

Oracle® Real Application Clusters Guard

Administration and Reference Guide

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Oracle Real Application Clusters Guard Administration and Reference Guide, Release 9.0.1
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Preface

This guide describes the administration of Oracle Real Application Clusters Guard. It describes the configuration parameters, how to set up customized features, how to use the command line interface, how to set up the network configuration, and how to troubleshoot Oracle Real Application Clusters Guard.

This preface contains these topics:

- [Audience](#)
- [Organization](#)
- [Related Documentation](#)
- [Conventions](#)
- [Documentation Accessibility](#)

Audience

This document is intended for database administrators and system administrators who need to administer an Oracle Real Application Clusters Guard environment. They are assumed to have a thorough understanding of the concepts of Oracle Real Application Clusters Guard, the administration of the Oracle server and Oracle9i Real Application Clusters, and their platform-specific cluster technology.

Organization

This document contains:

Chapter 1, "Oracle Real Application Clusters Guard Configuration Parameters"

This chapter describes the configuration parameters for Oracle Real Application Clusters Guard and discusses their values. It also explains how to change their values.

Chapter 2, "Using Oracle Real Application Cluster Guard Commands"

This chapter explains how to use the command line interface of Oracle Real Application Clusters Guard.

Chapter 3, "Customizing Oracle Real Application Clusters Guard"

This chapter describes how to customize the call-home feature, the custom query, role change notification, and Oracle Enterprise Manager for Oracle Real Application Clusters Guard. It also explains how to use the `DBMS_LIBCACHE` package to warm the cache on the secondary instance.

Chapter 4, "Administering Oracle Real Application Clusters Guard"

This chapter describes how to administer planned outages, recover from unplanned outages, and administer application failover, backups, and configuration changes.

Chapter 5, "Configuring the Network for Oracle Real Application Clusters Guard"

This chapter explains how to set up the network configuration.

Chapter 6, "Troubleshooting Oracle Real Application Clusters Guard"

This chapter describes message output and explains how to interpret the log files. It contains troubleshooting strategies for start-up problems, command line problems, monitor problems, and problems that originate outside of Oracle Real Application Clusters Guard.

Appendix A, "Oracle Real Application Clusters Guard Error Messages"

This appendix contains the Oracle Real Application Clusters Guard error messages.

Related Documentation

For more information, see these Oracle resources:

- *Oracle9i Real Application Clusters Concepts*
- *Oracle9i Real Application Clusters Installation and Configuration*
- *Oracle9i Database Administrator's Guide*
- *Oracle9i Backup and Recovery Concepts*
- *Oracle Net Services Administrator's Guide*
- Your platform-specific Oracle Real Application Clusters Guard installation guide

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Conventions

This section describes the conventions used in the text and code examples of the Oracle9i documentation set. It describes:

- [Conventions in Text](#)
- [Conventions in Code Examples](#)

Conventions in Text

We use various conventions in text to help you more quickly identify special terms. The following table describes those conventions and provides examples of their use.

Convention	Meaning	Example
Bold	Bold typeface indicates terms that are defined in the text or terms that appear in a glossary, or both.	The C datatypes such as ub4 , sword , or OCINumber are valid. When you specify this clause, you create an index-organized table .
<i>Italics</i>	Italic typeface indicates book titles, syntax clauses, or placeholders.	<i>Oracle9i Database Concepts</i> You can specify the <i>parallel_clause</i> . Run <i>Uold_release</i> .SQL where <i>old_release</i> refers to the release you installed prior to upgrading.
UPPERCASE monospace (fixed-width font)	Uppercase monospace typeface indicates elements supplied by the system. Such elements include executables, parameters, privileges, datatypes, RMAN keywords, SQL keywords, SQL*Plus or utility commands, packages and methods, as well as system-supplied column names, database objects and structures, user names, and roles.	You can specify this clause only for a NUMBER column. You can back up the database using the BACKUP command. These are grouped by the DEPTNO column. Specify the ROLLBACK_SEGMENTS parameter. Use the DBMS_STATS.GENERATE_STATS procedure.
lowercase monospace (fixed-width font)	Lowercase monospace typeface indicates sample user-supplied elements. Such elements include computer and database names, net service names, and connect identifiers, as well as user-supplied database objects and structures, column names, packages and classes, user names and roles, program units, and parameter values.	The deptno, dname, and loc columns are in the scott.dept table. Set the QUERY_REWRITE_ENABLED initialization parameter to true. Connect to the sales@sf.acme.com database. Connect as oe user.

Conventions in Code Examples

Code examples illustrate RMAN, SQL, PL/SQL, SQL*Plus, or other command-line statements. They are displayed in a fixed-width font and separated from normal text as shown in this example:

```
BACKUP DATABASE;
```

The following table describes typographic conventions used in code examples and provides examples of their use.

Convention	Meaning	Example
[]	Brackets enclose one or more optional items. Do not enter the brackets.	DECIMAL (digits [, precision])
{ }	Braces enclose two or more items, one of which is required. Do not enter the braces.	{ENABLE DISABLE}
	A vertical bar represents a choice of two or more options within brackets or braces. Enter one of the options. Do not enter the vertical bar.	{ENABLE DISABLE} [COMPRESS NOCOMPRESS]
...	Horizontal ellipsis points indicate either: <ul style="list-style-type: none"> ■ That we have omitted parts of the code that are not directly related to the example ■ That you can repeat a portion of the code 	CREATE TABLE ... AS subquery; SELECT col1, col2, ... , coln FROM emp;
.	Vertical ellipsis points indicate that we have omitted several lines of code not directly related to the example.	
Other punctuation	You must enter punctuation other than brackets, braces, vertical bars, and ellipsis points as it is shown.	
<i>Italics</i>	Italicized text indicates variables for which you must supply particular values.	STARTUP PFILE=init <i>sid</i> .ora In this example, the entire string <i>init</i> <i>sid</i> .ora is a placeholder for a parameter file that must contain your particular instance ID or SID.
UPPERCASE	Uppercase typeface indicates elements supplied by the system. We show these terms in uppercase in order to distinguish them from terms you define. Unless terms appear in brackets, enter them in the order and with the spelling shown. However, because these terms are not case sensitive, you can enter them in lowercase.	SELECT <i>ename</i> , <i>empno</i> FROM emp; SQLPLUS <i>username</i> / <i>password</i> INTO <i>TABLENAME</i> 'table'

Convention	Meaning	Example
lowercase	Lowercase typeface indicates programmatic elements that you supply. For example, lowercase indicates names of tables, columns, or files.	<pre>SELECT ename, empno FROM emp; SQLPLUS scott/tiger</pre>

Documentation Accessibility

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JAWS, a Windows screen reader, may not always correctly read the code examples in this document. The conventions for writing code require that closing braces should appear on an otherwise empty line; however, JAWS may not always read a line of text that consists solely of a bracket or brace.

Oracle Real Application Clusters Guard Configuration Parameters

This chapter describes the Oracle Real Application Clusters Guard configuration parameters. It contains the following sections:

- [Overview of the Oracle Real Application Clusters Guard Configuration File](#)
- [Oracle Real Application Clusters Guard Configuration Parameters](#)
- [Changing Oracle Real Application Clusters Guard Configuration Parameters](#)

Overview of the Oracle Real Application Clusters Guard Configuration File

Oracle Real Application Clusters Guard provides a set of templates that allow Oracle Real Application Clusters Guard to be easily configured. The templates contain tested configurations for such settings as Oracle Net Service parameters and initialization parameters. The Oracle Real Application Clusters Guard Setup Utility (PFSSSETUP) generates and deploys the files that are required by Oracle Real Application Clusters Guard. The files are automatically generated with the correct values, derived from the customized configuration file (`$ORACLE_SERVICE.conf`).

The Oracle Real Application Clusters Guard configuration file template is located in:

```
$ORACLE_HOME/pfs/setup/conf/savusetup.dat
```

The information in this file corresponds to a single Oracle9i Real Application Clusters database. If multiple databases are part of your Oracle Real Application Clusters Guard configuration, then a separate configuration file must be created for each database.

Copy the configuration file template:

```
$ cd $ORACLE_HOME/pfs/setup/conf
$ cp savusetup.dat $ORACLE_SERVICE.conf
```

Use a text editor to modify the new configuration file.

See Also: Your platform-specific Oracle Real Application Clusters Guard installation guide for more information about using the configuration file

The configuration parameters are grouped by the method that must be employed to modify the parameters. You may want to change the relocatable IP address, for example, if it conflicts with another IP address in the network, or you may want to turn on debugging to do some troubleshooting. Depending on the parameter that needs to be changed, there are different methods that you must employ to make the changes.

The methods of changing Oracle Real Application Clusters Guard parameters are summarized in [Table 1-1](#).

Table 1–1 How to Modify the Oracle Real Application Clusters Guard Configuration Parameter File

Type of Configuration Parameter	PFSSETUP	Operating System	Oracle
Permanent Cluster and Database Parameters	Generate and deploy all the files (option 6).	Recreate the existing packs by using the <code>DELETEPACKS</code> and <code>CREATEPACKS</code> scripts.	Shut down the database.
Operating System Specific Configuration Parameters	Generate and deploy the user definitions file (option 1).	Recreate the existing packs by using the <code>DELETEPACKS</code> and <code>CREATEPACKS</code> scripts.	Shut down the database.
Database and Oracle Real Application Clusters Guard Configuration Parameters	Generate and deploy all the files (option 6).	Halt the packs.	Run the <code>catpfs.sql</code> script.
Oracle Real Application Clusters Guard Configuration Parameters	Generate and deploy the user definitions file (option 1).	Halt the packs.	Shut down the database.
Network Configuration Parameters	Generate and deploy the user definitions file (option 1) and the Oracle network files (option 3).	Halt the packs.	Shut down the database and the listeners.
Database Configuration Parameters	Generate and deploy the Oracle instance files (option 4).	Halt the packs.	Shut down the database and the listeners.

See Also: ["Changing Oracle Real Application Clusters Guard Configuration Parameters"](#) on page 1-13 for detailed steps for changing each type of configuration parameter

Oracle Real Application Clusters Guard Configuration Parameters

The Oracle Real Application Clusters Guard configuration parameters are described in the following sections:

- [Permanent Cluster and Database Parameters](#)
- [Operating System Specific Configuration Parameters](#)
- [Database and Oracle Real Application Clusters Guard Configuration Parameters](#)

- [Oracle Real Application Clusters Guard Configuration Parameters](#)
- [Network Configuration Parameters](#)
- [Database Configuration Parameters](#)

Permanent Cluster and Database Parameters

Table 1–2 contains the permanent cluster and database parameters.

Table 1–2 Permanent Cluster and Database Configuration Parameters

Parameter Name	Value	Description
PLATFORM	Example: HP, SUN Default: None	Specifies the hardware cluster platform
PFS_CLUSTER_NAME	Range of values: A valid cluster name that does not include a dash (-) Default: None	Specifies the cluster name. It should be unique among the clusters that run on the same network.
PFS_HOSTA	Range of values: A valid host name that does not include a dash (-) Default: None	Specifies a host that is part of the Oracle Real Application Clusters Guard cluster
PFS_HOSTB	Range of values: A valid host name that does not include a dash (-) Default: None	Specifies a host that is part of the Oracle Real Application Clusters Guard cluster
ORACLE_BASE	Range of values: Any valid directory Default: None Recommended OFA value: <i>software_mount_point/app/oracle</i> Example: /u01/app/oracle	Specifies the directory at the top of the Oracle software and administrative file structure. It must be identical for all nodes of a cluster that access the database.
ORACLE_HOME	Range of values: Any valid directory Default: None Recommended OFA value: <i>\$ORACLE_BASE/product/release</i> Example: /u01/app/oracle/product/9.0.1	Specifies the directory containing the Oracle software for a specific Oracle Server release. It must be identical for all nodes of a cluster that access the database.

Table 1–2 Permanent Cluster and Database Configuration Parameters (Cont.)

Parameter Name	Value	Description
DB_NAME	Range of values: Valid database name Default: None Example: PRO	Specifies the value of the DB_NAME initialization parameter entered during installation or database creation. Multiple instances must have the same value for DB_NAME.
PFS_IP_PACK_HOSTA		Specifies an IP address that you want to add to a LAN interface card. The IP address will move with the pack if the pack is moved to another node.
PFS_IP_PACK_HOSTB		Specifies an IP address that you want to add to a LAN interface card. The IP address will move with the pack if the pack is moved to another node.
PFS_IP_SUBNET_HOSTA		Specifies the subnet for the IP address that is added to a LAN interface card. The IP address will move with the pack if the pack is moved to another node.
PFS_IP_SUBNET_HOSTB		Specifies the subnet for the IP address that is added to a LAN interface card. The IP address will move with the pack if the pack is moved to another node.

Operating System Specific Configuration Parameters

This section contains parameters that are specific to the Sun and HP platforms.

[Table 1–3](#) contains parameters that are specific to the Sun platform.

Table 1–3 Sun-Specific Configuration Parameters

Parameter Name	Value	Description
PFS_NET_IF_A		Specifies a network controller interface. The hme0 interfaces are typically used for the primary public network. The value varies depending on the public network configuration.
PFS_NET_IF_B		Specifies a network controller interface. The hme0 interfaces are typically used for the primary public network. The value varies depending on the public network configuration.

Table 1–3 Sun-Specific Configuration Parameters (Cont.)

Parameter Name	Value	Description
START_NET_TIMEOUT	Default: 180	Specifies the maximum time in seconds for Sun Cluster to start the pack
STOP_NET_TIMEOUT	Default: 180	Specifies the maximum time in seconds for Sun Cluster to stop the pack

Table 1–4 contains parameters that are specific to the HP platform.

Table 1–4 HP-Specific Configuration Parameters

Parameter Name	Value	Description
PFS_VG_HOSTA	Example: "emc1 emc2 emc3 "	Specifies the disk/volume groups used by the database. The value must be enclosed in double quotes.
PFS_VG_HOSTB	Example: "emc1 emc2 emc3 "	Specifies the disk/volume groups used by the database. The value must be enclosed in double quotes.

Database and Oracle Real Application Clusters Guard Configuration Parameters

Table 1–5 contains database and Oracle Real Application Clusters Guard parameters.

Table 1–5 Database and Oracle Real Application Clusters Guard Configuration Parameters

Parameter Name	Value	Description
ORACLE_SERVICE		Specifies the name of the service. Must be unique in the cluster. Oracle Corporation recommends restricting the name to 4 characters to avoid filename problems on heterogeneous systems.
ORACLE_USER	Range of values: Any valid operating system (OS) user that is part of the OS DBA group	Specifies the name of the operating system <code>oracle</code> user. This is the user that owns the Oracle Real Application Clusters Guard software.

Table 1–5 Database and Oracle Real Application Clusters Guard Configuration Parameters (Cont.)

Parameter Name	Value	Description
ORACLE_SID_HOSTA	Range of values: Any valid ORACLE_SID string Default: None Example: PRO1	<p>Specifies the Oracle System Identifier (SID), which is the same as the Oracle server instance. Because the SID is incorporated into many filenames, Oracle Corporation recommends restricting it to no more than 4 characters to avoid filename problems on heterogeneous systems.</p> <p>The SID for each instance in an Oracle9i Real Application Clusters cluster should be unique and should incorporate the name of the database it manipulates.</p>
ORACLE_SID_HOSTB	Range of values: Any valid ORACLE_SID string Default: None Example: PRO2	<p>Specifies the Oracle System Identifier (SID), which is the same as the Oracle server instance. Because the SID is incorporated into many filenames, Oracle Corporation recommends restricting it to no more than 4 characters to avoid filename problems on heterogeneous systems.</p> <p>The SID for each instance in an Oracle9i Real Application Clusters cluster should be unique and should incorporate the name of the database it manipulates.</p>
INSTANCE_NAME_HOSTA	Default: None Example: PRO1	<p>Specifies the name of the instance and is used to uniquely identify a specific instance when multiple instances share common service names. The instance name can be the same as the SID. It is indicated by the <code>INSTANCE_NAME</code> parameter in the initialization parameter file. The <code>INSTANCE_NAME</code> for each instance in an Oracle9i Real Application Clusters cluster must be unique.</p>
INSTANCE_NAME_HOSTB	Default: None Example: PRO2	<p>Specifies the name of the instance and is used to uniquely identify a specific instance when multiple instances share common service names. The instance name can be the same as the SID. It is indicated by the <code>INSTANCE_NAME</code> parameter in the initialization parameter file. The <code>INSTANCE_NAME</code> for each instance in an Oracle9i Real Application Clusters cluster must be unique.</p>

Table 1–5 Database and Oracle Real Application Clusters Guard Configuration Parameters (Cont.)

Parameter Name	Value	Description
SERVICE_NAMES	Range of values: Any ASCII string Example: PRO.oracle.com, where PRO is the database name and oracle.com is the database domain	Specifies the name of the database service on the network. By default, Oracle Universal Installer and Oracle Database Configuration Assistant create a service name that includes the entire global database name, a name comprised of the database name (DB_NAME) and the domain name (DB_DOMAIN), entered during installation or database creation. It is possible to provide multiple service names (by individual SERVICE_NAMES entries) so that different uses of an instance can be identified separately.
IS_MTS	Range of values: \$PFS_TRUE (1), \$PFS_FALSE (0) Default: \$PFS_FALSE	Specify \$PFS_TRUE if you are running a shared server process
TNS_ADMIN	Range of values: Any valid directory Default: \$ORACLE_HOME/network/admin	Specifies the directory containing the Oracle Net configuration files. It must be identical for all nodes of a cluster that access the database.

Oracle Real Application Clusters Guard Configuration Parameters

Table 1–6 contains Oracle Real Application Clusters Guard configuration parameters.

Table 1–6 Oracle Real Application Clusters Guard Configuration Parameters

Parameter Name	Value	Description
PFILE_HOSTA	<p>Range of values: Any valid initialization parameter file that references control files</p> <p>Default setting for OFA configuration: \$ORACLE_BASE /admin/\$DB_NAME /pfile /init\$ORACLE_SID_HOSTA.ora</p> <p>Default setting for non-OFA configuration: \$ORACLE_HOME /dbs/init\$ORACLE_SID_HOSTA.ora</p>	Specifies the initialization parameter file that is used when Oracle Real Application Clusters Guard starts the instance
PFILE_HOSTB	<p>Range of values: Any valid initialization parameter file that references control files</p> <p>Default setting for OFA configuration: \$ORACLE_BASE /admin/\$DB_NAME /pfile /init\$ORACLE_SID_HOSTB.ora</p> <p>Default setting for non-OFA configuration: \$ORACLE_HOME /dbs/init\$ORACLE_SID_HOSTB.ora</p>	Specifies the initialization parameter file that is used when Oracle Real Application Clusters Guard starts the instance
PFS_PREFERRED_PRIMARY	<p>Range of values: \$PFS_HOSTA, \$PFS_HOSTB</p> <p>Default: \$PFS_HOSTA</p>	Specifies the preferred primary node of the cluster
PFS_PREFERRED_SECONDARY	<p>Range of values: \$PFS_HOSTA, \$PFS_HOSTB</p> <p>Default: \$PFS_HOSTB</p>	Specifies the preferred secondary node of the cluster

Table 1–6 Oracle Real Application Clusters Guard Configuration Parameters (Cont.)

Parameter Name	Value	Description
PFS_LANGUAGE	Range of values: Any valid language name Default: AMERICAN	The NLS_LANG environment variable has three components: language, territory, and character set. The format of the NLS_LANG environment variable is LANGUAGE_TERRITORY.CHARSET.
PFS_TERRITORY	Range of values: Any valid territory name Default: AMERICA	PFS_LANGUAGE specifies language conventions for Oracle messages, day names, and month names. Each supported language has a unique name such as AMERICAN or JAPANESE.
CHARSET	Range of values: Any valid character set Default: US7ASCII	PFS_TERRITORY specifies conventions such as calendar, date, monetary, and numeric formats. Each supported territory has a unique name such as AMERICA or JAPAN. CHARSET specifies the character set used by the client application. Each supported character set has a unique acronym such as US7ASCII or UTF8. See Also: <i>Oracle9i Globalization Support Guide</i>
PFS_KEEP_PRIMARY	Range of values: \$PFS_TRUE (1), \$PFS_FALSE (0) Default: \$PFS_TRUE	Specifies whether to leave the primary pack up when the secondary pack does not come up during PFSBOOT. See Also: "Changing the PFS_KEEP_PRIMARY Parameter" on page 4-12
PFS_DEBUGGING	Range of values: \$PFS_TRUE (1), \$PFS_FALSE (0) Default: \$PFS_FALSE	Specifies whether to enable or disable Oracle Real Application Clusters Guard debugging
LISTENER_CHECK_INTERVAL	Range: At least 0 Default: 5	Specifies in seconds the frequency with which the listener monitor checks the public listener
PRIV_LSNR_CHECK_INTERVAL	Range: At least 0 Default: 60	Specifies in seconds the frequency with which the listener monitor checks the private listener
MAX_LSNR_RESTART	Range of values: At least 0 Default: 3	Specifies the maximum number of times the listener can be restarted

Table 1–6 Oracle Real Application Clusters Guard Configuration Parameters (Cont.)

Parameter Name	Value	Description
MIN_LSNR_RESTART_INTERVAL	Range of values: At least 0 Default: 300	Specifies in seconds the time period in which Oracle Real Application Clusters Guard can try to restart the listener. If Oracle Real Application Clusters Guard tries to restart the listener more than MAX_LSNR_RESTART times within MIN_LSNR_RESTART_INTERVAL, then Oracle Real Application Clusters Guard exits the listener monitor.
DUMPLSNR_TIMEOUT	Range of values: At least 0 Default: 60	Specifies in seconds how long to wait for the <code>NETSTAT -rn</code> command to complete
ORACLE_ARCH_TIMEOUT	Range of values: At least 0 Default: 60	Specifies in seconds how long to wait for <code>ALTER DATABASE ARCHIVE LOG ALL</code> statement to complete
ORACLE_CKPT_TIMEOUT	Range of values: At least 0 Default: 60	Specifies in seconds how long to wait for <code>ALTER SYSTEM CHECKPOINT GLOBAL</code> statement to complete
PFS_DUMP_LEVEL	Range of values: 0 to 10 Default: 10	Specifies the dump level associated with Oracle system state dumps
ORACLE_DUMP_TIMEOUT	Range of values: At least 0 Default: 60	Specifies in seconds how long to wait for Oracle <code>SYSTEMSTATE</code> and Oracle9i Real Application Clusters lock tree dump to complete

Network Configuration Parameters

Table 1–7 contains network configuration parameters.

Table 1–7 Network Configuration Parameters

Parameter Names	Value	Description
PFS_IP_HOSTA		Specifies the static IP address on PFS_HOSTA
PFS_IP_HOSTB		Specifies the static IP address on PFS_HOSTB
PFS_PORT_DED_HOSTA	Range of values: 1025 to 65535	Specifies the port setting for a dedicated configuration on PFS_HOSTA. Many operating systems reserve port numbers below 1024 for use by privileged processes.

Table 1–7 Network Configuration Parameters

Parameter Names	Value	Description
PFS_PORT_DED_HOSTB	Range of values: 1025 to 65535	Specifies the port setting for a dedicated configuration on PFS_HOSTB. Many operating systems reserve port numbers below 1024 for use by privileged processes.
PFS_PORT_MTS_HOSTA	Range of values: 1025 to 65535	Specifies the port setting for a shared server configuration on PFS_HOSTA. Many operating systems reserve port numbers below 1024 for use by privileged processes.
PFS_PORT_MTS_HOSTB	Range of values: 1025 to 65535	Specifies the port setting for a shared server configuration on PFS_HOSTB. Many operating systems reserve port numbers below 1024 for use by privileged processes.

Database Configuration Parameters

Table 1–8 contains database configuration parameters.

Table 1–8 Database Configuration Parameters

Parameter Name	Value	Description
DB_DOMAIN	Range of values: Any legal string of name components, separated by periods, and up to 128 characters long. This value cannot be null. Default: WORLD Example: oracle.com	Specifies the database domain in which the database is located, entered during installation or database creation. When possible, Oracle Corporation recommends that the database domain mirror the network domain.
INSTANCE_NUMBER_HOSTA	Example: 1	Specifies a unique number that maps the instance to one free list group for each database object created with the FREELIST_GROUPS storage parameter. Oracle Corporation recommends setting INSTANCE_NUMBER_HOSTn to the same value as the THREAD_HOSTn parameter.

Table 1–8 Database Configuration Parameters (Cont.)

Parameter Name	Value	Description
INSTANCE_NUMBER HOSTB	Example: 2	Specifies a unique number that maps the instance to one free list group for each database object created with the FREELIST_GROUPS storage parameter. Oracle Corporation recommends setting INSTANCE_NUMBER_HOST n to the same value as the THREAD_HOST n parameter.
THREAD_HOSTA	Range of values: 0 to maximum number of enabled threads Example: 1	Specifies the number of the redo thread to be used by the instance. Any available redo thread number can be used, but an instance cannot use the same thread number as another instance. Also, an instance cannot start when its redo thread is disabled. A value of 0 causes an available, enabled public thread to be chosen. An instance cannot mount a database if the thread is used by another instance or if the thread is disabled. Multiple instance must have different values for THREAD_HOSTA and THREAD_HOSTB.
THREAD_HOSTB	Range of values: 0 to maximum number of enabled threads Example: 2	Specifies the number of the redo thread to be used by the instance. Any available redo thread number can be used, but an instance cannot use the same thread number as another instance. Also, an instance cannot start when its redo thread is disabled. A value of 0 causes an available, enabled public thread to be chosen. An instance cannot mount a database if the thread is used by another instance or if the thread is disabled. Multiple instance must have different values for THREAD_HOSTA and THREAD_HOSTB.

Changing Oracle Real Application Clusters Guard Configuration Parameters

Use different methods to change Oracle Real Application Clusters Guard configuration parameters. This section contains the following topics:

- [Changing Permanent Cluster and Database Parameters](#)
- [Changing Operating System Specific Configuration Parameters](#)

- [Changing Database and Oracle Real Application Clusters Guard Configuration Parameters](#)
- [Changing Oracle Real Application Clusters Guard Configuration Parameters](#)
- [Changing Network Configuration Parameters](#)
- [Changing Database Configuration Parameters](#)

The procedures that are described in these sections use the `PFSCCTL` command line.

See Also: [Chapter 2, "Using Oracle Real Application Cluster Guard Commands"](#)

Changing Permanent Cluster and Database Parameters

To modify the parameters in [Table 1-2](#), you must:

1. Generate and deploy all the files.
2. Re-create the packs.

You may want to change these parameters in the following situations:

- You want to change one of the permanent cluster settings that was originally specified when the packs were created.
- You want to change one of the permanent database settings that was originally specified during Oracle installation or with a `CREATE DATABASE` statement.

For example, you might need to change the relocatable IP address if it conflicts with another IP address in the network. Another example is changing `$ORACLE_HOME` if the original file system where `$ORACLE_HOME` resided becomes unavailable.

The following steps and examples show how to reinstall Oracle Real Application Clusters Guard after modifying the parameters in [Table 1-2](#):

1. Modify the parameters from [Table 1-2](#) in the `$ORACLE_SERVICE.conf` file.
2. Invoke the `PFSCCTL` command line as `root`:

```
# pfscctl
```

You should see output similar to the following:

```
PFSCCTL for HOSTA: Version 9.0.1.0_0 - Production on Feb 01 2001 14:38:00
(c) Copyright 2001 , Oracle Corporation. All rights reserved.
Welcome to PFSCCTL. Type HELP for additional information.

ORACLE_SERVICE is set to SALES
```

DB_NAME is set to sales

3. Shut down the packs:

```
PFSCCTL> pfshalt
```

You should see output similar to the following:

pfshalt command succeeded.

