

Oracle9i Real Application Clusters

Real Application Clusters Guard I Configuration Guide

Release 2 (9.2.0.1.0) for UNIX Systems: AIX-Based Systems, Compaq Tru64 UNIX, HP 9000 Series HP-UX, and Sun Solaris

April 2002

Part No. A95979-02

ORACLE®

Oracle9i Real Application Clusters Real Application Clusters Guard I Configuration Guide Release 2
(9.2.0.1.0) for UNIX Systems: AIX-Based Systems, Compaq Tru64 UNIX, HP 9000 Series HP-UX, and Sun
Solaris

Part No. A95979-02

Copyright © 1996, 2002 Oracle Corporation. All rights reserved.

The Programs (which include both the software and documentation) contain proprietary information of Oracle Corporation; they are provided under a license agreement containing restrictions on use and disclosure and are also protected by copyright, patent and other intellectual and industrial property laws. Reverse engineering, disassembly or decompilation of the Programs, except to the extent required to obtain interoperability with other independently created software or as specified by law, is prohibited.

The information contained in this document is subject to change without notice. If you find any problems in the documentation, please report them to us in writing. Oracle Corporation does not warrant that this document is error-free. Except as may be expressly permitted in your license agreement for these Programs, no part of these Programs may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without the express written permission of Oracle Corporation.

If the Programs are delivered to the U.S. Government or anyone licensing or using the programs on behalf of the U.S. Government, the following notice is applicable:

Restricted Rights Notice Programs delivered subject to the DOD FAR Supplement are "commercial computer software" and use, duplication, and disclosure of the Programs, including documentation, shall be subject to the licensing restrictions set forth in the applicable Oracle license agreement. Otherwise, Programs delivered subject to the Federal Acquisition Regulations are "restricted computer software" and use, duplication, and disclosure of the Programs shall be subject to the restrictions in FAR 52.227-19, Commercial Computer Software - Restricted Rights (June, 1987). Oracle Corporation, 500 Oracle Parkway, Redwood City, CA 94065.

The Programs are not intended for use in any nuclear, aviation, mass transit, medical, or other inherently dangerous applications. It shall be the licensee's responsibility to take all appropriate fail-safe, backup, redundancy, and other measures to ensure the safe use of such applications if the Programs are used for such purposes, and Oracle Corporation disclaims liability for any damages caused by such use of the Programs.

Oracle is a registered trademark, and Oracle9i, PL/SQL, and SQL*Plus are trademarks or registered trademarks of Oracle Corporation. Other names may be trademarks of their respective owners.

Contents

Send Us Your Comments	v
Preface.....	vii
Audience	vii
How This Guide Is Organized	viii
Typographic Conventions	ix
Command Syntax	ix
Related Documentation	x
Oracle Support and Services	x
Documentation Accessibility	xii
1 Pre-installation	
Installation Overview	1-2
System Installation Requirements	1-3
Restrictions	1-3
Operating System Components.....	1-3
Oracle Product Requirements.....	1-6
Network Requirements.....	1-7
Implementation.....	1-8
Setting the Environment	1-9
Set Up Tasks to Perform as the root User	1-9
Set Up Tasks to Perform as the oracle User	1-10

2 Configuration Tasks

Installing Oracle9i Real Application Clusters Guard.....	2-2
Installing the Oracle9i Real Application Clusters Guard Files.....	2-2
Setting Up the Configuration File.....	2-3
Running the Setup Utility (PFSSETUP).....	2-4
Oracle Net Services Configuration.....	2-8
Dedicated Sessions.....	2-9

3 Post-Installation Tasks

Post-Installation Tasks for the oracle User.....	3-2
Post-Installation Tasks for the root User.....	3-10
Starting Oracle9i Real Application Clusters Guard.....	3-11
Troubleshooting.....	3-12

4 Upgrading to Oracle9i Real Application Clusters Guard I

Upgrading from Oracle9i Real Application Clusters Guard Release 9.0.x.....	4-2
Upgrading from Oracle9i Real Application Clusters Guard Release 9.0.1.x and Oracle Parallel Fail Safe 8.1.7.2.....	4-5
Troubleshooting Tips.....	4-8

A Optimal Flexible Architecture

Introduction to Optimal Flexible Architecture.....	A-2
OFA Compliant Installation.....	A-3
Non-OFA Compliant Installation.....	A-4

B Configuration Files

init_ORACLE_SERVICE_HOSTNAME[A B].ora.....	B-2
ORACLE_SERVICE_config.pfs.....	B-3
ORACLE_SERVICE_config_HOSTNAME[A B].ded.pfs.....	B-5
ORACLE_SERVICE_config_HOSTNAME[A B].mts.pfs.....	B-5

Index

Send Us Your Comments

**Oracle9i Real Application Clusters Real Application Clusters Guard I Configuration Guide
Release 2 (9.2.0.1.0) for UNIX Systems: AIX-Based Systems, Compaq Tru64 UNIX, HP 9000
Series HP-UX, and Sun Solaris**

Part No. A95979-02

Oracle Corporation welcomes your comments and suggestions on the quality and usefulness of this publication. Your input is an important part of the information used for revision.

- Did you find any errors?
- Is the information clearly presented?
- Do you need more information? If so, where?
- Are the examples correct? Do you need more examples?
- What features did you like most about this manual?

If you find any errors or have any other suggestions for improvement, please indicate the chapter, section, and page number (if available). You can send comments to us in the following ways:

- Email - osdwrite_us@oracle.com
- Postal service:
Oracle Corporation
Oracle9i Documentation
500 Oracle Parkway
Redwood Shores, CA 94065
USA

If you would like a reply, please give your name, address, and telephone number below.

If you have problems with the software, please contact your local Oracle Support Services representative.

Preface

This guide describes how to configure Oracle9i Real Application Clusters Real Application Clusters Guard I.

Audience

This guide is intended for database administrators or system administrators configuring Oracle9i Real Application Clusters Guard.

How This Guide Is Organized

This guide contains the following chapters and appendices:

- [Chapter 1, "Pre-installation"](#)

This chapter describes the pre-installation tasks required for Oracle9i Real Application Clusters Guard.

- [Chapter 2, "Configuration Tasks"](#)

This chapter describes how to install and configure Oracle9i Real Application Clusters Guard.

- [Chapter 3, "Post-Installation Tasks"](#)

This chapter describes how to start Oracle9i Real Application Clusters Guard.

- [Chapter 4, "Upgrading to Oracle9i Real Application Clusters Guard I"](#)

This chapter describes how to upgrade to Oracle9i Real Application Clusters Guard.

- [Appendix A, "Optimal Flexible Architecture"](#)

This appendix provides information on the Oracle9i Real Application Clusters Guard directory structure.

- [Appendix B, "Configuration Files"](#)

This appendix describes the Oracle9i Real Application Clusters Guard Packs configuration template files.

Typographic Conventions

The following table describes the typographic conventions used in this guide:

Convention	Description
<code>monospace</code>	Monospace type indicates UNIX commands, directory names, usernames, path names, and filenames.
brackets []	Words enclosed in brackets indicate key names (for example, Press [Return]). Note that brackets have a different meaning when used in command syntax.
<i>italics</i>	Italic type indicates a variable, including variable portions of filenames. It is also used for emphasis.
UPPERCASE	Uppercase letters indicate Structured Query Language (SQL) reserved words, initialization parameters, and environment variables.

Command Syntax

UNIX command syntax appears in `monospace` font and assumes the use of the Bourne shell. The "\$" character at the beginning of UNIX command examples is the default UNIX command prompt. Do not enter it as part of the command.

Item	Description
backslash \	A backslash indicates a command that is too long to fit on a single line. Enter the line as printed (with a backslash) or enter it as a single line without a backslash: <pre>dd if=/dev/rdisk/c0t1d0s6 of=/dev/rst0 bs=10b \ count=10000</pre>
braces { }	Braces indicate required items: <code>.DEFINE {macro1}</code>
brackets []	brackets []
brackets []	Ellipses indicate an arbitrary number of similar items: <code>CHKVAL fieldname value1 value2 ... valueN</code>
<i>italics</i>	Italic type indicates a variable. Substitute a value for the variable: <i>library_name</i>
vertical line	A vertical line indicates a choice within braces or brackets: <code>SIZE filesize [K M]</code>

Related Documentation

Refer to the following guides for more information about Oracle9i Real Application Clusters Guard:

- *Oracle9i Real Application Clusters Concepts*
- *Oracle9i Real Application Clusters Guard Concepts and Administration Guide*

Refer to the *Oracle9i Installation Guide for UNIX Systems* for information on installing Oracle9i Real Application Clusters.

Oracle Support and Services

The Oracle Corporation Web page is at the following URL:

<http://www.oracle.com>

Oracle Corporation offers a wide range of services to help facilitate corporate system solutions, including Oracle Education courses, Oracle Consulting services, and Oracle Worldwide Customer Support from the Web site. In addition, Oracle Corporation provides free trial software, updates on Oracle products and services, and technical brochures and data sheets.

Oracle Support Services

Technical Support registration and contact information worldwide is available at the following URL:

<http://www.oracle.com/support>

At Oracle's support site, you will find templates to help you prepare information about your problem before you call so that you may be helped more quickly. You will also need your CSI number (if applicable) or complete contact details, including any special project information.

OracleMetaLink

OracleMetaLink is the Oracle Corporation Web service for technical information. Members of OracleMetaLink can search for updates, alerts, patches, and other information about products, releases, and operating systems, or set preferences to be notified automatically of new information. OracleMetaLink offers a variety of services to assist in setting up and administering Oracle products, including procedures, scripts, commentary, and tuning and configuration best-practices bulletins. In addition, it offers forums for information sharing among Oracle

customers, and direct communication with Oracle Support. Oracle *MetaLink* is available to Product Support Customers at no extra cost. Sign up for free membership of this service at the following URL:

<http://www.oracle.com/support/metalink>

Use your Support Access Code (SAC) number to register.

Products and Documentation

For U.S.A customers, the Oracle Store is at the following URL:

<http://store.oracle.com>

Links to stores in other countries are available from this Web site.

Product documentation is available at the following URL:

<http://docs.oracle.com>

Customer Service

Global Customer Service contacts are listed at the following URL:

<http://www.oracle.com/support>

Education and Training

Training information and worldwide schedules are available from the following URL:

<http://education.oracle.com>

Oracle Technology Network

Register with the Oracle Technology Network (OTN) at the following URL:

<http://technet.oracle.com>

OTN delivers technical papers, code samples, product documentation, an Oracle online community and self-service developer support. It also offers Oracle's key developer products to enable rapid development and deployment of applications built on Oracle technology.

