

# HP StorageWorks

Booting Itanium Linux systems from a  
storage area network

application notes

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# About this document

These application notes describe boot setup procedures from a storage area network (SAN) with Itanium®-based Linux® systems.

For the latest version of this document, access the HP storage web site <http://h18006.www1.hp.com/storage/saninfrastructure.html>.

This section describes the content reflected in this document, including:

- [Application notes information](#), page 1
- [Intended audience](#), page 1
- [Accessing future product updates](#), page 2

## Application notes information

These application notes contain the following major topics:

- [Introduction](#), page 2
- [Supported configurations](#), page 2
- [Required hardware and software](#), page 3
- [Boot setup procedures for EVA and MSA](#), page 5
- [Deploying the operating system to the SAN](#), page 12
- [Loading the EFI HBA driver](#), page 13
- [Configuring the boot device on Emulex HBAs](#), page 13
- [Creating a LUN](#), page 11
- [Restrictions](#), page 14
- [Using the Udev utility with SUSE Linux systems](#), page 15
- [Working with the A6826A HBA](#), page 18

## Intended audience

This document is intended for customers who are familiar with:

- Red Hat™ Enterprise Linux® or SUSE® Linux Enterprise Server operating systems
- Host bus adapters (HBAs)
- Fibre Channel switch configuration, management, and zoning
- Storage arrays:
  - Modular Smart Array (MSA)
  - Enterprise Virtual Array (EVA)
  - Disk Array XP (XP)
  - Virtual Array (VA)

Additional documentation, including white papers and best practices documents, is available on the HP web site <http://www.hp.com>.

## Accessing future product updates

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After signing up, you can quickly locate your products by selecting **Business support** and then **Storage** under Product Category.

## Introduction

Traditionally, HP servers boot operating systems from internal SCSI or IDE storage devices. With the support of external booting in HP StorageWorks HBAs and RAID array, you have the option to eliminate server-based internal boot devices. Booting from an external device decreases downtime through faster server replacement in the event of a server failure.

This section describes the following:

[Why boot from a SAN?](#), page 2

[Additional information](#), page 2

## Why boot from a SAN?

Booting from a SAN provides:

- Improved disaster recovery
- Reduced backup time when the boot path is through a SAN
- Additional SAN-managed features

## Additional information

For detailed information about HBAs, switches, storage arrays, and storage software, go to the following HP web sites:

**Table 1 HP web site resources**

Topic	HP web site
HBAs and switches	<a href="http://h18006.www1.hp.com/storage/saninfrastructure.html">http://h18006.www1.hp.com/storage/saninfrastructure.html</a>
Storage array systems	<a href="http://h18006.www1.hp.com/storage/arrayssystems.html">http://h18006.www1.hp.com/storage/arrayssystems.html</a>
Multipathing software	<a href="http://h18006.www1.hp.com/storage/software.html">http://h18006.www1.hp.com/storage/software.html</a>
Integrity servers	<a href="http://www.hp.com/products1/servers/integrity/index.html">http://www.hp.com/products1/servers/integrity/index.html</a>

## Supported configurations

This document describes single-server configurations using the following arrays:

- MSA
- EVA
- XP
- VA (QLogic HBAs only)

## Server replacement in the event of a server failure

If a server fails, you must retain the HBAs to ensure that the replacement server hardware components are identical to the ones that you are replacing. Place the HBAs in the PCI slots of the new server in the same order as they were placed in the old server.

If you are using an internal disk for your swap file system, you can move this disk to the replacement server. You can also use a new disk, but you must format it and manually reset the swap file to that disk.

To reset the swap file:

1. Open the `/etc/fstab` file for editing.
2. Locate the swap entries and change them to the new swap partition.
3. Enter the following, or reboot:

```
# swapon -a
```

## Required hardware and software

Table 2 lists the *minimum* required hardware and software for booting from a SAN. HP recommends using the *latest* supported versions for operating systems, firmware, drivers, and Extensible Firmware Interface (EFI). Check for the latest supported versions on the web site <http://h18006.www1.hp.com/storage/saninfrastructure.html>.

