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DtS Data Migration to the MSA1000 – Microsoft Environments

***Abstract:** This white paper outlines step-by-step procedures for data migration from Direct Attach Storage on Smart Array Controllers, RA4100, and RA4100 Clusters to the MSA1000.*

DtS Architecture Data Migration

Direct Attach Storage (DAS) to SAN (DtS) architecture is an exclusive Hewlett Packard feature that provides a quick and easy way to migrate stored data protected by Smart Array and RA 4100 controllers to a StorageWorks MSA1000 storage system.

Data stored on one-inch universal disk drives (Ultra2 and Ultra3) using newer Smart Array controllers and data stored on RA4100 storage systems can be migrated to the StorageWorks MSA1000. Following a step-wise procedure, you simply remove the drives from the older systems and insert them into the MSA1000. Existing data, RAID sets, and configuration information will remain intact allowing data migration to be completed in minutes, not hours.

Key features and benefits of DtS architecture include:

- Instant consolidation of DAS into a SAN environment
- DtS creates an upgrade path from Smart Array and RA4100 controlled drives and data to a SAN environment
- Simple redeployment of DAS to SAN environment for growth management and capacity utilization
- Supports up to 42 drives and 32 volumes

HP Array Controllers that support DtS are:

Smart Array 3100ES
Smart Array 3200
Smart Array 4200
Smart Array 4250ES
Smart Array 431
Smart Array 5i
Smart Array 532
Smart Array 5312
Smart Array 5300
RA 4100 Controllers

Notice

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Migrating Data from Smart Array controllers, RA4100, and RA4100 Clusters

The following steps illustrate the migration from direct attached storage to the HP MSA1000 – all controlled by the same Host server.

IMPORTANT: It is recommended that you record the current configuration of all arrays and note which drives are part of each array prior to performing the migration. If you need to fall back to your former configuration, you will be required to re-enter all array and volume information.

Installation Notes and Prerequisites:

Hardware: As the HP FCA2101 HBA is an industry standard PCI adapter, it should work in all PCI compliant slots, regardless of server vendor. During the qualification and testing phase for both the HP FCA2101 HBA and the HP Modular SAN Array 1000, several different server vendor hardware platforms were tested - including models from IBM and Dell. Refer to the compatibility matrix for more details on multi-vendor x86 platform support.

Software: Minimum Operating System levels for the host computers are: Microsoft Windows NT4.0 Server Enterprise Edition with Service Pack 6a and Microsoft Windows 2000 Advanced Server with Service Pack 2. For configuration of the HP MSA1000, Microsoft Internet Explorer v5.0 (or above) with the Microsoft Virtual Machine update is required.

Refer to the Appendix for more detailed information on Migration Prerequisites and Migrations Limitations.

Data Drive Migration Steps

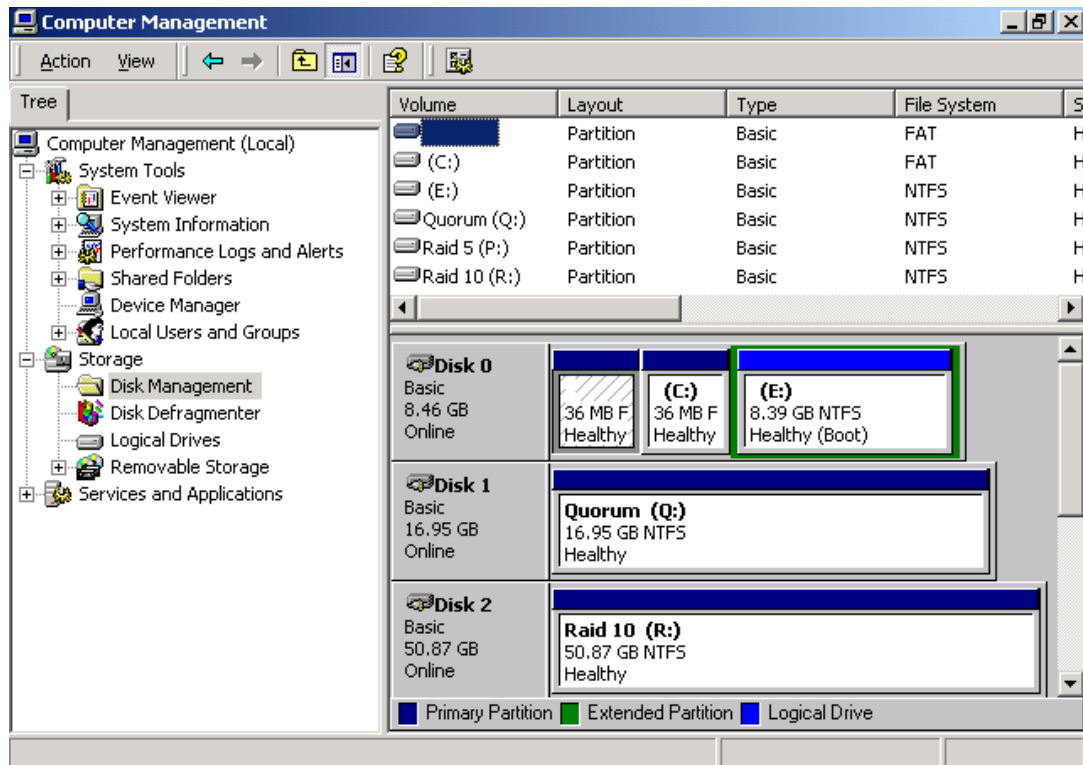
Windows 2000 FCA2101 HBA Driver Installation

1. Back up and verify all data on the drives to be migrated to tape or disk.
2. Note and record the current configuration of all arrays and note which drives are part of which array. This can be done in Array Controller Utility (ACU) by highlighting one of the arrays and noting the drives that are flashing on the current SCSI array unit.
3. Power down the server. If you are running a cluster environment, power down all secondary nodes first and then power down the primary node (owner) last.
4. Remove the existing HP StorageWorks Fibre Channel host bus adapter (RA 4100) or the HP Smart Array Controller from the server and replace with the HP FCA2101 HBA. It is important to note that **all volumes** controlled by either the RA4100 or the HP Smart Array controller **must** be migrated to the MSA1000.
5. Install the HP FCA2101 HBA in the server slot and attach the fiber optic interconnect component for appropriate communication to the MSA1000. Interconnect drawings are shown on the *HP StorageWorks Modular SAN Array 1000 Installation Overview* poster that was shipped with the equipment. Ensure that all interconnect components are in place for proper communication from the FCA2101 to the MSA1000.

