

SANworks by Compaq

Release Notes - Linux X86 Single Path Kit V2.0A for Enterprise Virtual Array

Part Number: AV-RTJ4C-TE

Third Edition (March 2003)

Product Version: 2.0A

This document contains the most recent product information about the *SANworks by Compaq* Linux Single Path Kit V2.0A used for integrating host servers with the *StorageWorks™* Enterprise Virtual Array (VCS Version 2.0).

For the latest version of these Release Notes and other product documentation, visit the *StorageWorks* website at:

<http://h18006.www1.hp.com/storage/index.html>

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Release Notes - Linux X86 Single Path Kit V2.0A for Enterprise Virtual Array

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Part Number: AV-RTJ4C-TE

Release Notes Contents

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Intended Audience

This document is intended to assist customers who purchased the hp StorageWorks Enterprise Virtual Array and the associated hp SANworks Operating System kits. Other associated software packages are:

- hp SANworks Virtual Controller Software Package V2.0 for Dual HSV Controllers
- hp SANworks Snapshot for Virtual Controller Software V2.0 for Dual HSV Controllers

This document is also intended for use by hp Customer Service personnel responsible for installing and maintaining designated devices associated with this storage system.

Conventions

The following conventions are used throughout this document:

- Unless otherwise specified, all references to VCS V2.0 refer to the software package (kit) and documentation version level. These software packages and documentation support VCS V2.0.
- Unless otherwise specified, all documentation that supports VCS V1.0, VCS V1.01, and VCS V1.02, also supports VCS 2.0.

- The *System Software for Enterprise Virtual Array* is the storage system software that contains Virtual Controller Software (VCS), Environmental Monitoring Unit (EMU) firmware, programmable component images, diagnostics, and message files. This storage system software is usually represented by a four-digit number, for example V2.000.
- Unless otherwise specified, all references to a controller or controller pair should be interpreted as the HSV110 Controller or HSV110 Controller pair.
- Unless otherwise specified, all references to the Enterprise Storage System or storage system should be interpreted as the Enterprise Virtual Array.
- Unless otherwise specified, all references to rack should be interpreted as the 9000-Series Enterprise Storage System Rack.
- Unless otherwise specified, all licensing references to host ID should be interpreted as the storage system World Wide Name (WWN).
- Unless otherwise specified, all references to the management appliance should be interpreted as the hp SANworks Management Appliance.
- Unless otherwise specified, all references to a single instance of a management agent, or the element manager, should be interpreted as the hp SANworks HSV Element Manager.
- The term Fabric means Fibre Channel Switched (FC-SW) connectivity.

New Features

This section briefly describes new features and changes that are supported by the Version 2.0A release of the Platform Kit Software together with the array controller running ACS Version 2.0.

New Features for Version 2.0A

The following are major enhancements included in the V2.0A release of the Platform Kit.

- **Rapid Deployment Pack**—ProLiant Essentials Rapid Deployment Pack provides automated server deployment and redeployment via a central console using imaging and scripting technologies for ProLiant servers. The deployment console provides simple drag-and-drop functionality for deployment events. The Platform Kit CD-ROM contains software components, drivers, and utilities that are located in the /rdp directory. See readme.txt on the CD-ROM for a more detailed

description of Rapid Deployment Pack, installation instructions, and restrictions. For general information on Rapid Deployment Pack, go to <http://h18013.www1.hp.com/products/servers/management/rdp/index.html>

NOTE: If you are using a BL20p or BL40p server, use the components in the /rdp/rhas21 directory instead of the regular platform kit.

- **Rapid Deployment Pack Procedures**—Two new Rapid Deployment Pack procedures were added for the installation of Fibre Channel Utilities and the qla2x00 driver RPM. The procedures are listed under Host Considerations, page 11.
 - **Fibre Channel Utilities**—The RPM `fibretutils-1.0.0-5.i386.rpm` contains assorted utilities that complement the qla2x00 driver package. The `fibretutils` package contains two major utilities: `hp_fccfg.sh` and `probe-luns`. The `hp_fccfg.sh` script allows you to recompile the driver if needed and change the default queue depth for disk devices attached to a qla2300 series fibre channel adapter. `Probe-luns` solves the problem of non-consecutive LUNs.
 - **QLA2x00 Driver RPM**—The RPM `qla2x00-6.0.2-5.Redhat-AS-2-1.i386.rpm` contains the adapter driver for the HP supported fibre channel adapters on Red Hat Advanced Server 2.1. The RPM contains the driver source code, precompiled modules for the base kernel of Red Hat Advanced Server 2.1, and system startup scripts. This procedure applies to ProLiant blade servers only.
- **Blade Servers**—Platform Kits now support ProLiant Blade Servers BL20p and BL40p.

