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Introduction

This document highlights methods of upgrading an existing P2000 G3 Modular Smart Array (MSA) storage system to the HP MSA 2040 SAN or HP MSA 2040 SAS storage system and also upgrading an existing P2000 G3 MSA array to the HP MSA 1040 storage system.

Storage systems can often be upgraded without any reformat to the vdisks and volumes, retaining data-in-place and saving time and effort. However in some circumstances, a backup and restore is required.

P2000 G3 MSA technical user documents can be found at: hp.com/go/p2000.

Additional information about the HP MSA 1040 may be found at hp.com/go/MSA1040.

Additional information about the HP MSA 2040 may be found at hp.com/go/MSA2040.

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Note

In this document, “P2000 G3 MSA” will be used to refer to any one of the P2000 G3 FC MSA, P2000 G3 FC/iSCSI MSA, P2000 G3 SAS MSA, P2000 G3 10GbE iSCSI MSA, or P2000 G3 iSCSI MSA unless specifically noted otherwise.

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Note

You cannot upgrade the MSA2000 G1 or MSA2000 G2 to the HP MSA 1040 or HP MSA 2040.

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Intended audience

This document is intended for HP MSA administrators and requires previous SAN knowledge. This document offers common known MSA facts that can contribute to an MSA best customer experience during the upgrade.

Prerequisites

Prerequisites for using this product include knowledge of:

- Networking
- SAN management
- Connectivity methods such as Direct Attach Storage (DAS), Fibre Channel (FC), and Serial Attached SCSI (SAS)
- iSCSI and Ethernet protocols
Related documentation

In addition to this guide, please refer to other documents for this product:

- HP MSA System Racking Instructions
- HP MSA 1040 Installation Guide
- HP MSA 1040 System Cable Configuration Guide
- HP MSA 1040 User Guide
- HP MSA 1040 CLI Reference Guide
- HP MSA 2040 Installation Guide
- HP MSA 2040 System Cable Configuration Guide
- HP MSA 2040 User Guide
- HP MSA 2040 CLI Reference Guide

You can find these documents from the Manuals page of the HP Business Support Center: hp.com/support/msa1040/manuals or hp.com/support/msa2040/manuals

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**Important**

This white paper contains the information necessary to upgrade any of the P2000 G3 MSA controller-based systems to the HP MSA 1040 or 2040 array or convert protocols on the HP MSA 1040 or 2040 arrays. The bulk of the steps are the same regardless which storage system you are upgrading from. If an instruction applies to only one or two of the original host protocols, you'll see [fc], [i], or [sa] at the beginning of the instruction.

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**Important**

The instructions in this document show how to re-enter settings using the legacy, version 2 of the Storage Management Utility (SMU).

See the SMU Reference Guide for using the virtualized version 3 SMU or converting back to the version 2 SMU.

If you see the login below, press the “Click to launch previous version” to get to the version 2 interface.

---

![Storage Management Utility](image-url)

User name:

Password:

Sign In  Clear

User language

Click to launch previous version
**HP MSA 1040 controller hardware overview**

The HP MSA 1040 can be purchased as either a large form factor (LFF) 12-drive or small form factor (SFF) 24-drive storage system.

**Note**

The HP MSA 1040 storage system supports 4 total enclosures, including the storage enclosure, for a maximum of 99 SFF drives or 48 LFF drives. Mixed LFF and SFF enclosures are supported; see the following table for the maximum LFF and SFF drive configurations for each controller. Note that mixing LFF and SFF expansion enclosures will give you values in between those shown.

<table>
<thead>
<tr>
<th>Max disk configurations</th>
<th>LFF controller enclosure</th>
<th>SFF controller enclosure</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFF expansion enclosures</td>
<td>12 + (3 x 12) = 48</td>
<td>24 + (3 x 12) = 60</td>
</tr>
<tr>
<td>SFF expansion enclosures</td>
<td>12 + (3 x 25) = 87</td>
<td>24 + (3 x 25) = 99</td>
</tr>
</tbody>
</table>

**HP MSA 1040 features**

- New controller architecture with a new processor
- 4 GB cache per controller
- 2 host ports per controller
- 4/8 Gb FC connectivity
- 6 Gb/12 Gb SAS connectivity
- 1GbE or 10GbE iSCSI connectivity
- [sa] Support for MSA Fan-out SAS cables
- New Web Interface ¹ to support virtualized storage features. Legacy Web Interface support is also included in GL200
- Support for Sub-LUN Tiering ¹; requires a license
- Wide Striping ¹; requires a license; Wide Striping allows more hard drives behind a single volume to improve performance (e.g., >16 drives for a volume)

**HP MSA 2040 controller hardware overview**

The HP MSA 2040 controller can support both LFF 12-drive or SFF 24-drive storage enclosures.

**Note**

The HP MSA 2040 storage systems support 8 total enclosures, including the storage enclosure, for a maximum of 199 SFF drives or 96 LFF drives. Mixed LFF and SFF enclosures are supported; see the following table for the maximum LFF and SFF drive configurations for each controller. Note that mixing LFF and SFF expansion enclosures will give you values in between those shown.

<table>
<thead>
<tr>
<th>Max disk configurations</th>
<th>LFF controller enclosure</th>
<th>SFF controller enclosure</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFF expansion enclosures</td>
<td>12 + (7 x 12) = 96</td>
<td>24 + (7 x 12) = 108</td>
</tr>
<tr>
<td>SFF expansion enclosures</td>
<td>12 + (7 x 25) = 187</td>
<td>24 + (7 x 25) = 199</td>
</tr>
</tbody>
</table>

¹ With GL200 Firmware.
**HP MSA 2040 features**

- New controller architecture with a new processor
- 4 GB cache per controller
- Support for solid state drives
- Full disk encryption
- 4 host ports per controller
- 4 Gb/8 Gb/16 Gb FC connectivity
- 6 Gb/12 Gb SAS connectivity
- 1GbE or 10GbE iSCSI connectivity
- Support for both FC and iSCSI in a single controller
- Increased support to seven D2700 SFF disk enclosures
- Increased I/O performance
- Support for Thin Provisioning
- Support for Sub-LUN Tiering
- Support for Read Cache
- Support for Performance Tier; requires a license
- New Web Interface to support virtualized storage features. Legacy Web Interface support is also included in GL200
- Wide Striping; Wide Striping allows more hard drives behind a single volume to improve performance (e.g., >16 drives for a volume)

**Supported and unsupported configurations with the HP MSA 1040 and HP MSA 2040 controllers**

Table 1 lists the supported storage enclosures and expansion enclosures after upgrading to the HP MSA 1040/2040 controllers.

<table>
<thead>
<tr>
<th>Item</th>
<th>Supported with the MSA 1040</th>
<th>Supported with the MSA 2040</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSA2000 G1 Storage Enclosure</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>MSA2000 G2 Storage Enclosure</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>P2000 G3 MSA Storage Enclosure</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>HP MSA 2040 Storage Enclosure</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>MSA2000 Expansion Enclosures</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>MS470 Expansion Enclosures</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>D2700 Expansion Enclosures</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>P2000 Expansion Enclosures</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>HP MSA 2040 Drive Enclosures</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

2 When using the P2000 G3 Storage Enclosure with MSA 2040 controllers, you will not be able to use SSD drives or have some of the performance benefits of the MSA 2040 Storage Enclosure.

