CSN System

Installation Guide

CSN1000 (using disk image)

Converged Services Node, Release 3.3.1
CSN System Installation Guide (CSN1000), **Edition 3**

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Preface

Scope of This Document

The main topics of this document are the procedures for installing and configuring:

- installing and configuring the Solaris operation system on the CSN Hosts and Database Servers
- installing and configuring the disk arrays
- installing and configuring the Oracle databases
- configuring the network switches and CSN Hosts for SIP high availability
- installing and configuring other third-party software
- installing the CSN software
- launching the CSN Platform
- uninstalling CSN and the databases

This document does not include:

- configuration of the signaling gateways (for more information, see the *Signaling Gateway Configuration Guide*)
- configuration of the CSN Platform using the MSE Console (for more information, see the *CSN System Configuration Guide*)

Who Should Use This Document

This document is written primarily for managers and engineers who:

- want to understand the end-to-end CSN system installation and configuration process
- install and configure the Solaris operating system on the CSN Hosts and Database Servers
- install and configure Oracle

- install other third-party software
- install and launch the CSN Platform

Where to Find Related Information

The Converged Services Node (CSN) documentation suite includes the following items:

- *CSN System Overview*
- *CSN Solutions Overview*
- *CSN System Reliability Description*
- *CSN Network Engineering Guide*
- *CSN System Installation Guide*
- *CSN System Configuration Guide*
- *CSN Provisioning Guide*
- *Console Provisioning User Guide*
- *CLI Provisioning User Guide*
- *SOAP Provisioning Client Developer Guide*
- *CSN System Administration Guide*
- *CSN Troubleshooting Guide*
- *Mobile Client Installation and User Guide*
- *Signaling Gateway Configuration Guide*

Documentation Conventions

CSN documentation uses the typefaces and symbols described below to indicate special text.

Table 1: Documentation conventions

Convention	Description	Example

`Bold fixed Courier font`	A string in bold fixed Courier font indicates one of the following:
	■ a filename or filename with path.
	■ a command.
	■ a value to be entered.
	■ a line of code.
		`install.sh`
		`/home/csn/.profile`
		`cd /home/csn`
		`5`
		`typedef string Name;`

Bold proportional font	A string in bold proportional font indicates one of the following: ■ a button in the GUI to be clicked. ■ a key on the keyboard to be pressed. ■ a field displayed in the GUI to be selected using a checkbox, option button, or drop-down list. ■ a field displayed in the GUI where data is to be entered.	Click **Add**. Press **Enter**. Select **TCP**. Enter the **Subscriber DN**.
Italics	Book title.	*System Overview*
`< >`	The item between the angle brackets is a variable. Substitute the variable with the appropriate value.	`<Host_ID>` `<ip_address>`
`[ ]`	The item between the square brackets is an optional item in a command.	`[-g]`
`|`	The items on the two sides of the pipe are mutually exclusive items in a command.	`-s | -r`

Revision History

The third edition of the *CSN System Installation Guide (CSN1000)* includes the following changes from the second edition.

Table 2: Revision history

Description	Reference
Added details for installing the disk array.	"Basic Disk Array Configuration" on page 36.
Added procedure to format the disk array.	"Installing and Formatting the Disk Array" on page 44.
Simplified procedure for installing on the Database Server, using an image disk and an automated installation script.	"Disk Mirroring and Configuration on the DB Server" on page 42.
Simplified procedure for configuring Oracle and installing the CSN databases Added details for installing ASM on the disk array.	"Configuring Oracle and Installing Databases" on page 49

Chapter 1

Hardware and Software Requirements

This chapter describes:

- the hardware requirements for the CSN Hosts and Database Servers
- the software requirements for the CSN Hosts and Database Servers

1.1   Hardware Requirements

CSN1000 is installed on two sites, with the following hardware at each site:

- a CSN Host
- a Database Server
- a disk array
- a signaling gateway
- Ethernet switches

The following diagram shows the required hardware at the two sites.
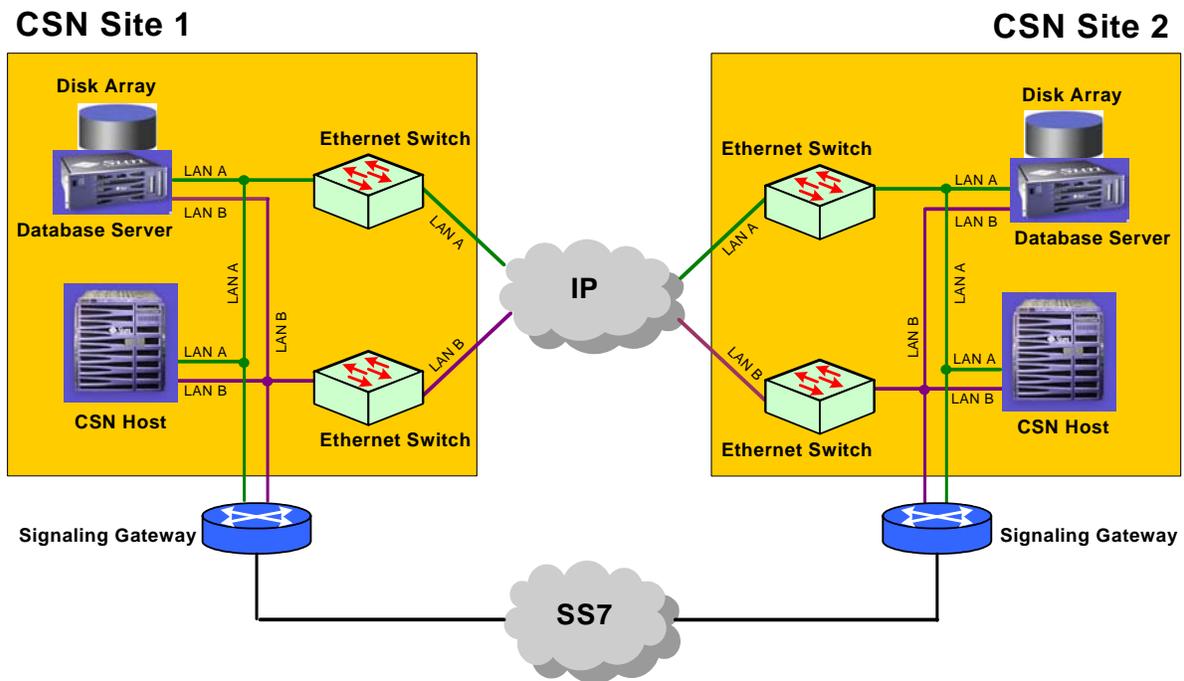
Figure 1: CSN1000 hardware at the two sites

A 19-inch, 4 post rack-mount kit is required at each CSN site. See Appendix A on page 111 for the recommended equipment layout on a standard rack.

1.1.1 CSN Host

With the exception of the database, all CSN processes run on the CSN Host.

Table 3: CSN Host requirements

Subcomponent	Description
Model	Sun Netra 1280 Server or Sun Sunfire V1280 Server ***Note:*** The Netra and Sunfire models are functionally equivalent; however, the Netra is NEBS-compliant and provides a DC-power option for carrier environments.
CPUs	UltraSPARC III Cu processors: ■ 1.2-GHz ■ 8-MB External Cache per processor Minimum: 4 processors Optional: 8 or 12 processors
RAM	8 GB (for 4 CPUs), 16 GB (for 8 CPUs), or 24 (for 12 CPUs)
Hard drives	2 x 73-GB, 10K RPM, Ultra3 SCSI disk drives
Ethernet ports	4 x 10/100/1000-Mbps ports
SCSI port	1 x Ultra3 port
DVD-ROM drive	1 x DVD-ROM Drive
System management	■ System Configuration Card ■ Sun Advanced Lights Out Manager (ALOM) software, pre-installed
Power supply	■ 4 x 1500-watt power supplies ■ Power cord kit (based on geographical location)
Operating system	See "Operating System" on page 8.
Warranty	Standard warranty
Options	■ PCI adapter with 2 x 10/100/1000 Mbps Ethernet UTP (RJ45) and 2 x Ultra Wide-SCSI interface (X4422A) ■ Solaris 10 DVD Multilingual Media Kit (latest release)

For redundancy, the CSN1000 Platform requires two CSN Hosts.

1.1.2 Database Server

The Database Server hosts the configuration database and billing database.

Table 4: Database Server requirements

Subcomponent	Description
Model	Sun Netra 240 Server or Sun Sunfire V215 Server or V240 Server ***Note:*** The Netra and Sunfire models are functionally equivalent; however, the Netra is NEBS-compliant and provides a DC-power option for carrier environments.
CPUs	UltraSparc IIIi processor: ■ 1.5 GHz ■ 1-MB L2 Cache per processor Total: 2 processors
RAM	4 GB
Hard drives	2 x 73-GB, 15K RPM, Ultra160 SCSI LVD disk drives
Ethernet ports	4 x 10/100/1000-Mbps ports
Expansion slots	■ 1 x 66-MHz, 64-bit wide PCI slot, full length ■ 2 x 33-MHz, 64-bit wide PCI slots, half length
DVD-ROM drive	1 x DVD-ROM Drive
System management	■ System Configuration Card ■ Sun Advanced Lights Out Manager (ALOM) software, pre-installed
Power supply	■ 2 x DC (1+1) power supply units OR 2 x AC (1+1) power supply units ■ Power cord kit (based on geographical location)
Operating system	See "Operating System" on page 8.
Warranty	Standard warranty
Options	■ Solaris 10 DVD Multilingual Media Kit (latest release)

For redundancy, the CSN1000 Platform requires two Database Servers.

1.1.3 Disk Array

The disk array stores customer data.

Table 5: Disk array requirements

Subcomponent	Description
Model	Sun StorEdge 3320 SCSI array, rack ready
Controller	1 x RAID controller
Cache	512 MB
SCSI drives	■ 365-GB (5 x 73-GB, 10K RPM disks) ■ 1 x Ultra320 SCSI-JBOD
Power supply	2 x AC power supplies
System management	■ Sun StorEdge Configuration Service Software ■ Enterprise StorEdge Management Base Applications Software Kit for Sun StorEdge Arrays
Others	■ 2 x LVD host connectors ■ 2 x fans ■ Sun StorEdge 3000 Universal Rack/Sliding Rail Kit, 2U
Warranty	Standard warranty

For redundancy, the CSN1000 Platform requires two disk arrays, one for each Database Server.

1.1.4 Signaling Gateway

A Signaling Gateway (SG) acts as a gateway to transport MTP (Message Transfer Part) messages between CSN and the service provider's SS7 network. For redundancy, all NSEs (Network Services Environments) register themselves to receive traffic for their given point code with all SGs.

CSN supports a standards-compliant SIGTRAN interface (RFC 2719) and has been tested against the Cisco ITP 7301.

1.1.5 Network Equipment

The Ethernet switches are NEBS-certified switches.

Table 6: Disk array requirements

Subcomponent	Description
Model	Cisco Catalyst 3560
Ports	24 x 10/100/1000 Mbps ports
Expansion slots	2 high-speed slots
Others	Dual A/B power

1.2   Software Requirements

For the purpose of installation, NewStep provides three DVDs:

- Solaris DVD

  Includes the Solaris 10 operating system from Sun Microsystems.

- NewStep DVD

  Includes CSN software, Oracle software, recommended Solaris patches, and other third-party software.

- NewStep installation image disk

  Includes the pre-installation of Solaris, Oracle, and other required third-party software (for installation on the Database Server).

This section describes the pieces of software that are required for installation, their targets of installation (CSN Hosts and/or Database Servers), and from where are they available.

1.2.1   CSN Software

CSN software is required for each of the two CSN Hosts and two Database Servers.

Table 7: CSN software requirements

Software	Version	Target		Available from
		CSN Host	DB Server	
CSN software	3.3.1	✓	✓	NewStep DVD

1.2.2 Operating System

An operating system is required for each of the two CSN Hosts and two Database Servers.

Table 8: Operating system requirements

Software	Version	Target CSN Host	Target DB Server	Available from
Solaris 10	11/06	✓		Solaris DVD
Solaris 10 recommended patches		✓		NewStep DVD
Solaris 10 and recommended patches	11/06		✓	NewStep installation image disk

1.2.3 RDBMS

An RDBMS is required for each of the two Database Servers (Oracle Server) and each of the two CSN Hosts (Oracle Client). The Oracle edition required is Oracle Standard Edition (SE).

Table 9: RDBMS software requirements

Software	Version	Target CSN Host	Target DB Server	Available from
Oracle 10g Server (10gr2_db_sol.cpio)	2 (10.2)		✓	NewStep installation image disk
Oracle 10g Client (10gr2_client_sol.cpio)	2 (10.2)	✓		NewStep DVD
NewStep custom scripts for Oracle installation (pfile.tar)		✓	✓	NewStep installation image disk

1.2.4 Additional Third-Party Software

Additional third-party software is required for each of the two CSN Hosts and two Database Servers.

Table 10: Additional third-party software requirements

Software	Version	Target		Available from
		CSN Host	DB Server	
Java components (JDK and SDK), 32 and 64 bit	5.0	✓	✓	NewStep DVD * (Java package)
ASN.1 Compiler	5.80	✓	✓	NewStep DVD * (ASN.1 package)
Java Dynamic Management Kit (JMDK)	5.0	✓	✓	NewStep DVD * (JDMK package)
Apache Tomcat	5.5.15	✓	✓	NewStep DVD * (Tomcat package)
Oracle Database JDBC Diver (Ojdbc14.jar)	Type 4 driver for use with JDK 1.4	✓		
Xalan for Java (xalan.jar)	2.6	✓		
Jakarta Commons		✓		NewStep DVD (Extralib package)
■ commons-collections.jar	3.1			
■ commons-pool.jar	1.2			
■ commons-dbcp.jar	1.2.1			
■ commons-httpclient.jar	3.0			
■ commons-logging.jar	1.2			
Cisco Call Manager JTAPI Package (jtapi.tar and jtapi.ini)	4.1	✓		
Java XML Parser (jdom.jar)	1.2	✓		
GNU/SMC tar package	1.15.1	✓	✓	NewStep DVD * (GNU/SMC package)

Table 10: Additional third-party software requirements (Continued)

Software	Version	Target		Available from
		CSN Host	DB Server	
csnSetTnc script		✓		NewStep DVD (TNC package)
Borland VisiBroker (only if CORBA installation is needed)	6.5	✓		NewStep DVD (VisiBroker package)

* All required additional third-party software for the Database Server is included in the NewStep installation image disk.

Chapter 2

Summary of Installation and Configuration

This chapter describes:

■ includes a flowchart of the end-to-end process for installing and configuring the CSN Platform

■ describes briefly the end-to-end process

■ includes a more detailed flowchart of the process for installing and configuring third-party software

2.1   Flowchart of the End-to-End Process

The flowchart below shows the major steps required to install and configure the CSN1000 Platform.
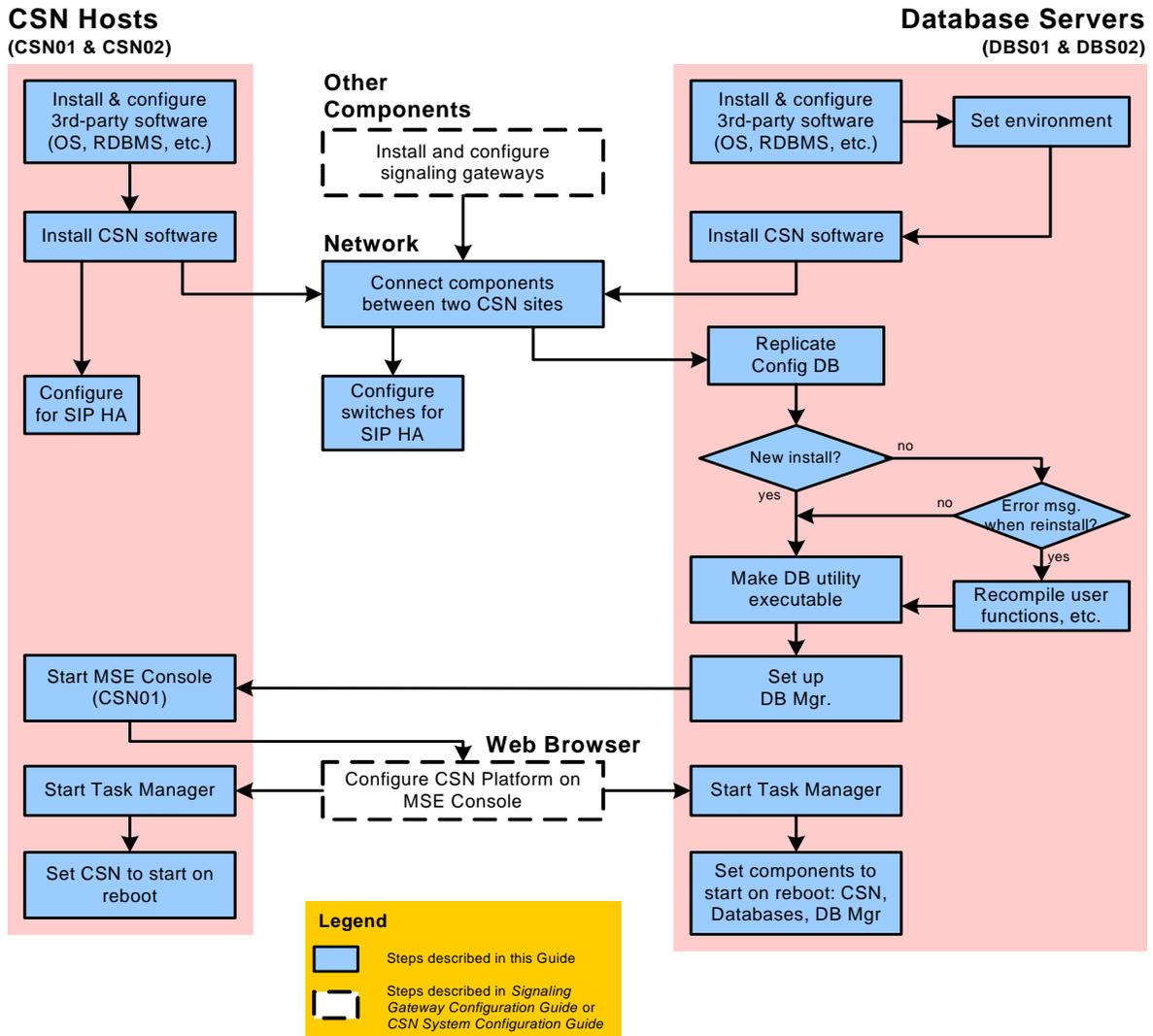
Figure 2: Flowchart: End-to-end installation of CSN1000

2.2   Brief Description of the End-to-End Process

The following subsections briefly describe the end-to-end process of installation and configuration, as shown in the "Flowchart of the End-to-End Process" on page 12.

