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HOWTO

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Communications

Compaq Computer Corporation

Contents

Converting Smart Array Cluster Storage to a Modular SAN Array for Additional Scalability

DAS-to-SAN Technology

Abstract: The Compaq Smart Array Cluster Storage offers 2 node clustering, Recovery Server, and direct attached storage support at SCSI economics, while providing high data availability with redundant controllers. As your storage requirements evolve and you need to expand your storage system to greater capacity or to attach a greater number of servers, the Smart Array Cluster Storage is easily convertible to a SAN because it is based on DAS-to-SAN (DtS) technology.

This "HOWTO" details the steps to convert a Smart Array Cluster Storage to a Modular SAN Array 1000 (MSA1000) in a direct attached environment.

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Notice

Converting Smart Array Cluster Storage to a Modular SAN Array for Additional Scalability
HOWTO prepared by ISS Technology Communications

Introduction

The Compaq Smart Array Cluster Storage (Figure 1) is an enclosure supporting 2-node clustering or direct attached storage at SCSI economics, while providing high data availability with redundant controllers. Because Smart Array Cluster Storage is based on the familiar SCSI technology, there are no additional infrastructure requirements such as hubs, switches, unique HBAs, and cables. This allows for a low initial investment for a high availability system supporting up to 1 terabyte of data. As your storage requirements evolve and you want to implement a Fibre Channel solution for additional scalability, the Smart Array Cluster Storage is easily convertible to a SAN.
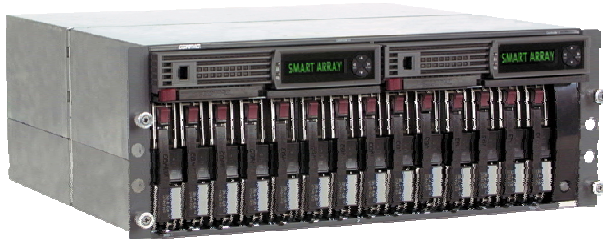

Figure 1.   Smart Array Cluster Storage system

The Smart Array Cluster Storage system offers DAS-to-SAN (DtS) technology, a quick-and-easy way to convert the Smart Array Cluster Storage system to the StorageWorks Modular SAN Array 1000 by Compaq when customer requirements change. Modular SAN Array 1000 (MSA1000) built upon Smart Array technology is the first generation 2 GB Fibre Channel storage system designed for the mid-range Storage Area Network (SAN). Designed to reduce the complexity, expense and risk of SAN deployments in a heterogeneous x86 server environment, the MSA1000 provides the customer a scaleable storage system with investment protection in mind.

To convert the Smart Array Cluster Storage system to a SAN, customers simply remove the Smart Array Cluster Storage controller(s) (Figure 2), replace them with Compaq StorageWorks MSA1000 controller(s), and add a Compaq Fibre Channel I/O board or Compaq Fibre Channel switchboard.
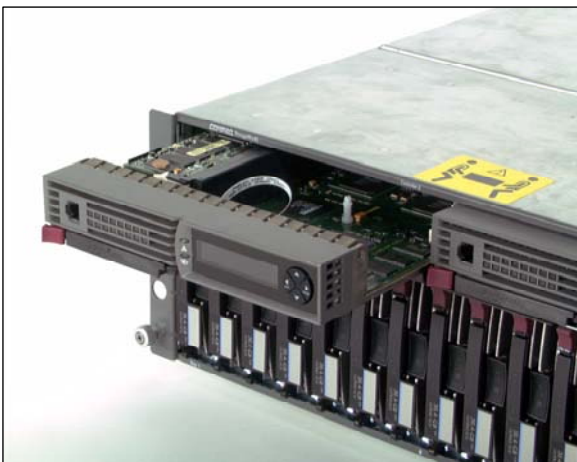

Figure 2. Hot-pluggable Smart Array Cluster Storage controller

This "HOWTO" explains the path customers can take to migrate to a Storage Area Network (SAN). The migration procedures cover converting a base-configured Smart Array Cluster Storage to a base-configured MSA1000.

To add redundant controllers, redundant switches, and redundant Host Bus Adapters (HBA), or to setup other advanced configurations, refer to the *Compaq StorageWorks Modular SAN Array 1000 User Guide*, which is available online at www.compaq.com/products/storageworks/msa1000/documentation.html.

Requirements

For a successful migration, you must have one Smart Array Cluster Storage product directly connected to a ProLiant server running Microsoft Windows 2000 Server, Microsoft Windows 2000 Advanced Server, Microsoft Windows NT 4.0 Server, or Microsoft Windows NT 4.0 Enterprise Edition.

