

***Oracle Corporation
and NetApp Inc.
v.
Crossroads Systems, Inc.***

IPR Nos. 2014-1197, -1207, -1209

October 30, 2015

Obviousness Combinations

- *CRD-5500 User Manual* in view of *CRD-5500 Data Sheet* and *Smith*
 - ▶ '147 Patent Claims 14-39 *Paper 1 (-1207), Petition, pp. 12-27*

- *Bergsten* in view of *Hirai*
 - ▶ '035 Patent Claims 1-2, 4-6, 11-12, 14 *Paper 1 (-1197), Petition, pp. 44-58*
 - ▶ '147 Patent Claims 1-2, 4, 5*, 10-11, 13 *Paper 1 (-1209), Petition, pp. 44-58*
 - ▶ '147 Patent Claims 14-39 *Paper 1 (-1207), Petition, pp. 42-55*

- *Kikuchi* in view of *Bergsten*
 - ▶ '147 Patent Claims 1-2, 4, 5*, 10-11, 13 *Paper 1 (-1209), Petition, pp. 29-44*
 - ▶ '147 Patent Claims 14-39 *Paper 1 (-1207), Petition, pp. 27-42*

* And in view of *Smith*

***CRD-5500 User Manual in View of
CRD-5500 Data Sheet and Smith***

'147 Patent Claims 14-39

The CRD-5500 User Manual Teaches a Storage Controller that Maps Between Hosts and Storage Devices

Figure 1-2 shows how you can connect as many as four hosts to the CRD-5500. By using the controller's Host LUN Mapping feature, you can assign redundancy groups to a particular host. This makes it possible for hosts running incompatible operating systems to use the same CRD-5500 controller. If the hosts are part of a VMS VAXCluster™ they can share access to all of the redundancy groups.

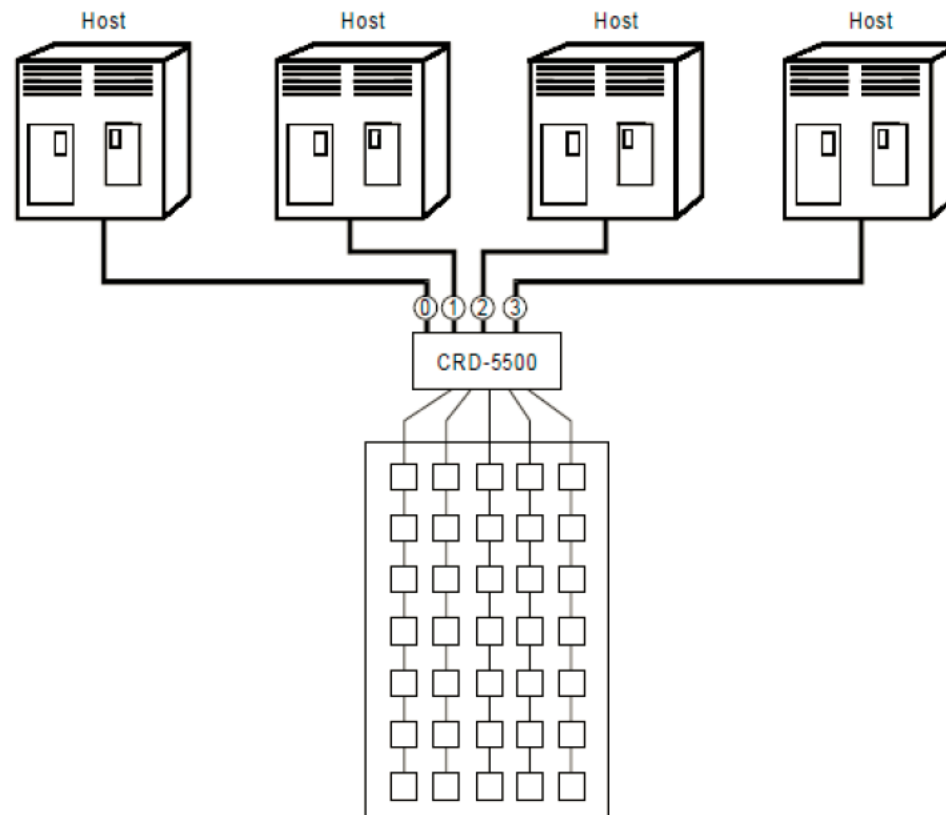


Figure 1-2: A multi-hosting example

Ex. 1003 (CRD-5500 Manual) at 1-2 – 1-3

(cited in Paper 1 (-1207), Petition, pp. 13, 17, 21; Ex. 1010, Chase Decl., pp. 21-22, 49).

Smith Discloses a Tachyon Controller Chip that Supports Fibre Channel

Tachyon High-Level Design Goals

The second major design goal was that Tachyon should support SCSI encapsulation over Fibre Channel (known as *FCP*). From the beginning of the project, Tachyon designers created SCSI hardware assists to support SCSI initiator transactions. These hardware assists included special queuing and caching. Early in the design, Tachyon only supported SCSI initiator functionality with its SCSI hardware assists. It became evident from customer feedback, however, that Tachyon must support SCSI target functionality as well, so SCSI target functionality was added to Tachyon SCSI hardware assists.