3 The HP MSA 2040 Storage Enclosure is the recommended chassis over the P2000 G3 MSA Storage Enclosure as the MSA 2040 Storage Enclosure hardware design allows for the full performance of MSA 2040 controllers.
Table 1. Supported/unsupported hardware configurations (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Supported with the MSA 1040</th>
<th>Supported with the MSA 2040</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP 3G SAS drives</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>SATA Drives</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>HP 6G/12G Dual Port SAS drives</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>HP 6G/12G SAS Midline (MDL)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>SSD SFF 6G/12G Enterprise Mainstream Drives</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Self-Encrypting Drives (SED)^4</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Consult the HP MSA 1040 QuickSpecs for the latest supported hard drive capacities.
Consult the HP MSA 2040 QuickSpecs for the latest supported hard drive and SSD capacities.

**Important**
Systems which were upgraded from previous generations of MSA arrays, MSA2000 G1 and MSA2000 G2, are not eligible for the upgrade. Validate that the main storage enclosure and disks are capable of upgrading to the MSA 1040 or MSA 2040. The storage enclosure must be a 6G capable storage enclosure and all the disks must also be 6G capable.

**Disk speed and enclosure link speeds**
Special considerations must be noted about disk speed and enclosure link speeds after upgrading a P2000 G3 MSA to the HP MSA 1040 or HP MSA 2040.

See Table 2 for disk speeds and enclosure link speeds after upgrading.

Table 2. Disk speed and enclosure link speed matrix with MSA 1040 or MSA 2040 controller installed

<table>
<thead>
<tr>
<th>Storage enclosure</th>
<th>SSD support</th>
<th>Storage enclosure disk link speed</th>
<th>Inter-controller interface speed</th>
<th>Expansion port link speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2000 G3 LFF</td>
<td>Not supported</td>
<td>3 Gb</td>
<td>Gen 1</td>
<td>6 Gb</td>
</tr>
<tr>
<td>P2000 G3 SFF</td>
<td>Not supported</td>
<td>3 Gb</td>
<td>Gen 1</td>
<td>6 Gb</td>
</tr>
<tr>
<td>HP MSA 2040 LFF/SFF</td>
<td>Supported</td>
<td>6 Gb</td>
<td>Gen 2</td>
<td>6 Gb</td>
</tr>
</tbody>
</table>

^4 SFF SSDs and SEDs are only supported in the MSA 2040 Storage Enclosures and D2700 Disk Enclosures when using MSA 2040 controllers. SSDs and SEDs are not supported when using the MSA 1040 storage system.
Moving between SAS, iSCSI, and FC topologies

The HP MSA 2040, like the P2000 G3 MSA, supports “moving between topologies” by a controller replacement. For instance, if your P2000 G3 iSCSI MSA has reached its host connect or performance maximums, the array can be upgraded to HP MSA 2040 SAN controllers with FC small form-factor pluggables (SFPs). The HP MSA 2040 products can adapt to new infrastructures while keeping the virtual disk data-in-place by doing a hardware controller replacement to match the infrastructure needed.

The MSA 2040 also supports changing between storage protocols. For example, the HP MSA 2040 SAN with FC SFPs can be transformed to an MSA 2040 SAS with a controller replacement.

Another example might be changing an MSA 2040 SAN FC mode to an MSA 2040 SAN Combo mode (FC/iSCSI). This example would require the addition of iSCSI SFPs.

Supported upgrade paths for the HP MSA 1040/2040

Table 3 shows a list of the supported upgrade paths covered in this document.

<table>
<thead>
<tr>
<th>Description</th>
<th>From</th>
<th>To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual controller</td>
<td>P2000 G3 FC MSA</td>
<td>HP MSA 1040 2-port 10GbE iSCSI</td>
</tr>
<tr>
<td></td>
<td>P2000 G3 FC/iSCSI MSA</td>
<td>HP MSA 1040 2-port 1GbE iSCSI</td>
</tr>
<tr>
<td></td>
<td>P2000 G3 SAS MSA</td>
<td>HP MSA 1040 2-port 8Gb FC</td>
</tr>
<tr>
<td></td>
<td>P2000 G3 10GbE iSCSI MSA</td>
<td>HP MSA 1040 2-port SAS</td>
</tr>
<tr>
<td></td>
<td>P2000 G3 iSCSI MSA</td>
<td></td>
</tr>
<tr>
<td>Single or dual controller</td>
<td>P2000 G3 FC MSA</td>
<td>HP MSA 2040 SAN</td>
</tr>
<tr>
<td></td>
<td>P2000 G3 FC/iSCSI MSA</td>
<td>HP MSA 2040 SAS</td>
</tr>
<tr>
<td></td>
<td>P2000 G3 SAS MSA</td>
<td>HP MSA 2040 SAS</td>
</tr>
<tr>
<td></td>
<td>P2000 G3 10GbE iSCSI MSA</td>
<td>HP MSA 2040 SAN</td>
</tr>
<tr>
<td></td>
<td>P2000 G3 iSCSI MSA</td>
<td></td>
</tr>
<tr>
<td>Single or dual controller</td>
<td>HP MSA 2040 SAN</td>
<td>HP MSA 2040 SAS</td>
</tr>
<tr>
<td></td>
<td>HP MSA 2040 SAS</td>
<td>HP MSA 2040 SAN</td>
</tr>
<tr>
<td>Dual controller</td>
<td>HP MSA 1040 2-port 10GbE iSCSI</td>
<td>HP MSA 2040 SAN</td>
</tr>
<tr>
<td></td>
<td>HP MSA 1040 2-port 1GbE iSCSI</td>
<td>HP MSA 2040 SAS</td>
</tr>
<tr>
<td></td>
<td>HP MSA 1040 2-port 8Gb FC</td>
<td>HP MSA 2040 SAS</td>
</tr>
<tr>
<td></td>
<td>HP MSA 1040 2-port SAS</td>
<td>HP MSA 2040 SAS</td>
</tr>
</tbody>
</table>

5 LUN mappings using a protocol that is different from the original controller (i.e., changing from iSCSI to FC) will be deleted during the upgrade and need to be remapped.

6 The HP MSA 2040 SAN controller will support up to four host connections with options of 16 Gb, 8 Gb FC, 10 Gb, and, 1 Gb iSCSI per controller. See Table 4 for valid configurations.
Note
This white paper examines single-to-single controller upgrades and dual-to-dual controller upgrades. This white paper does not examine single-to-dual or dual-to-single controller upgrades.

The MSA 2040 SAS controller supports up to four 6 Gb SAS or 12 Gb SAS connections per controller using mini-SAS HD connectors and upgrading from a P2000 G3 SAS storage system will require new host connect cables.

The table below lists the supported SFP locations on the MSA 2040 controller ports when using FC, iSCSI, and the combination of FC and iSCSI.

Table 4. Supported MSA 2040 SAN controller Host Ports and SFP locations

For dual controller systems, symmetrical SFP placement is required.

<table>
<thead>
<tr>
<th>Host Port 1 SFP</th>
<th>Host Port 2 SFP</th>
<th>Host Port 3 SFP</th>
<th>Host Port 4 SFP</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/16 Gb FC</td>
<td>8/16 Gb FC</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>1/10 Gb FC</td>
<td>1/10 Gb FC</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Note
Customers must upgrade their MSA 2040 SAN controller firmware to GL101 or later for iSCSI functionality and set the host port mode using the CLI command `set host-port-mode`. See the CLI Online Help or the HP MSA CLI Reference Guide for more information on the command.

