

Tru64 UNIX Best Practice

Using StorageWorks Command Console (SWCC) in TruCluster Server

This Best Practice describes how to install and configure the StorageWorks™ Command Console (SWCC) in a TruCluster™ Server Version 5.0A or higher environment.

Contents

Using SWCC in a TruCluster Server Environment

Is This Best Practice Right for You?	1
Before You Begin	2
StorageWorks Command Console Overview	2
Understanding the Problem	3
Does Running the Agent on Multiple Cluster Members Cause Problems?	6
Applying the Best Practice	7
Configure the Controller	8
Perform the Initial Setup First	8
Use Multiple-Bus Failover Mode	8
Verify That the HSG80/HSG60 Unit Offsets Are Zero Use SCSI-3 Mode	9
Use SCSI-3 Mode	10
Install and Run the Agent on One Cluster Member	11
Stop the Agent	20
Create the CAA Action Script	20
Create the CAA Resource	24
Register and Start the CAA Resource	25
Example of Creating, Registering, and Starting the CAA Resource	25
Viewing Events Posted by the Action Script	26
Edit the Startup Script	26
Install and Configure the SWCC Client	27
Do Not Use swcc_config to Start, Stop, or Restart	29
Verifying Success	29
Troubleshooting	31
Comments and Questions	31
Legal Notice	31

Using SWCC in a TruCluster Server Environment

The SWCC agent installation script for Tru64™ UNIX is not cluster aware. Because some installation and configuration details are unique to the TruCluster Server environment, installing and configuring SWCC in TruCluster Server requires special care.

See the Tru64 UNIX Best Practices Web page for more information about Best Practices documentation.

Is This Best Practice Right for You?

Not all Best Practices apply to all configurations, so you must be sure that it is appropriate for your system and circumstances. To use this Best Practice, you must meet the requirements described in the following table:

Requirement	Description
Operating System	Tru64 UNIX Version 5.0A or higher and TruCluster Server Version 5.0A or higher.
Supported Controllers and Minimum Firmware Versions	<p>The supported firmware has locking features that prevent data corruption resulting from access by multiple systems. The supported combinations of controllers and minimum firmware versions are as follows:</p> <ul style="list-style-type: none">• HSZ40 3.7• HSZ50 5.7• HSZ70 7.7• HSZ80 8.3-1• HSG80 8.5• HSG60 8.5L <p>Earlier versions of the firmware are explicitly not supported.</p>

Requirement	Description
Disk Space Required for Agent	2 MB free space in /tmp directory. 4 MB free space for the agent installation directory.
SWCC Kit	These kits include SWCC Version 2.3: <ul style="list-style-type: none"> • 380553-001, Tru64 UNIX Platform Solution Kit • 192211-B21, Tru64 UNIX Platform Solution Kit for MA6000
Impact on Availability	This Best Practice does not impact system availability.
Skill Level Requirements	This Best Practice is intended for experienced system administrators or programmers. You must be familiar with shell programming and have root access to the TruCluster Server cluster.

Before You Begin

Before you apply this Best Practice, you must understand some background information about how SWCC functions in a TruCluster Server environment.

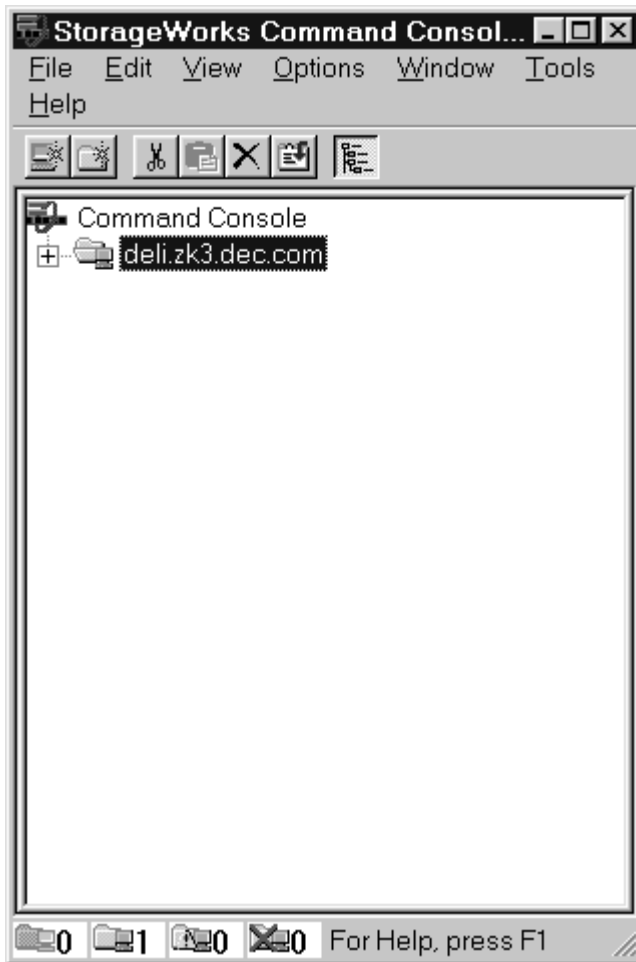
StorageWorks Command Console Overview

This section provides overview information about the StorageWorks Command Console (SWCC). If you are already familiar with the functions and features of SWCC, you can skip this section.

The SWCC is a graphical user interface (GUI) for managing StorageWorks Redundant Array of Independent Disks (RAID) array products from a client (console) running on Microsoft Windows NT 4.0 with service pack 4 or later, or on Windows 2000. With SWCC you can configure virtual disks, receive notification of events, and monitor your storage systems.

The SWCC consists of a client and an agent. The client GUI runs on Windows NT 4.0 or Windows 2000 and provides an easy method of configuring, operating, monitoring, and troubleshooting your storage subsystem. The client component (Command Console) provides the Navigation Tree, as shown in the *Example Navigation Tree Window*.

Example Navigation Tree Window



The agent is a companion program that is installed on Tru64 UNIX. The agent lets the client communicate with the storage system over a TCP/IP network.

Understanding the Problem

The SWCC Tru64 UNIX agent installation script is not cluster aware. It adds `swcc` and `S500swcc` entries to the `/sbin/init.d` and `/sbin/rc3.d` directories, respectively, and starts the `steamd` daemon on the system.

In addition, the SWCC configuration script (`/usr/opt/SWCCx/scripts/swcc_config`) and initialization file (`/usr/opt/SWCCx/etc/storage.ini`) are not context-dependent symbolic links (CDSLs) and are shared by all cluster members. Therefore, installing and configuring the SWCC agent on one cluster member configures the agent using the storage information for that cluster member, but the configuration information is then used on all cluster members.

