Compaq SANworks™

Release Notes
Secure Path Version 2.0 for IBM AIX
AA-RLT2A-TE/221296-001

This document summarizes features and characteristics of the SANworks Secure Path product, Version 2.0 for IBM AIX systems using StorageWorks Array Controllers for Fibre Channel. The Fibre Channel controllers, HSG80 and HSG60 must be configured for Fabric (FC-SW). This document provides information not covered elsewhere in the product documentation.

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IMPORTANT: Read this entire document before installing or upgrading the software.

Intended Audience

This document is intended for individuals responsible for installing, configuring and maintaining Compaq SANworks Secure Path Version 2.0 in their IBM AIX server environment with any one of the following StorageWorks RAID Arrays:

- RA8000/ESA12000 (HSG80)
- MA8000/EMA12000(HSG80)
- MA6000 (HSG60)

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The SANworks Secure Path Version 2.0 for IBM AIX software kit consists of the following:

The Secure Path documentation set:

Installation and Reference Guide – *COMPAQ SANworks Secure Path Version 2.0 for IBM AIX*

Warranty Card

Release Notes – *COMPAQ SANworks Secure Path Version 2.0 for IBM AIX* (This document*)*

A CD-ROM containing documentation and Secure Path Software V2.0 for IBM AIX.

Visit our Website for the Latest Information

Visit our website for the latest drivers, technical tips and documentation for SANworks Secure Path at:

http://www.compaq.com/products/storageworks

Operating System Support

Table 1 lists the hardware and software supported by SANworks Secure Path Software Version 2.0 for IBM AIX.

Table 1 - Secure Path (FC SAN Switch Installation) Prerequisites

Host Feature	Requirement			
Platform	IBM RS/6000 **(PCI bus only**)			
Operating Systems	AIX 4.3.2; AIX 4.3.3			
Secure Path Software Kit	SANworks Secure Path 2.0 for IBM AIX			
RAID Storage Systems				
HSG80	StorageWorks RA8000/MA8000/ESA12000/EMA12000 (FC) with dual controllers running ACS version 8.5F			
HSG60	StorageWorks MA6000 with dual controllers running ACS version 8.5L			
Solution Software Kit (with adapter driver)	StorageWorks Solution Software Version 8.5c for IBM AIX for the HSG80			
Solution Software Kit (with adapter driver)	StorageWorks Solution Software Version 8.5c for IBM AIX for the HSG60			
Host Bus Adapters	FC PCI Adapter, part number DS-SWIA1-PD			
FC Cables	FC Cables 234457-* (BNGBX-nn)			
FC SAN Switches	Compaq	8-Port	380591-B21	(DS-DSGGA-AA)
	Compaq	8-Port	380591-B22	(DS-DSGGA-AC)
	Compaq	8-Port	158222-B21	(DS-DSGGB-AA)
	Compaq	8-Port	158223-B21	(DS-DSGGB-AB)
	Compaq	8-Port	176219-B21	(DS-DSGGC-AA)
	Compaq	16-Port	380578-B21	(DS-DSGGA-AB)
	Compaq	16-Port	380578-B22	(DS-DSGGA-AD)
	Compaq	16-Port	158224-B21	(DS-DSGGB-BA)
	Compaq	16-Port	158225-B21	(DS-DSGGB-BB)
	Compaq	16-Port	212776-B21	(DS-DSGGC-AB)
FC Switch Firmware	The SAN switches required the following minimum firmware versions:			
	DS-DSGGA-XX	- V1.6d [1]		
	DS-DSGGB-XX	-V2.0.3a		
	DS-DSGGC-XX	-V2.1.7		

[1]If the DS-DSGGA-XX switch does not have the supported firmware, follow the directions contained on the CD-ROM for the IBM AIX Secure Path Version 2.0 release located in <mount directory>/firmware/README.

Coexistence with other Multipathing Products

Coexistence with other multipathing products, such as Secure Path for Sun Solaris or Secure Path for Windows NT/2000, has not been qualified at this time.

Installation Prerequisites

Hardware Prerequisites for Secure Path

Fibre Channel

Two paths must exist between each server and storage system. Each path must consist of a separate:

- Host Bus Adapter

  NOTE: On systems that support multiple I/O boards, Compaq recommends that each host bus adapter be installed on separate I/O boards to eliminate the I/O board as a single point of failure.

- Fibre Channel (SAN) Switch
- HSG80 or HSG60 Controllers

Secure Path 2.0 for IBM AIX supports a **maximum of 4 RAID systems** per adapter pair.

NOTE: The RAID storage system must be configured for Fibre Channel Fabric (FC-SW) in Multiple-bus Failover Mode.