2.2.1   Installing and Configuring Third-Party Software

Before you install the CSN software, you must install and configure the required third-party software on each of the two CSN Hosts and Database Servers.

Table 11: Information on third-party software installation and configuration

Topic	See
3rd-party software requirements	"Software Requirements" on page 4.
Summary of 3rd-party software installation and configuration	"Installation and Configuration on the CSN Host" on page 15. "Installation and Configuration on a Disk Array and DB Server" on page 17.
Details of 3rd-party software installation and configuration	"Installing and Configuring Solaris on the CSN Host" on page 11. "Configuring the Disk Array" on page 31. "Installing and Configuring Solaris the Database Server" on page 41. "Installing Additional Third-Party Software" on page 31. "Installing Oracle" on page 49.

2.2.2   Setting the Environment

After installing and configuring the required third-party software, you must create the CSN user and set up the appropriate installation environment at the two Database Servers, before you can install the CSN software.

For details on these tasks, see "Setting the Environment" on page 77.

2.2.3   Installing the CSN Software

The CSN software is the main software for the CSN Platform. During installation, the installer asks you a number of questions and automatically installs the appropriate components and schema.

For details on installing the CSN software, see "Installing the CSN Software" on page 81.

2.2.4 Connecting the Two CSN Sites

After installing and configuring components at each CSN site independently of that at the other sites, it is necessary to connect the components at the two sites.

2.2.5 Replicating the Configuration Database

The Database Server at one site (DBS01) contains the master configuration database. This database has to be replicated to the Database Server at the other site (DBS02), which contains the slave configuration database.

For details, see "Replicating the Configuration Database" on page 89.

2.2.6 Recompiling User Functions and Procedures

This step is not necessary for a new CSN installation. During a CSN reinstallation, however, if you encounter error messages and exceptions, perform a recompilation.

For details on recompiling, see "Recompiling User Functions, Procedures, and Objects" on page 91.

2.2.7 Initializing Database Backup and Making the DB Utility Executable

For details, see "Other Database-Related Tasks" on page 92.

2.2.8 Installing and Configuring the Database Manager

The Database Manager automates certain database maintenance tasks.

For details on installing and configuring the Database Manager, see "Setting Up the Database Manager" on page 93.

2.2.9 Configuring the CSN Platform

This step enables the components of the CSN Platform to work as a system. Use the Configuration tab of the MSE Console for this configuration.

For details on getting ready to use the Console, see "Configuring the CSN Platform" on page 98. For details on using the configuration tab of the Console, see the *CSN System Configuration Guide*.

2.2.10 Launching the CSN Platform

When the installation and configuration is complete on the entire CSN Platform, you can launch the CSN Platform by starting the Task Managers.

For details, see "Launching the CSN Platform" on page 101.

2.2.11 Setting Components to Start When Reboot

This step sets the CSN Platform, databases, and Database Manager to start automatically when reboot.

For details, see "Setting Components to Start When Reboot" on page 102.

2.3   Installation of 3rd Party Software on the CSN Host

The flowchart below shows the major steps required to install and configure 3rd-party software on a CSN Host for the CSN1000 Platform. Refer to the appropriate chapters and sections of this Guide for procedural details.

Repeat all the steps for each of the two CSN Hosts (CSN01 and CSN02).
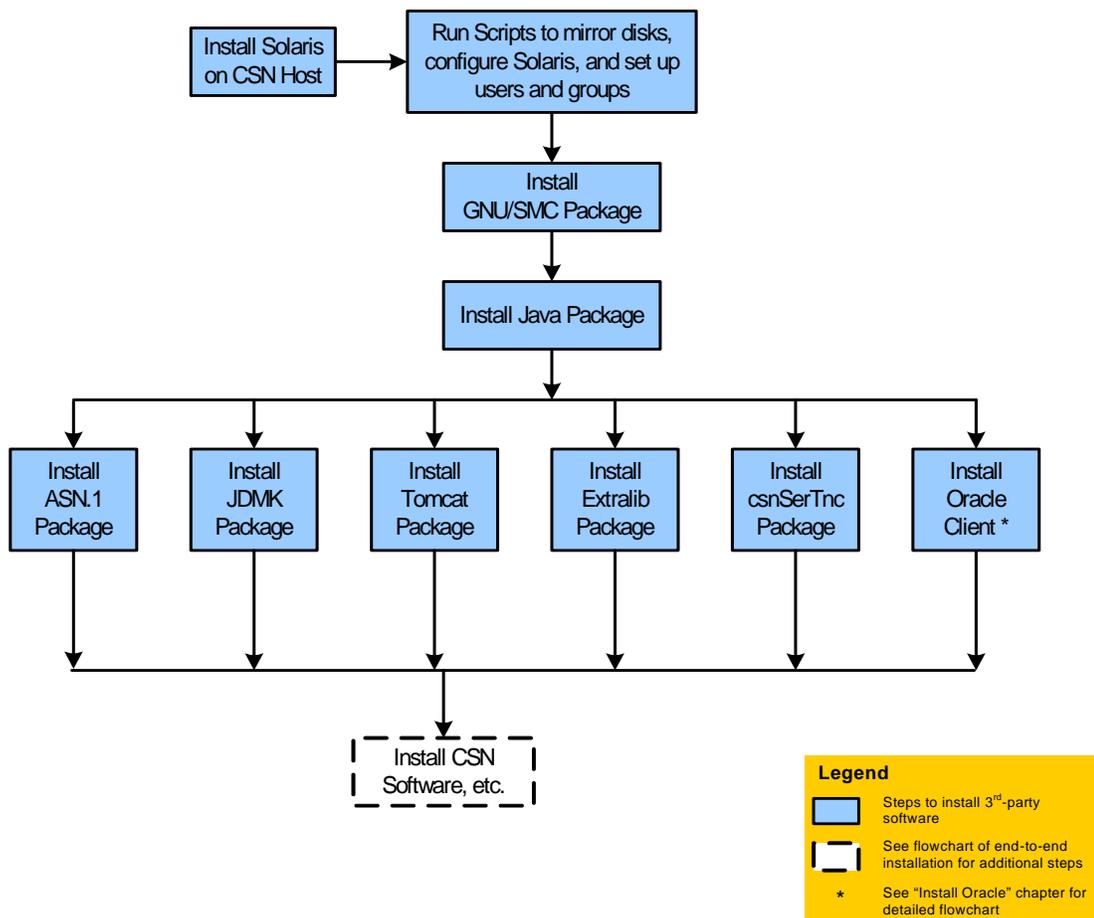
Figure 3: Flowchart: Installation of 3rd-party software on CSN Host

Chapter 3

Installing and Configuring Solaris on the CSN Host

This chapter describes:

- installation of Solaris on the CSN Host
- disk mirroring of the CSN Host
- configuration of Solaris on the CSN Host
- setting up of users and groups on the CSN Host

3.1   Installing Solaris on the CSN Host

This installation procedure is performed on each of the two CSN Hosts (CSN01 and CSN02)t.

Note: This procedure assumes that Solaris 10 is NOT installed on one of the internal disks. If the system comes with Solaris installed, you have to reinstall Solaris for partitioning purposes.

3.1.1   Connecting a Terminal to the System Controller Board Serial Port

1   Locate the serial port.

Refer to Figure 1 in the Sun Microsystems *SunFire V1280/Netra 240 System Administrator Guide*.

2   Set up the terminal to use the same baud rate as the serial port.

The serial port settings of the System Controller board are:

- 9600 8N1

- 9600 baud

- 8 data bits

- No parity

- 1 stop bit

3.1.2   Setting the Open Boot PROM (OBP) Prompt Environment

Do one of the following to reboot the system:

- If you use the Sun keyboard, reboot with the command:

  `STOP A`

  Note: If you use an emulation such as TeraTerm, use Ctrl+b. If you use an emulation such as TigerTerm, use Ctrl+pause+a.

- If you do not use the Sun keyboard, connect your keyboard to the console/ serial port and reboot with the either of the following methods:

  ◆   Type the command: `init 0`

  ◆   Press: Ctrl+break

Result: After rebooting, the "ok" prompt appears.

3.1.3 Installing the Solaris Operating System

After the System Controller has reset, insert the Solaris DVD into the DVD-ROM drive and execute the following command at the Open Boot Prompt (OBP), to install Solaris 10 to the internal hard drive of the CSN Host.

```
ok boot cdrom - nowin
```

Note: To get the ok prompt, use a Shift-Break (use a ~#, in case you use a tip hardware connect command.)

Answer the questions as shown in the table. For each step, type "X" next to the selection. After typing the answer, press Esc-2 to continue.

Table 12: Steps for installing Solaris

Step	Question/ Instruction	Your answer	Remark
1	Select a language.	**0**	For English.
2	What type of terminal are you using?	**1**	For ANSI standard CRT. *Note:* As an alternative, you can select **3** for VT100. In this case, instead of the Esc+<num> combinations in the instructions below, use F<num> function keys.
3	Solaris Installation Program	**Continue**	
4	Identify the system	**Continue**	
5	Is machine networked?	**Yes**	
6	Multiple network interfaces	**bge0**, **bge1**, **bge2**, **bge3**, **ce0**, **ce1**, **ce2**, **ce3**	For V1280, the interface names are ce0 to ce3. Select all.
7	Please select a primary network interface.	**bge0** or **ce0**	To select the first interface, use ce0 for V1280 Gigabit I/F.
8	DHCP for bge0 or ce0?	**No**	
9	Enter hostname for bge0 or ce0.	csn01 (example)	It does not have to be csn01, choose any one!
10	Enter the IP address for bge0 or ce0.	172.24.10.10 (example)	
11	System part of subnet?	**Yes**	
12	Enter the netmask for bge0 or ce0.	255.255.255.0	

Table 12: Steps for installing Solaris (Continued)

Step	Question/ Instruction	Your answer	Remark
13	Enable IPv6 for bge0 or ce0.	No	
14	Default route for bge0 or ce0.	Specify one.	
15	Router IP address for bge0 or ce0.	172.24.10.1 (example)	Server's default router.
16	Confirm information for bge0 or ce0.	(After validating the info) Continue	
17	DHCP for bge1 or ce1?	No	
18	Enter hostname for bge1 or ce1.	csn01b (example)	
19	Enter the IP address for bge1 or ce1.	172.24.20.10 (example)	
20	System part of subnet?	Yes	
21	Enter the netmask for bge1 or ce1.	255.255.255.0	
22	Enable IPv6 for bge1 or ce1.	No	
23	Default route for bge1 or ce1.	None.	
24	Confirm information for bge1 or ce1	(After validating the info) Continue	
25	DHCP for bge2 or ce2?	No	
26	Enter hostname for bge2 or ce2.	csn01c (example)	
27	Enter the IP address for bge2 or ce2.	172.24.15.10 (example)	
28	System part of subnet?	Yes	
29	Enter the netmask for bge2 or ce2.	255.255.255.0	
30	Enable IPv6 for bge2 or ce2.	No	
31	Default route for bge2 or ce2.	None.	
32	Confirm information for bge2 or ce2	(After validating the info) Continue	
33	DHCP for bge3 or ce3?	No	
34	Enter hostname for bge3 or ce3.	csn01d (example)	

Table 12: Steps for installing Solaris (Continued)

Step	Question/ Instruction	Your answer	Remark
35	Enter the IP address for bge3 or ce3.	172.24.15.11 (example)	
36	System part of subnet?	**Yes**	
37	Enter the netmask for bge3 or ce3.	255.255.255.0	
38	Enable IPv6 for bge3 or ce3.	**No**	
39	Default route for bge3 or ce3.	**None**.	
40	Confirm information for bge3 or ce3	(After validating the info) **Continue**	
41	Enable Kerboros?	**No**	
42	Confirm info.	(After validating the info) **Continue**	
43	Select the name service.	**None**	
44	Confirm info.	(After validating the info) **Continue**	
45	Enter the time zone.	(Select as appropriate)	
46	Country or Region	(Select as appropriate)	
47	Time Zone	(Select as appropriate)	
48	Date and time?	(Make changes if needed.)	
49	Confirm info.	(After validating the info) **Continue**	Ignore the "broken pipe" indication.
50	Root password	Type your root password; repeat to confirm.	
51	Identify this system	Press **F2**	
52	Enabling remote services	**No**	
53	Solaris Interactive Installation.	**Esc-2 Standard**	
54	Eject CD/DVD automatically after S/W install?	**Automatically Eject CD/ DVD**	
55	Reboot automatically after S/W installation?	**Auto Reboot**	

Table 12: Steps for installing Solaris (Continued)

Step	Question/ Instruction	Your answer	Remark
56	Solaris Interactive Installation.	Esc-4 Initial	
57	License	Esc-2_Accept	
58	Select Geographic Regions.	North America, Canada-English	
59	Select System Locale.	POSIX C	
60	Select Products.	Solaris 10 Extra Value Software Sun Validation Test Suite 6.0	Press **Enter** to list the products.
61	Additional Products.	None	
62	Select Software.	Entire distribution plus OEM support	
63	Select Disks.	c1t0d0	For 2-disk system.
64	Do You Want to Preserve Data?	Continue	
65	Automatically Layout File System.	Esc-4 Manual Layout	
66	File System and Disk Layout.	Esc-4_Customize	
67	Customize Disk c1t0d0	Continue	
68	File System and Disk Layout	Esc-4_Customize	
69	▪ Select a slice to modify.	0	For "root" slice.
	▪ Enter mount point.	/	For the "root" partition /slice.
	▪ Enter new slice size (in MB).	10000	
70	▪ Select a slice to modify or Done.	1	
	▪ Enter mount point.	swap	
	▪ Enter new slice size (in MB).	8000	
71	▪ Select a slice to modify or Done.	3	Make sure you skip slice 2.
	▪ Enter mount point.	/var	
	▪ Enter new slice size (in MB).	2000	

Table 12: Steps for installing Solaris (Continued)

Step	Question/ Instruction	Your answer	Remark
72	■ Select a slice to modify or Done.	4	
	■ Enter mount point.	/home	
	■ Enter new slice size (in MB).	10000	
73	■ Select a slice to modify or Done.	5	
	■ Enter mount point.	/u01	
	■ Enter new slice size (in MB).	12000	
74	■ Select a slice to modify or Done.	6	
	■ Enter mount point.	/backup	
	■ Enter new slice size (in MB).	####	See Appendix C for slice size.
75	■ Select a slice to modify or Done.	7	Slice 7 used for state db is required for mirroring drive.
	■ Enter mount point.	/state_db	
	■ Enter new slice size (in MB).	24	
76	Mount Remote File System?	**Continue**	
77	Profile?	**Continue**	
78	Warning: Unused Disk Space?	**Esc-2_OK**	

The system now starts to install the Solaris operating system. The installation may take approximately one hour to complete.

Note: While booting from CD_ROM, ignore error messages similar to the following:

```
internal error: Bad file number
svc:/system/filesystem/local:default: WARNING: /usr/sbin/zfs mount -a
failed: 4
Jun 13 14:05:08 svc.startd[7]: svc:/system/filesystem/local:default:
Method "/.
Jun 13 14:05:08 svc.startd[7]: system/filesystem/local:default failed
fatally:)
```

After reboot, when asked the following question, answer "no":

```
Do you need to override the system default NFS version 4 domain
name (yes/no)? [no]: no
```

3.1.4 Configuring "root" Login and FTP

After completing the steps in this subsection, the "root" user will be able to log in from an X Window type client rather than just the serial console.

Note: Ignore all sendmail messages from the Console.

1   Make sure the Solaris DVD is removed from the DVD-drive. In case it is not removed, execute the following commands:

`mount`

`eject`

If it is still not ejected, use the pin to remove the DVD.

2   Insert the NewStep DVD into the DVD drive.

3   Create directory:

`mkdir /home/root`

4   Change directory:

`cd /home/root`

5   Copy the installation source file, **`setup_csn-<version>.tar`**, from the NewStep DVD to the **`/home/root`** directory.

Note: Files from the DVD can be accessed from the following path: **`/cdrom/cdrom/.`**

6   Untar the tar file:

`tar xf setup_csn-<version>.tar`

7   Change to the installation script directory:

`cd /home/root/setup_csn`

8   To allow root access to the system, run the **`allow_root.sh`** script:

`./allow_root.sh`

3.1.5 Installing the Latest Patch Cluster

1   Create a temporary directory to store the patch:

> **`mkdir -p /home/root/patches/<current_date>`**

where **`<current_date>`** has the format YYYYMMDD.

2   Copy the latest patch cluster for Solaris 10 (**`10_Recommended.zip`**) from the NewStep DVD to the above directory.

`cp /cdrom/cdrom0/SolarisPatches/10_Recommended.zip /home/root/`
`patches/<current_date>`

3 Unzip this patch and start the install program to install the patches:

```
# cd /home/root/patches/<current_date>
# unzip 10_Recommended.zip 1>/dev/null 2>&1
# cd 10_Recommended
# ./install_cluster
```

4 When the prompt "Are you ready to continue with install? [y/n]:" appears, enter **y**.

   Note: The process takes several minutes to complete.

5 The installation of some patches may fail with return codes:

   - If the return code is 1, 4, or 8, it is normal; continue.
     - ◆ Code 1 means that the patch has already been applied.
     - ◆ Code 4 means that a newer patch has already been applied.
     - ◆ Code 8 means that the package to which the patch applies is not installed on the system.
   - If a patch fails with some other return code, check the following file for more information:

     `/var/sadm/install_data/Solaris_10_Recommended_Patch_Cluster_log`

6 When the installation is complete, perform reconfiguration reboot of the system for the patches to take effect:

```
# reboot -- -r
```

7 Log in again as root and go to the patch directory:

```
# cd /home/root/patches/<current_date>/10_Recommended
```

8 Run the installer again:

```
# ./install_cluster
```

9 The installation of some patches may fail with return codes.

   See step 5 for details.