**Table 2 Required hardware and software**

Feature	QLogic HBAs	Emulex HBAs
Linux operating systems	Red Hat Enterprise Linux 3 (Update 1 minimum). <b>Note:</b> Booting from EVA8000, EVA6000, or EVA4000 requires Red Hat Enterprise Linux 3 (Update 5 minimum). Red Hat Enterprise Linux 4 (Base release minimum) SUSE Linux Enterprise Server 9 (SP1 minimum)	Red Hat Enterprise Linux 4 (Update 2 minimum) SUSE Linux Enterprise Server 9 (SP2 minimum)
RAID arrays	EVA MSA XP VA	EVA MSA XP <b>Note:</b> The MultiPulse failover driver is only supported on “active-active” arrays: <ul style="list-style-type: none"> <li>• EVA3000/5000, VCS 4.004</li> <li>• EVA4000/6000/8000, XCS 5.110</li> <li>• MSA A-A, and XP</li> </ul>
HBA models	PCI-X 2.0 dual-port 4Gb FC adapter, part number AB379A FC1143 PCI-X 2.0 4Gb HBA, part number AB429A Q2300 2GB PCI-X HBA, part number A7538A A6826A 2GB PCI-X HBA, part number A6826A	FC2143 4GB PCI-X 2.0 HBA, part number AD167A FC2243 4GB PCI-X 2.0 HBA, part number AD168A
HBA drivers	PCI-X 2.0 dual-port 4Gb FC adapter, and FC1143 PCI-X 2.0 4Gb HBA (8.01.03 minimum) Q2300 and A6826A: <ul style="list-style-type: none"> <li>• 7.01.01 minimum for 2.4 kernels</li> <li>• 8.00.00 minimum for 2.6 kernels</li> </ul>	8.0.16.21 minimum for 2.6 kernels
EFI	PCI-X 2.0 dual-port 4Gb FC adapter, and FC1143 PCI-X 2.0 4Gb HBA: <ul style="list-style-type: none"> <li>• EFI driver: 1.01 minimum</li> <li>• EFI utility: 2.09 minimum</li> </ul> A6826A and Q2300: <ul style="list-style-type: none"> <li>• EFI driver: 1.30 minimum</li> <li>• EFI utility: 1.21 minimum</li> </ul>	EFI driver: 3.11a4 minimum EFI firmware: 5.01.a8 minimum

Feature	QLogic HBAs	Emulex HBAs
MultiPulse driver	N/A	Emulex MultiPulse driver 2.1.6 (2.6 kernel only)
HP Integrity Servers	PCI-X 2.0 dual-port 4Gb FC adapter, PCI-X 2.0 dual-port 4Gb FC adapter, and FC1143 PCI-X 2.0 4Gb HBA: <ul style="list-style-type: none"> <li>• Superdome (sx1000 )</li> <li>• rx7620</li> <li>• rx8620</li> </ul> A6826A and Q2300: <ul style="list-style-type: none"> <li>• Superdome (sx1000)</li> <li>• rx1600</li> <li>• rx1620</li> <li>• rx2600</li> <li>• rx2620</li> <li>• rx4640</li> <li>• rx5670</li> <li>• rx7620</li> <li>• rx8620</li> </ul> The following servers require SFW (System Firmware) 1.009 minimum to support the A6826A HBA: <ul style="list-style-type: none"> <li>• rx7620</li> <li>• rx8620</li> </ul>	<ul style="list-style-type: none"> <li>• Superdome (sx1000 )</li> <li>• rx7620</li> <li>• rx8620</li> </ul>
Fibre Channel switches	B-Series, C-Series, and M-Series switch products For a list of supported switch models, see the <i>HP StorageWorks SAN design reference guide</i> , available on <a href="http://h18006.www1.hp.com/products/storageworks/san/documentation.html">http://h18006.www1.hp.com/products/storageworks/san/documentation.html</a>	

## Boot setup procedures for EVA and MSA

The following sections describe the boot setup procedures for EVA and MSA with the required software and hardware described in [Table 2](#) on page 4.



### NOTE:

The HBA driver resident in the operating systems is supported only to install the operating system to the SAN. After deploying the operating system to the SAN, download and install the latest Linux HBA driver from <http://h18006.www1.hp.com/storage/saninfrastructure.html>.