Table 1 and Table 2 list additional hardware and software requirements.

Table 1. Minimum hardware requirements

√	Hardware
☐	FCA2101 HBA
☐	Fibre Channel Cables
☐	Modular SAN Array 1000 Controller[1]
☐	Modular SAN Array Fibre Channel I/O Module[1] **or** MSA Fabric Switch 6

Table 2. Software requirements

√	Software
☐	MSA1000 Firmware (available for download from www.compaq.com/support/files/server/us/locate/5664.html)
☐	MSA1000 Support Software Version 5.31 CD (from the Modular SAN Array 1000 Setup & Management Kit)

Conversion from a Smart Array Cluster Storage to a MSA1000 can only take place when:

- Both the Smart Array Cluster Storage and the MSA1000 support the operating system.

- Available PCI slots in the ProLiant server support Fibre Channel Host Bus Adapters.

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[1] The LCD will display the existing configuration. You must order the same number of controllers and modules that you have in your existing configuration.

Migration Procedures

The instructions in this section provide detailed information to guide you through the migration process. These procedures assume that, as a precaution, you have backed up the data on your system prior to removing power.

1. Power down server(s) and Smart Array Cluster Storage.

2. Remove the Smart Array Cluster Storage controller from the front of the Smart Array Cluster Storage and install the MSA1000 controller in its place.

Note: If only one Smart Array Cluster Storage controller resides in the original system, place the MSA1000 controller in the same slot. If two Smart Array Cluster Storage controllers reside in the system, then replace both controllers with MSA1000 controllers. MSA1000 requires Secure Path Software to support redundant controllers (see the *Compaq StorageWorks Modular SAN Array 1000 User Guide*).

Task 1: Removing the Smart Array Cluster Storage Controller (see Figure 3)

- Press the controller's thumb latch, and pull the latch handle toward you ❶.

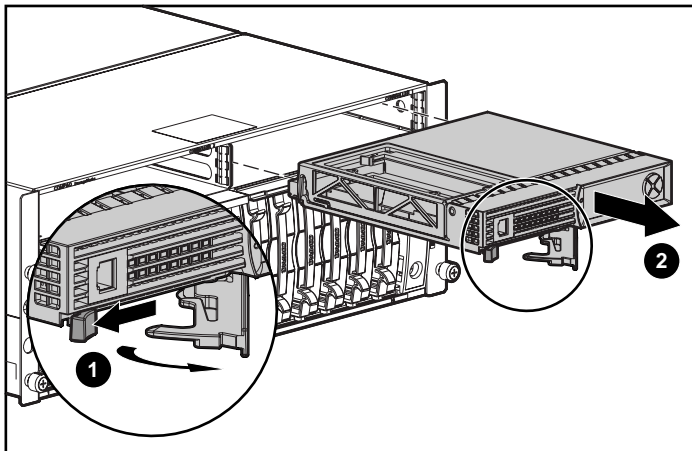- Remove the Smart Array Cluster Storage Controller by pulling it straight out of the chassis ❷.

Figure 3.   Removing the Smart Array Cluster Storage Controller

Task 2: Inserting the MSA1000 Controller (see Figure 4)

- Insert the MSA1000 Controller into the chassis ❶.

- Push the controller in as far as it will go, and press the latch inwards until it is flush against the front panel ❷.
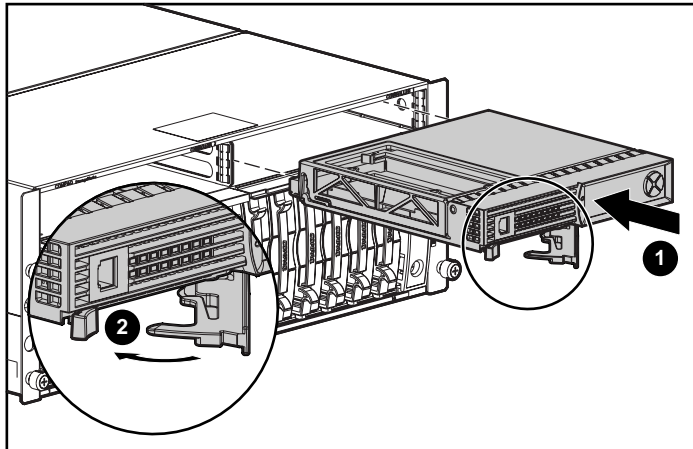

