Migrating from DS-SWSA4-xC (based on AMCC/JNI) FC Adapters to FCA2257x Adapters on Sun Solaris systems connected to HP StorageWorks EVA3000/EVA5000 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 software on which HP DS-SWSA4-PC/DS-SWSA4-SC Fibre Channel Adapters (FCAs) are based (for further details, see the customer note listed in For more information).

You must migrate from DS-SWSA4-PC/DS-SWSA4-SC FCA to FCA2257P/FCA2257S FCAs if one of the following conditions is true:

- You must install or update to Solaris 10 after HP StorageWorks Secure Path has been released for Solaris 10.
- You have a broken FCA and you cannot get a replacement FCA.
- You run into a driver problem that is not/cannot be solved by AMCC.
- You decide to migrate due to support considerations.

This document focuses on the migration from DS-SWSA4-PC/DS-SWSA4-SC FCA to FCA2257P/FCA2257S FCAs only (see Migration prerequisites). If you plan to upgrade to HP StorageWorks 4000/6000/8000 Enterprise Virtual Array (EVA4000/6000/8000) in the near future, different FCAs could be better replacement candidates. Contact your HP representative to discuss which FCA best meets your requirements in this case.

Migration prerequisites

Before performing the steps in the migration phase, perform the following:

- Analyze your storage area network (SAN) to identify the type of Fibre Channel switches, 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), cCPI, Sbus]/Fibre Channel switch) 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-Gbit FCAs to 2-Gbit FCAs, be sure you have different FC cables for SAN connectivity available (SC to LC).
- 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 during the migration process to limit the complexity.

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.

An additional consideration is custom applications that have been written with consideration of the host bus adapter (HBA) 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 which associated driver package are installed?
- Which version of Platform Kit and 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?
- Regarding World Wide Port Name/World Wide Node Name (WWPN/WWNN) of the FCAs, for which hosts have the WWPNs of the FCAs been configured on the EVA?
- 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? The values will change.

To check the 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 complete Sun StorEdge SAN 4.x software with support of Sun-branded AMCC/JNI FCAs 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 CPQfca* should be removed later after the removal of the FCA.

To check the current Secure Path version installed:

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

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

```
VERSION:  3.0D
```

In non-productive environments, you may only have one FCA connected to the HP StorageWorks Enterprise Virtual Array 3000/5000 (EVA3000/EVA5000) and no Secure Path installed. In these cases you will get:

```
ERROR: information for "CPQswsp" was not found
```

With Secure Path version 3.0D the following additional packages are or may be installed:

```
application HPfcraid        StorageWorks RAID Manager for Sun
application JNIsnia         JNI SNIA Fibre Channel HBA LIBRARY (Solaris)
application CPQhsv          Enterprise Virtual Array Installation Manager v3e
```

With Secure Path version 3.0C (SP1) the following additional packages are or may be installed:

```
application CPQhsv          Enterprise Virtual Array Installation Manager
application HPfcraid        StorageWorks RAID Manager for Sun
```

Depending on their presence, these packages must be removed after the removal of the FCA.

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 referenced in <u>For more information.</u>

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

FCA2257x installation and configuration

The FCA2257x installation and configuration consists of several steps that are described in detail in <u>Detailed example FCA2257x configuration for a given environment</u>. In short, the following steps are required:

- Verify the patch level installed and replace the patch if required as indicated in customer advisory OS050316_CW01 referenced in <u>For more information</u>
- Adjust /etc/vfstab to temporarily drop disk devices on EVA
- Shut down system
- Detach Fibre Channel cables
- Swap FCAs (Record WWPN if listed on FCA2257x)
- Re-attach Fibre Channel cables and potentially adjust port settings on the Fibre Channel switch/director
- Boot system into OpenBoot Prom and bring FCA link up to record WWPN if WWPN is not available on paper
- Boot system
- De-install Secure Path and its components
- Start with Secure Path installation (with potential additional reboot required)
- Adjust zoning for FCAs (if WWN zoning used)
- Adjust the WWPN configuration in the EVA
- Complete Secure Path installation
- Adjust /etc/vfstab to include previous disk devices on EVA
- Reboot system
- Verify that system sees all previous configurations

Detailed example analysis of a given environment

The following example illustrates the commands used and information shown for a SunFire 280R connected to an EVA5000 with two DS-SWSA4-PC cards, the Sun StorEdge SAN 4.4.x software installed, and three disks (LUNs) visible and used in a VERITAS Volume Manager configuration.