4. Generate a new set of Oracle Real Application Clusters Guard files. Invoke PFSSETUP as \$ORACLE_USER:

```
$ pfssetup
```

You should see output similar to the following:

```
PFSSETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:32:06 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_SERVICE is set to SALES
DB_NAME is set to sales
```

```
Do you wish to continue? [Y/N]
```

5. Enter y to continue. You should see output similar to the following:

```
PFSSETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:32:54 PST 200
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

Choose the set of files from the following:

- 1] User definitions file
- 2] ORACLE Real Application Clusters Guard files
- 3] ORACLE network files
- 4] ORACLE instance files
- 5] ORACLE network and instance files
- 6] All the files
- 7] Quit

6. Choose option 6:

```
PFS_SETUP> 6
```

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:33:16 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

Selected option ALL FILES

Choose an operation on the selected files:

- 1] Generate only
- 2] Deploy only
- 3] Generate and deploy
- 4] Deinstall
- 5] List the affected files
- 6] Return to Main Menu

7. Choose option 1:

```
PFS_SETUP> 1
```

You should see output similar to the following:

The list of affected files is

```
PFS_SALES_HOSTA.RUN
PFS_SALES_HOSTB.RUN
PFS_SALES_HOSTA.HALT
PFS_SALES_HOSTB.HALT
PFS_SALES_User.def
PFS_SALES_System.def
listener.ora.ded.pfs
tnsnames.ora.ded.pfs
tnsnames.ora.ded.clnr.pfs
SALES_config1.ded.pfs
SALES_config2.ded.pfs
SALES_config.pfs
init_SALES1_HOSTA.ora
init_SALES2_HOSTB.ora
```

Do you wish to continue? [Y/N]

8. Enter y to continue. You should see output similar to the following:

```
Backing up directory on /home_oracle/901_sales/pfs/setup/output/SALES/packs
HOSTA
Backing up directory on
/home_oracle/901_sales/pfs/setup/output/SALES/include HOSTA
Generating ORACLE Real Application Clusters Guard files
Generating Packs
Backing up directory on /home_oracle/901_
sales/pfs/setup/output/SALES/network HOSTA
Generating ORACLE network files
Backing up directory on /home_oracle/901_sales/pfs/setup/output/SALES/pfile
HOSTA
Generating ORACLE instance files
```

9. Deploy the new set of Oracle Real Application Clusters Guard files. Invoke PFSSETUP as \$ORACLE_USER:

```
$ pfssetup
```

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb 1 15:32:06 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_SERVICE is set to SALES
DB_NAME is set to sales
```

```
Do you wish to continue? [Y/N]
```

10. Enter y to continue. You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb 1 15:32:54 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

```
Choose the set of files from the following:
```

- 1] User definitions file
- 2] ORACLE Real Application Clusters Guard files
- 3] ORACLE network files
- 4] ORACLE instance files
- 5] ORACLE network and instance files
- 6] All the files
- 7] Quit

```
PFS_SETUP>
```

11. Choose option 6:

```
PFS_SETUP> 6
```

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:33:16 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

Selected option ALL_FILES

Choose an operation on the selected files:

- 1] Generate only
- 2] Deploy only
- 3] Generate and deploy
- 4] Deinstall
- 5] List the affected files
- 6] Return to Main Menu

12. Choose option 2:

```
PFS_SETUP> 2
```

13. Delete the existing packs as root:

```
# deletepacks
```

14. Create the new packs as root:

```
# createpacks
```

15. Start the packs, using PFSCTL as root.

```
# pfsctl
```

You should see output similar to the following:

```
PFSCTL for HOSTA: Version 9.0.1.0_0 - Production on Feb 01 2001 14:38:00
(c) Copyright 2001 , Oracle Corporation. All rights reserved.
Welcome to PFSCTL. Type HELP for additional information.
```



```
ORACLE_SERVICE is set to SALES
DB_NAME is set to sales
```

```
PFSCtl>
```

16. Enter the PFSBOOT command:

```
PFSCtl> pfsboot
```

You should see output similar to the following:

```
pfsboot command succeeded.
```

Changing Operating System Specific Configuration Parameters

To modify the parameters in [Table 1-3](#) and [Table 1-4](#), you must:

1. Generate and deploy the user definitions file.
2. Re-create the packs.

This is necessary in the following situations:

- You want to change one of the cluster settings that was specified during Oracle Real Application Clusters Guard installation.
- You want to change one of the permanent database settings that was specified during Oracle installation or with a `CREATE DATABASE` statement.

For example, you might need to change the maximum time in seconds to wait when Oracle Real Application Clusters Guard starts a relocatable IP address. Another example is needing to add more disk groups if you increase the number of datafiles in the database.

The following steps and examples show how to create a new user definitions file:

1. Modify the parameters from [Table 1-3](#) and [Table 1-4](#) in the `$ORACLE_SERVICE.conf` file.
2. Invoke PFSCtl as root.

```
$ pfsctl
```

You should see output similar to the following:

```
PFSCtl for HOSTA: Version 9.0.1.0_0 - Production on Feb 01 2001 14:38:00
(c) Copyright 2001 , Oracle Corporation. All rights reserved.
Welcome to PFSCtl. Type HELP for additional information.
```

```
ORACLE_SERVICE is set to SALES
DB_NAME is set to sales
```

3. Shut down the packs:

```
PFSCTL> pfshalt
```

You should see output similar to the following:

```
pfshalt command succeeded.
```

4. Generate a new user definitions file. Invoke PFSSETUP as \$ORACLE_USER:

```
$ pfssetup
```

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:32:06 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_SERVICE is set to SALES
DB_NAME is set to sales
```

```
Do you wish to continue? [Y/N]
```

5. Enter y to continue. You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:32:54 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

Choose the set of files from the following:

- 1] User definitions file
- 2] ORACLE Real Application Clusters Guard files
- 3] ORACLE network files
- 4] ORACLE instance files
- 5] ORACLE network and instance files
- 6] All the files
- 7] Quit

6. Choose option 1:

```
PFS_SETUP> 1
```

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:33:16 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

Selected option ORACLE_USER_FILE

Choose an operation on the selected files:

- 1] Generate only
- 2] Deploy only
- 3] Generate and deploy
- 4] Deinstall
- 5] List the affected files
- 6] Return to Main Menu

7. Choose option 1:

```
PFS_SETUP> 1
```

You should see output similar to the following:

```
The list of affected files is
PFS_SALES_User.def
```

Do you wish to continue? [Y/N]

8. Enter y to continue. You should see output similar to the following:

```
Backing up directory on /home_oracle/901_
sales/pfs/setup/output/SALES/include HOSTA
```

9. Deploy a new user definitions file. Invoke PFSSETUP as \$ORACLE_USER:

```
$ pfssetup
```

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:33:16 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

Selected option ORACLE_USER_FILE

Choose an operation on the selected files:

- 1] Generate only
- 2] Deploy only
- 3] Generate and deploy
- 4] Deinstall
- 5] List the affected files
- 6] Return to Main Menu

10. Choose option 2:

```
PFS_SETUP> 2
```

You should see output similar to the following:

```
The list of affected files is
PFS_SALES_User.def
```

```
Do you wish to continue? [Y/N]
```

11. Enter y to continue. You should see output similar to the following:

```
Deploying user file
Backing up directory on /mnt1/oracle/admin/sales/pfs/include HOSTA
Backing up directory on /mnt1/oracle/admin/sales/pfs/include HOSTB
```

12. Delete the existing packs as root:

```
# deletepacks
```

13. Create the new packs as root:

```
# createpacks
```

14. Invoke PFSCTL as root.

```
# pfsctl
```

You should see output similar to the following:

```
PFSCTL for HOSTA: Version 9.0.1.0_0 - Production on Feb 01 2001 14:38:00
```

```
(c) Copyright 2001 , Oracle Corporation. All rights reserved.  
Welcome to PFSCCTL. Type HELP for additional information.
```

```
ORACLE_SERVICE is set to SALES  
DB_NAME is set to sales
```

15. Start the packs:

```
PFSCCTL> pfsboot
```

You should see output similar to the following:

```
pfsboot command succeeded.
```

Changing Database and Oracle Real Application Clusters Guard Configuration Parameters

To modify the parameters in [Table 1-5](#), you must:

1. Generate and deploy all the files.
2. Run `catpfs.sql` to re-create the Oracle Real Application Clusters Guard schema.

This is necessary in the following situations:

- You want to change one of the database settings that was originally specified during Oracle Real Application Clusters Guard installation.
- You want to change one of the Oracle Real Application Clusters Guard settings that was originally specified during Oracle Real Application Clusters Guard installation.

For example, you may need to change the `$ORACLE_SID` parameter, or you may want to configure Oracle Real Application Clusters Guard to support a shared server.

The following steps and examples show how to create new Oracle Real Application Clusters Guard files and Oracle Real Application Clusters Guard schema.

1. Modify the parameters from [Table 1-5](#) in the `$ORACLE_SERVICE.conf` file.
2. Invoke PFSCCTL as root:

```
# pfsctl
```

You should see output similar to the following:

```
PFSCCTL for HOSTA: Version 9.0.1.0_0 - Production on  Feb 01 2001 14:38:00
(c) Copyright 2001 , Oracle Corporation.  All rights reserved.
Welcome to PFSCCTL. Type HELP for additional information.
```

```
ORACLE_SERVICE is set to SALES
DB_NAME is set to sales
```

```
PFSCCTL>
```

3. Shut down the packs:

```
PFSCCTL> pfshalt
```

You should see output similar to the following:

```
pfshalt command succeeded.
```

4. Generate a new set of Oracle Real Application Clusters Guard files. Invoke PFSSETUP as \$ORACLE_USER:

```
$ pfssetup
```

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:32:06 PST 2001
(c) Copyright 2001 Oracle Corporation.  All rights reserved.
```

```
ORACLE_SERVICE is set to SALES
DB_NAME is set to sales
```

```
Do you wish to continue? [Y/N]
```

5. Enter y to continue. You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:32:54 PST 2001
(c) Copyright 2001 Oracle Corporation.  All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

Choose the set of files from the following:

- 1] User definitions file
- 2] ORACLE Real Application Clusters Guard files
- 3] ORACLE network files

```

4] ORACLE instance files
5] ORACLE network and instance files
6] All the files
7] Quit

```

PFS_SETUP>

6. Choose option 6:

PFS_SETUP> 6

You should see output similar to the following:

```

PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:33:16 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.

```

```

ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin

```

Selected option ALL FILES

Choose an operation on the selected files:

```

1] Generate only
2] Deploy only
3] Generate and deploy
4] Deinstall
5] List the affected files
6] Return to Main Menu

```

PFS_SETUP>

7. Choose option 1:

PFS_SETUP> 1

You should see output similar to the following:

The list of affected files is

```

PFS_SALES_HOSTA.RUN
PFS_SALES_HOSTB.RUN
PFS_SALES_HOSTA.HALT
PFS_SALES_HOSTB.HALT
PFS_SALES_User.def
PFS_SALES_System.def

```

```
listener.ora.ded.pfs
tnsnames.ora.ded.pfs
tnsnames.ora.ded.clnnt.pfs
SALES_config1.ded.pfs
SALES_config2.ded.pfs
SALES_config.pfs
init_SALES1_HOSTA.ora
init_SALES2_HOSTB.ora
```

Do you wish to continue? [Y/N]

8. Enter y to continue. You should see output similar to the following:

```
Backing up directory on /home_oracle/901_sales/pfs/setup/output/SALES/packs
HOSTA
Backing up directory on /home_oracle/901_
sales/pfs/setup/output/SALES/include HOSTA
Generating ORACLE Real Application Clusters Guard files
Generating Packs
Backing up directory on /home_oracle/901_
sales/pfs/setup/output/SALES/network HOSTA
Generating ORACLE network files
Backing up directory on /home_oracle/901_sales/pfs/setup/output/SALES/pfile
HOSTA
Generating ORACLE instance files
```

9. Deploy the new set of Oracle Real Application Clusters Guard files. Invoke PFSSETUP as \$ORACLE_USER:

```
$ pfssetup
```

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb 1 15:32:06 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_SERVICE is set to SALES
DB_NAME is set to sales
```

Do you wish to continue? [Y/N]

10. Enter y to continue. You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb 1 15:32:54 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```



```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

Choose the set of files from the following:

- 1] User definitions file
- 2] ORACLE Real Application Clusters Guard files
- 3] ORACLE network files
- 4] ORACLE instance files
- 5] ORACLE network and instance files
- 6] All the files
- 7] Quit

PFS_SETUP>

11. Choose option 6:

PFS_SETUP> 6

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb 1 15:33:16 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

Selected option ALL_FILES

Choose an operation on the selected files:

- 1] Generate only
- 2] Deploy only
- 3] Generate and deploy
- 4] Deinstall
- 5] List the affected files
- 6] Return to Main Menu

PFS_SETUP>

12. Choose option 2:

PFS_SETUP> 2

13. Open the database outside of the packs.
14. Run `catpfs.sql` to recreate the Oracle Real Application Clusters Guard schema. Enter the following commands:

```
$ sqlplus "system/manager as sysdba"
SQL> @?/pfs/admin/catpfs.sql
```

15. Shut down the database.

16. Invoke PFSCCTL as root:

```
# pfsctl
```

You should see output similar to the following:

```
PFSCCTL for HOSTA: Version 9.0.1.0_0 - Production on Feb 01 2001 14:38:00
(c) Copyright 2001 , Oracle Corporation. All rights reserved.
Welcome to PFSCCTL. Type HELP for additional information.
```

```
ORACLE_SERVICE is set to SALES
DB_NAME is set to sales
```

```
PFSCCTL>
```

17. Start the packs:

```
PFSCCTL> pfsboot
```

You should see output similar to the following:

```
pfsboot command succeeded.
```

Changing Oracle Real Application Clusters Guard Configuration Parameters

To modify the parameters in [Table 1-6](#), you must generate and deploy the user definitions file.

This is necessary if you want to change one of the Oracle Real Application Clusters Guard settings that was originally specified during Oracle Real Application Clusters Guard installation.

For example, you may need to change the location of the initialization parameter file that Oracle Real Application Clusters Guard uses to start up the instance, or you may need to turn on debugging to troubleshoot Oracle Real Application Clusters Guard.

The following steps and example show how to create a new user definitions file.

1. Modify the parameters from [Table 1-6](#) in the `$ORACLE_SERVICE.conf` file.
2. Invoke PFSCTL as root:

```
# pfsctl
```

You should see output similar to the following:

```
PFSCTL for HOSTA: Version 9.0.1.0_0 - Production on  Feb 01 2001 14:38:00
(c) Copyright 2001 , Oracle Corporation.  All rights reserved.
Welcome to PFSCTL. Type HELP for additional information.
```

```
ORACLE_SERVICE is set to SALES
DB_NAME is set to sales
```

```
PFSCTL>
```

3. Shut down the packs:

```
PFSCTL> pfshalt
```

You should see output similar to the following:

```
pfshalt command succeeded.
```

4. Generate a new user definitions file. Invoke PFSSETUP as `$ORACLE_USER`:

```
$ pfssetup
```

You should output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:32:06 PST 2001
(c) Copyright 2001 Oracle Corporation.  All rights reserved.
```

```
ORACLE_SERVICE is set to SALES
DB_NAME is set to sales
```

```
Do you wish to continue? [Y/N]
```

5. Enter `y` to continue. You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:32:54 PST 2001
(c) Copyright 2001 Oracle Corporation.  All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
```

```
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

Choose the set of files from the following:

- 1] User definitions file
- 2] ORACLE Real Application Clusters Guard files
- 3] ORACLE network files
- 4] ORACLE instance files
- 5] ORACLE network and instance files
- 6] All the files
- 7] Quit

```
PFS_SETUP>
```

6. Choose option 1:

```
PFS_SETUP> 1
```

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:33:16 PST 2001
(c) Copyright 2001 Oracle Corporation.  All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

Selected option ORACLE_USER_FILE

Choose an operation on the selected files:

- 1] Generate only
- 2] Deploy only
- 3] Generate and deploy
- 4] Deinstall
- 5] List the affected files
- 6] Return to Main Menu

```
PFS_SETUP>
```

7. Choose option 1:

```
PFS_SETUP> 1
```

You should see output similar to the following:

```
The list of affected files is
PFS_SALES_User.def
```

```
Do you wish to continue? [Y/N]
```

8. Enter y to continue. You should see output similar to the following:

```
Backing up directory on /home_oracle
/901_sales/pfs/setup/output/SALES/include HOSTA
```

9. Deploy a new user definitions file. Invoke PFSSETUP as \$ORACLE_USER :

```
$ pfssetup
```

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb 1 15:33:16 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

```
Selected option ORACLE_USER_FILE
```

```
Choose an operation on the selected files:
```

- 1] Generate only
- 2] Deploy only
- 3] Generate and deploy
- 4] Deinstall
- 5] List the affected files
- 6] Return to Main Menu

```
PFS_SETUP>
```

10. Choose option 2:

```
PFS_SETUP> 2
```

You should see output similar to the following:

```
The list of affected files is
PFS_SALES_User.def
```

```
Do you wish to continue? [Y/N]
```

11. Enter `y` to continue. You should see output similar to the following:

```
Deploying user file
Backing up directory on /mnt1/oracle/admin/sales/pfs/include HOSTA
Backing up directory on /mnt1/oracle/admin/sales/pfs/include HOSTB
```

12. Invoke `PFSCCTL` as `root`.

```
# pfsctl
```

You should see output similar to the following:

```
PFSCCTL for HOSTA: Version 9.0.1.0_0 - Production on Feb 01 2001 14:38:00
(c) Copyright 2001 , Oracle Corporation. All rights reserved.
Welcome to PFSCCTL. Type HELP for additional information.
```

```
ORACLE_SERVICE is set to SALES
DB_NAME is set to sales
```

```
PFSCCTL>
```

13. Start the packs:

```
PFSCCTL> pfsboot
```

You should see output similar to the following:

```
pfsboot command succeeded.
```

Changing Network Configuration Parameters

To modify the parameters in [Table 1-7](#), you must:

1. Generate and deploy the user definitions files.
2. Generate and deploy the Oracle network files.

This is necessary when you want to change one of the network settings that was specified during Oracle Real Application Clusters Guard installation.

For example, you may need to change the port number for the Oracle Real Application Clusters Guard listener.

The following steps and examples show how to create a new user definitions file and new Oracle network files.

1. Modify the parameters from [table Table 1-7](#) in the `$ORACLE_SERVICE.conf` file.

2. Invoke PFSCTL as root:

```
# pfsctl
```

You should see output similar to the following:

```
PFSCTL for HOSTA: Version 9.0.1.0_0 - Production on  Feb 01 2001 14:38:00
(c) Copyright 2001 , Oracle Corporation. All rights reserved.
Welcome to PFSCTL. Type HELP for additional information.
```

```
ORACLE_SERVICE is set to SALES
DB_NAME is set to sales
```

```
PFSCTL>
```

3. Shut down the packs:

```
PFSCTL> pfshalt
```

You should see output similar to the following:

```
pfshalt command succeeded.
```

4. Generate a new user definitions file and new Oracle Network files. Invoke PFSSETUP as \$ORACLE_USER:

```
$ pfssetup
```

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:32:06 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_SERVICE is set to SALES
DB_NAME is set to sales
```

```
Do you wish to continue? [Y/N]
```

5. Enter y to continue. You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:32:54 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

Choose the set of files from the following:

- 1] User definitions file
- 2] ORACLE Real Application Clusters Guard files
- 3] ORACLE network files
- 4] ORACLE instance files
- 5] ORACLE network and instance files
- 6] All the files
- 7] Quit

PFS_SETUP>

6. Choose option 1:

PFS_SETUP> 1

You should see output similar to the following:

PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb 1 15:33:16 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.

ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin

Selected option ORACLE_USER_FILE

Choose an operation on the selected files:

- 1] Generate only
- 2] Deploy only
- 3] Generate and deploy
- 4] Deinstall
- 5] List the affected files
- 6] Return to Main Menu

PFS_SETUP>

7. Choose option 1:

PFS_SETUP> 1

You should see output similar to the following:

The list of affected files is
PFS_SALES_User.def

Do you wish to continue? [Y/N]

8. Enter y to continue. You should output similar to the following:

```
Backing up directory on /home_oracle/901_  
sales/pfs/setup/output/SALES/include HOSTA
```

Press Enter to continue

9. Press the Enter key. You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb 1 15:33:16 PST 2001  
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle  
ORACLE_HOME is set to /home_oracle/901_sales  
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs  
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

Selected option ORACLE_USER_FILE

Choose an operation on the selected files:

- 1] Generate only
- 2] Deploy only
- 3] Generate and deploy
- 4] Deinstall
- 5] List the affected files
- 6] Return to Main Menu

PFS_SETUP>

10. Choose option 6:

PFS_SETUP> 6

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb 1 15:32:06 PST 2001  
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_SERVICE is set to SALES  
DB_NAME is set to sales
```

Do you wish to continue? [Y/N]

11. Enter y to continue. You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:32:54 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

```
Choose the set of files from the following:
```

- 1] User definitions file
- 2] ORACLE Real Application Clusters Guard files
- 3] ORACLE network files
- 4] ORACLE instance files
- 5] ORACLE network and instance files
- 6] All the files
- 7] Quit

```
PFS_SETUP>
```

12. Choose option 3:

```
PFS_SETUP> 3
```

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:33:16 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

```
Selected option ORACLE_NETWORK_FILE
```

```
Choose an operation on the selected files:
```

- 1] Generate only
- 2] Deploy only
- 3] Generate and deploy
- 4] Deinstall
- 5] List the affected files
- 6] Return to Main Menu

```
PFS_SETUP>
```

13. Choose option 1:

```
PFS_SETUP> 1
```

You should see output similar to the following:

The list of affected files is

```
listener.ora.ded.pfs
tnsnames.ora.ded.pfs
tnsnames.ora.ded.clnr.pfs
```

Do you wish to continue? [Y/N]

14. Enter y to continue.**15. Deploy a new user definitions file. Invoke PFSSETUP as \$ORACLE_USER.**

```
$ pfssetup
```

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:33:16 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

Selected option ORACLE_USER_FILE

Choose an operation on the selected files:

```
1] Generate only
2] Deploy only
3] Generate and deploy
4] Deinstall
5] List the affected files
6] Return to Main Menu
```

```
PFS_SETUP>
```

16. Choose option 2:

```
PFS_SETUP> 2
```

You should see output similar to the following:

```
The list of affected files is
PFS_SALES_User.def
```

```
Do you wish to continue? [Y/N]
```

17. Enter y to continue. You should see output similar to the following:

```
Deploying user file
Backing up directory on /mnt1/oracle/admin/sales/pfs/include HOSTA
Backing up directory on /mnt1/oracle/admin/sales/pfs/include HOSTB

Press Enter to continue
```

18. Press the Enter key. You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:32:54 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

```
Choose the set of files from the following:
```

- 1) User definitions file
- 2) ORACLE Real Application Clusters Guard files
- 3) ORACLE network files
- 4) ORACLE instance files
- 5) ORACLE network and instance files
- 6) All the files
- 7) Quit

```
PFS_SETUP>
```

19. Choose option 3:

```
PFS_SETUP> 3
```

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:33:16 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
```

TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin

Selected option ORACLE_NETWORK_FILE

Choose an operation on the selected files:

- 1] Generate only
- 2] Deploy only
- 3] Generate and deploy
- 4] Deinstall
- 5] List the affected files
- 6] Return to Main Menu

PFS_SETUP>

20. Choose option 2:

PFS_SETUP> 2

You should see output similar to the following:

The list of affected files is

```
listener.ora.ded.pfs
tnsnames.ora.ded.pfs
tnsnames.ora.ded.clnt.pfs
```

Do you wish to continue? [Y/N]

21. Enter y to continue.

22. On both nodes, change the network file suffixes as follows:

- From listener.ora.ded.pfs to listener.ora
- From tnsnames.ora.ded.pfs to tnsnames.ora

23. Distribute the tnsnames.ora.ded.clnt.pfs file to the client nodes.

24. Invoke PFSCTL as root:

```
# pfsctl
```

You should see output similar to the following:

```
PFSCTL for HOSTA: Version 9.0.1.0_0 - Production on Feb 01 2001 14:38:00
(c) Copyright 2001 , Oracle Corporation. All rights reserved.
Welcome to PFSCTL. Type HELP for additional information.
```

ORACLE_SERVICE is set to SALES

```
DB_NAME is set to sales
```

```
PFSCCTL>
```

25. Start the packs:

```
PFSCCTL> pfsboot
```

You should see output similar to the following:

```
pfsboot command succeeded.
```

Changing Database Configuration Parameters

To modify the parameters in [Table 1-8](#), you must generate and deploy the Oracle instance files.

This is necessary if you want to change one of the database settings that was specified during Oracle Real Application Clusters Guard installation.

For example, you may need to change the database domain to mirror the network domain.

The following steps and examples show how to create new Oracle instance files.

1. Modify the parameters from [Table 1-8](#) in the `$ORACLE_SERVICE.conf` file.
2. Invoke PFSCCTL as root:

```
# pfscctl
```

You should see output similar to the following:

```
PFSCCTL for HOSTA: Version 9.0.1.0_0 - Production on Feb 01 2001 14:38:00
(c) Copyright 2001 , Oracle Corporation. All rights reserved.
Welcome to PFSCCTL. Type HELP for additional information.
```

```
ORACLE_SERVICE is set to SALES
```

```
DB_NAME is set to sales
```

```
PFSCCTL>
```

3. Stop the packs:

```
PFSCCTL> pfshalt
```

You should see output similar to the following:

pfshalt command succeeded.

4. Generate a new Oracle instance file. Invoke PFSSETUP as \$ORACLE_USER.

```
$ pfssetup
```

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:32:06 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_SERVICE is set to SALES
DB_NAME is set to sales
```

```
Do you wish to continue? [Y/N]
```

5. Enter y to continue. You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:32:54 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

```
Choose the set of files from the following:
```

- 1] User definitions file
- 2] ORACLE Real Application Clusters Guard files
- 3] ORACLE network files
- 4] ORACLE instance files
- 5] ORACLE network and instance files
- 6] All the files
- 7] Quit

```
PFS_SETUP>
```

6. Choose option 4:

```
PFS_SETUP> 4
```

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:33:16 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
ORACLE_BASE is set to /mnt1/oracle
```

```
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

Selected option ORACLE_INSTANCE_FILE

Choose an operation on the selected files:

- 1] Generate only
- 2] Deploy only
- 3] Generate and deploy
- 4] Deinstall
- 5] List the affected files
- 6] Return to Main Menu

```
PFS_SETUP>
```

7. Choose option 1:

```
PFS_SETUP> 1
```

You should see output similar to the following:

The list of affected files is

```
SALES_config1.ded.pfs
SALES_config2.ded.pfs
SALES_config.pfs
init_SALES1_HOSTA.ora
init_SALES2_HOSTB.ora
```

Do you wish to continue? [Y/N]

8. Enter y to continue. You should see output similar to the following:

```
Backing up directory on /home_oracle/901_sales/pfs/setup/output/SALES/pfile
HOSTA
Generating ORACLE instance files.
```

9. Deploy a new Oracle instance file. Invoke PFSSETUP as \$ORACLE_USER.

```
$ pfssetup
```

You should see output similar to the following:

```
PFS_SETUP for Solaris: Version 9.0.1.0_0 on Wed Feb  1 15:33:16 PST 2001
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```



```
ORACLE_BASE is set to /mnt1/oracle
ORACLE_HOME is set to /home_oracle/901_sales
PFS_HOME is set to /mnt1/oracle/admin/sales/pfs
TNS_ADMIN is set to /mnt1/oracle/admin/sales/network/admin
```

```
Selected option ORACLE_INSTANCE_FILE
```

```
Choose an operation on the selected files:
```

- 1] Generate only
- 2] Deploy only
- 3] Generate and deploy
- 4] Deinstall
- 5] List the affected files
- 6] Return to Main Menu

```
PFS_SETUP>
```

10. Choose option 2:

```
PFS_SETUP> 2
```

You should see output similar to the following:

```
The list of affected files is
```

```
SALES_config1.ded.pfs
SALES_config2.ded.pfs
SALES_config.pfs
init_SALES1_HOSTA.ora
init_SALES2_HOSTB.ora
```

```
Do you wish to continue? [Y/N]
```

11. Enter y to continue. You should see output similar to the following:

```
Deploying user file
Backing up directory on /mnt1/oracle/admin/sales/pfs/pfile HOSTA
Backing up directory on /mnt1/oracle/admin/sales/pfs/pfile HOSTB
```

12. Incorporate the Oracle Real Application Cluster Guard initialization parameter files into the existing initialization parameter files by using the `IFILE` initialization parameter.