To set up booting from a SAN, you must review and perform the following procedures:

1. [Prerequisite procedures](#), page 6
2. [Setting up switch-based zoning](#), page 6
3. [Creating a LUN](#), page 11
4. [Deploying the operating system to the SAN](#), page 12
5. [Configuring the boot device on Emulex HBAs](#), page 13 (Emulex HBAs only)

## Prerequisite procedures

The following procedures are not described in this document. However, you must perform them before performing the boot setup procedures.

- MSA and EVA
  - Creating a boot LUN (and data LUNs if desired)
  - Verifying that the storage units have the proper access

---

 **NOTE:**

The MultiPulse driver works only on active-active arrays, as described in [Table 2](#) on page 4.

---

- XP
  - Enabling LUN security on the CHIP port if multiple servers are connected to it
  - Creating a host group for each of the servers booting off the XP array
  - Adding a LUN as the boot device
  - Ensuring that only the WWN of the server has access to the boot device
  - Optionally adding data LUNs
  - Verifying that all existing storage units (virtual disks) have the proper access settings
- VA (QLogic only)
  - Adding a LUN as the boot device
  - Ensuring that only the WWN of the server has access to the boot device
  - Optionally adding data LUNs
  - Verifying that all existing storage units (virtual disks) have the proper access settings

## Setting up switch-based zoning

You must be familiar with switch-based zoning to configure the cabling described in this section. For specific information about zoning for your environment, see your switch's installation guide.

### Setting up switch zoning

You must set up switch zoning as part of your configuration. See the figures in "[Cabling options for single-channel and dual-channel HBAs](#)" on page 7, and "[Cabling options for dual-channel HBAs](#)" on page 9.



## Setting up initial zoning

1. Create a zone using the WWN or switch port number that includes the boot HBA port and a single controller port.
2. Enable the zone.

## Finalizing zoning

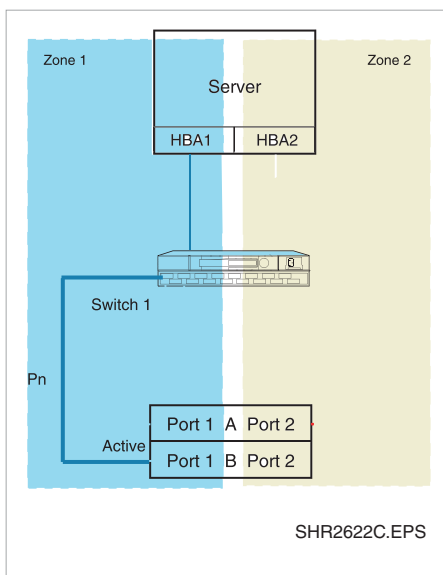
1. Perform the steps described in "[Deploying the operating system to the SAN](#)" on page 12.
2. Modify the initial zone to include a second controller port.
3. Create a zone in the second fabric to include a secondary boot HBA port and two other controller ports.

## Cabling options for single-channel and dual-channel HBAs

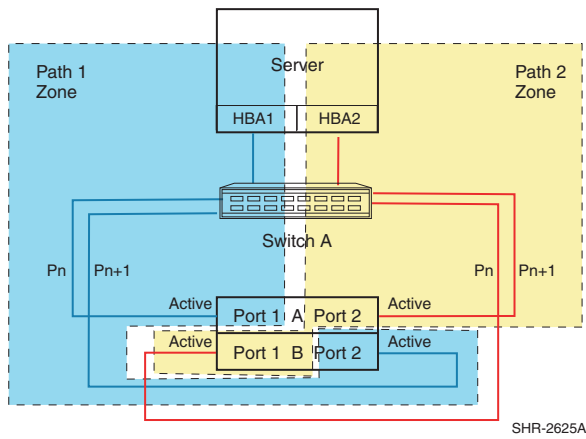
This section illustrates SAN cabling options for HBAs.

