Oracle® Database Gateway

Installation and Configuration Guide

11*g* Release 1 (11.1) for AIX 5L Based Systems (64-Bit), HP-UX PA-RISC (64-Bit), Solaris Operating System (SPARC 64-Bit), Linux x86, and Linux x86-64

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Oracle Database Gateway Installation and Configuration Guide, 11*g* Release 1 (11.1) for AIX 5L Based Systems (64-Bit), HP-UX PA-RISC (64-Bit), Solaris Operating System (SPARC 64-Bit), Linux x86, and Linux x86-64

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Primary Author: Maitreyee Chaliha

Contributor: Vira Goorah, Den Raphaely, Govind Lakkoju, Peter Wong, Juan Pablo Ahues-Vasquez, Peter Castro, and Charles Benet

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Preface

This guide describes how to install and configure Oracle Database Gateway for Sybase, Informix, Teradata, Microsoft SQL Server, and ODBC on UNIX based platforms.

This preface covers the following topics:

Intended Audience

This manual is intended for Oracle database administrators who perform the following tasks:

- Installing Oracle Database Gateways
- Configuring Oracle Database Gateways

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Related Documents

For more information, see the following documents:

- *Oracle Database Gateway for Sybase User's Guide*
- *Oracle Database Gateway for Informix User's Guide*
- *Oracle Database Gateway for Teradata User's Guide*
- *Oracle Database Gateway for Microsoft SQL Server User's Guide*
- *Oracle Database New Features Guide*
- *Oracle Call Interface Programmer's Guide*
- *Oracle Database Administrator's Guide*
- *Oracle Database Advanced Application Developer's Guide*
- *Oracle Database Concepts*
- *Oracle Database Performance Tuning Guide*
- *Oracle Database Error Messages*
- *Oracle Database Globalization Support Guide*
- *Oracle Database Reference*
- *Oracle Database SQL Language Reference*
- *Oracle Database Net Services Administrator's Guide*
- *SQL*Plus User's Guide and Reference*
- *Oracle Database Heterogeneous Connectivity Administrator's Guide*
- *Oracle Database Security Guide*

Conventions

The following typographic conventions are used in this manual:

Convention	Meaning
bold	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary
italics	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter, directory names, usernames, pathnames, and filenames.

Convention	Meaning
UPPERCASE	Uppercase letters indicate Structured Query Language (SQL) reserved words, initialization parameters, and environment variables.
[text]	Brackets are used in syntax statements for optional elements.
[text | text]	Vertical bar inside brackets is used in syntax statements to imply choice among optional elements.
{text | text}	Vertical bar inside braces is used in syntax statements to imply choice among mandatory elements.

Part I

Overview of the Oracle Database Gateway Installation

Part I contains the following chapter:

- Chapter 1, "Overview of the Oracle Database Gateway Installation"

1

Overview of the Oracle Database Gateway Installation

This chapter describes issues that you should consider before installing the Oracle Database Gateways. It includes information about the following topics:

Gateway Installation Configurations

You can install Oracle Database Gateway in either of the following configurations:

- On the same computer as an existing Oracle database but in a different Oracle home.
- On a system with no Oracle database.
- On the same computer as the Oracle database, and in the same Oracle home directory. Note that in this case, the Oracle database and the gateway must be at the same release level.

Gateway Installation Methods

The different installation methods to install Oracle Database Gateways are as follows:

Interactive Installation Method

When you use the interactive method to install Oracle Database Gateways, Oracle Universal Installer displays a series of screens that enable you to specify all of the required information.

Automated Installation Method Using Response Files

By creating a response file and specifying this file when you start Oracle Universal Installer, you can automate some or all of the Oracle Database Gateway installation. These automated installation methods are useful if you need to perform multiple installations on similarly configured systems or if the system where you want to install the software does not have X Window system software installed.

When you use a response file, you can run Oracle Universal Installer in the following modes, depending on whether you specify all of the required information or not:

- Silent Mode

  Oracle Universal Installer runs in silent mode if you use a response file that specifies all required information. None of the Oracle Universal Installer screens are displayed.

- Suppressed Mode

  Oracle Universal Installer runs in suppressed mode if you do not specify all required information in the response file. Oracle Universal Installer displays only the screens that prompt for the information that you did not specify.

For more information about these modes and about how to complete an installation using response files, refer to Appendix A, "Using Response Files for Noninteractive Installation".

Installation Considerations

This section contains information that you should consider before installing this product. It contains the following sections:

Release Notes

Read the release notes for the product before installing it. The release notes are available on the Oracle Database 11*g* Release 1 (11.1) installation media. The latest version of the release notes is also available on the OTN Web site:

`http://www.oracle.com/technology/documentation/index.html`

Hardware and Software Certification

The platform-specific hardware and software requirements included in this installation guide were current at the time this guide was published. However, because new platforms and operating system software versions might be certified after this guide is published, review the certification matrix on the Oracle*Meta*Link Web site for the most up-to-date list of certified hardware platforms and operating system versions. The Oracle*Meta*Link Web site is available at the following Web site:

`http://metalink.oracle.com`

If you do not have a current Oracle Support Services contract, you can access the same information at the following Web site:

`http://www.oracle.com/technology/support/metalink/content.html`

Multiple Oracle Homes Support

This product supports multiple Oracle homes. This means that you can install this release or previous releases of the software more than once on the same system, in different Oracle home directories.

Installing the Software on a System with an Existing Oracle Installation

You must install this product into a new Oracle home directory. You cannot install products from one release of Oracle database into an Oracle home directory of a different release. For example, you cannot install release 11.1 software into an existing Oracle 10gR2 Oracle home directory. If you attempt to install this release into an Oracle home directory that contains software from an earlier Oracle release, the installation fails.

You can install this release more than once on the same system if each installation is installed in a separate Oracle home directory.

Upgrades

Upgrades are not supported for Oracle Database Gateways.

Accessing the Installation Software

You can access the Oracle Database Gateway software by using one of the following methods:

- Download the software from OTN. Refer to Downloading Oracle Software from the OTN Web Site.
- Copy the software to a hard disk. Refer to Copying the Oracle Software to a Hard Disk

Downloading Oracle Software from the OTN Web Site

This section describes how to download the installation archive files and extract them on your hard disk. It contains the following topics:

- Downloading the Installation Archive Files
- Extracting the Installation Files

Downloading the Installation Archive Files

To download the installation archive files from OTN:

1. Use any browser to access the software download page on OTN:

   `http://www.oracle.com/technology/software/`

2. Navigate to the download page for the product that you want to install.
3. Select a file system with enough free space to store and expand the archive files.

   In most cases, the available disk space must be at least twice the size of the archive files.

4. On the file system that you selected in step 3, create a directory, for example, `gateway`, to hold the installation archive files.
5. Download the installation archive files to the directory that you created in step 4.

6. Verify that the files you downloaded are the same size as the corresponding files on OTN.

Extracting the Installation Files

To extract the installation archive files, perform the following steps:

1. If necessary, change directory to the directory that contains the downloaded installation archive files.
2. To uncompress each file, enter a command similar to the following:

   ```
   $ gunzip filename.cpio.gz
   ```

   This command creates files with names similar to the following:

   ```
   filename.cpio
   ```

3. To extract the installation files, enter a command similar to the following:

   ```
   $ cpio -idmv < filename.cpio
   ```

   Note: Refer to the download page for information about the correct options to use with the `cpio` command.

   Some browsers uncompress files while downloading them, but leave the `.gz` file extension. If these steps do not work, remove the `.gz` extension from the files and repeat step 3.

   For each file, this command creates a subdirectory named `Diskn`, where *n* is either 1 or the disk number identified in the file name.

Copying the Oracle Software to a Hard Disk

Before installing Oracle Database Gateway, you might want to copy the software to the hard disk. This enables the installation process to run a bit faster. Before copying the installation media content to the hard disk, you must mount the installation media. The following section describes how to mount discs and copy their content to the hard disk.

Mounting Disc

On most Solaris Operating Systems, the disc mounts automatically when you insert it into the disc drive. If the disc does not mount automatically, follow these steps to mount it:

1. Switch user to root

   ```
   $ su - root
   ```

2. If necessary, enter a command similar to one of the following to eject the currently mounted disc, then remove it from the drive:

   Solaris (SPARC):

   ```
   # eject
   ```

   AIX:

   ```
   # umount /cdrom
   ```

HP-UX PA-RISC:

```
# /usr/sbin/umount /SD_CDROM
```

In these examples, `/cdrom` and `/SD_CDROM` are the mount point directories for the disc drive.

3. Insert the appropriate disc into the disc drive.
4. To verify that the disc mounted automatically, enter a command similar to the following depending on your platform:

   Solaris (SPARC):

   ```
   # ls /cdrom/cdrom0
   ```

5. If this command fails to display the contents of the disc, enter a command similar to the following to mount it, depending on your platform:

   Solaris (SPARC):

   ```
   # /usr/sbin/mount -r -F hsfs /dev/dsk/cxtydzs2 /cdrom
   ```

   In this example, `/cdrom` is the disc mount point directory and `/dev/dsk/cxtydzs2` is the device name for the disc device, for example `/dev/dsk/c0t2d0s2`.

6. If Oracle Universal Installer is displaying the Disk Location dialog box, enter the disc mount point directory path, for example:

   ```
   /mnt/cdrom
   ```

Copying the Oracle Database Gateway Software to a Hard Disk

To copy the contents of the media to a hard disk:

1. Create a directory on the hard disk to hold the Oracle Database Gateway software:

   ```
   $ mkdir gateway
   ```

2. Change directory to the directory you created in step 1:

   ```
   $ cd gateway
   ```

3. Copy the contents of the mounted disc to the new directory as follows:

   ```
   $ cp -R /directory_path gateway
   ```

   In this example, `/directory_path` is the installation media mount point directory. The mount point directory is `/cdrom`.

Running the Oracle Universal Installer

Start the Installer and install the software, as follows:

1. If you are installing the software from disc, mount the appropriate disc if it is not already mounted

   Some platforms automatically mount discs when you insert them into the drive.

2. If necessary, log in as the Oracle software owner user (`oracle`) and set the `DISPLAY` environment variable.

3. To start the Installer, enter the following commands where *directory_path* is the CD-ROM mount point directory or the path of the `tg` directory on the DVD-ROM.

   ```
   $ /directory_path/runInstaller
   ```

4. Use the following guidelines to complete the installation:

   - Follow the instruction displayed in the Installer window. If you need additional information, click **Help**.
   - When the Installer prompts you to run a script with `root` privileges, enter a command similar to the following in a terminal where you are logged in as the root user, then click **Continue** or **OK**:

     ```
     # /script_path/script_name
     ```

   - If you encounter errors while installing or linking the software, then see Appendix B, "Oracle Database Gateway Troubleshooting" for information about troubleshooting.

5. When the installation is complete, click **Exit**, then click **Yes** to exit from the Installer.

Part II

Installing and Configuring Oracle Database Gateway for Sybase

Part II, "Installing and Configuring Oracle Database Gateway for Sybase" describes how to install and configure Oracle Database Gateway for Sybase on UNIX based platforms.

It contains the following chapters:

- Chapter 2, "Installing Oracle Database Gateway for Sybase"
- Chapter 3, "Configuring Oracle Database Gateway for Sybase"

2

Installing Oracle Database Gateway for Sybase

This chapter provides information about the hardware and software requirements and the installation procedure for Oracle Database Gateway for Sybase.

To install the gateway, follow these steps:

1. Ensure that the system meets all of the hardware and software requirements specified in "System Requirements for Oracle Database Gateway for Sybase" on page 2-1
2. Run the Oracle Universal Installer.

   See "Step Through the Oracle Universal Installer" on page 2-4 for more information about running the Oracle Universal Installer

   Oracle Universal Installer is a menu-driven utility that guides you through the installation of the gateway by prompting you with action items. The action items and the sequence in which they appear depend on your platform.

   See Table 2–3 for a description of the installation procedure of Oracle Database Gateway for Sybase

System Requirements for Oracle Database Gateway for Sybase

This section provides information about the hardware and software requirements for the gateway. It contains the following sections:

Hardware Requirements

Table 2–1 shows the minimum hardware requirements for Oracle Database Gateway for Sybase.

Table 2–1 Hardware requirements for Oracle Database Gateway for Sybase

Hardware Items	Required for AIX-Based System	Required for HP 9000 Series HP-UX PA-RISC	Required for Solaris Operating System (SPARC)	Required for Linux x86	Required for Linux x86 64 bit
Temporary Disk Space	400 MB	400 MB	400 MB	400 MB	400 MB
Disk Space	1.5 GB	1.5 GB	750 MB	750 MB	750 MB
Physical Memory*	512 MB	512 MB	512 MB	512 MB	512 MB
Swap Space	1 GB	1 GB	1 GB	1 GB	1 GB
Processor	IBM RS/6000 AIX-Based System Processor	HP 9000 Series 700 or 800 processor for hp-ux 11.0	Sun Solaris Operating System (SPARC) Processor	x86	x86_64

* The minimum swap space is 1 GB (or twice the size of RAM). On systems with 2 GB or more of RAM, the swap space can be between one and two times the size of RAM. On AIX systems with 1 GB or more of memory, do not increase the swap space more than 2 GB.

Checking the Hardware Requirements

To ensure that the system meets the minimum requirements, follow these steps:

1. To determine the physical RAM size, enter one of the following commands:

Operating System	Command
AIX	# `/usr/sbin/lsattr -E -l sys0 -a realmem`
HP-UX PA-RISC	# `/usr/sbin/dmesg | grep "Physical:"`
Solaris (SPARC)	# `/usr/sbin/prtconf | grep "Memory size"`
Linux x86	`# grep MemTotal /proc/meminfo`
Linux x86 64 bit	`# grep MemTotal /proc/meminfo`

   If the size of the physical RAM installed in the system is less than the required size, you must install more memory before continuing.

2. To determine the size of the configured swap space, enter one of the following commands:

Operating System	Command
AIX	`# /usr/sbin/lsps -a`
HP-UX PA-RISC	`# /usr/sbin/swapinfo -a`
Solaris (SPARC)	`# /usr/sbin/swap -s`
Linux x86	`# grep SwapTotal /proc/meminfo`
Linux x86 64 bit	`# grep SwapTotal /proc/meminfo`

   If necessary, see your operating system documentation for information about how to configure additional swap space.

3. To determine the amount of disk space available in the `/tmp` directory enter the following commands:

Operating System	Command
AIX	`# df -k /tmp`
HP-UX PA-RISC	`# df -k /tmp`
Solaris (SPARC)	`# df -k /tmp`
Linux x86	`# df -k /tmp`
Linux x86 64 bit	`# df -k /tmp`

4. To determine the amount of disk space available on the system enter the following commands:

Operating System	Command
AIX	`# df -k`
HP-UX PA-RISC	`# df -k`
Solaris (SPARC)	`# df -k`
Linux x86	`# df -k`
Linux x86 64 bit	`# df -k`

Software Requirements

The following section describes the minimum software requirements for Oracle Database Gateway for Sybase.

Operating System

Table 2–2 shows the minimum operating system version required for Oracle Database Gateway for Sybase. If your operating system is lower than the minimum requirements, upgrade your operating system to meet the specified levels.

Table 2–2 Operating Systems version for Oracle Database Gateway for Sybase

Operating System	Version
AIX	AIX 5L version 5.3, Maintenance level 02 or higher
HP-UX PA-RISC	HP-UX PA-RISC 11i V1 (11.11), 11i V2 (11.23) PA-RISC
Solaris (SPARC)	Solaris 9 Update 6 or higher or Solaris 10, 64-bit
Linux x86 Red Hat	One of the following operating system versions: ■ Red Hat Enterprise Linux AS/ES 3.0 (Update 4 or later) ■ Red Hat Linux 4.0
Linux x86 Suse	SUSE Linux Enterprise Server 9.0 with SP 2 or later
Linux x86 64 bit Red Hat	One of the following operating system versions: ■ Red Hat Enterprise Linux AS/ES 3.0 (Update 4 or later) ■ Red Hat Enterprise Linux AS/ES 4.0 (Update 1 or later)
Linux x86 64 bit Suse	SUSE Linux Enterprise Server 9.0 with SP2 or later

Checking the Software Requirements

To ensure that the system meets the minimum requirements, follow these steps:

- To determine which version of AIX is installed, enter the following command:

```
# oslevel -r
```

- To determine which version of HP-UX PA-RISC is installed, enter the following command:

```
# uname -a
```

- To determine which version of Solaris Operating System (SPARC) is installed, enter the following command:

```
# uname -r
```

- To determine which distribution and version of Linux x86 is installed, enter the following command:

```
# cat /etc/issue
```

- To determine which distribution and version of Linux x86 64 bit is installed, enter the following command:

```
# cat /proc/version
```

Certified Configuration

The gateway supports Sybase Adaptive Server. For the latest versions supported refer to the OTN Web site:

http://www.oracle.com/technology/products/gateways/pdf/certmatrix10g.pdf

Step Through the Oracle Universal Installer

Table 2–3 describes the installation procedure for Oracle Database Gateway for Sybase.

Table 2–3 The Oracle Universal Installer: Steps for Installing the Gateway

Screen	Response
Oracle Universal Installer: Welcome	Click **Next**.
Oracle Universal Installer: File Locations	The Source section of the screen is where you specify the source location that the Oracle Universal Installer must use to install the Oracle Database Gateway for Sybase. You need not edit the file specification in the Path field. The default setting for this field points to the installer file on your Oracle Database Gateway installation media. The Path field in the Destination section of the File Locations screen is where you specify the destination for your installation. You need not edit the path specification in the Path field. The default setting for this field points to *ORACLE_HOME*. After you set the fields in the File Locations screen as necessary, click **Next** to continue. After loading the necessary information from the installation media, the Oracle Universal Installer displays the Available Products screen.
Oracle Universal Installer: Available Product Components	**a**. Select **Oracle Database Gateway for Sybase 11.1.0.5.0**. **b.** Click **Next**.

Table 2–3 (Cont.) The Oracle Universal Installer: Steps for Installing the Gateway

Screen	Response
Oracle Database Gateway for Sybase	**Sybase Database Server Host Name** - Specify the host name of the machine hosting the Sybase database server. **Sybase Database Server Port number** - Specify the port number of the Sybase database server **Sybase Database Name** - Specify the Sybase database name Click **Next** to continue.
Oracle Universal Installer: Summary	The Installation Summary screen enables you to review a tree list of options and components for this installation. Click **Install** to start installation.
Oracle Net Configuration Assistant: Welcome	Click **Cancel**
Oracle Net Configuration Assistant:	Click **Yes**
Oracle Universal Installer: Configuration Tools	Click **Exit**
Exit	The final screen of the Oracle Universal Installer is the End of Installation screen. Click **Exit** to exit the installer.

3

Configuring Oracle Database Gateway for Sybase

After installing the gateway, perform the following tasks to configure Oracle Database Gateway for Sybase:

1. Configure the Gateway Initialization Parameter File
2. Configure Oracle Net for the Gateway
3. Configure the Oracle Database for Gateway Access
4. Create Database Links
5. Configure Two-Phase Commit
6. Create Sybase Views for Data Dictionary Support
7. Encrypt Gateway Initialization Parameter Values
8. Configure the Gateway to Access Multiple Sybase Databases

Configure the Gateway Initialization Parameter File

Perform the following tasks to configure the gateway initialization parameter file.

1. Choose a System Identifier for the Gateway
2. Customize the Initialization Parameter File

Choose a System Identifier for the Gateway

The gateway system identifier (SID) is an alphanumeric character string that identifies a gateway instance. You need one gateway instance, and therefore one gateway SID, for each Sybase database you are accessing. The SID is used as part of the file name for the initialization parameter file. The default SID is `tg4sybs`.

You can define a gateway SID, but using the default of tg4sybs is easier because you do not need to change the initialization parameter file name. However, if you want to access two Sybase databases, you need two gateway SIDs, one for each instance of the gateway. If you have only one Sybase database and want to access it sometimes with one set of gateway parameter settings, and other times with different gateway parameter settings, then you will need multiple gateway SIDs for the single Sybase database.

Customize the Initialization Parameter File

The initialization parameter file must be available when the gateway is started. During installation, the following default initialization parameter file is created:

```
$ORACLE_HOME/tg4sybs/admin/inittg4sybs.ora
```

Where `$ORACLE_HOME` is the directory under which the gateway is installed.

This initialization file is for the default gateway SID. If you are not using `tg4sybs` as the gateway SID, you must rename the initialization parameter file using the SID you chose in the preceding step "Choose a System Identifier for the Gateway" on page 3-1. This default initialization parameter file is sufficient for starting the gateway, verifying a successful installation, and running the demonstration scripts.

A number of initialization parameters can be used to modify the gateway behavior. Refer to Appendix C, "Initialization Parameters" for the complete list of initialization parameters that can be set. Changes made to the initialization parameters only take effect in the next gateway session. The most important parameter is the `HS_FDS_CONNECT_INFO` which describes the connection to the non-Oracle system.

The default initialization parameter file already has an entry for this parameter. The syntax for `HS_FDS_CONNECT_INFO` is as follows:

```
HS_FDS_CONNECT_INFO=host_name:port_number/database_name
```

Where:

Variable	Description
host_name	is the host name or IP address of the machine hosting the Sybase database.
port_number	is the port number of the Sybase database server.
database_name	is the Sybase database name.

> **See Also:** Appendix C, "Initialization Parameters" and the *Oracle Database Heterogeneous Connectivity Administrator's Guide* for more information about customizing the initialization parameter file.

Configure Oracle Net for the Gateway

The gateway requires Oracle Net to communicate with the Oracle database. After configuring the gateway, perform the following tasks to configure Oracle Net to work with the gateway:

1. Configure Oracle Net Listener for the Gateway
2. Stop and Start the Oracle Net Listener for the Gateway

Configure Oracle Net Listener for the Gateway

The Oracle Net Listener listens for incoming requests from the Oracle database. For the Oracle Net Listener to listen for the gateway, information about the gateway must be added to the Oracle Net Listener configuration file, `listener.ora`. This file by default is located in `$ORACLE_HOME/network/admin`, where `$ORACLE_HOME` is the directory under which the gateway is installed.

The following entries must be added to the `listener.ora` file:

- A list of Oracle Net addresses on which the Oracle Net Listener listens
- The executable name of the gateway that the Oracle Net Listener starts in response to incoming connection requests

Syntax of listener.ora File Entries

The Oracle database communicates with the gateway using Oracle Net and any supported protocol adapters. The following is the syntax of the address on which the Oracle Net Listener listens using the TCP/IP protocol adapter:

```
LISTENER=
        (ADDRESS=
          (PROTOCOL=TCP)
          (HOST=host_name)
          (PORT=port_number))
```

Where:

Variable	Description
host_name	is the name of the machine on which the gateway is installed.
port_number	specifies the port number used by the Oracle Net Listener. If you have other listeners running on the same machine, then the value of *port_number* must be different from the other listeners' port numbers.

To direct the Oracle Net Listener to start the gateway in response to incoming connection requests, add an entry to the `listener.ora` file. The syntax for HP-UX PA-RISC slightly different than the other platforms.

> **Note:** You must use the same SID value in the listener.ora file and the `tnsnames.ora` file which will be configured in the next step.

For AIX, Solaris SPARC, and Linux:

```
SID_LIST_LISTENER=
   (SID_LIST=
      (SID_DESC=
         (SID_NAME=gateway_sid)
         (ORACLE_HOME=oracle_home_directory)
         (PROGRAM=tg4sybs)
      )
   )
```

For HP-UX PA-RISC:

```
SID_LIST_LISTENER=
   (SID_LIST=
      (SID_DESC=
         (SID_NAME=gateway_sid)
         (ORACLE_HOME=oracle_home_directory)
         (PROGRAM=tg4sybs)
         (ENVS=SHLIB_PATH=$ORACLE_HOME/lib32)
      )
   )
```

Where:

Variable	Description
gateway_sid	specifies the SID of the gateway and matches the gateway SID specified in the connect descriptor entry in the `tnsnames.ora` file.
oracle_home_directory	specifies the Oracle home directory where the gateway resides.
`tg4sybs`	specifies the executable name of the Oracle Database Gateway for Sybase.

