408 Austin, TX 78705 T. 512-637-9220 / F. 512-371-9088

NetApp Ex. 1009, pg. 1333

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STATEMENT BY APPLICANT		First Named Inven	tor	Hoese, Geoffrey		
			Group Art Unit		2182	
			Examiner Name		Shin, Christopher	В.
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Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 136 of 253

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1			Examiner Name	Shin, Christophe	r B.
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Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 137 of 253

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			Filing Date	09/09/2003	
		ommerce	First Named Inventor	Geoffrey B. Hoese	
1	Patent and	Trademark Office	Group Art Unit	2182	
			Examiner Name	Shin, Christophe	r B.
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Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 141 of 253

·			Application Number	10/658,163	10/658,163	
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	_	ommerce Trademark Office	First Named Inventor	Geoffrey B. Hoes	Geoffrey B. Hoese	
	alent and	Trademark Office	Group Art Unit	2182		
			Examiner Name	Shin, Christopher B.		
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ARTIFACT SHEET

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Examples: 59123456PA, 59123456PB, 59123456ZA, 59123456ZB
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March 8, 2004

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CROSS1120-13

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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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IN THE UNITED STAT	ES PATENT AND TRADEMA	ARK OFFICE
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	Group Art Unit	Examiner
	2186	Unknown
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Commissioner for Patents	I hereby certify that this document is b	eing transmitted to COMMISSIONER
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I hereby state I am authorized to act o	n behalf of CROSSROADS SYS	rems, Inc.
	Respectfully sub	omitted,
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE Atty. Docket No. **REPLY TO OFFICE ACTION DATED 01/27/2005** CROSS1120-13 Geoffrey B. Hoese **Application Number** Date Filed JUL 2 7 2005 10/658,163 09/09/2003 Title Storage Router and Method for Providing Virtual **Local Storage** Group Art Unit Examiner 2182 Shin, Christopher B. Confirmation Number: 5675

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

Dear Sir:

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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.

10/658,163 Customer ID: 44654

2

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.

10/658,163 Customer ID: 44654

3

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.

Customer ID: 44654

10/658.163

4

- 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.

10/658,163 Customer ID: 44654

5

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. 6

- 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.

10/658,163 Customer ID: 44654

7

- 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.

10/658,163 Customer ID: 44654

8

- 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

10/658,163 Customer ID: 44654

10

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.

10/658,163 Customer ID: 44654

11

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 an 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.

10/658,163 Customer ID: 44654

12

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

10/658,163 Customer ID: 44654

13

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

14

10/658,163 Customer ID: 44654

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 <u>map contains a representation</u> 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

10/658,163 Customer ID: 44654

15

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

Customer ID: 44654

10/658,163

16

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

17

10/658,163 Customer ID: 44654

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 respectively 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.

10/658,163 Customer ID: 44654

18

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.

19

10/658,163 Customer ID: 44654

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 Attorneys for Applicant

John L. Adair Reg. No. 48,828

Date: July 27, 2005

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Exhibit A

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UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF TEXAS
AUSTIN DIVISION

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CROSSROADS SYSTEMS, (TEXAS), INC. §

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CHAPARRAL NETWORK STORAGE, INC.

CROSSROADS SYSTEMS, (TEXAS), INC. §

VS

7

NO. A 00 CA 248 SS

PATHLIGHT TECHNOLOGY, INC.

ORDER

BE IT REMEMBERED that on the 25th day of July 2000 the Court, in accordance with Marionan 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

21

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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 patentie 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

-2-

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

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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 (52) 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, oftrepeated 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

-4.

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."

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 ensuaring 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 "ensuared" 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. 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 devices"

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

-7-

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 7, Inc., 174 F.3d 1308, 1318 (Fed. Cir. 1999) ("[Wihen 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,

- 8 -

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

-9-

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.

VL "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

- 10 -

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.

-1-1-

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.

- 12 -

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 24 day of July 2000.

UNITED STATES DISTRICT JUDGE

- 14 -

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).

15

Case 1:13-cy-00825-SS ... Document 31-20 ... Filed 04/09/14. Bage 181 of 253

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.

- 16 -

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Exhibit B

	Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 184 of 253	
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Case 1:13-cv-00895-SS Document 28/-28 Filed 04/09/14 Page 185 of 253 # Ifw

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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

Examiner

2182

Shin, Christopher B

Confirmation No.

5675

Certification Under 37 C.F.R. §1.10

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

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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).

	Small Entity	Large Entity
First Month	\$ 60.00	\$ 120.00
Second Month	\$ 225.00	\$ 450.00
★ Third Month	\$ 510.00	\$ 1,020.00
Fourth Month	\$ 795.00	\$ 1,590.00
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

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Respectfully submitted,

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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 JUL 2 7 2005

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

5675

TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A PRIOR PATENT

Atty. Docket No. CROSS1120-13

Applicant
Geoffrey B, Hoese
Application Number
10/658,163
Title
Storage Router and Method for Providing Virtual
Local Storage
Group Art Unit
2182
Confirmation Number;

Commissioner for Patents P.O. Box 1460 Alexandria, VA 22313-1450

Dear Sir:

07/29/2005 CNGUYEN2 00000037 10658163

02 FC:1814

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Signature

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: 44654 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.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.
- 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 filling 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.

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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.

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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

Examiner

2182

Shin, Christopher B.