See Also: *Oracle9i Database Reference* for information about the `IFILE` initialization parameter

13. Invoke PFSCCTL as root:

```
# pfsctl
```

You should see output similar to the following:

```
PFSCCTL for HOSTA: Version 9.0.1.0_0 - Production on  Feb 01 2001 14:38:00
(c) Copyright 2001 , Oracle Corporation. All rights reserved.
Welcome to PFSCCTL. Type HELP for additional information.
```

```
ORACLE_SERVICE is set to SALES
DB_NAME is set to sales
```

```
PFSCCTL>
```

14. Start the packs:

```
PFSCCTL> pfsboot
```

You should see output similar to the following:

```
pfsboot command succeeded
```

Using Oracle Real Application Cluster Guard Commands

This chapter describes the Oracle Real Application Clusters Guard user commands. It contains the following sections:

- [Overview of the Oracle Real Application Clusters Guard Command Line Utility](#)
- [Oracle Real Application Clusters Guard User Commands](#)
- [Starting Oracle Real Application Clusters Guard](#)
- [Displaying the Current Status of Oracle Real Application Clusters Guard](#)
- [Restoring Oracle Real Application Clusters Guard After a Failure](#)
- [Moving the Primary Role](#)
- [Switching Roles in Oracle Real Application Clusters Guard](#)
- [Halting Oracle Real Application Clusters Guard](#)
- [Halting a Single Pack](#)
- [Starting a Single Pack](#)
- [Stopping the Secondary Role](#)
- [Using Oracle Real Application Clusters Guard Commands for Planned Outages](#)
- [Testing the Call-Home Script](#)
- [Listing the Oracle Real Application Clusters Guard Commands](#)
- [Generating the Uptime Report](#)
- [Exiting PFSCCTL](#)

Overview of the Oracle Real Application Clusters Guard Command Line Utility

The `PFSCTL` control utility is responsible for starting, stopping, and operating Oracle Real Application Clusters Guard through its interaction with the cluster manager. It provides a command line interface to the user. Many of the commands influence the behavior of the packs. A pack is software that ensures the availability of the set of resources required to run an Oracle instance. The pack controls the startup, shutdown, and restarting of Oracle Real Application Clusters Guard. There is one pack per instance. Each pack controls the following resources on its node:

- Oracle instance
- Monitors
- Listeners
- IP addresses
- Disk storage, depending on the platform

See Also: *Oracle9i Real Application Clusters Concepts* for more information about Oracle Real Application Clusters Guard components, including packs

Oracle Real Application Clusters Guard User Commands

[Table 2–1](#) shows the `PFSCTL` user commands that are available in Oracle Real Application Clusters Guard.

Table 2–1 Oracle Real Application Clusters Guard User Commands

Command	Description
PFSBOOT	Start all packs
PFSHALT	Stop all packs
MOVE_PRIMARY [<i>seconds</i>]	Move the primary role to the secondary instance in the specified number of seconds (optional). The default number of seconds is 30.
RESTORE	Restore the pack to the secondary role
STATUS	Display the state of the packs

Table 2–1 Oracle Real Application Clusters Guard User Commands (Cont.)

Command	Description
STOP_SECONDARY [<i>seconds</i>]	Stop the secondary pack in the specified number of seconds (optional). The default number is seconds is 30.
BOOTONE <i>pack_name</i> [-f]	Start the specified pack, with the option [-f] to start it on the foreign node. Note: Pack name is case-sensitive.
HALTONE <i>pack_name</i>	Stop the specified pack. Note: Pack name is case-sensitive.
SWITCHOVER [<i>seconds</i>]	Move the primary role to the secondary instance, then restore the secondary role to the former primary instance. The default number of seconds is 30, which applies to moving the primary role.
CALL_HOME	Test user-defined call-home script
REPORT [f <i>filename</i>] [-d <i>yyyy/mm/dd-hh:mm:ss</i>][-s]	Generates an uptime report. -f <i>filename</i> : Specifies the filename for the report. Example: report.rpt Default: Standard output -d <i>yyyy/mm/dd-hh:mm:ss</i> : Specifies the date and time from which to start the report (where <i>yyyy</i> is the year, <i>mm</i> is the month, <i>dd</i> is the date, <i>hh</i> is the hour based on 24 hours, <i>mm</i> is minutes, and <i>ss</i> is seconds Example: 2001/08/10-12:10:10 Default: Generate the report from the beginning of the logs -s: Generates only the uptime summary Default: Generates the full report
HELP	List PFSCCTL commands
QUIT/EXIT	Exit PFSCCTL

To use PFSCCTL commands, the ORACLE_SERVICE environment variable must be defined.

Run PFSCCTL commands as root because they invoke cluster-specific commands. PFSCCTL commands are case-insensitive except for the pack name that is specified in BOOTONE and HALTONE. They may be run from any node.

Enter the commands by entering the name of the script and then the name of the command.

For example, to start all packs, enter the following command:

```
# pfsctl
```

You should see output similar to the following:

```
PFSCTL for hostA: Version 9.0.1 - Production on Feb 25 2001 16:37:01
(c) Copyright 2001, Oracle Corporation. All rights reserved.
Welcome to PFSCTL. Type HELP for additional information.
```

```
ORACLE_SERVICE is set to SALES
DB_NAME is set to sales
```

When the PFSCTL prompt appears, enter the following command:

```
PFSCTL> pfsboot
```

You should see output similar to the following:

```
pfsboot command succeeded.
```

If there are multiple databases and you want to change to another Oracle Real Application Clusters Guard environment, then perform the following steps:

1. Exit the current Oracle Real Application Clusters Guard environment:
2. Set the ORACLE_SERVICE environment variable to a new value. For example:

```
PFSCTL> exit
```

```
# export ORACLE_SERVICE=FIN
```

3. Invoke PFSCTL:

```
# pfsctl
```

Starting Oracle Real Application Clusters Guard

Starting Oracle Real Application Clusters Guard means starting all the packs. Do this by entering the following commands:

```
# pfsctl
PFSCTL> pfsboot
```

You should see output similar to the following:

pfsboot command succeeded.

Displaying the Current Status of Oracle Real Application Clusters Guard

You can see the current status of the packs by entering the following commands:

```
# pfsctl
PFSCtl> status
```

If both packs are up, then you should see output similar to the following:

```
hostA
Info: Pack PFS_SALES_hostA started.
hostB
Info: Pack PFS_SALES_hostB started.
Info: Local database instance is up.
Info: Remote database instance is up.
Info: Running primary role locally.
Info: Running secondary role on remote node.
Info: Both nodes running as part of the cluster.
Info: Local node part of the cluster.
Info: Remote node part of the cluster.
Info: No internal process is running locally.
Info: No internal process is running remotely.
status command succeeded.
```

If Oracle Real Application Clusters Guard is running in non-resilient mode, then you should see output similar to the following:

```
hostB
Info: Pack PFS_SALES_hostA started.
hostB
Info: Pack PFS_SALES_hostB started.
Info: Local database instance is down.
Info: Remote database instance is up.
Info: No role running locally.
Info: Running primary role on remote node.
Info: Both nodes running as part of the cluster.
Info: Local node part of the cluster.
Info: Remote node part of the cluster.
Info: No internal process is running locally.
Info: No internal process is running remotely.
status command succeeded.
```

If both packs are down, then you should see output similar to the following:

```
Info: Pack PFS_SALES_hostA stopped.  
Info: Pack PFS_SALES_hostB stopped.  
Info: Local database instance is down.  
Info: Remote database instance is down.  
Info: No role running locally.  
Info: No role running on remote node.  
Info: Both nodes running as part of the cluster.  
Info: Local node part of the cluster.  
Info: Remote node part of the cluster.  
Info: No internal process is running locally.  
Info: No internal process is running remotely.  
status command succeeded.
```

Restoring Oracle Real Application Clusters Guard After a Failure

When there is a failure on the primary node, Oracle Real Application Clusters Guard automatically fails over the pack that was operating on the failed node. To restore resilience, you must restore operation of the pack to the failed node, where it will have the secondary role.

To restore the pack to the secondary role, enter the following commands:

```
# pfscctl  
PFSCCTL> restore
```

You should see output similar to the following:

```
restore command succeeded.
```

You can also use this command to restore resilience when the secondary pack fails.

Moving the Primary Role

Use the `MOVE_PRIMARY` command if you want to do maintenance on the primary node. The `MOVE_PRIMARY` command shuts down the instance on the primary node, using the `SHUTDOWN TRANSACTIONAL` statement. It triggers a failover after the instance is down, and the secondary node becomes the primary node. The optional `seconds` parameter specifies the time interval for the `SHUTDOWN TRANSACTIONAL` statement to complete. By default, the value is 30 seconds. If the `SHUTDOWN TRANSACTIONAL` statement times out, then `PFSCCTL` issues a `SHUTDOWN ABORT` statement.

To do a clean shutdown, make sure that all active sessions are closed before you issue the `MOVE_PRIMARY` command.

To move the primary role, enter commands similar to the following:

```
# pfctl  
PFCTL> move_primary 40
```

You should see output similar to the following:

```
move_primary_40 command succeeded.
```

Switching Roles in Oracle Real Application Clusters Guard

After a failover, when you have restored resilience with the `RESTORE` command, the primary role and the secondary role are not on their original nodes. If you want the roles to reside on their original nodes, then use the `SWITCHOVER` command. The `SWITCHOVER` command is equivalent to entering the `MOVE_PRIMARY` command and then the `RESTORE` command.

If you specify a number of seconds in the `SWITCHOVER` command:

```
PFCTL> switchover 40
```

then the number of seconds is applied to the `SHUTDOWN TRANSACTIONAL` statement that is part of moving the primary role.

See Also: ["Moving the Primary Role"](#) on page 2-6

If you do not specify a number of seconds, then the default value of 30 seconds is used.

The following example shows what happens when you use the `SWITCHOVER` command. Invoke `PFCTL`:

```
# pfctl
```

The output shows that `ORACLE_SERVICE` is set to `SALES`:

```
PFCTL for hostA: Version 9.0.1 - Production on Feb 07 200118:15:10  
(c) Copyright 2001 , Oracle Corporation. All rights reserved.  
Welcome to PFCTL. Type HELP for additional information.
```

```
ORACLE_SERVICE is set to sales  
DB_NAME is set to sales
```

Enter the `STATUS` command to see where the primary and secondary roles are:

```
PFCTL> status
```

You should see output similar to the following:

```
hostA
Info: Pack PFS_sales_hostA started.
hostB
Info: Pack PFS_sales_hostB started.
Info: Local database instance is up.
Info: Remote database instance is up.
Info: Running primary role locally.
Info: Running secondary role on remote node.
Info: Both nodes running as part of the cluster.
Info: Local node part of the cluster.
Info: Remote node part of the cluster.
Info: No internal process is running locally.
Info: No internal process is running remotely.
status command succeeded.
```

It shows that hostA has the primary role and hostB has the secondary role.

Enter the SWITCHOVER command:

```
PFSCTL> switchover
```

You should see output similar to the following:

```
switchover command succeeded.
```

Enter the STATUS command:

```
PFSCTL> status
```

You should see output similar to the following:

```
hostA
Info: Pack PFS_sales_hostA started.
hostB
Info: Pack PFS_sales_hostB started.
Info: Local database instance is up.
Info: Remote database instance is up.
Info: Running secondary role locally.
Info: Running primary role on remote node.
Info: Both nodes running as part of the cluster.
Info: Local node part of the cluster.
Info: Remote node part of the cluster.
Info: No internal process is running locally.
Info: No internal process is running remotely.
```

status command succeeded.

It shows that `hostA` has the secondary role and `hostB` has the primary role. The switchover was successful.

Halting Oracle Real Application Clusters Guard

When you need to perform a task which requires stopping Oracle Real Application Clusters Guard, use the `PFSHALT` command. Such tasks include upgrading Oracle Real Application Clusters Guard and other Oracle software.

Stopping Oracle Real Application Clusters Guard means stopping all the packs. Do this by entering the following commands:

```
# pfscctl
PFSCCTL> pfshalt
```

You should see output similar to the following:

pfshalt command succeeded.

Halting a Single Pack

Use the `HALTONE` command when you want to stop a specific pack no matter whether it is primary or secondary or on which node it is running. You may want to stop a specific pack when you want to do maintenance work. The consequences of halting a pack are different depending on what state the system is in and which pack you want to stop. The following table shows different conditions and the consequences of using the `HALTONE` command:

Initial Condition	Consequence of Using the <code>HALTONE</code> Command
The system is resilient. The pack you want to stop has the primary role.	The secondary pack becomes primary.
The system is resilient. The pack you want to stop has the secondary role.	The primary pack remains primary.
The system is not resilient.	No pack is running.

Stop a single pack by entering commands similar to the following:

```
# pfscctl  
PFSCCTL> haltone PFS_SALES_hostA
```

where `PFS_SALES_hostA` is the name of the pack that you want to stop.

You should see output similar to the following:

```
haltone_PFS_SALES_hostA command succeeded.
```

Starting a Single Pack

Use the `BOOTONE` command to start a specific pack on either its home node or on its foreign node (using the `-f` option).

See Also: *Oracle9i Real Application Clusters Concepts* for an explanation of home node and foreign node

Start a pack on its foreign node if you want to bring up the relocatable IP address on that node. Enter a command similar to the following:

```
PFSCCTL> bootone PFS_SALES_hostA -f
```

You should see output similar to the following:

```
bootone_PFS_SALES_hostA_-f command succeeded.
```

Now the `PFS_SALES_hostA` pack is running on its foreign node and its IP address is available on that node.

The `BOOTONE` command is especially useful when you want to start the primary pack on the node that is not specified as the preferred primary node. The `PFSBOOT` command always starts the packs so that the primary instance runs on the preferred primary node. However, in some cases, you may want to start Oracle Real Application Clusters Guard with the primary role on the node that is not specified as the preferred primary node. There are several ways to do this, but using the `BOOTONE` command is more efficient.

If the preferred primary node is Node A and you want to start the primary role on Node B, then perform the following steps:

1. Stop the packs on both nodes:

```
PFSCCTL> pfshalt
```

You should see output similar to the following:

pfshalt command succeeded.

2. Start the pack whose home node you want to be the primary node. If the pack name is PFS_SALES_hostB, then enter the following command:

```
PFSCtl> bootone PFS_SALES_hostB
```

You should see output similar to the following:

```
bootone_PFS_SALES_hostB command succeeded.
```

3. Start the other pack. If the pack name is PFS_SALES_hostA, then enter the following command:

```
PFSCtl> bootone PFS_SALES_hostA
```

You should see output similar to the following:

```
bootone_PFS_SALES_hostA command succeeded.
```

Both packs are now running their home nodes. The instance on Node B has the primary role because it was started first.

Stopping the Secondary Role

Use the `STOP_SECONDARY` command if you want to do maintenance on the secondary node. It shuts down the secondary instance. The optional seconds parameter specifies the time for the `SHUTDOWN TRANSACTIONAL` statement to complete. By default, the value is 30 seconds. Enter commands similar to the following:

```
# pfscctl
PFSCtl> stop_secondary 40
```

You should see output similar to the following:

```
stop_secondary_40 command succeeded.
```

Using Oracle Real Application Clusters Guard Commands for Planned Outages

You can use `PFSCtl` commands to shut down the instance on the node that you need to perform maintenance on. This section contains general instructions for planned outages on the node with primary role and the node with secondary role.

Note: Recall that when one node is unavailable, Oracle Real Application Clusters Guard cannot perform failover. Plan accordingly.

Planned Outage on the Secondary Node

1. Stop the secondary instance. Use commands similar to the following:

```
# pfctl
PFCTL> stop_secondary
```

You should see output similar to the following:

```
stop_secondary command succeeded.
```

2. Complete the desired maintenance on the secondary node.
3. Restore the secondary instance to the secondary node. Use the following command:

```
PFCTL> restore
```

You should see output similar to the following:

```
restore command succeeded.
```

Planned Outage on the Primary Node

1. Move the primary role to the secondary instance. Use commands similar to the following:

```
# pfctl
PFCTL> move_primary
```

You should see output similar to the following:

```
move_primary command succeeded.
```

2. Complete the desired maintenance on the former primary node.
3. Restore the secondary role to the former primary node. Use the following command:

```
PFCTL> restore
```

You should see output similar to the following:

restore command succeeded.

4. (Optional) Move the primary role back to the original primary node and restore the secondary role to the original secondary node. Use the following command:

```
PFSCtl> switchover
```

You should see output similar to the following:

```
switchover command succeeded.
```

Testing the Call-Home Script

When Oracle Real Application Clusters Guard detects a failure, the call-home feature executes a callout to a call-home script that has been customized by the user. The call-home script can be used to page or send e-mail, for example. The call-home script is located in:

```
$PFS_HOME/user/pfs_${ORACLE_SERVICE}_callhome.sh
```

The `CALL_HOME` command provides a way to test the script.

To test your call-home script, enter the following commands:

```
# pfscctl
PFSCtl> call_home
```

Successful completion of the command results in the customized outcome, such as a page.

See Also: ["Setting Up the Call-Home Feature"](#) on page 3-2

Listing the Oracle Real Application Clusters Guard Commands

To list the `PFSCtl` commands and their formats, enter the following commands:

```
# pfscctl
PFSCtl> help
```

You should see output similar to the following:

The following commands are available:

```
PFSBOOT
PFSHALT
MOVE_PRIMARY [seconds]
STOP_SECONDARY [seconds]
```

```

RESTORE
STATUS
SWITCHOVER [seconds]
REPORT [-f filename][-d yyyy/mm/dd-hh:mm:ss][-s]
QUIT
EXIT
BOOTONE [pack name] [-f]
HALTONE [pack name]
CALL_HOME
HELP
help command succeeded.

```

Generating the Uptime Report

Use the **REPORT** command to generate an uptime report. For example, enter the following command:

```
PFSCCTL> report -f report.txt -d 2001/11/09-16:42:00
```

You should see output similar to the following:

```

=====
| Oracle Real Application Clusters Guard for Solaris: Version 9.0.1
|
| (c) Copyright 2001 Oracle Corporation. All right reserved.
|
| Up Time Report generated by PFSCCTL report on 11/09/00
=====
Oracle service: SALES
Report time interval: 2001/11/09-16:42:00 -- 2001/11/09-17:00:31

Itemized downtime information:

Downtime Start      Node    Downtime End
Node    Interval (secs)
=====
Planned downtime
2001/11/09-16:55:42    hostA  2001/11/09-17:00:31    hostA  289

Unplanned downtime
----/--/-----:--:--          n/a      2001/11/09-16:42:00    hostA  0
2001/11/09-16:44:35    hostA  2001/11/09-16:44:45    hostB  10
2001/11/09-16:54:17    hostB  2001/11/09-16:54:32    hostA  15

Downtime summary:

```


Total planned downtime: 289 seconds
Total unplanned downtime: 25 seconds
Total downtime: 314 seconds
Availability for this interval: 97.7497%

Exiting PFSCTL

Use the `EXIT` or `QUIT` command to exit PFSCTL.

```
PFSCTL> exit
```

Customizing Oracle Real Application Clusters Guard

This chapter describes the scripts that should be customized for each Oracle Real Application Clusters Guard environment. It includes the following sections:

- [Overview of Customizing Oracle Real Application Clusters Guard](#)
- [Setting Up the Call-Home Feature](#)
- [Setting Up the Customer Query](#)
- [Setting Up Role Change Notification](#)
- [Setting Up Oracle Enterprise Manager for Oracle Real Application Clusters Guard](#)
- [Warming the Library Cache on the Secondary Instance](#)

Overview of Customizing Oracle Real Application Clusters Guard

You can customize your Oracle Real Application Clusters Guard installation. The following table shows the features that can be customized and the important files, scripts, or packages associated with each feature:

Call-home	<code>\$PFS_HOME/user/pfs_\$ORACLE_SERVICE_callhome.sh</code> script
Customer query	<code>\$ORACLE_HOME/pfs/admin/catpfs.sql</code> script
Role change notification	<code>\$PFS_HOME/user/pfs_\$ORACLE_SERVICE_notifyrole.sh</code> script
Oracle Enterprise Manager	ORATAB and DB_NAMES.conf files
Warming the library cache on the secondary instance	DBMS_LIBCACHE package, <code>pfs_\$ORACLE_SERVICE_warmcache.sh</code> script

Setting Up the Call-Home Feature

For failures in Oracle Real Application Clusters Guard that result in the primary instance or primary role becoming unavailable, Oracle Real Application Clusters Guard automatically executes specific failover or recovery actions. Although Oracle Real Application Clusters Guard can take certain automated actions, it requires manual intervention to repair some types of failures. It is important for those failures to be examined and quickly repaired so that a secondary outage does not occur. For example, a secondary instance may shut down due to a failure of the secondary node. Oracle Real Application Clusters Guard cannot restart the failed node because it requires manual examination of why the node failed, some repair action, and then restarting the failed node. The failure of the secondary node does not cause any downtime because the primary instance and service are still available, but Oracle Real Application Clusters Guard sends a call-home message to the Oracle Real Application Clusters Guard log immediately so that normal operation can be restored quickly.

Oracle Real Application Clusters Guard sends a call-home message to the Oracle Real Application Clusters Guard log for every failure that occurs in Oracle Real Application Clusters Guard regardless of the type of the failure. Oracle Real Application Clusters Guard also executes a callout to the call-home script. The

Oracle Real Application Clusters Guard Setup Utility (PFSSETUP) generates the script, which is located in:

```
$PFS_HOME/user/pfs_${ORACLE_SERVICE}_callhome.sh
```

This script is not executable until you customize it to suit the your environment. For example, you can customize the script so that an e-mail notification results in sending a page to the appropriate administrator.

The following call-home template is part of the call-home script:

```
# Call_Home Template
#
CALLHOME_MESSAGE=$1
#
# Example:
#
# mail <userid> << EOF
# !!! Alert: $CALLHOME_MESSAGE at `date` !!!
# EOF
```

When there is a failure, this part of the call-home script logs a message in `pfs_${ORACLE_SERVICE}_host.log` similar to the following:

```
Tue Dec  5 13:23:51 2000 PFS-2019: Info: PFS callhome with OracleUp_for_SALES_error_Will_
failover now.
Tue Dec  5 13:23:53 2000 PFS-2019: Info: PFS callhome with Failing_over_service_SALES now.
```

It also e-mails the messages to the userid that you specify when you customize the template.

Note: Oracle Real Application Clusters Guard does not provide an external call-home mechanism. It relies on the operating system or third-party tools installed on your site for sending notification to an administrator.

Setting Up the Customer Query

The heartbeat monitor checks not only whether the primary instance has a heartbeat but also whether it is capable of work. It monitors the work capability by repeatedly running a customized PL/SQL procedure containing a query that should represent the actual work that needs to be done in the instance. The default `catpfs.sql` script, which you run when you create the Oracle Real Application Clusters Guard database, prompts the user for a table owner and a table name upon which to run a

basic `SELECT` statement. Modify the `customer_query` package in the `catpfs.sql` script to reflect your business needs before running the script.

The `customer_query`, `customer_query.test`, is contained in `catpfs.sql` and is located in the `$ORACLE_HOME/pfs/admin` directory. The contents of the `customer_query.test` template are as follows:

```
REM customer_query package executed by ORACLE_PING
create or replace package customer_query as
  procedure test (total_rows out number);
end customer_query;
/

create or replace package body customer_query as
  procedure test (total_rows out number) is
  begin
    -- Example customer queries:
    -- select count(*) into total_rows from &&syn_name;
    -- select max(emp_id) into total_rows from &&syn_name;
    -- select sum(salary) into total_rows from &&syn_name;
  end;
end customer_query;
/

/* from ORACLE_PING */
EXEC SQL EXECUTE
  BEGIN
    customer_query.test(:number_of_rows);
  END ;
END-EXEC ;
```

The `customer_query` can be modified to select any single specific value such as a specific row, a row count, or a maximum value. When you write the `customer_query`, consider the following recommendations:

- Access a table that is representative of the application.
- Exercise as much of the database as possible. Do not reissue the same query each time the heartbeat monitor runs. Consider selecting a random row each time.
- Choose queries that can be completed within the desired timeout interval. For example, do not use queries that require the entire table to be scanned. Although the parameter values can be increased, increases contribute to the length of time it takes to detect a failure due to a database hang.

Test the customer query when the system is under heavy load to ensure that it can be completed within the interval defined by the `USER_TIMEOUT` value in the `ORAPING_CONFIG` table.

See Also: ["Making Online Changes to the ORAPING_CONFIG Table"](#) on page 4-14 to find out how to check the value of `USER_TIMEOUT`

Setting Up Role Change Notification

When an instance or pack comes up, goes down or changes role from secondary to primary, Oracle Real Application Clusters Guard sends a message to the Oracle Real Application Clusters Guard log. Automatic role change notification occurs when Oracle Real Application Clusters Guard takes automatic actions. Manual role change notification occurs only when `PFSCTL` commands are executed.

The notification of role changes are:

Notification	Type	Description
UP	Automatic	Called after the instance is started or after its role changes from secondary to primary
DOWN	Automatic	Called before the instance is shut down
CLEANUP	Manual	Called after the instance is shut down
PLANNED_UP	Manual	Called from <code>PFSCTL</code> before the instance is started
PLANNED_DOWN	Manual	Called from <code>PFSCTL</code> before the instance is shut down

The notification is implemented by a script called `pfs_${ORACLE_SERVICE}_notifyrole.sh`. The `PFSSETUP` utility generates the script, which resides under the `$PFS_HOME/user` directory. The script is not executable until you modify it. You can modify it to perform certain actions before an instance shuts down, for example. The following is the role notification script template:

```
# Role Notification Template
#
NOTIFY_ORACLE_SERVICE=$1
NOTIFY_NODE=$2
NOTIFY_ROLE=$3
NOTIFY_STATUS=$4
NOTIFY_LOGGING_DATE=$5
```

```
#
# --- DO NOT MODIFY ABOVE THIS LINE ---
#
# Example
#
case $NOTIFY_STATUS in
    "planned_up")
#   Run scripts that you want executed before the instance starts.
    ;;

    "up")
#   Run scripts that you want executed after the instance starts.
    ;;

    "planned_down" | "down")
#   Run scripts that you want executed before the instance is shut down.
#   WARNING: Scripts executed at this step will affect failover time.
    ;;

    "cleanup")
#   Run scripts that you want executed after the instance is shut down.
    ;;

esac
```

See Also: Your platform-specific Oracle Real Application Clusters Guard installation guide for more information about the PFS Installer

Examples of Role Change Notification Messages

The following examples show the messages that occur on each host:

- [Role Change Notification: PFSBOOT Command](#)
- [Role Change Notification: PFSHALT Command](#)
- [Role Change Notification: MOVE_PRIMARY Command](#)
- [Role Change Notification: RESTORE Command](#)
- [Role Change Notification: Automatic Failover](#)

Role Change Notification: PFSBOOT Command

When the `PFSBOOT` command is entered on `HOSTA`, the following messages appear in the Oracle Real Application Clusters Guard log on `HOSTA`:


```
Fri Dec 22 16:31:27 2000 PFS-5555: sales hostA unknown planned_up 2000/12/22-16:31:26
Fri Dec 22 16:32:13 2000 PFS-5555: sales hostA primary up 2000/12/22-16:32:12
```

The following messages appear in the Oracle Real Application Clusters Guard log on HOSTB:

```
Fri Dec 22 16:32:25 2000 PFS-5555: sales hostB unknown planned_up 2000/12/22-16:32:23
Fri Dec 22 16:33:18 2000 PFS-5555: sales hostB secondary up 2000/12/22-16:33:17
```

Role Change Notification: PFSHALT Command

When the PFSHALT command is entered on HOSTA, the following messages appear in the Oracle Real Application Clusters Guard log on HOSTA:

```
Fri Dec 22 16:38:41 2000 PFS-5555: sales hostA primary planned_down 2000/12/22-16:38:40
Fri Dec 22 16:38:50 2000 PFS-5555: sales hostA primary down 2000/12/22-16:38:49
Fri Dec 22 16:40:09 2000 PFS-5555: sales hostA primary cleanup 2000/12/22-16:40:08
```

The following messages appear in the Oracle Real Application Clusters Guard log on HOSTB:

```
Fri Dec 22 16:37:56 2000 PFS-5555: sales hostB secondary planned_down 2000/12/22-16:37:54
Fri Dec 22 16:38:04 2000 PFS-5555: sales hostB secondary down 2000/12/22-16:38:04
Fri Dec 22 16:38:27 2000 PFS-5555: sales hostB secondary cleanup 2000/12/22-16:38:26
```

Role Change Notification: MOVE_PRIMARY Command

When the MOVE_PRIMARY command is entered on HOSTA, the following messages appear in the Oracle Real Application Clusters Guard log on HOSTA:

```
Fri Dec 22 11:21:35 2000 PFS-5555: sales hostA primary planned_down 2000/12/22-11:21:35
Fri Dec 22 11:22:15 2000 PFS-5555: sales hostA primary down 2000/12/22-11:22:15
Fri Dec 22 11:22:25 2000 PFS-5555: sales hostA primary cleanup 2000/12/22-11:22:24
```

The following message appears in the Oracle Real Application Clusters Guard log on HOSTB:

```
Fri Dec 22 11:22:10 2000 PFS-5555: sales hostB primary up 2000/12/22-11:22:09
```

Role Change Notification: RESTORE Command

When the RESTORE command is entered on HOSTA, the following messages appear on the Oracle Real Application Clusters Guard log on HOSTA:

```
Fri Dec 22 12:20:24 2000 PFS-5555: sales hostA unknown planned_up 2000/12/22-12:20:23
Fri Dec 22 12:21:24 2000 PFS-5555: sales hostA secondary up 2000/12/22-12:21:23
```

No messages appear in the Oracle Real Application Clusters Guard log on HOSTB.