If you already have an existing Oracle Net Listener, then add the following syntax to `SID_LIST` in the existing `listener.ora` file:

For AIX, Solaris SPARC, and Linux:

```
SID_LIST_LISTENER=
(SID_LIST=
   (SID_DESC=.
     .
   )
   (SID_DESC=.
     .
   )
   (SID_DESC=
      (SID_NAME=gateway_sid)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4sybs)
   )
)
```

For HP-UX PA-RISC:

```
SID_LIST_LISTENER=
(SID_LIST=
   (SID_DESC=.
     .
   )
   (SID_DESC=.
     .
   )
   (SID_DESC=
      (SID_NAME=gateway_sid)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4sybs)
      (ENVS=SHLIB_PATH=$ORACLE_HOME/lib32)
   )
)
```

> **See Also:** *Oracle Net Services Administrator's Guide* for information about changing the `listener.ora` file.

Stop and Start the Oracle Net Listener for the Gateway

You must stop and restart the Oracle Net Listener to initiate the new settings, as follows:

1. Set the `PATH` environment variable to `$ORACLE_HOME/bin` where `$ORACLE_HOME` is the directory in which the gateway is installed.

   For example on the Linux platform, if you have the Bourne or Korn Shell, enter the following:

```
$ PATH=$ORACLE_HOME/bin:$PATH;export PATH
$ LD_LIBRARY_PATH=$ORACLE_HOME/lib:$LD_LIBRARY_PATH; export LD_LIBRARY_PATH
```

If you have the C Shell, enter the following:

```
$ setenv PATH $ORACLE_HOME/bin:$PATH
$ setenv LD_LIBRARY_PATH $ORACLE_HOME/lib:$LD_LIBRARY_PATH
```

Table 3–1 specifies which parameter value to use for the different platforms:

Table 3–1 Parameter Values for UNIX Based Platforms

Platform	Parameter Value
Solaris (SPARC) 64 bit	`LD_LIBRARY_PATH=$ORACLE_HOME/lib`
HP-UX PA-RISC	`SHLIB_PATH=$ORACLE_HOME/lib`
Linux x86, and Linux x86 64 bit	`LD_LIBRARY_PATH=$ORACLE_HOME/lib`
AIX	`LIBPATH=$ORACLE_HOME/lib`

2. If the listener is already running, use the `lsnrctl` command to stop the listener and then start it with the new settings, as follows:

```
$ lsnrctl stop
$ lsnrctl start
```

3. Check the status of the listener with the new settings, as follows:

```
$ lsnrctl status
```

The following is a partial output from a `lsnrctl` status check:

```
.
.
.
Services Summary...
Service "tg4sybs" has 1 instance(s).
  Instance "tg4sybs", status UNKNOWN, has 1 handler(s) for this service...
The command completed successfully
```

In this example, the service name is `tg4sybs` which is the default SID value assigned during installation.

Configure the Oracle Database for Gateway Access

Before you use the gateway to access Sybase data you must configure the Oracle database to enable communication with the gateway over Oracle Net.

To configure the Oracle database you must add connect descriptors to the `tnsnames.ora` file. By default, this file is in `$ORACLE_HOME/network/admin`, where `$ORACLE_HOME` is the directory in which the Oracle database is installed. You cannot use the Oracle Net Assistant or the Oracle Net Easy Config tools to configure the `tnsnames.ora` file. You must edit the file manually.

Configuring tnsnames.ora

Edit the `tnsnames.ora` file to add a connect descriptor for the gateway. The following is a syntax of the Oracle Net entry using the TCP/IP protocol:

connect_descriptor=

```
(DESCRIPTION=
   (ADDRESS=
      (PROTOCOL=TCP)
      (HOST=host_name)
      (PORT=port_number)
   )
   (CONNECT_DATA=
      (SID=gateway_sid))
   (HS=OK))
```

Where:

Variable	Description
connect_descriptor	is the description of the object to connect to as specified when creating the database link, such as `tg4sybs`. Check the `sqlnet.ora` file for the following parameter setting: ▪ `names.directory_path = (TNSNAMES)` **Note**: The sqlnet.ora file is typically stored in `$ORACLE_HOME/network/admin`.
`TCP`	is the TCP protocol used for TCP/IP connections.
host_name	specifies the machine where the gateway is running.
port_number	matches the port number used by the Oracle Net Listener that is listening for the gateway. The Oracle Net Listener's port number can be found in the `listener.ora` file used by the Oracle Net Listener. See "Syntax of listener.ora File Entries" on page 3-3.
gateway_sid	specifies the SID of the gateway and matches the SID specified in the `listener.ora` file of the Oracle Net Listener that is listening for the gateway. See "Configure Oracle Net Listener for the Gateway" on page 3-2 for more information.
`(HS=OK)`	specifies that this connect descriptor connects to a non-Oracle system.

See Also: *Oracle Database Administrator's Guide* for information about editing the `tnsnames.ora` file.

Create Database Links

Any Oracle client connected to the Oracle database can access Sybase data through the gateway. The Oracle client and the Oracle database can reside on different machines. The gateway accepts connections only from the Oracle database.

A connection to the gateway is established through a database link when it is first used in an Oracle session. In this context, a connection refers to the connection between the Oracle database and the gateway. The connection remains established until the Oracle session ends. Another session or user can access the same database link and get a distinct connection to the gateway and Sybase database.

Database links are active for the duration of a gateway session. If you want to close a database link during a session, you can do so with the `ALTER SESSION` statement.

To access the Sybase server, you must create a database link. A public database link is the most common of database links.

```
SQL> CREATE PUBLIC DATABASE LINK dblink CONNECT TO
2  "user" IDENTIFIED BY "password" USING 'tns_name_entry';
```

Where:

Variable	Description
dblink	is the complete database link name.
tns_name_entry	specifies the Oracle Net connect descriptor specified in the `tnsnames.ora` file that identifies the gateway

After the database link is created you can verify the connection to the Sybase database, as follows:

```
SQL> SELECT * FROM DUAL@dblink;
```

> **See Also:** *Oracle Database Administrator's Guide* and Oracle Database Heterogeneous Connectivity Administrator's Guide for more information about using database links.

Configure Two-Phase Commit

The gateway supports the following transaction capabilities:

- `COMMIT_CONFIRM`
- `READ_ONLY`
- `SINGLE_SITE`

The transaction model is set using the `HS_TRANSACTION_MODEL` initialization parameter. By default, the gateway runs in `COMMIT_CONFIRM` transaction mode. When the Sybase database is updated by a transaction, the gateway becomes the commit point site. The Oracle database commits the unit of work in the Sybase database after verifying that all Oracle databases in the transaction have successfully prepared the transaction. Only one gateway instance can participate in an Oracle two-phase commit transaction as the commit point site.

> **See Also:** *Oracle Database Heterogeneous Connectivity Administrator's Guide* for information about the two-phase commit process.

To enable the `COMMIT_CONFIRM` transaction mode, perform the following tasks:

1. Create a Recovery Account and Password
2. Create the Transaction Log Table

The log table, called `HS_TRANSACTION_LOG`, is where two-phase commit transactions are recorded.

Create a Recovery Account and Password

For the gateway to recover distributed transactions, a recovery account and password must be set up in the Sybase database. By default, both the user name of the account and the password are `RECOVER`. The name of the account can be changed with the gateway initialization parameter `HS_FDS_RECOVERY_ACCOUNT`. The account password can be changed with the gateway initialization parameter `HS_FDS_RECOVERY_PWD`.

Note: Oracle recommends that you do not use the default value `RECOVER` for the user name and password. Moreover, storing plain-text as user name and password in the initialization file is not a good security policy. There is now a utility called `tg4pwd`, that should be used for encryption. Refer to Section 4.2.3, 'Encrypting Initialization parameters' in the *Oracle Database Heterogeneous Connectivity Administrator's Guide* for further details.

1. Set up a user account in the Sybase database. Both the user name and password must be a valid Sybase user name and password.
2. In the initialization parameter file, set the following gateway initialization parameters:
   - `HS_FDS_RECOVERY_ACCOUNT` to the user name of the Sybase user account you set up for recovery.
   - `HS_FDS_RECOVERY_PWD` to the password of the Sybase user account you set up for recovery.

See Also: "Customize the Initialization Parameter File" on page 3-2 for information about editing the initialization parameter file. For information about `HS_FDS_RECOVERY_ACCOUNT` and `HS_FDS_RECOVERY_PWD`, see Appendix C, "Initialization Parameters".

Create the Transaction Log Table

When configuring the gateway for two-phase commit, a table must be created in the Sybase database for logging transactions. The gateway uses the transaction log table to check the status of failed transactions that were started at the Sybase database by the gateway and registered in the table.

Note: Updates to the transaction log table cannot be part of an Oracle distributed transaction.

Note: The information in the transaction log table is required by the recovery process and must not be altered. The table must be used, accessed, or updated only by the gateway.

The table, called `HS_TRANSACTION_LOG`, consists of two columns, `GLOBAL_TRAN_ID`, data type `CHAR(64) NOT NULL` and `TRAN_COMMENT`, data type `CHAR(255)`.

You can use another name for the log table, other than `HS_TRANSACTION_LOG`, by specifying the other name using the `HS_FDS_TRANSACTION_LOG` initialization parameter.

See Also: Appendix C, "Initialization Parameters" for information about the `HS_FDS_TRANSACTION_LOG` initialization parameter.

Create the transaction log table in the user account you created in "Create a Recovery Account and Password" on page 3-7. Because the transaction log table is used to record the status of a gateway transaction, the table must reside at the database where

the Sybase update takes place. Also, the transaction log table must be created under the owner of the recovery account.

> **Note:** To utilize the transaction log table, users of the gateway must be granted privileges on the table.

To create a transaction log table use the `tg4sybs_tx.sql` script, located in the directory `$ORACLE_HOME/tg4sybs/admin` where `$ORACLE_HOME` is the directory under which the gateway is installed. Use isql to execute the script, as follows:

```
$ isql -Urecovery_account -Precovery_account_password [-Sserver] -itg4sybs_tx.sql
```

Create Sybase Views for Data Dictionary Support

To enable Oracle data dictionary translation support use the `tg4sybs_cvw.sql` script, located in the directory `$ORACLE_HOME/tg4sybs/admin` where `$ORACLE_HOME` is the directory under which the gateway is installed. You must run this script on each Sybase database that you want to access through the gateway. Use isql to execute the script, as follows:

```
 $ isql -Usa_user -Psa_pwd [-Sserver] [-Ddatabase] -e -i tg4sybs_cvw.sql
```

where `sa_user` and `sa_pwd` are the Sybase system administrator user ID and password respectively.

Encrypt Gateway Initialization Parameter Values

The gateway uses user IDs and passwords to access the information in the remote database. Some user IDs and passwords must be defined in the gateway initialization file to handle functions such as resource recovery. In the current security conscious environment, having plain-text passwords that are accessible in the initialization file is deemed insecure. The `tg4pwd` encryption utility has been added as part of Heterogeneous Services to help make this more secure. This utility is accessible by this gateway. The initialization parameters which contain sensitive values can be stored in an encrypted form.

> **See Also:** *Oracle Database Heterogeneous Connectivity Administrator's Guide* for more information about using this utility.

Configure the Gateway to Access Multiple Sybase Databases

The tasks for configuring the gateway to access multiple Sybase databases are similar to the tasks for configuring the gateway for a single database. The configuration example assumes the following:

- The gateway is installed and configured with the default SID of `tg4sybs`
- The `ORACLE_HOME` environment variable is set to the directory where the gateway is installed
- The gateway is configured for one Sybase database named `db1`
- Two Sybase databases named `db2` and `db3` on a host with IP Address 204.179.79.15 are being added

Multiple Sybase Databases Example: Configuring the Gateway

Choose One System ID for Each Sybase Database

A separate instance of the gateway is needed for each Sybase database. Each instance needs its own gateway System ID (SID). For this example, the gateway SIDs are chosen for the instances that access the Sybase databases:

- `tg4sybs2` for the gateway accessing database `db2`
- `tg4sybs3` for the gateway accessing database `db3`

Create Two Initialization Parameter Files

Create an initialization parameter file for each instance of the gateway by copying the original initialization parameter file, `$ORACLE_HOME/tg4sybs/admin/inittg4sybs.ora`, twice, naming one with the gateway SID for `db2` and the other with the gateway SID for `db3`:

```
$ cd $ORACLE_HOME/tg4sybs/admin
$ cp inittg4sybs.ora inittg4sybs2.ora
$ cp inittg4sybs.ora inittg4sybs3.ora
```

Change the value of the `HS_FDS_CONNECT_INFO` parameter in the new files.

For `inittg4sybs2.ora`, enter the following:

```
HS_FDS_CONNECT_INFO=204.179.79.15:5000/db2
```

For `inittg4sybs3.ora`, enter the following:

```
HS_FDS_CONNECT_INFO=204.179.79.15:5000/db3
```

Note: If you have multiple gateway SIDs for the same Sybase database because you want to use different gateway parameter settings at different times, follow the same procedure. You create several initialization parameter files, each with different SIDs and different parameter settings.

Multiple Sybase Databases Example: Configuring Oracle Net Listener

Add Entries to listener.ora

Add two new entries to the Oracle Net Listener configuration file, `listener.ora`. You must have an entry for each gateway instance, even when multiple gateway instances access the same database.

The following example shows the entry for the original installed gateway first, followed by the new entries.

```
SID_LIST_LISTENER=
(SID_LIST=
   (SID_DESC=
      (SID_NAME=tg4sybs)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4sybs)
   )
   (SID_DESC=
      (SID_NAME=tg4sybs2)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4sybs)
```

```
   )
   (SID_DESC=
      (SID_NAME=tg4sybs3)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4sybs)
   )
)
```

where, `oracle_home_directory` is the directory where the gateway resides.

> **Note:** For HP-UX PA-RISC, the *envs* parameter also needs to be set. Refer to "Syntax of listener.ora File Entries" on page 3-3 for more information about adding the *envs* parameter.

Multiple Sybase Databases Example: Stopping and Starting the Oracle Net Listener

If the listener is already running, use the `lsnrctl` command to stop the listener and then start it with the new settings, as follows:

```
$ lsnrctl stop
$ lsnrctl start
```

Multiple Sybase Databases Example: Configuring Oracle Database for Gateway Access

Configuring Oracle Net for Multiple Gateway Instances

Add two connect descriptor entries to the `tnsnames.ora` file. You must have an entry for each gateway instance, even if the gateway instances access the same database.

The following Sybase example shows the entry for the original installed gateway first, followed by the two entries for the new gateway instances:

```
old_db_using=(DESCRIPTION=
              (ADDRESS=
                (PROTOCOL=TCP)
                (PORT=port_number)
                (HOST=host_name))
                (CONNECT_DATA=
                    (SID=tg4sybs))
               (HS=OK))
new_db2_using=(DESCRIPTION=
              (ADDRESS=
                (PROTOCOL=TCP)
                (PORT=port_number)
                (HOST=host_name))
                (CONNECT_DATA=
                    (SID=tg4sybs2))
                (HS=OK))
new_db3_using=(DESCRIPTION=
              (ADDRESS=
                (PROTOCOL=TCP)
                (PORT=port_number)
                (HOST=host_name))
                (CONNECT_DATA=
                    (SID=tg4sybs3))
                (HS=OK))
```

The value for PORT is the TCP/IP port number of the Oracle Net Listener that is listening for the gateway. The number can be found in the listener.ora file used by the Oracle Net Listener. The value for HOST is the name of the machine on which the gateway is running. The name also can be found in the listener.ora file used by the Oracle Net Listener.

Multiple Sybase Databases Example: Accessing Sybase Data

Enter the following to create a database link for the tg4sybs2 gateway:

```
SQL> CREATE PUBLIC DATABASE LINK SYBS2 CONNECT TO
  2  "user2" IDENTIFIED BY "password2" USING 'new_db2_using';
```

Enter the following to create a database link for the tg4sybs3 gateway:

```
SQL> CREATE PUBLIC DATABASE LINK SYBS3 CONNECT TO
  2  "user3" IDENTIFIED BY "password3" USING 'new_db3_using';
```

After the database links are created you can verify the connection to the new Sybase databases, as in the following:

```
SQL> SELECT * FROM ALL_USERS@SYBS2;

SQL> SELECT * FROM ALL_USERS@SYBS3;
```

Part III

Installing and Configuring Oracle Database Gateway for Informix

Part III, "Installing and Configuring Oracle Database Gateway for Informix" describes how to install and configure Oracle Database Gateway for Informix on UNIX based platforms.

It contains the following chapters:

- Chapter 4, "Installing Oracle Database Gateway for Informix"
- Chapter 5, "Configuring Oracle Database Gateway for Informix"

4

Installing Oracle Database Gateway for Informix

This chapter provides information about the hardware and software requirements and the installation procedure for Oracle Database Gateway for Informix.

To install the gateway, follow these steps:

1. Ensure that the system meets all of the hardware and software requirements specified in "System Requirements for Oracle Database Gateway for Informix" on page 4-1.
2. Run the Oracle Universal Installer.

   See "Step Through the Oracle Universal Installer" on page 4-4 for more information about running the Oracle Universal Installer

   Oracle Universal Installer is a menu-driven utility that guides you through the installation of the gateway by prompting you with action items. The action items and the sequence in which they appear depend on your platform.

   See Table 4–3 for a description of the installation procedure of Oracle Database Gateway for Informix.

System Requirements for Oracle Database Gateway for Informix

This section provides information about the hardware and software requirements for the gateway. It contains the following sections:

Hardware Requirements

Table 4–1 shows the minimum hardware requirements for Oracle Database Gateway for Informix.

Table 4–1 Hardware requirements for Oracle Database Gateway for Informix

Hardware Items	Required for AIX-Based System	Required for HP 9000 Series HP-UX PA-RISC	Required for Solaris Operating System (SPARC)	Required for Linux x86	Required for Linux x86 64 bit
Temporary Disk Space	400 MB	400 MB	400 MB	400 MB	400 MB
Disk Space	1.5 GB	1.5 GB	750 MB	750 MB	750 MB

Table 4–1 (Cont.) Hardware requirements for Oracle Database Gateway for Informix

Hardware Items	Required for AIX-Based System	Required for HP 9000 Series HP-UX PA-RISC	Required for Solaris Operating System (SPARC)	Required for Linux x86	Required for Linux x86 64 bit
Physical Memory*	512 MB	512 MB	512 MB	512 MB	512 MB
Swap Space	1 GB	1 GB	1 GB	1 GB	1 GB
Processor	IBM RS/6000 AIX-Based System Processor	HP 9000 Series 700 or 800 processor for hp-ux 11.0	Sun Solaris Operating System (SPARC) Processor	x86	x86_64

* The minimum swap space is 1 GB (or twice the size of RAM). On systems with 2 GB or more of RAM, the swap space can be between one and two times the size of RAM. On AIX systems with 1 GB or more of memory, do not increase the swap space more than 2 GB.

Checking the Hardware Requirements

To ensure that the system meets the minimum requirements, follow these steps:

1. To determine the physical RAM size, enter one of the following commands:

Operating System	Command
AIX	# /usr/sbin/lsattr -E -l sys0 -a realmem
HP-UX PA-RISC	# /usr/sbin/dmesg | grep "Physical:"
Solaris (SPARC)	# /usr/sbin/prtconf | grep "Memory size"
Linux x86	# grep MemTotal /proc/meminfo
Linux x86 64 bit	# grep MemTotal /proc/meminfo

   If the size of the physical RAM installed in the system is less than the required size, you must install more memory before continuing.

2. To determine the size of the configured swap space, enter one of the following commands:

Operating System	Command
AIX	# /usr/sbin/lsps -a
HP-UX PA-RISC	# /usr/sbin/swapinfo -a
Solaris (SPARC)	# /usr/sbin/swap -s
Linux x86	# grep SwapTotal /proc/meminfo
Linux x86 64 bit	# grep SwapTotal /proc/meminfo

   If necessary, see your operating system documentation for information about how to configure additional swap space.

3. To determine the amount of disk space available in the `/tmp` directory enter the following commands:

Operating System	Command
AIX	`# df -k /tmp`
HP-UX PA-RISC	`# df -k /tmp`
Solaris (SPARC)	`# df -k /tmp`
Linux x86	`# df -k /tmp`
Linux x86 64 bit	`# df -k /tmp`

4. To determine the amount of disk space available on the system enter the following commands:

Operating System	Command
AIX	`# df -k`
HP-UX PA-RISC	`# df -k`
Solaris (SPARC)	`# df -k`
Linux x86	`# df -k`
Linux x86 64 bit	`# df -k`

Software Requirements

The following section describes the minimum software requirements for Oracle Database Gateway for Informix.

Operating System

Table 4–2 shows the minimum operating system version required for Oracle Database Gateway for Informix. If your operating system is lower than the minimum requirements, upgrade your operating system to meet the specified levels.

Table 4–2 Operating Systems version for Oracle Database Gateway for Informix

Operating System	Version
AIX	AIX 5L version 5.3, Maintenance level 02 or higher
HP-UX PA-RISC	HP-UX PA-RISC 11i V1 (11.11), 11i V2 (11.23) PA-RISC
Solaris (SPARC)	Solaris 9 Update 6 or higher or Solaris 10, 64-bit
Linux x86 Red Hat	One of the following operating system versions: ■ Red Hat Enterprise Linux AS/ES 3.0 (Update 4 or later) ■ Red Hat Linux 4.0
Linux x86 Suse	SUSE Linux Enterprise Server 9.0 with SP 2 or later
Linux x86 64 bit Red Hat	One of the following operating system versions: ■ Red Hat Enterprise Linux AS/ES 3.0 (Update 4 or later) ■ Red Hat Enterprise Linux AS/ES 4.0 (Update 1 or later)
Linux x86 64 bit Suse	SUSE Linux Enterprise Server 9.0 with SP2 or later

Checking the Software Requirements

To ensure that the system meets the minimum requirements, follow these steps:

- To determine which version of AIX is installed, enter the following command:

```
# oslevel -r
```

- To determine which version of HP-UX PA-RISC is installed, enter the following command:

```
# uname -a
```

- To determine which version of Solaris Operating System (SPARC) is installed, enter the following command:

```
# uname -r
```

- To determine which distribution and version of Linux x86 is installed, enter the following command:

```
# cat /etc/issue
```

- To determine which distribution and version of Linux x86 64 bit is installed, enter the following command:

```
# cat /proc/version
```

Certified Configuration

The gateway supports Informix Dynamic Server. For the latest versions supported refer to the OTN Web site:

http://www.oracle.com/technology/products/gateways/pdf/certmatrix10g.pdf

Step Through the Oracle Universal Installer

Table 4–3 describes the installation procedure for Oracle Database Gateway for Informix.

Table 4–3 The Oracle Universal Installer: Steps for Installing the Gateway

Screen	Response
Oracle Universal Installer: Welcome	Click **Next**.
Oracle Universal Installer: File Locations	The Source section of the screen is where you specify the source location that the Oracle Universal Installer must use to install the Oracle Database Gateway for Informix. You need not edit the file specification in the Path field. The default setting for this field points to the installer file on your Oracle Database Gateway installation media. The Path field in the Destination section of the File Locations screen is where you specify the destination for your installation. You need not edit the path specification in the Path field. The default setting for this field points to *ORACLE_HOME*. After you set the fields in the File Locations screen as necessary, click **Next** to continue. After loading the necessary information from the installation media, the Oracle Universal Installer displays the Available Products screen.
Oracle Universal Installer: Available Product Components	**a.** Select **Oracle Database Gateway for Informix 11.1.0.5.0**. **b.** Click **Next**.

Table 4–3 (Cont.) The Oracle Universal Installer: Steps for Installing the Gateway

Screen	Response
Oracle Database Gateway for Informix	**Informix Database Server Host Name** - Specify the host name of the machine hosting the Informix database server. **Informix Database Server Port number** - Specify the port number of the Informix database server **Informix Server Name** - Specify the Informix server name **Informix Database Name** - Specify the Informix database name Click **Next** to continue.
Oracle Universal Installer: Summary	The Installation Summary screen enables you to review a tree list of options and components for this installation. Click **Install** to start installation.
Oracle Net Configuration Assistant: Welcome	Click **Cancel**
Oracle Net Configuration Assistant:	Click **Yes**
Oracle Universal Installer: Configuration Tools	Click **Exit**
Exit	The final screen of the Oracle Universal Installer is the End of Installation screen. Click **Exit** to exit the installer.