It can be confusing if you run the SWCC agent on multiple cluster members and those members do not have the same view of the storage. For example, assume that you have used the selective storage presentation (SSP) feature (`ENABLE_ACCESS_PATH=`, `DISABLE_ACCESS_PATH=`) to control which hosts have access to disk units D8, D9, and D10. Further assume that cluster member `swiss` can access these units, and that cluster member `rye` cannot. When you use the `hwmgr` command on each member to look at the available devices, member `swiss` can see units D8, D9, and D10, which are indicated by the user-assignable identifier (`IDENTIFIER=n`), but member `rye` cannot:

```
# hostname
swiss.zk3.dec.com
# hwmgr -view devices
HWID: Device Name           Mfg      Model           Location
-----
 54: /dev/disk/dsk0c        DEC      HSG80           IDENTIFIER=1
 55: /dev/disk/dsk1c        DEC      HSG80           IDENTIFIER=2
 56: /dev/disk/dsk2c        DEC      HSG80           IDENTIFIER=3
 57: /dev/disk/dsk3c        DEC      HSG80           IDENTIFIER=4
 58: /dev/disk/dsk4c        DEC      HSG80           IDENTIFIER=5
 59: /dev/disk/dsk5c        DEC      HSG80           IDENTIFIER=6
 60: /dev/disk/dsk6c        DEC      HSG80           IDENTIFIER=7
 62: /dev/cport/scp0              HSG80CCL      bus-4-targ-0-lun-0
 68: /dev/kevm
108: /dev/disk/floppy1c          3.5in floppy  fdi0-unit-0
119: /dev/disk/cdrom1c        DEC      RRD47 (C) DEC  bus-0-targ-5-lun-0
120: /dev/disk/dsk7c        COMPAQ  BB00911CA0     bus-1-targ-0-lun-0
125: /dev/dmapi/dmapi
126: /dev/disk/dsk8c        DEC      HSG80           IDENTIFIER=8
127: /dev/disk/dsk9c        DEC      HSG80           IDENTIFIER=9
128: /dev/disk/dsk10c       DEC      HSG80           IDENTIFIER=10

# hostname
rye.zk3.dec.com
# hwmgr -view devices
HWID: Device Name           Mfg      Model           Location
-----
 4: /dev/kevm
44: /dev/disk/floppy0c          3.5in floppy  fdi0-unit-0
53: /dev/disk/cdrom0c        DEC      RRD47 (C) DEC  bus-0-targ-5-lun-0
54: /dev/disk/dsk0c        DEC      HSG80           IDENTIFIER=1
55: /dev/disk/dsk1c        DEC      HSG80           IDENTIFIER=2
56: /dev/disk/dsk2c        DEC      HSG80           IDENTIFIER=3
```

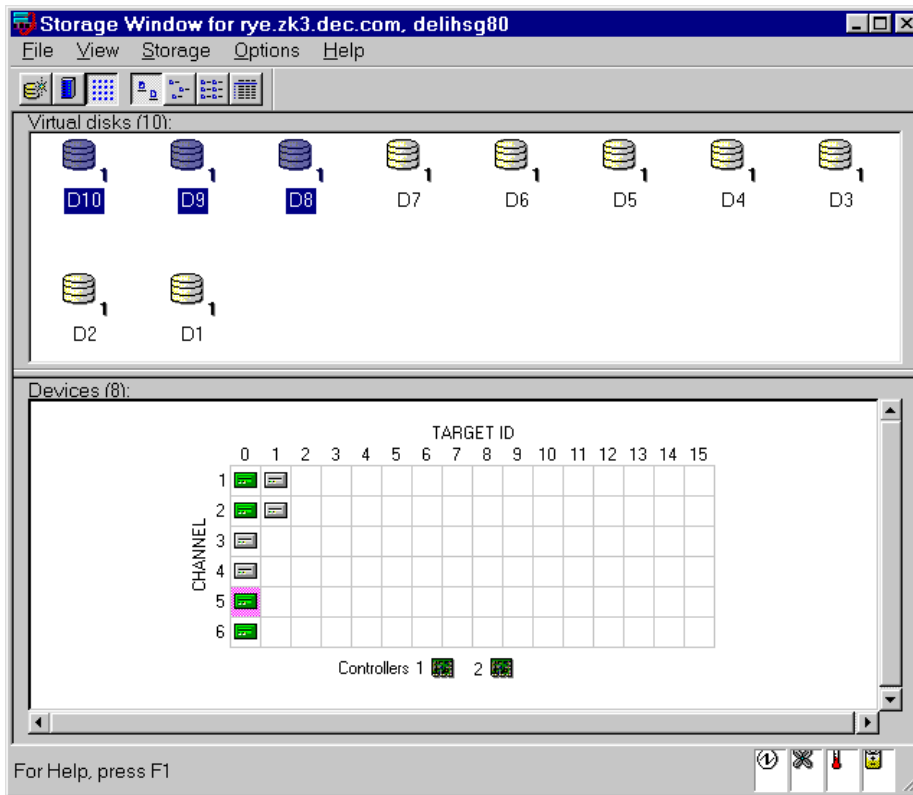
```

57: /dev/disk/dsk3c    DEC    HSG80    IDENTIFIER=4
58: /dev/disk/dsk4c    DEC    HSG80    IDENTIFIER=5
59: /dev/disk/dsk5c    DEC    HSG80    IDENTIFIER=6
60: /dev/disk/dsk6c    DEC    HSG80    IDENTIFIER=7
61: /dev/ntape/tape0   DEC    TLZ10    (C) DEC  bus-0-targ-4-lun-0
62: /dev/cport/scp0    DEC    HSG80CCL bus-4-targ-0-lun-0
125: /dev/dmapi/dmapi

```

However, because SWCC looks at storage from the controller's viewpoint, units D8, D9, and D10 appear in the Storage Window for rye even though member rye cannot directly access these units, as shown in the *Example of Confusing Storage Window Display*.

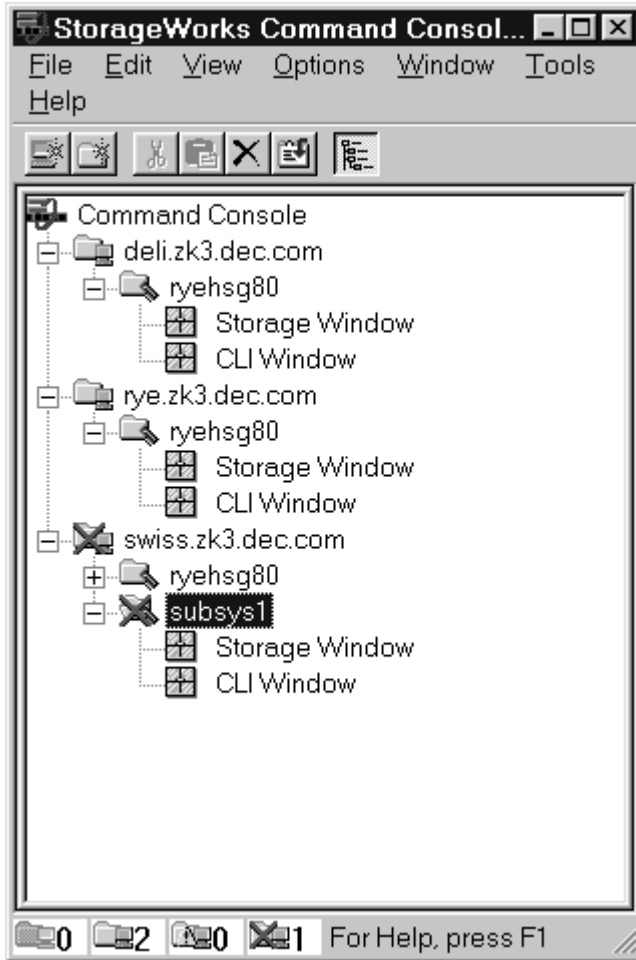
Example of Confusing Storage Window Display



