FUJITSU Software
PRIMECLUSTER Wizard for Oracle 4.3

Configuration and Administration Guide

Linux

J2UL-1679-03ENZ0(00)
May 2015

Preface

Purpose

The purpose of the document is to outline functions of PRIMECLUSTER Wizard for Oracle. Further, it describes the procedures from installation to operation management.

Readers

The document is intended for the system engineers and system administrators to design, configure, and manage a PRIMECLUSTER system. The reader should have expertise in the PRIMECLUSTER and Oracle database system.

Outline

The document consists of the following 6 chapters and 6 appendices:

- Chapter 1 Feature
- Chapter 2 Environment setup
- Chapter 3 Operation
- Chapter 4 Command
- Chapter 5 Notice
- Chapter 6 Message
- Appendix A Failure Case Studies
- Appendix B Change Oracle Resource Settings
- Appendix C Oracle Grid Infrastructure Installation and Oracle ASM instance, Oracle Database Creation
- Appendix D Using Oracle Database software on shared disks
- Appendix E Single-Node Cluster Operation
- Appendix F (Information) Action Definition File

Technical term

For technical words related to clusters in this document, refer to the manual. Unless otherwise specified, the following words are used for Oracle Database products. For details, refer to the Oracle Database manuals.

- **Oracle instance:**

  Referred to as "instance" or "Oracle instance" in this document.

- **Oracle listener:**

  Referred to as "Listener", or "Oracle listener" in this document.

- **Oracle Database:**

  Referred to as "Oracle Database", "Oracle" or "Oracle *Version Release*" in this document.

- **Oracle Automatic Storage Management:**

  Referred to as "Oracle ASM" or "ASM" in this document.

- **Oracle user:**

  Referred to "Oracle user" in this document.
  An operating system user account belonging to OSDBA group to operate and manage Oracle database system.

Notational convention

The document conforms to the following notational conventions:

Point

Contains important information about the subject at hand.

Information

Describes information a user can refer to.

See

Provides the names of manuals to be referenced.

Note

Describes points where a user should take notice.

Example

Describes settings using an example.

Export Controls

Exportation/release of this document may require necessary procedures in accordance with the regulations of your resident country and/or US export control laws.

Trademarks

Red Hat is a registered trademark of Red Hat, Inc. in the U.S. and other countries.

Linux is a registered trademark of Linus Torvalds.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

PRIMECLUSTER is a registered trademark of Fujitsu Limited.

Other product names are product names, trademarks, or registered trademarks of these companies.

Requests

- No part of this document may be reproduced or copied without permission of FUJITSU LIMITED.
- The contents of this document may be revised without prior notice.

Date of publication and edition

Date of publication and edition	Manual code
May 2015, First edition	J2UL-1679-03ENZ0(00)/J2UL-1679-03ENZ2(00)

Copyright notice

Copyright FUJITSU LIMITED 2015

Contents

Chapter 1 Feature 1
1.1 Feature Outline 1
1.2 Operating Environment 2

Chapter 2 Environment Setup 5
2.1 Oracle Environment Setting 5
2.2 Standby Operation 5
2.2.1 PRIMECLUSTER Installation and Configuration 5
2.2.2 Oracle Database Software Installation and Configuration 6
2.2.3 userApplication Configuration 8
2.2.4 userApplication Creation (without Oracle Resources) 8
2.2.4.1 userApplication creation 9
2.2.4.2 Configuration-Generate and Configuration-Activate 12
2.2.5 userApplication Operation Check 12
2.2.6 Oracle Database Creation and Setting 13
2.2.7 userApplication Edit 18
2.2.7.1 Oracle Resource Creation and Registration 19
2.2.7.2 Other Resource Creation and Registration 27
2.2.7.3 Configuration-Generate and Configuration-Activate 28
2.2.8 userApplication Operation Check 28
2.3 Information 29
2.3.1 Oracle resource Online/Offline Script 29
2.3.2 Oracle ASM (Automatic Storage Management) 32
2.3.2.1 Environment configuration with Oracle Database 11g R1 33
2.3.2.2 Environment configuration with Oracle Database 11g R2/12c R1 35
2.3.2.3 Precaution for Oracle ASM operation 38

Chapter 3 Operation 39
3.1 Oracle database Control through PRIMECLUSTER Wizard for Oracle 39
3.1.1 Oracle resources Startup and Shutdown 39
3.1.2 Oracle resources Monitoring 41
3.2 Oracle database Maintenance 44
3.2.1 Oracle database Setting Change 46
3.2.1.1 Oracle database must be stopped 46
3.2.2 Patch Application 47
3.2.2.1 Patch Application by In-place upgrade 47
3.2.2.2 Patch Application by Out-of-place upgrade 48
3.2.3 Backup 52
3.2.3.1 Cold backup 52
3.2.3.2 Hot backup 53
3.2.4 Recovery 53
3.2.4.1 Oracle database must be stopped 54
3.2.4.2 Oracle database does not need to be stopped 55
3.3 Oracle SYSTEM user Password Change 55
3.4 Corrective Action against Failover 56
3.5 Troubleshooting Information 57
3.6 Log Files 58

Chapter 4 Command 59
4.1 hvoradisable - Discontinue Monitoring Resources 59
4.2 hvoraenable - Restart Monitoring Resources 60
4.3 clorapass - Register Password for Monitoring 61
4.4 cloracpy - Create Backup File for Oracle Database Setup 62
4.5 clgetoralog - Collect Troubleshooting Information 63
4.6 clorainfo - Display Resource Configuration and Monitoring Status 65

Chapter 5 Notice....67

Chapter 6 Message....69

Appendix A Failure Case Studies....85
A.1 Oracle Instances....85
A.1.1 Startup/stop failure....85
A.1.2 AutoRecover or Failover....85
A.1.3 Warning State....86
A.2 Oracle Listeners....88
A.2.1 Startup/stop failure....88
A.2.2 AutoRecover or Failover....88
A.2.3 Warning state....89

Appendix B Change Oracle Resource Settings....90
B.1 Resource Additional Creation....90
B.1.1 Respectively....90
B.1.2 In a Group....91
B.2 Change Resource Settings....92
B.3 Resource Deletion....93
B.3.1 Respectively....93
B.3.2 In a Group....94

Appendix C Oracle Grid Infrastructure Installation and Oracle ASM instance, Oracle Database Creation....96

Appendix D Using Oracle Database software on shared disks....102

Appendix E Single-Node Cluster Operation....108
E.1 Oracle ASM not used....109
E.2 Oracle ASM of Oracle Database 11g R1 used....110
E.3 Oracle ASM of Oracle database 11g R2/12c R1 used....111

Appendix F (Information) Action Definition File....113

Chapter 1 Feature

1.1 Feature Outline

PRIMECLUSTER Wizard for Oracle is a software product that facilitates cluster operation management for Oracle database operating on a PRIMECLUSTER system.
The standby operation with Oracle database is enabled. The single-node cluster operation requires an operation node in which a cluster consists of one node.

This software provides the following features:

Feature	Description
Environment Setup	Environment setup tool to enable clustering of Oracle database
Monitoring	Daemon processes to monitor Oracle instance, Listener and detect their failures
Start and Stop Control	Scripts used for startup and stop of Oracle instances, Listeners
Setup and Operation Commands	Commands used for setup and operations

Environment Setup

To enable clustering of Oracle database, it is required that Oracle instances and Listeners are registered on userApplication(cluster application) as a "resource". PRIMECLUSTER Wizard for Oracle enables it. For details, refer to "Chapter 2 Environment Setup".

Monitoring

PRIMECLUSTER Wizard for Oracle provides daemon processes to monitor Oracle instances and Listeners and detect their failures. If errors are detected in monitoring, Oracle instances and Listeners are restarted and a failover occurs automatically. For details, refer to "3.1 Oracle database Control through PRIMECLUSTER Wizard for Oracle".

- Oracle instance Monitoring

  The daemon processes monitor Oracle instances in the following way.

  - Process Monitoring
    The daemon process connects to the Oracle instance as the SYSTEM user and cyclically monitors Oracle background processes (PMON, SMON, DBWn, LGWR and CKPT).

  - Table Monitoring
    The daemon process creates a table for monitoring and cyclically manipulates data on the table with SQL statements (INSERT, UPDATE, DELETE and COMMIT). It checks the SQL execution result to monitor Oracle instances. Therefore, it means that not only the background process failures but also logical failures can be detected.

- Listener Monitoring

  The daemon process monitors a Listener process in the following way.

  - Process Monitoring
    The daemon process cyclically monitors Listener process.

  - Tnsping command
    The daemon process cyclically executes the tnsping command to check that Oracle Net Services are running.

Start and Stop Control

PRIMECLUSTER Wizard for Oracle provides scripts to start up and stop Oracle instances and Listeners automatically, according to the state transition of userApplication. For details, refer to "3.1 Oracle database Control through PRIMECLUSTER Wizard for Oracle".

- Oracle instance Start and Stop

  In standby operation, the script starts up the Oracle instance, checking the state and recovering. For example, if the Oracle instance had failed during online backup, the scripts automatically execute "END BACKUP" during the startup.
  When stopping, the scripts stop the instance in the IMMEDIATE mode. If it fails, the script immediately tries in the ABORT. It means that the failover of userApplication can be performed at high-speed.

- Listener Start and Stop

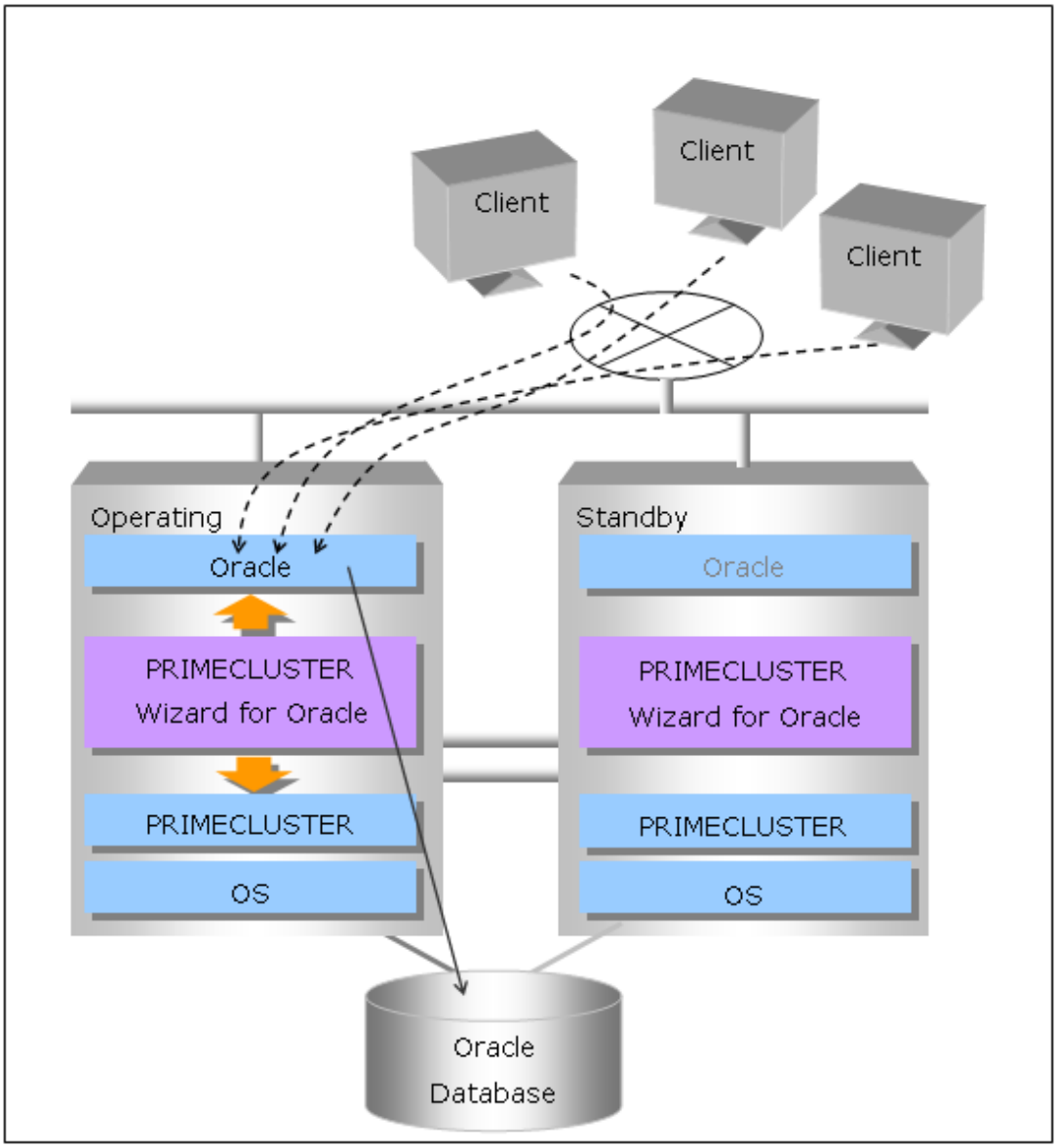
  In standby operation, the script starts up and stops the Listener with "lsnrctl start/stop" command, checking the state.

Setup and Operation Commands

PRIMECLUSTER Wizard for Oracle provides auxiliary commands for setup and operation. For details, refer to "Chapter 4 Command".

1.2 Operating Environment

Standby operation

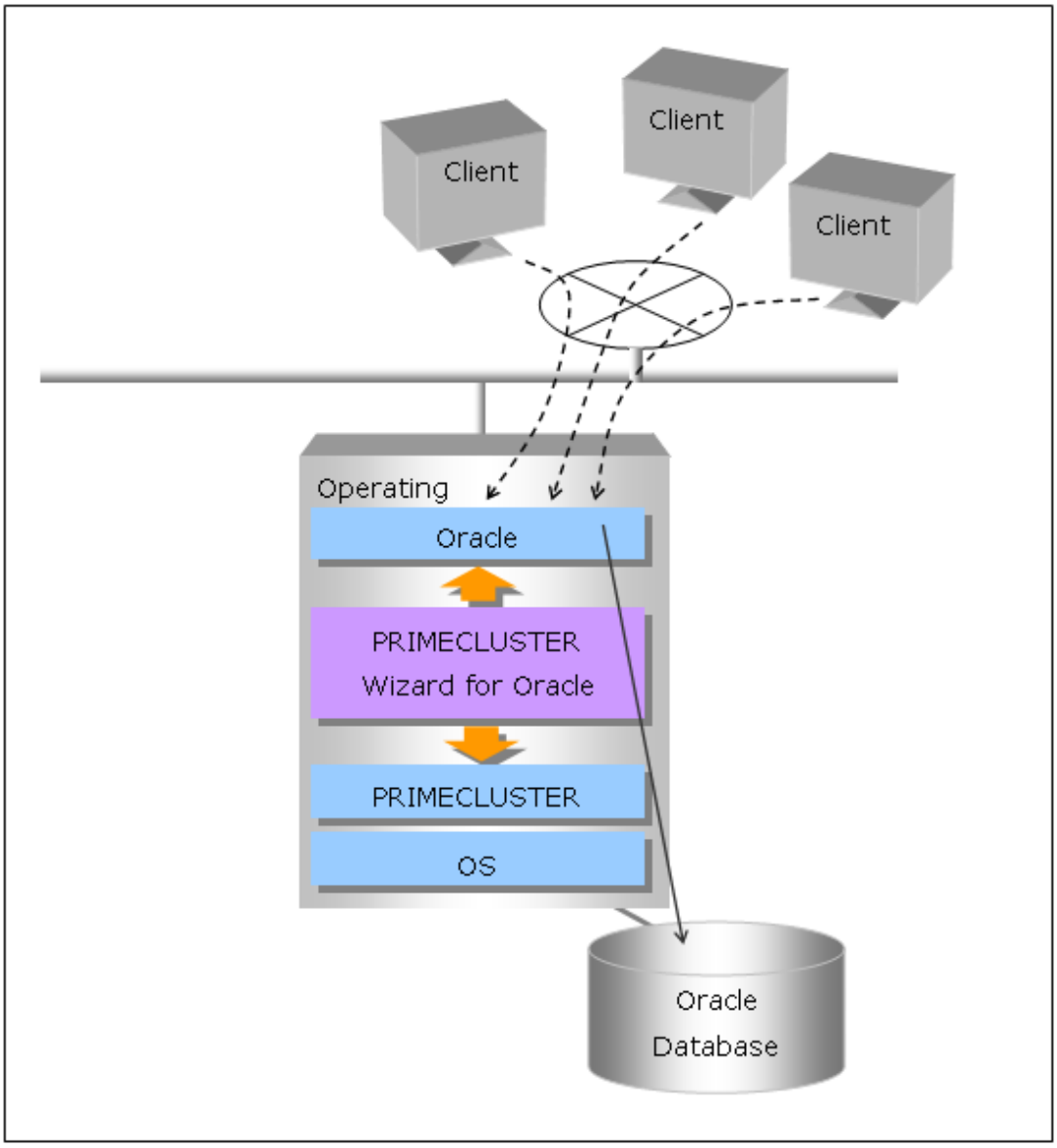


In standby operation, a cluster system consists of an operating node and standby nodes. On the operating node, the resources such as Oracle applications, a logical IP address and shared disks are active. On the standby node, these resources are inactive. In the event of a failure, userApplication is switched to the standby node, and the resources in this standby node become activated. Then, the client can connect itself to the operating node using the logical IP address without changing any settings.

Note

- In order to use Oracle ASM of Oracle Database 11g R2/12c R1, it is necessary to install Oracle Grid Infrastructure. When installing Oracle Grid Infrastructure, the composition which separates the installation user of Oracle Database and the installation user of Oracle Grid Infrastructure is supported. The composition which creating one user is not supported.
  A different directory must be assigned respectively for an ORACLE_BASE of the installation user of Oracle Database and an ORACLE_BASE of the installation user of Oracle Grid Infrastructure.
- When using Oracle ASM of Oracle database 11g R2/12c R1 in standby operation, database services are not available.

Single-Node Cluster operation



In Single-Node Cluster operation, a cluster system consists of one node.

The status of Oracle database is monitored. Oracle database operation can be continued by restarting Oracle database automatically if Oracle database failures are detected.

Note

- In order to use Oracle ASM of Oracle Database 11g R2/12c R1, it is necessary to install Oracle Grid Infrastructure. When installing Oracle Grid Infrastructure, the composition which separates the installation user of Oracle Database and the installation user of Oracle Grid Infrastructure is supported. The composition which creating one user is not supported.
  A different directory must be assigned respectively for an ORACLE_BASE of the installation user of Oracle Database and an ORACLE_BASE of the installation user of Oracle Grid Infrastructure.
- When using Oracle ASM of Oracle database 11g R2/12c R1 in single-node cluster operation, database services are not available.

Information

For further details about the operation modes of Standby operation and Single-Node Cluster operation, refer to "PRIMECLUSTER Installation and Administration Guide".

Chapter 2 Environment Setup

2.1 Oracle Environment Setting

This section explains a general setup procedure of Oracle database operating on a PRIMECLUSTER system.

Note

The setup procedure explained in section "2.2 Standby Operation" assumes that the userApplication will be created newly.
In the case of upgrading from previous version, refer to "Software Release Guide PRIMECLUSTER Wizard for Oracle".

Standby operation

No.	Procedure	
	operating node	Standby node
1	Install and configure PRIMECLUSTER	Install and configure PRIMECLUSTER
2	Install PRIMECLUSTER Wizard for Oracle	Install PRIMECLUSTER Wizard for Oracle
3	Install and configure Oracle database software	Install and configure Oracle database software
4	Create userApplication	-
5	Create and set up an Oracle database	-
6	-	Set up an Oracle database
7	Create and set up Oracle resources	-

For details, refer to "2.2 Standby Operation".

Single-node cluster operation

For details, see "Appendix E Single-Node Cluster Operation".

2.2 Standby Operation

This section describes how to configure an environment for standby operation.

2.2.1 PRIMECLUSTER Installation and Configuration

Set up hardware

Set up hardware required for PRIMECLUSTER. The shared disk is also required to create an Oracle database.

Install software

Install PRIMECLUSTER first, referring to "Software Release Guide" accompanying the software.
Standby operation requires the following editions:

- PRIMECLUSTER Enterprise Edition
- PRIMECLUSTER HA Server
- PRIMECLUSTER Clustering Base

Then, install PRIMECLUSTER Wizard for Oracle referring to "Software Release Guide" accompanying the software.

Set up cluster system

Configure a cluster system according to "PRIMECLUSTER Installation and Administration Guide".

2.2.2 Oracle Database Software Installation and Configuration

This section explains how to install and configure Oracle database software.

Note

- Install only Oracle database software to all nodes. Do not create a database in this section (Database creation is performed in "2.2.6 Oracle Database Creation and Setting").
- If you install Oracle database software on the shared disk, using Oracle ASM is not supported. Install the Oracle database software on a local disk of each node when you use Oracle ASM.
- If multiple Oracle homes are configured on one server, a different user name must be assigned for each Oracle home.
- If you install Oracle Grid Infrastructure to use Oracle ASM on Oracle database 11g R2/12c R1, you must create install user for the Oracle Grid Infrastructure and the Oracle Database installations separately. For information on how to install this configuration, see "2.3.2 Oracle ASM (Automatic Storage Management)".
- Confirm the contents of "Chapter 5 Notice" before Installing.

Initial setup

- Set up the kernel parameter

  Set up values in the "/etc/system" file for Oracle database in addition to the values for PRIMECLUSTER.
  The kernel parameter values vary depending on the implemented Oracle database versions.
  Refer to the Oracle database installation guide. The parameter values should be identical on all the nodes.

  The kernel parameters can be configured with the sysctl (8) utility when they are executed. The procedures for changing the kernel parameters and setting up the new kernel parameters are explained below.

  Note

  For semopm (the third value of "kernel.sem"), specify a value of 4 or more.

  Example

  The following command enables the value of /etc/sysctl.conf for the kernel. You do not have to reconfigure the kernel.

  To change the kernel parameter while the OS is running, use sysctl (8). For details about sysctl (8), refer to the manual pages.

  ```
  sysctl -p <filename>
  ```

  If <filename> is omitted, read from /etc/sysctl.conf.

- Oracle User

  Create an OS user which belongs to OSDBA group to allow users to install and operate Oracle database. The user ID and the group ID must be the same on all the nodes.

Example

Create an operating system user account belonging to OSDBA group (dba) and Oracle Inventory group (oinstall).

```
# groupadd -g <group ID> dba
# groupadd -g <group ID> oinstall
# useradd -g oinstall -G dba oracle
# passwd oracle
```

Set up an environment variable of an Oracle user.

Example

(.bash_profile)

```
ORACLE_BASE=/u01/app/oracle;  export ORACLE_BASE
ORACLE_HOME=/u01/app/oracle/product/db;  export ORACLE_HOME
ORACLE_SID=ora  export ORACLE_SID
LD_LIBRARY_PATH=$ORACLE_HOME/lib;  export LD_LIBRARY_PATH
PATH=$ORACLE_HOME/bin:/usr/bin:/bin:/usr/bin/X11/:/usr/local/bin;  export PATH
```

Note

PRIMECLUSTER Wizard for Oracle controls Oracle database as the Oracle user which belongs to OSDBA group.

- Be sure to include ORACLE_HOME/bin in the PATH environment variable of the Oracle user.
- Check if root user access privileges can switch the user to the Oracle user, using the su (1M) command.

```
# su - <Oracle user>
```

- A command (e.g. script) that has interactive mode should not be described in Oracle user's profile.
  (e.g. /etc/profile, .bash_profile, .cshrc, .profile)
- Environment that Oracle user's home directory and profile are located on the shared disk is not supported. Oracle user's home directory and profile must be located on the local disk of each node.

See

For further details, refer to the Oracle Database manual.

Installation

Install Oracle database software using Oracle user access privileges.

Install a program on the local disk of each node or on the shared disk. If you install it on the local disk, refer to the Oracle Database manual. If you install it on the shared disk, refer to "Appendix D Using Oracle Database software on shared disks".

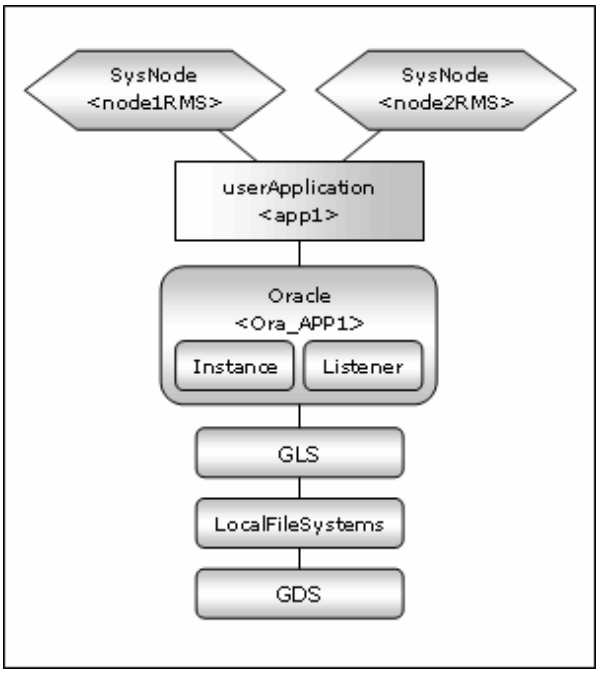
The database needs to be created on the shared disk when configuration of the cluster system is completed, not when Oracle database software is installed. The details will be described in "2.2.6 Oracle Database Creation and Setting".

See

For further details, refer to the Oracle Database manual.

2.2.3 userApplication Configuration

Operating userApplication is configured as follows:



userApplication	Description	Resources
app1	userApplication on all operation nodes	Oracle resource (instance, listener) Gds resource LocalFileSystems resource Gls resource

RMS Wizard allows you to set up the environment by selecting numbers from the menu.

Firstly, it is necessary to create userApplication without Oracle resources, and add the resource after creating an Oracle database. The sections below explain how to do it.

See

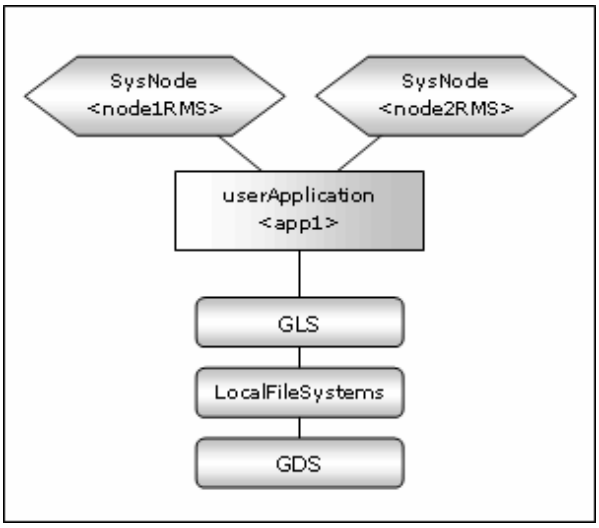
For further details, refer to the PRIMECLUSTER manuals.

2.2.4 userApplication Creation (without Oracle Resources)

This section explains how to create userApplication and set up non-Oracle resources.

Set up Oracle resources after creating a database.

Non-Oracle resources are configured first as follows:



GDS setup

GDS is set as "switching disk" for standby operation.

Information

It is possible to prepare the disk class for Oracle system table space and other Oracle data respectively, and the MONITORONLY attribute of the disk class is set to "NO" for the Oracle system table space and "YES" for the other Oracle data.

userApplication setup

Create userApplication according to "PRIMECLUSTER Installation and Administration Guide".
Set up userApplication using the RMS Wizard. The RMS Wizard uses the format that allows you to select information in the menu.