5

Configuring Oracle Database Gateway for Informix

After installing the gateway, perform the following tasks to configure Oracle Database Gateway for Informix:

1. Configure the Gateway Initialization Parameter File
2. Configure Oracle Net for the Gateway
3. Configure the Oracle Database for Gateway Access
4. Create Database Links
5. Configure Two-Phase Commit
6. Encrypt Gateway Initialization Parameter Values
7. Configure the Gateway to Access Multiple Informix Databases

Configure the Gateway Initialization Parameter File

Perform the following tasks to configure the gateway initialization parameter file:

1. Choose a System Identifier for the Gateway
2. Customize the Initialization Parameter File

Choose a System Identifier for the Gateway

The gateway system identifier (SID) is an alphanumeric character string that identifies a gateway instance. You need one gateway instance, and therefore one gateway SID, for each Informix database you are accessing. The SID is used as part of the file name for the initialization parameter file. The default SID is `tg4ifmx`.

You can define a gateway SID, but using the default of `tg4ifmx` is easier because you do not need to change the initialization parameter file name. However, if you want to access two Informix databases, you need two gateway SIDs, one for each instance of the gateway. If you have only one Informix database and want to access it sometimes with one set of gateway parameter settings, and other times with different gateway parameter settings, then you will need multiple gateway SIDs for the single Informix database.

Customize the Initialization Parameter File

The initialization parameter file must be available when the gateway is started. During installation, the following default initialization parameter file is created:

```
$ORACLE_HOME/tg4ifmx/admin/inittg4ifmx.ora
```

Where `$ORACLE_HOME` is the directory under which the gateway is installed.

This initialization file is for the default gateway SID. If you are not using `tg4ifmx` as the gateway SID, you must rename the initialization parameter file using the SID you chose in the preceding step "Choose a System Identifier for the Gateway" on page 5-1. This default initialization parameter file is sufficient for starting the gateway, verifying a successful installation, and running the demonstration scripts.

A number of initialization parameters can be used to modify the gateway behavior. Refer to Appendix C, "Initialization Parameters" for the complete list of initialization parameters that can be set. Changes made to the initialization parameters only take effect in the next gateway session. The most important parameter is the `HS_FDS_CONNECT_INFO` which describes the connection to the non-Oracle system.

The default initialization parameter file already has an entry for this parameter. The syntax for `HS_FDS_CONNECT_INFO` is as follows:

```
HS_FDS_CONNECT_INFO=host_name:port_number/server_name/database_name
```

Where:

Variable	Description
host_name	is the host name or IP address of the machine hosting the Informix database.
port_number	is the port number of the Informix database server.
server_name	specify the Informix database server name.
database_name	is the Informix database name.

See Also: Appendix C, "Initialization Parameters" and the *Oracle Database Heterogeneous Connectivity Administrator's Guide* for more information about customizing the initialization parameter file.

Configure Oracle Net for the Gateway

The gateway requires Oracle Net to communicate with the Oracle database. After configuring the gateway, perform the following tasks to configure Oracle Net to work with the gateway:

1. Configure Oracle Net Listener for the Gateway
2. Stop and Start the Oracle Net Listener for the Gateway

Configure Oracle Net Listener for the Gateway

The Oracle Net Listener listens for incoming requests from the Oracle database. For the Oracle Net Listener to listen for the gateway, information about the gateway must be added to the Oracle Net Listener configuration file, `listener.ora`. This file by default is located in `$ORACLE_HOME/network/admin`, where `$ORACLE_HOME` is the directory under which the gateway is installed.

The following entries must be added to the `listener.ora` file:

- A list of Oracle Net addresses on which the Oracle Net Listener listens

- The executable name of the gateway that the Oracle Net Listener starts in response to incoming connection requests

Syntax of listener.ora File Entries

The Oracle database communicates with the gateway using Oracle Net and any supported protocol adapters. The following is the syntax of the address on which the Oracle Net Listener listens using the TCP/IP protocol adapter:

```
LISTENER=
        (ADDRESS=
          (PROTOCOL=TCP)
          (HOST=host_name)
          (PORT=port_number))
```

Where:

Variable	Description
host_name	is the name of the machine on which the gateway is installed.
port_number	specifies the port number used by the Oracle Net Listener. If you have other listeners running on the same machine, then the value of *port_number* must be different from the other listeners' port numbers.

To direct the Oracle Net Listener to start the gateway in response to incoming connection requests, add an entry to the `listener.ora` file. The syntax for HP-UX PA-RISC slightly different than the other platforms.

> **Note:** You must use the same SID value in the listener.ora file and the `tnsnames.ora` file which will be configured in the next step.

For AIX, Solaris SPARC, and Linux:

```
SID_LIST_LISTENER=
   (SID_LIST=
      (SID_DESC=
         (SID_NAME=gateway_sid)
         (ORACLE_HOME=oracle_home_directory)
         (PROGRAM=tg4ifmx)
      )
   )
```

For HP-UX PA-RISC:

```
SID_LIST_LISTENER=
   (SID_LIST=
      (SID_DESC=
         (SID_NAME=gateway_sid)
         (ORACLE_HOME=oracle_home_directory)
         (PROGRAM=tg4ifmx)
         (ENVS=SHLIB_PATH=$ORACLE_HOME/lib32)
      )
   )
```

Where:

Variable	Description
gateway_sid	specifies the SID of the gateway and matches the gateway SID specified in the connect descriptor entry in the `tnsnames.ora` file.
oracle_home_directory	specifies the Oracle home directory where the gateway resides.
`tg4ifmx`	specifies the executable name of the Oracle Database Gateway for Informix.

If you already have an existing Oracle Net Listener, then add the following syntax to `SID_LIST` in the existing `listener.ora` file:

For AIX, Solaris SPARC, and Linux:

```
SID_LIST_LISTENER=
(SID_LIST=
   (SID_DESC=.
     .
   )
   (SID_DESC=.
     .
   )
   (SID_DESC=
      (SID_NAME=gateway_sid)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4ifmx)

   )
)
```

For HP-UX PA-RISC:

```
SID_LIST_LISTENER=
(SID_LIST=
   (SID_DESC=.
     .
   )
   (SID_DESC=.
     .
   )
   (SID_DESC=
      (SID_NAME=gateway_sid)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4ifmx)
      (ENVS=SHLIB_PATH=$ORACLE_HOME/lib32)
   )
)
```

> **See Also:** *Oracle Database Net Services Administrator's Guide* for information about changing the `listener.ora` file.

Stop and Start the Oracle Net Listener for the Gateway

You must stop and restart the Oracle Net Listener to initiate the new settings, as follows:

1. Set the `PATH` environment variable to `$ORACLE_HOME/bin` where `$ORACLE_HOME` is the directory in which the gateway is installed.

For example on the Linux platform, if you have the Bourne or Korn Shell, enter the following:

```
$ PATH=$ORACLE_HOME/bin:$PATH;export PATH
$ LD_LIBRARY_PATH=$ORACLE_HOME/lib:$LD_LIBRARY_PATH; export LD_LIBRARY_PATH
```

If you have the C Shell, enter the following:

```
$ setenv PATH $ORACLE_HOME/bin:$PATH
$ setenv LD_LIBRARY_PATH $ORACLE_HOME/lib:$LD_LIBRARY_PATH
```

Table 5–1 specifies which parameter value to use for the different platforms:

Table 5–1 Parameter Values for UNIX Based Platforms

Platform	Parameter Value
Solaris (SPARC) 64 bit	`LD_LIBRARY_PATH=$ORACLE_HOME/lib`
HP-UX PA-RISC	`SHLIB_PATH=$ORACLE_HOME/lib`
Linux x86, and Linux x86 64 bit	`LD_LIBRARY_PATH=$ORACLE_HOME/lib`
AIX	`LIBPATH=$ORACLE_HOME/lib`

2. If the listener is already running, use the `lsnrctl` command to stop the listener and then start it with the new settings, as follows:

```
$ lsnrctl stop
$ lsnrctl start
```

3. Check the status of the listener with the new settings, as follows:

```
$ lsnrctl status
```

The following is a partial output from a `lsnrctl` status check:

```
.
.
.
Services Summary...
Service "tg4ifmx" has 1 instance(s).
  Instance "tg4ifmx", status UNKNOWN, has 1 handler(s) for this service...
The command completed successfully
```

In this example, the service name is `tg4ifmx` which is the default SID value assigned during installation.

Configure the Oracle Database for Gateway Access

Before you use the gateway to access Informix data you must configure the Oracle database to enable communication with the gateway over Oracle Net.

To configure the Oracle database you must add connect descriptors to the `tnsnames.ora` file. By default, this file is in `$ORACLE_HOME/network/admin`, where `$ORACLE_HOME` is the directory in which the Oracle database is installed. You cannot use the Oracle Net Assistant or the Oracle Net Easy Config tools to configure the `tnsnames.ora` file. You must edit the file manually.

Configuring tnsnames.ora

Edit the `tnsnames.ora` file to add a connect descriptor for the gateway. The following is a syntax of the Oracle Net entry using the TCP/IP protocol:

```
connect_descriptor=
   (DESCRIPTION=
      (ADDRESS=
         (PROTOCOL=TCP)
         (HOST=host_name)
         (PORT=port_number)
      )
      (CONNECT_DATA=
         (SID=gateway_sid))
      (HS=OK))
```

Where:

Variable	Description
connect_descriptor	is the description of the object to connect to as specified when creating the database link, such as `tg4ifmx`. Check the sqlnet.ora file for the following parameter setting: ▪ `names.directory_path = (TNSNAMES)` **Note**: The `sqlnet.ora` file is typically stored in `$ORACLE_HOME/network/admin`.
`TCP`	is the TCP protocol used for TCP/IP connections.
host_name	specifies the machine where the gateway is running.
port_number	matches the port number used by the Oracle Net Listener that is listening for the gateway. The Oracle Net Listener's port number can be found in the `listener.ora` file used by the Oracle Net Listener. See "Syntax of listener.ora File Entries" on page 5-3.
gateway_sid	specifies the SID of the gateway and matches the SID specified in the `listener.ora` file of the Oracle Net Listener that is listening for the gateway. See "Configure Oracle Net Listener for the Gateway" on page 5-2 for more information.
`(HS=OK)`	specifies that this connect descriptor connects to a non-Oracle system.

See Also: *Oracle Database Administrator's Guide* for information about editing the `tnsnames.ora` file.

Create Database Links

Any Oracle client connected to the Oracle database can access Informix data through the gateway. The Oracle client and the Oracle database can reside on different machines. The gateway accepts connections only from the Oracle database.

A connection to the gateway is established through a database link when it is first used in an Oracle session. In this context, a connection refers to the connection between the Oracle database and the gateway. The connection remains established until the Oracle session ends. Another session or user can access the same database link and get a distinct connection to the gateway and Informix database.

Database links are active for the duration of a gateway session. If you want to close a database link during a session, you can do so with the `ALTER SESSION` statement.

To access the Informix server, you must create a database link. A public database link is the most common of database links.

```
SQL> CREATE PUBLIC DATABASE LINK dblink CONNECT TO
2  "user" IDENTIFIED BY "password" USING 'tns_name_entry';
```

Where:

Variable	Description
dblink	is the complete database link name.
tns_name_entry	specifies the Oracle Net connect descriptor specified in the `tnsnames.ora` file that identifies the gateway

After the database link is created you can verify the connection to the Informix database, as follows:

```
SQL> SELECT * FROM DUAL@dblink;
```

> **See Also:** *Oracle Database Administrator's Guide* and *Oracle Database Heterogeneous Connectivity Administrator's Guide* for more information about using database links.

Configure Two-Phase Commit

The gateway supports the following transaction capabilities:

- COMMIT_CONFIRM
- READ_ONLY
- SINGLE_SITE

The transaction model is set using the HS_TRANSACTION_MODEL initialization parameter. By default, the gateway runs in COMMIT_CONFIRM transaction mode. When the Informix database is updated by a transaction, the gateway becomes the commit point site. The Oracle database commits the unit of work in the Informix database after verifying that all Oracle databases in the transaction have successfully prepared the transaction. Only one gateway instance can participate in an Oracle two-phase commit transaction as the commit point site.

> **See Also:** *Oracle Database Heterogeneous Connectivity Administrator's Guide* for information about the two-phase commit process.

To enable the COMMIT_CONFIRM transaction mode, perform the following tasks:

1. Create a Recovery Account and Password
2. Create the Transaction Log Table

The log table, called HS_TRANSACTION_LOG, is where two-phase commit transactions are recorded.

Create a Recovery Account and Password

For the gateway to recover distributed transactions, a recovery account and password must be set up in the Informix database. By default, both the user name of the account and the password are RECOVER. The name of the account can be changed with the

gateway initialization parameter HS_FDS_RECOVERY_ACCOUNT. The account password can be changed with the gateway initialization parameter HS_FDS_RECOVERY_PWD.

Note: Oracle recommends that you do not use the default value RECOVER for the user name and password. Moreover, storing plain-text as user name and password in the initialization file is not a good security policy. There is now a utility called tg4pwd, that should be used for encryption. Refer to Section 4.2.3, 'Encrypting Initialization parameters' in the *Oracle Database Heterogeneous Connectivity Administrator's Guide* for further details.

---

1. Set up a user account in the Informix database. Both the user name and password must be a valid Informix user name and password.
2. In the initialization parameter file, set the following gateway initialization parameters:
   - HS_FDS_RECOVERY_ACCOUNT to the user name of the Informix user account you set up for recovery.
   - HS_FDS_RECOVERY_PWD to the password of the Informix user account you set up for recovery.

See Also: Customize the Initialization Parameter File on page 5-1 for information about editing the initialization parameter file. For information about HS_FDS_RECOVERY_ACCOUNT and HS_FDS_RECOVERY_PWD, see Appendix C, "Initialization Parameters".

Create the Transaction Log Table

When configuring the gateway for two-phase commit, a table must be created in the Informix database for logging transactions. The gateway uses the transaction log table to check the status of failed transactions that were started at the Informix database by the gateway and registered in the table.

Note: Updates to the transaction log table cannot be part of an Oracle distributed transaction.

Note: The information in the transaction log table is required by the recovery process and must not be altered. The table must be used, accessed, or updated only by the gateway.

The table, called HS_TRANSACTION_LOG, consists of two columns, GLOBAL_TRAN_ID, data type CHAR(64) NOT NULL and TRAN_COMMENT, data type CHAR(255).

You can use another name for the log table, other than HS_TRANSACTION_LOG, by specifying the other name using the HS_FDS_TRANSACTION_LOG initialization parameter.

See Also: Appendix C, "Initialization Parameters" for information about the HS_FDS_TRANSACTION_LOG initialization parameter.

Create the transaction log table in the user account you created in Create a Recovery Account and Password on page 5-7. Because the transaction log table is used to record the status of a gateway transaction, the table must reside at the database where the Informix update takes place. Also, the transaction log table must be created under the owner of the recovery account.

> **Note:** To utilize the transaction log table, users of the gateway must be granted privileges on the table.

To create a transaction log table use the `tg4ifmx_tx.sql` script, located in the directory `$ORACLE_HOME/tg4ifmx/admin` where `$ORACLE_HOME` is the directory under which the gateway is installed, as follows:

1. Login as user ID `RECOVER`.
2. Set environment variable `DELIMIDENT`.

   If you have the Bourne or Korn Shell, enter the following:

   ```
   $ DELIMIDENT = y; export DELIMIDENT
   ```

   If you have the C Shell, enter the following:

   ```
   $ setenv DELIMIDENT y
   ```

3. Execute the script using dbaccess, as follows.

   ```
   $ cd $ORACLE_HOME/tg4ifmx/admin
   $ dbaccess database_name tg4ifmx_tx.sql
   ```

Encrypt Gateway Initialization Parameter Values

The gateway uses user IDs and passwords to access the information in the remote database. Some user IDs and passwords must be defined in the gateway initialization file to handle functions such as resource recovery. In the current security conscious environment, having plain-text passwords that are accessible in the initialization file is deemed insecure. The `tg4pwd` encryption utility has been added as part of Heterogeneous Services to help make this more secure. This utility is accessible by this gateway. The initialization parameters which contain sensitive values can be stored in an encrypted form.

> **See Also:** *Oracle Database Heterogeneous Connectivity Administrator's Guide* for more information about using this utility.

Configure the Gateway to Access Multiple Informix Databases

The tasks for configuring the gateway to access multiple Informix databases are similar to the tasks for configuring the gateway for a single database. The configuration example assumes the following:

- The gateway is installed and configured with the default SID of `tg4ifmx`.
- The `ORACLE_HOME` environment variable is set to the directory where the gateway is installed.
- The gateway is configured for one Informix database named `db1`.
- Two Informix databases named `db2` and `db3` on a host with IP Address 204.179.79.15 are being added.

Multiple Informix Databases Example: Configuring the Gateway

Choose One System ID for Each Informix Database

A separate instance of the gateway is needed for each Informix database. Each instance needs its own gateway System ID (SID). For this example, the gateway SIDs are chosen for the instances that access the Informix databases:

- `tg4ifmx2` for the gateway accessing database `db2`.
- `tg4ifmx3` for the gateway accessing database `db3`.

Create Two Initialization Parameter Files

Create an initialization parameter file for each instance of the gateway by copying the original initialization parameter file, `$ORACLE_HOME/tg4ifmx/admin/inittg4ifmx.ora`, twice, naming one with the gateway SID for `db2` and the other with the gateway SID for `db3`:

```
$ cd $ORACLE_HOME/tg4ifmx/admin
$ cp inittg4ifmx.ora inittg4ifmx2.ora
$ cp inittg4ifmx.ora inittg4ifmx3.ora
```

Change the value of the `HS_FDS_CONNECT_INFO` parameter in the new files.

For `inittg4ifmx2.ora`, enter the following:

```
HS_FDS_CONNECT_INFO=204.179.79.15:3900/sr2/db2
```

For `inittg4ifmx3.ora`, enter the following:

```
HS_FDS_CONNECT_INFO=204.179.79.15:3900/sr3/db3
```

Note: If you have multiple gateway SIDs for the same Informix database because you want to use different gateway parameter settings at different times, follow the same procedure. You create several initialization parameter files, each with different SIDs and different parameter settings.

Multiple Informix Databases Example: Configuring Oracle Net Listener

Add Entries to listener.ora

Add two new entries to the Oracle Net Listener configuration file, `listener.ora`. You must have an entry for each gateway instance, even when multiple gateway instances access the same database.

The following example shows the entry for the original installed gateway first, followed by the new entries.

```
SID_LIST_LISTENER=
(SID_LIST=
   (SID_DESC=
      (SID_NAME=tg4ifmx)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4ifmx)
   )
   (SID_DESC=
      (SID_NAME=tg4ifmx2)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4ifmx)
```

```
   )
   (SID_DESC=
      (SID_NAME=tg4ifmx3)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4ifmx)
   )
)
```

where, `oracle_home_directory` is the directory where the gateway resides.

> **Note:** For HP-UX PA-RISC, the *envs* parameter also needs to be set. Refer to "Syntax of listener.ora File Entries" on page 5-3 for more information on adding the *envs* parameter.

Multiple Informix Databases Example: Stopping and Starting the Oracle Net Listener

If the listener is already running, use the `lsnrctl` command to stop the listener and then start it with the new settings, as follows:

```
$ lsnrctl stop
$ lsnrctl start
```

Multiple Informix Databases Example: Configuring Oracle Database for Gateway Access

Configuring Oracle Net for Multiple Gateway Instances

Add two connect descriptor entries to the `tnsnames.ora` file. You must have an entry for each gateway instance, even if the gateway instances access the same database.

The following Informix example shows the entry for the original installed gateway first, followed by the two entries for the new gateway instances:

```
old_db_using=(DESCRIPTION=
              (ADDRESS=
                (PROTOCOL=TCP)
                (PORT=port_number)
                (HOST=host_name))
                (CONNECT_DATA=
                    (SID=tg4ifmx))
               (HS=OK))
new_db2_using=(DESCRIPTION=
              (ADDRESS=
                (PROTOCOL=TCP)
                (PORT=port_number)
                (HOST=host_name))
                (CONNECT_DATA=
                    (SID=tg4ifmx2))
                (HS=OK))
new_db3_using=(DESCRIPTION=
              (ADDRESS=
                (PROTOCOL=TCP)
                (PORT=port_number)
                (HOST=host_name))
                (CONNECT_DATA=
                    (SID=tg4ifmx3))
```

```
(HS=OK))
```

The value for PORT is the TCP/IP port number of the Oracle Net Listener that is listening for the gateway. The number can be found in the listener.ora file used by the Oracle Net Listener. The value for HOST is the name of the machine on which the gateway is running. The name also can be found in the listener.ora file used by the Oracle Net Listener.

Multiple Informix Databases Example: Accessing Informix Data

Enter the following to create a database link for the tg4ifmx2 gateway:

```
SQL> CREATE PUBLIC DATABASE LINK IFMX2 CONNECT TO
  2  "user2" IDENTIFIED BY "password2" USING 'new_db2_using';
```

Enter the following to create a database link for the tg4ifmx3 gateway:

```
SQL> CREATE PUBLIC DATABASE LINK IFMX3 CONNECT TO
  2  "user3" IDENTIFIED BY "password3" USING 'new_db3_using';
```

After the database links are created you can verify the connection to the new Informix databases, as in the following:

```
SQL> SELECT * FROM ALL_USERS@IFMX2;

SQL> SELECT * FROM ALL_USERS@IFMX3;
```

Part IV

Installing and Configuring Oracle Database Gateway for Teradata

Part IV, "Installing and Configuring Oracle Database Gateway for Teradata" describes how to install and configure Oracle Database Gateway for Teradata on UNIX based platforms.

It contains the following chapters:

- Chapter 6, "Installing Oracle Database Gateway for Teradata"
- Chapter 7, "Configuring Oracle Database Gateway for Teradata"

6

Installing Oracle Database Gateway for Teradata

This chapter provides information about the hardware and software requirements and the installation procedure for Oracle Database Gateway for Teradata.

To install the gateway, follow these steps:

1. Ensure that the system meets all of the hardware and software requirements specified in "System Requirements for Oracle Database Gateway for Teradata" on page 6-1.
2. Run the Oracle Universal Installer.

   See "Step Through the Oracle Universal Installer" on page 6-4 for more information about running the Oracle Universal Installer.

   Oracle Universal Installer is a menu-driven utility that guides you through the installation of the gateway by prompting you with action items. The action items and the sequence in which they appear depend on your platform.

   See Table 6–3 for a description of the installation procedure of Oracle Database Gateway for Teradata

System Requirements for Oracle Database Gateway for Teradata

This section provides information about the hardware and software requirements for the gateway. It contains the following sections:

Hardware Requirements

Table 6–1 shows the minimum hardware requirements for Oracle Database Gateway for Teradata.

Table 6–1 Hardware requirements for Oracle Database Gateway for Teradata

Hardware Items	Required for AIX-Based System	Required for HP 9000 Series HP-UX PA-RISC	Required for Solaris Operating System (SPARC)	Required for Linux x86	Required for Linux x86 64 bit
Temporary Disk Space	400 MB	400 MB	400 MB	400 MB	400 MB
Disk Space	1.5 GB	1.5 GB	750 MB	750 MB	750 MB
Physical Memory*	512 MB	512 MB	512 MB	512 MB	512 MB

Table 6–1 (Cont.) Hardware requirements for Oracle Database Gateway for Teradata

Hardware Items	Required for AIX-Based System	Required for HP 9000 Series HP-UX PA-RISC	Required for Solaris Operating System (SPARC)	Required for Linux x86	Required for Linux x86 64 bit
Swap Space	1 GB	1 GB	1 GB	1 GB	1 GB
Processor	IBM RS/6000 AIX-Based System Processor	HP 9000 Series 700 or 800 processor for hp-ux 11.0	Sun Solaris Operating System (SPARC) Processor	x86	x86_64

* The minimum swap space is 1 GB (or twice the size of RAM). On systems with 2 GB or more of RAM, the swap space can be between one and two times the size of RAM. On AIX systems with 1 GB or more of memory, do not increase the swap space more than 2 GB.

Checking the Hardware Requirements

To ensure that the system meets the minimum requirements, follow these steps:

1. To determine the physical RAM size, enter one of the following commands:

Operating System	Command
AIX	# `/usr/sbin/lsattr -E -l sys0 -a realmem`
HP-UX PA-RISC	# `/usr/sbin/dmesg | grep "Physical:"`
Solaris (SPARC)	# `/usr/sbin/prtconf | grep "Memory size"`
Linux x86	`# grep MemTotal /proc/meminfo`
Linux x86 64 bit	`# grep MemTotal /proc/meminfo`

   If the size of the physical RAM installed in the system is less than the required size, you must install more memory before continuing.

