hp StorageWorks Modular Smart Array 1000

Configuration Procedures - for HP-UX

This addendum applies to the following documents:

HP StorageWorks Modular Smart Array 1000 Installation Guide
Part number: 254092-005 (October 2003)

Read the important notes on the following page and then insert this Addendum as Chapter 7 in your MSA1000 Installation Guide.

Important MSA1000 HP-UX support notes

- Required MSA1000 controller firmware version:
  - HP-UX specific alternative firmware, currently version 4.30
- Supported HP-UX operating system versions:
  - 11.11
  - 11.23
- Supported controller configuration:
  - Single controller only
- Supported Fibre Channel connections:
  - Fabric connection through the MSA1000 Fibre Channel I/O module with an external switch
  - Fabric connection through the optional embedded MSA SAN Switch 2/8 module
  - Direct connect of the MSA1000 Fibre Channel I/O module to the HBA in the server
  - Direct connect of the optional MSA Hub 2/3 module to the HBA in the server
- Supported storage configuration tools:
  - All configurations, through a serial connection to the MSA1000 controller: MSA1000 Command Line Interface (CLI)
  - Configurations with access to the MSA1000 through a ProLiant management server: HP StorageWorks Array Configuration Utility (ACU)

    A ProLiant management server running an approved Windows or Linux operating system may be used (only) to configure and/or monitor MSA1000. See the Windows or Linux chapter of the MSA1000 Installation Guide for instructions.
- Fibre Channel Arbitrated Loop (FC/AL) configuration notes:
  - FC/AL configurations must enable hard addressing on the MSA1000 controller. See "Array Controller Configuration Settings" in the Command Line Interface user guide for instructions.

- ■ LUN configuration notes:
  - — A minimum of one storage LUN on the MSA1000 must be configured and set to the HP-UX host mode before connecting the MSA1000 to the HP-UX server.
  - — Set the ratio of read cache to write cache to prioritize writing in RAID 1, RAID 1+0, RAID 5, and RAID ADG configurations to improve non-random write performance.
  - — Set the controller rebuild priority to medium or high to minimize exposure during a drive rebuild. During a drive rebuild, limit I/O activity from the attached servers.
  - — When determining how many hard drives to include in an array and how many LUNs to create from that array, consider the I/O load of the data that will be stored on those LUNs.

    In general, striping an array across many hard drives increases the total throughput on that array and delivers better I/O performance, but there is a performance trade-off when an array is divided into multiple LUNs. Too many LUNs on the same group of hard drives causes more drive seeking and a loss of throughput.
  - — When assigning a RAID level to a LUN, consider the required level of fault tolerance and performance for the data on that LUN.

    The following supported RAID types offer differing levels of fault tolerance and performance:
    - — RAID 0 - data striping only
      (no fault tolerance - highest I/O performance)
    - — RAID 1 (RAID 1+0) - drive mirroring (data striping and drive mirroring)
      (high fault tolerance - high I/O performance)
    - — RAID 5 - distributed data guarding, with distributed parity data
    - — RAID ADG - Advanced Data Guarding, with two sets of distributed parity
      (high fault tolerance - low performance)
  - — In configurations where the server operating system resides on a LUN within the MSA1000, do not share other LUNs on that array with other servers.

Configuration Procedures - HP-UX Environments

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Deploying the MSA1000 in an HP-UX environment involves:

1. Completing all Prerequisites
2. Updating MSA1000 controller firmware, page 2
3. Installing EMS on HP-UX server(s) (optional), page 12
4. Configuring the storage, page 13

Each of these procedures is discussed in the following paragraphs.

Note: You must perform these installation procedures in the sequence listed in the *HP StorageWorks Modular Smart Array 1000 Installation Guide* and this addendum. If you deviate from this sequence, you may have to uninstall and then reinstall your MSA1000.

Prerequisites

■ Install and connect all equipment correctly, as detailed in Chapter 1: "Installation Procedures - for all MSA1000 Deployments" of the MSA1000 installation guide.

■ Obtain the documentation for the storage configuration tool you plan to use.

Documentation for the MSA1000 is available on the MSA1000 Documentation CD and the **Technical Documentation** page of the MSA1000 web site at http://www.hp.com/go/msa1000.

Updating MSA1000 controller firmware

HP-UX environments must install alternative firmware on the MSA1000 controller that exclusively supports the HP-UX operating system. This alternative firmware supports HP-UX only and is not supported for use with any other operating system.