10 When the installation is complete, reboot the system for the patches to take effect:

```
# reboot
```

11 Log in again as root and verify that OS has been successfully patched:

```
# uname -a
```
   Result: The output should look similar to:
   `SunOS csn09 5.10 Generic_118833-36 sun4u sparc SUNW,<model_number>`

   Note: It is important that the patch level is **118833-36**

3.2   Disk Mirroring and Configuration on the CSN Host

This section describes how you can use several scripts to perform disk mirroring, Solaris configuration, as well as setting up users and groups on the CSN Host.

1   Login as **root**

2   Change to the installation script directory:

cd /home/root/setup_csn

3   Change the file execution permissions:

chmod +x *

4   Run the following disk mirroring script:

ksh ./setup_csn -n

Note: If you are installing on a server similar to the 280-R, you may encounter a warning similar to "Cannot open /etc/hostname.eri". Ignore the warning.

The script asks several questions:

a.   When asked about type of installation, select "all in one".

b.   When asked to enter IP addresses, enter the IP addresses as configured in the OS installation.

c.   When asked to enter the NTP server address, enter the appropriate NTP server address.

d.   When asked other questions, ignore them.

   Note: Enter "-" if you do not have a value for the parameter.

e.   Answer the prompts for password for root user.

5   Wait until the system reboots.

6   Login as **root**

7   Change to the installation script directory:

cd /home/root/setup_csn

8   Run the following disk mirroring script:

```
# ksh ./setup_mirroring2.sh
```

Note: The mirroring process takes about 2 hours to complete. It may vary depending on the number of disks.

Result: The newly created disk mirrors will then try to synchronize; this may take over an hour for a smaller disk and longer for larger disks. The synchronization progress will be shown similar to the following:
    18:44:59 Resyncing mirrors: 77% 98% 48% 50%
    18:45:29 Resyncing mirrors: 78% 48% 50%
As each disk slice reaches 100%, it will be removed from the list.

9   Re-boot it using the command:

```
ok boot disk
```

Note: The ok prompt can be obtained by sending break command from the teraterm console.

Chapter 4

Installing Additional Third-Party Software

This chapter describes the installation of the:

- GNU/SMC package
- Java package (JDK)
- ASN.1 package (ASN.1 package compiler)
- JDMK package
- Tomcat package (Apache Tomcat web server, Oracle JDBC driver, and Xalan)
- Extralib package (Jakarta commons, Cisco JTAPI, and Java XML parser)
- TNC package (csnSetTnc script)

Note: See also the following installation flowcharts: "Installation of 3rd Party Software on the CSN Host" on page 16

Note: When you install on the Database Server using the NewStep installation image disk, there is no need to install additional third-party software separately.

4.1   Introduction to Installation of Third-Party Software

An installation script is available to simplify the installation of various third-party software. The installation process is very similar for each of the packages.

4.1.1   General Installation Procedure

For each package, use the following procedure:

1   Make sure the NewStep DVD is inserted in the DVD drive.

2   Using ssh, log in as `root`

3   Change the directory:

     `# cd /home/root/setup_csn`

4   Run the command:

     `# ./install_3rdparty.sh <package_name>`

     where `<package_name>` is the name of the third-party software package, as described in "Installing Individual Packages" on page 31.

5   Where applicable, answer the questions that the script asks.

6   When the installation is complete, which usually takes several minutes, repeat step 4 to install the next package, until you have installed all the required packages.

4.1.2   Third-Party Logs

Third-party logs are store in the following directory:

     `/home/root/logs/install_3rdparty.log`

4.2   Installing Individual Packages

4.2.1   Installing the GNU/SMC Package

This installation procedure for the GNU/SMC package is to be performed on each of the two CSN Hosts (CSN01 and CSN02)and each of the two Database Servers (DBS01 and DBS02).

1   To prepare for installation, see "General Installation Procedure" on page 30, steps 1 to 3.

2   Run the command:

  `# ./install_3rdparty.sh smc`

3   When asked by the script, answer the questions in the following order:

  `all`

  `all`

Result: The installation proceeds and takes about 1 minute to complete.

4.2.2   Installing the Java Package

This installation procedure for the Java package (JDK) is to be performed on each of the two CSN Hosts (CSN01 and CSN02)and each of the two Database Servers (DBS01 and DBS02).

1   To prepare for installation, see "General Installation Procedure" on page 30, steps 1 to 3.

2   Run the command:

  `# ./install_3rdparty.sh java`

3   When asked by the script, answer the questions in the following order:

  `yes`

  `yes`

Result: The installation proceeds and takes about 4 minutes to complete.

4.2.3 Installing the ASN.1 Package

This installation procedure of the ASN.1 package (ASN.1 runtime) is to be performed on each of the two CSN Hosts (CSN01 and CSN02)and each of the two Database Servers (DBS01 and DBS02).

1   To prepare for installation, see "General Installation Procedure" on page 30, steps 1 to 3.

2   Run the command:

```
# ./install_3rdparty.sh asn1
```

Result: The script does not ask any questions. The installation proceeds and takes about 2 minutes to complete.

4.2.4 Installing the JDMK Package

This installation procedure of the JDMK package is to be performed on each of the two CSN Hosts (CSN01 and CSN02)and each of the two Database Servers (DBS01 and DBS02).

1   To prepare for installation, see "General Installation Procedure" on page 30, steps 1 to 3.

2   Run the command:

```
# ./install_3rdparty.sh jdmk
```

3   When asked by the script, answer the questions in the following order:

```
all
Y
Y
Y
```

Result: The installation proceeds and takes about 3 minutes to complete.

4.2.5 Installing the Tomcat Package

This installation procedure of the Tomcat package (Apache Tomcat web server, Oracle JDBC driver, Xalan, and customization of Tomcat) is to be performed on each of the two CSN Hosts (CSN01 and CSN02).

1   To prepare for installation, see "General Installation Procedure" on page 30, steps 1 to 3.

2   Run the command:

    # ./install_3rdparty.sh tomcat

Result: The script does not ask any questions. The installation proceeds and takes about 1 minute to complete.

4.2.6 Installing the Extralib Package

This installation procedure of the Extralib package (Jakarta commons, Cisco JTAPI, and Java XML parser) is to be performed on each of the two CSN Hosts (CSN01 and CSN02).

1   To prepare for installation, see "General Installation Procedure" on page 30, steps 1 to 3.

2   Run the command:

    # ./install_3rdparty.sh extralib

Result: The script does not ask any questions. The installation proceeds and takes about 1 minute to complete.

4.2.7 Installing the TNC Package

This installation procedure of the TNC package (csnSetTnc script) is to be performed on each of the two CSN Hosts (CSN01 and CSN02).

1   To prepare for installation, see "General Installation Procedure" on page 30, steps 1 to 3.

2   Run the command:

    # ./install_3rdparty.sh tnc

Result: The script does not ask any questions. The installation proceeds and takes about 1 minute to complete.

Chapter 5

Configuring the Disk Array

This chapter describes:

- the basic disk array configuration

5.1 Basic Disk Array Configuration

This configuration procedure described in this chapter is performed on each of the two disk arrays, which are associated with the two Database Servers (DBS01 and DBS02).

You must configure the Sun StorEdge 3320 JBOD disk array before you configure the Database Server. Make sure that the additional SCSI controller board is installed in the Database Server before connecting the disk array.

The JBOD disk array is set up for a Split-Bus Single-Initiator bus with two host adapters in the same Database Server.

Cabling a Split-Bus, Single-Initiator JBOD Configuration

The disk array is connected to two ports on the single Database Server. This is an efficient way to provide redundant, fault tolerant database storage.

Figure 4 shows a split-bus JBOD with two host connections using one host connection to each channel (single-initiator mode). Connect the bottom two connectors on the StorEdge 3320 back panel to the built-in SCSI controller and the newly installed SCSI controller board. (The order of these connections does not matter. However, do not connect the disk array to the Database Server before installing the operating system.)

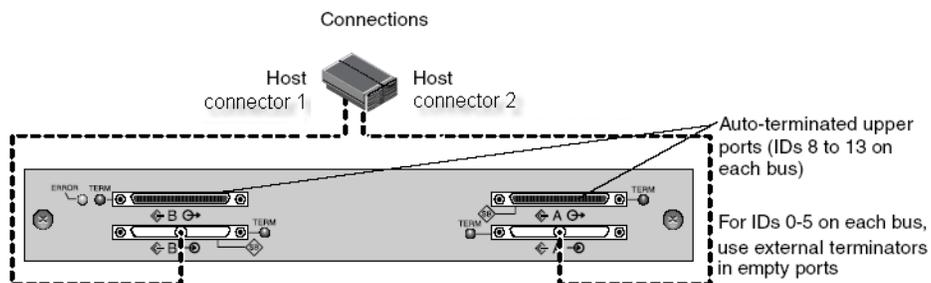*Note:* In this example, the physical drive IDs are 8 to 13 on each channel.

Figure 4: Split-bus single-initiator JBOD configuration

In the following table, A and B indicate the two host channels. The table shows the IDs assigned to each channel in the split-bus configuration.

Table 13: Physical drive IDs for a split-bus JBOD in single-initiator mode

	Channel A	Channel B
	Channel A ID 8	Channel B ID 8
	Channel A ID 9	Channel B ID 9
	Channel A ID 10	Channel B ID 10
IDs	Channel A ID 11	Channel B ID 11
	Channel A ID 12	Channel B ID 12
	Channel A ID 13	Channel B ID 13

Installing Disk Drives

Referring to Figure 5, insert the first three disk drives into the leftmost three slots of the Sun StorEdge 3320 (labelled Disk 0, 1, and 2), and the remaining three disks into the third three slots from the left (labelled Disk 6, 7, and 8).
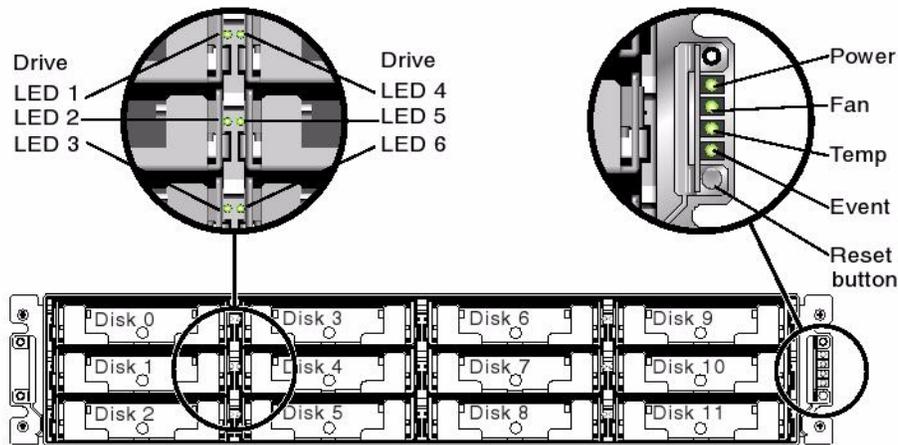

Figure 5: Front panel of Sun StorEdge 3320 array with LEDs displayed

Chapter 6

Installing and Configuring Solaris on the Database Server

This chapter describes:

- installation of Solaris, Oracle and other third-party software on the Database Server
- disk mirroring of the Database Server
- installation and formatting of the disk array

6.1   Installing Solaris on the Database Server

This installation procedure is performed on teach of the two Database Servers (DBS01 and DBS02).

Note: This procedure assumes that Solaris 10 is NOT installed on one of the internal disks. If the system comes with Solaris installed, you have to reinstall Solaris for partitioning purposes.

6.1.1   Connecting a Terminal to the System Controller Board Serial Port

1   Locate the serial port.

Refer to in the Sun Microsystems *SunFire System Administrator Guide*.

2   Set up the terminal to use the same baud rate as the serial port.

The serial port settings of the System Controller board are:

- 9600 8N1
- 9600 baud
- 8 data bits
- No parity
- 1 stop bit

6.1.2   Setting the Open Boot PROM (OBP) Prompt Environment

Do one of the following to reboot the system:

- If you use the Sun keyboard, reboot with the command:

  `STOP A`

  Note: If you use an emulation such as TeraTerm, use Ctrl+b. If you use an emulation such as TigerTerm, use Ctrl+pause+a.

- If you do not use the Sun keyboard, connect your keyboard to the console/ serial port and reboot with the either of the following methods:

  - Type the command: `init 0`
  - Press: Ctrl+break

  Result: After rebooting, the "ok" prompt appears.

6.1.3 Installing Solaris, Oracle, and Third-party Software

For ease of installation of Solaris, Oracle, and other required third-party software, NewStep has prepared an image disk and a script to automate the installation process.

After the System Controller has reset, insert the NewStep image disk into the DVD-ROM drive and execute the following command at the Open Boot Prompt (OBP), to install Solaris, Oracle, and other third-party software to the internal hard drive of the Database Server.

```
ok boot cdrom - install
```

Note: To get the ok prompt, use a Shift-Break (use a ~#, in case you use a tip hardware connect command.)

The installation process may take over half an hour to complete. The installation is done when the login prompt is displayed on the console:

```
csnhost console login:
```

6.2 Disk Mirroring and Configuration on the DB Server

This section describes how you can use several scripts to perform disk mirroring, Solaris configuration, as well as setting up users and groups on the Database Server.

1 Insert CSN software distribution DVD/CD into the optical (CD/DVD) drive.

2 Login as **root**

Note: The initial root password is **newstep**; you can change it later.

3 Change to the installation script directory:

`# cd /home/root/setup_csn`

4 Run the following disk mirroring script:

`# ksh ./setup_csn`

Notes:
If you are installing on a server similar to the 280-R, you may encounter a warning similar to "Cannot open /etc/hostname.eri". Ignore the warning.
If the proper DVD/CD is not in the drive, the script will prompt you to insert it.

The script asks several questions:

a. When asked about type of installation, select "database node".

b. When asked to enter IP addresses, enter the IP addresses assigned to this CSN node.

c. When asked to enter the NTP server address, enter the appropriate NTP server address.

d. When asked other questions, ignore them.

Note: Enter "-" if you do not have a value for the parameter.

e. Answer the prompts for password for root, oracle, and csn users.

5 Wait until the system reboots.

6 Login as **root**

7 Change to the installation script directory:

`# cd /home/root/setup_csn`

8 Run the following disk mirroring script:

`ksh ./setup_mirroring2.sh`

Note: The mirroring process takes about 2 hours to complete. It may vary depending on the number of disks.

Result: The newly created disk mirrors will then try to synchronize; this may take over an hour for a smaller disk and longer for larger disks. The synchronization progress will be shown similar to the following:

    18:44:59 Resyncing mirrors: 77% 98% 48% 50%
    18:45:29 Resyncing mirrors: 78% 48% 50%
As each disk slice reaches 100%, it will be removed from the list.

9 When disk mirroring is complete, execute the following commands, while still logged in as root:

`touch /reconfigure`

`shutdown -y -g 0 -i 5`

Result: This will schedule the reconfiguration of the OS at the next boot. Meanwhile, it will power down the server.

10 After the system finishes its power down sequence, turn off the power by turning the switch on the front panel from the "on" to the "off" position.
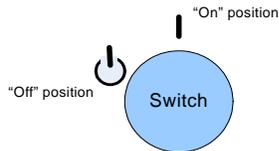

Figure 6: Switch positions

6.3   Installing and Formatting the Disk Array

6.3.1   Connecting and Switching On the Disk Array

1   Attach the JBOD disk array (StorEdge 3320) to the Database Server:

- Make sure that the additional SCSI controller is installed.

- The two SCSI connectors on the Database Server's back panel are identical to the connectors on the disk array's back panel. See Figure 4, on page 36.

  Connect the bottom two connectors on the disk array's back panel to the built-in SCSI controller and the secondary SCSI controller board with appropriate cables (SCSI VHDCI/VHDCI cable). For example, you can use Sun's cables: product number X1138A (2m) or X1136A (0.8m).

2   On the back panel of the disk array, turn on the power switches for *both* power supplies. Wait until the disk LEDs stop blinking and become steady green.

3   On the front panel of the disk array, make sure that all the lights on the right-hand side of the panel are green.

    Note: If the lights are not green, turn off the power on the back panel and troubleshoot the installation. Make sure that all the disks are plugged in all the way and that both power supplies are functioning.

4   On the front panel of the Database Server, turn on the power switch and press the on/standby button located next to the switch.

    Result: The Database Server starts to boot. When it finishes, you are ready to format the disk array, as describe in the next section.

6.3.2   Formatting the Disk Array

1   After you have switched on the disk array and Database Server, log in to the Database Server as **root**

2   Verify that all the disks are recognized by the OS by executing:

`# `**`format`**

Result: The system displays the Available Disk Selection menu, similar to the following:

```
Searching for disks...done

AVAILABLE DISK SELECTIONS:
       0. c1t0d0 <SUN146G cyl 14087 alt 2 hd 24 sec 848>
          /pci@1c,600000/scsi@2/sd@0,0
       1. c1t1d0 <SUN146G cyl 14087 alt 2 hd 24 sec 848>
          /pci@1c,600000/scsi@2/sd@1,0
       2. c2t8d0 <SUN72G cyl 14087 alt 2 hd 24 sec 424>
```

```
                     /pci@1e,600000/scsi@2/sd@8,0
          3. c2t9d0 <SUN72G cyl 14087 alt 2 hd 24 sec 424>
                     /pci@1e,600000/scsi@2/sd@9,0
          4. c2t10d0 <SUN72G cyl 14087 alt 2 hd 24 sec 424>
                     /pci@1e,600000/scsi@2/sd@a,0
          5. c3t8d0 <SUN72G cyl 14087 alt 2 hd 24 sec 424>
                     /pci@1c,600000/scsi@2,1/sd@8,0
          6. c3t9d0 <SUN72G cyl 14087 alt 2 hd 24 sec 424>
                     /pci@1c,600000/scsi@2,1/sd@9,0
          7. c3t10d0 <SUN72G cyl 14087 alt 2 hd 24 sec 424>
                     /pci@1c,600000/scsi@2,1/sd@a,0
     Specify disk (enter its number):
```

Note: There should be eight disks numbered 0 to 7. Disks 0 and 1 are built in OS disks. Disks 2-7 are the disks inside the disk array. For each of those disks (2-7), repeat the steps below.