2.2.4.1 userApplication creation

1. Execute hvw command on any one of the cluster nodes and start up RMS Wizard.

```
# hvw -n <Configuration Name>
```

2. Select Application-Create in the "Main configuration menu" screen.

```
node1: Main configuration menu, current configuration: config_standby
No RMS active in the cluster
 1) HELP                          10) Configuration-Remove
 2) QUIT                          11) Configuration-Freeze
 3) Application-Create            12) Configuration-Thaw
 4) Application-Edit              13) Configuration-Edit-Global-Settings
 5) Application-Remove            14) Configuration-Consistency-Report
 6) Application-Clone             15) Configuration-ScriptExecution
 7) Configuration-Generate        16) RMS-CreateMachine
 8) Configuration-Activate        17) RMS-RemoveMachine
 9) Configuration-Copy
Choose an action: 3
```

3. Select WIZSTANDBY in the "Application type selection menu" screen.

```
Creation: Application type selection menu:
 1) HELP                              6) GENERIC
 2) QUIT                              7) ORACLE
 3) RETURN                            8) SCALABLE
 4) OPTIONS                           9) STANDBY
 5) DEMO                             10) WIZSTANDBY
Application Type: 10
```

Note

- Do not select ORACLE (all caps) in this screen. This is the menu for the configuration generated with PRIMECLUSTER Wizard for Oracle 4.2.
- If you use Oracle resources in combination with PRIMECLUSTER Wizard for NAS, refer to "PRIMECLUSTER Wizard for NAS Configuration and Administration Guide".

4. In the case of editing the userApplication name, specify ApplicationName in the "Settings of turnkey wizard "WIZSTANDBY"" screen.

```
Settings of turnkey wizard "WIZSTANDBY" (APP1:not yet consistent)
1) HELP                              4) REMOVE+EXIT
2) NO-SAVE+EXIT                      5) ApplicationName=APP1
3) SAVE+EXIT                         6) Machines+Basics(-)
Choose the setting to process: 5
```

5. Select Machines+Basics to set up nodes and basic setting of userApplication.

```
Settings of turnkey wizard "WIZSTANDBY" (APP1:not yet consistent)
1) HELP                              4) REMOVE+EXIT
2) NO-SAVE+EXIT                      5) ApplicationName=APP1
3) SAVE+EXIT                         6) Machines+Basics(-)
Choose the setting to process: 6
```

Specify an operating node in "Machines[0]" and specify a standby node in "Machines[1]".

Select "AdditionalMachines" if you add nodes.
For details, refer to HELP or "PRIMECLUSTER Installation and Administration Guide".

Information

The following setup values are recommended. The other attributes not described below are optional.

Attributes	Values
AutoSwitchOver	HostFailure|ResourceFailure|Shutdown
PersistentFault	1
HaltFlag	yes

```
Machines+Basics (app1:consistent)
 1) HELP
 2) -
 3) SAVE+EXIT
 4) REMOVE+EXIT
 5) AdditionalMachine
 6) AdditionalConsole
 7) Machines[0]=node1RMS
 8) Machines[1]=node2RMS
 9) (PreCheckScript=)
10) (PreOnlineScript=)
11) (PostOnlineScript=)
12) (PreOfflineScript=)
13) (OfflineDoneScript=)
14) (FaultScript=)
15) (AutoStartUp=no)
16) (AutoSwitchOver=HostFailure|ResourceFailure|ShutDown)
17) (PreserveState=no)
18) (PersistentFault=1)
19) (ShutdownPriority=)
20) (OnlinePriority=)
21) (StandbyTransitions=)
22) (LicenseToKill=no)
23) (AutoBreak=yes)
24) (HaltFlag=yes)
25) (PartialCluster=0)
26) (ScriptTimeout=)
Choose the setting to process:
```

6. Select SAVE+EXIT after setting Machines+Basics.

7. Set up a resource required for the shared disk (ex. GDS) in the "Setting of turnkey wizard "WIZSTANDBY"" screen.

```
Settings of turnkey wizard "WIZSTANDBY" (APP1:not yet consistent)
 1) HELP                              9) Procedure:BasicApplication(-)
 2) -                                10) Oracle(-)
 3) SAVE+EXIT                        11) Symfoware(-)
 4) -                                12) Procedure:SystemState3(-)
 5) ApplicationName=APP1             13) Procedure:SystemState2(-)
 6) Machines+Basics(app1)            14) Gls:Global-Link-Services(Gls_APP1)
 7) CommandLines(-)                  15) LocalFileSystems(Lfs_APP1)
 8) Procedure:Application(-)         16) Gds:Global-Disk-Services(Gds_APP1)
Choose the setting to process:
```

8. Return to the Main configuration menu by executing SAVE+EXIT. (Any settings related to Oracle should not be done here).

```
Settings of turnkey wizard "WIZSTANDBY" (APP1:not yet consistent)
 1) HELP                              9) Procedure:BasicApplication(-)
 2) -                                10) Oracle(-)
 3) SAVE+EXIT                        11) Symfoware(-)
 4) -                                12) Procedure:SystemState3(-)
 5) ApplicationName=APP1             13) Procedure:SystemState2(-)
 6) Machines+Basics(app1)            14) Gls:Global-Link-Services(Gls_APP1)
 7) CommandLines(-)                  15) LocalFileSystems(Lfs_APP1)
 8) Procedure:Application(-)         16) Gds:Global-Disk-Services(Gds_APP1)
Choose the setting to process: 3
```

2.2.4.2 Configuration-Generate and Configuration-Activate

1. Execute Configuration-Generate and Configuration-Activate. Then the environment setup will successfully be completed.

```
node1: Main configuration menu, current configuration: config_standby
No RMS active in the cluster
 1) HELP                          10) Configuration-Remove
 2) QUIT                          11) Configuration-Freeze
 3) Application-Create            12) Configuration-Thaw
 4) Application-Edit              13) Configuration-Edit-Global-Settings
 5) Application-Remove            14) Configuration-Consistency-Report
 6) Application-Clone             15) Configuration-ScriptExecution
 7) Configuration-Generate        16) RMS-CreateMachine
 8) Configuration-Activate        17) RMS-RemoveMachine
 9) Configuration-Copy
Choose an action:
```

2. Select QUIT and terminate RMS Wizard.

```
node1: Main configuration menu, current configuration: config_standby
No RMS active in the cluster
 1) HELP                          10) Configuration-Remove
 2) QUIT                          11) Configuration-Freeze
 3) Application-Create            12) Configuration-Thaw
 4) Application-Edit              13) Configuration-Edit-Global-Settings
 5) Application-Remove            14) Configuration-Consistency-Report
 6) Application-Clone             15) Configuration-ScriptExecution
 7) Configuration-Generate        16) RMS-CreateMachine
 8) Configuration-Activate        17) RMS-RemoveMachine
 9) Configuration-Copy
Choose an action: 2
```

2.2.5 userApplication Operation Check

Start userApplication by executing "hvcm" command then check if it is properly running on all the nodes.

Shared disk

Check if you can access to the shared disk from the operating node.
Also, check if a file can be created on the shared disk using Oracle user access privileges.
Switch userApplication to the standby node, and check them on the standby node as well as the operating node.

Logical IP address

Check if you can access the operating node from the client using the logical IP address.
Switch userApplication to the standby node, and check them on the standby node as well as the operating node.

See

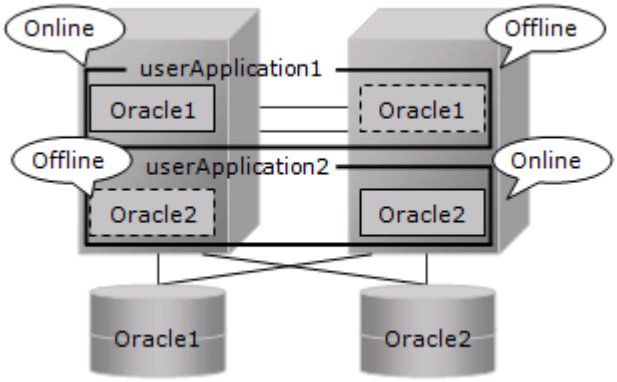
For the RMS command, refer to the "PRIMECLUSTER Installation and Administration Guide".

2.2.6 Oracle Database Creation and Setting

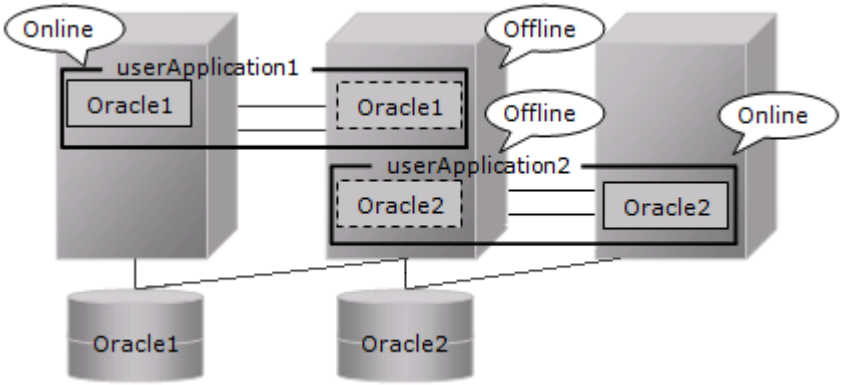
It is necessary to create a database on the shared disk. The creation should be performed on an operation node. After that, setup on standby nodes in the same configuration to be accessible to the database from the standby nodes.

Example

- Mutual standby



- 2:1 Standby



1. Startup of userApplication.

   Start up userApplication on an operation node where a database is created.

2. Creation of database

Create a database on a shared disk mounted to the operation node.

Note

If multiple Oracle homes are configured on one server, a different Oracle instance name must be assigned for each Oracle home.

Information

- Refer to the Oracle Database manual.
- Check if the Oracle user has privileges to write in a shared disk before creating the database.
- Confirm the contents of "Chapter 5 Notice" before creating.

- Destination of database files

Files		Locations	Note
Initialization Parameter File (PFILE)		Arbitrary	Recommend to allocate on a local disk of each node.
Server Parameter File (SPFILE)		Share	See "Server Parameter File (SPFILE)" below.
Password file		Arbitrary	See "Password file" below.
Control Files		Share	-
Data Files		Share	-
Redo Log Files		Share	-
Archived Redo Log Files		Arbitrary	Recommend to be multiplexed, allocating on a shared disk and a local disk.
Flash Recovery Area		Share	-
log files	AUDIT_FILE_DEST	Local	To be gathered surely for trouble investigation, allocate them on a local disk of each node.
	BACKGROUND_DUMP_DEST	Local	
	CORE_DUMP_DEST	Local	
	USER_DUMP_DEST	Local	
	DIAGNOSTIC_DEST	Local	

Note

- Note that there is sufficient space to archive for archived redo log files if they are located on shared disks. If there is insufficient space, and data updating processing through monitoring SQL hangs, an oracle resource might fail. Afterwards, the service might stop finally on both operating node and standby node, because the space of shared disk is insufficient and the failover of userApplication fails on the standby node.
- If you install Oracle database software on the shared disk, locate database files referring to "Appendix D Using Oracle Database software on shared disks".

- Initialization Parameter File (PFILE)

The initial parameter setting of LOCAL_LISTENER must be compatible with that of listener.ora and tnsnames.ora. You should also pay close attention to set up Oracle network.

- Server Parameter File (SPFILE)

  If you use the server parameter file, store it on a shared disk. If it is not stored on the shared disk, the settings will be inconsistent between operating and standby nodes. After you allocate server parameter file on a shared disk, configure the settings in an operating and a standby both nodes for referring the server parameter file.

Example

- Method of making a symbolic link file to the server parameter file

```
$ ln -s <the mount point of a shared disk>/spfile<$ORACLE_SID>.ora <$ORACLE_HOME>/dbs/
spfile<$ORACLE_SID>.ora
```

- Method to write the path of the server parameter file in initialization parameter file

  How to set the initialized parameter file (<$ORACLE_HOME>/dbs/init<$ORACLE_SID>.ora):

```
spfile = /mnt2/db/parameter/spfile.ora
```

Note

If you create a database using DBCA (Database Configuration Assistant), you might not be able to specify where the server parameter file is stored. If this occurs, move the server parameter file to the shared disk after creating the database as follows:

1. Mount the shared disk if it is not mounted. Start userApplication that is created at "2.2.3 userApplication Configuration".
2. Move the server parameter file to the shared disk.

```
# mv <$ORACLE_HOME>/dbs/spfile<$ORACLE_SID>.ora <shared disk>/spfile<$ORACLE_SID>.ora
```

3. Edit the initialized parameter file <$ORACLE_HOME>/dbs/init<$ORACLE_SID>.ora as follows:

```
spfile=<shared disk>/spfile<$ORACLE_SID>.ora
```

Execute step "3" on both of the operating node and standby nodes.
You can also use "cloracpy" command to execute it on the standby nodes after the operating node.

- Password file

  Allocate Password file on either a local disk or a shared disk. To which allocate it, refer to the following.

  - Local disk
    When allocate Password file on a local disk, it is necessary to edit it of each node. Therefore, the maintenance efficiency decreases compared with the case allocated on a shared disk.

  - Shared disk
    When allocate Password file on a shared disk, it only has to edit on a shared disk. Therefore, the maintenance efficiency improves compared with the case allocated on a local disk.

    When allocate Password file on a shared disk, make a symbolic link file under the "$ORACLE_HOME/dbs" of each node.

```
$ ln -s <the mount point of a shared disk>/orapw<SID> <$ORACLE_HOME>/dbs/orapw<SID>
```

Other notices for database creation are below.

Note

- If you use Oracle ASM, it is necessary to register the Oracle ASM as an RMS resource. Refer to "2.3.2 Oracle ASM (Automatic Storage Management)".

- The processes other than definition of system environment variables must not be added to login.sql of Oracle DBA users.
  SQL can be described in the SQL*Plus profile login.sql. However, it might automatically be executed and affect ongoing operations because Oracle instance is controlled through SQL*Plus in PRIMECLUSTER Wizard for Oracle.
  It is available to setup the system environment variables to login.sql by SET command.

3. Configuration of Oracle Net Services

Configure Oracle Net Services such as Listener and net service name on operation node.

- Network setup

Files	Locations	Note
listener.ora	Arbitrary	For placement of the file, refer to the below "information".
tnsnames.ora	Arbitrary	Same as above
<LISTENER>.log	Local	

Information

Allocate listener.ora file and tnsnames.ora file on either a local disk or a shared disk. To which allocate them, refer to the following.

- Local disk
  When allocate those files on a local disk, it is necessary to edit them of each node. Therefore, the maintenance efficiency decreases compared with the case allocated on a shared disk. In one side, it is possible to gather the files surely when the trouble is investigated because the influence of the state of the mount of a shared disk is not received.

- Shared disk
  When allocate those files on a shared disk, it only has to edit them on a shared disk. Therefore, the maintenance efficiency improves compared with the case allocated on a local disk. In one side, when the mount is not done, a shared disk might not be able to gather the necessary files for the trouble is investigated.

  When allocate those files on a shared disk, make a symbolic link file under the "$ORACLE_HOME/network/admin" of each node.

  In the case of listener.ora

```
$ ln -s <the mount point of a shared disk>/listener.ora <$ORACLE_HOME>/network/admin/
listener.ora
```

  In the case of tnsnames.ora

```
$ ln -s <the mount point of a shared disk>/tnsnames.ora <$ORACLE_HOME>/network/admin/
tnsnames.ora
```

- Oracle listener

Create a Listener by editing listener.ora file, or using netca (Oracle Net Configuration Assistant).

```
$ORACLE_HOME/network/admin/listener.ora
```

If you use Oracle listener switching operation using a logical IP address for standby operation, specify the logical IP address for the IP address of the Oracle listener.

Example

```
LISTENER =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = <logical IP address>)(PORT = 1521))
  )
```

```
SID_LIST_LISTENER =
  (SID_LIST =
    (SID_DESC =
      (GLOBAL_DBNAME = ora)
      (ORACLE_HOME = /u01/app/oracle/product/db)
      (SID_NAME = ora)
    )
  )
```

- Net Service Name

  If the Oracle listener is monitored through "tnsping" command, set up the tnsnames.ora file, or using netca (Oracle Net Configuration Assistant).

```
$ORACLE_HOME/network/admin/tnsnames.ora
```

  Then, specify the network service name set for tnsnames.ora in the environment setting of the Oracle listener of PRIMECLUSTER Wizard for Oracle. In that case, ORACLE_SID, host (logical IP address), and port number must be the same as those of the Oracle listener.

Example

```
Network service name =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = <logical IP address>)(PORT = 1521))
    (CONNECT_DATA = (SID = ora))
  )
```

Notices for Configuring Oracle Net Services are below.

Note

- The Oracle "TWO_TASK" environment variable must not be used.

  It is used to add a connect identifier to connect to Oracle database then automatically connect to network. In PRIMECLUSTER Wizard for Oracle, network connection is not supported. Users are supposed to connect to Oracle instances in local connection (" / as sysdba"). If network connection is required, specify "@connect identifier" instead of using the "TWO_TASK" environment variable at the connecting.

- OS authentication of Listener must be enabled.

  There are two methods to enable it:

  - Define a parameter in sqlnet.ora file as below.

```
LOCAL_OS_AUTHENTICATION_<LISTENER_NAME> = ON
```

  - Not define the "LOCAL_OS_AUTHENTICATION_<LISTENER_NAME>" parameter in sqlnet.ora file. (default)

- If multiple Oracle homes are configured on one server, a different Oracle Listener name must be assigned for each Oracle home.

4. Site preparation for standby nodes

Set up the standby nodes in the same configuration for the database (directory creation, file copy, and links) as the operating node.

- Agreement of configuration

  All configurations of the database and Oracle Net Services on standby nodes must match that of the operating node.

  - Under <$ORACLE_HOME>/dbs
  - Under <$ORACLE_BASE>/admin/<$ORACLE_SID>

- Under <$ORACLE_BASE>/diag
- Under <$ORACLE_HOME>/network/admin

The access privilege to the directories and files above must be also the same as that on the operating node.
If you set where archive log is output on the operating node, it is necessary to set the same on the standby nodes.

Information

The required files on the operating node can be backed up in the tar format with the "cloracpy" command. Refer to "4.4 cloracpy - Create Backup File for Oracle Database Setup".

- SYSTEM user password

  PRIMECLUSTER Wizard for Oracle accesses and monitors Oracle instances as the Oracle SYSTEM user. Therefore, the SYSTEM user's password must be registered in PRIMECLUSTER Wizard for Oracle. Refer to "4.3 clorapass - Register Password for Monitoring" to register the password.

- Define the full path of the log file

  Define the full path of the alert log and the listener log in /opt/FJSVclora/etc/clgetoralog.conf. See the Note in "4.5 clgetoralog - Collect Troubleshooting Information" for details.

5. Check Oracle database operation

   PRIMECLUSTER Wizard for Oracle starts and stops the Oracle instance and Oracle listener after changing from the root user to the Oracle user by using su(1M).

   Check if Oracle database is properly running by starting and stopping the Oracle instance and Oracle listener manually after changing from the root user to the Oracle user by using su(1M) as follows.

```
# su - <Oracle user>
$ lsnrctl start <Listener>
$ lsnrctl stop <Listener>
$ sqlplus /nolog
SQL> connect / as sysdba
SQL> startup
SQL> shutdown immediate
```

Note

Before switching userApplication from the operating node to standby nodes, shut down all databases and Listeners on the operating node. If not, all processes associated with Oracle instance would be forcibly killed.

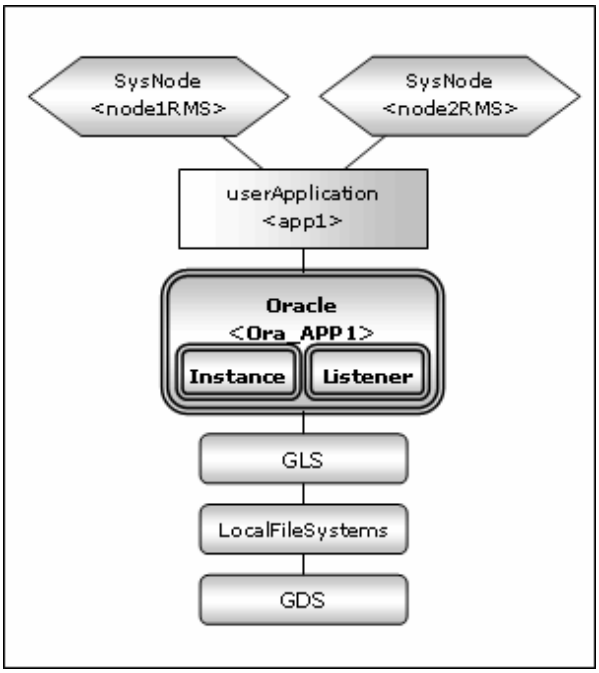
After the check completed, shut down all databases and Listeners, and stop RMS on all nodes.

2.2.7 userApplication Edit

Register Oracle resources in userApplication that was created at "2.2.4 userApplication Creation (without Oracle Resources)".

In standby operation, userApplication is configured as follows.

Note that userApplication resource (Ora_App1) is being created and added in this section.



Note

- Check if Oracle database is properly running by starting and stopping the Oracle instance and Oracle listener manually.
- Stop the Oracle instance, Oracle listener, and RMS on all the nodes in a cluster system before starting next section.
- Do not create multiple resources for the same an Oracle instance or a Listener.

See

For further details, refer to the "PRIMECLUSTER Installation and Administration Guide".

2.2.7.1 Oracle Resource Creation and Registration

The following example shows how to configure the Oracle environment.

1. Execute the following command on any one of the cluster nodes.
   (Configuration name specified at "2.2.4 userApplication Creation (without Oracle Resources)" also should be specified as <Configuration Name>.)

```
# hvw -n <Configuration Name>
```

2. Select Application-Edit in the "Main configuration menu" screen.

```
node1: Main configuration menu, current configuration: config_standby
No RMS active in the cluster
 1) HELP                          10) Configuration-Remove
 2) QUIT                          11) Configuration-Freeze
 3) Application-Create            12) Configuration-Thaw
 4) Application-Edit              13) Configuration-Edit-Global-Settings
 5) Application-Remove            14) Configuration-Consistency-Report
 6) Application-Clone             15) Configuration-ScriptExecution
 7) Configuration-Generate        16) RMS-CreateMachine
 8) Configuration-Activate        17) RMS-RemoveMachine
 9) Configuration-Copy
Choose an action: 4
```

3. Select userApplication (displayed in capital letters) created at "2.2.4 userApplication Creation (without Oracle Resources)".

```
Edit: Application selection menu:
1) HELP                           7) Gls_APP1
2) QUIT                           8) Lfs_APP1
3) RETURN                         9) app1
4) OPTIONS
5) APP1
6) Gds_APP1
Application Name: 5
```

4. Select Oracle(-) in the "Settings of turnkey wizard "WIZSTANDBY"" screen.

```
Settings of turnkey wizard "WIZSTANDBY" (APP1:not yet consistent)
 1) HELP                          9) Procedure:BasicApplication(-)
 2) -                            10) Oracle(-)
 3) SAVE+EXIT                    11) Symfoware(-)
 4) -                            12) Procedure:SystemState3(-)
 5) ApplicationName=APP1         13) Procedure:SystemState2(-)
 6) Machines+Basics(app1)        14) Gls:Global-Link-Services(Gls_APP1)
 7) CommandLines(-)              15) LocalFileSystems(Lfs_APP1)
 8) Procedure:Application(-)     16) Gds:Global-Disk-Services(Gds_APP1)
Choose the setting to process: 10
```

5. Add Oracle instances and Oracle listeners in the Oracle setup screen.

```
Oracle (Ora_APP1:not yet consistent)
1) HELP                    4) REMOVE+EXIT          7) StartPriority=Same
2) -                       5) AdditionalInstance
3) SAVE+EXIT               6) AdditionalListener
Choose the setting to process:
```

Attributes	Description
AdditionalInstance	Add an Oracle instance resource.
AdditionalListener	Add an Oracle listener resource.
StartPriority	Set up the startup order of the Oracle instance and Oracle listener. The default is "Same"(Simultaneous startup).

Example

StartPriority

If a shared server configuration or dynamic service information is used, specify "Listener" for the StartPriority attribute.

6. Add Oracle instance resource.
   Select AdditionalInstance, FREECHOICE and enter ORACLE_SID.

```
Oracle (Ora_APP1:not yet consistent)
1) HELP                    4) REMOVE+EXIT          7) StartPriority=Same
2) -                       5) AdditionalInstance
3) SAVE+EXIT               6) AdditionalListener
Choose the setting to process: Choose the setting to process: 5
```

```
Setting menu : OracleSID for Oracle instance
1) HELP
2) RETURN
3) FREECHOICE
Set additional instance OracleSID: 3
        >> ora
```

Information

An Oracle instance resource name on RMS is based on the ORACLE_SID <OracleSID> entered on this step.

```
ORACLE_Ora_<ApplicationName>_<OracleSID>
```

This resource name has the following convention and rules.

- The resource name must be up to 39 characters.
- "ORACLE_Ora_" is a fixed word.
- For information on how to set up <ApplicationName>, refer to the step "4" of "2.2.4.1 userApplication creation".

Note

For addition of Oracle ASM instance resource, refer to "2.3.2 Oracle ASM (Automatic Storage Management)".

7. Edit advanced settings of Oracle instance resource.

```
Setting menu : Detail setting for Oracle instance
 1) HELP                          10) Interval=30
 2) NO-SAVE+RETURN                11) WatchTimeout=300
 3) SAVE+RETURN                   12) (PreOnlineScript=)
 4) OracleUser=oracle             13) (PostOnlineScript=)
 5) StartTimeout=600              14) (PreOfflineScript=)
 6) StopTimeout=180               15) (PostOfflineScript=)
 7) AbortTimeout=60               16) (FaultScript=)
 8) StopModeStop=immediate        17) (Flags=)
 9) StopModeFail=abort
Choose the setting to process:
```

The settings for Oracle instance resource are as follows:

Attributes	Description
OracleSID	ORACLE_SID It can contain the following characters. However, the character string must not start with the hyphen. - 0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz_-+
OracleUser	- Oracle instance resource, Oracle ASM instance resource(Oracle Database 11g R1) - Operating system user which belongs to OSDBA group. (refer to “Oracle User” of “2.2.2 Oracle Database Software Installation and Configuration”.) - Oracle ASM instance resource(Oracle Database 11g R2/12c R1) - Grid user It can contain the following characters. However, the character string must not start with the hyphen. - 0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz_-
StartTimeout	Timeout duration of Oracle instance startup. (seconds) Default: 600 (300 - 86400)
StopTimeout	Timeout duration of Oracle instance stop. (seconds) Default: 180 (60 - 86400)
AbortTimeout	Timeout duration of forced termination in the event of an Oracle instance stop error. (seconds) Default: 60 (60 - 86400)
StopModeStop	Oracle instance stop mode in normal time. Default: Immediate mode (abort, immediate, transactional)
StopModeFail	Oracle instance stop mode in the event of a failure. Default: Abort mode (abort, immediate)
Interval	Monitoring interval of Oracle instance. (seconds) Default: 30 (5 - 86400)
WatchTimeout	No response time during monitoring Oracle instance. (seconds) Default: 300 (30 - 3600)
PreOnlineScript	Executed before online processing. The script must be entered with a full path name. If you are specifying arguments, separate the arguments with "blanks". It can contain the following characters. - 0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz_-+/"`#$^&*(){}[]|;:<,>.?
PostOnlineScript	Executed after online processing. The script must be entered with a full path name. If you are specifying arguments, separate the arguments with "blanks". It can contain the following characters. - 0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz_-+/"`#$^&*(){}[]|;:<,>.?
PreOfflineScript	Executed before offline processing. The script must be entered with a full path name. If you are specifying arguments, separate the arguments with "blanks".

Attributes		Description
		It can contain the following characters. - 0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz_-+/"`#$^&*(){}[]|;:<,>.?
PostOfflineScript		Executed after offline processing. The script must be entered with a full path name. If you are specifying arguments, separate the arguments with "blanks". It can contain the following characters. - 0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz_-+/"`#$^&*(){}[]|;:<,>.?
FaultScript		Executed when a fault occurs. The script must be entered with a full path name. If you are specifying arguments, separate the arguments with "blanks". It can contain the following characters. - 0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz_-+/"`#$^&*(){}[]|;:<,>.?
Flags	NullDetector (D)	If you do not want to monitor the resource, select this flag "NullDetector(D)". Default: "NullDetector(D)" is not selected.
	AutoRecover (A)	If you want to restart the resource before failover when a resource failure occurs, select this flag "AutoRecover(A)". Default: "AutoRecover(A)" is not selected.
	MonitorOnly (M)	If you do not want to generate a failover when a resource failure occurs, select this flag "MonitorOnly(M)". Default: "MonitorOnly(M)" is not selected.

