Migrating from DS-SWSA4-xC (based on AMCC/JNI) FC Adapters to FCA2257x Adapters on Sun Solaris systems connected to HP StorageWorks EMA/HSG arrays white paper

Executive summary

Applied Micro Circuits Corporation (AMCC), who recently merged with Jaycor Networks Incorporated (JNI), has announced that it will discontinue the hardware and driver software on which HP DS-SWSA4-PC and DS-SWSA4-SC Fibre Channel Adapters (FCAs) are based (for further details, refer to customer note listed in For more information).

As a result of this discontinuance, you must migrate from the DS-SWSA4-PC (PCI bus) to the FCA2257P or from the DS-SWSA4-SC (S bus) FCA to the FCA2257S FCA if one of the following conditions is true:

- You have a broken FCA and you cannot get a replacement FCA.
- You run into a driver problem that is not or cannot be solved by AMCC.
- You decide to migrate due to support considerations.
- You need support for a Solaris version not currently supported.

This white paper focuses on the migration from the DS-SWSA4-PC (PCI bus) to the FCA2257P or from the DS-SWSA4-SC (S bus) FCA to the FCA2257S FCA.

Migration prerequisites

Before performing the steps in the migration phase, the following actions must be completed:

- Analyze your storage area network (SAN) to identify the type and version of Fibre Channel switches and the type of zoning, FCAs, and associated drivers used in your current environment (for further details, see Analysis of current environment).
- Verify that the FCA2257P or FCA2257S is supported by HP in the desired hardware configuration (server type/server card slots [PCI (3.3V and 5V), Sbus]/Fibre Channel switches) and desired software configuration (Solaris version/Path Management/Volume Management/Cluster Server/Enterprise Backup Solution).
- Be sure the replacement FCAs are available before starting with the migration.
- As you switch from 1-Gb FCAs to 2-Gb FCAs, be sure you have the correct Fibre Channel cables for SAN connectivity available. The 2-Gb FCAs use a different connector and will require a new (SC to LC) cable.
- Schedule planned downtime for your affected servers (to estimate your required downtime, see Impact of migration to production environments and FCA2257x installation and configuration).
- Do not add new logical unit numbers (LUNs)/storage arrays or make any further changes during the migration process to limit the complexity of the operation.

Impact of migration to production environments

Replacing the FCAs typically involves downtime in your production environment. The different steps required for the migration are outlined in FCA2257x installation and configuration. The downtime will vary, depending on the time your system takes to boot and the time required for the different steps. With small servers and experienced administrators, downtime will typically be at least one hour. Normal recovery roll back precautions should be in place.

An additional consideration is custom applications that may have been written with consideration of the FCA characteristics. Such custom applications will also have to be migrated, which is out of the scope of this document.

Analysis of current environment

You must know or find out the following to later modify the configuration:

- Which cards and associated driver package are installed?
- Which version of Platform Kit and HP StorageWorks Secure Path are installed?
- For DS-SWSA4-PC PCI cards, which PCI slots are occupied? Can the FCA2257P replacement cards be put into the same PCI slots?
- What is the World Wide Port Name (WWPN) and World Wide Node Name (WWNN) of the FCAs?
- What are the WWPNs of the EVA ports (automatically detected by Secure Path installation)?
- Is your SAN zoning WWN based or port based?

What are the current device files for the disks on the Solaris host?

To check current driver package installed:

```
# pkginfo | grep –i jni
```

The output of the preceding command will differ depending on the type of FCA installed and the associated driver version.

With DS-SWSA4-PC (FCI-1063) FCA (config file /kernel/drv/fca-pci.conf):

```
system       CPQfcaPCI              CPQ/JNI Fibre Channel SCSI HBA Driver (32-bit PCI)
```

With DS-SWSA4-SC (FC64-1063) FCA (config file /kernel/drv/fcaw.conf)

```
system       CPQfcaw       CPQ/JNI Fibre Channel SCSI HBA Driver (64-bit SBus)
```

If the Sun StorEdge SAN 4.x software has been installed, you may also see the following:

```
system       SUNWjfca       JNI Fibre Channel Adapter (FCA) Driver
system       SUNWjfcau      JNI Fibre Channel Adapter (FCA) (usr)
system       SUNWjfcaux     JNI Fibre Channel Adapter (FCA) (usr) (64-bit)
system       SUNWjfcax      JNI Fibre Channel Adapter (FCA) Driver (64-bit)
```

Depending on their presence, the driver packages (CPQfcaw or CPQfcaPCI) should be removed after the removal of the FCA.

To check the current Secure Path version installed:

```
# pkginfo -l CPQswsp | grep -i version
```

The output of the previous command should be similar to the following:

```
VERSION:  3.0D
```

With Secure Path version 3.0D the following packages will be installed:

```
application HPfcraid       StorageWorks RAID Manager for Sun
```

Note:
Before removal of CPQswsp, you must verify that the correct Sun Patch Level is installed. Otherwise your system may no longer boot after removal of Secure Path. For further details, see customer advisory OS050316_CW01 in For more information.

For further commands and examples on how to find out the various information, see Detailed example analysis of a given environment.

FCA2257x installation and configuration

The FCA2257x installation and configuration consists of several steps that are described in detail in [Detailed example FCA2257x configuration for a given environment](#). In short, the following required steps are listed as an overview:

1. Verify patch level and take appropriate action as indicated in customer advisory OS050316_CW01. For more detailed information, refer to this advisory.
2. Modify /etc/vfstab to temporarily omit disk devices on the affected storage array.
3. Shut down the host system.
4. Detach the Fibre Channel cables.
5. Swap FCAs (record WWPN if listed on FCA2257x).
6. Replace the Fibre Channel cables.
7. Boot system into OpenBoot Prom and bring FCA link up to record WWPN if WWPN is not available on paper.
8. Boot system.
9. De-install Secure Path and its components.
10. Start with Secure Path installation (with potential additional reboot required).
11. Adjust zoning for FCAs (if WWN zoning is used).
12. Adjust the connections and LUN presentation on the HSG80.
13. Complete Secure Path installation.
14. Verify that system can access the previous disk configuration.
15. Restore /etc/vfstab to the original settings.
16. Reboot the system.
17. Verify that system can access the previous disk configuration.

Detailed example analysis of a given environment

The following example illustrates the commands used and information shown for a Sun Host connected to an HSG80-based storage system with two DS-SWSA4-PC cards and three disks (LUNs) visible.

List jni packages installed:

```
# pkginfo | grep -i jni
system      CPQfcaPCI      CPQ/JNI Fibre Channel SCSI HBA Driver (32-bit PCI)
```

Display system diagnostic information to show how many cards and into which slots they are installed (the DS-SWSA4-PC card display shows only Fibre Channel as name and no model number):

```
    # /usr/platform/sun4u/sbin/prtdiag
======================== IO Cards ========================

     Bus   Freq
Brd  Type  MHz   Slot  Name                             Model
---  ----  ----  ----  -------------------------------  ----------------------
SYS  PCI   33    1     pciclass,001000                  Symbios,53C875
SYS  PCI   33    2     fibre-channel
SYS  PCI   33    3     fibre-channel
SYS  PCI   33    10    SUNW,m64B                        ATY,GT-B
```

Show all disk devices through format:

```
# echo | format
Searching for disks...done


AVAILABLE DISK SELECTIONS:
       0. c0t0d0 <SUN9.0G cyl 4924 alt 2 hd 27 sec 133>
          /pci@1f,4000/scsi@3/sd@0,0
       1. c0t1d0 <SUN18G cyl 7506 alt 2 hd 19 sec 248>
          /pci@1f,4000/scsi@3/sd@1,0
       2. c4t0d0 <DEC-HSG80-V88F cyl 5255 alt 2 hd 20 sec 169>
          /swsp@0,1/ssd@0,0
       3. c4t0d1 <DEC-HSG80-V88F cyl 5255 alt 2 hd 20 sec 169>
          /swsp@0,1/ssd@0,1
       4. c4t0d2 <DEC-HSG80-V88F cyl 13996 alt 2 hd 20 sec 254>
          /swsp@0,1/ssd@0,2
```

Display Secure Path information.

The following is a short extract:

```
# spmgr display
  Server:  ue    Report Created: Tue, Jun 28 15:39:39 2005
  Command: spmgr display
  = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
  Storage:  5000-1FE1-001A-B3F0
  Load Balance: Off  Auto-restore: Off
  Path Verify: On    Verify Interval: 30
  HBAs: fca-pci-0  fca-pci-1
  Controller:  ZG21300608, Operational
               ZG21200930, Operational
  Devices: c4t0d0  c4t0d1  c4t0d2

  TGT/LUN   Device               WWLUN_ID                         #_Paths
    0/  0   c4t0d0               6000-1FE1-001A-B3F0-0009-2120-0930-014D   4

          Controller  Path_Instance      HBA             Preferred?  Path_Status
          ZG21300608                                     no
                      hsx-0-32-1         fca-pci-0       no          Standby
                      hsx-77-33-1        fca-pci-1       no          Standby

          Controller  Path_Instance      HBA             Preferred?  Path_Status
          ZG21200930                                     no
                      hsx-11-34-1        fca-pci-0       no          Active
                      hsx-66-35-1        fca-pci-1       no          Available
```

Verify if there are entries for slices of preceding disks in /etc/vfstab:

```
# cat /etc/vfstab
#device         device          mount           FS      fsck    mount   mount
#to mount       to fsck         point           type    pass    at boot options
#
#/dev/dsk/c1d0s2 /dev/rdsk/c1d0s2 /usr           ufs     1       yes     -
fd      -       /dev/fd fd      -       no      -
/proc   -       /proc   proc    -       no      -
/dev/dsk/c0t0d0s1       -       -       swap    -       no      -
/dev/dsk/c0t0d0s0       /dev/rdsk/c0t0d0s0      /       ufs     1       no      -
/dev/dsk/c0t0d0s4       /dev/rdsk/c0t0d0s4      /usr    ufs     1       no      -
/dev/dsk/c0t0d0s3       /dev/rdsk/c0t0d0s3      /var    ufs     1       no      -
/dev/dsk/c0t0d0s6       /dev/rdsk/c0t0d0s6      /export/home    ufs     2       yes     -
/dev/dsk/c0t0d0s5       /dev/rdsk/c0t0d0s5      /opt    ufs     2       yes     -
swap    -       /tmp    tmpfs   -       yes     -
#
#****************HSG devices****************************
/dev/dsk/c4t0d0s2       /dev/rdsk/c4t0d0s2      /mnt/d0 ufs     2       yes     -
/dev/dsk/c4t0d1s2       /dev/rdsk/c4t0d1s2      /mnt/d1 ufs     2       yes     -
/dev/dsk/c4t0d2s2       /dev/rdsk/c4t0d2s2      /mnt/d2 ufs     2       yes     -
```