### Cabling options for single-channel HBAs

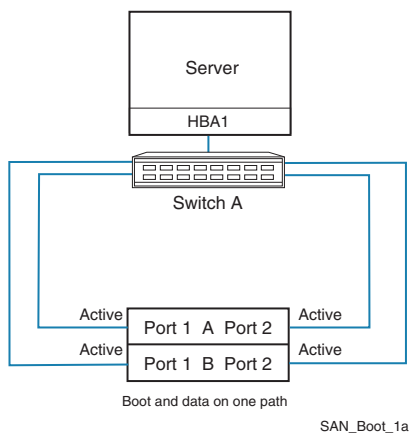
Boot from SAN is supported in the zoned single-channel HBA configurations shown in [Figure 1](#) through [Figure 5](#).



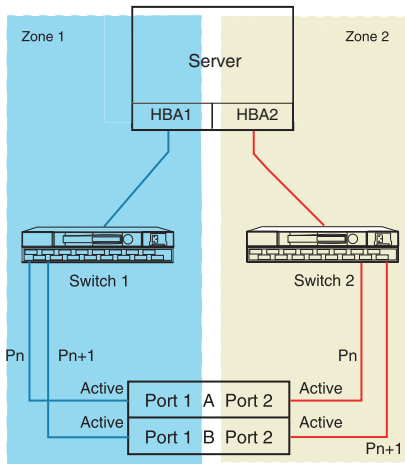
**Figure 1 Single server, two single-channel HBAs, one switch, straight-cable storage configuration**



**Figure 2 Single server, two single-channel HBAs, one switch, cross-cable storage configuration**

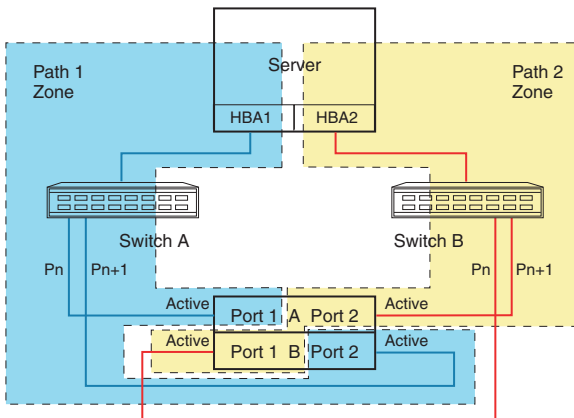


**Figure 3 Single server, one single-channel HBA, one switch cross-cable storage configuration**



SHR-2631B

**Figure 4 Single server, two single-channel HBAs, two switches, straight-cable HA storage configuration**

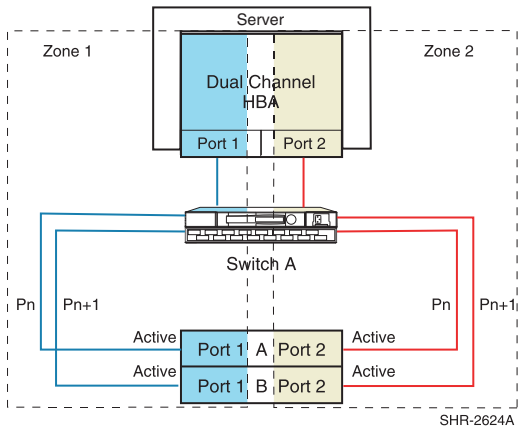


SHR-2427D

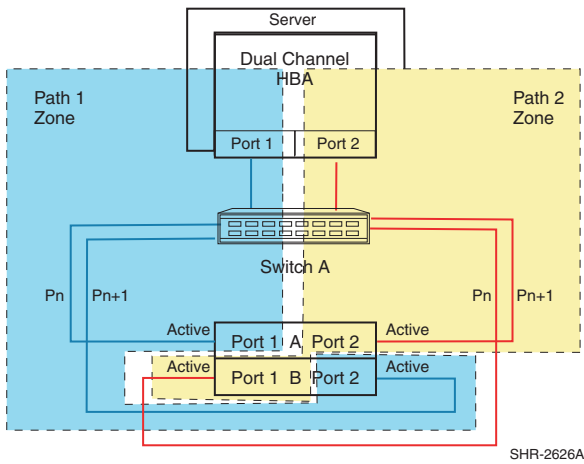
**Figure 5 Single server, two single-channel HBAs, two switches, cross-cable HA storage configuration**