Support for Hearing and Speech Impaired Customers

Oracle Corporation provides dedicated Text Telephone (TTY) access to Oracle Support Services within the United States of America 24 hours a day, seven days a week.

- For answers to technical questions, call:
1.800.446.2398
- For answers to non-technical questions, call:
1.800.464.2330

Documentation Accessibility

Our goal is to make Oracle products, services, and supporting documentation accessible, with good usability, to the disabled community. To that end, our documentation includes features that make information available to users of assistive technology. This documentation is available in HTML format, and contains markup to facilitate access by the disabled community. Standards will continue to evolve over time, and Oracle Corporation is actively engaged with other market-leading technology vendors to address technical obstacles so that our documentation can be accessible to all of our customers. For additional information, visit the Oracle Accessibility Program Web site at:

<http://www.oracle.com/accessibility/>

Accessibility of Code Examples in Documentation 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.

Accessibility of Links to External Web Sites in Documentation This documentation may contain links to Web sites of other companies or organizations that Oracle Corporation does not own or control. Oracle Corporation neither evaluates nor makes any representations regarding the accessibility of these Web sites.

Pre-installation

This chapter describes the pre-installation and configuration tasks required for Oracle9i Real Application Clusters Guard. It contains the following sections:

- [Installation Overview](#)
- [System Installation Requirements](#)
- [Setting the Environment](#)

Installation Overview

To install Oracle9i Real Application Clusters Guard, perform the following tasks:

1. **Check the prerequisites:** Ensure that the system meets the hardware, software, memory, and disk space requirements for Oracle9i Real Application Clusters Guard.

See Also: See "[System Installation Requirements](#)" on page 1-3 for information about requirements.

2. **Set up the UNIX environment:** Ensure that the UNIX environment is set up correctly for Oracle9i Real Application Clusters Guard.

See Also: See "[Setting the Environment](#)" on page 1-9 for information about setting up the UNIX environment.

3. **Set up the Oracle environment:** Ensure that a two-node cluster has been created and configured.

See Also: See "[Setting the Environment](#)" on page 1-9 for information on setting up the Oracle environment.

4. **Configure Oracle9i Real Application Clusters Guard:** Use the provided setup utility (PFSSETUP) to configure Oracle9i Real Application Clusters Guard.

See Also: See [Chapter 2, "Configuration Tasks"](#) for information about configuring Oracle9i Real Application Clusters Guard.

5. **Perform post-installation tasks:** Start Oracle9i Real Application Clusters Guard and ensure that it is correctly installed and configured.

See Also: See [Chapter 3, "Post-Installation Tasks"](#) for information about post-installation tasks.

System Installation Requirements

Verify that the system meets the requirements described in the following sections before installing Oracle9i Real Application Clusters Guard:

- [Restrictions](#)
- [Operating System Components](#)
- [Oracle Product Requirements](#)
- [Network Requirements](#)

Restrictions

The following restrictions apply to Oracle9i Real Application Clusters Guard:

- Oracle9i Real Application Clusters Guard uses the physical host name, that is the output of the `hostname` command, interchangeably with cluster node names. Therefore, make sure that the cluster node name is the same as host name.
- Oracle9i Real Application Cluster Guard does not allow the host name (node name) to have any special characters such as hyphens, dashes, dots and so on. This also implies that the host name (node name) cannot have the domain name included in it. Make sure that the host name (node name) does not include any of the following characters:

```
^ \ : * ? < > | " % # + ! @ ~ & ^ ( ) - _ ' [ ] { } ; = . ,
```

- Oracle9i Real Application Cluster Guard is supported only on 2 cluster nodes.
- The Oracle9i Real Application Clusters database must be running in Primary/Secondary configuration.

Note: For information on how to run Oracle9i Real Application Clusters in Primary/Secondary configuration, refer to *Oracle9i Real Application Clusters Concepts*.

Operating System Components

The operating system dependent layer provides the services required for proper operation of Oracle9i Real Application Clusters. Oracle9i Real Application Clusters Guard also requires these components, but might require different versions from the

Oracle9i Real Application Clusters software. [Table 1-1](#) shows the operating system software components required for Oracle9i Real Application Clusters Guard.

Table 1-1 Operating System Software Components

Software	Platform	Requirements
Operating System	Solaris	Solaris 8
	HP	HP-UX 11.0
	Tru64	Compaq Tru64 UNIX, Version 5.1
	AIX	AIX Version 4.3.3 or higher
Operating System Patches	All	<p>For information on Operating System patch requirements, refer to the <i>Oracle9i Installation Guide for UNIX</i>, and the Oracle9i Release Notes for your platform.</p> <p>For Solaris: If Sun Solaris patch update 5 or 6 is installed, then SUN patch 110662-06 is required. Starting with Sun Solaris patch update 7, this patch will no longer be required because the fix will be included with this release.</p> <p>Patch 110662-06: Starting with Sun Solaris patch 110662-03, a fix for KSH was introduced that made KSH UNIX98 compatible in its arithmetic constant handling (Sun bugid: 4286837). Since this fix causes incompatibilities for exiting scripts, a patch is available to back out the change (Sun bugid: 4473696). Obtain patch 110662-06 to fix this problem.</p> <p>For further information, please contact Sun support.</p>
Cluster	Solaris	Sun Enterprise Cluster 3.0, Veritas Volume Manager Version 3.0.4
	HP	MC/ServiceGuard 11.13 OPS Edition with patch PHSS_22876 or later
	Tru64	Compaq TruCluster Software 5.1, with patches GB_G01313 and GB_G01314
	AIX	HACMP/ES Version 4.4, or higher

Note: For AIX-Based Systems, Oracle9i Real Application Clusters Guard is supported on RS6000 clusters and is not supported on SP2 systems.

[Table 1–2](#) lists the commands required to determine the operating system patches for each platform.

Table 1–2 *Commands to Use to Determine Operating System Patches*

Platform	Command
Solaris	To determine which operating system patches are installed, enter the following command: <pre>\$ showrev -p</pre>
HP	To determine which operating system patches are installed, enter the following command: <pre>\$ swlist -l product grep PH</pre> To determine which operating system bundles are installed, enter the following command: <pre>\$ swlist -l bundle</pre>
Tru64	To determine which operating system patches are installed, enter the following command: <pre>\$ dupatch</pre> or <pre>\$ setld -i more</pre>

Table 1–2 Commands to Use to Determine Operating System Patches

Platform	Command
AIX	<p>To determine which operating system patches are installed, enter the following command:</p> <pre>\$ instfix -a</pre> <p>To determine whether a specific patch is installed, enter the following command:</p> <pre>\$ instefix -ivk APAR_number</pre> <p>To determine which operating system filesets are installed, enter the following command:</p> <pre>\$ lsllpp -l</pre> <p>To determine is a specific operating system fileset is installed, enter the following command:</p> <pre>\$ lsllpp -l [fileset_name]</pre>

Oracle Product Requirements

Table 1–3 lists the products that must be installed and running before you install Oracle9i Real Application Clusters Guard.

Table 1–3 Oracle Product Requirements for Oracle9i Real Application Clusters Guard

Product	Description
Oracle9i Enterprise Edition, Release 2 (9.2.x)	Provides the applications and files required to manage a database. All other Oracle9i Real Application Clusters components are installed on top of Oracle9i Enterprise Edition.
Oracle9i Real Application Clusters, 9.2.x	Provides the necessary Oracle9i Real Application Clusters services, scripts, initialization file, and data files.
Oracle Net, Release 2 (9.2.x)	Provides the networking software required for communicating between Oracle Servers. This software must be installed on both nodes.
SQL*Plus, Release 2 (9.2.x)	Oracle software required for accessing a database.

Note: The Oracle9i Real Application Clusters Guard files are installed as part of the Oracle9i Real Application Clusters installation. To install the Oracle9i Real Application Clusters Guard files, choose the Oracle9i Real Application Clusters option.

Network Requirements

You must pre-allocate two relocatable IP addresses, one for each Real Application Clusters Guard Pack, for use by client connections. These relocatable IP addresses are used as logical hosts, and Oracle9i Real Application Clusters Guard configures the availability of the relocatable IP address as required. For information on setting up relocatable IP addresses, refer to your system documentation.

Use the following parameters to specify the relocatable IP address in the Oracle9i Real Application Clusters Guard setup configuration file:

- PFS_IP_PACK_HOSTA
- PFS_IP_PACK_HOSTB

After you run the PFSSETUP utility, as described in [Chapter 2](#), these relocatable IP addresses are associated with the public network adapter. If the Oracle9i Real Application Clusters Guard Pack is moved to another node, these relocatable IP addresses are also moved.

Note: The relocatable IP addresses specified using the PFS_IP_PACK_HOSTA and PFS_IP_PACK_HOSTB parameters must each have an entry in the `/etc/hosts` file.

For Sun Cluster 3.0, specify the public network adapter using the PFS_NET_IF_A and PFS_NET_IF_B configuration parameters. The public network adapter must already be part of a Network Adapter Failover (NAFO) group. Before installing Real Application Clusters Guard, create a NAFO group to host the relocatable IP address for a Real Application Clusters Guard Pack. Refer to the Sun Cluster 3.0 Installation Guide for more information on NAFO groups.

See Also: See [Chapter 2](#) and the *Oracle9i Real Application Clusters Guard Concepts and Administration Guide* for more information on configuring the network.

Implementation

Please note the following:

- On Sun Solaris, each Real Application Clusters Guard Pack is implemented as a resource group. For information on resource groups, refer to the Sun Cluster 3.0 documentation.
- For HP 9000 Series HP-UX systems, each Real Application Clusters Guard Pack is implemented as a package. For more information on packages, refer to *Configuring OPS Clusters with Service Guard OPS Edition*.
- For Compaq tru64 systems, each Real Application Clusters Guard Pack is implemented as a Application Resource. For more information on Application Resources, refer to *Cluster High Available Applications and Cluster Administration*.
- For IBM AIX HACM systems, each Real Application Clusters Guard Pack is implemented as a Application Monitor, refer to the IBM RedBook *Exploring HACMP 4.4:Enhancing the capabilities of Cluster Multi-Processing*.

Setting the Environment

This section describes how to set up the environment. It contains the following sections:

- [Set Up Tasks to Perform as the root User](#)
- [Set Up Tasks to Perform as the oracle User](#)

Set Up Tasks to Perform as the root User

As the `root` user, configure the system for Oracle9i Real Application Clusters Guard by setting the environment options described in [Table 1-4](#).