3   At the "Specify disk (enter its number):" prompt, type the disk number.

4   Do one of the following:

- If the system responds with: "Disk not labeled. Label it now?":

     a.   Type **y**

     Result: The system displays the Format menu.

     b.   At the "format>" prompt, type **quit**

     Result: The system displays the Available Disk Selection menu, similar to the one shown in step 2.

     c.   At the "Specify disk (enter its number):" prompt, type the same disk number you previously did in step 3.

     Result: The system displays the Format menu.

- If the system displays the Format menu directly (that is, without first displaying the "Disk not labeled. Label it now?" message), continue to the next step.

5   The Format menu looks similar to the following:

```
FORMAT MENU:
          disk      - select a disk
          type      - select (define) a disk type
          partition - select (define) a partition table
          current   - describe the current disk
          format    - format and analyze the disk
          repair    - repair a defective sector
          label     - write label to the disk
          analyze   - surface analysis
          defect    - defect list management
          backup    - search for backup labels
          verify    - read and display labels
          save      - save new disk/partition definitions
          inquiry   - show vendor, product and revision
```

```
        volname    - set 8-character volume name
        !<cmd>     - execute <cmd>, then return
        quit
format>
```

At the "format>" prompt, type **partition**

Result: The system displays the Partition menu, similar to the following:

```
PARTITION MENU:
        0      - change `0' partition
        1      - change `1' partition
        2      - change `2' partition
        3      - change `3' partition
        4      - change `4' partition
        5      - change `5' partition
        6      - change `6' partition
        7      - change `7' partition
        select - select a predefined table
        modify - modify a predefined partition table
        name   - name the current table
        print  - display the current table
        label  - write partition map and label to the disk
        !<cmd> - execute <cmd>, then return
        quit
partition>
```

6   At the "partition>" prompt, type **print** to display partition information.

Result: The system displays the Current Partition Table, similar to the following:

```
Current partition table (original):
Total disk cylinders available: 14087 + 2 (reserved cylinders)

Part      Tag    Flag    Cylinders        Size            Blocks
  0      root    wm      0 -    25     129.19MB    (26/0/0)        264576
  1      swap    wu     26 -    51     129.19MB    (26/0/0)        264576
  2    backup    wu      0 - 14086      68.35GB    (14087/0/0) 143349312
  3 unassigned   wm      0                 0       (0/0/0)              0
  4 unassigned   wm      0                 0       (0/0/0)              0
  5 unassigned   wm      0                 0       (0/0/0)              0
  6       usr    wm     52 - 14086      68.10GB    (14035/0/0) 142820160
  7 unassigned   wm      0                 0       (0/0/0)              0

partition>
```

7   Do one of the following:

- If the Partition Table you see on your screen is identical to what is shown in step 6, skip to step 16.

- If the Partition Table you see on your screen is different from what is shown in step 6, continue to the next step.

8   At the "partition>" prompt, type **modify**

Result: The system displays the Select Partitioning Base menu:

```
Select partitioning base:
        0. Current partition table (original)
        1. All Free Hog
Choose base (enter number) [0]?
```

9   Type **1** to select "All Free Hog".

Result: The system displays a table similar to the following:

```
enter 1 for "All Free Hog", the following is displayed:
Part      Tag    Flag    Cylinders       Size            Blocks
  0      root     wm     0               0           (0/0/0)             0
  1      swap     wu     0               0           (0/0/0)             0
  2      backup   wu     0 - 14086       68.35GB     (14087/0/0) 143349312
  3 unassigned    wm     0               0           (0/0/0)             0
  4 unassigned    wm     0               0           (0/0/0)             0
  5 unassigned    wm     0               0           (0/0/0)             0
  6       usr     wm     0               0           (0/0/0)             0
  7 unassigned    wm     0               0           (0/0/0)             0

Do you wish to continue creating a new partition
table based on above table [yes]?
```

10   Type **yes** to create the new partition table.

Result: The system asks: "Free Hog partition [6]?

11   Press Enter to accept "6" (free hog partition).

12   Keep pressing Enter to accept the displayed default values, one line at a time,
until all the summary information is displayed, as follows:

```
Part      Tag    Flag    Cylinders       Size            Blocks
  0      root     wm     0               0           (0/0/0)             0
  1      swap     wu     0               0           (0/0/0)             0
  2      backup   wu     0 - 14086       68.35GB     (14087/0/0) 143349312
  3 unassigned    wm     0               0           (0/0/0)             0
  4 unassigned    wm     0               0           (0/0/0)             0
  5 unassigned    wm     0               0           (0/0/0)             0
  6       usr     wm     0 - 14086       68.35GB     (14087/0/0) 143349312
  7 unassigned    wm     0               0           (0/0/0)             0

Okay to make this the current partition table [yes]?
```

13   Press Enter again to confirm your acceptance of this table.

14   At the "Enter table name (remember quotes):" prompt, enter **"jbod"**

Note: Make sure you include the quotation marks.

15 At the "Ready to label disk, continue?" prompt, type **y**

Result: The system displays the Partition menu.

16 At the "partition>" prompt, type **quit**

Result: This exits the Partition menu and the system displays the Format menu.

17 Do one of the following:

- If you have one or more disks to format:

  a. At the "format>" prompt, type **disk**

  Result: This exits the Format menu and the system displays the Available Disk Selection menu.

  b. At the "Specify disk (enter its number):" prompt, type the disk number of the next disk you want to format. Then repeat steps 4 to 7 for each disk, until you have formatted all the disks.

- If you are formatting the last disk, at the "format>" prompt, type **quit**

  Result: This completes the formatting procedure.

Chapter 7

Configuring Oracle and Installing Databases

This chapter describes how to:

- install ASM on JBOD disk array
- configure Oracle
- install the CSN databases

7.1   Overview

For the CSN1000 Platform, installing the RDBMS requires an installation of

- the Database Server software on each of the two Database Servers
- the Database Client software on each of the two CSN Hosts

.

The following table shows the required files for RDBMS installation.

Table 14: Files in the RDBMS

Filename	For Installation of	Description
pfile.tar	Oracle Client	Profile
DB-R<version>.tar	Oracle Server	Custom scripts
10gr2_db_sol.cpio-gz	Oracle Server	Oracle 10g Server software
10gr2_client_sol.cpio	Oracle Client	Oracle 10g Client software

7.2   Overview of Configuring Oracle Server and Installing Databases

The configuration and installation process described in this section is performed on each of the two Database Servers.

The flowchart below shows the major steps required on each Database Server.
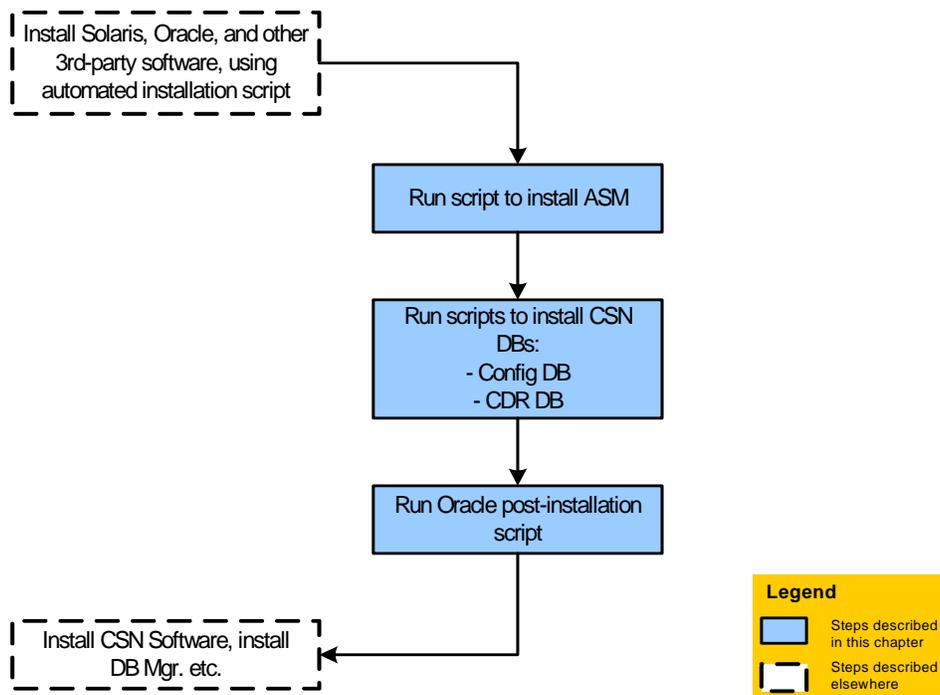
Figure 7: Flowchart: Configuration of Oracle and installation of databases

7.3   Installing ASM on JBOD Disk Array

1   Log in as **root**

2   Run the ASM install script:

```
# cd /home/oracle/pfile
# ./jbodsetup.sh
```

Note: You may be asked to confirm creation of the new file system:
```
metainit: csndbhost: d6: unit already set up
newfs: construct a new file system /dev/md/rdsk/d6: (y/n)?
```
If asked, answer **y**

Note: Ignore the following warnings during installation:
 - "ORA-15110: no diskgroups mounted"
 - "ORA-15100: invalid or missing diskgroup name"

3   Check for completion of the process by using scripts:

a.   Log in as **oracle**

b. $ **cd /home/oracle/utl**

c. $ **asmdkgpinfo**

d. $ **asmdiskstatus**

Result: When the process is complete, the following is displayed:

```
NAME                           STATE       TYPE
------------------------------ ----------- ------
DATA                           MOUNTED     NORMAL

PATH                           FG     STATE     TOTAL_MB    FREE_MB
------------------------------ ------ -------- ---------- ----------
/dev/rdsk/c2t8d0s6             FG1    NORMAL       69736      69713
/dev/rdsk/c2t9d0s6             FG1    NORMAL       69736      69716
/dev/rdsk/c2t10d0s6            FG1    NORMAL       69736      69716
/dev/rdsk/c3t8d0s6             FG2    NORMAL       69736      69717
/dev/rdsk/c3t9d0s6             FG2    NORMAL       69736      69718
/dev/rdsk/c3t10d0s6            FG2    NORMAL       69736      69718
```

4   When the installation is complete, proceed to the next section.

7.4   Installing CSN databases

1   Log in as `oracle`

2   Run the Configuration Database install script:

```
$ cd /home/oracle/pfile
$ installcsn.sh
```

3   When prompted, enter the password: `incharge220`

4   Monitor the process by checking the logs in `/u01/app/oracle/admin/csn/scripts` or by running:

```
$ /home/oracle/utl/dbstatus csn
```

Result: When the process is complete, it reports to you that csn is OPEN:

```
INSTANCE    STATUS ENABLED  OPEN_TIME
---------- ------ -------- -------------------
csn         OPEN   PUBLIC   10-10-2006 11:52:35
```

5   Run the CDR Database install script:

```
$ installcdr.sh
```

6   When prompted, enter the password: `incharge220`

7   Monitor the process by checking the logs in `/u01/app/oracle/admin/cdr/scripts` or by running:

```
$ /home/oracle/utl/dbstatus cdr
```

Result: When the process is complete, it reports to you that cdr is OPEN:

```
INSTANCE    STATUS ENABLED  OPEN_TIME
---------- ------ -------- -------------------
cdr         OPEN   PUBLIC   10-10-2006 11:56:25
```

7.5   Running the Oracle Post-Installation Script

The following procedure is required for both the master DB and the slave DB.

1   Log in as `root`

2   Change the directory and run the Oracle postinstall script:

`$ cd /home/root/setup_csn`

`$ ./oracle_postinstall.sh`

3   Reboot to test.

4   To monitor the Oracle processes startup, use the command:

`$ tail -f $ORACLE_HOME/startup.log`

Note: In case the database(s) does not start up upon reboot, try to start using the following commands:
`$ cd $ORACLE_ HOME/utl`
`$ startasm`
`$ startdb csn`
`$ startdb cdr`

7.6   Installing Database Client Software

The installation and configuration of the Database Client software described in this section is performed on each of the two CSN Hosts (CSN01 and CSN02).

The flowchart below is an expansion of the "Install Oracle Client" step in the flowchart of "Installation of 3rd Party Software on the CSN Host" on page 16. It shows the major steps required to install and configure the Oracle Client on each CSN Host.
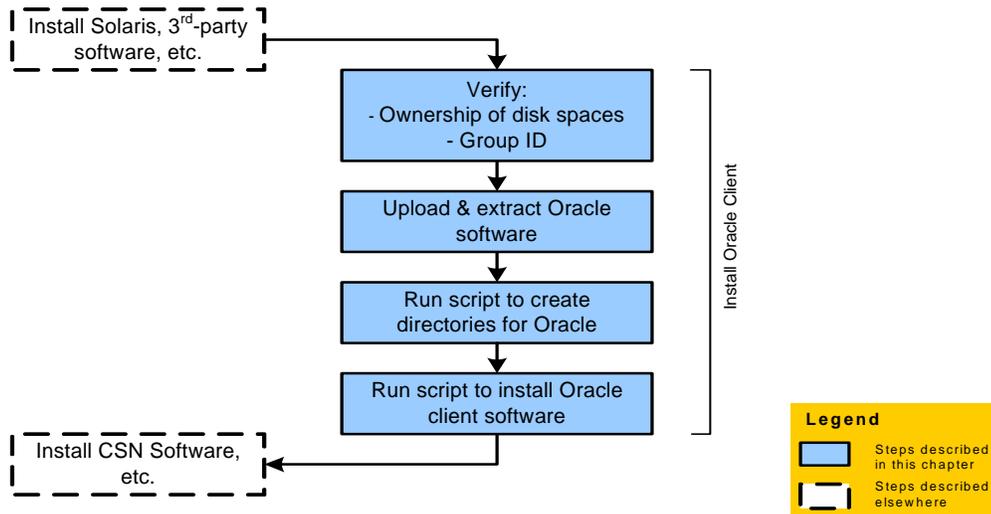
Figure 8: Flowchart: Installation of Oracle Client on CSN Host

7.6.1 Preparing for Installation

You install the Oracle Client software on the CSN Hosts after you have installed the Oracle Server software on the Database Servers.

Oracle Client software owner account:

- User: **oracle**
- Group: **dba** (or **oinstall**)

Minimum disk spaces to be owned by the Oracle Client software account owner, oracle:

- **/u01**: 3G+
- **/backup**: 3G+

Verifying ownership of disk spaces

1 Log in as **root**

2 To make sure that the **oracle** user owns the **/u01** and **/backup** disk spaces, run:

```
# chown -R oracle /u01 /backup
```

Verifying the group ID

The required group and user were created after the installation of Solaris. In this section, you verify the required setup and make changes where necessary.

1 Log in as **oracle**

2 To make sure the group ID of **oracle** is **dba**, run:

```
$ id -a
```

Result: If the group ID is correct, the screen output provides information similar to the following, with the gid field indicating (dba):

```
uid=1001(oracle) gid=101(dba) groups=101(dba)
```

3 If the screen output displays oracle's group ID to be **oinstall** instead of **dba**:

   a. Open the following file:

      /home/oracle/pfile/csnclient.rsp

   b. Modify the value of UNIX_GROUP_NAME in this file to match that group ID (that is, **oinstall**).

7.6.2　Oracle Client Runtime Installation

1　Copy the install bundle (`DB-R<version>.tar.gz`) to the `/home/oracle` directory:

```
$ cp /cdrom/cdrom/oracle/DB-R<version>.tar.gz /home/oracle/
```

2　Untar the install bundle:

```
$ cd
$ gunzip DB-R<version>.tar.gz
$ tar -xvf DB-R<version>.tar
```

3　After extraction, update the `.profile` file:

```
$ cp pfile/client_profile .profile
```

4　Re-log in as `oracle`

5　Create a directory for installation of the Oracle Client software:

```
$ mkdir -p /backup/oracle/oorig10gR2c
```

6　From the install source media (e.g. NewStep installation DVD), load the Oracle Client software file (`10gr2_client_sol.cpio`) to this directory.

7　Extract the Oracle Client software file as follows:

```
$ cd /backup/oracle/oorig10gR2c
$ cpio -idmv < 10gr2_client_sol.cpio
```

8　After extraction, run the installer:

```
$ ./runInstaller -responseFile /home/oracle/pfile/csnclient.rsp -silent
```

Result: The output would be similar to following, note at end of installation you have a warning highlighted in Red:

```
Checking installer requirements...
Checking operating system version: must be 5.8, 5.9 or 5.10.    Actual 5.10
                                Passed
Checking Temp space: must be greater than 250 MB.  Actual 3940 MB   Passed
Checking swap space: must be greater than 500 MB.  Actual 7253 MB   Passed
Checking monitor: must be configured to display at least 256 colors.  Actual 1
6777216    Passed
All installer requirements met.
………………………………..
End of install phases.(Thu Jun 23 14:23:36 EST 2006)
Starting to execute configuration assistants
Configuration assistant "Oracle Net Configuration Assistant" succeeded
WARNING: The following configuration scripts
/u01/app/oracle/product/10.2.0/root.sh
need to be executed as root for configuring the system. If you skip the
execution of the configuration tools, the configuration will not be complete and
the product won't function properly. In order to get the product to function
properly, you will be required to execute the scripts and the configuration
tools after exiting the GUI.
```

```
The installation of Oracle Client was successful.
Please check '/u01/app/oracle/oraInventory/logs/silentInstall2006-06-
23_02-18-14PM.log' for more details.
```

Warning: Do NOT exit the installation now!

9   Open another session and log in as **root**

10   Execute the **root.sh** script, as follows:

```
# cd /u01/app/oracle/oraInventory
# ./orainstRoot.sh
# cd /u01/app/oracle/product/10.2.0
# ./root.sh
```

Note: When prompted, you may accept default answers.