### Cabling options for dual-channel HBAs

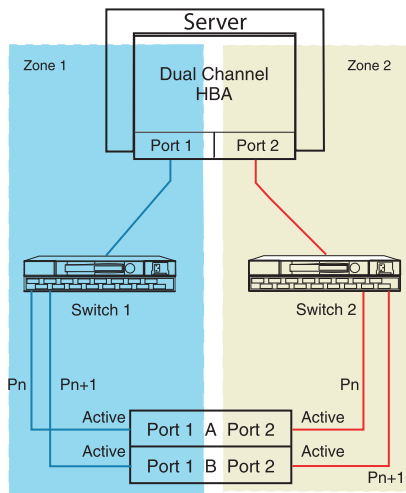
Dual-channel HBAs are typically used when the number of server PCI slots is limited. [Figure 6](#) through [Figure 9](#) show the cabling options for dual-channel HBAs.



**Figure 6 Single server, one dual-channel HBA, one switch, straight-cable storage configuration**

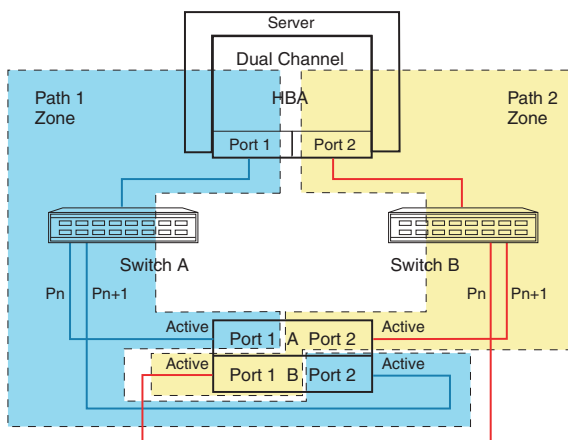


**Figure 7 Single server, one dual-channel HBA, one switch, cross-cable storage configuration**



SHR-2619C

**Figure 8 Single server, one dual-channel HBA, one switch, cross-cable storage configuration**



SHR-2621A

**Figure 9 Single server, one dual-channel HBA, two switches, cross-cable HA storage configuration**

## Creating a LUN

The following sections describe how to create LUNs on storage arrays.

### Creating a LUN on EVAs

To create a LUN on EVAs:

1. Using a web browser, access Command View EVA or the HSV Element Manager.
2. Create the LUN and assign a host. You must create a host if one does not exist.
3. Return to the server.

For detailed information about using Command View EVA, see the *HP StorageWorks Command View EVA getting started guide*.

## Creating a LUN on MSAs

To create a LUN on MSAs:

1. Create a virtual disk (LUN) using the Array Configuration Utility (ACU) on a separate server.
2. Using the Selective Storage Presentation option, assign the LUN to the HBA connection.
3. Return to the server.

## Creating a LUN on XPs

Using a web browser, start Command View XP and perform the following steps:

1. Select an array port (such as CL1-A).
2. Set LUN security for the selected array port.
3. Create a host group with the proper host mode for Linux.
4. Assign the first boot HBA port WWN to the newly created host group.
5. Assign LUN 0 to the host group.

For detailed information about using Command View XP, see the *HP StorageWorks Command View XP for XP Disk Arrays user guide*.

## Deploying the operating system to the SAN

Before creating a boot disk and deploying the operating system to the SAN, you must start with a clean, unpartitioned virtual disk. Perform the following steps:

1. Download the latest HBA driver from the web site:  
<http://h18006.www1.hp.com/storage/saninfrastructure.html>.
2. Using the native operating system installation program, deploy the operating system to the selected boot LUN on the SAN.

The operating system installer for the supported Linux distributions maps the Fibre Channel LUNs at installation time.

---

### △ CAUTION:

If you are planning to set up booting from a RAID array that has other virtual disks attached to other servers, be aware that when setting up booting for the new server, the operating system installation program may display many partitions available on the array. *Verify that the correct virtual disk and partition are selected before deploying the operating system to the SAN.* HP recommends using Selective Storage Presentation on all arrays and verifying the correct virtual disk prior to installation.