Table 1-4 UNIX Environment

Environment Option	Requirement
UNIX group for oracle roles	A UNIX group is required for the OSDBA role. Ensure that you have an OSDBA group defined in the <code>/etc/group</code> file on all nodes of the cluster.
UNIX accounts	A UNIX account that is dedicated to installing and running Oracle9i Real Application Clusters Guard is needed. The account must be a member of the SYSDBA group. Create the UNIX account on all nodes of the cluster. This guide assumes the account is called <code>oracle</code> .
Login shell	The Korn shell must be the default shell for the <code>oracle</code> and <code>root</code> account that runs Oracle9i Real Application Clusters Guard. The Korn shell is the only shell supported with this release of Oracle9i Real Application Clusters Guard. To use the Korn shell: <code>/bin/ksh</code>

Table 1–4 UNIX Environment (Cont.)

Environment Option	Requirement
User equivalence	<p>The <code>oracle</code> account installing and running Oracle9i Real Application Clusters Guard must have remote shell (REMSH/RSH) access to all nodes in the cluster. Set up user equivalence by adding entries for the other nodes in the cluster to the <code>.rhosts</code> file of the <code>oracle</code> account or to the <code>/etc/hosts.equiv</code> file.</p> <p>For example, create a <code>.rhosts</code> file in the <code>oracle</code> user's home directory on all nodes in the cluster with the following format:</p> <pre># <hostname> <username> hosta oracle hostb oracle</pre>
Permissions for file creation	<p>Set the file creation mask to <code>022</code> for the <code>oracle</code> account, as follows:</p> <pre>\$ umask 022</pre>

Set Up Tasks to Perform as the oracle User

Log in to the `oracle` account and perform the following tasks, if required:

1. Set environment variables.

[Table 1–5](#) lists required and optional environment variables to use for Oracle9i Real Application Clusters Guard.

Table 1–5 Environment Variables

Environment Variable	Requirement	Description
DB_NAME	Required	Specifies the value of the initialization parameter DB_NAME entered during the Oracle installation process or during database creation.
ORACLE_BASE	Optional	Specifies the directory at the top of the Oracle software and administrative file structure. Not required, but recommended as part of an OFA-compliant configuration. Note: Do not set the ORACLE_BASE variable if you are not using an OFA-compliant configuration.
ORACLE_HOME	Required	Specifies the directory containing the Oracle software for a particular release. Ensure that the ORACLE_HOME environment variable specifies a directory that does not already contain any Oracle software.
ORACLE_SID	Required	Specifies the system identifier, or SID, for the Oracle Server instance. Because the SID is incorporated into many filenames, Oracle Corporation recommends restricting it to no more than four characters, to avoid filename problems on different systems. The SID for each instance in a Real Application Cluster database must be unique and should incorporate the name of the database it uses.
ORACLE_SERVICE	Required	Specifies a unique identifier for the Oracle9i Real Application Clusters Guard environment. This value is used to identify each Oracle9i Real Application Clusters Guard environment. You can set this variable to the same value as the DB_NAME environment variable. Use the ORACLE_SERVICE environment variable to distinguish between Oracle9i Real Application Clusters Guard environments.

Table 1–5 Environment Variables (Cont.)

Environment Variable	Requirement	Description
ORA_NLS33	Optional	Specifies the location of the global technology character set data. Required if the *.nlb files are not in the default location, which is \$ORACLE_HOME/ocommon/nls/admin/data.
NLS_LANG	Optional	Required if you creating a database that uses a character set other than US7ASCII.
PATH	Required	Specifies the search path for shell executables: <ul style="list-style-type: none">■ For Sun Solaris, include the following directories: \$ORACLE_HOME/bin, /usr/ccs/bin, /usr/bin, /etc, and /usr/local/bin if it exists■ For HP-UX, include the following directories: \$ORACLE_HOME/bin, /usr/ccs/bin, /usr/bin, /etc, /usr/bin/X11, and /usr/local/bin if it exists■ For Tru64, include the following directories: \$ORACLE_HOME/bin, /usr/bin, /etc, /usr/bin/X11, and /usr/local/bin, if it exists■ For AIX, include the following directories: \$ORACLE_HOME/bin, /usr/bin, /etc, /usr/lbin, /usr/bin/X11, and /usr/local/bin, if it exists

See Also: For more information on environment variables, refer to the *Oracle9i Administrator's Reference for UNIX Systems*.

2. Check for user equivalence of the `oracle` account by performing a remote login (`rlogin`) to each node in the cluster, including the local node. If you are prompted for a password, the `oracle` account does not have user equivalence. Ensure that you give the same attributes to all the nodes in the cluster.
3. Make sure that you have a two node Oracle9i Real Application Clusters database running and tuned with the Oracle products as listed in [Table 1-3](#) installed. The alert log contains entries showing whether the Oracle9i Real Application Clusters software is running.

Note: Make sure that the Real Applications Clusters database is running and performing as expected in a Primary/Secondary configuration.

Make sure that the database is properly tuned for runtime performance as well as instance recovery.

Refer to the Oracle9i Real Application Clusters Guard *Concepts and Administration Guide* for more information on possible configurations.

Configuration Tasks

This chapter describes how to install and configure Oracle9i Real Application Clusters Guard. It contains the following sections:

- [Installing Oracle9i Real Application Clusters Guard](#)
- [Installing the Oracle9i Real Application Clusters Guard Files](#)
- [Setting Up the Configuration File](#)
- [Running the Setup Utility \(PFSSETUP\)](#)
- [Oracle Net Services Configuration](#)

Installing Oracle9i Real Application Clusters Guard

The following sections describe how to complete a new Oracle9i Real Application Clusters Guard installation:

- [Installing the Oracle9i Real Application Clusters Guard Files](#)
- [Setting Up the Configuration File](#)
- [Running the Setup Utility \(PFSSETUP\)](#)

Installing the Oracle9i Real Application Clusters Guard Files

Oracle9i Real Application Clusters Guard is included with the Oracle9i Real Application Clusters software. Oracle Universal Installer automatically installs Oracle9i Real Application Clusters Guard when you choose to install Oracle9i Real Application Clusters software. For complete instructions on how to install Oracle9i Real Application Clusters, refer to the *Oracle9i Real Application Clusters Installation and Configuration Guide*.

See [Appendix A](#) for more information about Oracle9i Real Application Clusters Guard files and directories.

The following table describes the contents of the most important directories:

Directory	Contents
admin	SQL scripts
bin	Oracle9i Real Application Clusters Guard executables and utilities
doc	README file
lib	Library files
mesg	Binary and text messages
setup	Oracle9i Real Application setup executable and configuration files, templates, and sample files
sys	Oracle9i Real Application Clusters Guard internal files

Note: The Oracle9i Real Application Clusters Guard software directory should exist on all nodes of the cluster where Oracle9i Real Application Clusters Guard runs.

Setting Up the Configuration File

The information in the Oracle9i Real Application Clusters Guard configuration file corresponds to a single Oracle9i Real Application Clusters database. If you intend to use Oracle9i Real Application Clusters Guard with multiple databases, you must create a separate configuration file for each database. The parameters in the Oracle9i Real Application Clusters Guard configuration file are used to create the Oracle9i Real Application Clusters Guard Packs and environment.

The `$ORACLE_HOME/pfs/setup/conf/savsetup.dat` file contains a template for the Oracle9i Real Application Clusters Guard configuration file.

To create a separate configuration file:

1. Change to the `$ORACLE_HOME/pfs/setup/conf` directory:

```
$ cd $ORACLE_HOME/pfs/setup/conf
```

2. Copy the `savsetup.dat` file to `SALES.conf`, where `SALES` is the value of the `$ORACLE_SERVICE` variable. For example:

```
$ cp savsetup.dat SALES.conf
```

3. Use a text editor to modify the Oracle9i Real Application Clusters Guard configuration file. You must set **all** of the parameters in the configuration file, except `ORACLE_BASE`. Set `ORACLE_BASE` only if you are using Oracle Flexible Architecture (OFA). If you are not using Oracle Flexible Architecture (OFA), comment out the `ORACLE_BASE` entry.

You can use the default values in the configuration file if those values are acceptable.

The Oracle9i Real Application Clusters configuration file is divided into six sections. Each section has been categorized based on the Oracle9i Real Application Clusters Guard parameters contained in that section. If you need to modify an Oracle9i Real Application Clusters Guard parameter, modify it using the Oracle9i Real Application Clusters Guard Setup utility (PFSSETUP). Depending on the parameter, different files and areas of the Oracle9i Real Application Clusters Guard environment are affected. Each section heading in the configuration file identifies the requirements for changing the parameters in that section. For example, changing the `ORACLE_SERVICE` parameter affects all of the Oracle9i Real Application Clusters Guard files, and therefore all files must be regenerated and redeployed using the Oracle9i Real Application Clusters Guard Setup utility.

See Also: For more information on the configuration files, refer to [Appendix B, "Configuration Files"](#).

Note: Do not delete any parameters from the configuration file. All of the parameters are required for Oracle9i Real Application Clusters Guard to run.

For a detailed description of the the parameters in the Oracle9i Real Application Clusters Guard installation configuration parameter file, refer to the *Oracle9i Real Application Clusters Guard Concepts and Administration Guide*.

Running the Setup Utility (PFSSETUP)

This section describes how to configure Oracle9i Real Application Clusters Guard using the Oracle9i Real Application Clusters Guard PFSSETUP utility. The PFSSETUP utility uses the Oracle9i Real Application Clusters Guard configuration file as described in ["Setting Up the Configuration File" on page 2-3](#). The PFSSETUP utility automatically searches for the `ORACLE_SERVICE.conf` file.

Note: The PFSSETUP utility deploys the Oracle9i Real Application Clusters Guard files on both cluster nodes.

To run the PFSSETUP utility:

Note: The following example shows the output as displayed on the Sun SPARC Solaris platform.

This example illustrates an initial configuration of Oracle9i Real Application Clusters Guard. For detailed information and more examples of Oracle9i Real Application Clusters Guard configurations, refer to the *Oracle9i Real Application Clusters Guard Concepts and Administration Guide*.

1. Set the `ORACLE_SERVICE` and `DB_NAME` environment variables.

The `ORACLE_SERVICE` environment variable specifies the Oracle9i Real Application Clusters Guard identifier. This identifier differentiates one Oracle9i

Real Application Clusters Guard environment from another, and identifies the correct Oracle9i Real Application Clusters Guard configuration file. For example:

```
$ export ORACLE_SERVICE=SALES
$ export DB_NAME=SALES
```

2. Change to the `$ORACLE_HOME/pfs/setup` directory and run the PFSSETUP utility:

```
$ cd $ORACLE_HOME/pfs/setup
$ ./pfssetup
```

The PFSSETUP utility version information is displayed:

```
PFS_SETUP for Solaris: Version 9.2.0.1.0 on Mon Mar 19 10:35:53 PST 2002
(c) Copyright 2002 Oracle Corporation. All rights reserved.
```

3. Confirm the ORACLE_SERVICE and DB_NAME settings when prompted:

```
ORACLE_SERVICE is set to SALES
DB_NAME is set to SALES
Do you wish to continue? [Y/N] Y
```

4. Enter Y to continue or N to exit the PFSSETUP utility.
5. Check the values of environment variables displayed.

The Oracle9i Real Application Clusters Guard Setup main menu appears:

```
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>
```

Options 1 to 5 in the preceding menu set up only the files specified in the option. For example, if you choose option 3, then only the ORACLE network files are set up.