List jni packages installed:

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

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
System Configuration:  Sun Microsystems  sun4u Sun Fire 280R (UltraSPARC-III)
...
                        Bus  Max
        IO   Port Bus   Freq Bus  Dev,
Brd  Type  ID   Side Slot MHz  Freq Func State Name                                Model
----  ---- ---- ---- ---- ---- ---- ---- ----- ------------------------------- ----------------------
I/O  PCI   8    B    4    33   33   1,0  ok    pci-pci8086,b154.0/pci108e,1000   PCI-BRIDGE
...
I/O  PCI   8    B    4    33   33   3,0  ok    pci108e,1000-pci108e,1000.1       device on pci-bridge
I/O  PCI   8    B    4    33   33   3,1  ok    SUNW,qfe-pci108e,1001             SUNW,pci-qfe/pci-bridg+
I/O  PCI   8    B    3    33   33   2,0  ok    fibre-channel-pci1242,4643.0
I/O  PCI   8    B    2    33   33   3,0  ok    fibre-channel-pci1242,4643.0
```

Show all disk devices through format:

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


AVAILABLE DISK SELECTIONS:
       0. c1t0d0 <SUN18G cyl 7506 alt 2 hd 19 sec 248>
          /pci@8,600000/SUNW,qlc@4/fp@0,0/ssd@w2100002037e45fe6,0
       1. c4t0d0 <COMPAQ-HSV110(C)COMPAQ-3025 cyl 126 alt 2 hd 128 sec 128>
          /swsp@0,1/ssd@0,0
       2. c4t0d1 <COMPAQ-HSV110(C)COMPAQ-3025 cyl 254 alt 2 hd 128 sec 128>
          /swsp@0,1/ssd@0,1
       3. c4t0d2 <COMPAQ-HSV110(C)COMPAQ-3025 cyl 254 alt 2 hd 128 sec 128>
          /swsp@0,1/ssd@0,2
Specify disk (enter its number): Specify disk (enter its number):
```

Display Secure Path information:

```
# spmgr display
  Server:  sarahb    Report Created: Thu, Apr 28 16:51:37 2005
  Command: spmgr display
  = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
  Storage:  5000-1FE1-5000-D7F0
  Load Balance: Off  Auto-restore: Off
  Path Verify: On   Verify Interval: 30
  HBAs: fca-pci-0  fca-pci-1
  Controller:  P5849D19IO401E, Operational
               P5849D19IO405C, Operational
  Devices:  c4t0d0  c4t0d1  c4t0d2

  TGT/LUN   Device              WWLUN_ID                               #_Paths
    0/  0   c4t0d0              6005-08B4-0001-573F-0001-5000-0A34-0000   4

          Controller  Path_Instance      HBA             Preferred?  Path_Status
          P5849D19IO401E                                  no
                  hsx-3648-35-1      fca-pci-0       no          Standby
                  hsx-4866-34-1      fca-pci-1       no          Standby

          Controller  Path_Instance      HBA             Preferred?  Path_Status
          P5849D19IO405C                                  no
                  hsx-3851-36-1      fca-pci-0       no          Active
                  hsx-5069-37-1      fca-pci-1       no          Available
...
```

Verify if there are entries for slices of preceding disks in /etc/vfstab. In the following example only the boot disk is present and a VERITAS Volume (/dev/vx/dsk/testdg/vol01):

```
# cat /etc/vfstab
#device         device          mount           FS      fsck    mount   mount
#to mount       to fsck         point           type    pass    at boot options
fd      -       /dev/fd fd      -       no      -
/proc   -       /proc   proc    -       no      -
/dev/dsk/c1t0d0s1       -       -       swap    -       no      -
/dev/dsk/c1t0d0s0       /dev/rdsk/c1t0d0s0      /       ufs     1       no      -
/dev/dsk/c1t0d0s7       /dev/rdsk/c1t0d0s7      /export ufs     2       yes     -
swap    -       /tmp    tmpfs   -       yes     -
/dev/vx/dsk/testdg/vol01  /dev/vx/rdsk/testdg/vol01 /mnt/test        ufs     2       yes     -
```