2. To determine the size of the configured swap space, enter one of the following commands:

Operating System	Command
AIX	`# /usr/sbin/lsps -a`
HP-UX PA-RISC	`# /usr/sbin/swapinfo -a`
Solaris (SPARC)	`# /usr/sbin/swap -s`
Linux x86	`# grep SwapTotal /proc/meminfo`
Linux x86 64 bit	`# grep SwapTotal /proc/meminfo`

   If necessary, see your operating system documentation for information about how to configure additional swap space.

3. To determine the amount of disk space available in the `/tmp` directory enter the following commands:

Operating System	Command
AIX	`# df -k /tmp`
HP-UX PA-RISC	`# df -k /tmp`

Operating System	Command
Solaris (SPARC)	`# df -k /tmp`
Linux x86	`# df -k /tmp`
Linux x86 64 bit	`# df -k /tmp`

4. To determine the amount of disk space available on the system enter the following commands:

Operating System	Command
AIX	`# df -k`
HP-UX PA-RISC	`# df -k`
Solaris (SPARC)	`# df -k`
Linux x86	`# df -k`
Linux x86 64 bit	`# df -k`

Software Requirements

The following section describes the minimum software requirements for Oracle Database Gateway for Teradata.

Operating System

Table 6–2 shows the minimum operating system version required for Oracle Database Gateway for Teradata. If your operating system is lower than the minimum requirements, upgrade your operating system to meet the specified levels.

Table 6–2 Operating Systems version for Oracle Database Gateway for Teradata

Operating System	Version
AIX	AIX 5L version 5.3, Maintenance level 02 or higher
HP-UX PA-RISC	HP-UX PA-RISC 11i V1 (11.11), 11i V2 (11.23) PA-RISC
Solaris (SPARC)	Solaris 9 Update 6 or higher or Solaris 10, 64-bit
Linux x86 Red Hat	One of the following operating system versions: ■ Red Hat Enterprise Linux AS/ES 3.0 (Update 4 or later) ■ Red Hat Linux 4.0
Linux x86 Suse	SUSE Linux Enterprise Server 9.0 with SP 2 or later
Linux x86 64 bit Red Hat	One of the following operating system versions: ■ Red Hat Enterprise Linux AS/ES 3.0 (Update 4 or later) ■ Red Hat Enterprise Linux AS/ES 4.0 (Update 1 or later)
Linux x86 64 bit Suse	SUSE Linux Enterprise Server 9.0 with SP2 or later

Checking the Software Requirements

To ensure that the system meets the minimum requirements, follow these steps:

- To determine which version of AIX is installed, enter the following command:

```
# oslevel -r
```

- To determine which version of HP-UX PA-RISC is installed, enter the following command:

  ```
  # uname -a
  ```

- To determine which version of Solaris Operating System (SPARC) is installed, enter the following command:

  ```
  # uname -r
  ```

- To determine which distribution and version of Linux x86 is installed, enter the following command:

  ```
  # cat /etc/issue
  ```

- To determine which distribution and version of Linux x86 64 bit is installed, enter the following command:

  ```
  # cat /proc/version
  ```

Certified Configuration

Teradata client libraries are required on the machine where the gateway is installed. For the latest certified clients refer to the OTN Web site:

http://www.oracle.com/technology/products/gateways/pdf/certmatrix10g.pdf

Step Through the Oracle Universal Installer

Table 6–3 describes the installation procedure for Oracle Database Gateway for Teradata.

Table 6–3 The Oracle Universal Installer: Steps for Installing the Gateway

Screen	Response
Oracle Universal Installer: Welcome	Click **Next**.
Oracle Universal Installer: File Locations	The Source section of the screen is where you specify the source location that the Oracle Universal Installer must use to install the Oracle Database Gateway for Teradata. You need not edit the file specification in the Path field. The default setting for this field points to the installer file on your Oracle Database Gateway installation media. The Path field in the Destination section of the File Locations screen is where you specify the destination for your installation. You need not edit the path specification in the Path field. The default setting for this field points to *ORACLE_HOME*. After you set the fields in the File Locations screen as necessary, click **Next** to continue. After loading the necessary information from the installation media, the Oracle Universal Installer displays the Available Products screen.
Oracle Universal Installer: Available Product Components	**a.** Select **Oracle Database Gateway for Teradata 11.1.0.5.0**. **b.** Click **Next**.

Table 6–3 (Cont.) The Oracle Universal Installer: Steps for Installing the Gateway

Screen	Response
Oracle Database Gateway for Teradata	**Teradata Database Server Host IP or Alias** - Specify either the host IP or alias name of the machine running the Teradata database server. **Teradata Database Server Port number** - Specify the port number of the Teradata database server **Teradata Database Name** - Specify the Teradata database name **Teradata TD_ICU_DATA Path** - Specify the local path where ICU data libraries are located (Typically `/opt/teradata/tdicu/lib` or what `$TD_ICU_DATA` is set to in `/etc/profile`). **Teradata COPLIB Path** – Specify the local path were `COPLIB` is located (Typically `/usr/lib` or what `$COPLIB` is set to in `/etc/profile`). **Teradata COPERR Path** – Specify the local path were `COPERR` is located (Typically `/usr/lib` or what `$COPERR` is set to in `/etc/profile`). Click **Next** to continue.
Oracle Universal Installer: Summary	The Installation Summary screen enables you to review a tree list of options and components for this installation. Click **Install** to start installation.
Oracle Net Configuration Assistant: Welcome	Click **Cancel**
Oracle Net Configuration Assistant:	Click **Yes**
Oracle Universal Installer: Configuration Tools	Click **Exit**
Exit	The final screen of the Oracle Universal Installer is the End of Installation screen. Click **Exit** to exit the installer.

7

Configuring Oracle Database Gateway for Teradata

After installing the gateway, perform the following tasks to configure Oracle Database Gateway for Teradata:

1. Configure the Gateway Initialization Parameter File
2. Configure Oracle Net for the Gateway
3. Configure the Oracle Database for Gateway Access
4. Create Database Links
5. Configure Two-Phase Commit
6. Encrypt Gateway Initialization Parameter Values
7. Configure the Gateway to Access Multiple Teradata Databases

Configure the Gateway Initialization Parameter File

Perform the following tasks to configure the gateway initialization parameter file:

1. Choose a System Identifier for the Gateway
2. Customize the Initialization Parameter File

Choose a System Identifier for the Gateway

The gateway system identifier (SID) is an alphanumeric character string that identifies a gateway instance. You need one gateway instance, and therefore one gateway SID, for each Teradata database you are accessing. The SID is used as part of the file name for the initialization parameter file. The default SID is `tg4tera`.

You can define a gateway SID, but using the default of `tg4tera` is easier because you do not need to change the initialization parameter file name. However, if you want to access two Teradata databases, you need two gateway SIDs, one for each instance of the gateway. If you have only one Teradata database and want to access it sometimes with one set of gateway parameter settings, and other times with different gateway parameter settings, then you will need multiple gateway SIDs for the single Teradata database.

Customize the Initialization Parameter File

The initialization parameter file must be available when the gateway is started. During installation, the following default initialization parameter file is created:

```
$ORACLE_HOME/tg4tera/admin/inittg4tera.ora
```

Where `$ORACLE_HOME` is the directory under which the gateway is installed.

This initialization file is for the default gateway SID. If you are not using `tg4tera` as the gateway SID, you must rename the initialization parameter file using the SID you chose in the preceding step "Choose a System Identifier for the Gateway" on page 7-1. This default initialization parameter file is sufficient for starting the gateway, verifying a successful installation, and running the demonstration scripts.

A number of initialization parameters can be used to modify the gateway behavior. Refer to Appendix C, "Initialization Parameters"for the complete list of initialization parameters that can be set. Changes made to the initialization parameters only take effect in the next gateway session. The most important parameter is the `HS_FDS_CONNECT_INFO` which describes the connection to the non-Oracle system.

The default initialization parameter file already has an entry for this parameter. The syntax for `HS_FDS_CONNECT_INFO` is as follows:

```
HS_FDS_CONNECT_INFO=host_alias:port_number[/database_name]
```

Where:

Variable	Description
host_alias	is the host alias name or IP address of the machine hosting the Teradata database.
port_number	is the port number of the Teradata database server.
database_name	is the Teradata database name.

> **See Also:** Appendix C, "Initialization Parameters" and the *Oracle Database Heterogeneous Connectivity Administrator's Guide* for more information about customizing the initialization parameter file.

Configure Oracle Net for the Gateway

The gateway requires Oracle Net to communicate with the Oracle database. After configuring the gateway, perform the following tasks to configure Oracle Net to work with the gateway:

1. Configure Oracle Net Listener for the Gateway
2. Stop and Start the Oracle Net Listener for the Gateway

Configure Oracle Net Listener for the Gateway

The Oracle Net Listener listens for incoming requests from the Oracle database. For the Oracle Net Listener to listen for the gateway, information about the gateway must be added to the Oracle Net Listener configuration file, `listener.ora`. This file by default is located in `$ORACLE_HOME/network/admin`, where `$ORACLE_HOME` is the directory under which the gateway is installed.

The following entries must be added to the `listener.ora` file:

- A list of Oracle Net addresses on which the Oracle Net Listener listens.
- The executable name of the gateway that the Oracle Net Listener starts in response to incoming connection requests.

Syntax of listener.ora File Entries

The Oracle database communicates with the gateway using Oracle Net and any supported protocol adapters. The following is the syntax of the address on which the Oracle Net Listener listens using the TCP/IP protocol adapter:

```
LISTENER=
        (ADDRESS=
          (PROTOCOL=TCP)
          (HOST=host_name)
          (PORT=port_number))
```

Where:

Variable	Description
host_name	is the name of the machine on which the gateway is installed.
port_number	specifies the port number used by the Oracle Net Listener. If you have other listeners running on the same machine, then the value of *port_number* must be different from the other listeners' port numbers.

To direct the Oracle Net Listener to start the gateway in response to incoming connection requests, add an entry to the `listener.ora` file.

> **Note:** You must use the same SID value in the listener.ora file and the `tnsnames.ora` file which will be configured in the next step.

For Linux 32bit:

```
SID_LIST_LISTENER=
   (SID_LIST=
      (SID_DESC=
         (SID_NAME=gateway_sid)
         (ORACLE_HOME=oracle_home_directory)
         (PROGRAM=tg4tera)
         (ENVS=LD_LIBRARY_PATH=oracle_home_directory/lib:teradata_client_
directory/lib:/usr/lib)
      )
   )
```

For Solaris SPARC and Linux x86 64bit:

```
SID_LIST_LISTENER=
   (SID_LIST=
      (SID_DESC=
         (SID_NAME=gateway_sid)
         (ORACLE_HOME=oracle_home_directory)
         (PROGRAM=tg4tera)
         (ENVS=LD_LIBRARY_PATH=teradata_client_directory/lib:oracle_home_
directory/lib32:/usr/lib)
      )
   )
```

For AIX:

```
SID_LIST_LISTENER=
   (SID_LIST=
      (SID_DESC=
```

```
         (SID_NAME=gateway_sid)
         (ORACLE_HOME=oracle_home_directory)
         (PROGRAM=tg4tera)
         (ENVS=LIBPATH=teradata_client_directory/lib:oracle_home_
directory/lib32:/usr/lib)
      )
   )
```

For HP-UX PA-RISC:

```
SID_LIST_LISTENER=
   (SID_LIST=
      (SID_DESC=
         (SID_NAME=gateway_sid)
         (ORACLE_HOME=oracle_home_directory)
         (PROGRAM=tg4tera)
         (ENVS=SHLIB_PATH=teradata_client_directory/lib:oracle_home_
directory/lib32:/usr/lib)
      )
   )
```

Where:

Variable	Description
gateway_sid	specifies the SID of the gateway. Matches the gateway SID specified in the connect descriptor entry in the `tnsnames.ora` file.
oracle_home_directory	specifies the Oracle home directory where the gateway resides.
teradata_client_directory	specifies the directory where the Teradata client resides.
`tg4tera`	specifies the executable name of the Oracle Database Gateway for Teradata.

If you already have an existing Oracle Net Listener, then add the following syntax to `SID_LIST` in the existing `listener.ora` file. Note the syntax provided below is for Linux 32 bit. Refer to the above section for other platforms.

For Linux 32 bit:

```
SID_LIST_LISTENER=
(SID_LIST=
   (SID_DESC=.
     .
   )
   (SID_DESC=.
     .
   )
   (SID_DESC=
      (SID_NAME=gateway_sid)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4tera)
(ENVS=LD_LIBRARY_PATH=oracle_home_directory/lib:teradata_client_
directory/lib:/usr/lib)
   )
)
```

> **See Also:** *Oracle Net Services Administrator's Guide* for information about changing the `listener.ora` file.

Stop and Start the Oracle Net Listener for the Gateway

You must stop and restart the Oracle Net Listener to initiate the new settings, as follows:

1. Set the `PATH` environment variable to `$ORACLE_HOME/bin` where `$ORACLE_HOME` is the directory in which the gateway is installed.

   For example on the Linux platform, if you have the Bourne or Korn Shell, enter the following:

   ```
   $ PATH=$ORACLE_HOME/bin:$PATH;export PATH
   $ LD_LIBRARY_PATH=$ORACLE_HOME/lib:$LD_LIBRARY_PATH; export LD_LIBRARY_PATH
   ```

   If you have the C Shell, enter the following:

   ```
   $ setenv PATH $ORACLE_HOME/bin:$PATH
   $ setenv LD_LIBRARY_PATH $ORACLE_HOME/lib:$LD_LIBRARY_PATH
   ```

   Table 7–1 specifies which parameter value to use for the different platforms:

Table 7–1 Parameter Values for UNIX Based Platforms

Platform	Parameter Value
Solaris (SPARC) 64 bit	`LD_LIBRARY_PATH=$ORACLE_HOME/lib`
HP-UX PA-RISC	`SHLIB_PATH=$ORACLE_HOME/lib`
Linux x86, and Linux x86 64 bit	`LD_LIBRARY_PATH=$ORACLE_HOME/lib`
AIX	`LIBPATH=$ORACLE_HOME/lib`

2. If the listener is already running, use the `lsnrctl` command to stop the listener and then start it with the new settings, as follows:

   ```
   $ lsnrctl stop
   $ lsnrctl start
   ```

3. Check the status of the listener with the new settings, as follows:

   ```
   $ lsnrctl status
   ```

   The following is a partial output from a `lsnrctl` status check:

```
.
.
.
Services Summary...
Service "tg4tera" has 1 instance(s).
  Instance "tg4tera", status UNKNOWN, has 1 handler(s) for this service...
The command completed successfully
```

In this example, the service name is `tg4tera` which is the default SID value assigned during installation.

Configure the Oracle Database for Gateway Access

Before you use the gateway to access Teradata data you must configure the Oracle database to enable communication with the gateway over Oracle Net.

To configure the Oracle database you must add connect descriptors to the `tnsnames.ora` file. By default, this file is in `$ORACLE_HOME/network/admin`,

where $ORACLE_HOME is the directory in which the Oracle database is installed. You cannot use the Oracle Net Assistant or the Oracle Net Easy Config tools to configure the tnsnames.ora file. You must edit the file manually.

Configuring tnsnames.ora

Edit the tnsnames.ora file to add a connect descriptor for the gateway. The following is a syntax of the Oracle Net entry using the TCP/IP protocol:

```
connect_descriptor=
   (DESCRIPTION=
      (ADDRESS=
         (PROTOCOL=TCP)
         (HOST=host_name)
         (PORT=port_number)
      )
      (CONNECT_DATA=
         (SID=gateway_sid))
      (HS=OK))
```

Where:

Variable	Description
connect_descriptor	is the description of the object to connect to as specified when creating the database link, such as tg4tera. Check the sqlnet.ora file for the following parameter setting: names.directory_path = (TNSNAMES) **Note:** The sqlnet.ora file is typically stored in $ORACLE_HOME/network/admin.
TCP	is the TCP protocol used for TCP/IP connections.
host_name	specifies the machine where the gateway is running.
port_number	matches the port number used by the Oracle Net Listener that is listening for the gateway. The Oracle Net Listener's port number can be found in the listener.ora file used by the Oracle Net Listener. See "Syntax of listener.ora File Entries" on page 7-3.
gateway_sid	specifies the SID of the gateway and matches the SID specified in the listener.ora file of the Oracle Net Listener that is listening for the gateway. See "Configure Oracle Net Listener for the Gateway" on page 7-2 for more information.
(HS=OK)	specifies that this connect descriptor connects to a non-Oracle system.

See Also: *Oracle Database Administrator's Guide* for information about editing the tnsnames.ora file.

Create Database Links

Any Oracle client connected to the Oracle database can access Teradata data through the gateway. The Oracle client and the Oracle database can reside on different machines. The gateway accepts connections only from the Oracle database.

A connection to the gateway is established through a database link when it is first used in an Oracle session. In this context, a connection refers to the connection

between the Oracle database and the gateway. The connection remains established until the Oracle session ends. Another session or user can access the same database link and get a distinct connection to the gateway and Teradata database.

Database links are active for the duration of a gateway session. If you want to close a database link during a session, you can do so with the `ALTER SESSION` statement.

To access the Teradata server, you must create a database link. A public database link is the most common of database links.

```
SQL> CREATE PUBLIC DATABASE LINK dblink CONNECT TO
2  "user" IDENTIFIED BY "password" USING 'tns_name_entry';
```

Where:

Variable	Description
dblink	is the complete database link name.
tns_name_entry	specifies the Oracle Net connect descriptor specified in the `tnsnames.ora` file that identifies the gateway

After the database link is created you can verify the connection to the Teradata database, as follows:

```
SQL> SELECT * FROM DUAL@dblink;
```

> **See Also:** *Oracle Database Administrator's Guide* and *Oracle Database Heterogeneous Services Administrator's Guide* for more information about using database links.

Configure Two-Phase Commit

The gateway supports the following transaction capabilities:

- `COMMIT_CONFIRM`
- `READ_ONLY`
- `SINGLE_SITE`

The transaction model is set using the `HS_TRANSACTION_MODEL` initialization parameter. By default, the gateway runs in `COMMIT_CONFIRM` transaction mode. When the Teradata database is updated by a transaction, the gateway becomes the commit point site. The Oracle database commits the unit of work in the Teradata database after verifying that all Oracle databases in the transaction have successfully prepared the transaction. Only one gateway instance can participate in an Oracle two-phase commit transaction as the commit point site.

> **See Also:** *Oracle Database Heterogeneous Connectivity Administrator's Guide* for information about the two-phase commit process.

To enable the `COMMIT_CONFIRM` transaction mode, perform the following tasks:

1. Create a Recovery Account and Password
2. Create the Transaction Log Table

The log table, called `HS_TRANSACTION_LOG`, is where two-phase commit transactions are recorded.

Create a Recovery Account and Password

For the gateway to recover distributed transactions, a recovery account and password must be set up in the Teradata database. By default, both the user name of the account and the password are RECOVER. The name of the account can be changed with the gateway initialization parameter HS_FDS_RECOVERY_ACCOUNT. The account password can be changed with the gateway initialization parameter HS_FDS_RECOVERY_PWD.

Note: Oracle recommends that you do not use the default value RECOVER for the user name and password. Moreover, storing plain-text as user name and password in the initialization file is not a good security policy. There is now a utility called tg4pwd, that should be used for encryption. Refer to Section 4.2.3, 'Encrypting Initialization parameters' in the *Oracle Database Heterogeneous Connectivity Administrator's Guide* for further details.

---

1. Set up a user account in the Teradata database. Both the user name and password must be a valid Teradata user name and password.
2. In the initialization parameter file, set the following gateway initialization parameters:
   - HS_FDS_RECOVERY_ACCOUNT to the user name of the Teradata user account you set up for recovery.
   - HS_FDS_RECOVERY_PWD to the password of the Teradata user account you set up for recovery.

   See Also: "Customize the Initialization Parameter File" on page 7-1 for information about editing the initialization parameter file. For information about HS_FDS_RECOVERY_ACCOUNT and HS_FDS_RECOVERY_PWD, see Appendix C, "Initialization Parameters".

Create the Transaction Log Table

When configuring the gateway for two-phase commit, a table must be created in the Teradata database for logging transactions. The gateway uses the transaction log table to check the status of failed transactions that were started at the Teradata database by the gateway and registered in the table.

Note: Updates to the transaction log table cannot be part of an Oracle distributed transaction.

Note: The information in the transaction log table is required by the recovery process and must not be altered. The table must be used, accessed, or updated only by the gateway.

The table, called HS_TRANSACTION_LOG, consists of two columns, GLOBAL_TRAN_ID, data type CHAR(64) and TRAN_COMMENT, data type CHAR(255).

You can use another name for the log table, other than HS_TRANSACTION_LOG, by specifying the other name using the HS_FDS_TRANSACTION_LOG initialization parameter.

> **See Also:** Appendix C, "Initialization Parameters" for information about the HS_FDS_TRANSACTION_LOG initialization parameter.

Create the transaction log table in the user account you created in "Create a Recovery Account and Password" on page 7-8. Because the transaction log table is used to record the status of a gateway transaction, the table must reside at the database where the Teradata update takes place. Also, the transaction log table must be created under the owner of the recovery account.

> **Note:** To utilize the transaction log table, users of the gateway must be granted privileges on the table.

To create a transaction log table use the tg4tera_tx.sql script, located in the directory $ORACLE_HOME/tg4tera/admin, where $ORACLE_HOME is the directory under which the gateway is installed.

Encrypt Gateway Initialization Parameter Values

The gateway uses user IDs and passwords to access the information in the remote database. Some user IDs and passwords must be defined in the gateway initialization file to handle functions such as resource recovery. In the current security conscious environment, having plain-text passwords that are accessible in the initialization file is deemed insecure. The tg4pwd encryption utility has been added as part of Heterogeneous Services to help make this more secure. This utility is accessible by this gateway. The initialization parameters which contain sensitive values can be stored in an encrypted form.

> **See Also:** *Oracle Database Heterogeneous Connectivity Administrator's Guide* for more information about using this utility.

Configure the Gateway to Access Multiple Teradata Databases

The tasks for configuring the gateway to access multiple Teradata databases are similar to the tasks for configuring the gateway for a single database. The configuration example assumes the following:

- The gateway is installed and configured with the default SID of tg4tera
- The ORACLE_HOME environment variable is set to the directory where the gateway is installed.
- The gateway is configured for one Teradata database named db1.
- Two Teradata databases named db2 and db3 on a host with IP Address 204.179.79.15 are being added.

Multiple Teradata Databases Example: Configuring the Gateway

Choose One System ID for Each Teradata Database

A separate instance of the gateway is needed for each Teradata database. Each instance needs its own gateway System ID (SID). For this example, the gateway SIDs are chosen for the instances that access the Teradata databases:

- tg4tera2 for the gateway accessing database db2.

- tg4tera3 for the gateway accessing database db3.

Create Two Initialization Parameter Files

Create an initialization parameter file for each instance of the gateway by copying the original initialization parameter file: $ORACLE_HOME/tg4tera/admin/inittg4tera.ora, twice, naming one with the gateway SID for db2 and the other with the gateway SID for db3:

```
$ cd $ORACLE_HOME/tg4tera/admin
$ cp inittg4tera.ora inittg4tera2.ora
$ cp inittg4tera.ora inittg4tera3.ora
```

Change the value of the HS_FDS_CONNECT_INFO parameter in the new files.

For inittg4tera2.ora, enter the following:

```
HS_FDS_CONNECT_INFO=204.179.79.15:1025/db2
```

For inittg4tera3.ora, enter the following:

```
HS_FDS_CONNECT_INFO=204.179.79.15:1025/db3
```

Note: If you have multiple gateway SIDs for the same Teradata database because you want to use different gateway parameter settings at different times, follow the same procedure. You create several initialization parameter files, each with different SIDs and different parameter settings.

Multiple Teradata Databases Example: Configuring Oracle Net Listener

Add Entries to listener.ora

Add two new entries to the Oracle Net Listener configuration file, listener.ora. You must have an entry for each gateway instance, even when multiple gateway instances access the same database.