Enterprise Virtual Array Storage System

This document contains the most recent product information about the Enterprise Virtual Array. An Enterprise Virtual Array storage system consists of the following:

- One pair of HSV110 Controllers.
- An array of physical disk drives that the controller pair controls. The disk drives are located in drive enclosures that house the support systems for the disk drives.
- Associated physical, electrical, and environmental systems.
- The HSV Element Manager, which is the graphical interface to the storage system. The element manager software resides on the Management Appliance and is accessed through a browser.
- Management Appliance, switches and cabling.

- At least one host attached through the fabric.

Enterprise Virtual Array System Software

hp SANworks Virtual Controller Software (VCS) V2.0 provides storage software capability for the HSV110 Array Controller and is provided in the VCS V2.0 software kit.

Enterprise Virtual Array Documentation

The Enterprise Virtual Array Catalog of Associated Documentation is included on the Technical Documentation page. You can display a comprehensive list of Enterprise Virtual Array documentation, as well as associated product documentation that may be required to operate your storage system. To access the Technical Documentation page, go to:

<http://h18006.www1.hp.com/products/storageworks/enterprise/documentation.html>

Support Release Information

For future product support release information visit

<http://h18006.www1.hp.com/storage/index.html>

This website provides downloadables for storage products.

Supported Configurations

Refer to the Enterprise Virtual Array Quick Specs for supported configurations. The *HP StorageWorks Heterogeneous Open SAN Design Reference Guide* is a detailed guide for SAN configurations and is available at:

<http://h18004.www1.hp.com/products/storageworks/san/documentation.html>

Supported Operating Systems

The Enterprise Virtual Array storage system is compatible with the following operating systems:

- Tru64 UNIX
- Windows NT/Windows 2000/Windows Server 2003
- OpenVMS

- Sun Solaris
- HP-UX
- IBM AIX
- Linux (Single Path)
- Novell NetWare (Single Path)

Table 1–1 lists the operating system’s specifications, which are compatible with the Enterprise Virtual Array.

NOTE: Table 1-1 contains current minimum level operating system specifications at the time of the Enterprise Virtual Array V2.0A release. Some component versions may change due to revision. For the latest information go to:

<http://h18006.www1.hp.com/storage/index.html>

Table 1–1: Operating System Specifications

Operating System	OS Version	*Kernel uni/smp	FCA (HBA)	Adapter Firmware	Adapter Driver	Secure Path
X86			281541-B21	3.01.09	6.0.2	N/A
Red Hat	7.2	2.4.7-10/2.7-10smp				
Red Hat AS	2.1	2.4.9-e.3/2.4.9-e.3smp				
SuSE Linux Enterprise Server	7	2.4.7-4GB/2.4.7-64GB-smp				

*Only out-of-box kernels are supported.

Blade Server ProLiant BL20p is shipped with an in-built HBA driver, version 6.0.2.

Table 1–2 details the Linux Storage System Attachments

Table 1–2: Platform/Storage System Attachment

Platform or Operating System	Platform HBA SAN Attachment	Multi-Path Support	Enterprise Virtual Array SAN Attachment	EMA/ESA 12000, EMA 16000, MA/RA8000, MA6000 Storage System SAN Attachment
X86	281541-B21	Not supported	Single path only	F-Port using FABRIC topology Transparent only
Red Hat 7.2				
Red Hat AS 2.1				
SuSE Linux Enterprise Server 7				

Table 1–3 details the supported web browsers.

Table 1–3: Supported Browsers

OS	OS Version	Browser	Minimum Version
Linux	See Table 1-1	Netscape	V4.76 or later

Switch Support

This Fibre Channel Platform Kit supports the Fibre Channel switches and firmware versions listed in Table 1–4.

IMPORTANT: StorageWorks recommends that you do not mix switch firmware versions in your SAN. It is considered best practice to uniformly upgrade all switches in the SAN.