Instructions for upgrading to the HP MSA 1040 or HP MSA 2040

Overview
This section lists the methods to update an existing HP MSA storage system to the updated controllers of the HP MSA 2040.

This section examines the following:

- Upgrade considerations
- Known limitations
- Before you begin the upgrade
- Upgrade procedure

---

7 SFP in Host Port 1 must match SFP in Host Port 2
8 SFP in Host Port 3 must match SFP in Host Port 4
Upgrade considerations

The following is a list of upgrade considerations that need to be noted during the upgrade:

**Important**

- Before upgrading to the HP MSA 1040 or HP MSA 2040, you will need to copy data from any existing SATA virtual disks to SAS virtual disks as SATA drives are not supported with the HP MSA 1040 or HP MSA 2040 controllers.
- If an HP MSA 2040 storage enclosure is purchased for use with MSA 2040 controllers, existing drives will need to be removed from the P2000 G3 storage enclosure and placed into the new HP MSA 2040 storage enclosure in the same order as they were in the P2000 G3 storage enclosure.
- The MSA 1040 storage system comes standard with dual controllers and a storage enclosure. Drives from a P2000 G3 storage system must be moved to the MSA 1040 storage system enclosure during the upgrade process and placed in the same order as they were in the P2000 G3 storage enclosure.
- If an HP MSA 2040 Storage Enclosure is purchased and there was an existing Remote Snap replication or 512 Snapshot license on the P2000 G3 storage enclosure, new licenses will need to be obtained and applied to the upgraded system.
- The new licenses can be obtained from the MSA 1040/2040 product support page under “Software updates and licensing.”
  hp.com/support/msa1040
  hp.com/support/msa2040
- If you have an existing VMware® virtual infrastructure that utilizes the P2000 G3 MSA, refer the “VMware vSphere” section prior to upgrading.

- If multipath is used, multipath settings for the new controllers will need to be added before the upgrade to ensure consistent access to the array after the upgrade. Failure to properly update the multipath settings could result in data unavailability or data corruption.
- Host mapping may need to be recreated after upgrade. Record array mapping in case this information is required.
- Allow a minimum of two hours to complete the upgrade process. Allow additional time for configurations that contain large host counts because volume-to-host mappings may need to be reconfigured.
- If your current environment is Boot from SAN, verify Boot from SAN settings after the upgrade using this document as a guide. From the following link, locate the “Boot from SAN” document that pertains to your corresponding operating system and review the “Setting up the HBAs” section.
  h18026.www1.hp.com/storage/networking/bootsan.html?jumpid=reg_r1002_usen_c-001_title_r0002
- During the upgrade, the storage system will be powered down and all HP MSA controllers and/or enclosures will be removed and replaced with HP MSA 1040 or HP MSA 2040 controllers and enclosures.
- IP addresses might not be retained during the upgrade. See the MSA user documentation for setting the initial IP addresses of the new controller management ports.
- The Storage Management Utility (SMU) for the HP MSA 1040 and MSA 2040 supports Firefox, Internet Explorer, Chrome, and Safari.
- If you are changing storage protocols with the upgrade, you will need to validate that you have the appropriate host bus adapters to support the new storage protocol.
- If changing protocols during the upgrade, new cables (FC, Direct Access Cables [DAC], mini-SAS HD, or Ethernet) will be needed to utilize the new protocol of the controller. Qualified cables can be found in the MSA 1040 or MSA 2040 QuickSpecs and are available for purchase.
- The HP MSA 2040 SAN controllers do not include SFP transceivers. Qualified SFPs for the HP MSA 2040 can be found in the MSA 2040 QuickSpecs and are available for purchase in four packs.
- The HP MSA 2040 SAN controllers have four ports for all protocols, so more cables (FC, Direct Access Cables [DAC] or Ethernet) might be needed to utilize the additional ports on the controller.
- If you are moving to MSA 2040 SAS controllers, you will need to purchase cables with HD mini-SAS (SFF 8644 connector) connectors for connection to the MSA 2040 SAS host ports. Qualified cables can be found in the MSA 2040 QuickSpecs and are available for purchase.
- The HP MSA 1040 controllers come pre-installed with the appropriate transceivers (8 Gb FC, 10 Gb Optical iSCSI, or 1 Gb RJ-45 iSCSI). Replacing the 10 Gb optical transceivers with 10G DAC cables is supported. Qualified optical cables and 10G DAC cables are listed in the MSA 1040 QuickSpecs.

**Note**
Only HP MSA 2040 SFPs and qualified DACs will be recognized and usable within the HP MSA 2040 controllers. SFPs from other sources: P2000 G3 MSA, HP switches, and HP FC HBAs will not be recognized and will not function within the HP MSA 2040 controllers. Qualified SFPs and 10G DAC cables are listed in the HP MSA 2040 QuickSpecs.

**Known limitations**
The following is the list of limitations that can be found with the upgrade.
- Mixing P2000 G3 and HP MSA 1040 or HP MSA 2040 controllers in the same chassis is not supported.
- Mixing two different protocol controllers (for example, HP MSA 2040 SAN and HP MSA 2040 SAS) in the same storage enclosure is not supported.

**Before you begin the upgrade**
Be sure to perform the following best practices to prepare for your upgrade:

**Note**
Appendix A contains a checklist of the necessary data that will help you gather and save the configuration information for the upgrade.

**Note**
Validate that all required hardware for the upgraded storage system is available before starting. This includes but is not limited to: FC or iSCSI SFPs, iSCSI DACs, HD mini-SAS cables, and optical cables.

Not all of the above are required for every upgrade.

1. Back up all existing data on the existing storage system.
2. If the storage system has any problems, such as hardware warnings or virtual disks whose health is Degraded or Fault, resolve the problems before starting the upgrade.
3. Record the MSA storage system management IP address(es).
5. Download the latest MSA 1040 / MSA 2040 storage controller firmware:
   A. Go to hp.com/support/storage
   B. Click [Disk Storage Systems].
   C. Click [MSA Storage], then click [HP MSA Storage].
   D. Select [HP MSA 1040 SAN Storage] or [HP MSA 2040 SAN Storage].
   E. Under Download options, click [drivers, software & firmware].
   F. Select your product, then select your operating system from the drop-down menu.
   G. Click the + to expand the [Firmware—Storage Controller] table.
   H. In the Description column of the table, click the title of the firmware:
      - To download the firmware, click [Download].
6. **[fc]** Record the Worldwide Names (WWNs) of the existing storage system controller’s FC ports.
7. **[fc]** Record FC WWN IDs, Names (nicknames), and profile settings of the FC HBAs you will be using to connect to the storage system, if any. The WWN IDs/Names are listed under the “Host ID” property in the HP SMU. This can be found from the HP SMU by expanding Hosts from the Configuration View frame (see figure 2).

8. **[fc]** Record FC link speeds and topology settings. This can be found from the HP SMU by choosing Configuration -> System Settings -> Host Interfaces. (see figure 3).

9. **[i]** Record the IP addresses of the controller iSCSI ports. This can be found from the HP SMU by selecting Configuration > System Settings > Host Interfaces.