The following example shows the entry for the original installed gateway first, followed by the new entries.

```
SID_LIST_LISTENER=
(SID_LIST=
   (SID_DESC=
      (SID_NAME=tg4tera)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4tera)

(ENVS=LD_LIBRARY_PATH=oracle_home_directory/lib:teradata_client_
directory/lib:/usr/lib)
   )
   (SID_DESC=
      (SID_NAME=tg4tera2)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4tera)

(ENVS=LD_LIBRARY_PATH=oracle_home_directory/lib:teradata_client_
directory/lib:/usr/lib)
   )
   (SID_DESC=
      (SID_NAME=tg4tera3)
```

```
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4tera)

(ENVS=LD_LIBRARY_PATH=oracle_home_directory/lib:teradata_client_
directory/lib:/usr/lib)
   )
)
```

where, `oracle_home_directory` is the directory where the gateway resides.

> **Note:** For HP-UX PA-RISC, the *envs* parameter also needs to be set. Refer to "Syntax of listener.ora File Entries" on page 7-3 for more information about adding the *envs* parameter.

Multiple Teradata Databases Example: Stopping and Starting the Oracle Net Listener

If the listener is already running, use the `lsnrctl` command to stop the listener and then start it with the new settings, as follows:

```
$ lsnrctl stop
$ lsnrctl start
```

Multiple Teradata Databases Example: Configuring Oracle Database for Gateway Access

Configuring Oracle Net for Multiple Gateway Instances

Add two connect descriptor entries to the `tnsnames.ora` file. You must have an entry for each gateway instance, even if the gateway instances access the same database.

The following Teradata example shows the entry for the original installed gateway first, followed by the two entries for the new gateway instances:

```
old_db_using=(DESCRIPTION=
              (ADDRESS=
                (PROTOCOL=TCP)
                (PORT=port_number)
                (HOST=host_name))
                (CONNECT_DATA=
                    (SID=tg4tera))
               (HS=OK))
new_db2_using=(DESCRIPTION=
              (ADDRESS=
                (PROTOCOL=TCP)
                (PORT=port_number)
                (HOST=host_name))
                (CONNECT_DATA=
                    (SID=tg4tera2))
                (HS=OK))
new_db3_using=(DESCRIPTION=
              (ADDRESS=
                (PROTOCOL=TCP)
                (PORT=port_number)
                (HOST=host_name))
                (CONNECT_DATA=
                    (SID=tg4tera3))
```

```
(HS=OK))
```

The value for PORT is the TCP/IP port number of the Oracle Net Listener that is listening for the gateway. The number can be found in the listener.ora file used by the Oracle Net Listener. The value for HOST is the name of the machine on which the gateway is running. The name also can be found in the listener.ora file used by the Oracle Net Listener.

Multiple Teradata Databases Example: Accessing Teradata Data

Enter the following to create a database link for the tg4tera2 gateway:

```
SQL> CREATE PUBLIC DATABASE LINK TERA2 CONNECT TO
  2  "user2" IDENTIFIED BY "password2" USING 'new_db2_using';
```

Enter the following to create a database link for the tg4tera3 gateway:

```
SQL> CREATE PUBLIC DATABASE LINK TERA3 CONNECT TO
  2  "user3" IDENTIFIED BY "password3" USING 'new_db3_using';
```

After the database links are created you can verify the connection to the new Teradata databases, as in the following:

```
SQL> SELECT * FROM ALL_USERS@TERA2;

SQL> SELECT * FROM ALL_USERS@TERA3;
```

Part V

Installing and Configuring Oracle Database Gateway for Microsoft SQL Server

Part V, "Installing and Configuring Oracle Database Gateway for Microsoft SQL Server" describes how to install and configure Oracle Database Gateway for Microsoft SQL Server on UNIX based platforms.

It contains the following chapters:

- Chapter 8, "Installing Oracle Database Gateway for Microsoft SQL Server"
- Chapter 9, "Configuring Oracle Database Gateway for Microsoft SQL Server"

8

Installing Oracle Database Gateway for Microsoft SQL Server

This chapter provides information about the hardware and software requirements and the installation procedure for Oracle Database Gateway for Micorsoft SQL Server.

To install the gateway, follow these steps:

1. Ensure that the system meets all of the hardware and software requirements specified in "System Requirements for Oracle Database Gateway for Microsoft SQL Server" on on page 8-1.
2. Run the Oracle Universal Installer.

   See "Step Through the Oracle Universal Installer" on on page 8-4 for more information about running the Oracle Universal Installer

   Oracle Universal Installer is a menu-driven utility that guides you through the installation of the gateway by prompting you with action items. The action items and the sequence in which they appear depend on your platform.

   See Table 8–3 for a description of the installation procedure of Oracle Database Gateway for Microsoft SQL Server.

System Requirements for Oracle Database Gateway for Microsoft SQL Server

This section provides information about the hardware and software requirements for the gateway. It contains the following sections:

Hardware Requirements

Table 2–1 shows the minimum hardware requirements for Oracle Database Gateway for Microsoft SQL Server.

Table 8–1 Hardware requirements for Oracle Database Gateway for Microsoft SQL Server

Hardware Items	Required for AIX-Based System	Required for HP 9000 Series HP-UX PA-RISC	Required for Solaris Operating System (SPARC)	Required for Linux x86	Required for Linux x86 64 bit
Temporary Disk Space	400 MB	400 MB	400 MB	400 MB	400 MB
Disk Space	1.5 GB	1.5 GB	750 MB	750 MB	750 MB
Physical Memory*	512 MB	512 MB	512 MB	512 MB	512 MB
Swap Space	1 GB	1 GB	1 GB	1 GB	1 GB
Processor	IBM RS/6000 AIX-Based System Processor	HP 9000 Series 700 or 800 processor for hp-ux 11.0	Sun Solaris Operating System (SPARC) Processor	x86	x86_64

* The minimum swap space is 1 GB (or twice the size of RAM). On systems with 2 GB or more of RAM, the swap space can be between one and two times the size of RAM. On AIX systems with 1 GB or more of memory, do not increase the swap space more than 2 GB.

Checking the Hardware Requirements

To ensure that the system meets the minimum requirements, follow these steps:

1. To determine the physical RAM size, enter one of the following commands:

Operating System	Command
AIX	# `/usr/sbin/lsattr -E -l sys0 -a realmem`
HP-UX PA-RISC	# `/usr/sbin/dmesg | grep "Physical:"`
Solaris (SPARC)	# `/usr/sbin/prtconf | grep "Memory size"`
Linux x86	`# grep MemTotal /proc/meminfo`
Linux x86 64 bit	`# grep MemTotal /proc/meminfo`

   If the size of the physical RAM installed in the system is less than the required size, you must install more memory before continuing.

2. To determine the size of the configured swap space, enter one of the following commands:

Operating System	Command
AIX	`# /usr/sbin/lsps -a`
HP-UX PA-RISC	`# /usr/sbin/swapinfo -a`
Solaris (SPARC)	`# /usr/sbin/swap -s`
Linux x86	`# grep SwapTotal /proc/meminfo`
Linux x86 64 bit	`# grep SwapTotal /proc/meminfo`

   If necessary, see your operating system documentation for information about how to configure additional swap space.

3. To determine the amount of disk space available in the `/tmp` directory enter the following commands:

Operating System	Command
AIX	`# df -k /tmp`
HP-UX PA-RISC	`# df -k /tmp`
Solaris (SPARC)	`# df -k /tmp`
Linux x86	`# df -k /tmp`
Linux x86 64 bit	`# df -k /tmp`

4. To determine the amount of disk space available on the system enter the following commands:

Operating System	Command
AIX	`# df -k`
HP-UX PA-RISC	`# df -k`
Solaris (SPARC)	`# df -k`
Linux x86	`# df -k`
Linux x86 64 bit	`# df -k`

Software Requirements

The following section describes the minimum software requirements for Oracle Database Gateway for Microsoft SQL Server.

Operating System

Table 8–2 shows the minimum operating system version required for Oracle Database Gateway for Microsoft SQL Server. If your operating system is lower than the minimum requirements, upgrade your operating system to meet the specified levels.

Table 8–2 Operating Systems version for Oracle Database Gateway for Microsoft SQL Server

Operating System	Version
AIX	AIX 5L version 5.3, Maintenance level 02 or higher
HP-UX PA-RISC	HP-UX PA-RISC 11i V1 (11.11), 11i V2 (11.23) PA-RISC
Solaris (SPARC)	Solaris 9 Update 6 or higher or Solaris 10, 64-bit
Linux x86 Red Hat	One of the following operating system versions: ■ Red Hat Enterprise Linux AS/ES 3.0 (Update 4 or later) ■ Red Hat Linux 4.0
Linux x86 Suse	SUSE Linux Enterprise Server 9.0 with SP 2 or later
Linux x86 64 bit Red Hat	One of the following operating system versions: ■ Red Hat Enterprise Linux AS/ES 3.0 (Update 4 or later) ■ Red Hat Enterprise Linux AS/ES 4.0 (Update 1 or later)
Linux x86 64 bit Suse	SUSE Linux Enterprise Server 9.0 with SP2 or later

Checking the Software Requirements

To ensure that the system meets the minimum requirements, follow these steps:

- To determine which version of AIX is installed, enter the following command:

  ```
  # oslevel -r
  ```

- To determine which version of HP-UX PA-RISC is installed, enter the following command:

  ```
  # uname -a
  ```

- To determine which version of Solaris Operating System (SPARC) is installed, enter the following command:

  ```
  # uname -r
  ```

- To determine which distribution and version of Linux x86 is installed, enter the following command:

  ```
  # cat /etc/issue
  ```

- To determine which distribution and version of Linux x86 64 bit is installed, enter the following command:

  ```
  # cat /proc/version
  ```

Certified Configuration

The gateway supports Microsoft SQL Server. For the latest versions supported refer to the OTN Web site:

http://www.oracle.com/technology/products/gateways/pdf/certmatrix10g.pdf

Step Through the Oracle Universal Installer

Table 8–3 describes the installation procedure for Oracle Database Gateway for Microsoft SQL Server

Table 8–3 The Oracle Universal Installer: Steps for Installing the Gateway

Screen	Response
Oracle Universal Installer: Welcome	Click **Next**.
Oracle Universal Installer: Specify Home Details	Specify a name for the installation in the Name field. You can also choose not to edit the default setting of the Name field of the Specify Home Details screen. The Path field in the Specify Home Details screen is where you specify the destination for your installation. You need not edit the path specification in the Path field. The default setting for this field points to *ORACLE_HOME*. After you set the fields in the Specify Home Details screen as necessary, click **Next** to continue. After loading the necessary information from the installation media, the Oracle Universal Installer displays the Available Products screen.
Oracle Universal Installer: Available Product Components	a. Select Oracle Database Gateway for Microsoft SQL Server 11.1.0.5.0. b. Click Next.

Table 8–3 (Cont.) The Oracle Universal Installer: Steps for Installing the Gateway

Screen	Response
Oracle Database Gateway for Microsoft SQL Server	**SQL Server Database Server Host Name** - Specify the host name of the machine hosting the MS SQL Server database. **SQL Server Database Server Port number** - Specify the port number of the SQL Server database server **SQL Server Database Name** - Specify the SQL Server database name Click **Next** to continue.
Oracle Universal Installer: Summary	The Installation Summary screen enables you to review a tree list of options and components for this installation. Click **Install** to start installation.
Oracle Net Configuration Assistant: Welcome	Click **Cancel**.
Oracle Net Configuration Assistant:	Click **Yes**.
Oracle Universal Installer: Configuration Tools	Click **Exit**.
Exit	The final screen of the Oracle Universal Installer is the End of Installation screen. Click **Exit** to exit the installer.

9

Configuring Oracle Database Gateway for Microsoft SQL Server

After installing the gateway, perform the following tasks to configure Oracle Database Gateway for Microsoft SQL Server:

1. Configure the Gateway Initialization Parameter File
2. Configure Oracle Net for the Gateway
3. Configure the Oracle Database for Gateway Access
4. Create Database Links
5. Configure Two-Phase Commit
6. Create SQL Server Views for Data Dictionary Support
7. Encrypt Gateway Initialization Parameter Values
8. Configure the Gateway to Access Multiple SQL Server Databases

Configure the Gateway Initialization Parameter File

Perform the following tasks to configure the gateway initialization parameter file.

1. Choose a System Identifier for the Gateway
2. Customize the Initialization Parameter File

Choose a System Identifier for the Gateway

The gateway system identifier (SID) is an alphanumeric character string that identifies a gateway instance. You need one gateway instance, and therefore one gateway SID, for each SQL Server database you are accessing. The SID is used as part of the file name for the initialization parameter file. The default SID is `tg4msql`.

You can define a gateway SID, but using the default of tg4msql is easier because you do not need to change the initialization parameter file name. However, if you want to access two SQL Server databases, you need two gateway SIDs, one for each instance of the gateway. If you have only one SQL Server database and want to access it sometimes with one set of gateway parameter settings, and other times with different gateway parameter settings, then you will need multiple gateway SIDs for the single SQL Server database.

Customize the Initialization Parameter File

The initialization parameter file must be available when the gateway is started. During installation, the following default initialization parameter file is created:

```
$ORACLE_HOME/tg4msql/admin/inittg4msql.ora
```

Where `$ORACLE_HOME` is the directory under which the gateway is installed.

This initialization file is for the default gateway SID. If you are not using tg4msql as the gateway SID, you must rename the initialization parameter file using the SID you chose in the preceding step "Choose a System Identifier for the Gateway" on page 9-1. This default initialization parameter file is sufficient for starting the gateway, verifying a successful installation, and running the demonstration scripts.

A number of initialization parameters can be used to modify the gateway behavior. Refer to Appendix C, "Initialization Parameters" for the complete list of initialization parameters that can be set. Changes made to the initialization parameters only take effect in the next gateway session. The most important parameter is the `HS_FDS_CONNECT_INFO` which describes the connection to the non-Oracle system.

The default initialization parameter file already has an entry for this parameter. The syntax for `HS_FDS_CONNECT_INFO` is as follows:

```
HS_FDS_CONNECT_INFO=host_name[[:port_number]|/[instance_name]][/database_name]
```

Where:

Variable	Description
host_name	is the host name or IP address of the machine hosting the SQL Server database.
port_number	is the port number of the SQL Server database.
instance_name	is the instance of SQL Server running on the machine.
database_name	is the SQL Server Database database name.

Either of the variables *port_number* or *instance_name* can be used, but not both together. Optionally, they both can be omitted. The variable *database_name* is always optional. The slash (/) is required when a particular value is omitted. For example, all of the following entries are valid:

```
HS_FDS_CONNECT_INFO=host_name/instance_name/database_name
HS_FDS_CONNECT_INFO=host_name//database_name
HS_FDS_CONNECT_INFO=host_name:port_name//database_name
HS_FDS_CONNECT_INFO=host_name/instance_name
HS_FDS_CONNECT_INFO=host_name
```

> **See Also:** Appendix C, "Initialization Parameters" and the *Oracle Database Heterogeneous Connectivity Administrator's Guide* for more information about customizing the initialization parameter file.

Configure Oracle Net for the Gateway

The gateway requires Oracle Net to communicate with the Oracle database. After configuring the gateway, perform the following tasks to configure Oracle Net to work with the gateway:

1. Configure Oracle Net Listener for the Gateway

2. Stop and Start the Oracle Net Listener for the Gateway

Configure Oracle Net Listener for the Gateway

The Oracle Net Listener listens for incoming requests from the Oracle database. For the Oracle Net Listener to listen for the gateway, information about the gateway must be added to the Oracle Net Listener configuration file, `listener.ora`. This file by default is located in `$ORACLE_HOME/network/admin`, where `$ORACLE_HOME` is the directory under which the gateway is installed.

The following entries must be added to the `listener.ora` file:

- A list of Oracle Net addresses on which the Oracle Net Listener listens
- The executable name of the gateway that the Oracle Net Listener starts in response to incoming connection requests

Syntax of listener.ora File Entries

The Oracle database communicates with the gateway using Oracle Net and any supported protocol adapters. The following is the syntax of the address on which the Oracle Net Listener listens using the TCP/IP protocol adapter:

```
LISTENER=
        (ADDRESS=
          (PROTOCOL=TCP)
          (HOST=host_name)
          (PORT=port_number))
```

Where:

Variable	Description
host_name	is the name of the machine on which the gateway is installed.
port_number	specifies the port number used by the Oracle Net Listener. If you have other listeners running on the same machine, then the value of *port_number* must be different from the other listeners' port numbers.

To direct the Oracle Net Listener to start the gateway in response to incoming connection requests, add an entry to the `listener.ora` file. The syntax for HP-UX PA-RISC slightly different than the other platforms.

> **Note:** You must use the same SID value in the listener.ora file and the `tnsnames.ora` file which will be configured in the next step.

For AIX, Solaris SPARC, and Linux:

```
SID_LIST_LISTENER=
   (SID_LIST=
      (SID_DESC=
         (SID_NAME=gateway_sid)
         (ORACLE_HOME=oracle_home_directory)
         (PROGRAM=tg4msql)
      )
   )
```

For HP-UX PA-RISC:

```
SID_LIST_LISTENER=
   (SID_LIST=
      (SID_DESC=
         (SID_NAME=gateway_sid)
         (ORACLE_HOME=oracle_home_directory)
         (PROGRAM=tg4msql)
         (ENVS=SHLIB_PATH=$ORACLE_HOME/lib32)
      )
   )
```

Where:

Variable	Description
gateway_sid	specifies the SID of the gateway and matches the gateway SID specified in the connect descriptor entry in the `tnsnames.ora` file.
oracle_home_directory	specifies the Oracle home directory where the gateway resides.
`tg4msql`	specifies the executable name of the Oracle Database Gateway for Microsoft SQL Server.

If you already have an existing Oracle Net Listener, then add the following syntax to `SID_LIST` in the existing `listener.ora` file:

For AIX, Solaris SPARC, and Linux:

```
SID_LIST_LISTENER=
(SID_LIST=
   (SID_DESC=.
     .
   )
   (SID_DESC=.
     .
   )
   (SID_DESC=
      (SID_NAME=gateway_sid)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4msql)
   )
)
```

For HP-UX PA-RISC:

```
SID_LIST_LISTENER=
(SID_LIST=
   (SID_DESC=.
     .
   )
   (SID_DESC=.
     .
   )
   (SID_DESC=
      (SID_NAME=gateway_sid)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4msql)
      (ENVS=SHLIB_PATH=$ORACLE_HOME/lib32)
   )
)
```

See Also: *Oracle Net Administrator's Guide* for information about changing the `listener.ora` file.

Stop and Start the Oracle Net Listener for the Gateway

You must stop and restart the Oracle Net Listener to initiate the new settings, as follows:

1. Set the PATH environment variable to `$ORACLE_HOME/bin` where `$ORACLE_HOME` is the directory in which the gateway is installed.

   For example on the Linux platform, if you have the Bourne or Korn Shell, enter the following:

   ```
   $ PATH=$ORACLE_HOME/bin:$PATH;export PATH
   $ LD_LIBRARY_PATH=$ORACLE_HOME/lib:$LD_LIBRARY_PATH; export LD_LIBRARY_PATH
   ```

   If you have the C Shell, enter the following:

   ```
   $ setenv PATH $ORACLE_HOME/bin:$PATH
   $ setenv LD_LIBRARY_PATH $ORACLE_HOME/lib:$LD_LIBRARY_PATH
   ```

   Table 9–1 specifies which parameter value to use for the different platforms:

Table 9–1 Parameter Values for UNIX Based Platforms

Platform	Parameter Value
Solaris (SPARC) 64 bit	`LD_LIBRARY_PATH=$ORACLE_HOME/lib`
HP-UX PA-RISC	`SHLIB_PATH=$ORACLE_HOME/lib`
Linux x86, and Linux x86 64 bit	`LD_LIBRARY_PATH=$ORACLE_HOME/lib`
AIX	`LIBPATH=$ORACLE_HOME/lib`

2. If the listener is already running, use the `lsnrctl` command to stop the listener and then start it with the new settings, as follows:

   ```
   $ lsnrctl stop
   $ lsnrctl start
   ```

3. Check the status of the listener with the new settings, as follows:

   ```
   $ lsnrctl status
   ```

   The following is a partial output from a `lsnrctl` status check:

```
.
.
.
Services Summary...
Service "tg4msql" has 1 instance(s).
  Instance "tg4msql", status UNKNOWN, has 1 handler(s) for this service...
The command completed successfully
```

In this example, the service name is `tg4msql` which is the default SID value assigned during installation.

Configure the Oracle Database for Gateway Access

Before you use the gateway to access SQL Server data you must configure the Oracle database to enable communication with the gateway over Oracle Net.

To configure the Oracle database you must add connect descriptors to the `tnsnames.ora` file. By default, this file is in `$ORACLE_HOME/network/admin`, where `$ORACLE_HOME` is the directory in which the Oracle database is installed. You cannot use the Oracle Net Assistant or the Oracle Net Easy Config tools to configure the `tnsnames.ora` file. You must edit the file manually.

Configuring tnsnames.ora

Edit the `tnsnames.ora` file to add a connect descriptor for the gateway. The following is a syntax of the Oracle Net entry using the TCP/IP protocol:

```
connect_descriptor=
   (DESCRIPTION=
      (ADDRESS=
         (PROTOCOL=TCP)
         (HOST=host_name)
         (PORT=port_number)
      )
      (CONNECT_DATA=
         (SID=gateway_sid))
      (HS=OK))
```

Where:

Variable	Description
connect_descriptor	is the description of the object to connect to as specified when creating the database link, such as tg4msql. Check the sqlnet.ora file for the following parameter setting: ▪ `names.directory_path = (TNSNAMES)` **Note**: The sqlnet.ora file is typically stored in `$ORACLE_HOME/network/admin`.
`TCP`	is the TCP protocol used for TCP/IP connections.
host_name	specifies the machine where the gateway is running.
port_number	matches the port number used by the Oracle Net Listener that is listening for the gateway. The Oracle Net Listener's port number can be found in the `listener.ora` file used by the Oracle Net Listener. See "Syntax of listener.ora File Entries" on page 9-3.
gateway_sid	specifies the SID of the gateway and matches the SID specified in the `listener.ora` file of the Oracle Net Listener that is listening for the gateway. See "Configure Oracle Net Listener for the Gateway" on page 9-3 for more information.
`(HS=OK)`	specifies that this connect descriptor connects to a non-Oracle system.

See Also: *Oracle Database Administrator's Guide* for information about editing the `tnsnames.ora` file.

Create Database Links

Any Oracle client connected to the Oracle database can access SQL Server data through the gateway. The Oracle client and the Oracle database can reside on different machines. The gateway accepts connections only from the Oracle database.

A connection to the gateway is established through a database link when it is first used in an Oracle session. In this context, a connection refers to the connection between the Oracle database and the gateway. The connection remains established until the Oracle session ends. Another session or user can access the same database link and get a distinct connection to the gateway and SQL Server database.

Database links are active for the duration of a gateway session. If you want to close a database link during a session, you can do so with the `ALTER SESSION` statement.

To access the SQL Server, you must create a database link. A public database link is the most common of database links.

```
SQL> CREATE PUBLIC DATABASE LINK dblink CONNECT TO
2  "user" IDENTIFIED BY "password" USING 'tns_name_entry';
```

Where:

Variable	Description
dblink	is the complete database link name.
tns_name_entry	specifies the Oracle Net connect descriptor specified in the `tnsnames.ora` file that identifies the gateway

After the database link is created you can verify the connection to the SQL Server database, as follows:

```
SQL> SELECT * FROM DUAL@dblink;
```

> **See Also:** *Oracle Database Administrator's Guide* and Oracle Database Heterogeneous Connectivity Administrator's Guide for more information about using database links.

Configure Two-Phase Commit

The gateway supports the following transaction capabilities:

- `COMMIT_CONFIRM`
- `READ_ONLY`
- `SINGLE_SITE`

The transaction model is set using the `HS_TRANSACTION_MODEL` initialization parameter. By default, the gateway runs in `COMMIT_CONFIRM` transaction mode. When the SQL Server database is updated by a transaction, the gateway becomes the commit point site. The Oracle database commits the unit of work in the SQL Server database after verifying that all Oracle databases in the transaction have successfully prepared the transaction. Only one gateway instance can participate in an Oracle two-phase commit transaction as the commit point site.

> **See Also:** *Oracle Database Heterogeneous Connectivity Administrator's Guide* for information about the two-phase commit process.

To enable the `COMMIT_CONFIRM` transaction mode, perform the following tasks:

1. Create a Recovery Account and Password
2. Create the Transaction Log Table

The log table, called HS_TRANSACTION_LOG, is where two-phase commit transactions are recorded.

