Procedures For Booting Windows From A SAN

Compaq Enterprise Storage
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This document describes the procedures for booting Windows NT and Windows 2000 from SAN Storage Arrays.

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Introduction

At Compaq, we are continually making additions to our storage solution product line. Please check our web site for more information about our Fibre Channel product line as well as the latest drivers, technical tips, and updates to this application note and other documentation. Visit our web site at:

http://www.compaq.com/support/storage

Traditionally, Compaq servers have booted operating systems from internal SCSI and IDE storage devices. With the support of external booting by Compaq's FC-HBA (Fibre Channel Host Bus Adapter) and Compaq's Storageworks RAID Arrays, customers now have the option of eliminating server based, internal boot devices. Booting from an external device provides decreased downtime because of faster server replacement in the event of a server failure.

Supported Configurations

This document covers single server, cluster, and Secure Path based configurations using the Enterprise Modular Array (transparent or multiple path modes), and the Enterprise Virtual Array (multiple path mode).

Restrictions

Operating System Based Restrictions

Microsoft's *Windows NT* and *Windows 2000* operating systems require a unique, dedicated disk for booting. Therefore, each server connected to an RAID Array must have its own disk, or LUN (Logical Unit Number), dedicated solely for booting and operating system files. Data can be allocated across both the boot disk and the remaining disks. Booting from array-based disk partitions is possible.

Note: The memory paging system requires fast access to the *pagefile.sys* file. In some cases, in SAN environments with heavy I/O loads, the access request for moving information to or from the paging file may be delayed. This can cause the operating system to halt, requiring a reboot to recover. Microsoft recommends that if paging errors occur, page files should be relocated onto disks which are built into the server using its internal data paths. Microsoft has published a technical article, **http://support.microsoft.com/default.aspx?scid=kb;EN-US;q305547**, with additional recommendations related to booting from a SAN.

Clustering Restrictions

Microsoft requires that clustered servers keep boot disks on data paths that are separate from shared-storage paths. This requires a dedicated fibre channel adapter for booting and another for shared disks.

Server Replacement In The Event Of A Server Failure

You must retain the FC-HBA's to ensure that the replacement server hardware components are identical in every way to the one you are replacing. Place the FC-HBA's into the PCI slots of the new server **in the same order** as they were place in the old. If you are using an internal disk for your paging file system, you can move it to the replacement server. You can also use a new disk, but you will be required to format it and manually reset the paging to that disk.

Required Hardware And Software

RAID Arrays

- Enterprise Virtual Array
- Enterprise Modular Array (EMA16000, MA8000, EMA12000 Fibre Channel)

Host Bus Adapters

Supported Adapter:

- Compaq 33 MHz, 64 bit, PCI to FC host bus adapter, part numer 176479-B21 (also known as DS-KGPSA-CB)

Fibre Channel HUB

Supported Fibre Channel Hub:

- Compaq 7 port
- Compaq 12 port

Fibre Channel Switch

Supported Fibre Channel Switch:

- Compaq 8 port switch
- Compaq 8 port SAN switch
- Compaq 16 port switch
- Compaq 16 port SAN switch

Server Platforms (Architectures)

Only Compaq Proliant Servers are supported.

Supported External Boot Device:

- Compaq Enterprise Virtual Arrays
- Compaq Enterprise Modular Arrays with ACS (Array Controller Software) version 8.5 or 8.6.
- Refer to the StorageWorks Solution Kit documentation for supported disks.

Operating Systems

Supported OS:

- Microsoft x86 *Windows NT 4.0 Server*
- Microsoft x86 *Windows NT 4.0 Enterprise Server*
- Microsoft x86 *Windows 2000 Server*
- Microsoft x86 *Windows 2000 Advanced Server*

Device Setup and Configuration

Refer to the documentation that came with your hardware and software kits to obtain more complete instructions on the use and operation of your equipment.

Server Setup

Steps for server configuration:

1. Power up the server and check the server BIOS version. Upgrade the BIOS to the latest Compaq recommended version if needed. Check the Compaq website for information about the latest BIOS versions.
2. Power off the server and install the FC-HBA (record the FC-HBA's IEEE number and make note of which PCI slot it occupies).

FC-HBA Setup

Logical steps for FC-HBA configuration:

- Verify the adapter firmware version and upgrade if needed

- Verify the operating topology - Arbitrated Loop for hubs or Fabric for switches
- Set the Fabric or Arbitrated Loop parameters using the *LP6DUTIL* program

Note: The *LP6DUTIL* program is available in a ZIP file form (lp6dutil.zip) from the Compaq Storage Support web site. Simply copy the ZIP file to a convenient location, unzip it to a temporary directory, and copy the executable to your MS-DOS bootable diskette.

The Basic Steps

1. Prepare the RAID Array (that is, create connections and set no access to LUN's)
2. Verify that the operating system version to be installed meets prerequisites
3. Verify that the hardware meets prerequisites
4. Verify that the FC-HBA to be installed meets prerequisites
5. Configure your server with up-to-date BIOS
6. Configure your FC-HBA with the correct firmware and BIOS
7. Setup the FC-HBA for booting and identify the correct boot path
8. Begin the opearing system loading procedure
    - add the appropriate FC-HBA driver
9. Repeat for additional servers
10. Boot servers and install Compaq's SANworks Secure Path software for Multiple Path configurations

Detailed Boot Setup Procedures

Enterprise Modular Arrays

Transparent Failover Mode

- FC-HBA (Fibre Channel Host Bus Adapter) - part number 176479-B21
    - Procedures for firmware version 3.82A1 and boot BIOS 1.52A1 in

        `EMA_BOOTING_1-52A1_TRANSPARENT.PDF`

    - Procedures for firmware version 3.882A1 and boot BIOS 1.60A4 in

        `EMA_BOOTING_1-60A4_TRANSPARENT.PDF`

Multiple Path Failover Mode

- FC-HBA (Fibre Channel Host Bus Adapter) - part number 176479-B21
    - Procedures for firmware version 3.82A1 and boot BIOS 1.52A1 in

        `EMA_BOOTING_1-52A1_MULTIPATH.PDF`

    - Procedures for firmware version 3.882A1 and boot BIOS 1.60A4 in

        `EMA_BOOTING_1-60A4_MULTIPATH.PDF`

Enterprise Virtual Arrays

- FC-HBA (Fibre Channel Host Bus Adapter) - part number 176479-B21
    - Procedures for firmware version 3.882A1 and boot BIOS 1.60A4 in

        `EVA_BOOTING_1-60A4_MULTIPATH.PDF`

Where To Go To Get Help

Contact your Compaq service provider.