Show VERITAS Volume Manager disk information:

```
# vxdisk list
DEVICE        TYPE      DISK         GROUP        STATUS
c1t0d0s2      sliced    -            -            error
c4t0d0s2      sliced    -            -            error
c4t0d1s2      sliced    disk01       rootdg       online
c4t0d2s2      sliced    c4t0d2s2     testdg       online
```

Display VERITAS Volume Manager configuration:

```
# vxprint -h
Disk group: rootdg

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

dm disk01         c4t0d1s2     -          4128768   -         -         -        -

Disk group: testdg

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

dm c4t0d2s2       c4t0d2s2     -          4128768   -         -         -        -

v  vol01          fsgen        ENABLED    4128768   -         ACTIVE    -        -
pl vol01-01       vol01        ENABLED    4128768   -         ACTIVE    -        -
sd c4t0d2s2-01    vol01-01     ENABLED    4128768   0         -         -        -
```

As can be seen from the previous output two EVA disks are part of the VERITAS Volume Manager configuration and the file system that is mounted during boot is on one disk.

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

```
# grep target /kernel/drv/fca*.conf | grep -v '#'
target_controllers = 126;
target35_wwpn="5000-1FE1-5000-D7F9";
target36_wwpn="5000-1FE1-5000-D7FC";
target34_wwpn="5000-1FE1-5000-D7F8";
target37_wwpn="5000-1FE1-5000-D7FD";
```

The following screen and screen extract (from HP StorageWorks Command View) shows the EVA configuration including the worldwide names that have been configured for host sarah:

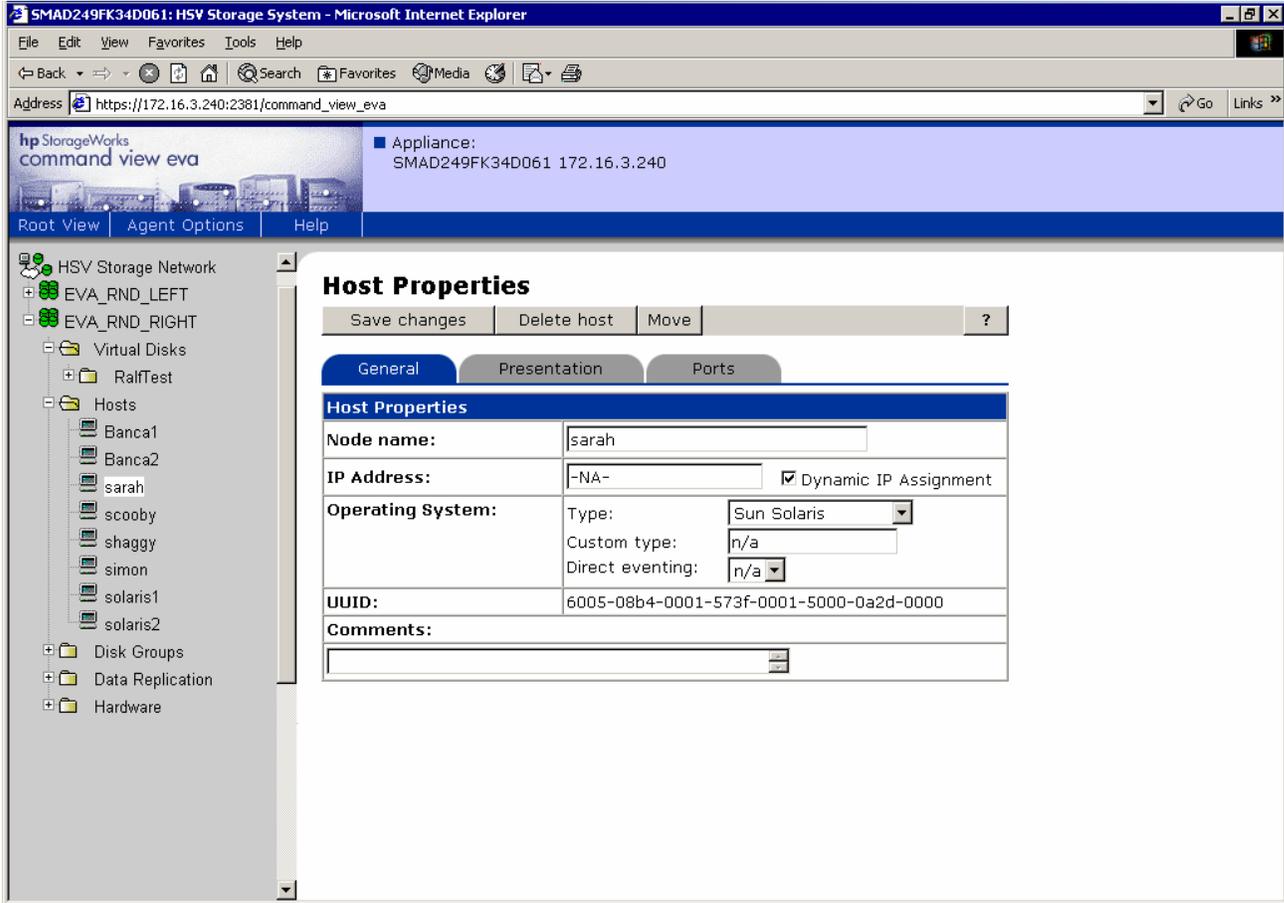**Figure 1.** HP StorageWorks Command View EVA Host Properties (general)