Tachyon Feature Set

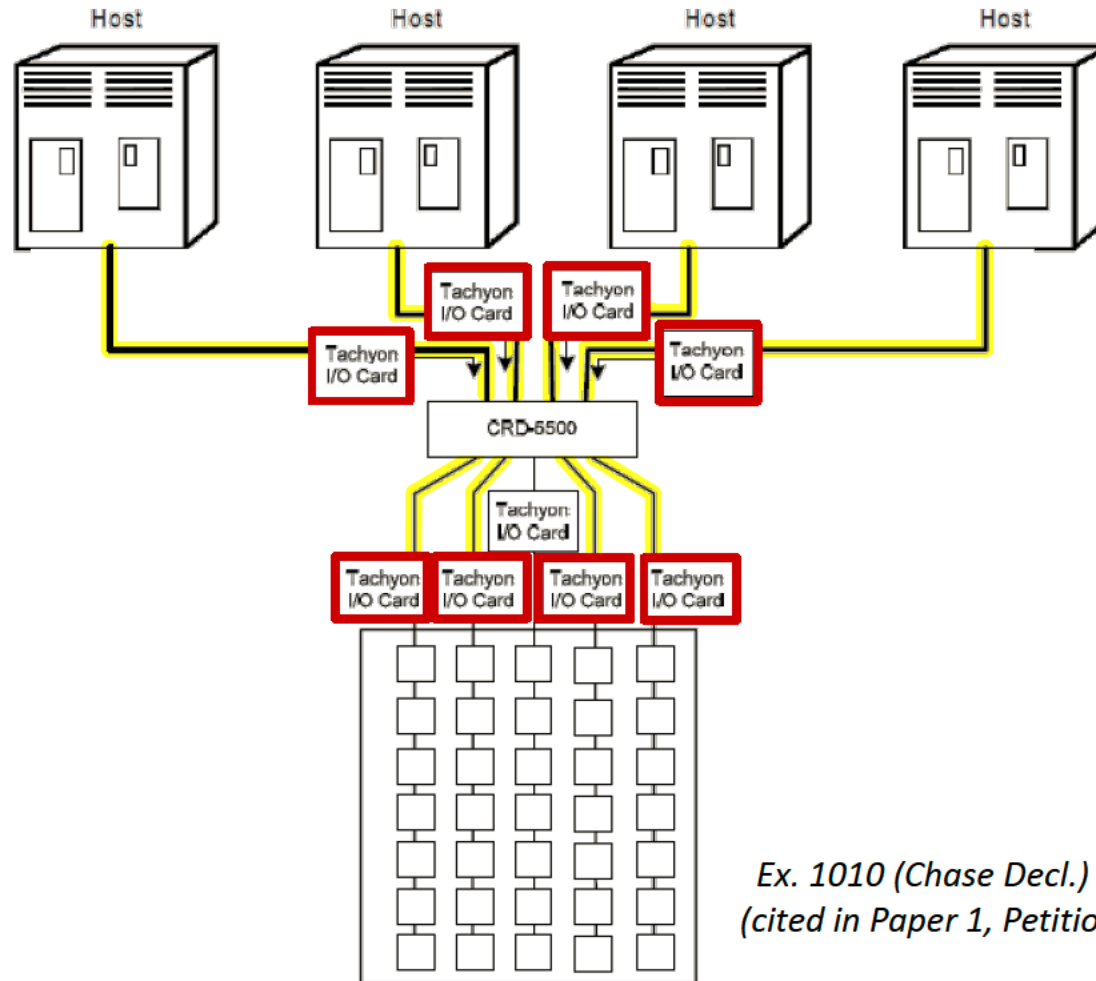
To provide support for customer mass storage applications, Tachyon:

- Supports up to 16,384 concurrent SCSI I/O transactions.
- Can be programmed to function as either an initiator or a target.
- Assists the protocol for peripheral I/O transactions via SCSI encapsulation over Fibre Channel (FCP).

Ex. 1005 (Smith) at 4 (cited in Paper 1 (-1207), Petition, pp. 15-17, 20-21; Ex. 1010, Chase Decl., pp. 19, 49).

Combination of *CRD-5500 User Manual* and *Smith*

Interface modules of the *CRD-5500 User Manual* adapted with the Tachyon functionality of *Smith*



*Ex. 1010 (Chase Decl.) at p. 22 (colors added)
(cited in Paper 1, Petition, pp. 17-18; Ex. 1010,
Chase Decl., p. 22).*

Patent Owner's Arguments Fail

- Patent Owner argues that the combination does not render the claims obvious because it maps between host channels and storage, not between hosts and storage
- This argument fails:
 - ▶ Patent Owner's construction is contrary to broadest reasonable interpretation
 - ▶ *CRD-5500 User Manual* teaches mapping to particular hosts
 - ▶ *CRD-5500 User Manual* embodiment shows mapping to particular hosts
 - ▶ Patent Owner and its expert acknowledge that the *CRD-5500 User Manual's* embodiment maps to particular hosts

Patent Owner's Construction Is Contrary to Broadest Reasonable Interpretation

- “Mapping” and “access controls” are given their broadest reasonable interpretation
 - ▶ Specification does not place restrictions on how to map to hosts
- ▶ Contrary to Patent Owner's position in District Court that “map” need only contain “a representation of devices on each side of the storage router”

*Paper 45 (-1207), Pet. Reply, p. 5;
Ex. 1001, '147 Patent, 4:26-29.*

Paper 29 (-1207), PO Resp., p. 2.

1.2 Flexible RAID Set Configuration

In addition to its flexible hardware design, the CRD-5500's firmware offers the user the flexibility to configure RAID sets in many different ways:

...

- The controller's Host LUN Mapping feature makes it possible to map RAID sets differently to each host. You make the same redundancy group show up on different LUNs to different hosts, or make a redundancy group visible to one host but not to another.

*Ex. 1003 (CRD-5500 Manual) at 1-1
(cited in Paper 1, Petition, pp. 13-14).*

The CRD-5500 User Manual Embodiment Shows Mapping To Particular Hosts

Figure 1-2 shows how you can connect as many as four hosts to the CRD-5500. By using the controller's Host LUN Mapping feature, you can assign redundancy groups to a particular host. This makes it possible for hosts running incompatible operating systems to use the same CRD-5500 controller. If the hosts are part of a VMS VAXCluster™ they can share access to all of the redundancy groups.