10. **[i]** Record any port IQN Host IDs and Names (nicknames) that were given for hosts (ensure that you capture all nicknames for all hosts). This can be found from the HP SMU by selecting Hosts > View > Overview.

11. **[sa]** Record any SAS host nicknames. This can be found from the HP SMU by selecting Hosts from the configuration view panel, then selecting View > Overview.

12. **[i]** Record iSNS information. This can be found from the HP SMU by selecting Configuration > System Settings > Host Interfaces.

13. **[i]** Record existing CHAP information. This information can be located from the HP SMU by selecting Hosts > Provisioning > Configure CHAP.

---

**Note**

IQN names will no longer be applicable if you are upgrading to the FC or SAS protocol controller. The IQN Host IDs and Names will be applicable if you choose to upgrade to the iSCSI protocol controller and choose to use the iSCSI targets of the new controller. Similarly, recording FC and SAS WWNs, nicknames, and speeds are only valid if you are moving to an MSA 1040 2-port 8 Gb FC, MSA 1040 2-port SAS, MSA 2040 SAN (FC or mixed FC/iSCSI), or an MSA 2040 SAS.

---

**Figure 1.** Recording FC ports WWNs
14. Record existing volume mapping information (see figure 4). This can be found from the HP SMU by selecting the volume and then under **Provisioning | Explicit Mappings**.

You might want to take a screenshot of the explicit mappings if you have a substantial amount of mappings. You can also use the Command Line Interface (CLI) command **“show volume-maps”** to record mappings.
If you are changing host interfaces (for example, from iSCSI to FC), any host-specific mapping will no longer be valid. If you have host-specific mappings and are changing host interfaces, you need to record mappings. Later, during the upgrade process, you will remap the hosts.

Figure 4. Volume mapping screen for the P2000 G3 MSA

15. Record all system user names, passwords, and the user types for users that can log on to the storage system. This can be found from the HP SMU under Configuration | Users | Modify Users.

Note
Do not delete user names; simply record existing user name and user information. Passwords will show up as blank on the screen.

16. Record the system information.
This can be found from the HP SMU under Configuration | System Settings | System Information.

17. Record the email notification information.
This can be found from the HP SMU under Configuration | Services | Email Notification.

18. Record the SNMP notification information.
This can be found from the HP SMU under Configuration | Services | SNMP Notification.

19. Record the date and time information.
This can be found from the HP SMU under Configuration | System Settings | Date, Time.

20. Record network management services information.
This can be found from the HP SMU under Configuration | Services | Management.

21. Record advanced disk settings information.
This can be found from the HP SMU under Configuration | Advanced Settings | Disk.

22. Record advanced cache settings information.
This can be found from the HP SMU under **Configuration | Advanced Settings | Cache.**

23. Record the snapshot scheduling information.
   This can be found from the HP SMU under **Provisioning | Modify Schedule.**

---

**Note**
Do not modify the schedule; simply record the existing schedule information.

24. If applicable, record remote storage system(s) used for Remote Snap.
   This can be found from the HP SMU under **Configuration | Remote Systems.**

**Capturing controller parameters**
To capture all existing controller parameters, such as the network address, before the upgrade, save the existing controller logs to your management PC. This can be done by using the FTP utility and running the `get logs` command. The data contained in these logs will prove helpful in the event of a support issue after the upgrade. This step could take three to five minutes to complete.

1. In HP SMU, prepare to use FTP:
   - Determine the network-port IP addresses of the system’s controllers.
   - Verify that the system’s FTP service is enabled.
   - Verify that the HP MSA storage system login account has the correct permissions to use the FTP interface.
2. Open a Command Prompt (Windows®) or a terminal window (UNIX®) and navigate to the destination directory for the log file.
3. Enter the FTP controller-network-address (for example: FTP 10.1.0.9).
4. Log in as an FTP user.
5. Enter the following command:
   ```
   get logs filename.zip
   ```
   Filename is recommended to be in the format `yyyymmdd_ftp_system-name_controller-ID`.

   **Note**
   For example:
   ```
   get logs 20140124_ftp_Storage2_A.zip
   ```
   Record the filename and path for future reference.

7. Quit the FTP session.

**Update host software**
Update the host software on each connected server using the latest drivers available for the MSA 1040 or MSA 2040. Support software for the MSA 1040 can be found at: [hp.com/go/msa1040](http://hp.com/go/msa1040) and the support for the MSA 2040 can be found at: [hp.com/go/msa2040](http://hp.com/go/msa2040).

Verify that the software is supported using the SPOCK webpage: [hp.com/storage/spock](http://hp.com/storage/spock).

To ensure that the multipath software will be able to use the new controller after it is installed, update the multipath software to correctly identify the new controller. This may require a reboot of the operating system.
Finishing up
1. Shut down all hosts connected to the array.
2. Label existing host connect cables if they are to be used in the upgraded system. All SAS host connect cables will need to be replaced due to the change in the SAS connector type.
3. Label all management network cables with the controller ID before disconnecting from the existing controllers.

Upgrading to the HP MSA 1040 or HP MSA 2040
The upgrade procedure is listed here for the single and dual controller upgrades with and without attached expansion enclosures.

Upgrade procedure
The upgrade procedure for the MSA includes the following steps:
• Shut down each controller
• Remove and replace the controllers/enclosures
• Determine and set the IP address of the new controller(s)
• Update the MSA 1040 or MSA 2040 controller firmware to the latest available version
• Re-enter controller information
• Reconnect host connect cables and verify infrastructure
• Re-establish Remote Snap communication, if necessary
• Complete the upgrade

Shut down each controller
Shut down the MSA controller(s) using the HP SMU. This procedure helps ensure that data from cache will be flushed to disk.
1. Select Tools | Shut down or Restart Controller.
2. In the Operation section, select Shut down.
3. In the Controller type section, choose Storage and in the Controller section, choose one of the following:

<table>
<thead>
<tr>
<th>System type</th>
<th>Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single controller</td>
<td>Shut down RAID Controller A</td>
</tr>
<tr>
<td>Dual controller</td>
<td>Shut down both RAID controllers</td>
</tr>
</tbody>
</table>

4. Click Shut Down Now.

Note
A SMU warning message might appear. This is an informational message that requires no action.

5. Click Yes to confirm the operation.
7. Verify that the “OK to Remove” blue light on the back of the controller(s) is lit.

Note
Verify that the Cache Status LED on the back of the controller is not blinking after the “OK to Remove” blue LED is illuminated. A blinking cache status LED means that cache has not been flushed to disk. If the cache light is blinking after the “OK to Remove” blue LED is illuminated, call HP support. See figures 5, 6, 7, 8, or 9 for your controller.
Figure 5. P2000 G3 FC MSA controller status

Figure 6. P2000 G3 FC/iSCSI MSA controller status

Figure 7. P2000 G3 SAS MSA controller status
8. Completely power down the MSA array by removing the power cords on the back of the controller enclosure.

9. If you have expansion drive enclosure(s) that are connected to the MSA controller enclosure, power them down by pressing the power switches at the back of each drive enclosure to the Off (O) position.

**Note**
If power supplies do not have power switches, remove the power cord.

**Remove and replace the controller(s) and enclosure**

1. If expansion enclosures are connected to the controller enclosure, label and remove the mini-SAS expansion cable from each controller SAS OUT port (see figures 5, 6, 7, 8, or 9 for your controller). If more than one expansion enclosure is connected in series, the remaining SAS cables from these expansion enclosures can remain connected to each other.