See

- For details about *Script, refer to "2.3.1 Oracle resource Online/Offline Script".
- For details about Flags, refer to "PRIMECLUSTER RMS with Wizard Tools Configuration and Administration Guide".

Note

- If NullDetector is enabled, the AutoRecover and MonitorOnly attribute will automatically be disabled.
- If "Instance" or "Listener" is specified for StartPriority, MonitorOnly cannot be enabled. To enable it, specify "Same".
- Flags=<*Abbreviation*> indicates that the flag attribute is enabled.

8. Select SAVE+RETURN to quit advanced settings.

```
Setting menu : Detail setting for Oracle instance
 1) HELP                          10) Interval=30
 2) NO-SAVE+RETURN                11) WatchTimeout=300
 3) SAVE+RETURN                   12) (PreOnlineScript=)
 4) OracleUser=oracle             13) (PostOnlineScript=)
 5) StartTimeout=600              14) (PreOfflineScript=)
 6) StopTimeout=180               15) (PostOfflineScript=)
 7) AbortTimeout=60               16) (FaultScript=)
 8) StopModeStop=immediate        17) (Flags=)
 9) StopModeFail=abort
Choose the setting to process: 3
```

9. Add Oracle listener resource.
Select AdditionalListener, FREECHOICE and enter Listener name.

```
Oracle (Ora_APP1:consistent)
1) HELP                           5) AdditionalInstance
2) -                              6) AdditionalListener
3) SAVE+EXIT                      7) StartPriority=Same
4) REMOVE+EXIT                    8) OracleInstanceName[0]='ora'
Choose the setting to process: 6
```

```
Setting menu : ListenerName for Oracle listener
1) HELP
2) RETURN
3) FREECHOICE
Set additional Listener Name: 3
        >> LISTENER
```

Information

An Oracle listener resource name on RMS is based on the listener name <ListenerName> entered on this step.

```
LISTENER_Ora_<ApplicationName>_<ListenerName>
```

This resource name has the following convention and rules.

- The resource name must be up to 39 characters.
- "LISTENER_Ora_" is a fixed word.
- For information on how to set up <ApplicationName>, refer to the step "4" of "2.2.4.1 userApplication creation".

10. Edit advanced settings of Oracle listener resource.

```
Setting menu : Detail setting for Oracle listener
 1) HELP                    6) StartTimeout=180        11) (PostOnlineScript=)
 2) NO-SAVE+RETURN          7) StopTimeout=60          12) (PreOfflineScript=)
 3) SAVE+RETURN             8) Interval=30             13) (PostOfflineScript=)
 4) OracleUser=oracle       9) WatchTimeout=300        14) (FaultScript=)
 5) (TNSName=)             10) (PreOnlineScript=)      15) (Flags=A)
Choose the setting to process:
```

The settings for Oracle listener resource are as follows:

Attributes	Description
ListenerName	Listener name.

Attributes	Description
	It can contain the following characters. However, the character string must not start with the hyphen. - 0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz_-
OracleUser	- Oracle listener resource(Oracle Database 11g R1), Oracle listener resource(Oracle ASM is not used with Oracle Database 11g R2/12c R1) - Operating system user for Listener control. - Oracle listener resource(Oracle ASM is used with Oracle Database 11g R2/12c R1) - Grid user It can contain the following characters. However, the character string must not start with the hyphen. - 0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz_-
TNSName	Network service for Listener monitoring Execute "tnsping" command to monitor the Oracle listener when TNSName is set (tnsnames.ora). If the TNSName is omitted, process monitoring of the Oracle listener will only be performed. It can contain the following characters. However, the character string must not start with the hyphen. - 0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz_-.
StartTimeout	Timeout during Oracle listener startup. (seconds) Default: 180 (120 - 86400)
StopTimeout	Timeout during Oracle listener stop. (seconds) Default: 60 (60 - 86400)
Interval	Monitoring interval of Oracle listener. (seconds) Default: 30 (5 - 86400)
WatchTimeout	No response time during monitoring Oracle listener. (seconds) Default: 300 (30 - 3600)
PreOnlineScript	Executed before online processing. The script must be entered with a full path name. If you are specifying arguments, separate the arguments with "blanks". It can contain the following characters. - 0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz_-+/"`#$^&*(){}[]|;:<,>.?
PostOnlineScript	Executed after online processing. The script must be entered with a full path name. If you are specifying arguments, separate the arguments with "blanks". It can contain the following characters. - 0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz_-+/"`#$^&*(){}[]|;:<,>.?
PreOfflineScript	Executed before offline processing. The script must be entered with a full path name. If you are specifying arguments, separate the arguments with "blanks". It can contain the following characters.

Attributes		Description
		- 0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz_-+/"`#$^&*(){}[]|;:<,>.?
PostOfflineScript		Executed after offline processing. The script must be entered with a full path name. If you are specifying arguments, separate the arguments with "blanks". It can contain the following characters. - 0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz_-+/"`#$^&*(){}[]|;:<,>.?
FaultScript		Executed when a fault occurs. The script must be entered with a full path name. If you are specifying arguments, separate the arguments with "blanks". It can contain the following characters. - 0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz_-+/"`#$^&*(){}[]|;:<,>.?
Flags	NullDetector (D)	If you do not want to monitor the resource, select this flag "NullDetector(D)". Default: "NullDetector(D)" is not selected.
	AutoRecover (A)	If you want to restart the resource before failover when a resource failure occurs, select this flag "AutoRecover(A)". Default: "AutoRecover(A)" is selected.
	MonitorOnly (M)	If you do not want to generate a failover when a resource failure occurs, select this flag "MonitorOnly(M)". Default: "MonitorOnly(M)" is not selected.

See

- For details about *Script, refer to "2.3.1 Oracle resource Online/Offline Script".
- For details about Flags, refer to "PRIMECLUSTER RMS with Wizard Tools Configuration and Administration Guide".

Note

- If NullDetector is enabled, the AutoRecover and MonitorOnly attribute will automatically be disabled.
- If "Instance" or "Listener" is specified for StartPriority, MonitorOnly cannot be enabled. To enable it, specify "Same".
- Flags=<*Abbreviation*> indicates that the flag attribute is enabled.

11. Select SAVE+RETURN to quit advanced settings.

```
Setting menu : Detail setting for Oracle listener
 1) HELP                    6) StartTimeout=180        11) (PostOnlineScript=)
 2) NO-SAVE+RETURN          7) StopTimeout=60          12) (PreOfflineScript=)
 3) SAVE+RETURN             8) Interval=30             13) (PostOfflineScript=)
 4) OracleUser=oracle       9) WatchTimeout=300        14) (FaultScript=)
 5) (TNSName=)             10) (PreOnlineScript=)      15) (Flags=A)
Choose the setting to process: 3
```

12. Confirm that Oracle instance and listener resources have been set, and then select SAVE+EXIT.
    In the next screen, confirm that Oracle(Ora_*xxx*) have been set.

```
Oracle (Ora_APP1:consistent)
1) HELP                                  6) AdditionalListener
2) -                                     7) StartPriority=Same
3) SAVE+EXIT                             8) OracleInstanceName[0]='ora'
4) REMOVE+EXIT                           9) OracleListenerName[0]=LISTENER
5) AdditionalInstance
Choose the setting to process: 3
```

```
Settings of turnkey wizard "WIZSTANDBY" (APP1:not yet consistent)
 1) HELP                                 9) Procedure:BasicApplication(-)
 2) -                                   10) Oracle(Ora_APP1)
 3) SAVE+EXIT                           11) Symfoware(-)
 4) -                                   12) Procedure:SystemState3(-)
 5) ApplicationName=APP1                13) Procedure:SystemState2(-)
 6) Machines+Basics(app1)               14) Gls:Global-Link-Services(Gls_APP1)
 7) CommandLines(-)                     15) LocalFileSystems(Lfs_APP1)
 8) Procedure:Application(-)            16) Gds:Global-Disk-Services(Gds_APP1)
Choose the setting to process:
```

2.2.7.2 Other Resource Creation and Registration

1. If you have any other required resources, register and create them in the "Settings of turnkey wizard "WIZSTANDBY"" screen.

Information

Other resources (ex. Procedure resource, resource concerning backup software) should be registered here.
For details of them, refer to the each manual. (For Procedure resource, refer to "PRIMECLUSTER Installation and Administration Guide".)

2. Select SAVE+EXIT to return Main configuration menu.

```
Settings of turnkey wizard "WIZSTANDBY" (APP1:not yet consistent)
 1) HELP                                 9) Procedure:BasicApplication(-)
 2) -                                   10) Oracle(Ora_APP1)
 3) SAVE+EXIT                           11) Symfoware(-)
 4) -                                   12) Procedure:SystemState3(-)
 5) ApplicationName=APP1                13) Procedure:SystemState2(-)
 6) Machines+Basics(app1)               14) Gls:Global-Link-Services(Gls_APP1)
 7) CommandLines(-)                     15) LocalFileSystems(Lfs_APP1)
 8) Procedure:Application(-)            16) Gds:Global-Disk-Services(Gds_APP1)
Choose the setting to process: 3
```

3. If you have any other required userApplications, create them in Main configuration menu screen.

2.2.7.3 Configuration-Generate and Configuration-Activate

1. Execute Configuration-Generate and Configuration-Activate.

```
node1: Main configuration menu, current configuration: config_standby
No RMS active in the cluster
 1) HELP                          10) Configuration-Remove
 2) QUIT                          11) Configuration-Freeze
 3) Application-Create            12) Configuration-Thaw
 4) Application-Edit              13) Configuration-Edit-Global-Settings
 5) Application-Remove            14) Configuration-Consistency-Report
 6) Application-Clone             15) Configuration-ScriptExecution
 7) Configuration-Generate        16) RMS-CreateMachine
 8) Configuration-Activate        17) RMS-RemoveMachine
 9) Configuration-Copy
Choose an action:
```

2. Select QUIT and terminate RMS Wizard.

```
node1: Main configuration menu, current configuration: config_standby
No RMS active in the cluster
 1) HELP                          10) Configuration-Remove
 2) QUIT                          11) Configuration-Freeze
 3) Application-Create            12) Configuration-Thaw
 4) Application-Edit              13) Configuration-Edit-Global-Settings
 5) Application-Remove            14) Configuration-Consistency-Report
 6) Application-Clone             15) Configuration-ScriptExecution
 7) Configuration-Generate        16) RMS-CreateMachine
 8) Configuration-Activate        17) RMS-RemoveMachine
 9) Configuration-Copy
Choose an action: 2
```

Information

After set up userApplication, the settings in this section can be confirmed with "clorainfo -c" command. Refer to "4.6 clorainfo - Display Resource Configuration and Monitoring Status" for details.

2.2.8 userApplication Operation Check

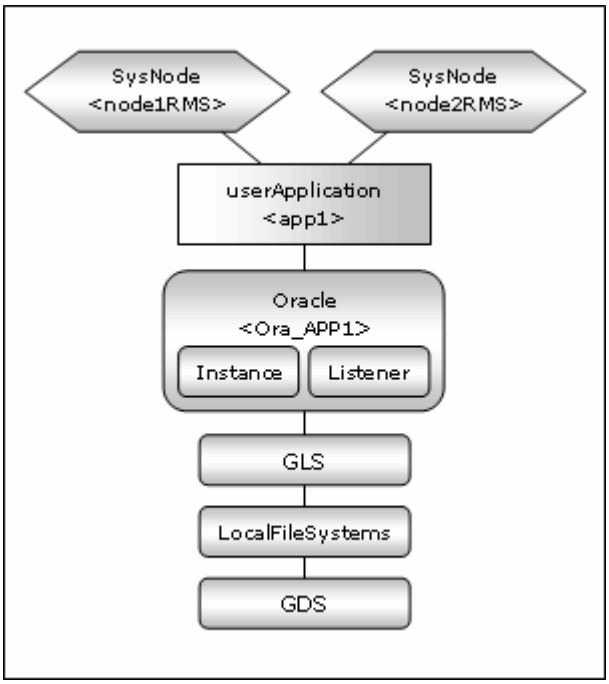
Start userApplication by executing "hvcm" command then check if it is properly running on all the nodes.

See

For the RMS command, refer to "PRIMECLUSTER Installation and Administration Guide".

Cluster configuration

Check if the configuration is as follows in the Cluster Admin screen of Web-Based Admin View.



Shared disk

Check if you can access to the shared disk from the operating node.
Also, check if a file can be created on the shared disk using Oracle user access privileges.

Logical IP address

Check if you can access the operating node from the client using the logical IP address.

Oracle database

Check if you can access to Oracle database running on the operating node from the client using the logical IP address.

Information

If Oracle instance resource becomes Warning state, it might have been caused by wrong registration of SYSTEM user password. Register the correct password using "clorapass" command to prevent it. For details, refer to "4.3 clorapass - Register Password for Monitoring".

2.3 Information

2.3.1 Oracle resource Online/Offline Script

PRIMECLUSTER Wizard for Oracle allows users to execute their own unique processing before or after startup or stop of Oracle instances and Listeners (Online/ Offline processing).
For example, application startup/stop and batch processing can be executed along with startup or stop of Oracle instances and Listeners.

Script Type

Script		Description
startup	PreOnlineScript	Executed before OnlineScript. Set up in RMS Wizard ("hvw" command).
	OnlineScript	Starts resource up during userApplication Online processing. It is impossible to setup by user.

Script			Description
		prestartup*	It is usable only for the Oracle instance resource in standby operation. Executed before Oracle instance startup. If the Oracle instance state (STATUS of the V$INSTANCE view) has to be checked Put the executable file that begins with "prestartup" in the "/opt/FJSVclora/usr" directory.
		nomount*	It is usable only for the Oracle instance resource in standby operation. Executed when the Oracle instance status (STATUS column in V$INSTANCE view) is "STARTED" during Oracle instance startup. Put the executable file that begins with "nomount" in the "/opt/FJSVclora/usr" directory.
		mount*	It is usable only for the Oracle instance resource in standby operation. Executed when the Oracle instance status (STATUS column in V$INSTANCE view) is "MOUNTED" during Oracle instance startup. Put the executable file that begins with "mount" in the "/opt/FJSVclora/usr" directory.
	PostOnlineScript		Executed after OnlineScript. Set up in RMS Wizard ("hvw" command).
Stop	PreOfflineScript		Executed before OfflineScript. Set up in RMS Wizard ("hvw" command).
	OfflineScript		Stops resource down during userApplication Offline processing. It is impossible to setup by user.
	PostOfflineScript		Executed after OfflineScript. Set up in RMS Wizard ("hvw" command).
other	FaultScript		Executed when failures occur. Set up in RMS Wizard ("hvw" command).

See

For information on how to set up these scripts, refer to "2.2.7.1 Oracle Resource Creation and Registration".

- PreOnlineScript
- PostOnlineScript
- PreOfflineScript
- PostOfflineScript
- FaultScript

For detail of these scripts, refer to "3.1 Oracle database Control through PRIMECLUSTER Wizard for Oracle".

- OnlineScript
- OfflineScript

Execution sequence

Script			userApplication startup	resource AutoRecover	userApplication stop (normal)	userApplication stop (resource failure)
startup	PreOnlineScript		**1**	----	----	----
	OnlineScript		**2**	**1**	----	----
		prestartup*	**3**	**2**	----	----

Script			userApplication startup	resource AutoRecover	userApplication stop (normal)	userApplication stop (resource failure)
		nomount*	**4**	**3**	----	----
		mount*	**5**	**4**	----	----
	PostOnlineScript		**6**	**5**	----	----
stop	PreOfflineScript		----	----	**1**	**2**
	OfflineScript		----	----	**2**	**3**
	PostOfflineScript		----	----	**3**	**4**
other	FaultScript		----	----	----	**1**

Example

The execution sequence of scripts is described below when StartPriority set as "Listener";

- userApplication startup

  Note that all PreOnlineScript are executed firstly.

  1. PreOnlineScript of Listener resource
  2. PreOnlineScript of Oracle instance resource
  3. OnlineScript of Listener resource
  4. PostOnlineScript of Listener resource
  5. OnlineScript (including startup*, nomount*, mount*) of Oracle instance resource
  6. PostOnlineScript of Oracle instance resource

- Listener resource AutoRecover

  Note that PreOnlineScript of Listener resource is not executed.

  1. OnlineScript of Listener resource
  2. PostOnlineScript of Listener resource

- normal userApplication stop (user operation)

  Note that all PreOfflineScript are executed firstly.

  1. PreOfflineScript of Oracle instance resource
  2. PreOfflineScript of Listener resource
  3. OfflineScript of Oracle instance resource
  4. PostOfflineScript of Oracle instance resource
  5. OfflineScript of Listener resource
  6. PostOfflineScript of Listener resource

- userApplication stop caused by Listener resource failure

  Note that not only FaultScript of Listener resource but also FaultScript of Oracle instance resource are executed.

  1. FaultScript of Listener resource
  2. FaultScript of Oracle instance resource
  3. PreOfflineScript of Oracle instance resource
  4. PreOfflineScript of Listener resource

5. OfflineScript of Oracle instance resource
6. PostOfflineScript of Oracle instance resource
7. OfflineScript of Listener resource
8. PostOfflineScript of Listener resource

Notice (PreOnlineScript, PostOnlineScript, PreOfflineScript, PostOfflineScript, FaultScript)

- Execute the scripts using root privileges.
- The exit code 0 indicates normal termination. The value other than 0 indicates abnormal termination or switching process failures.
- If the script exceeds the maximum execution time (ScriptTimeout), switching process will fail.
- Each script has the environment variable defined in RMS.
- The script must be entered with a full path name. If you are specifying arguments, separate the arguments with "blanks".

See

For details of each script, refer to the "PRIMECLUSTER RMS with Wizard Tools Configuration and Administration Guide".

Notice (prestartup*, nomount*, mount*)

- The file is stored in /opt/FJSVclora/usr. If there are two or more files, they will be executed in alphabetical order of the file name.
- A return code of 0 indicates normal termination. A return code of other than 0 indicates abnormal termination. If the script terminates abnormally, Oracle instance startup will also fail.
- System administrator access privileges are used for script execution.
- The parameters are as follows:
  - $1 : $ORACLE_HOME
  - $2 : $ORACLE_SID
  - $3 : Oracle user name
- If the script is not completed within the timeout period for Oracle instance startup, it will be considered as abnormal exit. Refer to step "7" of "2.2.7.1 Oracle Resource Creation and Registration".

Note

The user scripts above are usable only for the Oracle instance resource in standby operation.

2.3.2 Oracle ASM (Automatic Storage Management)

An Oracle ASM can be used for standby operation.

Standby operation

Create an Oracle ASM instance resource.
The Oracle ASM instance will not be monitored, but only started or stopped. If the Oracle ASM instance fails, an Oracle instance resource error will be detected, so userApplication will be switched to the standby node, and ongoing operations will never be disrupted.

For Oracle Database 11g R1, refer to "2.3.2.1 Environment configuration with Oracle Database 11g R1" and for Oracle Database 11g R2/12c R1, refer to "2.3.2.2 Environment configuration with Oracle Database 11g R2/12c R1".

2.3.2.1 Environment configuration with Oracle Database 11g R1

Notes in the case of using Oracle ASM of Oracle Database 11g R1 in standby operation are as follows.

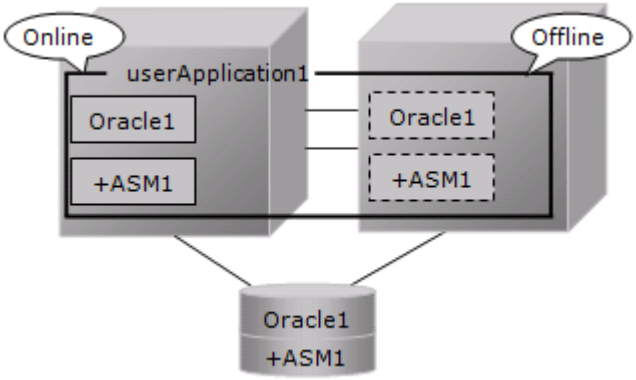
Creation and configuration of Oracle ASM instances

- Operation node

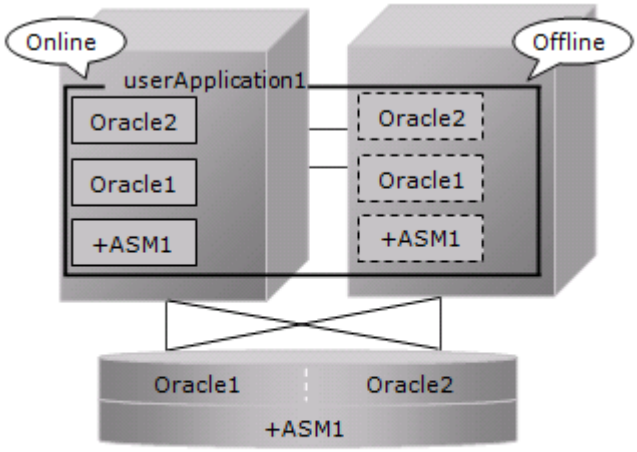
  The Oracle ASM instance and database are only created on the operating node. The standby nodes will only operate the database on the shared disk of the operating node.

Note

- An Oracle ASM instance name must begin with "+". The default name is "+ASM".
  If multiple Oracle ASM instances are configured on one server, a different Oracle ASM instance name must be assigned for each Oracle ASM instance.
- If multiple Oracle homes are configured on one server, a different Oracle instance name must be assigned for each Oracle home.
- Create the Oracle ASM instance and the Oracle database. The relation between the Oracle ASM instance and the database should become 1:1.
  - Oracle ASM instance : database = 1:1

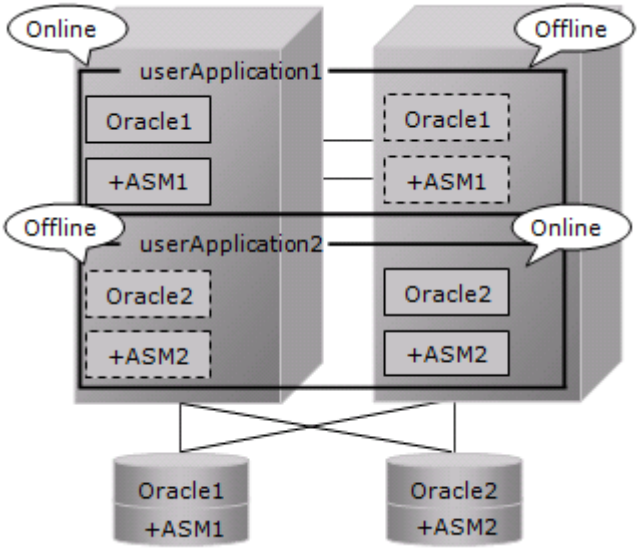


  - Oracle ASM instance : database = 1:n
    The following figure shows an example that Oracle ASM instance : database = 1:2.

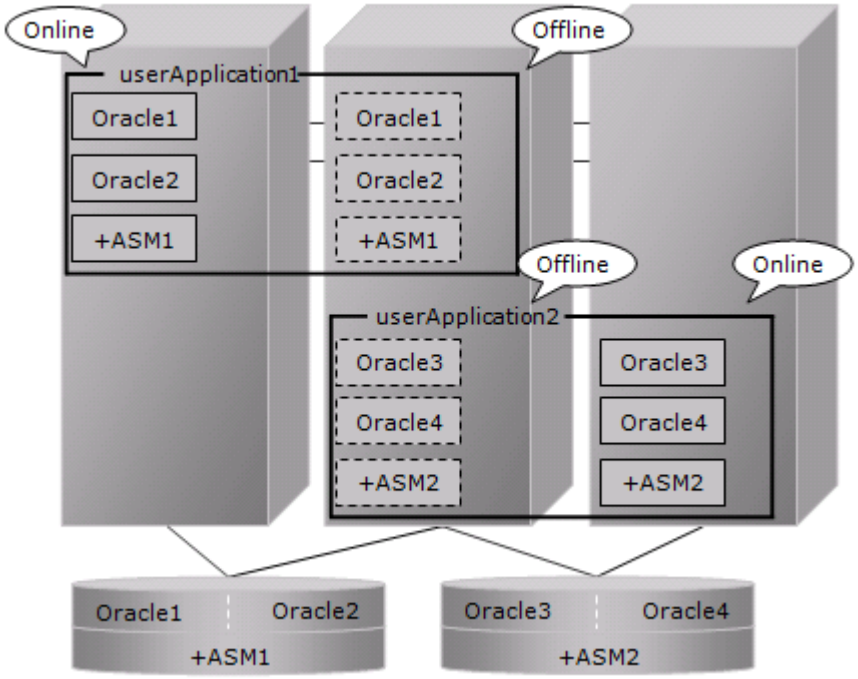


- In mutual standby operation and N:1 standby operation, the relation between Oracle ASM instance and database should become 1:1 or 1:n on each userApplication.

  - Mutual standby
    The following figure shows an example that Oracle ASM instance : database = 1:1 on each userApplication.



  - N:1 standby
    The following figure shows an example that Oracle ASM instance : database = 1:2 on each userApplication.



See

Refer to the Oracle Database manual.

- Standby node

  Set up the standby nodes in the same configuration (directory creation, file copy, and links) as the operating node where the AMS instance and database are created.

- Under $ORACLE_HOME/dbs
- Under $ORACLE_BASE/admin/$ORACLE_SID
- $ORACLE_BASE/admin/< Oracle ASM instance name>
- $ORACLE_BASE/diag/asm

The access privilege to the directories and files must be also the same as that on the operating node.
If you set where archive log is output on the operating node, it is necessary to set the same on the standby nodes.

CSS on the standby node must be set and started by manually, though CSS on the operating node is set and started automatically while Oracle database is being created.

Note

If required files on the operating node are backed up in the tar format with "cloracpy"(refer to "4.4 cloracpy - Create Backup File for Oracle Database Setup") command, configuration information of the Oracle ASM instance will not be backed up. Copy the following file manually in the tar format:

- $ORACLE_BASE/admin/<Oracle ASM instance name>

Oracle ASM initialization parameter check

Check if the disk group in which the Oracle database is created is set for the Oracle ASM instance initialization parameter "ASM_DISKGROUPS".

See

For the initialized parameter of the Oracle ASM instance, refer to the Oracle Database manual.

userApplication creation

When creating userApplication, create an Oracle ASM instance resource and Oracle instance resource. Register them in the same Oracle resource.

Information

- For information on how to create Oracle ASM instance resource, refer to "2.2.7.1 Oracle Resource Creation and Registration".
- The NULLDETECTOR attribute is automatically set to the flag of the Oracle ASM instance resource. This value cannot be changed.

2.3.2.2 Environment configuration with Oracle Database 11g R2/12c R1

Notes in the case of using Oracle ASM of Oracle Database 11g R2/12c R1 in standby operation are as follows.

Supported Configurations

In order to use Oracle ASM of Oracle Database 11g R2/12c R1, it is necessary to install Oracle Grid Infrastructure. When installing Oracle Grid Infrastructure, the composition which separates the installation user of Oracle Database and the installation user of Oracle Grid Infrastructure is supported. The composition which creating one user is not supported.

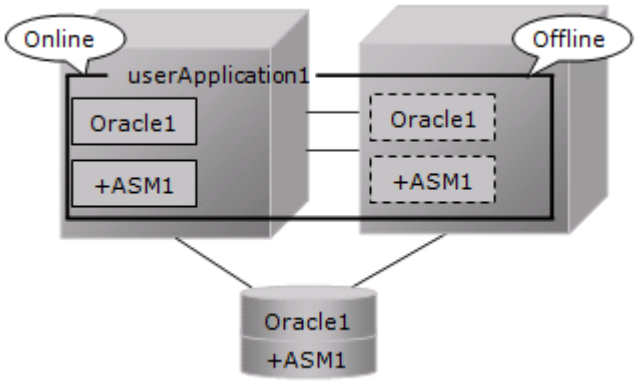
A different directory must be assigned respectively for an ORACLE_BASE of the installation user of Oracle Database and an ORACLE_BASE of the installation user of Oracle Grid Infrastructure.