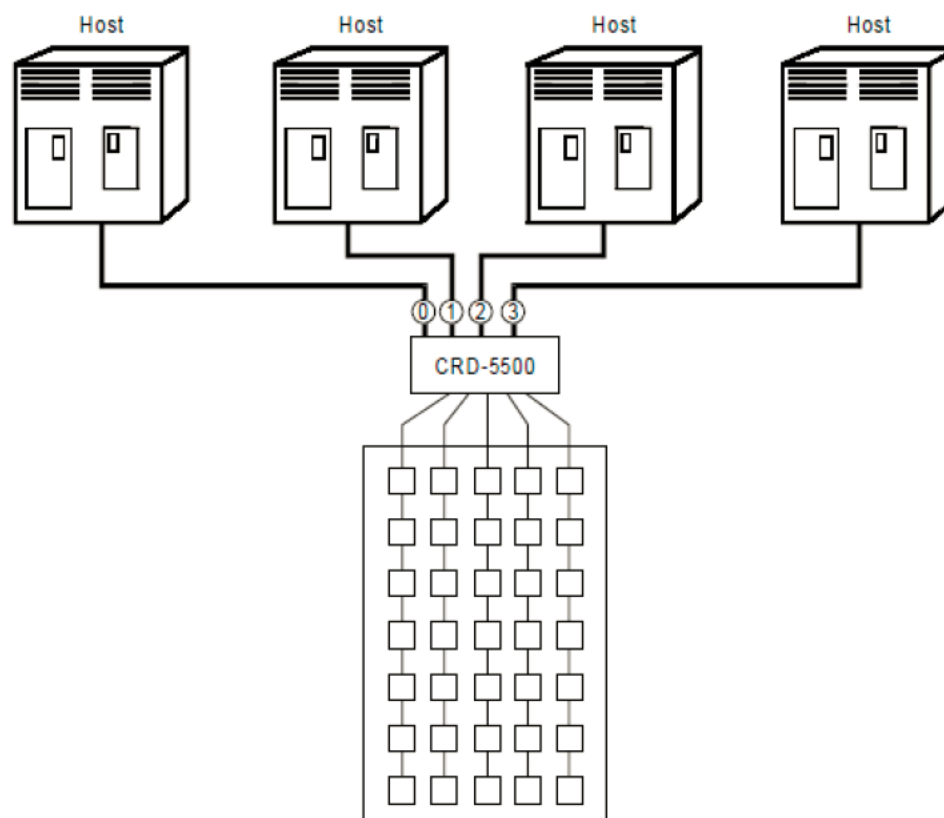


Figure 1-2: A multi-hosting example

Ex. 1003 (CRD-5500 Manual) at 1-2 – 1-3
(cited in Paper 1 (-1207), Petition, pp. 13, 17, 21).

The CRD-5500 User Manual Embodiment Shows Mapping To Particular Hosts

The CRD-5500 permits the I/O modules in slots 1, 2, and 3 to be configured as host or disk channel modules. The *Channel Settings* screen is the place to configure these modules. Use the up and down arrow keys to maneuver to the channel you wish to configure and press Enter. Then use the arrow keys to toggle between host and disk. Press Enter again to save your selection. Channel 0 is always a host channel and channels 4 through 6 are always disk channels, so the monitor utility will restrict access to these fields.

Monitor Utility
CHANNEL SETTINGS

02-09-96
13:20:49

Channel	Module Type	Module Description
0	HOST	16-Bit Single-Ended
1	HOST	16-Bit Differential
2	HOST	16-Bit Single-Ended
3	DISK	16-Bit Single-Ended
4	DISK	16-Bit Single-Ended
5	DISK	16-Bit Single-Ended
6	DISK	16-Bit Single-Ended
7	DISK	16-Bit Single-Ended
8	DISK	16-Bit Single-Ended

UP ARROW: CURSOR UP | DOWN ARROW: CURSOR DOWN | ENTER: SELECT | CTRL-Z: EXIT

Ex. 1003 (CRD-5500 Manual) at 4-5
(cited in Paper 1 (-1207), Petition, pp. 13-14, 21).

The CRD-5500 User Manual Embodiment Shows Mapping To Particular Hosts

This screen may be used to map LUNs on each host channel to a particular redundancy group. Or you may prevent a redundancy group from appearing on a host channel. Thus, for example, you may map redundancy group 1 to LUN 5 on host channel 0 and the same redundancy group to LUN 12 on host channel 1. Or you may make redundancy group 8 available on LUN 4 on host channel 0 and block access to it on host channel 1.

Monitor Utility
HOST LUN MAPPING
Channel 0

02-09-96
13:14:00

Host LUN	Redundancy Group	Host LUN	Redundancy Group
0	0	16	16
1	1	17	17
2	-	18	18
3	-	19	19
4	5	20	20
5	-	21	21
6	6	22	22
7	7	23	23
8	8	24	24
9	9	25	25
10	10	26	26
11	11	27	27
12	12	28	28
13	13	29	29
14	14	30	30
15	15	31	31

ARROW KEYS: MOVE CURSOR | N: NEXT CH | P: PREV CH | ENTER: SELECT | CTRL-Z: EXIT

*Ex. 1003 (CRD-5500 Manual) at 4-5
(cited in Paper 1 (-1207), Petition, pp. 13-14, 20-22).*

Patent Owner And Its Expert Acknowledge That CRD-5500 Embodiment Maps To Particular Hosts

visible to one host but not another” is misplaced. Reading the sentence in the context of the CRD-5500 Manual as a whole, it is clear that it is referring to a case in which the hosts are on different channels, such as shown in Figure 1-2 (entitled “A multi-hosting example”), wherein each of four hosts is connected to a separate host channel. Ex. 1004, at 1-2. In this example, **because there is only one host per channel**, mapping a redundancy group to one channel, but not another, will have the effect that the hosts connected to the different channels would necessarily have access to different redundancy groups. Levy ¶ 221. The Host LUN Mapping

...