If using VERITAS Volume Manager, you could see entries similar to the following:

```
# cat /etc/vfstab
#device          device          mount          FS     fsck    mount   mount
#to mount        to fsck         point          type   pass    at boot options
#
#/dev/dsk/c1d0s2 /dev/rdsk/c1d0s2 /usr           ufs    1       yes     -
fd       -       /dev/fd fd      -       no      -
/proc    -       /proc  proc     -       no      -
/dev/dsk/c0t0d0s1        -       -       swap     -       no      -
/dev/dsk/c0t0d0s0        /dev/rdsk/c0t0d0s0      /       ufs     1       no      -
/dev/dsk/c0t0d0s4        /dev/rdsk/c0t0d0s4      /usr    ufs     1       no      -
/dev/dsk/c0t0d0s3        /dev/rdsk/c0t0d0s3      /var    ufs     1       no      -
/dev/dsk/c0t0d0s6        /dev/rdsk/c0t0d0s6      /export/home    ufs     2       yes     -
/dev/dsk/c0t0d0s5        /dev/rdsk/c0t0d0s5      /opt    ufs     2       yes     -
swap     -       /tmp    tmpfs   -       yes     -
#
#****************HSG devices****************************
/dev/dsk/c4t0d1s2       /dev/rdsk/c4t0d1s2      /mnt/d1    ufs     2       yes -
/dev/dsk/c4t0d2s2       /dev/rdsk/c4t0d2s2      /mnt/d2    ufs     2       yes -
/dev/vx/dsk/rootdg/test0 /dev/vx/rdsk/rootdg/test0 /mnt/vx/d0 vxfs - yes suid
```

Show VERITAS Volume Manager disk information:

```
vxdisklist
Menu: VolumeManager/Disk/ListDisk

  Use this menu operation to display a list of disks.  You can
  also choose to list detailed information about the disk at
  a specific disk device address.

Enter disk device or "all" [<address>,all,q,?] (default: all)

DEVICE       DISK         GROUP        STATUS
c0t0d0       -            -            error
c0t1d0       disk01       rootdg       online
c4t0d0       c4t0d0s2     rootdg       online
c4t0d1       c4t0d1s2     rootdg       online
c4t0d2       c4t0d2s2     rootdg       online
```

Display VERITAS Volume Manager configuration:

```
#  vxprint -h
Disk group: rootdg

TY NAME         ASSOC        KSTATE      LENGTH      PLOFFS  STATE      TUTIL0  PUTIL0
dg rootdg       rootdg       -           -           -       -          -       -

dm c4t0d0s2     c4t0d0s2     -           17751760 -          -          -       -
dm c4t0d1s2     c4t0d1s2     -           17751760 -          -          -       -
dm c4t0d2s2     c4t0d2s2     -           71084440 -          -          -       -
dm disk01       c0t1d0s2     -           35363560 -          -          -       -

v  rootvol2     fsgen        ENABLED     20973112 -          ACTIVE     -       -
pl rootvol2-01  rootvol2     ENABLED     20973112 -          ACTIVE     -       -
sd disk01-B0    rootvol2-01  ENABLED     1           0       -          -       Block0
sd disk01-02    rootvol2-01  ENABLED     20973111 1          -          -       -

v  swapvol      gen          ENABLED     14263224 -          ACTIVE     -       -
pl swapvol-01   swapvol      ENABLED     14263224 -          ACTIVE     -       -
sd disk01-01    swapvol-01   ENABLED     14263224 0          -          -       -

v  test0        fsgen        ENABLED     10485760 -          ACTIVE     -       -
pl test0-01     test0        ENABLED     10488140 -          ACTIVE     -       -
sd c4t0d0s2-01  test0-01     ENABLED     10488140 0          -          -       -
```

From these outputs of the VERITAS configuration, it can be determined that there is one volume mounted at boot time.

Show information about the WWPN/WWNN binding (this is done automatically by Secure Path but should be verified to ensure that all WWPNs will be present in the driver configuration file of the new card):

```
# grep target /kernel/drv/fca*.conf | grep -v '#'
target_controllers = 126;
target32_wwpn="5000-1FE1-001A-B3F1";
target34_wwpn="5000-1FE1-001A-B3F3";
target35_wwpn="5000-1FE1-001A-B3F4";
target33_wwpn="5000-1FE1-001A-B3F2";
```

The following screen shots (from HSG Element Manager) show the host connections to the HSG subsystem.

Figure 1. HP StorageWorks HSG Element Manager Host Properties Extracts—Presentation and Ports
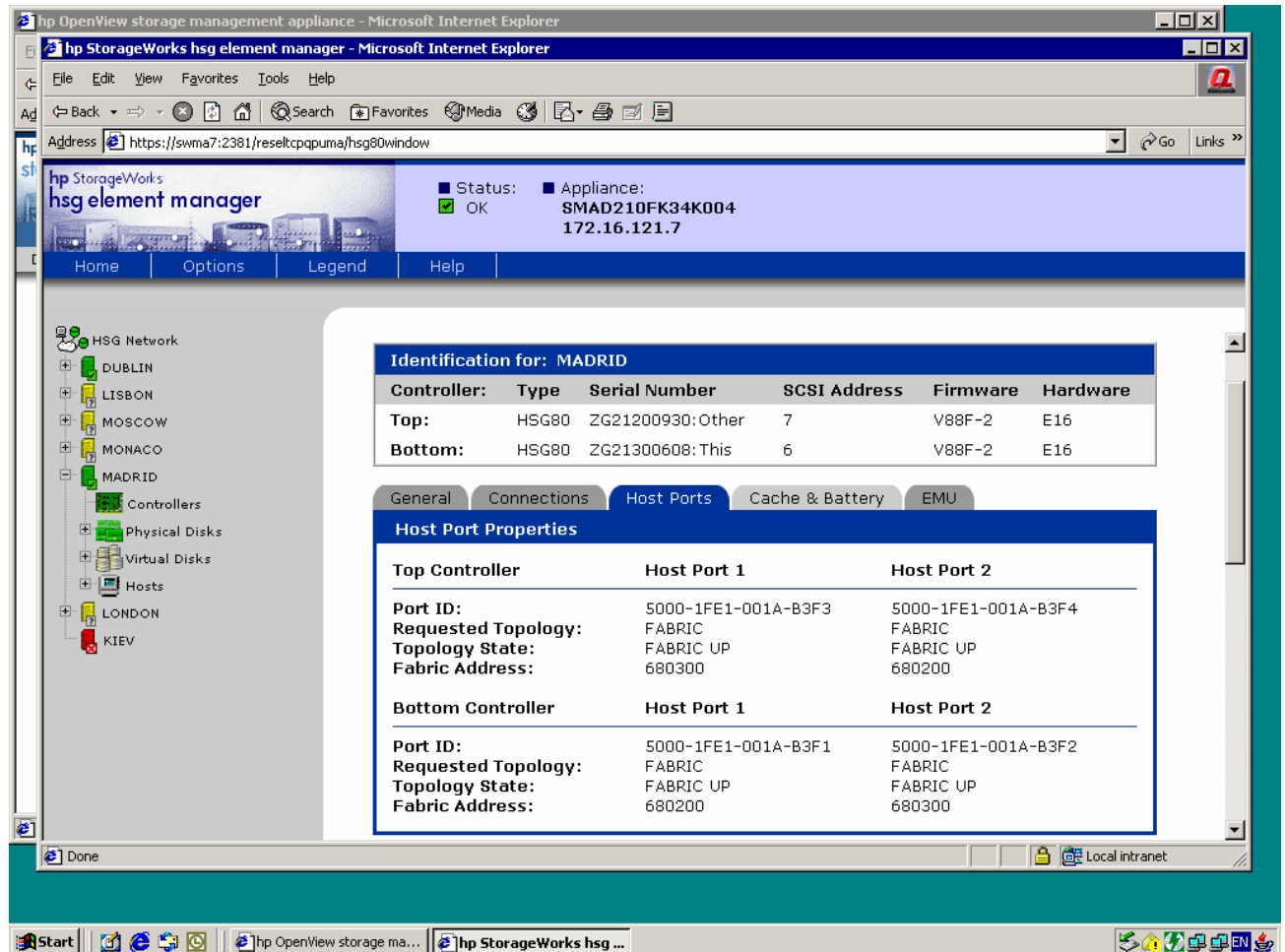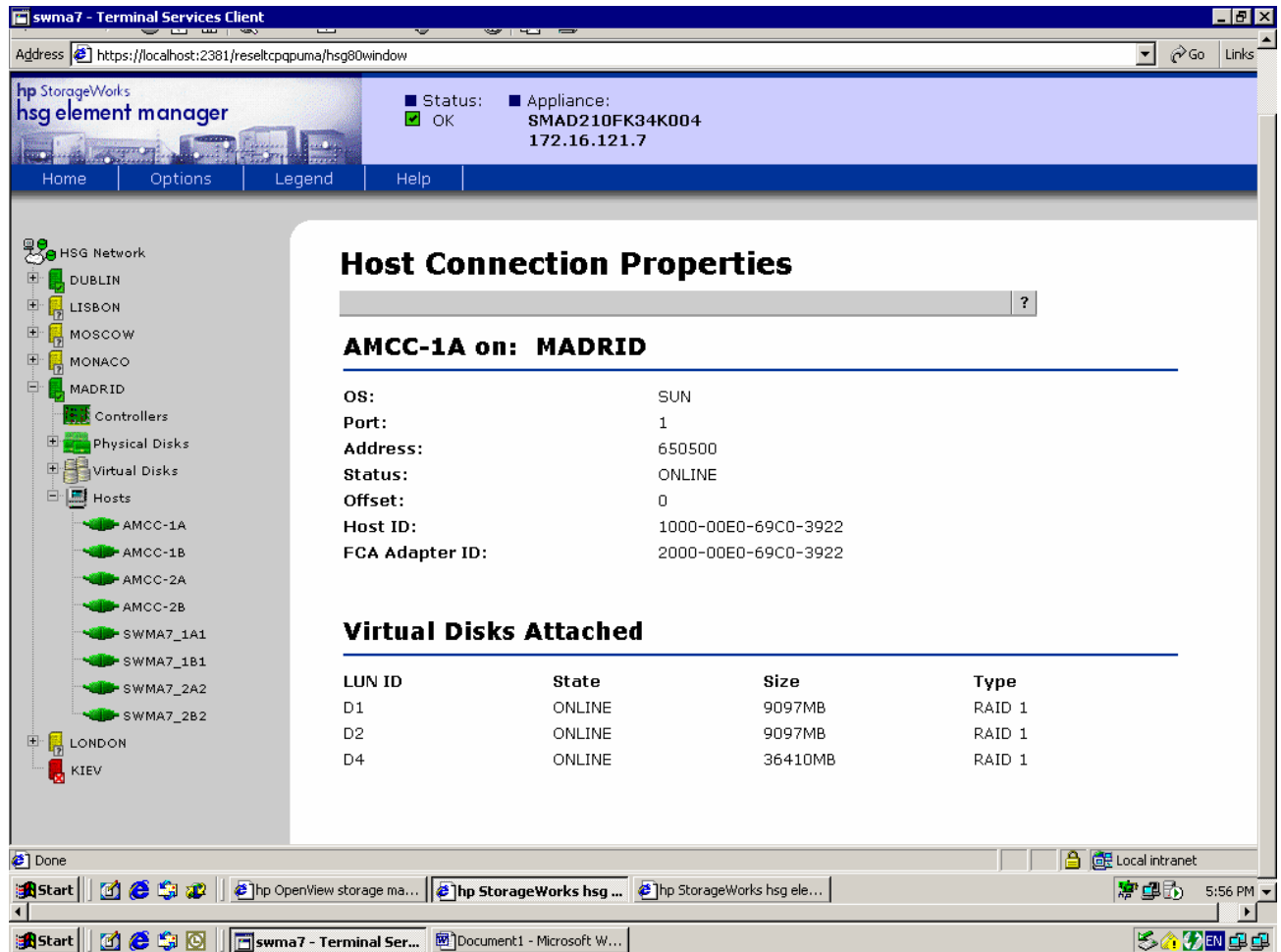
Figure 2. HP StorageWorks HSG Element Manager Host Properties Extracts—Presentation and Ports

In case you configured multiple Solaris systems on a storage system and do not know which WWPN will have to be replaced for a given host, you may need to look up the WWPN of your current FCAs. If you know to which Fibre Channel switch ports your system is connected, you may look up this information on a SAN switch or through a SAN management application (for example, switchshow or nsshow commands on a B-series switch). Another approach is to look up this information on the Solaris host.