Different methods are available for updating the firmware; follow the instructions that match your environment:

■ Fibre Channel switched fabric deployments, page 2

■ Fibre Channel Arbitrated Loop and direct connect deployments, page 7

Fibre Channel switched fabric deployments

1. Obtain the necessary firmware files:

   a. Go to the **Software, Firmware & Drivers** page of the MSA1000 web site at http://www.hp.com/go/msa1000.

   b. Select the **Controller Firmware** option for HP-UX.

   c. Do ONE of the following:

      — Select the ISO option and create a firmware CD to perform an online or offline update

      — Select the ZIP file option and copy the firmware files to a directory on the server and perform an online update

   d. Record firmware location and version information in the spaces provided in the last row of Table 1.

Table 1: HP-UX System Information Table

Class	H/W Path	Driver	WWPN	Description
MSA1000 controller firmware filenames and path:				

2. Install the SCSI Command Utility (SCU) on the server:

   a. From the console, do ONE of the following:

      — Insert the newly created firmware CD in the CD-ROM drive of the server, mount the CD-ROM, and view the contents of the CD to locate the SCU for your environment.

      — Navigate to the directory on the server in which you copied and unzipped the firmware files and view the contents of the directory to locate the SCU for your environment.

   b. Copy the executable SCU file from the directory for your environment to the /usr/bin directory on the server:

      When copying from the firmware CD, enter:
      ```
      # cp /cdrom/<scu_directory>/scu /usr/bin
      ```

      When copying from the local directory, enter:
      ```
      # cp /<scu_directory>/scu /usr/bin
      ```

      where <scu_directory> is the path to the SCU files.

      Example command, when copying from the firmware CD:
      ```
      # cp /cdrom/scu/ia64/scu /usr/bin
      ```

   c. Change the permissions on the SCU file to allow access and use.

Note: Additional SCU-related files are located in the /scu directories, including readme, scripting, and help files.

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3. From HP-UX, determine the hardware path (H/W Path), Device Special Filename (DSF), and Fibre Channel driver instance of each HBA that has an MSA1000 controller attached by entering:
   ```
   # ioscan -fn > scanfile
   ```

   Open the scanfile with the editor of your choice and record the H/W Path and DSF for each MSA1000 controller in the spaces provided in Table 1.

The following is an example of the information included in the ioscan and a sample completed table:

```
Class   I H/W Path                 Driver    State    H/W Type   Description
------- - ------------------------ --------- -------- ---------- ----------------------------
ba      2 0/2                       lba       CLAIMED  BUS_NEXUS  Local PCI Adapter (782)
fc      1 0/2/0/0                   fcd       CLAIMED  INTERFACE  HP 2Gb Dual Port PCI/PCI-X
                                                                 Fibre Channel Adapter (Port 1)
                /dev/fcd1
fcp     0 0/2/0/0.4                 fcd_fcp   CLAIMED  INTERFACE  FCP Domain
ext_bus 4 0/2/0/0.4.11.0.0          fcd_vbus  CLAIMED  INTERFACE
target  8 0/2/0/0.4.11.0.0.1        tgt       CLAIMED  DEVICE
disk    4 0/2/0/0.4.11.0.1.7        sdisk     CLAIMED             MSA1000 VOLUME
                /dev/dsk/c4t1d7  /dev/rdsk/c4t1d7
target  9 0/2/0/0.4.11.0.0.2        tgt       CLAIMED  DEVICE
disk    5 0/2/0/0.4.11.0.1.2.5      sdisk     CLAIMED             MSA1000 VOLUME
                /dev/dsk/c4t2d5  /dev/rdsk/c4t2d5
.
.
.
ext_bus 5 0/2/0/0.4.11.255.0        fcd_vbus  CLAIMED  INTERFACE  FCP Device Interface
target  7 0/2/0/0.4.11.255.0.0      tgt       CLAIMED  DEVICE
ctl     4 0/2/0/0.4.11.255.0.0.0    sctl      CLAIMED  DEVICE     MSA1000
                /dev/rscsi/c5t0d0
```

Table 2: Sample Information Table for this System with one HBA and one MSA1000 Controller