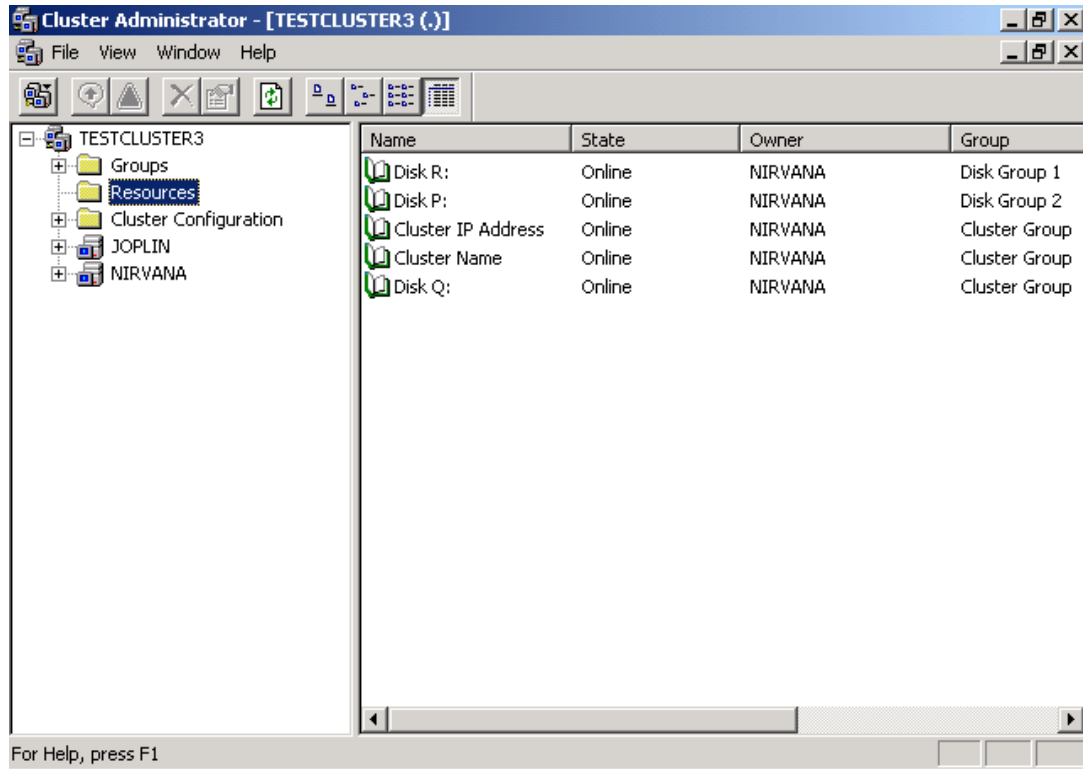
6. Migrate the drives from the existing arrays (for example, RA4100 or Smart Array controllers) to the MSA1000. Drive order is not important although it is recommended that drives be moved to the same bay position in the new unit. Note and record the locations of the drives and their corresponding arrays in case that information is needed for later use.
7. Make sure all drives are fully seated in the MSA1000 and power it on. When the startup process of the MSA1000 is complete, the following message displays:
“01 COMPAQ MSA1000 STARTUP COMPLETE”
8. Scroll back through the messages on the MSA1000 display and verify that the number of volumes (arrays) you intended to migrate are detected. This can be verified by the message:
“120 Configured Volumes: X” (where X is the number of volumes migrated/detected)
9. After the MSA1000 reports the correct number of migrated volumes, power on your server and run the server vendor's BIOS setup utility. Use the BIOS setup utility to perform the vendor-specific tasks required to install the adapter (if applicable). Save the configuration, and perform a reboot of the server.
MSCS Cluster Note: If you are running a cluster environment, power on the primary node in the cluster (the last server that was powered down) and continue to follow the Migration Steps for the appropriate Operating System. After all Migrations Steps have been completed, repeat the steps for the other server members of your cluster.
10. When Windows 2000 has started, the Plug-and-Play message ‘Found New Hardware’ pop-up windows will appear stating it has found a ‘Fibre Channel Controller and Installing...’ for each HBA detected.
11. The New Hardware Wizard window appears next for each HBA found. Click Cancel to exit each Wizard screen.
12. Insert the MSA1000 Support Software v5.31 or higher CD into the CD-ROM drive and let it autostart the HP MSA1000 Setup Installation Program.
13. Click Agree for the License Agreement (after reading it) to continue the setup program.
14. Select the Install Windows 2000 Drivers option button from the HP Support Software Setup screen option list.

15. The HP Setup screen window appears with the following description:
“HP KGPSA-xx, PCI-Fibre Channel Host Bus Adapter Driver Software
Version: 5-4.54.7.”
16. After the Setup program determines that the HBAs are physically installed in the system, the following statement displays:
“Setup is ready to begin the install process. Please review the information about the current package below before continuing.”
17. The following confirmation screen appears:
“The software is not installed on the system, but is supported for installation.”
18. When the following message appears...
“Press the [Install] button to continue with the install or [Close] button to cancel.”
...click Install to begin the process.
19. A rotating “Q” indicates the installation is in progress. Several Found New Hardware messages will appear and disappear as the drivers are installed for each device.
20. The following message displays:
“The installation was completed successfully”.
21. The system must reboot to finish the driver installation. If you do not wish to reboot, click Close to exit Setup.

22. After the system reboots, ensure that all the drives are recognized in the Microsoft Management Console (MMC) and that all clients and applications properly recognize all data on the drives. To access Disk Management, either:
- From the Control Panel, select Administrative Tools and then Computer Management and Disk Management.
 - Right-click My Computer and choose Manage and then Disk Management



23. If migrating a cluster, ensure that all the drives are recognized in Cluster Administrator by going to Cluster Administrator under the Administrative Tools in the Programs menu of the Start button. Once this is verified, repeat steps 4-6 and 11-24 for all other servers in the cluster.