Figure 2. HP StorageWorks Command View EVA Host Properties extracts—Presentation and Ports

In case you configured multiple Solaris systems as one host 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 SAN 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 Brocade 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: 100000E069C044F9  WWPN: 200000E069C044F9
 [ID 451854 kern.notice] fca-pci1: Fibre Channel WWNN: 100000E069C044F9  WWPN: 200000E069C043F8
 [ID 451854 kern.notice] fca-pci0: Fibre Channel WWNN: 100000E069C044F9  WWPN: 200000E069C044F9
 [ID 451854 kern.notice] fca-pci1: Fibre Channel WWNN: 100000E069C044F9  WWPN: 200000E069C043F8
```

In case WWN (WWPN)-based zoning is used, this information also must be retrieved from the SAN. The following output shows the WWN-based zoning on SAN red and SAN blue (which consists of the EVA ports and of a DS-SWSA4-PC FCA):

Zone red-solaris-eva:

50001FE15000D7F9	# EVA Controller A Port 1
50001FE15000D7FC	# EVA Controller B Port 2
200000E069C044F9	# DS-SWSA4-PC instance fca-pci0

Zone blue-solaris-eva:

50001FE15000D7F8	# EVA Controller A Port 2
50001FE15000D7FD	# EVA Controller B Port 1
200000E069C043F8	# DS-SWSA4-PC instance fca-pci1

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 referenced in [For more information.](#)

You must 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, you must remove it (patchrm) before proceeding. Check the operating system version and presence of the offending patch and remove it:

```
# uname -a
SunOS sarahb 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.
```

Make a copy of your /etc/vfstab file and remove all entries in /etc/vfstab that refer to disks on EVA3000/EVA5000. Then shut down the system:

```
# cp –p /etc/vfstab /etc/vfstab.orig
# vi /etc/vfstab

# init s

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
```

After the system has been shut down and powered off, the AMCC/JNI FCAs must be disconnected from the SAN and the cards removed from the PCI/Sbus slots. Now the Sun FCAs must be put into the respective PCI/Sbus slots and connected with the appropriate FC cable to the SAN.

After having connected the FC cables, power on the system. At the OK prompt, display the devices:

```
ok show-devs
/pci@8,600000
/pci@8,700000
/memory-controller@0,400000
/SUNW,UltraSPARC-III@0,0
/virtual-memory
/memory@m0,0
/aliases
/options
/openprom
/chosen
/packages
/pci@8,600000/SUNW,qlc@4
/pci@8,600000/SUNW,qlc@4/fp@0,0
/pci@8,600000/SUNW,qlc@4/fp@0,0/disk
/pci@8,700000/QLGC,qla@3
/pci@8,700000/QLGC,qla@2
/pci@8,700000/pci@1
/pci@8,700000/scsi@6,1
/pci@8,700000/scsi@6
/pci@8,700000/usb@5,3
/pci@8,700000/network@5,1
/pci@8,700000/ebus@5
 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@8,700000/QLGC,qla@3" select-dev
QLogic QLA2300 Fibre Channel Host Adapter fcode version 2.00.05 01/29/03
Firmware version 3.01.20
```

Look up the WWPN of the FCA on the SAN switch/director (which is 210000E08B1751BC for qla@3 in this case). Do the same operation for the other HBA and look up the WWPN on the SAN switch/director (which is 210000E08B17D9BC for qla@2 in this case):