Class	H/W Path DSF	Driver	WWPN	Description
fc	0/2/0/0 /dev/fcd1	fcd	50060b00 001188da	HP 2Gb Dual Port PCI/PCI-X Fibre Channel Adapter (Port 1)
ctl	0/2/0/0.4.11.255.0.0.0 /dev/rscsi/c5t0d0	sctl	500805f3 0008aab0	MSA1000
MSA1000 controller firmware filename and path: `/tmp/scu/msav430b285.bin`				

4. Obtain the World Wide Port Name (WWPN) of the HBA and the MSA1000 controller (WWPN are used when configuring storage):

   a. To obtain the WWPN of the HBA in the server, use the `fcmsutil` command from HP-UX:
   (The WWPN is called the Port World Wide Name in HP-UX.):

      Example command, using the sample information in Table 2:

      ```
      fcmsutil /dev/fcd1
      ```

   b. To obtain the WWPN of the MSA1000 controller, use the `show` command from the CLI of the MSA1000:
   (The WWPN is called the Reported Port ID in the CLI.):

      Example command, using the sample information in Table 2:

      ```
      show this_controller
      ```

   c. Record these WWPN in the spaces provided in Table 1.

5. Download the firmware to the active controller by entering the SCU `DOWNLOAD` command:

Note: To download new firmware to the controller, you must know the:

■ Path of the firmware file, obtained in step 1
   (Example: `/tmp/scu/msav430b285.bin`)
■ Device Special Filename of the controller, obtained in step 3
   (Example: `/dev/rscsi/c5t0d0`)
■ The following procedures use the sample information illustrated in step 3.

Example command, using the sample information in Table 2:

```
# /usr/bin/scu -f /dev/rscsi/c5t0d0 download
/tmp/scu/msav430b285.bin save segment

    Downloading File "msa430b285.bin" of 1048576 bytes...

    Download completed successfully...

    Delaying for 120 seconds while firmware is saved, please be
    patient... 120
```

⚠ **Caution:** Do not restart the server or the MSA1000 until the download of the firmware is completed.

When the download is complete, the CLI prompt is redisplayed.

> **Note:** The MSA1000 displays the message FIRMWARE FLASH STARTED when the download begins and FIRMWARE FLASH DONE when the download is complete.

6. When the MSA1000 controller displays FIRMWARE FLASH DONE, power cycle the MSA1000.

   When the MSA1000 completes its startup routine, the MSA1000 STARTUP COMPLETE message is displayed.

7. Verify that the controller firmware was updated by entering the SHOW INQUIRY command within the SCU and reading the display.

   Example command, using the sample information in Table 2:

   ```
   # scu -f /dev/rscsi/c5t0d0 show inquiry
   ```

   The following information is displayed:

   ```
   Inquiry Information:

           Peripheral Device Type: 0xc <Array Controller>
             Peripheral Qualifier: 0 <Peripheral Device Connected>
             Device Type Modifier: 0
                  Removable Media: No
                     ANSI Version: 4 <Complies to ANSI X3.351-200x, SPC-2>
                     ECMA Version: 0
                      ISO Version: 0
            Response Data Format: 2 <SCSI-2)
            Terminate I/O Process: No
                Additional Length: 247
                Reserved (byte 5): 0x80
                Soft Reset Support: No
           Target Transfer Disable: No
           Linked Command Support: No
       Synchronous Data Transfers: No
   Support for 16 Bit Transfers: No
   Support for 32 Bit Transfers: No
     Relative Addressing Support: No
           Vendor Identification: MSA1000
           Firmware Revision Level: 4.30
              Vendor Specific Data: 35 30 44 39 49 50 30 33 56 00 00
   ```

Fibre Channel Arbitrated Loop and direct connect deployments

If the MSA1000 is connected directly to an HP-UX server, update the controller firmware by temporarily connecting the MSA1000 to a ProLiant server and performing the update through the ProLiant server.

1. Locate a ProLiant server to which you can temporarily direct-connect the MSA1000.

Note: The selected ProLiant server must have an MSA1000-supported HBA installed. For a complete list of supported devices, see the *MSA1000 Compatibility Guide* on the Technical Documentation page of the MSA1000 web site at site at http://www.hp.com/go/msa1000.