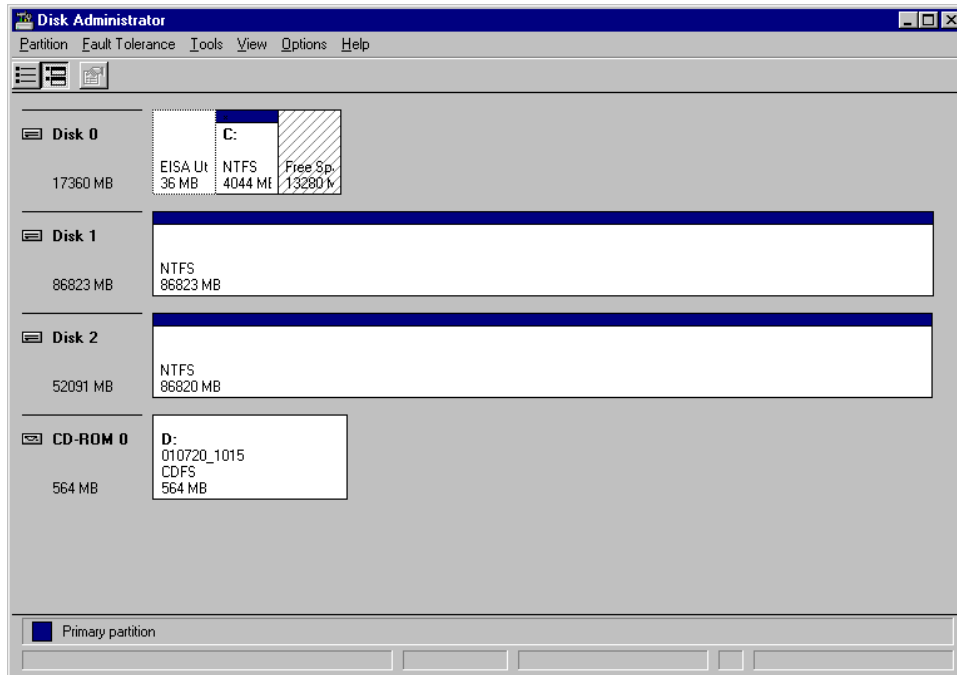


Windows NT 4.0 FCA2101 HBA Driver Installation

1. Back up and verify all data on the drives to be migrated to tape or disk.
 2. Note and record the current configuration of all arrays and note which drives are part of which array. This can be done in Array Controller Utility (ACU) by highlighting one of the arrays and noting the drives that are flashing on the current SCSI array unit.
 3. Power down the server. If you are running a cluster environment, power down all secondary nodes first and then power down the primary node (owner) last.
 4. Remove the existing HP StorageWorks Fibre Channel host bus adapter (RA 4100) or the HP Smart Array Controller from the server and replace with the HP FCA2101 HBA. It is important to note that **all volumes** controlled by either the RA4100 or the HP Smart Array controller **must** be migrated to the MSA1000.
 5. Install the HP FCA2101 HBA in the server slot and attach the fiber optic interconnect component for appropriate communication to the MSA1000. Interconnect drawings are shown on the *HP StorageWorks Modular SAN Array 1000 Installation Overview* poster that was shipped with the equipment. Ensure that all interconnect components are in place for proper communication from the FCA2101 to the MSA1000.
 6. Migrate the drives from the existing arrays (for example, RA4100 or Smart Array controllers) to the MSA1000. Drive order is not important although it is recommended that drives be moved to the same bay position in the new unit. Note and record the locations of the drives and their corresponding arrays in case that information is needed for later use.
 7. Make sure all drives are fully seated in the MSA1000 and power it on. When the startup process of the MSA1000 is complete, the following message displays:
“01 COMPAQ MSA1000 STARTUP COMPLETE”
 9. Scroll back through the messages on the MSA1000 display and verify that the number of volumes (arrays) you intended to migrate are detected. This can be verified by the message:
“120 Configured Volumes: X” (where X is the number of volumes migrated/detected)
 10. After the MSA1000 reports the correct number of migrated volumes, power on your server and run the server vendor's BIOS setup utility. Use the BIOS setup utility to perform the vendor-specific tasks required to install the adapter (if applicable). Save the configuration, and perform a reboot of the server.
- MSCS Cluster Note:** If you are running a cluster environment, power on the primary node in the cluster (the last server that was powered down) and continue to follow the Migration Steps for the appropriate Operating System. After all Migrations Steps have been completed, repeat the steps for the other server members of your cluster.
11. When Windows NT 4.0 has started, insert the MSA1000 Support Software v5.31 or higher CD into the CD-ROM drive, and let it autostart the Setup Installation Program.
 12. Click Agree for the License Agreement to continue the setup program.
 13. Select the Install Windows NT 4.0 HBA Drivers option button from the HP Support Software Setup screen option list.

14. The ‘HP Setup for Microsoft Windows NT 4.0’ screen window appears with the details “Emulex LP6000/LP7000/LP8000/LP9000/LP850/LP950, PCI-Fibre Channel Adapter Driver.” The status window indicates “The Software component for the supported hardware is not installed,” and is followed by the driver file version, time stamp, and date stamp.
15. The [Install] and [Exit] icon options appear.
16. Click Install when the “Press the [Install] button to continue with the install or [Exit] button to cancel” window appears.
17. The FCA2101 HBA install begins and a progress bar window appears.
18. The HP Setup Window appears when the files have finished installing with the message “Press the EXIT button on the Main Window to complete the Installation.” Click OK to close this window and return to the Main Window.
19. A Reboot Computer window appears. Remove the MSA1000 Support Software v5.31 or higher CD from the CD-ROM drive and click Reboot Now.
20. After the system reboots, click **Start → Control Panel → SCSI Devices → Drivers**. The driver appears in the window as ‘Emulex LP6000, LP7000, LP8000, LP9000, LP850, LP950 Fibre Channel Adapter Driver.’

21. Ensure that all the drives are recognized in Disk Administrator and that all clients and applications properly recognize all data on the drives. To access Disk Administrator, go to **Start → Programs → Administrator Tools (Common) → Disk Administrator**.



22. If migrating a cluster, ensure that all the drives are recognized in Cluster Administrator by going to Cluster Administrator under the Administrative Tools in the Programs menu of the Start button. Once this is verified, repeat steps 4-6 and 11-22 for all other servers in the cluster.

Migration Steps for Boot Drives - Microsoft NT 4.0 and Windows 2000 Advanced Server

Boot drives controlled by Smart Array controllers can be migrated to the MSA1000, allowing the server to boot externally from the SAN.

Important notes:

ALL drives controlled by a Smart Array controller must also be migrated to the SAN (not just the boot drives). **The following steps for Boot drive migrations assumes that an HBA has already been installed in the server, the necessary OS drivers have been loaded, and there may be other volumes already created on the MSA1000.**

Boot Drive Migration Prerequisites

NOTE: The memory paging system requires fast access to the *pagefile.sys* file. In some cases, in SAN environments with heavy I/O loads, the access request for moving information to or from the paging file may be delayed. This can cause the operating system to halt, requiring a reboot to recover. Microsoft recommends that if paging errors occur, page files should be relocated to disks that are built into the server using its internal data paths. Microsoft has published a technical article with additional recommendations related to booting from a SAN at:

<http://support.microsoft.com/default.aspx?scid=kb;EN-US;q305547>

Several steps must be taken to obtain background information to maintain a seamless transition from direct attach Smart Array controlled boot drives to the MSA1000.

