

December 2002
Document Number
178B-0902A-WWEN
Prepared by:
Network Storage Solutions
Hewlett Packard Company

Contents

Migrating Data from Smart Array controllers and RA4100 controllers.....	3
Installation Notes and Prerequisites:.....	3
Data Drive Migration Steps:.....	3
Considerations	6
Appendix	7
Migration Prerequisites and Migration Limitations	7
MSA1000 fallback to RA4100 or Smart Array controllers	9

DtS Data Migration to the MSA1000 – Linux Environments

***Abstract:** This white paper outlines step-by-step procedures for data migration from Direct Attach Storage on Smart Array Controllers and RA4100 controllers 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

© 2002 HP Computer Corporation

HP, StorageWorks, Smart Array, SupportPak, and the HP logo are trademarks of Hewlett Packard Company.

Other product names mentioned herein may be trademarks of their respective companies.

HP shall not be liable for technical or editorial errors or omissions contained herein. The information in this document is provided “as is” without warranty of any kind and is subject to change without notice. The warranties for HP products are set forth in the express limited warranty statements accompanying such products. Nothing herein should be construed as constituting an additional warranty.

Migrating Data from Smart Array controllers and RA4100 controllers

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 FCA2214 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 FCA2214 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: Operating System levels for the host computers are: Linux Red Hat 2.1 Advanced Server, Linux Red Hat 7.2 Professional, and Linux SuSE SLES7. For configuration of the HP MSA1000, Microsoft Internet Explorer v5.0 (or above) with the Microsoft Virtual Machine update is required.

Kernel source must be installed for the driver installation to complete. If kernel source is not installed, please see your vendor's documentation for steps on installing it

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

Data Drive Migration Steps:

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.
4. Install the HP FCA2214 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 MSA1000. Ensure that all interconnect components are in place for proper communication from the FCA2214 to the MSA1000.
5. 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.
6. Log on as root and mount the MSA1000 Support Software CD for NetWare / Linux.
7. Create a temporary directory for the HBA source code.
8. Navigate to the \LINUX directory on the CD.

9. Copy msinstall to the temporary directory.
10. Extract the contents of the FCA2214 HBA driver source to the temporary directory using the following command:

```
# tar -xvzf qla2x00src-v6.0.2.tgz -C <dir>
```

where <dir> is the path and name of the temporary directory created above.
11. Navigate to the temporary directory.
12. Run the provided script to rebuild a new kernel for use with the driver by entering:

```
# ./msinstall
```

This script will compile a new kernel image, which allows Linux to detect the MSA1000 Controller and its configured LUNs. Without it, only the MSA1000 Controller will be recognized. The boot loader will be configured to boot to this new kernel. This process may take awhile.
13. Once this has completed, you will need to reboot. Eject the MSA1000 Support Software CD for Netware / Linux and reboot.
14. Once the system's OS is backup up, log on as root again.
15. To load the driver, type:

```
# insmod qla2300
```

NOTE: The install process will attempt to put the HBA drivers in the startup scripts and in initrd. Please verify that the script added these – if not, it will have to be done manually.
16. Shut down the Server and its attached storage (if it is external).
17. Physically 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.
18. 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"
```
19. 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)
20. After the MSA1000 reports the correct number of migrated volumes, power on your server.
21. As the Operating System loads, most of the volumes should mount based on `etc/fstab` settings. If necessary, perform the command

```
# mount -a
```

Which will mount all volumes listed in `etc/fstab`. However, you may want to modify `etc/fstab` so these volumes will mount automatically. If `etc/fstab` is modified to mount the volumes (changing from Smart Array or RA4100 to MSA1000). Make a copy of `etc/fstab` (such as `etc/fstab.old`) in case a fall back is needed to the old controller – see Fall Back section

22. The volumes should now be mounted and controlled by the MSA1000.

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 external as two are used for the internal 14-drive shelf. If migrating from a Smart Array 5304 or 4200 to an MSA1000, only three of the channels can be migrated to a single MSA1000. The fourth channel will have to be migrated to a second MSA1000. **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 a server consolidation or operating system upgrade during the migration. Perform the DtS Migration first, verify that all volumes are available, perform and verify another Full Backup, then carry on with the server consolidation or operating system upgrade.
- Do not attempt a migration if one of the drives is marked as “FAILED”. Replace the failed drive, and let the array rebuild before 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.
- Secure Path is not supported by the MSA1000 in an external boot (SAN boot) environment.

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. Modify etc/fstab (back to original – rename if saved)
2. Install drivers for legacy controller
3. Power down the server.
4. Remove the FCA2214 HBA.
5. Install the legacy controller (either the HP StorageWorks 64-bit/66-Mhz Fibre Channel Host Adapter or the HP Smart Array controller).
6. 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.
7. Power up the server.
8. After the reboot, you must reassign and recreate the Array and Volume information through HP Array Configuration Utility (ACU).
9. **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.**
10. A reboot of the server may or may not be required.