```
ok " /pci@8,700000/QLGC,qla@2" select-dev
QLogic QLA2300 Fibre Channel Host Adapter fcode version 2.00.05 01/29/03
Firmware version 3.01.20
```

Be sure you record the port-wwn (WWPN) before proceeding. After you have recorded the WWPN, boot the system. If you use VERITAS Volume Manager and have rootdg on the EVA disks, you will get similar error messages to the following messages, which is normal as your disks from the EVA cannot yet be seen. You will also see error messages for the fca-pci driver as the FCA for this driver is no longer present:

```
ok boot
Boot device: /pci@8,600000/SUNW,qlc@4/fp@0,0/disk@w2100002037e45fe6,0:a  File and args:
SunOS Release 5.8 Version Generic_117350-24 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
Starting VxVM restore daemon...
VxVM starting in boot mode...
vxvm:vxconfigd: ERROR: enable failed: Error in disk group configuration copies
        No valid disk found containing disk group; transactions are disabled.
vxvm:vxconfigd: FATAL ERROR: Rootdg cannot be imported during boot
configuring IPv4 interfaces: eri0 qfe3.
Hostname: sarahb
/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
drvconfig: driver failed to attach: fca-pci
/kernel/drv/sparcv9/fca-pci symbol ddi_model_convert_from multiply defined
VxVM general startup...
vxvm:vxconfigd: ERROR: enable failed: Error in disk group configuration copies
        No valid disk found containing disk group; transactions are disabled.
vxvm: Vold is not enabled for transactions
        No volumes started
The system is coming up.  Please wait.
checking ufs filesystems
/dev/rdsk/c1t0d0s7: is clean.
starting rpc services: rpcbind done.
Setting netmask of eri0 to 255.255.0.0
Setting netmask of qfe3 to 255.255.248.0
Setting default IPv4 interface for multicast: add net 224.0/4: gateway sarahb
syslog service starting.
Print services started.
May  2 08:32:40 sarahb sendmail[399]: My unqualified host name (sarahb) unknown; sleeping for retry
VxVM Provider initialization warning: Configuration daemon is not accessible
volume management starting.
vxvm:vxrecover: ERROR: IPC failure: Configuration daemon is not accessible
Starting VxVM Diskgroup Configuration Log Daemon...
Sun Microsystems Inc.   SunOS 5.8       Generic Patch   October 2001
You have new mail.
The system is ready.

sarahb console login:
```

Display system diagnostic information to show that the cards are installed properly (Sun FCAs are typically not showing a model string; the name is the same as the first compatible display for .properties at the OK prompt):

```
# /usr/platform/sun4u/sbin/prtdiag
System Configuration:  Sun Microsystems  sun4u Sun Fire 280R (UltraSPARC-III)
...
========================= IO Cards =========================


                          Bus  Max
      IO   Port Bus       Freq Bus  Dev,
Brd  Type  ID   Side Slot MHz  Freq Func State Name                                Model
---- ---- ---- ---- ---- ---- ---- ---- ----- ------------------------------- ---------------------
...
I/O   PCI    8    B    3   33   33  2,0   ok    QLGC,qla-pci1077,9.1077.9.1/sd (+
I/O   PCI    8    B    2   33   33  3,0   ok    QLGC,qla-pci1077,9.1077.9.1/sd (+
```

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
ERROR: information for "CPQhsv" was not found
ERROR: information for "CPQfcaw" was not found
ERROR: information for "JNIsnia" was not found


# 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.
```

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 FC disks are used and a certain patch level is installed as illustrated in the following example:

```
# ./install_SP
Logging installation to /var/adm/HPfcraid.MonMay02-08:41:49.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] y

Processing package instance <QLA2300> from </net/choochb/export/pkgs/EVA/sp30d/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.
devfsadm: driver failed to attach: qla2300
Warning: Driver (qla2300) successfully added to system but failed to attach

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

## Note: The Installation Manager has detected that the Sun qlc driver is bound
         to your QLogic 2x00 card. To resolve this issue, the system must be
         rebooted. After the reboot re-execute ./install_SP.
```

Reboot the system as indicated in the previous message and re-execute install_SP after the system is up and running again but do not complete the installation initially.