Driver Version Identification

Verify that the driver version for the FC HBA is 1.5.10.1. by entering the following:

lslpp –l PC1000.driver.obj

The following example verification message appears:

```
Fileset                 Level     State       Description
----------------------------------------------------------------------------
Path:/usr/lib/objrepos
PC1000.driver.obj       1.5.10.1  COMMITTED   StorageWorks AIX Dual-Rail
                                              V1.0 Fabric and Loop
```

Installation Issues

Installation Types

Installations of Secure Path V2.0 may be of two types:

1. A server that has never been configured with a RAID system. For this installation, verify that the steps outlined in Chapter 3 of the *Compaq SANworks Secure Path 2.0 for IBM AIX Installation and Reference Guide* have been completed and the units on the RAID array are visible from the two adapter paths to Secure Path.
2. A server already has a RAID system with a single path installation under the IBM AIX Solution Kit. The steps to perform this installation are documented in Appendix B of the *Secure Path Version 2.0 for IBM AIX Installation and Reference Guide.*

Installations in the HACMP Environment

- Secure Path Version 2.0 FC HBA driver must be installed on all nodes accessing the RAID system in the cluster.
- SWCC Installation Considerations:
  - The SWCC agent must be installed and configured on all systems in the cluster. Verify that each server has the agent access device identified and that the RAID systems are seen by each server.
  - The SWCC agent may only be running on one server in the cluster.
  - Install the SWCC Agent failover script on one and only one node of the cluster.

For more information on agent installation, refer to Chapter 4 of the *Compaq StorageWorks HSG60/HSG80 Array ACS Version 8.5c Solution Software for IBM AIX Installation and Configuration Guide.*

Partitioned Storagesets

Storage Units configured from partitioned storage sets must be identified and defined as other units on the RAID storage system. It is recommended that all partitions be assigned to the same HSG80 or HSG60 controller and the same host even though they have unique unit identifiers.

Under Secure Path, if units created from partitions have a preferred path set to a controller, then all such partitions must have the same preferred path. Failover and failback events of a partitioned unit will affect all partitions of the same storageset.

Connection Offsets

If connection offsets are used with Secure Path, set the same offset value on both connections to the AIX HBA pair. Refer to Chapter 1, the section titled Assigning Unit Numbers of the *Compaq StorageWorks HSG60/HSG80 Array ACS Version 8.5c Solution Software for IBM AIX Installation and Configuration Guide* for more information on how to use connection offsets.

The cbxfcar Autorecovery Daemon

The Secure Path autorecovery daemon (cbxfcar) is installed in conjunction with the FC HBA driver. The autorecovery daemon (cbxfcar) starts when the driver is installed and an entry is added to /etc/inittab to automatically start the daemon on system boot.

Operating Constraints

Output from lsdev -Cc disk

When executing the command 'lsdev -Cc disk' on an AIX server running Secure Path, the devices will list a parent adapter shown as follows:

```
# lsdev -Cc disk
hdisk0      Available    40-60-00-4,0   16 Bit LVD SCSI Disk Drive
hdisk1      Available    40-60-00-8,0   16 Bit LVD SCSI Disk Drive
hdisk2      Available    2D-08-00-0,0   DEC HSG80 Command Console LUN
hdisk3      Available    2D-08-00-0,1   DEC HSG80 RAID Array
hdisk4      Available    2D-08-00-0,2   DEC HSG80 RAID Array
hdisk5      Available    2D-08-00-0,3   DEC HSG80 RAID Array
hdisk6      Available    2D-08-00-0,4   DEC HSG80 RAID Array
hdisk7      Available    2D-08-00-0,5   DEC HSG80 RAID Array
hdisk8      Available    2D-08-00-0,6   DEC HSG80 RAID Array
```

In this example, the two adapters are scsi4 and scsi5, configured as shown below:

```
scsi4   Available 2A-08    Cambex Fibre Channel I/O Controller
scsi5   Available 2D-08    Cambex Fibre Channel I/O Controller
```

While all of the above hdisks claim they are owned by 2D-08 (scsi5) this does not actually reflect their current state. These values should not be relied upon. To determine the state of a disk use the Secure Path Management Utility (cbxfcsm) as described in the Installation and Reference Guide.

Managing Secure Path 2.0 using SMIT

The Secure Path management tools have been integrated into the IBM AIX *smit* utility. From the *smit* menus, many different functions can be performed such as:

- Monitoring failover
- Configuring failback
- Resolving failures

Most of these functions may also be accessed by the Secure Path management utility (cbxfcsm), but there are some additional parameters which cannot be modified from cbxfcsm.

> **NOTE:** At any point, if you wish to see the command line smit uses to execute a function, simply press 'F6' and the command line will be displayed.

From the ***smit*** utility System Management menu, select Devices. This will present a list of applicable devices to the system. Then choose the **Cambex Fibre Channel Adapter** menu. The following screen appears:

```
                    Cambex Fibre Channel Adapter

  Move cursor to desired item and press Enter.

    List All Cambex FC Adapters
    Change / Show Characteristics of a Cambex FC Adapter
    Generate Error Report
    Trace Cambex FC Adapters
    Change / Show Device Status
    Configure Path / Show Path Status
    Change / Show Auto Recovery of Cambex FC Adapters


  F1=Help        F2=Refresh      F3=Cancel       F8=Image
  F9=Shell       F10=Exit        Enter=Do
```

To view adapters from this screen, select the first option, **List All Cambex FC Adapters**. This will display a brief listing of all Cambex Fibre Channel I/O Controllers installed on the system.