Confirmation Number:

5675

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Januia Pampell

Janice Pampell

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

Dear Sir:

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

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 193 of 253

Attorney Docket: CROSS1120-13 Customer ID: 44654 Application No. 10/658,163

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.

2

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.
- Terminal disclaimer fee under 37 C.F.R. 1.20(d) included.

Steven Sprinkle

Dated

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 194 of 253



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 N	0.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.		
10/658,163	0/658,163 09/09/2003		Geoffrey B. Hoese	CROSS1120-13	5675		
25094	7590	11/01/2005	•	EXAM	INER		
DLA PIP	ER RUDI	VICK GRAY CARY	Y US, LLP	SHIN, CHRISTOPHER B			
	ersity Ave			ART UNIT	PAPER NUMBER		
E. Paio Ai	to, CA 94	+303-2246		2182			
				DATE MAILED: 11/01/2004	•		

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

PTO-90C (Rev. 10/03)

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 195 of 253

	Application No.	Applicant(s)							
	10/658,163	HOESE ET AL.							
Office Action Summary	Examiner	Art Unit							
	Christopher B Shin	2182							
The MAILING DATE of this communication appe Period for Reply	ears on the cover sheet with the co	orrespondence address							
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 Ju	<u>ly 2005</u> .								
2a)⊠ This action is FINAL . 2b)⊠ This	action is non-final.								
3) Since this application is in condition for allowan	ce except for formal matters, pro	secution as to the merits is							
closed in accordance with the practice under E	x parte Quayle, 1935 C.D. 11, 45	3 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 withdraw	n from consideration.								
5) Claim(s) is/are allowed.									
6)⊠ Claim(s) <u>15-53</u> 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 <u>09 September 2003</u> is/a									
Applicant may not request that any objection to the o									
Replacement drawing sheet(s) including the correction									
11) The oath or declaration is objected to by the Ex	aminer. Note the attached Office	Action of form P1O-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	, , , ,	_							
* See the attached detailed Office action for a list of	of the certified copies not received	d. 							
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-1449 or PTO/SB/08) Paper No(s)/Mail Date 07252005.	4) Interview Summary (Paper No(s)/Mail Dai 5) Notice of Informal Pa 6) Other:								

U.S. Patent and Trademark Office PTOL-326 (Rev. 1-04)

Office Action Summary

Part of Paper No./Mail Date 10252005

Application/Control Number: 10/658,163 Page 2

Art Unit: 2182

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).

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 Page 3

Art Unit: 2182

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:

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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.
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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

hhh

October 26, 2005 cbs

NetApp Ex. 1009, pg. 1401

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STATEMENT BY APPLICANT			First Named Inven	tor	Hoese, Geoffrey	
			Group Art Unit		2182	
			Examiner Name		Shin, Christopher	B.
Sheet	1	OF 4	Attorney Docket N	umber	CROSS1120-13	
			U.S. PATENT DOC	UMENTS		
Examiner Initials	Cite No.	Document N	umber	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines Where Relevan Passages or Figures Appea
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			First Named Inventor	Geoffrey B. Hoese		
			Group Art Unit	2182		
		·	Examiner Name	Shin, Christophe	r B.	
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FOR		149 US Department of	Filing Date	09/09/2003	
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			Examiner Name	Shin, Christopher B.	
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		ommerce	First Named Inventor	Geoffrey B. Hoese		
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			Examiner Name	<u> </u>		
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			Examiner Name	Shin, Christophe	r B.
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Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 210 of 253

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE Atty. Docket No. REPLY TO OFFICE ACTION DATED 11/01/2005 CROSS1120-13 Applicant Geoffrey B. Hoese DEC 2 0 2005 **Application Number** Date Filed 10/658,163 09/09/2003 Title Storage Router and Method for Providing Virtual Local Storage Group Art Unit Examiner 2182 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 $\sqrt{2} - \sqrt{5} = \sqrt{5}$

Signature

Sulle H. Blackpas

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.

Attorney Docket No. CROSS1120-13

2

10/658,163 Customer ID: 44654

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.

10/658.163 Customer ID: 44654

3

- 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 gueue 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

Attorney Docket No. CROSS1120-13

10/658,163 Customer ID: 44654

4

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.

Attorney Docket No. CROSS1120-13

10/658,163 Customer ID: 44654

5

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.

Attorney Docket No. CROSS1120-13

Customer ID: 44654

10/658,163

7

- 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.

Attorney Docket No. CROSS1120-13

Customer ID: 44654

10/658,163

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- 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.

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 218 of 253

Attorney Docket No. CROSS1120-13

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10/658,163 Customer ID: 44654

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- 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.

Attorney Docket No. CROSS1120-13

10

10/658,163 Customer ID: 44654

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

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 220 of 253

Attorney Docket No. CROSS1120-13

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10/658,163 Customer ID: 44654

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

1301 W. 25th Street, Suite 408

Austin, TX 78705 Tel. (512) 637-9220 Fax. (512) 371-9088 DEC 2 0 2005

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

Examiner

2182

Shin, Christopher B.

Confirmation Number:

5675

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 **December** 25, 2005.

Dear Sir:

P.O. Box 1450

Commissioner for Patents

Alexandria, VA 22313-1450

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 copending 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.

