CHAPTER 4

Installing Gateway With an Embedded Database

This chapter explains how to install and uninstall Cisco Prime Network 3.9 with an embedded Oracle database.

This chapter includes:

Overview

The Cisco Prime Network embedded Oracle 11g 11.2.0.1.0 database is fully integrated with Cisco Prime Network and allows Cisco Prime Network to manage and monitor its data.

This solution provides the following benefits:

- A single integrated solution that requires minimal management.
- Easier, faster, and less error-prone installation and upgrades.

Complete the procedures in this chapter only if:

- You want to install Cisco Prime Network with an embedded Oracle database.
- You are not installing a Cisco Prime Network gateway high availability solution. If you are installing a gateway HA solution, proceed to one of the following chapters:
  - Chapter 10, "Installing a Gateway With an Embedded Database in a Veritas High Availability Configuration."
  - Chapter 11, "Installing a Gateway in a Red Hat Cluster Suite HA and Oracle Active Data Guard DR Configuration."

However, because the Cisco Prime Network gateway HA solution installs an embedded database, review the Embedded Database Requirements, page 4-2, before proceeding to those chapters.

Embedded Database Requirements

In addition to the requirements in System Requirements, page 2-1, other requirements for installing gateway with an Embedded Database are listed below:

Operating System

Note

- The Cisco Prime Network embedded database is not supported on Red Hat 6.
- Embedded Database can be installed on VMware but for Fault management performance information for embedded database on VMware, please contact your Cisco account representative.

You can install the embedded database on:

- **Solaris**

  Supports on Solaris 10 Update 10 or later (English language).

  The Oracle 11g R2 database is built and tested on the Solaris 10 Update 6 (u6) operating system (see Oracle bug 9152554). Oracle Global Software Support cannot support anything earlier than Solaris 10 u6. The runtime environment for the Oracle 11g R2 database must use Solaris 10 u6.

  To verify that you have the required Solaris version, enter:

  ```
  # cat /etc/release
  ```

  In the command output, you should see u10 or later.

Note Prime Network requires a minimum of Solaris 10 Update 10 (u10). If the version is earlier than, u10, you must upgrade to u10.

- **Red Hat**

  Supports on Red Hat Enterprise Linux Server Release 5.3 to 5.6, 64-bit or later Server Edition (English language).

Note Cisco Prime Network 3.9 currently does not operate under Red Hat 5.6 unless additional RPMs are installed. For information, see the Red Hat RPMs for Red Hat 5.6, page 2-13.

To verify that all required RPMs are installed, enter the following command as the root user:

```
rpm -q binutils compat-libstdc++-33-3.2.3 elfutils-libelf elfutils-libelf-devel
gcc-4.1.2
gcc-c++-4.1.2 glibc glibc-common glibc-devel glibc-headers ksh libaio libaio-devel
libgcc-4.1.2 libstdc++ libstdc++-devel make numactl-devel sysstat-7.0.2 --qf
'%{name}.%{arch}\n'|sort
```

Oracle recommends that you install the Linux operating system with the default software packages (RPMs). Do not customize the RPMs during installation. The following packages, or later versions of them, are required for the Oracle 11g R2 database:

- binutils
- compat-libstdc++-33-3.2.3
- elfutils-libelf
- elfutils-libelf-devel
- gcc-4.1.2
- gcc-c++-4.1.2
- glibc-2.5
- glibc-common-2.5
- glibc-devel-2.5
- glibc-headers-2.5
- ksh
- libaio
- libaio-devel
- libgcc-4.1.2
- libstdc++
- libstdc++-devel
- make
- numactl-devel
- sysstat-7.0.2

Note If any of the preceding packages are missing, the installation fails.

To verify that you have the required Linux version, enter:

```
# cat /etc/redhat-release
```

In the command output, you should see:

```
Red Hat Enterprise Linux Server release 5.3 Beta (Tikanga)
```

If the embedded database mount points contained in networkdata/archive logs and control files are set outside the local disks, for example, on a SAN, make corresponding entries in /etc/vfstab so the mount points are available to Solaris during a reboot.