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2. Obtain the necessary firmware files:
   a. Go to the **Software, Firmware & Drivers** page of the MSA1000 web site at http://www.hp.com/go/msa1000.
   b. Select the **Controller Firmware** option for HP-UX.
   c. Do ONE of the following:
      — Select the ISO option and create a firmware CD to perform an online or offline update
      — Select the ZIP file option and copy the firmware files to a directory on the server and perform an online update
   d. Record firmware location and version information in the spaces provided in the last row of Table 1.
3. Connect a Fibre Channel cable to the fiber optic port on the MSA1000 Fibre Channel I/O module and to the fiber optic port on the HBA in the selected ProLiant server.

4. Access the MSA Flash Utility using the procedures in the following paragraphs that match your environment.

For online updates using a Windows server

a. Do ONE of the following:

— Insert the newly created firmware CD in the CD-ROM drive of the server and view the contents of the CD to locate the msaflash utility for your Windows environment.

— Navigate to the directory on the server to which you copied the firmware files and view the contents of the directory to locate the msaflash utility for your Windows environment.

b. Execute `msa.exe` to access the MSA Flash Utility.

c. Proceed to step 5 to perform the update.

For online updates using a Linux server

a. Do ONE of the following:

— Insert the newly created firmware CD in the CD-ROM drive of the server and view the contents of the CD to locate the msaflash files for your Linux environment.

— Navigate to the directory on the server to which you copied the firmware files and view the contents of the directory to locate the msaflash files for your Linux environment.

b. Untar the file *msaflash.tar* and then execute `msainst` to install the MSA Flash Utility components on the server.

c. From a terminal running within X Windows, execute `msaflash` to access the MSA Flash Utility.

d. Proceed to step 5 to perform the update.

For offline updates using a ProLiant server for any operating system

Note: This updating method uses the bootable firmware CD created in step 2.

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a. Power off the MSA1000.

b. Power off the selected ProLiant server.

Note: Follow the recommended power-off procedures for these devices.

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c. Insert the newly created firmware CD into the CD-ROM drive of the selected ProLiant server.

d. Power on the MSA1000 by pressing the power switch located on the front panel of the MSA1000.

Wait for the MSA1000 to complete its startup routine and the following message to display on the LCD panel on the front of the MSA1000:

`MSA1000 Startup Complete`

This startup process may take up to eight minutes.

Note: Proceed to the next step only after the `Startup Complete` message is displayed. If you power on the server before the MSA1000 has completed its power-on sequence, your server may not see the MSA1000 properly.

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e. Power on the selected ProLiant server.

The server boots to the MSA1000 firmware CD and displays the MSA1000 utility screen.

f. Select **Flash MSA Firmware**.

The MSA Flash Utility screen is displayed.
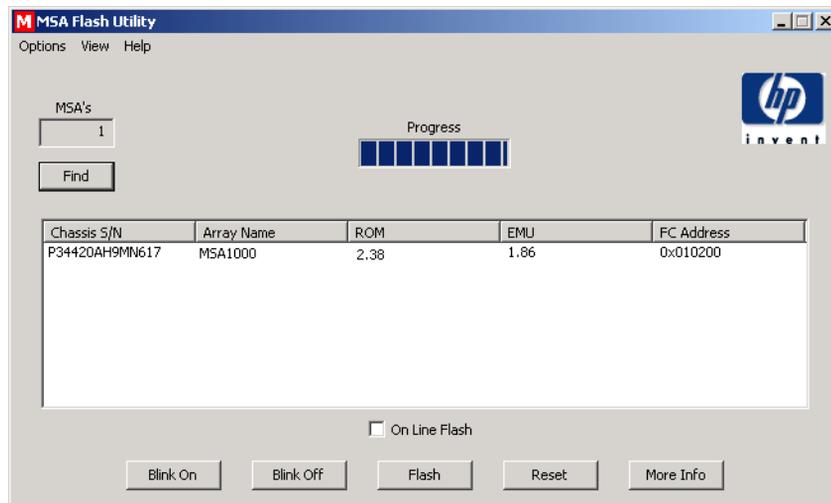
Proceed to step 5 to perform the update.

---

5. In the **MSA Flash Utility**, click **Find**.

    After a few moments, all detected MSA1000 controllers are displayed.

Note: The correct firmware version on the controller is displayed in the ROM column.


Figure 1: Finding all MSA1000 controllers

6. Select the controller to update and click **Flash**.

    An informational message estimating the time required to flash the firmware
    is displayed.

    After closing the message, a directory window is displayed.