Petitioners’ hypothetical system would operate in the same way. Even in the

Patent Owner’s Response (Paper 29 (-1207)) at 44-45.

Patent Owner And Its Expert Acknowledge That CRD-5500 Embodiment Maps To Particular Hosts

Q. In the circumstance where there is only a single host device on a fibre channel, is the fibre channel ID sufficient to identify the host device?

A. So you're switching now to the host side of the --

Q. (BY MR. GARDELLA) Correct.

A. -- map?

Q. (BY MR. GARDELLA) Correct.

A. Well, on the host side of the map, all that's required in the map is an identifier sufficient to distinguish between multiple hosts on the first transport medium. So a fibre channel ID of some kind would be one example of something that could distinguish between such hosts.

*Ex. 1218 (July 15, 2015 Levy Dep.) at 57:10-24 (objections omitted)
(cited in Paper 45 (-1207), Pet. Reply, p. 3).*

Patent Owner And Its Expert Acknowledge That CRD-5500 Embodiment Maps To Particular Hosts

- Q. But you would agree that the host interface ID is sufficient to ensure in this embodiment that transmissions are sent to the proper hosts?
- A. Well, as in the CRD-5500 where there is a channel identifier, this interface ID does get the response sent back on the proper interface. And when there's only a single host present, that would be the host that is indicated.

*Ex. 1218 (July 15, 2015 Levy Dep.) at 95:13-22 (objections omitted)
(cited in Paper 45 (-1207), Pet. Reply, p. 19).*

Patent Owner's Arguments Fail

- Patent Owner argues that those of ordinary skill in the art would not have combined the *CRD-5500 User Manual*, *CRD-5500 Data Sheet*, and *Smith*, because the references are incompatible
- This argument fails:
 - ▶ Patent Owner's argument is impermissible bodily incorporation

In re Keller, 642 F.2d 413, 425 (CCPA 1981)
(cited in Paper 45 (-1207), Pet. Reply, pp. 7-8).
 - ▶ The references provide rationale to adapt CRD-5500 to include Fibre Channel, which show that those of ordinary skill could have and would have combined the teachings of the references

Rationale to Combine *CRD-5500 User Manual* and *Smith*

- The CRD-5500 was “designed to support tomorrow’s high speed serial interfaces such as Fiberchannel (FCAL)”

*Ex. 1004 (CRD-5500 Datasheet) at 1
(cited in Paper 1 (-1207), Petition, pp. 13, 16).*
- The CRD-5500 allows users “to easily add new interfaces or more powerful modules as they become available”

*Ex. 1004 (CRD-5500 Datasheet) at 2
(cited in Paper 1 (-1207), Petition, p. 17).*
- One of ordinary skill would have added Fibre Channel to the CRD-5500 to take advantage of Fibre Channel’s well known benefits, such as storage at higher speeds and greater distances than SCSI

*Ex. 1005 (Smith) at 1, 3
(cited in Ex. 1010, Chase Decl., pp. 22-23, 69).*

Rationale to Combine *CRD-5500 User Manual* and *Smith*

“Key storage issues for enterprise customers include their current and future needs for distributed storage in conjunction with improved network storage management; increased connectivity and capacity, plus dynamic expansion capabilities; high performance, availability, and reliability; investment protection; and reduced cost of ownership.

...

Inherent I/O and physical limitations, however, now prevent SCSI technology from satisfying the expanding needs of enterprise storage.

...

Fibre Channel technology...provides the means to satisfy all the enterprise storage needs identified above.”

*Ex. 1028 (Compaq Technology Brief) at 3, 8
(cited in Ex. 1010, Chase Decl., p. 21).*

Bergsten in View of Hirai

'035 Patent Claims 1-2, 4-6, 11-12, 14

'147 Patent Claims 1-2, 4-5, 10-11, 13-39

Bergsten Teaches Mapping Hosts to Storage Devices

As mentioned above, a storage controller according to the present invention uses virtual-to-real device mapping to provide transparency of I/O operations to the host computers, as will now be described. A single host (virtual) address may map to a single physical address, or, to improve performance, the storage controller may map a single host address to multiple physical addresses, which may be distributed among multiple MSDs located in different storage arrays. The storage controller 3 maps a host address to one or more physical addresses using a two-part process that is transparent to all hosts. Specifically, a host address received from a host is first mapped to a logical address, and the logical address is then mapped to a physical (real) address in one or more MSDs.

...

The storage controller maintains and uses a tree structure such as that illustrated in FIG. 8 to map the host interface ID and block number to a logical device. The tree structure 40

*Ex. 1007 (Bergsten) at 8:62-9:8, 9:21-23
(cited in Petition (-1207), pp. 30, 36, 51);
Ex. 1010, Chase Decl., pp. 80-81, 111).*

Hirai Teaches Access Controls

Partition	Computer name	Access right
Partition 1	Personal computer 1	RWCX
	Personal computer 2	RWCX
	Personal computer 3	RWCX
Partition 2	Personal computer 1	RW
	Personal computer 3	R
Partition 3	Personal computer 1	R
	Personal computer 2	R
Partition n	.	.
	.	.
	.	.
	.	.

(R: Readable, W: Writable, C: Creatable, X: Executable)

Figure 2

Ex. 1008 (Hirai) at 6 (cited in Paper 1, Petition, p. 43; Ex. 1010, Chase Decl., pp. 142, 168).