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Customer ID: 44654 Application No. 10/658,163

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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 the required fee, and/or any deficiencies or credit any overpayments regarding this application from deposit account 50-3183 of Sprinkle IP Law Group.

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Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 223 of 253 Application or Docket Number PATENT APPLICATION FEE DETERMINATION RECORD 03 Effective January 1, 2003 **CLAIMS AS FILED - PART I** SMALL ENTITY OTHER THAN (Column 1) (Column 2) TYPE [OR SMALL ENTITY TOTAL CLAIMS 12.61 FEE RATE RATE FEE BASIC FEE FOR NUMBER FILED NUMBER EXTRA 375.00 IASIC FEE 750.00 OR TOTAL CHARGEABLE CLAIMS minus 20= X\$ 9= X\$18= 4 INDEPENDENT CLAIMS minus 3 = X42= X84= đя MULTIPLE DEPENDENT CLAIM PRESENT +140= +280± OR * If the difference in column 1 is less than zero, enter "0" in column 2 TOTAL 71/10 OR' TOTAL **CLAIMS AS AMENDED - PART II** OTHER THAN SMALL ENTITY OR SMALL ENTITY (Column 1) (Column 2) (Column 3) HIGHEST ADDL ADDI-REMAINING NUMBER PRESENT TIONAL RATE RATE TIONAL AFTER PREVIOUSLY EXTRA ENDMENT PAID FOR FEE FEE 39 Total Minus * X\$ 9= X\$18= Minus Independent X422 X84= OR FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM +280= +140= OR OR ADDIT. FEE ADDIT, FEE (Column 1) CLAIMS (Column 2) (Column 3) 8 ADDI-ADDI-REMAINING MIMBER RATE AFTER PREVIOUSLY JIONAL RATE TIONAL **EXTRA** CENDMENT PAID FOR FEE FEE Total Minus ** X\$ 9= X\$18= OR Minus X42= X84= OR FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM +140= +280= OR TOTAL OR ADDIT. FEE ADDIT, FEE (Column 1) (Column 2) HIGHESY (Column 3) CLAIMS ADDL REMAINING NUMBER ADDI-PRESENT AFTER TIONAL RATE PREVIOUSLY RATE TIONAL PAID FOR FEE FEE Total Minus X\$ 9= X\$18= OR Independent Minus X42= X84= FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM OR +140= OB. +280= * 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."

** TOTAL ADDIT. FEE OR ADDIT.

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate book in column 1. OR ADDIT, FEE

*U.S. Government Printing Office: 2000-499-484/78011

FORM PTO-875 (Ray, 12/02)

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Application Number	Application/Control No.		Applicant(s)/Patent Reexamination HOESE ET AL.	under		
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Approved/Disapproved b	y:					
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.

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 REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

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 should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. 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.

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.

Page 1 of 3

PTOL-85 (Rev. 07/05) Approved for use through 04/30/2007.

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 226 of 253

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail

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Commissioner for Patents
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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	B. Hoese	CROSS1120-13	5675
APPLN. TYPE	SMALL ENTITY			PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
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The Director of the USPTO NOTE: The Issue Fee and Printerest as shown by the reco	is requested to apply the Issuublication Fee (if required) w	e Fee and Publicat	tion Fee (if any	r) or to re-apply any prevother than the applicant;	viously paid issue fee to the applic a registered attorney or agent; or	cation identified above. the assignee or other party in
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This collection of informatio an application. Confidentiali submitting the completed ap this form and/or suggestions Box 1450, Alexandria, Virgi Alexandria, Virginia 22313-	n is required by 37 CFR 1.3 ty is governed by 35 U.S.C. plication form to the USPTO for reducing this burden, sh nia 22313-1450. DO NOT \$ 1450.	11. The information 122 and 37 CFR 20. Time will vary ould be sent to the SEND FEES OR C	on is required to 1.14. This colled depending upon the Chief Information COMPLETED	o obtain or retain a benefiction is estimated to tak on the individual case. A ation Officer, U.S. Paten FORMS TO THIS ADD	it by the public which is to file (at te 12 minutes to complete, including the complete of the amount of the and Trademark Office, U.S. Dep PRESS. SEND TO: Commissioner	nd by the USPTO to process ing gathering, preparing, and ime you require to complete partment of Commerce, P.O. for Patents, P.O. Box 1450
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PTOL-85 (Rev. 07/05) Appr	roved for use through 04/30/	2007.	OMB 0651	-0033 U.S. Patent an	d Trademark Office; U.S. DEPAR	RTMENT OF COMMERCE

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 227 of 253



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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.			
10/658,163	09/09/2003	Geoffrey B. Hoese	CROSS1120-13 5675				
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DLA PIPER RUI 2000 University A	DNICK GRAY CAR	Y US, LLP	SHIN, CHRISTOPHER B				
E. Palo Alto, CA 9			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.

Page 3 of 3

PTOL-85 (Rev. 07/05) Approved for use through 04/30/2007.

