PRIMECLUSTER Wizard for Oracle Configuration and Administration Guide 4.2

Linux for Itanium

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 system.

Outline

The document consists of the following 6 chapters and 4 appendixes:

Chapter 1 Feature
Chapter 2 Environment setup
Chapter 3 Operation
Chapter 4 Command
Chapter 5 Notice
Chapter 6 Message
Appendix A
Appendix B
Appendix C
Appendix D

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 products. For details, refer to the Oracle manuals.

Oracle instance:
Referred to as "instance", "Oracle instance", or "Oracle RAC instance" in this document
Oracle listener:
Referred to as "Listener", or "Oracle listener" in this document
Oracle Real Application Clusters:
Referred to as "RAC" or "Oracle RAC10g" in this document
Oracle Clusterware:
Referred to as "Oracle Clusterware" in this document
Oracle user:
Operating system user account belonging to OSDBA group to operate and manage Oracle systems.
Referred to "Oracle user" or "DBA user" in this document

Notational convention

The document conforms to the following notational conventions:

Describes points to be taken notice of.

 Describes information a user can refer to.

 Describes by using an example.

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Contents

Chapter 1   Feature

1.1　　Feature Outline

PRIMECLUSTER Wizard for Oracle is a software product that facilitates cluster operation management for Oracle operating on a PRIMECLUSTER system.
The scalable operation requires Oracle Real Application Clusters (RAC or Oracle RAC 10g).
The standby operation requires Oracle cold standby instances.

Module structure

The modules for operating Oracle on PRIMECLUSTER are as follows:

Environment setup Wizard	Environment setup tool to enable Oracle operation on PRIMECLUSTER
Detector	Module to monitor Oracle
Scripts	Control Oracle startup and stop
Setup/operation command	Commands used to set up and operate

Environment setup

The environment setup tool provides "ORACLE" Wizard that generates userApplication in the environment configuration by executing the "hvw" command of PRIMECLUSTER RMS Wizard.

Monitoring

A detector monitors Oracle instances and Oracle listeners.
The detector connects itself to Oracle as a system user to monitor the Oracle instance.　Then, it periodically creates, updates, and deletes a table, which is created in the system user's default table space by executing the SQL command so that it can monitor the process state of the Oracle instance as well as logical failures.　If the Oracle instance hangs and the SQL statements do not return within a specified time, it is notified as a time out error.
The two types of monitoring the Oracle listener are process detection and the "tnsping" command.
In operation with Oracle RAC 10g, a detector monitors Oracle instances and Oracle listeners.　If the Oracle instances and listeners fail, they will be recovered by Oracle Clusterware.

Startup and stop control

Along with the state transition of a cluster system, scripts automatically start or stop Oracle instances or Oracle listeners.　These scripts first check and then start up the Oracle instances. If damage occurs, the scripts automatically recover the Oracle instances.　For example, if the Oracle instance fails during online backup, the scripts automatically execute "end backup" to start up the Oracle instance (When the AutoRecover is set to "Yes".)　When stopping the Oracle instance, the scripts stop it in the immediate mode (default).　If this does not occur properly, the scripts will stop the instance in the abort mode.　This means operating node switchover can be performed at high-speed.
In operation with Oracle RAC 10g, start and stop of Oracle Clusterware are managed.

1.2   Operating Environment

Scalable operation
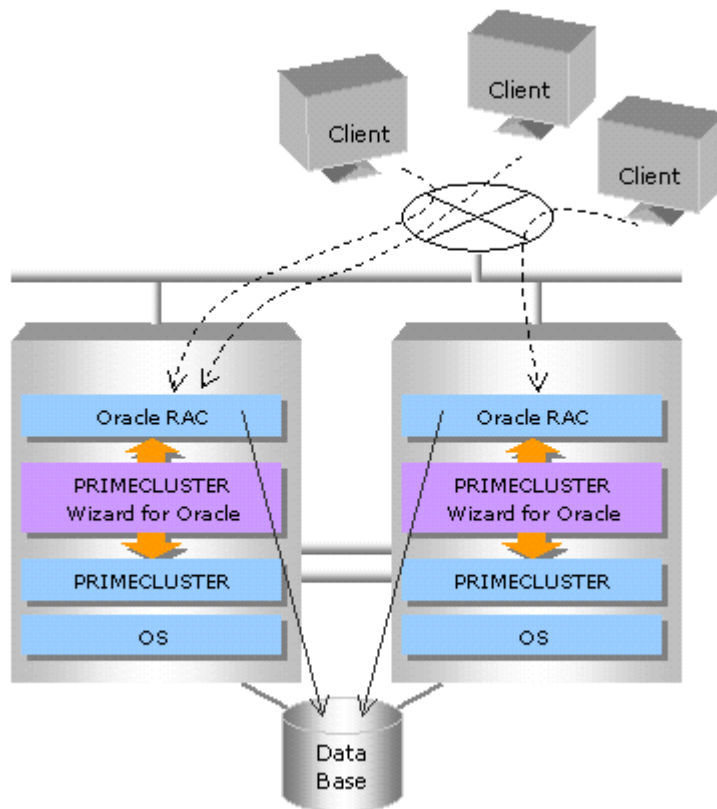
In scalable operation with RAC, Oracle is operated on all the nodes.   The clients can access to the database regardless of which node they are connected to.