Role Change Notification: Automatic Failover

When automatic failover occurs, the following messages appear in the Oracle Real Application Clusters Guard log on HOSTA:

```
Fri Dec 22 15:03:42 2000 PFS-5555: sales hostA primary down 2000/12/22-15:03:41
Fri Dec 22 15:04:51 2000 PFS-5555: sales hostA primary cleanup 2000/12/22-15:04:50
```

The following messages appear in the Oracle Real Application Clusters Guard log on HOSTB:

```
Fri Dec 22 15:03:38 2000 PFS-5555: sales hostB primary up 2000/12/22-15:03:37
```

Setting Up Oracle Enterprise Manager for Oracle Real Application Clusters Guard

You can use Oracle Enterprise Manager to administer the Oracle Real Application Clusters Guard database. The following requirements must be met in order to use Oracle Enterprise Manager:

- The Oracle System Identifier (SID) for each instance in the Oracle9i Real Application Clusters must be unique.
- The ORATAB file and the DB_NAMES.conf file must be configured for OPSCCTL.

Note: Follow these guidelines rather than the Oracle Enterprise Manager instructions in the Oracle9i Real Application Clusters documentation.

The ORATAB File

Create an entry for the Oracle9i Real Application Clusters database in the ORATAB file. Oracle Enterprise Manager uses the ORATAB file during service discovery to determine:

- Whether the database is an Oracle9i Real Application Clusters database
- The database name

Use the following syntax for the Oracle9i Real Application Clusters entry:

```
db_name:$ORACLE_HOME:N
```

where `DB_NAME` is the database name given to the Oracle9i Real Application Clusters database. `$ORACLE_HOME` is the directory path to the database. `N` indicates that the database should not be started at reboot time.

The following example is for a database named `SALES`:

```
SALES:/u01/oracle/901:N
```

The DB_NAMES.conf File

Create a `DB_NAMES.conf` file under the `$ORACLE_HOME/ops` directory. Oracle Enterprise Manager uses this file during service discovery to determine which instances run on the nodes. This file should contain the parameters shown in the following:

Parameter	Description
<code>NODE_LIST</code>	Defines the nodes for an Oracle9i Real Application Clusters
<code>INST_ORACLE_SID</code>	Defines the System Identifier (SID) for each instance in the clusters
<code>LSNR_LISTENER_NAME</code>	Defines the listener name for each instance

The following is a sample entry in the `SALES.conf` file for a database named `SALES`:

```
nodelist="0,1"
inst_oracle_sid=(SALES1, SALES2)
lsnr_listener_name="SALES_HOSTA_PRIVLSNR"
```

Ensure that `OPSD` has been started on each node by the `oracle` user at system start-up. `OPSD` resides in `$ORACLE_HOME/bin`.

Configure the `LISTENER.ORA` file on each node with:

- The listener name
- A TCP/IP address for Oracle Enterprise Manager
- The `SID_LIST_ListenerName`. The `SID_LIST_ListenerName` entry should provide information about the database service, including the global database name, the Oracle home location of the database, and the Oracle System Identifier (SID) of the instance.

For example:

```
SALES_HOSTA_PRIVLSNR=
  (DESCRIPTION=
    (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.70)(PORT=1524)))

SID_LIST_ SALES_HOSTA_PRIVLSNR=
  (SID_LIST=
    (SID_DESC=
      (ORACLE_HOME=/mnt1/oracle/901)
      (SID_NAME=SALES1)))
```

See Also: *Oracle Enterprise Manager Configuration Guide*

Warming the Library Cache on the Secondary Instance

This section contains the following topics:

- [Overview of Warming the Library Cache](#)
- [Setting Up DBMS_LIBCACHE](#)
- [Using DBMS_LIBCACHE](#)

Overview of Warming the Library Cache

The library cache includes the shared SQL areas, private SQL areas, PL/SQL procedures and packages, and control structures such as locks and library cache handles. A shared SQL area contains the parse tree and execution plan for a single SQL statement or for similar SQL statements. Oracle saves memory by using one shared SQL area for multiple similar DML statements, particularly when many users execute the same application. A private SQL area contains data such as bind information and runtime buffers. Oracle processes PL/SQL program units (procedures, functions, packages, anonymous blocks, and database triggers) much the same way it processes individual SQL statements. Oracle allocates a shared area to hold the parsed, compiled form of a program unit. Oracle allocates a private area to hold values specific to the session that executes the program unit, including local, global, and package variables and buffers for executing SQL.

See Also: *Oracle9i Database Concepts*

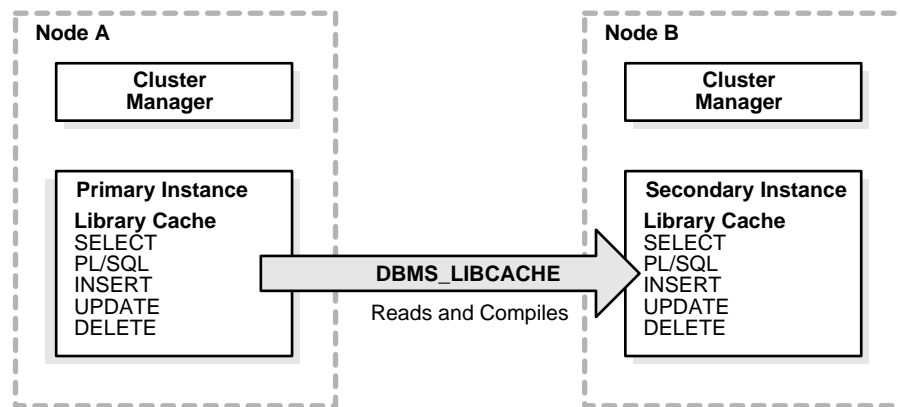
Maintaining information about frequently executed SQL and PL/SQL statements in the library cache improves the performance of the Oracle database server. In an Oracle9i Real Application Clusters primary/secondary configuration, the library cache associated with the primary instance contains up-to-date information. If

failover occurs, then the benefit of that information is lost unless the library cache on the secondary instance is populated before failover.

You can use the `DBMS_LIBCACHE` package to transfer the information in the library cache of the primary instance to the library cache of the secondary instance. This process is called **warming the library cache**. It improves performance immediately after failover because the new primary library cache does not need to be populated with parsed SQL statements and compiled PL/SQL units.

Figure 3–1 shows the library cache being compiled at the secondary instance, using SQL statements and PL/SQL units extracted from the primary instance.

Figure 3–1 Warming the Library Cache of the Secondary Instance



`DBMS_LIBCACHE` captures and compiles the sharable part of selected cursors. It selects cursors based on the amount of sharable memory used and the frequency with which the associated SQL statements are used. It then populates the library cache on the secondary instance with the compiled cursors.

Execute the `DBMS_LIBCACHE` package on the secondary instance:

- As a regularly scheduled job
- Before executing a manual failover or switchover

See Also: ["Using DBMS_LIBCACHE"](#) on page 3-15

Setting Up DBMS_LIBCACHE

Installing the `DBMS_LIBCACHE` procedure causes the following actions to occur:

1. Creates a user named `PARSER`.
2. Asks for a password for `PARSER`.
3. Asks for default and temporary tablespace for `PARSER`.
4. Creates a database link named `LIBC_LINK` that is owned by `PARSER`.
5. Asks for an appropriate connect string to use when the database link connects to other instances of the Oracle9i Real Application Clusters configuration to collect the library cache information.

Note: Oracle Net configuration of the `listener.ora` and `tnsnames.ora` files for this connect string must already be completed on all the nodes of the Oracle9i Real Application Clusters configuration.

The `DBMS_LIBCACHE` package can be installed at any time, either during installation of Oracle9i Real Application Clusters or later, during normal operation.

Perform the following steps to set up `DBMS_LIBCACHE`:

1. Connect as the user `SYS`. Enter the following commands:

```
$ cd $ORACLE_HOME/pfs/admin
$ sqlplus "/" as sysdba
```

You should see output similar to the following:

```
$ sqlplus "/" as sysdba
```

```
SQL*Plus: Release 9.0.1.0.0 - Production on Fri Feb 9 15:45:54 2001
```

```
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
Connected to:
```

```
Oracle9i Enterprise Edition Release 9.0.1.0.0 - Production
With the Partitioning and Real Application Clusters options
JServer Release 9.0.1.0.0 - Production
```

```
SQL>
```

2. Create the header definition package for `DBMS_LIBCACHE` by running `catlibc.sql`. The `catlibc.sql` procedure is found in the `$ORACLE_`

HOME/pfs/admin directory, which you entered in step 1. Enter the following command:

```
SQL> @catlibc.sql
```

You should see output similar to the following:

```
Package created.
```

```
drop public synonym dbms_libcache$def
*
```

```
ERROR at line 1:
```

```
ORA-01432: public synonym to be dropped does not exist
```

```
Synonym created.
```

```
Grant succeeded.
```

```
View created.
```

```
Grant succeeded.
```

```
drop public synonym v$sql2
*
```

```
ERROR at line 1:
```

```
ORA-01432: public synonym to be dropped does not exist
```

```
Synonym created.
```

```
... Creating the parsing user and database link.
```

Below are the list of online tablespaces in this database.
Decide which tablespace you wish to use for the PARSER user.

```
TABSPACE_NAME
```

```
-----
```

```
RBS
```

```
TEMP
```

```
USERS
```

```
Please enter the parsing users password and tablespaces.
```

```
Enter value for parser_password:
```

3. The package has created a user called PARSER. Enter the password for PARSER. For example:

```
parser
```

You should see output similar to the following:

```
Enter value for default_tablespace:
```

4. Enter the default tablespace for `PARSER`. For example:

```
USERS
```

You should see output similar to the following:

```
Enter value for temporary_tablespace:
```

5. Enter the temporary tablespace for `PARSER`. For example:

```
TEMP
```

You should see output similar to the following:

```
User created.
```

```
Grant succeeded.
```

```
Enter value for parser_password:
```

6. Enter the password that you specified in step 3. For example:

```
parser
```

You should see output similar to the following:

```
Connected.
```

```
drop public database link libc_link
*
```

```
ERROR at line 1:
```

```
ORA-02024: database link not found
```

```
Please enter the parsing users TNS connect string.
```

```
Enter value for connect_string:
```

7. Enter the TNS connect string that will be used to connect to the other instance of the Oracle9i Real Application Clusters configuration. `PARSER` uses this database link to connect to the library cache on the other instance. For example:

```
parser_service
```


You should see output similar to the following:

```
Database link created.
```

8. **Create the DBMS_LIBCACHE package. Connect as user SYS and run dbmslibc.sql, which is found in the \$ORACLE_HOME/pfs/admin directory. Enter the following commands:**

```
$ cd $ORACLE_HOME/pfs/admin
$ sqlplus "/ as sysdba"
```

```
SQL> @dbmslibc
```

You should see output similar to the following:

```
Package created.
```

```
drop public synonym dbms_libcache
*
```

```
ERROR at line 1:
```

```
ORA-01432: public synonym to be dropped does not exist
```

```
Synonym created.
```

```
Grant succeeded.
```

```
Grant succeeded.
```

```
Package body created.
```

Using DBMS_LIBCACHE

The main public interface of the DBMS_LIBCACHE package is the `COMPILE_FROM_REMOTE` procedure. Invoke it from the instance on which the library cache needs to be populated, the secondary instance in the context of Oracle Real Application Clusters Guard. While the DBMS_LIBCACHE package has been designed for an Oracle9i Real Application Clusters configuration, you can use it in other Oracle environments that would benefit from warming the library cache.

Oracle Corporation recommends that you invoke the procedure after the contents of the library cache on the primary instance have stabilized. You can use the `COMPILE_FROM_REMOTE` procedure in the following ways:

- As a regularly scheduled job
- Before executing a manual failover or switchover

On the secondary instance, perform the following steps:

- 1. Connect as the user PARSER, using SQL*Plus:

```
$ sqlplus parser/password
```

- 2. Turn on server output:

```
SQL> set serveroutput on;
```

- 3. Execute the COMPILE_FROM_REMOTE procedure. The SQL statement should have the following format:

```
EXECUTE sys.dbms_libcache.compile_from_remote(db_link,username,threshold_
executions,threshold_sharable_mem);
```

[Table 3–1](#) describes the arguments for executing the COMPILE_FROM_REMOTE procedure.

Table 3–1 Arguments for the COMPILE_FROM_REMOTE Procedure

Name	Description	Mandatory	Default Value
DB_LINK	The database link that points to the primary instance	Yes	LIBC_LINK, which is the database link that is created during installation. Can be changed by the user.
USERNAME	The user whose information is extracted from the primary instance to be parsed on the secondary instance	No	All users

Table 3–1 Arguments for the *COMPILE_FROM_REMOTE* Procedure (Cont.)

Name	Description	Mandatory	Default Value
THRESHOLD_EXECUTIONS	Minimum number of executions of a SQL statement that must have occurred before the SQL statement will be considered for extraction	No	3 Check the EXECUTIONS column in the V\$SQL view for the SQL statements that will be considered. Increasing the value causes the secondary instance to extract only the most frequently executed SQL statements. Decreasing the value cause the secondary instance to extract more SQL statements, which will populate the cache with more information. If some SQL statements are not used often, then the additional information has limited usefulness.
THRESHOLD_SHARABLE_MEM	Minimum size of cursors that will be considered for extraction	No	1000 Check the SHARABLE_MEM column of the V\$SQL view for the statements that are considered. Increasing the value causes the secondary instance to extract and create only the largest cursors. Generally, the largest cursors take most of the time needed for warming the library cache. Decreasing the value causes the secondary instance to extract smaller cursors that may not be as useful.

Only DB_LINK is mandatory. The EXECUTE statement must contain a value for DB_LINK. Specify values for the other arguments only if their values are different from the default values. For example, if you want to specify the following values:

DB_LINK	LIBC_LINK
USERNAME	APPS
THRESHOLD_EXECUTION	5
THRESHOLD_SHARABLE_MEM	800

then execute the `COMPILE_FROM_REMOTE` procedure with the following SQL statement:

```
SQL> EXECUTE sys.dbms_libcache.compile_from_remote('LIBC_LINK','APPS',5,800);
```

Example: Compiling All Cursors for All Users with Default Threshold Values
Enter the following SQL statement:

```
SQL> EXECUTE sys.dbms_libcache.compile_from_remote('LIBC_LINK');
```

You should see output similar to the following:

```
Total SQL statements to compile=14
Total SQL statements compiled=14
```

Example: Compiling All Cursors for the Oracle GL Application with Default Threshold Values

The `COMPILE_FROM_REMOTE` procedure is invoked twice because the cursors may be owned by the `APPS` user or the `GL` user:

```
SQL> EXECUTE sys.dbms_libcache.compile_from_remote('LIBC_LINK', 'APPS');
SQL> EXECUTE sys.dbms_libcache.compile_from_remote('LIBC_LINK', 'GL');
```

Administering Oracle Real Application Clusters Guard

This chapter describes how to administer an Oracle Real Application Clusters Guard environment. It includes the following sections:

- [Administering Planned Outages](#)
- [Recovering from an Unplanned Outage on One Node](#)
- [Recovering from Unplanned Outages on Both Nodes](#)
- [Administering Failover of the Applications](#)
- [Enhancing Application Failover with Role Change Notification](#)
- [Changing the Configuration](#)
- [Managing the Oracle Real Application Clusters Guard Log Files](#)

Administering Planned Outages

This section contains the following topics:

- [Maintenance on the Primary Node](#)
- [Maintenance on the Secondary Node](#)

Maintenance on the Primary Node

Maintenance, such as hardware repair or an operating system upgrade, requires a planned outage so that the primary role can be moved to the secondary node. Plan it for a part of the business cycle that is less busy and give advance notification to users. Perform the following steps:

1. From the `PFSCCTL` command line, enter the `MOVE_PRIMARY` command to move the primary role to the secondary instance:

```
PFSCCTL> move_primary
```

2. Complete maintenance.
3. Restore the pack to the secondary role on the idle node.

```
PFSCCTL> restore
```

Note: The system is now resilient, but the primary and secondary roles are reversed from the initial states. If you want to restore the nodes to their initial states, then continue with the following steps.

4. Move the primary role to the original primary node and the secondary role to the original secondary node (optional):

```
PFSCCTL> switchover
```

Maintenance on the Secondary Node

Maintenance on the secondary node does not interrupt operation, but the system is not resilient while the secondary node is down.

1. Stop the secondary instance:

```
PFSCCTL> stop_secondary
```

2. Complete maintenance.

3. Restore the pack on the secondary node.

```
PFSCtl> restore
```

Recovering from an Unplanned Outage on One Node

When an unplanned outage occurs on the primary node, Oracle Real Application Clusters Guard automatically fails over to the secondary node and notifies the user that a role change has occurred. At this point, Oracle Real Application Clusters Guard is operating in a non-resilient state with the primary role on the former secondary node.

After you have performed root cause analysis and repaired the source of the fault, restore the secondary role on the former primary node:

```
PFSCtl> restore
```

The primary and secondary roles have now been reversed. Choose one of the following actions:

- [Operate with Reversed Primary and Secondary Roles](#)
- [Return to the Original Primary/Secondary Configuration](#)
- [Choose a Less Critical Application to Restore](#)

Operate with Reversed Primary and Secondary Roles

After restoring both packs, you can continue to operate with primary and secondary roles that are reversed from the initial state. For sites with symmetric configurations, there is no need to return to the original state. Returning to the original roles requires a planned outage and can be avoided. In fact, some users intentionally operate with role reversal on a fixed schedule (such as every three months) in order to test the capabilities of the system.

Return to the Original Primary/Secondary Configuration

Returning to the original primary/secondary configuration requires a planned outage while the primary role is moved. Plan it for a less busy part of your business cycle and give advance notice to users. Execute it as follows:

```
# pfctl  
PFSCtl> switchover
```

Choose a Less Critical Application to Restore

If your system includes more than one uniquely identified database per node, then performance may be degraded after a failover. For example, if you have a two-node cluster in a primary/secondary configuration and you are also running an unrelated database on the secondary node, then the secondary node will be running the primary services as well as the unrelated database after failover and may be overloaded. In this situation, you should move the less critical service to the other node when it is restored.

Perform the following steps for each of the services that will be moved to the restored node:

1. Set the `ORACLE_SERVICE` environment variable. For example:

```
$ export ORACLE_SERVICE=SALES
```

2. Restore the instance with secondary role:

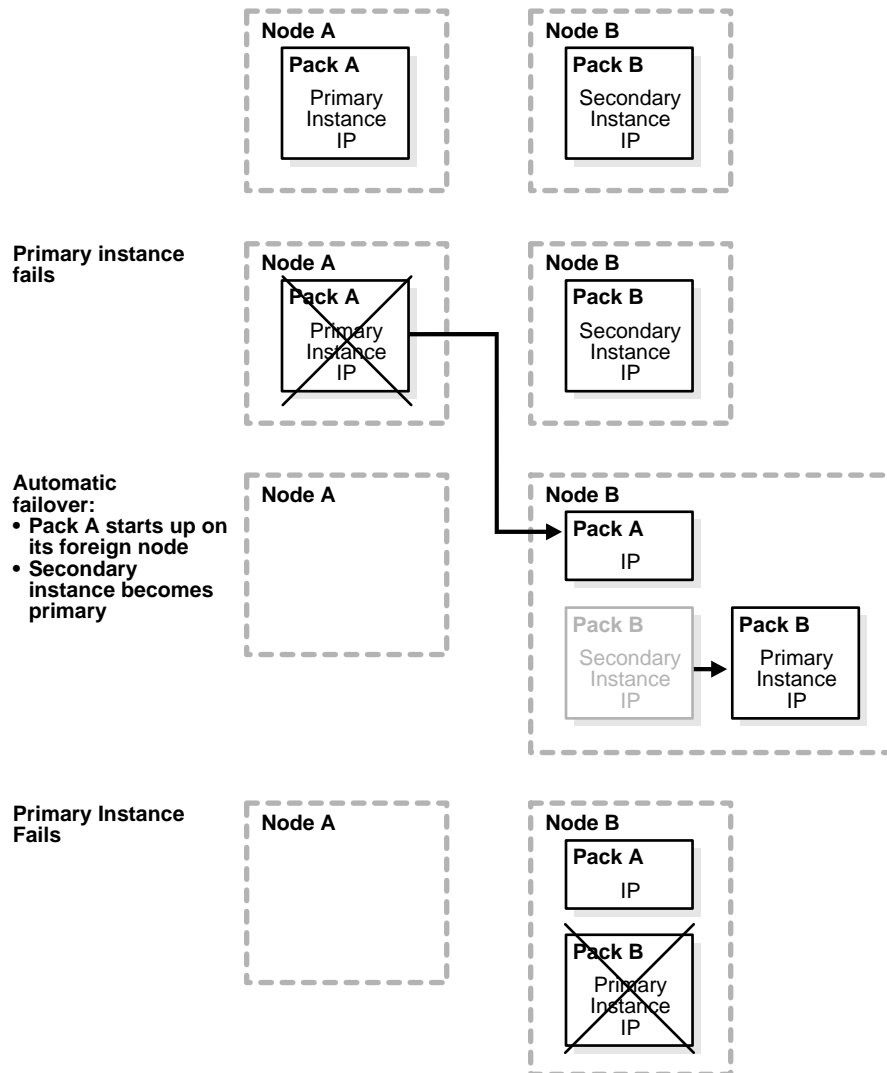
```
# pfctl  
PFCTL> restore
```

3. Move the primary role to the original primary node:

```
PFCTL> switchover
```

Recovering from Unplanned Outages on Both Nodes

[Figure 4-1](#) and [Figure 4-2](#) show what happens when both instances of a two-node cluster fail.

Figure 4–1 Failure of Both Instances, Part 1

During normal operation, both Node A and Node B are up and operational. Pack A is running on its home node, Node A, and has the primary role. It contains the primary instance and an IP address. Pack B is running on its home node, Node B, and has the secondary role. It contains the secondary instance and an IP address.

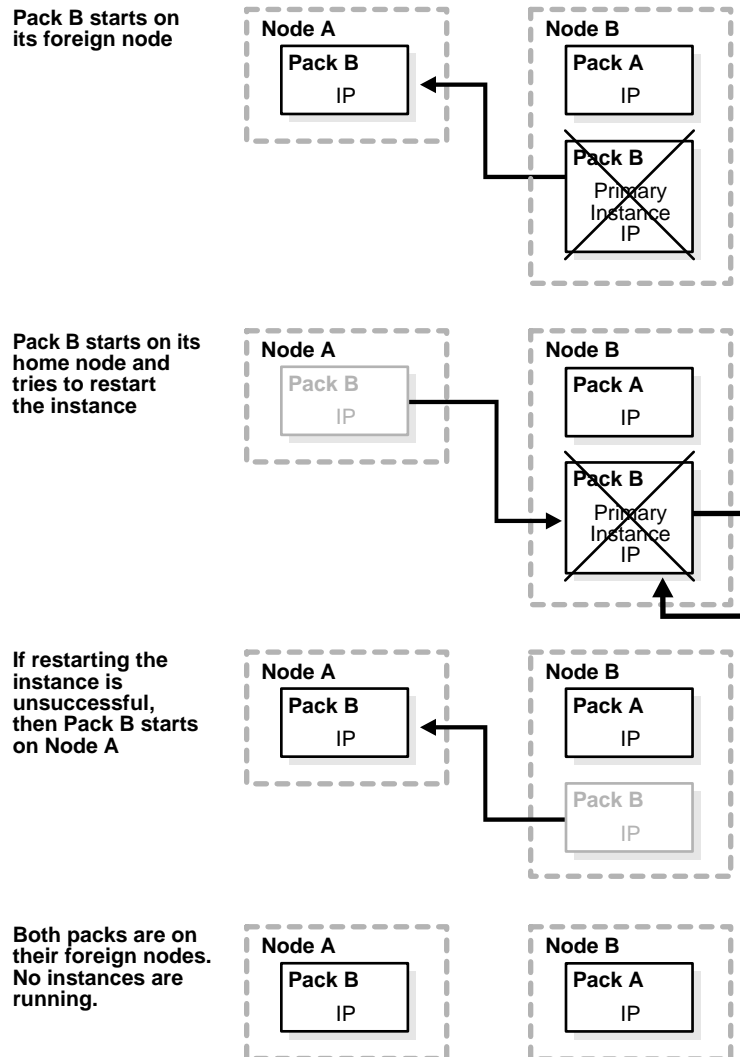
If the primary instance fails, then Oracle Real Application Clusters Guard automatically takes the following failover actions:

- The secondary instance becomes the primary instance.
- Pack A starts on Node B in foreign mode. This means that only its IP address is activated on Node B.

Now both Pack A and Pack B are running on Node B. Pack B contains the primary instance and its IP address. Pack A contains only an IP address. Nothing is running on Node A. The system is not resilient.

If the primary instance fails, then Pack A and Pack B contain only IP addresses.

[Figure 4-2](#) shows what happens after the primary instance fails.

Figure 4–2 Failure of Both Instances, Part 2

Pack B starts on its foreign node (Node A). Pack A is still running on Node B. Only the IP addresses are up on the nodes. Because there is no instance running, Pack B restarts on its home node and tries to restart the primary instance. If restarting the instance is unsuccessful, Pack B again starts on its foreign node. The outcome of double instance failure is:

- Both packs are running on their foreign nodes.
- Only the IP addresses are up.
- No instances are running.

First diagnose and repair the cause of the failures. To restart the instances, you must perform the following steps:

1. Halt both of the packs. Enter the following command:

```
PFSCCTL> pfshalt
```

You should see output similar to the following:

```
pfshalt command succeeded.
```

2. Start both of the packs. Enter the following command:

```
PFSCCTL> pfsboot
```

You should see output similar to the following:

```
pfsboot command succeeded.
```

Administering Failover of the Applications

Oracle Real Application Clusters Guard restores service quickly. The application must restart transactions when it receives an Oracle message that indicates that failure has occurred.

Failing over the application when the primary instance fails is straightforward. The application sessions receive the ORA-1089 and ORA-1034 Oracle errors for new requests and the ORA-1041, ORA-3113, and ORA-3114 Oracle errors for active requests. These errors must be trapped by the application. At reconnection, the application connects transparently to the new primary instance. For example, in the case of a web server, the server threads are restarted for each connection pool against the new primary instance. The current transactions are then resubmitted by the clients.

Failing over the application when the primary node fails is not straightforward because of TCP/IP time-out. TCP/IP time-out is a significant problem for high availability. It occurs when a node fails without closing the sockets, because new requests can be made to an IP address that is unavailable. For active requests, the delays to the client are the values for `TCP_IP_ABORT_CINTERVAL` and `TCP_IP_ABORT_INTERVAL`. For sessions that are waiting for read/write completion, the

delay is the value for `TCP_KEEPAIVE_INTERVAL`. The values for these TCP/IP parameter should be tuned at each site.