1. The first step is to upgrade both the firmware of the MSA1000, and also the driver, firmware, and boot BIOS of the StorageWorks FCA2101 HBA. Minimum levels are:

MSA1000 2.3x or above

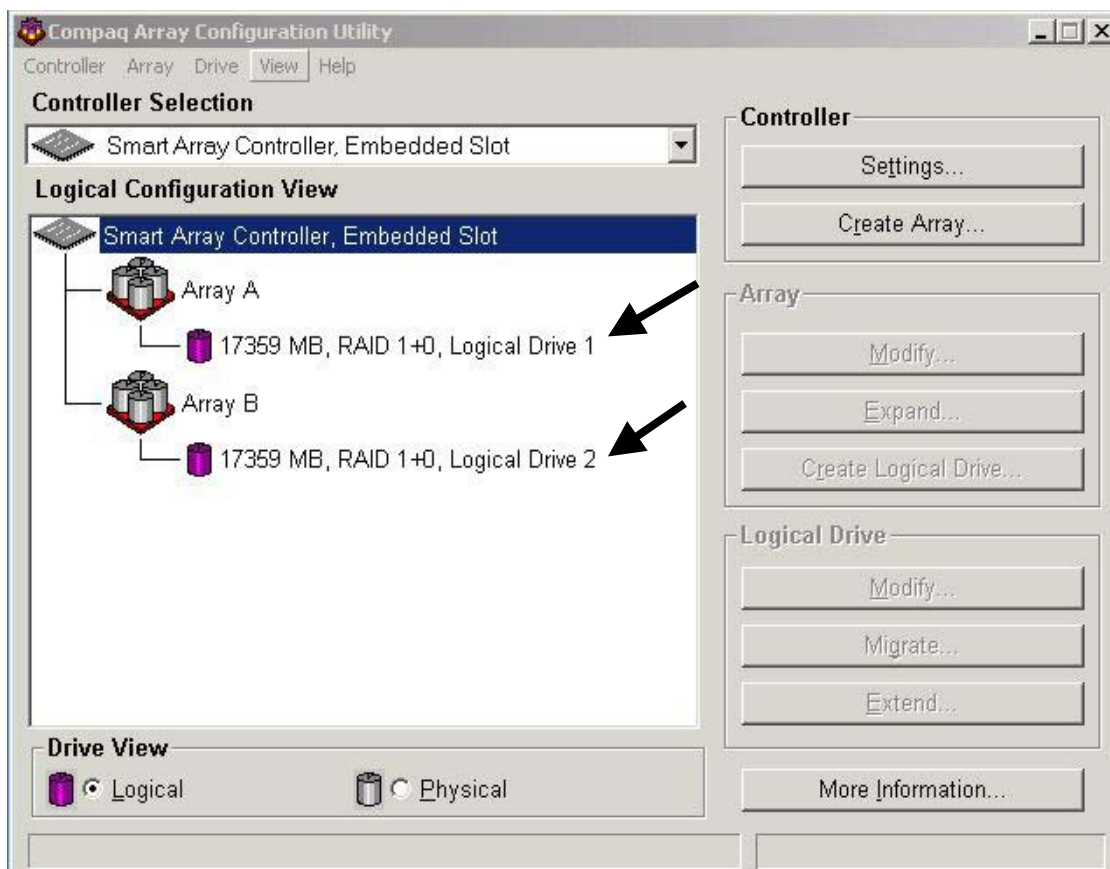
FCA2101 HBA driver version x82.a9, firmware version 3.82a1, and Boot BIOS version 1.61a2 or above (See HP website for latest supported versions on MSA1000).

Firmware and driver updates can be obtained from either the MSA1000 Support Software CD version 6.11 or from this webpage:

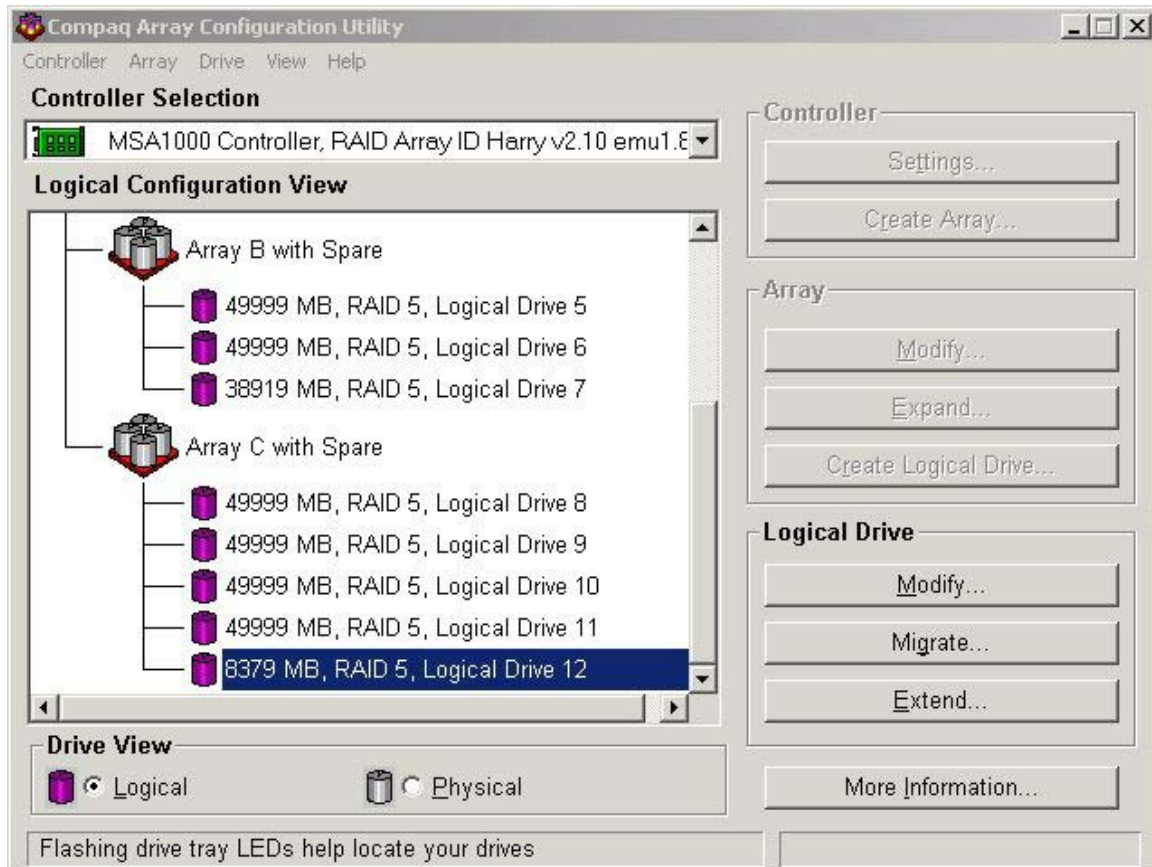
<http://www.compaq.com/storage/diskarrays-support.html>

It is important to note that migrating boot drives to the SAN changes the complexity / procedures for MSA1000 controller Firmware updates, and also for the server's HBA firmware / driver updates.