Create a Recovery Account and Password

For the gateway to recover distributed transactions, a recovery account and password must be set up in the SQL Server database. By default, both the user name of the account and the password are RECOVER. The name of the account can be changed with the gateway initialization parameter HS_FDS_RECOVERY_ACCOUNT. The account password can be changed with the gateway initialization parameter HS_FDS_RECOVERY_PWD.

Note: Oracle recommends that you do not use the default value RECOVER for the user name and password. Moreover, storing plain-text as user name and password in the initialization file is not a good security policy. There is now a utility called tg4pwd, that should be used for encryption. Refer to Section 4.2.3, 'Encrypting Initialization parameters' in the *Oracle Database Heterogeneous Connectivity Administrator's Guide* for further details.

---

1. Set up a user account in the SQL Server database. Both the user name and password must be a valid SQL Server user name and password.
2. In the initialization parameter file, set the following gateway initialization parameters:
   - HS_FDS_RECOVERY_ACCOUNT to the user name of the SQL Server user account you set up for recovery.
   - HS_FDS_RECOVERY_PWD to the password of the SQL Server user account you set up for recovery.

     See Also: "Customize the Initialization Parameter File" on page 9-2 for information about editing the initialization parameter file. For information about HS_FDS_RECOVERY_ACCOUNT and HS_FDS_RECOVERY_PWD, see Appendix C, "Initialization Parameters".

Create the Transaction Log Table

When configuring the gateway for two-phase commit, a table must be created in the SQL Server database for logging transactions. The gateway uses the transaction log table to check the status of failed transactions that were started at the SQL Server database by the gateway and registered in the table.

Note: Updates to the transaction log table cannot be part of an Oracle distributed transaction.

Note: The information in the transaction log table is required by the recovery process and must not be altered. The table must be used, accessed, or updated only by the gateway.

The table, called HS_TRANSACTION_LOG, consists of two columns, GLOBAL_TRAN_ID, data type CHAR(64) NOT NULL and TRAN_COMMENT, data type CHAR(255).

You can use another name for the log table, other than HS_TRANSACTION_LOG, by specifying the other name using the HS_FDS_TRANSACTION_LOG initialization parameter.

> **See Also:** Appendix C, "Initialization Parameters" for information about the HS_FDS_TRANSACTION_LOG initialization parameter.

Create the transaction log table in the user account you created in "Create a Recovery Account and Password" on page 9-8. Because the transaction log table is used to record the status of a gateway transaction, the table must reside at the database where the SQL Server update takes place. Also, the transaction log table must be created under the owner of the recovery account.

> **Note:** To utilize the transaction log table, users of the gateway must be granted privileges on the table.

To create a transaction log table use the tg4msql_tx.sql script, located in the directory $ORACLE_HOME/tg4msql/admin where $ORACLE_HOME is the directory under which the gateway is installed. Use isql to execute the script, as follows:

```
$ isql -Urecovery_account -Precovery_account_password [-Sserver] -itg4msql_tx.sql
```

Create SQL Server Views for Data Dictionary Support

To enable Oracle data dictionary translation support use the tg4msql_cvw.sql script, located in the directory $ORACLE_HOME/tg4msql/admin where $ORACLE_HOME is the directory under which the gateway is installed. You must run this script on each SQL Server database that you want to access through the gateway. Use isql to execute the script, as follows:

```
$ isql -Usa_user -Psa_pwd [-Sserver] [-ddatabase] -e -i tg4msql_cvw.sql
```

where sa_user and sa_pwd are the SQL Server system administrator user ID and password respectively.

Encrypt Gateway Initialization Parameter Values

The gateway uses user IDs and passwords to access the information in the remote database. Some user IDs and passwords must be defined in the gateway initialization file to handle functions such as resource recovery. In the current security conscious environment, having plain-text passwords that are accessible in the initialization file is deemed insecure. The tg4pwd encryption utility has been added as part of Heterogeneous Services to help make this more secure. This utility is accessible by this gateway. The initialization parameters which contain sensitive values can be stored in an encrypted form.

> **See Also:** *Oracle Database Heterogeneous Connectivity Administrator's Guide* for more information about using this utility.

Configure the Gateway to Access Multiple SQL Server Databases

The tasks for configuring the gateway to access multiple SQL Server databases are similar to the tasks for configuring the gateway for a single database. The configuration example assumes the following:

- The gateway is installed and configured with the default SID of `tg4msql`
- The `ORACLE_HOME` environment variable is set to the directory where the gateway is installed
- The gateway is configured for one SQL Server database named `db1`
- Two SQL Server databases named `db2` and `db3` on a host with IP Address 204.179.79.15 are being added

Multiple SQL Server Databases Example: Configuring the Gateway

Choose One System ID for Each SQL Server Database

A separate instance of the gateway is needed for each SQL Server database. Each instance needs its own gateway System ID (SID). For this example, the gateway SIDs are chosen for the instances that access the SQL Server databases:

- `tg4msql2` for the gateway accessing database `db2`
- `tg4msql3` for the gateway accessing database `db3`

Create Two Initialization Parameter Files

Create an initialization parameter file for each instance of the gateway by copying the original initialization parameter file, `$ORACLE_HOME/tg4msql/admin/inittg4msql.ora`, twice, naming one with the gateway SID for `db2` and the other with the gateway SID for `db3`:

```
$ cd $ORACLE_HOME/tg4msql/admin
$ cp inittg4msql.ora inittg4msql2.ora
$ cp inittg4msql.ora inittg4msql3.ora
```

Change the value of the `HS_FDS_CONNECT_INFO` parameter in the new files.

For `inittg4msql2.ora`, enter the following:

```
HS_FDS_CONNECT_INFO=204.179.79.15:1433//db2
```

For `inittg4msql3.ora`, enter the following:

```
HS_FDS_CONNECT_INFO=204.179.79.15:1433//db3
```

> **Note:** If you have multiple gateway SIDs for the same SQL Server database because you want to use different gateway parameter settings at different times, follow the same procedure. You create several initialization parameter files, each with different SIDs and different parameter settings.

Multiple SQL Server Databases Example: Configuring Oracle Net Listener

Add Entries to listener.ora

Add two new entries to the Oracle Net Listener configuration file, `listener.ora`. You must have an entry for each gateway instance, even when multiple gateway instances access the same database.

The following example shows the entry for the original installed gateway first, followed by the new entries:

```
SID_LIST_LISTENER=
```

```
(SID_LIST=
   (SID_DESC=
      (SID_NAME=tg4msql)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4msql)
   )
   (SID_DESC=
      (SID_NAME=tg4msql2)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4msql)
   )
   (SID_DESC=
      (SID_NAME=tg4msql3)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=tg4msql)
   )
)
```

where, `oracle_home_directory` is the directory where the gateway resides.

> **Note:** For HP-UX PA-RISC, the *envs* parameter also needs to be set. Refer to "Syntax of listener.ora File Entries" on page 9-3 for more information about adding the *envs* parameter.

Multiple SQL Server Databases Example: Stopping and Starting the Oracle Net Listener

If the listener is already running, use the `lsnrctl` command to stop the listener and then start it with the new settings, as follows:

```
$ lsnrctl stop
$ lsnrctl start
```

Multiple SQL Server Databases Example: Configuring Oracle Database for Gateway Access

Configuring Oracle Net for Multiple Gateway Instances

Add two connect descriptor entries to the `tnsnames.ora` file. You must have an entry for each gateway instance, even if the gateway instances access the same database.

The following SQL Server example shows the entry for the original installed gateway first, followed by the two entries for the new gateway instances:

```
old_db_using=(DESCRIPTION=
              (ADDRESS=
                (PROTOCOL=TCP)
                (PORT=port_number)
                (HOST=host_name))
                (CONNECT_DATA=
                    (SID=tg4msql))
               (HS=OK))
new_db2_using=(DESCRIPTION=
              (ADDRESS=
                (PROTOCOL=TCP)
                (PORT=port_number)
                (HOST=host_name))
```

```
                (CONNECT_DATA=
                    (SID=tg4msql2))
                (HS=OK))
new_db3_using=(DESCRIPTION=
              (ADDRESS=
                (PROTOCOL=TCP)
                (PORT=port_number)
                (HOST=host_name))
                (CONNECT_DATA=
                    (SID=tg4msql3))
                (HS=OK))
```

The value for PORT is the TCP/IP port number of the Oracle Net Listener that is listening for the gateway. The number can be found in the `listener.ora` file used by the Oracle Net Listener. The value for HOST is the name of the machine on which the gateway is running. The name also can be found in the `listener.ora` file used by the Oracle Net Listener.

Multiple SQL Server Databases Example: Accessing SQL Server Data

Enter the following to create a database link for the `tg4msql2` gateway:

```
SQL> CREATE PUBLIC DATABASE LINK MSQL2 CONNECT TO
  2  "user2" IDENTIFIED BY "password2" USING 'new_db2_using';
```

Enter the following to create a database link for the `tg4msql3` gateway:

```
SQL> CREATE PUBLIC DATABASE LINK MSQL3 CONNECT TO
  2  "user3" IDENTIFIED BY "password3" USING 'new_db3_using';
```

After the database links are created you can verify the connection to the new SQL Server databases, as in the following:

```
SQL> SELECT * FROM ALL_USERS@MSQL2;

SQL> SELECT * FROM ALL_USERS@MSQL3;
```

Part VI

Installing and Configuring Oracle Database Gateway for ODBC

Part VI, "Installing and Configuring Oracle Database Gateway for ODBC" describes how to install and configure Oracle Database Gateway for ODBC on UNIX based platforms.

It contains the following chapters:

- Chapter 10, "Installing Oracle Database Gateway for ODBC"
- Chapter 11, "Configuring Oracle Database Gateway for ODBC"

10

Installing Oracle Database Gateway for ODBC

This chapter provides information about the hardware and software requirements and the installation procedure for Oracle Database Gateway for ODBC.

To install the gateway, follow these steps:

1. Ensure that the system meets all of the hardware and software requirements specified in "System Requirements for Oracle Database Gateway for ODBC" on page 10-1
2. Run the Oracle Universal Installer.

   See "Step Through the Oracle Universal Installer" on page 10-4 for more information about running the Oracle Universal Installer

   Oracle Universal Installer is a menu-driven utility that guides you through the installation of the gateway by prompting you with action items. The action items and the sequence in which they appear depend on your platform.

   See Table 10–3 for a description of the installation procedure of Oracle Database Gateway for ODBC

System Requirements for Oracle Database Gateway for ODBC

This section provides information about the hardware and software requirements for the gateway. It contains the following sections:

Hardware Requirements

Table 10–1 shows the minimum hardware requirements for Oracle Database Gateway for ODBC.

Table 10–1 Hardware requirements for Oracle Database Gateway for ODBC

Hardware Items	Required for AIX-Based System	Required for HP 9000 Series HP-UX PA-RISC	Required for Solaris Operating System (SPARC)	Required for Linux x86	Required for Linux x86 64 bit
Temporary Disk Space	400 MB	400 MB	400 MB	400 MB	400 MB
Disk Space	1.5 GB	1.5 GB	750 MB	750 MB	750 MB
Physical Memory*	512 MB	512 MB	512 MB	512 MB	512 MB
Swap Space	1 GB	1 GB	1 GB	1 GB	1 GB
Processor	IBM RS/6000 AIX-Based System Processor	HP 9000 Series 700 or 800 processor for hp-ux 11.0	Sun Solaris Operating System (SPARC) Processor	x86	x86_64

* The minimum swap space is 1 GB (or twice the size of RAM). On systems with 2 GB or more of RAM, the swap space can be between one and two times the size of RAM. On AIX systems with 1 GB or more of memory, do not increase the swap space more than 2 GB.

Checking the Hardware Requirements

To ensure that the system meets the minimum requirements, follow these steps:

1. To determine the physical RAM size, enter one of the following commands:

Operating System	Command
AIX	# `/usr/sbin/lsattr -E -l sys0 -a realmem`
HP-UX PA-RISC	# `/usr/sbin/dmesg | grep "Physical:"`
Solaris (SPARC)	# `/usr/sbin/prtconf | grep "Memory size"`
Linux x86	`# grep MemTotal /proc/meminfo`
Linux x86 64 bit	`# grep MemTotal /proc/meminfo`

   If the size of the physical RAM installed in the system is less than the required size, you must install more memory before continuing.

2. To determine the size of the configured swap space, enter one of the following commands:

Operating System	Command
AIX	`# /usr/sbin/lsps -a`
HP-UX PA-RISC	`# /usr/sbin/swapinfo -a`
Solaris (SPARC)	`# /usr/sbin/swap -s`
Linux x86	`# grep SwapTotal /proc/meminfo`
Linux x86 64 bit	`# grep SwapTotal /proc/meminfo`

   If necessary, see your operating system documentation for information about how to configure additional swap space.

3. To determine the amount of disk space available in the `/tmp` directory enter the following commands:

Operating System	Command
AIX	`# df -k /tmp`
HP-UX PA-RISC	`# df -k /tmp`
Solaris (SPARC)	`# df -k /tmp`
Linux x86	`# df -k /tmp`
Linux x86 64 bit	`# df -k /tmp`

4. To determine the amount of disk space available on the system enter the following commands:

Operating System	Command
AIX	`# df -k`
HP-UX PA-RISC	`# df -k`
Solaris (SPARC)	`# df -k`
Linux x86	`# df -k`
Linux x86 64 bit	`# df -k`

Software Requirements

The following section describes the minimum software requirements for Oracle Database Gateway for ODBC.

Operating System

Table 10–3 shows the minimum operating system version required for Oracle Database Gateway for ODBC. If your operating system is lower than the minimum requirements, upgrade your operating system to meet the specified levels.

Table 10–2 Operating Systems version for Oracle Database Gateway for ODBC

Operating System	Version
AIX	AIX 5L version 5.3, Maintenance level 02 or higher
HP-UX PA-RISC	HP-UX PA-RISC 11i V1 (11.11), 11i V2 (11.23) PA-RISC
Solaris (SPARC)	Solaris 9 Update 6 or higher or Solaris 10, 64-bit
Linux x86 Red Hat	One of the following operating system versions: ■ Red Hat Enterprise Linux AS/ES 3.0 (Update 4 or later) ■ Red Hat Linux 4.0
Linux x86 Suse	SUSE Linux Enterprise Server 9.0 with SP 2 or later
Linux x86 64 bit Red Hat	One of the following operating system versions: ■ Red Hat Enterprise Linux AS/ES 3.0 (Update 4 or later) ■ Red Hat Enterprise Linux AS/ES 4.0 (Update 1 or later)
Linux x86 64 bit Suse	SUSE Linux Enterprise Server 9.0 with SP2 or later

Checking the Software Requirements

To ensure that the system meets the minimum requirements, follow these steps:

- To determine which version of AIX is installed, enter the following command:

```
# oslevel -r
```

- To determine which version of HP-UX PA-RISC is installed, enter the following command:

```
# uname -a
```

- To determine which version of Solaris Operating System (SRPARC) is installed, enter the following command:

```
# uname -r
```

- To determine which distribution and version of Linux x86 is installed, enter the following command:

```
# cat /etc/issue
```

- To determine which distribution and version of Linux x86 64 bit is installed, enter the following command:

```
# cat /proc/version
```

Certified Configuration

For the latest certified configuration refer to the OTN Web site:

http://www.oracle.com/technology/products/gateways/pdf/certmatrix10g.pdf

Step Through the Oracle Universal Installer

Table 10–3 describes the installation procedure for Oracle Database Gateway for ODBC.

Table 10–3 The Oracle Universal Installer: Steps for Installing Oracle Database Gateway for ODBC

Screen	Response
Oracle Universal Installer: Welcome	Click **Next**.
Oracle Universal Installer: File Locations	The Source section of the screen is where you specify the source location that the Oracle Universal Installer must use to install the Oracle Database Gateway for ODBC. You need not edit the file specification in the Path field. The default setting for this field points to the installer file on your gateway installation media. The Path field in the Destination section of the File Locations screen is where you specify the destination for your installation. You need not edit the path specification in the Path field. The default setting for this field points to *ORACLE_HOME*. After you set the fields in the File Locations screen as necessary, click **Next** to continue. After loading the necessary information from the installation, the Oracle Universal Installer displays the Available Products screen.
Oracle Universal Installer: Available Product Components	**a**. Select **Oracle Database Gateway for ODBC 11.1.0.5.0**. **b.** Click **Next**.
Oracle Universal Installer: Summary	The Installation Summary screen enables you to review a tree list of options and components for this installation. Click **Install** to start installation.
Oracle Net Configuration Assistant: Welcome	Click **Cancel**

Table 10–3 (Cont.) The Oracle Universal Installer: Steps for Installing Oracle Database Gateway for ODBC

Screen	Response
Oracle Net Configuration Assistant:	Click **Yes**
Oracle Universal Installer: Configuration Tools	Click **Exit**
Exit	The final screen of the Oracle Universal Installer is the End of Installation screen. Click Exit to exit the installer.

11

Configuring Oracle Database Gateway for ODBC

After installing the gateway and the ODBC driver for the non-Oracle system, perform the following tasks to configure Oracle Database Gateway for ODBC:

1. Configure the Gateway Initialization Parameter File
2. Configure Oracle Net for the Gateway
3. Configure the Oracle Database for Gateway Access
4. Create Database Links
5. Encrypt Gateway Initialization Parameter Values
6. Configure the Gateway to Access Multiple ODBC Data Sources

Configure the Gateway Initialization Parameter File

Perform the following tasks to configure the gateway initialization file:

1. Create the Initialization Parameter File
2. Set the Initialization Parameter Values

Create the Initialization Parameter File

You must create an initialization file for your Oracle Database Gateway for ODBC. Oracle supplies a sample initialization file, `inithsodbc.ora`. The sample file is stored in the `$ORACLE_HOME/hs/admin` directory.

To create an initialization file for the ODBC gateway, copy the sample initialization file and rename it to `init`*`sid`*`.ora`, where *`sid`* is the system identifier (SID) you want to use for the instance of the non-Oracle system to which the gateway connects.

The gateway system identifier (SID) is an alphanumeric character string that identifies a gateway instance. You need one gateway instance, and therefore one gateway SID, for each ODBC source you are accessing.

If you want to access two ODBC sources, you need two gateway SIDs, one for each instance of the gateway. If you have only one ODBC source but want to access it sometimes with one set of gateway parameter settings, and other times with different gateway parameter settings, then you will need multiple gateway SIDs for the single ODBC source. The SID is used as part of the file name for the initialization parameter file.

Set the Initialization Parameter Values

After the initialization file has been created, you must set the initialization parameter values. A number of initialization parameters can be used to modify the gateway behavior. You must set the HS_FDS_CONNECT_INFO and the HS_FDS_SHAREABLE_NAME initialization parameters. Other initialization parameters have defaults or are optional. You can use the default values and omit the optional parameters, or you can specify the parameters with values tailored for your installation. Refer to Appendix C, "Initialization Parameters" for the complete list of initialization parameters that can be set. Changes made to the initialization parameters only take effect in the next gateway session.

The HS_FDS_CONNECT_INFO initialization parameter specifies the information required for connecting to the non-Oracle system. Set the HS_FDS_CONNECT_INFO as follows:

```
HS_FDS_CONNECT_INFO=dsn_value
```

where *dsn_value* is the data source name configured in the odbc.ini file

The HS_FDS_SHAREABLE_NAME initialization parameter specifies the full path of the ODBC driver manager. Set the HS_FDS_SHAREABLE_NAME as follows:

```
HS_FDS_SHAREABLE_NAME=full_path_of_odbc_driver
```

where full_path_of_odbc_driver is the full path to the ODBC driver manager

> **Note:** Before deciding whether to accept the default values or to change them, see Appendix C, "Initialization Parameters" for detailed information about all the initialization parameters.

Example: Setting Initialization Parameter Values

The following is an example of an odbc.ini file that uses DataDirect Technologies SQLServer ODBC driver. The ODBC driver is installed in $ODBCHOME, which is the /opt/odbc520 directory.

```
[ODBC Data Sources]
SQLServerWP=DataDirect 5.20 SQL Server Wire Protocol

[SQLServerWP]
Driver=/opt/odbc520/lib/ivmsss18.so
Description=DataDirect 5.20 SQL Server Wire Protocol
Database=oratst
LogonID=TKHOUSER
Password=TKHOUSER
Address=sqlserver-pc,1433
QuotedId=Yes
AnsiNPW=No

[ODBC]
Trace=0
TraceFile=/opt/odbc520/odbctrace.out
TraceDll=/opt/odbc520/lib/odbctrac.so
InstallDir=/opt/odb520
ConversionTableLocation=/opt/odbc520/tables
UseCursorLib=0
```

To configure the Gateway for ODBC to use this driver, the following lines are required in init*sid*.ora:

```
HS_FDS_CONNECT_INFO=SQLServerWP
HS_FDS_SHAREABLE_NAME=/opt/odbc520/lib/libodbc.so
set ODBCINI=/opt/odbc/odbc.ini
```

If the ODBC driver you are using requires you to set some environment variables then you can either set them in the initizlization file or in the environment.

The `HS_FDS_CONNECT_INFO` initialization parameter value must match the ODBC data source name in the `odbc.ini` file.

> **Note:** If the ODBC driver supports Quoted Identifiers or Delimited Identifiers it should be turned on.

Configure Oracle Net for the Gateway

The gateway requires Oracle Net to communicate with the Oracle database. After configuring the gateway, perform the following tasks to configure Oracle Net to work with the gateway:

1. Configure Oracle Net Listener for the Gateway
2. Stop and Start the Oracle Net Listener for the Gateway

Configure Oracle Net Listener for the Gateway

The Oracle Net Listener listens for incoming requests from the Oracle database. For the Oracle Net Listener to listen for the gateway, information about the gateway must be added to the Oracle Net Listener configuration file, `listener.ora`. This file by default is located in `$ORACLE_HOME/network/admin`, where `$ORACLE_HOME` is the directory under which the gateway is installed.

The following entries must be added to the `listener.ora` file:

- A list of Oracle Net addresses on which the Oracle Net Listener listens
- The executable name of the gateway that the Oracle Net Listener starts in response to incoming connection requests

Syntax of listener.ora File Entries

The Oracle database communicates with the gateway using Oracle Net and any supported protocol adapters. The following is the syntax of the address on which the Oracle Net Listener listens using the TCP/IP protocol adapter:

```
LISTENER=
        (ADDRESS=
          (PROTOCOL=TCP)
          (HOST=host_name)
          (PORT=port_number))
```

Where:

Variable	Description
host_name	is the name of the machine on which the gateway is installed.
port_number	specifies the port number used by the Oracle Net Listener. If you have other listeners running on the same machine, then the value of *port_number* must be different from the other listeners' port numbers.

To direct the Oracle Net Listener to start the gateway in response to incoming connection requests, add an entry to the `listener.ora` file. The syntax for HP-UX PA-RISC slightly different than the other platforms.

> **Note:** You must use the same SID value in the `tnsnames.ora` file and the `listener.ora` file.

For Linux:

```
SID_LIST_LISTENER=
   (SID_LIST=
      (SID_DESC=
         (SID_NAME=gateway_sid)
         (ORACLE_HOME=oracle_home_directory)
         (PROGRAM=hsodbc)
(ENVS=LD_LIBRARY_PATH=odbc_library_dir:$ORACLE_HOME/lib)
      )
   )
```

For HP-UX PA-RISC:

```
SID_LIST_LISTENER=
   (SID_LIST=
      (SID_DESC=
         (SID_NAME=gateway_sid)
         (ORACLE_HOME=oracle_home_directory)
         (PROGRAM=hsodbc)
         (ENVS=SHLIB_PATH=odbc_library_dir:$ORACLE_HOME/lib32)
      )
   )
```

Where:

Variable	Description
gateway_sid	specifies the SID of the gateway and matches the gateway SID specified in the connect descriptor entry in the `tnsnames.ora` file.
oracle_home_directory	specifies the Oracle home directory where the gateway resides.
odbc_library_dir	specifies the ODBC driver library path
`hsodbc`	specifies the executable name of the Oracle Database Gateway for ODBC.

If you already have an existing Oracle Net Listener, then add the following syntax to `SID_LIST` in the existing `listener.ora` file:

For Linux:

```
SID_LIST_LISTENER=
(SID_LIST=
   (SID_DESC=.
     .
   )
   (SID_DESC=.
     .
   )
   (SID_DESC=
      (SID_NAME=gateway_sid)
```

```
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=hsodbc)
(ENVS=LD_LIBRARY_PATH=odbc_library_dir:$ORACLE_HOME/lib)
   )
)
```

For HP-UX PA-RISC:

```
SID_LIST_LISTENER=
(SID_LIST=
   (SID_DESC=.
     .
   )
   (SID_DESC=.
     .
   )
   (SID_DESC=
      (SID_NAME=gateway_sid)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=hsodbc)
      (ENVS=SHLIB_PATH=odbc_library_dir:$ORACLE_HOME/lib32)
   )
)
```

See Also: *Oracle Net Administrator's Guide* for information about changing the `listener.ora` file.