Oracle Grid Infrastructure Installation and Oracle ASM instance, Oracle Database Creation

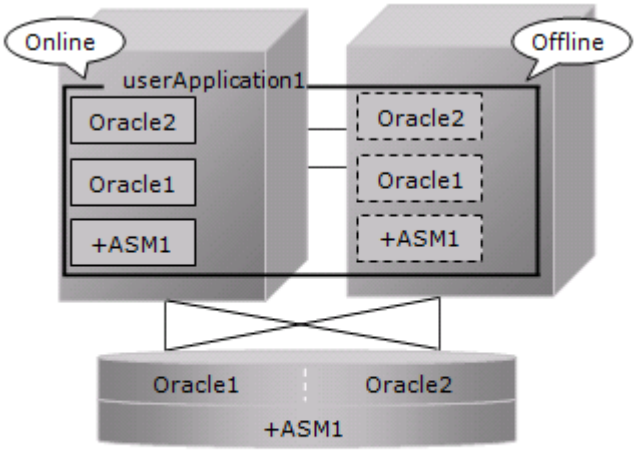
See "Appendix C Oracle Grid Infrastructure Installation and Oracle ASM instance, Oracle Database Creation" to install Oracle Grid Infrastructure and create Oracle ASM instance, Oracle Database.

Note

- An Oracle ASM instance name must begin with "+". The default name is "+ASM".
- If multiple Oracle homes are configured on one server, a different Oracle instance name must be assigned for each Oracle home.
- The relation between Oracle ASM instance and database should become 1:1 or 1:n.
  - Oracle ASM instance : database = 1:1



  - An Oracle ASM instance : database = 1:n
    The following figure shows an example that Oracle ASM instance : database = 1:2.



- The following configuration of standby operation using Oracle ASM 11g R2/12c R1 is supported.
  - 1:1 standby

  The following configuration of standby operation using Oracle ASM 11g R2/12c R1 is not supported.
  - Cascade
  - Mutual standby
  - N:1 standby
  - Priority transfer

- N:M standby

- When using Oracle ASM of Oracle Database 11g R2/12c R1 in standby operation, database services are is not available.

See

Refer to the Oracle Database manual.

Change Oracle Restart Settings

Change the settings of Oracle Restart to control Oracle ASM by PRIMECLUSTER Wizard for Oracle.

- Oracle Database 11g R2/12c R1(12.1.0.1)

  Execute the following command on each node with Grid user access privileges to set for Oracle Restart and the CSS(Cluster Services Synchronization) daemon to start when OS starts, and disable automatic startup of Oracle instances, Oracle listener, and Oracle ASM.

Component	Command
Oracle Restart	crsctl enable has
CSS	crsctl modify resource ora.cssd -attr "AUTO_START=always"
Oracle ASM	srvctl disable asm
Oracle listener	srvctl disable listener [-l <listener_name>]
Oracle instance	srvctl disable database -d <db_unique_name>

- Oracle Database 12c R1 PSR12.1.0.2 or later

  Execute the following command on each node with Grid user access privileges to set for Oracle Restart to start when OS starts, and disable automatic startup of Oracle instances, Oracle listener, and Oracle ASM.

Component	Command
Oracle Restart	crsctl enable has
Oracle ASM	srvctl disable asm
Oracle listener	srvctl disable listener [-l <listener_name>]
Oracle instance	srvctl disable database -d <db_unique_name>

userApplication Create

When creating userApplication, create an Oracle ASM instance resource and Oracle instance resource. Register them in the same Oracle resource.

Information

- For further details of registering Oracle ASM instance in a Oracle resource, refer to step 5 of "2.2.7.1 Oracle Resource Creation and Registration"

- The NULLDETECTOR attribute is automatically set to the flag of the Oracle ASM instance resource. This value cannot be changed.

Note

- Set up Grid user to Oracle ASM instance resource and Oracle listener resource, Oracle user to Oracle instance resource.

- In case of Oracle Database 11g R2/12c R1(12.1.0.1), set up the following script in PreOnlineScript of the Oracle ASM instance resource to start Oracle ASM after CSS started.

```
/opt/FJSVclora/sbin/cloracsswait <Grid user>
```

2.3.2.3 Precaution for Oracle ASM operation

A disk group that is used for the Oracle ASM instance must not be mounted or unmounted manually. For the disk group is mounted, the following message might be output to the console when the Oracle ASM resource is activated, but no action needs to be taken.

- ORA-15032: not all alterations performed
- ORA-15017: diskgroup "diskgroup name" cannot be mounted
- ORA-15030: diskgroup name "diskgroup name" is in use by another diskgroup

Chapter 3 Operation

3.1 Oracle database Control through PRIMECLUSTER Wizard for Oracle

This section describes startup, shutdown and monitoring of Oracle resources in standby operation and single-node cluster operation.

3.1.1 Oracle resources Startup and Shutdown

Oracle instance Startup

Startup procedure of an Oracle instance is as follows:

1. su - <Oracle user>
2. sqlplus /nolog
3. connect / as sysdba
4. startup nomount or startup mount
5. alter database mount (if "startup nomount" was executed at step "4")
6. alter database open

- Initialized parameter file and server parameter file

  The initialized parameter file is not specified for Oracle instance startup through PRIMECLUSTER Wizard for Oracle, so the default initialized parameter file will be used instead. Specify the initialized parameter file for the following default path (symbolic link).

```
<$ORACLE_HOME>/dbs/init<$ORACLE_SID>.ora
```

  The server parameter file should be located in the shared disk because it is dynamically changed. When you use the server parameter file, specify the full path of the server parameter file to the initialization parameter file. Refer to "2.2.6 Oracle Database Creation and Setting".
  It is recommended that the initialization parameter file settings are the same on the operating nodes and standby nodes.

Note

In single-node cluster operation, the definition described at "Initialized parameter file and server parameter file" is not necessary.

- Recovery processing

  PRIMECLUSTER Wizard for Oracle recovers the Oracle instance in the following cases:

  - When there is ACTIVE table space in the V$BACKUP view.
  - When there are files required to be recovered in the V$RECOVER_FILE view.

- DBA authentication

  PRIMECLUSTER Wizard for Oracle connects to Oracle instance with SYSDBA system privilege to start up or stop Oracle instance/database. In this case, local connection in operating system authentication is used.

Oracle instance Shutdown

- Shutdown procedure of an Oracle instance by user operation is as follows:

  1. su - <Oracle user>
  2. sqlplus /nolog
  3. connect / as sysdba

4. shutdown <immediate / abort / transactional> (Setup with StopModeStop)
   Default : immediate
5. If Oracle instance is not stopped at step "4" (except for abort), use shutdown abort.
6. If Oracle instance is not stopped at step "4" or "5", shut it down forcibly by sending SIGKILL to the background processes.

- Shutdown procedure of an Oracle instance by resource failure or failover is as follows:

  1. su - <Oracle user>
  2. sqlplus /nolog
  3. connect / as sysdba
  4. shutdown <immediate / abort> (Setup with StopModeFail)
     Default : abort
  5. If Oracle instance is not stopped at step "4" (except for abort), use shutdown abort.
  6. If Oracle instance is not stopped at step "4" or "5", shut it down forcibly by sending SIGKILL to the background processes.

Listener Startup

Startup procedure of a Listener is as follows:

1. su - <Oracle user>
2. lsnrctl start <ListenerName>
3. Makes sure that a Listener process does exist.

Listener Shutdown

Shutdown procedure of a Listener is as follows:

1. su - <Oracle user>
2. lsnrctl stop <ListenerName>
3. Makes sure that a Listener process does not exist.
4. If Listener is not stopped at step "3", shut it down forcibly by sending SIGKILL to the background process.

Oracle ASM instance Startup

Startup procedure of an Oracle ASM instance is as follows:

- Oracle Database 11g R1/11g R2/12c R1(12.1.0.1)

  1. su - <Oracle user>
  2. sqlplus /nolog
  3. connect / as sysasm
  4. startup mount (if "STARTED" already, "alter diskgroup all mount" is executed.)

- Oracle Database 12c R1 PSR12.1.0.2 or later

  1. su - <Oracle user>
  2. srvctl enable asm
  3. srvctl start asm
  4. srvctl disable asm

Oracle ASM instance Shutdown

- Oracle Database 11g R1/11g R2/12c R1(12.1.0.1)
  - Shutdown procedure of an Oracle ASM instance by user operation is as follows:
    1. su - <Oracle user>
    2. sqlplus /nolog
    3. connect / as sysasm
    4. shutdown <immediate / abort / transactional> (Setup with StopModeStop)
       Default : immediate
    5. If the Oracle ASM is not stopped at step "4" (except for abort), use shutdown abort.
    6. If the Oracle ASM is not stopped at step "4" or "5", shut it down forcibly by sending SIGKILL to the background processes.
  - Shutdown procedure of an Oracle ASM instance by resource failure or failover is as follows:
    1. su - <Oracle user>
    2. sqlplus /nolog
    3. connect / as sysasm
    4. shutdown <immediate / abort> (Setup with StopModeFail)
       Default : abort
    5. If the Oracle ASM is not stopped at step "4" (except for abort), use shutdown abort.
    6. If the Oracle ASM is not stopped at step "4" or "5", shut it down forcibly by sending SIGKILL to the background processes.
- Oracle Database 12c R1 PSR12.1.0.2 or later
  - Shutdown procedure of an Oracle ASM instance by user operation is as follows:
    1. su - <Oracle user>
    2. srvctl stop asm -stopoption <immediate/abort/transactional (Setup by "StopModeStop")> -force
       default : immediate
    3. If the Oracle ASM has not stopped in "2", execute the following. (When choosing excluding "abort" in "2")
       sqlplus /nolog
       connect / as sysasm
       shutdown abort
    4. If the Oracle ASM has not stopped in "2" or "3", abort the background process by sending SIGKILL.
  - Shutdown procedure of an Oracle ASM instance by resource failure or failover is as follows:
    1. su - <Oracle user>
    2. srvctl stop asm -stopoption <immediate/abort (Setup by "StopModeFail")> -force
       default : abort
    3. If the Oracle ASM has not stopped in "2", execute the following. (When choosing excluding "abort" in "2")
       sqlplus /nolog
       connect / as sysasm
       shutdown abort
    4. If the Oracle ASM has not stopped in "2" or "3", abort the background process by sending SIGKILL.

3.1.2 Oracle resources Monitoring

Oracle instance Monitoring

Monitoring procedure of an Oracle instance is as follows:

1. Check the Oracle background process (PMON, SMON) every 30 seconds (static).
   If the process status can be confirmed after Oracle instance gets activated, go to step "2".
2. su - <Oracle user>
3. Local connection to the Oracle instance as the SYSTEM user.
4. If the state of the database which is OPEN can be confirmed, go to step "5".
5. Check if the Oracle background processes (PMON, SMON, DBW*n*, LGWR, CKPT) are alive.
   The monitoring interval can be changed at the setting of "Interval" and its default value is 30 seconds.
6. Check if SQL(INSERT, UPDATE, DELETE and COMMIT) can be properly executed using the monitoring table on the SYSTEM user's default table space.
   The monitoring with SQL is executed in accordance with the setting of "Interval". The elapsed time from the last monitoring is checked. Only when 60 seconds or more pass, the monitoring with SQL is executed.
7. Oracle instance is reconnected once every 24 hours.

In the standby node, step 1 is executed to confirm that the Oracle background processes(PMON, SMON) do not exist.

- SYSTEM user password

  PRIMECLUSTER Wizard for Oracle monitors Oracle instance as the SYSTEM user. Set the SYSTEM user's password. Refer to "4.3 clorapass - Register Password for Monitoring".

- Monitoring table (FAILSAFEORACLE_<ORACLE_SID>)

  PRIMECLUSTER Wizard for Oracle creates a monitoring table on the SYSTEM user's default table space if the monitoring table does not exist. The table will not be deleted.

- Warning notification

  If the following symptoms are detected, PRIMECLUSTER Wizard for Oracle will notify RMS of the warning state. It is not the Fault state, so a failover will not occur.

  - Oracle instance cannot be connected due to incorrect SYSTEM user's password that is registered with the "clorapass" command (ORA-01017 detected)
  - Since the SYSTEM user account is locked, so Oracle instance connection is not allowed (ORA-28000 detected)
  - Since the SYSTEM user's password has expired, so Oracle instance connection is not allowed (ORA-28001 detected)
  - When the max session or max process error occurs, so Oracle instance connection is not allowed (ORA-00018 or ORA-00020 detected)
  - When the monitoring timeout occurs due to getting no reply from SQL for a certain period of time.
    If the monitoring timeout occurs, SQL is executed again. If a reply from SQL is received, the Online state is notified.

- Oracle database errors that causes failover

  If the Oracle database errors are detected, PRIMECLUSTER Wizard for Oracle will notify RMS of the Offline state. Then the Oracle instance resources become the resource failure state and a failover will occur.

  If the AutoRecover(A) flags of the Oracle instance resources are selected, the Oracle instances will be restart before failover when the Oracle instance resource failure occurs. For details about AutoRecover(A), refer to "2.2.7.1 Oracle Resource Creation and Registration".

  In the following case, the Offline state is notified to RMS:

  - The background processes (PMON, SMON, DBWn, LGWR and CKPT) do not exist.

  Example

  For example, the following cases correspond:

  - Oracle instance terminates abnormally.

- Oracle instance is stopped without stopping the monitoring.

- Oracle database errors (ORA-*xxxxx*) are returned after executing SQL.
  Oracle database errors (ORA-*xxxxx*) detected during monitoring will be handled in accordance with the action definition file(/opt/FJSVclora/etc/FJSVclorafm.actionlist).
  If the Oracle database errors defined as Of in the action definition file are detected, the Offline state is notified.
  See "Appendix F (Information) Action Definition File".

  Example

  For example, the following cases correspond:

  - ORA-04031 (out of memory in the shared pool) occurs.

- The monitoring timeout occurs twice in a row after executing SQL.
  If the reply from SQL does not return for 300 seconds (default), the monitoring timeout occurs and the Oracle resource will be the Warning state. Then PRIMECLUSTER Wizard for Oracle reconnects to the Oracle instance. If the reply does not return for 300 seconds during reconnection, the Offline state is notified.
  The monitoring timeout can be changed at the setting of "WatchTimeout" and its default value is 300 seconds.

  Example

  For example, the following cases correspond:

  - Oracle Database hangs up because archive logs run out of space.
  - The system load is too high.

Note

Failover occurs according to the setting of AutoSwitchOver of userApplication(cluster application).
If AutoSwitchOver=ResourceFailure(at resource failure) is selected, a userApplication will failover when a resource failure occurs.
For details about the settings of userApplication(cluster application), refer to the "PRIMECLUSTER Installation and Administration Guide".

Listener Monitoring

Monitoring procedure of a Listener is as follows:

1. Makes sure that a Listener process is alive by using ps command.
2. Makes sure that the net service name is valid by using "tnsping" command.
   The monitoring with tnsping is executed in accordance with the setting of "Interval". The elapsed time from the last tnsping is checked. Only when 60 seconds or more pass, the monitoring with tnsping is executed.

   Note

   When TNSName is set, tnsping is executed. For details about TNSName, refer to "2.2.7.1 Oracle Resource Creation and Registration".

In the standby node, step 1 is executed to confirm that the Listener processes do not exist.

- Monitoring timeout

  If there is no reply from tnsping command after a certain period of time, the monitoring timeout will be considered then the Oracle Listener resource will be put into Warning. If the monitoring timeout occurs twice in a row, a resource will be considered as fault then a failover will be performed.

  The monitoring timeout (the wait time from Oracle Listener) can be changed with WatchTimeout.

- Failover

  If the Oracle listener errors are detected, PRIMECLUSTER Wizard for Oracle will notify RMS of the Offline state. Then the Oracle listener resources become the resource failure state and a failover will occur.

  If the AutoRecover(A) flags of the Oracle listener resources are selected, the Oracle listener will be restart before failover when the Oracle listener resource failure occurs. For details about AutoRecover(A), refer to "2.2.7.1 Oracle Resource Creation and Registration".

  In the following case, the Offline state is notified to RMS:

  - The listener process does not exist.
  - The tnsping command fails.
  - The monitoring timeout occurs twice in a row.

Note

Failover occurs according to the setting of AutoSwitchOver of userApplication(cluster application).
If AutoSwitchOver=ResourceFailure(at resource failure) is selected, a userApplication will failover when a resource failure occurs.
For details about the settings of userApplication(cluster application), refer to the "PRIMECLUSTER Installation and Administration Guide".

Oracle ASM instance Monitoring

Oracle ASM is not monitored. NullDetector flag is automatically enabled.

3.2 Oracle database Maintenance

This section discusses how to change Oracle database settings, apply Oracle database patches, backup and recover Oracle databases. In a cluster system, the shared disk device in which Oracle data is stored is activated and deactivated along with Oracle database startup and stop.

- Oracle database is monitored during userApplication operation. If Oracle database is stopped manually, then the cluster system will consider that the Oracle resource fails, so Oracle database will be restarted or Oracle database operation will be switched to the standby node.
- While userApplication is not running, the shared disk is deactivated.

If you need to control Oracle database manually for Oracle cold backup or other maintenance tasks, put PRIMECLUSTER in maintenance mode, and stop monitoring the Oracle instances and Listeners temporarily.

General procedure

The general maintenance procedure is as follows:

1. Start userApplication

   Start userApplication that includes the Oracle instance resource if it is stopped.

2. Put userApplication into maintenance mode and stop monitoring

   Put userApplication into maintenance mode.

   Next, stop monitoring the Oracle instance and Listener resources by executing the "hvoradisable" command.

3. Confirmation of maintenance mode and stop of monitoring

   Confirm that changing into maintenance mode and stop of monitoring have been successfully done.

   (Refer to note of "4.1 hvoradisable - Discontinue Monitoring Resources".)

4. Stop Oracle database -dependent resources

   If there are Oracle database -dependent resources, stop them manually before stopping Oracle database.

5. Stop Oracle database

   Stop Oracle instance and listener manually.

6. Do maintenance on Oracle database

   Change the Oracle database settings, apply Oracle database patches, backup and recovery Oracle databases.

7. Start Oracle database

   After the maintenance is completed, start Oracle instance to "OPEN" status. Start Listener if it is also stopped.

   Before going on to the next step, be sure to check that Oracle instance and Listener are properly running. The Oracle instance must be OPEN.

8. Start Oracle database -dependent resources

   If Oracle database -dependent resources are stopped, start them manually.

9. Restart resource monitoring and stop maintenance mode

   Restart monitoring the Oracle instance and Listener resources again using "hvoraenable" command.

   Next, stop maintenance mode of userApplication.

10. Confirmation of restart of monitoring and maintenance mode

    Confirm that restart of monitoring and changing out of maintenance mode have been successfully done.

    (Refer to note of "4.2 hvoraenable - Restart Monitoring Resources".)

Information

- Maintenance mode and resource monitoring

  To stop Oracle database with userApplication active, use the "monitoring disruption" function of PRIMECLUSTER Wizard for Oracle. "Monitoring disruption" - Stop the Oracle resource monitoring only. If non-Oracle resource fails, a failover will be generated.

- Maintenance mode of userApplication

  If you put userApplication into maintenance mode, resource failure is ignored. It means that userApplication failover and resource autorecovery do not occur even if Oracle database is manually stopped. This enables maintenance work of resources including Oracle resources.

  For information on how to put userApplication into maintenance mode, see the "PRIMECLUSTER RMS Configuration and Administration Guide".

- Oracle instance and Listener monitoring

  hvoradisable and hvoraenable commands enable to discontinue and restart monitoring Oracle instances and Oracle listener resources.

  If you put userApplication into maintenance mode only, Oracle session for monitoring remains. If you execute hvoradisable command additionally, the Oracle session is killed. This enables executing shutdown command with "normal" option in Oracle database manual stop.

  For information on how to cancel or restart monitoring the Oracle instance and Listener resource, refer to "4.1 hvoradisable - Discontinue Monitoring Resources" and "4.2 hvoraenable - Restart Monitoring Resources".

Note

- Monitoring restart

  If Oracle instances and Oracle listeners are stopped manually after resource monitoring disruption, start them manually before starting resource monitoring again. If you restart resource monitoring with the Oracle resources inactive, the Oracle resources will fail.

- Resource state during monitoring

  If the "hvoradisable" command properly stops monitoring the resources, they will enter Warning.

- Plan the maintenance procedure according to the operation environment and the maintenance requirement. Refer to the procedures described in this section and the Oracle Database documents.

3.2.1 Oracle database Setting Change

You can change Oracle database settings such as initialized parameters and data files using the procedures described below.

Note

Oracle database must be stopped depending on the settings. For details, refer to the Oracle Database manual.

3.2.1.1 Oracle database must be stopped

If Oracle database must be stopped, change the settings as follows:

1. Maintenance mode / Monitoring disruption

```
# /opt/SMAW/SMAWRrms/bin/hvutil -m on <userApplication> (Maintenance mode)
# /opt/FJSVclora/sbin/hvoradisable -a <userApplication>  (Monitoring disruption)
```

2. Confirmation of maintenance mode and stop of monitoring

   Confirm that changing into maintenance mode and stop of monitoring have been successfully done.

   (Refer to note of "4.1 hvoradisable - Discontinue Monitoring Resources".)

3. Oracle database stop

```
# su - <Oracle user>
$ sqlplus /nolog
SQL> connect / as sysdba
SQL> shutdown immediate
```

4. Setup change

   Change Oracle database settings such as initialized parameters and data files.

5. Oracle database startup

```
# su - <Oracle user>
$ sqlplus /nolog
SQL> connect / as sysdba
SQL> startup
```

6. Monitoring restart / Maintenance mode stop

```
# /opt/FJSVclora/sbin/hvoraenable -a <userApplication>(Monitoring restart)
# /opt/SMAW/SMAWRrms/bin/hvutil -m off <userApplication> (Maintenance mode stop)
```

7. Confirmation of restart of monitoring and maintenance mode

   Confirm that restart of monitoring and changing out of maintenance mode has been successfully done.
   (Refer to note of "4.2 hvoraenable - Restart Monitoring Resources".)

3.2.2 Patch Application

The method of applying an Oracle patch (e.g. Oracle PSR: Patch Set Release) varies depending on database mounting.

If a database does not need to be mounted before and after patch application, be sure to stop RMS before applying a patch.

If a database needs to be mounted before and after patch application, monitoring must be cancelled before applying a patch as follows:

Information

The following are offered from Oracle Database 11g R2 as a method of applying Oracle PSR (Patch Set Release).

- In-place upgrade

  It is a method of installing PSR on existing ORACLE_HOME by the superscription. It is offered from previous version.

  For further details, refer to "3.2.2.1 Patch Application by In-place upgrade"

- Out-of-place upgrade

  It is a method of installing PSR in new ORACLE_HOME which is different from existing ORACLE_HOME. It is offered from Oracle Database 11g R2.

  For further details, refer to "3.2.2.2 Patch Application by Out-of-place upgrade"

3.2.2.1 Patch Application by In-place upgrade

This section discusses how to apply PSR in Oracle Database 11g R1 or Oracle Database 11g R2/12c R1 by In-place upgrade.

1. Start userApplication (Operation node)

   Start userApplication that includes the Oracle instance and listener resources if it is stopped.

2. Maintenance mode (Operation node)

   Start maintenance mode for userApplication on operation node.

   Example

   If you start maintenance mode for all userApplication, execute the following command.

   ```
   # /opt/SMAW/SMAWRrms/bin/hvutil -M on
   ```

   Confirm that state of userApplication has become "Maintenance" on all nodes.

3. Monitoring disruption of Oracle resource (All nodes)

   Stop monitoring the Oracle instance and listener resources by executing the "hvoradisable" command on all nodes.

   Example

   If you stop monitoring all the Oracle resources on a local node, execute the following command.

   ```
   # /opt/FJSVclora/sbin/hvoradisable -a
   ```

   Confirm that states of the Oracle instance and listener resources have become "Warning" on all nodes.

Information

In standby operation, applying Oracle PSR (Patch Set Release) on the standby node without stopping monitoring Oracle resources might cause problems because Oracle database is monitored on the standby node. Therefore it is necessary to stop monitoring them on the standby node.

4. Oracle database stop (if necessary)

```
# su - <Oracle user>
$ sqlplus /nolog
SQL> connect / as sysdba
SQL> shutdown immediate
```

5. Patch application

   Apply patches depending on the destination of the Oracle Database software.

See

For further details, refer to the Oracle Database manual.

6. Oracle database startup (if stopped)

```
# su - <Oracle user>
$ sqlplus /nolog
SQL> connect / as sysdba
SQL> startup
```

7. Restart Oracle resource monitoring (All nodes)

   Restart monitoring the Oracle instance and listener resources again using the hvoraenable command on all nodes.

Example

If you restart monitoring all the Oracle resources on a local node, execute the following command.

```
# /opt/FJSVclora/sbin/hvoraenable -a
```

Confirm that states of the Oracle instance and listener resources have become the previous state ("Online" or "Offline") from "Warning" on all nodes.

8. Stop maintenance mode (Operation node)

   Stop maintenance mode of userApplication on operation node.

Example

If you stop maintenance mode for all userApplication, execute the following command.

```
# /opt/SMAW/SMAWRrms/bin/hvutil -M off
```

Confirm that state of userApplication has become the previous state ("Online", "Standby" or "Offline") from "Maintenance" on all nodes.

3.2.2.2 Patch Application by Out-of-place upgrade

This section discusses how to apply PSR by Out-of-place upgrade in Oracle Database 11g R2/12c R1.

Note

- Upgrade to local disk if the Oracle Database software is located on local disk.
- Upgrade to shared disk if the Oracle Database software is located on shared disk.
- Changing the placement (local disk, shared disk) of the Oracle Database software at the upgrade does not support.

1. Start userApplication (Operation node)

   Start userApplication that includes the Oracle instance and listener resources if it is stopped.

2. Maintenance mode (Operation node)

   Start maintenance mode for userApplication on operation node.

   #### Example

   If you start maintenance mode for all userApplication, execute the following command.

   ```
   # /opt/SMAW/SMAWRrms/bin/hvutil -M on
   ```

   Confirm that state of userApplication has become "Maintenance" on all nodes.

3. Monitoring disruption of Oracle resource (All nodes)

   Stop monitoring the Oracle instance and listener resources by executing the "hvoradisable" command on all nodes.

   #### Example

   If you stop monitoring all the Oracle resources on a local node, execute the following command.

   ```
   # /opt/FJSVclora/sbin/hvoradisable -a
   ```

   Confirm that states of the Oracle instance and listener resources have become "Warning" on all nodes.

   #### Information

   In standby operation, applying Oracle PSR (Patch Set Release) on the standby node without stopping monitoring Oracle resources might cause problems because Oracle database is monitored on the standby node. Therefore it is necessary to stop monitoring them on the standby node.

4. Stop Oracle database -dependent resources (Operation node)

   If there are Oracle database -dependent resources, stop them manually before stopping Oracle database.

5. Applying PSR, and upgrade of database

   1. Applying PSR (All nodes)

      - If Oracle Database Software is located in local disk, execute the Out-of-place upgrade on all nodes.
      - If Oracle Database Software is located in shared disk, execute the Out-of-place upgrade on operation node.

      For information on how to execute the Out-of-place upgrade, refer to the Oracle Database manual.

      #### Note

      - Select "Install database software only" on the "Select Installation Option" screen.

- For details, refer to the Oracle Database manual.

2. Upgrade of database (Operation node)

   Execute dbua (Database Upgrade Assistant) on operation node, and upgrade the database.

   Note

   - Execute "<New ORACLE_HOME>/bin/dbua".
   - For details, refer to the Oracle Database manual.

3. Move the SPFILE to the shared disk (Operation node)

   Move the SPFILE (server parameter file) to the shared disk when it is newly generated on a local disk after the upgrade of the database is executed. Afterwards, specify SPFILE path to PFILE (the initialization parameter file "<New ORACLE_HOME>/dbs/init<SID>.ora") or make a symbolic link file to SPFILE.

   Note

   If Oracle Database Software is located in shared disk, this step is not necessary.

   See

   For details, see "2.2.6 Oracle Database Creation and Setting".