Standby operation
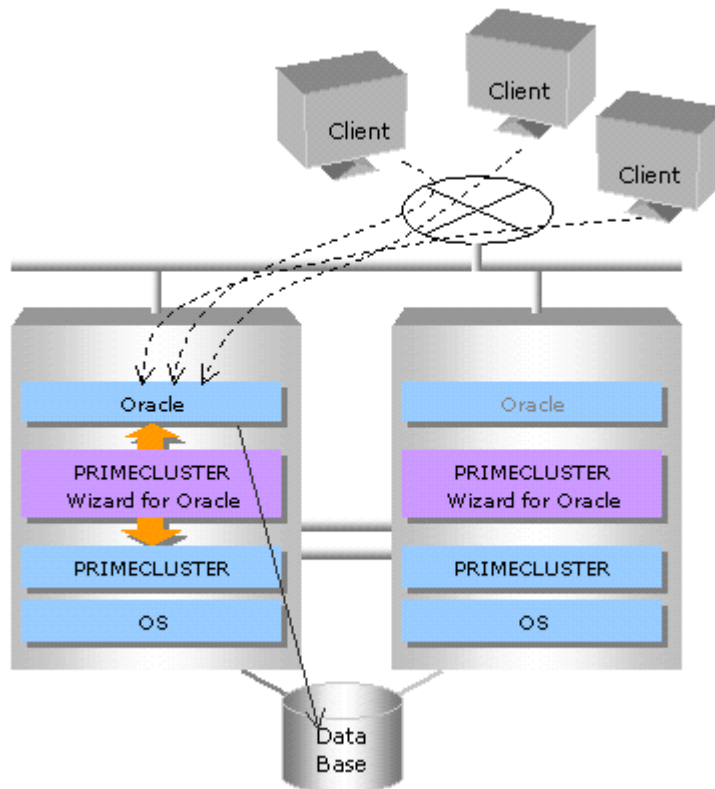
In standby operation, a cluster system consists of an operating node and standby nodes.　 On the operating node, the resources such as Oracle applications, a logical IP address and shared disks are active.　 On the standby node, these resources are inactive.　 In the event of a failure, userApplication 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.

Chapter 2   Environment Setup

2.1   Oracle Environment Setting

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

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 software	Install and configure Oracle 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".

Scalable operation (Oracle RAC 10g)

No	Procedure	
	One arbitrary node	Other nodes
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 software	Install and configure Oracle software (*Installation automatically done)
4	Create and set up an Oracle database	-
5	Create and set up Oracle resources	-

For details, refer to"2.3 Oracle RAC 10g Scalable Operation".

The setup procedure explained in section "2.2" and "2.3" assumes that the userApplication will be created newly.   In the case of upgrading from previous version, refer to "Installation Guide for PRIMECLUSTER Wizard for Oracle".

2.2   Standby Operation

This section descries how to configure an environment for standby operation.
For the configuration procedure for Oracle RAC 10g scalable operation, refer to"2.3 Oracle RAC 10g scalable 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 "PRIMECLUSTER Installation Guide".
Then, install Oracle Wizard following the instructions of the "PRIMECLUSTER Wizard for Oracle Installation Guide".

Standby operation requires the PRIMECLUSTER Enterprise Edition or PRIMECLUSTER HA Server

Set up cluster system

Configure a cluster system including network systems and shared disk units according to the PRIMECLUSTER manual.

2.2.2   Oracle Installation and Configuration

This section explains how to install and configure Oracle.

Initial setup

Set up the kernel parameter

Set up values in the "/etc/system" file for Oracle in addition to the values for PRIMECLUSTER.
The kernel parameter values vary depending on the implemented Oracle versions.
Refer to the Oracle 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.

Before installing Oracle, it is necessary to change the "/etc/sysctl.conf" file and reboot the node.
For semopm (the third value of "kernel.sem", specify a value of 4 or more.

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.)
```

/etc/services

Set up a port number for the Oracle listener.


```
listener    1521/tcp    oracle
```

Oracle User

Create a DBA (database administrator) to allow users to install and operate Oracle. The user ID and the group ID must be the same on all the nodes.


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

Normally, the group name should be "dba" and "oinstall".

Set up an environment variable of an Oracle user.

(.bash_profile)