6. To create all of the Oracle9i Real Application Clusters Guard setup files, enter option 6 at the prompt.

The following menu appears:

```
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. To generate and deploy the setup files, enter option 3 at the prompt.

The list of affected files appears:

Note: The list of affected files might differ for each platform. The following example shows the list for Sun SPARC Solaris. The following list is the least number of files for Sun SPARC Solaris.

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

```
PFS_SALES.RUN  
PFS_SALES.HALT  
PFS_SALES.MONSTART  
PFS_SALES.MONSTOP  
PFS_SALES_User.def  
PFS_SALES_System.def  
listener.ora.ded.pfs  
tnsnames.ora.ded.pfs  
tnsnames.ora.ded.clnt.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]
```

Note: For HP 9000 Series HP-UX systems, the list of files generated also includes:

```
PFS_SALES_hosta.sh
PFS_SALES_hostb.sh
PFS_SALES_hosta.conf
PFS_SALES_hostb.conf
```

8. Enter Y to continue.

The PFSSETUP utility generates and deploys the files to each node in the cluster.

When this process is complete, the menu shown in step 5 reappears.

9. Enter 6 to return to the main menu.

10. Enter 7 to exit.

Note: Do not start the Oracle9i Real Application Clusters Guard packs until you have created the Oracle9i Real Application Clusters database. For more information, refer to [Chapter 3, "Post-Installation Tasks"](#).

Oracle Net Services Configuration

A description of how to configure the Oracle network is beyond the scope of this guide and is covered in detail in the *Oracle Net Services Administrator's Guide* and in *Oracle9i Real Application Clusters Concepts*. However, to configure a minimal network before exploring the features of Oracle9i Real Application Clusters Guard, verify that multiple copies of the `tnsnames.ora`, `sqlnet.ora`, and `listener.ora` files do not exist.

The PFSSETUP utility creates the required Oracle Net Services configuration files for the Oracle9i Real Application Clusters Guard environment, based on the information entered in the Oracle9i Real Application Clusters Guard configuration file. During the deployment phase, the Oracle9i Real Application Clusters Guard setup utility automatically copies the generated Oracle Net Services files (`tnsnames.ora` and `listener.ora`) appended with a descriptive name and a `.pfs` extension, into the `$TNS_ADMIN` directory. The path for the `$TNS_ADMIN` directory is specified in the Oracle9i Real Application Clusters Guard configuration file. The default setting for the `TNS_ADMIN` environment variable is `$ORACLE_HOME/network/admin`.

To avoid interfering with a currently running Oracle9i Real Application Clusters environment, the PFSSETUP utility does not automatically replace or install newly generated network files. Before you can use Oracle9i Real Application Clusters Guard, you must append the files generated by the PFSSETUP utility to the current Oracle Net Services configuration files. See [Chapter 3](#) for more information on using the Oracle9i Real Application Clusters Guard files.

The following Oracle Net Services files are generated by the PFSSETUP utility:

File	Description
<code>listener.ora.ded.pfs</code>	Dedicated server (<code>IS_MTS</code> parameter is set to false) configuration file for the listeners that identifies the Oracle9i Real Application Clusters Guard listener name and the service it is listening for
<code>listener.ora.mts.pfs</code>	Shared server (<code>IS_MTS</code> parameter is set to true) configuration file for the listeners that identifies the Oracle9i Real Application Clusters Guard listener name and the service it is listening for
<code>tnsnames.ora.ded.pfs</code>	Dedicated server (<code>IS_MTS</code> parameter is set to false) configuration file that contains net service names mapped to connect descriptors

File	Description
<code>tnsnames.ora.ded.clnr.pfs</code>	Dedicated server client (IS_MTS parameter is set to false) configuration file that contains net service names mapped to connect descriptors
<code>tnsnames.ora.mts.pfs</code>	Shared server (IS_MTS parameter is set to true) configuration file that contains net service names mapped to connect descriptors
<code>tnsnames.ora.mts.clnr.pfs</code>	Shared server client (IS_MTS parameter is set to true) configuration file that contains net service names mapped to connect descriptors

Dedicated Sessions

This section provides information on dedicated sessions.

Net Services for Server

During the Oracle9i Real Application Clusters Guard setup, a `listener.ora.ded.pfs` file for the server nodes is created in the `$TNS_ADMIN` directory if the `TNS_ADMIN` environment variable is defined, or in the `$ORACLE_HOME/network/admin` directory if the `TNS_ADMIN` environment variable is not defined.

The following examples show sample listener configurations generated by the PFSSETUP utility.

Example 2-1 Sample Listener Configuration for Primary and Secondary Nodes

```
SALES_hosta_LSNR=
(DESCRIPTION= (ADDRESS=(PROTOCOL=TCP)(HOST=192.10.1.21)(PORT=2024)(QUEUE_SIZE=1024)))
STARTUP_WAIT_TIME_SALES_hosta_LSNR=0
CONNECT_TIMEOUT_SALES_hosta_LSNR=10
#TRACE_LEVEL_SALES_hosta_LSNR=SUPPORT

SALES_hostb_LSNR=
(DESCRIPTION= (ADDRESS=(PROTOCOL=TCP)(HOST=192.10.1.22)(PORT=2024)(QUEUE_SIZE=1024)))
STARTUP_WAIT_TIME_SALES_hostb_LSNR=0
CONNECT_TIMEOUT_SALES_hostb_LSNR=10
#TRACE_LEVEL_SALES_hostb_LSNR=SUPPORT
```

Example 2–2 Sample Listener Configuration for OEM for Primary and Secondary Nodes

```
SID_LIST_SALES_hosta_PRIVLSNR=
(SID_LIST=
(SID_DESC=(ORACLE_HOME=/u01/app/oracle/SALES/92)
(SID_NAME=SALES1)))

SALES_hosta_PRIVLSNR=
(DESCRIPTION= (ADDRESS=(PROTOCOL=TCP) (HOST=192.10.1.51) (PORT=2024) (QUEUESIZE=1024)))
STARTUP_WAIT_TIME_SALES_hosta_PRIVLSNR=0
CONNECT_TIMEOUT_SALES_hosta_PRIVLSNR=10
#TRACE_LEVEL_SALES_hosta_PRIVLSNR=SUPPORT

SID_LIST_SALES_hostb_PRIVLSNR=
(SID_LIST=
(SID_DESC=(ORACLE_HOME=/u01/app/oracle/SALES/92)
(SID_NAME=SALES2)))

SALES_hostb_PRIVLSNR=
(DESCRIPTION= (ADDRESS=(PROTOCOL=TCP) (HOST=192.10.1.52) (PORT=2024) (QUEUESIZE=1024)))
STARTUP_WAIT_TIME_SALES_hostb_PRIVLSNR=0
CONNECT_TIMEOUT_SALES_hostb_PRIVLSNR=10
#TRACE_LEVEL_SALES_hostb_PRIVLSNR=SUPPORT
```

Net Services for Clients

During the Oracle9i Real Application Clusters Guard setup, a `tnsnames.ora.ded.clnt.pfs` file for the client is created in the `$TNS_ADMIN` directory if the `TNS_ADMIN` environment variable is defined, or in the `$ORACLE_HOME/network/admin` directory if the `TNS_ADMIN` environment variable is not defined.

The following examples show sample service aliases in the client `tnsnames.ora.ded.clnt` file generated by the PFSSETUP utility.

Example 2–3 Net Service Name for Connections to Primary Instance

```
SALES_DED=
(DESCRIPTION=
(Load_Balance=OFF)
(ADDRESS_LIST=
(ADDRESS=(PROTOCOL=TCP) (HOST=192.10.1.21) (PORT=2024) )
(ADDRESS=(PROTOCOL=TCP) (HOST=192.10.1.22) (PORT=2024) )
```

```

)
(CONNECT_DATA=
(SERVICE_NAME=SALES.oracle.com)
(SERVER=DEDICATED)
(INSTANCE_ROLE=PRIMARY)
)
)

```

Example 2–4 Net Service Name for TAF BASIC Connections to Primary Instance

```

SALES_DED_BASIC=
(DESCRIPTION=
(Load_balance=OFF)
(Failover=ON)
(Address_list= (Address=(Protocol=TCP)(Host=192.10.1.21)(Port=2024))
(Address=(Protocol=TCP)(Host=192.10.1.22)(Port=2024)))
(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=192.10.1.22)(Port=2024))
(Address=(Protocol=TCP)(Host=192.10.1.21)(Port=2024)))
(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) )))

```

Example 2-5 Net Service Name for Dedicated TAF PRECONNECT Connections

```

SALES_DED_PRE=
  (DESCRIPTION=
    (LOAD_BALANCE=OFF)
    (FAILOVER=ON)
    (ADDRESS_LIST=
      (ADDRESS=(PROTOCOL=TCP)(HOST=192.10.1.21)(PORT=2024))
      (ADDRESS=(PROTOCOL=TCP)(HOST=192.10.1.22)(PORT=2024)))
    (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=192.10.1.22)(PORT=2024))
      (ADDRESS=(PROTOCOL=TCP)(HOST=192.10.1.21)(PORT=2024)))
    (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)
  
```

Post-Installation Tasks

This chapter describes post-installation tasks. It contains the following sections:

- [Post-Installation Tasks for the oracle User](#)
- [Post-Installation Tasks for the root User](#)
- [Starting Oracle9i Real Application Clusters Guard](#)
- [Troubleshooting](#)

Note: To avoid interfering with a currently running Oracle9i Real Application Clusters environment, the PFSSETUP utility does not automatically replace or install newly generated network files. Before you can use Oracle9i Real Application Clusters Guard, you must append the files generated by the PFSSETUP utility to the current Net Services configuration files.

Post-Installation Tasks for the oracle User

Perform the following steps as the `oracle` user:

1. Log in as the Oracle software owner, typically, the `oracle` user.
2. Configure the server using the network configuration files generated by the `PFSSETUP` utility.

During the Oracle9i Real Application Clusters Guard setup, the following network configuration files are created:

File	Description
<code>listener.ora.ded.pfs</code>	Dedicated server (IS_MTS parameter is set to false) configuration file for the listeners that identifies the Oracle9i Real Application Clusters Guard listener name and the service it is listening for
<code>listener.ora.mts.pfs</code>	Shared server (IS_MTS parameter is set to true) configuration file for the listeners that identifies the Oracle9i Real Application Clusters Guard listener name and the service it is listening for
<code>tnsnames.ora.ded.pfs</code>	Dedicated server (IS_MTS parameter is set to false) configuration file that contains net service names mapped to connect descriptors
<code>tnsnames.ora.ded.clnr.pfs</code>	Dedicated server client (IS_MTS parameter is set to false) configuration file that contains net service names mapped to connect descriptors
<code>tnsnames.ora.mts.pfs</code>	Shared server (IS_MTS parameter is set to true) configuration file that contains net service names mapped to connect descriptors
<code>tnsnames.ora.mts.clnr.pfs</code>	Shared server client (IS_MTS parameter is set to true) configuration file that contains net service names mapped to connect descriptors

The files in the preceding table are created in the `$TNS_ADMIN` directory if the `TNS_ADMIN` environment variable is defined, or in the `$ORACLE_HOME/network/admin` directory if the `TNS_ADMIN` environment variable is not defined.

- a. If network configuration files do not already exist, copy or rename the files to the correct suffix. For example:

```
$ cd $TNS_ADMIN
```

```

$ ls
listener.ora.ded.pfs tnsnames.ora.ded.pfs tnsnames.ora.ded.clnt.pfs
$ cp listener.ora.ded.pfs listener.ora
$ cp tnsnames.ora.ded.pfs tnsnames.ora

```

- b. Copy the client configuration file, `tnsnames.ora.ded.clnt.pfs`, to all of the client systems.
 - c. If network configuration files already exist, append the Oracle9i Real Application Clusters Guard entries to the existing network configuration files. Ensure that all entries in the network configuration files are unique.
3. Set up the Oracle instance parameter files for Oracle9i Real Application Clusters Guard.

During the Oracle9i Real Application Clusters Guard setup, the following parameter files are created:

Filename	Description
<code>init_ORACLE_SERVICE_HOSTA.pfs</code>	Sample initialization parameter file for host A.
<code>init_ORACLE_SERVICE_HOSTB.pfs</code>	Sample initialization parameter file for host B.
<code>ORACLE_SERVICE_config.pfs</code>	Common configuration parameter file containing recommended Oracle9i Real Application Clusters Guard initialization and configuration parameter settings. Parameters for this file should be set for both instances on host A and host B. This file contains two parameters, <code>PFILE_HOSTA</code> and <code>PFILE_HOSTB</code> . These parameters are set to indicate the location of the initialization parameter files for the two hosts. Ensure that these files exist or create a link from the files you want to use to the locations specified by these parameters.
<code>ORACLE_SERVICE_config_HOSTA.mts.pfs</code>	Host A configuration parameter file containing required Oracle9i Real Application Clusters Guard parameter settings for a system running shared server configuration.
<code>ORACLE_SERVICE_config_HOSTA.ded.pfs</code>	Host A configuration parameter file containing required Oracle9i Real Application Clusters Guard parameter settings for a system running dedicated server configuration.

Filename	Description
<code>ORACLE_SERVICE_config_HOSTB.mts.pfs</code>	Host B configuration parameter file containing required Oracle9i Real Application Clusters Guard parameter settings for a system running shared server configuration.
<code>ORACLE_SERVICE_config_HOSTB.ded.pfs</code>	Host B configuration parameter file containing required Oracle9i Real Application Clusters Guard parameter settings for a system running dedicated server configuration.

The files in the preceding table are created in the `$ORACLE_BASE/admin/$DB_NAME/pfile` directory for an OFA installation, or in the `$ORACLE_HOME/pfs/$DB_NAME/pfile` for a non OFA installation.

If you already have initialization parameter files set up for the Oracle9i Real Application Clusters database, you can use the `IFILE` parameter to include the initialization parameter files created by Oracle9i Real Application Clusters Guard.

The following example `initSALES1.ora` file shows a sample initialization parameter file for the first instance:

```
ifile=/u01/oracle/admin/SALES/pfile/initSALES.ora
rollback_segments=(rbs1_1, rbs1_2)
thread=1
cluster_database=true
instance_name=SALES1
```

The following example `initSALES2.ora` file shows a sample initialization parameter file for the second instance:

```
ifile=/u01/oracle/admin/SALES/pfile/initSALES.ora
rollback_segments=(rbs2_1, rbs2_2)
thread=2
cluster_database=true
instance_name=SALES2
```

The following example shows the contents of the `initSALES1.ora` file for the first instance after embedding the Oracle9i Real Application Clusters Guard parameter files within an existing parameter file. Make sure not to include multiple entries for the same initialization parameter. Because they are included in the embedded parameter files, the `THREAD` and `CLUSTER_DATABASE` parameters have been removed.

```

ifile=/u01/oracle/admin/SALES/pfile/initSALES.ora
ifile=/u01/oracle/admin/SALES/pfile/init_SALES_nodeA.ora
ifile=/u01/oracle/admin/SALES/pfile/SALES_config.pfs
ifile=/u01/oracle/admin/SALES/pfile/SALES_config_nodeA.ded.pfs
rollback_segments=(rbs1_1, rbs1_2)

```

The following example shows the contents of the `initSALES2.ora` file for the second instance after embedding the Oracle9i Real Application Clusters Guard parameter files within an existing parameter file. Make sure that you only have single entries for each initialization parameter. Because they are included in the embedded parameter files, the `THREAD` and `CLUSTER_DATABASE` parameters have been removed.

```

ifile=/u01/oracle/admin/SALES/pfile/initSALES.ora
ifile=/u01/oracle/admin/SALES/pfile/init_SALES_nodeB.ora
ifile=/u01/oracle/admin/SALES/pfile/SALES_config.pfs
ifile=/u01/oracle/admin/SALES/pfile/SALES_config_nodeB.ded.pfs
rollback_segments=(rbs2_1, rbs2_2)

```

For more information about these configuration files, refer to [Appendix B](#).

4. Run the `catpfs.sql` script to create the required Oracle9i Real Application Clusters Guard objects in the database.

To run this script, you must have `SYSDBA` privileges. Run the script as follows:

- a. Make sure that all user tables are available.
- b. Change to the `$ORACLE_HOME/pfs/admin` directory:

```
$ cd $ORACLE_HOME/pfs/admin
```

- c. Use `SQL*Plus` to connect to the database as the `SYS` user and run the `catpfs.sql` script, where `sys_password` is the password (for example, `CHANGE_ON_INSTALL`):

```
$ sqlplus 'SYS/sys_password AS SYSDBA'
SQL> @catpfs.sql
```

The `catpfs.sql` script creates the following:

- * Oracle9i Real Application Clusters Guard user
- * `CUSTOMER_QUERY` package for Oracle Heartbeat Monitor
- * `ORAPING_CONFIG` and `ORAPING_HEARTBEAT` tables for Oracle Heartbeat Monitor

- * PFSSORAPING_CONFIG and PFSSORAPING_HEARTBEAT views for Oracle Heartbeat Monitor
- * PFS_UP_INSTANCE_NAME tables for the Oracle instance monitor

The following example shows output from the `catpfs.sql` script:

```
Enter the PFS software owner [Default: OPS$ORACLE]:ops$oracle
```

```
Dropping ops$oracle..
```

```
DROP USER ops$oracle CASCADE
```

```
*
```

```
ERROR at line 1:
```

```
ORA-01918: user 'OPS$ORACLE' does not exist
```

```
Creating ops$oracle..
```

```
User created.
```

```
Grant succeeded.
```

Below are the list of online tablespaces in this database.

Decide which tablespace you wish to create the PFS tables and indexes. It is NOT recommended to use the system tablespace for storing PFS objects.

```
TABLESPACE_NAME
```

```
-----
```

```
INDX
```

```
TEMP
```

```
TOOLS
```

```
USERS
```

```
RBS
```

```
Specify ops$oracle user's default tablespace:users
```

```
User altered.
```

```
Specify ops$oracle user's temporary tablespace:temp
```

```
User altered.
```

```
Creating Customer Query Package...
```

```
Specify owner of the customer query table:scott
```

```
Specify customer query table:emp
```

Connected.

Grant succeeded.

Connected.

Creating synonym for the customer query table...

Specify synonym for customer query table:emp

DROP SYNONYM emp

*

ERROR at line 1:

ORA-01434: private synonym to be dropped does not exist

Synonym created.

Creating CUSTOMER_QUERY package

Package created.

Package body created.

Creating tables and views for Oracle heartbeat monitor.

DROP PUBLIC SYNONYM pfs\$oraping_config

*

ERROR at line 1:

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

DROP PUBLIC SYNONYM pfs\$oraping_heartbeat

*

ERROR at line 1:

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

DROP PUBLIC SYNONYM oraping_heartbeat

*

ERROR at line 1:

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

DROP VIEW pfs\$oraping_config

*

ERROR at line 1:

ORA-00942: table or view does not exist

DROP VIEW pfs\$oraping_heartbeat

*

```
ERROR at line 1:
ORA-00942: table or view does not exist

DROP TABLE oraping_config
      *
ERROR at line 1:
ORA-00942: table or view does not exist

DROP TABLE oraping_heartbeat
      *
ERROR at line 1:
ORA-00942: table or view does not exist

Table created.
1 row created.

Commit complete.

Table created.

Table altered.
1 row created.
Commit complete.
View created.
View created.
Synonym created.
Synonym created.
Synonym created.
View created.
View created.
Creating tables and views for Oracle instance monitor.

Specify instance_name for instance on PFS_HOSTA: prod1
DROP TABLE pfs_up_prod1
      *
ERROR at line 1:
ORA-00942: table or view does not exist

Table created.
1 row created.