2. The second step is to determine which LUN is the boot LUN for the server. Below is a screen shot from the Array Configuration Utility (ACU) of a server with a direct attach boot Logical Drive (LUN) and a data LUN that controlled by the **Internal Smart Array Controller**. These are the volumes to be migrated to the MSA1000. A LUN (Logical Unit Number) is a sub-addressing scheme that each SCSI Device has. In this case, the Logical Drive X can be associated with a LUN. For instance, in the below picture, Logical Drive 1 is the boot LUN, and Logical Drive 2 is the data LUN.



The next screen shot is also of ACU, but now we are looking at the **MSA1000 Controller**, and the Logical Drives / LUN's that have been created on it.



Notice that there are a total of 12 Logical Drives / LUN's currently controlled by the MSA1000. Once we migrate the 2 Logical Drives / LUN's from the internal Smart Array controller, the MSA1000 will control a total of 14 LUN's.

This information is important because when you select the boot LUN from the MSA1000, there is not enough information to determine which LUN is the migrated boot LUN, unless investigation has been done prior, making it possible to determine which is the boot LUN.

```
Adapter 1: S_ID:000001 PCI Bus #:02 PCI Device #:09

ALPA:02 SelectID:7C      WWPN:500805F3 00011031

01.      LUN:01          COMPAQ  MSA1000 VOLUME  2.10
02.      LUN:02          COMPAQ  MSA1000 VOLUME  2.10
03.      LUN:03          COMPAQ  MSA1000 VOLUME  2.10
04.      LUN:04          COMPAQ  MSA1000 VOLUME  2.10
05.      LUN:05          COMPAQ  MSA1000 VOLUME  2.10
06.      LUN:06          COMPAQ  MSA1000 VOLUME  2.10
07.      LUN:07          COMPAQ  MSA1000 VOLUME  2.10
08.      LUN:08          COMPAQ  MSA1000 VOLUME  2.10
09.      LUN:09          COMPAQ  MSA1000 VOLUME  2.10
10.      LUN:0A          COMPAQ  MSA1000 VOLUME  2.10
11.      LUN:0B          COMPAQ  MSA1000 VOLUME  2.10
12.      LUN:0C          COMPAQ  MSA1000 VOLUME  2.10
13.      LUN:0D          COMPAQ  MSA1000 VOLUME  2.10
14.      LUN:0E          COMPAQ  MSA1000 VOLUME  2.10

Enter a Selection:
B#W: Boot number via WWPN. B#D: Boot number via DID
Enter <x> to Exit          <PageUp> to Previous Menu
```

For instance, remember that in our scenario above, the MSA1000 Controller has 12 LUNs, and the Internal Smart Array had 2 LUNs. Viewing an FCA2101 utility screen (above), you can see that all 14 LUNs are now controlled by the MSA1000. 13 and 14 are the two LUNs that were migrated from the Internal Smart Array Controller. These two LUNs will show up appended to an existing list of LUNs. Without having done the research, it would be difficult to determine that “**13. LUN: 0D**” was the boot LUN that had been migrated from the Internal Smart Array Controller

Boot Drive Migration Steps

1. The first step in the boot drive migration process is to shut down the server, after cleanly exiting any applications that are running. Further, you should power down the MSA1000 (making sure other servers are not performing I/O on the MSA1000).
2. Power on the server, and at the F10 prompt, enter into the server's setup utility (alternatively, you can boot off of the Smart Start CD). The setup utility should detect the addition of the StorageWorks FCA2101 HBA. Go to the configure hardware section, and set the StorageWorks FCA2101 adapter as 'Controller Order First'.

```

Step 3: View or edit details                                     Help=F1
Slot 2 - PCI PCI Bridge - Bus 6
  PCI Function 1..... Enabled

Bus 6 - Compaq NC3131 Fast Ethernet NIC (Port 1)
  Network Resources..... Enabled

Bus 6 - Compaq NC3131 Fast Ethernet NIC (Port 2)
  Network Resources..... Enabled

Slot 4 - Compaq StorageWorks FCA2101
  Controller Resources..... Enabled

  Controller Order..... First

Slot 6 - Compaq Remote Insight Lights-Out Edition - Bus 1      Auto-Added
  Server Identification
  PCI Resources..... Enabled

More: PgUp/PgDn
>Edit=ENTER< <Edit Resources=F6> <Advanced=F7> <Done=F10>

```

3. Save Changes (F10), and exit the setup utility. As the server is rebooting, power it down.
4. Move all the drives controlled by the Smart Array controller to open, contiguous slots on the MSA1000.
5. If there are other servers accessing volumes on the MSA1000 that you are migrating these boot drives to, run ACU on one of those servers and use Selective Storage Presentation (SSP) to restrict access so that the correct server only has access to the boot LUN. See **Considerations** section for more information.
6. Power on the MSA1000 – As the MSA1000 boots, a message will appear on the MSA1000 LED that new volumes have been detected (this number will of course correspond to the number of volumes migrated from the Smart Array controller).
7. Power up the server.
8. During the server's POST, you will see a screen that looks like the one below. Press <Alt E> to start the Emulex BIOS utility.

```
!!! Emulex LP950 BIOS, Copyright 2002 !!!   RB1.61A1
Press <Alt E> to go to Emulex BIOS Utility
Press <s> to skip Emulex BIOS
```

2. You are presented with a list of HBA's in the server.
Press 1 → Enter to select the displayed HBA

```
Emulex Light Pulse BIOS Utility, RB1.61A1
Copyright 1997 - 2002 Emulex Corp

Emulex Adapters in the System:

1.  LP950:          PCI Bus #:02 PCI Device #:09

Enter a Selection:

Enter <x> to Exit
```


3. You are presented with two selections. Note the options at the bottom of the screen to navigate through the menus.

Press 2 → Enter to select **Configure This Adapter's Parameters**.

```
Adapter 1:      PCI Bus #:02 PCI Device #:09

LP950:   I/O Base: 3000   Firmware Version: RS3.82A1
Port Name: 10000000 C92B678A   Node Name: 20000000 C92B678A
Topology: Auto Topology: Loop first (Default)

1. Configure Boot Devices
2. Configure This Adapter's Parameters

Enter a Selection:

Enter <x> to Exit   <d> to Default Values   <PageUp> to Previous Menu
```

You are presented with 9 options.