```
ORACLE_BASE=/u01/app/oracle; export ORACLE_BASE
ORACLE_HOME=/u01/app/oracle/product/10.2.0; export ORACLE_HOME
ORACLE_SID=ora
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
```


- PRIMECLUSTER Wizard for Oracle controls Oracle as the Oracle DBA user. Be sure to include ORACLE_HOME/bin in the PATH environment variable of the DBA 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) It may cause failure of userApplicatoin startup or shutdown.

For further details, refer to the Oracle manual.

Installation

Standby operation

Install Oracle using Oracle user access privileges.   Install a program on the local disk of each node.   The database needs to be created on the shared disk when configuration of the cluster system is completed, not when Oracle is installed.   The details will be described later in this document.

Scalable operation

For information on how to install RAC, refer to the RAC Installation Guide.

For further details, refer to the Oracle manual.

2.2.3   userApplication Creation

Operating userApplication is configured as follows:

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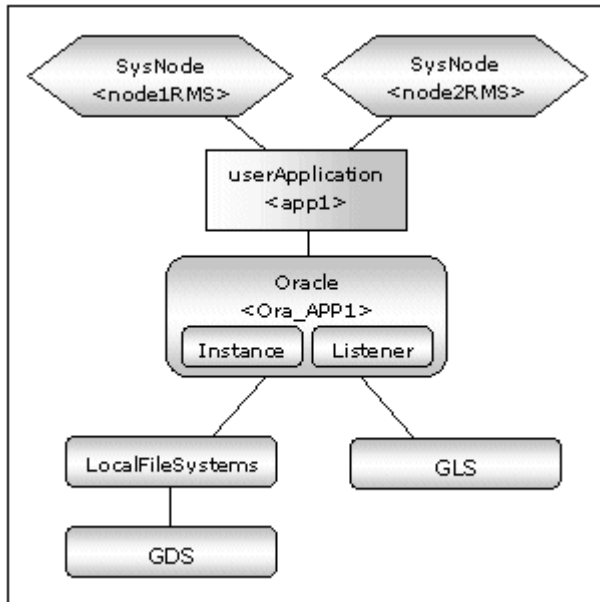
userApplication	Description	Resources
app1	userApplication on all operation nodes	Oracle resource (instance, listener) Gds resource LocalFileSystem resource Gls resource

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

  1. Application-Create   Create userApplication.

  2. Configuration-Generate   Generate userApplication.

  3. Configuration-Activate   Activate userApplication.

The menu in capital letters (e.g. WIZSTANDBY) indicates the turnkey wizard in the application type selection menu.   This wizard allows for easy creation of userApplication.

For further details, refer to the PRIMECLUSTER manuals.

2.2.4　　　userApplication with No Oracle Resources

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

Set up Oracle resources after creating a database.

Standby operation

Non-Oracle resources are configured first as follows:
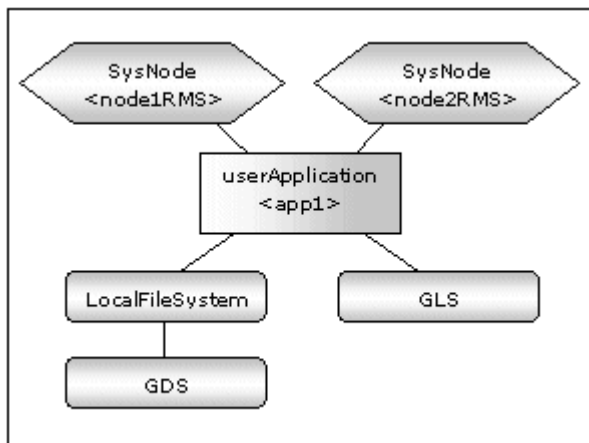
GDS setup

GDS is set as "switching disk" for standby operation.   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 "6.7 Setting Up Cluster Applications" of the "PRIMECLUSTER Installation and Administration Guide".

Set up userApplication using the RMS Configuration Wizard.   The RMS Configuration Wizard uses the format that allows you to select information in the menu.

The following command is executed on any one of the cluster nodes:

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

The following example shows how to configure the userApplication with No Oracle Resources.

1. Create userApplication by selecting Application-Create in the "Main configuration menu" page.

```
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
```

2. 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 for backward compatibility.

3. Specify a userApplication name of 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
```

4. Select Machines+Basics to set up nodes and following menu items.
Set an operating node to Machines [0], and standby nodes to Machines [n].   Select AdditionalMachines when adding a new node.   For other settings, refer to HELP or the PRIMECLUSTER Installation and Administration Guide.

```
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
```

> **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

5. Save the above settings by selecting SAVE+EXIT.

```
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. Set up resources required for shared disks (Gls, LocalFileSystems, and Gds) 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(-)
 7) CommandLines(-)               15) LocalFileSystems(-)
 8) Procedure:Application(-)      16) Gds:Global-Disk-Services(-)
Choose the setting to process:
```

7. Return to the Main configuration menu by selecting SAVE+EXIT. (Any settings related to Oracle should not be done at this point.)