Stop and Start the Oracle Net Listener for the Gateway

You must stop and restart the Oracle Net Listener to initiate the new settings, as follows:

1. Set the `PATH` environment variable to `$ORACLE_HOME/bin` where `$ORACLE_HOME` is the directory in which the gateway is installed.

   For example on the Linux platform, if you have the Bourne or Korn Shell, enter the following:

   ```
   $ PATH=$ORACLE_HOME/bin:$PATH;export PATH
   $ LD_LIBRARY_PATH=$ORACLE_HOME/lib:$LD_LIBRARY_PATH; export LD_LIBRARY_PATH
   ```

   If you have the C Shell, enter the following:

   ```
   $ setenv PATH $ORACLE_HOME/bin:$PATH
   $ setenv LD_LIBRARY_PATH $ORACLE_HOME/lib:$LD_LIBRARY_PATH
   ```

   Table 11–1 specifies which parameter value to use for the different platforms:

Table 11–1 Parameter Values for UNIX Based Platforms

Platform	Parameter Value
Solaris (SPARC) 64 bit	`LD_LIBRARY_PATH=$ORACLE_HOME/lib`
HP-UX PA-RISC	`SHLIB_PATH=$ORACLE_HOME/lib`
Linux x86, and Linux x86 64 bit	`LD_LIBRARY_PATH=$ORACLE_HOME/lib`
AIX	`LIBPATH=$ORACLE_HOME/lib`

2. If the listener is already running, use the `lsnrctl` command to stop the listener and then start it with the new settings, as follows:

   ```
   $ lsnrctl stop
   ```

```
$ lsnrctl start
```

3. Check the status of the listener with the new settings, as follows:

```
$ lsnrctl status
```

   The following is a partial output from a `lsnrctl` status check. In this example hsodbc is the SID.

```
.
.
.
Services Summary...
Service "hsodbc" has 1 instance(s).
  Instance "hsodbc", status UNKNOWN, has 1 handler(s) for this service...
The command completed successfully
```

Configure the Oracle Database for Gateway Access

Before you use the gateway to access an ODBC data source you must configure the Oracle database to enable communication with the gateway over Oracle Net.

To configure the Oracle database you must add connect descriptors to the `tnsnames.ora` file. By default, this file is in `$ORACLE_HOME/network/admin`, where `$ORACLE_HOME` is the directory in which the Oracle database is installed. You cannot use the Oracle Net Assistant or the Oracle Net Easy Config tools to configure the `tnsnames.ora` file. You must edit the file manually.

> **See Also:** *Oracle Database Administrator's Guide* for information about editing the `tnsnames.ora` file.

Configuring tnsnames.ora

Edit the `tnsnames.ora` file to add a connect descriptor for the gateway. The following is a syntax of the Oracle Net entry using the TCP/IP protocol:

```
connect_descriptor=
   (DESCRIPTION=
      (ADDRESS=
         (PROTOCOL=TCP)
         (HOST=host_name)
         (PORT=port_number)
      )
      (CONNECT_DATA=
         (SID=gateway_sid))
      (HS=OK))
```

Where:

Variable	Description
connect_descriptor	is the description of the object to connect to as specified when creating the database link, such as `hsodbc`. Check the sqlnet.ora file for the following parameter setting: `names.directory_path = (TNSNAMES)` Note: The `sqlnet.ora` file is typically stored in `$ORACLE_HOME/network/admin`.
`TCP`	is the TCP protocol used for TCP/IP connections.
host_name	specifies the machine where the gateway is running.
port_number	matches the port number used by the Oracle Net Listener that is listening for the gateway. The Oracle Net Listener's port number can be found in the `listener.ora` file used by the Oracle Net Listener. See "Syntax of listener.ora File Entries" on page 11-3.
gateway_sid	specifies the SID of the gateway and matches the SID specified in the `listener.ora` file of the Oracle Net Listener that is listening for the gateway. See "Configure Oracle Net Listener for the Gateway" on page 11-3 for more information.
`(HS=OK)`	specifies that this connect descriptor connects to a non-Oracle system.

Create Database Links

Any Oracle client connected to the Oracle database can access an ODBC data source through the gateway. The Oracle client and the Oracle database can reside on different machines. The gateway accepts connections only from the Oracle database.

A connection to the gateway is established through a database link when it is first used in an Oracle session. In this context, a connection refers to the connection between the Oracle database and the gateway. The connection remains established until the Oracle session ends. Another session or user can access the same database link and get a distinct connection to the gateway and ODBC data source.

Database links are active for the duration of a gateway session. If you want to close a database link during a session, you can do so with the `ALTER SESSION` statement.

To access the ODBC data source, you must create a database link. A public database link is the most common of database links.

```
SQL> CREATE PUBLIC DATABASE LINK dblink CONNECT TO
2  "user" IDENTIFIED BY "password" USING 'tns_name_entry';
```

Where:

Variable	Description
dblink	is the complete database link name.
tns_name_entry	specifies the Oracle Net connect descriptor specified in the `tnsnames.ora` file that identifies the gateway

After the database link is created you can verify the connection to the ODBC data source, as follows:

```
SQL> SELECT * FROM DUAL@dblink;
```

See Also: *Oracle Database Administrator's Guide* and *Oracle Database Heterogeneous Connectivity Administrator's Guide* for more information about using database links.

Encrypt Gateway Initialization Parameter Values

The gateway uses user IDs and passwords to access the information in the remote database. Some user IDs and passwords must be defined in the gateway initialization file to handle functions such as resource recovery. In the current security conscious environment, having plain-text passwords that are accessible in the initialization file is deemed insecure. The `tg4pwd` encryption utility has been added as part of Heterogeneous Services to help make this more secure. This utility is accessible by this gateway. The initialization parameters which contain sensitive values can be stored in an encrypted form.

See Also: *Oracle Database Heterogeneous Connectivity Administrator's Guide* for more information about using this utility.

Configure the Gateway to Access Multiple ODBC Data Sources

The tasks for configuring the gateway to access multiple ODBC data sources are similar to the tasks for configuring the gateway for a single data source. The configuration example assumes the following:

- The gateway is installed and configured with the SID of `hsodbc`.
- The gateway is configured to access one ODBC data source named `dsn1`.
- Two ODBC data sources named dsn2 and dsn3 where dsn2 and dsn3 are the data source names configured in the odbc.ini file, are being added.

Multiple ODBC Data Sources Example: Configuring the Gateway

Choose One System ID for Each ODBC Data Source

A separate instance of the gateway is needed for each ODBC data source. Each instance needs its own gateway System ID (SID). For this example, the gateway SIDs are chosen for the instances that access the ODBC data source:

- `hsodbc2` for the gateway accessing data source `dsn2`.
- `hsodbc3` for the gateway accessing data source `dsn3`.

Create Two Initialization Parameter Files

Create an initialization parameter file for each instance of the gateway by copying the original initialization parameter file `$ORACLE_HOME/hs/admin/inithsodbc.ora`, twice, naming one with the gateway SID for `dsn2` and the other with the gateway SID for `dsn3`:

```
$ cd ORACLE_HOME/hs/admin
$ cp inithsodbc.ora inithsodbc2.ora
$ cp inithsodbc.ora inithsodbc3.ora
```

Change the value of the `HS_FDS_CONNECT_INFO` parameter in the new files, as follows:

For `inithsodbc2.ora`, enter the following:

```
HS_FDS_CONNECT_INFO=dsn2
```

For `inithsodbc3.ora`, enter the following:

```
HS_FDS_CONNECT_INFO=dsn3
```

> **Note:** If you have multiple gateway SIDs for the same ODBC data source because you want to use different gateway parameter settings at different times, follow the same procedure. You create several initialization parameter files, each with different SIDs and different parameter settings.

Multiple ODBC Data Sources Example: Configuring Oracle Net Listener

Add Entries to listener.ora

Add two new entries to the Oracle Net Listener configuration file, `listener.ora`. You must have an entry for each gateway instance, even when multiple gateway instances access the same database.

The following example shows the entry for the original installed gateway first, followed by the new entries. The syntax for HP-UX PA-RISC slightly different than the other platforms.

```
SID_LIST_LISTENER=
(SID_LIST=
   (SID_DESC=
      (SID_NAME=hsodbc)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=hsodbc)
(ENVS=LD_LIBRARY_PATH=odbc_library_dir:$ORACLE_HOME/lib)
   )
   (SID_DESC=
      (SID_NAME=hsodbc2)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=hsodbc)
(ENVS=LD_LIBRARY_PATH=odbc_library_dir:$ORACLE_HOME/lib)
   )
   (SID_DESC=
      (SID_NAME=hsodbc3)
      (ORACLE_HOME=oracle_home_directory)
      (PROGRAM=hsodbc)
(ENVS=LD_LIBRARY_PATH=odbc_library_dir:$ORACLE_HOME/lib)
   )
)
```

where, `oracle_home_directory` is the directory where the gateway resides.

Multiple ODBC Data Sources Example: Stopping and Starting the Oracle Net Listener

If the listener is already running, use the `lsnrctl` command to stop the listener and then start it with the new settings, as follows:

```
$ lsnrctl stop
$ lsnrctl start
```

Multiple ODBC Data Sources Example: Configuring Oracle Database for Gateway Access

Add two connect descriptor entries to the `tnsnames.ora` file. You must have an entry for each gateway instance, even if the gateway instances access the same database.

The following example shows the entry for the original installed gateway first, followed by the two entries for the new gateway instances:

```
old_dsn_using=(DESCRIPTION=
               (ADDRESS=
                 (PROTOCOL=TCP)
                 (PORT=port_number)
                 (HOST=host_name))
                 (CONNECT_DATA=
                     (SID=hsodbc))
                (HS=OK))
new_dsn2_using=(DESCRIPTION=
               (ADDRESS=
                 (PROTOCOL=TCP)
                 (PORT=port_number)
                 (HOST=host_name))
                 (CONNECT_DATA=
                     (SID=hsodbc2))
                 (HS=OK))
new_dsn3_using=(DESCRIPTION=
               (ADDRESS=
                 (PROTOCOL=TCP)
                 (PORT=port_number)
                 (HOST=host_name))
                 (CONNECT_DATA=
                     (SID=hsodbc3))
                 (HS=OK))
```

The value for `PORT` is the TCP/IP port number of the Oracle Net Listener that is listening for the gateway. The number can be found in the `listener.ora` file used by the Oracle Net Listener. The value for `HOST` is the name of the machine on which the gateway is running. The name also can be found in the `listener.ora` file used by the Oracle Net Listener.

Multiple ODBC Data Sources Example: Accessing ODBC Data

Enter the following to create a database link for the `hsodbc2` gateway:

```
SQL> CREATE PUBLIC DATABASE LINK ODBC2 CONNECT TO
  2  "user2" IDENTIFIED BY "password2" USING 'new_dsn2_using';
```

Enter the following to create a database link for the `hsodbc3` gateway:

```
SQL> CREATE PUBLIC DATABASE LINK ODBC3 CONNECT TO
  2  "user3" IDENTIFIED BY "password3" USING 'new_dsn3_using';
```

After the database links are created, you can verify the connection to the new ODBC data sources, as in the following:

```
SQL> SELECT * FROM ALL_USERS@ODBC2;

SQL> SELECT * FROM ALL_USERS@ODBC3;
```

Part VII

Removing Oracle Database Gateway

Part VII, "Removing Oracle Database Gateway" describes how to remove Oracle Database Gateway.

It contains the following chapter:

- Chapter 12, "Removing Oracle Database Gateway"

12

Removing Oracle Database Gateway

If you decide to remove the Oracle Database Gateway, perform the following steps:

1. Stop the following process: Oracle Net Listener using the following command:

   ```
   ORACLE_HOME/bin/lsnrctl stop
   ```

2. Log in as the oracle user:

   ```
   $ su - oracle
   ```

3. Set the ORACLE_HOME environment variable to specify the path of the Oracle home that you want to remove:

   - Bourne, Bash, or Korn shell:

     ```
     $ ORACLE_HOME=/u01/app/oracle/product/11.1.0/db_1; export ORACLE_HOME
     ```

   - C shell:

     ```
     $ setenv ORACLE_HOME /u01/app/oracle/product/11.1.0/db_1
     ```

4. Start the Installer as follows:

   ```
   $ $ORACLE_HOME/oui/bin/runInstaller
   ```

5. Step through the Oracle Universal Installer. Use the prompts listed in Table 12–1, " Steps to Deinstall the Oracle Database Gateway Using Oracle Universal Installer" as a guide for removing, following the instructions in the Response column.

Table 12–1 Steps to Deinstall the Oracle Database Gateway Using Oracle Universal Installer

Prompt	Response
1. Oracle Universal Installer: Welcome	Click **Deinstall Products**.
2. Inventory	You may either choose to remove *all* products that you may have installed at the time of your original gateway installation, or you may choose to remove only an instance of Oracle Database Gateway. ▪ To remove *all* products: Select the *ORACLE_HOME* where Oracle Database Gateway was installed. ▪ Click **Remove...** ▪ To remove *only* one instance of Oracle Database Gateway, expand the rows within the *ORACLE_HOME* recursively until you arrive at the folder. ▪ Click **Remove...**

Table 12–1 (Cont.) Steps to Deinstall the Oracle Database Gateway Using Oracle Universal Installer

Prompt	Response
3. Confirmation	Click **Yes**.
4. Inventory	Click **Close**.
5. Oracle Universal Installer: Welcome	Click **Cancel**.
6. Exit	Click **Yes**.

6. The Oracle Database Gateway is now removed.

When the Oracle Universal Installer confirms that the deinstallation has ended, verify that the removal procedure was successful. To do this, read the contents of the deinstallation log file, which is located in the `C:\Program Files\Oracle\Inventory\logs` directory.

The default file name is InstallActions*YYYY-MM-DD_HH-mm-SS-AM/PM*.log, where:

YYYY is year;
MM is month
DD is day
HH is hour
mm is minute
SS is seconds
AM/PM is daytime or evening

These variables in the log file name represent the date and time the product was removed.

7. The only files that are removed are those that were copied to the *`ORACLE_HOME`* directory during the gateway installation. You must remove any other related files manually, including deleting `listener.ora` and `tnsnames.ora` entries relating to the gateway, dropping database links.

Part VIII

Appendixes

Part VIII, "Appendixes"includes appendixes containing information relevant to installing and configuring Oracle Database Gateways.

It contains the following chapters:

- Appendix A, "Using Response Files for Noninteractive Installation"
- Appendix B, "Oracle Database Gateway Troubleshooting"
- Appendix C, "Initialization Parameters"

A

Using Response Files for Noninteractive Installation

This appendix describes how to install and configure Oracle products using response files. It includes information about the following topics:

Introduction

You can automate the installation and configuration of Oracle software, either fully or partially, by specifying a response file when you start Oracle Universal Installer. Oracle Universal Installer uses the values contained in the response file to provide answers to some or all of Oracle Universal Installer prompts:

- If you include responses for all of the prompts in the response file and specify the `-silent` option when starting Oracle Universal Installer, then Oracle Universal Installer runs in silent mode. During a silent-mode installation, Oracle Universal Installer does not display any screens. Instead, it displays progress information in the terminal that you used to start it.
- If you include responses for some or all of the prompts in the response file and omit the `-silent` option, then Oracle Universal Installer runs in suppressed mode. During a suppressed-mode installation, Oracle Universal Installer displays only the screens for which you did not specify all required information. You can also use variables in the response file or command-line options to suppress other installer screens, such as the Welcome screen or Summary screen, that do not prompt for information.

The following table describes several reasons why you might want to run Oracle Universal Installer in silent mode or suppressed mode:

Mode	Uses
Silent	Use silent mode if you want to: ■ Complete an unattended installation, which you might schedule using operating system utilities such as `at` ■ Complete several similar installations on multiple systems without user interaction ■ Install the software on a system that does not have X Window System software installed on it Oracle Universal Installer displays progress information in the terminal that you used to start it, but it does not display any of Oracle Universal Installer screens.
Suppressed	Use suppressed mode if you want to complete similar Oracle software installations on more than one system, providing default answers to some, but not all of Oracle Universal Installer prompts. If you do not specify information required for a particular Installer screen in the response file, Oracle Universal Installer displays that screen. It suppresses screens for which you have provided all of the required information.

Installation Overview

To install and configure Oracle products using Oracle Universal Installer in silent or suppressed mode, follow these steps:

1. Create the `oraInst.loc` file.
2. Prepare a response file.
3. Run Oracle Universal Installer in silent or suppressed mode.

These steps are described in the following sections.

Creating the oraInst.loc File

If you plan to install Oracle products using Oracle Universal Installer in silent or suppressed mode, you must manually create the `oraInst.loc` file if it does not already exist. This file specifies the location of the Oracle Inventory directory where Oracle Universal Installer creates the inventory of Oracle products installed on the system.

> **Note:** If Oracle software has been installed previously on the system, the `oraInst.loc` file might already exist. If the file does exist, you do not need to create a file.

To create the `oraInst.loc` file, follow these steps:

1. Switch user to root:
2. On HP-UX PA-RISC and Solaris (SPARC), create the /var/opt/oracle directory if it does not exist:

   ```
   # mkdir /var/opt/oracle
   ```

3. Change directory as follows, depending on your operating system:

   AIX:

```
# cd /etc
```

HP-UX PA-RISC and Solaris (SPARC):

```
# cd /var/opt/oracle
```

4. Enter the following commands to set the appropriate owner, group, and permissions on the `oraInst.loc` file:

```
# chown oracle:oinstall oraInst.loc
# chmod 664 oraInst.loc
```

Preparing a Response File

This section describes the methods that you can use to prepare a response file for use during silent-mode or suppressed-mode installations:

- Editing a Response File Template
- Recording a Response File

Editing a Response File Template

Oracle provides response file templates for each product and installation type, and for each configuration tool. The response files for Oracle Gateways, `tg.rsp` and `netca.rsp` are located in the `response` directory on the media.

> **Note:** If you copied the software to a hard disk, the response files are located in the `Disk1/response` directory.

To prepare a response file:

1. Copy the response file from the response file directory to a directory on your system:

```
$ cp /directory_path/response/response_file.rsp local_directory
```

In this example, *`directory_path`* is the CD-ROM mount point directory or the directory on the DVD. If you have copied the software to a hard drive, you can edit the file in the `response` directory if you prefer.

2. Open the response file in a text editor:

```
$ vi /local_dir/response_file.rsp
```

3. Edit the file, following the instructions in the file.

> **Note:** Oracle Universal Installer or configuration assistant fails if you do not correctly configure the response file. Refer to the "Silent-Mode Response File Error Handling" section on page B-3 for more information about troubleshooting a failed silent-mode installation.

4. Change the permissions on the file to 700:

```
$ chmod 700 /local_dir/response_file.rsp
```

Recording a Response File

This method is most useful for Custom or software-only installations.

You can use Oracle Universal Installer in interactive mode to record a response file that you can edit and then use to complete silent-mode or suppressed-mode installations. When you are recording the response file, you can either complete the installation, or you can exit from Oracle Universal Installer on the Summary page, before it starts to copy the software to the system.

To record a new response file:

1. Complete the pre-installation tasks listed in respective chapters.

   When you run Oracle Universal Installer to record a response file, it checks the system to verify that it meets the requirements to install the software. For this reason, Oracle recommends that you complete all of the required pre-installation tasks and record the response file while completing an installation.

2. If you have not installed Oracle software on this system previously, create the `oraInst.loc` file, as described in the previous section.

3. Ensure that the Oracle software owner user (typically `oracle`) has permissions to create or write to the Oracle home path that you will specify when you run Oracle Universal Installer.

4. To record a response file, enter a command similar to the following to start Oracle Universal Installer:

   Note: Do not specify a relative path to the response file. If you specify a relative path, Oracle Universal Installer fails.

   ```
   $ /directory_path/runInstaller -record -destinationFile filename
   ```

   In the previous example:

   - *`directory_path`* is either the CD-ROM mount point directory, the path of the directory on the DVD, or the path of the `Disk1` directory on the hard drive
   - The `-record` parameter specifies that you want to record the responses that you enter in a response file
   - *`filename`* is the full path and file name of the response file that you want to record

5. On each Installer screen, specify the required information.

6. When Oracle Universal Installer displays the Summary screen, do one of the following:

   - Click **Install** to create the response file, then continue with the installation.
   - Click **Cancel**, then **Yes** to create the response file but exit from Oracle Universal Installer without installing the software.

   The response file is saved in the location that you specified using the `-destinationFile` option.

7. If you did not complete the installation, delete the Oracle home directory that Oracle Universal Installer created using the path you specified on the Specify File Locations screen.

8. Before using the recorded response file on another system, use a text editor to edit the file and make any required changes.

   Use the comments in the file as a guide when editing it.

Running Oracle Universal Installer in Silent or Suppressed Mode

To run Oracle Universal Installer in silent or suppressed mode, follow these steps:

1. Complete the pre-installation tasks listed in the respective chapters.
2. Log in as the Oracle software owner user (typically `oracle`).
3. To start Oracle Universal Installer in silent or suppressed mode, enter a command similar to the following:

   ```
   $ $ /directory_path/runInstaller -silent -noconfig -responseFile filename
   ```

   Note: Do not specify a relative path to the response file. If you specify a relative path, Oracle Universal Installer fails.

   In this example:

   - *`directory_path`* is either the installation media mount point directory, the path of the directory on the DVD, or the path of the `Disk1` directory on the hard drive.
   - `-silent` indicates that you want to run Oracle Universal Installer in silent mode.
   - `-noconfig` suppresses running the configuration assistants during installation, and a software-only installation is performed instead.
   - *`filename`* is the full path and file name of the installation response file that you configured.

   Note: For more information about other options for the `runInstaller` command, enter the following command:

   ```
   $ /directory_path/runInstaller -help
   ```

B

Oracle Database Gateway Troubleshooting

This appendix contains information about troubleshooting. It includes information about the following topics:

Verify Requirements

Before performing any of the troubleshooting steps in this appendix, ensure that the system meets the requirements and that you have completed all of the pre-installation tasks specified in respective chapters.

Read the Release Notes

Read the release notes for the product before installing it. The release notes are available on the Oracle Database 11*g* installation media. The latest version of the release notes is also available on the OTN Web site:

`http://www.oracle.com/technology/documentation/index.html`

What to Do If an Installation Error Occurs

If you encounter an error during installation:

- Do not exit Oracle Universal Installer.
- If you clicked **Next** after you entered incorrect information on one of the installation screens, click **Back** to return to the screen and correct the information.
- If you encounter an error while Oracle Universal Installer is copying or linking files, refer to the "Reviewing the Log of an Installation Session" section on page B-2.
- If you encounter an error while a configuration assistant is running, refer to the "Troubleshooting Configuration Assistants" section on page B-2.
- If you cannot resolve the problem, remove the failed installation by following the steps listed in the "Cleaning Up After a Failed Installation" section on page B-4.

Reviewing the Log of an Installation Session

During an installation, Oracle Universal Installer records all of the actions that it performs in a log file. If you encounter problems during the installation, review the log file for information about possible causes of the problem.

To view the log file, follow these steps:

1. If necessary, enter the following command to determine the location of the `oraInventory` directory:

   For AIX and Linux:

   ```
   $ cat /etc/oraInst.loc
   ```

   For Solaris SPARC:

   ```
   # more /var/opt/oracle/oraInst.loc
   ```

   For HP-UX PA-RISC:

   ```
   $ cat /var/opt/oracle/oraInst.loc
   ```

   The `inventory_loc` parameter in this file specifies the location of the `oraInventory` directory.

2. Enter the following command to change directory to Oracle Universal Installer log file directory, where *`orainventory_location`* is the location of the `oraInventory` directory:

   ```
   $ cd /orainventory_location/logs
   ```

3. Enter the following command to determine the name of the log file:

   ```
   $ ls -ltr
   ```

   This command lists the files in the order of creation, with the most recent file shown last. Installer log files have names similar to the following, where *`date_time`* indicates the date and time that the installation started:

   ```
   installActionsdate_time.log
   ```

4. To view the most recent entries in the log file, where information about a problem is most likely to appear, enter a command similar to the following:

   ```
   $ tail -50 installActionsdate_time.log | more
   ```

   This command displays the last 50 lines in the log file.