Memory Requirements

For the exact storage and memory requirements, contact your Cisco account representative to obtain the *Cisco Prime Network Capacity Planning Guide*, which provides detailed deployment guidelines as you plan your Cisco Prime Network installation.

For the **Installation Phase**, the database memory requirements are:

- Swap space:
  - Solaris—500 MB
  - Linux—150 MB
- At least 4 GB of RAM

For the **Runtime Phase**, the database memory requirements are:

- Swap space:
  - Solaris—Equal to the size of RAM, up to 16 GB
  - Linux—Two times the size of RAM, up to 32 GB
- Table 4-1 lists the runtime phase RAM requirements.

Table 4-1 Database Memory During Runtime

Deployment Configuration	Minimum RAM Requirements
1 actionable event per second	8 GB
Up to 5 actionable events per second	8 GB
Up to 20 actionable events per second	16 GB
Up to 50 actionable events per second	16 GB
Up to 100 actionable events per second	24 GB
Up to 200 actionable events per second	24 GB
Up to 250 actionable events per second	24 GB

Storage Requirements

For the installation phase, the database storage requirements are:

- 1 GB of space in the /tmp directory.
- 6 GB of space for software files in the home directory of the database's OS user (usually /export/home/oracle).

For the run-time phase, the storage is required for the data file, redo logs, archive log, and backup file:

- A *data file* is a physical file on disk that contains data structures such as tables and indexes. The optimal location is an external disk array (preferably RAID 10). The data files are created under the directory that you specify during installation.
- Online *redo logs* are a set of files that contain records of changes made to data. Redo log files should not reside on the same disk as the data files. On a Solaris server, use UFS partition mounted with the forcedirectio option. For example, for the file system /dev/dsk/c0t1d0s6, the entry in /etc/vfstab should look like the following:

```
/dev/dsk/c0t1d0s6 /dev/rdsk/c0t1d0s6 /directio ufs 1 yes forcedirectio
```

On a Linux server, use ext3 partition mounted with the default mount options.

The redo logs are created under the directory that you specify during installation.

- An *archive log* is a member of an online redo log that has been archived by the Oracle database. Archived log files should not reside on the same disk as the data files. The archived redo log files can be applied to a database backup for media recovery. The archive logs are created under the directory that you specify during installation.

Note If the embedded database mount points for networkdata/archive logs/control files are set outside the local disks (for example, on a storage area network), make corresponding entries in /etc/vfstab(Solaris) or /etc/fstab (Linux) so the mount points can be accessed during reboots. If this is not done, the embedded database and gateway will not start.

- A *backup file* stores a copy the database data, which can be used to reconstruct data. Backup files should not reside on the same disk as the data files. The backup files are created under the directory that you specify during installation.

Table 4-2 provides the run-time embedded database storage requirements.

Table 4-2 Run Time Embedded Database Storage Requirements

Deployment Configuration	Data File (GB)	Redo Logs (GB)	Archive Logs (GB)	Backup File (GB)
Up to 1 actionable event per second.	28	6	22	22
Up to 5 actionable events per second.	92	6	138	111
Up to 20 actionable events per second.	340	6	440	510
Up to 50 actionable events per second.	775	8	1100	1163
Up to 100 actionable events per second.	1484	12	2200	2226
Up to 200 actionable events per second.	2239	12	4400	3358
Up to 250 actionable events per second.	2616	12	5500	3924

Your system administrator must:

- Back up the archive logs to tape daily.
- Back up the database backups to external storage, such as to tape.

Port Requirements

Port 1102 must be available for SSH communication between the Cisco Prime Network owner and the database owner, regardless of whether the Cisco Prime Network gateway and the embedded database are installed separately or on the same server.

If you are installing the embedded database and the Cisco Prime Network gateway on separate servers, the following additional ports must be available on the remote server:

- 22 (the default SSH port).
- 1521 (the database's listener port).

The installation prompts you for an SMTP server and an e-mail address to receive e-mail notifications of database errors. Port 25 should be available to receive e-mail notifications, and the UNIX **sendmail** utility should be configured in advance.