	Application No.	Applicant(s)
	10/050 100	
Notice of Allowability	10/658,163 Examiner	HOESE ET AL.
•	Lamino	
·	Christopher B. Shin	2182
The MAILING DATE of this communication apperatus and all claims being allowable, PROSECUTION ON THE MERITS IS herewith (or previously mailed), a Notice of Allowance (PTOL-85) NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIOF the Office or upon petition by the applicant. See 37 CFR 1.313	(OR REMAINS) CLOSED in this apply or other appropriate communication IGHTS. This application is subject to 3 and MPEP 1308.	plication. If not included will be mailed in due course. THIS
1. This communication is responsive to the AF received Dece	<u>ember 20, 2005</u> .	
2. The allowed claim(s) is/are <u>15-53</u> .		·
3.	e been received. e been received in Application No cuments have been received in this of this communication to file a reply fENT of this application. iitted. Note the attached EXAMINER' es reason(s) why the oath or declara st be submitted. son's Patent Drawing Review (PTO-	complying with the requirements S AMENDMENT or NOTICE OF tion is deficient.
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 DEPOSIT OF and/or INFORMATION about the deposit attached Examiner's comment regarding REQUIREMENT 		
Attachment(s) 1. Notice of References Cited (PTO-892) 2. Notice of Draftperson's Patent Drawing Review (PTO-948) 3. Information Disclosure Statements (PTO-1449 or PTO/SB/0 Paper No./Mail Date 4. Examiner's Comment Regarding Requirement for Deposit of Biological Material	6. ☐ Interview Summary Paper No./Mail Dat 8), 7. ☐ Examiner's Amendm	e nent/Comment nt of Reasons for Allowance
U.S. Patent and Trademark Office PTOL-37 (Rev. 7-05)	tice of Allowability	CHRISTOPHER B. SHIN PRIMARY EXAMINER GROUP 3/8) Part of Paper No (Mail Date 01047005

	NITED STATES PATENT AND TRADEM	ARK OFFICE
OIF EREPLY TO OFFIC	E ACTION DATED 11/01/2005	Atty. Docket No. CROSS1120-13
DEC 2 0 2005 8	Applicant Geoffrey B. Hoese	
•	Application Number 10/658,163	Date Filed 09/09/2003
MARINA MARINA	Title Storage Router and Me Local Storage	ethod for Providing Virtual
	Group Art Unit 2182	Examiner Shin, Christopher B.
	Confirmation Number:	

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

Dear Sir:

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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 12-15-05

Signature

Signature

TULIE 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.

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NetApp Ex. 1009, pg. 1432

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 230 of 253

Issue	Classification	

Application/Control No.	Applicant(s)/Pater Reexamination	nt under
10/658,163	HOESE ET AL.	
Examiner	Art Unit	•
Christopher B. Ship	2182	

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Part of Paper No. 01042005



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	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/658,163	HOESE ET AL.	
	Examiner	Art Unit	_
	Christopher B. Shin	2182	

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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
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710	36-38	10/24/2005	CBS

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710	305, 11	1/3/2006	CBS
709	258	1/3/2006	CBS

SEARCH NOTES (INCLUDING SEARCH STRATEGY)							
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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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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 *OC00000018039068* *OC00000018039068*

44654 SPRINKLE IP LAW GROUP 1301 W. 25TH STREET SUITE 408 **AUSTIN, TX 78705**

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.

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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

25094 DLA PIPER RUDNICK GRAY CARY US, LLP 2000 University Avenue E. Palo Alto, CA 94303-2248 CONFIRMATION NO. 5675 *OC00000018039055* *OC00000018039055*

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).

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Issue C	lassifica	ation

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Application/Control No.	Applicant(s)/Patent	under
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Part of Paper No. 01042005

Case 1:13-cv-00895-SS Document 3/1/200 Filed 04/09/14 Page 235 of 253

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail

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10/658,163	09/09/2003		Geoffrey I	B. Hoese		CRO	SS1120-13	5675	
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PTOL-85 (Rev. 07/05) Approved for use through 04/30/2007.

OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

MA.	(LA	TTAL OF PA	YMENT OF ISSU) 37 C.F.R. 1.311)	JE FEE	Docket No. CROSS1120-13
ALCON .			Applicant(s)		
10	polication No.	Filing Date	Examiner	Group Art Unit	Confirmation No.
	10/658,163	09/09/2003	Shin, Christopher B.	2182	5675
			Title:		

Mail Stop: Issue Fee Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450

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	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



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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 *OC00000018039068*

OC00000018039068

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: OF Docketed By:

Date Docketed

2100 (571) 272-3594

ATTORNEY/APPLICANT COPY

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE Atty. Docket No. NOTIFICATION OF LARGE ENTITY STATUS CROSS1120-13 Applicant: Geoffrey B. Hoese, et al. Application No. Filing Date: 10/658,163 09/09/2003 Patent No. Issue Date 7,051,147 05/23/2006 For: Storage Router and Method for Providing Virtual **Local Storage** Group Art: Confirmation No. 2182 5675

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

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Janice Pampell

re that all the proper fees have been paid

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

dohn 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

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 239 of 253 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)							

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Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 240 of 253

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New Applications Under 35 U.S.C. 111

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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.