Note: These parameters are specific to your operating system. See your operating system documentation for more information.

TCP/IP time-outs are addressed in Oracle Real Application Clusters Guard by using relocatable IP addresses and the call-home feature. Because Oracle Real Application Clusters Guard moves the IP addresses, active requests for an address do not wait to time out. Requests for connection are refused immediately and are routed transparently to the new primary instance. Requests that issue SQL statements receive a broken pipe error (ORA-3113), allowing the application to restart. The application should detect this error and take appropriate action.

See Also: ["Setting Up the Call-Home Feature"](#) on page 3-2

Enhancing Application Failover with Role Change Notification

The role change notification in Oracle Real Application Clusters Guard can enhance application failover. The feature allows you to implement actions such as running or halting applications when the notification of a role change (UP, PLANNED_UP, PLANNED_DOWN, DOWN, CLEANUP) is received. For example, when the instance starts, the notification can be used to start the applications. When the instance terminates, the notification can be used to halt the applications. It is also possible to halt the application when a role starts. This allows secondary applications to halt when the primary role fails over, for example.

See Also: ["Setting Up Role Change Notification"](#) on page 3-5

Automatic role change notification behaves as follows:

- An UP notification occurs
 - After the instance (primary or secondary) starts
 - After an instance role changes from secondary to primary
- A DOWN notification occurs before the instance (primary or secondary) is shut down
- A CLEANUP notification occurs after the instance (primary or secondary) is shut down

Manual role notification occurs only when `PFSCTL` commands are executed, for example, during planned outages. Manual role notification behaves as follows:

- A `PLANNED_UP` notification occurs before the instance (primary or secondary) starts
- A `PLANNED_DOWN` notification occurs before the instance (primary or secondary) is shut down

Changing the Configuration

Most configuration changes can be made to an Oracle Real Application Clusters Guard environment by switching over to the secondary instance, applying the change, and switching back (optional). The following types of configuration changes are described in this section:

- [Changing the Oracle Real Application Clusters Guard Configuration Parameters](#)
- [Changing the Configuration of Both Instances of Oracle9i Real Application Clusters](#)
- [Making Online Changes to the Configuration](#)
- [Changing the `PFS_KEEP_PRIMARY` Parameter](#)
- [Making Online Changes to the `ORAPING_CONFIG` Table](#)

Changing the Oracle Real Application Clusters Guard Configuration Parameters

There are several ways to change Oracle Real Application Clusters Guard configuration parameters, depending on what kind of parameter needs to be changed. For example, changing `$ORACLE_HOME` requires the packs to be re-created, while changing the port numbers requires that the packs, the database, and the listener be halted.

See Also: [Chapter 1, "Oracle Real Application Clusters Guard Configuration Parameters"](#) for information about changing configuration parameters

Changing the Configuration of Both Instances of Oracle9i Real Application Clusters

If you want to change initialization parameters for both instances, then perform the following steps.

Note: This applies only to initialization parameters that are not included in the mandatory parameters listed in the `$ORACLE_SERVICE_config.pfs`, `$ORACLE_SERVICE_config.Host.ded.pfs`, and `init_$ORACLE_SID_Host.ora` files. Changing the `INSTANCE_NAMES` parameter, for example, requires the `catpfs.sql` script to be re-run.

See Also: [Chapter 1, "Oracle Real Application Clusters Guard Configuration Parameters"](#) for information about changing configuration parameters

1. Modify the desired parameters for both instances.
2. Stop the secondary instance.

```
PFSCCTL> stop_secondary
```
3. Restart the secondary instance.

```
PFSCCTL> restore
```
4. Move the primary role to the secondary instance.

```
PFSCCTL> move_primary
```
5. Restore the secondary instance on the former primary node.

```
PFSCCTL> restore
```
6. Reverse the roles to their original locations, if desired. (Use the `SWITCHOVER` command.)

Making Online Changes to the Configuration

Oracle supports many online changes.

1. Make the online configuration change at the primary instance. For example, enter the following SQL statement:

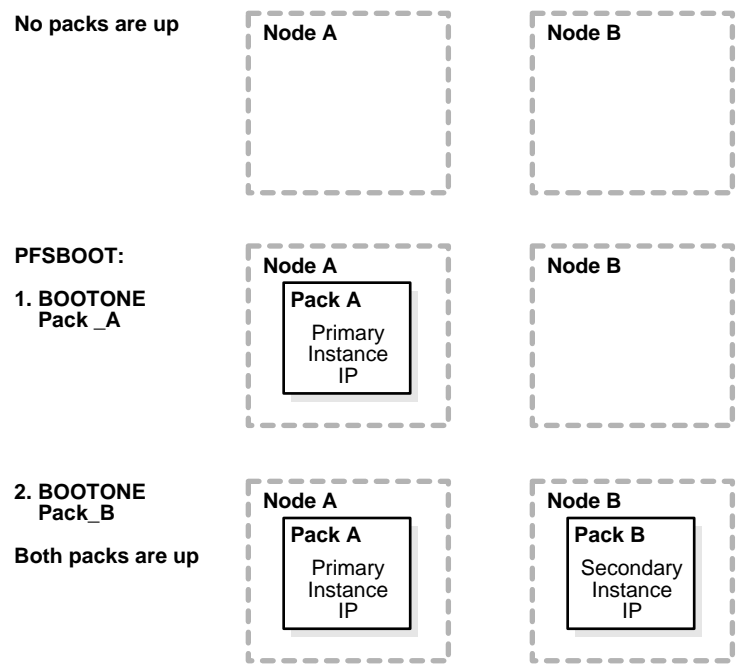
```
SQL> ALTER SYSTEM SET fast_start_mttr_target = 120;
```
2. Make the same configuration change to the Oracle configuration files to ensure that the change is preserved at the next failover or restart.

Changing the PFS_KEEP_PRIMARY Parameter

The `PFS_KEEP_PRIMARY` parameter specifies whether to leave the primary pack up and running when the secondary pack does not come up during `PFSBOOT`.

[Figure 4–3](#) shows the effect of entering the `PFSBOOT` command during normal operation.

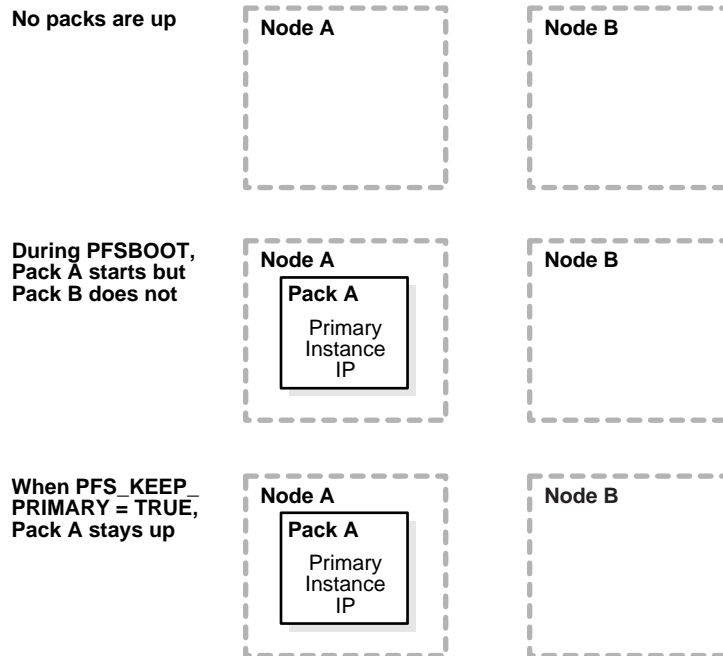
Figure 4–3 *PFSBOOT During Normal Operation*



Before the command is entered, no packs are running. When the `PFSBOOT` command is entered, Oracle Real Application Clusters Guard first starts Pack A on Node A, which becomes the primary node. Then Oracle Real Application Clusters Guard starts Pack B on Node B, which becomes the secondary node.

[Figure 4–4](#) shows what happens when `PFS_KEEP_PRIMARY` is set to `$PFS_TRUE` and the second pack does not start.

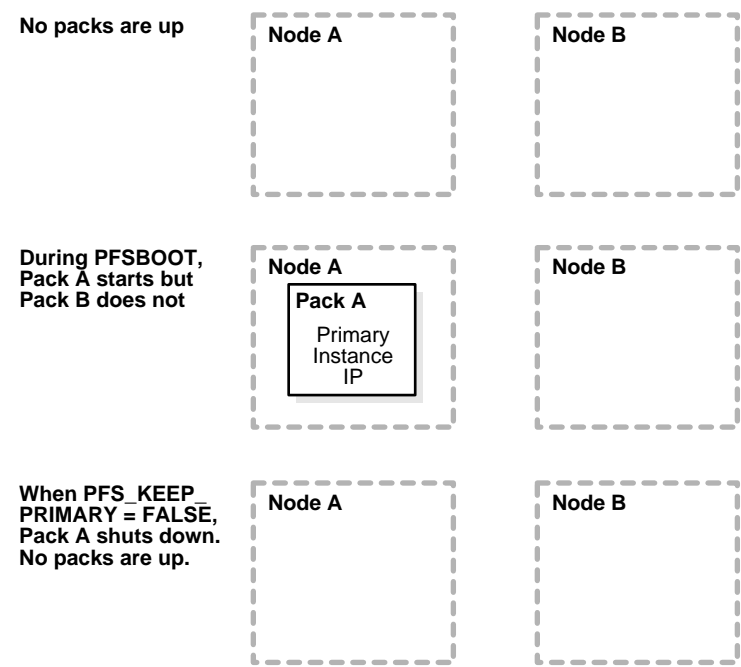
Figure 4–4 PFSBOOT When PFS_KEEP_PRIMARY=TRUE and Secondary Pack Does Not Start



When the `PFSBOOT` command is entered, Oracle Real Application Clusters Guard starts Pack A on Node A, which becomes the primary node. However, when Oracle Real Application Clusters Guard tries to start Pack B on Node B, it fails for some reason. If `PFS_KEEP_PRIMARY` is set to `$PFS_TRUE`, then Pack A remains up. The system runs without resilience while you diagnose the cause of the failure on Node B.

Figure 4–5 shows what happens when `PFS_KEEP_PRIMARY` is set to `$PFS_FALSE` and the second pack does not start.

Figure 4–5 PFSBOOT When PFS_KEEP_PRIMARY=FALSE and Secondary Pack Does Not Start



When the `PFSBOOT` command is entered, Oracle Real Application Clusters Guard starts Pack A on Node A, which becomes the primary node. If Oracle Real Application Clusters Guard fails to start Pack B on Node B and `PFS_KEEP_PRIMARY` is set to `$PFS_FALSE`, then Oracle Real Application Clusters Guard shuts down Pack A on Node A. No packs are running.

See Also: ["Changing Oracle Real Application Clusters Guard Configuration Parameters"](#) on page 1-28 for more information about changing the value of `PFS_KEEP_PRIMARY`

Making Online Changes to the ORAPING_CONFIG Table

The heartbeat monitor uses a database table, `ORAPING_CONFIG`, to record the configuration information. The use of a table ensures that both instances of the cluster always use the same value. This table is refreshed on an interval defined by the `CONFIG_INTERVAL` parameter.

[Table 4–1](#) shows the parameters in the `ORAPING_CONFIG` table.

Table 4–1 Parameters in the ORAPING_CONFIG Table

Parameter Name	Default Value	Description
INTERNAL_TIMEOUT	30	Time in seconds to execute internal ORACLE_PING statements
USER_TIMEOUT	60	Time in seconds to execute customer query
MAX_TRIES	3	Number of times to try to execute the heartbeat monitor cycle before declaring failure
SPECIAL_WAIT	300	Time in seconds to wait for special events to complete
RECOVERY_RAMPUP_TIME	300	Time in seconds to wait for ramp-up after failover
CYCLE_TIME	120	Time in seconds to execute heartbeat monitor and sleep cycle
CONNECT_TIMEOUT	30	Time in seconds to establish heartbeat monitor connection
CONFIG_INTERVAL	600	Time in seconds to wait before reading the ORAPING_CONFIG table
TRACE_FLAG	0	Flag to enable (1) or disable (0) SQL trace
TRACE_ITERATIONS	1	Number of heartbeat monitor cycles to trace if trace is enabled
LOGON_STORM_THRESHOLD	50	If the number of sessions logging on to the database exceeds the value of LOGON_STORM_THRESHOLD during the heartbeat monitor cycle, then Oracle Real Application Clusters Guard ignores the CONNECT_TIMEOUT parameter.

Suppose performance issues arise during initial testing of the system. Then you can run Oracle Real Application Clusters Guard with the values in the ORAPING_CONFIG table raised to a level that allows problems to persist long enough for detailed analysis. You can lower the configuration values when the system is stable.

Another reason to change the values in the ORAPING_CONFIG table is to customize them for different workloads. False failovers can occur when workloads are so large that timeouts occur simply because the system is busy.

To change the values in the ORAPING_CONFIG table, perform steps similar to the following:

1. Connect as the \$ORACLE_USER and view the default values in the ORAPING_CONFIG table. Enter the following commands:

```
$ sqlplus /
SQL> SELECT * FROM oraping_config;
```

You should see the following output:

```
INTERNAL_TIMEOUT USER_TIMEOUT MAX_RETRIES SPECIAL_WAIT
RECOVERY_RAMPUP_TIME
-----
-----
CYCLE_TIME CONNECT_TIMEOUT CONFIG_INTERVAL TRACE_FLAG
TRACE_ITERATIONS
-----
-----
LOGON_STORM_THRESHOLD
-----
-----
30          60          3          300
300
120          30          600          0          1
50
```

2. Update the ORAPING_CONFIG table. Enter commands similar to the following:

```
SQL> UPDATE oraping_config SET
2 cycle_time = 300,
3 connect_timeout = 120,
4 user_timeout = 120,
5 special_wait = 600,
6 logon_storm_threshold =100;
1 row updated.
SQL> COMMIT;
```

3. View the results of the update. Enter the following command:

```
SQL> SELECT * FROM oraping_config;
```

You should see output similar to the following:

```
INTERNAL_TIMEOUT USER_TIMEOUT MAX_RETRIES SPECIAL_WAIT
RECOVERY_RAMPUP_TIME
-----
-----
CYCLE_TIME CONNECT_TIMEOUT CONFIG_INTERVAL TRACE_FLAG
TRACE_ITERATIONS
-----
-----
```

```
-----
LOGON_STORM_THRESHOLD
-----
300          30          120          3          600
300          300          120          600          0          1
100
```

Managing the Oracle Real Application Clusters Guard Log Files

Note: Do not delete the Oracle Real Application Clusters Guard log files. They are essential for tracking faults.

Oracle Real Application Clusters Guard writes log files and debug files to the following locations:

OFA configuration: \$ORACLE_BASE/admin/\$DB_NAME/pfs/pfsdump
non-OFA configuration: \$ORACLE_HOME/pfs/\$DB_NAME/log

To find the Oracle Real Application Clusters Guard logs, change to the pfsdump directory. Enter a command similar to the following:

```
cd /mnt1/oracle/admin/sales/pfs/pfsdump
```

List the contents of the directory. You should see output similar to the following:

```
pfs_sales_host1.debug      pfs_sales_host1_ping.log
pfs_sales_host1.log
```

Allow sufficient space for the log files. If the log files become too large, then copy them manually to a backup location. Oracle Real Application Clusters Guard will automatically open a new copy of the file that has been archived when it writes to the file again.

See Also: ["Interpreting Message Output in Oracle Real Application Clusters Guard"](#) on page 6-2 for more information about log and debug files

Recovering from a Failover While Datafiles are in Backup Mode

When datafiles are in backup mode, they appear to instance recovery as if they are past versions. Oracle issues a message at the next startup that says media recovery is required. Media recovery is *not* required. Solve the problem by taking the following actions:

- 1. Stop the packs.
- 2. Mount the database.
- 3. Take each affected datafile out of backup mode.
- 4. Restart the packs.

Note: RMAN does not encounter this problem. If you are using RMAN, this procedure is not necessary.

The steps are shown in more detail as follows:

- 1. Halt the packs. Enter the following command:

```
PFSCCTL> pfshalt
```
- 2. Mount one of the instances. Enter commands similar to the following:

```
$ sqlplus "system/manager as sysdba"
SQL> startup mount;
```
- 3. Identify the datafiles that are in backup mode. Enter commands similar to the following:

```
SELECT file#, recover, fuzzy, tablespace_name, name
FROM v$datafile_header
WHERE fuzzy = 'YES' ;
```

You should see output similar to the following:

FILE#	REC	FUZ	TABLESPACE	NAME
----	---	---	-----	-----
6	NO	YES	USERS	/dev/vx/rdisk/home-dg/oracle_usr01
7	NO	YES	USERS	/dev/vx/rdisk/home-dg/oracle_usr02

- 4. Take the datafiles out of backup mode. Enter SQL statements similar to the following:

```
SQL> ALTER DATABASE DATAFILE '/dev/vx/rdsk/home-dg/oracle_usr01' END BACKUP;
```

You should see output similar to the following:

```
Database altered.
```

Continue taking affected datafiles out of backup mode.

```
SQL> ALTER DATABASE DATAFILE '/dev/vx/rdsk/home-dg/oracle_usr02' END BACKUP;
```

```
Database altered.
```

Note: If you repeat the ALTER DATABASE...END BACKUP statement, Oracle issues errors. They are not destructive, and you can ignore them.

```
SQL> ALTER DATABASE DATAFILE '/dev/vx/rdsk/home-dg/oracle_usr01' END BACKUP;
```

Output similar to the following may occur:

```
alter database datafile '/dev/vx/rdsk/home-dg/oracle_usr01' end backup
*
ERROR at line 1:
ORA-01235: END BACKUP failed for 1 file(s) and succeeded for 0
ORA-01199: file 6 is not in online backup mode
ORA-01110: data file 6: '/dev/vx/rdsk/home-dg/oracle_usr01'
```

5. Unmount the Oracle instance.

```
SQL> shutdown immediate
```

6. Start the packs.

```
PFSCCTL> pfsboot
```

Note: You should also take datafiles out of backup mode before a switchover. You can do it manually, or you can implement it as a call-out from the PLANNED_DOWN state in role change notification.

See Also:

- *Oracle9i User-Managed Backup and Recovery Guide*
- *Oracle9i SQL Reference*
- ["Setting Up Role Change Notification"](#) on page 3-5

Configuring the Network for Oracle Real Application Clusters Guard

This chapter describes how to configure the Oracle network for Oracle Real Application Clusters Guard. It contains the following sections:

- [Configuring the Oracle Network](#)
- [Dedicated Server Connections](#)
- [Shared Server Connections](#)
- [Transparent Application Failover Dedicated Connections](#)

Configuring the Oracle Network

The following network configurations can be used with Oracle Real Application Clusters Guard:

- [Dedicated Server Connections](#)
- [Shared Server Connections](#)
- [Transparent Application Failover Dedicated Connections](#)

These options are supported with Oracle Real Application Clusters Guard, but you must configure them according to the guidelines in this chapter. The decision about which type of connection to use depends on the resources available, as well as application and business needs.

See Also: *Oracle Net Services Administrator's Guide*

Dedicated Server Connections

Dedicated server environments do not have cross-instance listener registration. A connection request made to a specific instance's listener can be connected only to that instance's service. When the primary instance fails, the re-connection request from the client is rejected by the failed instance's listener. Oracle Real Application Clusters Guard stops the failed instance's listener and the IP address to which it was listening. Oracle Real Application Clusters Guard then restarts the IP address on the node where the secondary instance performs recovery and becomes the primary instance. When the client resubmits the request, the client re-establishes the connection using the new primary instance's listener that then connects the client to the new primary instance.

Oracle Real Application Clusters Guard uses the `LOCAL_LISTENER` initialization parameter to specify the network name that resolves to an address of Oracle Net local listeners (listeners that are running on the same machine as the instance). The address is specified in the `tnsnames.ora` file.

For example, if the `LOCAL_LISTENER` initialization parameter is set to `listener_SALES_HOSTA`, and `listener_SALES_HOSTA` uses TPC/IP on port 1421, then the entry in the `tnsnames.ora.ded.pfs` file looks like this:

```
listener_SALES_HOSTA=
  (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.74)(PORT=1421))
```

Note: The `HOST` is defined to be the relocatable IP address.

Example of an Oracle Real Application Clusters Guard Dedicated Network Configuration

Suppose the following Oracle Real Application Clusters Guard environment called SALES exists:

	Node 1	Node 2
ORACLE_SERVICE (database)	SALES	SALES
ORACLE_SID (instance)	SALES1	SALES2
Listener	SALES_HOSTA_LSNR	SALES_HOSTB_LSNR
Relocatable IP address	144.25.28.74	144.25.28.75

Configure the LOCAL_LISTENER parameter to allow for service registration. Then the following parameters are defined as shown in the following table:

Parameter	Node 1	Node 2
SERVICE_NAME	SALES.Oracle.COM	SALES.Oracle.COM
INSTANCE_NAME	SALES1	SALES2
LOCAL_LISTENER	listener_SALES_HOSTA	listener_SALES_HOSTB

The values of the LOCAL_LISTENER parameter can be resolved through the local tnsnames.ora files on Nodes 1 and 2, respectively:

```
listener_SALES_HOSTA=
  (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.74)(PORT=1421))

listener_SALES_HOSTB=
  (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.75)(PORT=1421))
```

The following actions result from this configuration:

- 1. The PMON process for instance SALES1 registers with listener SALES_HOSTA_LSNR.

The PMON process for instance SALES2 registers with listener SALES_HOSTB_LSNR.

You can confirm this by asking for a services summary on each node:

```
LSNRCTL> services SALES_HOSTA_LSNR
Connecting to
(DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.74)(PORT=1421)
Services Summary...
Service "sales.oracle.com"          has 1 instances.
  Instance "SALES1"
    Status: READY Total handlers: 1 Relevant handlers: 1
    DEDICATED established:6 refused:0 current:0 max:0 state:ready
    Session: NS

LSNRCTL> services SALES_HOSTB_LSNR
Connecting to
(DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.75)(PORT=1421)
Services Summary...
Service "sales.oracle.com"          has 1 instances.
  Instance "SALES2"
    Status: READY/SECONDARY Total handlers: 1 Relevant handlers: 1
    DEDICATED established:11 refused:0 current:0 max:0 state:ready
    Session: NS
```

2. The client sends a connect request.

The connect descriptor contains addresses of listeners located on 144.25.28.74 and 144.25.28.75 that listen for connection requests for a database service called SALES.Oracle.com with a primary instance role.

The connect descriptor address list features connect-time failover and no client load balancing. Connect-time failover is enabled by setting `FAILOVER=ON`. When set to `ON`, the `FAILOVER` parameter instructs Oracle Net at connect time to fail over to 144.25.28.75 if the first address, 144.215.28.74, fails. The `FAILOVER` parameter defaults to `ON` for description lists, descriptions, and address lists.

The `SALES_DED` net service name enables connections to the instance with the primary instance role. The `SERVER=DEDICATED` specification forces a dedicated server connection.

```
SALES_DED=
(DESCRIPTION=
  (LOAD_BALANCE=OFF)
  (ADDRESS_LIST=
    (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.74)(PORT=1421))
    (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.75)(PORT=1421)))
  (CONNECT_DATA=
    (SERVICE_NAME=SALES.Oracle.com)
    (SERVER=DEDICATED)
    (INSTANCE_ROLE=PRIMARY)))
```

- 3. The listener receives the request and directs it to the appropriate server.
- 4. The connection is accepted by the server.

See Also: *Oracle Net Services Administrator's Guide*

Shared Server Connections

Dynamic service registration relies on the PMON process to register instance information with a listener, as well as the current state and load of the instance and shared server dispatchers. The registered information enables the listener to forward client connection requests to the appropriate service handler.

In Oracle Real Application Clusters Guard, the LISTENER attribute in the DISPATCHER initialization parameter has been configured to allow for dynamic service registration of information to both listeners, also referred to as cross-instance listener registration. The primary instance registers with the primary instance listener as well as the secondary instance listener. This enables the primary instance to accept connections from its local listener, as well as from the secondary instance listener. A secondary instance registers with its local listener as a secondary instance.

Example of an Oracle Real Application Clusters Guard Shared Server Connection

Suppose that the following Oracle Real Application Clusters Guard environment called SALES exists:

	Node 1	Node 2
ORACLE_SERVICE	SALES	SALES
ORACLE_SID (instance)	SALES1	SALES2
Listener	SALES_HOSTA_LSNR	SALES_HOSTB_LSNR
Relocatable IP address	144.25.28.74	144.25.28.75

Define the DISPATCHERS initialization parameter on each node:

- On Node 1:
dispatchers=

```
"(ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.74)(LISTENER=listener_SALES)"
```

■ **On Node 2:**

```
dispatchers=
"(ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.75)(LISTENER=listener_SALES)"
```

Note:

- Each instance has one dispatcher.
 - The configuration forces the relocatable IP address to be used for the dispatcher.
 - Oracle Net dynamically selects the TCP/IP port for the dispatcher.
-
-

The listener value (listener_SALES) can then be resolved through a local `tnsnames.ora` file on both servers as follows, assuming that the listener alias name is `listener_SALES` and the two ports are 1526:

```
listener_SALES=
DESCRIPTION=
  (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.74)(PORT=1526))
  (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.75)(PORT=1526))
```

The following actions result from this configuration:

1. Each dispatcher listens on the address assigned to it.
2. The PMON processes for the SALES1 and SALES2 instances register with both listeners. The listeners are updated dynamically with information about the load of the instances and dispatchers. You can confirm this by asking for a services summary on each node. Enter the following command:

```
$ lsnrctl
```

You should see output similar to the following:

```
LSNRCTL for Solaris: Version 9.0.1.0.0 - Production on 03-JAN-2001 13:54:16
(c) Copyright 2001 Oracle Corporation. All rights reserved.
```

```
Welcome to LSNRCTL, type "help" for information.
```

Enter the following command:

```
LSNRCTL> set display normal
```

You should see output similar to the following:

```
Service display mode is NORMAL
```

Enter the following command:

```
LSNRCTL> services SALES_HOSTA_LSNR
```

You should see output similar to the following:

```
Connecting to
(DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.74)(PORT=1526)(QUEUE=1024)))
Services Summary...
Service "sales.oracle.com"          has 2 instances.
  Instance "sales1"
    Status: READY Total handlers: 1 Relevant handlers: 1
    D000 established:3 refused:0 current:0 max:1022 state:ready
    (ADDRESS=(PROTOCOL=tcp)(HOST=144.25.28.74)(PORT=60349))
    Session: NS
  Instance "sales2"
    Status: READY/SECONDARY Total handlers: 1 Relevant handlers: 1
    D000 established:0 refused:0 current:0 max:1022 state:ready
    (ADDRESS=(PROTOCOL=tcp)(HOST=144.25.28.75)(PORT=60858))
    Session: NS
The command completed successfully
```

3. The client requests a connection.

The connect descriptors list specifies connect-time failover and no client load balancing. At connection time, Oracle Net fails over to 144.25.28.75 if the first address, 144.215.28.74, fails.

The SALES_MTS net service name enables connections to the instance with the primary instance role.

If a shared server is specified and a client connection request arrives when no dispatchers are registered, then the request can be handled by a dedicated server process. Oracle Real Application Clusters Guard forces clients to always use a dispatcher because (SERVER=SHARED) is configured in the connect data portion of the connect descriptor. If a dispatcher is not available, the client connection request is rejected.

The client connect descriptor uses an address list that contains the listener addresses for the primary instance and the secondary instance. The `LOAD_BALANCE` parameter is set to `OFF` because all client connections should go to the primary instance.

For example, define `SALES_MTS` as follows:

```
SALES_MTS=
  (DESCRIPTION=
    (LOAD_BALANCE=OFF)
    (ADDRESS_LIST=
      (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.74)(PORT=1526))
      (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.75)(PORT=1526)))
    (CONNECT_DATA=
      (SERVICE_NAME=SALES.Oracle.COM)
      (SERVER=SHARED)
      (INSTANCE_ROLE=PRIMARY)))
```

4. The listener receives the connection request and determines whether the client's request can be serviced. If not, the listener refuses the network connection request.
5. If the client's request is valid, then the listener performs one of the following actions:
 - The listener hands the connection request directly to a dispatcher.
 - The listener issues a redirect message to the client. The message contains the network address of a dispatcher. The client then dissolves the network session to the listener and establishes a network session to the dispatcher, using the network address provided in the message, and directs the client's to the appropriate server.