Note

Installation of Secure Path (CPQswsp) requires the presence of a LUN to be done successfully. Therefore, you need to ensure that both the zoning and the WWPN configuration for the EVA3000/EVA5000 have been adjusted.

```
# ./install_SP
Logging installation to /var/adm/HPfcraid.MonMay02-08:52:50.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 CPQswsp, version  3.0D.


 -- Hit RETURN to continue --
```

```
Processing package instance <CPQswsp> from </net/choochb/export/pkgs/EVA/sp30d/solaris>

Storageworks Secure Path
(sparc) 3.0D
# Copyright © 1999-2004 Hewlett-Packard Company.
#
# RESTRICTED RIGHTS: Use, duplication or disclosure by the U.S. Government
# is subject to restrictions as set forth in subparagraph ©(1)(ii) of the
# Rights in Technical Data and Computer Software clause in DFARS 252.227-7013.
#
#       Hewlett-Packard Company
#       3000 Hanover Street
#       Palo Alto, CA 94304 U.S.A.
#
# Rights for non-DOD U.S. Government Departments and Agencies are as set forth
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# Portions of this software are proprietary to and embody the confidential
# technology of Hewlett-Packard Company. Possession, use, or copying of this
# software and media is authorized only pursuant to a valid written license
# from Hewlett-Packard Company or an authorized sublicensor.

Installing Secure Path Version 3.0D
Logging to /var/adm/CPQswsp.MonMay02-08:53:24.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,?]
```

Do not continue with the installation momentarily. In case you did not look up the WWPN at the OK prompt, you may also look up 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="210000e08b17d9bc";
 [ID 358785 kern.info] qla2300-hba1-adapter-port-name="210000e08b1751bc";
```

In this example, the WWPN of the FCAs are 210000E08B17D9BC and 210000E08B1751BC. The next step is to change the SAN configuration to replace the DS-SWSA4-xx WWPNs with the FCA2257x WWPNs. The following output shows the adapted WWPN-based zoning on SAN red and SAN blue (which now includes the FCA2257x WWPNs):

Zone red-solaris-eva:

50001FE15000D7F9	# EVA Controller A Port 1
50001FE15000D7FC	# EVA Controller B Port 2
210000E08B1751BC	# FCA2257P instance qla2300–hba0

Zone blue-solaris-eva:

50001FE15000D7F8	# EVA Controller A Port 2
50001FE15000D7FD	# EVA Controller B Port 1
210000E08B17D9BC	# FCA2257P instance qla2300—hba1

After you have adapted the SAN configuration, you must change the EVA configuration to reflect the new FCAs. First add the new WWPNs with Add port, then remove the old WWPNs with Delete port so that the following FCA WWPNs are finally configured (extract from Command View).

Select the Ports tab in Host Properties of Command View as illustrated in Figure 3.

Figure 3. HP StorageWorks Command View EVA Host Properties ports
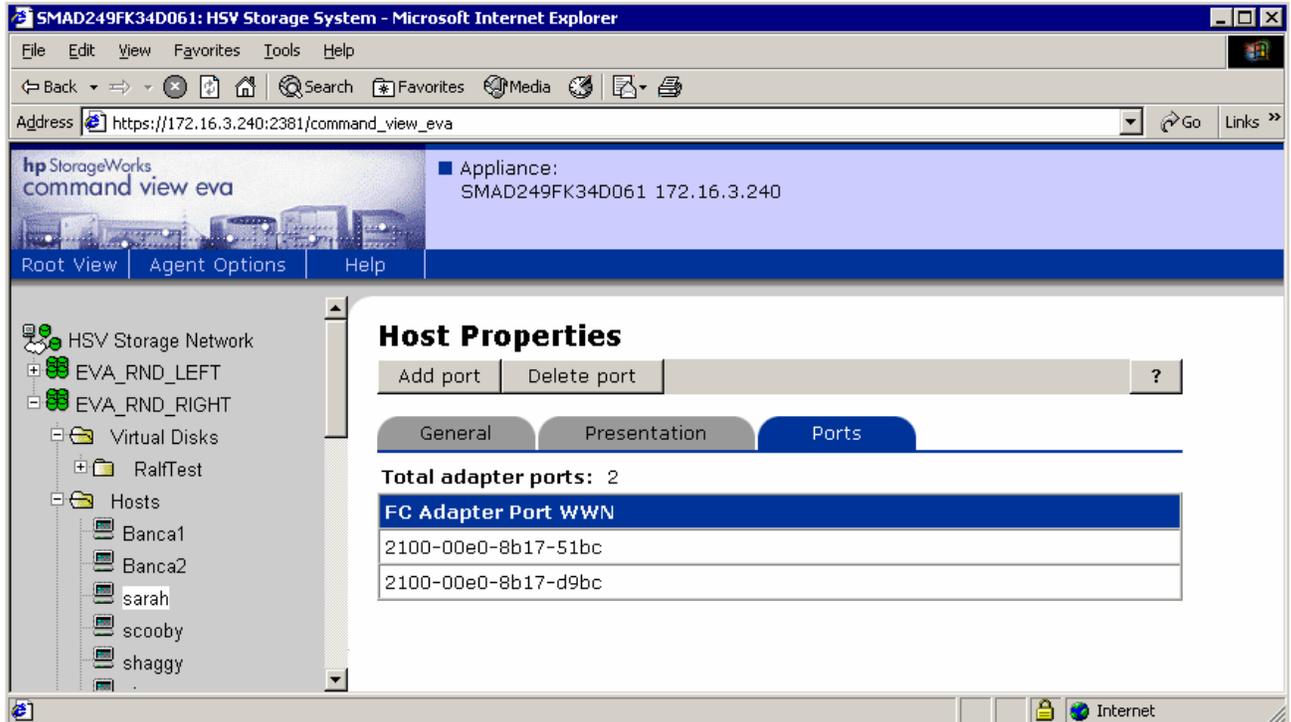
After you have completed the previous configuration steps, you may resume with the Secure Path installation and install the CPQswsp package:

```
...
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.
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

File /var/adm/spconfig.MonMay02-09:41:18.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
........
Writing conf files.
**********************************************************************************************************************
**********************************************************************************
Done.
```

Copy back your saved /etc/vfstab file and reboot your system to complete installation:

```
# cp -p /etc/vfstab.orig /etc/vfstab
# init 6
```

When rebooting the system, verify that you do not see any storage-related error messages. The following is the extract of the boot messages:

```
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: /pci@8,600000/SUNW,qlc@4/fp@0,0/disk@w2100002037e45fe6,0:a  File and args:
SunOS Release 5.8 Version Generic_117350-24 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): QLogic QLA2300 Fibre Channel Host Adapter fcode version 2.00.05 01/29/03
QLogic qla2300 Fibre Channel Driver v4.13.01 Instance: 1 Firmware v3.2.15
qla2300(1): QLogic QLA2300 Fibre Channel Host Adapter fcode version 2.00.05 01/29/03
Starting VxVM restore daemon...
VxVM starting in boot mode...
vxvm:vxconfigd: ERROR: enable failed: Error in disk group configuration copies
        No valid disk found containing disk group; transactions are disabled.
vxvm:vxconfigd: FATAL ERROR: Rootdg cannot be imported during boot

configuring IPv4 interfaces: eri0 qfe3.
Hostname: sarahb
Configuring /dev and /devices
cpqccl65:        found array controller device at tgt33, lun0
cpqccl65:        Vendor/Product ID = COMPAQ  HSV110 (C)COMPAQ
cpqccl66:        found array controller device at tgt34, lun0
cpqccl66:        Vendor/Product ID = COMPAQ  HSV110 (C)COMPAQ
cpqccl69:        found array controller device at tgt37, lun0
cpqccl69:        Vendor/Product ID = COMPAQ  HSV110 (C)COMPAQ
cpqccl320:       found array controller device at tgt32, lun0
cpqccl320:       Vendor/Product ID = COMPAQ  HSV110 (C)COMPAQ
cpqccl323:       found array controller device at tgt35, lun0
cpqccl323:       Vendor/Product ID = COMPAQ  HSV110 (C)COMPAQ
cpqccl324:       found array controller device at tgt36, lun0
cpqccl324:       Vendor/Product ID = COMPAQ  HSV110 (C)COMPAQ
Configuring the /dev directory (compatibility devices)
VxVM general startup...
NOTICE: vxvm:vxdmp: added disk array OTHER_DISKS, datype = OTHER_DISKS