Press 1 → Enter to **Enable or Disable BIOS**

```
Adapter 1:          PCI Bus #:02 PCI Device #:09

LP950:   I/O Base: 3000   Firmware Version: RS3.82A1
Port Name: 10000000 C92B678A   Node Name: 20000000 C92B678A
Topology: Auto Topology: Loop first (Default)

1. Enable or Disable BIOS
2. Change Default ALPA of this adapter
3. Change PLOCI Retry Timer (+Advanced Option+)
4. Topology Selection (+Advanced Option+)
5. Enable or Disable Spinup delay (+Advanced Option+)
6. Auto Scan Setting (+Advanced Option+)
7. Enable or Disable EDD 3.0 (+Advanced Option+)
8. Enable or Disable Start Unit Command (+Advanced Option+)
9. Enable or Disable Environment Variable (+Advanced Option+)
A. Auto Sector Format Select (+For MSA1000 Array Use Only+)

Enter a Selection:

Enter <x> to Exit          <PageUp> to Previous Menu
```

4. Enable the BIOS (for BOOT)

Press 1 → Enter to enable the BIOS

```
Adapter 1:          PCI Bus #:02 PCI Device #:09

The BIOS is Disabled!!

Enable Press 1, Disable Press 2:1

Enter <x> to Exit          <PageUp> to Previous Menu
```

5. Press the Page Up key twice to return to this menu.

Press 1 → Enter to **Configure Boot Devices**

```

Adapter 1:      PCI Bus #:02 PCI Device #:09

LP950:   I/O Base: 3000   Firmware Version: RS3.82A1
Port Name: 10000000 C92B678A   Node Name: 20000000 C92B678A
Topology: Auto Topology: Loop first (Default)

1. Configure Boot Devices
2. Configure This Adapter's Parameters

Enter a Selection:

Enter <x> to Exit   <d> to Default Values   <PageUp> to Previous Menu

```

6. You are presented with a list of saved boot devices (below).

Press 1 → Enter to select **Primary Boot**

```

Adapter 1:   S_ID:000001 PCI Bus #:02 PCI Device #:09

List of Saved Boot Devices:

1. Unused   DID:000000 WWPN:00000000 00000000 LUN:00   Primary Boot
2. Unused   DID:000000 WWPN:00000000 00000000 LUN:00
3. Unused   DID:000000 WWPN:00000000 00000000 LUN:00
4. Unused   DID:000000 WWPN:00000000 00000000 LUN:00
5. Unused   DID:000000 WWPN:00000000 00000000 LUN:00
6. Unused   DID:000000 WWPN:00000000 00000000 LUN:00
7. Unused   DID:000000 WWPN:00000000 00000000 LUN:00
8. Unused   DID:000000 WWPN:00000000 00000000 LUN:00

Select a Boot Entry:

Enter <x> to Exit                               <PageUp> to Previous Menu

```

7. You are prompted to select the desired boot device

Enter **01** then press Enter

```
Adapter 1: S_ID:000001 PCI Bus #:02 PCI Device #:09

00. Clear selected boot entry!!
01. ALPA:02(7C) WWPN:500805F3 00011031 LUN:01   COMPAQ  MSA1000 VOLUME  2.10

Select The Two Digit Number of The Desired Boot Device:

Enter <x> to Exit   <PageUp> to Previous Menu   <PageDn> to Next Page
```

8. You are then prompted to enter a starting LUN. Enter **00**, then press Enter

```
Adapter 1: S_ID:000001 PCI Bus #:02 PCI Device #:09

00. Clear selected boot entry!!
01. ALPA:02(7C) WWPN:500805F3 00011031 LUN:01   COMPAQ  MSA1000 VOLUME  2.10

ALPA:02(7C) WWPN:500805F3 00011031
Enter two digits of starting LUN (Hex):00
<PageUp> to Previous Menu

Select The Two Digit Number of The Desired Boot Device:01

Enter <x> to Exit   <PageUp> to Previous Menu
```

That will then display a list of ALL LUN's that have been configured on the MSA1000. It is at this point that the research at the beginning of the migration process pays off. From a previous section, you know that the MSA1000 had a total of 12 Logical Drives. You then migrated another two logical drives to the MSA1000. Of the two logical drives that you migrated, the first one is the boot LUN of the server. Consequently, you would enter **13** (in this case) as the desired boot LUN

9. Enter 13, then Enter

```
Adapter 1: S_ID:000001 PCI Bus #:02 PCI Device #:09

ALPA:02 SelectID:7C      WWPN:500805F3 00011031

01.      LUN:01           COMPAQ  MSA1000  VOLUME  2.10
02.      LUN:02           COMPAQ  MSA1000  VOLUME  2.10
03.      LUN:03           COMPAQ  MSA1000  VOLUME  2.10
04.      LUN:04           COMPAQ  MSA1000  VOLUME  2.10
05.      LUN:05           COMPAQ  MSA1000  VOLUME  2.10
06.      LUN:06           COMPAQ  MSA1000  VOLUME  2.10
07.      LUN:07           COMPAQ  MSA1000  VOLUME  2.10
08.      LUN:08           COMPAQ  MSA1000  VOLUME  2.10
09.      LUN:09           COMPAQ  MSA1000  VOLUME  2.10
10.      LUN:0A           COMPAQ  MSA1000  VOLUME  2.10
11.      LUN:0B           COMPAQ  MSA1000  VOLUME  2.10
12.      LUN:0C           COMPAQ  MSA1000  VOLUME  2.10
13.      LUN:0D           COMPAQ  MSA1000  VOLUME  2.10
14.      LUN:0E           COMPAQ  MSA1000  VOLUME  2.10

Enter a Selection: 13
B#W: Boot number via WWPN. B#D: Boot number via DID
Enter <x> to Exit                <PageUp> to Previous Menu
```

After selecting 13 as the desired boot LUN, you will need to select how to boot this device – via WWN (World Wide Name) or DID (Device ID).