Transparent Application Failover Dedicated Connections

Transparent application failover (TAF) instructs Oracle Net to fail over an established connection to a different listener. This enables the user to continue to work, using the new connection as if the original connection had not failed. Using TAF requires manual configuration of a net service name that includes the `FAILOVER_MODE` parameter in the `CONNECT_DATA` portion of the connect descriptor.

This section includes the following topics:

- [TAF Basic Dedicated Connections](#)

- **TAF Pre-Established Dedicated Connections**

See Also: *Oracle Net Services Administrator's Guide* for more information about TAF

TAF Basic Dedicated Connections

In this example of a TAF basic dedicated connection, the TAF application first tries to connect to the 144.25.28.74 IP address. If it cannot connect, then it attempts to perform a connect-time failover to 144.25.27.75. If the instance fails after the connection, then the TAF application fails over to the other node's listener, reserving `SELECT` statements that are in progress. If the failover connection attempt fails, then Oracle Net waits 5 seconds before trying to connect again. Oracle Net attempts to connect up to 180 times.

```
SALES_DED_BASIC=
  (DESCRIPTION=
    (LOAD_BALANCE=OFF)
    (FAILOVER=ON)
    (ADDRESS_LIST=
      (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.74)(PORT=1524))
      (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.75)(PORT=1524)))
    (CONNECT_DATA=
      (SERVICE_NAME=SALES.Oracle.COM)
      (SERVER=DEDICATED)
      (INSTANCE_ROLE=PRIMARY)
      (FAILOVER_MODE=
        (BACKUP=SALES_DED_BASIC_BACKUP)
        (TYPE=SELECT)
        (METHOD=BASIC)
        (RETRIES=180)
        (DELAY=5))))

SALES_DED_BASIC_BACKUP=
  (DESCRIPTION=
    (LOAD_BALANCE=OFF)
    (FAILOVER=ON)
    (ADDRESS_LIST=
      (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.75)(PORT=1524))
      (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.74)(PORT=1524)))
    (CONNECT_DATA=
      (SERVICE_NAME=SALES.Oracle.COM)
      (SERVER=DEDICATED)
      (INSTANCE_ROLE=PRIMARY))
```

```
(FAILOVER_MODE=
  (BACKUP=SALES_DED_BASIC)
  (TYPE=SELECT)
  (METHOD=BASIC)
  (RETRIES=180)
  (DELAY=5) ) ) )
```

TAF Pre-Established Dedicated Connections

When TAF is configured, a back-up connection can be pre-established to the secondary instance. The initial and back-up connections are specified explicitly. In the following example, Oracle Net connects to the listener on HOSTA and establishes a pre-connection to HOSTB, the secondary instance. If HOSTA fails after the connection, then the TAF application fails over to HOSTB. The RETRIES and DELAY parameters cause Oracle Net to automatically try to connect again if the first connection attempt fails.

In the following example of a TAF pre-established dedicated connection, the TAF application tries to connect to the 144.25.28.74 address first. If it cannot, then Oracle Net attempts connect-time failover to 144.25.27.75. A back-up connection is pre-established. If the instance fails after the connection, then the TAF application fails over to the other node's listener, reserving any SELECT statements in progress. If the failover connection attempt fails, then Oracle Net waits 5 seconds before trying to connect again. Oracle Net attempts to connect up to 180 times.

```
SALES_DED_PRE=
  (DESCRIPTION=
    (LOAD_BALANCE=OFF)
    (FAILOVER=ON)
    (ADDRESS_LIST=
      (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.74)(PORT=1524))
      (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.75)(PORT=1524))
    )
    (CONNECT_DATA=
      (SERVICE_NAME=SALES.Oracle.COM)
      (SERVER=DEDICATED)
      (INSTANCE_ROLE=PRIMARY)
      (FAILOVER_MODE=
        (BACKUP=SALES_DED_PRE_SECONDARY)
        (TYPE=SELECT)
        (METHOD=PRECONNECT)
        (RETRIES=180)
        (DELAY=5) ) ) )
  )

SALES_DED_PRE_SECONDARY=
```

```
(DESCRIPTION=
  (LOAD_BALANCE=OFF)
  (FAILOVER=ON)
  (ADDRESS_LIST=
    (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.75)(PORT=1524))
    (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.74)(PORT=1524)))
  (CONNECT_DATA=
    (SERVICE_NAME=SALES.Oracle.COM)
  (SERVER=DEDICATED)
  (INSTANCE_ROLE=SECONDARY)
  (FAILOVER_MODE=
    (BACKUP=SALES_DED_PRE)
    (TYPE=SELECT)
    (METHOD=PRECONNECT)
    (RETRIES=48)
    (DELAY=900))))
```

Troubleshooting Oracle Real Application Clusters Guard

This chapter describes how to troubleshoot an Oracle Real Application Clusters Guard system. It includes the following topics:

- [Interpreting Message Output in Oracle Real Application Clusters Guard](#)
- [Troubleshooting Start-Up Problems](#)
- [Troubleshooting Command Line Problems](#)
- [Troubleshooting Oracle Real Application Clusters Guard Monitors](#)
- [Troubleshooting the System Outside of the Packs](#)

Interpreting Message Output in Oracle Real Application Clusters Guard

Oracle Real Application Clusters Guard provides detailed error messages that can help in troubleshooting. Error messages from the Oracle database server and from third-party media vendors also provide useful troubleshooting output. This section contains the following topics:

- [Identifying Types of Message Output](#)
- [Identifying Error Codes](#)
- [Interpreting Oracle Real Application Clusters Guard Error Messages](#)
- [Interpreting Debugging Output](#)

Identifying Types of Message Output

[Table 6–1](#) shows the types of message output that are useful for troubleshooting Oracle Real Application Clusters Guard.

Table 6–1 *Message Output*

Type of Output	Produced By	Location	Description
PFSCtl messages	PFSCtl command line	Standard output (terminal and PFSCtl.log)	
PFS messages	Packs and monitors	OFA: \$ORACLE_BASE /admin/\$DB_NAME/pfs /pfsdump/pfs_\$ORACLE_SERVICE_Host.log Non-OFA: \$ORACLE_HOME /pfs/\$DB_NAME/log /pfs_\$ORACLE_SERVICE_Host.log	Contains a chronological log of actions that are relevant to Oracle Real Application Clusters Guard, error messages that are generated by Oracle Real Application Clusters Guard and the Oracle database server, and administrative operations
PFS debug file	\$PFS_DEBUGGING command	OFA: \$ORACLE_BASE /admin/\$DB_NAME/pfs /pfsdump/pfs_\$ORACLE_SERVICE_Host.debug Non-OFA: \$ORACLE_HOME /pfs/\$DB_NAME/log /pfs_\$ORACLE_SERVICE_Host.debug	Contains detailed output generated by Oracle Real Application Clusters Guard processes. This file is appended when \$PFS_DEBUGGING is set to \$PFS_TRUE.

Table 6–1 Message Output (Cont.)

Type of Output	Produced By	Location	Description
Monitor log files	Heartbeat monitor	OFA: \$ORACLE_BASE/admin /\$DB_NAME/pfs/pfsdump /pfs_\$ORACLE_SERVICE_ Host_oraping.log Non-OFA: \$ORACLE_HOME/pfs /\$DB_NAME/log/pfs_ \$ORACLE_SERVICE__Host_ oraping.log	Contains information about the functioning of the heartbeat monitor
PFS trace file	Heartbeat monitor	The directory specified by the USER_DUMP_DEST initialization parameter	Contains SQL*Trace output, including wait and bind data. This file is created when TRACE_FLAG is set to \$PFS_TRUE in the ORAPING_CONFIG table. See Also: "Making Online Changes to the ORAPING_CONFIG Table" on page 4-14
Fault data capture	Listener monitor	\$ORACLE_ HOME/network/trace/pfs_ lsnr_LsnrPid.trc or \$ORACLE_ HOME/network/trace/pfs_ lsnr_Time.trc where <i>Time</i> is the time in seconds when the listener terminated	Contains output generated by the netstat UNIX command
Fault data capture	Pack	The directory specified by the USER_DUMP_DEST initialization parameter	Contains output generated by Oracle system state dump and utlopslt.sql script
Alert log	Oracle database server	The directory specified by the BACKGROUND_DUMP_DEST initialization parameter	Contains a chronological log of errors, initialization parameter file settings, and administrative operations
Oracle trace file	Oracle database server	The directory specified by the USER_DUMP_DEST initialization parameter	Contains detailed output generated by Oracle server processes
System logs	Operating system		

Identifying Error Codes

The following types of error codes are found in the Oracle Real Application Clusters Guard logs and trace files:

- Errors with the PFS prefix
- Errors with the ORA prefix
- Errors preceded by **ERROR**

See Also:

- [Appendix A, "Oracle Real Application Clusters Guard Error Messages"](#)
- *Oracle9i Database Error Messages*

Oracle Real Application Clusters Guard Error Message Numbers

[Table 6–2](#) shows the error ranges for Oracle Real Application Clusters Guard error messages:

Table 6–2 Oracle Real Application Clusters Guard Error Ranges

Error Range	Cause
0000-0999	Generic
1000-2999	Main layer
3000-3999	OS-dependent layer
4000-4999	Pack layer
5000-5999	PFSCtl command line
6000-6999	Instance monitor
7000-7999	Listener monitor
8000-8999	Heartbeat monitor
9000-9999	Internal Oracle Real Application Clusters Guard process and role change notification
10000-19999	Oracle Real Application Clusters Guard Setup Utility (PFSSETUP)

Interpreting Oracle Real Application Clusters Guard Error Messages

Note the following suggestions for identifying useful messages in the Oracle Real Application Clusters Guard log files:

- Most of the messages in the log are information for capturing the root cause of a problem the first time it occurs. When a problem occurs, try to identify one or two errors that are most important.
- Check for errors that are preceded by "Warning". This indicates that a pack or a monitor has incurred a problem but is continuing to operate. It is an indication that actions may need to be taken before an outage occurs. The problem is described in the text of the message.
- Check for errors that are preceded by "Alert". This indicates the problem that the pack or monitor incurred.
- Read the messages in chronological order. The errors before and after the alert are usually the most informative.
- Identify the type of error according to [Table 6-2](#). Refer to [Appendix A](#) for information about the most important messages.

Example: Interpreting Oracle Real Application Clusters Guard Errors

The following is an example of messages from the Oracle Real Application Clusters Guard log file, `pfs_SALES_hostA.log`:

```
Wed Jan 10 11:57:14 2001 PFS-6014: Info: Routine connecting to instance.
Wed Jan 10 11:57:14 2001 ERROR: Encountered Oracle error while executing CONNECT --!
Wed Jan 10 11:57:14 2001 ORA-01034: ORACLE not available
ORA-27101: shared memory realm does not exist
SVR4 Error: 2: No such file or directory
Wed Jan 10 11:57:14 2001 PFS-6016: Alert: Routine failed to connect to instance.
Wed Jan 10 11:57:14 2001 PFS-6003: Warning: Routine 1 exits. Attempt to stop routine 0.
Wed Jan 10 11:57:14 2001 PFS-6006: Alert: ORACLE instance is not available. Instance
monitor exits.
```

Read the log in chronological order. The first alert message is:

```
PFS-6016: Alert: Routine failed to connect to instance.
```

The Oracle Real Application Clusters Guard error number is 6016, which means that the problem concerns the instance monitor. The messages before the alert contain an ORA-01034 error:

```
ORA-01034: ORACLE not available
```

You can conclude that the pack was halted because the Oracle instance or the database is down.

Interpreting Debugging Output

If the standard Oracle Real Application Clusters Guard logging is not generating enough information, then the Oracle Real Application Clusters Guard debug option can be used to generate more extensive output. Enable the Oracle Real Application Clusters Guard debug option by setting the `PFS_DEBUGGING` parameter to `$PFS_TRUE`.

Use debugging for the following purposes:

- To understand the cluster commands issued by Oracle Real Application Clusters Guard
- To determine where a Oracle Real Application Clusters Guard command is failing

The output is redirected to a separate trace file to prevent overloading the Oracle Real Application Clusters Guard log file. The debugging output contains the following information:

- Information generated by the cluster commands issued by Oracle Real Application Clusters Guard
- The results of Oracle Real Application Clusters Guard statement execution

See Also: ["Changing Oracle Real Application Clusters Guard Configuration Parameters"](#) on page 1-28 for more information about change the value of `PFS_DEBUGGING`

Troubleshooting Start-Up Problems

Use the `PFSBOOT` to start the packs. The steps of the `PFSBOOT` command are:

1. Check the prerequisites for executing the `PFSBOOT` command. These conditions cannot exist:
 - Check whether packs are already running.
 - Check whether the instance is running outside of the packs.
 - Check whether failover or restart is occurring.
2. Start the packs.

If the `PFSBOOT` command fails, then check the following items:

- ☐ Are there errors in the Oracle Real Application Clusters Guard logs?
- ☐ Are there errors in the alert logs?
- ☐ Is the cluster up and running?
- ☐ Is the network operating properly?

Oracle Corporation recommends setting up the call-home function to alert the user when the `PFSBOOT` command fails during normal processing.

See Also: ["Setting Up the Call-Home Feature"](#) on page 3-2

The Oracle Real Application Clusters Guard logs should clearly describe why the `PFSBOOT` command failed. You may need to stop the database manually before re-issuing the `PFSBOOT` command. The `PFSBOOT` command may also fail if the packs are running in foreign mode or if the monitors do not start successfully.

See Also:

- ["Recovering from Unplanned Outages on Both Nodes"](#) on page 4-4 for an explanation of a situation in which the packs may be running in foreign mode
- ["Troubleshooting Oracle Real Application Clusters Guard Monitors"](#) on page 6-16

This section contains the following examples:

- [Example: PFSBOOT Command Fails](#)
- [Example: PFSBOOT Command Fails](#)
- [Example: PFSBOOT Starts and Fails](#)

Example: PFSBOOT Command Fails

When you enter the `PFSBOOT` command, the following message may appear at the command line:

```
Alert: pfsboot command failed.
```

Diagnosis

The following output appears in the Oracle Real Application Clusters Guard log on hostA (pfs_SALES_hostA.log):

```
Fri Jan 12 16:15:07 2001 PFS-5014: Processing command pfsboot.  
Fri Jan 12 16:15:08 2001 PFS-5074: Alert: System is not clear. Pack PFS_SALES_hostA is  
running. Use PFSCCTL PFSHALT first.  
Fri Jan 12 16:15:09 2001 PFS-5080: Alert: pfsboot command failed
```

The first alert message is:

```
PFS-5074: Alert: System is not clear. Pack PFS_SALES_hostA is running. Use  
PFSCCTL PFSHALT first.
```

The message number indicates that the problem is in the PFSCCTL command line. The text of the message indicates that the PFS_SALES_hostA pack is already running. Enter the STATUS command to find out the exact state of the packs:

```
PFSCCTL> status
```

The following output results:

```
Info: Pack PFS_SALES_hostA started.  
hostB  
Info: Pack PFS_SALES_hostB started.  
Info: Local database instance is up.  
Info: Remote database instance is up.  
Info: Running primary role locally.  
Info: Running secondary role on remote node.  
Info: Both nodes running as part of the cluster.  
Info: Local node part of the cluster.  
Info: Remote node part of the cluster.  
Info: No internal process is running locally.  
Info: No internal process is running remotely.  
status command succeeded.
```

Solution

The STATUS command shows that both packs are running. If you want to restart the packs, then:

1. Halt both packs. Enter the PFSHALT command:

```
PFSCCTL> pfshalt
```

2. Start both packs. Enter the PFSBOOT command:

```
PFSCTL> pfsboot
```

Example: PFSBOOT Command Fails

When you enter the PFSBOOT command, the following message may appear at the command line:

```
Alert: pfsboot command failed.
```

Diagnosis

The following output appears in the Oracle Real Application Clusters Guard log on hostA (pfs_SALES_hostA.log):

```
Mon Jan 15 10:02:57 2001 PFS-4019: Info: Attempt to send notification that instance role
has changed.
Mon Jan 15 10:02:58 2001 PFS-5555: SALES hostA unknown planned_up 2001/01/15-10:02:57
Mon Jan 15 10:02:58 2001 PFS-2021: Info: Calling user provided role change notification
script: /mnt1/oracle/admin/sales/pfs/user/pfs_SALES_notifyrole.sh
Mon Jan 15 10:02:59 2001 PFS-2012: Info: User role notification script succeeded
Mon Jan 15 10:03:08 2001 PFS-4005: Info: Pack PFS_SALES_hostA starting on home node.
Mon Jan 15 10:03:09 2001 PFS-4010: Info: Attempt to initialize all variables.
Mon Jan 15 10:03:10 2001 PFS-4011: Info: Attempt to enable IP address.
Mon Jan 15 10:03:11 2001 PFS-4012: Info: Attempt to acquire disk storage.
Mon Jan 15 10:03:11 2001 PFS-4013: Info: Attempt to start public listener monitor and
public listener SALES_hostA_LISTNR.
Mon Jan 15 10:03:12 2001 PFS-7001: Info: Attempt to start private listener monitor and
private listener SALES_hostA_PRIVLSNR.
Mon Jan 15 10:03:13 2001 PFS-2020: Info: Start monitor avmlprog SALES_hostA_LISTNR 12432
Mon Jan 15 10:03:14 2001 PFS-4014: Info: Attempt to start database instance.
Mon Jan 15 10:03:14 2001 PFS-2020: Info: Start monitor avmlprog SALES_hostA_PRIVLSNR 12540
Mon Jan 15 10:03:16 2001 PFS-1000: Alert: Attempt to start Oracle instance failed.
Mon Jan 15 10:03:21 2001 PFS-5050: Alert: PFSCTL BOOTONE failed.
.
.
.
Mon Jan 15 10:03:50 2001 PFS-5064: Alert: Attempt to start primary failed.
Mon Jan 15 10:03:51 2001 PFS-5080: Alert: pfsboot command failed.
```

The first alert message is:

```
PFS-1000: Alert: Attempt to start Oracle instance failed.
```

The message number indicates that the problem was reported from the Oracle Real Application Clusters Guard main layer. The text of the message reports a problem with starting the Oracle instance.

The alert log (alertSALES1.log) does not show an entry for instance startup.

Try to start the database manually outside of the packs. Enter the following commands:

```
$ sqlplus /nolog
SQL*Plus: release 9.0.1.0.0 - Production on Mon Jan 15 10:26:11 2001
© Copyright 2001 Oracle Corporation. All rights reserved.
```

```
SQL> connect / as sysdba
Connected to an idle instance.
```

```
SQL> startup pfile=init_SALES1_hostA.ora
LRM-00101: unknown parameter name 'service_name'
ORA-01078: failure in processing system parameters
```

The Oracle errors indicate that there is a problem with the `SERVICE_NAME` initialization parameter.

Solution

Correct the problem with the initialization parameter. Restart the packs:

```
PFSCCTL> pfsboot
```

Example: PFSBOOT Starts and Fails

When you enter the `PFSBOOT` command, the resulting output shows that the command succeeded:

```
PFSCCTL> pfsboot
pfsboot command succeeded.
```

When you enter the `STATUS` command, the following output may result:

```
hostA
Info: Pack PFS_SALES_hostA started.
hostB
Info: Pack PFS_SALES_hostB started.
Info: Local database instance is up.
Info: Remote database instance is up.
Info: Running primary role locally.
Info: Running secondary role on remote node.
Info: Both nodes running as part of the cluster.
Info: Local node part of the cluster.
Info: Remote node part of the cluster.
Info: No internal process is running locally.
Info: No internal process is running remotely.
```

status command succeeded.

The output shows that although the PFSBOOT command started the instances, it shut down before starting other processes.

Diagnosis

If the packs start successfully and then shut down, then the following scenarios are possible:

- The packs terminated abnormally.
- A server-side error occurred.
- The heartbeat monitor failed to stay up.

Examine the Oracle Real Application Clusters Guard log, the database log, and the trace files for errors:

```
Mon Jan 15 14:37:15 2001 PFS-4019: Info: Attempt to send notification that instance role
has changed.
Mon Jan 15 14:37:26 2001 PFS-4005: Info: Pack PFS_SALES_hostA starting on home node.
Mon Jan 15 14:37:27 2001 PFS-4010: Info: Attempt to initialize all variables.
Mon Jan 15 14:37:28 2001 PFS-4011: Info: Attempt to enable IP address.
Mon Jan 15 14:37:28 2001 PFS-4012: Info: Attempt to acquire disk storage.
Mon Jan 15 14:37:29 2001 PFS-4013: Info: Attempt to start public listener monitor and
public listener SALES_hostA_LSNR.
Mon Jan 15 14:37:30 2001 PFS-7001: Info: Attempt to start private listener monitor and
private listener SALES_hostA_PRIVLSNR.
Mon Jan 15 14:37:30 2001 PFS-2020: Info: Start monitor avmlprog SALES_hostA_LSNR 8964
Mon Jan 15 14:37:32 2001 PFS-4014: Info: Attempt to start database instance.
Mon Jan 15 14:37:32 2001 PFS-2020: Info: Start monitor avmlprog SALES_hostA_PRIVLSNR 9069
Mon Jan 15 14:37:57 2001 PFS-4032: Info: Check if ACTIVE_INSTANCE_COUNT is set to 1.
Mon Jan 15 14:37:58 2001 PFS-4015: Info: Attempt to start instance monitor.
Mon Jan 15 14:37:59 2001 PFS-4016: Info: Attempt to check INSTANCE_ROLE.
Mon Jan 15 14:38:00 2001 PFS-2020: Info: Start monitor avmuprog SALES 9557
Mon Jan 15 14:38:01 2001 PFS-1001: Info: INSTANCE_ROLE is primary_instance.
Mon Jan 15 14:38:02 2001 PFS-4017: Info: Attempt to start ORACLE_PING.
Mon Jan 15 14:38:03 2001 PFS-2020: Info: Start monitor avmuprog SALES 9745
Mon Jan 15 14:38:03 2001 PFS-4018: Info: Attempt to enable pack switching.
Mon Jan 15 14:38:04 2001 PFS-4019: Info: Attempt to send notification that instance role
has changed.
Mon Jan 15 14:38:04 2001 PFS-8002: Warning: Instance sales1 is not registered with SALES_
hostA_LSNR.
Mon Jan 15 14:38:05 2001 PFS-5555: SALES hostA primary up 2001/01/15-14:38:04
Mon Jan 15 14:38:05 2001 PFS-2021: Info: Calling user provided role change notification
script: /mnt1/oracle/admin/sales/pfs/user/pfs_SALES_notifyrole.sh
Mon Jan 15 14:38:06 2001 PFS-2012: Info: User role notification script succeeded
Mon Jan 15 14:38:06 2001 PFS-9900: Info: Attempt to start role change notification.
```

```
Mon Jan 15 14:38:08 2001 PFS-4020: Info: Attempt to start DBMS_JOBS.
Mon Jan 15 14:38:08 2001 PFS-2020: Info: Start monitor avmrprog SALES 10010
Mon Jan 15 14:38:09 2001 PFS-4004: Info: Run method on home node completed.
Mon Jan 15 14:38:13 2001 PFS-5002: PFSCITL BOOTONE succeeded.
Mon Jan 15 14:38:15 2001 PFS-4019: Info: Attempt to send notification that instance role
has changed.
Mon Jan 15 14:38:15 2001 PFS-8002: Warning: Instance sales1 is not registered with SALES_
hostA_LSNR.
Mon Jan 15 14:38:26 2001 PFS-8002: Warning: Instance sales1 is not registered with SALES_
hostA_LSNR.
Mon Jan 15 14:38:36 2001 PFS-8002: Warning: Instance sales1 is not registered with SALES_
hostA_LSNR.
Mon Jan 15 14:38:47 2001 PFS-8002: Warning: Instance sales1 is not registered with SALES_
hostA_LSNR.
Mon Jan 15 14:38:58 2001 PFS-8002: Warning: Instance sales1 is not registered with SALES_
hostA_LSNR.
Mon Jan 15 14:39:09 2001 PFS-8002: Warning: Instance sales1 is not registered with SALES_
hostA_LSNR.
Mon Jan 15 14:39:10 2001 PFS-5002: PFSCITL BOOTONE succeeded.
Mon Jan 15 14:39:11 2001 PFS-5007: PFSCITL PFSBOOT succeeded.

Mon Jan 15 14:39:12 2001 PFS-3000: Info: Pack PFS_SALES_hostA started.
Mon Jan 15 14:39:14 2001 PFS-3000: Info: Pack PFS_SALES_hostB started.
Mon Jan 15 14:39:15 2001 PFS-3002: Info: Local database instance is up.
Mon Jan 15 14:39:17 2001 PFS-3004: Info: Remote database instance is up.
Mon Jan 15 14:39:19 2001 PFS-3006: Info: Running primary role locally.
Mon Jan 15 14:39:19 2001 PFS-8002: Warning: Instance sales1 is not registered with SALES_
hostA_LSNR.
Mon Jan 15 14:39:22 2001 PFS-3010: Info: Running secondary role on remote node.
Mon Jan 15 14:39:26 2001 PFS-3012: Info: Both nodes running as part of the cluster.
Mon Jan 15 14:39:29 2001 PFS-3013: Info: Local node part of the cluster.
Mon Jan 15 14:39:30 2001 PFS-8002: Warning: Instance sales1 is not registered with SALES_
hostA_LSNR.
Mon Jan 15 14:39:31 2001 PFS-3014: Info: Remote node part of the cluster.
Mon Jan 15 14:39:32 2001 PFS-3072: Info: No internal process is running locally.
Mon Jan 15 14:39:33 2001 PFS-3073: Info: No internal process is running remotely
Mon Jan 15 14:39:34 2001 PFS-5015: pfsboot command succeeded.
Mon Jan 15 14:39:41 2001 PFS-8002: Warning: Instance sales1 is not registered with SALES_
hostA_LSNR.
Mon Jan 15 14:39:51 2001 PFS-8002: Warning: Instance sales1 is not registered with SALES_
hostA_LSNR.
Mon Jan 15 14:40:02 2001 PFS-8002: Warning: Instance sales1 is not registered with SALES_
hostA_LSNR.
Mon Jan 15 14:40:13 2001 PFS-8002: Warning: Instance sales1 is not registered with SALES_
hostA_LSNR.
Mon Jan 15 14:40:23 2001 PFS-8005: Alert: MTS service or instance sales1 not registered
with SALES_hostA_LSNR in 120 seconds. Exit. Mon Jan 15 14:40:24 2001
Mon Jan 15 14:40:25 2001 PFS-2019: Info: PFS callhome with Oraping_monitor_exits now.
Mon Jan 15 14:40:25 2001 PFS-2019: Info: PFS callhome with Oraping_for_SALES_error_Will_
failover now.
```



```

Mon Jan 15 14:40:26 2001 PFS-2019: Info: PFS callhome with Failing_over_service_SALES now.
Mon Jan 15 14:40:30 2001 PFS-4007: Info: Pack PFS_SALES_hostA stopping on home node.
Mon Jan 15 14:40:31 2001 PFS-4019: Info: Attempt to send notification that instance role
has changed.
Mon Jan 15 14:40:31 2001 PFS-5555: SALES hostA primary down 2001/01/15-14:40:31
Mon Jan 15 14:40:32 2001 PFS-2021: Info: Calling user provided role change notification
script: /mnt1/oracle/admin/sales/pfs/user/pfs_SALES_notifyrole.sh
Mon Jan 15 14:40:32 2001 PFS-2012: Info: User role notification script succeeded
Mon Jan 15 14:40:33 2001 PFS-4028: Info: Attempt to halt instance monitor.
Mon Jan 15 14:40:34 2001 PFS-4029: Info: Attempt to halt ORACLE_PING.
Mon Jan 15 14:40:35 2001 PFS-3064: Info: Service PFS_SALES_Ping_hostA has already been
stopped.
Mon Jan 15 14:40:35 2001 PFS-9902: Info: Attempt to stop role change notification Mon Jan
15 14:40:36 2001 PFS-4027: Info: Attempt to archive, checkpoint, and dump database.
Mon Jan 15 14:40:45 2001 PFS-1012: Info: Local and remote ORACLE systemstates dumped to
USER_DUMP_DEST.
Mon Jan 15 14:40:45 2001 PFS-4026: Info: Attempt to abort database.
Mon Jan 15 14:40:46 2001 PFS-4019: Info: Attempt to send notification that instance role
has changed.
Mon Jan 15 14:40:47 2001 PFS-5555: SALES hostA primary cleanup 2001/01/15-14:40:46
Mon Jan 15 14:40:47 2001 PFS-2021: Info: Calling user provided role change notification
script: /mnt1/oracle/admin/sales/pfs/user/pfs_SALES_notifyrole.sh
Mon Jan 15 14:40:48 2001 PFS-2012: Info: User role notification script succeeded
Mon Jan 15 14:40:49 2001 PFS-2003: Info: Attempt to start internal PFS process on primary
instance.
Mon Jan 15 14:40:49 2001 PFS-4025: Info: Attempt to halt public listener monitor
and public listener SALES_hostA_LSNR.
Mon Jan 15 14:40:50 2001 PFS-7003: Info: Attempt to halt private listener monitor and
private listener SALES_hostA_PRIVLSNR.
Mon Jan 15 14:40:51 2001 PFS-2017: Info: Start to clean up PFS processes.
Mon Jan 15 14:40:52 2001 PFS-4024: Info: Attempt to release disk storage.
Mon Jan 15 14:40:52 2001 PFS-2015: Info: Stop process ./avmlmon.sh_SALES_hostA_LSNR
succeeded.
Mon Jan 15 14:40:52 2001 PFS-4022: Info: Attempt to disable IP address.
Mon Jan 15 14:40:53 2001 PFS-2015: Info: Stop process SALES_hostA_LSNR succeeded
Mon Jan 15 14:40:53 2001 PFS-4030: Info: Halt method on home node completed.
Mon Jan 15 14:40:54 2001 PFS-2015: Info: Stop process ./avmlmon.sh_SALES_hostA_PRIVLSNR
succeeded.
Mon Jan 15 14:40:54 2001 PFS-2015: Info: Stop process SALES_hostA_PRIVLSNR succeeded.