As the WWPN information is only logged during boot, this assumes that either/var/adm/messages or an archived messages file contains this information. The following command searches for string wwpn in /var/adm/messages and lists the last four lines with columns 5–8 (field delimiter ":"):

```
# grep -i wwpn /var/adm/messages | tail -4 | cut -d: -f4-8
[ID 451854 kern.notice] fca-pci0: Fibre Channel WWNN: 100000E069C03922  WWPN: 200000E069C03922
[ID 451854 kern.notice] fca-pci1: Fibre Channel WWNN: 100000E069C03922  WWPN: 200000E069C038A1
[ID 451854 kern.notice] fca-pci0: Fibre Channel WWNN: 100000E069C03922  WWPN: 200000E069C03922
[ID 451854 kern.notice] fca-pci1: Fibre Channel WWNN: 100000E069C03922  WWPN: 200000E069C038A1
```

In case WWN (WWPN)-based zoning is used, this information needs also to be retrieved from the Fibre Channel switches. The following output is a short extract showing the WWN-based zoning on a SAN (which consists of the HSG ports and of a DS-SWSA4-PC FCA). For the installation of the new FCAs, the zone information will have to be modified to include the new FCAs.

```
Zone show
zone:  AMCC
            Protocol:ALL
        20:00:00:e0:69:c0:39:22
        20:00:00:e0:69:c0:38:a1
        50:00:1f:e1:00:1a:b3:f1
        50:00:1f:e1:00:1a:b3:f2
        50:00:1f:e1:00:1a:b3:f3
        50:00:1f:e1:00:1a:b3:f4
```

Detailed example FCA2257x configuration for a given environment

Verify and potentially fix the patch level of your system.

Note

Before removal of CPQswsp, you must verify that the correct Sun Patch Level is installed. Otherwise your system may no longer boot after removal of Secure Path. For further details, see customer advisory OS050316_CW01 in For more information.

---

1. Check if the following patch is installed on the system:

   Solaris 9: 113713-18

   Solaris 8: 110934-21

   Solaris 7: 107443-23

   If the patch is installed, remove it (patchrm) before proceeding. Check the operating system version and for the presence of the offending patch and remove it. For more information, refer to SUN articles for resolution.
   ```
   # uname -a
   SunOS  5.8 Generic_117350-24 sun4u sparc SUNW,Sun-Fire-280R
   # showrev -p | grep 110934
   Patch: 110934-04 Obsoletes: 109137-01, 110949-01, 111363-01 Requires: 110380-03 Incompatibles:
   Packages: SUNWcsu, SUNWarc
   Patch: 110934-20 Obsoletes: 109137-01, 110949-01, 111363-01 Requires: 110380-04 Incompatibles:
   Packages: SUNWcsu, SUNWarc
   Patch: 110934-21 Obsoletes: 109137-01, 110949-01, 111363-01 Requires: 110380-04 Incompatibles:
   Packages: SUNWcsu, SUNWarc
   # patchrm 110934-21

   Checking installed patches...

   Backing out patch 110934-21...

   Patch 110934-21 has been backed out.
   ```

2. Make a copy of your /etc/vfstab file and remove all entries in /etc/vfstab that refer to disks on an HSG/EMA.
   ```
   # cp –p /etc/vfstab /etc/vfstab.orig
   # vi /etc/vfstab
   ```

3. Shut down the system.

```
# init 5

INIT: New run level: 5
The system is coming down.  Please wait.
System services are now being stopped.
...
The system is down.
syncing file systems... done
```

4. After the system has been shut down and powered off, disconnect the AMCC/JNI FCAs from the Fibre Channel switches and remove the cards from the PCI/Sbus slots.
5. Install the replacement (FCA2257c or FCA2257s) FCA into the respective PCI/Sbus slots.

   WWNN is sometimes available from a label on the FCA, and if so, record the information and skip to step 9.

6. Connect the appropriate Fibre Channel cables to the FCAs.
7. After connecting the Fibre Channel cables, power on the system. At the OK prompt, display the devices:

```
ok show-devs
/pci@6,2000
/pci@6,4000
/pci@4,2000
/pci@4,4000
/SUNW,UltraSPARC-II@3,0
/mc@0,0
/counter-timer@1f,1c00
/pci@1f,2000
/pci@1f,4000
/associations
/virtual-memory
/memory@0,0
/aliases
/options
/openprom
/chosen
/packages
/pci@6,4000/scsi@4,1
/pci@6,4000/scsi@4
/pci@6,4000/QLGC,qla@3
/pci@6,4000/QLGC,qla@2
/pci@6,4000/scsi@4,1/tape
More [<space>,<cr>,q,n,p,c] ?q
```

Unfortunately it is not possible to look up the WWPN of the FCA2257x FCAs. However, you can bring the link online without installing the driver by selecting the appropriate QLGC device:

```
ok " /pci@6,4000/QLGC,qla@3" Select-dev
QLogic QLA2300 Fibre Channel Host Adapter fcode version 1.18.5 1/24/02
Loading QLA2300 firmware - version 3.00.35
```

Look up the WWPN of the FCA on the Fibre Channel switch (or director) on the port to which it is cabled. Do the same operation for the other FCA.

8. Record the port-wwn (WWPN) before proceeding. After recording the WWPN, boot the system. The following boot is with no VERITAS Volumes. An example is included also with VERITAS Volumes.

```
# boot
Boot device: disk  File and args:
SunOS Release 5.8 Version Generic_108528-27 64-bit
Copyright 1983-2003 Sun Microsystems, Inc.  All rights reserved.
/kernel/drv/sparcv9/fca-pci symbol ddi_model_convert_from multiply defined
/kernel/drv/sparcv9/fca-pci symbol ddi_model_convert_from multiply defined
/kernel/drv/sparcv9/fca-pci symbol ddi_model_convert_from multiply defined
/kernel/drv/sparcv9/fca-pci symbol ddi_model_convert_from multiply defined
/kernel/drv/sparcv9/fca-pci symbol ddi_model_convert_from multiply defined
/kernel/drv/sparcv9/fca-pci symbol ddi_model_convert_from multiply defined
/kernel/drv/sparcv9/fca-pci symbol ddi_model_convert_from multiply defined
/kernel/drv/sparcv9/fca-pci symbol ddi_model_convert_from multiply defined

configuring IPv4 interfaces: hme0.
Hostname: ue
/kernel/drv/sparcv9/fca-pci symbol ddi_model_convert_from multiply defined
drvconfig: driver failed to attach: fca-pci
/kernel/drv/sparcv9/fca-pci symbol ddi_model_convert_from multiply defined
/kernel/drv/sparcv9/fca-pci symbol ddi_model_convert_from multiply defined
drvconfig: driver failed to attach: fca-pci
Secure Path Agent started.
The system is coming up.  Please wait.
Jun 30 09:06:21 spagent[117]: Starting spagent.
checking ufs filesystems
/dev/rdsk/c0t0d0s5: is clean.
/dev/rdsk/c0t0d0s6: is clean.
NIS domainname is stolab
starting rpc services: rpcbind keyserv done.
Setting netmask of hme0 to 255.255.0.0
Setting default IPv4 interface for multicast: add net 224.0/4: gateway ue
syslog service starting.
Print services started.
Secure Path Agent started.
volume management starting.
The system is ready.
```

If you have VERITAS Volumes, you might have messages similar to the following.

```
kernel/drv/sparcv9/fca-pci symbol ddi_model_convert_from multiply defined
Starting VxVM restore daemon...
VxVM starting in boot mode...
NOTICE: vxvm:vxdmp: added disk array DISKS, datype = Disk
vxvm:vxconfigd: WARNING: Disk c4t0d0s2 in group rootdg: Disk device not found
vxvm:vxconfigd: WARNING: Disk c4t0d1s2 in group rootdg: Disk device not found
vxvm:vxconfigd: WARNING: Disk c4t0d2s2 in group rootdg: Disk device not found
configuring IPv4 interfaces: hme0.
Hostname: ue
/kernel/drv/sparcv9/fca-pci symbol ddi_model_convert_from multiply defined
drvconfig: driver failed to attach: fca-pci
/kernel/drv/sparcv9/fca-pci symbol ddi_model_convert_from multiply defined
/kernel/drv/sparcv9/fca-pci symbol ddi_model_convert_from multiply defined
drvconfig: driver failed to attach: fca-pci
/kernel/drv/sparcv9/fca-pci symbol ddi_model_convert_from multiply defined
VxVM general startup...
Jun 30 16:24:56 spagent[212]: Starting spagent.
Secure Path Agent started.
The system is coming up.  Please wait.
checking ufs filesystems
/dev/rdsk/c0t0d0s5: is clean.
/dev/rdsk/c0t0d0s6: is clean.
NIS domainname is stolab
starting rpc services: rpcbind keyserv done.
Setting netmask of hme0 to 255.255.0.0
Setting default IPv4 interface for multicast: add net 224.0/4: gateway ue
syslog service starting.
Print services started.
Secure Path Agent started.
volume management starting.


console login:
```