---

3. Install the HBA driver.
4. Optionally, configure the following during the operating system installation:
  - Configure a root (/) partition on the boot LUN.
  - Configure a boot partition of type GPT (or FAT32) on the selected boot LUN.
  - Place the Linux swap partition on the SAN.

---

### NOTE:

For optimal performance, HP recommends placing the swap partition on an internal hard drive, if available. Placing the swap partition on the SAN is supported, but depending on the server and the SAN configuration, server performance might be impacted, especially for servers in a SAN with heavy I/O loads.

---

## Loading the EFI HBA driver

The EFI HBA driver may not load automatically during server initialization. If this occurs, you can load the EFI driver manually.

To load the driver manually:

1. Enter the following command to display driver information:

```
drivers -b
```

2. To configure the EFI driver, specify the driver using its handle (ID):

- For Emulex HBAs, enter:

```
drvcfg -s handle
```

- For QLogic HBAs, enter:

```
drvcfg -s handle instance
```

The *handle* is the ID of the EFI driver you want to load.

The *instance* is the HBA port.



### NOTE:

Only experienced users should configure the EFI driver.

---

## Configuring the boot device on Emulex HBAs

To configure the boot device on an Emulex HBA:

1. Enter the following command to display a list of HBAs and their IDs (handles):

```
drivers -b
```

2. Enter the following command:

```
drvcfg -s handle
```

The *handle* is the ID of the HBA you want to configure.

3. Select **Enable or Disable BIOS** from the main menu.
4. Select **Enable**, and then press **Esc** to return to the main menu.
5. Select **Configure the HBA parameters**.
6. Select the following options:
  - **Topology**
  - **Point to Point**
7. Press **Esc** twice to return to the main menu.

8. Select the following options:
  - **Boot Target Scan**
  - **Boot Path Discovered Targets**
9. Press **Esc** twice to return to the main menu.
10. Initialize zoning by following the steps in "[Setting up initial zoning](#)" on page 7, unless directly connected.
11. On the boot server, select the first line, and then press **Enter**.
12. Select **Scan Targets**.

A single WWN appears. This is the node to which your boot device is attached.
13. Using a storage configuration application or following the procedures in "[Creating a LUN](#)" on page 11, create a LUN and give it access to the HBA WWN.



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**NOTE:**

For XP arrays, you must run Scan Targets a second time after you create LUN 0 and presented it to the host. Doing so makes the WWN of the boot HBA available so it can be presented to the LUN.

---

14. On the boot server, press **Enter** to display a LUN. (This is the LUN to which your boot device has access.) Press **Enter** again to return to the main menu.
15. Select **Boot this device via WWN**.

The boot table displays an entry listing for the boot device target WWN and LUN information.
16. Press **Esc** to exit the utility.

## Restrictions

This section describes boot from SAN restrictions.

### Installing in single-path mode

HP recommends that you initially deploy the operating system to the SAN in single-path mode. To do so, map the root directory ( / ) to /boot to /dev/sda (or to the first Fibre Channel device).

After deploying the operating system to the SAN, install the supported failover driver, and then configure multiple paths.

### Assigning the primary boot HBA

For boot from SAN configurations, HP recommends placing the primary boot HBA in PCI slot number 1, if possible, or in the next available PCI slot. The primary boot HBA should be before all other HBAs on the PCI bus.

### Active paths and boot LUNs

In boot from SAN configurations, the boot paths must be on the active path to the boot LUN. In the event of a failover event, storage controller reboot, or some other event in the SAN, it is possible for a currently configured boot path to become the standby path to the LUN. In this case, attempting to boot using the configured boot path fails.

To correct this problem, either configure a new boot option at the EFI level using the second path to the LUN, or switch the standby path to the boot LUN back to the active path.



---

△ **CAUTION:**

Use caution when switching paths. If there are other servers attached to the storage array, stop all I/O on those servers before switching paths. Allow the array to stabilize before restarting I/O.

---

## Target port order

When the primary boot path fails and the host is rebooted, the host may fail to find the boot LUN through the alternate path if the order of target ports (as seen by the HBAs) is not consistent across SANs.

You must arrange the target ports on the SAN so that all SANs have the same target port order.