```

The first warning is:

```

Mon Jan 15 14:38:15 2001 PFS-8002: Warning: Instance sales1 is not registered
with SALES_hostA_LSNR.

```

The first alert is:

```

Mon Jan 15 14:40:23 2001 PFS-8005: Alert: MTS service or instance sales1 not
registered with SALES_hostA_LSNR in 120 seconds. Exit. Mon Jan 15 14:40:24 2001

```

The message numbers are in the 8000 range, so the problem has been reported from the heartbeat monitor. The message text indicates that there is a problem with service registration. The instance failed to register with the listener within 120 seconds.

Check the environment variable and the initialization parameters that affect service registration:

- ☐ Is the `TNS_ADMIN` environment variable set correctly in the `$PFS_HOME/include/$ORACLE_SERVICE.env` file?
- ☐ Are the following initialization parameters set correctly?

`SERVICE_NAMES`
`ACTIVE_INSTANCE_COUNT`
`INSTANCE_NAME`
- ☐ Does the `LOCAL_LISTENER` parameter (for dedicated connections) specify a valid alias in the `$TNS_ADMIN/tnsnames.ora` file?
- ☐ Does the `LISTENER` attribute of the `DISPATCHERS` parameter (for multi-threaded server connections) specify a valid alias in the `$TNS_ADMIN/tnsnames.ora` file?

For example, in a dedicated configuration:

Parameter	Value
ORACLE_SERVICE	SALES
Relocatable IP address	144.25.28.74
Port	1524

If `LOCAL_LISTENER` is defined in the `SALES_config.hostA.ded.pfs` file as follows:

```
LOCAL_LISTENER=listener_SALES_hostA
```

then `listener_SALES_hostA` must be resolved properly in the `tnsnames.ora` file:

```
listener_SALES_hostA=
  (ADDRESS=(PROTOCOL=TCP)(HOST=144.25.28.74)(PORT=1524))
```

Solution

There are several causes of failed service registration. The best practice is to look for the simplest solutions first. For example, it is common for service registration to fail because the `LOCAL_LISTENER` parameter is not set correctly. Ensure that the value of the `LOCAL_LISTENER` parameter in the initialization parameter file (`init.ora`) matches the entry in the `tnsnames.ora` file.

Troubleshooting Command Line Problems

If you cannot invoke the `PFSCCTL` command line, then check the following conditions:

- ❑ Was Oracle Real Application Clusters Guard installed and deployed correctly?

The `oracle` user must install the Oracle Real Application Clusters Guard software. If another user installed the Oracle Real Application Clusters Guard software, then re-install the Oracle Real Application Clusters Guard software as `oracle`.

- ❑ Are you logged on as the super user (`root`)?

If you are not logged on as `root`, then you will see output similar to the following:

```
PFSCCTL for hostA: Version 9.0.1- Production on Jan 15 2001 16:49:59
(c) Copyright 2001 , Oracle Corporation. All rights reserved.
Welcome to PFSCCTL. Type HELP for additional information.
pfscctl[38]: /home_oracle/901_sales/pfs/bin/PFSCCTL.log: cannot create

ORACLE_SERVICE is set to SALES
DB_NAME is set to sales

PFSCCTL>
```

- ❑ Are the following environment variables set?

```
ORACLE_SERVICE  
DB_NAME
```

If `ORACLE_SERVICE` is not set, then you will see output similar to the following:

```
PFSCCTL for hostA:Version 9.0.1- Production on Jan 15 2001 16:47:30  
(c) Copyright 2001, Oracle Corporation. All rights reserved.  
Welcome to PFSCCTL. Type HELP for additional information.
```

Alert: `ORACLE_SERVICE` is not set. Set it and run PFSCCTL again.

If `DB_NAME` is not set, then you will see output similar to the following:

```
PFSCCTL for hostA:Version 9.0.1- Production on Jan 15 2001 16:47:30  
(c) Copyright 2001, Oracle Corporation. All rights reserved.  
Welcome to PFSCCTL. Type HELP for additional information.
```

Alert: `DB_NAME` is not set. Set it and run PFSCCTL again.

- ❑ Is `$ORACLE_HOME/pfs/bin` in the `PATH` variable?

If `$ORACLE_HOME/pfs/bin` is not in the `PATH` variable, then you will see output similar to the following:

```
# pfsctl  
pfsctl: command not found
```

If `$ORACLE_HOME/pfs/bin` is not in the `PATH` variable, then you can execute the PFSCCTL command line utility from `$ORACLE_HOME/pfs/bin` or you can include `$ORACLE_HOME/pfs/bin` in the `PATH` variable.

Troubleshooting Oracle Real Application Clusters Guard Monitors

This section contains the following topics:

- [Troubleshooting the Heartbeat Monitor](#)
- [Troubleshooting the Instance Monitor](#)
- [Troubleshooting the Listener Monitor](#)

Troubleshooting the Heartbeat Monitor

If the heartbeat monitor is not operating properly, then check the following items:

- ❑ Is the heartbeat monitor running?

The heartbeat monitor runs on the primary and secondary nodes. Check for its existence as follows:

```
$ ps -fu owner | grep avmpmon.sh
```

It should have a child process called `avmping`.

- ❑ Are there error messages or messages about restarting the heartbeat monitor in the Oracle Real Application Clusters Guard logs?

For example, these messages may appear in `pfs_SALES_hostA_ping.log`:

```
Tue Jan 16 09:11:57 2001 PFS-8500: Info: Oracle Real Application Clusters
Guard: oracle-ping v90100.
Tue Jan 16 09:11:57 2001 PFS-8501: Info: Rampup flag is set ON.
Tue Jan 16 09:11:57 2001 PFS-8503: Info: ORACLE_PING started.. Check
PFS$ORAPING_HEARTBEAT view.
Tue Jan 16 09:11:57 2001 ERROR : Encountered Oracle error while executing
SELECT--!
Tue Jan 16 09:11:57 2001 ORA-00942: table or view does not exist
```

- ❑ Are the heartbeat monitor tables in the database?

Look for `oraping_heartbeat` and `oraping_config`, whose owner is `OPS$owner`. The tables are created by `$ORACLE_HOME/pfs/admin/catpfs.sql`.

Troubleshooting the Instance Monitor

If the instance monitor is not operating properly, then check the following items:

- ❑ Is the instance monitor running?

The instance monitor runs on the primary and secondary nodes. Check for its existence by looking for the following message in the `pfs_${ORACLE_SERVICE}_host.log`:

```
Tue Jan 16 09:28:31 2001 PFS-2020: Info: Start monitor avmuprog SALES 5312
```

There should be a child process for `avmuprog` (PID 5312) called `avmumon`. Check for its existence with the following command:

```
$ ps -fu PFS_owner | grep avmumon
```

- ❑ Are the instance monitor tables in the database?

Look for `pfs_up_${INSTANCE_NAME}`, owned by `owner`. There should be 2 tables with 2 unique instance names. They are created by `${ORACLE_HOME}/pfs/admin/catpfs.sql`.

- ❑ Are there error messages in the Oracle Real Application Clusters Guard log?

Troubleshooting the Listener Monitor

If the listener monitor is not operating properly, then check the following items:

- ❑ Is the `TNS_ADMIN` environment variable set correctly?

Check the settings in the `$PFS_HOME/include/${ORACLE_SERVICE}.env` and `$PFS_HOME/include/PFS_${ORACLE_SERVICE}_User.def` files.

- ❑ Are the listener names correct?

Check the `listener.ora` and `tnsnames.ora` files under the `$TNS_ADMIN` directory.

❑ Are the relocatable IP addresses enabled?

Use the `netstat` UNIX command to check. For example, if your relocatable IP address is 139.185.141.55, make sure that you see an entry for it in the `netstat` output. Enter the following command:

```
$ netstat -rn
```

You should see output similar to the following:

Routing Table: IPv4					
Destination	Gateway	Flags	Ref	Use	Interface
204.152.65.16	204.152.65.17	U	1	465	hme2
204.152.65.0	204.152.65.1	U	1	465	hme1
204.152.65.32	204.152.65.33	U	1	465	hme1:1
139.185.141.0	139.185.141.99	U	1	1200	hme0
139.185.141.0	139.185.141.106	U	1	0	hme0:6
139.185.141.0	139.185.141.105	U	1	0	hme0:5
139.185.141.0	139.185.141.55	U	1	0	hme0:7
224.0.0.0	139.185.141.99	U	1	0	hme0
default	139.185.141.1	UG	1	3117	
127.0.0.1	127.0.0.1	UH	4	729224	lo0

See Also: [Table 6–3](#)

❑ Does the listener monitor exist?

For example, find the listener monitor PID in the `pfs_${ORACLE_SERVICE}_host.log`:

```
Mon Feb 12 16:02:42 2001 PFS-2020: Info: Start monitor avmlprog sales_
hostA_LSNR 17878
```

17878 is the listener monitor PID.

Enter the following command to find out whether the listener monitor exists:

```
$ ps -ef | grep 17878
```

You should see output similar to the following:

```
root 17937 17878 0 16:02:42 ? 0:08 /bin/ksh ./avmlmon.sh sales_hostA_LSNR
```

- ❑ Are there error messages in the Oracle Real Application Clusters Guard log?

For example, in the `pfs_SALES_hostA.log`:

```
Mon Jan 15 13:29:00 2001 PFS-4037: Alert: Attempt to start listener  
monitor failed.
```

Troubleshooting the System Outside of the Packs

The packs cannot solve underlying performance or stability problems in the system. If such problems exist, then you must solve them outside of the packs. To troubleshoot outside of the packs, follow these steps:

1. Stop the packs. Enter the following command:

`PFSCCTL> pfshalt`
2. Enable the relocatable IP addresses and storage groups. See [Table 6–3](#).
3. Start the listeners that listen on the relocatable IP addresses.
4. Start the Oracle9i Real Application Clusters database.
5. Ensure that the instances are registered with the listeners.
6. Try to reproduce the problem to locate its source. Solve the problem.
7. Shut down the listeners.
8. Shut down the Oracle9i Real Application Clusters database.
9. Disable the relocatable IP addresses and storage groups. See [Table 6–3](#).
10. Start the packs. Enter the following command:

```
PFSCCTL> pfsboot
```


Table 6–3 Enabling and Disabling IP Addresses and Storage Groups on Sun and HP Platforms

Action	HP Platform	Sun Platform
Enable IP address	# <code>cmmodnet -a -i IP_address IP_subnet</code>	<ol style="list-style-type: none"> 1. List the available network interface: # <code>ifconfig IF:N IP_address up</code> where <i>IF</i> is the interface (for example, hme0) <i>N</i> is an integer greater than 0 2. Enable the IP address on the new interface: # <code>ifconfig IF addif IP_address netmask mask up</code>
Disable IP address	# <code>cmmodnet -r -i IP_address IP_subnet</code>	# <code>ifconfig IF removeif IP_address netmask mask down</code>
Enable storage group	# <code>vgchange -a s volume_group</code>	Done automatically by Sun Cluster Manager
Disable storage group	# <code>vgchange -s n volume_group</code>	Done automatically by Sun Cluster Manager

Example: Enabling an IP Address on the Sun Platform

To enable 144.25.27.74 as a relocatable IP address, enter the following command:

```
# ifconfig hme0:1 144.25.28.74 up
```

Display the IP addresses by entering the following command:

```
# ifconfig -a
```

You should see output similar to the following:

```
lo0: flags=1000849<UP,LOOPBACK,RUNNING,MULTICAST,IPv4> mtu 8232 index 1
    inet 127.0.0.1 netmask ff000000
hme0: flags=1000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 2
    inet 144.25.28.70 netmask ffffffff00 broadcast 144.25.31.255
hme0:1: flags=1000862<BROADCAST,NOTRAILERS,RUNNING,MULTICAST,IPv4> mtu 1500 ind2
    inet 144.25.28.74 netmask ffffffff00 broadcast 144.25.31.255
hme1: flags=1008863<UP,BROADCAST,NOTRAILERS,RUNNING,MULTICAST,PRIVATE,IPv4> mtu3
    inet 204.152.65.1 netmask ffffffff0 broadcast 204.152.65.15
hme1:1: flags=1008843<UP,BROADCAST,RUNNING,MULTICAST,PRIVATE,IPv4> mtu 1500 ind3
    inet 204.152.65.33 netmask ffffffff0 broadcast 204.152.65.47
```

Example: Enabling an IP Address on the HP Platform

To enable 195.1.1.150 as a relocatable IP address, enter the following command;

```
# cmmmodnet -a -i 195.1.1.150 195.1.1.0
```

Display the IP address by entering the following command:

```
$ netstat -in
```

You should see output similar to the following:

Name	Mtu	Network	Address	Ipkts	Opkts
lan2	1500	192.1.1.0	192.1.1.3	81859	40987
lan5:1	1500	195.1.1.0	195.1.1.150	0	0
lan0	1500	139.185.141.0	139.185.151.34	22782	23614
lo0	4136	127.0.0.0	127.0.0.1	30084	30084
lan5	1500	195.1.1.0	195.1.1.3	81855	40984

Oracle Real Application Clusters Guard Error Messages

Message Number Ranges

0xxx: Generic Messages

1xxx: Oracle Library Messages

2xxx: Internal Library Messages

3xxx: Cluster Library Messages

4xxx: Run and Halt Script Messages

5xxx: PFSCTL Messages

6xxx: Instance Monitor Messages

7xxx: Listener Monitor Messages

8xxx: Heartbeat Monitor Messages

9xxx: Internal Oracle Real Application Clusters Guard Process and Role Change Messages

10xxx: PFSSETUP Messages

Generic Messages : 0xxx

0001, 1, "Alert: incorrect number of arguments for %s"

*Cause: An incorrect number of parameters was passed to the function.

*Action: Check the function interface and the parameters passed to it.

0002, 1, "Alert: invalid value specified to %s"

*Cause: An incorrect parameter value was passed to the function.

*Action: Check the function interface and the parameters passed to it.

0003, 1, "Alert: specified log file does not exist or is not executable %s"

*Cause:

*Action: Check the existence of the file and its attributes.

0004, 1, "Alert: system command %s failed"

*Cause: Execution of the system command failed.

*Action: Check the command format.

Oracle Library Messages: 1xxx

1000, 1, "Alert: failed to start ORACLE instance"
*Cause: Encountered errors when starting Oracle instance.
*Action: Check INIT.ORA file and database trace files.

1001, 1, "Info: INSTANCE_ROLE is PRIMARY_INSTANCE"
1002, 1, "Info: INSTANCE_ROLE is SECONDARY_INSTANCE"
1003, 1, "Alert: attempt to check INSTANCE_ROLE failed"
*Cause: Failed to obtain INSTANCE_ROLE from v\$instance table.
*Action: Check if ORACLE instance is up.

1004, 1, "Alert: attempt to abort instance failed"
*Cause: SHUTDOWN ABORT failed.
*Action: Check if Oracle instance is up. Check trace files.

1005, 1, "Alert: attempt to kill PMON using pid failed"
*Cause: Real Application Clusters Guard may have a wrong PMON pid.
*Action: Check if the process ID can be grepped using PS command.

1006, 1, "Alert: INIT.ORA file %s does not exist"
*Cause: Specified INIT.ORA file does not exist.
*Action: Check if the INIT.ORA file name is correct.

1007, 1, "Warning: SHUTDOWN TRANSACTIONAL timed out"
*Cause: There might be some sessions still running.
*Action: No action needed. Real Application Clusters Guard will issue SHUTDOWN ABORT.

1008, 1, "Alert: attempt to get PMON pid failed"
*Cause: Using PS to get PMON pid failed.
*Action: Check if PMON exists and/or ORACLE_SID is correct.

1009, 1, "Alert: attempt to get background process %s pid failed"
*Cause: Using PS to get pid failed.
*Action: Check if instance is up and/or ORACLE_SID is correct.

1010, 1, "Alert: attempt to kill background process %s failed"
*Cause: Sending signal 9 to background process failed.
*Action: Check if instance is up. Check its trace files.

1011, 1, "Info: network status has been dumped to %s"
1012, 1, "Info: local and remote ORACLE system state dumped to USER_DUMP_DEST"
1013, 1, "Info: local ORACLE system state dumped to USER_DUMP_DEST"
1014, 1, "Info: remote ORACLE system state dumped to USER_DUMP_DEST"
1015, 1, "Info: local instance is down and no system state dump is performed on either instance"

Internal Library Messages: 2xxx

2000, 1, "Info: user-defined callhome script %s is not provided"
*Cause: Either it does not exist or it is not executable.
*Action: Check with user.

2001, 1, "Warning: message number is incorrect"
*Cause: An incorrect message number was passed to the log function.
*Action: Check the message number.

2002, 1, "Info: user-defined role notification script is not provided: %s %s %s %s %s"
*Cause: Either it does not exist or it is not executable.
*Action: Check with user.

2003, 1, "Info: attempt to start internal Real Application Clusters Guard process on

```

primary instance"
2004, 1, "Info: attempt to start internal Real Application Clusters Guard process on
secondary instance"
2005, 1, "Info: attempt to stop internal Real Application Clusters Guard process"
2006, 1, "Info: restart succeeded"
2007, 1, "Info: restart failed"
2008, 1, "Alert: attempt to kill internal Real Application Clusters Guard process %s
failed"
*Cause: Sending signal 9 to internal Real Application Clusters Guard process failed.
*Action: Check the attributes of the corresponding script.
2009, 1, "Info: attempt to stop local internal Real Application Clusters Guard process"
2010, 1, "Info: attempt to stop remote internal Real Application Clusters Guard process"
2011, 1, "Info: attempt to stop internal Real Application Clusters Guard process
succeeded"
2012, 1, "Info: user-defined role notification script succeeded"
2013, 1, "Warning: user-defined role notification script failed"
2014, 1, "Warning: user-defined role notification script exists but is not executable"
2015, 1, "Info: stop process %s succeeded"
2016, 1, "Warning: stop process %s failed"
2017, 1, "Info: start clean up of Real Application Clusters Guard processes"
2018, 1, "Warning: internal Real Application Clusters Guard process exists. Do PFSCCTL
RESTORE after it finishes"
*Cause: .
*Action: Check status to make sure internal Real Application Clusters Guard process has
finished, and do RESTORE later.
2019, 1, "Info: Real Application Clusters Guard callhome with %s now"
2020, 1, "Info: start monitor %s %s %s"
2021, 1, "Info: calling user-defined role change notification script: %s"

```

Cluster Library Messages: 3xxx

```

3000, 1, "Info: Pack %s started"
3001, 1, "Info: Pack %s stopped"
3002, 1, "Info: Local database instance is up"
3003, 1, "Info: Local database instance is down"
3004, 1, "Info: Remote database instance is up"
3005, 1, "Info: Remote database instance is down"
3006, 1, "Info: Running primary role locally"
3007, 1, "Info: Running secondary role locally"
3008, 1, "Info: No role running locally"
3009, 1, "Info: Running primary role on remote node"
3010, 1, "Info: Running secondary role on remote node"
3011, 1, "Info: No role running on remote node"
3012, 1, "Info: Both nodes running as part of the cluster"
3013, 1, "Info: Local node part of the cluster"
3014, 1, "Info: Remote node part of the cluster"
3015, 1, "Info: Pack %s is not running on either node"
3050, 1, "Alert: could not get information about pack %s"
*Cause:

```

```

*Action: Check pack and cluster status.
3051, 1, "Alert: could not get information about local database instance"
*Cause:
*Action: Check local instance status.
3052, 1, "Alert: could not get information about remote database instance"
*Cause:
*Action: Check remote instance status.
3053, 1, "Alert: could not get information about local database role"
*Cause:
*Action: Check local instance status.
3054, 1, "Alert: could not get information about remote database role"
*Cause:
*Action: Check remote instance status.
3055, 1, "Alert: neither node is running as part of the cluster"
*Cause:
*Action: Check cluster and node status.
3056, 1, "Alert: local node not part of the cluster"
*Cause:
*Action: Check cluster and node status.
3057, 1, "Alert: remote node not part of the cluster"
*Cause:
*Action: Check cluster and node status.
3058, 1, "Alert: SUN data service not registered"
*Cause:
*Action: Check cluster status.
3059, 1, "Alert: node %s is either physically down or not part of the cluster"
*Cause:
*Action: Check node and/or cluster status.
3060, 1, "Alert: node %s is not configured to be part of the cluster"
*Cause:
*Action: Check cluster status.
3061, 1, "Alert: Pack %s is not configured to run on the cluster"
*Cause:
*Action: Check cluster status.
3062, 1, "Alert: cluster is not running"
*Cause: The cluster is not running.
*Action: Check cluster status.
3063, 1, "Alert: cluster command failed: %s %s"
*Cause: Cluster-related command returned an error.
*Action: Check cluster log file.
3064, 1, "Info: service %s has already been stopped"
3065, 1, "Alert: failed to stop the service that restarts the service program"
*Cause: Failed to stop service that restarts the service program.
*Action: Check cluster log file.
3066, 1, "Alert: attempt to halt service %s failed"
*Cause: Attempt to stop service returned an error.
*Action: Check Real Application Clusters Guard log file and cluster log file.
3067, 1, "Alert: wrong pack name: %s. Pack is not registered or does not exist"
*Cause: Pack name was incorrect or the pack has not been registered yet.
*Action: Check cluster pack status.

```

```
3068, 1, "Alert: failed to give up Pack: %s"
*Cause: Failed to stop pack on this node.
*Action: Check Real Application Clusters Guard log and cluster log files.
3069, 1, "Info: Pack %s is not running on any node"
3070, 1, "Info: Internal process is running locally"
3071, 1, "Info: Internal process is running remotely"
3072, 1, "Info: No internal process is running locally"
3073, 1, "Info: No internal process is running remotely"
3074, 1, "Alert: give up pack cluster command timed out"
*Cause: Give up pack returned an error.
*Action: Check cluster system log.
3075, 1, "Alert: Cluster is running"
*Cause: The cluster is running.
*Action: Check cluster status.
```

Run and Halt Script Messages: 4xxx

```
4000, 1, "Alert: attempt to enable IP address failed"
*Cause: Enable IP address function returned an error.
*Action: Check if the IP address is correct or if that IP has been enabled.
4001, 1, "Alert: attempt to disable Pack switch failed"
*Cause: Disable pack switch function returned an error.
*Action: Check if the pack name is correct and the status of pack.
4002, 1, "Alert: attempt to acquire disk storage failed"
*Cause: Acquire storage function returned an error.
*Action: Check storage's names are correct and their status.
4003, 1, "Alert: attempt to enable pack switch failed"
*Cause: Enable pack switch function returned an error.
*Action: Check if the pack name is correct and the status of pack.
4004, 1, "Info: run method on home node completed"
4005, 1, "Info: Pack %s starting on home node"
4006, 1, "Info: Pack %s starting on foreign node"
4007, 1, "Info: Pack %s stopping on home node"
4008, 1, "Info: Pack %s stopping on foreign node"
4009, 1, "Alert: attempt to release disk storage failed"
*Cause: Attempt to release storage returned an error.
*Action: Check storages names and their status.
4010, 1, "Info: attempt to initialize all variables"
4011, 1, "Info: attempt to enable IP address"
4012, 1, "Info: attempt to acquire disk storage"
4013, 1, "Info: attempt to start public listener monitor and public listener %s"
4014, 1, "Info: attempt to start database instance"
4015, 1, "Info: attempt to start instance monitor"
4016, 1, "Info: attempt to check INSTANCE_ROLE"
4017, 1, "Info: attempt to start heartbeat monitor"
4018, 1, "Info: attempt to enable pack switching"
4019, 1, "Info: attempt to send notification that instance role has changed"
4020, 1, "Info: attempt to start DEMS_JOBS"
4021, 1, "Info: run script on foreign node completed"
```

```

4022, 1, "Info: attempt to disable IP address"
4023, 1, "Info: halt script on foreign node completed"
4024, 1, "Info: attempt to release disk storage"
4025, 1, "Info: attempt to halt public listener monitor and public listener %s"
4026, 1, "Info: attempt to abort database"
4027, 1, "Info: attempt to archive, checkpoint, and dump database"
4028, 1, "Info: attempt to halt instance monitor"
4029, 1, "Info: attempt to halt heartbeat monitor"
4030, 1, "Info: halt method on home node completed"
4031, 1, "Alert: attempt to disable IP address failed"
*Cause: Attempt to disable IP address returned an error.
*Action: Check if the IP address is correct or if that IP has been
4032, 1, "Info: check if ACTIVE_INSTANCE_COUNT is set to 1"
4033, 1, "Alert: ACTIVE_INSTANCE_COUNT is not set to 1"
*Cause:
*Action: Check INIT.ORA file to make sure ACTIVE_INSTANCE_COUNT=1.
4034, 1, "Alert: attempt to start instance monitor failed"
*Cause: Starting instance monitor returned an error.
*Action: Check if Oracle instance is up. Check cluster log files.
4035, 1, "Alert: attempt to stop instance monitor failed"
*Cause: Attempt to stop instance monitor returned an error.
*Action: Check if Oracle instance is up. Check cluster log files.
4036, 1, "Alert: instance monitor detected that the instance is down and initiated
failover"
*Cause: Instance monitor service exited.
*Action: Check if Oracle instance is up.
4037, 1, "Alert: attempt to start listener monitor failed"
*Cause: Starting listener monitor returned an error. The listener may not be up.
*Action: Check listener and LISTENER.ORA listener configuration file.
4038, 1, "Alert: attempt to stop listener monitor failed"
*Cause: Stopping listener monitor returned an error.
*Action: Check listener and cluster log files.
4039, 1, "Alert: attempt to start heartbeat monitor failed"
*Cause: Starting the heartbeat monitor returned an error. The instance and listener may
not be up.
*Action: Check instance, listener, and cluster log files.
4040, 1, "Alert: attempt to stop heartbeat monitor failed"
*Cause: Stopping heartbeat monitor returned an error.
*Action: Check cluster log files.