2. Remove labeled host connect cables. SAS cables will need to be replaced due to the change of the SAS connector type on the MSA 2040 controllers.

3. Remove labeled Ethernet cables from the MSA management ports on each controller.
Important
If you are replacing the P2000 G3 MSA Storage Enclosure, remove and label each drive from the existing enclosure for re-insertion in the new MSA storage enclosure into the same slots. Replace the enclosure and re-insert the drives into the new MSA storage enclosure. Skip to step 7.

4. If you upgrading to the MSA 2040 controllers and not replacing the P2000 G3 MSA Storage Enclosure, remove the existing controller(s) from the array head.

Follow the steps found on the HP Product Recycling page for proper disposal of controllers:
hp.com/hpinfo/globalcitizenship/environment/recycle/index.html

5. Insert the new HP MSA 2040 controller(s) into the storage enclosure and tighten the thumb screws.

6. Insert SFPs into the HP MSA 2040 SAN controllers; if you are planning to use DAC cables for iSCSI then no SFPs are required. MSA 2040 SAS controllers do not require SFPs. MSA 1040 controllers have SFPs pre-installed; remove 10 Gb iSCSI SFPs if you will be using DACs with the MSA 1040 controllers.

7. Reconnect or install new host connect cables. You must already have the correct SFPs or SAS cables for the MSA 2040 and DACs for either the MSA 1040 or MSA 2040 available for installation.

See table 5 below.

Table 5. Connecting data path cables to new controllers

<table>
<thead>
<tr>
<th>Existing MSA Storage system</th>
<th>New MSA 1040/2040 Storage system</th>
<th>Attaching host connect cables</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2000 G3 FC</td>
<td>HP MSA 2040 SAN FC mode</td>
<td>Reconnect existing FC cables as labeled</td>
</tr>
<tr>
<td>P2000 G3 FC/iSCSI</td>
<td>HP MSA 2040 SAN Combo mode</td>
<td>Reconnect existing FC cables as labeled</td>
</tr>
<tr>
<td>P2000 G3 10G iSCSI</td>
<td>HP MSA 1040 2-port 8Gb FC</td>
<td>Install new FC cables</td>
</tr>
<tr>
<td>P2000 G3 iSCSI</td>
<td>HP MSA 2040 SAN iSCSI mode</td>
<td>Install new FC cables in ports 1 and 2</td>
</tr>
<tr>
<td>P2000 G3 SAS</td>
<td>HP MSA 1040 2-port SAS</td>
<td>Install new Optical 10GbE/DAC/1GbE Ethernet cables in ports 3 and 4</td>
</tr>
<tr>
<td>MSA 2040 SAS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HP MSA 1040 2-port 1GbE iSCSI</td>
<td>HP MSA 2040 SAN iSCSI mode</td>
<td>Reconnect existing iSCSI cables as labeled in ports 1 and 2</td>
</tr>
<tr>
<td>HP MSA 1040 2-port 10GbE iSCSI</td>
<td>HP MSA 1040 2-port 1GbE iSCSI</td>
<td>or Install new Optical 10GbE/DAC/1GbE Ethernet cables</td>
</tr>
<tr>
<td>HP MSA 1040 2-port 8Gb FC</td>
<td>HP MSA 1040 2-port 10GbE iSCSI</td>
<td></td>
</tr>
<tr>
<td>HP MSA 1040 2-port SAS</td>
<td>HP MSA 1040 2-port 10GbE iSCSI</td>
<td></td>
</tr>
</tbody>
</table>

8. Reconnect the Ethernet cables removed from the management ports.
Figure 10. HP MSA 1040 controller status

Figure 11. HP MSA 1040 SAS controller status

Figure 12. HP MSA 2040 SAN controller status
9. If expansion enclosures were connected to the controller enclosure, reconnect the expansion SAS cable from the expansion enclosures to the MSA 1040 or MSA 2040 controller SAS OUT port (see figures 10, 11, 12, and 13).

10. Power up the expansion enclosures by pressing the power switches at the back of the expansion enclosure to the On (–) position or inserting the power cords. While enclosures power up, their LEDs blink. After the LEDs stop blinking, if no LEDs on the front and back of the enclosure are amber, the power-on sequence is complete and no faults have been detected.

11. Power on the HP MSA 1040 or HP MSA 2040 storage enclosure by pressing the power switches on the back of the controller enclosure to the On (–) position. If your HP MSA 1040 or HP MSA 2040 controller enclosure does not have power switches, plug power cords into the power supplies to power up the enclosure.

12. Verify the “FRU status” light is lit solid green on the back of the controller(s) before continuing. See figures 10, 11, 12, and 13.

**Determine and set the IP address of the new controller(s)**

Before you can access the SMU GUI, you must determine the IP address of the new controllers. There are multiple methods to obtain the IP addresses for your HP MSA 1040 or HP MSA 2040 system:

- Use the supplied mini-USB serial cable to verify the management IP address using the “show network-parameters” command.
- Find the two IP addresses assigned to an HP MSA 1040 or HP MSA 2040 System storage device in the DHCP server’s address table. Record these addresses.
- Use a network management utility to discover HP MSA 1040 or HP MSA 2040 System storage devices on the local LAN through SNMP, for example, HP-SIM.
- Use a ping broadcast to identify the device through the host’s ARP table.

Connect to the HP MSA 1040 or HP MSA 2040 using the mini-USB cable or to the SMU using the discovered IP address in your browser. If you are using DHCP, record the assigned IP addresses; otherwise set the IP address of the controller management ports to the previous values as saved in Appendix A.

Update the MSA 1040 or MSA 2040 controller firmware to the latest available version. See **Technical Support/Manuals** from [hp.com/go/msa1040](http://hp.com/go/msa1040) or [hp.com/go/msa2040](http://hp.com/go/msa2040).
Re-entering controller information
Re-enter the following information stored in the controllers:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
</table>
| Host interfaces           | This is where the FC topology (loop, point-to-point, auto) and port speed (4 Gb, 8 Gb, 16 Gb*, or auto) are assigned. Set iSCSI port addresses and iSCSI settings if you upgrade and change protocols. Re-enter iSNS and CHAP information.  
  * 16 Gb FC is only on the HP MSA 2040. |
| System information        | This includes the system name, contact name, and system location information.                                                                 |
| Host volume mapping       | This is where volume host access is assigned.                                                                                                                                                           |
| User configuration        | An example includes assigning user rights to users that are allowed to log on to the array. All custom user names will need to be re-entered.                                                           |
| Network management services | An example includes enabling FTP access to the array.                                                                                                                                                  |
| Email configuration       | This is used for event notification.                                                                                                                                                                    |
| SNMP trap address information | This is used for event notification.                                                                                                                                                                    |
| Snapshot and Remote Snap licenses | Refer to upgrade considerations section.                                                                                                                                                              |
| Existing snapshot schedules | Schedules of when snapshots are taken or reset, or volume copy schedules.                                                                                                                             |

Re-enter Date and Time
Re-enter system settings as follows:

1. Log into the HP SMU version 3.
2. Click *Date and Time drop-down* | *Set Date and Time.*

*Note*
Use the user name “manage” and the password “!manage” (without quotes) to log in to the HP SMU since the user name and password will return to defaults.