As another example, if you use the `/usr/opt/SWCCx/scripts/swcc_config` configuration tool to make a change to the storage subsystem information and restart the agent on one member, you must also use the `/usr/opt/SWCCx/scripts/swcc_config`

configuration tool to restart the agent on all other members. If you do not do this, the Navigation Tree Window for the two members can show a discrepancy, as shown in the *Example of Discrepancy in Navigation Tree Window Display*.

Example of Discrepancy in Navigation Tree Window Display



Does Running the Agent on Multiple Cluster Members Cause Problems?

The required ACS firmware version for the controller implements a locking mechanism that prohibits data corruption caused by simultaneous system

access, either from cluster members or standalone systems. Your data integrity is protected.

However, running the agent on multiple cluster members can cause confusion. For example, if you make changes with the agent on one cluster member, those changes are not immediately reflected by the agents on other cluster members, so what you see in the Navigation Tree Window might not be what you expect.

Applying the Best Practice

We make the following recommendations for running SWCC in a TruCluster Server environment. The controller recommendations are specific to the HSG80, HSG60, and HSZ80 controllers.

- Configure your hardware as described in the TruCluster Server *Hardware Configuration* manual for your version of TruCluster Server.
- Use multiple-bus failover mode so that all units are available to both ports of an HSG80/HSG60/HSZ80 controller.
- Set the HSG80/HSG60 unit offsets to 0 for all connections.
- Make sure that the HSG80/HSG60/HSZ80 Command Console LUN (CCL) is enabled. We recommend that you use the controller in SCSI-3 mode so that the CCL is always located at LUN 0.
- Install the SWCC agent on one cluster member. (The SWCC installation script does not allow you to install it on more than one member at a time.)
- Use the cluster application availability (CAA) scripts described in this Best Practice to start and stop the SWCC agent, and to provide failover for the `swcc` resource.
- Edit the `/sbin/init.d/swcc` startup script to probe for a TruCluster Server environment.
- Configure the SWCC client to use a cluster alias as the address for the SWCC agent system to avoid having to change the client if the CAA `swcc` resource fails over to another member. You can use the default cluster alias, or any alias to which all of the cluster members belong.

These recommendations are described in more detail in the sections that follow.

In addition, if you used the selective storage presentation (SSP) feature (ENABLE_ACCESS_PATH=, DISABLE_ACCESS_PATH=) to control which hosts have access to disk units on the HSG80/HSG60/HSZ80 controller, set the access paths so that the appropriate cluster member connections are enabled. If you used zoning on a Fibre Channel switch, remember that this selective view of your storage is reflected in the Navigation Tree Window.

Configure the Controller

This section describes how to configure the HSG80/HSG60/HSZ80 controller for use with SWCC in a TruCluster Server environment.

Perform the Initial Setup First

The TruCluster Server *Hardware Configuration* manual for your version of TruCluster Server describes how to configure the hardware in a TruCluster Server environment. This manual includes complete information on setting up a controller in a shared SCSI or Fibre Channel environment. If the tasks are applicable to your environment, complete the tasks described in the Using Fibre Channel Storage chapter. That chapter explains the use of Fibre Channel switches and hubs, zoning switches, and SSP. It also describes example Fibre Channel configurations supported by TruCluster Server.

Use the *Hardware Configuration* manual to configure your hardware before you implement this Best Practice. Although you perform some hardware configuration as part of this Best Practice, do so after your initial hardware configuration is complete.

Use Multiple-Bus Failover Mode

In multiple-bus failover mode, all unit numbers (0 through 199) are potentially visible on all four controller ports in a dual-redundant configuration. With multiple-bus failover:

- The host controls the failover by accessing units over a different path or causing the access to the unit to be through the other controller.
- An active controller causes a failover to the other controller if the controller recognizes the loss of the switch, hub, or cable to a controller port.
- Each cluster member system can have two or more (fabric only) KGPSA host bus adapters (multiple paths to the storage units).

You set multiple-bus failover from the controller maintenance terminal with the `set multibus copy = this|other` command. Ensure that you copy the configuration information from the controller that you know has a good array configuration.

Note

When you enter the command to set multiple-bus failover and copy the configuration information to the other controller, the other controller will restart. The restart may set off the audible alarm (which you can silence by pressing the button on the environmental monitoring unit (EMU)). The command line interpreter (CLI) will display an event report, and continue reporting the condition until you clear the condition with the `clear cli` command.

```
HSG80> set multibus copy = this
HSG80> show this
Controller:
  HSG80 ZG02700662 Software V85F-0, Hardware E05
  NODE_ID           = 5000-1FE1-0006-3F10
  ALLOCATION_CLASS   = 0
  SCSI_VERSION      = SCSI-3
  Configured for MULTIBUS_FAILOVER with ZG02700619
    In dual-redundant configuration
  Device Port SCSI address 7
  Time: 01-MAR-2001 17:48:32
  Command Console LUN is lun 0 (NOIDENTIFIER)
```

Verify That the HSG80/HSG60 Unit Offsets Are Zero

In multiple-bus failover mode, the default offset is 0 for all host connections. However, if a controller pair is switched from transparent failover mode to multiple-bus failover mode, the unit offsets for transparent mode remain in effect, so a connection can have a non-zero unit offset. For each connection to your cluster, verify that the unit offset is 0. If the offsets are incorrect, set them and then restart both controllers.

```
HSG80> show connection
Connection
Name      Operating system      Controller  Port  Address      Status Offset
-----
RYE_1    TRU64_UNIX            OTHER      2     011400      OL other  0
          HOST_ID=2000-0000-C922-4AAC
          ADAPTER_ID=1000-0000-C922-4AAC
RYE_2    TRU64_UNIX            THIS      1     011400      OL this   0
          HOST_ID=2000-0000-C922-4AAC
          ADAPTER_ID=1000-0000-C922-4AAC
RYE_3    TRU64_UNIX            OTHER      1     011400      OL other  0
```