7. In the directory window, navigate to the HP-UX directory on the CD and select the firmware file to use. (Example: *v430b285.bin*)

8. Follow the onscreen instructions to complete the flashing process.

   Wait for the `Flash Successful` message to be displayed on the front of the MSA1000 controller.

9. When the `Flash Successful` message is displayed, close the message window to return to the MSA Flash Utility main menu.

10. Select the controller that was flashed and click **Reset** to restart the controller.

    Wait 2 -5 minutes for the controller to reset and the `Startup Complete` message to be displayed on the front of the MSA1000 controller.

11. After the MSA1000 startup process is complete, in the MSA Flash Utility, click **Find** and read the display to verify that the update was completed successfully.
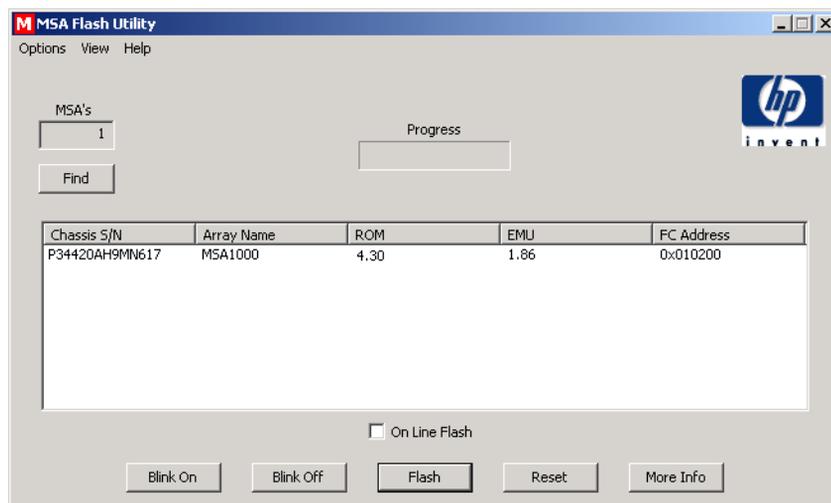
Figure 2: Confirming that the update was completed

12. If the MSA1000 is temporarily connected to a ProLiant server, either remove the connection or, if desired, maintain the connection and configure the MSA1000 controller and storage through the ACU on the ProLiant server.

    See the Windows or Linux chapter of the MSA1000 installation guide for instructions.

Installing EMS on HP-UX server(s) (optional)

To install the Event Monitoring Service (EMS) on the HP-UX server:

1. From the HP-UX console, do ONE of the following:

   - Insert the newly created firmware CD in the CD-ROM drive of the server, mount the CD-ROM, and view the contents of the CD to locate the EMS for your HP-UX environment.

   - Navigate to the directory on the server in which you copied and unzipped the firmware files and view the contents of the directory to locate the EMS for your HP-UX environment.

2. Copy the EMS to the desired location on the server by entering one of the following copy commands:

   When copying from the firmware CD, enter:
   ```
   # cp -R /cdrom/<ems_directory>/* <target_directory>
   ```

   When copying from the local directory, enter:
   ```
   # cp -R /<ems_directory>/* /<target_directory>
   ```

   Where `<ems_directory>` is the source location of the EMS and where `<target_directory>` is the target location for the EMS.

   Example command, when copying from the firmware CD:
   ```
   # cp -R /cdrom/ems/ia64/* /var/spool/sw
   ```

3. Install the EMS by entering the `swinstall` command:

   ```
   # swinstall
   ```

4. Repeat these procedures for each HP-UX server that you want to manage through EMS.

Note: To launch the EMS and use it to monitor your system, see the EMS Hardware Monitors User Guide, located on the HP web site at http://docs.hp.com/hpux/diag/index.html.

Configuring the storage

Thorough planning is critical to the successful and efficient deployment of any storage array system. As discussed in the planning sections of Chapter 1: "Installation Procedures - for all MSA1000 Deployments" of the MSA1000 installation guide, plans should include decisions about total system capacity, fault-tolerance, performance, and availability.

Storage configuration tasks include:

■ Creating arrays / LUNs

■ Identifying the operating system of each connection to the MSA1000

■ Entering Selective Storage Presentation (SSP) or Access Control List (ACL) settings to isolate the storage from unauthorized access

Perform these tasks using your chosen configuration utility. For information about configuring the storage, refer to the ACU or the CLI user documentation.

See the corresponding tables in the MSA1000 installation guide to record information about your storage.