

Booting Windows From Enterprise Modular Arrays

Multiple Path Mode Procedures

Firmware 3.82A1 with boot BIOS 1.60.a4

Compaq Enterprise Storage
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Refer to the Introduction (INTRODUCTION.PDF) for information about supported configurations, restrictions, and an overview of the procedures detailed here.

Detailed Installation Procedure

This document is valid for BIOS menus based on the 176479-B21 (DS-KGPSA-CB) firmware 3.82A1 with boot BIOS 1.60.a4.

Note: The user is expected to have a working knowledge of the HSG80-based Fibre Channel RAID Array technology and the interconnections required to attach to an FC-HBA (host bus adapter) in a Windows-based server. This information is in the documentation that comes with the RAID Array and StorageWorks Solution Kit. The user is also expected to have a working knowledge of Windows NT 4.0 or Windows 2000.

References in this document to HSG80 are intended to cover all of the RA8000 Family RAID Array products.

Prework

The items listed below are not covered in this document. However, they are part of the initial setup and they must be completed.

RA8000/ESA12000, MA8000/EMA12000, or MA6000

- Setting and/or verifying the HSG80 controller port topology for your configuration.
- Setting and/or verifying the controller SCSI Version. In SCSI-3 mode, LUN 0 is assigned to the Command Console. Therefore, the unit you assign as your boot disk must be LUN 1 or higher. **SCSI-3 mode is recommended.**
- Verifying that all existing storage units have the proper access set.
- Delete any unused connections.

Switch-based Configurations And Zoning

- If zoning is enabled, be sure to check the switch for any zoning conflicts.

Compaq RAID Array Controller Setup

In the course of your set up procedure, you will be required to set up your HSG-80 controller for either Arbitrated Loop (hub-based) or Fabric (switch-based) topology. You will need to use the CLI (Command Line Interface) to do this.

There are two ways to use CLI:

- via a terminal or a terminal emulator like Hyperterm running on a PC.
- via the CLI Window of the Command Console client program.

Hub And Switch Setup

No special considerations are required for booting.

Special Considerations For Boot Disk Partitions

Before attempting to create a boot disk, you must ensure that you are starting with a clean, unpartitioned virtual disk. We recommend using HSUTIL, DILX, or FDISK to delete any partitions that may already exist. If you have just created a new virtual disk, this condition would not exist and you would simply need to create the partition in a step during the installation procedure, itself.

If you are planning to set up booting from a RAID Array that has other virtual disks attached to other servers, be aware of the following. When setting up booting for the new server, the installation program will present you with a list of partition onto which to load the operating system. You will see a disk for every controller port the HBA can access. Although it may look like you have more than one virtual disk available for booting, it really is only one. When creating a partition for the operating system load, you need to create the same partition size on all the disks that carry the same disk description as determined by Windows (for example, Disk 00 Id 01 XXXXX). If you don't make the partitions exactly the same, and especially in SCSI-3 mode, the installer will format the partition, reboot, and restart the selection process.

Booting Multiple Path Configurations

Note: If you are creating a single server, multiple path configuration (which requires Secure Path) use the procedures in this section and ignore instructions for the second FC-HBA and path.

Boot disks created on the Compaq RAID Arrays are limited to 8GB due to features of the 176479-B21 (DS-KGPSA-CB) FC-HBA firmware.

The steps for booting clusters and/or servers with Secure Path are similar to single servers. The additional steps are summarized below. Following that, there is a step-by-step procedural example for booting a two node cluster running Windows and Secure Path.

Considerations For Booting Clusters

Microsoft requires that the FC-HBA used for booting must not be the same FC-HBA used for cluster shared storage. For this reason, you will need to double the number of FC-HBA's in each server when setting up for cluster booting. In general, the key steps for setting up booting include:

- installing all 176479-B21 (DS-KGPSA-CB) FC-HBA's but not connecting them
- configuring for booting each FC-HBA that attaches to boot disks (for cluster, your RAID Array will need two, separate boot disks)
- one-at-a-time, connect and set up the FC-HBA for booting
- set up disk connectivity from each, intended, unique boot disk to its server (use CLI)
- one-at-a-time, install the Windows operating system onto the desired (unique and dedicated) disk in the RAID Array
- make sure the drive letters are the same for both servers' boot disks
- boot the servers
- install cluster software

Considerations For Secure Path

Secure Path provides high availability computing by use of a redundant data path to the RAID Array. In a cluster situation, because of the Microsoft requirement that the boot FC-HBA is different from the shared data FC-HBA, each server will need four FC-HBA's (two boot, two data) bringing the total to eight FC-HBA's overall. This provides data path redundancy for boot and data. Other than this additional requirement, the procedure for setting up booting is no different from either single server or cluster. Secure Path is an application that loads after the operating system has booted and should be treated the same as any other application installation.

Procedure

Note: ProLiant are available in two configurations. Newer models use RBSU (ROM Based Setup Utility) for controlling booting. If you have a newer ProLiant, you should follow the two RBSU procedures below. If you have an older model without RBSU, skip to the non-RBSU setup.