	HOST_ID=2000-0000-C922-4AAC		ADAPTER_ID=1000-0000-C922-4AAC				
RYE_4	TRU64_UNIX	THIS	2	011400	OL this	0	
	HOST_ID=2000-0000-C922-4AAC		ADAPTER_ID=1000-0000-C922-4AAC				
SWISS_1	TRU64_UNIX	OTHER	2	011200	OL other	0	
	HOST_ID=2000-0000-C924-4B7B		ADAPTER_ID=1000-0000-C924-4B7B				
SWISS_2	TRU64_UNIX	THIS	1	011200	OL this	0	
	HOST_ID=2000-0000-C924-4B7B		ADAPTER_ID=1000-0000-C924-4B7B				
SWISS_3	TRU64_UNIX	OTHER	1	011200	OL other	0	
	HOST_ID=2000-0000-C924-4B7B		ADAPTER_ID=1000-0000-C924-4B7B				
SWISS_4	TRU64_UNIX	THIS	2	011200	OL this	0	
	HOST_ID=2000-0000-C924-4B7B		ADAPTER_ID=1000-0000-C924-4B7B				

If an offset is not zero, you can change it as follows:

```
HSG80> set RYE_1 unit_offset = 0
HSG80> restart other
HSG80> restart this
```

Use SCSI-3 Mode

A logical unit number (LUN) is an address of a logical unit on a virtual disk. The Command Console LUN (CCL), also called a communications LUN, is a special logical unit number that is used to communicate with the controller to set up the SWCC.

We recommend that you use the controller's SCSI-3 mode, which forces the CCL to be always enabled, at LUN 0, and does not allow it to float.

Use the `show this` and `show other` commands to determine which SCSI mode is being used.

```
HSG80> show this
Controller:
  HSG80 ZG02700662 Software V85F-0, Hardware E05
  NODE_ID           = 5000-1FE1-0006-3F10
  ALLOCATION_CLASS   = 0
  SCSI_VERSION      = SCSI-3
  Configured for MULTIBUS_FAILOVER with ZG02700619
    In dual-redundant configuration
  Device Port SCSI address 7
  Time: 01-MAR-2001 17:48:32
  Command Console LUN is lun 0 (NOIDENTIFIER)
:
:
HSG80> show other
Controller:
  HSG80 ZG02700619 Software V85F-0, Hardware E05
  NODE_ID           = 5000-1FE1-0006-3F10
  ALLOCATION_CLASS   = 0
  SCSI_VERSION      = SCSI-3
  Configured for MULTIBUS_FAILOVER with ZG02700662
    In dual-redundant configuration
  Device Port SCSI address 6
```

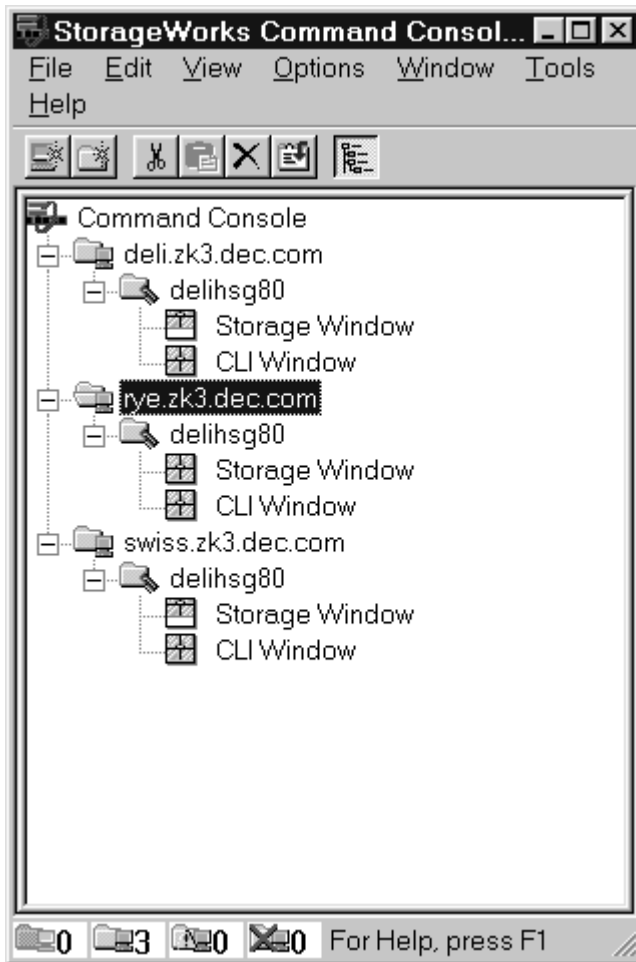
Time: 02-MAR-2001 18:07:48
Command Console LUN is lun 0 (NOIDENTIFIER)

Install and Run the Agent on One Cluster Member

We recommend that you run the SWCC agent on only one cluster member and use CAA for failover. The SWCC Navigation Tree Window treats cluster members as standalone systems. That is, the Navigation Tree Window does not include a cluster management object; you initiate all management tasks at the system (member) level. If you were to add each cluster member to the Navigation Tree Window, each member would be displayed as a standalone system and would appear to have ownership of the controllers attached to it, which might be confusing at first glance.

For example, consider the Navigation Tree Window in the *Example of Cluster Storage Display*. Although systems `rye` and `swiss` are both members of the `deli` cluster, you cannot determine that information from the display.

Example of Cluster Storage Display



Follow these steps to install the agent software on a TruCluster Server cluster member:

1. Insert the storage subsystem CD-ROM in the CD-ROM drive.
2. Mount the CD-ROM with the command:

```
# mount -r -t cdfs /dev/disk/cdrom0c /mnt
```

where *cdrom0c* is the name of the CD-ROM drive.
3. Change to the Command Console directory with the following command:

```
# cd /mnt/agent
```

- Execute the installation script with this command:

```
# setld -l .
```

- Follow the online instructions to install the software.

The agent installation procedure requires details about the configuration, including the information listed in the following table:

Property	Description
The host name of the client systems	Network names for the computers (PCs) on which the Command Console Client (the GUI) will be running.
Password	Required of the client system to gain configuration access.
Access level	The amount of control to be granted to the client system. If you want to restrict the type of access from a client, you must specify a password. The possible options are: <ul style="list-style-type: none">• 0 Overall status• 1 Detailed status• 2 Configuration and Status
Notification schemes	The mechanism by which to notify you of a change in status. The possible options are: <ul style="list-style-type: none">• 0 No notification over the network. Local notification through e-mail and an entry in the system error log file.• 1 Notification sent to the client via TCP/IP. Local notification sent through e-mail and an entry in the system error log file.• 2 Notification sent to the Simple Network Management Protocol (SNMP) station. Local notification sent through e-mail and an entry in the system error log file.• 3 Notification sent to the client via TCP/IP and to the SNMP station. Local notification sent through e-mail and an entry in the system error log file.