6. PRIMECLUSTER Wizard for Oracle Settings

   1. Login profile Setting Change (All nodes)

      Open Oracle user's login profile with editor (e.g. vi), and change the setting of the ORACLE_BASE and ORACLE_HOME environment variable to new path. Execute this procedure on all nodes.

      Example

      - Before changes

      ```
      ORACLE_HOME=/u01/app/oracle/product/11.2.0/dbhome_1
      ```

      - After changes

      ```
      ORACLE_HOME=/u01/app/oracle/product/11.2.0/dbhome_2
      ```

      See

      For details, see "2.2.2 Oracle Database Software Installation and Configuration".

   2. Transfer PFILE to standby nodes (Operation node, Standby node)

      Create tar archive file from "<New ORACLE_HOME>/dbs" on operation node.

      Example

      ```
      # su - oracle
      $ tar cfpvP /tmp/dbs.tar <New ORACLE_HOME>/dbs
      ```

After that, transfer the archive file from operation node to standby node by FTP, and expand it.

Example

```
# su - oracle
$ tar xfpvP /tmp/dbs.tar
```

Note

- If Oracle Database Software is located in shared disk, this step is not necessary.
- In single-node cluster operation, this step is not necessary.
- Do not use the cloracpy command of PRIMECLUSTER Wizard for Oracle on this step.
- Set the access privilege of files which are expanded on the standby node same as the files on operating node.

See

For details, see "2.2.6 Oracle Database Creation and Setting".

3. The allocation of Oracle Net Services configuration file (All nodes)

   Copy the Oracle Net Services configuration file from under the <Old ORACLE_HOME> to under the <New ORACLE_HOME>. Execute this procedure on all nodes

   - If Oracle Database Software is located in local disk, execute this procedure on all nodes.
   - If Oracle Database Software is located in shared disk, execute this procedure on operation node.

Example

```
$ cp -p <Old ORACLE_HOME>/network/admin/*.ora <New ORACLE_HOME>/network/admin/
```

Note

- Edit "<New ORACLE_HOME>/network/admin/*.ora" file when there are parameters depending on ORACLE_BASE and ORACLE_HOME in the Oracle Net Services configuration file after copy.
- Do not use the cloracpy command of PRIMECLUSTER Wizard for Oracle on this step.

7. Confirming Oracle Startup (Operation node)

   Confirm that Oracle instance and Listener started. If not, start up them manually.

Note

- The Oracle instance should start in the state of OPEN.
- Confirm the process of the listener is as "<New ORACLE_HOME>/bin/tnslsnr".
- If the process of the listener is as "<Old ORACLE_HOME>/bin/tnslsnr", stop it and start as "<New ORACLE_HOME>/bin/tnslsnr".

8. Start resources dependent on Oracle database (Operation node)

   If resources that are dependent on Oracle database had been stopped on step 4, start them manually.

9. Restart Oracle resource monitoring (All nodes)

   Restart monitoring the Oracle instance and listener resources again using the hvoraenable command on all nodes

   Example

   If you restart monitoring all the Oracle resources on a local node, execute the following command.

   ```
   # /opt/FJSVclora/sbin/hvoraenable -a
   ```

   Confirm that states of the Oracle instance and listener resources have become the previous state ("Online" or "Offline") from "Warning" on all nodes.

10. Stop maintenance mode (Operation node)

    Stop maintenance mode of userApplication on operation node.

    Example

    If you stop maintenance mode for all userApplication, execute the following command.

    ```
    # /opt/SMAW/SMAWRrms/bin/hvutil -M off
    ```

    Confirm that state of userApplication has become the previous state ("Online", "Standby" or "Offline") from "Maintenance" on all nodes.

11. Confirming of switch to the standby node

    Confirm the switch of userApplication to the standby node, and the correct start.

    Note

    - In single-node cluster operation, this step is not necessary.
    - Confirm step 6 when you cannot correctly start userApplication on the standby node.

12. Restart service

    Switch userApplication to the operation node if necessary, and restart service.

3.2.3 Backup

This section discusses how to backup Oracle databases.

3.2.3.1 Cold backup

You can perform Oracle database cold backup (offline backup) as follows. If there are Oracle database -dependent resources (e.g. SAP R/3), a resource failure might occur during Oracle database stop, so it is necessary to stop them manually in advance.

1. Maintenance mode / Monitoring disruption

   ```
   # /opt/SMAW/SMAWRrms/bin/hvutil -m on <userApplication> (Maintenance mode)
   # /opt/FJSVclora/sbin/hvoradisable -a <userApplication>(Monitoring disruption)
   ```

2. Confirmation of maintenance mode and stop of monitoring

   Confirm that changing into maintenance mode and stop of monitoring have been successfully done.

(Refer to note of "4.1 hvoradisable - Discontinue Monitoring Resources".)

3. Oracle database stop

```
# su - <Oracle user>
$ sqlplus /nolog
SQL> connect / as sysdba
SQL> shutdown immediate
```

4. Cold backup

   Perform cold backup of the database.

5. Oracle database startup

```
# su - <Oracle user>
$ sqlplus /nolog
SQL> connect / as sysdba
SQL> startup
```

6. Monitoring restart / Maintenance mode stop

```
# /opt/FJSVclora/sbin/hvoraenable -a <userApplication> (Monitoring restart)
# /opt/SMAW/SMAWRrms/bin/hvutil -m off <userApplication> (Maintenance mode stop)
```

7. Confirmation of restart of monitoring and maintenance mode

   Confirm that restart of monitoring and changing out of maintenance mode has been successfully done.

   (Refer to note of "4.2 hvoraenable - Restart Monitoring Resources".)

3.2.3.2 Hot backup

You can perform Oracle database hot backup (online backup) as follows.

1. Maintenance mode / Monitoring disruption

```
# /opt/SMAW/SMAWRrms/bin/hvutil -m on <userApplication> (Maintenance mode)
# /opt/FJSVclora/sbin/hvoradisable -a <userApplication> (Monitoring disruption)
```

2. Confirmation of maintenance mode and stop of monitoring

   Confirm that changing into maintenance mode and stop of monitoring have been successfully done.

   (Refer to note of "4.1 hvoradisable - Discontinue Monitoring Resources".)

3. Hot backup

   Perform hot backup of the database.
   Be sure to check that the Oracle instance and Listener are properly running before going on to the next step.

4. Monitoring restart / Maintenance mode stop

```
# /opt/FJSVclora/sbin/hvoraenable -a <userApplication> (Monitoring restart)
# /opt/SMAW/SMAWRrms/bin/hvutil -m off <userApplication> (Maintenance mode stop)
```

5. Confirmation of restart of monitoring and maintenance mode

   Confirm that restart of monitoring and changing out of maintenance mode has been successfully done.

   (Refer to note of "4.2 hvoraenable - Restart Monitoring Resources".)

3.2.4 Recovery

Recover the Oracle database according to the necessity of Oracle database stop.

Information

When Oracle database must be stopped to recover the Oracle database:

- The data file belongs to SYSTEM table area or UNDO table area
- The whole database is recovered
- Incomplete recovery is performed

When Oracle database does not have to be stopped to recover the Oracle database:

- The data file does not belong to SYSTEM table area or UNDO table area
- Complete recovery is performed

For details, refer to the Oracle Database manual

3.2.4.1 Oracle database must be stopped

If Oracle database must be stopped, recovery the Oracle database as follows. If there are Oracle database-dependent resources (e.g. SAP R/3), a resource failure might occur during Oracle database stop, so it is necessary to stop them manually in advance.

1. userApplication stop

```
# /opt/SMAW/SMAWRrms/bin/hvutil -f <userApplication>
```

2. Monitoring disruption

   Resource which monitoring is stopped by hvoradisable command will not start up even if the userApplication starts up. Using this function, the resources other than Oracle database can start up.

```
# /opt/FJSVclora/sbin/hvoradisable -a <userApplication>
```

3. Confirmation of stop of monitoring

   Confirm that stop of monitoring has been successfully done.

   (Refer to note of "4.1 hvoradisable - Discontinue Monitoring Resources".)

4. userApplication startup

```
# /opt/SMAW/SMAWRrms/bin/hvswitch <userApplication>
```

5. Recovery

   Recover the database.

6. Oracle instance and Listener startup

```
# su - <Oracle user>
$ lsnrctl start <Listener>
$ sqlplus /nolog
SQL> connect / as sysdba
SQL> startup
```

7. Monitoring restart

```
# /opt/FJSVclora/sbin/hvoraenable -a <userApplication>
```

8. Confirmation of restart of monitoring

   Confirm that restart of monitoring has been successfully done.

   (Refer to note of "4.2 hvoraenable - Restart Monitoring Resources".)

3.2.4.2 Oracle database does not need to be stopped

If the Oracle database does not need to be stopped, recover the Oracle database as follows;

1. Maintenance mode / Monitoring disruption

```
# /opt/SMAW/SMAWRrms/bin/hvutil -m on <userApplication> (Maintenance mode)
# /opt/FJSVclora/sbin/hvoradisable -a <userApplication> (Monitoring disruption)
```

2. Confirmation of maintenance mode and stop of monitoring

   Confirm that changing into maintenance mode and stop of monitoring have been successfully done.

   (Refer to note of "4.1 hvoradisable - Discontinue Monitoring Resources".)

3. Recovery

   Recover the database.
   Be sure to check if the Oracle instance and Listener are properly running before going on to the next step.

4. Monitoring restart / Maintenance mode stop

```
# /opt/FJSVclora/sbin/hvoraenable -a <userApplication>(Monitoring restart)
# /opt/SMAW/SMAWRrms/bin/hvutil -m off <userApplication> (Maintenance mode stop)
```

5. Confirmation of restart of monitoring and maintenance mode

   Confirm that restart of monitoring and changing out of maintenance mode has been successfully done.

   (Refer to note of "4.2 hvoraenable - Restart Monitoring Resources".)

3.3 Oracle SYSTEM user Password Change

You can change the Oracle SYSTEM user password without stopping operation by using the following steps on the node where userApplication is Online.

1. Discontinue monitoring the Oracle instance resources

   Execute the following command to stop monitoring Oracle resources. In standby operation, execute it on the operating node. In single-node cluster operation, execute it on the one node.

```
# /opt/FJSVclora/sbin/hvoradisable -a <userApplication>
```

   Be sure to check the following message in syslog before going to the next step:

```
[Info] [0101] Fault Watching is disabled
```

2. Change the Oracle SYSTEM user password

   Change the Oracle SYSTEM user password, or unlock SYSTEM user account.

   - Change the Oracle SYSTEM user password
     In standby operation, change the password on the operating node. In single-node cluster operation, change it on the one node.

Example

The following example shows how to change password to "oracle".

```
# su - <Oracle user>
$ sqlplus /nolog
SQL> connect / as sysdba
SQL> alter user system identified by oracle;
SQL> exit
```

- Unlock SYSTEM user account
  Refer to [Case 2] of "A.1.3 Warning State".

3. Register the Oracle SYSTEM user password to PRIMECLUSTER Wizard for Oracle

   Register the Oracle SYSTEM user password to PRIMECLUSTER Wizard for Oracle using "clorapass" command.
   In standby operation, register the password on the operating node. In single-node cluster operation, register it on the one node.

```
# /opt/FJSVclora/sbin/clorapass
Enter OracleSID > sid           (Enter ORACLE_SID)
Enter Password > ******        (Enter "oracle" for password.)
Re-enter Password > ******     (Re-enter "oracle" for password.)
finished
```

4. Restart monitoring the Oracle instance resources

   Execute the following command to restart monitoring Oracle resources. In standby operation, execute it on the operation node. In single-node cluster operation, execute it on the one node.

```
# /opt/FJSVclora/sbin/hvoraenable -a <userApplication>
```

   Be sure to check the following message in syslog after execution:

```
[Info] [0102] Fault Watching is enabled
```

Information

- For the "hvoradisable" or "hvoraenable" command, refer to "4.1 hvoradisable - Discontinue Monitoring Resources", "4.2 hvoraenable - Restart Monitoring Resources".
- For information on how to change the Oracle SYSTEM user password, refer to the Oracle Database manual.
- For the "clorapass" command, refer to "4.3 clorapass - Register Password for Monitoring".
- When passwords of Oracle user, Grid user, and Oracle SYS user are changed, the setting of PRIMECLUSTER Wizard for Oracle does not need to be changed.

3.4 Corrective Action against Failover

Oracle database logging

If a failover occurs in the event of a failure in PRIMECLUSTER operation with Oracle database, solve the problem referring to the Oracle database alert log or log files.

Log of PRIMECLUSTER Wizard for Oracle

PRIMECLUSTER Wizard for Oracle provides information what kind of failure is detected and what corrective action is taken in the following log files:

```
/var/opt/reliant/log/FJSVclora_<OracleSID>*.log
/var/opt/reliant/log/FJSVclora_<ListenerName>*.log
```

The format of log files is as follows:

```
Date/type/ID/text
2002/04/25 15:18:40 [Info] [1101] Starting Oracle detector
2002/04/25 15:18:40 [Info] [1102] Connected to Oracle
2002/04/25 15:18:40 [Error] [1299] ORA-01034 Oracle not available.
```

- Date

  Output in the format of YYYY/MM/DD HH:MM:SS.

- Type

  Indicates classification. (Information, Error, Warning)

- ID

  Indicates a message number.

- Text

  Indicates message content.

Note

There is no restriction of space or memory for log files. RMS manages the log files.

The log files will be used for troubleshooting. Do not delete or edit them.

3.5 Troubleshooting Information

If you encounter any problems with PRIMECLUSTER Wizard for Oracle operation you will need to conduct troubleshooting from log files and setup files of PRIMECLUSTER Wizard for Oracle and its related products.

You may use the following files:

Oracle database information

- Configuration files
  - initialization parameter file

    $ORACLE_HOME/dbs/*.ora

    $ORACLE_BASE/admin/$ORACLE_SID/pfile/*.ora

  - Oracle Net Services file

    $ORACLE_HOME/network/admin/*.ora

- Log files
  - Oracle alert log

    $ORACLE_HOME/rdbms/log/alert_$ORACLE_SID.log

    $ORACLE_BASE/diag/*

  - listener log

    $ORACLE_HOME/network/log/<ListenerName>.log

    $ORACLE_BASE/diag/*

PRIMECLUSTER information

Refer to "PRIMECLUSTER Configuration and Administration Guide".

PRIMECLUSTER Wizard for Oracle information

- Configuration files

  /opt/FJSVclora/etc/*

  /usr/opt/reliant/etc/hvgdconfig

  /usr/opt/reliant/build/< RMS configuration name >.usfiles/*

- Log files

  /var/opt/reliant/log/*

Information

You can collect troubleshooting information for Oracle database and PRIMECLUSTER Wizard for Oracle using "pclsnap" command. The "pclsnap" command is a system information tool and is included in ESF (Enhanced Support Facility). If an error occurs on a PRIMECLUSER system, the command will collect required information to solve the problem. Oracle database information can be collected only if PRIMECLUSTER Wizard for Oracle is correctly set. For details, refer to "4.5 clgetoralog - Collect Troubleshooting Information".

3.6 Log Files

PRIMECLUSTER Wizard for Oracle generates log files under the following directory.

- /var/opt/reliant/log

  Log files having information about startup/stop are stored in this directory.

  Disk space for the directory is managed by PRIMECLUSTER.

  ### See

  Refer to "PRIMECLUSTER Installation and Administration Guide".

- /var/opt/FJSVclora

  Log files having information about monitoring are stored in this directory. When the log files would reach the maximum size of their files, a message will overwrite the oldest stored messages.

  Required disk space for the directory is described below;

  - Oracle instance resource

    5.5 MB per resource

  - Listener resource

    4.5 MB per resource

  - Oracle ASM instance resource

    0.0 MB per resource (no output)

  However, when the watch timeout is detected, the following log files are made by the write-once type.

  - FJSVclora_<SID>_idto.trclog
  - FJSVclora_<LISTENER>_ldto.trclog

  These increase by 62 bytes about one watch timeout. In addition, the amount of consumption management by RMS is not performed because these logs are management outside in RMS.

Note

Do not remove these log files.

Chapter 4 Command

4.1 hvoradisable - Discontinue Monitoring Resources

User

Super user

Format

/opt/FJSVclora/sbin/hvoradisable *userApplication Resource*

/opt/FJSVclora/sbin/hvoradisable -a [*userApplication*]

Function

hvoradisable discontinues monitoring the Oracle instance and Oracle listener resources on the local node where the command is executed. The command is used to stop the Oracle instances or Oracle listeners for maintenance. Also, it is available regardless of whether userApplication is activated or deactivated.

If the command is executed while userApplication is stopped, and then it is started, the Oracle resources will enter Warning without being started.

If the command is executed while userApplication is running, it will disable resource monitoring. The Oracle resources will enter Warning. Even though the Oracle instance and Oracle listener are stopped, they will remain Warning. When you execute the command while userApplication is running, be sure to check the resource state is Warning the stop the Oracle instance and Oracle listener.

Stopping userApplication, or clearing faulted state of userApplication will automatically restart monitoring resource.

Information

- The Oracle ASM instance resource is not monitored, so it is not necessary to discontinue monitoring the resource with the command.
- For further details about Oracle ASM instance resources, refer to "2.3.2 Oracle ASM (Automatic Storage Management)".

Parameter

userApplication Resource

Specify userApplication including Oracle resources that will be disrupted monitoring.

Specify either of the Oracle instance or Oracle listener that will be disrupted monitoring.

Specify them on the local node.

-a [*userApplication*]

The option discontinues monitoring all Oracle instance and Oracle Listener resources that belong to userApplication that is running on a local node and is specified for *userApplication*.

If *userApplication* is omitted, the option will discontinue monitoring all the Oracle resources on the local node.

Exit status

0: Normal termination

1: Abnormal termination

2: Abnormal termination (disruption of resource monitoring with the -a option fails)

Note

Note that execution timing. Unexpected resource failure or userApplication failover might be caused.

- Do not execute the command while state transition of userApplication is in progress.
- Do not execute the command while RMS is not running.

- Do not operate userApplications right after execution of the command. (At least a five-second interval is necessary.)
- Do not operate Oracle instances and Oracle listeners manually right after execution of the command.
  Confirm the stop of monitoring by using one of the following ways before the Oracle database operation.
  - Output of message "INFO: 0101: Fault Watching is disabled" in syslog
  - Transition of resources onto Warning
  - Output of clorainfo -m command is "disable".

4.2 hvoraenable - Restart Monitoring Resources

User

Super user

Format

/opt/FJSVclora/sbin/hvoraenable *userApplication Resource*

/opt/FJSVclora/sbin/hvoraenable -a [*userApplication*]

Function

hvoraenable restarts monitoring the Oracle instance and Oracle listener resources on the local node where resource monitoring is disrupted. It is available regardless of whether userApplication is activated or deactivated.

If the command is executed while userApplication is stopped, disabling resource monitoring with hvoradisable will be cancelled.

If the command is executed while userApplication is running, it will restart resource monitoring.

The command must be executed after the Oracle instance and Oracle listener are started manually. Be sure to check the resource state is changed from Warning to Online.

Information

- The Oracle ASM instance resource is not monitored, so it is not necessary to cancel monitoring for them with the command.
- For further details about Oracle ASM instance resources, refer to "2.3.2 Oracle ASM (Automatic Storage Management)".

Parameter

userApplication Resource

Specify userApplication including Oracle resources that will be restarted monitoring.

Specify either of the Oracle instance or Oracle listener that will be restarted monitoring.

Specify them on the local node.

-a [*userApplication*]

The option restarts monitoring all Oracle instance and Oracle Listener resources that belong to userApplication that is running on a local node and is specified for *userApplication*.

If *userApplication* is omitted, the option will restart monitoring all the Oracle resources on the local node.

Exit status

0: Normal termination

1: Abnormal termination

2: Abnormal termination (restarting of resource monitoring with the -a option fails)

Note

Note that execution timing. Unexpected resource failure or userApplication failover might be caused.

- Do not execute the command while state transition of userApplication is in progress.
- Do not operate userApplications right after execution of the command. (At least a five-second interval is necessary.)
- If Oracle instances or Oracle listeners have been stopped manually while stop of monitoring, start them up manually before the execution of this command.
- Confirm the restart of monitoring by using one of the following ways.
  - Output of message "INFO: 0102: Fault Watching is enabled" in syslog.
  - Transition of resources onto the previous state("Online", "Offline").
  - Output of clorainfo -m command is "enable".

4.3 clorapass - Register Password for Monitoring

User

Super user

Format

/opt/FJSVclora/sbin/clorapass

Function

clorapass registers the Oracle SYSTEM user password for PRIMECLUSTER Wizard for Oracle. The detector monitors Oracle instances using the SYSTEM user privileges, so it requires the SYSTEM user password.

If the password is not registered, the detector will use "manager" as the SYSTEM user password.

Execute the command on any one of the nodes.

Parameter

None.

Exit status

0: Normal termination

Non-0: Abnormal termination

Example

```
# /opt/FJSVclora/sbin/clorapass
Enter OracleSID > ora          (Enter ORACLE_SID, e.g.: "ora")
Enter Password > ******        (Enter the Oracle SYSTEM user password, e.g.: "oracle")
Re-enter Password > ******    (Re-enter the Oracle SYSTEM user password, e.g.: "oracle")
finished
```

Information

- For information on how to change the Oracle SYSTEM user's password while the cluster system is running, refer to "3.3 Oracle SYSTEM user Password Change ".

- The password character string that the "clorapass" command handles is explained below.
  - ASCII character; hexadecimal digit 21, 23-3f and 41-7e (decimal digit 33,35-63 and 65-126)
    - Nonquoted identifiers; alphanumeric characters, underscore (_), dollar sign ($) and pound sign (#)

      ```
      abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789_$#
      ```

    - The following characters in quoted identifiers

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

  - It cannot contain spaces, tabs, "at" signs(@) and multibyte characters.
  - If it contain quoted characters or it begins with a character except alphabetical characters, you do not have to enclose the password in double quotation marks(").
  - It can be as long as 63 characters. (In Oracle Database, the name can be as long as 30 characters)

4.4 cloracpy - Create Backup File for Oracle Database Setup

User

Oracle DBA user

Format

/opt/FJSVclora/sbin/cloracpy

Function

cloracpy enables users to backup files required for Oracle database setup on the operating node in the tar format. Also, the users can copy the file and set links by extracting the backup data on the standby nodes.

The command can be used in the following cases:

- Standby operation
- Oracle Database Software is located on local disk of each node.
- The $ORACLE_HOME and $ORACLE_BASE settings are the same between the operating node and the standby nodes.
- The Oracle database configuration is the same between the operating node and the standby nodes.
- Database creation and setup is already completed on the operating node.
- The command is executed with Oracle user access privileges
- $ORACLE_BASE, $ORACLE_HOME, and $ORACLE_SID are set in the Oracle user environment variables.

The following backup files can be created in the tar format:

- All files under $ORACLE_HOME/dbs
- All files under $ORACLE_BASE/admin/$ORACLE_SID
- All files under $ORACLE_HOME/network/admin
- All files under $ORACLE_BASE/diag

The files on the operating node will be stored in the "/tmp/oracle.$ORACLE_SID.tar" file. Then, they will be deployed on the standby node with "tar xvfP /tmp/oracle.$ORACLE_SID.tar" command.

Information

- tar command on standby nodes should be executed with Oracle user or root user.
- If executed with Oracle user, specify "xvfPp" options. (tar xvfPp /tmp/oracle.<$ORACLE_SID>.tar)

- If executed with root user, specify "xvfP" options. (tar xvfP /tmp/oracle.<$ORACLE_SID>.tar)

Note

Since cloracpy creates and deploy the backup files in the tar format using the full path, it cannot be used if the "$ORACLE_BASE" and "$ORACLE_HOME" settings are incompatible between the operating and standby nodes.

Also, if the operation method is different between the operating node and standby nodes, the command cannot be used. If a file with the same name exists, it will be overridden.

Parameter

None.

Exit status

0: Normal termination

Non-0: Abnormal termination

4.5 clgetoralog - Collect Troubleshooting Information

User

Super user

Format

/opt/FJSVclora/bin/clgetoralog [-n *RMSconfiguration*] [-d *output_directory*] [-a]

Function

clgetoralog collects Oracle database information for troubleshooting. "clgetoralog" command collects Oracle setup database information and log files on a PRIMECLUSTER system. The information will be collected in the "<hostname>_<yymmddHHMMSS>_clgetoralog.tar.Z" (or tar.gz) file.

The "clgetoralog" command collects

- Initialized parameter file

  $ORACLE_HOME/dbs/*.ora

  $ORACLE_BASE/admin/$ORACLE_SID/pfile/*.ora

- Oracle database alert log

  BACKGROUND_DUMP_DEST/*.log

  $ORACLE_HOME/rdbms/log/*.log

  Some files under $ORACLE_HOME/log/diag

  Some files under $ORACLE_BASE/diag

- listener.ora, tnsnames.ora

  $ORACLE_HOME/network/admin/*.ora

- Listener log

  $ORACLE_HOME/network/log/*.log

- V/L, configuration, and log files of PRIMECLUSTER Wizard for Oracle
- V/L and log files (switchlog) of RMS
- V/L, configuration, and patch information of PRIMECLUSTER

- System information

  uname -a (system basic information)

  uptime (system operating time)

  cat /proc/cpuinfo (CPU information)

  cat /proc/version (Linux version)

  sysctl -a (kernel parameter)

  ipcs (shared resources)

  cat /proc/swaps (swap information)

  ptree -pal, ps -efw (process information)

  ntpq -p (NTP information)

  /var/log/messages file

- UpdateSite(MW) information

  uam showup

Information

"pclsnap" command can also be used to collect troubleshooting information. (When -a, -A or -h option is specified.)

Parameter

[-n *RMSconfiguration*]

Specify the RMS configuration name for *RMSconfiguration*.
If this option is specified, "clgetoralog" command will collect RMS configuration information in addition to the information described in "Function". You can check the RMS configuration name using the following command if RMS is running.

```
# /opt/SMAW/SMAWRrms/bin/hvdisp -a | grep Configuration
Configuration: /opt/SMAW/SMAWRrms/build/config.us
```

If this option is omitted, the command will collect information described in "Function" only.

[-d *output_directory*]

Specify the directory where information is collected.
Then, the command will store the "<hostname>_<yymmddHHMMSS>_clgetoralog.tar.Z" (or tar.gz) file in the directory. If the directory specified does not exist, it will automatically be created.
If this option is omitted, the command will store the "<hostname>_<yymmddHHMMSS>_clgetoralog.tar Z" (or tar.gz) file under the default directory (/var/tmp).

[-a]

The option will collect the following information in addition to the information described in "Function":

- Group of currently active RMS configuration files (all RMS configuration files with the -n option)
- RMS log files (/var/opt/reliant/log/*)
- RMS environment variable configuration file (/usr/opt/reliant/bin/hvenv.local)
- /var/log/messages (all generations)
- /etc/hosts
- /etc/passwd
- /etc/services
- /etc/fstab
- /etc/fstab.pcl

Exit status

0: Normal termination

Non-0: Abnormal termination

Note

This command gets the value of BACKGROUND_DUMP_DEST or DIAGNOSTIC_DEST parameter from the initialized parameter file or the server parameter file, and searches the Oracle database alert log and the listener log. However, if these parameter files cannot be read(e.g. the server parameter file exists on a shared disk that is not mounted), the alert log and the listener log are not also collected.
To prevent it, define the alert log the listener log in /opt/FJSVclora/etc/clgetoralog.conf using the full path so that you can acquire them.
Where the alert log and the listener log are stored is defined in BACKGROUND_DUMP_DEST parameter.
(BACKGROUND_DUMP_DEST / DIAGNOSTIC_DEST parameter can be found in the initialized parameter file or the server parameter file. It can be also displayed by SQL "show parameter dest".)

The following shows how to define /opt/FJSVclora/etc/clgetoralog.conf.
(Example: BACKGROUND_DUMP_DEST is "/oracle/admin/orclsid/bdump"):

```
COLLECTOBJ=/oracle/admin/orclsid/bdump/alert_orclsid.log   (an Oracle alart log)
COLLECTOBJ=/oracle/product/network/log/listener.log   (a listener log)
```

Start with "COLLECTOBJ=" and specify the file name using the full path after "=".