11   After executing the **root.sh** script, press Ctrl+C to exit the Oracle installation.

7.6.3 Oracle Client TNS Configuration

1   Log in as **oracle**

2   Copy the **tnsnames.ora** file from the primary database server to
/home/oracle/pfile.

Note: The database server should have been already installed and configured.

3   Copy the **tnsnames.ora** file to the proper location:

```
$ cp $HOME/pfile/tnsnames.ora $ORACLE_HOME/network/admin
```

Transparent Application Failover (TAF) Client Setup

1   `$ cp $HOME/pfile/sqlnet.ora $ORACLE_HOME/network/admin/sqlnet.ora`

You also need to change the default behavior of the TCP, as follows:

2   Log in as **root**

3   `# ndd -set /dev/tcp tcp_ip_abort_interval 30000`

Note: The number given in the command is based on NewStep system tests. You may
need to modify it to suit your specific deployment.

4   `# ndd -set /dev/tcp tcp_ip_abort_cinterval 15000`

Note: The number given in the command is based on NewStep system tests. You may
need to modify it to suit your specific deployment.

C h a p t e r 8

Configuring for SIP High Availability (HA)

This chapter describes configuration of the CSN for SIP high availability (HA), including the configuration of:

- the CSN network (router and switches)
- the CSN Hosts

8.1 Introduction to Configuration for SIP HA

The following diagram shows the network connectivity for deployment of the CSN Platform, including SIP high availability (HA).
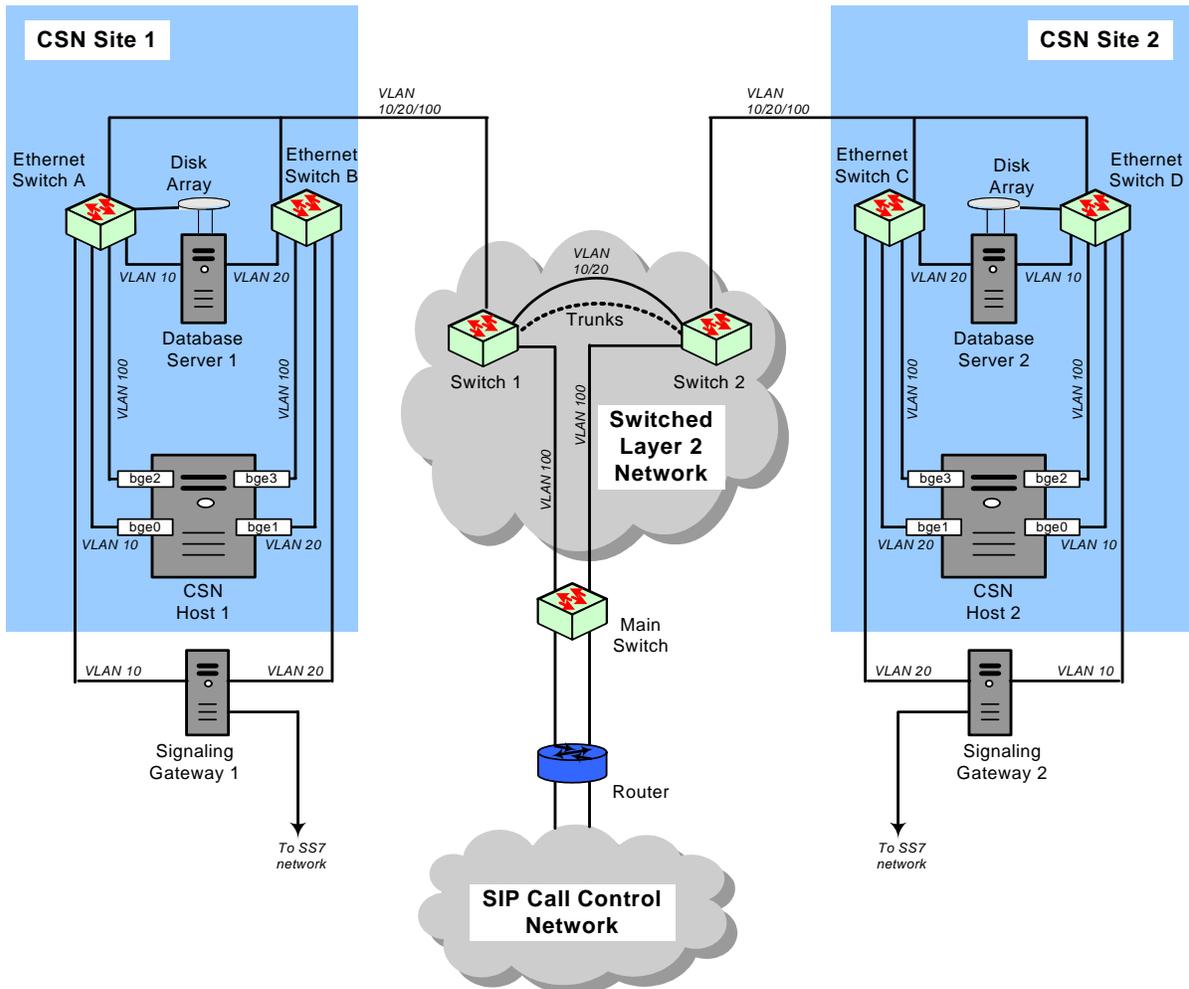
Figure 9: Network connectivity for deployment of CSN with SIP HA

To implement the highly available SIP call processing capability, the CSN Platform includes three VLANs—VLAN10, VLAN20, and VLAN100—in its high availability design.

Note: The three VLANS described in this chapter are different from the default VLAN1, which is used for administering switches.

8.2   SIP HA Configuration Example

Referring to Figure 9, "Network connectivity for deployment of CSN with SIP HA," on page 60, the Ethernet Switches that are part of the CSN Platform (in the CSN nodes) are configured with two VLANs (VLAN 10 and VLAN 20). These two VLANs are one-one mapped to two different IP subnets.

A third VLAN (VLAN 100) with one member IP Address—that is, the CSN SIP Public IP address—is added to all four switches (A, B, C, and D).

Table 15: VLAN configuration

VLAN ID	Server	IP
10	172.24.10.0/24 Private subnet for CSN internal traffic; tunnelled through Switch 1 and Switch 2	172.24.10.10 - ce2@csn01 UP 172.24.10.11 - eri0@dbs01 UP 172.24.10.20 - ce2@csn02 UP 172.24.10.21 - eri0@dbs02 UP
20	172.24.20.0/24 Private subnet for CSN internal traffic; tunnelled through Switch 1 and Switch 2	172.24.20.10 - ce3@csn01 UP 172.24.20.11 - hme0@dbs01 UP 172.24.20.20 - ce3@csn02 UP 172.24.20.21 - hme0@dbs02 UP
100	172.24.15.0/24 Public subnet for SIP traffic between CSN and other SIP elements	172.24.15.10 - ce0:1@csn01 UP 172.24.15.11 - ce1@csn01 UP 172.24.15.100 - ce0@csn01 UP 172.24.15.20 - ce0:1@csn02 UP 172.24.15.21 - ce1@csn02 UP 172.24.15.100 - ce0@csn02 DOWN

Configuring CSN for SIP HA requires configuration of:

■   the CSN network
■   the CSN Hosts

See the following sections for continuation of this example:

8.3   Configuring the CSN Network for SIP HA

Configuration of the CSN network for SIP HA includes the configuration of:

■   the router
■   the Main Switch
■   At CSN Site 1:
   ◆   Switch 1
   ◆   Switch A
   ◆   Switch B
■   At CSN Site 2:
   ◆   Switch 2
   ◆   Switch C
   ◆   Switch D

Using the values in "SIP HA Configuration Example" on page 61, the following subsections continue with the example of how you can configure the router and switches.

8.3.1   Configuring the Router

Set up the router as shown in the table below.

Table 16: Configuration of the router

IOS Command	Description
Enable	Switch to enable mode.
Configure terminal	Switch to global configuration mode.
Interface FastEthernet0/1	Interface 0/1.
IP address 172.31.0.1 255.255.255.0	Define IP/mask for this interface.
Exit	Exit interface.
IP Route 172.24.10.0 255.255.255.0 172.31.0.2	Route all traffic to 172.24.10.0 subnet.
IP Route 172.24.20.0 255.255.255.0 172.31.0.2	Route all traffic to 172.24.20.0 subnet.
IP Route 172.24.100.0 255.255.255.0 172.31.0.2	Route all traffic to 172.24.100.0 subnet.
Exit	Exit global config.
Write memory	Commit changes to NVRAM.

8.3.2 Configuring the Main Switch

Set up the Main Switch for VLANs 1/10/20/100 and routing as shown in the table below.

Table 17: Configuration of the Main Switch

IOS Command	Description
Enable	Switch to enable mode.
Configure Terminal	Enter global configuration mode.
Hostname Main	Assign name to switch.
Exit	Exits configuration mode.
Vlan database	Enter VLAN database.
Vlan 10	Create VLAN 10.
Vlan 20	Create VLAN 20.
Vlan 100	Create VLAN 100.
Configure Terminal	Enter configuration mode.
Interface Vlan 10	Enter VLAN 10 interface.
IP Address 172.24.10.1	Assign IP address to VLAN interface.
No shut	Bring up the interface.
Exit	Exit VLAN interface.
Interface Vlan 20	Enter VLAN 20 interface.
IP Address 172.24.20.1	Assign IP address to VLAN interface
No shut	Bring up the interface
Exit	Exit VLAN interface.
Interface Vlan 100	Enter VLAN 100 interface.
IP Address 172.24.100.1	Assign IP address to VLAN interface.
No shut	Bring up the interface
Exit	Exit VLAN interface.
IP routing	Enable routing on the switch by using the IP routing.

Table 17: Configuration of the Main Switch (Continued)

IOS Command	Description
Interface FastEthernet 0/1	Enter FastEthernet 0/1 interface.
No Switchport	No switchport command makes the interface Layer 3 capable.
IP Address 172.31.0.2	Assign IP address.
No shutdown	
IP Route 0.0.0.0 0.0.0.0 172.31.0.1	Configure the default route for the switch.
Exit	Exit interface
Interface FastEthernet0/2	Enter interface configuration for port 0/2. This is where you pick the port you want to trunk. (Connecting Switch 1)
Switchport mode trunk	Set port to trunking mode.
Switchport trunk encapsulation dot1q	Set trunk type to 802.1q. If your switch only supports either ISL or 802.1q, this command does not exist because there is nothing to specify. This command only works when you can choose between the two.
Switchport trunk allow vlan 10,20,100	Allow only VLANs 10,100. It is important that you restrict the VLANs to only the ones you need for security best practices.
Exit	Exit interface.
Interface FastEthernet0/3	Entering interface configuration for port 0/2. This is where you pick the port you want to trunk (Connecting Switch 2).
Switchport trunk encapsulation dot1q	Set trunk type to 802.1q. If your switch only supports either ISL or 802.1q, this command does not exist because there is nothing to specify. This command only works when you can choose between the two.
Switchport trunk allow vlan 10,20,100	Allow only VLANs 10,100. It is important that you restrict the VLANs to only the ones you need for security best practices.
Exit	Exit global configuration.
Write memory	Commit changes to NVRAM

8.3.3 Configuring Switch 1 and Switch 2

Set up Switch 1 at Site A and Switch 2 at Site B in exactly the same way, as shown in the table below.

Table 18: Configuration of Switch 1 and Switch 2

IOS Command	Description
Enable	Switch to enable mode.
Vlan Database	Enter VLAN database.
Vlan 10	Create VLAN 10.
Vlan 20	Create VLAN 20.
Vlan 100	Create VLAN 100.
Exit	Exit VLAN database.
Configure Terminal	Enter global configuration mode.
Interface FastEthernet0/1	Enter interface configuration for port 0/1. This is where you pick the port you want to trunk (From Main Switch).
Switchport mode trunk	Set port to trunking mode.
Switchport trunk encapsulation dot1q	Set trunk type to 802.1q. If your switch only supports either ISL or 802.1q, this command does not exist because there is nothing to specify. This command only works when you can choose between the two.
Switchport trunk allow vlan 10,20,100	Allow only VLANs 10,20,100. It is important that you restrict the VLANs to only the ones you need for security best practices.
Exit	Exit interface.
Interface FastEthernet0/3	Enter interface configuration for port 0/3. This is where you pick the port you want to trunk (Connecting to Switch A if you are working with Switch 1, or connecting with Switch D if you are working with Switch 2).
Switchport mode trunk	Set port to trunking mode.
Switchport trunk encapsulation dot1q	Set trunk type to 802.1q. If your switch only supports either ISL or 802.1q, this command does not exist because there is nothing to specify. This command only works when you can choose between the two.
Switchport trunk allow vlan 10,100	Allow only VLANs 10,100. It is important that you restrict the VLANs to only the ones you need for security best practices.

Table 18: Configuration of Switch 1 and Switch 2 (Continued)

IOS Command	Description
Exit	Exit interface.
Interface FastEthernet0/4	Enter interface configuration for port 0/4. This is where you pick the port you want to trunk (Connecting to Switch B if you are working with Switch 1, or connecting with Switch C if you are working with Switch 2).
Switchport mode trunk	Set port to trunking mode.
Switchport trunk encapsulation dot1q	Set trunk type to 802.1q. If your switch only supports either ISL or 802.1q, this command does not exist because there is nothing to specify. This command only works when you can choose between the two.
Switchport trunk allow vlan 20,100	Allow only VLANs 10,100. It is important that you restrict the VLANs to only the ones you need for security best practices.
Exit	Exit interface.
Exit	Exit global configuration.
Write memory	Commit changes to NVRAM.

8.3.4 Configuring Switch A and Switch D

Set up Switch A at Site A and Switch D at Site B in exactly the same way, as shown in the table below.

Table 19: Configuration of Switch A and Switch D

IOS Command	Description
Enable	Switch to enable mode.
Configure Terminal	Enter global configuration mode.
Interface FastEthernet0/1	Enter interface configuration for port 0/1. This is where you pick the port you want to trunk (From Switch 1 if you are working with Switch A, or from Switch 2 if you are working with Switch D).
Switchport mode trunk	Set port to trunking mode.
Switchport trunk encapsulation dot1q	Set trunk type to 802.1q. If your switch only supports either ISL or 802.1q, this command does not exist because there is nothing to specify. This command only works when you can choose between the two.

Table 19: Configuration of Switch A and Switch D (Continued)

IOS Command	Description
Switchport trunk allow vlan 10,100	Allow only VLANs 10,100. It is important that you restrict the VLANs to only the ones you need for security best practices.
Exit	Exit interface.
Interface FastEthernet0/3	Enter interface configuration for port 0/20.
Switchport mode access vlan 10	Assign static VLAN 10 to port 0/3.
Exit	Exit interface.
Interface FastEthernet 0/4	Enter interface configuration for port 0/4.
Switchport mode access vlan 100	Assign VLAN 100 to port 0/4.
Exit	Exit interface.
Exit	Exit global configuration.
Write memory	Commit changes to NVRAM.

Note: You can create as many ports as you need to access the VLANs based on VLAN IDs.

8.3.5 Configuring Switch B and Switch C

Set up Switch B at Site A and Switch C at Site B in exactly the same way, as shown in the table below.

Table 20: Configuration of Switch B and Switch C

IOS Command	Description
Enable	Switch to enable mode.
Configure Terminal	Enter global configuration mode.
Interface FastEthernet0/1	Enter interface configuration for port 0/1. This is where you pick the port you want to trunk (From Switch 1 if you are working with Switch B, or from Switch 2 if you are working with Switch C).
Switchport mode trunk	Set port to trunking mode.
Switchport trunk encapsulation dot1q	Set trunk type to 802.1q. If your switch only supports either ISL or 802.1q, this command does not exist because there is nothing to specify. This command only works when you can choose between the two.

Table 20: Configuration of Switch B and Switch C (Continued)

IOS Command	Description
Switchport trunk allow vlan 20,100	Allow only VLANs 10,100. It is important that you restrict the VLANs to only the ones you need for security best practices.
Exit	Exit interface.
Interface FastEthernet0/3	Enter interface configuration for port 0/20.
Switchport mode access vlan 20	Assign static VLAN 10 to port 0/3.
Exit	Exit interface.
Interface FastEthernet 0/4	Enter interface configuration for port 0/4.
Switchport mode access vlan 100	Assign VLAN 100 to port 0/4.
Exit	Exit interface
Exit	Exit global configuration.
Write memory	Commit changes to NVRAM.

Note: You can create as many ports as you need to access the VLANs based on VLAN IDs.

8.4   Configuring the CSN Hosts for SIP HA

The Solaris multipathing (IPMP) feature monitors the network interface cards (NICs) in a CSN Host. If a NIC fails to respond to pinging, Solaris fails it over to the other NIC that shares the same SIP (public) IP address.

Using the values in "SIP HA Configuration Example" on page 61, the following subsections continue with the example of how you can configure the IPMP in both CSN Hosts (CSN01 and CSN02).