Property	Description
Subsystem name	A unique, user-defined name for the controller in a single-controller storage configuration, and for each controller pair in a dual-redundant configuration. Try to use a descriptive name that will clearly identify the controller or its location.
E-mail destination for notification	<p>An e-mail account that will receive error and status information. Specifying an e-mail account is optional, and requires that mail be already configured on the TruCluster Server cluster. See the TruCluster Server <i>Cluster Administration</i> manual for your version of TruCluster Server for information on configuring mail.</p> <p>The agent sends a mail notification in a form similar to the following:</p> <pre> From: StorageWorks_Agent@deli.zk3.dec.com Date: Tue, 6 Mar 2001 03:29:13 -0500 (EST) Sub: StorageWorks Agent on swiss.zk3.dec.com This is a message from your StorageWorks RAID Manager Software. A RAID system status change has been detected. Corrective action may be required! Refer to the following status information and your Agent Log file for more direction. Hostname: swiss.zk3.dec.com CRITICAL: Unable to open device - scp0 (SP_MONITOR: MonitorSubsys) </pre>
Cluster member status	<p>If you are installing this agent in a TruCluster Server environment, answer yes.</p> <p>This option invokes the <code>steamd -s</code> option, which forces the <code>steamd</code> daemon to rescan the SCSI busses on startup to detect any change in device configuration.</p>

The *Example of Installing the Agent, Using Version SWCC500*, shows a complete log of the agent installation on a TruCluster Server cluster member.

Example of Installing the Agent, Using Version SWCC500

```
# mount -r -t cdfs /dev/disk/cdrom0c /mnt
# cd /mnt/agent
# ls
SWCC500  instctrl
# setld -l .

*** Enter subset selections ***

The following subsets are mandatory and will be installed automatically
unless you choose to exit without installing any subsets:

    * SWCC Agent 2.3 For Tru64 Unix

You may choose one of the following options:

    1) ALL of the above
    2) CANCEL selections and redisplay menus
    3) EXIT without installing any subsets

Estimated free disk space(MB) in root:323.9 usr:1285.2 var:1756.5

Enter your choices or press RETURN to redisplay menus.

Choices (for example, 1 2 4-6): 1

You are installing the following mandatory subsets:

    SWCC Agent 2.3 For Tru64 Unix

You are installing the following optional subsets:

Estimated free disk space(MB) in root:323.9 usr:1285.2 var:1756.5

Is this correct? (y/n): y
setld:
Checking file system space required to install selected subsets:

File system space checked OK.

1 subsets will be installed.

Loading subset 1 of 1 ...

SWCC Agent 2.3 For Tru64 Unix
  Copying from . (disk)
  Verifying

1 of 1 subsets installed successfully.
Setting up daemon for V5.x.
NOTE: 'catman' is currently running, so I can't update
your 'whatis' database. After this installation
run 'catman -w' if you want to update 'whatis'.
```

----- CLIENT.INI -----

The 'client.ini' file stores information about PC's running the SWCC Graphical User Interface (GUI). To allow client systems running the GUI access to your StorageWorks RAID subsystem you will need to enter the following information for each client.

- * Clients hostname.
- * Clients access privilege.
- * Clients notification level.

For more information see man page steamd.8.

Press 'Return' to Continue

Adding a Client system

Enter the host name of the Client system : **adminpc.zk3.dec.com**

Enter the subsystem access privilege (which controls the level of access a client has for communicating with the storage subsystems).
The possible options are:

- 0 = Overall Status
- 1 = Detailed Status
- 2 = Configuration + Status

Enter Access Level (0, 1, 2) : **2**

The Agent server can notify a client when an error condition occurs.
Notification schemes available are:

- 0 = No Error Notification
- 1 = Notification via a TCP/IP Socket
- 2 = Notification via the SNMP protocol
- 3 = Notification via both TCP/IP and SNMP

Enter Error Notification Level (0, 1, 2, 3) : **1**

Review Client Information--

name: adminpc.zk3.dec.com
access level: 2
error notification: 1

Is this information correct? [y,n] **y**

Would you like to add another client? [y,n] **n**

----- PASSWORD -----

In order for a user of the SWCC client GUI to do remote configurations, a password is required. If this installation is superseding an older version and the old password is found; you will be asked if you want to use it. If you don't use it you will be asked for a new password

For more information see man page steamd.8.

Press 'Return' to Continue

Changing Client Access Password

Enter Password (4-16 Chars)

OR

Press 'ESC' RETURN to Quit:

Re-Enter Password:

PASSWORD CHANGED!

Press RETURN to continue:

----- STORAGE.INI -----

The 'storage.ini' file stores information about RAID devices connected to your server. The SWCC agent reads this file at startup. If this installation supersedes an older version and the storage.ini file is found; you will be given the option to use it. If not; the following information will be needed for each RAID subsystem you want the agent to interact with.

- * RAID subsystem name.
- * Monitoring Interval in seconds.

For more information see man page steamd.8.

Press 'Return' to Continue

Scanning your system. This may take awhile depending on the size of your system. Please Stand-By.

* * *

Adding a Storage Subsystem

Enter a name for the FIRST HSG80 I found on this system: **delihsg80**

The Agent monitors RAID systems at regular intervals. You specify this polling interval in seconds (0 = No monitor; 300 = every 5 minutes.)

Enter Monitoring Interval for delihsg80: **300**

Review Storage Subsystem Information--

name: delihsg80

Monitor Interval: 300

Is this information correct? [y,n] **y**

----- NOTIFY.INI -----

The 'notify.ini' file stores mail notification information. If you and/or anyone else should be notified via Email when a RAID subsystem event occurs, enter their Email addresss in the next screen. If this installation supersedes an older version and an existing notify.ini is found; you will be given the option to use it. If not; the following information will be needed for each person you want notified.

- * Email address of person to notify.
- * Notification Level.

For more information see man page steamd.8.

Press 'Return' to Continue

Change State of Email Notification

Email Notification is currently DISABLED. Whould you like to enable it?

Enter [y/n] : **y**

Email Notification is now ENABLED.

Adding a Storage Email Notification User

Enter the Email address of a person to notify : **sysadm@zk3.dec.com**

The Agent has 3 levels of mail notification ranging from Critical to Critical and Warning to Critical and Warning and Informational.

1 = Fatal Errors

- 2 = Warnings and Fatal Errors
- 3 = Information, Warnings and Fatal Errors

Enter level of notification : 1

--Review Email Notification Information--

Email: sysadm@zk3.dec.com

Level: Critical Errors Only (1)

Is this information correct? [y,n] **y**

Would you like to add another notify user? [y,n] **n**

----- toggle -----

The SWCC Agent can run on a stand alone server or in a Tru64 TruCluster environment. The next question you will need to answer determines arguments supplied to the Agent at startup. If you are installing this Agent in a TruCluster environment answer 'Y' for yes. If you are not running TruCluster answer 'N' for no.

REMEMBER: Only one instance of the Agent should run in a cluster unless all HSZ's and HSG's in the cluster are running firmware versions that support the SWCC lock bit. See your HSx documentation for more information.

For more information on switches see man page steamd.8.