Table 1–4: Fibre Channel Switch Support

Description	Part Number	Firmware Version
SAN Switch 8 (8 Port FC, 1 Gbps)	158222-B21 DS-DSGGB-AA	2.6.0h
SAN Switch 16 (16 Port FC, 1 Gbps)	158223-B21 DS-DSGGB-AB	2.6.0h
SAN Switch 8-EL (8 Port FC Entry Level, 1 Gbps)	176219-B21 DS-DSGGC-AA	2.6.0h
SAN Switch 16-EL (16 Port FC Entry Level, 1 Gbps)	212776-B21 DS-DSGGC-AB	2.6.0h
SAN Switch 2/32 (16-32 Ports FC, 2 Gbps)	230616-B21 DS-DSGGS-AA	4.0.2b
SAN Switch Integrated (32 Port FC, 1 Gbps)	230616-B21 DS-DSGGS-AA	2.6.0h
SAN Switch Integrated 64 (64 Port FC, 1 Gbps)	230617-B21 DS-DSGGS-AB	2.6.0h
SAN Switch 2/16 (16 Port FC, 2 Gbps)	240602-B21 DS-DSGGD-AA	3.02k
SAN Switch 2/8-EL (8 Port FC Entry Level, 2 Gbps)	258707-B21 DS-DSGGD-AC	3.02k
SAN Switch 2/16-EL (16 Port FC Entry Level, 2 Gbps)	283056-B21 DS-DSGGD-AD	3.02k
SAN Core Switch 2/64 (32-64 Ports FC, 2 Gbps)	254508-B21 DS-DSGGE-AB	4.0.2b
SAN Director 64 (32-64 Ports FC, 1 Gbps)	254512-B21 DS-DMGGD-AA	02.00.00

Table 1–4: Fibre Channel Switch Support (Continued)

SAN Edge Switch 32 (32 Ports FC, 1 Gbps)	2T-M3032-AA (See Note)	02.00.00
SAN Edge Switch 16 (16 Ports FC, 1 Gbps)	2T-M3016-AA (See Note)	02.00.00
SAN Director 2/64 (32-64 Ports FC, 2 Gbps)	286809-B21 DS-DMGGD-BA	02.00.00
SAN Director 2/140 Switch (140 Ports FC, 2 Gbps)	316093-B21 DS-DMGGD-CA	04.01.02
SAN Edge Switch 2/32 (32 Ports FC, 2 Gbps)	286810-B21 DS-DMGGE-BC	02.00.00
SAN Edge Switch 2/16 (16 Ports FC, 2 Gbps)	286811-B21 DS-DMGGE-BB	02.00.00
SAN Edge Switch 2/24 (24 Ports FC, 2 Gbps)	316095-B21 DS-DMGGE-BD	04.01.02

NOTE: The listed 1 Gbps SAN Edge Switches are CSS (Custom Services and Solutions) orderable only. Please contact your StorageWorks sales representative at 1-800-STORWORK for further information on these CSS components.

For the latest versions of switch firmware, please visit the StorageWorks website:

<http://www.hp.com/country/us/eng/prodserv/storage.html>

Single Path Support Configurations

A Linux server with a single FCA supports single path mode.

IMPORTANT: Single path mode should not be used in mission critical environments. See the white paper for further details.

Operating Constraints

Any operating constraints specific to the Enterprise Virtual Array hardware and HSV Element Manager can be found in their respective release notes.

Failover/Failback

There are specific failback preference settings for the HSV controllers that are operating system specific (see the Enterprise Virtual Array hardware release notes for details).

Avoiding Problem Situations

Avoiding problem situations specific to the hp SANworks Management Appliance can be found in the Management Appliance Update January 2002 Release Notes.

Avoiding problem situations specific to the hp SANworks HSV Element Manager can be found in the HSV Element Manager Release Notes.

In addition, avoiding problem situations pertaining Enterprise Virtual Array hardware can be found in the hardware release notes.

Codeload Usage

When a maximum configured system is running at maximum load, codeload functionality cannot be used effectively due to Secure Path timing constraints. The system may time out before codeload is completed. Because of this behavior, VCS upgrade should be done during off peak usage.