Additional Requirements

For remote embedded database installations:

- Perl version 5.8.6 or later must be installed on the root user.
- The installation script copies the Oracle installation files to the remote server under the home directory of the user connecting to the workstation through SSH. The home directory must have at least 4 GB of space available for the installation files. This is especially important if the home directory is root (/), because over consumption might cause the server to crash.

In addition to the list of UNIX shells required for Cisco Prime Network (see UNIX Services and Components, page 2-14), the embedded database also requires BASH (/bin/bash & /usr/bin/bash)

Verify that /etc/hosts includes the machine's local hostname and IP address. For example:

```
Good /etc/hosts
::1     localhost
127.0.0.1       localhost
your-IP-address your-hostname loghost
Bad /etc/hosts
# Do not remove the following line, or various programs
# that require network functionality will fail.
127.0.0.1 localhost.localdomain localhost
::1     localhost6.localdomain6 localhost6
```

You can install the Cisco Prime Network 3.9 embedded database on an IPv4-only server or on a dual stack server (IPv4 and IPv6). You cannot install the embedded database on an IPv6-only server.

Security

Cisco Prime Network connects to the database using an Oracle encryption feature. By default, connections between the Cisco Prime Network server (gateway and units) and the embedded database are encrypted.

Installing the Cisco Prime Network Gateway With an Embedded Database

Before proceeding for the gateway installation with an embedded database, do the following:

- Verify the gateway system requirements. See System Requirements, page 2-1.
- Verify the embedded database requirement. See Embedded Database Requirements, page 4-2.
- Before starting the gateway installation, verify that the *network user* home directory is not mounted directly

Complete the following steps to install an embedded database on the same or separate server as the Cisco Prime Network gateway:

Step 1 Insert "Disk 1: New Install" in the DVD drive.

Step 2 Open a Telnet or SSH session to the gateway and log in as the user root.

Step 3 Back up and remove the old version of the gateway (if an older version exists).

Step 4 To change to the CD directory, enter:

```
cd /cdrom/cdrom0/Server
```

Step 5 To install the Cisco Prime Network gateway, enter:

```
perl ./install.pl -user network user
```

where *network user* is the operating system user account for the Cisco Prime Network application, created when Cisco Prime Network is installed. In the following example, *network user* is set to network39.

For example, if the name of the user is network39, enter:

```
perl ./install.pl -user network39
```

The *network user* must start with a letter and contain only the characters shown in brackets: [A-Z a-z 0-9].

Note The *network user* cannot contain a [.] character. For example, network39 is permitted, but network3.9 is not.

The gateway is installed in the default directory /export/home/*network user*. In this example, the installation directory is /export/home/network39.

To change the installation directory, add the **-dir** *[desired directory]* switch at the end of the **perl ./install.pl -user** *network user* command; for example, **perl install.pl -user network39 -dir /opt/network39**.

The installation of the gateway starts. The installation procedure is automatic and requires no user input.

Note The installation might take a while. For information on the Cisco Prime Network environment created during installation, see Appendix A, "Folders Created in Cisco Prime Network."

Note (Solaris only) If the pre install verification check hangs when checking for the minimum swap file size, restart the Solaris picl service:

```
svcadm disable picl
svcadm enable picl
```

After the picl service restarts, rerun the install.pl script.

Step 6 After the installation is complete, you will be prompted to configure Prime Network. Enter **yes** to continue to the next step or **no** to configure later using the **network-conf** command.

Before configuring Cisco Prime Network on gateway, as the Cisco Prime Network user, copy the Oracle installation .zip files from the Disk 3 and Disk 4 of the installation DVD to the embedded_oracle directory (*NETWORKHOME*/local/scripts/embedded_oracle).

For Solaris, copy the following .zip files from "Disk 3: Database Binaries for Solaris":

- solaris.sparc64_11gR2_database_1of2.zip
- solaris.sparc64_11gR2_database_2of2.zip

For Linux, copy the following .zip files from "Disk 4: Database Binaries for Linux".

- linux.x64_11gR2_database_1of2.zip
- linux.x64_11gR2_database_2of2.zip

Step 7 Select **Set machine as Prime Network gateway**, then press Enter. The Prime Network configuration utility configures the system by running a number of procedures, including generation of SSH keys.