Press 'Return' to Continue

Are you running the Agent in a cluster? [y,n] **y**

Setting 's' switch

SWCC500 software installed successfully.

steamd config: Device Failover disabled
steamd config: Bus Scanning enabled, forcing initial scan
Agent Version: 2.3 (Build 77)
GetStgParms>> Scanning the bus for devices

Configuring "SWCC Agent 2.3 For Tru64 Unix" (SWCC500) on member0

```
Configuring "SWCC Agent 2.3 For Tru64 Unix" (SWCC500) on member1
Configuring "SWCC Agent 2.3 For Tru64 Unix" (SWCC500) on member2
```

Stop the Agent

If the installation is successful, the installation script starts the `steamd` daemon on the cluster member. Because you will be using CAA to start and manage SWCC, you should stop this instance of the daemon to keep your post-installation testing as simple as possible.

```
# cd
# umount /mnt
# ps agx | grep steamd
540567 pts/1    S      0:00.11 /usr/opt/SWCC500/bin/steamd sF
540850 pts/1    S +    0:00.00 grep steamd
# kill 540567
```

Create the CAA Action Script

You can have CAA control the `steamd` daemon and fail it over to another member when necessary. The CAA action script invokes the startup and shutdown functions in the shell script. If the cluster member on which the `steamd` daemon is running fails or is shut down, CAA relocates the daemon entry to another member. The action script is called `swcc.scr` here, but you can choose another name.

Save the action script shown in *Complete CAA Action Script* to the `/var/cluster/caa/script/swcc.scr` file, or another filename of your choice. (We suggest that you use this action script as is until you get the `swcc` resource working.) This file must exist for the CAA commands to complete successfully. Make sure that this file is executable, because it is called by CAA.

The example script assumes that you are using the SWCC500 version of the agent. If you have a later version of the agent, as identified in the `/usr/opt` directory, update the following line in the script.

```
APPDIR="/usr/opt/SWCC500" # Application home directory
```

The example directs output to log files, using the directory `/var/cluster/caa/log`. These log files can be useful for debugging purposes. Change the directory as appropriate.

Complete CAA Action Script

```
#!/usr/bin/ksh -p
#
svcName="swcc" # Servicename
CAA_ADMIN="root" # Account to receive CAA mail
CAALOGDIR="/var/cluster/caa/log" # Directory for logfiles
ACTION=$1 # Action (either start or stop)
LOG="{CAALOGDIR}/${ACTION}_${svcName}.$$" # Destination for script output
#LOG="/dev/console"
#
PROBE_PROCS="steamd" # Processes to probe
START_APPCMD="startswcc" # Application startup cmd
STOP_APPCMD="zapdaemon steamd" # Application stop cmd
APPDIR="/usr/opt/SWCC500" # Application home directory
ADVFS_DIRS="" # Application directories to
#
# Custom procedures for SWCC
#
startswcc () {
    if [ -f ${APPDIR}/bin/steamd ]
    then
        nohup ${APPDIR}/bin/steamd SF >> ${LOG} &
    else
        echo "steamd executable missing, aborting startup..." >> ${LOG}
        return 2
    fi
}
# Application specific stuff
#
#
FUSER="/usr/sbin/fuser" # Command to use for closing
EVMPOST="/usr/bin/evmpost -p 650 -a" # EVM command to post events
#
export START_APPCMD STOP_APPCMD APPDIR ADVFS_DIRS PROBE_PROCS
#
# 8<-----8<----- End Custom variables 8<-----8<-----
#
# Static variables
#
PATH=/sbin:/usr/sbin:/usr/bin:/usr/sbin
TERM=vt100
SHELL=/usr/bin/sh
HOME=/
USER=root
LOGNAME=root
HOST=`/bin/hostname`
umask 117
cd ${DIR}
OLDPWD=`pwd`
export ACTION DIR PATH TERM SHELL HOME USER LOGNAME HOST OLDPWD
#
# Frequently used procedures
#
checkdaemon () {
    R=`ps -o command -A | grep $1 | grep -v grep | wc -l`
    return $R
}
```

```

#
killdaemon () {
    kill -TERM `ps -o pid,command -A | grep $1 | grep -v grep | awk '{print $1}'`
    while checkdaemon $1; [ $? -gt 0 ]; do
        sleep 1
    done
}
#
# Kill (-9) a given process using brutal force
#
zapdaemon () {
    for i in ${1}
    do
        kill -9 `ps -o pid,command -A | grep ${i} | grep -v grep | awk '{print $1}'`
        checkdaemon ${i}
        if [ $? -ne 0 ]; then
            echo "Retrying to kill process ${i} "
            kill -9 `ps -o pid,command -A | grep ${i} | \
                grep -v grep | awk '{print $1}'`
            checkdaemon ${i}
        fi
        if [ $? -ne 0 ]; then
            echo "Process ${i} (PID: `ps -o pid,command -A | grep ${i} | grep -v
grep | awk '{print $1}'`) \
                seems to be stubborn, please investigate"
            exit 2
        fi
    fi
done
}
#
# If failure, post EVM event
#
postevent () {
    ${EVMPOST} "*URGENT* CAA Script Failure, Cannot ${2} ${1} . Aborting ${2} "
    echo "Cannot ${2} ${1} . Aborting ${2} at `date`.`" >> ${LOG}
    echo "Cannot ${2} ${1} . Aborting ${2} at `date`.`" | \
        /usr/bin/mailx -s "*URGENT* CAA Script Failure" $CAA_ADMIN
    return 2
}
#
# Probe for a running process/application
#
probeapp () {
    ps -o command -A | grep $1 | grep -v grep > /dev/null 2>&1
    if [ $? -ne 0 ]; then
        echo "Cannot probe process ${1} . Posting EVM event."
        ${EVMPOST} "*URGENT* CAA Script Failure, Probing of process ${1} failed "
        exit 2
    fi
    echo "Application ${1} is alive"
}
#
# Main section
#
# Start section
#
case $1 in
'start')
    echo "" >> ${LOG}
    echo "Start action script for service : ${svcName} \
        \'/bin/date +%A %d %B %H:%M:%S` ``" >> ${LOG}

```

```

#
# Start SWCC
#
echo "Starting SWCC ... " >> ${LOG}
cd $APPDIR
$START_APPCMD >> ${LOG}
if [ $? -ne 0 ]; then
    postevent "SWCC startup" start
    exit 2
fi
echo "Started SWCC steamd" >> ${LOG}
#
# All done ...
#
${EVMPOST} "Start action script for service ${svcName} DONE"
echo "Start action script for service ${svcName} DONE, \
  \'/bin/date +%A %d %B %H:%M:%S\' " >> ${LOG}
echo "" >> ${LOG}
exit 0
#
;;
#
# Stop section
#
'stop')
    echo "" >> ${LOG}
    echo "Stop action script for service : ${svcName} \
  \'/bin/date +%A %d %B %H:%M:%S\' " >> ${LOG}
#
# Stop SWCC
#
echo "Stopping SWCC ... " >> ${LOG}
$STOP_APPCMD >> ${LOG}
if [ $? -ne 0 ]; then
    postevent "SWCC steamd" stop
    exit 2
fi
$STOP_APPCMD2 >> ${LOG}
if [ $? -ne 0 ]; then
    postevent "SWCC steamd" stop
    exit 2
fi
echo "SWCC steamd shutdown done ." >> ${LOG}
${EVMPOST} "Stop action script for service ${svcName} DONE"
echo "Stop action script for service ${svcName} DONE, \
  \'/bin/date +%A %d %B %H:%M:%S\' " >> ${LOG}
echo "" >> ${LOG}
exit 0
#
;;
#
# Probe if application is still alive
#
'check')
    echo "Probing SWCC daemons at \
  \'/bin/date +%A %d %B %H:%M:%S\' " >> ${LOG}
for i in ${PROBE_PROCS}
do
    probeapp ${i} >> ${LOG}
done