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 241 of 253 🖎 AO 120 (Rev. 2/99) REPORT ON THE TO: Mail Stop 8 Director of the U.S. Patent & Trademark Office FILING OR DETERMINATION OF AN P.O. Box 1450 ACTION REGARDING A PATENT OR Alexandria, VA 22313-1450 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 X Patents or Trademarks: DOCKET NO. DATE FILED U.S. DISTRICT COURT CV 08-05687 HRL 12/19/2008 280 North First St, Rm 2112, San Jose, CA 95121 PLAINTIFF DEFENDANT SYMANTEC CORPORATION CROSSROADS SYSTEMS INC. PATENT OR DATE OF PATENT HOLDER OF PATENT OR TRADEMARK OR TRADEMARK TRADEMARK NO. SEE ATTACHED COMPLAINT 3 In the above-entitled case, the following patent(s) have been included: INCLUDED BY DATE INCLUDED ☐ Amendment ☐ Answer Cross Bill ☐ Other Pleading PATENT OR DATE OF PATENT HOLDED OF DAMENER OF AD TOST TOR

TRAĐEMARK NO.	OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK				
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In the above	entitled case, the following de	ecision has been rendered or judge	ment issued:			
DECISION/JUDGEMENT						
CLERK	(BY)	DEPUTY CLERK	DATE			

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

Betty Walton

Richard W. Wieking

December 19, 2008

ORIGINAL 1 LATHAM & WATKINS LLP FILED Mark A. Flagel (Bar No. 110635) 2 Yury Kapgan (Bar No. 218366) 08 DEC 19 PM 5: 00 355 South Grand Avenue RICHARD W. WIEKING CLERK U.S. DISTRICT COURT NO. DISTRICT CA S.J. Los Angeles, California 90071-1560 3 Telephone: (213) 485-1234 Facsimile: (213) 891-8763 5 LATHAM & WATKINS LLP David A. Nelson, pro hac vice pending 6 Jennifer Bauer, pro hac vice pending 7 5800 Sears Tower Chicago, IL 60606 Telephone: (312) 876-7700 Facsimile (312) 993-9767 8 9 E-filing 10 Attorneys for Plaintiff Symantec Corporation 11 12 UNITED STATES DISTRICT COURT 13 NORTHERN DISTRICT OF CALIFORNIA 14 SAN JOSE DIVISION 15 SYMANTEC CORPORATION, a Delaware Corporation, 16 Plaintiff, 17 ٧. 18 JUDGMENT CROSSROADS SYSTEMS, INC. 19 a Texas Corporation 20 DEMAND FOR JURY TRIAL Defendant. 21 22 **COMPLAINT** 23 Plaintiff Symantec Corporation ("Symantec") hereby pleads the following claims 24 for Declaratory Judgment against Defendant Crossroads Systems, Inc. ("Crossroads"), and 25 alleges as follows: 26 27 28 WATKINS COMPLAINT FOR DECLATORY JUDGMENT

FAXED

	(· · ·
. 1	<u>PARTIES</u>
2	1. Plaintiff Symantec is a Delaware Corporation with its principal place of
3	business at 20330 Stevens Creek Boulevard, Cupertino, California 95014-2132.
4	2. On information and belief, Defendant Crossroads is a Texas Corporation wit
5	its principal place of business at 11000 MoPac Expressway, Austin, Texas, 78759.
6	JURISDICTION AND VENUE
7	3. The Court has subject matter jurisdiction over this action and the matter
8	pleaded herein under 28 U.S.C. §§ 1331 and 1338(a) because the action arises under the Federal
9	Declaratory Judgment Act, 28 U.S.C. § 2201 et seq., and the Patent Act of the United States, 35
10	U.S.C. § 1, et seq.
11	4. Venue is proper in the United States District Court for the Northern District
12	of California pursuant to 28 U.S.C. § 1391(b)(2) in that a substantial part of the acts giving rise
13	to the claim occurred in this District, and Crossroads is subject to personal jurisdiction in this
14	District.
15	INTRADISTRICT ASSIGNMENT
16	This action for a declaratory judgment of non-infringement and invalidity of
17	patents is assigned on a district-wide basis under Civil L.R. 3-2(c).
18	GENERAL ALLEGATIONS
19	6. This action involves U.S. Patent No. 5,941,972 ("the '972 patent") attached
20	hereto as Exhibit A, U.S. Patent No. 6,425,035 ("the '035 patent"), attached hereto as Exhibit B,
21	U.S. Patent No. 6,421,753 ("the '753 patent"), attached hereto as Exhibit C, U.S. Patent No.
22	6,763,419 ("the '419 patent"), attached hereto as Exhibit D, U.S. Patent No. 6,738,854 ("the '854
23	patent"), attached hereto as Exhibit E, U.S. Patent No. 6,789,152 ("the '152 patent"), attached
24	hereto as Exhibit F, and U.S. Patent No. 7,051,147 ("the '147 patent"), attached hereto as Exhibit
25	G (collectively "the patents-in-suit"). The '035, '753, '419, '854, '152 and '147 patents all claim
26	priority to the '972 patent.
27	7. On August 26, 2004, Crossroads sent a letter to Veritas Software Corporation
28	("Veritas") offering Veritas a license to the '972 and '035 patents in exchange, in part, for "a
LATHAM & WATKINS ATTORNEYS AT LAW LOS ANGELES	COMPLAINT FOR DECLARATORY JUDGMENT

royalty rate as a percentage of the net sales of [Veritas] products covered by the '972 or '035 Patents."