Patent Owner's Arguments Fail

- Patent Owner argues that the combination *Bergsten* and *Hirai* would not have been obvious, because *Hirai* utilizes “file system-based” access controls and not block-level access controls
- This argument fails:
 - ▶ *Bergsten* teaches allowing access using NLLBPs, and it was within the ordinary skill of those in the art to adapt *Bergsten* to include *Hirai*'s access controls

*See Paper 1 (-1207), Petition, at pp. 44-46;
Ex. 1010, Chase Decl., ¶¶ 249-50.*

- **Bergsten allows access to storage devices using NLLBPs**

Each of the storage controllers also provides virtualized data access and emulation, as mentioned above. A local storage controller will emulate its local storage array from the viewpoint of its local host computer system; similarly, the local storage controller will emulate its local host computer system from the viewpoint of its local storage array. Such emulation is implemented, in part, by using a common communication interface for data communication paths 7 and 8, such as SCSI. Again, in other embodiments, the data communication paths 7 and 8 may conform to other protocols and standards, such as serial SCSI, Fiber Channel, or ESCON.

*Ex. 1007 (Bergsten) at 5:65-6:9
(cited in Paper 1 (-1207), Petition, p. 44).*

- **Those of ordinary skill would have adapted Bergsten's map, which uses NLLBPs, in view of Hiraï's teaching of access controls**

*Ex. 1010 (Chase Decl.) ¶¶ 249-50;
Ex. 2055 (Chase Dep.) at 328:20-22
(cited in Paper 29 (-1207), Patent Owner's Resp., p. 11).*

Patent Owner's Arguments Fail

- Patent Owner argues that *Bergsten* does not teach the claimed “map,” because the Host Interface ID in *Bergsten's* map identifies the host interface and not the host
- This argument fails:
 - ▶ Patent Owner's construction is contrary to the broadest reasonable interpretation
 - ▶ *Bergsten* teaches mapping to particular hosts
 - ▶ *Bergsten* shows embodiments that map to particular hosts
 - ▶ Parties' experts agree that the embodiment maps to particular hosts

Patent Owner's Construction Is Contrary to Broadest Reasonable Interpretation

- “Mapping” and “access controls” are given their broadest reasonable interpretation
 - ▶ Specification does not place restrictions on how to map to hosts
- ▶ Contrary to Patent Owner's position in District Court that “map” need only contain “a representation of devices on each side of the storage router”

*Paper 45 (-1207), Pet. Reply, p. 5;
Ex. 1001, '147 Patent, 4:26-29.*

Paper 29 (-1207), PO Resp., p. 2.

Bergsten Teaches Mapping to Particular Hosts

FIG. 7 illustrates the process of mapping a virtual address to a logical address. Because a given storage controller may have an interface with more than one host or multiple paths to the same host, each host address includes a host interface identifier (ID) that identifies the particular host or redundant path with which the access request is associated. Hence, in step 701, the storage controller receives a host interface ID and a host (memory) block number. In step 702, the storage controller determines whether the host device ID and block number map exactly to a logical device. This determination can be made by checking the status of a single bit representing whether or not the mapping is exact.

*Ex. 1007 (Bergsten) at 9:8-20;
see Ex. 1010 (Chase Decl.), pp. 174-75 (citing Fig. 7).*

Parties' Experts Agree that *Bergsten* Maps to Particular Hosts

Q. In the circumstance where there is only a single host device on a fibre channel, is the fibre channel ID sufficient to identify the host device?

A. So you're switching now to the host side of the --

Q. (BY MR. GARDELLA) Correct.

A. -- map?

Q. (BY MR. GARDELLA) Correct.

A. Well, on the host side of the map, all that's required in the map is an identifier sufficient to distinguish between multiple hosts on the first transport medium. So a fibre channel ID of some kind would be one example of something that could distinguish between such hosts.

*Ex. 1218 (July 15, 2015 Levy Dep.) at 57:10-24 (objections omitted)
(cited in Paper 45 (-1207), Pet. Reply, p. 3).*

Parties' Experts Agree that *Bergsten* Maps to Particular Hosts

- Q. But you would agree that the host interface ID is sufficient to ensure in this embodiment that transmissions are sent to the proper hosts?
- A. Well, as in the CRD-5500 where there is a channel identifier, this interface ID does get the response sent back on the proper interface. And when there's only a single host present, that would be the host that is indicated.

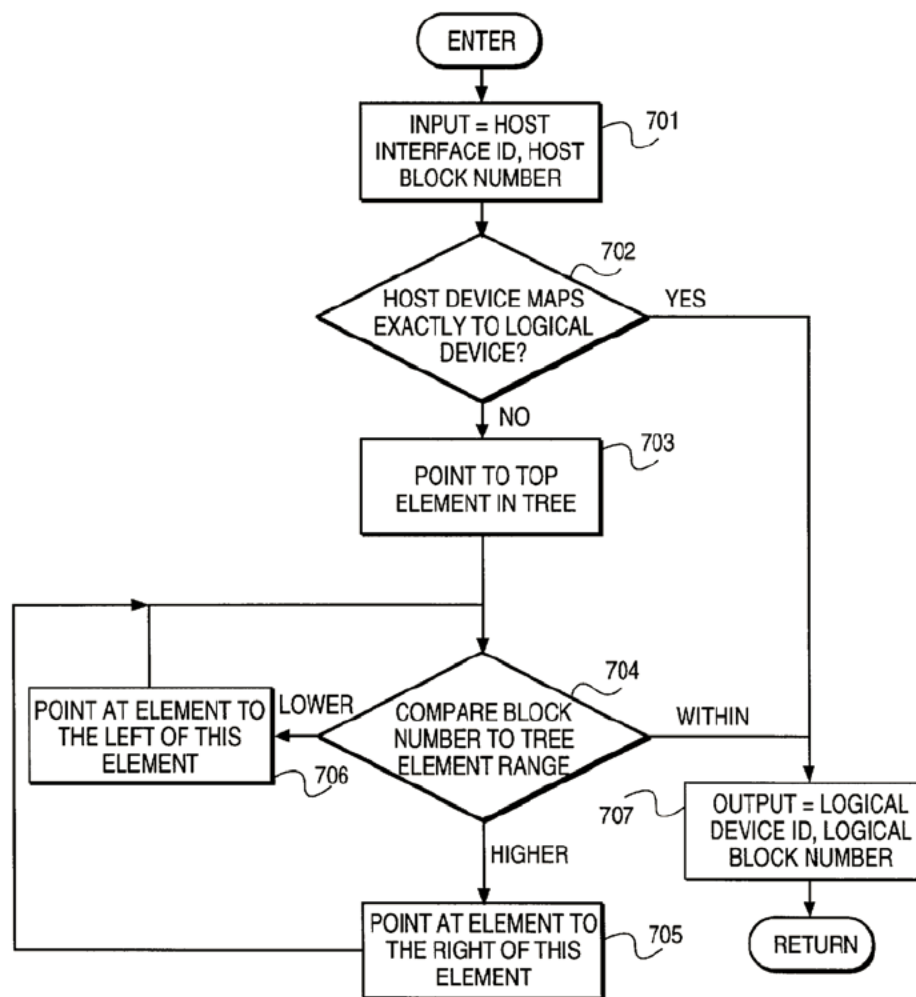
*Ex. 1218 (July 15, 2015 Levy Dep.) at 95:13-22 (objections omitted)
(cited in Paper 45 (-1207), Pet. Reply, p. 19).*