Figure 14. Date and time configuration
Re-enter Host Port Information

1. Click System | Action | Set Up Host Ports.

Figure 15. Host Port configuration

Re-enter System Information

1. Click Home | Action | Set System Information.

Figure 16. Set System Information

Enter the settings as follows:

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date, time</td>
<td>Verify the time zone, date, and system time.</td>
</tr>
<tr>
<td>Host interfaces</td>
<td>The CLI &quot;set host-parameters&quot; command is used to set FC and iSCSI parameters on host ports. FC settings can include connection type and speed. The iSCSI parameters include IP address, IP netmask, IP gateway, and IP version. The MSA 2040 SAS controller requires no SAS port configuration. See the HP MSA 1040 or HP MSA 2040 CLI Guides for more information. For MSA 2040 SAN controllers to use the iSCSI protocol, it is required to set the controller host port mode using the CLI set host-port-mode command. See the CLI Online Help or the HP MSA CLI Reference Guide for more information on the command. MSA 2040 SAN controller FW must be updated to GL101R001 or later to enable iSCSI capabilities. The manuals can be found at: hp.com/support/msa1040/manuals or hp.com/support/msa2040/manuals.</td>
</tr>
<tr>
<td>System information</td>
<td>Re-enter the name, contact, location, and system information. This information was recorded in step 16 of the &quot;Before you begin the upgrade&quot; section.</td>
</tr>
</tbody>
</table>
Verify host names and update if necessary
Assign or re-enter host nicknames and profiles.

1. Log into the HP SMU version 3.
2. Click Hosts and then highlight the Host ID.

**Figure 17. Highlight Host ID**

3. Click Action | Modify Initiator.

**Figure 18. Modify Initiator**

4. Type in the nickname.
5. [optional] Select the host initiators from the same physical host and "Add to Host" (see SMU Guide).
6. [Optional] Select hosts from the cluster and "Add to Host Group" (See SMU Guide).
Re-enter explicit volume mappings
Re-enter explicit volume mappings as follows:

1. Log into the HP SMU version 3.
2. Click **Mapping** and then click **Action | Map**.
3. Using the filter and search on each column, locate the Host Group, Host, or Initiator and select. Using the filter and search on each column, locate the Volume Group or Volume and select. Click the “**Map**” button.

**Figure 19.** Host and Volume Selection

4. Select the **Mode**, **LUN**, and **Ports** (Ports correspond to the same port on both controllers ex. 1 = A1 and B1). Click **Apply**.

**Figure 20.** Apply Mappings

```plaintext
<table>
<thead>
<tr>
<th>Group</th>
<th>Host</th>
<th>Volume</th>
<th>Mode</th>
<th>LUN</th>
<th>Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>-</td>
<td>15G_host1a</td>
<td>50141390231c4e9c</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>15G_host1b</td>
<td>50141390231c4e9c</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>15G_host2a</td>
<td>50141390231c4e9c</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>15G_host2b</td>
<td>50141390231c4e9c</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>15G_host3a</td>
<td>50141390231c4e9c</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>15G_host3b</td>
<td>50141390231c4e9c</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
```

Select one or more entries from Available Hosts and Available Volumes and click Map.
Re-enter user information
Re-enter the user configuration information, including "user name" and "user type" as follows:

**Note**
This information was recorded in step 16 of the “Before you begin the upgrade” section.

1. Click **Home | Action | Manage Users**.

**Figure 21.** Manage Users

2. Add any additional users that you had created on the previous MSA controller, set their passwords, roles, and interfaces.

3. Select the default user(s) and re-assign passwords and other attributes.

**Figure 22.** User Management
Re-enter services information

1. Log into the HP SMU version 3.
2. Click **Home | Action | Set up Notifications**.

**Figure 23.** Set Up Notifications

3. Select SNMP to re-enter SNMP information.
4. Select Email to re-enter email notification parameters.

**Figure 24.** Notification Settings

---

**Note**
The HP MSA 1040 and HP MSA 2040 allow the user to configure the syslog notification level.

5. Select Managed Logs to enable managed logs.
6. To set up system services, select **System | Action | Set Up System Services**.
7. Re-enable the system services.

**Figure 26. System Services**

<table>
<thead>
<tr>
<th>System Services</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network Management Services</strong></td>
</tr>
<tr>
<td>Web Browser Interface (WBI)</td>
</tr>
<tr>
<td>□ HTTP □ HTTPS</td>
</tr>
<tr>
<td>Default Management Mode: v2 v3</td>
</tr>
<tr>
<td>Command Line Interface (CLI)</td>
</tr>
<tr>
<td>□ Telnet □ SSH</td>
</tr>
<tr>
<td>Storage Management Initiative Specification (SMI-S)</td>
</tr>
<tr>
<td>□ Enable □ Encrypted</td>
</tr>
<tr>
<td>Other Interfaces</td>
</tr>
<tr>
<td>□ File Transfer Protocol (FTP)</td>
</tr>
<tr>
<td>□ Simple Network Management Protocol (SNMP)</td>
</tr>
<tr>
<td>□ Service Debug</td>
</tr>
<tr>
<td>□ Activity Progress Reporting</td>
</tr>
<tr>
<td>In-band Management Services</td>
</tr>
<tr>
<td>□ In-band SES Capability</td>
</tr>
</tbody>
</table>

**Snapshot and Remote Snap Licenses**

1. Select **Home | Action | Install License**. Type in the path and license file or browse to the license file and then click Install License File to add the updated license.

   The new license is only needed if you have upgraded to the MSA 2040 storage enclosure.

**Snapshot Schedules**

1. Select **Volumes | Action | Manage Schedules**. Verify the existing linear snapshot schedules.
Verify FC switch configuration
1. When upgrading to a FC based controller, verify that the FC switch zoning configuration is updated with the new storage system port WWNs.

Re-establish iSCSI connectivity
1. If upgrading to an iSCSI based controller, re-establish iSCSI sessions from the hosts to the new storage system IQN.

Remote Snap communication
For Remote Snap, if the management controllers cannot communicate with each other, you will need to set the remote replication secondary addresses on the secondary array using the secondary storage system’s addresses.

Complete the upgrade
1. Power up all hosts connected to the storage system.
2. From the hosts, verify that the MSA volumes are accessible. This will require a multipath reconfigure if multipath was used prior to upgrading and not updated prior to the upgrade.

Congratulations! You have successfully upgraded to the HP MSA 1040 or HP MSA 2040.

VMware vSphere

Note
This section only applies when upgrading from the P2000 G3 MSA (TS250 firmware) to the MSA 1040/2040 (GL200 and greater firmware).

Upgrading the MSA controller(s) changes the signature on the storage system, which causes the ESX/ESXi host to detect the LUN as a snapshot. After the upgrade, you might experience missing datastores and virtual machines (VMs). You will need to add the missing datastores and VMs back into the vSphere inventory using the resignature process. For Raw Device Mapping (RDM) that is presented directly to VM from the MSA storage system, will need to be manually imported using CLI commands.

Since the MSA 1040 and MSA 2040 SAN storage systems are T10 compliant, there is no need for the VAAI Plug-in to be installed. If your ESX/ESXi server hosts both P2000 G3 MSA and HP MSA 1040/2040 SAN storage systems, it is recommended that you uninstall the VAAI Plug-in, remove claimrules, and then re-install VAAI after the controller upgrade. This ensures all claimrules are associated with the correct storage system.