10. Enter 1 for **Boot this device via WWN**

```

Adapter 1:  S_ID:000001 PCI Bus #:02 PCI Device #:09

ALPA:02 SelectID:7C      WWPN:500805F3 00011031

01.      LUN:01          COMPAQ  MSA1000 VOLUME  2.10
02.      LUN:02          COMPAQ  MSA1000 VOLUME  2.10
03.      LUN:03
04.      LUN:04
05.      LUN:05          DID:000002 WWPN:500805F3 00011031  LUN:
06.      LUN:06
07.      LUN:07
08.      LUN:08
09.      LUN:09
10.      LUN:0A
11.      LUN:0B
12.      LUN:0C
13.      LUN:0D          COMPAQ  MSA1000 VOLUME  2.10
14.      LUN:0E          COMPAQ  MSA1000 VOLUME  2.10

Enter a Selection: 13
B#W: Boot number via WWPN. B#D: Boot number via DID
Enter <x> to Exit                                <PageUp> to Previous Menu

```

You are then brought back the List of Saved Boot Devices screen.

11. Press X to exit.

```

Adapter 1:  S_ID:000001 PCI Bus #:02 PCI Device #:09

List of Saved Boot Devices:

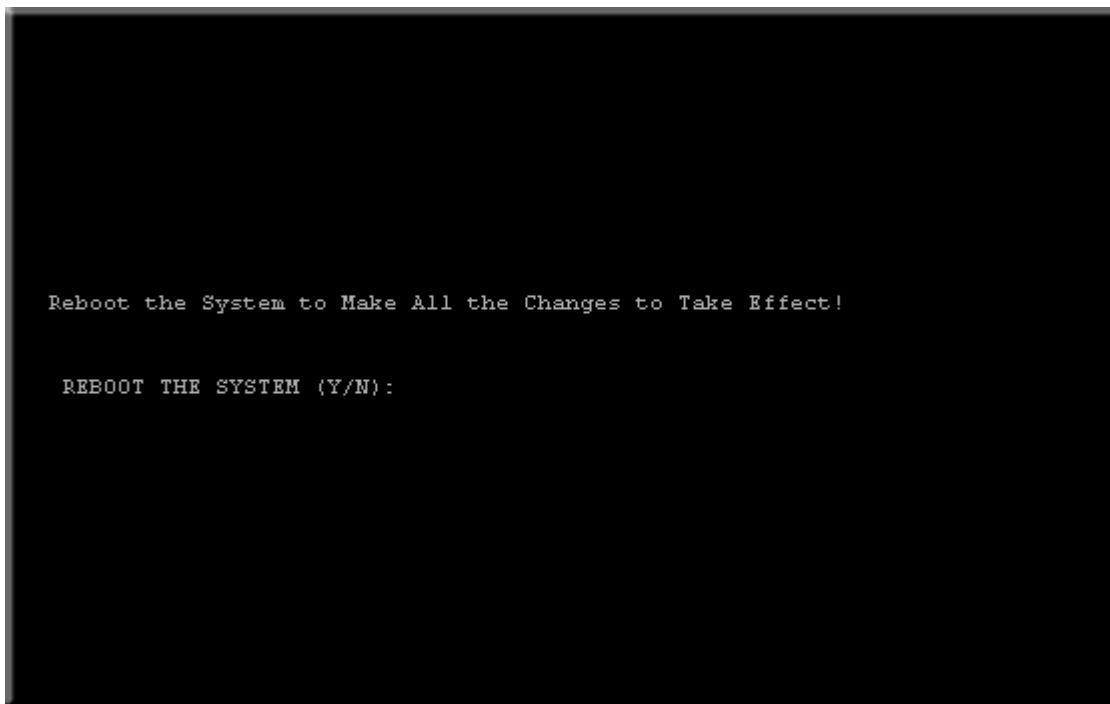
1. Used      DID:000000 WWPN:500805F3 00011031 LUN:0D  Primary Boot
2. Unused    DID:000000 WWPN:00000000 00000000 LUN:00
3. Unused    DID:000000 WWPN:00000000 00000000 LUN:00
4. Unused    DID:000000 WWPN:00000000 00000000 LUN:00
5. Unused    DID:000000 WWPN:00000000 00000000 LUN:00
6. Unused    DID:000000 WWPN:00000000 00000000 LUN:00
7. Unused    DID:000000 WWPN:00000000 00000000 LUN:00
8. Unused    DID:000000 WWPN:00000000 00000000 LUN:00

Select a Boot Entry:

Enter <x> to Exit                                <PageUp> to Previous Menu

```

12. Press Y to reboot the system

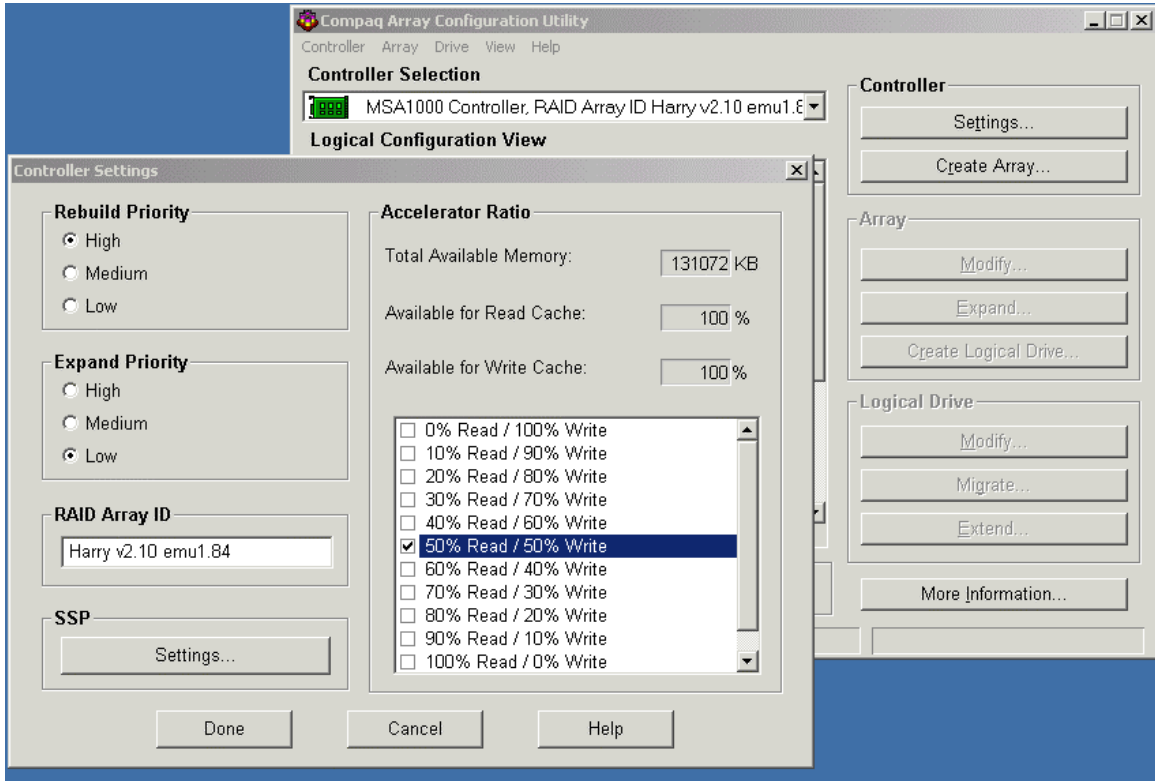


When the server reboots, it will now boot via the MSA1000 controller.