5. If the error displayed by Oracle Universal Installer or listed in the log file indicates a relinking problem, refer to the following file for more information:

   ```
   $ORACLE_HOME/install/make.log
   ```

Troubleshooting Configuration Assistants

To troubleshoot an installation error that occurs when a configuration assistant is running:

- Review the installation log files listed in the "Reviewing the Log of an Installation Session" section on page B-2.

- Review the specific configuration assistant log file located in the `$ORACLE_HOME/cfgtoollogs` directory. Try to fix the issue that caused the error.
- If you see the "Fatal Error. Reinstall" message, look for the cause of the problem by reviewing the log files. Refer to the "Fatal Errors" section on page B-3 for further instructions.

Configuration Assistant Failure

Oracle configuration assistant failures are noted at the bottom of the installation screen. The configuration assistant interface displays additional information, if available. The configuration assistant execution status is stored in the following file:

oraInventory_location`/logs/installActions`*date_time*`.log`

The execution status codes are listed in the following table:

Status	Result Code
Configuration assistant succeeded	0
Configuration assistant failed	1
Configuration assistant cancelled	-1

Fatal Errors

If you receive a fatal error while a configuration assistant is running, you must remove the current installation and reinstall the Oracle software, as follows:

1. Remove the failed installation as described in the "Cleaning Up After a Failed Installation" section on page B-4.
2. Correct the cause of the fatal error.
3. Reinstall the Oracle software.

Silent-Mode Response File Error Handling

To determine whether a silent-mode installation succeeds or fails, refer to the following log file:

`/`*oraInventory_location*`/logs/silentInstall`*date_time*`.log`

If necessary, refer to the previous section for information about determining the location of the `oraInventory` directory.

A silent installation fails if:

- You do not specify a response file
- You specify an incorrect or incomplete response file
- Oracle Universal Installer encounters an error, such as insufficient disk space

Oracle Universal Installer or configuration assistant validates the response file at run time. If the validation fails, the silent-mode installation or configuration process ends. Oracle Universal Installer treats values for parameters that are of the wrong context, format, or type as if no value was specified in the file.

Cleaning Up After a Failed Installation

If an installation fails, you must remove files that Oracle Universal Installer created during the attempted installation and remove the Oracle home directory. Perform the following steps to remove the files:

1. Start Oracle Universal Installer as described in the "Running the Oracle Universal Installer" section on page 1-5.
2. Click **Deinstall Products** on the Welcome window or click **Installed Products** on any Installer window.

   The Inventory window appears, listing installed products.
3. Select the Oracle home that contains the products that you want to remove, then click **Remove**.
4. Manually remove the Oracle home directory created during the failed installation.
5. Reinstall the Oracle software.

C

Initialization Parameters

The Oracle database initialization parameters in the `init.ora` file are distinct from gateway initialization parameters. Set the gateway parameters in the initialization parameter file using an agent-specific mechanism, or set them in the Oracle data dictionary using the `DBMS_HS` package. The gateway initialization parameter file must be available when the gateway is started. Changes made to the initialization parameters only take effect in the next gateway session.

This appendix contains a list of the gateway initialization parameters that can be set for each gateway and their description. It also describes the initialization parameter file syntax. It includes the following sections:

Initialization Parameter File Syntax

The syntax for the initialization parameter file is as follows:

1. The file is a sequence of commands.
2. Each command should start on a separate line.
3. End of line is considered a command terminator (unless escaped with a backslash).
4. If there is a syntax error in an initialization parameter file, none of the settings take effect.
5. Set the parameter values as follows:

   ```
   [SET][PRIVATE] parameter=value
   ```

   Where:

   `parameter` is an initialization parameter name. It is a string of characters starting with a letter and consisting of letters, digits and underscores. Initialization parameter names are case sensitive.

value is the initialization parameter value. It is case-sensitive. An initialization parameter value is either:

a. A string of characters that does not contain any backslashes, white space or double quotation marks (")

b. A quoted string beginning with a double quotation mark and ending with a double quotation mark. The following can be used inside a quoted string:

* backslash (\) is the escape character
* \n inserts a new line
* \t inserts a tab
* \" inserts a double quotation mark
* \\ inserts a backslash

A backslash at the end of the line continues the string on the next line. If a backslash precedes any other character then the backslash is ignored.

For example, to enable tracing for an agent, set the HS_FDS_TRACE_LEVEL initialization parameter as follows:

```
HS_FDS_TRACE_LEVEL=ON
```

SET and PRIVATE are optional keywords. You cannot use either as an initialization parameter name. Most parameters are needed only as initialization parameters, so you usually do not need to use the SET or PRIVATE keywords. If you do not specify either SET or PRIVATE, the parameter is used only as an initialization parameter for the agent.

SET specifies that, in addition to being used as an initialization parameter, the parameter value is set as an environment variable for the agent process. Use SET for parameter values that the drivers or non-Oracle system need as environment variables.

PRIVATE specifies that the initialization parameter should be private to the agent and should not be uploaded to the Oracle database. Most initialization parameters should not be private. If, however, you are storing sensitive information like a password in the initialization parameter file, then you may not want it uploaded to the server because the initialization parameters and values are not encrypted when uploaded. Making the initialization parameters private prevents the upload from happening and they do not appear in dynamic performance views. Use PRIVATE for the initialization parameters only if the parameter value includes sensitive information such as a username or password.

SET PRIVATE specifies that the parameter value is set as an environment variable for the agent process and is also private (not transferred to the Oracle database, not appearing in dynamic performance views or graphical user interfaces).

Oracle Database Gateway for Sybase Initialization Parameters

This section lists all the initialization file parameters that can be set for the Oracle Database Gateway for Sybase. They are as follows:

- HS_CALL_NAME
- HS_DB_DOMAIN
- HS_DB_INTERNAL_NAME
- HS_DB_NAME

- HS_DESCRIBE_CACHE_HWM
- HS_LANGUAGE
- HS_LONG_PIECE_TRANSFER_SIZE
- HS_OPEN_CURSORS
- HS_RPC_FETCH_REBLOCKING
- HS_RPC_FETCH_SIZE
- HS_TIME_ZONE
- HS_TRANSACTION_MODEL
- IFILE
- HS_FDS_CONNECT_INFO
- HS_FDS_DEFAULT_OWNER
- HS_FDS_PROC_IS_FUNC
- HS_FDS_RECOVERY_ACCOUNT
- HS_FDS_RECOVERY_PWD
- HS_FDS_RESULTSET_SUPPORT
- HS_FDS_TRACE_LEVEL
- HS_FDS_TRANSACTION_LOG
- HS_FDS_FETCH_ROWS

Oracle Database Gateway for Informix Initialization Parameters

This section lists all the initialization file parameters that can be set for the Oracle Database Gateway for Informix. They are as follows:

- HS_DB_DOMAIN
- HS_DB_INTERNAL_NAME
- HS_DB_NAME
- HS_DESCRIBE_CACHE_HWM
- HS_LANGUAGE
- HS_LONG_PIECE_TRANSFER_SIZE
- HS_OPEN_CURSORS
- HS_RPC_FETCH_REBLOCKING
- HS_RPC_FETCH_SIZE
- HS_TIME_ZONE
- HS_TRANSACTION_MODEL
- IFILE
- HS_FDS_CONNECT_INFO
- HS_FDS_DEFAULT_OWNER
- HS_FDS_RECOVERY_ACCOUNT

- HS_FDS_RECOVERY_PWD
- HS_FDS_TRACE_LEVEL
- HS_FDS_TRANSACTION_LOG
- HS_FDS_FETCH_ROWS

Oracle Database Gateway for Teradata Initialization Parameters

This section lists all the initialization file parameters that can be set for the Oracle Database Gateway for Teradata. They are as follows:

- HS_DB_DOMAIN
- HS_DB_INTERNAL_NAME
- HS_DB_NAME
- HS_DESCRIBE_CACHE_HWM
- HS_LANGUAGE
- HS_LONG_PIECE_TRANSFER_SIZE
- HS_OPEN_CURSORS
- HS_RPC_FETCH_REBLOCKING
- HS_RPC_FETCH_SIZE
- HS_TIME_ZONE
- HS_TRANSACTION_MODEL
- IFILE
- HS_FDS_CONNECT_INFO
- HS_FDS_DEFAULT_OWNER
- HS_FDS_RECOVERY_ACCOUNT
- HS_FDS_RECOVERY_PWD
- HS_FDS_TRACE_LEVEL
- HS_FDS_TRANSACTION_LOG
- HS_FDS_FETCH_ROWS

Oracle Database Gateway for SQL Server Initialization Parameters

This section lists all the initialization file parameters that can be set for the Oracle Database Gateway for Micorsoft SQL Server. They are as follows:

- HS_CALL_NAME
- HS_DB_DOMAIN
- HS_DB_INTERNAL_NAME
- HS_DB_NAME
- HS_DESCRIBE_CACHE_HWM
- HS_LANGUAGE
- HS_LONG_PIECE_TRANSFER_SIZE

- HS_OPEN_CURSORS
- HS_RPC_FETCH_REBLOCKING
- HS_RPC_FETCH_SIZE
- HS_TIME_ZONE
- HS_TRANSACTION_MODEL
- IFILE
- HS_FDS_CONNECT_INFO
- HS_FDS_DEFAULT_OWNER
- HS_FDS_PROC_IS_FUNC
- HS_FDS_RECOVERY_ACCOUNT
- HS_FDS_RECOVERY_PWD
- HS_FDS_RESULTSET_SUPPORT
- HS_FDS_TRACE_LEVEL
- HS_FDS_TRANSACTION_LOG
- HS_FDS_REPORT_REAL_AS_DOUBLE
- HS_FDS_FETCH_ROWS

Oracle Database Gateway for ODBC Initialization Parameters

This section lists all the initialization file parameters that can be set for the Oracle Database Gateway for ODBC. They are as follows:

- HS_DB_DOMAIN
- HS_DB_INTERNAL_NAME
- HS_DB_NAME
- HS_DESCRIBE_CACHE_HWM
- HS_LANGUAGE
- HS_LONG_PIECE_TRANSFER_SIZE
- HS_OPEN_CURSORS
- HS_RPC_FETCH_REBLOCKING
- HS_RPC_FETCH_SIZE
- HS_FDS_SHAREABLE_NAME
- HS_TIME_ZONE
- IFILE
- HS_FDS_CONNECT_INFO
- HS_FDS_DEFAULT_OWNER
- HS_FDS_TRACE_LEVEL
- HS_TRANSACTION_MODEL
- HS_FDS_FETCH_ROWS

Initialization Parameter Description

The following sections describe all the initialization file parameters that can be set for gateways.

HS_CALL_NAME

Property	Description
Default value	None
Range of values	Not applicable

Specifies the remote functions that can be referenced in SQL statements. The value is a list of remote functions and their owners, separated by semicolons, in the following format:

owner_name.function_name

For example:

```
owner1.A1;owner2.A2;owner3.A3
```

If an owner name is not specified for a remote function, the default owner name becomes the user name used to connect to the remote database (specified when the Heterogeneous Services database link is created or taken from user session if not specified in the DB link).

The entries for the owner names and the function names are case-sensitive.

HS_DB_DOMAIN

Property	Description
Default value	WORLD
Range of values	1 to 199 characters

Specifies a unique network sub-address for a non-Oracle system. The HS_DB_DOMAIN initialization parameter is similar to the DB_DOMAIN initialization parameter, described in the *Oracle Database Reference*. The HS_DB_DOMAIN initialization parameter is required if you use the Oracle Names server. The HS_DB_NAME and HS_DB_DOMAIN initialization parameters define the global name of the non-Oracle system.

> **Note:** The HS_DB_NAME and HS_DB_DOMAIN initialization parameters must combine to form a unique address in a cooperative server environment.

HS_DB_INTERNAL_NAME

Property	Description
Default value	01010101
Range of values	1 to 16 hexadecimal characters

Specifies a unique hexadecimal number identifying the instance to which the Heterogeneous Services agent is connected. This parameter's value is used as part of a transaction ID when global name services are activated. Specifying a nonunique number can cause problems when two-phase commit recovery actions are necessary for a transaction.

HS_DB_NAME

Property	Description
Default value	HO
Range of values	1 to 8 characters

Specifies a unique alphanumeric name for the data store given to the non-Oracle system. This name identifies the non-Oracle system within the cooperative server environment. The HS_DB_NAME and HS_DB_DOMAIN initialization parameters define the global name of the non-Oracle system.

HS_DESCRIBE_CACHE_HWM

Property	Description
Default value	100
Range of values	1 to 4000

Specifies the maximum number of entries in the describe cache used by Heterogeneous Services. This limit is known as the describe cache high water mark. The cache contains descriptions of the mapped tables that Heterogeneous Services reuses so that it does not have to re-access the non-Oracle data store.

If you are accessing many mapped tables, increase the high water mark to improve performance. Increasing the high water mark improves performance at the cost of memory usage.

HS_LANGUAGE

Property	Description
Default value	System-specific
Range of values	Any valid language name (up to 255 characters)

Provides Heterogeneous Services with character set, language, and territory information of the non-Oracle data source. The value must use the following format:

language[*_territory.character_set*]

> **Note:** The globalization support initialization parameters affect error messages, the data for the SQL Service, and parameters in distributed external procedures.

Character Sets

Ideally, the character sets of the Oracle database and the non-Oracle data source are the same. If they are not the same, Heterogeneous Services attempts to translate the character set of the non-Oracle data source to the Oracle database character set, and back again. The translation can degrade performance. In some cases, Heterogeneous Services cannot translate a character from one character set to another.

> **Note:** The specified character set must be a superset of the operating system character set on the platform where the agent is installed.

Language

The language component of the `HS_LANGUAGE` initialization parameter determines:

- Day and month names of dates
- AD, BC, PM, and AM symbols for date and time
- Default sorting mechanism

Note that Oracle does not determine the language for error messages for the generic Heterogeneous Services messages (`ORA-25000` through `ORA-28000`). These are controlled by the session settings in the Oracle database.

> **Note:** Use the `HS_NLS_DATE_LANGUAGE` initialization parameter to set the day and month names, and the AD, BC, PM, and AM symbols for dates and time independently from the language.

Territory

The territory clause specifies the conventions for day and week numbering, default date format, decimal character and group separator, and ISO and local currency symbols. Note that the level of globalization support between the Oracle database and the non-Oracle data source depends on how the gateway is implemented.

HS_LONG_PIECE_TRANSFER_SIZE

Property	Description
Default value	64 KB
Range of values	Any value up to 2 GB

Sets the size of the piece of `LONG` data being transferred. A smaller piece size means less memory requirement, but more round-trips to fetch all the data. A larger piece size means fewer round-trips, but more of a memory requirement to store the intermediate pieces internally. Thus, the initialization parameter can be used to tune a system for the best performance, with the best trade-off between round-trips and memory requirements, and network latency or response time.

HS_OPEN_CURSORS

Property	Description
Default value	50
Range of values	1 to the value of OPEN_CURSORS initialization parameter of Oracle database

Defines the maximum number of cursors that can be open on one connection to a non-Oracle system instance.

The value never exceeds the number of open cursors in the Oracle database. Therefore, setting the same value as the OPEN_CURSORS initialization parameter in the Oracle database is recommended.

HS_RPC_FETCH_REBLOCKING

Property	Description
Default value	ON
Range of values	OFF or ON

Controls whether Heterogeneous Services attempts to optimize performance of data transfer between the Oracle database and the Heterogeneous Services agent connected to the non-Oracle data store.

The following values are possible:

- OFF disables reblocking of fetched data so that data is immediately sent from agent to server.
- ON enables reblocking, which means that data fetched from the non-Oracle system is buffered in the agent and is not sent to the Oracle database until the amount of fetched data is equal or higher than the value of HS_RPC_FETCH_SIZE initialization parameter. However, any buffered data is returned immediately when a fetch indicates that no more data exists or when the non-Oracle system reports an error.

HS_RPC_FETCH_SIZE

Property	Description
Default value	50000
Range of values	1 to 10000000

Tunes internal data buffering to optimize the data transfer rate between the server and the agent process.

Increasing the value can reduce the number of network round-trips needed to transfer a given amount of data, but also tends to increase data bandwidth and to reduce latency as measured between issuing a query and completion of all fetches for the query. Nevertheless, increasing the fetch size can increase latency for the initial fetch results of a query, because the first fetch results are not transmitted until additional data is available.

HS_TIME_ZONE

Property	Description
Default value for '[+|-]hh:mm'	Derived from the NLS_TERRITORY initialization parameter
Range of values for '[+|-]hh:mm'	Any valid datetime format mask

Specifies the default local time zone displacement for the current SQL session. The format mask, [+|-]hh:mm, is specified to indicate the hours and minutes before or after UTC (Coordinated Universal Time—formerly Greenwich Mean Time). For example:

```
HS_TIME_ZONE = [+ | -] hh:mm
```

HS_TRANSACTION_MODEL

Property	Description
Default Value	COMMIT_CONFIRM
Range of Values	COMMIT_CONFIRM, READ_ONLY, SINGLE_SITE

Specifies the type of transaction model that is used when the non-Oracle database is updated by a transaction.

The following values are possible:

- COMMIT_CONFIRM provides read and write access to the non-Oracle database and allows the gateway to be part of a distributed update. To use the commit-confirm model, the following items must be created in the non-Oracle database:
  - Transaction log table. The default table name is HS_TRANSACTION_LOG. A different name can be set using the HS_FDS_TRANSACTION_LOG parameter. The transaction log table must be granted SELECT, DELETE, and INSERT privileges set to public.
  - Recovery account. The account name is assigned with the HS_FDS_RECOVERY_ACCOUNT parameter.
  - Recovery account password. The password is assigned with the HS_FDS_RECOVERY_PWD parameter.

    COMMIT_CONFIRM does not apply to Oracle Database Gateway for ODBC. The default value for Oracle Database Gateway for ODBC is SINGLE_SITE.
- READ_ONLY provides read access to the non-Oracle database.
- SINGLE_SITE provides read and write access to the non-Oracle database. However, the gateway cannot participate in distributed updates.

IFILE

Property	Description
Default value	None
Range of values	Valid parameter file names

Use the IFILE initialization parameter to embed another initialization file within the current initialization file. The value should be an absolute path and should not contain environment variables. The three levels of nesting limit does not apply.

See Also: *Oracle Database Reference*

HS_FDS_CONNECT_INFO

Property	Description
Default Value	None
Range of Values	Not applicable

HS_FDS_CONNECT_INFO which describes the connection to the non-Oracle system.

The default initialization parameter file already has an entry for this parameter. The syntax for HS_FDS_CONNECT_INFO for the gateways are as follows:

For Oracle Database Gateway for Sybase:

HS_FDS_CONNECT_INFO=*host_name*:*port_number*/*database_name*

where, *host_name* is the host name or IP address of the machine hosting the Sybase database, *port_number* is the port number of the Sybase database server, and *database_name* is the Sybase database name.

For Oracle Database Gateway for Informix:

HS_FDS_CONNECT_INFO=*host_name*:*port_number*/*server_name*/*database_name*

where, *host_name* is the host name or IP address of the machine hosting the Informix database, *port_number* is the port number of the Informix database server, *server_name* is the name of the server machine for the Informix data, and *database_name* is the Informix database name.

For Oracle Database Gateway for Teradata:

HS_FDS_CONNECT_INFO=*host_alias*:*port_number*[/*database_name*]

where, *host_alias* is the host alias name or IP address of the machine hosting the Teradata database, *port_number* is the port number of the Teradata database server, and *database_name* is the Teradata database name. The *database_name* variable is optional.

For Oracle Database Gateway for Microsoft SQL Server:

HS_FDS_CONNECT_INFO=*host_name*[[:*port_number*]|/[*instance_name*]][/*database_name*]

where, *host_name* is the host name or IP address of the machine hosting the Microsoft SQL Server database, *port_number* is the port number of the Microsoft SQL Server database server, *instance_name* is the instance of SQL Server running on the machine, and *database_name* is the Microsoft SQL Server database name. Either of the variables *port_number* or *instance_name* can be used, but not both together. Optionally, they both can be omitted. The variable *database_name* is always optional. The slash (/) is required when a particular value is omitted. For example, all of the following entries are valid:

HS_FDS_CONNECT_INFO=*host_name*/*instance_name*/*database_name*
HS_FDS_CONNECT_INFO=*host_name*//*database_name*

```
HS_FDS_CONNECT_INFO=host_name:port_name//database_name
HS_FDS_CONNECT_INFO=host_name/instance_name
HS_FDS_CONNECT_INFO=host_name
```

For Oracle Database Gateway for ODBC:

```
HS_FDS_CONNECT_INFO=dsn_value
```

where *dsn_value* is the data source name configured in the `odbc.ini` file.

HS_FDS_DEFAULT_OWNER

Property	Description
Default Value	None
Range of Values	Not applicable

The name of the table owner that is used for the non-Oracle database tables if an owner is not specified in the SQL statements.

> **Note:** If this parameter is not specified and the owner is not explicitly specified in the SQL statement, then the user name of the Oracle user or the user name specified when creating the database link is used.

HS_FDS_PROC_IS_FUNC

Property	Description
Default Value	`FALSE`
Range of Values	`TRUE`, `FALSE`

Enables return values from functions. By default, all stored procedures and functions do not return a return value to the user.

> **Note:** If you set this initialization parameter, you must change the syntax of the procedure execute statement for all existing stored procedures to handle return values.

HS_FDS_RECOVERY_ACCOUNT

Property	Description
Default Value	RECOVER
Range of values	Any valid user ID

Specifies the name of the recovery account used for the commit-confirm transaction model. An account with user name and password must be set up at the non-Oracle system. For more information about the commit-confirm model, see the `HS_TRANSACTION_MODEL` parameter.

The name of the recovery account is case-sensitive.

HS_FDS_RECOVERY_PWD

Property	Description
Default Value	RECOVER
Range of values	Any valid password

Specifies the password of the recovery account used for the commit-confirm transaction model set up at the non-Oracle system. For more information about the commit-confirm model, see the HS_TRANSACTION_MODEL parameter.

The name of the password of the recovery account is case-sensitive.

HS_FDS_RESULTSET_SUPPORT

Property	Description
Default Value	FALSE
Range of Values	TRUE, FALSE

Enables result sets to be returned from stored procedures. By default, all stored procedures do not return a result set to the user.

Note: If you set this initialization parameter, you must do the following:

- Change the syntax of the procedure execute statement for all existing stored procedures, to handle result sets
- Work in the sequential mode of Heterogeneous Services

HS_FDS_TRACE_LEVEL

Property	Description
Default Value	OFF
Range of values	OFF, ON, DEBUG

Specifies whether error tracing is turned on or off for gateway connectivity.

The following values are valid:

- OFF disables the tracing of error messages.
- ON enables the tracing of error messages that occur when you encounter problems. The results are written by default to a gateway log file in LOG directory where the gateway is installed.
- DEBUG enables the tracing of detailed error messages that can be used for debugging.

HS_FDS_TRANSACTION_LOG

Property	Description
Default Value	HS_TRANSACTION_LOG
Range of Values	Any valid table name

Specifies the name of the table created in the non-Oracle system for logging transactions. For more information about the transaction model, see the HS_TRANSACTION_MODEL parameter.

HS_FDS_SHAREABLE_NAME

Property	Description
Default Value	None
Range of Values	Not applicable

Specifies the full path name to the ODBC driver manager.

This is a required parameter, whose format is:

HS_FDS_SHAREABLE_NAME=*odbc_installation_path*/lib/libodbc.sl

Where:

odbc_installation_path is the path where the ODBC driver is installed.

HS_FDS_REPORT_REAL_AS_DOUBLE

Property	Description
Default Value	FALSE
Range of Values	TRUE, FALSE

Enables Oracle Database Gateway for Microsoft SQL Server to treat SINGLE FLOAT PRECISION fields as DOUBLE FLOAT PRECISION fields.

HS_FDS_FETCH_ROWS

Property	Description
Default Value	100
Range of Values	Any integer between 1 and 1000
Syntax	HS_FDS_FETCH_ROWS=*num*

HS_FDS_FETCH_ROWS specifies the fetch array size. This is the number of rows to be fetched from the non-Oracle database and to return to Oracle database at one time. This parameter will be affected by the HS_RPC_FETCH_SIZE and HS_RPC_FETCH_REBLOCKING parameters.

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