Below are the steps for adding missing datastores, VMs, and deactivated the VAAI Plug-in. Refer to the VMware documentation and support before upgrading the controller(s).

Retrieving the disk information before upgrading the controller(s)
Refer to the following VMware Documentation links for specific details for steps 1 through 3.

CLI vmkfstools link: vmkfstools

Service console command esxcfg-scsidevs link: esxcfg-scsidevs

Before performing the controller upgrade, collect all disk information related to Virtual Machine File System (VMFS) and RDM files.

1. Make sure the VM data is properly backed up.
2. From the ESX/ESXi console, run the following commands to collect the disk information:
   A. Enter the vmkfstools -P command to query the VMFS file system and save the disk information to file
      vmkfstools -P /vmfs/volumes/DATASTORE_NAME/VM_NAME/VM_NAME.vmdk
      # UUID: 518421ec-a2b768ec-1eed-001cc468d0c4 Partitions spanned (on “lvm”):
      # naa.600c0ff00011caddea9f835101000000:1
B. Save the VMFS disk information to a file.

C. Enter the `vmkfstools -q` command to query the RDM file system

```bash
vmkfstools -q /vmfs/volumes/DATASTORE_NAME/VM_NAME/VM_NAME_RDM.vmdk
```

# Disk /vmfs/volumes/vmfs5/RDMVM/RDMVM.vmdk is a Non-pass through Raw Device Mapping
# Maps to: vml.020056000600c0f0001cadd1fa0835f101000000503303020

D. Enter the `esxcfg-scsidevs -u` to list NAA ID with their primary name and use the vml number from step c for the input parameter

```bash
esxcfg-scsidevs -u | grep vml.0200010000600c0ff000db41bae7458151010000004d5341203230
```

# naa.600c0ff000db41bae7458151010000000

E. Save the RDM disk information to a file.

3. Repeat steps 1 and 2 for additional VMs, and save all the disk information to a file for use after the controller upgrade.

**Deactivating the MSA VAAI Plug-in and removing the claimrules before upgrading the controller(s)**

1. Put the ESX server into maintenance mode for the host with the VAAI Plug-in installed.

2. Remove the VAAI Plug-in by running the following command from the ESX/ESXi console:

```bash
esxcli software vib remove -n vmware-esx-hp_vaaip_p2000
```

3. Enter the `esxcli storage core claimrule list` command to confirm the claimrule numbers for the MSA VAAI Plug-in. Rule numbers are 5001, 5002, 5003, and 5004.

```bash
esxcli storage core claimrule list --claimrule-class=Filter
```

# RuleClass   Rule Class    Type     Plug-in      Matches
# ---------- ----- ------- ------ ----------- --------------------------------
# Filter     5001 file    vendor    VAAI_FILTER    vendor=HP model=P2000 G3 FC
# Filter     5002 file    vendor    VAAI_FILTER    vendor=HP model=P2000 G3 FC/iSCSI
# Filter     5003 file    vendor    VAAI_FILTER    vendor=HP model=P2000 G3 iSCSI
# Filter     5004 file    vendor    VAAI_FILTER    vendor=HP model=P2000 G3 SAS

4. Deactivate all claimrules for the MSA VAAI Plug-in. For example, to delete the “5001” claimrule enter the `esxcli storage core claimrule remove` command:

```bash
esxcli storage core claimrule remove -r 5001 --claimrule-class=Filter
esxcli storage core claimrule remove -r 5001 --claimrule-class=VAAI
```

5. Enter the `esxcli storage core claimrule load` command to load the new rules:

```bash
esxcli storage core claimrule run --claimrule-class=Filter
```

6. Enter the `esxcli storage core claimrule list` command to confirm that the claimrules of the MSA VAAI Plug-in are deleted:

```bash
esxcli storage core claimrule list --claimrule-class=all
```

The response should no longer include filter rules for P2000 models.

7. Shutdown all VMs and the ESX/ESXi server(s) in preparation for the controller upgrade.

8. Proceed to “Upgrading to the HP MSA 1040 or HP MSA 2040” section to upgrade the controllers.
Post controller upgrade
Once the controller upgrade process outlined in this document has been completed and the ESX/ESXi servers are online, missing datastore(s) and inaccessible VMs may be listed in the vSphere inventory. To add them back into inventory, follow the steps below:

Inventory Datastore(s) and VMFS VM(s)
Refer to the following VMware documentation hyperlinks for details.

Entering and Exiting Maintenance Mode

Resignature a VMFS Datastore

Adding and Removing VMs
1. Take the ESX/ESXi host out of maintenance mode.
2. Remove all VMs that are listed as inaccessible in the vSphere inventory.
3. Assign a New Signature to the Disk/LUN by running the add storage wizard.
   A. Select the Disk/LUN based on the information saved before the controller upgrade. The new signature adds the datastore back into the inventory with a prefix name of snap. This is because the original name is still reserved by vSphere.
   B. Repeat the above steps for each Disk/LUN that needs to be re-inventoried.
4. Re-inventory the VMs from the signature datastores (refer to Adding and Removing Virtual Machines).

Note
To restore the original datastore names, remove all the VMs from the inventory again and then rename the datastores. Follow step 4 to re-inventory the VMs again.

Inventory RDM Virtual Machine(s)
Refer to the following VMware documentation hyperlinks for specific details.

VMware KB (1026256)

Adding and Removing Virtual Machines
For each RDM VM, use the appropriate command:
• Creating a virtual RDM: Enter the `vmkfstools -r` command.
• Creating a physical RDM: Enter the `vmkfstools -z` command.
These commands recreate the descriptor file (example.vmdk) and mapping file, (example-rdm.vmdk)
1. Refer to the RDM disk information that was saved before upgrading the controller.
2. For example, to create a pass-through raw disk mapping file for a physical RDM, run the following commands from the ESX/ESXi console:
   A. Change directory to VM directory:
      
   B. Enter the following command to generate a new descriptor and mapping file:
      `vmkfstools -z /vmfs/devices/disks/naa.600c0ff00011cadd1fa0835101000000 VM_NAME.vmdk`
   C. Repeat steps a through b for all RDM disks.
3. Add the VM back into inventory.
**Upgrade scenarios**

There are some considerations to be aware of when upgrading the P2000 to the MSA 1040/2040 or when upgrading an MSA 1040 to an MSA 2040. These scenarios use the latest GL200 firmware.

See the User Guide for more information on Linear and Virtual Disk Groups.

**Scenario 1:**
The user has Linear Disk Groups and wants to keep using only Linear Disk Groups.

The user can continue to use the MSA array and create the Linear Disk Groups in the same manner used before upgrading. The user can use either Version 2 or Version 3 of the SMU.

**Scenario 2:**
The user has Linear Disk Groups and wants to start using Virtual Disk Groups and keep the remaining Linear Disk Groups.

The user will be able to have both Linear and Virtual Disk Groups on the same MSA array. In order to utilize the Virtual Disk Groups, there must be available drives to construct the Disk Groups. This process might require purchasing new drives if no unused drives exist.

Use Version 3 of the SMU to create the new Virtual Disk Groups. Version 2 of the SMU does not have the capability to create Virtual Disk Groups.