The next logical step will be to run ACU and Selective Storage Presentation (SSP) to restrict access to this server's boot LUN. See the following section entitled **Considerations**.

Considerations

If multiple servers are accessing a single StorageWorks MSA1000, best practices would dictate that you enable SSP (Selective Storage Presentation). SSP is an access control feature that allows multiple hosts running multiple applications on the SAN to have controlled access to MSA1000 storage on the SAN. This selective access allows policies to be set to determine which servers can access which storage, down to a logical volume level.



For more Information, please read:

MSA1000 User Guide

MSA1000 SAN Configuration Guide

Appendix

Migration Prerequisites and Migration Limitations

- The Smart Array 5304 and 4200 controllers have 4 channels that can control up to 4 external chassis. While the MSA1000 also has 4 channels, only two are available externally, as two are used for the internal 14-drive shelf. For instance, consider a Smart Array 5304 or 4200 installation: a single array on channel 1 and a single array on channel 2, and a third array that spans channels 3 and 4, the array that spans channel 3 and 4 will have to be migrated to a separate MSA1000. If you follow this method of migration, the MSA1000 may prompt you to **enable volumes (y/n)** and/or that MSA1000 may report that some drives/volumes are missing. Answer ‘yes’ to enabling the volumes and the migration will be complete. **Please Note: Once the drives have been migrated to the MSA1000, you cannot fall back to the Smart Array controller and have the controller recognize the array / volume structures. The RAID Information Service (RIS) will be overwritten by the MSA1000, and the Smart Array controller cannot interpret it to recreate the array and volume structure – ALL DATA WILL BE LOST.**
- All arrays and volumes controlled by either a Smart Array controller or an RA4100 controller must be moved during the migration process. The DtS Architecture does not support a partial migration. Furthermore, do not attempt an operating system upgrade during the migration. Perform the DtS Migration first, verify that all volumes are available, perform and verify another Full Backup, then proceed with the operating system upgrade.
- Do not attempt a migration if one of the disk drives is marked as “Failed”. Replace the failed disk drive and allow the array to be rebuilt before performing the migration.
- Do not attempt a migration if there are unconfigured drives in either the MSA1000 or attached StorageWorks Enclosures (Model 4314R / 4354R). These drives must either be configured or removed from the chassis for the migration to occur successfully.
- If you are migrating from multiple Smart Array controllers or RA 4100’s, migrate one Smart Array controller or RA 4100 at a time. Move the drives or the drive shelf, and power on the MSA1000. Ensure that the MSA1000 (after full power up) detects the appropriate number of volumes. Power down the MSA1000, and migrate the next set of Smart Array / RA 4100 controlled drives or drive shelf. Again ensure that the MSA1000 (after full power up) detects the appropriate number of migrated volumes. Please note and record drive and shelf location as well as array configurations (via ACU) before the migrations.
- If migrating from an RA 4100 to the MSA1000, there will be two open drive slots. These slots can be filled with more drives, and a separate logical volume created on them.
- If you have spare drives configured in your arrays, you may have to reassign the spare to your array (via HP ACU) after the migration procedure.
- In certain cases, Selective Storage Presentation (SSP) may have to be reconfigured when migrating from an RA4100 to the MSA1000.
- If you have StorageWorks SWVR loaded, the data migrations should work. Many migration scenarios were tested with SWVR without failure.

- In an RA4100 environment, if you have HP SANworks Secure Path installed, you must disable and remove this software prior to the DtS Migration. After a successful migration has occurred, install Secure Path V3.1B for Windows Workgroup Edition (for MSA1000), as the older version of Secure Path is not compatible with the MSA1000. (NOTE: If the version of MSA1000 firmware is 2.1X or greater, you will need to install Secure Path V4.0 for Windows Workgroup Edition).
- Secure Path will not provide redundancy to the boot LUN. Secure Path will only provide redundancy after the operating system has loaded, not during OS load / boot.

Dual Bus vs. Single Bus Drive Enclosures

If you are migrating a dual bus drive enclosure that enclosure will occupy both external SCSI buses on the HP MSA1000. Please ensure which models you are migrating from and plan accordingly prior to the migration. Supported enclosures include the following HP models:

StorageWorks Enclosure Model 4314R (Maximum of two can be connected to the MSA1000)

190209-001

190209-B31 (Int'l)

190209-291 (Japan)

StorageWorks Enclosure Model 4354R (Maximum of one can be connected to the MSA1000)

190211-001

190211-B31 (Int'l)

190211-291 (Japan)

MSA1000 fallback to RA4100 or Smart Array controllers

Follow these steps to restore your former configurations (HP Smart Array controlled volumes or HP RA 4100 controlled volumes) from the MSA1000:

1. Power down the server.
2. Remove the FCA2101 HBA.
3. Replace the FCA2101 HBA with the legacy controller (either the HP StorageWorks 64-bit/66-Mhz Fibre Channel Host Adapter or the HP Smart Array controller).
4. Migrate the disk drives back to the legacy RA 4100 or Smart Array controller, taking care to restore the drives to their position prior to the migration.
5. Power up the server, and install the drivers required for the legacy controller.
6. After the reboot, you must reassign and recreate the Array and Volume information through HP Array Configuration Utility (ACU).
7. **The legacy controller will not be able to read the restored Array and Volume information correctly. Therefore, you MUST enter the Array and Volume information EXACTLY as it was set up before the migration to the MSA1000 via HP ACU. This is why it is imperative that you note and record the Array information and Volume information PRIOR to performing the migration. NOTE: If you have migrated 4 external channels from a Smart Array 5304 or 4200 to the MSA1000 (as described in Migration Prerequisites and Migration Limitations) you will not be able to fall back and have the Smart Array 5304 or 4200 recognize the array or volume structures.**
8. A reboot of the server will be required.