Step 8 Enter the required information at the prompts. The following table lists the prompts that appears at various stages of the configuration and their required settings.

Table 4-3 Gateway Installation Prompts and Required Input

Prompt for...	Enter...	Notes
Is NTP configured on this machine?	Y	Default is **yes**
Password for OS root user	The Unix root password. For example, admin.	Prime Network uses the root password to set machine-level settings and to execute scripts as "root".
Password for internal, automatically created users (root, bosenable, bosconfig, bosusermngr, web monitoring user)	The password that will be used to access the various Prime Network system components.	This password will also be used as the database schemes password. The password must meet the specified requirements: it must be at least eight alphanumeric characters containing upper and lower case letters; it must contain one number and one special character; it cannot contain the at sign (@) or forward slash (/) , exclamation point (!), and $ characters. If you enter a restricted characters, the installation will fail. You can change the password for each of these users at a later stage.

Table 4-3 Gateway Installation Prompts and Required Input

Prompt for...	Enter...	Notes
Prime Network to install the database?	Y	If you enter **yes**, Prime Network will install the database internally. You do not need an external database installation and setup. Before you enter **yes**, ensure that you have copied the embedded database files from Installation Disk 3: Database Binaries for Solaris or Disk 4: Database Binaries for Linux to NETWORKHOME/local/scripts/embedded_oracle. A message will be displayed if the files are not found in this location.
Install database on a remote server?	N	Default is **no**. This guide assumes that the database will be installed locally on the gateway server. Enter **yes**, if you decide to install the database on a remote server. After entering **yes**, the next few prompts will ask you to enter remote server details like, IP address, username to connect to the remote server, OS admin and OS root user password. **Note** If the IP address that you enter is not the default one, the database installation updates the hostname in the listener's files. Verify that /etc/hosts is updated with the correct IP address and hostname. If more than one hostname is attached to the selected IP address, the first hostname is used.
Select a single interface for the database services (This prompt appears if more than one interface is detected during the network-conf).	The corresponding number of the one to be used for the database connection	Cisco Prime Network 3.9 supports dual NICs. If the installation detects that the server is configured with multiple NICs, you are prompted to specify the one to use for the database connection.
OS user of the database	The username of the Unix user of the database. The default is oracle.	
Oracle user home directory	Path to the Oracle user home directory. The default is /export/home/oracle.	The directory must have a minimum of 6 GB of disk space for oracle binaries.
Remove previous installation of Oracle?	Y	Default is **yes**. If you already have Oracle installed with the same user and home directory , enter **yes** to remove it before installing the new database. If you enter **no**, the installation will quit.
Select Prime Network database profile	The number corresponding to the estimated profile.	Select from 1-6 based on the actionable events per second.

Table 4-3 Gateway Installation Prompts and Required Input

Prompt for...	Enter...	Notes
Location for the database's datafiles	Path to the directory containing the datafiles.	The locations of the database datafiles.
Destination for redo logs	Path to the directory containing the redo.	The locations of the redo files. On a Solaris server, use UFS partition mounted with the **forcedirectio** option. On a Linux server, use ext3 partition mounted with the default mount options.
Automatic database backups?	Y/N	If you entered **no** at this prompt, you can enable automatic backups later with the `./emdbctl --enable_backup` command. See the *Cisco Prime Network 3.9 Administrator Guide* for information on the emdbctl utility.
Destination for archive logs	Path to the directory containing the archive logs.	The locations of the redo logs, archive and backup files should not reside on the same disk as the data files.
Destination for backup files	Path to the directory containing the backup files.	The locations of the redo logs, archive and backup files should not reside on the same disk as the data files.
Install DB Critical Patch Update	Y/N	Default is **no**. If you enter **yes**, installation would take 90 more minutes to complete. **Note** If you enter No at this prompt, you can install the DB patch later with **emdbctl - -install_db_sec_patch**. See the *Cisco Prime Network 3.9 Administrator Guide* for information on the emdbctl utility.
SMTP server IP/Hostname	company-email-server-address	You must have SMTP server access from the gateway in order to receive email notifications. Port 25 must be available.
Select a single interface for Prime Network backend services (This prompt appears if more than one interface is detected during the network-conf).	The number corresponding with the IP address of the back-end interface to be used for gateway-to-unit communication.	Prime Network 3.9 supports dual network interface cards (NICs). You are prompted to specify the NIC to use for Prime Network back-end services (such as transport, http, and so on) for gateway-to-unit communication. Dual NICs let you isolate the northbound interface from the back-end interface.