- 8. Veritas requested Crossroads to provide Veritas with the basis for Crossroads' assertions that any of the products or offerings of Veritas were covered by any claims of the '972 and/or '035 patents. Crossroads indicated that it could not provide such information to Veritas without a non-disclosure agreement in place. The parties discussed the non-disclosure agreement for a short period, but did not ultimately reach such an agreement. Veritas again requested Crossroads' basis for its claims. But the basis was never provided and the parties had no further communication after the first quarter of 2005 until Crossroads suddenly reappeared in December of 2008. In 2005, Symantec acquired Veritas.
- 9. On December 12, 2008, Crossroads sent a letter to Symantec offering a license to the patents-in-suit for "any/all products, potentially including the various storage foundation products acquired from Veritas" in exchange, in part, for "a running royalty on the net sales of products using the patented access controls feature."
- 10. Upon information and belief, Crossroads contends that one or more of Symantec's products infringe one or more claims of the patents-in-suit and that those claims are valid, although it still has provided Symantec with no basis for such contentions.
- 11. Symantec denies that any of its products infringe any claim of the patents-insuit, and also denies that the patents-in-suit are valid.

FIRST CLAIM FOR RELIEF

Declaratory Relief Regarding Non-Infringement

- 12. Symantec incorporates herein the allegations of paragraphs 1-11.
- 13. An actual and justiciable controversy exists between Plaintiff Symantec and Defendant Crossroads as to the non-infringement of the patents-in-suit, which is evidenced by Crossroads' allegations that Veritas' products, later acquired by Symantec, as well as other Symantec products infringe valid claims of the patents-in-suit, and Symantec's allegations herein.

LATHAM & WATKINS
ATTORNEYS AT LAW
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COMPLAINT FOR DECLARATORY JUDGMENT

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	thìs action; and
26	5. That Symantec be awarded such other and further relief as the Court may deem
27	appropriate.
28	·
INS	COMPLAINT FOR DECLARATORY JUDGMENT 4

DEMAND FOR JURY TRIAL Plaintiff Symantec respectfully demands a jury trial in this action. Dated: December 19, 2008 LATHAM & WATKINS LLP Attorneys for Plaintiff SYMANTEC CORPORATION LATHAM & WATKINS COMPLAINT FOR DECLARATORY JUDGMENT

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 246 of 253







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. 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

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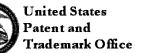
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Maintenance Fee Statement

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).

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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. APPLICATION NUMBER	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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Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 249 of 253



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

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; Jeffry T. Russell, Cibolo, TX;

IR103 (Rev. 11/05)

REVOCATION AND POWER CHANGE OF MAILI		Atty. Docket No. (Opt.) CROSS1120-13
	Applicants	
	Geoffrey B Hoese, et. a	ı.
	Application Number 10/658,163	Filed 9/9/2003
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Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450 Dear Sir:	Reynetto	Se Vegas Name
Crossroads Systems, Inc., 100% own by the Assignment recorded on Decer all previous Powers of Attorney and ar all of the firm of SPRINKLE IP LAW GRO	mber 31, 1997 on Reel/Frame: opoints the following attorneys	8929/0290, hereby revokes under Customer No. 44654
transact all business in the Patent and	Trademark Office connected	therewith.
STEVEN R. SPRINKI JOHN ADAIR ARI AKMAL	LE Registration No. Registration No. Registration No.	48,828
Direct all telep	hone calls and correspondence	ce to:
Sr A	Customer No. 44654 PRINKLE IP LAW GROUP P.O. Box 684767 .ustin, TX 78768-4767 Attn: Steven Sprinkle 637.9220 / Fax (512) 371.908	38
hereby state I am authorized to act of	n behalf of CROSSROADS SYST	EMS, INC.
	Respectfully sub	mitted,
	Crossroads Sys	stems, Inc.
Dated: 8/// . 2004	By: Sala	11



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UNITED STATES DEPARTMENT OF COMMERCE United States Patent and Trademark Office Address COMMISSIONER FOR PATENTS P.O. BOX 1450 Alexandria, Vinnia, 27313-1450

Alexandria, Virginia 22313-1450 www.uspto.gov

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 *OC00000012130740*

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.

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Case 1:13-cv-00895-\$S Document 31-20 Filed 04/09/14 Page 252 of 253



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APPL NO.	(c) DATE	ART UNIT	FIL FEE REC'D	ATTY.DOCKET NO	DRAWINGS	TOT CLMS	IND CLMS	
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25094 GRAY, CARY, WARE & FREIDENRICH LLP 1221 SOUTH MOPAC EXPRESSWAY SUITE 400 AUSTIN, TX 78746-6875 CONFIRMATION NO. 5675
FILING RECEIPT
OC000000011479527

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

Case 1:13-cv-00895-SS Document 31-20 Filed 04/09/14 Page 253 of 253

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

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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

1:13-CV-01023-SS - Crossroads Systems, Inc. v. Dell Inc.

1:13-CV-01025-SS - Crossroads Systems, Inc. v. Huawei Technologies Co. Ltd, et al

1:13-CV-01026-SS - Crossroads Systems, Inc. v. Tandberg Data Corporation

1:14-CV-00149-SS - Crossroads Systems, Inc. v. NetApp, Inc.