9. Remove all Secure Path and driver-related packages. In this case, these are three packages:

```
# pkginfo CPQswsp HPfcraid CPQhsv CPQfcaPCI CPQfcaw JNIsnia
system      CPQfcaPCI      CPQ/JNI Fibre Channel SCSI HBA Driver (32-bit PCI)
system      CPQswsp        Storageworks Secure Path
application HPfcraid       StorageWorks RAID Manager for Sun

# pkgrm CPQswsp HPfcraid CPQfcaPCI

The following package is currently installed:
   CPQswsp            Storageworks Secure Path
                      (sparc) 3.0D

Do you want to remove this package? y

## Removing installed package instance <CPQswsp>
(A previous attempt may have been unsuccessful.)

This package contains scripts which will be executed with super-user
permission during the process of removing this package.

Do you want to continue with the removal of this package [y,n,?,q] y
## Verifying package dependencies.
## Processing package information.
## Executing preremove script.
Logging to /var/adm/CPQswsp.FriApr29-18:04:52.log
vxvm:vxdisk: ERROR: Cannot get records from vxconfigd: Record not in disk group
Spagent received signal: 15
SPagent: accept(2) received signal: Interrupted system call
Apr 29 18:04:53 spagent[759]: Stopping spagent.
Deinstalling hsx driver from kernel
Deinstalling swsp driver from kernel
Deinstalling path driver from kernel
Deinstalling cpqccl driver from kernel
Restoring devlink.tab
Removing Secure Path entries from ssd.conf
Removing Secure Path entries from sd.conf
Removing Secure Path entries from fca-pci.conf
Removing Secure Path entries from /etc/system
## Removing pathnames in class <none>
/usr/share/man/man7d <shared pathname not removed>
/usr/share/man/man1m <shared pathname not removed>
/kernel/misc/sparcv9 <shared pathname not removed>
/kernel/drv/sparcv9 <shared pathname not removed>
## Executing postremove script.

Secure Path entries have been removed.
If you wish to access the RAID units, you can update the sd.conf
file by running the following command:

        /opt/HPfcraid/bin/config.sh

## Updating system information.

Removal of <CPQswsp> was successful.

The following package is currently installed:
   HPfcraid           StorageWorks RAID Manager for Sun
                      (sparc) 3.0D

Do you want to remove this package? y

## Removing installed package instance <HPfcraid>

This package contains scripts which will be executed with super-user
permission during the process of removing this package.

Do you want to continue with the removal of this package [y,n,?,q] y
## Verifying package dependencies.
## Processing package information.
## Executing preremove script.
## Restoring /etc/system...
## Removing pathnames in class <sed>
/etc/system <shared pathname not removed>
## Removing pathnames in class <fcraid>
/opt/HPfcraid/etc/wwn.ini
/opt/HPfcraid/etc/reg.ini
/opt/HPfcraid/etc/adapt.ini
/opt/HPfcraid/etc
/opt/HPfcraid/bin/sdconf_editor
/opt/HPfcraid/bin/qla.ign
/opt/HPfcraid/bin/ql
/opt/HPfcraid/bin/jni
/opt/HPfcraid/bin/emu64
```

```
/opt/HPfcraid/bin/emu32
/opt/HPfcraid/bin/dfc64
/opt/HPfcraid/bin/dfc32
/opt/HPfcraid/bin/config.sh
/opt/HPfcraid/bin/adapt.sh
/opt/HPfcraid/bin/adapt.cfg
/opt/HPfcraid/bin
/opt/HPfcraid
## Updating system information.

Removal of <HPfcraid> was successful.

The following package is currently installed:
   CPQfcaPCI         CPQ/JNI Fibre Channel SCSI HBA Driver (32-bit PCI)
                     (sparc) 2.6.13


Do you want to remove this package? y

## Removing installed package instance <CPQfcaPCI>

This package contains scripts which will be executed with super-user
permission during the process of removing this package.

Do you want to continue with the removal of this package [y,n,?,q] y
## Verifying package dependencies.
## Processing package information.
## Executing preremove script.
## Removing pathnames in class <sed>
/etc/system <shared pathname not removed>
## Removing pathnames in class <none>
/usr/share/man/man7d/fca-pci.7d
/usr/share/man/man7d <shared pathname not removed>
/opt/CPQfcaPCI/technote.txt
/opt/CPQfcaPCI/diagnostics.txt
/opt/CPQfcaPCI/canal
/opt/CPQfcaPCI
/kernel/drv/sparcv9/fca-pci
/kernel/drv/sparcv9 <shared pathname not removed>
/kernel/drv/fca-pci.conf
/kernel/drv/fca-pci
## Updating system information.

Removal of <CPQfcaPCI> was successful.
```

10. Re-install Secure Path with the *install_SP* script, which is located in the solaris directory. Typically another
    reboot is required during Secure Path installation if internal Fibre Channel disks are used and a certain patch
    level is installed. This is documented in the installation and reference guide for Secure Path 3.0D on page
    46, document number AA-RKYDK-TE. Consult this section of the manual if installing with the HSG controllers
    set in SCSI-2 mode.

```
 # ./install_SP
 Logging installation to /var/adm/HPfcraid.ThuJun30-09:49:41.log

  StorageWorks Secure Path Installation Manager

    This Installation Manager will guide you through the process of adding
    different software packages that may be required to either install or
    upgrade your StorageWorks array and/or Secure Path on your system.  Please
    familiarize yourself with the Secure Path documentation and follow the
    on-screen instructions carefully because some of the packages may not
    apply to your system.  This script will query your system for installed
    components so most of the prompts have an appropriate default.  Hit return
    to accept the default.


  -- Hit RETURN to continue --

## Checking the Solaris patch levels ...
## Solaris operating system version has been verified.
## Solaris patch level(s) have been verified.

 Installation Manager - System scan

    The installation manager will now scan your system for
    compatible adapters.  This may take a minute or so.


.................................................................................................
...............................
```

```
================================================================================

Installation of QLA2300, version  Solaris, Rev=4.13.01.

Do you want to continue with the installation of <QLA2300>? [Y,n]

Processing package instance <QLA2300> from </opt/load/SWSP-V30D-full/solaris>

QLogic QLA2300 driver
(sparc) Solaris, Rev=4.13.01

Copyright (c) 1996-2003, by QLogic Corporation. All rights reserved.


Where do you want the driver object installed (default=/kernel/drv):
Using </> as the package base directory.
## Processing package information.
## Processing system information.
## Verifying package dependencies.
## Verifying disk space requirements.

Installing QLogic QLA2300 driver as <QLA2300>

## Installing part 1 of 1.
/kernel/drv/q3ip
/kernel/drv/q3ip.conf
/kernel/drv/q3ip_v9
/kernel/drv/qla2300
/kernel/drv/qla2300.conf
/kernel/drv/qla2300_v9
[ verifying class <none> ]
## Executing postinstall script.

Installation of <QLA2300> was successful.
Please wait while the driver attaches.
Jun 30 09:51:54 ue qla2300: QLogic qla2300 Fibre Channel Driver v4.13.01 Instance: 0 Firmware
v3.2.15
Jun 30 09:51:54 ue qla2300: qla2300(0): QLA2300 Fibre Channel Host Adapter fcode version 1.18.5
1/24/02
Jun 30 09:51:59 ue qla2300: QLogic qla2300 Fibre Channel Driver v4.13.01 Instance: 1 Firmware
v3.2.15
Jun 30 09:51:59 ue qla2300: qla2300(1): QLA2300 Fibre Channel Host Adapter fcode version 1.18.5
1/24/02


================================================================================


Installation of HPfcraid, version  3.0D.


 -- Hit RETURN to continue --

Processing package instance <HPfcraid> from </opt/load/SWSP-V30D-full/solaris>

StorageWorks RAID Manager for Sun
(sparc) 3.0D
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 StorageWorks HPfcraid installation
```

```
Using </opt> as the package base directory.
## Processing package information.
## Processing system information.
## Verifying disk space requirements.

Installing StorageWorks RAID Manager for Sun as <HPfcraid>

## Installing part 1 of 1.
/opt/HPfcraid/bin/adapt.cfg
/opt/HPfcraid/bin/adapt.sh
/opt/HPfcraid/bin/config.sh
/opt/HPfcraid/bin/dfc32
/opt/HPfcraid/bin/dfc64
/opt/HPfcraid/bin/emu32
/opt/HPfcraid/bin/emu64
/opt/HPfcraid/bin/jni
/opt/HPfcraid/bin/ql
/opt/HPfcraid/bin/qla.ign
/opt/HPfcraid/bin/sdconf_editor
/opt/HPfcraid/etc/adapt.ini
/opt/HPfcraid/etc/reg.ini
/opt/HPfcraid/etc/wwn.ini
[ verifying class <fcraid> ]
Modifying /etc/system
[ verifying class <sed> ]

Installation of <HPfcraid> was successful.

================================================================================
```

11.
```
Installation of CPQswsp, version  3.0D.
```


- ■   Hit RETURN to continue –
- ■

Momentarily stop with the installation. In case you did not look up the WWPN at the OK prompt, you may also lookup the WWPN now by opening another terminal window on the system:

```
 # grep adapter-port-name /var/adm/messages | tail -4 | cut -d: -f4-8
   [ID 358785 kern.info] qla2300-hba0-adapter-port-name="210000e08b08a972";
   [ID 358785 kern.info] qla2300-hba1-adapter-port-name="210000e08b0b7904";
   [ID 358785 kern.info] qla2300-hba0-adapter-port-name="210000e08b08a972";
   [ID 358785 kern.info] qla2300-hba1-adapter-port-name="210000e08b0b7904";
```

In this example, the WWPN of the FCAs are 210000e08b08a972 and 210000e08b0b7904. The next step is to change the SAN configuration to replace the DS-SWSA4-xx WWPNs with the FCA2257x WWPNs with the new FCAs.

12. After you have adapted the SAN configuration, check the HSG configuration to ensure the connections have been made. Following is an example from HSG Element Manager.