Figure 4.   Installing the MSA1000 Controller

3. Disconnect the SCSI cable(s) from the Smart Array Cluster Storage system and server(s).

4. Remove the blanking panel from the back of the Smart Array Cluster Storage by loosening the thumbscrew that holds the panel in place ❶ and remove the panel from the back of the unit ❷ (see Figure 5).
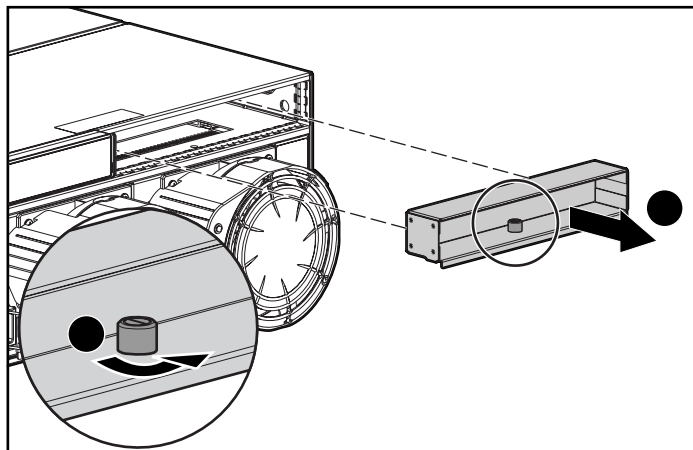

Figure 5.   Removing the blanking panel

5. Insert the Modular SAN Array Fibre Channel I/O Module (or add the MSA Fabric Switch 6) into the same slot as the active controller, sliding it in as far as it will go and pressing in firmly to ensure the module is securely seated with the controller.
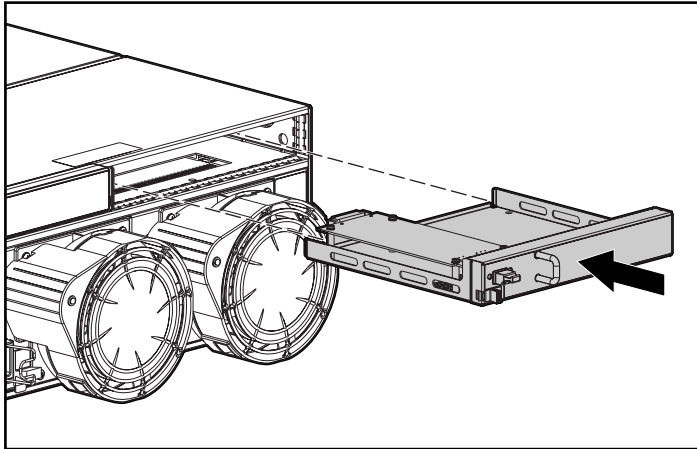

Figure 6.   Inserting the I/O Module

Note: The MSA Fabric Switch 6 is an optional six port, 2 GB/s Fibre Channel Fabric Switch. The MSA Fabric Switch 6 replaces the standard single port Fibre Channel connection provided by the Modular SAN Array Fibre Channel I/O Module. For more information, refer to the *MSA Fabric Switch 6 User Guide*, which is available online at www.compaq.com/products/storageworks/msa1000/documentation.html.

6. Install the Compaq FCA2101 HBA in the server slot and attach the fiber optic interconnect component for appropriate communication to the MSA1000. Ensure that all interconnect components are in place for proper communication from the FCA2101 to the MSA1000.

   Repeat this step for additional servers.

7. Connect the FCA2101 HBA in the server to the Modular SAN Array Fibre Channel I/O Module(s) in the back of the MSA1000 using fibre channel cables.

Note: If using a switch (or dual switches), connect the FCA2101 HBA(s) from the server and the Modular SAN Array Fibre Channel I/O Module to the switch(es).

   Repeat this step for additional servers.

8. Power on the MSA1000. The LCD should display a message stating, "Compaq MSA1000 Startup Complete."

9. Make sure the firmware is current. Use the LCD to check the firmware version for the MSA1000 and compare this version to the latest version available for download at www.compaq.com/support/files/server/us/locate/5664.html. If the latest version is not installed on the MSA1000, download the firmware from the Web and install it.

10. Power on the server. After the server reboots, a New Hardware Found message will appear. Click the **Cancel** button.