Specify instance_name for instance on PFS_HOSTB: prod2
DROP TABLE pfs_up_prod2
      *
ERROR at line 1:
```

ORA-00942: table or view does not exist

Table created.
1 row created.

NOTE:

catpfs complete. Please check catpfs.log for any errors.

5. To ensure that the Oracle9i Real Application Clusters database is functioning properly, shut down and start up all Oracle instances manually.

For example, enter the following commands where

INIT.ORA_parameter_file is the name of the initialization file as defined by the PFILE variable in the PFS_ORACLE_SERVICE_User.def definition file.

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

```
SQL> STARTUP pfile=INIT.ORA_parameter_file
```

The definition file is located in the `$ORACLE_HOME/pfs/DB_NAME/include` directory for non-OFA compliant installations and in the

`$ORACLE_BASE/admin/DB_NAME/pfs/include` directory for OFA compliant installations.

Post-Installation Tasks for the root User

Perform the following steps as the `root` user:

Note: Perform the tasks described in "[Post-Installation Tasks for the oracle User](#)" on page 3-2 before starting the tasks described in this section.

1. To ensure that the `oracle` user's environment is available to the `root` user, log in as the `oracle` user and enter the following command:

```
$ su root
```

2. Set the `ORACLE_SERVICE` and `DB_NAME` environment variables to the appropriate values.
3. If you have created a database manually, ensure that the system configuration is reflected in the `oratab` file. The `oratab` file is located in the `/var/opt/oracle` directory for Solaris and in the `/etc` directory for AIX, HP, and Tru64.

Add an entry for each server instance on the system using the following format:

```
DB_NAME:ORACLE_HOME:N
```

In this example `N` indicates that the database should not be started at reboot time. Always enter the `N` option so that Oracle9i Real Application Clusters Guard can control startup and shutdown of the database.

4. Change to the `$ORACLE_HOME/pfs/setup` directory and register the Oracle9i Real Application Clusters Guard Packs with the cluster by running the `createpacks` script

Ensure that the `DB_NAME`, `ORACLE_SERVICE`, `ORACLE_HOME`, and if necessary, the `ORACLE_BASE` environment variables are set correctly before running the script.

```
# cd $ORACLE_HOME/pfs/setup
# ./createpacks
```

Note: Run the `createpacks` script on only one of the nodes of the cluster.

Note: For HP 9000 Series HP-UX systems, you must shut down the cluster before running the `createpacks` script. To shut down the cluster, use the `cmhaltcl` command.

Starting Oracle9i Real Application Clusters Guard

The Oracle9i Real Application Clusters Guard software is controlled from the command line. To start Oracle9i Real Application Clusters Guard:

1. Log in as the `root` user.
2. Shut down all listeners associated with the Oracle9i Real Application Clusters Guard database on the cluster.
3. Ensure that the `DB_NAME`, `ORACLE_SERVICE`, `ORACLE_HOME`, and if necessary, the `ORACLE_BASE` environment variables are set correctly.
4. To enter Oracle9i Real Application Clusters Guard commands, enter the following command:

```
# pfsctl
```

See Also: Refer to the *Oracle9i Real Application Clusters Guard Concepts and Administration Guide* for information about the `pfsctl` script.

5. Start Oracle9i Real Application Clusters Guard from the PFSCCTL prompt:

```
PFSCCTL> pfsboot
```
6. Check the Oracle9i Real Application Clusters Guard packs log file for any errors:
 - For an OFA compliant installation, check the `pfs_ORACLE_SERVICE_hostname.log` file in the `$ORACLE_BASE/admin/db_name/pfs/pfsdump` directory.

- For an non-OFA compliant installation, check the `pfs_ORACLE_SERVICE_hostname.log` file in the `$ORACLE_HOME/pfs/db_name/log/` directory.
- 7. Check the Oracle Heartbeat Monitor logs for errors:
 - For an OFA installation, check the `pfs_ORACLE_SERVICE_hostname_ping.log` file in the `$ORACLE_BASE/admin/db_name/pfs/pfsdump` directory.
 - For an non-OFA installation, check the `pfs_ORACLE_SERVICE_hostname_ping.log` file in the `$ORACLE_HOME/pfs/db_name/log` directory.

Troubleshooting

The following notes may help you to troubleshoot problems with Oracle9i Real Application Clusters Guard:

- The PFSCCTL status output "Both nodes are part of cluster" does not indicate that both nodes are up and running. One of the nodes might be down. Check the state of a node using the following commands:
 - For Sun Cluster 3.0:


```
/usr/cluster/bin/scstat
```
 - For HP:


```
/usr/sbin/cnviewcl
```
 - For Tru64:


```
/usr/bin/caa_stat
```
 - For AIX:


```
/usr/es/sbin/cluster/clstat
```
- The following parameters are not used by Oracle9i Real Application Clusters Guard in Sun Cluster 3.0, but must be specified for compatibility:
 - START_NET_TIMEOUT
 - STOP_NET_TIMEOUT
 - PFS_NET_IF_A *

- PFS_NET_IF_B *

*Specify the actual network interface adapter (that is, hme0) for PFS_NET_IF_A and PFS_NET_IF_B, not the NAFO group.

- If you have problems with NAFO on Sun Solaris, note the following:
 - If no NAFO group exists, the system attempts to discover a network adapter on the subnet identified by the hostnames, and create single adapter NAFO groups.
 - If you want multiple net adapters as backups, get and use the adapter lists on the subnet identified by the hostnames, and read the "How to Configure Public Network Management (PNM)" chapter in the Sun Cluster 3.0 Installation Guide.
 - To check the status of the NAFO groups, enter the following command:

```
$ /usr/cluster/bin/pnmstat -l
```

The output might look similar to the following:

group	adapters	status	fo_time	act_adp
nafo0	hme0	OK	NEVER	hme0

For further information on NAFO groups please refer to the Sun Cluster documentation or contact Sun support.

- If both the nodes of the cluster simultaneously fail, the Oracle Real Application Clusters Guard Packs start automatically when the nodes reboot. Enter the following command as the `root` user to stop the resources in the install environment:

```
# cd $ORACLE_HOME/pfs/bin
# pfsctl
PFSCIL>pfshalt
```

Note: This problem can occur any time all nodes are stopped without first stopping the Oracle9i Real Application Clusters Guard Packs using `pfscctl`. For example, if you perform a Sun Clusters shutdown, which stops all nodes cleanly, it does not run `pfscctl` and stop the packs. When you later boot a node, the Oracle9i Real Application Clusters Guard Pack is restarted automatically.

- The following Oracle9i Real Application Clusters Guard error might be displayed because of inconsistencies between SC2.2 and SC3.0:

```
Alert: could not generate file properly - Packs files
```

If it appears, remove all the files from the `$ORACLE_HOME/pfs/setup/output/ORACLE_SERVICE/packs` directory and reconfigure Oracle9i Real Application Clusters Guard.

- When using the OFA architecture, ensure any user-specific configuration files for Real Application Clusters Guard are backed up and removed, so that they do not conflict with the new Real Application Clusters Guard files.

Upgrading to Oracle9i Real Application Clusters Guard I

This chapter describes how to upgrade to this release of Oracle9i Real Application Clusters Guard. Specifically, this chapter describes:

- [Upgrading from Oracle9i Real Application Clusters Guard Release 9.0.x](#)
- [Upgrading from Oracle9i Real Application Clusters Guard Release 9.0.1.x and Oracle Parallel Fail Safe 8.1.7.2](#)
- [Troubleshooting Tips](#)

If an upgrade path is not described in this chapter then that upgrade path is not supported in this release.

Note: This release of Oracle9i Real Application Clusters Guard requires Sun Cluster 3.0 on Sun Solaris systems. If you need to upgrade the version of Sun Cluster, you must follow the instructions in this chapter.

Upgrading from Oracle9i Real Application Clusters Guard Release 9.0.x

This section describes how to upgrade to Oracle9i Real Application Clusters Guard Release 2 (9.2.0.1.0) if you currently use any of the following releases on Sun Cluster 2.2:

- Oracle9i Real Application Clusters Guard Release 9.0.1.0
- Oracle9i Real Application Clusters Guard Release 9.0.1.1
- Oracle9i Real Application Clusters Guard Release 9.0.1.2

Perform the following steps:

1. Back up all Oracle configuration files.

Remember to back up files in the `$ORACLE_HOME/network` and `$ORACLE_HOME/dbs` directories. If you perform OFA compliant installations, also make backups as follows:

- a. Back up and remove all user-specific files by removing the following directories:

```
$ORACLE_HOME/pfs
$ORACLE_BASE/admin/DB_NAME/pfs
$ORACLE_BASE/admin/DB_NAME/pfile
$ORACLE_BASE/admin/DB_NAME/network
```

- b. Back up the Oracle Service configuration file as follows:

```
$ cd $ORACLE_HOME/pfs/setup/conf
$ cp $ORACLE_SERVICE.conf $ORACLE_SERVICE.conf.BACKUP92010
```

2. Use the `pfscctl` utility to stop the Oracle9i Real Application Clusters Guard software:

- a. Ensure that the following environment variables are set correctly:

- ORACLE_SERVICE
- PFS_HOME
- DB_NAME

- b. Stop the Oracle9i Real Application Clusters Guard software:

```
$ pfscctl
PFSCCTL> pfshalt
```

3. Use the PFSSETUP utility to delete the old Oracle9i Real Application Clusters Guard Pack files:

- a. Run the `pfsetup` utility:

```
$ pfsetup
```

- b. Choose option 6 - All the files

- c. Choose option 4 - Deinstall

Note that this step does not remove the software files.

- d. Log in as the `root` user.

- e. Run the `deletepacks` command to de-register the packs from the cluster framework:

```
# cd $ORACLE_HOME/pfs/setup
# ./deletepacks
```

4. Upgrade the cluster software from Sun Cluster 2.2 to Sun Cluster 3.0.

Refer to the Sun Cluster 3.0 documentation for instructions on this procedure. For additional information, contact Sun support.

5. Test the Real Applications Clusters environment:

- a. Boot both nodes into cluster mode.

- b. Run Real Applications Clusters on both nodes.

Make sure that Real Applications Clusters and associated databases operate correctly on Sun Cluster 3.0 independently of Oracle9i Real Application Clusters Guard before continuing.

6. Install Oracle9i Real Application Clusters Guard Release 2 (9.2.0.1.0) using the instructions in the "Installing the Oracle9i Real Application Clusters Guard Files" section in [Chapter 2](#) of this guide.

7. Test the Real Application Clusters environment, again, by running Real Applications Clusters and testing that the database is operating correctly.

8. Configure Oracle9i Real Application Clusters Guard:

- a. Shut down both instances.

- b. Copy the `savsetup.dat` file to `$ORACLE_SERVICE.conf`:

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

- c. Update the `$ORACLE_SERVICE.conf` file using the configuration information from the `$ORACLE_SERVICE.conf.BACKUP92010` file you saved in step 1.
 - d. Run the `pfssetup` utility:

```
$ pfssetup
```
 - e. Choose option 6 - All the files
 - f. Choose option 1 - Generate Only
 - g. Choose option 6 - All the files
 - h. Choose option 2 - Deploy Only
 - i. Log in as the `root` user.
 - j. Run the `createpacks` command to register the packs from the cluster framework:

```
# cd $ORACLE_HOME/pfs/setup
# ./createpacks
```
9. Complete the installation:
- a. Modify the appropriate database initialization (`init.ora`) files to include the required Real Application Clusters Guard parameters as described in [Chapter 3](#).
 - b. Update the Real Application Clusters Guard generated `listener.ora` and `tnsnames.ora` files as described in [Chapter 3](#).
 - c. Test the Real Application Clusters environment, again, by running Real Applications Clusters and testing that the database is operating correctly.
 - d. Ensure that the following environment variables are set correctly:
 - `ORACLE_SERVICE`
 - `PFS_HOME`
 - `DB_NAME`

- e. Start the Oracle9i Real Application Clusters Guard software:


```
$ pfsctl
PFSCCTL> pfsboot
```
- f. Check the `$ORACLE_HOME/pfs/setup/PFS_Setup.log` file for messages. Messages that begin with `ORA-` and `PFS-` might help you resolve any problems you encounter.

Upgrading from Oracle9i Real Application Clusters Guard Release 9.0.1.x and Oracle Parallel Fail Safe 8.1.7.2

This section describes how to upgrade to Oracle9i Real Application Clusters Guard Release 2 (9.2.0.1.0) if you currently use any of the following releases:

- Oracle9i Real Application Clusters Guard Release 9.0.1.3
- Oracle Parallel Fail Safe 8.1.7.2

Perform the following steps:

1. Back up all Oracle configuration files.

Remember to back up files in the `$ORACLE_HOME/network` and `$ORACLE_HOME/dbs` directories. If you perform OFA compliant installations, also make backups as follows:

- a. Back up and remove all user-specific files by removing the following directories:

```
$ORACLE_HOME/pfs
$ORACLE_BASE/admin/DB_NAME/pfs
$ORACLE_BASE/admin/DB_NAME/pfile
$ORACLE_BASE/admin/DB_NAME/network
```

- b. Back up the Oracle Service configuration file as follows:

```
$ cd $ORACLE_HOME/pfs/setup/conf
$ cp $ORACLE_SERVICE.conf $ORACLE_SERVICE.conf.BACKUP92010
```

2. Use the `pfsctl` utility to stop the Oracle9i Real Application Clusters Guard or Oracle Parallel Fail Safe software:
 - a. Ensure that the following environment variables are set correctly:
 - `ORACLE_SERVICE`

- PFS_HOME
- DB_NAME
- b. Stop the Oracle9i Real Application Clusters Guard software:

```
$ pfscctl  
PFSCCTL> pfshalt
```
- 3. Use the `pfsetup` utility to delete the old Oracle9i Real Application Clusters Guard Pack files:
 - a. Run the `pfsetup` utility:

```
$ pfsetup
```
 - b. Choose option 6 - All the files
 - c. Choose option 4 - Deinstall
Note that this step does not remove the software files.
 - d. Log in as the `root` user.
 - e. Run the `deletepacks` command to de-register the packs from the cluster framework:

```
# cd $ORACLE_HOME/pfs/setup  
# ./deletepacks
```
- 4. Upgrade the Oracle Server to Oracle9i release 9.2.0.1. Following the instructions for migrating the Oracle Database in the Oracle9i Migration documentation. This step installs the Oracle9i Real Application Clusters Guard files.
- 5. Test the Real Applications Clusters environment:
 - a. Boot both nodes into cluster mode.
 - b. Run Real Applications Clusters on both nodes.Make sure that Real Applications Clusters and associated databases operate correctly independently of Oracle9i Real Application Clusters Guard before continuing.
- 6. Configure Oracle9i Real Application Clusters Guard:
 - a. Shut down both instances.

- b.** Copy the `savsetup.dat` file to `$ORACLE_SERVICE.conf`:

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

- c.** Update the `$ORACLE_SERVICE.conf` file using the configuration information from the `$ORACLE_SERVICE.conf.BACKUP92010` file you saved in step one.

- d.** Run the `pfssetup` utility:

```
$ pfssetup
```

- e.** Choose option 6 - All the files

- f.** Choose option 1 - Generate Only

- g.** Choose option 6 - All the files

- h.** Choose option 2 - Deploy Only

- i.** Log in as the `root` user.

- j.** Run the `createpacks` command to register the packs from the cluster framework:

```
# cd $ORACLE_HOME/pfs/setup
# ./createpacks
```

7. Complete the installation:

- a.** Modify the appropriate database initialization (`init.ora`) files to include the required Real Application Clusters Guard parameters as described in [Chapter 3](#).

- b.** Update the Real Application Clusters Guard generated `listener.ora` and `tnsnames.ora` files as described in [Chapter 3](#).

- c.** Test the Real Application Clusters environment, again, by running Real Applications Clusters and testing that the database is operating correctly.

- d.** Ensure that the following environment variables are set correctly:

- `ORACLE_SERVICE`
- `PFS_HOME`
- `DB_NAME`

- e. Start the Oracle9i Real Application Clusters Guard software:

```
$ pfscctl  
PFSCCTL> pfsboot
```

- f. Check the `$ORACLE_HOME/pfs/setup/PFS_Setup.log` file for messages. Messages that begin with `ORA-` and `PFS-` might help you resolve any problems you encounter.

Troubleshooting Tips

Consider the following points while troubleshooting an upgrade problem:

- The following message might appear if the `$ORACLE_HOME/pfs/setup/output/$ORACLE_SERVICE/packs` directory is not empty:

```
Alert: could not generate file properly - Packs files
```
- When performing an OFA compliant installation, user-specific configuration files might conflict with the new Real Application Clusters Guard files. Back up and remove these file to ensure a successful upgrade.
- If the `pfshalt` or `haltone` commands fail while using the `pfscctl` utility, consider the following:
 - Check the associated Real Application Clusters Guard log files, Oracle log files, network log files, and system log files for errors.
 - Check the Real Application Clusters Guard Pack state using the `scstat` command. If a Real Application Clusters Guard is in a `STOP_FAILED` state, investigate and correct the error before clearing the `STOP_FAILED` state and restarting the pack.

The following conditions might put the Real Application Clusters Guard in a `STOP_FAILED` state:

- The Oracle instance cannot be stopped.
- The relocatable IP cannot be disabled.
- A timeout occurs.

After correcting the condition and clearing the `STOP_FAILED` state, run the the `pfshalt` or `haltone` command again. These commands ensure that the system clears any processes, shared memory segments or other resources.

For information on clearing the STOP_FAILED flag, refer to the section "Administering Data-Service Resources" in the Sun Cluster 3.0 U1 Data Services, Installation and Configuration Guide.

Optimal Flexible Architecture

The Oracle9i Real Application Clusters Guard directory structure depends on the type of installation you perform when installing the software. This appendix contains the following sections:

- [Introduction to Optimal Flexible Architecture](#)
- [OFA Compliant Installation](#)
- [Non-OFA Compliant Installation](#)

Introduction to Optimal Flexible Architecture

Oracle Corporation recommends the Optimal Flexible Architecture (OFA) standard for Oracle installations. The OFA standard is a set of configuration guidelines for efficient and reliable Oracle databases that require little maintenance.

OFA provides the following benefits:

- Organizes large amounts of complicated software and data on disk to avoid device bottlenecks and poor performance
- Facilitates routine administrative tasks, such as software and data backup functions, which are often vulnerable to data corruption
- Eases switching among multiple Oracle databases
- Manages and administers database growth adequately
- Helps to eliminate fragmentation of free space in the data dictionary, isolate other fragmentation, and minimize resource contention

To switch to the OFA standard, you must modify the directory structure and relocate the database files.

See Also:

- See the Oracle operating-system specific documentation for more information about OFA.
- See the *Oracle9i Administrator's Guide* for information about relocating your database files.

OFA Compliant Installation

If the `ORACLE_BASE` environment variable is set during installation, an OFA compliant installation is performed, and the `PFS_HOME` environment variable is set to `$ORACLE_BASE/admin/db_name/pfs`.

An OFA compliant installation of Oracle9i Real Application Clusters Guard results in a directory structure similar to the following:

```

$ORACLE_HOME
$ORACLE_HOME/pfs
$ORACLE_HOME/pfs/admin
$ORACLE_HOME/pfs/bin
$ORACLE_HOME/pfs/bin/oracle_up
$ORACLE_HOME/pfs/bin/oracle_ping
$ORACLE_HOME/pfs/bin/oracle_lsnr
$ORACLE_HOME/pfs/bin/oracle_role
$ORACLE_HOME/pfs/bin/pfs_watchdog
$ORACLE_HOME/pfs/demo
$ORACLE_HOME/pfs/doc
$ORACLE_HOME/pfs/lib
$ORACLE_HOME/pfs/lib/pfs_cluster
$ORACLE_HOME/pfs/lib/pfs_internal
$ORACLE_HOME/pfs/lib/pfs_oracle
$ORACLE_HOME/pfs/mesg
$ORACLE_HOME/pfs/setup
$ORACLE_HOME/pfs/setup/conf
$ORACLE_HOME/pfs/setup/template
$ORACLE_HOME/pfs/setup/template/include
$ORACLE_HOME/pfs/setup/template/network
$ORACLE_HOME/pfs/setup/template/packs
$ORACLE_HOME/pfs/setup/template/pfile
$ORACLE_HOME/pfs/setup/template/user
$ORACLE_HOME/pfs/setup/output
$ORACLE_HOME/pfs/setup/output/ORACLE_SERVICE
$ORACLE_HOME/pfs/setup/output/ORACLE_SERVICE/packs
$ORACLE_HOME/pfs/setup/output/ORACLE_SERVICE/include
$ORACLE_HOME/pfs/setup/output/ORACLE_SERVICE/network
$ORACLE_HOME/pfs/setup/output/ORACLE_SERVICE/pfile
$ORACLE_HOME/pfs/sys

$ORACLE_BASE/admin/
$ORACLE_BASE/admin/db_name
$ORACLE_BASE/admin/db_name/pfs
$ORACLE_BASE/admin/db_name/pfs/include

```

```
$ORACLE_BASE/admin/db_name/pfs/packs
$ORACLE_BASE/admin/db_name/pfs/pfile
$ORACLE_BASE/admin/db_name/pfs/pfsdump
$ORACLE_BASE/admin/db_name/pfs/user
```

Non-OFA Compliant Installation

If the `ORACLE_BASE` environment variable is *not* set during installation, a non-OFA compliant installation is performed and the `PFS_HOME` environment variable is set to `$ORACLE_HOME/pfs/db_name`.

A non-OFA compliant installation of Oracle9i Real Application Clusters Guard results in a directory structure similar to the following:

```
$ORACLE_HOME
$ORACLE_HOME/pfs
$ORACLE_HOME/pfs/admin
$ORACLE_HOME/pfs/bin
$ORACLE_HOME/pfs/bin/oracle_up
$ORACLE_HOME/pfs/bin/oracle_ping
$ORACLE_HOME/pfs/bin/oracle_lsnr
$ORACLE_HOME/pfs/bin/oracle_role
$ORACLE_HOME/pfs/bin/pfs_watchdog
$ORACLE_HOME/pfs/demo
$ORACLE_HOME/pfs/doc
$ORACLE_HOME/pfs/lib
$ORACLE_HOME/pfs/lib/pfs_cluster
$ORACLE_HOME/pfs/lib/pfs_internal
$ORACLE_HOME/pfs/lib/pfs_oracle
$ORACLE_HOME/pfs/mesg
$ORACLE_HOME/pfs/setup
$ORACLE_HOME/pfs/setup/conf
$ORACLE_HOME/pfs/setup/template
$ORACLE_HOME/pfs/setup/template/include
$ORACLE_HOME/pfs/setup/template/network
$ORACLE_HOME/pfs/setup/template/packs
$ORACLE_HOME/pfs/setup/template/pfile
$ORACLE_HOME/pfs/setup/template/user
$ORACLE_HOME/pfs/setup/output
$ORACLE_HOME/pfs/setup/output/ORACLE_SERVICE
$ORACLE_HOME/pfs/setup/output/ORACLE_SERVICE/packs
$ORACLE_HOME/pfs/setup/output/ORACLE_SERVICE/include
$ORACLE_HOME/pfs/setup/output/ORACLE_SERVICE/network
$ORACLE_HOME/pfs/setup/output/ORACLE_SERVICE/pfile
$ORACLE_HOME/pfs/sys
```

```
$ORACLE_HOME/pfs/db_name  
$ORACLE_HOME/pfs/db_name/include  
$ORACLE_HOME/pfs/db_name/log  
$ORACLE_HOME/pfs/db_name/packs  
$ORACLE_HOME/pfs/db_name/pfile  
$ORACLE_HOME/pfs/db_name/user
```


B

Configuration Files

This appendix contains information on the following configuration files:

- [init_ORACLE_SERVICE_HOSTNAME\[A | B\].ora](#)
- [ORACLE_SERVICE_config.pfs](#)
- [ORACLE_SERVICE_config_HOSTNAME\[A | B\].ded.pfs](#)
- [ORACLE_SERVICE_config_HOSTNAME\[A | B\].mts.pfs](#)

init_ORACLE_SERVICE_HOSTNAME[A|B].ora

The `init_ORACLE_SERVICE_PFS_HOST[A|B].ora` file defines the following parameters for each instance:

Parameter	Definition
INSTANCE_NUMBER	Unique instance number. Maps the instance to one free list group for each database object created with the storage parameter <code>FREELIST GROUPS</code> . Oracle Corporation recommends setting the <code>INSTANCE_NUMBER</code> to the same value as the <code>THREAD</code> parameter.
THREAD	Unique thread number. Specifies the number of the redo thread used by the instance. You can specify any available redo thread number, 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 zero 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.
INSTANCE_NAME	Unique instance name. Identifies the name of the instance and is used to uniquely identify a specific instance when multiple instances share common service names.

[Example B-1](#) and [Example B-2](#) show samples of the `init_ORACLE_SERVICE_HOSTNAME[A|B].ora` file that the `PFSSETUP` utility creates.

Example B-1 `init_SALES_nodeA.ora`

```
instance_number=1
thread=1
instance_name=SALES1
```

Example B-2 `init_SALES_nodeB.ora`

```
instance_number=2
thread=2
instance_name=SALES2
```

ORACLE_SERVICE_config.pfs

The `ORACLE_SERVICE_config.pfs` file contains the mandatory and recommended settings for selected initialization parameters for Oracle9i Real Application Clusters Guard. All instances must use the same `ORACLE_SERVICE_config.pfs` file.

[Example B-3](#) shows a sample `ORACLE_SERVICE_config.pfs` file created by the PFSSETUP utility:

Note: In the following example, the settings for the `db_name`, `db_domain`, and `service_names` parameters, are sample values and can vary, depending on your system and requirements.

Example B-3 SALES_config.pfs

```
active_instance_count=1
compatible=9.0.0
db_block_checking=true
db_block_checksum=true
db_name=SALES
db_domain=WORLD
service_names=SALES.WORLD
max_dump_file_size=unlimited
os_authent_prefix=OPS$
cluster_database=true
remote_os_authent=true
timed_statistics=true
```

The following table describes the parameters in the preceding example:

Parameter	Requirement	Value	Description
ACTIVE_INSTANCE_COUNT	Required	1	A value of 1 designates one instance in a two-instance cluster as the primary instance and the other instance as the secondary instance.
COMPATIBLE	Required	9.0.0	The Oracle server must maintain compatibility with Oracle server Release 2 (9.2.0.1.0).

Parameter	Requirement	Value	Description
DB_NAME	Required	SALES, for example	The name specified must correspond with the name specified in the PFSSETUP utility file (\$ORACLE_SERVICE.conf).
DB_DOMAIN	Required	WORLD, for example	The database domain specified must correspond with the database domain specified in the PFSSETUP utility file (\$ORACLE_SERVICE.conf).
CLUSTER_DATABASE	Required	TRUE	A value of TRUE enables Oracle9i Real Application Clusters Guard.
SERVICE_NAMES	Required	SALES.WORLD	The service name specified must correspond with the service name specified in the Oracle9i Real Application Clusters installation configuration file (\$ORACLE_SERVICE.conf). You can provide multiple service names (using individual SERVICE_NAMES entries) so that different usage of an instance can be identified separately. Oracle9i Real Application Clusters Guard supports only one SERVICE_NAMES entry.
OS_AUTHENT_PREFIX	Required	OP\$	OP\$ is the prefix that Oracle uses to authenticate users attempting to connect to the server.
REMOTE_OS_AUTHENT	Required	TRUE	Remote clients are authenticated using OP\$.
DB_BLOCK_CHECKING	Recommended	TRUE	Controls whether Oracle performs block checking for data blocks.
DB_BLOCK_CHECKSUM	Recommended	TRUE	Determines whether the DBWn processes and the direct loader calculate a checksum and store it in the cache header of every data block when writing it to disk.
FAST_START_MTTR_TARGET	Recommended	System-specific, application specific	Specifies the time in seconds required during crash or instance recovery.

Parameter	Requirement	Value	Description
MAX_DUMP_FILE_SIZE	Recommended	UNLIMITED	Specifies the maximum size of trace files.
TIMED_STATISTICS	Recommended	TRUE	Specifies whether statistics related to time are collected.

ORACLE_SERVICE_config_HOSTNAME[A/B].ded.pfs

The `ORACLE_SERVICE_config_HOSTNAME[A/B].ded.pfs` files contain the dedicated network initialization parameters for Oracle9i Real Application Clusters Guard. These files are generated when the Oracle9i Real Application Clusters Guard configuration parameter `IS_MTS` is set to `false`, which is the default setting.

[Example B-4](#) and [Example B-5](#) show samples of the `ORACLE_SERVICE_config_HOSTNAME[A/B].ded.pfs` files that the `PFSSETUP` utility creates.

Example B-4 SALES_config_nodea.ded.pfs

```
local_listener=listener_SALES_nodeA
```

Example B-5 SALES_config_nodeb.ded.pfs

```
local_listener=listener_SALES_nodeB
```

The `LOCAL_LISTENER` parameter is required. It specifies a network name that resolves to an address of a Oracle Net local listener. The address is specified in the `tnsnames.ora` file.

ORACLE_SERVICE_config_HOSTNAME[A/B].mts.pfs

The `ORACLE_SERVICE_config_HOSTNAME[A/B].mts.pfs` files contain the Shared Servers network initialization parameters for Oracle9i Real Application Clusters Guard. These files are generated when the Oracle9i Real Application Clusters Guard installation configuration parameter `IS_MTS` is set to `true`.

[Example B-6](#) and [Example B-7](#) show samples of the `ORACLE_SERVICE_config_HOSTNAME[A/B].mts.pfs` file that the `PFSSETUP` utility creates.

Example B-6 sales_config_nodea.mts.pfs

```
dispatchers="(address=(protocol=tcp)(host=192.10.1.21)(lis=listener_sales)"
```

Example B-7 sales_config_nodeb.mts.pfs

```
dispatchers="(address=(protocol=tcp)(host=192.10.1.22)(lis=listener_sales)"
```

The `lis=listener_sales` setting enables an instance to register its instance information with remote listeners on the other nodes. The `listener_sales` value is resolved to a listener address list through a `tnsnames.ora` file.

Index

C

Command Syntax, ix
configuring
 Oracle Net, 2-8
Customer Service
 information, xi

D

data options, 2-1
dedicated sessions, 2-9
documentation
 related, x

E

Education and Training
 information, xi
environment
 setting the, 1-9
 UNIX, 1-9
environment variables, 1-10, 1-11
 NLS_LANG, 1-12
 ORA_NLS33, 1-12
 ORACLE_BASE, 1-11
 ORACLE_HOME, 1-11

I

installation
 OFA-compliant, A-3
 overview, 1-2
installation configuration file

 for Oracle9i RAC Guard, 2-3
installing
 a new Oracle9i Real Application Clusters
 Guard, 2-2
 Oracle9i Real Application Clusters Guard, 2-2

N

NLS_LANG environment variable, 1-12
non-OFA compliant
 installation, A-4

O

OFA
 See also Optimal Flexible Architecture
OFA-compliant
 installation, A-3
Optimal Flexible Architecture, A-1, A-2, B-1
 introduction, A-2
ORA_NLS33 environment variable, 1-12
Oracle Data Option Demos, 2-1
Oracle MetaLink
 description, x
Oracle Net
 configuring, 2-8
 for clients, 2-10
 for server, 2-9
Oracle Parallel Fail, 4-5
Oracle product
 requirements, 1-6
Oracle Support and Services, x
Oracle Technology Network
 description, xi

- oracle user
 - post-installation tasks, 3-2
- ORACLE_BASE environment variable, 1-11
- ORACLE_HOME environment variable, 1-11
- Oracle9i Real Application Clusters Guard
 - installing, 2-2

P

- PFSSETUP setup utility
 - running, 2-4
- PFSSETUP utility
 - running, 2-4
- post-installation tasks
 - for oracle user, 3-2
 - for root user, 3-10
- Products and Documentation
 - where to find, xi

R

- reader's comment form, v
- related documentation, x
- requirements
 - network, 1-7
 - Oracle product, 1-6
 - system installation, 1-3
- root user
 - post-installation tasks, 3-10

S

- setting
 - the environment, 1-9
- setting up
 - the installation configuration file for Oracle9i RAC Guard, 2-3
- set-up tasks
 - oracle user, 1-10
 - root user, 1-9
 - root user set up tasks, 1-9
 - set-up tasks as oracle user, 1-10
- Support for Hearing and Speech Impaired
 - information, xii
- system installaton

- requirements, 1-3

T

- troubleshooting, 4-8
- Typographic Conventions, ix

U

- upgrading, 4-1