Secure Path Agent started.
May  3 10:25:09 spagent[1338]: Starting spagent.
The system is coming up.  Please wait.
checking ufs filesystems
/dev/rdsk/c1t0d0s7: is clean.
starting rpc services: rpcbind done.
Setting netmask of eri0 to 255.255.0.0
Setting netmask of qfe3 to 255.255.248.0
Setting default IPv4 interface for multicast: add net 224.0/4: gateway sarahb
syslog service starting.
Print services started.
Secure Path Agent started.
volume management starting.
Starting VxVM Diskgroup Configuration Log Daemon...
The system is ready.
sarahb console login:
```

Verify that all disks are visible through format:

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


AVAILABLE DISK SELECTIONS:
       0. c1t0d0 <SUN18G cyl 7506 alt 2 hd 19 sec 248>
          /pci@8,600000/SUNW,qlc@4/fp@0,0/ssd@w2100002037e45fe6,0
       1. c4t0d0 <COMPAQ-HSV110(C)COMPAQ-3025 cyl 126 alt 2 hd 128 sec 128>
          /swsp@0,1/ssd@0,0
       2. c4t0d1 <COMPAQ-HSV110(C)COMPAQ-3025 cyl 254 alt 2 hd 128 sec 128>
          /swsp@0,1/ssd@0,1
       3. c4t0d2 <COMPAQ-HSV110(C)COMPAQ-3025 cyl 254 alt 2 hd 128 sec 128>
          /swsp@0,1/ssd@0,2
Specify disk (enter its number): Specify disk (enter its number):
```

Verify Secure Path information if all paths are present:

```
# spmgr display
  Server:  sarahb    Report Created: Tue, May 03 10:47:37 2005
  Command: spmgr display
  = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
  Storage:  5000-1FE1-5000-D7F0
  Load Balance: Off  Auto-restore: Off
  Path Verify: On    Verify Interval: 30
  HBAs: qla2300-0  qla2300-1
  Controller:  P5849D19IO401E, Operational
               P5849D19IO405C, Operational
  Devices:  c4t0d0  c4t0d1  c4t0d2

  TGT/LUN   Device         WWLUN_ID                              #_Paths
    0/  0   c4t0d0         6005-08B4-0001-573F-0001-5000-0A34-0000   4

          Controller  Path_Instance     HBA            Preferred?  Path_Status
          P5849D19IO401E                                no
                      hsx-0-34-1        qla2300-0       no          Standby
                      hsx-1218-35-1     qla2300-1       no          Standby

          Controller  Path_Instance     HBA            Preferred?  Path_Status
          P5849D19IO405C                                no
                      hsx-203-37-1      qla2300-0       no          Active
                      hsx-1421-36-1     qla2300-1       no          Available

  ...
```

Show VERITAS Volume Manager disk information:

```
# vxdisk list
DEVICE     TYPE     DISK      GROUP     STATUS
c1t0d0s2   sliced   -         -         error
c4t0d0s2   sliced   -         -         error
c4t0d1s2   sliced   disk01    rootdg    online
c4t0d2s2   sliced   c4t0d2s2  testdg    online
```

Verify that you have the correct /etc/vfstab in place and that all file systems are mounted:

```
# cat /etc/vfstab
#device         device          mount           FS      fsck    mount   mount
#to mount       to fsck         point           type    pass    at boot options
fd       -      /dev/fd  fd     -       no      -
/proc    -      /proc    proc   -       no      -
/dev/dsk/c1t0d0s1     -       -       swap    -       no      -
/dev/dsk/c1t0d0s0     /dev/rdsk/c1t0d0s0      /       ufs     1       no      -
/dev/dsk/c1t0d0s7     /dev/rdsk/c1t0d0s7      /export ufs     2       yes     -
swap     -      /tmp     tmpfs  -       yes     -
/dev/vx/dsk/testdg/vol01  /dev/vx/rdsk/testdg/vol01  /mnt/test     ufs     2       yes     -

# df -k
Filesystem         1024-blocks      Used   Available Capacity  Mounted on
/dev/dsk/c1t0d0s0     15896187    2245978   13491248    15%    /
/proc                        0          0          0     0%    /proc
fd                           0          0          0     0%    /dev/fd
mnttab                       0          0          0     0%    /etc/mnttab
swap                   1805344         16    1805328     1%    /var/run
swap                   1805440        112    1805328     1%    /tmp
/dev/dsk/c1t0d0s7       191611         45     172405     1%    /export
/dev/vx/dsk/testdg/vol01
                       2000863          9    1940829     1%    /mnt/test
```

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, July 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
HP Customer Notice: AMCC JNI Adapter End Of Life Customer Communication	http://h20000.www2.hp.com/bizsupport/TechSupport/Document.jsp?objectID=PSD_CN0714W