11. Insert the MSA1000 Support Software Version 5.31 CD in the CD-ROM drive of the server.

12. Click **Agree** after reading the license agreement.

13. Click the **Install Windows 2000 HBA Driver** button on the Compaq Support Software CD screen (see Figure 7).
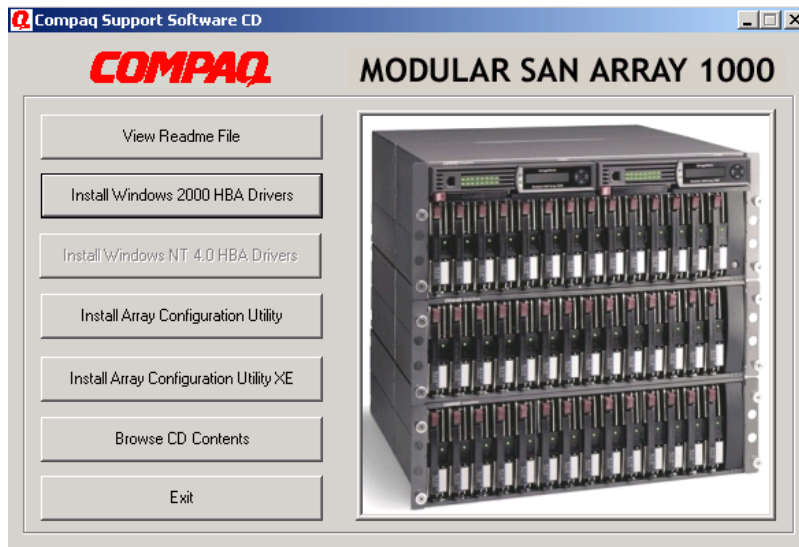

Figure 7.   MSA1000 dialog box

14. Click the **Install** button on the Compaq Setup screen (see Figure 8).
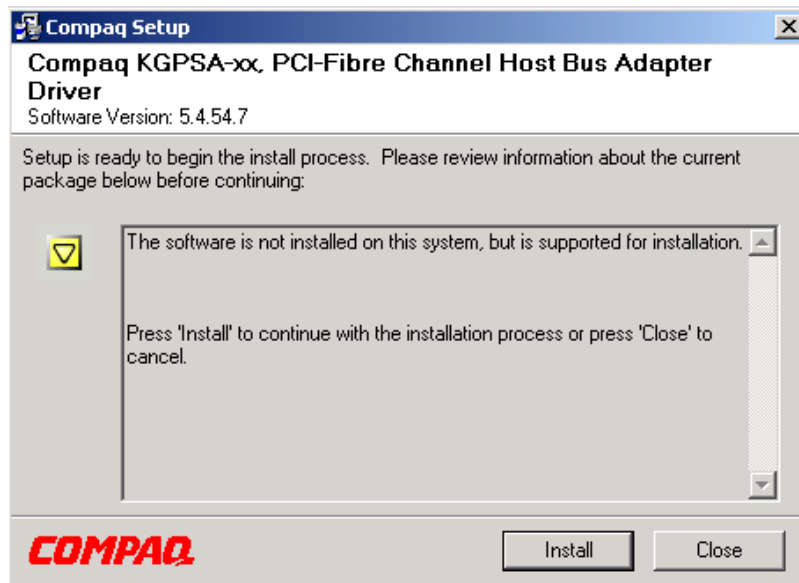

Figure 8.   MSA1000 install dialog box

15. Click the **Reboot** button on the second Compaq Setup screen (see Figure 9) and remove the MSA1000 Support Software Version 5.31 CD from the CD-ROM drive of the server.
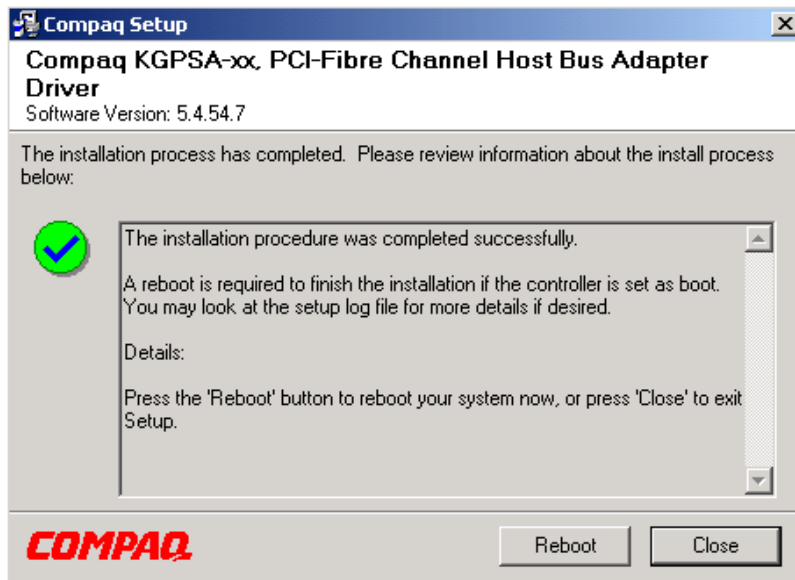

Figure 9.   MSA1000 reboot dialog box

16. Right-mouse click on **My Computer**, and select **Manage**.

17. Select **Disk Management** under Storage. You should be able to see the volumes on the MSA1000.

Troubleshooting Tips

This section provides tips for troubleshooting some common problems found in the Compaq labs regarding the migration of Smart Array Cluster Storage to MSA1000.