8.4.1   Configuring CSN01

1   Open the following file and modify the lines indicated in bold, if required.

```
csn01:/home/csnr30$ cat /etc/hosts
#
# Internet host table
#
127.0.0.1        localhost
172.24.10.10     csn01    csn01.newstep.local     loghost
172.24.20.10     csn01b
172.24.15.100    csn01c
172.24.15.11     csn01d
```

2   Open the following file and modify the lines indicated in bold, if required.

```
csn01:/etc/inet$ cat ipnodes
#
# Internet host table
#
::1      localhost
127.0.0.1        localhost
172.24.10.10     csn01    loghost
172.24.20.10     csn01b
172.24.15.100    csn01c
172.24.15.11     csn01d
```

3   Open the following file and modify it, if required.

```
csn01:/home/csnr30$ grep csn /etc/hostname.*
/etc/hostname.ce0:csn01
/etc/hostname.ce1:csn01b
/etc/hostname.ce2:csn01c
/etc/hostname.ce3:csn01d
```

4   Open the following file and add the line indicated in bold, if required.

```
csn01:/home/csnr30$ cat /etc/netmasks
#
# The netmasks file associates Internet Protocol (IP) address
# masks with IP network numbers.
172.24.10.0     255.255.255.0
172.24.15.0     255.255.255.0
172.24.20.0     255.255.255.0
```

5   Create the following file and add the lines indicated in bold.

```
csn01:/home/csnr30$ cat /etc/rc3.d/S89ipmp
ifconfig ce2 group migrate
ifconfig ce3 group migrate
ifconfig ce2 addif 172.24.15.10 netmask 0xffffff00 broadcast + -failover
ifconfig ce3 inet 172.24.15.11 netmask 0xffffff00 broadcast + -failover
```

6   Open the following file and modify it, if required.

```
csn01:/home/csnr30$ cat /etc/default/mpathd
#
#pragma ident   "@(#)mpathd.dfl 1.2     00/07/17 SMI"
#
# Time taken by mpathd to detect a NIC failure in ms. The minimum
# time that can be specified is 100 ms.
#
FAILURE_DETECTION_TIME=10000
#
# Failback is enabled by default. To disable failback turn off
# this option
#
FAILBACK=yes
#
# By default only interfaces configured as part of multipathing
# groups are tracked. Turn off this option to track all network
# interfaces on the system
#
TRACK_INTERFACES_ONLY_WITH_GROUPS=yes
```

7   Open the following file, or create it if it does not exist, and add the line indicated in bold.

```
csn01:/etc/rc3.d$ cat S91ntwkrtes
route add -net 172.24.15.0 -netmask 255.255.255.0 172.24.15.1 -
ifp ce2
```

8.4.2 Configuring CSN02

1 Open the following file and modify the lines indicated in bold, if required.

```
csn02:/home/csnr30$ cat /etc/hosts
#
# Internet host table
#
127.0.0.1       localhost
172.24.10.20    csn02   csn02.newstep.local     loghost
172.24.20.20    csn02b
172.24.15.100   csn02c
172.24.15.21    csn02d
```

2 Open the following file and modify the lines indicated in bold, if required.

```
csn02:/home/csn$ cat /etc/inet/ipnodes
#
# Internet host table
#
::1     localhost
127.0.0.1       localhost
172.24.10.20    csn02   loghost
172.24.20.20    csn02b
172.24.15.100   csn02c
172.24.15.21    csn02d
```

3 Open the following file and modify it, if required.

```
csn02:/home/csnr30$ grep csn /etc/hostname.*
/etc/hostname.ce0:csn02
/etc/hostname.ce1:csn02b
/etc/hostname.ce2:csn02c
/etc/hostname.ce3:csn02d
```

4 Open the following file and add the line indicated in bold, if required.

```
csn02:/home/csnr30$ cat /etc/netmasks
#
# The netmasks file associates Internet Protocol (IP) address
# masks with IP network numbers.
#
172.24.10.0     255.255.255.0
172.24.15.0     255.255.255.0
172.24.20.0     255.255.255.0
```

5 Create the following file and add the lines indicated in bold.

```
csn02:/home/csnr30$ cat /etc/rc3.d/S89ipmp
ifconfig ce2 group migrate
ifconfig ce3 group migrate
ifconfig ce2 addif 172.24.15.20 netmask 0xffffff00 broadcast + -failover
ifconfig ce3 inet 172.24.15.21 netmask 0xffffff00 broadcast + -failover
```

6 Open the following file and modify it, if required.

```
csn02:/home/csn$ cat /etc/default/mpathd
#
#pragma ident   "@(#)mpathd.dfl 1.2    00/07/17 SMI"
#
# Time taken by mpathd to detect a NIC failure in ms. The minimum
# time that can be specified is 100 ms.
#
FAILURE_DETECTION_TIME=10000
#
# Failback is enabled by default. To disable failback turn off
# this option
#
FAILBACK=yes
#
# By default only interfaces configured as part of multipathing
# groups are tracked. Turn off this option to track all network
# interfaces on the system
#
TRACK_INTERFACES_ONLY_WITH_GROUPS=yes
```

7 Open the following file, or create it if it does not exist, and add the line indicated in bold.

```
csn02:/home/csn$ cat /etc/rc3.d/S91ntwkrtes
route add -net 172.24.15.0 -netmask 255.255.255.0 172.24.15.1 -
ifp ce2
```

Chapter 9

Understanding the CSN Database Instances

This chapter describes:

- the CSN database instances, for the purpose of installation and configuration

9.1   Overview

9.1.1 Scope

This chapter explains the CSN database instances only for the purpose of installation and configuration. For a general description of the databases, see the *CSN System Overview* and the *CSN System Reliability Description*.

Database installation is performed in two stages:

1   Installation and configuration of the RDBMS

This stage includes installation and configuration of the Oracle RDBMS and the setting up of TNS names and database replication. These topics are covered in "Configuring Oracle and Installing Databases" on page 49.

To place this stage in the context of 3rd party software installation, see "Installation of 3rd Party Software on the CSN Host" on page 16.

2   Installation of database table schema and user objects

This stage is part of the installation of the CSN software and is covered in "Installing the CSN Software" on page 81.

Managing the databases:

■   You can use the MSE Console to manage the databases. To perform database management tasks on the Console, you need database administration privileges and remote script execution permissions. For information on using the MSE Console to manage the databases, see the *CSN System Administration Guide*.

9.1.2 Database Instances and TNS Names

CSN has two types of database: Configuration Database and CDR Database. For redundancy, there are two instances of each type of database, labeled as instances 1 and 2.

Therefore, four database instances and four Oracle TNS (Transparent Network Substrate) names must be set up in the CSN Platform.

TNS Names:

■   csn01 – db_1 = server #1 IP
■   csn02 – db_1 = Server #1 IP
■   csn02 – db_2 = Server #2 IP

In a dual DB configuration, it is important to set the TNS names to point at both IPs.

9.2   Configuration Database

The Configuration Database is used by the MSE Console and call processing components to store and retrieve configuration data.

Two instances of the Configuration Database are required. These instances are created when you install the CSN software on the two Database Servers (DBS01 and DBS02).

Two TNS names are required on the CSN Host to point to instances 1 and 2 of the Configuration Database, for example:

- csn_master
- csn_slave

The secondary Configuration Database (read only) is replicated from the primary Configuration Database.

9.3   CDR Database

The CDR Database stores Call Detail Records (CDRs), which keep track of the details of call sessions.

Two instances of the CDR Database are required. These instances are created when you install the CSN software on the two Database Servers (DBS01 and DBS02).

Two TNS names are required on the CSN Host to point to instances 1 and 2 of the CDR Database, for example:

- cdr_tns_1
- cdr_tns_2

Chapter 10

Setting the Environment

This chapter describes:

■ the tasks performed to set the installation environment

10.1 Superuser

This section describes the tasks performed by someone with superuser privileges on:

- the two CSN Hosts (CSN01 and CSN02)
- the two Database Servers (DBS01 and DBS02)

Make sure that the following tasks have been performed:

- creating the users "csn" and "oracle"
- creating the "dba" group
- granting "csn" and "oracle" the privilege to manage the databases

In this Guide, it is assumed that the CSN user is "csn". After installation, the user who starts the MSE Console must be the same CSN user, "csn".

10.2 Oracle User

This section describes the task performed by someone with Oracle user privileges.

10.2.1 Granting the CSN User Write Permissions to Log Files

This step gives the CSN user, "csn", write permission to a log directory and a log file. The following procedure is performed on each of the two Database Servers.

1   Log in as "oracle".

2   Change to the directory:

`$ORACLE_HOME/network/log`

3   Add write permission to the directory, by executing:

`chmod g+w $ORACLE_HOME/network/log`

4   Check whether the `listener.log` file exists in this directory; then, do one of the following:

- If the file does not exist, create it as an empty file:

    `touch listener.log`

- If the file exists, continue.

5   Add write permission to the `listener.log` file in this directory, by executing:

`chmod g+w $ORACLE_HOME/network/log/listener.log`

Note: If the `listener.log` file is removed manually, it has to be recreated manually with the group write permission.

10.3 CSN User

This section describes tasks performed by the CSN user.

10.3.1 Editing the ".profile" File

The `.profile` file controls the Unix environment variables vital to the execution of the CSN software. During a standard CSN installation, this file is automatically included under the CSN user's home directory.

In most cases, the default settings in the provided `.profile` file are appropriate for typical CSN deployments; that is, manual editing of the file is not required.

Exceptions:

- If the cellular system is GSM, add the following section:

    ```
    #set up TCAP environment
    set QHLRMODE=GSM
    ```

    Note: CDMA is the default. If the cellular system is CDMA, delete or comment out the QHLRMODE line.

C h a p t e r 1 1

Installing the CSN Software

This chapter describes:

- how to install the CSN software on the CSN Host
- how to install the CSN software on the Database Server

11.1   The CSN Software Load File

NewStep provides you with a CSN software load file for installation. The name of this load file is

        <CSN_load>

for example:

        CSN-R<version>.tar.gz

The CSN software load file is the main file for installing the CSN Platform; it contains all the CSN components. The same package is used for installing the appropriate components on each CSN Host and each Database Server.

During installation, the installer asks you a number of questions. Your answers indicate whether you are installing on a CSN Host or a Database Server, and whether you use a Database Server for the master or slave configuration database. The installer automatically installs the appropriate components and schema, as shown in the following table.

Table 21: Selected components to be installed from the CSN software package

	Target		
Component/ DB/ Schema	CSN Hosts	DB Server (Master DB)	DB Server (Slave DB)
CSN Platform components	✓	✓	✓
MSE Console	✓		
Configuration schema		✓	
CDR schema		✓	✓

11.2   Installing CSN Software on the CSN Host

This installation procedure is performed on each of the two CSN Hosts (CSN01 and CSN02).

1   Log in to the CSN Host as **csn** user where the CSN load file is to be installed.

2   If the Task Manager (Mtm) is running, stop it, by doing one of the following:

csn stop

or

kill <Mtm_PID>

3   If Tomcat is running, use the following command in the CSN user's **bin** directory to stop it:

stopMSEConsole.sh

Note: If Tomcat is not running, executing **stopMSEConsole.sh** results in a message "java.net.ConnectException: Connection refused" printed to the command line output. This is not an error, it simply means Tomcat is not running, so stopping Tomcat is not successful.

4   Create a temporary directory, **temp**.

5   Change the directory to **temp**.

6   Copy or use FTP to download the CSN load file, **<CSN_load>**, to the **temp** directory.

7   Execute the Unix command:

gzip -d -c <CSN_load> | tar -xf - ./csn_install.sh

Result: The above command leaves the **<CSN_load>** file intact and extracts a **csn_install.sh** file in the **temp** directory.

8   Run the CSN installation script:

./csn_install.sh

9   Follow the prompts from the CSN installation script. When prompted to:

- Overwrite existing CSN installation, answer "y".

- Install CSN Platform components, answer "y".

- Install CSN Management Console component, answer "y".

- Install CSN Self-Provisioning Service, answer "y".

- "Install new CSN database (Warning: choosing yes will erase existing data)? (y/n)", answer "n".

- ■ "What is your deployment mode, SINGLE or DUAL", answer "".

- ■ "Install new CSN CDR database (Warning: choosing yes will erase existing data)? (y/n)", answer "n".

11.2.1 Editing the server.xml File on the CSN Host

This procedure is required only on the CSN Host running the MSE Console.

1   Log in as **csn** to the CSN Host running the MSE Console.

2   Under the Unix prompt, execute:

cp $HOME/data/server.xml $CATALINA_HOME/conf

Caution: Copying the **server.xml** file overwrites existing Tomcat web server's configuration.

Note: The MSE Console can be accessed using port 55000.

3   You can accept the default values in the **server.xml** file. But if you want to customize it, see Appendix F, "Editing the server.xml File" on page 132.

4   Execute the **apply_deltas.sh** script using the following commands:

cd /home/csn/db/Oracle/csn/delta

./apply_deltas.sh

Note: If prompted to confirm, answer **Yes**.

11.3   Installing CSN Software on the Database Server

This installation procedure is performed on each of the two Database Servers (DBS01 and DBS02).

1   Log in to the Database Server where the CSN load file is to be installed.

2   Create a temporary directory, `temp`.

3   Change the directory to `temp`.

4   Copy or use FTP to download the CSN load file, `<CSN_load>`, to the `temp` directory.

5   Execute the Unix command:

`gzip -d -c <CSN_load> | tar -xf - ./csn_install.sh`

Result: The above command leaves the `<CSN_load>` file intact and extracts a `csn_install.sh` file in the `temp` directory.

6   Run the CSN installation script:

`./csn_install.sh`

7   Follow the prompts from the CSN installation script:

- When prompted to install Platform Components, answer "y".

- When prompted to install MSE Console, answer "n".

- When prompted for "Install new CSN provisioning database (Warning: choosing yes will erase existing data)? (y/n)", answer "y" (if it is the master database) or "n" (if it is the slave database).

  Result: The Configuration Database (provisioning database) will be installed on the Database Server.

- When prompted to enter the CSN task manager OAM service name, enter it as defined in the `etc/services` file. This service name, along with the port number associated with it, has to be defined and be exactly the same on all the CSN Hosts and Database Servers. For information on port numbers, see Appendix D, "Port Description" on page 123.

- When prompted for "Install new CSN CDR database (Warning: choosing yes will erase existing data)? (y/n)", answer "y" to install the CSN CDR database on the Database Server.

  Result: The CDR Database will be installed on the Database Server.

- When prompted for the CDR database user name, password, and TNS name, enter `cdr`/`cdr` for user name and password and `cdr_tns_1` or `cdr_tns_2` for the TNS name, depending on which Database Server you are working on.

Chapter 12

Additional Database-Related Installation

This chapter describes how to:

- replicate the configuration database from the master to the slave
- recompile user functions and procedures
- initialize database backup
- make the database utility executable
- configure the Database Manager

12.1   Connecting the Two CSN Sites

Up to this point, the components at one site are installed and configured independently of those at the other sites. Now, you must connect the components between the two sites before you can proceed.

12.2   Replicating the Configuration Database

For redundancy of the Configuration Database, you need to replicate the master Configuration Database in one Database Server to the slave Configuration Database in the other Database Server. Different replicating procedures are required to be performed on the two Database Servers.

12.2.1 Database Server Hosting the Master Configuration Database

1   Log in as **csn**

2   To replicate the database or reset the replication, use the commands:

```
$ cd $HOME/db/Oracle/csn/other
$ sqlplus csn/csn@csn_master
SQL> @createmvlog.sql
```

3   To verify, use the command:

```
SQL> @find_obj_status.sql
SQL> exit
```

4   If you see INVALID anywhere in the response:

a.   Follow the procedure in "Recompiling User Functions, Procedures, and Objects" on page 91.

b.   If the problem persists, contact NewStep for support.

12.2.2 Database Server Hosting the Slave Configuration Database

Make sure you have completed the procedure for replication at the server for the master Configuration Database before you start this procedure.

1   Log in as **oracle**

2   Use the commands:

```
$ cd $HOME/dba
$ sqlplus general/incharge220@csn_slave
SQL> @createdblink.sql
SQL> exit
```

3   Log in as **csn**

4   Use the commands:

```
$ cd $HOME/db/Oracle/csn/other
$ sqlplus csn/csn@csn_slave
SQL> @build_replicate.sql
```

5   To verify, use the command:

```
SQL> @find_obj_status.sql
SQL> exit
```

6   If you see INVALID anywhere in the response:

a.   Follow the procedure in "Recompiling User Functions, Procedures, and Objects" on page 91.

b.   If the problem persists, contact NewStep for support.

12.3   Recompiling User Functions, Procedures, and Objects

This step is not necessary for a new CSN installation on the Database Server. During a CSN reinstallation, however, if you encounter error messages and exceptions, perform a recompilation on the Database Server.

- To recompile the user function:

```
$ cd $ORACLE_HOME/rdbms/admin
$ export ORACLE_SID=csn
$ sqlplus /nolog
SQL> connect / as sydba
SQL> @utlrp.sql
```

12.4 Other Database-Related Tasks

The following procedure is performed on each of the two Database Servers.

12.4.1 Making the Database Utility Executable

1   Log in as **oracle**

2   Run the following commands:

    $ **cd $HOME/utl**
    $ **chmod +x ***

12.5 Setting Up the Database Manager

The Database Manager performs daily routine clean-and-recycle tasks on the databases. For a detailed description of these tasks, see the *CSN System Administration Guide*, "Maintaining the System" chapter.

During the installation of Oracle, several subdirectories are installed in the Oracle home directory as part of the database management configuration utilities. These subdirectories include:

- **utl**—including most of the utilities such as those for starting and stopping the databases and the Listeners, and for moving data between accounts
- **backup**—including hot backup and export tools

Avoid making changes to these subdirectories, because they are configured specifically for the Oracle platform and this database release.

The Database Manager core is installed in **/home/oracle/cdrmgr** during database installation. Normally, only configuration of the Database Manager is required.

Unless otherwise indicated, configuration of the Database Manager, as described below, is performed on each of the two Database Servers (DBS01 and DBS02).

12.5.1 Installing the OM History Cleanup Scripts

This procedure is required only for the Database Server that hosts the master Configuration Database. Make sure the Configuration and CDR Databases and their objects, including OMs, are installed on this Database Server before you use the following procedure.

1   Log in as **oracle**

2 $ **cd csn/other**

3   Log in to sqlplus as **csn**

       $ **sqlplus csn/csn@csn_master**

4   sql> **@clean_history.sql**

5   sql> **@clean_history_ext.sql**

12.5.2 Configuring the Database Manager Environment

The Database Manager uses data from the **db.properties** configuration file for parameters such as tns, user, pwd, alarmhost, and alarmport.

Most of the default values in this file are acceptable. However, to configure for your environment, you have to modify the alarm host IP addresses. For details of the parameters and default values in this file, see Appendix E, "File Description", on page 125.

Editing the db.properties File

1 $ `cd $HOME/cdrmgr`

2   Modify the **db.properties** file (host IP addressees), according to your requirements.

Note: Make sure you set the role for **db.properties**, as either **p** or **s**, for primary (master) and secondary (slave), respectively.

12.5.3 Configuring the Database Manager for Backup, Export and Recycle

The Database Manager executes daily backups and deletes obsolete backup data. The configuration file used for backup purposes is **mnssexp.cfg**.