Figure 3. HP StorageWorks Command View HSG host connections summary
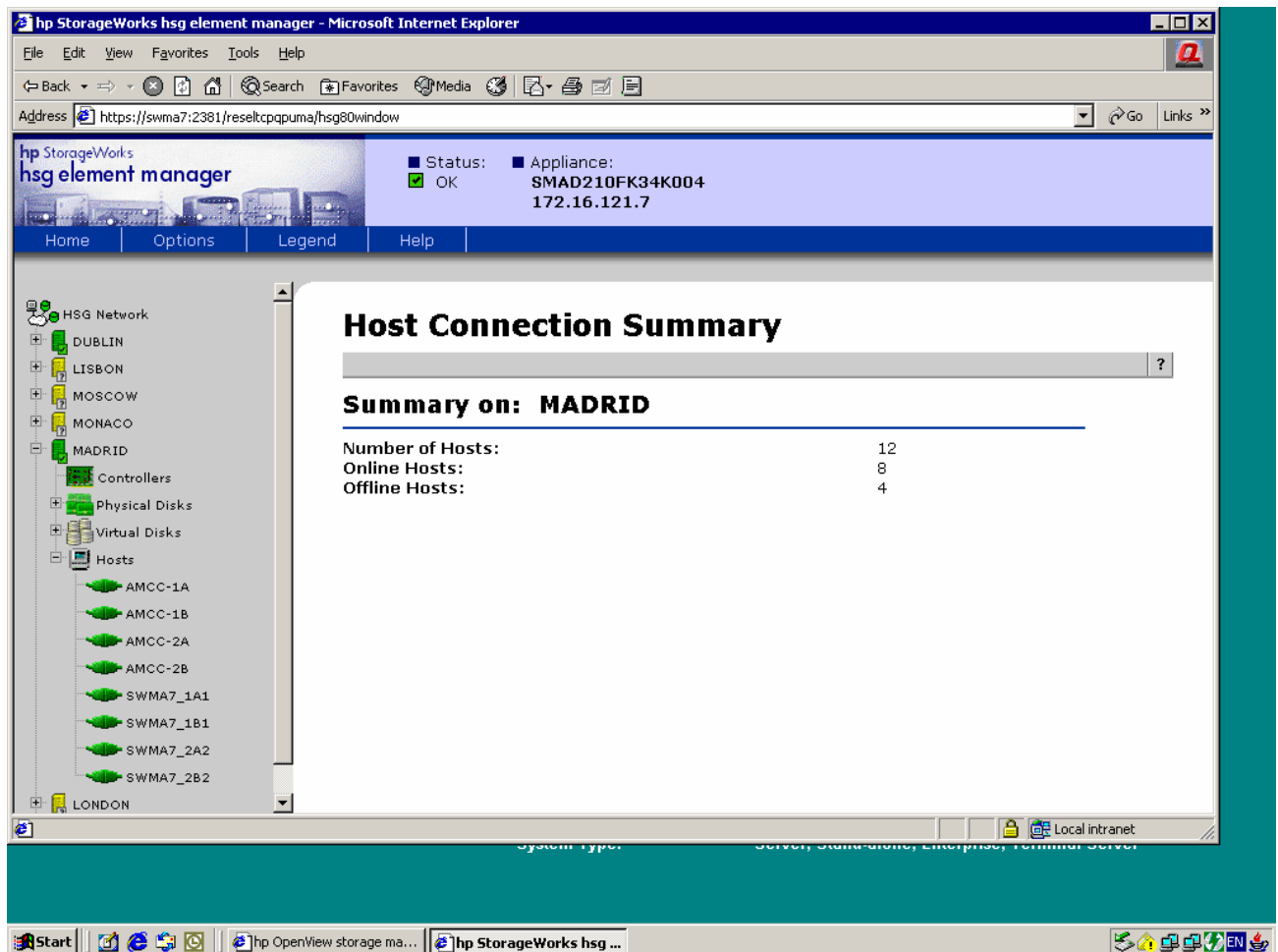
This can also be verified with the show connections command at the HSG80 CLI, as indicated in Figure 4.

Figure 4. HP StorageWorks HSG Element Manager Host connections CLI view
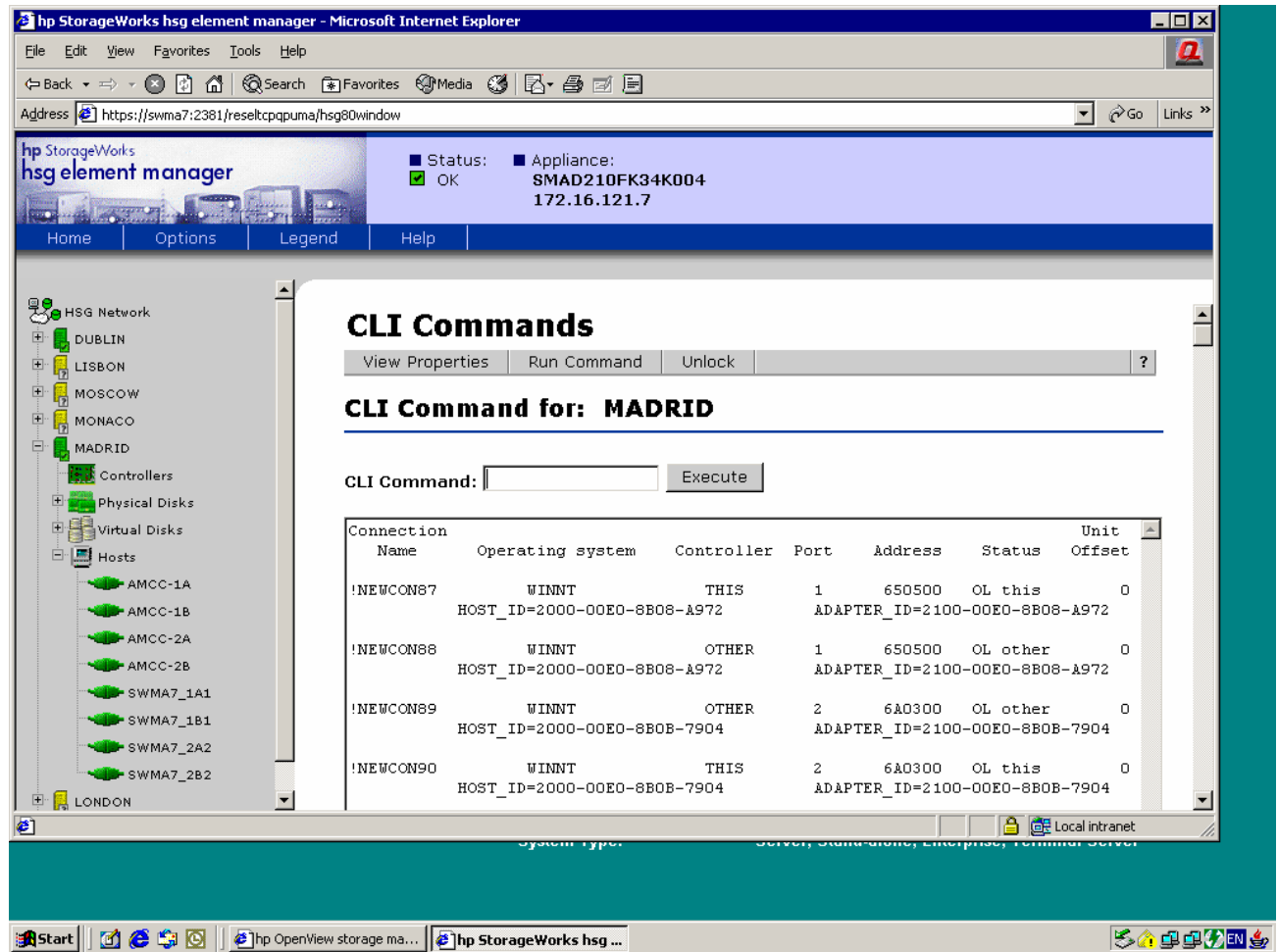
If the connections are not present, this absence must be investigated or the installation will fail as there will be no valid paths to the controllers.

If the connections are present, they have to be modified to reflect the desired names and set the operating system type to Sun and then added to the LUN presentation. The old connections should also be deleted. Following is an example of how this looks from HSG Element Manager after modifying the connections and LUN presentation. It is also possible to perform these commands directly on the HSG. It is not advisable, however, to have multiple maintenance sessions open to the HSG controllers simultaneously.

Figure 5. HP StorageWorks HSG Element Manager Host connection summary

Figure 6. HP StorageWorks HSG Element Manager virtual disk connections
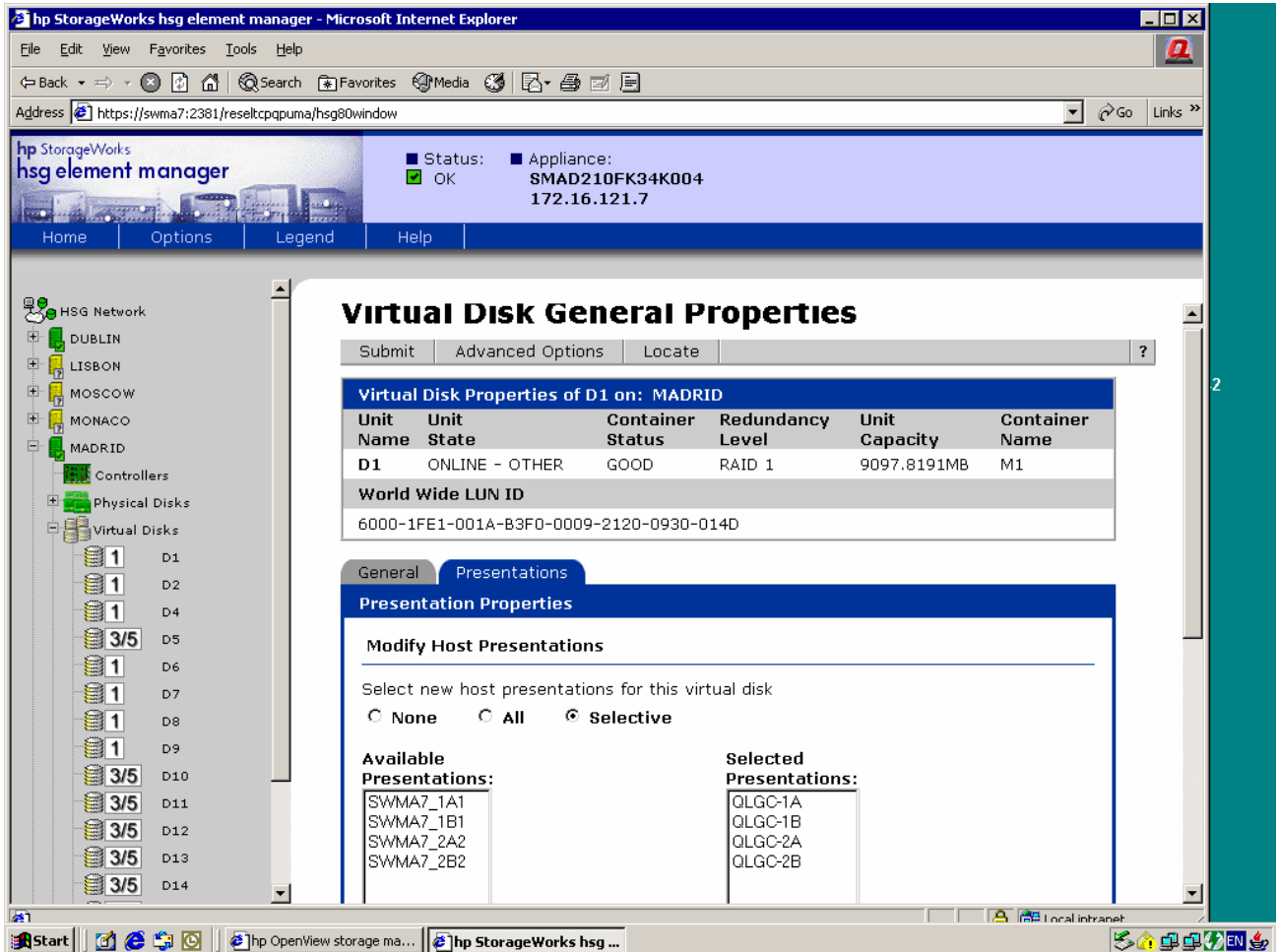
After you have completed the previous configuration steps, you may resume with the Secure Path installation and install the CPQswsp package:

13.

```
    ...
    Do you want to continue with the installation of <CPQswsp> [y,n,?] y

    Installing Storageworks Secure Path as <CPQswsp>



Installation of CPQswsp, version  3.0D.

 -- Hit RETURN to continue --  Jun 30 09:57:33 ue login: ROOT LOGIN /dev/pts/1 FROM storageb


Processing package instance <CPQswsp> from </opt/load/SWSP-V30D-full/solaris>

Storageworks Secure Path
(sparc) 3.0D
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```

```
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Installing Secure Path Version 3.0D
Logging to /var/adm/CPQswsp.ThuJun30-11:27:08.log
## Executing checkinstall script.