Patent Owner's Arguments Fail

- Patent Owner argues that the combination could not provide access controls because the emulation drivers of *Bergsten* would remove host identity information before reaching the map
- This argument fails:
 - ▶ Patent Owner cites no evidence from *Bergsten*

Patent Owner's Resp. (Paper 29 (-1207)), pp. 16, 34;
Ex. 2053 (Levy Decl.), pp. 77, 112.
 - ▶ *Bergsten* does not teach that host identifying information is discarded

Bergsten Does Not Teach that Host Identifying Information Is Discarded



Ex. 1007 (Bergsten) Fig. 7 (cited by Paper 1 (-1207),
Petition, p. 51); Ex. 1010 (Chase Decl.), ¶¶ 299, 313.

Patent Owner's Arguments Fail

- Patent Owner argues that those of ordinary skill in the art would not have combined *Bergsten* with the access controls of *Hirai* because the purpose of *Bergsten* is to provide “open access” to “all” storage
- This argument fails:
 - ▶ *Bergsten* suggests access controls
 - ▶ The Board was correct in finding that providing access to all storage does not conflict with portions of storage being restricted

Bergsten Suggests Access Controls

A storage controller of the present invention further allows data blocks to be write protected, so that a block cannot be modified from any host computer. Write protection may be desirable for purposes such as virus protection or implementation of security firewalls. Write protection can be achieved by configuring the storage controller appropriately at set-up time or by inputting a write protect command to the storage controller from a host computer.

*Ex. 1007 (Bergsten) at 15:39-47
(cited in Paper 1 (-1207), Petition, p. 45).*

Those of Ordinary Skill in the Art Would Have Combined *Bergsten* and *Hirai*

(250.) In the combined system, the partition control table of Hirai would be merged with the map of Bergsten to implement access controls to particular data sections. The access controls would be based upon logical addressing. Moreover, this addition can interoperate with other elements of Bergsten. For example, by integrating the access controls into the logical addressing mechanism, the access rights to data are identical for each copy of the data across all of the controllers linked in a network as described by Bergsten. In this manner, Bergsten could retain its goal of having multiple copies of data accessible to multiple host computer systems at different locations while managing data integrity based upon an administratively managed access rights plan. *See id.* at 3:4-8.

Ex. 1010 (Chase Decl.) ¶ 250.

The Board Was Correct in Finding that Providing Access to All Storage Does Not Conflict with Portions of Storage Being Restricted

Patent Owner argues that the “purpose of *Bergsten* is to provide a system in which *all hosts* have the same access to *all storage*.” Prelim. Resp. 50–51 (citing Ex. 1007, Abstract, 1:39–42, 3:1–4, 4:7–9, 4:39–41, 4:66–5:2). Patent Owner, thus, argues that Petitioners cannot show a reasonable likelihood of success. *Id.* at 51. After considering Patent Owner’s citations to *Bergsten*, we find that all hosts having the same access to all storage would not necessarily conflict with, for example, some portions of all storage being restricted to all hosts.

Institution Decision (Paper 13 (-00197)) at 13.

Kikuchi in View of Bergsten

'147 Patent Claims 1-2, 4-5, 10-11, 13-39

Kikuchi Teaches Access Controls to a Single Storage Device

The technique for determining access authorization could for example involve the registration of the host addresses of those host devices for which access is authorized in the address registration unit 104 and comparison of these address with the host address extracted from each command, with authorization being given in the case of a matching address. Alternatively, the host addresses of those host

Ex. 1006 (Kikuchi) at 4:35-44 (cited in Paper 1 (-1207), Petition, p. 28).

Kikuchi Teaches Access Controls to a Single Storage Device

With the invention of the fourth apparatus, the disk apparatus is able to identify a host device from the host address imbedded within the command sent from the host device. Moreover because a partition offset information value is stored for each host device, the disk apparatus is able to allocate a different disk partition to each host device. Consequently, a single disk apparatus can essentially appear as a different disk to each host device, enabling the efficient usage of modern large volume disk apparatus.

*Ex. 1006 (Kikuchi) at 8:37-45 (cited in Paper 1 (-1207),
Petition, pp. 36, 38; Ex. 1010, Chase Decl., pp. 108-09).*

Bergsten Teaches Virtual Storage Mapping to Multiple Storage Devices

As mentioned above, a storage controller according to the present invention uses virtual-to-real device mapping to provide transparency of I/O operations to the host computers, as will now be described. A single host (virtual) address may map to a single physical address, or, to improve performance, the storage controller may map a single host address to multiple physical addresses, which may be distributed among multiple MSDs located in different storage arrays. The storage controller 3 maps a host address to one or more physical addresses using a two-part process that is transparent to all hosts. Specifically, a host address received from a host is first mapped to a logical address, and the logical address is then mapped to a physical (real) address in one or more MSDs.