```

PFSCCTL Messages: 5xxx

```

5002, 1, "PFSCCTL BOOTONE succeeded"
5003, 1, "PFSCCTL HALTONE succeeded"
5005, 1, "Secondary role already up"
5006, 1, "Update uptime log"
5007, 1, "PFSCCTL PFSBOOT succeeded"
5008, 1, "PFSCCTL PFSHALT succeeded"
5009, 1, "Archiving the database now"

```

5010, 1, "Checkpointing the database now"
5011, 1, "The following commands are available:"
5012, 1, "Welcome to PFSCCTL. Type HELP for additional information"
5013, 1, "ORACLE_SERVICE is set to %s"
5014, 1, "Processing command %s"
5015, 1, "%s command succeeded"
5016, 1, "[seconds]"
5017, 1, "[beginning date]"
5018, 1, "[ending date]"
5019, 1, "[pack name]"
5050, 1, "Alert: PFSCCTL BOOTONE failed"
*Cause: Starting single pack failed.
*Action: Check Real Application Clusters Guard log files.
5051, 1, "Alert: PFSCCTL HALTONE failed"
*Cause: Stopping single pack failed.
*Action: Check Real Application Clusters Guard log files.
5052, 1, "Alert: attempt to stop internal Real Application Clusters Guard process failed"
*Cause: Sending signal 9 to internal Real Application Clusters Guard process failed.
*Action: Check the attribute of the corresponding script.
5053, 1, "Warning: secondary node not up"
*Cause: Could not find secondary node.
*Action: Use cluster commands to check nodes in the cluster.
5054, 1, "Info: secondary running on foreign node"
5055, 1, "Alert: PFSCCTL MOVE_PRIMARY failed"
*Cause: SHUTDOWN TRANSACTIONAL on primary failed. Pack failover failed.
*Action: Check database trace files and Real Application Clusters Guard log files.
5056, 1, "Info: primary moved. No longer resilient"
5057, 1, "Warning: no primary pack"
*Cause: Cannot find a pack whose instance role is primary.
*Action: Check pack status and roles of all instances.
5059, 1, "Warning: instance up without pack"
*Cause: Instance is running without pack.
*Action: Check if DBA runs the instance for maintenance purpose.
5060, 1, "Alert: attempt to stop pack failed"
*Cause: Stopping returned an error.
*Action: Check Real Application Clusters Guard log files and cluster log files.
5061, 1, "Alert: PFSCCTL RESTORE failed"
*Cause: Starting secondary pack failed.
*Action: Check Real Application Clusters Guard log files.
5062, 1, "Warning: secondary pack not up"
*Cause:
*Action:
5063, 1, "Alert: attempt to stop secondary failed"
*Cause: Stopping secondary pack failed.
*Action: Check Real Application Clusters Guard log files.
5064, 1, "Alert: attempt to start primary failed"
*Cause: Starting primary pack failed.
*Action: Check Real Application Clusters Guard log files.

```

5065, 1, "Alert: attempt to start secondary failed"
*Cause: Starting secondary pack failed.
*Action: Check Real Application Clusters Guard log files.
5066, 1, "Alert: attempt to halt primary failed"
*Cause: Stopping primary pack failed.
*Action: Check Real Application Clusters Guard log files.
5067, 1, "Alert: attempt to halt secondary failed"
*Cause: Stopping secondary pack failed.
*Action: Check Real Application Clusters Guard log files.
5068, 1, "Warning: secondary role is not up"
*Cause: Cannot find instance with SECONDARY_INSTANCE instance role.
*Action: Check both instances.
5071, 1, "Info: System is clear"
5072, 1, "Alert: attempt to stop internal Real Application Clusters Guard process
failed"
*Cause: Sending signal 9 to internal Real Application Clusters Guard process failed.
*Action: Check the attribute of the corresponding script.
5073, 1, "Alert: system is not clear. Instance %s is running. Use PFSCCTL PFSHALT first"
*Cause: Instance is running.
*Action: Stop instance before starting Real Application Clusters Guard.
5074, 1, "Alert: system is not clear. Pack %s is running. Use PFSCCTL PFSHALT first"
*Cause: Pack is running.
*Action: Stop packs first before starting Real Application Clusters Guard.
5075, 1, "Alert: system is not clear. Internal process is running. Use PFSCCTL PFSHALT
first"
*Cause: Internal Real Application Clusters Guard process is running.
*Action: Stop it first before starting Real Application Clusters Guard.
5076, 1, "Alert: failed to start pack %s on its foreign node"
*Cause: Start a pack on its foreign node failed.
*Action: Check Real Application Clusters Guard log files.
5077, 1, "Alert: invalid command. Try again"
*Cause: This is not a valid PFSCCTL command.
*Action: Type HELP for correct commands.
5078, 1, "Alert: ORACLE_SERVICE is not set. Set it and run PFSCCTL again"
*Cause: The environment variable ORACLE_SERVICE is not set.
*Action: Set it and run PFSCCTL again.
5079, 1, "Alert: DB_NAME is not set. Set it and run PFSCCTL again"
*Cause: The environment variable DB_NAME is not set.
*Action: Set it and run PFSCCTL again.
5080, 1, "Alert: %s command failed"
*Cause: PFSCCTL command failed.
*Action: Check Real Application Clusters Guard log files.
5081, 1, "Alert: ORACLE_SERVICE is not set properly"
*Cause: The environment variable ORACLE_SERVICE is not set correctly.
*Action: Check if its value is correct.
5555, 1, "%s %s %s %s %s"
*Cause: This is the Uptime log message for reporting purpose.
*Action:
5556, 1, "Oracle service: %s"
5557, 1, "Report time interval: %s -- %s"

```

```

5558, 1, "Itemized downtime information:"
5559, 1, "Downtime \t\tFailed \tDowntime \t\tRecovered \tInterval"
5560, 1, "Start \t\t\tNode \tEnd \t\t\tNode \t\t(hh:mm:ss)"
5561, 1, "Planned downtime"
5562, 1, "Unplanned downtime"
5563, 1, "Downtime summary:"
5564, 1, "Availability for this interval: %s%"
5565, 1, "Total planned downtime: %s (%s seconds)"
5566, 1, "Total unplanned downtime: %s (%s seconds)"
5567, 1, "Total downtime: %s (%s seconds)"
5568, 1, "[-f filename] [-d yyyy/mm/dd-hh:mm:ss] [-s]"
5600, 1, "Info: checking if PFSCCTL MOVE_PRIMARY finished"
5601, 1, "Info: PFSCCTL MOVE_PRIMARY completed successfully"
5602, 1, "Alert: PFSCCTL MOVE_PRIMARY failed to finish within timer"
5603, 1, "Info: wait for internal process to finish before issuing PFSCCTL RESTORE"

```

Instance Monitor Messages: 6xxx

```

6000, 1, "Info: instance monitor stopped monitoring"
6001, 1, "Alert: instance monitor failed to start routine 0"
*Cause: Creating a new process failed.
*Action: Check system status.
6002, 1, "Info: attempt to start routine 1"
6003, 1, "Warning: routine 1 exits. Attempt to stop routine 0"
*Cause: Routine 0 died or instance was down.
*Action: Real Application Clusters Guard will automatically restart both if instance is
not down or start failover if instance is down.
6004, 1, "Info: attempt to start routine 0"
6005, 1, "Alert: instance monitor has tried restarting MAX_ORACLE_UP_RETRIES times"
*Cause: Instance monitor has restarted Routine 0 and 1 too many times.
*Action: Check instances and Real Application Clusters Guard log files.
6006, 1, "Alert: ORACLE instance is not available. Instance monitor exits"
*Cause: Instance was down.
*Action: Real Application Clusters Guard will initiate a failover.
6007, 1, "Info: routine connected successfully"
6008, 1, "Info: routine got INSTANCE_NAME successfully"
6009, 1, "Info: routine checked lock table successfully"
6010, 1, "Alert: routine found lock table missing"
*Cause: Missing critical Real Application Clusters Guard tables.
*Action: Run catpfs.sql.
6011, 1, "Info: routine 0 locked table. Routine now sleeping"
6012, 1, "Info: stopped shadow process"
6013, 1, "Alert: routine 0 failed to lock table. Routine exited"
*Cause: Routine 0 update table failed.
*Action: Check instance status.
6014, 1, "Info: routine connecting to instance"
6015, 1, "Info: routine connected to instance successfully"
6016, 1, "Alert: routine failed to connect to instance"
*Cause: Routine failed to connect to instance as normal user.

```

```

*Action: Check instance status.
6017, 1, "Info: routine disconnected successfully"
6018, 1, "Alert: routine failed to disconnect"
*Cause: Routine failed to disconnect from an instance.
*Action: Check instance status.
6019, 1, "Info: routine does not need cleanup"
6020, 1, "Alert: failed to stop routine 0"
*Cause: Sending signal 9 to Routine 0 failed.
*Action: Check Routine 0 status.
6021, 1, "Alert: failed to set up signal handlers"
*Cause:
*Action: Check system status.
6022, 1, "Alert: failed to stop shadow processes"
*Cause: Send signal 9 to shadow process failed.
*Action: Check shadow process status.
6023, 1, "Alert: attempt to CONNECT as normal user timed out"
*Cause:
*Action: Check instance status.
6024, 1, "Alert: attempt to CONNECT as SYSDBA timed out"
*Cause:
*Action: Check instance status.
6025, 1, "Alert: attempt to UPDATE timed out"
*Cause:
*Action: Check instance status.
6026, 1, "Alert: attempt to SELECT timed out"
*Cause:
*Action: Check instance status.
6027, 1, "Alert: attempted action timed out"
*Cause:
*Action: Check instance status.

```

Listener Monitor Messages: 7xxx

```

7000, 1, "Warning: listener %s has been restarted too many times. Listener will not be
restarted, only monitored"
*Cause: The listener has been restarted multiple times, but it keeps failing. The
listener monitor is not monitoring it now.
*Action: Check the listener.
7001, 1, "Info: attempt to start private listener monitor and private listener %s"
7002, 1, "Alert: attempt to start and monitor private listener %s failed"
*Cause: Starting private listener monitor returned an error.
*Action: Check the listener and cluster log files.
7003, 1, "Info: attempt to halt private listener monitor and private listener %s"
7004, 1, "Alert: attempt to stop private listener %s failed"
*Cause: Stopping listener using LSNRCTL STOP failed.
*Action: Check the listener.
7005, 1, "Alert: attempt to start listener %s failed"
*Cause: Starting listener using LSNRCTL START failed.
*Action: Check the listener.

```

7006, 1, "Info: elapsed time exceeds MIN_LSNR_RESTART_INTERVAL; resetting listener restart counter"
7007, 1, "Warning: incrementing listener restart counter to %s"
*Cause: Listener has been restarted recently.
*Action: Check the listener.
7008, 1, "Info: attempt to start listener %s succeeded"
7009, 1, "Info: private listener %s restarted"
7010, 1, "Info: private listener %s failed again"
7011, 1, "Alert: listener monitor for %s terminated abnormally. No failover"
*Cause: Private listener monitor exits.
*Action: Real Application Clusters Guard will keep monitor listener on but will not restart listener.

Heartbeat Monitor Messages: 8xxx

8000, 1, "Warning: defunct heartbeat monitor %s exists"
*Cause: A heartbeat monitor was found before starting heartbeat monitor. This may be a heartbeat monitor that was running before an abnormal exit or abort.
*Action: Old heartbeat monitor will be stopped and a new one will be started.
8001, 1, "Info: instance %s is registered with %s"
8002, 1, "Warning: instance %s is not registered with %s"
*Cause: Checked listener status and found instance was not registered with listener.
*Action: No action is needed. Real Application Clusters Guard will keep checking it for a specific time interval.
8003, 1, "Info: shared server service %s is registered with %s"
8004, 1, "Warning: shared server service %s is not registered with %s"
*Cause: Checked listener status and found instance was not registered with listener.
*Action: No action is needed. Real Application Clusters Guard will keep checking it for a specific time interval.
8005, 1, "Alert: shared server service or instance %s not registered with %s in %s seconds. Exit"
*Cause: Instance not registered with listener for too long time.
*Action: Check INIT.ORA file and Oracle Net configuration file.
8006, 1, "Info: check if %s is registered with %s"
8007, 1, "Info: elapsed time exceeds heartbeat monitor timeout interval. Resetting heartbeat monitor restart counter"
8008, 1, "Warning: heartbeat monitor timed out %s times. Restart heartbeat monitor"
*Cause: Heartbeat monitor recently timed out.
*Action: Check Real Application Clusters Guard log files and instance status.
8009, 1, "Alert: heartbeat monitor timed out %s times. Exit"
*Cause: Heartbeat monitor recently timed out too many times.
*Action: Real Application Clusters Guard initiates failover.
8010, 1, "Info: too many local fatal errors. Resetting heartbeat monitor local-fatal counter"
8011, 1, "Warning: heartbeat monitor reports local fatal error %s times. Restarting heartbeat monitor"
*Cause: Heartbeat monitor recently got local fatal error.
*Action: Check local instance and Real Application Clusters Guard log file.
8012, 1, "Alert: heartbeat monitor reports local fatal error %s times. Exit"

```

*Cause: Heartbeat monitor recently got local fatal error too many times.
*Action: Real Application Clusters Guard initiates failover.
8013, 1, "Warning: heartbeat monitor detects remote fatal error"
*Cause:
*Action:
8014, 1, "Info: too many remote fatal errors. Resetting heartbeat monitor remote-fatal
counter"
8015, 1, "Warning: heartbeat monitor reports remote fatal error %s times. Restarting
heartbeat monitor"
*Cause: Heartbeat monitor recently detected remote side fatal.
*Action: Check remote instance and Real Application Clusters Guard log file on that node.
8016, 1, "Alert: heartbeat monitor reports remote fatal error %s times. Initiating
takeover"
*Cause: Heartbeat monitor recently detected remote fatal error too many times.
*Action: Check secondary instance status.
8017, 1, "Info: attempt to initiate primary takeover from node %s to this node"
8018, 1, "Info: primary instance receives remote fatal error. No action taken"
8019, 1, "Warning: remote fatal error detected with role = UNKNOWN. No action taken"
*Cause: Current node detected remote fatal error but did not know its own role.
*Action: Check local instance role.
8020, 1, "Info: too many tool errors. Resetting heartbeat monitor tool-error counter"
8021, 1, "Warning: heartbeat monitor reports tool error %s times. Restarting heartbeat
monitor"
*Cause: Heartbeat monitor recently detected tool errors.
*Action: Check local system status.
8022, 1, "Alert: heartbeat monitor reports tool error %s times. Exit"
*Cause: Heartbeat monitor recently detected tool errors too many times.
*Action: Check local system status.
8023, 1, "Info: too many heartbeat monitor errors during specified interval. Resetting
heartbeat monitor any-error counter"
8024, 1, "Warning: heartbeat monitor reports %s total errors of all kinds. Restarting
heartbeat monitor"
*Cause: Heartbeat monitor recently detected too many errors of all kinds.
*Action: Check Real Application Clusters Guard log files.
8025, 1, "Alert: heartbeat monitor reports %s errors. Exit"
*Cause: Heartbeat monitor recently detected errors too many times.
*Action: Check Real Application Clusters Guard log files.
8026, 1, "Alert: heartbeat monitor detects failure. Initiating failover"
*Cause: Heartbeat monitor detected failure.
*Action: Check Real Application Clusters Guard log files.
8027, 1, "Info: defunct heartbeat monitor %s was stopped"
8028, 1, "Alert: attempt to stop defunct heartbeat monitor %s failed"
*Cause: Sending signal 9 to it failed.
*Action: Check heartbeat monitor status and system status.
8029, 1, "Info: attempt to start heartbeat monitor with parameters %s %s %s"
8030, 1, "Warning: heartbeat monitor exits with error code %s"
*Cause: Heartbeat monitor detected errors with instance.
*Action: Check instance, heartbeat monitor, and system status.
8500, 1, "Info: Oracle Real Application Clusters Guard: Heartbeat Monitor v90100"
8501, 1, "Info: rampup flag is set ON"

```

```

8502, 1, "Info: rampup flag is set OFF"
8503, 1, "Info: heartbeat monitor started. Check PFS$ORAPING_HEARTBEAT view"
8504, 1, "Alert: failed to CONNECT while getting initial heartbeat"
*Cause:
*Action: Check instance status.
8505, 1, "Alert: failed to SELECT while getting initial heartbeat"
*Cause:
*Action: Check instance status.
8506, 1, "Alert: failed to DISCONNECT while getting initial heartbeat"
*Cause:
*Action: Check instance status.
8507, 1, "Alert: cannot CONNECT to local instance as normal user"
*Cause:
*Action: Check instance status.
8508, 1, "Alert: cannot CONNECT to local instance as SYSDBA"
*Cause:
*Action: Check instance status.
8509, 1, "Alert: cannot SELECT from ORAPING_HEARTBEAT table"
*Cause:
*Action: Check instance status.
8510, 1, "Alert: cannot UPDATE ORAPING_HEARTBEAT table"
*Cause:
*Action: Check instance status.
8511, 1, "Alert: cannot SELECT from ORAPING_HEARTBEAT table"
*Cause:
*Action: Check instance status.
8512, 1, "Alert: cannot EXECUTE customer query"
*Cause: Executing PL/SQL package failed.
*Action: Check instance status and PL/SQL package status.
8513, 1, "Alert: cannot check for instance recovery"
*Cause: SELECT from v$lock table failed.
*Action: Check instance status.
8514, 1, "Alert: cannot check for logon storm"
*Cause: SELECT from v$session table failed.
*Action: Check instance status.
8515, 1, "Alert: cannot DISCONNECT from instance"
*Cause:
*Action: Check instance status.
8516, 1, "Alert: cannot enable SQL tracing"
*Cause: Attempt to set event failed.
*Action: Check instance status.
8517, 1, "Alert: local fatal error"
*Cause:
*Action: Check local instance status.
8518, 1, "Alert: remote fatal error"
*Cause:
*Action: Check remote instance status.
8519, 1, "Info: in rampup mode. Ignore all errors"
8520, 1, "Alert: Neither primary nor secondary flag is set"

```

*Cause: Primary and secondary role flag files are missing.
*Action: Check them in corresponding directory.
8521, 1, "Alert: PFS_HOME and ORACLE_SERVICE are not set"
*Cause: Environment variables are not set.
*Action: Set them.
8522, 1, "Alert: CONNECT as normal user timed out"
*Cause:
*Action: Check instance status.
8523, 1, "Alert: CONNECT as SYSDBA timed out"
*Cause:
*Action: Check instance status.
8524, 1, "Alert: SELECT from ORAPING_CONFIG table timed out"
*Cause:
*Action: Check instance status.
8525, 1, "Alert: UPDATE ORAPING_HEARTBEAT table timed out"
*Cause:
*Action: Check instance status.
8526, 1, "Alert: SELECT from ORAPING_HEARTBEAT table timed out"
*Cause:
*Action: Check instance status.
8527, 1, "Alert: SELECT from partner's ORAPING_HEARTBEAT table timed out"
*Cause:
*Action: Check instance status.
8528, 1, "Alert: EXECUTE customer query timed out"
*Cause:
*Action: Check instance status.
8529, 1, "Alert: check for instance recovery timed out"
*Cause:
*Action: Check instance status.
8530, 1, "Alert: check for logon storm timed out"
*Cause:
*Action: Check instance status.
8531, 1, "Alert: enable SQL tracing timed out"
*Cause:
*Action: Check instance status.
8532, 1, "Alert: other timeout"
*Cause:
*Action: Check instance status.
8533, 1, "Info: no cleanup is needed for shadow processes"
8534, 1, "Alert: check for logon storm failed"
*Cause:
*Action: Check instance status.
8535, 1, "Alert: DECLARE cursor failed"
*Cause:
*Action: Check instance status.
8536, 1, "Alert: OPEN cursor failed"
*Cause:
*Action: Check instance status.
8537, 1, "Alert: FETCH cursor failed"
*Cause:

```

*Action: Check instance status.
8538, 1, "Alert: CLOSE cursor failed"
*Cause:
*Action: Check instance status.
8539, 1, "Alert: partner failed to update its heartbeat"
*Cause:
*Action: Check instance status.
8540, 1, "Alert: SELECT from partner's ORAPING_HEARTBEAT table failed"
*Cause:
*Action: Check instance status.
8541, 1, "Alert: EXECUTE customer query failed"
*Cause:
*Action: Check instance status.
8542, 1, "Alert: cannot open heartbeat monitor's log file"
*Cause:
*Action: Check system and directory status.
8543, 1, "Alert: ORACLE_HOME and/or ORACLE_SERVICE not set"
*Cause: Environment variables are not set.
*Action: Set them.
8544, 1, "Warning: failed to stop shadow processes"
*Cause: Sending signal 9 to shadow process failed.
*Action: Check shadow process and system status.
8545, 1, "Warning: instance recovery is in progress"
*Cause:
*Action:
8546, 1, "Warning: system is in logon storm"
*Cause: Number of new sessions logged on in last heartbeat monitor cycle exceeds logon_
storm_threshold.
*Action: Check database instance status and pfs$oraping_config table.
8547, 1, "Warning: Failed to update ORAPING_CONFIG table to synchronize timeout values "
*Cause: Update of the ORAPING_CONFIG table to synchronize timeout values failed"
*Action: Check database error messages.

```

PFS Internal Process and Role Change Messages: 9xxx

```

9000, 1, "Info: failover and role change succeeded"
9001, 1, "Alert: role change failed. Restarting instance"
*Cause: Primary role did not fail over correctly.
*Action: Check remote instance and node.
9002, 1, "Alert: role change failed. Will not restart instance"
*Cause: Recently restarted. Will not restart again.
*Action: Check instance and node status.
9003, 1, "Alert: no resilience. Restarting instance"
*Cause: Secondary pack does not exist.
*Action: No action is needed.
9004, 1, "Alert: instance running without pack. Do not restart instance"
*Cause: Instance was started without pack by DBA for maintenance purpose.
*Action: Do nothing.
9005, 1, "Alert: no resilience. Will not restart instance"

```

```

*Cause: Secondary pack does not exist and this node recently restarted instance.
*Action: Check local instance.
9006, 1, "Info: Pack failed over successfully to the other node"
9007, 1, "Alert: Pack did not fail over to the other node. Will restart the Pack"
*Cause: Pack did not failover.
*Action: Pack will be restarted on its foreign node.
9008, 1, "Info: primary role failed over successfully"
9009, 1, "Info: restarting instance"
9010, 1, "Alert: primary role did not fail over. Will not restart instance"
*Cause: Instance role change failed.
*Action: Check both instances.
9900, 1, "Info: attempt to start role change notification"
9901, 1, "Alert: attempt to start role change notification failed"
*Cause: Starting role change notification returned an error.
*Action: Check instance and cluster status.
9902, 1, "Info: attempt to stop role change notification"
9903, 1, "Alert: attempt to stop role change notification failed"
*Cause: Stopping role change notification returned an error.
*Action: Check instance and cluster status.
9904, 1, "Info: secondary instance had a reconfiguration event or timed out"
9905, 1, "Info: secondary instance waits for reconfiguration event again"

```

PFS Setup Messages: 10xxx

```

10001, 1, "Do you wish to continue? [Y/N] "
10002, 1, "ORACLE_HOME is set to %s"
10003, 1, "ORACLE_BASE is set to %s"
10004, 1, "TNS_ADMIN is set to %s"
10005, 1, "PFS_HOME is set to %s"
10006, 1, "\t\tChoose the set of files from the following:"
10007, 1, "\t2] ORACLE Real Application Clusters Guard files"
10008, 1, "\t3] ORACLE network files"
10009, 1, "\t4] ORACLE instance files"
10010, 1, "\t5] ORACLE network and instance files"
10011, 1, "\t6] All the files"
10012, 1, "\t7] Quit"
10013, 1, "\tChoose an operation on the selected files:"
10014, 1, "\t1] Generate only"
10015, 1, "\t2] Deploy only"
10016, 1, "\t3] Generate and deploy"
10017, 1, "\t5] List the affected files"
10018, 1, "\t6] Return to Main Menu"
10019, 1, "Press Enter to continue"
10020, 1, "Packs already configured. Run DELETEPACKS first"
10021, 1, "Deploying user file"
10022, 1, "Changing ownership and file permissions"
10023, 1, "Generating Packs"
10024, 1, "Generating ORACLE Real Application Clusters Guard files"
10025, 1, "Generating ORACLE network files"

```

```
10026, 1, "Generating ORACLE instance files"
10027, 1, "Backing up %s directory on %s"
10028, 1, "Deploying files"
10029, 1, "Deploying ORACLE Real Application Clusters Guard files"
10030, 1, "Deploying ORACLE network files"
10031, 1, "Deploying ORACLE instance files"
10032, 1, "DB_NAME is set to %s"
10033, 1, "The list of affected files is \n "
10034, 1, "\t1] User definitions file"
10035, 1, "This utility should be run under root privileges"
10036, 1, "\t4] Deinstall"
10037,1, "Deinstalling USER file"
10038,1, "Deinstalling ORACLE Real Application Clusters Guard files"
10039,1, "Deinstalling ORACLE network files"
10040,1, "Deinstalling ORACLE instance files"
10041, 1, "pfsroot file %s has been created on %s. Please run it as root user."
10042, 1, "Failed to create pfsroot file %s on %s"
10050, 1, "Alert: ORACLE_SERVICE is not set. Set it and rerun this script"
*Cause: Environment variable is not set.
*Action: Set it.
10051, 1, "Alert: DB_NAME is not set. Set it and rerun this script"
*Cause: Environment variable is not set.
*Action: Set it.
10052, 1, "Alert: could not find Real Application Clusters Guard configuration file %s"
*Cause:
*Action: Check if Real Application Clusters Guard configuration file exists.
10053, 1, "Alert: cannot start the cluster"
*Cause: Starting cluster failed.
*Action: Check cluster status and cluster log files.
10054, 1, "Alert: cannot configure pack %s"
*Cause: Configuring pack failed.
*Action: Check cluster status and cluster log files.
10055, 1, "Alert: cannot configure data service %s"
*Cause:
*Action: Check cluster status and cluster log files.
10056, 1, "Alert: node %s is down"
*Cause:
*Action: Check node status and cluster status.
10057, 1, "Alert: errors in generating %s"
*Cause:
*Action: Check PFSSETUP log file.
10058, 1, "Alert: check file %s"
*Cause:
*Action: Check PFSSETUP log files.
10059, 1, "Alert: Real Application Clusters Guard installation terminated
unsuccessfully"
*Cause:
*Action: Check PFSSETUP log files.
10060, 1, "Alert: could not generate file %s properly"
```

```
*Cause:
*Action: Check PFSSETUP log files.
10061, 1, "Warning: start the cluster on other node before starting packs"
*Cause: Node was not running in a cluster.
*Action: Start the node as part of the cluster first.
10062, 1, "Alert: ORACLE_HOME is not set. Set it and rerun this script"
*Cause: Environment variable is not set.
*Action: Set it.
10063, 1, "ORACLE_BASE is not set"
*Cause: Environment variable is not set.
*Action: None.
10064, 1, "Selected option  "
*Cause: Part of option chosen message.
*Action: None.
10065, 1, "WARNING: DEINSTALL option selected. This would remove some installed files"
*Cause: Warn users of the option chosen.
*Action: User will be prompted for a continue/not continue decision.
10066, 1, "Enter a number between 1 and 7"
*Cause: Chosen an incorrect option during PFSSETUP.
*Action: Enter a correct number for operation to perform.
10067, 1, "invalid message number"
*Cause: Message id does not exist in avemesg.sh
*Action: Check message id being used. Verify it is in avemesg.sh
10068, 1, "Exiting! This host is not a member of cluster"
*Cause: The host we are on is not listed as valid cluster member.
*Action: Check for valid hosts in config file.
10069, 1, "user is not a member of Oracle owner\'s primary group. Exiting"
*Cause: User does not belong to oracle user\'s primary group.
*Action: User is not a member of the group that is the primary group of oracle user.
10070, 1, "the following files have incorrect checksums on host: "
*Cause: These files have not been deployed witch correct checksums.
*Action: Deploy files again.
10071, 1, "verifying checksums of deployed files on host"
*Cause: Verifying checksums of deployed files on remote hosts.
*Action: None.
10072, 1, "files deployed successfully"
*Cause: checksums correct on remote host.
*Action: None.
10073, 1, "Warning! Deploying files while one or more of the following packs are up: "
*Cause: Not safe to deploy Real Application Clusters Guard files while packs are up.
*Action: Bring down the packs before deploying files.
10074, 1, "Directory %s does not exist"
*Cause: The directory required for OFS structure does not exist
*Action: Make sure the db_name is set correctly and proper case
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