Found prerequisite kit(s): HPfcraid

Using </opt> as the package base directory.
## Processing package information.
## Processing system information.
   4 package pathnames are already properly installed.
## Verifying package dependencies.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

This package contains scripts which will be executed with super-user
permission during the process of installing this package.

Do you want to continue with the installation of <CPQswsp> [y,n,?] y

Installing Storageworks Secure Path as <CPQswsp>

## Executing preinstall script.
## Installing part 1 of 1.
[ verifying class <none> ]
/etc/rc0.d/K36spinit <linked pathname>
/etc/rc1.d/K36spinit <linked pathname>
/etc/rc2.d/S89spinit <linked pathname>
/etc/rcS.d/K36spinit <linked pathname>
/etc/rcS.d/S10hsx <linked pathname>
/etc/rcS.d/S44spdrv <linked pathname>
/etc/rcS.d/S65spdrv <linked pathname>
/etc/rcS.d/S89spinit <linked pathname>
## Executing postinstall script.
Adding Secure Path drivers.
Jun 30 11:27:44 ue cpqccl: cpqccl64: found array controller device at tgt0, lun0
Jun 30 11:27:44 ue cpqccl: cpqccl64: Vendor/Product ID = DEC     HSG80CCL
Jun 30 11:27:44 ue cpqccl: cpqccl66: found array controller device at tgt2, lun0
Jun 30 11:27:44 ue cpqccl: cpqccl66: Vendor/Product ID = DEC     HSG80CCL
Jun 30 11:27:47 ue cpqccl: cpqccl320:       found array controller device at tgt0, lun0
Jun 30 11:27:47 ue cpqccl: cpqccl320:       Vendor/Product ID = DEC     HSG80CCL
Jun 30 11:27:47 ue cpqccl: cpqccl322:       found array controller device at tgt2, lun0
Jun 30 11:27:47 ue cpqccl: cpqccl322:       Vendor/Product ID = DEC     HSG80CCL
Installing spmgr soft link for EVM compatibility

********************************************************************************
********************************************************************************
**                                                                          **
** Please run /opt/CPQswsp/bin/spconfig                                     **
** before rebooting your system to complete the installation of Secure Path. **
** See the spconfig man page for available options.                         **
**                                                                          **
********************************************************************************
********************************************************************************


Installation of <CPQswsp> was successful.

# /opt/CPQswsp/bin/spconfig -d 10 -v


File /var/adm/spconfig.ThuJun30-11:28:06.log is a verbose listing
of the Secure Path installation

Indicator Key:
```

```
.        Inquiry
+        Show This CLI command
-        Show Other CLI command
~        Show Connections CLI command
,        Show Units CLI command
*        Adding Extra entries
type 4 inst 0 parent "/pci@6,4000/QLGC,qla@2" device rccl0@0,0
type 4 inst 0 parent "/pci@6,4000/QLGC,qla@2" device rccl0@2,0
type 4 inst 1 parent "/pci@6,4000/QLGC,qla@3" device rccl1@0,0
type 4 inst 1 parent "/pci@6,4000/QLGC,qla@3" device rccl1@2,0
Trying to open /dev/rccl0@0,0 ...
Found DEC     HSG80CCL    5000-1FE1-001A-B3F0 ZG21300608
.HSG has get luns mode page
Using peripheral device addressing method
byte              data                                    output
------------------------------------------------------------------------
000     00 01 00 00 00 00 00 00 60 00 1f e1 00 1a b3 f0    ........`.......
016     00 09 21 20 09 30 01 4d                           ..! .0.M
WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-014D LUN: 1
Using peripheral device addressing method
byte              data                                    output
------------------------------------------------------------------------
000     00 02 00 00 00 00 00 00 60 00 1f e1 00 1a b3 f0    ........`.......
016     00 09 21 20 09 30 01 50                           ..! .0.P
WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0150 LUN: 2
Using peripheral device addressing method
byte              data                                    output
------------------------------------------------------------------------
000     00 04 00 00 00 00 00 00 60 00 1f e1 00 1a b3 f0    ........`.......
016     00 09 21 20 09 30 01 53                           ..! .0.S
WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0153 LUN: 4
Trying to open /dev/rccl0@2,0 ...
Found DEC     HSG80CCL    5000-1FE1-001A-B3F0 ZG21200930
.HSG has get luns mode page
Using peripheral device addressing method
byte              data                                    output
------------------------------------------------------------------------
000     00 01 00 00 00 00 00 00 60 00 1f e1 00 1a b3 f0    ........`.......
016     00 09 21 20 09 30 01 4d                           ..! .0.M
WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-014D LUN: 1
Using peripheral device addressing method
byte              data                                    output
------------------------------------------------------------------------
000     00 02 00 00 00 00 00 00 60 00 1f e1 00 1a b3 f0    ........`.......
016     00 09 21 20 09 30 01 50                           ..! .0.P
WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0150 LUN: 2
Using peripheral device addressing method
byte              data                                    output
------------------------------------------------------------------------
000     00 04 00 00 00 00 00 00 60 00 1f e1 00 1a b3 f0    ........`.......
016     00 09 21 20 09 30 01 53                           ..! .0.S
WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0153 LUN: 4
Trying to open /dev/rccl1@0,0 ...
Found DEC     HSG80CCL    5000-1FE1-001A-B3F0 ZG21200930
.HSG has get luns mode page
Using peripheral device addressing method
byte              data                                    output
------------------------------------------------------------------------
000     00 01 00 00 00 00 00 00 60 00 1f e1 00 1a b3 f0    ........`.......
016     00 09 21 20 09 30 01 4d                           ..! .0.M
WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-014D LUN: 1
Using peripheral device addressing method
byte              data                                    output
------------------------------------------------------------------------
000     00 02 00 00 00 00 00 00 60 00 1f e1 00 1a b3 f0    ........`.......
016     00 09 21 20 09 30 01 50                           ..! .0.P
WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0150 LUN: 2
Using peripheral device addressing method
byte              data                                    output
------------------------------------------------------------------------
000     00 04 00 00 00 00 00 00 60 00 1f e1 00 1a b3 f0    ........`.......
016     00 09 21 20 09 30 01 53                           ..! .0.S
WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0153 LUN: 4
Trying to open /dev/rccl1@2,0 ...
Found DEC     HSG80CCL    5000-1FE1-001A-B3F0 ZG21300608
.HSG has get luns mode page
Using peripheral device addressing method
```

```
byte                 data                           output
------------------------------------------------------------------------
000    00 01 00 00 00 00 00 00 60 00 1f e1 00 1a b3 f0    ........`.......
016    00 09 21 20 09 30 01 4d                            ..! .0.M
WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-014D LUN: 1
Using peripheral device addressing method
byte                 data                           output
------------------------------------------------------------------------
000    00 02 00 00 00 00 00 00 60 00 1f e1 00 1a b3 f0    ........`.......
016    00 09 21 20 09 30 01 50                            ..! .0.P
WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0150 LUN: 2
Using peripheral device addressing method
byte                 data                           output
------------------------------------------------------------------------
000    00 04 00 00 00 00 00 00 60 00 1f e1 00 1a b3 f0    ........`.......
016    00 09 21 20 09 30 01 53                            ..! .0.S
WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0153 LUN: 4
WWNN: 5000-1FE1-001A-B3F0 WWPN: 5000-1FE1-001A-B3F1
        WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-014D Target: -1 LUN: 1
                Parent: "/pci@6,4000/QLGC,qla@2"
        WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0150 Target: -1 LUN: 2
                Parent: "/pci@6,4000/QLGC,qla@2"
        WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0153 Target: -1 LUN: 4
                Parent: "/pci@6,4000/QLGC,qla@2"
WWNN: 5000-1FE1-001A-B3F0 WWPN: 5000-1FE1-001A-B3F3
        WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-014D Target: -1 LUN: 1
                Parent: "/pci@6,4000/QLGC,qla@2"
        WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0150 Target: -1 LUN: 2
                Parent: "/pci@6,4000/QLGC,qla@2"
        WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0153 Target: -1 LUN: 4
                Parent: "/pci@6,4000/QLGC,qla@2"
WWNN: 5000-1FE1-001A-B3F0 WWPN: 5000-1FE1-001A-B3F4
        WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-014D Target: -1 LUN: 1
                Parent: "/pci@6,4000/QLGC,qla@3"
        WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0150 Target: -1 LUN: 2
                Parent: "/pci@6,4000/QLGC,qla@3"
        WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0153 Target: -1 LUN: 4
                Parent: "/pci@6,4000/QLGC,qla@3"
WWNN: 5000-1FE1-001A-B3F0 WWPN: 5000-1FE1-001A-B3F2
        WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-014D Target: -1 LUN: 1
                Parent: "/pci@6,4000/QLGC,qla@3"
        WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0150 Target: -1 LUN: 2
                Parent: "/pci@6,4000/QLGC,qla@3"
        WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0153 Target: -1 LUN: 4
                Parent: "/pci@6,4000/QLGC,qla@3"
Assigned target 32 to WWPN: 5000-1FE1-001A-B3F1
Assigned target 33 to WWPN: 5000-1FE1-001A-B3F2
Assigned target 34 to WWPN: 5000-1FE1-001A-B3F3
Assigned target 35 to WWPN: 5000-1FE1-001A-B3F4
Writing conf files.
Remove wwpn 5000-1FE1-001A-B3F1 from sd.conf and platform kit
Remove wwpn 5000-1FE1-001A-B3F3 from sd.conf and platform kit
Remove wwpn 5000-1FE1-001A-B3F4 from sd.conf and platform kit
Remove wwpn 5000-1FE1-001A-B3F2 from sd.conf and platform kit
Looking up existing swsp global settings
Looking up existing swsp entries
Looking up existing hsx entries
Applying new devices
        WWNN: 5000-1FE1-001A-B3F0 WWPN: 5000-1FE1-001A-B3F1
                WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-014D
                /pci@6,4000/QLGC,qla@2 qla2300
*               WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0150
                /pci@6,4000/QLGC,qla@2 qla2300
                WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0153
                /pci@6,4000/QLGC,qla@2 qla2300
        WWNN: 5000-1FE1-001A-B3F0 WWPN: 5000-1FE1-001A-B3F3
                WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-014D
                /pci@6,4000/QLGC,qla@2 qla2300
*               WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0150
                /pci@6,4000/QLGC,qla@2 qla2300
                WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0153
                /pci@6,4000/QLGC,qla@2 qla2300
        WWNN: 5000-1FE1-001A-B3F0 WWPN: 5000-1FE1-001A-B3F4
                WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-014D
                /pci@6,4000/QLGC,qla@3 qla2300
*               WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0150
                /pci@6,4000/QLGC,qla@3 qla2300
```