```

```

        echo ""Probing SWCC daemons DONE at \
            \'/bin/date +%A %d %B %H:%M:%S\"'"          >> ${LOG}
    exit 0
;;
*)      echo "usage: $0 {start|stop|check}"
        exit 1
;;
esac

```

Create the CAA Resource

Use the `caa_profile` command to create a CAA resource profile, and use the `caa_register` command to register the resource after you have created it.

This Best Practice uses `swcc` as the resource name. Use `application` as the resource type and specify the location of the action script.

If you want to start the resource automatically, regardless of whether it had been stopped or running before the reboot, set `auto_start=1`. Set `auto_start=0` if you want to start the resource only if it had been running before the reboot.

An example `caa_profile -create` command is as follows:

```
# caa_profile -create swcc -a swcc.scr -t application -o as=1
```

You can specify either a full pathname for the script file, or its filename, in which case the `caa_profile` command looks for the file in the `/var/cluster/caa/script` directory.

By default, `caa_profile -create` enables `steamd` to run on all members with a placement policy of `balanced`. The `steamd` daemon can therefore run on any member of the cluster. If this default does not meet your needs, use the `-c` option to specify the members that can host the application resource and use the `-p` option to specify a placement policy.

The default check interval is 60 seconds. The check interval is the maximum amount of time that an application can be unavailable to clients before CAA attempts to restart it. Under some circumstances, this default can lead to a situation where a resource fails and is not restarted quickly enough. You need to determine whether the 60-second check interval is suitable, and change it with the `caa_profile -update -o ci=x` command if it is not.

If the `caa_profile -create` command completes successfully, use the `caa_profile -print resource_name` command to verify the profile is as you intended:

```
# caa_profile -print swcc
NAME=swcc
TYPE=application
ACTION_SCRIPT=swcc.scr
ACTIVE_PLACEMENT=0
AUTO_START=1
CHECK_INTERVAL=60
DESCRIPTION=swcc
FAILOVER_DELAY=0
FAILURE_INTERVAL=0
FAILURE_THRESHOLD=0
HOSTING_MEMBERS=
OPTIONAL_RESOURCES=
PLACEMENT=balanced
REQUIRED_RESOURCES=
RESTART_ATTEMPTS=1
SCRIPT_TIMEOUT=60
```

Register and Start the CAA Resource

Use the `caa_register resource_name` and `caa_start resource_name` commands to register and start the resource with CAA:

```
# caa_register swcc
# caa_start swcc
```

Example of Creating, Registering, and Starting the CAA Resource

The following example creates, registers, and starts the `swcc` resource, and displays its status:

```
# caa_profile -create swcc -a swcc.scr -t application -o as=1

# caa_profile -print swcc
NAME=swcc
TYPE=application
ACTION_SCRIPT=swcc.scr
ACTIVE_PLACEMENT=0
AUTO_START=1
CHECK_INTERVAL=60
DESCRIPTION=swcc
FAILOVER_DELAY=0
FAILURE_INTERVAL=0
FAILURE_THRESHOLD=0
HOSTING_MEMBERS=
OPTIONAL_RESOURCES=
PLACEMENT=balanced
REQUIRED_RESOURCES=
RESTART_ATTEMPTS=1
SCRIPT_TIMEOUT=60
```

```

# caa_register swcc

# caa_stat swcc
NAME=swcc
TYPE=application
TARGET=OFFLINE
STATE=OFFLINE

# caa_start swcc
Attempting to start 'swcc' on member 'swiss'
Start of 'swcc' on member 'swiss' succeeded.

# caa_stat swcc
NAME=swcc
TYPE=application
TARGET=ONLINE
STATE=ONLINE on swiss

```

See `caa_profile(8)`, `caa_register(8)`, and `caa_stat(1)` for additional information.

Viewing Events Posted by the Action Script

The action script shown in *Complete CAA Action Script* posts events to indicate state transitions and failures. You can use the event viewer to monitor these events. You can launch the event viewer through SysMan Menu or SysMan Station. See `sysman(8)` for additional information.

The following example shows sample event monitor output generated by the action script:

```

-----+
EventId Pri      Timestamp  Host      Summary
-----+
-----+
234 650 14-Mar-2001 09:54:29 swiss      EVM admin msg: Start action script for service swcc DONE
231 650 14-Mar-2001 09:54:26 swiss      EVM admin msg: Stop action script for service swcc DONE
230 600 14-Mar-2001 09:54:23 swiss      CAAD[1062599]: 'swcc' on 'swiss' went OFFLINE unexpectedly
228 650 14-Mar-2001 09:54:23 swiss      EVM admin msg: *URGENT* CAA
Script Failure, Probing of process steamd failed
207 650 14-Mar-2001 09:53:21 swiss      EVM admin msg: Start action script for service swcc DONE

```

Edit the Startup Script

After you are satisfied that `swcc` is operating correctly under CAA control, edit the beginning of the `/sbin/init.d/swcc` file to test whether the `swcc` resource is registered with CAA, and exit if it is. (If you did not name the resource `swcc` when you created it, use the name you chose.)

```

#!/sbin/sh
#
/usr/bin/caa_stat -a swcc -g
is_registered=$?

if [ "$is_registered" = 0 ]

```

```

then
    exit 0
fi

trap "echo" 2
IBASE="/usr/opt/SWCC500"
PATH=/sbin:/usr/sbin:/usr/bin:/bin
export PATH
SWITCH=`cat $IBASE/etc/drs.conf`
:
:

```

The example script assumes that you are using the SWCC500 version of the agent. If you have a later version of the agent, as identified in the /usr/opt directory, update the following line in the script.

```
IBASE="/usr/opt/SWCC500"
```

Install and Configure the SWCC Client

The SWCC client runs only on Microsoft Windows NT 4.0, service pack 4 or later, or on Windows 2000. The client installation program is included on the Solution Software CD-ROM that is packaged in the Tru64 UNIX Platform Solution Kit.

Note

If a previous version of the SWCC client is already installed on the PC, you must uninstall it before beginning the installation.