2.2.5　　　　Configuration-Generate and Configuration-Activate

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:
```

2.2.6　　　　userApplication Operation Check

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

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

![Information icon]

Information

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

2.2.7　　　　Oracle Database Creation and Setting

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
Init.ora file	Arbitrary	Choose either
Server parameter file	Share	Refer to the following item "Parameter file"
Password file	Share	-
Control files	Share	-
Data files	Share	-
Redo log files	Share	-
Archive 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	

- Check if the Oracle user has privileges to write in a shared disk before creating the database.
- If you use ASM (Automatic Storage Management) for Oracle 10g, it is necessary to register the ASM as an RMS resource. Refer to "2.4.2 ASM (Automatic Storage Management)".

Create a database

Operation node

Create a database on the operating node.   The database must be accessible from the standby nodes.

Refer to the Oracle manual.

Standby node

Set up the standby nodes in the same configuration (directory creation, file copy, and links) as the operating node.
Under <$ORACLE_HOME>/dbs
Under <$ORACLE_BASE>/admin/<$ORACLE_SID>
Under <$ORACLE_HOME>/network/admin

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.

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".

Mutual standby / N:1 Standby operation

Create a database on an operating node.
The database on the shared disk created on the operating node must be accessible from the standby nodes.   This is the same as the other operation modes.

Mutual standby
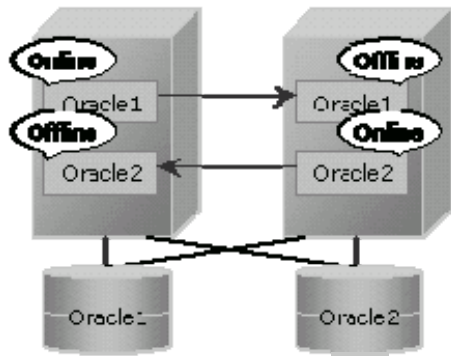
2:1 Standby
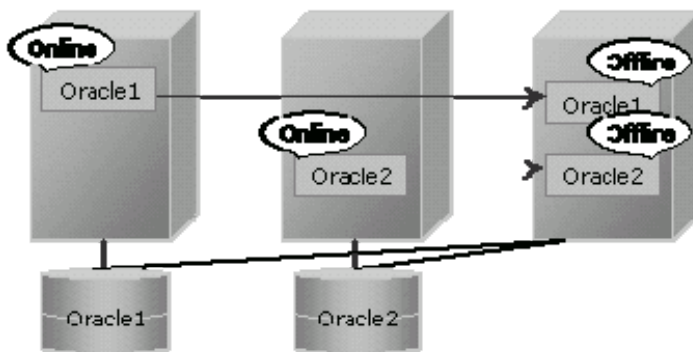
Parameter file

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.   If you use the init.ora file, allocate it on either a local disk or a shared disk.

If you use server parameter file, allocate it on a shared disk.   If it is not allocated on the shared disk, the settings will be inconsistent between operating and standby nodes.

After you allocate server parameter file on a shared disk, make a symbolic link file to refer to the file on a shared disk in operation and standby both nodes.   Set it by either following methods:

-        Method of making a symbolic link file to server parameter file on a shared disk.
-        Method to write the path of the server parameter file in an init.ora file.

-        Method of making a symbolic link file to server parameter file on a shared disk.

```
$  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 an init.ora file.

```
spfile = <the mount point of a shared disk>/spfile<$ORACLE_SID>.ora
```

If you create a database using DBCA (Database Configuration Assistant) in the Oracle 10g environment, 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 Creation".

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. Set the access to the server parameter file on a shared disk(refer to the above-mentioned example).

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

Network setup
The files are allocated as follows:

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
```
"¥" mark shows that the command line continues to the next line.

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.


```
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/10.2.0)
      (SID_NAME = ora)
    )
  )
```


In Oracle 10g or later environment, operating system 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)

tnsnames.ora

If the Oracle listener is monitored through tnsping, set up the "tnsnames.ora" file. 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.


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

System user password

PRIMECLUSTER Wizard for Oracle accesses and monitors Oracle 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.

Check Oracle operation

Check if Oracle is properly running by starting and stopping the Oracle instance and Oracle listener manually.

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

2.2.8 Oracle Resource Creation and Setting

Register Oracle resources in userApplication that is created at "2.2.4 userApplication with No Oracle Resources".

Standby operation

In standby operation, userApplication is configured as follows.
Note that userApplication resource (Ora_App1) is being created and added.
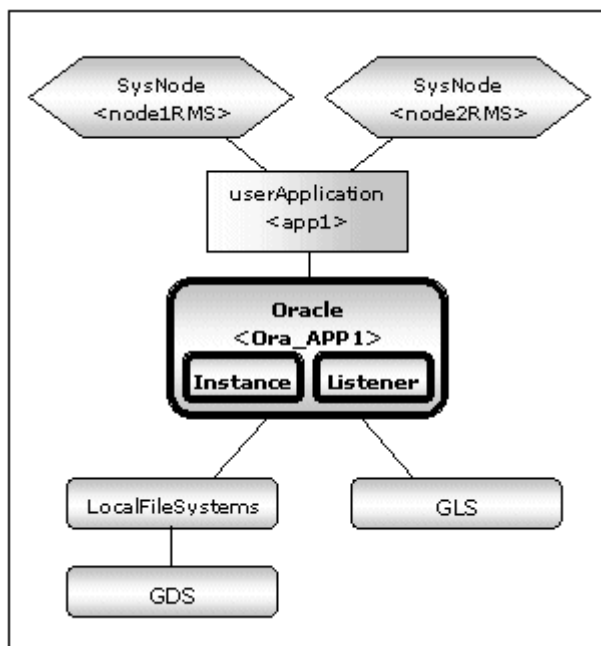
Execute the following command on any one of the cluster nodes.   Note that <Configuration name> must be the same as that specified at "2.2.4 userApplication with No Oracle Resources".

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

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

  1. Application-Edit   Create userApplication.
  2. Configuration-Generate   Generate userApplication.
  3. Configuration-Activate   Activate userApplication.

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

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

2.2.9　　　userApplication with Oracle Resources

The following example shows how to configure the Oracle environment.

1. 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
```

2. Select userApplication created at "2.2.4 userApplication with No Oracle Resources". For scalable operation, select "app1" and "app2".

```
Edit: Application selection menu (restricted):
1) HELP
2) QUIT
3) RETURN
4) OPTIONS
5) APP1
Application Name: 5
```

3. 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
```

4. Add Oracle instances and Oracle listeners in the Oracle setup page.

```
Oracle (Ora_APP1:not yet consistent)
 1) HELP                            6) AdditionalListener
 2) -                              7) AdditionalOracle10gService
 3) SAVE+EXIT                      8) AdditionalOracle10gNodeapps
 4) REMOVE+EXIT                    9) AdditionalOracle10gClusterware
 5) AdditionalInstance            10) StartPriority=Same
Choose the setting to process:
```

Attributes	Description
AdditionalInstance	Add an Oracle instance resource.
AdditionalListener	Add an Oracle listener resource.
AdditionalOracle10gService	Not used.
AdditionalOracle10gNodeapps	Not used.
AdditionalOracle10gClusterware	Not used.
StartPriority	Set up the startup order of the Oracle instance and Oracle listener. The default is "Simultaneous startup".

![Example icon]
Example

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

5. Add Oracle instances.