Server ROM BIOS Upgrade for RBSU (ROM Based Setup Utility) ProLiant Servers

1. Boot the server from the ProLiant Smart Start CD-ROM version 5.3 or higher or download the latest ROM BIOS from <http://www.compaq.com>.
2. Install the latest ROM from Smart Start or the one that was downloaded.

Setting The Boot Order for RBSU (ROM Based Setup Utility) ProLiant Servers

1. While the system is booting, Press the <F9> key for the ROM Based Setup Utility.
2. Choose *Boot Controller Order*.
3. Select the primary PCI Fibre Channel Adapter and move it to *Controller Order 1*. Move the secondary adapter to *Controller Order 3*.
4. Exit the utility.

Server Setup non-RBSU ProLiant Servers

1. Boot from the ProLiant Smart Start CD-ROM and run the program to clear the configuration.
2. Run the System Configuration Utility.
3. Set the boot position of the Smart Array Controller to 15.
4. Reboot the server.

FC-HBA Setup

1. Record the FC-HBA's IEEE number. (You may install all adapters at this time).
2. Install the 176479-B21 (DS-KGPSA-CB) and record the PCI slot it occupies.
3. While the server is booting, watch for the message *Press <Alt E> To Go To Emulex BIOS Utility*. Press the **<Alt E>** key combination.
4. A screen will appear prompting you to *Enter a Selection*.
5. Choose the first adapter.
6. Choose option 2, *Configure This Adapter's Parameters*.
7. Choose option 1, *Enable or Disable BIOS*. Press the **<1>** key to enable BIOS. (These steps will be repeated for the other adapters after the Windows operating system has been installed).
8. Choose option 4, *Topology Selection (+Advanced Option+)*.
9. Choose *Point to Point*. Press the **<Pg Up>** key.
10. Choose option 8, *Enable Start Unit Command (+Advanced Option+)*. Press the **<1>** key to enable.
11. Press the **<X>** to exit and reboot the server.
12. While the server is booting, watch for the message *Press <Alt E> To Go To Emulex BIOS Utility*. Press the **<Alt E>** key combination.
13. Choose the first adapter.
14. Choose option 1, *Configure Boot Devices*.
15. Choose 1 as the primary boot path.
16. Use a terminal or computer running a terminal emulator to use CLI for the next steps:
 1. Use CLI to configure a device with no access allowed.

```
HSG> initialize disk10000
HSG> add unit d1 disk10000 disable_access_path=all
HSG> Show d1
```

2. Note to which LUN the controller is online.
3. Verify that the FC-HBA is online..

```
HSG> show connections
```

4. Rename the connection, if desired.
5. Assign the the FC-HBA access to the LUN.

```
HSG> set d1 enable_access_path=!newcon01

...enter the names of connections that are associated with
same controller to which the LUN is online. There should
be two connections entered at this time.
```

17. Enter the number of the first Compaq HSG device in the list.
18. At the prompt, enter the two digits of starting LUN (Hex). Use the LUN number you created earlier.
19. Choose 1, *Boot this device via WWPn*.
20. Repeat the last four steps for the second item in the List Of Saved Boot Devices.

Operating System Install

1. Insert the Windows operating system CD-ROM.
2. Reboot the server.
3. For Windows 2000, press the **<F6>** key when prompted. For Windows NT, press the **<F6>** key as soon as the text setup starts.
4. When the setup program prompts you to specify an additional device, choose *S=Specify Additional Device*.
5. Insert the diskette that came with your 176479-B21 (DS-KGPSA-CB). It contains the FC-HBA driver required for booting. Press the **<Enter>** key.
6. A list of devices will appear.

For Windows 2000, three devices are listed, choose:
Compaq KGPSA-xx, PCI-Fibre Channel, FC-HBA.

For Windows NT, choose:

Emulex LP6000/LP7000/LP8000/LP9000/LP850/LP950, PCI-Fibre Channel Adapter.

7. Continue with the Operating System installation. While in its text mode stage, two instances of the boot device will be presented. **Choose the second instance install the Operating System files.**

Note: Do not install networking while your are installing the Windows NT operating system. If you require networking, you **must** install it **after the rest of the installation is completed**. Use the Smart Start CD-ROM to update drivers after completion of the Operating System installation.

8. **Windows NT Only:** If you are using the 4.81a5 driver, you must install the Adjunct driver (for persistent binding) after the operating system has finished its installation.
9. Install the latest Operating System Service Pack.
10. Run the Fibre Channel Software Setup from Compaq's SANworks Platform Kit.
11. Install SANworks Secure Path High Availability Software.
12. Use the Compaq Smart Start CD-ROM to update system drivers.

Remaining adapters

1. Refer to the FC-HBA Setup section (above) of this document to configure the remaining FC-HBAs.
2. The two remaining FC-HBA's can now be connected to the switches or hubs. No BIOS changes need to be made.
 - o One FC-HBA must be connected to the top switch or hub and the other FC-HBA to the bottom switch or hub.
 - o Using CLI, rename the new connections and create LUNs to use with these connections.

Note: You will need to repeat the *Booting Secure Path Configurations* setup steps for the other server before you begin with the Cluster Installation.

Cluster Setup Steps

1. Create a new LUN to be used with the clustering service. There should be eight connections, four from each server.
2. Reboot the server.
3. Install clustering service. (Refer to Microsoft documentation on cluster installation.)