Wild card characters "*" cannot be used in the middle of the path name.

```
COLLECTOBJ=/oracle/admin/orclsid/bdump/*.trc        (OK)
COLLECTOBJ=/oracle/admin/*/bdump/*.trc              (NG)
```

If the size of the troubleshooting information including the information which defined /opt/FJSVclora/etc/clgetoralog.conf exceeds 10MB, the troubleshooting information is collected except for the information which defined /opt/FJSVclora/etc/clgetoralog.conf.
The -a option will collect the troubleshooting information including the information which defined /opt/FJSVclora/etc/clgetoralog.conf even if the size exceeds 10MB.

4.6 clorainfo - Display Resource Configuration and Monitoring Status

User

Super user

Format

/opt/FJSVclora/bin/clorainfo { -c [*RMSconfiguration*] | -e | -m [*ResourceName*] | -v }

Function

clorainfo displays configuration information and monitoring state of Wizard for Oracle.

Parameter

-c [*RMSconfiguration*]

The option displays setup information of Wizard for Oracle resources that are defined in the specified RMS configuration. Specify the RMS configuration name for *RMSconfiguration*

If *RMSconfiguration* s omitted, setup information of Wizard for Oracle resources that are currently active in the RMS configuration will be displayed.

-e

The option displays kernel parameter values and Oracle database setup information on the local node.

-m [*ResourceName*]

The option displays whether or not Wizard for Oracle resources are being monitored (enable: monitoring is active, disable: monitoring is inactive).

If *ResourceName* is specified, it will check the status of resource monitoring and returns the one of the following codes:

- 0: Monitoring is active (RMS is running)
- 2: Monitoring is inactive (RMS is running)
- 10: Monitoring is active (RMS is not running)
- 12: Monitoring is inactive (RMS is not running)

The resource name of Wizard for Oracle (*ResourceName*) must exist on the local node.

If *ResourceName* is omitted, whether or not all the resources of Wizard for Oracle on the local node are monitored will be displayed.

-v

The option displays package information of Wizard for Oracle that is installed on the local node.

Exit status

0: Normal termination or RMS is running and resource monitoring is active ("-m *ResourceName*" specified)

2: RMS is running and resource monitoring is inactive ("-m *ResourceName*" specified)

10: RMS is stopped, and resource monitoring is active ("-m *ResourceName*" specified)

12: RMS is stopped, and resource monitoring is inactive ("-m *ResourceName*" specified)

Other than the above values: Abnormal termination

Chapter 5 Notice

Particular attention must be given to the operation of PRIMECLUSTER Wizard for Oracle.

Prerequisites and requirements

PRIMECLUSTER Wizard for Oracle has specific system requirements and component prerequisites that need to be understood prior to operation.

- More than one Oracle Database product which version/release is different can be installed on the same node. However, the version and release should be same on an operating node and standby nodes. For the Oracle Database products supported, refer to "Readme" and "Handbook".
- A user name, user ID, group name, and group ID should be identical on all the nodes to install Oracle Database.
- If multiple Oracle homes are configured on one server, a different user name must be assigned for each Oracle home.
- An Oracle database must be configured on the shared disk.
- Setting Oracle database log output on the shared disk is not recommended. When a disk device fails, log might not be output.
- Note of location of archived redo logs.
  - Located on local disks

    If Oracle database recovery is required, the archived redo logs on both nodes should be put together.
  - Located on shared disks

    Note that there is sufficient space to archive for archived redo log files. If there is insufficient space, and data updating processing through monitoring SQL hangs, an oracle resource might fail.

    Afterwards, the service might stop finally on both operating node and standby node, because the space of shared disk is insufficient and the failover of userApplication fails on the standby node.
- The Oracle "TWO_TASK" environment variable cannot be used. For details, refer to "2.2.6 Oracle Database Creation and Setting".
- The setting to connect to an Oracle database must not be described in login.sql of an Oracle user. For details, refer to "2.2.6 Oracle Database Creation and Setting".
- PRIMECLUSTER Wizard for Oracle connects to Oracle instance with SYSDBA system privilege to start up or stop Oracle instance/database. In this case, local connection in operating system authentication is used. Therefore, the following requirements should be satisfied. (If not, startup and stop of Oracle instance/database might fail.)
  - Oracle user that is set for Oracle instance resource in "2.2.7.1 Oracle Resource Creation and Registration" should belong to OSDBA group.
  - SQLNET.AUTHENTICATION_SERVICES parameter should not define in sqlnet.ora file.

  The other connections (ex. user own connection for maintenance) can use the password file authentication.
- A command (e.g. script) that has interactive mode should not be described in Oracle user's profile.
  (e.g. /etc/profile, .bash_profile, .cshrc, .profile)
  It may cause the following failures.
  - Failures of userApplication startup, shutdown or monitoring of Oracle resources.
  - clgetoralog command and clorainfo command hang up and they do not return to command line.
- Environment that Oracle user's home directory and profile are located on the shared disk is not supported. Oracle user's home directory and profile must be located on the local disk of each node.
- Operating system authentication of Listener should be enabled. For details, refer to "2.2.6 Oracle Database Creation and Setting".
- Oracle user should have access privileges for /tmp directory.

  The programs of PRIMECLUSTER Wizard for Oracle working with Oracle user use /tmp directory. If Oracle user does not have access privileges for /tmp directory, the programs do not work correctly and startup or shutdown of Oracle database fails.

- In order to use Oracle ASM of Oracle Database 11g R2/12c R1, it is necessary to install Oracle Grid Infrastructure. When installing Oracle Grid Infrastructure, the composition which separates the installation user of Oracle Database and the installation user of Oracle Grid Infrastructure is supported. The composition which creating one user is not supported.
- In order to use Oracle ASM of Oracle Database 11g R2/12c R1, a different directory must be assigned respectively for an ORACLE_BASE of the installation user of Oracle Database and an ORACLE_BASE of the installation user of Oracle Grid Infrastructure.
- When using Oracle ASM of Oracle Database 11g R2/12c R1 in standby node or single-node cluster, database services are not available.
- Upgrade to local disk if the Oracle Database software is located on local disk.
  Upgrade to shared disk if the Oracle Database software is located on shared disk.
  Changing the placement of the Oracle Database software at the upgrade does not support.

Features and functions

Below are guidelines and precautions to be taken in using the features and functions provided by PRIMECLUSTER Wizard for Oracle.

- The detector connects itself to the database using SYSTEM user access privileges to monitor Oracle instances. It also monitors Oracle database operation by creating a monitoring table on the SYSTEM user default table space. The size of the table is only a few bytes. The table data is periodically updated, so the REDO log is updated, and the archive log data is output.
- Stopping an Oracle instance in the "immediate" mode fails while Oracle Online backup is running.

  In this case, the Oracle instance will be stopped in "abort" mode.
- The time required for Oracle instance startup and stop varies depending on the database size. The default startup timeout is 10 minutes. The default stop timeout is 3 minutes.
  The RMS command "hvshut" has its own timeout. Even though hvshut times out, userApplication stop processing will be continued along with RMS stop.
- If a database failure is detected during Oracle instance startup, the database will automatically be recovered (END BACKUP, MEDIA RECOVERY). If the backup mode of database is detected during the startup of Oracle instances, it will automatically be canceled. If media failure is detected, they will automatically be recovered.
- If "Instance" or "Listener" is specified for StartPriority, MonitorOnly cannot be enabled. To enable it, specify "Same". For details, refer to "2.2.7.1 Oracle Resource Creation and Registration".

Configuration

Below are guidelines and precautions to be taken in configuring an environment that allows for PRIMECLUSTER Wizard for Oracle operations.

- Be aware of the exit code and timeout duration when the following scripts are set:
  PreOnlineScript, PostOnlineScript, PreOfflineScript, PostOfflineScript, FaultScript.
  For details, refer to "2.3.1 Oracle resource Online/Offline Script".
- Do not create multiple resources for the same an Oracle instance, an Oracle ASM instance or a Listener.
- In "2.2.4.1 userApplication creation userApplication creation", if you use Oracle resources in combination with PRIMECLUSTER Wizard for NAS, refer to "PRIMECLUSTER Wizard for NAS Configuration and Administration Guide".

Operations

Users need to take a special precaution when changing the system password for PRIMECLUSTER Wizard for Oracle as follows:

- For information on how to change the Oracle SYSTEM user password while a cluster system is running, refer to "3.3 Oracle SYSTEM user Password Change ". Register the changed Oracle SYSTEM user password to PRIMECLUSTER Wizard for Oracle. When the passwords of Oracle user, Grid user or Oracle SYS user are changed, it is not necessary to register the passwords to PRIMELCUSTER Wizard for Oracle.

Others

Users need to take the following special precaution when operating PRIMECLUSTER Wizard for Oracle:

- If an Oracle instance is stopped in the ABORT mode, it will automatically be recovered at the next instance startup.

Chapter 6 Message

This chapter describes messages generated by PRIMECLUSTER Wizard for Oracle and lists the possible causes and actions you can take to resolve any problems indicated by a message.

The following messages appear in syslog (daemon.err).

- Oracle instance resource messages
- Oracle listener resource messages
- Common messages

The following messages appear in command execution screen.

- clgetoralog messages
- clorainfo messages
- hvoradisable/hvoraenable messages
- cloracpy messages
- clorapass messages

Oracle instance resource messages

ERROR: 1202: Cannot map shared memory or get semaphore

[Content]

A system error occurred. Acquisition of shared memory or semaphores failed.

[Corrective action]

The problem might be due to insufficient system resource. Check the system environment.

ERROR: 1203: Cannot open actionlist

[Content]

The action definition file cannot be opened.

[Corrective action]

Check if the action definition file already exists, or file access privileges have been changed.

ERROR: 1204: Corrupted actionlist: Invalid errno, line=*linenumber*

[Content]

The errno setting of the action definition file is incorrect.

[Corrective action]

Check the errno setting of line=*linenumber* in the action definition file.

ERROR: 1205: Corrupted actionlist: Invalid status, line=*linenumber*

[Content]

The status setting of the action definition file is incorrect.

[Corrective action]

Check the status setting of line=*linenumber* in the action definition file.

ERROR: 1206: Corrupted actionlist: Invalid action, line=*linenumber*

[Content]

The action setting of the action definition file is incorrect.

[Corrective action]

Check the action setting of line=*linenumber* in the action definition file.

ERROR: 1208: *Oracle process* process error

[Content]

An Oracle instance process error was detected.

[Corrective action]

Check if Oracle instance is properly running by referring to the Oracle instance alert log.

ERROR: 1213: Action error detected: Offline

[Content]

The Offline state of the resource will be notified.

[Corrective action]

Check if Oracle instance is properly running by referring to the Oracle instance alert log.

ERROR: 1214: Action error detected: Faulted

[Content]

The Faulted state of the resource will be notified.

[Corrective action]

Check if Oracle instance is properly running by referring to the Oracle instance alert log.

ERROR: 1215: Action error detected: Restart

[Content]

Monitoring will be retried.

[Corrective action]

Check if Oracle instance is properly running by referring to the Oracle instance alert log.

ERROR: 1219: Cannot read hvgdconfig

[Content]

The RMS configuration file (hvgdconfig file) cannot be read.

[Corrective action]

If you modify the RMS configuration file manually, check the settings.

ERROR: 1220: Not Found *ResourceName* setting in hvgdconfig

[Content]

The *ResourceName* setting of the RMS configuration file (hvgdconfig file) is incorrect.

[Corrective action]

If you modify the RMS configuration file manually, check the settings.

ERROR: 1223: Not found *AttributeName* in hvgdconfig

[Content]

The *AttributeName* setting of the RMS configuration file (hvgdconfig file) is incorrect.

[Corrective action]

If you modify the RMS configuration file manually, check the settings.

ERROR: 1224: Receiving of monitoring instruction failed (*detail*)

[Content]

An internal error occurred. Acquisition of shared memory or semaphores failed.

[Corrective action]

Contact system administrators.

ERROR: 1225: Reporting of monitoring result failed : *status*

[Content]

An internal error occurred. Notification of monitoring result failed.

[Corrective action]

Contact system administrators.

ERROR: 1226: Checking existence of Detector process failed

[Content]

An internal error occurred. Checking whether or not the detector process is alive failed.

[Corrective action]

Contact system administrators.

ERROR: 1227: Invalid setting in hvgdconfig : *AttributeName*

[Content]

The *AttributeName* setting of the RMS configuration file (hvgdconfig file) is incorrect.

[Corrective action]

If you modify the RMS configuration file manually, check the settings.

ERROR: 1299: ORA-*xxxxx*

[Content]

An Oracle instance error ORA-*xxxxx* is output.

[Corrective action]

Check if Oracle instance is properly running by referring to the Oracle instance alert log.

WARNING: 1302: Action error detected: Warning

[Content]

The warning state of the resource will be notified.

[Corrective action]

Check if Oracle instance is properly running by referring to the Oracle instance alert log.

ERROR: 3402: clorainstance detected Oracle error! (ORA-*xxxxx*:)

[Content]

An Oracle instance error occurred while Oracle instance startup or shutdown was in progress (svrmgrl).

[Corrective action]

Check if Oracle instance is properly running by referring to the Oracle instance alert log.

ERROR: 3403: clorainstance detected Oracle error! (ORA-*xxxxx*:)
ERROR: 7301: clasminstance detected Oracle error! (ORA-*xxxxx*:)

[Content]

An Oracle instance error occurred while Oracle instance startup or shutdown was in progress (sqlplus).

[Corrective action]

Check if Oracle instance is properly running by referring to the Oracle instance alert log.

Oracle listener resource messages

ERROR: 2202: Cannot map shared memory or get semaphore

[Content]

A system error occurred. Acquisition of shared memory or semaphores failed.

[Corrective action]

The problem might be due to insufficient system resource. Check the system environment.

ERROR: 2203: Cannot get *ORACLE_HOME*

[Content]

ORACLE_HOME cannot be acquired.

[Corrective action]

Check if *ORACLE_HOME* is correctly set for the environment variable.

ERROR: 2204: Cannot read hvgdconfig

[Content]

The RMS configuration file (hvgdconfig file) cannot be read.

[Corrective action]

If you modify the RMS configuration file manually, check the settings.

ERROR: 2205: Not Found *ResourceName* setting in hvgdconfig

[Content]

The *ResourceName* setting of the RMS configuration file (hvgdconfig file) is incorrect.

[Corrective action]

If you modify the RMS configuration file manually, check the settings.

ERROR: 2206: Not Found *AttributeName* in hvgdconfig

[Content]

The *AttributeName* setting of the RMS configuration file (hvgdconfig file) is incorrect.

[Corrective action]

If you modify the RMS configuration file manually, check the settings.

ERROR: 2210: Tnsping detected the error (*detail*)

[Content]

Listener monitoring with tnsping command failed.

[Corrective action]

Check the Listener log and if the Listener is properly running.

ERROR: 2211: The listener name is invalid

[Content]

The Oracle listener name is incorrect.

[Corrective action]

Check the Listener settings such as listener.ora and tnsnames.ora.

ERROR: 2214: The process of the listener does not exist

[Content]

An Oracle listener process failure was detected. It will be output along with userApplication stop.

[Corrective action]

If the error is output during userApplication is online, check the Listener log and if the Listener is properly running.

ERROR: 2215: Process ID of the listener is not found

[Content]

The Listener process ID is unknown.

[Corrective action]

Check the Listener log and if the Listener is properly running.

ERROR: 2219: Reporting of monitoring result failed : *status*

[Content]

An internal error occurred. Notification of monitoring result failed.

[Corrective action]

Contact system administrators.

ERROR: 2220: System error occurred(*detail*)

[Content]

A system error occurred.

[Corrective action]

The problem might be due to insufficient system resource. Check the system environment.

ERROR: 2221: Receiving of monitoring instruction failed (*detail*)

[Content]

An internal error occurred. Acquisition of shared memory or semaphores failed.

[Corrective action]

Contact system administrators.

ERROR: 2222: Checking existence of Detector process failed

[Content]

An internal error occurred. Checking whether or not the detector process is alive failed.

[Corrective action]

Contact system administrators.

Common messages

INFO: 0101: Fault Watching is disabled

[Content]

Monitoring resource was discontinued after the hvoradisable was executed.

[Corrective action]

None. Execute "hvoraenable" command to restart resource monitoring.

Information

For details, refer to "4.1 hvoradisable - Discontinue Monitoring Resources".

INFO: 0102: Fault Watching is enabled

[Content]

Resource monitoring was restarted after hvoraenable command was executed.

[Corrective action]

None.

Information

For details, refer to "4.2 hvoraenable - Restart Monitoring Resources".

ERROR: 0207: Cannot allocate memory for hvgdconfig : *AttributeName*

[Content]

A system error occurred. Acquisition of memory failed.

[Corrective action]

The problem might be due to insufficient system resource. Check the system environment.

ERROR: 0208: Data init error

[Content]

A system error occurred. Acquisition of semaphore failed.

[Corrective action]

The problem might be due to insufficient system resource. Check the system environment.

ERROR: 0209: Fork error

[Content]

A system error occurred. Generation of process failed.

[Corrective action]

The problem might be due to insufficient system resource. Check the system environment.

ERROR: 0211: User *UserName* not found.

[Content]

The Oracle user settings are incorrect.

[Corrective action]

Check if Oracle user information (e.g. username) is correct.

ERROR: 0212: Cannot create log *path_name*.

[Content]

Log files cannot be created.

[Corrective action]

The problem might be due to insufficient system resource. Check the system environment.

ERROR: 0213: Library init error

[Content]

A system error occurred. Initialization failed.

[Corrective action]

The problem might be due to insufficient system resource. Check the system environment.

ERROR: 0219: Detector aborted

[Content]

A system error occurred. The detector will be terminated.

[Corrective action]

The problem might be due to insufficient system resource. Check the system environment.

ERROR: 0220: Not found *AttributeName* in hvgdconfig.

[Content]

The *AttributeName* setting of the RMS configuration file (hvgdconfig file) is not set.

[Corrective action]

If you modify the RMS configuration file manually, check the settings.

ERROR: 0221: Invalid setting in hvgdconfig : *AttributeName*

[Content]

The *AttributeName* setting of the RMS configuration file (hvgdconfig file) is incorrect.

[Corrective action]

If you modify the RMS configuration file manually, check the settings.

ERROR: 0222: Checking permission of resource monitoring failed

[Content]

An internal error occurred. Checking monitoring disruption failed.

[Corrective action]

Contact system administrators.

ERROR: 0223: Checking existence of fault monitor process failed

[Content]

An internal error occurred. Checking whether or not the monitoring process is alive failed.

[Corrective action]

Contact system administrators.

ERROR: 0224: Sending monitoring instruction failed (*detail*)

[Content]

A system error occurred. Acquisition of shared memory or semaphores failed.

[Corrective action]

Contact system administrators.

ERROR: 0225: Receiving of monitoring result failed (*detail*)

[Content]

A system error occurred. Acquisition of shared memory or semaphores failed.

[Corrective action]

Contact system administrators.

ERROR: 0226: Watch Timeout occurred (*count*)

[Content]

Since there is no response from Oracle instance or Listener, timeout occurs.

[Corrective action]

Check if Oracle instance or Listener is properly running by referring to the Oracle instance alert log or Listener log.

ERROR: 0227: Receiving of Script notice failed

[Content]

An internal error occurred. Communication with the script failed.

[Corrective action]

Contact system administrators.

ERROR: 0228: Starting fault monitor failed

[Content]

Startup of the monitoring process failed.

[Corrective action]

Contact system administrators.

ERROR: 0229: Pipe error

[Content]

A system error occurred. Creation of output pipe failed.

[Corrective action]

The problem might be due to insufficient system resource. Check the system environment.

Note

PRIMECLUSTER Wizard for Oracle outputs error messages to system console other than messages described above if error in Oracle instance startup occurs.

clgetoralog messages

clgetoralog [ERROR] Creation of temporary directory failed! (*directory_name*)

[Content]

Cannot make a temporary directory.

[Corrective action]

/tmp space may be insufficient. Check the system environment.

clgetoralog [ERROR] Invalid RMS Configuration name! (*RMS_configuration*)

[Content]

The specified RMS configuration *RMS_configuration* does not exist.

[Corrective action]

Retry with a correct RMS configuration name.

clgetoralog [ERROR] No space in *path_name* (*details*)!

[Content]

Not enough disk space in *path_name*.

[Corrective action]

path_name space may be insufficient. Check the system environment.

clgetoralog [ERROR] Creation of directory failed! (*directory_name*)

[Content]

Cannot make a directory *directory_name* where collected information is stored.

[Corrective action]

Disk space may be insufficient. Check the system environment.

clgetoralog [ERROR] "*file_name*" already exists!

[Content]

Cannot make *file_name* because the same name file already exists.

[Corrective action]

The directory where the collected information has been stored is shown in the following message. Create an archive file from the directory manually with other file name.

clgetoralog [ERROR] Creation of "*file_name*" failed!

[Content]

Cannot create an archive file *file_name*.

[Corrective action]

The directory where the collected information has been stored is shown in the following message. Create an archive file from the directory manually.

clgetoralog [WARN] Obtaining local SysNode Name failed!

[Content]

Cannot get local SysNode name, but clgetoralog continues collecting information.

[Corrective action]

None.

clgetoralog [WARN] Execution of hvw failed!

[Content]

Cannot execute an RMS command hvw(1M) correctly, but clgetoralog continues collecting information.

[Corrective action]

None.

clgetoralog [WARN] Result of hvw is invalid!

[Content]

An RMS command hvw(1M) has returned unexpected result, but clgetoralog continues collecting information.

[Corrective action]

None.

clgetoralog [WARN] Wizard for Oracle resources not found in hvgdconfig!

[Content]

There are no definitions of Wizard for Oracle resources in hvgdconfig file, but clgetoralog continues collecting information.

[Corrective action]

None.

clgetoralog [WARN] Obtaining RMS Configuration name from CONFIG.rms failed!

[Content]

Cannot get RMS configuration name, but clgetoralog continue collecting information.

[Corrective action]

None.

clgetoralog [WARN] Invalid RMS Configuration name! (*RMS_configuration*)

[Content]

Cannot get RMS configuration name, but clgetoralog continue collecting information.

[Corrective action]

None.

clorainfo messages

clorainfo: ERROR: Obtaining local SysNode Name failed!

[Content]

Cannot get a local SysNode name.

[Corrective action]

Check if CF (Cluster Foundation) has been configured and is "UP" state.

---

clorainfo: ERROR: Checking RMS running status failed! (*details*)

[Content]

Cannot check if RMS is running or not.

[Corrective action]

Check if PRIMECLUSTER installation, cluster setup and building a userApplication (cluster application) have been completed.

---

clorainfo: ERROR: Obtaining RMS configuration name failed! (*details*)

[Content]

Cannot get an RMS configuration name.

[Corrective action]

Check if building a userApplication (cluster application) has been completed.

---

clorainfo: ERROR: CONFIG.rms does not exist! (*details*)

[Content]

CONFIG.rms file does not exist.

[Corrective action]

Check if building a userApplication (cluster application) has been completed.

---

clorainfo: ERROR: Wizard for Oracle resources not found

[Content]

There are no Wizard for Oracle resources in a build userApplication (cluster application).

[Corrective action]

Check if building a userApplication (cluster application) has been completed or Oracle instance resources or Listener resources are included in the userApplication.

---

clorainfo: ERROR: The specified resource does not exist on this SysNode (*SysNode_name*), or does not belong to Wizard for Oracle! - *resource_name*

[Content]

The specified resource *resource_name* does not exist on the local node *SysNode_name*, or is not a Wizard for Oracle resource.

[Corrective action]

Retry with a correct resource name.

---

clorainfo: ERROR: Resource does not belong to Wizard for Oracle - *resource_name*

[Content]

The specified resource *resource_name* is not a Wizard for Oracle resource.

[Corrective action]

Retry with a correct resource name.

clorainfo: ERROR: Invalid RMS Configuration.

[Content]

RMS configuration is invalid.

[Corrective action]

Check if building a userApplication (cluster application) has been completed.

clorainfo: ERROR: *RMS_configuration* does not exist.

[Content]

The specified RMS configuration does not exist.

[Corrective action]

Retry with a correct RMS configuration name.

hvoradisable/hvoraenable messages

command: ERROR: Internal error! (*details*)

[Content]

Internal error occurred.

[Corrective action]

Contact system administrators.

command: ERROR: Failed to disable/enable resource monitoring - *resource_name*

[Content]

Cannot disable or enable monitoring.

[Corrective action]

Contact system administrators.

command: ERROR: hvgdconfig does not exist!

[Content]

hvgdconfig file does not exist.

[Corrective action]

Check if building a userApplication (cluster application) has been completed.

command: ERROR: Obtaining local SysNode Name failed!

[Content]

Cannot get a local SysNode name.

[Corrective action]

Check if CF (Cluster Foundation) has been configured and is "UP" state.

command: ERROR: Obtaining RMS configuration Name failed!

[Content]

Cannot get an RMS configuration name.

[Corrective action]

Check if building a userApplication (cluster application) has been completed.

command: ERROR: Execution of hvw failed!

[Content]

Cannot execute an RMS command hvw(1M) correctly.

[Corrective action]

Check if building a userApplication (cluster application) has been completed.

command: ERROR: Result of hvw is invalid!

[Content]

Cannot get an result of RMS command hvw(1M) correctly.

[Corrective action]

Check if building a userApplication (cluster application) has been completed.

command: ERROR: Failed to disable/enable resource monitoring! (*details*)

[Content]

Cannot disable or enable monitoring because of details.

[Corrective action]

Check if PRIMECLUSTER installation, cluster setup and building a userApplication (cluster application) have been completed.

command: ERROR: No Wizard for Oracle resources belong to specified userApplication! - *userApplication_name*

[Content]

There are no Wizard for Oracle resources in the specified userApplication *userApplication_name*.

[Corrective action]

Retry with a correct userApplication name.

command: ERROR: No Wizard for Oracle resources are in the current RMS configuration!

[Content]

There are no Wizard for Oracle resources in the current RMS configuration.

[Corrective action]

Check if building a userApplication (cluster application) has been completed or Oracle instance resources or Listener resources are included in the userApplication.

command: ERROR: No Wizard for Oracle resources exist on this node! - *SysNode_name*

[Content]

There are no Wizard for Oracle resources on a local node *SysNode_name*.

[Corrective action]

Check if building a userApplication (cluster application) has been completed or Oracle instance resources or Listener resources are included in the userApplication.

command: ERROR: Invalid userApplication or Resource!

[Content]

The specified userApplication name or resource name is invalid.

[Corrective action]

Retry with a correct userApplication name and resource name.

---

command: ERROR: The specified resource does not exist on *SysNode_name*! - *resource_name*

[Content]

The specified resource does not exist on a local node *SysNode_name*.

[Corrective action]

Retry with a correct resource name or retry on a correct node.

---

command: WARNING: RMS is not running, but the monitoring of resource_name is disabled/enabled.

[Content]

The monitoring is disabled or enabled although RMS is not running.

[Corrective action]

This setting will become effective in the next RMS startup.

cloracpy messages

ORACLE_SID not found.

[Content]

ORACLE_SID cannot be acquired.

[Corrective action]

Check if ORACLE_SID is correctly set for the environment variable.

ORACLE_HOME not found.

[Content]

ORACLE_HOME cannot be acquired.

[Corrective action]

Check if ORACLE_HOME is correctly set for the environment variable.

ORACLE_BASE not found.

[Content]

ORACLE_BASE cannot be acquired.

[Corrective action]

Check if ORACLE_BASE is correctly set for the environment variable.

ORACLE_HOME/dbs is invalid.

[Content]

ORACLE_HOME/dbs directory does not exist.

[Corrective action]

Check if the directory exists.

ORACLE_HOME/network/admin is invalid.

[Content]

ORACLE_HOME/network/admin directory does not exist.

[Corrective action]

Check if the directory exists.

cloracpy: *ORACLE_BASE*/admin/*ORACLE_SID* is invalid.

[Content]

ORACLE_BASE/admin/*ORACLE_SID* directory does not exist.

[Corrective action]

On the standby node, extract the backup data and create directory which is specified in the AUDIT_FILE_DEST initialization parameter.