---

 **NOTE:**

When arranging target ports on the SAN, you must ensure that the connections do not move at a later time. This can limit the flexibility for connecting targets on the SAN).

---

Proper configuration ensures that if the primary path fails during a host reboot, proper failover occurs, and the secondary path functions as the boot path, as expected.

## New storage LUNs

If new storage LUNs are presented to the server between reboots, the boot from SAN attempt may fail. The Linux kernel maps LUNs in the order of discovery. If the relative position of the boot LUN has changed, the boot attempt may fail.

For SUSE Linux systems with Emulex HBAs, HP recommends using the `udev` utility to avoid an unsuccessful boot, as described in "[Using the Udev utility with SUSE Linux systems](#)" on page 15.

---

 **NOTE:**

If you create a new EFI boot option, you must edit the `/etc/fstab` file to mount the correct boot, root, and swap partitions.

---

## Using the udev utility with SUSE Linux systems

Use the `udev` utility to ensure that your SUSE Linux system boots successfully in a boot from SAN configuration.

---

 **NOTE:**

This information pertains only to systems running SUSE Linux 2.6 kernels with Emulex HBAs.

---

## udev prerequisites

Before you begin:

- Perform the procedure described in "[Deploying the operating system to the SAN](#)" on page 12 to install the operating system.
- Ensure that a single path from the HBA to the disk is present.
- Ensure that the `udev` utility is installed and working.



### NOTE:

HP supports the `udev` version distributed with the operating system.

- By default, `CONFIG_HOTPLUG` is usually enabled on Linux kernels. However, check to ensure that `CONFIG_HOTPLUG` is enabled on the Linux 2.6 kernel.
- Ensure that `sysfs` filesystem is mounted.
- Ensure that the `rules` files exist in the appropriate directories. By default, SUSE has `udev` rules for SCSI disks. SUSE's `udev` devices are located in `/dev/disk/`.



### TIP:

If the `/dev/disk/` folder does not contain the `by-id` file, enter the following command to start `udev`:

```
udevstart
```

## Setting up udev

To set up `udev`:

1. Enter the following command to ensure that `udev` starts at boot time:

```
$ insserv boot.udev
```

2. Determine the boot disk and partition by using one of the following commands:

- For x86/x64 servers:

- `$ more /etc/fstab`

The output is similar to the following:

```
/dev/sda2 / reiserfs acl,user_xattr 1 1
/dev/sda1 swap swap pri=42 0 0
.....
```

- `$ more /boot/grub/menu.lst`

The output is similar to the following:

```
title Linux
kernel (hd0,1)/boot/vmlinuz root=/dev/sda2 vga=0x317 selinux=0
splash=silent resume=/dev/sda1 elevator=cfq showopts
initrd (hd0,1)/boot/initrd
```

- For Itanium servers:

```
/boot/efi/efi/SuSE/elilo.conf
```

3. Determine the equivalent `udev` device using the following command:

```
$ ls -l /dev/disk/by-id/
```

The output is similar to the following:

```
lrwxrwxrwx 1 root root 10 May 24 17:06 360060e8004295e000000295e00000033p1
-> ../../sda1
lrwxrwxrwx 1 root root 10 May 24 17:06 360060e8004295e000000295e00000033p2
-> ../../sda2
```

The udev file name for sda1 is 360060e8004295e000000295e00000033p1.

4. Once you determine the udev device equivalents for the boot and swap partitions, modify the following files to reflect the udev devices.

- For x86/x64 servers:

```
$ /boot/grub/menu.lst
```

- For Itanium servers:

```
/boot/efi/efi/SuSE/elilo.conf
```

The following example shows the effect of the change on the files:

Before:

```
title Linux
kernel (hd0,1)/boot/vmlinuz root=/dev/sda2 vga=0x317 selinux=0
splash=silent resume=/dev/sda1 elevator=cfq showopts
initrd (hd0,1)/boot/initrd
```

After:

```
title Linux
kernel (hd0,1)/boot/vmlinuz
root=/dev/disk/by-id/360060e8004295e000000295e00000033p2
vga=0x317 selinux=0 splash=silent
resume=/dev/disk/by-id/360060e8004295e000000295e00000033p1 elevator=cfq showopts
initrd (hd0,1)/boot/initrd
```