To install the client:

1. Insert the Solution SW CD-ROM from the platform kit into the CD-ROM drive of the PC that will run the client.
2. If the program does not start automatically, run the setup file `D:\SWCC\CLIENT\INTEL\SETUP.EXE`, where `D:` is the location of your CD-ROM drive. The installation program is self-extracting and by default stores the client software in the `C:\Program Files\Compaq\SWCC` directory.

You are presented with a list of available client applications.

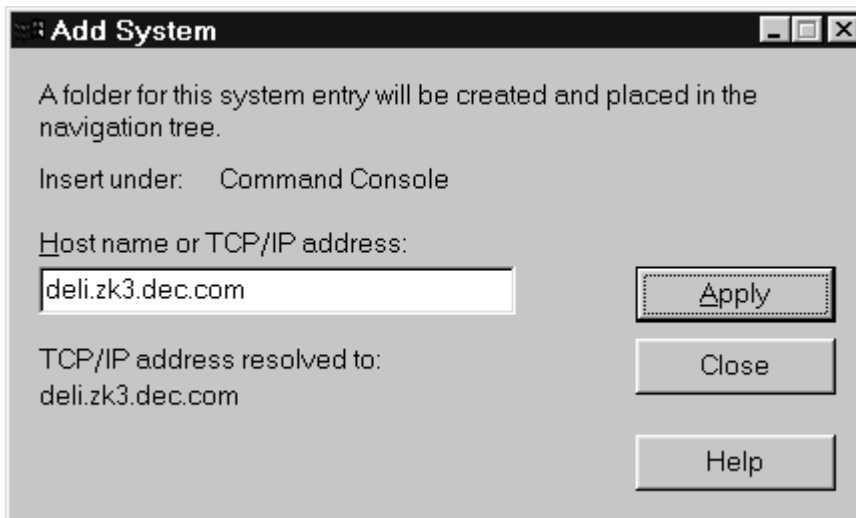
3. Choose the applications appropriate for your environment. For an HSG80/HSG60 environment, choose only the following:
 - SWCC Navigation Window
 - HSG80 Controller for ACS85 or HSG60 Controller

- (Optional) Command Line Interface for HS*

Be sure to choose HSG80 Controller for ACS85 and not HSG80 Controller.

4. Follow the installation script to complete the procedure.
5. If you are prompted to restart the system when the installation is complete, click on Yes.
6. From the Windows NT or Windows 2000 Start menu, SWCC client provides you with choices. To begin, click on StorageWorks Command Console. StorageWorks Command Console contains a Navigation Tree Window that lets you connect to, monitor, and configure many subsystems.
7. From the File menu, select Add System. The *Example Add System Window* dialog box appears.

Example Add System Window



8. Enter the name of a cluster alias and click on Apply. You can use the default cluster alias, or any alias to which all of the cluster members belong.
9. Expand the system object for the cluster (remember that SWCC treats this as system, not as a cluster). Note that any storage systems detected by the SWCC agent running on the cluster are displayed.

Do Not Use `swcc_config` to Start, Stop, or Restart

After you place the `steamd` daemon under CAA control and edit the `/sbin/init.d/swcc` file, use only CAA to start, stop, and restart SWCC.

The `/usr/opt/SWCCx/scripts/swcc_config` utility includes options to enable, disable, and restart SWCC. These options call the `/sbin/init.d/swcc` script to start, stop, and restart SWCC. If you modified the `/sbin/init.d/swcc` script as described in *Edit the Startup Script*, these commands will no longer work on a cluster member.

Note

The recommended edit to the `/sbin/init.d/swcc` file prevents the `/usr/opt/SWCCx/scripts/swcc_config` utility from starting, stopping, or restarting SWCC when the `swcc` resource is registered with CAA. However, `swcc_config` is not aware of this change, and still attempts to start, stop, and restart SWCC if you choose these options. This action results in a problem-status message.

If you did not modify the `/sbin/init.d/swcc` script as described in *Edit the Startup Script*, do not use these options because they can interfere with CAA control of the `swcc` resource. For example, if you use `/usr/opt/SWCCx/scripts/swcc_config` to stop SWCC on a cluster member, CAA then restarts the `swcc` resource on that member or another member.

Verifying Success

After you apply the Best Practice for using SWCC in a cluster, you can verify whether it was successful by performing the following steps. You will probably find it easier to call the CAA commands interactively to test your work and get immediate feedback.

In this discussion, the active member is the member on which CAA starts the resource; it may or may not be the member that you are currently using.

1. To determine whether the CAA resource is online, and, if so, on which member, use the `caa_stat` command.

If the resource is not online, use the `caa_start` command to start the CAA resource. CAA reports the member on which the resource is started, as follows:

```
# caa_start swcc
Attempting to start 'swcc' on member
'deli' Start of 'swcc' on member 'deli' succeeded.
```

2. To verify that SWCC is running on the member, use the `ps` command to determine whether the `steamd` daemon is running on the member:

```
# ps agx | grep steamd
540567 pts/1    S      0:00.11 /usr/opt/SWCC500/bin/steamd sF
540850 pts/1    S +    0:00.00 grep steamd
```

3. To verify that the SWCC agent is accessible from the client, use the client running on a PC to display information about the storage configuration. Make sure to use the cluster alias when connecting from the client.
4. To stop the CAA resource, use the `caa_stop swcc` command on any member.
5. To verify that SWCC was removed, use the `ps` command to determine if the `steamd` daemon is running on the member. There should not be a `steamd` process.

```
# ps agx | grep steamd
540850 pts/1    S +    0:00.00 grep steamd
```

6. To start the CAA resource on another member, use the `caa_start swcc` command with the `-c` option.
7. To verify that the SWCC agent is accessible from the client, use the client running on a PC to display information about the storage configuration. Make sure to use the cluster alias when connecting from the client.
8. To fail over the CAA resource to another member of your choice, use the `caa_relocate swcc` command with the `-c` option.

```
# caa_relocate swcc -c rye
Attempting to stop 'swcc' on member 'swiss'
Stop of 'swcc' on member 'swiss' succeeded.
Attempting to start 'swcc' on member 'rye'
Start of 'swcc' on member 'rye' succeeded.
```

```
# caa_stat swcc
NAME=swcc
TYPE=application
TARGET=ONLINE
STATE=ONLINE on rye
```

If the Best Practice was not successful, see *Troubleshooting* for information about identifying and solving problems.

Troubleshooting

If you determine that the Best Practice was not successful, as described in *Verifying Success*, use the following table to identify and solve problems. In this discussion, the active member is the member on which you run the CAA resource.

Problem	Possible Solutions
The <code>caa_stat</code> command indicates that the CAA resource is offline.	Use the <code>caa_start swcc</code> command interactively to start the CAA resource.
The <code>steamd</code> daemon is running on multiple members.	Use the <code>caa_stat swcc</code> to determine the cluster member on which CAA is running the resource. Then, use the <code>ps</code> command to determine the process IDs of the <code>steamd</code> daemon on the other members, and use the <code>kill</code> command to stop these processes.

Comments and Questions

We value your comments and questions on the information in this document. Please mail your comments to us at this address:

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