The access privilege to the directory must be also the same as that on the operating node.

cloracpy: *ORACLE_BASE*/diag is invalid.

[Content]

ORACLE_BASE/diag directory does not exist.

[Corrective action]

On the standby node, extract the backup data and create directory which is specified in the DIAGNOSTIC_DEST initialization parameter.
The access privilege to the directory must be also the same as that on the operating node.

cloracpy:tar is error.(*EXIT_CODE*).

[Content]

Cannot execute tar(1) command correctly.

[Corrective action]

Check the disk space or authority of /tmp directory.

clorapass messages

Cannot read *password_file*.

[Content]

Cannot read the password file.

[Corrective action]

Check the password file.

File format error *password_file*.

[Content]

Password file occurred format error.

[Corrective action]

Delete the password file, set password again. If more than one password was registered in the file, set all of them.

Cannot allocate memory.

[Content]

A system error occurred. Acquisition of memory failed.

[Corrective action]

The problem might be due to insufficient system resource. Check the system environment.

Cannot write *password_file*.

[Content]

Cannot write the password file.

[Corrective action]

Check the password file.

Password not match.

[Content]

An incorrect password was entered.

[Corrective action]

Enter a correct password.

Appendix A Failure Case Studies

Most of Oracle instance startup failures or cluster failover failures are due to Oracle instance down invents. Sometimes, the same or similar problems can occur due to setup or evaluation mistakes made by users.

This section discusses possible causes, corrective and preventive action of problems caused by improper settings or mistaken evaluations

Oracle instances	Startup/stop failure	A.1.1
	AutoRecover or Failover	A.1.2
	Warning status	A.1.3
Oracle listeners	Startup/stop failure	A.2.1
	AutoRecover or Failover	A.2.2

A.1 Oracle Instances

A.1.1 Startup/stop failure

Oracle instance startup or stop failed.

[Case 1]

Oracle instance startup or stop fails when the PRIMECLUSTER RMS resource settings are invalid.

Check the resource setup information by executing "clorainfo -c" command. Refer to "4.6 clorainfo - Display Resource Configuration and Monitoring Status".

- Oracle user
- OracleSID
- Scripts (e.g. PreOnlineScript)
  - A correct path must be set.
  - The script must have execution permission.
  - The script must behave correctly.

If your setup information is incorrect, set proper values again. Refer to "Chapter 2 Environment Setup".

[Case 2]

Oracle instance startup or stop fails when user script settings in /opt/FJSVclora/usr are incorrect (standby operation only).

Check if the user scripts behave correctly.

[Case 3]

Oracle instance startup or stop fails when Oracle database settings are invalid.

Check the Oracle database alertlog, so you might be able to detect the cause of the failure.
Also, check if Oracle database can be started or stopped properly.
If you discontinue Oracle instance resource monitoring, you can operate Oracle database manually. Refer to "3.2.4.1 Oracle database must be stopped".

A.1.2 AutoRecover or Failover

AutoRecover or a userApplication failover occurred because of an Oracle instance resource failure.

[Case 1]

If there is insufficient space to archive, and data updating processing through monitoring SQL hangs, an oracle resource might fail.

Afterwards, the service might stop finally on both operating node and standby node, because the space of shared disk is insufficient and the failover of userApplication fails on the standby node.

Check the Oracle database alertlog, so you might be able to detect the cause of the failure.
Also, backup archive logs then reserve enough disk space.

[Case 2]

If monitoring timeout occurs twice in a row, a resource failure will occur. If the following error message is output to syslog, you can determine the cause of this problem:

```
ERROR: 0226: Watch Timeout occurred
```

Take corrective action on Oracle.
In Oracle instance monitoring of PRIMECLUSTER Wizard for Oracle, if there is no reply from Oracle database within a specified time, monitoring timeout will be considered. At the first monitoring timeout, the resource will only enter Warning, however, if it occurs twice in a row, a resource failure will be determined.

A.1.3 Warning State

Oracle instance has been activated, but an Oracle instance resource has entered Warning.

[Case 1]

An Oracle instance resource enters Warning when

- The Oracle SYSTEM user password is not registered in PRIMECLUSTER Wizard for Oracle
- The Oracle SYSTEM user password is registered in PRIMECLUSTER Wizard for Oracle, but it is incorrect
- The correct Oracle SYSTEM user password is registered in PRIMECLUSTER Wizard for Oracle, but it is disabled

If ORA-01017 is output to syslog, you can determine the cause of this problem.

Register the correct SYSTEM user password again. Refer to "3.3 Oracle SYSTEM user Password Change ".

[Case 2]

An Oracle instance resource enters Warning when the Oracle SYSTEM user account is locked, so you are not allowed to connect to Oracle instance.

If ORA-28000 is output to syslog, you can determine the cause of this problem.
You can also check the SYSTEM user account by referring to the following SQL statement.
If the "account_status" column indicates "LOCKED(TIMED)" or "LOCKED", you can determine the cause of this problem.

```
# su - <Oracle user>
$ sqlplus /nolog
SQL> connect / as sysdba
SQL> select username, account_status from dba_users;
```

Access Oracle instance using sysdba privileges then release account locking of the SYSTEM user.

```
# su - <Oracle user>
$ sqlplus /nolog
SQL> connect / as sysdba
SQL> alter user system account unlock;
```

If ORA-01017 is output to syslog as well as ORA-28000, an incorrect password might have been registered. In this case, correct the SYSTEM user password. Refer to "3.3 Oracle SYSTEM user Password Change ". Then, release account locking using the procedure above.

[Case 3]

An Oracle instance resource enters Warning when instance monitoring is discontinued.

Check the monitoring status by executing "clorainfo -m" command. Refer to "4.6 clorainfo - Display Resource Configuration and Monitoring Status".
If instance monitoring has been discontinued, check if the Oracle instance has been activated with the OPEN status then restart monitoring. Refer to "4.2 hvoraenable - Restart Monitoring Resources".

[Case 4]

In Oracle instance monitoring, an Oracle instance resource enters Warning if there is no reply from SQL statement(e.g. INSERT, UPDATE, etc.) within a specified time, but you can access Oracle instance, and the instance indicates OPEN.

Take corrective action on Oracle.
In Oracle instance monitoring of PRIMECLUSTER Wizard for Oracle, if there is no reply from Oracle instance within a specified time, monitoring timeout will be considered and the following error message will also be output to syslog:

```
ERROR: 0226: Watch Timeout occurred
```

At the first monitoring timeout, the resource will only enter Warning, however, if it occurs twice in a row, a resource failure will be determined.

[Case 5]

In Oracle instance monitoring, an Oracle instance resource enters Warning if you cannot access Oracle instance because of a max session error or max process error.

If ORA-00018 or ORA-00020 is output to syslog, you can determine the cause of this problem.

For the maximum number of sessions that are set in the Oracle SESSIONS parameter, or the maximum number of processes that are set in the PROCESSES parameter, estimate enough values considering monitoring sessions for PRIMECLUSTER Wizard for Oracle.

[Case 6]

An Oracle instance resource enters Warning when the SYSTEM user's password has expired, so Oracle instance connection is not allowed.

If ORA-28001 is output to syslog, you can determine the cause of this problem.
You can also check it by referring to the following SQL statement
If the ORA-28001 error message appears, you can determine the cause of this problem.

```
# su - <Oracle user>
$ sqlplus /nolog
SQL> connect system/password
ERROR:
ORA-28001: the password has expired

Changing password for system
New password:
```

In this case, change the SYSTEM user's password. After that, register the password with "clorapass" command. Refer to "3.3 Oracle SYSTEM user Password Change ".

See

For details refer to the Oracle Database manual.

A.2 Oracle Listeners

A.2.1 Startup/stop failure

Oracle listener startup or stop failed.

[Case 1]

Oracle listener startup or stop fails when the PRIMECLUSTER RMS resource settings are invalid.
Check the following resource setup information by executing "clorainfo -c" command. Refer to "4.6 clorainfo - Display Resource Configuration and Monitoring Status".

- Oracle user name
- Listener name
- TNSName (net service name)
- Scripts (e.g. PreOnlineScript)
  - A correct path must be set.
  - The script must have execution permission.
  - The script must behave correctly.

If your setup information is incorrect, set proper values again. Refer to "Chapter 2 Environment Setup".

[Case 2]

Oracle listener startup or stop fails when the Listener settings such as IP address and port number are incorrect.

Check Listener logs, so you might be able to detect the cause of the failure.

Check if the settings of listener.ora are correct.

Also, check if the Listener can be started or stopped properly. If you discontinue Oracle instance resource monitoring, you can operate Oracle database manually. Refer to "3.2.4.1 Oracle database must be stopped".

A.2.2 AutoRecover or Failover

AutoRecover or a userApplication failover occurred because of Oracle listener resource failure.

[Case 1]

A userApplication failover occurs when the PRIMECLUSTER RMS resource settings (especially TNSName) are invalid.

Check the following resource setup information by executing "clorainfo -c" command. Refer to "4.6 clorainfo - Display Resource Configuration and Monitoring Status".

- Oracle user name
- Listener name
- TNSName (net service name)

If your setup information is incorrect, set proper values again. Refer to "Chapter 2 Environment Setup".

[Case 2]

A userApplication failover occurs when the net service name of tnsnames.ora is incorrect.

Check the net service name in tnsnames.ora file.

A.2.3 Warning state

A listener resource has entered Warning.

[Case 1]

A listener resource enters Warning when listener monitoring is discontinued.
Check the monitoring status by executing the "clorainfo -m" command. Refer to "4.6 clorainfo - Display Resource Configuration and Monitoring Status".

If listener monitoring has been discontinued, check if the listener has been activated then restart monitoring. Refer to "4.2 hvoraenable - Restart Monitoring Resources".

[Case 2]

In listener monitoring using the tnsping command of the Oracle database, when constant time did not have the reply of the tnsping command, the resource enters Warning (WatchTimeout).
If the following error message is output to syslog, you can confirm the cause of this problem:

"ERROR: 0226: Watch Timeout occurred"

Check the listener log, and investigate and handle it.
In listener monitoring of PRIMECLUSTER Wizard for Oracle, if there is no reply from tnsping within a specified time, monitoring timeout will be considered. At the first monitoring timeout, the resource will only enter Warning, however, if it occurs twice in a row, a resource failure will be determined.

Appendix B Change Oracle Resource Settings

This section explains how to change the Oracle resource settings.

B.1 Resource Additional Creation

B.1.1 Respectively

This section explains how to create an Oracle resource newly and register it to an existing userApplication that includes an Oracle resource already.

Example

To create a Listener "LISTENER_2" newly and register it to an existing userApplication including an Oracle instance resource and a Listener resource "LISTENER" already.

1. Stop RMS on all nodes.
2. Start up RMS Wizard by executing "hvw -n <Configuration Name>" command on any node.
3. Select Application-Edit in the "Main configuration menu" screen.
4. Select userApplication name (displayed in capital letters) where resources are registered in the "Application selection menu" screen.
5. Select Oracle(Ora_*xxx*) in the "Settings of turnkey wizard "WIZSTANDBY"" screen.
6. Select Additional*xxx* in the "Oracle (Ora_*xxx*:consistent)" screen.

   Example

   If you create and register an Oracle instance resource or an Oracle ASM instance resource, select AdditionalInstance here, and edit advanced settings of the resource according to the step "7" and "8" of "2.2.7.1 Oracle Resource Creation and Registration".

   If you create and register a Listener resource, select AdditionalListener here, and edit advanced settings of the resource according to the step "10" and "11" of "2.2.7.1 Oracle Resource Creation and Registration".

```
Oracle (Ora_APP1:consistent)
1) HELP                          6) AdditionalListener
2) -                             7) StartPriority=Same
3) SAVE+EXIT                     8) OracleInstanceName[0]='ora'
4) REMOVE+EXIT                   9) OracleListenerName[0]=LISTENER
5) AdditionalInstance
Choose the setting to process:
```

   In the single-node cluster operation, the setting of AutoRecover Flag is recommended for Oracle instance resources and Oracle Listener resources.
   The availability is increased by restarting Oracle instance resources and Oracle Listener resources automatically when an error is detected.

Attributes	Values
Flags	AutoRecover (A)

7. Repeat the step "6" if need to create and register resources else.

8. Select SAVE+EXIT in the "Oracle (Ora_*xxx*:consistent)" screen after completed.
9. Select SAVE+EXIT in the "Settings of turnkey wizard "WIZSTANDBY"" screen.
10. Select RETURN in the "Application selection menu" screen.
11. Execute Configuration-Generate and Configuration-Activate in the "Main configuration menu" screen.
12. Select QUIT in the "Main configuration menu" screen and terminate RMS Wizard.

B.1.2 In a Group

This section explains how to create an Oracle resource newly and register it to an existing userApplication that does not include any Oracle instance resource and Listener resource.

Example

To create an Oracle instance resource and(or) a Listener resource newly and register them(it) to an existing userApplication including GDS, LFS and GLS resources already.

In the standby operation, it is the same as the procedure in "2.2.7 userApplication Edit.

1. Stop RMS on all nodes.
2. Start up RMS Wizard by executing "hvw -n <Configuration Name>" command on any node.
3. Select Application-Edit in the "Main configuration menu" screen.
4. Select userApplication name (displayed in capital letters) where resources are registered in the "Application selection menu" screen.
5. Select Oracle(-) in the "Settings of turnkey wizard "WIZSTANDBY"" screen.
6. Select Additional*xxx* in the "Oracle (Ora_*xxx*:not yet consistent)" screen.

   ### Example

   ```
   Oracle (Ora_APP1:not yet consistent)
   1) HELP                    4) REMOVE+EXIT          7) StartPriority=Same
   2) -                       5) AdditionalInstance
   3) SAVE+EXIT               6) AdditionalListener
   Choose the setting to process:
   ```

   If you create and register an Oracle instance resource or an Oracle ASM instance resource, select AdditionalInstance here, and edit advanced settings of the resource according to the step "7" and "8" of "2.2.7.1 Oracle Resource Creation and Registration".

   If you create and register a Listener resource, select AdditionalListener here, and edit advanced settings of the resource according to the step "10" and "11" of "2.2.7.1 Oracle Resource Creation and Registration".

   In the single-node cluster operation, the setting of AutoRecover Flag is recommended for Oracle instance resources and Oracle Listener resources.
   The availability is increased by restarting Oracle instance resources and Oracle Listener resources automatically when an error is detected.

Attributes	Values
Flags	AutoRecover (A)

7. Select SAVE+EXIT in the "Oracle (Ora_*xxx*:consistent)" screen after completed.
8. Select SAVE+EXIT in the "Settings of turnkey wizard "WIZSTANDBY"" screen.

9. Select RETURN in the "Application selection menu" screen.
10. Execute Configuration-Generate and Configuration-Activate in the "Main configuration menu" screen.
11. Select QUIT in the "Main configuration menu" screen and terminate RMS Wizard.

B.2 Change Resource Settings

This section explains how to change settings of an existing resource.

Example

To change "Interval" attribute of an existing Oracle instance resource(e.g. changes it from 30 to 60).

1. Stop RMS on all nodes.
2. Start up RMS Wizard by executing "hvw -n <Configuration Name>" command on any node.
3. Select Application-Edit in the "Main configuration menu" screen.
4. Select userApplication name (displayed in capital letters) including target resources in the "Application selection menu" screen.
5. Select Oracle(Ora_*xxx*) in the "Settings of turnkey wizard "WIZSTANDBY"" screen.
6. Select the target resource name in the "Oracle (Ora_*xxx*:consistent)" screen.

   ### Example

   If an Oracle instance resource, select OracleInstanceName[0]='*OracleSID*'.
   If a Listener resource, select OracleListenerName[0]=*LISTENER*.

   ```
   Oracle (Ora_APP1:consistent)
   1) HELP                                6) AdditionalListener
   2) -                                   7) StartPriority=Same
   3) SAVE+EXIT                           8) OracleInstanceName[0]='ora'
   4) REMOVE+EXIT                         9) OracleListenerName[0]=LISTENER
   5) AdditionalInstance
   Choose the setting to process:
   ```

   Select a registered OracleSID or a registered Listener name in the next screen.
   The following screen shot indicates the case of an Oracle instance.

   ```
   Setting menu : OracleSID for Oracle instance
   1) HELP                                4) FREECHOICE
   2) RETURN                              5) SELECTED:'ora'
   3) NONE
   Choose an Instance Name for Oracle: 5
   ```

7. Change settings in the "Detail setting for *xxx*" screen.
   - Oracle instance resource or Oracle ASM instance resource

     Change advanced settings of the resource according to the step "7" of "2.2.7.1 Oracle Resource Creation and Registration".
   - Listener resource

     Change advanced settings of the resource according to the step "10" of "2.2.7.1 Oracle Resource Creation and Registration".

8. Select SAVE+RETURN in the "Detail setting for *xxx*" screen after completed.
9. Repeat the step "6" and "7" if need to change resources else.
10. Select SAVE+EXIT in the "Oracle (Ora_*xxx*:consistent)" screen after completed.
11. Select SAVE+EXIT in the "Settings of turnkey wizard "WIZSTANDBY"" screen.
12. Select RETURN in the "Application selection menu" screen.
13. Execute Configuration-Generate and Configuration-Activate in the "Main configuration menu" screen.
14. Select QUIT in the "Main configuration menu" screen and terminate RMS Wizard.

B.3 Resource Deletion

B.3.1 Respectively

This section explains how to delete an Oracle instance or a Listener resource from an existing userApplication that includes an Oracle resource already.

Example

To delete only a Listener resource from an existing userApplication including an Oracle instance resource and a Listener resource already in standby operation.

1. Stop RMS on all nodes.
2. Start up RMS Wizard by executing "hvw -n <Configuration Name>" command on any node.
3. Select Application-Edit in the "Main configuration menu" screen.
4. Select userApplication name (displayed in capital letters) including target resources in the "Application selection menu" screen.
5. Select Oracle(Ora_*xxx*) in the "Settings of turnkey wizard "WIZSTANDBY"" screen.
6. Select the target resource in the "Oracle (Ora_*xxx*:consistent)" screen, and select NONE in the next screen.

Example

- Oracle instance resource deletion

```
Oracle (Ora_APP1:consistent)
1) HELP                                6) AdditionalListener
2) -                                   7) StartPriority=Same
3) SAVE+EXIT                           8) OracleInstanceName[0]='ora'
4) REMOVE+EXIT                         9) OracleListenerName[0]=LISTENER
5) AdditionalInstance
Choose the setting to process: 8
```

```
Setting menu : OracleSID for Oracle instance
1) HELP                                4) FREECHOICE
2) RETURN                              5) SELECTED:'ora'
3) NONE
Choose an Instance Name for Oracle: 3
```

```
Oracle (Ora_APP1:consistent)
1) HELP                                6) AdditionalInstance
2) -                                   7) AdditionalListener
3) SAVE+EXIT                           8) StartPriority=Same
4) REMOVE+EXIT                         9) OracleListenerName[0]=LISTENER
Choose the setting to process:
```

7. Repeat the step "6" if need to delete resources else.
8. Select SAVE+EXIT in the "Oracle (Ora_*xxx*:consistent)" screen after completed.
9. Select SAVE+EXIT in the "Settings of turnkey wizard "WIZSTANDBY"" screen.
10. Select RETURN in the "Application selection menu" screen.
11. Execute Configuration-Generate and Configuration-Activate in the "Main configuration menu" screen.
12. Select QUIT in the "Main configuration menu" screen and terminate RMS Wizard.

B.3.2 In a Group

This section explains how to delete an Oracle resource and a Listener resource in a group from an existing userApplication including them already.

Example

To delete an Oracle resource and a Listener resources in a group from an existing userApplication including them already in standby operation.

1. Stop RMS on all nodes.
2. Start up RMS Wizard by executing "hvw -n <Configuration Name>" command on any node.
3. Select Application-Edit in the "Main configuration menu" screen.

4. Select userApplication name (displayed in capital letters) including target resources in the "Application selection menu" screen.
5. Select Oracle(Ora_*xxx*) to be deleted in the "Settings of turnkey wizard "WIZSTANDBY"" screen.
6. Select REMOVE+EXIT in the "Oracle (Ora_*xxx*:consistent)" screen, and reply "yes" for the reply message.
7. Select SAVE+EXIT in the "Settings of turnkey wizard "WIZSTANDBY"" screen.
8. Select RETURN in the "Application selection menu" screen.
9. Execute Configuration-Generate and Configuration-Activate in the "Main configuration menu" screen.
10. Select QUIT in the "Main configuration menu" screen and terminate RMS Wizard.

Appendix C Oracle Grid Infrastructure Installation and Oracle ASM instance, Oracle Database Creation

This section describes how to install Oracle Grid Infrastructure and Oracle Database when you use Oracle ASM of Oracle Database 11g R2/12c R1.

Point

When Oracle ASM of Oracle Database 11g R2/12c R1 is used in standby operation, it is necessary to install Oracle Grid Infrastructure.

Note

- In order to use Oracle ASM of Oracle Database 11g R2/12c R1, it is necessary to install Oracle Grid Infrastructure. When installing Oracle Grid Infrastructure, the composition which separates the installation user of Oracle Database and the installation user of Oracle Grid Infrastructure is supported. The composition which creating one user is not supported.
  A different directory must be assigned respectively for an ORACLE_BASE of the installation user of Oracle Database and an ORACLE_BASE of the installation user of Oracle Grid Infrastructure.
- When using Oracle ASM of Oracle Database 11g R2/12c R1 in standby node, database services are not available.

Install Oracle Grid Infrastructure and Oracle Database on the local disk of each node.

The Oracle ASM instance and database are only created on the operating node. The standby node will only set the Oracle ASM instance and the database made by the operation node.

The table below shows the procedure for settings of Oracle Grid Infrastructure and Oracle Database.

No	Overview	
	Operating node	Standby node
1	Set up the kernel parameter	Set up the kernel parameter
2	Create Grid user, Oracle user	Create Grid user, Oracle user
3	Set up shared disk units	
4	Create userApplication with No Oracle Resources	Create userApplication with No Oracle Resources
5	userApplication startup	
6	Install Oracle Grid Infrastructure	
7	Install Oracle Database	
8	Create Oracle Database	
9	Change IP address of the Oracle listener	
10	Check SPFILE of Oracle ASM	
11	Check parameter file of the database	
12	Stop Oracle Database, Oracle ASM, Oracle listener	
13		userApplication switch
14		Install Oracle Grid Infrastructure
15		Install Oracle Database

No	Overview	
	Operating node	Standby node
16	Copy directory of Oracle	Copy directory of Oracle
17		Restart the Oracle listener
18		Change SPFILE of Oracle ASM
19		Stop temporary diskgroup
20		Restart the Oracle ASM
21		Delete temporary diskgroup
22		Register Oracle Database resource
23		Start Oracle Database resource
24		Stop Oracle Database, Oracle ASM, Oracle listener

For details of each step as follows.

1. Set up the kernel parameter
   Set up values in the /etc/sysctl.conf file for Oracle database in addition to the values for PRIMECLUSTER.
   The kernel parameter values vary depending on the implemented Oracle Database versions.
   Refer to the Oracle Database installation guide. The parameter values should be the same on all the nodes.

   For semopm, specify a value of 4 or more.

2. Create Grid user, Oracle user

   Create separate users, Grid user and Oracle user. Grid user is for installation of Oracle Grid Infrastructure and Oracle user is for Oracle Database.
   Set a different directory for an ORACLE_BASE of the installation user of Oracle Database and an ORACLE_BASE of the installation user of Oracle Grid Infrastructure, respectively.
   Set ORACLE_HOME of Oracle Grid Infrastructure to Grid user's ORACLE_HOME environment variable.
   Set ORACLE_HOME of Oracle Database to Oracle user's ORACLE_HOME environment variable.
   Set ORACLE_SID of Oracle Grid Infrastructure to Grid user's ORACLE_SID environment variable.
   Set ORACLE_SID of Oracle Database to Oracle user's ORACLE_SID environment variable.The user ID, the group ID and environment variable must be the same on all nodes.

Example

The example of setting Oracle user's environment variable.
(.bash_profile)

```
ORACLE_BASE=/u01/app/oracle;  export ORACLE_BASE
ORACLE_HOME=/u01/app/oracle/product/db;  export ORACLE_HOME
ORACLE_SID=ora;  export ORACLE_SID
LD_LIBRARY_PATH=$ORACLE_HOME/lib; export LD_LIBRARY_PATH
PATH=$ORACLE_HOME/bin:/usr/bin:/bin:/usr/bin/X11/:/usr/local/bin;  export PATH
```

Example

The example of setting Grid user's environment variable.

(.bash_profile)

```
ORACLE_BASE=/u01/app/grid;  export ORACLE_BASE
ORACLE_HOME=/u01/app/grid/product/db;  export ORACLE_HOME
```

```
ORACLE_SID=+ASM;  export ORACLE_SID
PATH=$ORACLE_HOME/bin:/usr/bin:/bin:/usr/bin/X11/:/usr/local/bin;  export PATH
```

3. Set up shared disk units

   Set shared disk units that are managed by Oracle ASM. At this time, create at least more than two volumes (devices) on share disk. These volumes are used for storing database or making temporary diskgroup on the step 14. Set the Grid user to the owner of the device files of the shared disk.

4. Create userApplication with No Oracle Resources

   Create userApplication that does not include Oracle resources before installing Oracle Grid Infrastructure.
   For information on how to create the userApplication, see following.

   - 2.2.3 userApplication Configuration
   - 2.2.4 userApplication Creation (without Oracle Resources))
   - 2.2.5 userApplication Operation Check

5. userApplication startup on operation node

   Start userApplication on operation node, and verify the shared disk units and the takeover IP address are enabled.

6. Install Oracle Grid Infrastructure on operation node

   Install Oracle Grid Infrastructure to the local disks on operation node with Grid user according to the Oracle Database manuals and the installation guide.

   - Oracle Database 11g R2
     Select the "Configure Oracle Grid Infrastructure for a Standalone Server" option to install and create the Oracle ASM instance and the diskgroup which stores the database.
   - Oracle Database 12c R1
     Select the "Install and Configure Oracle Grid Infrastructure for a Standalone Server" option to install and create the Oracle ASM instance and the disk group which stores the database.

   The Oracle ASM instance name must begin with "+". The default name is "+ASM".

7. Install Oracle Database on operation node

   Install Oracle Database to the local disks on operation node with Oracle user by referring to the Oracle Database manual and installation guide. Install only Oracle Database software, and do not create the database in this step.

8. Create Oracle Database on operation node

   On operation node, create Oracle Database on diskgroup made at step 6.

9. Change IP address of the Oracle listener

   If you use Oracle listener switching operation using a logical IP address, specify the logical IP address for the IP address of the Oracle listener.

   - <Grid user's $ORACLE_HOME>/network/admin/listener.ora

     If the Oracle listener is monitored through tnsping, set up the following file.

   - <Oracle user's $ORACLE_HOME>/network/admin/tnsnames.ora
   - <Grid user's $ORACLE_HOME>/network/admin/tnsnames.ora

   For information on how to modify, see "2.2.6 Oracle Database Creation and Setting".

10. Check SPFILE of Oracle ASM

    Execute the following command as a Grid user on operation node and record the location of the Oracle ASM SPFILE.

```
# su - <Grid user>
$ export ORACLE_SID=+ASM
$ asmcmd spget
+DATA/asm/asmparameterfile/registry.xxx  <-- record this line
```

11. Check parameter file of the database

    Execute the following command as a Grid user on operation node and record the location of the SPFILE.

```
# su - <Grid user>
$ crsctl status resource <Oracle Database resource name> -p | grep SPFILE
SPFILE=+DATA/xxxx/spfilexxxx.ora  <-- record after "SPFILE =" of this line
```

Example

You can confirm <Oracle Database resource name> using "crsctl status resource -t" command.

```
# su - <Grid user>
$ crsctl status resource -t
--------------------------------------------------------------------------------
NAME           TARGET  STATE        SERVER                   STATE_DETAILS
--------------------------------------------------------------------------------
Local Resources
--------------------------------------------------------------------------------
ora.DATA.dg
               ONLINE  ONLINE       node1
ora.LISTENER.lsnr
               ONLINE  ONLINE       node1
ora.asm
               ONLINE  ONLINE       node1                    Started
ora.ons
               OFFLINE OFFLINE      node1
--------------------------------------------------------------------------------
Cluster Resources
--------------------------------------------------------------------------------
ora.orcl.db
      1        ONLINE  ONLINE       node1                    Open
ora.cssd
      1        ONLINE  ONLINE       node1
ora.diskmon
      1        OFFLINE OFFLINE
ora.evmd
      1        ONLINE  ONLINE       node1
$
```

In the above configuration, <Oracle Database resource name> is "ora.racdb.db".