1:14-CV-00150-SS - Crossroads Systems, Inc. v. Quantum Corporation

Date	Document	Pages
	Coversheet	1-2
	USPTO Internal Documents	3-6, 21, 56-58, 67-79
09/27/01	Continuation Application and Related Documents	22-55, 59-66,
		80-84
09/27/01	Official Filing Receipt	96-97
01/25/02	Notice of Publication	98
02/28/02	Terminal Disclaimer	85-86
03/11/02	Notice of Allowability	87-90, 93-95
06/07/02	Payment of Issue Fee	91-92
07/03/02	Issue Notification	99
07/23/02	Letters Patent	7-14
05/21/03	Request for Certificate of Correction	100-101
10/27/03	Certificate of Correction	15
08/17/04	Revocation and Power of Attorney	102
06/07/05	Revocation and Power of Attorney (second request)	103
10/13/05	Payment of 3.5 Year Maintenance Fee	104
10/08/05	Maintenance Fee Statement: PAID	105
11/17/05	Notice of Acceptance of Power of Attorney and Notice Regarding Power of Attorney	106-107
8/8/2006	Ex Parte Re-Exam Certificate	16-20
12/04/09	Payment of the 7.5 Year Maint. Fee	108
01/14/14	Payment of the 11.5 Year Maint. Fee	109

Date	Document	Page
	Coversheet	1-2
	USPTO internal documents	113, 118-120, 123- 130, 141, 155-160, 174-175, 177, 199, 249, 251, 276-277, 320-321, 347, 372- 407, 412-419, 423
	Request for Ex-Parte Re-examination	13-103, 115-117
	U.S. Patent 6,425,035	104-112
08/04/04	Notice of Re-examination Request Filing Date Notice of Assignment of Re-examination Request	121-122
09/22/04	Order Granting Request for Ex Parte Re-examination	131-140
12/08/04	Notification of Litigation Under 37 CFR 1.565 & Cert. of Mailing	142-151
12/08/04	Revocation and Power of Attorney and Change of Mailing Address	424-425
11/26/04	Decision on Petition to Make Special Under M.P.E.P. §708.02(II): Infringement	426
01/11/05	Notification of Re-examination Under 1.565 and Cert. of Mailing	152-154
02/07/05	Notice of Acceptance of POA	176
02/07/05	Office Action in Ex Parte Re-examination	161-173
02/18/05	Change of Correspondence Address of Third Party Requestor	178-180
02/24/05	PTO advised of POA served on Third Party Requester	181-183
03/17/05	Office Action in Ex Parte Re-examination	184-189
03/23/05	Information Disclosure Statement	190-198

Case 1:13-cv-00895-SS Document 31-22 Filed 04/09/14 Page 2 of 2

03/30/05	Notification Under 37 CFR 1.565/Notification of Stay and Order	200-205
04/06/05	Reply to Office Action Under Ex Parte Re-examination	206-248
04/18/05	Notice of Acceptance of Power of Attorney	250
05/24/05	Office Action	252-275
07/22/05	Reply to Office Action Under Ex Parte Re-examination	278-319, 322-346, 348-349
07/29/05	Notification re: Stay	351-355
07/29/05	Interview Requested	350
08/09/05	Interview Summary	356-359
08/22/05	Interview Summary	360-364
09/01/05	Statement of Examiner Interview Summary (08/09/05)	365-367
09/01/05	Statement of Examiner Interview Summary (08/22/05)	368-370
09/08/05	Submission of References to complete Record by Applicants	371
09/23/05	Notice of Intent to Issue Ex Parte Re-examination Certificate	408-411
10/07/05	Comments on Statement of Reasons for Patentability and/or Confirmation	420-422
08/06/06	Ex Parte Re-examination Certificate	3-12

PROSECUTION FILE HISTORY SUMMARY FOR REEXAMINATION NO. 90/007,317 OF 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
- 1:13-CV-01023-SS Crossroads Systems, Inc. v. Dell Inc.
- 1:13-CV-01025-SS Crossroads Systems, Inc. v. Huawei Technologies Co. Ltd, et al
- 1:13-CV-01026-SS Crossroads Systems, Inc. v. Tandberg Data Corporation
- 1:14-CV-00149-SS Crossroads Systems, Inc. v. NetApp, Inc.
- 1:14-CV-00150-SS Crossroads Systems, Inc. v. Quantum Corporation

Date	Document	Page
	USPTO Internal docs	6, 14-58, 117-118, 144, 171- 172, 221, 237-238, 248, 257-263, 266-267, 295-300
	Request for Ex Parte Re-examination	268-283
	U.S. Patent 6,425,035	284-293, 294
12/10/04	Notice of Re-examination Request Filing Date Notice of Assignment of Re-examination Request	264-265
12/16/04	Order Granting Request for Ex Parte Re- examination	249-256
01/11/05	Notification of Litigation Under 37 CFR 1.565 & Cert. of Mailing	245-247
02/07/05	Office Action in Ex Parte Re-examination	301-313
03/17/05	Decision merging proceedings	239-244
03/23/05	IDS	228-236
03/30/05	Notification Under 37 CFR 1.565/Notification of Stay and Order	222-227
04/06/05	Reply to Office Action Under <i>Ex Parte</i> Reexamination Dated 2/7/05	177-220
04/08/05	Certificate of Service on Third Party Requesters (Revocation and POA and Change of Mailing Address)	173-176
04/18/05	Notice of Acceptance of Power of Attorney	314
05/24/05	Office Action in Ex Parte Re-examination	147-170
07/22/05	Reply to Office Action Under Ex Parte Re- examination	75-116, 119-143, 145-146
07/29/05	Notification re: Stay	315-319
66	Interview Requested	320-321