```
Oracle (Ora_APP1:not yet consistent)
 1) HELP                            6) AdditionalListener
 2) -                              7) AdditionalOracle10gService
 3) SAVE+EXIT                      8) AdditionalOracle10gNodeapps
 4) REMOVE+EXIT                    9) AdditionalOracle10gClusterware
 5) AdditionalInstance            10) StartPriority=Same
Choose the setting to process: 5
```

Enter ORACLE_SID.

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

![Information icon]
Information

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

- Oracle instance resource/ASM instance resource
  ORACLE_Ora_<ApplicationName>_<OracleSID>

This resource name has the following convention and rules.

- Characters per resource name must be less than 40 characters.
- "ORACLE_Ora_" is a fixed character string.

```
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
```

Oracle instance setup

Attributes		Description
OracleSID		ORACLE_SID
OracleUser		DBA user for Oracle control.
StartTimeout		Timeout duration of Oracle startup.
		Default: 600s (300s - 86400s)
StopTimeout		Timeout duration of Oracle stop.
		Default: 180s (60s - 86400s)
AbortTimeout		Timeout duration of forced termination in the event of an Oracle stop error.
		Default: 60s (60s - 86400s)
StopModeStop		Oracle stop mode in normal time.
		Default: Immediate mode (abort, immediate, transactional)
StopModeFail		Oracle stop mode in the event of a failure.
		Default: Abort mode (abort, immediate)
Interval		Monitoring interval of Oracle instance.
		Default: 30s (5s - 86400s)
WatchTimeout		No response time during monitoring Oracle.
		Default: 300s (30s - 3600s)
PreOnlineScript		Executed before online processing.
		No default
PostOnlineScript		Executed after online processing.
		No default
PreOfflineScript		Executed before offline processing.
		No default
PostOfflineScript		Executed after offline processing.
		No default
FaultScript		Executed when a fault occurs.
		No default
Flags	NullDetector (D)	Selects whether or not resource monitoring is enabled. If it is enabled, resource monitoring will not be performed. The resource monitoring is disabled as default.

	AutoRecover (A)	Selects whether or not resource restart is attempted before failover in the event of a resource failure. If it is enabled, the resource will be restarted. The resource is not restarted as default.
	MonitorOnly (M)	Selects whether or not a failover is generated in the event of a resource failure. If it is enabled, the resource will not be switched. The resource will be switched as default.

Information

- For details about *Scripts, refer to"2.4.1 Oracle Online/Offline Script".
- For details about Flags, refer to "9 Appendix – Attributes" of the "PRIMECLUSTER RMS Configuration and Administration Guide".

Note

- If NullDetector is enabled, the AutoRecover and MonitorOnly attribute will automatically be disabled.
- MonitorOnly can be enabled in the following cases:
  - One resource of "Instance" type and one resource of "Listener" type exist, and StartPriority is set to "Same".
    In this case, MonitorOnly only for the one of them can be enabled.
  - More than one resources of "Instance" type exist.
    In this case, MonitorOnly for the one of them cannot be enabled, but all of the others can be enabled.
- Flags=<Abbreviation > indicates that the flag attribute is enabled.

6. Add Oracle listeners.

```
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
```

Enter the listener name.

```
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 entered on this step.
- Oracle listener resource
  LISTENER_Ora_<ApplicationName>_<ListenerName>
This resource name has the following convention and rules.
- Characters per resource name must be less than 40 characters.
- "LISTENER_Ora_" is a fixed character string.

```
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
```

Oracle listener setup

Attributes		Description
ListenerName		Listener name.
OracleUser		DBA user for Oracle control.
TNSName		Network service for listener monitoring Execute the 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.
StartTimeout		Timeout during Oracle startup. Default: 180s (120s - 86400s)
StopTimeout		Timeout during Oracle stop. Default: 60s (60s - 86400s)
Interval		Monitoring interval of Oracle instance. Default: 30s (5s - 86400s)
WatchTimeout		No response time during monitoring Oracle. Default: 300s (30s - 3600s)
PreOnlineScript		Executed before online processing. No default
PostOnlineScript		Executed after online processing. No default
PreOfflineScript		Executed before offline processing. No default
PostOfflineScript		Executed after offline processing. No default
FaultScript		Executed when a fault occurs. No default
Flags	NullDetector (D)	Selects whether or not resource monitoring is enabled. If it is enabled, resource monitoring will not be performed. The resource monitoring is disabled as default.
	AutoRecover (A)	Selects whether or not resource restart is attempted before failover in the event of a resource failure. If it is enabled, the resource will be restarted. The resource is not restarted as default.
	MonitorOnly (M)	Selects whether or not a failover is generated in the event of a resource failure. If it is enabled, the resource will not be switched. The resource will be switched as default.

Information

- For details about *Scripts, refer to"2.4.1 Oracle Online/Offline Script".
- For details about Flags, refer to "9 Appendix – Attributes" of the "PRIMECLUSTER

RMS Configuration and Administration Guide".