Table 4-3 Gateway Installation Prompts and Required Input

Prompt for...	Enter...	Notes
Is Prime Network being installed as part of the Prime IP-NGN Suite?	Y	Default is **yes**. If you install Prime Network in standalone mode and later decide to integrate with the Prime Central suite, see the *Cisco Prime Central 1.1 Quick Start Guide*, section "Configuring Domain Managers as Suite Components."
Email for receiving alerts	username@company-name.com	E-mail address to receive notification when database errors occur.

The installation is completed.

The installation log is available at *NETWORKHOME*/local/scripts/embedded_oracle/ana_embedded_oracle.log.

What's Next?

After the gateway installation with embedded database is complete, continue with the following topics:

- Complete the Running the add_emdb_storage.pl Utility, page 4-11 procedure to add the required data files and online redo logs.
- Launching the Gateway, page 5-20
- Updating the Database Host in the Registry for NAT, page 5-22
- Changes Resulting from the Installation, page 5-26
- Verifying the Cisco Prime Network Gateway Installation, page 5-22
- Chapter 7, "Installing Cisco Prime Network Unit."
- (Optional) Enabling the Network Discovery Feature, page 9-1. Use this section to automatically discover the devices that exist in the network.

Running the add_emdb_storage.pl Utility

Use the **add_emdb_storage.pl** script to add database files according to the database size you estimate you will need. You are prompted to provide the database profile, the estimated database capacity and the history size for events and workflows. This enables the script to calculate the maximum size of the database, and to create the data files, temp files, and redo logs. See Table 4-2 on page 4-5 for information on database sizing.

Before You Begin

If you need assistance estimating the database size, contact your Cisco representative. The representative can provide the Memory Assessment Tool to help you with the sizing.

Step 1 Log into the Cisco Prime Network gateway as *network user*. (*network user* is the UNIX account for the Cisco Prime Network application, created when Cisco Prime Network is installed; for example, **network39**.)

Step 2 Change directories to *NETWORKHOME*/Main/scripts/embedded_db and enter the following command:

```
# ./add_emdb_storage.pl
```

If you are installing the embedded database as part of the Red Hat Cluster Suite (RHCS) Oracle Active Data Guard (ADG) gateway high availability, you must add the **-ha** flag:

```
# ./add_emdb_storage.pl -ha
```

Note Adding the -ha flag is important for the RHCS/ADG gateway HA, see the Setting Up Geographical Redundancy, page 11-26.

Step 3 Enter the number corresponding to the estimated database profile that meets your requirement.

Step 4 Insert the event and workflow archiving size in days.

Note If you enter incorrect values—such as the wrong database profile estimate—you can rerun the script with different inputs.

- If you encounter any errors, messages similar to the following examples are displayed.
  - If there is not enough disk space to create the additional database files or redo logs, enter another location.
  - If the files or redo logs cannot be created for any reason, you will see an error message and the following prompt:

```
- How would you like to continue?
---------------------------------
1) Retry
2) Skip (move to the next in list)
3) Abort
 (1 - 3) [default 1]
```

For example, if the correct permissions were not set, you would see the following.

```
Failed to add datafile for network39:
-1119: ORA-01119: error in creating database file '/2del/network39_DATA11.dbf'
ORA-27040: file create error, unable to create file
Linux-x86_64 Error: 13: Permission denied
```

The menu choices provide with you with an opportunity to fix the permissions and retry creating the file or log.

On Solaris, verify the new location is mounted as UFS with 'forcedirectio' option.

The log file is located in *NETWORKHOME*/Main/logs/emdb/add-storage-*time-stamp*.log.