```
                    WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0153
                    /pci@6,4000/QLGC,qla@3 qla2300
         WWNN: 5000-1FE1-001A-B3F0 WWPN: 5000-1FE1-001A-B3F2
                    WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-014D
                    /pci@6,4000/QLGC,qla@3 qla2300
*                   WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0150
                    /pci@6,4000/QLGC,qla@3 qla2300
                    WWID: 6000-1FE1-001A-B3F0-0009-2120-0930-0153
                    /pci@6,4000/QLGC,qla@3 qla2300

Finalize files in memory
Dumping files from memory
Free file memory
Done.
```

14. Verify that all disks are visible through format:

```
# echo | format
Searching for disks...done


#  format
Searching for disks...done


AVAILABLE DISK SELECTIONS:
       0. c0t0d0 <SUN9.0G cyl 4924 alt 2 hd 27 sec 133>
          /pci@1f,4000/scsi@3/sd@0,0
       1. c0t1d0 <SUN18G cyl 7506 alt 2 hd 19 sec 248>
          /pci@1f,4000/scsi@3/sd@1,0
       2. c4t0d0 <DEC-HSG80-V88F cyl 5255 alt 2 hd 20 sec 169>
          /swsp@0,1/ssd@0,0
       3. c4t0d1 <DEC-HSG80-V88F cyl 5255 alt 2 hd 20 sec 169>
          /swsp@0,1/ssd@0,1
       4. c4t0d2 <DEC-HSG80-V88F cyl 13996 alt 2 hd 20 sec 254>
          /swsp@0,1/ssd@0,2

Specify disk (enter its number):
```

Verify Secure Path information if all Paths are present:

```
# spmgr display
  Server:  ue    Report Created: Thu, Jun 30 11:51:48 2005
  Command: spmgr display
  = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
  Storage:  5000-1FE1-001A-B3F0
  Load Balance: Off  Auto-restore: Off
  Path Verify: On    Verify Interval: 30
  HBAs: qla2300-0  qla2300-1
  Controller:  ZG21300608, Operational
               ZG21200930, Operational
  Devices:  c4t0d0  c4t0d1  c4t0d2

  TGT/LUN   Device              WWLUN_ID                            #_Paths
    0/  0   c4t0d0              6000-1FE1-001A-B3F0-0009-2120-0930-014D   4

          Controller  Path_Instance      HBA             Preferred?  Path_Status
          ZG21300608                                     no
                      hsx-88-32-1        qla2300-0       no          Standby
                      hsx-179-33-1       qla2300-1       no          Standby

          Controller  Path_Instance      HBA             Preferred?  Path_Status
          ZG21200930                                     no
                      hsx-101-34-1       qla2300-0       no          Active
                      hsx-166-35-1       qla2300-1       no          Available


  TGT/LUN   Device              WWLUN_ID                            #_Paths
    0/  1   c4t0d1              6000-1FE1-001A-B3F0-0009-2120-0930-0150   4

          Controller  Path_Instance      HBA             Preferred?  Path_Status
          ZG21300608                                     no
                      hsx-89-32-2        qla2300-0       no          Standby
                      hsx-180-33-2       qla2300-1       no          Standby

          Controller  Path_Instance      HBA             Preferred?  Path_Status
          ZG21200930                                     no
```

```
                                      hsx-102-34-2        qla2300-0      no            Active
                                      hsx-167-35-2        qla2300-1      no            Available


                TGT/LUN    Device              WWLUN_ID                              #_Paths
                  0/  2    c4t0d2              6000-1FE1-001A-B3F0-0009-2120-0930-0153   4

                      Controller  Path_Instance      HBA               Preferred?  Path_Status
                      ZG21300608                                        no
                                  hsx-91-32-4        qla2300-0          no          Standby
                                  hsx-182-33-4       qla2300-1          no          Standby

                      Controller  Path_Instance      HBA               Preferred?  Path_Status
                      ZG21200930                                        no
                                  hsx-104-34-4       qla2300-0          no          Active
                                  hsx-169-35-4       qla2300-1          no          Available


        # cat /etc/vfstab
        #device          device           mount           FS      fsck    mount   mount
        #to mount        to fsck          point           type    pass    at boot options
        #
        #/dev/dsk/c1d0s2 /dev/rdsk/c1d0s2 /usr            ufs     1       yes     -
        fd       -        /dev/fd fd      -       no      -
        /proc    -        /proc   proc    -       no      -
        /dev/dsk/c0t0d0s1       -       -       swap    -       no      -
        /dev/dsk/c0t0d0s0       /dev/rdsk/c0t0d0s0      /       ufs     1       no      -
        /dev/dsk/c0t0d0s4       /dev/rdsk/c0t0d0s4      /usr    ufs     1       no      -
        /dev/dsk/c0t0d0s3       /dev/rdsk/c0t0d0s3      /var    ufs     1       no      -
        /dev/dsk/c0t0d0s6       /dev/rdsk/c0t0d0s6      /export/home    ufs     2       yes     -
        /dev/dsk/c0t0d0s5       /dev/rdsk/c0t0d0s5      /opt    ufs     2       yes     -
        swap     -        /tmp    tmpfs   -       yes     -
        #
        #***************HSG devices*******************************
        /dev/dsk/c4t0d1s2       /dev/rdsk/c4t0d1s2      /mnt/d1 ufs     2       yes -
        /dev/dsk/c4t0d2s2       /dev/rdsk/c4t0d2s2      /mnt/d2 ufs     2       yes -
        /dev/vx/dsk/rootdg/test0 /dev/vx/rdsk/rootdg/test0 /mnt/vx/d0 vxfs - yes suid

        # vxprint -h
        Disk group: rootdg

        TY NAME          ASSOC       KSTATE    LENGTH    PLOFFS  STATE    TUTIL0  PUTIL0
        dg rootdg        rootdg      -         -         -       -        -       -

        dm c4t0d0s2      c4t0d0s2    -         17751760  -       -        -       -
        dm c4t0d1s2      c4t0d1s2    -         17751760  -       -        -       -
        dm c4t0d2s2      c4t0d2s2    -         71084440  -       -        -       -
        dm disk01        c0t1d0s2    -         35363560  -       -        -       -

        v  rootvol2      fsgen       ENABLED   20973112  -       ACTIVE   -       -
        pl rootvol2-01   rootvol2    ENABLED   20973112  -       ACTIVE   -       -
        sd disk01-B0     rootvol2-01 ENABLED   1         0       -        -       Block0
        sd disk01-02     rootvol2-01 ENABLED   20973111  1       -        -       -

        v  swapvol       gen         ENABLED   14263224  -       ACTIVE   -       -
        pl swapvol-01    swapvol     ENABLED   14263224  -       ACTIVE   -       -
        sd disk01-01     swapvol-01  ENABLED   14263224  0       -        -       -

        v  test0         fsgen       ENABLED   10485760  -       ACTIVE   -       -
        pl test0-01      test0       ENABLED   10488140  -       ACTIVE   -       -
        sd c4t0d0s2-01   test0-01    ENABLED   10488140  0

        List disk information
        Menu: VolumeManager/Disk/ListDisk
          Use this menu operation to display a list of disks.  You can
          also choose to list detailed information about the disk at
          a specific disk device address.
        Enter disk device or "all" [<address>,all,q,?] (default: all)
        DEVICE       DISK         GROUP        STATUS
        c0t0d0       -            -            error
        c0t1d0       disk01       rootdg       online
        c4t0d0       c4t0d0s2     rootdg       online
        c4t0d1       c4t0d1s2     rootdg       online
        c4t0d2       c4t0d2s2     rootdg       online
```

15. Copy back your saved /etc/vfstab file and reboot your system to complete installation:
```
# cp -p /etc/vfstab.orig /etc/vfstab
```

16. When rebooting the system, verify that you do not see any unfamiliar storage-related error messages. The following is the extract of the boot messages. This has no VERITAS Volumes; an example follows that contains VERITAS Volumes.

```
# init 6
    INIT: New run level: 6
    The system is coming down.  Please wait.
    System services are now being stopped.
    ...
    The system is down.
    syncing file systems... done
    rebooting...
    Resetting ...
    ...
Rebooting with command: boot
Boot device: disk  File and args:
SunOS Release 5.8 Version Generic_108528-27 64-bit
Copyright 1983-2003 Sun Microsystems, Inc.  All rights reserved.
QLogic qla2300 Fibre Channel Driver v4.13.01 Instance: 0 Firmware v3.2.15
qla2300(0): QLA2300 Fibre Channel Host Adapter fcode version 1.18.5 1/24/02
QLogic qla2300 Fibre Channel Driver v4.13.01 Instance: 1 Firmware v3.2.15
qla2300(1): QLA2300 Fibre Channel Host Adapter fcode version 1.18.5 1/24/02
configuring IPv4 interfaces: hme0.
Hostname: ue
Configuring /dev and /devices
cpqccl96:       found array controller device at tgt32, lun0
cpqccl96:       Vendor/Product ID = DEC     HSG80CCL
cpqccl98:       found array controller device at tgt34, lun0
cpqccl98:       Vendor/Product ID = DEC     HSG80CCL
cpqccl353:      found array controller device at tgt33, lun0
cpqccl353:      Vendor/Product ID = DEC     HSG80CCL
cpqccl355:      found array controller device at tgt35, lun0
cpqccl355:      Vendor/Product ID = DEC     HSG80CCL
Configuring the /dev directory (compatibility devices)
Jun 30 11:39:56 spagent[129]: Starting spagent.
Secure Path Agent started.
The system is coming up.  Please wait.
checking ufs filesystems
/dev/rdsk/c4t0d2s2: is clean.
/dev/rdsk/c4t0d1s2: is clean.
/dev/rdsk/c4t0d0s2: is clean.
/dev/rdsk/c0t0d0s5: is clean.
/dev/rdsk/c0t0d0s6: is clean.
NIS domainname is stolab
starting rpc services: rpcbind keyserv done.
Setting netmask of hme0 to 255.255.0.0
Setting default IPv4 interface for multicast: add net 224.0/4: gateway ue
syslog service starting.
Print services started.
Secure Path Agent started.
volume management starting.
Jun 30 11:40:46 ue hsx: NOTICE: Path hsx-88-32-1 locked, must be quiesced prior to detach
The system is ready.

console login:
```

Example boot containing VERITAS Volumes:

```
# init 6
#
INIT: New run level: 6
The system is coming down.  Please wait.
System services are now being stopped.
Spagent received signal: 15
SPagent: accept(2) received signal: Interrupted system call
Print services stopped.
Jul  7 08:55:11 syslogd: going down on signal 15

Request is in process..
VEA Server is shutting down  .
Server was shutdown successfully
The system is down.
syncing file systems... done
rebooting...
```

```
Resetting ...