Ex. 1007 (Bergsten) 8:62-9:8 (cited in Paper 1 (-1207), Petition, pp. 36, 49; Ex. 1010, Chase Decl., pp. 80-81, 89-90, 111).

Patent Owner's Arguments Fail

- Patent Owner argues that *Kikuchi* does not provide a map or access controls, because the hosts in *Kikuchi* have full access to the disk
- This argument fails:
 - ▶ Patent Owner improperly attacks *Kikuchi* individually, but Petitioners' proposed combination modifies *Kikuchi* in light of *Bergsten's* teaching of virtual storage
 - ▶ *Kikuchi* teaches mapping and access controls

Kikuchi in View of *Bergsten* Provides Mapping and Access Controls

- Patent Owner impermissibly attacks *Kikuchi* individually

*Patent Owner's Response (Paper 29 (-1207)), pp. 26-28 ; In re Keller, 642 F.2d 413, 426 (CCPA 1981)
(cited in Paper 45 (-1207), Pet. Reply, p. 16).*

- Prof. Chase confirms that *Kikuchi* would have been adapted in view of *Bergsten's* teaching of virtual storage mapping

*Ex. 1010 (Chase Decl.) ¶144;
Ex. 1007 (Bergsten) at 8:62-9:8
(cited in Paper 1 (-1207), Petition, pp. 36, 49).*

Kikuchi Teaches Mapping and Access Controls

- “The technique for determining access authorization could for example involve the registration of the host addresses of those host devices for which access is authorized in the address registration unit 104 and comparison of these address with the host address extracted from each command, with authorization being given in the case of a matching address.”

*Ex. 1006 (Kikuchi) at 4:35-44
(cited in Paper 1 (-1207), Petition, p. 28).*

- “With the invention of the fourth apparatus, the disk apparatus is able to identify a host device from the host address imbedded within the command sent from the host device. Moreover because a partition offset information value is stored for each host device, the disk apparatus is able to allocate a different disk partition to each host device. Consequently, a single disk apparatus can essentially appear as a different disk to each host device, enabling the efficient usage of modern large volume disk apparatus.”

*Ex. 1006 (Kikuchi) at 8:37-45
(cited in Paper 1 (-1207), Petition, pp. 36, 38).*

Patent Owner's Arguments Fail

- Patent Owner argues that a person of ordinary skill would not have combined *Kikuchi* and *Bergsten* because the combination is “complex” and changes *Kikuchi*'s “simple” correlation scheme
- This argument fails:
 - ▶ Those of ordinary skill would have had rationale to combine the teachings of the references
 - ▶ Prof. Chase explains that the combination was within the ordinary skill of those in the art, and Patent Owner provides no evidence to the contrary

Rationale to Combine *Kikuchi* with *Bergsten*

Prof. Chase confirms that using *Bergsten's* virtual storage mapping would allow *Kikuchi* advantageously to use multiple disks

- Increase storage capacity
- Increase storage address range
- Increase flexibility and ease of administration (can add or modify)

Ex. 1010 (Chase Decl.) ¶ 146.

The Combination of *Kikuchi* and *Bergsten* Was Within the Ordinary Skill Of those in the Art at the Time

- Prof. Chase explains that tables and trees were interchangeable for those of ordinary skill in the art

Ex. 1010 (Chase Decl.) ¶ 145.

- Patent Owner's expert does not dispute this

Q. Does your declaration provide any testimony to the effect that the combination of *Kikuchi* and *Bergsten* proposed by Dr. Chase would be beyond the level of ordinary skill in the art?

A. I don't believe it has any testimony to that effect.

*Ex. 1218 (July 15, 2015 Levy Dep.) at 103:16-21
(cited in Paper 45 (-1207), Pet. Reply, p. 16).*

Patent Owner's Arguments Fail

- Patent Owner argues that the combination could not provide access controls because the emulation drivers of *Bergsten* would remove *Kikuchi's* host identity information before reaching the map

- This argument fails:

- ▶ Patent Owner cites no evidence from *Bergsten*

*Patent Owner's Resp. (Paper 29 (-1207)), pp. 16, 34;
Ex. 2053 (Levy Decl.), pp. 77, 112.*

- ▶ *Bergsten* does not teach that host identifying information is discarded

***Bergsten* Does Not Teach that Host Identifying Information Is Discarded**

commands from the host device. (*Ex. 1006 at the Abstract*) The host devices can be connected, for example, via a Fibre Channel or SCSI transport medium to the control device and the control device is, in turn, connected to a storage unit via, for example, a FC or SCSI transport medium. (*Id. at 1:31-36; see also id. at 5:37-39*) *Kikuchi* executes access control by extracting a host address from each host device command and determining whether the address is registered in an address registration unit. (*Id. at 4:35-44; see also id. at 5:3-6*)

Paper 1 (-1207), Petition, p. 28 (discussing Kikuchi).

Kikuchi Is Prior Art

- *Kikuchi* was filed on August 18, 1997, more than five months before Patent Owner filed on December 31, 1997
- Patent Owner bears the burden of proving prior invention, which requires continuous diligence to reduce the invention to practice during the critical period

Oracle Corp. v. Click-to-Call Tech. L.P., No. IPR2013-00312, Paper 52 at 15 (PTAB Oct. 28, 2014)
(cited in Paper 45 (-1207), Pet. Reply, pp. 14-15).

- Diligence cannot be shown when the Patent Owner chooses to delay testing of the invention for business reasons

Id.; Naber v. Cricchi, 567 F.2d 382, 385 (Cust. & Pat. App. 1977)
(cited in Paper 45 (-1207), Pet. Reply, p. 11).

Patent Owner Cannot Show Diligence

- During the critical period, Patent Owner worked exclusively on a product – the Verrazano bridge – that did not embody the invention (it lacked access controls)

Patent Owner's Response (Paper 29 (-1207)) at 23-24.