Configuration Database

1 $ `cd $HOME/backup/mnss`

2   Make an init backup and export it with the command:

$ **mnssext**

3   Wait for the process to complete.

Note: The process may take a while; it is complete when the prompt appears.

CDR Database

1 $ `cd $HOME/backup/cdr`

2   Verify that in the export config file, **cdrexp.cfg**, the account in TABLES matches your created CDR schema account name (default **cdr**).

```
---
TABLES=("cdr.cdr_history","cdr.cdr_reason","cdr.ss_parameter")
---
```

12.5.4 Starting the cdrmgr

Run the following commands:

```
$ cd /home/oracle/cdrmgr
$ startmgr
```

Note: The cdrmgr could be stopped by using the command: **stopmgr**

Chapter 13

Configuring and Launching the CSN Platform

This chapter describes:

- getting ready to configure the CSN Platform
- invoking CSN
- creating and installing the auto-launch script

13.1   Configuring the CSN Platform

13.1.1 Configuring CSN Using the MSE Console

After installing the CSN software on all the CSN Hosts and Database Servers, you must configure the CSN Platform with the MSE Console—which is a web application accessible via a web browser—before CSN can begin processing calls.

To start the MSE Console:

1   Log in to the CSN Host where the MSE Console is located (typically CSN01).

2   Change to the CSN user's `$HOME/bin` directory.

3   Run the script:

`startMSEConsole.sh`

To configure the CSN Platform from a web browser:

1   Point the web browser to the URL of the MSE Console:

`http://<MSE_IP>:<port>/mseconsole/`

where `<MSE_IP>` is the IP address of the CSN Host where the MSE Console is located and `<port>` is the port number that corresponds to the Jakarta configuration in the `server.xml` file.

2   Log in to the MSE Console and configure the CSN Platform as required.

For information on how to configure CSN using the MSE Console, see the *CSN System Configuration Guide*.

After configuring the CSN Platform, you are ready to launch it.

Important: Before starting the Task Manager (Mtm), you must stop the MSE Console by running the **stopMSEConsole.sh** script in the CSN user's `$HOME/bin` directory.

13.1.2 Configuring Syslog

Syslog is a Solaris utility that captures log messages related to the operating system. It reports hardware failures, user login activities, system level messages, etc. Syslog is installed on each machine when you installed Solaris on it, and it starts automatically at each boot time.

The syslog daemon process syslogd reads configuration information from the **/etc/syslog.conf** file. The format of the configuration is documented in the Solaris man pages. To make sure syslog works for CSN, the following line has to be included in the **/etc/syslog.conf** file:

```
*.err;kern.debug;daemon.notice;mail.crit /var/adm/messages
```

To verify that the syslog process is running, use the following Unix command:

```
ps -ef|grep syslogd
```

The syslog messages can be viewed in the **/var/adm/messages** file.

13.1.3 Configuring Log Maintenance

The log maintenance files are included with the CSN software load. After installation, use the following procedure and the scripts will copy log maintenance configuration files to the appropriate backup directories and set up cron jobs for log maintenance.

Normally, CSN software is installed on the Database Server. In case it is not, you can use an alternative method to configure log maintenance. For more information, see "Configuring Log Maintenance—Alternative Method" on page 100.

Setting up cron jobs under the csn user

Perform the following steps on each CSN Host and each Database Server:

1   Log in as **csn**

2   Execute the following script:

```
# bin/csn_log_manager_install.sh
```

Setting up cron jobs under the oracle user

Perform the following substeps on each Database Server:

1   Log in as **oracle**

2   Execute the following script:

```
# cdrmgr/oracle_log_manager_install.sh
```

Verifying the contents of the crontab files

To verify the contents of the crontab files, execute the following command on each CSN Host and Database Server:

1 Log in as **oracle**

```
# crontab -l
30 0  * * * home/oracle/cdrmgr/log_manager.ksh
```

2 Log in as **csn**

```
# crontab -l
30 0  * * * home/csn/bin/log_manager.ksh
```

13.1.4 Configuring Log Maintenance—Alternative Method

If CSN software is not installed on the Database Server, you can use this alternative method.

Copying log configuration files to backup directories

1 On the Database Server, log in as **oracle**

2 # **cd $HOME/cdrmgr**

3 Copy the **$HOME/cdrmgr/oracle_log.cfg** file to **/backup/oracle_logs.cfg**

Setting up cron jobs

1 On the Database Server, log in as **oracle**

2 Add an entry similar to the following line into your crontab:

```
15 0  * * * /home/oracle/log_manager.ksh
```

13.2 Launching the CSN Platform

After configuring the CSN software, you can launch CSN to process calls.

Launching CSN consists of starting the Task Manager (Mtm) on each of the CSN Hosts and Database Servers. You can start these Task Managers in any order you want.

To start a Task Manager,

1   Log in as `csn`

2   Use the command:

`csn start`

After the Task Managers have started, they in turn start all the required CSN processes.

After a few minutes, verify the list of processes with the command:

`csn status`

13.3 Setting Components to Start When Reboot

An autolaunch script is provided in CSN to simplify the launch process. It sets the database and Database Manager to start when reboot.

1 Log in as `root`

2 Change the directory and run the autolaunch script:

```
cd /home/root/setup_csn
./setup_autolaunch.sh
```

3 Reboot the CSN Host to test.

4 After rebooting, log in as `oracle`

5 To monitor the Oracle processes startup, use the command:

```
tail -f $ORACLE_HOME/startup.log
```

6 Execute the command:

```
tail -f /home/oracle/cdrmgr/Log/dblog.txt
```

Result: If the Database Manager is running, the screen displays the keep alive messages from the cdr_current table every 5 seconds.

13.4   Configuring CSN Servers to Auto-boot

It is useful to configure CSN servers to auto-boot after a power failure. The
following general command sets up the auto-boot:

```
/usr/platform/<name_of_platform>/sbin/scadm set
sc_powerstatememory true
```

Examples

For Netra 240, the command is:

```
/usr/platform/SUNW,Netra-240/sbin/scadm set sc_powerstatememory true
```

For Sunfire V240, the command is:

```
/usr/platform/SUNW,Sun-Fire-V240/sbin/scadm set
sc_powerstatememory true
```

Chapter 14

Uninstalling CSN and Databases

This chapter describes:

- how to uninstall CSN
- how to restore CSN
- how to uninstall the databases

14.1 Uninstalling CSN

1 Login to the CSN Host or Database Server where the CSN software is to be uninstalled.

2 Do one of the following:

- If you are uninstalling CSN on a Database Server, continue to step 3.

- If you are uninstalling CSN on a CSN Host and Tomcat is not running, continue to step 3.

- If you are uninstalling CSN on a CSN Host and Tomcat is running, stop Tomcat by using the following command in the CSN user's **bin** directory:

  stopMSEConsole.sh

  Note: If Tomcat is not running, executing **stopMSEConsole.sh** results in a message "java.net.ConnectException: Connection refused" printed to the command line output. This is not an error, it simply means Tomcat is not running, so stopping Tomcat is not successful.

3 Change the directory to **bin**.

4 Under the Unix prompt, execute **csn_uninstall.sh**

5 Follow the prompt from the CSN uninstallation script.

Result: The uninstallation process creates a backup directory, which contains the uninstalled software.

The uninstalled software can be restored. For more information, see "Restoring CSN" on page 107.

It is recommended that you copy this backup directory to a tape backup and delete the original backup directory to save disk space.

14.2 Restoring CSN

1 Login to the CSN Host or Database Server where the CSN software is to be restored.

2 Do one of the following:

- If you are restoring CSN on a Database Server, continue to step 3.

- If you are restoring CSN on a CSN Host and Tomcat is not running, continue to step 3.

- If you are restoring CSN on a CSN Host and Tomcat is running, stop Tomcat by using the following command in the CSN user's **bin** directory:

    stopMSEConsole.sh

    Note: If Tomcat is not running, executing **stopMSEConsole.sh** results in a message "java.net.ConnectException: Connection refused" printed to the command line output. This is not an error, it simply means Tomcat is not running, so stopping Tomcat is not successful.

3 Change the directory to the backup directory created in "Uninstalling CSN" on page 106.

Note: If you have copied the backup directory to a tape backup and deleted the original backup directory, you must first recreate the backup directory and copy the content from the tape backup.

4 Change the directory to **bin**.

5 Under the Unix prompt, execute **./csn_restore.sh**

6 Follow the prompt from the CSN restoration script.

14.3 Uninstalling Oracle 10g Databases and Software

You need a GUI interface such as the X Window environment to uninstall Oracle.

Step 1: Record ASM Disk Information

1   Log in to the Database Server as **oracle**

2 $ **cd utl**

3 $ **asmdiskstatus**

4   Record the output of this execution.

> *Note:* You need this information later during installation.

Step 2: Delete Databases

1   Log in to the Database Server as **oracle**

2 $ **dbca**

3   When prompted, click Next.

4   In the DB Assistant Welcome window, select Delete Database; then, click Next.

5   When asked to select a DB name, select csn.

6   Click Finish and confirm the deletion.

7   When asked whether you want to perform another operation, click Yes.

8   Repeat steps 5 to 7, selecting cdr as the DB name.

9   When the process is complete, click Cancel to exit.

Step 3: Delete Oracle 10g Software

1   Log in to the Database Server as **oracle**

2 $ **cd $ORACLE_HOME/oui/bin**

3 $ **./runInstaller.sh**

4   When the Welcome window appears, click Deinstall Product.

5   In the Inventory window, select OraDb10g_homeasm; then, click Remove.

6   When prompted for confirmation, click Yes.

7   Wait until the process is complete; then, click Close.

8   Click Cancel to exit.

9   When prompted, to continue, click Yes.

Step 4: Reformat 10g ASM Used Disks

Step 4 requires the information recorded in "Step 1: Record ASM Disk Information" on page 108.

The following procedure assumes that the old Standard ASM used disks, as recorded in the output of Step 1, are: c1t11d1s6, c1t11d2s6, c5t12d0s6, c5t12d1s6.

1   Log in to the Database Server as **root**

2   **# format**

Result: The screen display is similar to the following:

```
Searching for disks...done
c5t12d0: configured with capacity of 67.33GB
AVAILABLE DISK SELECTIONS:
       0. c1t11d0 <SUN-StorEdge3310-0325 cyl 34474 alt 2 hd 64 sec 64>
          /pci@8,700000/pci@3/scsi@4/sd@b,0
       1. c1t11d1 <SUN-StorEdge3310-0325 cyl 34474 alt 2 hd 64 sec 32>
          /pci@8,700000/pci@3/scsi@4/sd@b,1
       2. c1t11d2 <SUN-StorEdge3310-0325 cyl 34474 alt 2 hd 64 sec 32>
          /pci@8,700000/pci@3/scsi@4/sd@b,2
       3. c1t11d3 <SUN-StorEdge3310-0325 cyl 34474 alt 2 hd 64 sec 64>
          /pci@8,700000/pci@3/scsi@4/sd@b,3
       4. c2t0d0 <SUN72G cyl 14087 alt 2 hd 24 sec 424>
          /pci@8,600000/SUNW,qlc@4/fp@0,0/ssd@w2100000c506644d4,0
       5. c2t1d0 <SUN72G cyl 14087 alt 2 hd 24 sec 424>
          /pci@8,600000/SUNW,qlc@4/fp@0,0/ssd@w2100000c506bad29,0
       6. c5t12d0 <SUN-StorEdge3310-0325 cyl 34474 alt 2 hd 64 sec 64>
          /pci@8,600000/pci@1/scsi@4/sd@c,0
       7. c5t12d1 <SUN-StorEdge3310-0325 cyl 34474 alt 2 hd 64 sec 32>
          /pci@8,600000/pci@1/scsi@4/sd@c,1
       8. c5t12d2 <SUN-StorEdge3310-0325 cyl 34474 alt 2 hd 64 sec 32>
          /pci@8,600000/pci@1/scsi@4/sd@c,2
Specify disk (enter its number):
```

3   At the prompt, enter **1**

Result: The screen display is similar to the following:

```
selecting c1t11d1
[disk formatted]
FORMAT MENU:
        disk       - select a disk
        type       - select (define) a disk type
        partition  - select (define) a partition table
        current    - describe the current disk
        format     - format and analyze the disk
        repair     - repair a defective sector
        label      - write label to the disk
        analyze    - surface analysis
        defect     - defect list management
```

```
                    backup    - search for backup labels
                    verify    - read and display labels
                    save      - save new disk/partition definitions
                    inquiry   - show vendor, product and revision
                    volname   - set 8-character volume name
                    !<cmd>    - execute <cmd>, then return
                    quit
            format>
```

4   At the prompt: enter **format**

   Result: The screen display is similar to the following:

```
        Ready to format.  Formatting cannot be interrupted
        and takes 2039 minutes (estimated). Continue?
```

5   Ignore the warning. At the prompt, enter **y** to continue.

   Result: A progress indicator in the XXX/YY/ZZ format is displayed.

6   Wait until you see:
       1: the message: "formatting … done"
       2: the first group number (i.e. XXX) larger than 256

   Note: This takes approximately one minute. You do not have to wait 2039 minutes.

7   Press Ctrl+C to interrupt.

   Result: The screen display is similar to the following:

```
        Beginning format. The current time is Mon May 1 14:42:21 2006
        Formatting...
        done
        Verifying media...
                pass 0 - pattern = 0xc6dec6de
        ^C 257/14/22
        Total of 0 defective blocks repaired.
        format>
```

8   At the prompt: enter **quit**

9   Repeat the same procedure for the other used disks (in this example, disks 2, 7 & 8).

Appendix A

Rack Mount Layout

This appendix describes the recommended layout of CSN equipment on a rack

A.1   Recommended Equipment Layout on Rack

Typically, pieces of the CSN Platform hardware are mounted on a standard 19"
wide rack at each CSN site. The following diagram shows the recommended
equipment layout on the rack, together with the height requirement (in rack units)
for each piece of equipment.

Cisco Catalyst 3560	1U
Cisco Catalyst 3560	1U
Cisco ITP 7301	1U
Sun StorEdge 3320	2U
Sun Netra 240	2U
Sun Netra 1280	12U

Standard 19" wide rack
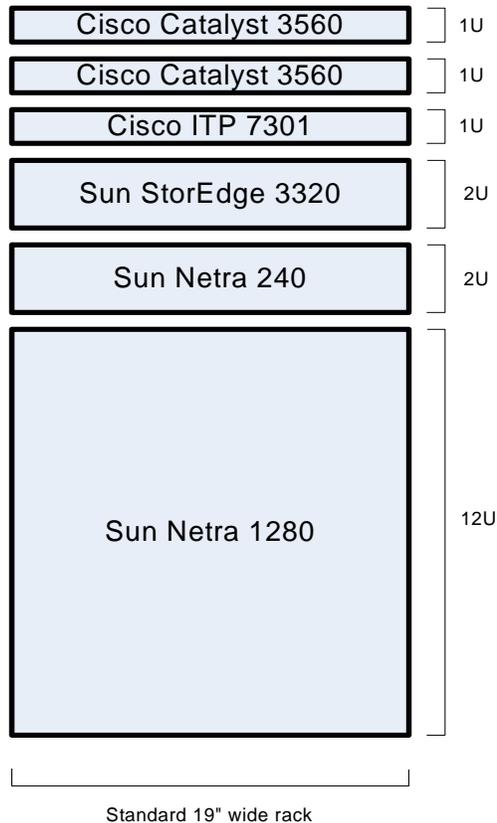
Figure 10: Rack mount layout for CSN equipment

Appendix B

Additional Database Installation Details

This appendix describes how to:

- make sure X-Window works
- configuring raw disks
- work with multiple IP addresses

B.1   Making Sure X-Window Works

Use the command to check whether X-Window works in your environment:

```
$ xclock
```

Result: If X-Window works, an analog clock icon appears; otherwise, configure your environment. Refer to your X-Window documentation for instructions.

B.2   Configuring Available Raw Disks

Verify the correctness of raw disk information and configure them before you use the available raw disks as candidate disks.

Prerequisites:

- All disks are in two different controllers.
- The disk in each controller group has the same size as its peer in the other controller group.