Case 1:13-cv-00895-SS Document 31-23 Filed 04/09/14 Page 2 of 2

08/09/05	Interview Summary	71-74
08/22/05	Interview Summary	69-70
08/24/05	Interview Summary	67-68
09/01/05	Statement of Examiner Interview Summary (08/09/05)	61-66
09/01/05	Statement of Examiner Interview Summary (08/22/05)	322-324
09/08/05	Submission of References to complete Record by Applicants	59-60
09/23/05	Notice of Intent to Issue Ex-Parte Certificate	10-13
10/07/05	Comments on Statement of Reasons for Patentability and/or Confirmation	7-9
08/08/06	Ex-Parte Re-exam Certificate	1-5

PROSECUTION FILE HISTORY SUMMARY FOR U.S. PATENT NO. 7,934,041

FOR CIVIL ACTION NOS.:

- 1:13-CV-00895-SS Crossroads Systems, Inc. v. Oracle Corporation
- 1:13-CV-01023-SS Crossroads Systems, Inc. v. Dell Inc.
- 1:13-CV-01025-SS Crossroads Systems, Inc. v. Huawei Technologies Co. Ltd, et al
- 1:13-CV-01026-SS Crossroads Systems, Inc. v. Tandberg Data Corporation
- 1:14-CV-00149-SS Crossroads Systems, Inc. v. NetApp, Inc.
- 1:14-CV-00150-SS Crossroads Systems, Inc. v. Quantum Corporation

Date	Document	Page
	Coversheet	1-2
	USPTO Internal documents	66, 113, 132-133, 136, 175, 188, 190-192, 195, 217-218
01/20/10	Continuation Application	19-65
02/03/10	Filing Receipt	67-69
02/03/10	Notice of Acceptance of Power of Attorney	70
05/21/10	Information Disclosure Statement	72-92
05/13/10	Notice of Publication	71
06/09/10	Information Disclosure Statement	93-97
08/20/10	Information Disclosure Statement	98-102
09/10/10	First Office Action	106-112, 114-131, 134-135
09/10/10	Examiner's Interview Summary	103-105
12/10/10	Reply to Office Action, Terminal Disclaimer, and Information Disclosure Statement	137-174
12/17/10	Information Disclosure Statement	176-183
01/10/11	Notice of Allowance	184-187, 189, 193-194, 196-198
03/16/11	Assignment & Recordation Cover Sheet	220-222
03/11/11	Recordation of Assignment	223-225
03/21/11	Payment of Issue Fee and Amendment Under 312	199-207
03/23/11	Response to Rule 312 Communication	208-209
04/06/11	Issue Notification	210
04/26/11	Letters Patent 7,934,041	3-18
07/11/11	Certificate of Correction Filed	211-216
09/13/11	Certificate of Correction	219

PROSECUTION FILE HISTORY SUMMARY FOR U.S. PATENT NO. 7,051,147

FOR CIVIL ACTION NOS.:

1:13-CV-00895-SS - Crossroads Systems, Inc. v. Oracle Corporation

1:13-CV-01025-SS - Crossroads Systems, Inc. v. Huawei Technologies Co. Ltd, et al

1:14-CV-00149-SS - Crossroads Systems, Inc. v. NetApp, Inc.

1:14-CV-00150-SS - Crossroads Systems, Inc. v. Quantum Corporation

DATE MAILED	DOCUMENT	PAGES
	Coversheet	1-2
	USPTO internal docs	78-80, 91, 102-109, 127- 129, 142-143, 182,188-189, 191, 223-224,
		229-231, 233- 234, 241-246
09/09/03	Continuation Patent Application and Preliminary Amendment	17-77
10/17/03	Information Disclosure Statement	81-85
11/21/03	Petition to Make Special Because of Actual Infringement, including Declaration in Support	86-87
12/12/03	Filing Receipt	252-253
01/30/04	Information Disclosure Statement	88-90
03/18/04	Notice of Publication of Application	251
04/09/04	Information Disclosure Statement	92-94
04/29/04	Information Disclosure Statement	95-96
05/18/04	Supplement to Petition to Make Special Filed 11/21/03	97-100
08/17/04	Revocation and Power of Attorney	250
11/26/04	Decision on Petition to Make Special: GRANTED	101
01/27/05	Office Action	110-126
07/13/05	Information Disclosure Statement	130-141
07/26/05	Revocation and Power of Attorney (2 nd Request)	144-145
07/27/05	Reply to Office Action and Terminal Disclaimer	146-187
08/12/05	Notice Regarding POA (to SIPLG)	190
10/28/05	Terminal Disclaimer	192-193
11/01/05	Final Office Action	194-209
12/15/05	Reply to Office Action and Terminal Disclaimer	210-222
01/20/06	Notice of Allowability	225-228
02/10/06	Notice of Acceptance of Power of Attorney and Notice of Acceptance of Power of Attorney	232, 237
03/14/06	Payment of Issue Fee; Change of Correspondence Address	235-236
05/03/06	Issue Notification	249
05/23/06	Letters Patent 7,051,147	3-16

Case 1:13-cv-00895-SS Document 31-25 Filed 04/09/14 Page 2 of 2

06/09/08	Notification of Large Entity Status	238-240
11/20/09	Payment of the 3.5 Year Maint. Fee	248
09/26/13	Payment of the 7.5 Year Maint. Fee	247