Linux Server Workaround

Before installing the Solution Software Kit, kernel sources and header files must be reinstalled or the kit will not install properly. To install the files, type the following commands:

```
rpm -e kernel-source-2.4.x
rpm -e kernel-headers-2.4.x
rpm -i kernel-source-2.4.x
rpm -i kernel-headers-2.4.x
```

NOTE: This procedure applies to all versions of Linux.

Enterprise Storage System Notes

Cable Requirements

When an Enterprise Virtual Array is installed, an SC-to-LC (1-Gb to 2-Gb) cable is required for host connectivity. Table 1-5 provides a listing of available cables.

Table 1-5: LC-SC cables

Length	Description	hp Part Number
2.0 m ± 40 mm	CA ASSY, LC-SC, Optical 2M	187891-002

Table 1–5: LC-SC cables

Length	Description	hp Part Number
5.0 m ± 80 mm	CA ASSY, LC-SC, Optical 5M	187891-005
15.0 m ± 150 mm	CA ASSY, LC-SC, Optical 15M	187891-015
30.0 m ± 300 mm	CA-ASSY, LC-SC, Optical 30M	187891-030
50.0 m ± 500 mm	CA-ASSY, LC-SC, Optical 50M	187891-050

Table 1–6: LC-LC cables

Length	Description	hp Part Number
2.0 m ± 40 mm	2-meter LC-LC Multi-Mode Fibre Cable	221692-B21
5.0 m ± 80 mm	5-meter LC-LC Multi-Mode Fibre Cable	221692-B22
15.0 m ± 150 mm	15-meter LC-LC Multi-Mode Fibre Cable	221692-B23
30.0 m ± 300 mm	30-meter LC-LC Multi-Mode Fibre Cable	221692-B26
50.0 m ± 500 mm	50-meter LC-LC Multi-Mode Fibre Cable	221692-B27

Licensing Support Information

If you have trouble obtaining a License Key or need other licensing support information, refer to the *hp StorageWorks Enterprise Virtual Array License Instructions* which are shipped with the VCS V2.0 software kit.

For assistance with incorrect Authorization ID, contact your authorized hp Authorized Service Provider.

For assistance with lost Authorization ID and Authorization ID not shipped, contact your hp order channel.

Host Considerations

This section contains information on issues and important reminders regarding the host servers.

Selective Storage Presentation (SSP) on SuSE SLES-7

A server reboot is required after using Selective Storage Presentation (SSP) to grant host access to a LUN.

QLA2x00 Adapter Driver Package

The RPM, `qla2x00-6.0.2-5.Redhat-AS-2-1.i386.rpm`, contains the adapter driver that supports the HP Fibre Channel adapters on Red Hat Advanced Server 2.1. The RPM contains the driver source code, precompiled modules for the base kernel of Red Hat Advanced Server 2.1, and system startup scripts.

The driver revision in this RPM is 6.0.2. This procedure applies to ProLiant blade servers only.

Install and Uninstall

To install the `qla2x00` RPM, follow the directions that are in the Rapid Deployment Pack User Guide for deploying RPMs to a ProLiant server. You can also copy the `qla2x00.rpm` file to your system by typing the command:

```
# rpm -i qla2x00-6.0.2-6.Redhat-AS-2-1.i386.rpm
```

To remove the `qla2x00` package, type the command:

```
# rpm -e qla2x00
```

Components of QLA2x00

Driver Source Code

The driver source code is located in the `/opt/hp/storage_drivers/qla602/src` directory. You may need to compile new driver modules if you rebuild your kernel. It is recommended that you use the `hp_fccfg.sh` script in the `fibretils` RPM.

NOTE: You must have the kernel sources for the current kernel installed to proceed with the driver module recompilation.

However, if you want to rebuild the driver modules manually, perform the following steps:

1. Change the directory to `/opt/hp/storage_drivers/qla602/src`
2. Remove any previously compiled drivers by typing the command:

```
make -f makefile.nosp clean
```

3. Compile the driver modules by typing the command:

```
make -f makefile.nonsmp SMP=x
```

where `x=0` if you are using a uni-processor machine, or `x=1` if you are using an SMP machine.

4. Copy the `qla2300.o` file to the `/lib/modules/<kernel version>/kernel/drivers/scsi` directory.
5. Reload the `qla2300` module or reboot your server.