Methodology

This section lists basic methodology to use when troubleshooting. First, gather the information to resolve the issue. Ask the following questions:

1. Is the problem reproducible or random?

2. What hardware and/or software are involved?

3. Were any errors made in implementing steps?

4. Was more than one variable changed at a time?

5. Does the problem occur on the server or is it specific to the storage box?

6. Were any steps skipped or completed out of order?

7. Were any steps accidentally added?

8. Were any steps added intentionally to complete or correct another step? Place checkmarks against the steps as they are/were executed. If steps had to be added on the fly in order to proceed, record why and where.

After asking the questions, complete the following steps to resolve the issue:

1. Decide on one cause and possible solution at a time. Make appropriate modifications and then test those modifications. Try to minimize the number of things you change between tests.

2. Test each modification to see if it fixed the problem.

3. Write down all symptoms, causes, and solutions. Having a written record makes an excellent reference for future troubleshooting.

Common Issues

For common issues that may occur during the migration, refer to Chapter 2, "Operation and Troubleshooting" of the *Compaq StorageWorks Modular SAN Array 1000 User Guide* available online at www.compaq.com/products/storageworks/msa1000/documentation.html.

Conclusion

The Smart Array Cluster Storage system is the ideal platform for direct attached and 2 node clustering minimizing initial infrastructure cost by not requiring a Fibre Channel network until necessary. But as your storage requirements evolve and you want to implement a Fibre Channel solution for greater scalability, the Smart Array Cluster Storage is easily convertible to a SAN because it is based on unique Compaq DtS technology, allowing for a seamless conversion path from Smart Array Cluster Storage to the MSA1000. This migration eliminates initial SAN deployment complexity, lowers cost of ownership, and provides investment protection.

Appendix A–Web Resources

Table 3 provides links to the resources referenced in this "HOWTO" and additional information that may be helpful in planning a SAN migration.

Table 3. Compaq web resources

Resource Description	Web Address
Product Information	
The **Smart Array Cluster Storage site** includes product information in the form of demos and documentation.	www.compaq.com/sharedstorage
The **Modular SAN Array 1000 site** includes product and support information.	www.compaq.com/products/storageworks/msa1000/index.html
Product Documentation	
The **Smart Array Cluster Storage QuickSpecs** contain an overview, the standard features, the TechSpecs, and configuration information for this product.	www.compaq.com/products/quickspecs/11050_na/ 11050_na.HTML
The **StorageWorks Modular Smart Array 1000 QuickSpecs** contain an overview, the standard features, the TechSpecs, and configuration information for this product.	www.compaq.com/products/quickspecs/11033_na/ 11033_na.HTML
The **Compaq StorageWorks Modular SAN Array 1000 User Guide** provides step-by-step instructions for installation and should be used as a reference for operation, troubleshooting, and future upgrades.	www.compaq.com/products/storageworks/msa1000/ documentation.html
The **Compaq Smart Array Cluster Storage Technology white paper** discusses the Smart Array Cluster Storage solution.	ftp://ftp.compaq.com/pub/supportinformation/papers/ tc020201wp_rev0_us.pdf
Software Downloads	
The **Server Software Download Center** allows downloading of the latest support software, drivers, utilities, and agents and provides information about software enhancements and fixes.	www.compaq.com/support/files/server/us/index.html
The **Compaq Array Configuration Utility for Windows 2000**, a GUI-based application, helps you configure Compaq SMART-2 Array Controllers, Compaq Smart Array Controllers, Compaq Integrated Smart Array Controller, and Compaq StorageWorks RAID Array Controllers.	www.compaq.com/support/files/server/us/locate/2012.html
The **Compaq Array Configuration Utility XE for Windows**, a Web-based application, helps you configure Compaq SMART-2 Array Controllers, Compaq Smart Array Controllers, Compaq Integrated Smart Array Controller, and Compaq StorageWorks RAID Array Controllers.	www.compaq.com/support/files/server/us/locate/3271.html