Initializing Memory

Initializing Memory
Rebooting with command: boot
Boot device: disk  File and args:
SunOS Release 5.8 Version Generic_108528-27 64-bit
Copyright 1983-2003 Sun Microsystems, Inc.  All rights reserved.
QLogic qla2300 Fibre Channel Driver v4.13.01 Instance: 0 Firmware v3.2.15
qla2300(0): QLA2300 Fibre Channel Host Adapter fcode version 1.18.5 1/24/02
QLogic qla2300 Fibre Channel Driver v4.13.01 Instance: 1 Firmware v3.2.15
qla2300(1): QLA2300 Fibre Channel Host Adapter fcode version 1.18.5 1/24/02
Starting VxVM restore daemon...
VxVM starting in boot mode...
NOTICE: vxvm:vxdmp: added disk array DISKS, datype = Disk

configuring IPv4 interfaces: hme0.
Hostname: ue
VxVM starting special volumes ( test0 )...
Configuring /dev and /devices
cpqccl96:       found array controller device at tgt32, lun0
cpqccl96:       Vendor/Product ID = DEC     HSG80CCL
cpqccl98:       found array controller device at tgt34, lun0
cpqccl98:       Vendor/Product ID = DEC     HSG80CCL
cpqccl353:      found array controller device at tgt33, lun0
cpqccl353:      Vendor/Product ID = DEC     HSG80CCL
cpqccl355:      found array controller device at tgt35, lun0
cpqccl355:      Vendor/Product ID = DEC     HSG80CCL
Configuring the /dev directory (compatibility devices)
VxVM general startup...
Jul  7 08:59:05 spagent[257]: Starting spagent.Secure Path Agent started.
The system is coming up.  Please wait.
checking ufs filesystems
/dev/rdsk/c4t0d2s2: is clean.
/dev/rdsk/c4t0d1s2: is clean.
/dev/rdsk/c0t0d0s5: is clean.
/dev/rdsk/c0t0d0s6: is clean.
NIS domainname is stolab
starting rpc services: rpcbind keyserv done.
Setting netmask of hme0 to 255.255.0.0
Setting default IPv4 interface for multicast: add net 224.0/4: gateway ue
syslog service starting.
Print services started.
Secure Path Agent started.
volume management starting.

Jul  7 08:59:32 ue hsx: NOTICE: Path hsx-88-32-1 locked, must be quiesced prior to detach

The system is ready.

console login:
```

17. Verify that all disks are visible through format:

```
# echo | format
Searching for disks...done


#  format
Searching for disks...done


AVAILABLE DISK SELECTIONS:
       0. c0t0d0 <SUN9.0G cyl 4924 alt 2 hd 27 sec 133>
          /pci@1f,4000/scsi@3/sd@0,0
       1. c0t1d0 <SUN18G cyl 7506 alt 2 hd 19 sec 248>
          /pci@1f,4000/scsi@3/sd@1,0
       2. c4t0d0 <DEC-HSG80-V88F cyl 5255 alt 2 hd 20 sec 169>
          /swsp@0,1/ssd@0,0
       3. c4t0d1 <DEC-HSG80-V88F cyl 5255 alt 2 hd 20 sec 169>
          /swsp@0,1/ssd@0,1
       4. c4t0d2 <DEC-HSG80-V88F cyl 13996 alt 2 hd 20 sec 254>
          /swsp@0,1/ssd@0,2

Specify disk (enter its number):
```

Verify Secure Path information to ensure that all paths are present:

```
# spmgr display
  Server:  ue    Report Created: Thu, Jun 30 11:51:48 2005
  Command: spmgr display
  = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
  Storage:  5000-1FE1-001A-B3F0
  Load Balance: Off  Auto-restore: Off
  Path Verify: On    Verify Interval: 30
  HBAs: qla2300-0  qla2300-1
  Controller:  ZG21300608, Operational
               ZG21200930, Operational
  Devices: c4t0d0  c4t0d1  c4t0d2

  TGT/LUN   Device          WWLUN_ID                              #_Paths
    0/  0   c4t0d0          6000-1FE1-001A-B3F0-0009-2120-0930-014D   4

          Controller  Path_Instance     HBA           Preferred?  Path_Status
          ZG21300608                                  no
                      hsx-88-32-1       qla2300-0     no            Standby
                      hsx-179-33-1      qla2300-1     no            Standby

          Controller  Path_Instance     HBA           Preferred?  Path_Status
          ZG21200930                                  no
                      hsx-101-34-1      qla2300-0     no            Active
                      hsx-166-35-1      qla2300-1     no            Available


  TGT/LUN   Device          WWLUN_ID                              #_Paths
    0/  1   c4t0d1          6000-1FE1-001A-B3F0-0009-2120-0930-0150   4

          Controller  Path_Instance     HBA           Preferred?  Path_Status
          ZG21300608                                  no
                      hsx-89-32-2       qla2300-0     no            Standby
                      hsx-180-33-2      qla2300-1     no            Standby

          Controller  Path_Instance     HBA           Preferred?  Path_Status
          ZG21200930                                  no
                      hsx-102-34-2      qla2300-0     no            Active
                      hsx-167-35-2      qla2300-1     no            Available


  TGT/LUN   Device          WWLUN_ID                              #_Paths
    0/  2   c4t0d2          6000-1FE1-001A-B3F0-0009-2120-0930-0153   4

          Controller  Path_Instance     HBA           Preferred?  Path_Status
          ZG21300608                                  no
                      hsx-91-32-4       qla2300-0     no            Standby
                      hsx-182-33-4      qla2300-1     no            Standby

          Controller  Path_Instance     HBA           Preferred?  Path_Status
          ZG21200930                                  no
                      hsx-104-34-4      qla2300-0     no            Active
                      hsx-169-35-4      qla2300-1     no            Available


# cat /etc/vfstab
#device          device          mount          FS     fsck    mount   mount
#to mount        to fsck         point          type   pass    at boot options
#
#/dev/dsk/c1d0s2 /dev/rdsk/c1d0s2 /usr          ufs    1       yes     -
fd      -       /dev/fd fd      -       no      -
/proc   -       /proc   proc    -       no      -
/dev/dsk/c0t0d0s1       -       -       swap    -       no      -
/dev/dsk/c0t0d0s0       /dev/rdsk/c0t0d0s0      /       ufs     1       no      -
/dev/dsk/c0t0d0s4       /dev/rdsk/c0t0d0s4      /usr    ufs     1       no      -
/dev/dsk/c0t0d0s3       /dev/rdsk/c0t0d0s3      /var    ufs     1       no      -
/dev/dsk/c0t0d0s6       /dev/rdsk/c0t0d0s6      /export/home    ufs     2       yes     -
/dev/dsk/c0t0d0s5       /dev/rdsk/c0t0d0s5      /opt    ufs     2       yes     -
swap    -       /tmp    tmpfs   -       yes     -
#
#***************HSG devices********************************
/dev/dsk/c4t0d1s2       /dev/rdsk/c4t0d1s2      /mnt/d1 ufs     2       yes -
/dev/dsk/c4t0d2s2       /dev/rdsk/c4t0d2s2      /mnt/d2 ufs     2       yes -
/dev/vx/dsk/rootdg/test0 /dev/vx/rdsk/rootdg/test0 /mnt/vx/d0 vxfs - yes suid

# vxprint -h
```

```
            Disk group: rootdg

            TY NAME          ASSOC        KSTATE    LENGTH    PLOFFS   STATE    TUTIL0   PUTIL0
            dg rootdg        rootdg       -         -         -        -        -        -

            dm c4t0d0s2      c4t0d0s2     -         17751760  -        -        -        -
            dm c4t0d1s2      c4t0d1s2     -         17751760  -        -        -        -
            dm c4t0d2s2      c4t0d2s2     -         71084440  -        -        -        -
            dm disk01        c0t1d0s2     -         35363560  -        -        -        -

            v  rootvol2      fsgen        ENABLED   20973112  -        ACTIVE   -        -
            pl rootvol2-01   rootvol2     ENABLED   20973112  -        ACTIVE   -        -
            sd disk01-B0     rootvol2-01  ENABLED   1         0        -        -        Block0
            sd disk01-02     rootvol2-01  ENABLED   20973111  1        -        -        -

            v  swapvol       gen          ENABLED   14263224  -        ACTIVE   -        -
            pl swapvol-01    swapvol      ENABLED   14263224  -        ACTIVE   -        -
            sd disk01-01     swapvol-01   ENABLED   14263224  0        -        -        -

            v  test0         fsgen        ENABLED   10485760  -        ACTIVE   -        -
            pl test0-01      test0        ENABLED   10488140  -        ACTIVE   -        -
            sd c4t0d0s2-01   test0-01     ENABLED   10488140  0        -        -        -


            List disk information
            Menu: VolumeManager/Disk/ListDisk
              Use this menu operation to display a list of disks.  You can
              also choose to list detailed information about the disk at
              a specific disk device address.
            Enter disk device or "all" [<address>,all,q,?] (default: all)
            DEVICE         DISK         GROUP        STATUS
            c0t0d0         -            -            error
            c0t1d0         disk01       rootdg       online
            c4t0d0         c4t0d0s2     rootdg       online
            c4t0d1         c4t0d1s2     rootdg       online
            c4t0d2         c4t0d2s2     rootdg       online
```

Glossary

FCA	Fibre Channel Adapter
LUN	Logical Unit Number. An addressable storage collection. Seen as a disk on Solaris
WWNN	World Wide Node Name, unique 64-bit address for Fibre Channel addressing of a node
WWPN	World Wide Port Name, unique 64-bit address for Fibre Channel addressing of a port

For more information

For additional information, refer to the following web resources.

Resource description	Web address
HP StorageWorks Secure Path V3.0D for Sun Solaris Installation and Reference Guide (AA-RKYDK-TE, July 2004)	http://h20000.www2.hp.com/bizsupport/TechSupport/DocumentIndex.jsp?contentType=SupportManual&prodSeriesId=315586
HP StorageWorks Secure Path V3.0D for Sun Solaris Release Notes (T3035-98201, June 2004)	http://h20000.www2.hp.com/bizsupport/TechSupport/DocumentIndex.jsp?contentType=SupportManual&prodSeriesId=315586
Secure Path Removal will render system unbootable, Customer Advisory OS050316_CW01	http://h20000.www2.hp.com/bizsupport/TechSupport/Document.jsp?objectID=PSD_OS050316_CW01
Manuals (guides, supplements, addendums, and son on)—HP StorageWorks Array Controller Software HSG v8.8	http://h18006.www1.hp.com/products/storageworks/acs/documentation.html
HP Customer Notice: AMCC JNI Adapter End Of Life Customer Communication	http://h20000.www2.hp.com/bizsupport/TechSupport/Document.jsp?objectID=PSD_CN0714W