Precompiled Driver Binaries

Included in the RPM is a precompiled `qla2300` driver module. The module was compiled for the 2.4.9-e.3 kernel, which should be the base kernel with the Red Hat Advanced Server distribution. The RPM installer will attempt to load the precompiled module when the RPM is installed. If the driver load fails for some reason, you can also recompile the driver modules for your environment by following the steps above.

System Startup Scripts

Also included in the RPM are system startup scripts which are copied into the `/etc/rc.d/init.d` directory. There are also links created from the startup scripts to the `/etc/rc.d/rcX.d` directories. Links are created and driver modules are started when the system is processing the specific run-level startup directory.

Fibreutils Utilities

The RPM, `fibreutils-1.0.0-5.i386.rpm`, contains assorted utilities that complement the `qla2x00` driver package.

Fibreutils contains two major utilities:

- `hp_fccfg.sh`—This script allows a recompile of the driver if needed and changes the default queue depth for disk devices attached to a `qla2300` series fibre channel adapter.
- `probe-luns`—This utility solves the problem of non-consecutive LUNs.

Install and Uninstall

To install the fibreutils RPM, follow the directions that are in the Rapid Deployment Pack User Guide for deploying RPMs to a ProLiant server. The fibreutils RPM can also be installed by copying the .rpm file to your system and typing the command:

```
# rpm -i fibreutils-1.0.0-5.i386.rpm
```

To remove the fibreutils package, type the command:

```
# rpm -e fibreutils
```

Components of Fibreutils

Here is a more detailed description of each component.

Hp_fccfg.sh

The `hp_fccfg.sh` script allows you to recompile the `qla2300.o` module, invoke the `probe-luns` script, and change the default queue depth of the disk devices attached to a `qla23xx` adapter. To use this script, you must have the `qla2x00` driver RPM installed on your system, as well as the kernel sources.

1. Start the script by typing the command:

```
# hp_fccfg.sh
```

The Main Menu is displayed.

2. To recompile the driver, choose **Recompile QLA Driver**.

The **Recompile and Reload QLA Driver Menu** is displayed.

Menu options **Compile SMP QLA Single Path Driver** and **Compile Non-SMP QLA Single Path Driver** compile the `qla2300.o` module and place it in the correct directory to be used by `insmod`. Any change to driver module files, such as copying, are displayed in the `/var/log/messages` file.

3. Return to the Main Menu by choosing the **Back to Main Menu** option.
4. To invoke the different `probe-luns` options, choose **LUN Rescan Options** from the Main Menu.

The **LUN Rescan Options Menu** is displayed.

The most useful options are **Show Adapters in System** and **Probe for LUNs**.

- The **Show Adapters in System** option shows all SCSI subsystem adapters on your server.

- The **Probe for LUNs** option is the best option to scan for non-consecutive LUNs.
5. Choose the **Probe for IDs** option from the Main Menu to change the default queue depth of the qla2300 module when the module is loaded at boot time.

When you choose the **Probe for IDs** option, the current default queue depth is displayed.

6. Enter the new queue depth number when prompted for a response.

Probe-LUNs

The purpose of the probe-luns script is to configure non-consecutive LUNs that are seen through a qla23xx adapter.

NOTE: the probe-luns script does NOT do dynamic LUN discovery. The script should be invoked from the command-line as follows:

```
# probe-luns <options>
```

The two most useful options are:

- -a displays a list of available adapters to scan
- -l scan adapters by LUNs

NOTE: This is the preferred method of scanning for non-consecutive LUNs.

The probe-luns script is run automatically at system startup through the use of startup scripts in `/etc/init.d`.

Storage System Scripting Utility for Enterprise Virtual Array

Refer to the HSV Element Manager release notes prior to using the Storage System Scripting Utility (SSSU), as SSSU communicates directly with the element manager.

Documentation Anomalies

Installation and Configuration Guide Anomalies

Page 2-3, step 3:

The SSSU executable is installed in the following directory by default:

`/opt/CPQhsv/bin`

The directory is incorrect. The following directory is correct:

`/usr/local/sss/bin`

Page 2-3, **Note:**

NOTE: This is the default installation directory, which the user may alter during the installation process. If you have used a different installation directory, the path would be:

`/<BASE_DIR>/CPQhav/bin`

The directory is incorrect. The following directory is correct:

`/<BASE_DIR>/ENTsss/`