- During the critical period, Patent Owner admits there were roughly 5 Verrazano bridge prototypes

*Ex. 1220 (Middleton Dep.) at 58
(cited in Paper 45 (-1207), Pet. Reply, p. 12).*

- Patent Owner admits it could have included access controls in the Verrazano bridge prototypes

*Ex. 1220 (Middleton Dep.) at 63-64, 70-72
(cited in Paper 45 (-1207), Pet. Reply, pp. 12-13).*

Patent Owner Cannot Show Diligence

Q. The bridge software which was under test on the approximately five Verrazano prototypes included certain functionality. Correct?

A. Correct.

Q. And that functionality could have included access control functionality if the software team had chosen to include that functionality in that build of the software?

Q. Correct?

Q. Is that fair to say?

A. To the best of my knowledge, yes.

*Ex. 1220 (Middleton Dep.) at 63:17-64:4 (objection omitted)
(cited in Paper 45 (-1207), Pet. Reply, p. 12).*

Patent Owner Cannot Show Diligence

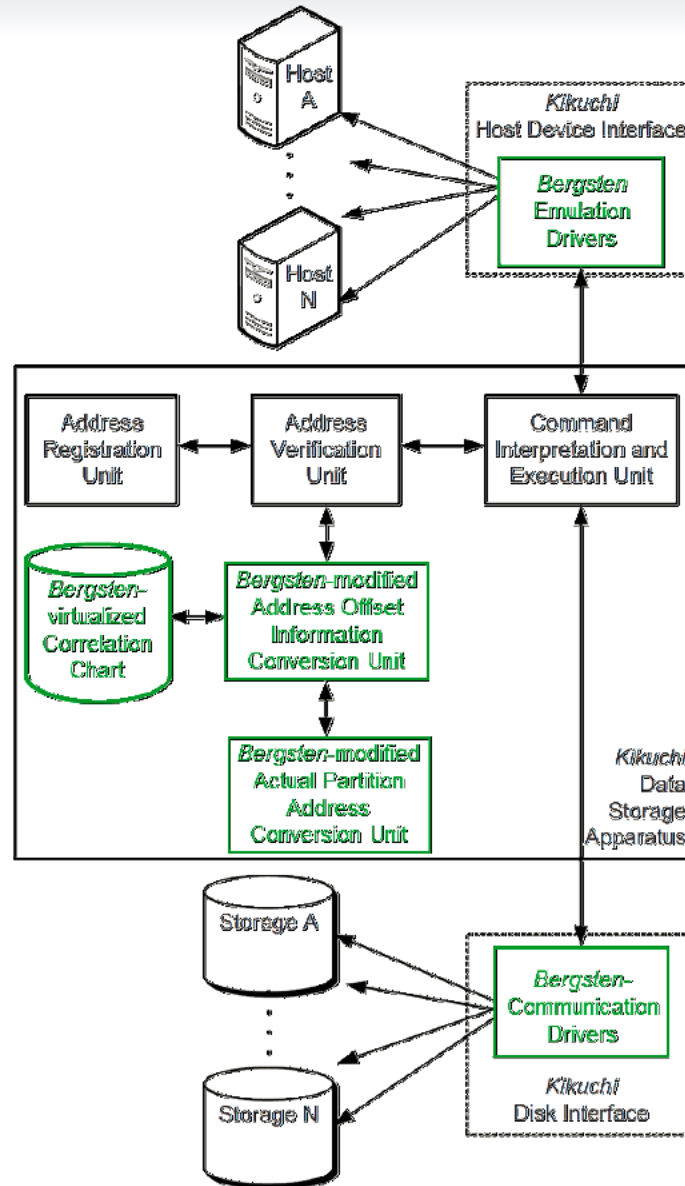
- Oct. 20-Nov. 24, 1997: Patent Owner cites no evidence of diligence at all

*Patent Owner's Response (Paper 29 (-1207)) at p.24
(citing Ex. 2311 (purported chronology)).*

- Nov. 25-Dec. 31, 1997: only minimal revisions to patent application

*Ex. 1228 (redline comparing July 11, 1997 draft to Dec. 31, 1997 draft)
(cited in Paper 45, Pet. Reply, p.14).*

Kikuchi in View of Bergsten



Secondary Considerations of Non-obviousness

No Evidence of Nexus

- Commercial Success

- ▶ No evidence that products embodied subject patents

- *E.g.*, no evidence that bridges and routers provided claimed “mapping”

- Ex. 2043 (Bianchi Decl.); Ex. 1221 (Bianchi Dep.) at p.33-35
(cited in See Paper 45, Pet. Reply, p. 23).*

- Licensing

- ▶ No evidence that license payments made for freedom to make or sell products that embody the subject patents

- ▶ Licensed other patents, products outside scope of '147 patent

- *E.g.*, SCSI-to-FC outside scope of '147 Patent, which requires FC-to-FC

- Ex. 1223 (Crane Dep.) at pp. 50-53, 117-19
(cited in Paper 45, Pet. Reply, p. 24).*

Patent Owner's Evidence Is Insufficient to Show Nonobviousness

- Long-Felt Need

- ▶ No evidence that others failed to solve need
- ▶ Need recognized and solved

*Ex. 1004 (CRD-5500 Data Sheet) at 1
(cited in Paper 45, Pet. Reply, p. 25).*

- Commercial Success

- ▶ No evidence that sales are due to patented feature, rather than other non-patented features, pricing, demand, etc.

*Ex. 1221 (Bianchi Dep.) at 108, 119
(cited in Paper 45, Pet. Reply, p. 23).*

- Licensing

- ▶ No evidence that licenses are due to patent, rather than threat of litigation or pending business transaction

*Ex. 1223 at 169
(cited in Paper 45, Pet. Reply, p. 24).*