5. Change the following file to complete the file modification:

```
$ /etc/fstab
```

The following example shows the effect of the change on the file:

Before:

```
/dev/sda2 / reiserfs acl,user_xattr 1 1
/dev/sda1 swap swap pri=42 0 0
```

After:

```
/dev/disk/by-id/360060e8004295e000000295e00000033p2 / reiserfs acl,user_xattr 1 1
/dev/disk/by-id/360060e8004295e000000295e00000033p1
```

6. For mutipath configurations, install the Emulex MultiPulse driver as described in the *HP StorageWorks MultiPulse failover driver for Linux application notes*.

After completing this procedure, the boot from SAN LUN always maps the same way (that is, by ID). This ensures that the operating system boots even though the LUN discovery map may change.

## udev limitations

The following limitations apply to SUSE Linux systems with 2.6 kernels using the udev utility:

- The udev utility does not provide persistency during system BIOS and Boot Loader startup because the root file system must be mounted for the udev utility scripts to execute. Ensure that the system can always find the kernel root file system and boot files as described in "[udev prerequisites](#)" on page 16.
- The udev utility is not supported with the Logical Volume Manager (LVM) and device partitioning.

# Working with the A6826A HBA

This section describes how to upgrade and configure the A6826A HBA for booting from a SAN.

## A6826A HBA revision restrictions

The following A6826A HBA revision restrictions apply:

- The A6826A HBA, MFR revision D or later, is supported for Linux boot from SAN configurations.
- The A6826A HBA, MFR revision B, does not include an EFI driver in flash memory and does not support booting from a SAN as shipped. However, you can upgrade the software to support booting from a SAN as described in "[Upgrading the A6826A HBA for booting from a SAN](#)" on page 18.

## Upgrading the A6826A HBA for booting from a SAN

To enable booting from a SAN, the A6826A HBA must include an EFI HBA driver. To upgrade early versions of the A6826A HBA with this driver:

1. Install the A6826A in a Linux server with a local boot disk.
2. Boot to Linux.
3. Load the `fibreutils` RPM package.
4. Reboot the server to the EFI shell.
5. Set the drive to the boot disk; for example:  

```
fs1:
```
6. Change to the directory containing `EFIUTIL`; for example:  

```
cd \efi\qla2x00
```
7. Run `EFIUTIL`:  

```
efiutil
```
8. Use the `adapter` command to select the first HBA channel.
9. Use the `risc_fw_write` command to write the RISC firmware to flash memory. Use the default firmware file.
10. Use the `efi_write` command to write the EFI driver to flash memory. Use the default driver file.
11. Repeat steps 8 through 10 for other HBA channels.
12. Select **quit** to exit `EFIUTIL`.
13. Use the `reset` command to reboot.

The EFI driver banner appears at EFI boot time.

## Using `EFIUTIL` to configure the A6826A HBA

Before you perform this procedure, install and configure the HBA as described in the HBA's installation instructions.

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 **NOTE:**

This procedure is necessary only for A6826A HBAs with EFI drivers earlier than 1.42.

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To configure the HBA using EFIUTIL:

1. Start EFIUTIL:

```
efiutil
```

2. Enter the `adapter` command to select the first HBA channel.

3. Select **configure**.

4. Select **edit\_efi**.

The system displays the following message:

```
Enable Alternative Boot Device
```

5. Perform one of the following steps:

- To skip enabling an alternate boot device, enter **N**, and then go to [step 6](#).
- To manually configure a primary and alternate boot device:
  - Enter **Y**.
  - Follow [step 6](#) through [step 9](#) to complete the `edit_efi` command.
  - Configure database entries 0 and 1 using the `edit_database` command, and then go to [step 10](#).

6. Enter **N** at the `Enable EFI boot order list` prompt.

7. Enter **N** at the `Enable Selective Login` prompt.

8. Enter **N** at the `Enable Selective LUN Login` prompt.

9. Enter **1** at the `EFI Variable EFIFCScanLevel` prompt.

10. Select **write** to confirm the changes.

11. Select **quit** to exit the configuration menu.