---

**Note**
For the 1040, using virtualized storage requires a license.

**Scenario 3:**
The user has Linear Disk Groups and wants to start using Virtual Disk Groups and wants to migrate the existing Linear Disk Groups to use the MSA virtualization features.

Host-based migration is necessary to move the Linear volumes to Virtual volumes.

To migrate the data, create new Virtual Disk Groups and then copy the data from the Linear Disk Groups onto the newly created Virtual Disk Group using a file copy.

Again, this process might require purchasing new drives for use with the Virtual Disk Groups if no unused drives exist.

Use Version 3 of the SMU to create the new Virtual Disk Groups. Version 2 of the SMU does not have the capability to create Virtual Disk Groups.
### Appendix A

Before you power down your hosts and remove the existing MSA controllers, review this checklist and ensure you have all the necessary information.

**Management IP configuration**

<table>
<thead>
<tr>
<th></th>
<th>Controller A</th>
<th>Controller B</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP address</td>
<td>______________________</td>
<td>______________________</td>
</tr>
<tr>
<td>Netmask:</td>
<td>______________________</td>
<td>______________________</td>
</tr>
<tr>
<td>Gateway:</td>
<td>______________________</td>
<td>______________________</td>
</tr>
</tbody>
</table>

**Controller FC Worldwide Names**

<table>
<thead>
<tr>
<th></th>
<th>Controller A WWNs</th>
<th>Controller B WWNs</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1:</td>
<td>_____________________</td>
<td>_____________________</td>
</tr>
<tr>
<td>B1:</td>
<td>_____________________</td>
<td>_____________________</td>
</tr>
</tbody>
</table>

**FC and SAS host nicknames**

<table>
<thead>
<tr>
<th>WWN</th>
<th>Nickname</th>
<th>Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Controller iSCSI port addresses** (listed under Host Interface in the SMU)

<table>
<thead>
<tr>
<th></th>
<th>Controller A IP address: Port 1:</th>
<th>Port 2:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Port iQN host nicknames** (iSCSI only)

<table>
<thead>
<tr>
<th>Host ID</th>
<th>Nickname</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Volume mappings**

<table>
<thead>
<tr>
<th>Volume name</th>
<th>Host name or Host ID</th>
<th>Ports</th>
<th>LUN</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No/R/RW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No/R/RW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No/R/RW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No/R/RW</td>
</tr>
</tbody>
</table>
### Network Management Services

**Web Browser Interface (WBI)**

- [ ] HTTP
- [ ] HTTPS

**Command Line Interface**

- [ ] (CLI) Telnet
- [ ] SSH

**Storage Management Initiative Specification (SMI-S)**

- [ ] Enable
- [ ] Encrypted

**Other Interfaces**

- [ ] File Transfer Protocol (FTP)
- [ ] Simple Network Management Protocol (SNMP)
- [ ] Service Debug
- [ ] In-band Management Services In-band SES Capability

### Email alerts configuration

<table>
<thead>
<tr>
<th>Notification level</th>
<th>SMTP server address</th>
<th>Sender name</th>
<th>Sender domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/E/C/W/I</td>
<td>____________</td>
<td>__________</td>
<td>____________</td>
</tr>
</tbody>
</table>

Email address 1: ________________________________________

Email address 2: ________________________________________

Email address 3: ________________________________________

Email address 4: ________________________________________

### SNMP traps configuration

**Notification level**: N/E/C/W/I

- SNMP read community: ____________
- SNMP write community: ____________
- Trap host IP address 1: ____________
- Trap host IP address 2: ____________
- Trap host IP address 3: ____________
**Advanced Disk Settings**

SMART Configuration:

Dynamic Spare Capability:

Available and Spare Drive Spin Down Capability:

Drive Spin Down Delay (minutes):

Drive Spin Down Suspend Period:

<table>
<thead>
<tr>
<th>Time to Suspend</th>
<th>(HH)</th>
<th>(MM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to Suspend</td>
<td>(HH)</td>
<td>(MM)</td>
</tr>
</tbody>
</table>

Exclude Weekend Days from Suspend Period:

EMP Polling Rate:

**Advanced Cache Settings**

Sync Cache Mode:
- Immediate
- Flush to Disk

Missing LUN Response:
- Not Ready
- Illegal Request

Host Control of Write-Back Cache:

Auto-Write Through Cache Trigger Conditions

Controller Failure:

Cache Power:

CompactFlash:

Power Supply Failure:

Fan Failure:

Over Temperature Failure:

Auto-Write Through Cache Behaviors

Revert when Trigger Condition Clears:
Notify Other Controller:

**Remote Snap Remote System Information**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP address:*</td>
<td></td>
</tr>
<tr>
<td>User name:*</td>
<td></td>
</tr>
<tr>
<td>Password:*</td>
<td></td>
</tr>
</tbody>
</table>

*If applicable

**System user names**

**Note**
SNMP User Characteristics (User Access vs. Trap Target, Authentication Type, Privacy Type, Privacy Password, and Trap Host Address) only need to be set if the “SNMPv3 User Definition” is checked.

<table>
<thead>
<tr>
<th>User Name (default users and their default settings are shown below)</th>
<th>Attribute</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Password</td>
<td>/manage/monitor/ftp</td>
<td></td>
</tr>
<tr>
<td>SNMPv3 User Definition Checked?</td>
<td>No/No/No</td>
<td></td>
</tr>
<tr>
<td>User Roles</td>
<td>manage, monitor/monitor/manage, monitor</td>
<td></td>
</tr>
<tr>
<td>User Type</td>
<td>standard/standard/standard</td>
<td></td>
</tr>
<tr>
<td>WBI Access?</td>
<td>Yes/Yes/No</td>
<td></td>
</tr>
<tr>
<td>CLI Access?</td>
<td>Yes/Yes/No</td>
<td></td>
</tr>
<tr>
<td>FTP Access?</td>
<td>Yes/No/Yes</td>
<td></td>
</tr>
<tr>
<td>SMI-S Access</td>
<td>Yes/No/No</td>
<td></td>
</tr>
<tr>
<td>Base Preference</td>
<td>Base 10/Base 10/Base 10</td>
<td></td>
</tr>
<tr>
<td>Precision Preference</td>
<td>1/1/1</td>
<td></td>
</tr>
<tr>
<td>Unit Preference</td>
<td>Auto/Auto/Auto</td>
<td></td>
</tr>
<tr>
<td>Temperature Preference</td>
<td>Celsius/Celsius/Celsius</td>
<td></td>
</tr>
<tr>
<td>Auto Sign out</td>
<td>30/30/30</td>
<td></td>
</tr>
<tr>
<td>Locale</td>
<td>English/English/English</td>
<td></td>
</tr>
<tr>
<td>SNMP User Characteristics</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Authentication Type</td>
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<tr>
<td>Privacy Type</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Privacy Password</td>
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<td></td>
</tr>
<tr>
<td>Trap Host Address</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
System information
System name: ______________________________
System contact: ______________________________
System location: ______________________________
System information: ______________________________

Date/time information
Network time protocol: Enabled/Disabled
NTP server address: _____._____._____._____.
Time zone offset: ________________________

Controller logs filenames
Controller A: ________________________________________
Controller B: ________________________________________

Learn more at hp.com/go/MSA