- If NullDetector is enabled, the AutoRecover and MonitorOnly attribute will automatically be disabled.
- MonitorOnly can be enabled in the following cases:
  - One resource of "Instance" type and one resource of "Listener" type exist, and StartPriority is set to "Same".
  In this case, MonitorOnly only for the one of them can be enabled.
  - More than one resources of "Listener" type exist.
  In this case, MonitorOnly for the one of them cannot be enabled, but all of the others can be enabled.
- Flags=< Abbreviation > indicates that the flag attribute is enabled.

7. Save the above settings by selecting SAVE+EXIT.

```
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: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
```

2.2.10   Other Resource Registration

If you have any other required resources and userApplication, register and create them using the RMS Configuration Wizard.

2.2.11   Configuration-Generate and Configuration-Activate

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:
```

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.

2.2.12   userApplication Operation Check

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

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

      a) Standby operation
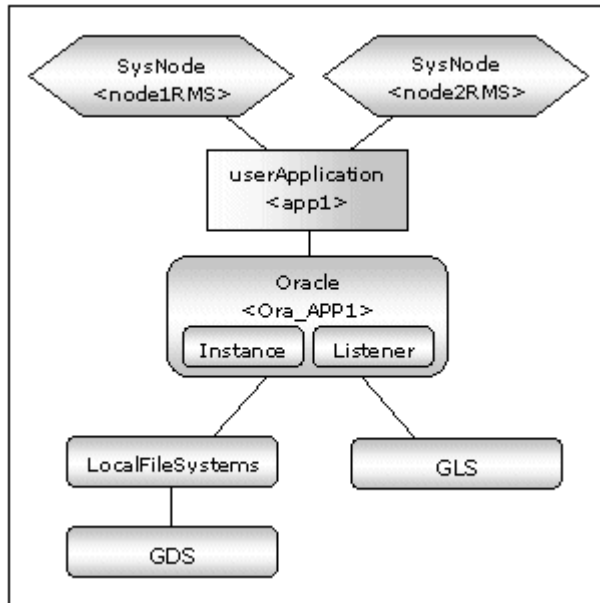
   b. Check if you can access to the shared disk from the operating node.   Also, check if a file can be created on the shared disk using Oracle user access privileges.
   c. Check if you can access the operating node from the client using the logical IP address.
   d. Check if you can access to Oracle running on the operating node from the client using the logical IP adders.

Information

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

2.3 Oracle RAC 10g Scalable Operation

2.3.1 PRIMECLUSTER Installation and Configuration

Hardware configuration

Configure hardware required to operate PRIMECLUSTER. A shared disk device is also required to create Oracle database files.

Software installation

Install PRIMECLUSTER Enterprise Edition according to the "PRIMECLUSTER Enterprise Edition Installation/Administration Guide".
Install PRIMECLUSTER Wizard for Oracle according to the "PRIMECLUSTER Wizard for Oracle Installation Guide".

Cluster configuration

Configure a cluster system, network, and shared disk device according to the PRIMECLUSTER manuals.

Software installation

In Oracle RAC 10g operation, there are two methods of starting up Oracle Clusterware as follows. For details, refer to "". The starting method of "1" is recommended.

1. Oracle Clusterware in a PRIMECLUSTER RMS resource then relies on userApplication behavior.
2. Automatically starts along with OS startup without registering Oracle Clusterware in a PRIMECLUSTER RMS resource.

If you choose method of "2", be aware that Oracle Clusterware accesses a shared disk device as soon as OS is activated. A volume on the shared disk must be active when the Oracle Clusterware is activated.

2.3.2 Oracle Software Installation and Configuration

Site Preparation

Set kernel parameters and user groups according to the Oracle manual and installation guide.   It is necessary to set a logical IP address for RAC on each node.
If you create a DBA (Database Administrator) user to install Oracle, start, or stop Oracle operation, make sure that user ID and group ID are identical on all the nodes.
For semopm (the third value of "kernel.sem", specify a value of 4 or more.

Oracle Clusterware installation

Install Oracle Clusterware by referring to the Oracle manual and installation guide.

The PRIMECLUSTER Wizard for Oracle determines a directory where to install Oracle Clusterware with the "$ORA_CRS_HOME" environment variable.   Set an installation directory of Oracle Clusterware for the "$ORA_CRS_HOME" environment variable of an Oracle DBA user.

Refer to the following setup example:

```
ORA_CRS_HOME=/opt/oracle/product/10.1.0/crs; export ORA_CRS_HOME
```

Oracle RAC 10g installation

Install Oracle 10g with the RAC option by referring to the Oracle manual and installation guide.

- 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)   It may cause failure of userApplication startup or shutdown.

- PRIMECLUSTER Wizard for Oracle controls Oracle as the Oracle DBA user.   Be sure to include ORACLE_HOME/bin and $ORA_CRS_HOME/bin in the PATH environment variable of the DBA user.

Refer to the following setup example:

```
ORACLE_HOME=/opt/oracle/product/10.1.0/db; export ORACLE_HOME
ORA_CRS_HOME=/opt/oracle/product/10.1.0/crs; export ORA_CRS_HOME
PATH= $ORACLE_HOME/bin: $ORA_CRS_HOME/bin; export PATH
```

Database creating and settings

Create a database by referring to the Oracle manual and installation guide.

In Oracle RAC 10 scalable operation, the RMS resource name is generated based on the resource name of Oracle RAC 10g as follows:

- Oracle RAC 10g instance resource
  Ora_<ApplicationName>_<inst_name>.i
- Oracle 10g listener resource
  Ora_<ApplicationName>_<inst_name>.l
  The default value of <lsnr_name> is "LISTENER_<node name>".
- Oracle Clusterware resource
  Ora_<ApplicationName>_Clusterware

The resource name begins with "Ora_<ApplicationName>_" instead of "ora" of the resource name displayed with the crs_stat command of Oracle 10g.

- Oracle RAC 10g instance resource
- <ApplicationName"> must be up to 39 characters.
- For information on how to set up <ApplicationName>, refer to"2.3.4 userApplication with Oracle Clusterware" and "2.3.5 userApplication with Oracle RAC Instances and Listeners".

Disabling automatic startup of Oracle Clusterware

Disable automatic startup of Oracle Clusterware by executing the following command on each node with super user access privileges.

Refer to the following setup example:

```
# /etc/init.d/init.crs disable
```


This setup is required when the Oracle Clusterware is registered in an RMS resource.

Disabling automatic startup of CRS resource

Disable automatic startup of Oracle RAC instance (inst, db, srv) by setting "never" to AUTO_START attribute.
This is because the Oracle RAC instance is registered as an RMS resource, and it is startup is controlled by userApplication, not Oracle Clusterware.

It is possible to set it by executing the following commands.

```
# su - <Oracle user>
$ srvctl modify database -d $DB_NAME -y manual
```

AUTO_START of the database, the instance, and the service resource is set to "never" by executing the above-mentioned command.

For detail of editing AUTO_START, refer to Oracle manuals.

Operation check

Check if Oracle instances and listeners are properly operating. Also, check if the crs_stat command can be executed using the DBA user.

The following example shows the operation results:

```
$ crs_stat -t
Name            Type          Target     State      Host
--------------------------------------------------------------
ora....1.lsnr  application    ONLINE     ONLINE     node1
ora.node1.gsd  application    ONLINE     ONLINE     node1
ora.node1.ons  application    ONLINE     ONLINE     node1
```