The raw disks used in the configuration example are as follows:

- c1t11d2, c1t11d3 (in controller 1)
- c5t12d0, c5t12d2 (in controller 2)

Configuring Procedure:

1   Log in as **root**

2   Use the command:

```
# format
```

Result: The screen output is similar to the following:

```
Searching for disks...done
AVAILABLE DISK SELECTIONS:
       0. c1t11d0 <SUN-StorEdge3310-0325 cyl 34474 alt 2 hd 64 sec 64>
          /pci@8,700000/pci@3/scsi@4/sd@b,0
       1. c1t11d1 <SUN-StorEdge3310-0325 cyl 34474 alt 2 hd 64 sec 32>
          /pci@8,700000/pci@3/scsi@4/sd@b,1
       2. c1t11d2 <SUN-StorEdge3310-0325 cyl 34474 alt 2 hd 64 sec 32>
          /pci@8,700000/pci@3/scsi@4/sd@b,2
       3. c1t11d3 <SUN-StorEdge3310-0325 cyl 34474 alt 2 hd 64 sec 64>
          /pci@8,700000/pci@3/scsi@4/sd@b,3
       4. c2t0d0 <SUN72G cyl 14087 alt 2 hd 24 sec 424>
          /pci@8,600000/SUNW,qlc@4/fp@0,0/ssd@w2100000c506644d4,0
       5. c2t1d0 <SUN72G cyl 14087 alt 2 hd 24 sec 424>
          /pci@8,600000/SUNW,qlc@4/fp@0,0/ssd@w2100000c506bad29,0
       6. c5t12d0 <SUN-StorEdge3310-0325 cyl 34474 alt 2 hd 64 sec 32>
          /pci@8,600000/pci@1/scsi@4/sd@c,0
       7. c5t12d1 <SUN-StorEdge3310-0325 cyl 34474 alt 2 hd 64 sec 32>
          /pci@8,600000/pci@1/scsi@4/sd@c,1
       8. c5t12d2 <SUN-StorEdge3310-0325 cyl 34474 alt 2 hd 64 sec 32>
          /pci@8,600000/pci@1/scsi@4/sd@c,2
Specify disk (enter its number)[8]:
```

3   At the prompt, enter: **1**

Result: The screen output is similar to the following:

```
selecting c1t11d1
```

```
              [disk formatted]
              FORMAT MENU:
                      disk      - select a disk
                      type      - select (define) a disk type
                      partition - select (define) a partition table
                      current   - describe the current disk
                      format    - format and analyze the disk
                      repair    - repair a defective sector
                      label     - write label to the disk
                      analyze   - surface analysis
                      defect    - defect list management
                      backup    - search for backup labels
                      verify    - read and display labels
                      save      - save new disk/partition definitions
                      inquiry   - show vendor, product and revision
                      volname   - set 8-character volume name
                      !<cmd>    - execute <cmd>, then return
                      quit
        format>
```

4   At the prompt, enter: **partition**

Result: The screen output is similar to the following:

```
        PARTITION MENU:
                  0       - change `0' partition
                  1       - change `1' partition
                  2       - change `2' partition
                  3       - change `3' partition
                  4       - change `4' partition
                  5       - change `5' partition
                  6       - change `6' partition
                  7       - change `7' partition
                  select - select a predefined table
                  modify - modify a predefined partition table
                  name   - name the current table
                  print  - display the current table
                  label  - write partition map and label to the disk
                  !<cmd> - execute <cmd>, then return
                  quit
        partition>
```

5   At the prompt, enter: **print**

Result: The screen output is similar to the following:

```
        Current partition table (original):
        Total disk cylinders available: 34474 + 2 (reserved cylinders)

        Part      Tag    Flag     Cylinders        Size            Blocks
          0       usr     wm      0                0           (0/0/0)     0
          1 unassigned    wu      0                0           (0/0/0)     0
          2       backup  wu      0 - 34473        33.67GB     (34474/0/0) 70602752
          3 unassigned    wm      0 - 5            6.00MB      (6/0/0)     12288
          4 unassigned    wm      0                0           (0/0/0)     0
          5 unassigned    wm      0                0           (0/0/0)     0
```

```
         6 usr            wm      6 - 34473      33.66GB   (34468/0/0) 70590464
         7 unassigned     wm      0              0         (0/0/0)            0
       partition>
```

6   At the prompt, enter: **modify**

Result: The screen output is similar to the following:

```
       Select partitioning base::
          0. Current partition table (original)
          1. All free hog
       Choose base (enter number) [0]?
```

7   At the prompt, enter: **1**

Result: The screen output is similar to the following:

```
       Part      Tag    Flag    Cylinders      Size            Blocks
         0        root    wm     0              0         (0/0/0)      0
         1        swap    wu     0              0         (0/0/0)      0
         2      backup    wu     0 - 34473      33.67GB   (34474/0/0) 70602752
         3 unassigned     wm     0              0         (0/0/0)      0
         4 unassigned     wm     0              0         (0/0/0)      0
         5 unassigned     wm     0              0         (0/0/0)      0
         6 usr            wm     6              0         (0/0/0)      0
         7 unassigned     wm     0              0         (0/0/0)      0
       Do you wish to continue creating a new partition table based on above table
       [yes]?
```

8   At the prompt, enter: **yes**

Result: The screen output is similar to the following:

```
       Free Hog partition [6]?
```

9   At the prompt, press Enter to accept the default.

Result: The screen displays a series of prompts to ask about the size of each partition.

10   With the exception of the first one, accept the default, as follows:

```
       Enter size of partition '0' [0b, 0c, 0.00mb, 0.00gb]: 256c
       Enter size of partition '1' [0b, 0c, 0.00mb, 0.00gb]:
       Enter size of partition '3' [0b, 0c, 0.00mb, 0.00gb]:
       Enter size of partition '4' [0b, 0c, 0.00mb, 0.00gb]:
       Enter size of partition '5' [0b, 0c, 0.00mb, 0.00gb]:
       Enter size of partition '7' [0b, 0c, 0.00mb, 0.00gb]:
```

Result: After answering the last prompt, the screen output is similar to the following:

```
       Part      Tag    Flag    Cylinders      Size            Blocks
         0        root    wm     0 - 255        256.00MB  (256/0/0)    0
         1        swap    wu     0              0         (0/0/0)      0
         2      backup    wu     0 - 34473      33.67GB   (34474/0/0) 70602752
         3 unassigned     wm     0              0         (0/0/0)      0
         4 unassigned     wm     0              0         (0/0/0)      0
         5 unassigned     wm     0              0         (0/0/0)      0
         6 usr            wm     256 - 34473    33.42GB   (34218/0/0) 70078464
         7 unassigned     wm     0              0         (0/0/0)      0
```

11 At the "OK to make this the current partition table [yes]?" prompt, enter: `yes`

12 At the "Enter table name (remember quotes)" prompt, enter: `asm1`

13 At the "Ready to label disk, continue" prompt, enter: `yes`

14 At the "partition" prompt, enter: `quit` to exit.

15 Repeat the previous procedure for all the disks except the one in each controller group that you plan to use for Oracle databases.

Note: That is, if you have 5 disks in each controller group (or a total of 10 disks in two controller groups, as assigned by your system administrator), repeat this procedure for 4 disks in each controller group (or a total of 8 disks in the two groups), so that 1 disk in each group is left as a spare.

B.3   Working With Multiple IP Addresses

A multihomed computer is associated with multiple IP addresses. This is typically
achieved by having multiple network cards on the computer. Each IP address is
associated with a host name. In addition, you can set up aliases for the host name.
By default, Oracle Universal Installer uses the ORACLE_HOSTNAME
environment variable setting to find the host name. If ORACLE_HOSTNAME is
not set and you are installing on a computer that has multiple network cards, then
Oracle Universal Installer determines the host name by using the first entry in the **/
etc/hosts** file.

```
$ ORACLE_HOSTNAME=somehost.us.acme.com
$ export ORACLE_HOSTNAME
option end
```

B.4   Building Objects on the Slave

1   Log in as **csn**

2   Run the following commands:

```
$ cd db/oracle/cdr
$ sqlplus cdr/cdr@cdr_slave @build_cdrobjs.sql
```

Appendix C

Disk Partitioning

This appendix provides the recommended values for disk partitioning

CSN and ORACLE Solaris 10 - Oracle 10 G Disk Partitioning Map

Slice	Dual Drive CSN/Database Server - 73 GB				Dual Drive CSN/Database Server - 146 GB			
	Disk1 - 73 GB		Disk 2 - 73 GB		Disk 1 - 146 GB		Disk 2 - 146 GB	
	Name	Size	Name	Size	Name	Size	Name	Size
		MB		MB		MB		MB
0	/	10000	O/S mirror	10000	/	10000	O/S mirror	10000
1	swap	8000	O/S mirror	8000	swap	8000	O/S mirror	8000
2	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
3	/var	2000	O/S mirror	2000	/var	2000	O/S mirror	2000
4	/home	10000	O/S mirror	10000	/home	10000	O/S mirror	10000
5	/u01	12000	O/S mirror	12000	/u01	12000	O/S mirror	12000
6	/backup	27900	O/S mirror	27900	/backup	97500	O/S mirror	97500
7	state db	24	state db	24	state db	24	state db	24

Total 69924 MB 69924 MB 139524 MB 139524 MB

Note 1: 73 GB Drive - Formatted capacity = 68.3 GB = 69994 MB
Note 2: 146 GB Drive Formatted capacity = 136.6 GB = 139848 MB

Slice	Quad Drive Server - Sunfire V240 ONLY - 146 GB O/S - Oracle ASM Drives 3 & 4 - 146GB							
	Disk 1 - 146 GB		Disk 2 - 146 GB		Disk 3 - 146 GB		Disk 3 - 146 GB	
	Name	Size	Name	Size	Name	Size	Name	Size
		MB		MB		MB		MB
0	/	10000	O/S mirror	10000	Oracle ASM-A1	23300	Oracle ASM-B1	23300
1	swap	8000	O/S mirror	8000	Oracle ASM-A2	23300	Oracle ASM-B2	23300
2	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used
3	/var	2000	O/S mirror	2000	Oracle ASM-A3	23300	Oracle ASM-B3	23300
4	/home	10000	O/S mirror	10000	Oracle ASM-A4	23300	Oracle ASM-B4	23300
5	/u01	12000	O/S mirror	12000	Oracle ASM-A5	23300	Oracle ASM-B5	23300
6	/backup	97500	O/S mirror	97500	Oracle ASM-A6	23300	Oracle ASM-B6	23300
7	state db	24	state db	24	state db	24	state db	24

Total 139524 MB 139524 MB 139824 MB 139824 MB

Appendix D

Port Description

The Unix ports and CSN ports are defined in the `/etc/services` file. The following is an example of the content of this file. You may modify the range of ports to suit your environment.

```
#---------------------------------------------------------------
# Ports assignments
# Port range used: 41000 to 41999
#---------------------------------------------------------------
TaskMgr         41001/udp               # TaskMgr_n
TaskMgrOAM      41002/tcp               # TaskMgrOAM_n

DLSvc           41010/tcp               # DLSimSvc_n
CaasSvc         41011/tcp               # VasReal_o
CseOAM_1        41012/tcp               # VTServerOAM_o
CseOAM_2        41012/tcp               # VTServerOAM_d

DBWriterOAM_1   41020/tcp               # DbWriterOAM_o
DBWriterOAM_2   41021/tcp               # DbWriterOAM_d

CdrWriter       41030/tcp               # CdrWriterSvc
CdrWriterOAM    41031/tcp               # CdrOAMSvc

LogWriterSvc    41040/tcp               # LogWriterSvc_n
LogWriterOAM    41041/tcp               # LogWriterOAM_n

NseRtt_1        41050/tcp               # Mediator_o
NseRtt_2        41051/tcp               # Mediator_d
```

```
NseOAM_1        41052/tcp                      # MediatorOAM_o
NseOAM_2        41053/tcp                      # MediatorOAM_d


MTP_Svc         41060/tcp                      # PrimaryVsp_n
Sccp_Svc        41062/tcp                      # SCCPService_n


MseTrapPort     41070/tcp                      # JMXTrap
MseRmiPort      41071/tcp                      # JMXRMI
MseSnmpPort     41072/tcp                      # JMXSNMP
MseAlarmPort    41073/udp                      # JMXAlarm


Console         41080/tcp
ConsoleShutdown 41081/tcp


# New added for Release 3
MseDirPort      41082/tcp                      # Component Directory RMI port
SubscriberRtt   41083/tcp                      # Subscriber Rtt port
SubscriberTcp   41084/tcp
SubscriberOAM   41085/tcp
SipRtrOAM       41086/tcp
SipRtr          41087/tcp
SipNseOAM       41088/tcp
SipNseRtt       41089/tcp
SipConnector    41090/udp
TcapOAM         41100/tcp
TcapRtt         41101/tcp
SccpPort        41102/tcp
Jtapi           41200/tcp
SR              41201/tcp
SR_2            41202/tcp


############### End of ports #############
```

Appendix E

File Description

This appendix describes the **db.properties** file

E.1   The **db.properties** file

This is the configuration file for the Database Manager, located at **$HOME/cdrmgr**.

E.1.1   Description of the db.properties File

Most of the default values listed below are acceptable to CSN. However, the vales for the parameters marked with * must be verified or modified according to your environment.

Table 22: db.properties parameters definition

Parameter	Value	Description
DB.driver	Oracle.jdbc.driver.OracleDriver	jdbc driver (do not change)
DB.urlprefix	jdbc:oracle:oci	jdbc url prefix (do not change)
DB.tns *	cdr1.newstep	cdr db service name in tnsnames.ora
DB.user *	cdr	cdr db user
DB.pwd *	cdr	cdr db user password
DB.schema	cdr	cdr db schema (do not change)
DB.md_hour	2	Daily maintenance start hour Range: 2 to 22
DB.md_to	3600000	Daily maintenance time out in ms Range: 1800000 to 7200000
DB.mw_hour	3	Weekly maintenance start hour Range: 2 to 22 **Note:** If mw_hour = md_hour, Daily maintenance runs first.
DB.mw_to	3600000	Weekly maintenance time out in ms Range: 1800000 to 7200000
DB.mw_day	0	Weekly maintenance day: 1: Sun; 2: Monday; 3: Tuesday …. 0: Every day
DB2.tns *	mnss1.newstep	config db service name in tnsnames.ora
DB2.user *	mnss	config db user

Table 22: db.properties parameters definition (Continued)

Parameter	Value	Description
DB2.pwd *	mnss	config db user password
DB2.schema	mnss	config db schema (do not change)
DB2.tables2clean	OM_RAW_CPU OM_RAW_INTERFACE OM_RAW_KERNAL OM_RAW_MEMORY	OM data collection tables need to be recycled
DB2.days2keep	10	OM data collection expiration days Range: 0 - 100
ENV.cdrmgr_port *	8013	cdr manager service port
ENV.break_time	15000	Database Manager job break time in ms Range: 1000 to 30000
ENV.loglevel	0	Log level: 0: basic, 1: detail: 2: debug
ENV.dbglevel	0	Debug level: 0: basic, 1: detail: 2: debug
ENV.logdest	/home/oracle/cdrmgr/Log/	Destination of log file
ENV.logfile	dblog.txt	Log file name
ENV.sendalarm	True	True: alarm; False: log alarm only
ENV.alarmhost *	172.24.10.10	Alarm host 1
ENV.alarmport *	61100	Alarm port 1
ENV.alarmhost2 *	172.24.20.10	Alarm host 2
ENV.alarmport2 *	61100	Alarm port 2
ENV.alarmhost3 *	172.24.50.10	Alarm host 3
ENV.alarmport3 *	61100	Alarm port 3
ENV.alarmhost4 *	172.24.60.10	Alarm host 4
ENV.alarmport4 *	61100	Alarm port 4

E.1.2 Example of the db.properties file

```
#csn databases maintenance properties
#Mary Roe
#created 03/12/2004
#last modified 11/12/2006

#database Properties
DB.driver=oracle.jdbc.driver.OracleDriver
DB.urlprefix=jdbc:oracle:oci

#cdr database info
DB.tns=cdr31_csnd05
DB.user=general
DB.pwd=incharge220
DB.schema=cdr31
DB.md_hour=5
DB.md_to=1800000
DB.mw_hour=5
DB.mw_to=1800000
DB.mw_day=0

#cfg database info
DB2.tns=csn31_csnd05
DB2.user=general
DB2.pwd=incharge220
DB2.schema=csn31
DB2.tables2clean=OM_RAW_CPU,OM_RAW_INTERFACE,OM_RAW_KERNEL,OM_R
AW_MEMORY,OM_RAW_DISK
DB2.days2keep=32
DB2.role=P
DB2.lsncheck=/home/oracle/utl/listenerstatus
DB2.asmdiskcheck=/home/oracle/utl/asmdiskstatus

#Environment Properties
# cdr manager service port
ENV.cdrmgr_port=8013
# cdr manager break time in ms
ENV.break_time=5000
# log level 0: basic, 1: detail: 2: debug
```

```
ENV.loglevel=0
# debug level 0: basic, 1: detail: 2: debug
ENV.dbglevel=0
# destination of log file
ENV.logdest=/home/oracle/cdrmgr/Log/
# log file name
ENV.logfile=dbmgr.log

# send alarm to monitor or just log alarm info
ENV.sendalarm=true
#alarm host and port
ENV.alarmhost=172.24.10.10
ENV.alarmport=61100
ENV.alarmhost2=172.24.20.10
ENV.alarmport2=61100
ENV.alarmhost3=172.24.50.10
ENV.alarmport3=61100
ENV.alarmhost4=172.24.60.10
ENV.alarmport4=61100
```

Appendix F

Customizing the CSN Host

This appendix describes how to:

- edit the `server.xml` file
- change the IP address of the CSN Host

F.1   Editing the server.xml File

The **server.xml** file is located in the **/opt/apache-tomcat/conf** directory.

You can customize the **server.xml** file to match the server, such as the database URL, port numbers, database TNS name, user name and password.

This appendix provides an example of the **server.xml** file.

Example of the server.xml file

In this example:

> **aaaa** = console shutdown port #
>
> **bbbb** = console port #
>
> **cccc** = csn db hostname as in the **tnsnames.ora** file
>
> **dddd** = csn db username
>
> **eeee** = csn db password

Note: Port numbers should match those listed in the **/etc/services** file to avoid port conflicts. For more information, see Appendix D, "Port Description" on page 123.

_____

```
<Server portulaca" shutdown="SHUTDOWN">


<Connector port="bbbb" maxHttpHeaderSize="8192" maxThreads="150"
minSpareThreads="25" maxSpareThreads="75" enableLookups="false"
redirectPort="8443" acceptCount="100" connectionTimeout="20000"
disableUploadTimeout="true" scheme="http"/>


<Context path="/mseconsole" docBase="mseconsole" debug="9"
reloadable="true" crossContext="true">

    <Resource name="jdbc/mse" auth="Container" type="javax.sql.DataSource"
    driverClassName="oracle.jdbc.driver.OracleDriver"
    url="jdbc:oracle:oci:@cccc" username="dddd" password="eeee"
    maxActive="5" maxIdle="-1" maxWait="-1"/>
</Context>
```

F.2   Changing the IP Address of the CSN Host

The following procedure is for changing the IP address of the CSN Host.

1   Log in as `root`

2   Update the IP address in the `/etc/inet/hosts` file.

3   Check the hostname in the `/etc/hostname.<NIC_NAME>` file.

Note: Do not change the hostname of the CSN Host; this will cause problems for Oracle DB startup.

4   If the subnet or netmask has been changed, update the `/etc/inet/netmasks` file.

5   Update IP address in the `/etc/inet/ipnodes` file.

6   If the default router has been changed, update the `/etc/defaultroutere` file.

7   If the subnet or gateway has been changed, update the `/etc/rc3.d/S91ntwkrtes` file for the route table.

8   Reboot the CSN Host.

9   After the reboot, verify that the CSN Host is reachable via the new IP address.

10   Log in as `csn`

11   Launch the MSE Console to update the configuration to reflect the IP change. (e.g. SIP local address, outbound address, DB connection, deployment table, etc)

```
$ ./startMSEConsole.sh
```

12   Save and check in the changes.

13   Stop the MSE Console and restart CSN

```
$ ./stopMSEConsole.sh
$ csn start
```