Selecting the **Change / Show Characteristics of a Cambex FC Adapter** brings up a detailed menu outlining many different adjustable parameters for the Cambex FC adapter.

One important field is the DMA window size. This field must be adjusted on certain machines to see LUNs. If you are having difficulty detecting LUNs on your system, you should refer to the Avoiding Problem Situation*s* section of this document or Chapter 4 of the *Compaq SANworks Secure Path 2.0 for IBM AIX Installation and Reference Guide.*

> **WARNING:** Changing any of the other options on the **Change/Show Characteristics of a Cambex FC Adapter** can result in system instability and/or unpredictable behavior.

To receive specific information on any of the other options, move the cursor over the option, press F1, and a brief description appears.

The next two items on the **Change / Show Characteristics of a Cambex FC Adapter** menu are **Generate Error Report** and **Trace Cambex FC Adapters**. Both of these options are only necessary for obtaining system information when troubleshooting with a Compaq representative. For other information on these entries, see the *Avoiding Problem Situations* section located in this document.

Change / Show Device Status is the next menu option. When selecting this option, you will be presented with a list of hdisks that are under FC adapter control. Once selected, a screen presenting the current state of the LUN represented by that hdisk will be displayed. To move the online path of that LUN, simply select your desired online path available from the pop up menu choices, and press Enter. This will transition the LUN to the new path, provided the path is accessible.

In order to change a path status, select **Configure Path / Show Path Statu**s. This option will let you view the current state or modify a path.

The final option of the smit menus in the Cambex FC adapter menu is **Change / Show Auto Recovery of Cambex FC Adapters.** This menu will allow you to change the timing of probes by the cbxfcar daemon for failed or recovered paths.

When a path has failed, Secure Path will begin probing it to see when it has returned to a Standby state. The options in this menu allow the user to tune the frequency of the probing. The first option, **Time Interval to Check Failed Paths (sec)** is the amount of time (in seconds) that will pass between probes. The second option, **Number of Inquirie**s **to Check Failed Path**, determines how many times the path must appear ready before it is configured as the standby path.

The *Compaq SANworks Secure Path Version 2.0 for IBM AIX Installation and Reference Guide* does not reference *smit* menus. Except for the **Change/Show Auto Recovery of Cambex FC Adapters** menu, the Secure Path status and management tool (cbxfcsm) may also be used to configure most FC HBA parameters. Refer to the *Compaq Secure Path Version 2.0 for IBM AIX Installation and Reference Guide* for further details on cbxfcsm.

Additional Features

Unit availability

To add a new unit to the Secure Path configuration, run cfgmgr. Units are dynamically available without system reboot.

Avoiding Problem Situations

Connection Offsets

If connection offsets are used with AIX, set the same offset value on both connections to the AIX HBA pair.

Create Only Two Paths to a RAID Storage Unit

WARNING: Secure Path requires that **only two** paths exist from the server to the LUN on the RAID storage system.

Viewing LUNs After Running cfgmgr

If you run cfgmgr and can see the adapters but not the LUNs, set your DMA size to 64MB by entering the following commands:

```
# rmdev -l scsi4
scsi4 Defined
# chdev -l scsi4 -a dma_window=64M
scsi4 changed
# mkdev -l scsi4¶
```

Performance on SP Class Machines

On some SP machines, problems have been noticed with multiple adapters on the third PCI bus (pci2). On these machines using pci2 should be avoided as it will have an adverse effect on system performance.

Logging Errors and Debugging Problems

When problems occur and possible troubleshooting information is required by Compaq personnel, use the following commands:

errpt -a

This command will print a full output of errors logged by the system. As this may be important for locating problems with the software this should probably be output to a file as shown:

errpt -a > /tmp/errorlog.txt

Another utility, *runtrace*, found in the /usr/lpp/cbxfc directory may prove helpful for debugging problem situations. Enter:

/usr/lpp/cbxfc/runtrace

Now produce the symptoms of whatever problem is occurring and then enter the following commands:

trcstop

trcrpt > /tmp/trace.out

Provide the contents of the /tmp/trace.out file to a Compaq representative for analysis.

Both commands *errpt -a* and *runtrace* may be executed from the *smit* menus. They are references inside the **Cambex Fibre Channel Adapter** menu as **Generate Error Report** and **Trace Cambex FC Adapters**. See the section on Managing Secure Path 2.0 using smit for more information on using smit to control Secure Path.

Cases to Retry Operations

Occasionally when executing a command to a disk within a Secure Path environment it is necessary to retry the command. For example, when running cfgmgr -v for the first time, it is possible that some devices will be in a Defined state, but not in an Available state. When this occurs, immediately repeat execution of cfgmgr. This should resolve the problem.

The cause of this problem is due to verbose reporting of UNIT ATTENTIONs from the RAID Array in combination with AIX's handling of them.

These situations will commonly arise when an hdisk has not been accessed for a long duration of time. If this is the case and the hdisk does not respond (an I/O error may be reported), retry the command and the problem should be resolved.