12. Stop Oracle Database, Oracle ASM, Oracle listener

    Execute the following command as a Grid user on operation node to stop Oracle instance, Oracle ASM, Oracle listener. Specify the database name made at step 8 for <db_name>. Specify the Diskgroup made at step 6 for <diskgroup_name>.

```
# su - <Grid user>
$ srvctl stop database -d <db_name>
$ srvctl stop diskgroup -g <diskgroup_name>
$ srvctl stop asm
$ srvctl stop listener
```

13. userApplication switch

    Switch userApplication to the standby node, and verify the shared disk units and the takeover IP address are enabled.

14. Install Oracle Grid Infrastructure on standby node

    Install Oracle Database to the local disks on standby node with Grid user according to the Oracle Database manuals and the installation guide.

- Oracle Database 11g R2
  Select the "Configure Oracle Grid Infrastructure for a Standalone Server" option to unstall and create Oracle ASM instance and the temporary diskgroup.

- Oracle Database 12c R1
  Select the "Install and Configure Oracle Grid Infrastructure for a Standalone Server" option to install and create Oracle ASM instance and the temporary diskgroup.

Specify the Oracle ASM instance name. The Oracle ASM instance name must be same made at step 6.

Specify the temporary diskgroup name. The temporary diskgroup name must be different name made at step 6.

15. Install Oracle Database on standby node

    Install Oracle Database to the local disks on standby node with Oracle user by referring to the Oracle Database manual and installation guide. Install only Oracle Database software, and do not create the database in this step.

16. Copy directory of Oracle database

    Copy the following directories of the operation node to the standby node.

    - Under <Oracle user's $ORACLE_HOME>/dbs
    - Under <$ORACLE_BASE>/admin/$ORACLE_SID
    - Under <$ORACLE_BASE>/diag
    - Under <Grid user's $ORACLE_HOME>/network/admin

    The access privilege to the directories and files must be also the same as that on the operating node.

Information

The required files on the operating node can be backed up in the tar format with the "cloracpy" command. See "4.4 cloracpy - Create Backup File for Oracle Database Setup".

If you use the "cloracpy" command, you must execute respectively by the Oracle user and the Grid user.

17. Restart the Oracle listener

    Execute the following command as a Grid user on standby node and verify that the Oracle listener restarts.

```
# su - <Grid user>
$ srvctl stop listener
$ srvctl start listener
```

18. Change SPFILE of Oracle ASM

    Set the location of the Oracle ASM SPFILE recorded at step 10.

    - Oracle Database 11g R2
      Execute the following command as a Grid user on standby node.

```
# su - <Grid user>
$ export ORACLE_SID=<ASM SID>
$ asmcmd spset <SPFILE PATH>
```

    - Oracle Database 12c R1
      Execute the following command as a Grid user on standby node.
      Specify the diskgroup made at step 6 for <diskgroup_name>.

```
# su - <Grid user>
$ export ORACLE_SID=<ASM SID>
$ sqlplus / as sysasm
SQL> alter diskgroup <diskgroup_name> mount;
SQL> exit
$ asmcmd spset <SPFILE PATH>
```

```
# su - <Grid user>
$ srvctl stop diskgroup -g <diskgroup_name>
```

19. Stop temporary diskgroup

    Execute the following command as a Grid user on standby node to stop temporary diskgroup.

    Specify the temporary diskgroup name made at step 14 for <diskgroup_name>.

```
# su - <Grid user>
$ srvctl stop diskgroup -g <diskgroup_name>
```

20. Restart the Oracle ASM

    Execute the following command as a Grid user on standby node to restart the Oracle ASM.

```
# su - <Grid user>
$ srvctl stop asm
$ srvctl start asm
```

21. Delete temporary diskgroup

    Execute the following command as a Grid user on standby node to delete temporary diskgroup.
    Specify the temporary diskgroup name made at step 14 for <diskgroup_name>.

```
# su - <Grid user>
$ srvctl remove diskgroup -g <diskgroup_name>
```

22. Register Oracle Database resource

    Execute the following command as an Oracle user on standby node to register database resource made at step 8 to Oracle Restart of the standby node.

    Specify the database name made at step 8 for <db_unique_name>, <db_name>.

    Specify the Oracle user's ORACLE_HOME for <oracle_home>.

    Specify the SPFILE recorded at step 11 for <SPFILE PATH>

    Specify the Diskgroup made at step 6 for <disk_group_list>.

```
# su - <Oracle user>
$ srvctl add database -d <db_unique_name> -o <oracle_home> -p <SPFILE PATH> -n <db_name> -a
<disk_group_list>
```

23. Start Oracle Database resource on standby node

    Execute the following command as a Grid user on standby node and verify the Oracle Database can be started. Specify the database name made at step 8 for <db_name>.

```
# su - <Grid user>
$ srvctl start database -d <db_name>
```

24. Stop Oracle Database, Oracle ASM, Oracle listener

    Execute the following command as a Grid user on standby node to stop Oracle Database, Oracle ASM and Oracle listener. Specify the database name made at step 8 for <db_name>. Specify the Diskgroup made at step 6 for <diskgroup_name>.

```
# su - <Grid user>
$ srvctl stop database -d <db_name>
$ srvctl stop diskgroup -g <diskgroup_name>
$ srvctl stop asm
$ srvctl stop listener
```

After the installation of Oracle Grid Infrastructure and Oracle Database is completed, change Oracle Restart Settings and create userApplication. For details, see "2.3.2.2 Environment configuration with Oracle Database 11g R2/12c R1".

Appendix D Using Oracle Database software on shared disks

This section describes how to build a cluster application when Oracle Database software is installed on shared disks.

The table below shows the procedure for settings of Oracle Database.

No	Overview	
	Operating node	Standby node
1	Install PRIMECLUSTER and PRIMECLUSTER Wizard for Oracle	Install PRIMECLUSTER and PRIMECLUSTER Wizard for Oracle.
2	Create userApplication with No Oracle Resources	
3	Set up the kernel parameter	Set up the kernel parameter
4	Create Oracle user	Create Oracle user
5	userApplication startup	
6	Set up shared disk units	
7	Set up Oracle Inventory	
8	Set up environment variables	
9	Install Oracle Database	
10	Create Oracle listener	
11	Create Oracle Database	
12	Check Operation of Oracle Database and listener	
13	Set up PRIMECLUSTER Wizard for Oracle	
14	Create userApplication with Oracle Resources	
15	Check Operation of userApplication	

For details of each step as follows.

1. Install PRIMECLUSTER and PRIMECLUSTER Wizard for Oracle

   Install PRIMECLUSTER and PRIMECLUSTER Wizard for Oracle.

   For information on how to install them, see following.

   - 2.2.1 PRIMECLUSTER Installation and Configuration

2. Create userApplication with No Oracle Resources

   Create userApplication that does not include Oracle resources.

   For information on how to create it, see following.

   - 2.2.3 userApplication Configuration
   - 2.2.4 userApplication Creation (without Oracle Resources))
   - 2.2.5 userApplication Operation Check

3. Set up the Kernel parameter

   For information on how to set up Kernel parameter, see following.

   - 2.2.2 Oracle Database Software Installation and Configuration

4. Create Oracle user

   For information on how to create Oracle user, see following.

   - 2.2.2 Oracle Database Software Installation and Configuration

Note

Set the path names (on shared disk) of the Oracle base directory and the Oracle home directory in Oracle user's login profile.

5. userApplication startup

   Start up userApplication on operation node, and verify the shared disk units and the takeover IP address are enabled.

6. Set up shared disk units

   Set the write permission for Oracle user to the shared disk.

7. Set up Oracle Inventory

   Create Oracle Inventory directory in ORACLE_HOME on the shared disk.

```
$ mkdir -p $ORACLE_BASE/product/11.2.0/db_1/oraInventory
```

   Create oraInst.loc on the shared disk.

```
$ cat $ORACLE_BASE/etc/oraInst.loc
inventory_loc=$ORACLE_BASE/product/11.2.0/db_1/oraInventory
inst_group=oinstall
```

8. Set up environment variables

   Set up environment variables before Oracle Universal Installer(OUI) starts.

```
$ unset TZ PERL
$ export ORACLE_HOSTNAME=<logical IP address>
```

9. Install Oracle Database

   Install Oracle Database by Oracle Universal Installer(OUI).

```
$ runInstaller -invPtrLoc $ORACLE_BASE/etc/oraInst.loc ORACLE_HOSTNAME=<logical IP address > [-
debug]
```

   Specify the full path of the oraInst.loc made at step 7 for the argument "$ORACLE_BASE/etc/oraInst.loc" of "-invPtrLoc".

   Specify logical IP address for "ORACLE_HOSTNAME".

   The "-debug" is optional.

   Proceed with the installation by following the OUI prompt.

   - Oracle Database 11g R2

     In "Select Installation Option " screen, select the "Install database software only".

   - Oracle Database 11g R1

     In "Select Installation Method " screen, uncheck " Create Starter Database".

10. Create Oracle listener

    Create listener and set up Net Service Name by Network Configuration Assistant (netca). Specify the logical IP address for the IP address of the listener. Start up the listener.
    The files are allocated as follows:

Files	Locations	Note
listener.ora	Share	-
tnsnames.ora	Share	-
<LISTENER>.log	Share	-

11. Create Oracle Database

Create the database by Database Configuration Assistant (DBCA).

- Allocate a database
  Create a database on the shared disk. The shared disk must be activated.
  The files are allocated as follows:

Files		Locations	Note
Initialization parameter file (PFILE)		Share	-
Server parameter file (SPFILE)		Share	-
Password file		Share	-
Control files		Share	-
Data files		Share	-
Redo log files		Share	-
Archived redo log files		Arbitrary	Recommend to be multiplexed, allocating on a shared disk and a local disk.
Flash Recovery Area		Share	-
log files	AUDIT_FILE_DEST	Share	-
	BACKGROUND_DUMP_DEST	Share	
	CORE_DUMP_DEST	Share	
	USER_DUMP_DEST	Share	
	DIAGNOSTIC_DEST	Share	

Note

Note that there is sufficient space to archive for archived redo log files if they are located on shared disks. If there is insufficient space, and data updating processing through monitoring SQL hangs, an oracle resource might fail. Afterwards, the service might stop finally on both operating node and standby node, because the space of shared disk is insufficient and the failover of userApplication fails on the standby node.

Information

Check if the Oracle user has privileges to write in a shared disk before creating the database.

- Create a database (In the case that the Oracle Database software is located on shared disk)
  - Operation node
    Create a database on the operating node.

Note

If multiple Oracle homes are configured on one server, a different Oracle instance name must be assigned for each Oracle home.

Information

Refer to the Oracle Database manual.

- Standby node
  There is no procedure on the standby node.

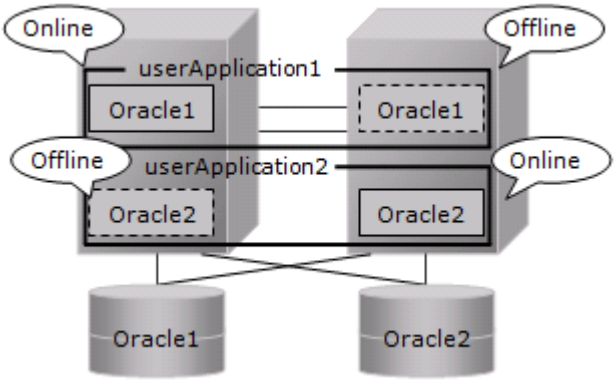
Note

Do not use "cloracopy" command in PRIMECLUSTER Wizard for Oracle if Oracle Database software is located on the shared disk.

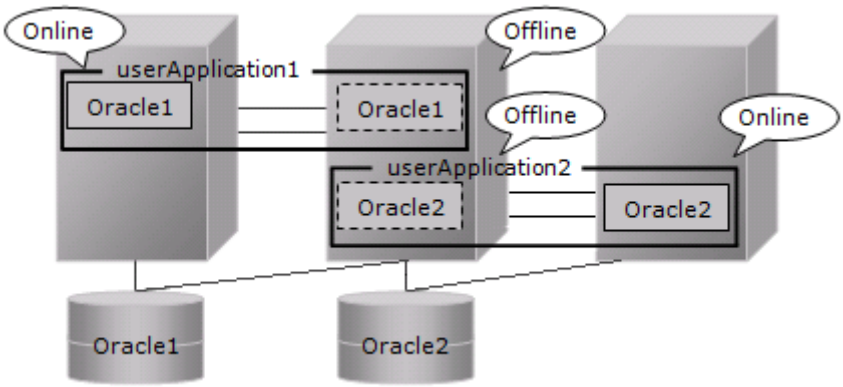
Example

In the case of Mutual standby operation and N:1 Standby operation, create a database on an operating node as well as 1:1 Standby operation. There is no procedure on the standby node. This is the same as the other operation modes.

- Mutual standby



- 2:1 Standby



12. Check Operation of Oracle Database and listener

    Check operation of Oracle Database and listener of each node.

1. Start up RMS on all nodes if RMS does not start.

```
# /opt/SMAW/SMAWRrms/bin/hvcm -a
```

Stop Oracle Database and listener on operation node.

```
# su - ora11gr1
$ sqlplus / as sysdba
SQL> shutdown immediate
SQL> exit
$ lsnrctl stop LISTENER
$ exit
#
```

2. Switch userApplication to the standby node.

```
# /opt/SMAW/SMAWRrms/bin/hvswitch <userApplication> node2RMS
```

3. Start up listener and Oracle Database on the standby node.

```
# su - ora11gr1
$ lsnrctl start LISTENER
$ sqlplus / as sysdba
SQL> startup
SQL> exit
$ exit
#
```

4. Execute step 2 and step 3 on all standby nodes.
5. Stop Oracle Database and listener.
6. Stop RMS on all nodes.

Note

- The Oracle “TWO_TASK” environment variable must not be used. It is used to add a connect identifier to connect to Oracle instance then automatically connect to network. In PRIMECLUSTER Wizard for Oracle, network connection is not supported. Users are supposed to connect to Oracle instance in local connection (“ / as sysdba”). If network connection is required, specify “@connect identifier” instead of using the “TWO_TASK” environment variable when connecting at the connecting.
- The processes other than definition of system environment variables must not be added to login.sql of Oracle DBA users. SQL can be described in the SQL*Plus profile login.sql. However, it might automatically be executed and affect ongoing operations because Oracle instance is controlled through SQL*Plus in PRIMECLUSTER Wizard for Oracle. It is available to setup the system environment variables to login.sql by SET command.

13. Set up PRIMECLUSTER Wizard for Oracle

Register the Oracle SYSTEM user password by "clorapass" command. See following.

- 4.3 clorapass - Register Password for Monitoring

Define the full path of the alert log and the listener log in /opt/FJSVclora/etc/clgetoralog.conf. See following.

- 4.5 clgetoralog - Collect Troubleshooting Information

14. Create userApplication with Oracle Resources

For information on how to create userApplication with Oracle Resources, see following.

- 2.2.7 userApplication Edit

15. Check operation of userApplication

For information on how to check operation of userApplication, see following.

- 2.2.8 userApplication Operation Check

Appendix E Single-Node Cluster Operation

This section explains construction procedures and maintenance procedures in the case of using PRIMECLUSTER Wizard for Oracle with Single-node cluster operation.

Configuration Procedure

Configuration procedures depend on whether Oracle ASM is used and the version of Oracle ASM. Configure it by the following procedures according to your environment.

- Oracle ASM not used

No	Procedure
1	Install and configure PRIMECLUSTER
2	Install PRIMECLUSTER Wizard for Oracle
3	Install and configure Oracle Database software
4	Create userApplication with No Oracle resources
5	Create and set up an Oracle Database
6	Edit userApplication
7	Check Operation of userApplication

For details, see "E.1 Oracle ASM not used".

- Oracle ASM of Oracle Database 11g R1 used

No	Procedure
1	Install and configure PRIMECLUSTER
2	Install PRIMECLUSTER Wizard for Oracle
3	Install and configure Oracle Database software
4	Create userApplication with No Oracle resources
5	Create and set up an Oracle Database
6	Edit userApplication
7	Check Operation of userApplication

For details, see "E.2 Oracle ASM of Oracle Database 11g R1 used".

- Oracle ASM of Oracle Database 11g R2/12c R1 used

No	Procedure
1	Install and configure PRIMECLUSTER
2	Install PRIMECLUSTER Wizard for Oracle
3	Set up the kernel parameter
4	Create Grid user, Oracle user
5	Set up shared disk units
6	Create userApplication with No Oracle resources
7	Start userApplication
8	Install Oracle Grid Infrastructure software
9	Install Oracle Database software
10	Create and set up an Oracle Database

No	Procedure
11	Edit userApplication
12	Check Operation of userApplication

For details, see "E.3 Oracle ASM of Oracle database 11g R2/12c R1 used".

Note

- In order to use Oracle ASM of Oracle Database 11g R2/12c R1, it is necessary to install Oracle Grid Infrastructure. When installing Oracle Grid Infrastructure, the composition which separates the installation user of Oracle Database and the installation user of Oracle Grid Infrastructure is supported. The composition which creating one user is not supported.
- In order to use Oracle ASM of Oracle Database 11g R2/12c R1, a different directory must be assigned respectively for an ORACLE_BASE of the installation user of Oracle Database and an ORACLE_BASE of the installation user of Oracle Grid Infrastructure.
- When using Oracle ASM of Oracle Database 11g R2/12c R1 in single-node cluster operation, database services are not available.

Maintenance Procedures

For maintenance procedures for single-node cluster operation, see "Chapter 3 Operation".

E.1 Oracle ASM not used

1. Install and configure PRIMECLUSTER
   Install and configure PRIMECLUSTER according to Software Release Guides and manuals of PRIMECLUSTER.
2. Install PRIMECLUSTER Wizard for Oracle
   Install PRIMECLUSTER Wizard for Oracle according to a Software Release Guide of PRIMECLUSTER Wizard for Oracle.
3. Install and configure Oracle Database software
   Set up the kernel parameter, create Oracle user and install Oracle Database software. See "2.2.2 Oracle Database Software Installation and Configuration".
4. Create userApplication with No Oracle resources
   Create userApplication with No Oracle resources and check the operation of userApplication. See the following:
   - 2.2.4 userApplication Creation (without Oracle Resources)
   - 2.2.5 userApplication Operation Check

   In single-node cluster operation, the settings for userApplication are as follows. For the attribute of the others, see the PRIMECLUTSER manuals.

Attributes	Values
AutoSwitchOver	Do not set the values.
PersistentFault	1
HaltFlag	no
ShutdownPriority	Do not set the values.
OnlinePriority	Do not set the values.

5. Create and set up an Oracle Database
   - In single-node cluster operation, create and set up an Oracle Database
     Create Oracle database and Oracle listener according to the Oracle Database manuals.
   - SYSTEM user password
     Register the Oracle SYSTEM user password. See "4.3 clorapass - Register Password for Monitoring".

- Define the full path of the log file
  Define the full path of the alert log and the listener log. See "4.5 clgetoralog - Collect Troubleshooting Information".

- Check Oracle database operation
  Check if the Oracle database operation is properly running by executing start and stop of Oracle instances and Oracle listeners manually.

6. Edit userApplication
   Register Oracle instance resources and Oracle listener resources to userApplication that is created at the step 4. See "2.2.7 userApplication Edit".
   The setting of AutoRecover Flag is recommended for Oracle instance resources and Oracle listener resources. The availability is increased by restarting Oracle instance resources and Oracle listener resources automatically when an error is detected.

Attributes	Values
Flags	AutoRecover (A)

7. Check Operation of userApplication
   Check the operation of userApplication including Oracle resources. See "2.2.8 userApplication Operation Check".

E.2 Oracle ASM of Oracle Database 11g R1 used

1. Install and configure PRIMECLUSTER
   Install and configure PRIMECLUSTER according to Software Release Guides and manuals of PRIMECLUSTER.

2. Install PRIMECLUSTER Wizard for Oracle
   Install PRIMECLUSTER Wizard for Oracle according to a Software Release Guide of PRIMECLUSTER Wizard for Oracle.

3. Install and configure Oracle Database software
   Set up the kernel parameter, create Oracle user and install Oracle Database software. See "2.2.2 Oracle Database Software Installation and Configuration".

4. Create userApplication with No Oracle resources
   Create userApplication with No Oracle resources and check the operation of userApplication. See the following:

   - 2.2.4 userApplication Creation (without Oracle Resources)

   - 2.2.5 userApplication Operation Check

   In single-node cluster operation, the settings for userApplication are as follows. For the attribute of the others, see the PRIMECLUTSER manuals.

Attributes	Values
AutoSwitchOver	Do not set the values.
PersistentFault	1
HaltFlag	no
ShutdownPriority	Do not set the values.
OnlinePriority	Do not set the values.

5. Create and set up an Oracle Database

   - In single-node cluster operation, create and set up an Oracle Database
     Create Oracle database and Oracle listener according to the Oracle Database manuals.

   - SYSTEM user password
     Register the Oracle SYSTEM user password. See "4.3 clorapass - Register Password for Monitoring".

   - Define the full path of the log file
     Define the full path of the alert log and the listener log. See "4.5 clgetoralog - Collect Troubleshooting Information".

- Check Oracle database operation
  Check if the Oracle database operation is properly running by executing start and stop of Oracle instances and Oracle listeners manually.

6. Edit userApplication
   Register Oracle instance resources, the Oracle ASM resource and Oracle listener resources to userApplication that is created at the step 4. See "2.3.2.1 Environment configuration with Oracle Database 11g R1".
   The setting of AutoRecover Flag is recommended for Oracle instance resources and Oracle listener resources. The availability is increased by restarting Oracle instance resources and Oracle listener resources automatically when an error is detected.

Attributes	Values
Flags	AutoRecover (A)

7. Check Operation of userApplication
   Check the operation of userApplication including Oracle resources. See "2.2.8 userApplication Operation Check".

E.3 Oracle ASM of Oracle database 11g R2/12c R1 used

1. Install and configure PRIMECLUSTER
   Install and configure PRIMECLUSTER according to Software Release Guides and manuals of PRIMECLUSTER.

2. Install PRIMECLUSTER Wizard for Oracle
   Install PRIMECLUSTER Wizard for Oracle according to a Software Release Guide of PRIMECLUSTER Wizard for Oracle.

3. Set up the kernel parameter
   Set up the kernel parameter. See the step 1 of "Appendix C Oracle Grid Infrastructure Installation and Oracle ASM instance, Oracle Database Creation".

4. Create Grid user, Oracle user
   Create and set up the Oracle user and Grid user. See the step 2 of "Appendix C Oracle Grid Infrastructure Installation and Oracle ASM instance, Oracle Database Creation".

5. Set up shared disk units
   Set shared disk units that are managed by Oracle ASM. Set the Grid user to the owner of the device files of the shared disk.

6. Create userApplication with No Oracle resources
   Create userApplication with No Oracle resources and check the operation of userApplication. See the following:

   - 2.2.4 userApplication Creation (without Oracle Resources)
   - 2.2.5 userApplication Operation Check

   In single-node cluster operation, the settings for userApplication are as follows. For the attribute of the others, see the PRIMECLUTSER manuals.

Attributes	Values
AutoSwitchOver	Do not set the values.
PersistentFault	1
HaltFlag	no
ShutdownPriority	Do not set the values.
OnlinePriority	Do not set the values.

7. Start userApplication
   Start userApplication on operation node, and verify the shared disk units and the takeover IP address are enabled.

8. Install Oracle Grid Infrastructure software
   It is necessary to install Oracle Grid Infrastructure software and Oracle Database software.
   Install Oracle Grid Infrastructure software. See the step 6 of "Appendix C Oracle Grid Infrastructure Installation and Oracle ASM instance, Oracle Database Creation".

9. Install Oracle Database software
   Install Oracle Database software. See the step 7 of "Appendix C Oracle Grid Infrastructure Installation and Oracle ASM instance, Oracle Database Creation".

10. Create and set up an Oracle Database

    - In single-node cluster operation, create and set up an Oracle Database
      Create Oracle database and Oracle listener according to the Oracle Database manuals.

    - SYSTEM user password
      Register the Oracle SYSTEM user password. See "4.3 clorapass - Register Password for Monitoring".

    - Define the full path of the log file
      Define the full path of the alert log and the listener log. See "4.5 clgetoralog - Collect Troubleshooting Information".

    - Check Oracle database operation
      Check if the Oracle database operation is properly running by executing start and stop of Oracle instances and Oracle listeners manually.

11. Edit userApplication
    Register Oracle instance resources, the Oracle ASM resource and Oracle listener resources to userApplication that is created at the step 3. See "2.3.2.2 Environment configuration with Oracle Database 11g R2/12c R1".
    The setting of AutoRecover Flag is recommended for Oracle instance resources and Oracle listener resources. The availability is increased by restarting Oracle instance resources and Oracle listener resources automatically when an error is detected.

Attributes	Values
Flags	AutoRecover (A)

12. Check Operation of userApplication
    Check the operation of userApplication including Oracle resources. See "2.2.8 userApplication Operation Check".

Appendix F (Information) Action Definition File

The Oracle instance-monitoring detector of RIMECLUSTER Wizard for Oracle determines in accordance with the Action Definition File what corrective action should be taken from the error code. The Action Definition File provides Oracle instance error numbers, corrective actions, and error descriptions.

Action Definition File name and path

```
/opt/FJSVclora/etc/FJSVclorafm.actionlist
```

File format

```
errno/Status/Action/Message
  18    Cn   Wa "maximum number of sessions exceeded"
  20    Cn   Wa "maximum number of processes (%s) exceeded"
 470    All  Of "LGWR process terminated with error"
 471    All  Of "DBWR process terminated with error"
 472    All  Of "PMON process terminated with error"
 942    Ol   Np "table or view does not exist"
1012    All  Rs "not logged on"
1034    All  Of "ORACLE not available"
```

- errno

  Indicates the Oracle error number (ORA-*xxxxx*).

- Status

  Indicates the processing state of the detector which monitors Oracle instances.

  - Cn : When connecting to an Oracle instance.
  - Ol : Under connection with an Oracle instance.
  - Dc : When disconnecting to an Oracle instance.
  - All : Any status of above.

- Action

  Indicates the action how the detector handles Oracle instance error.

  - Np : Ignores any detected Oracle instance errors and continues to monitor. Notifies the state which is the same as previous time.
  - Of : Notifies Offline and stops monitoring.
  - Wa : Notifies Warning and continues to monitor.
  - Rs : Restarts detector.
  - Fa : Notifies Faulted and stops monitoring.

- Message

  Message indicates text of the error code.

Note

- The Oracle instance errors(ORA-*xxxxx*) that are not defined in the Action Definition File will be handled as Np.

- In the cases such as the following, Oracle instance errors will be handled as an action which is different from the action defined in the Action Definition File.
  - When the Oracle instance errors (ORA-*xxxxx*) are detected during DELETE processing in the SQL table monitoring, the errors will be handled as follows. It prevents to remain the abnormal state when SQL commands cannot be continued.
    - The Oracle instance errors(ORA-*xxxxx*) that are defined as Np or are not defined in the Action Definition File will be handled as Rs.
    - The Oracle instance errors(ORA-*xxxxx*) that are defined as Wa will be handled as Rs after notifying of Warning.
  - When the Oracle instance errors (ORA-*xxxxx*) are detected during connecting to the Oracle instance, the errors that are defined as Np or are not defined will be handled as Of.
    The following situation corresponds.
    When Oracle database archive files are full, the monitoring timeout occurs and the Oracle instance error, ORA-00257 (archiver error. Connect internal only, until freed.), is detected during connecting to the Oracle instance.
  - When ORA-01012, ORA-03113 or ORA-03135 are detected except when connecting to the Oracle instance, the errors will be handled as Rs.