```
ora.node1.vip   application   ONLINE   ONLINE   node1
ora....2.lsnr   application   ONLINE   ONLINE   node2
ora.node2.gsd   application   ONLINE   ONLINE   node2
ora.node2.ons   application   ONLINE   ONLINE   node2
ora.node2.vip   application   ONLINE   ONLINE   node2
ora....rac.db   application   ONLINE   ONLINE   node1
ora....1.inst   application   ONLINE   ONLINE   node1
ora....2.inst   application   ONLINE   ONLINE   node2
$
```

2.3.3   userApplication Creation

In Oracle RAC 10g, Oracle instances and listeners are managed as PRIMECLUSTER RMS resources.   Also, the Oracle Clusterware can be registered in an RMS resource optionally.

Configuration A

The Oracle Clusterware and Oracle RAC instance are registered in different userApplication.
(Use the configuration A if Oracle Clusterware is registered in an RMS resource, and an Oracle RAC instance exists on one node if you are planning to add Oracle RAC instances in the future or each node has multiple Oracle RAC instances.)
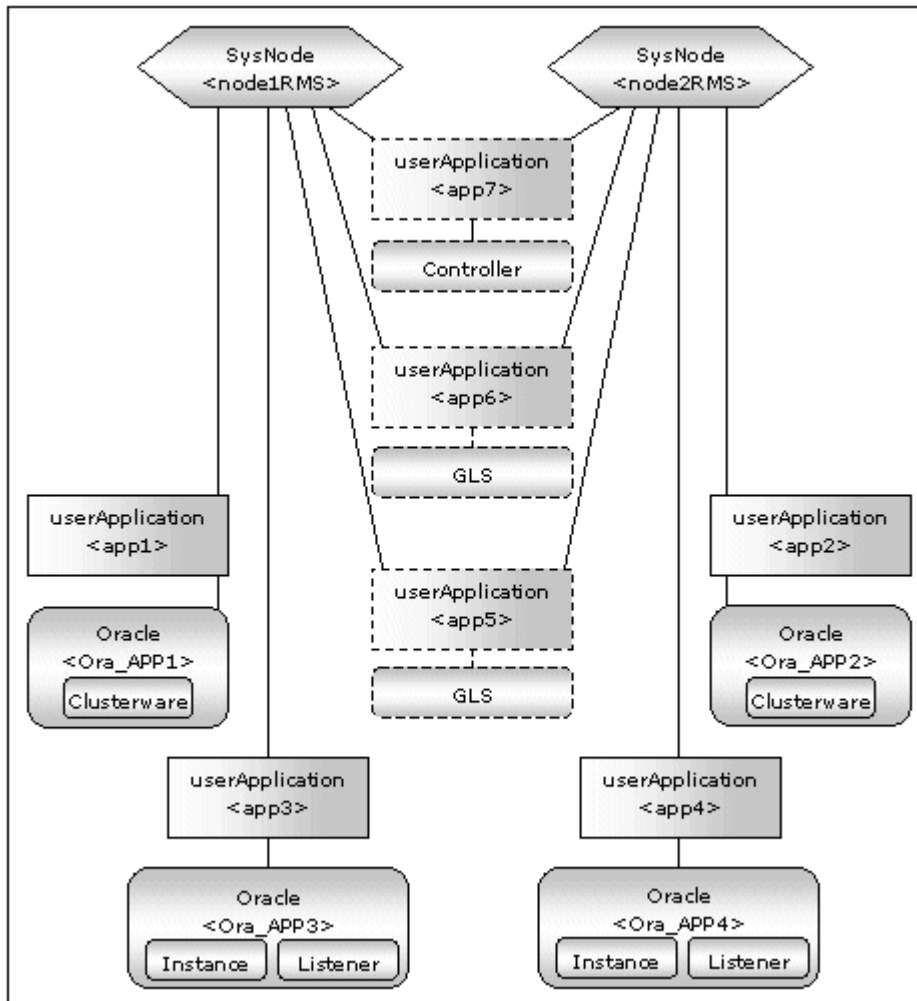
userApplication	Description	Resources
app1, app2	Controls Oracle Clusterware. It is created on each node.	Oracle resource (Clusterware)
app3, app4	Controls Oracle instances and listeners. It is created on each node.	Oracle resource (instances, listeners)
app5, app6	Used as standby for Gls or takeover network.(Option) Create them according to operating conditions.	Gls resource, Cmdline resource, etc
app7	Starts up or stops Oracle instance userApplication (app3 and app4) simultaneously on all nodes. Optional	Controller resource

If userApplication app3 and app4 are stopped due to an Oracle RAC instance resource failure, userApplication app1 and app2 of Oracle Clusterware will not be affected.

Information

The controlling userApplication (app7) is optional and can be used to start up or stop userApplication (app3 and app4) for Oracle instances on all nodes at the same time

Note

If the "KeepOnline" flag of Oracle Clusterware resource is enabled, the userApplication which controls Oracle instances should be stopped first, and then the userApplication which controls Oracle Clusterware should be stopped.(In the above image, app3 should be stopped before app1 stopping. app4 should be stopped before app2 stopping.)
Set the procedure to do them automatically by using PreOfflineScript of Oracle Clusterware resource. For details, refer to step "8" of "2.3.4".
For further details of the "KeepOnline" flag, refer to the "2.3.4 userApplication with Oracle Clusterware ".

Configuration B

The Oracle Clusterware and Oracle RAC instance are registered in the same userApplication.
(Use the configuration B if Oracle Clusterware is registered in an RMS resource, and an Oracle RAC instance exists on one node if you are not planning to add Oracle RAC instances in the future.)
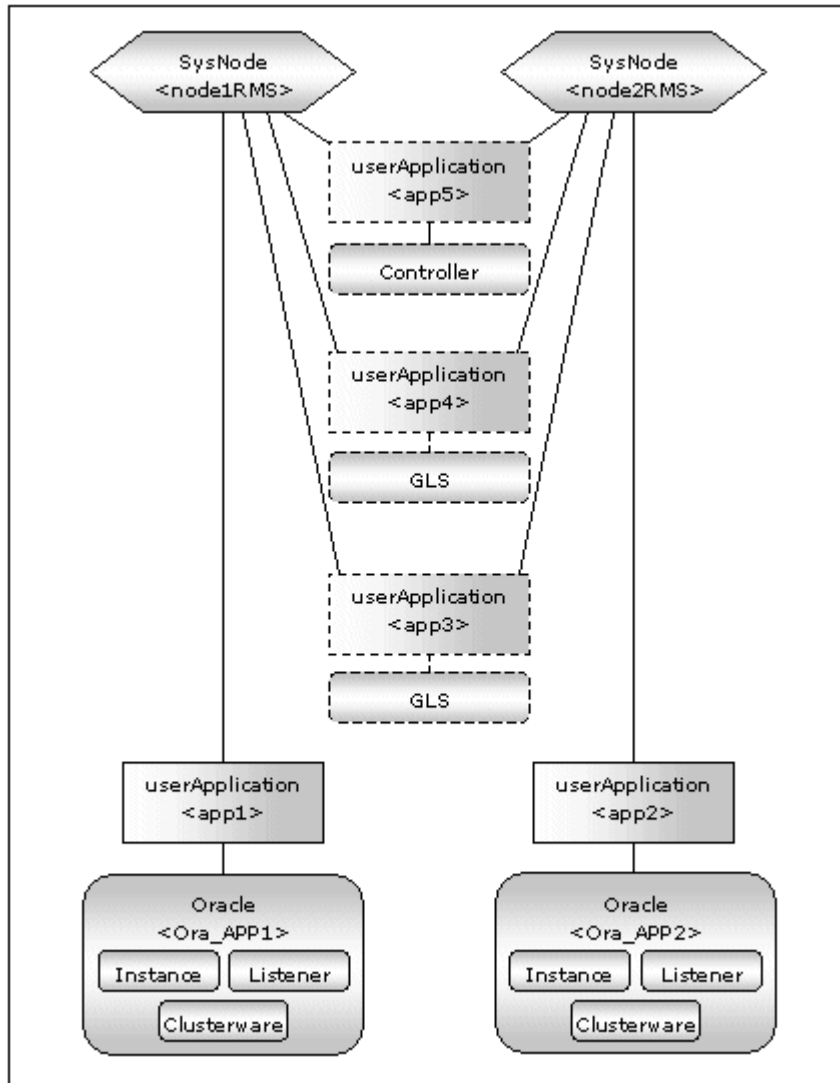
userApplication	Description	Resources
app1, app2	Controls Oracle Clusterware. It is created on each node.	Oracle resource (Clusterware, instances, listeners)
app3, app4	Used as standby for Gls or takeover network.(Option) Create them according to operating conditions.	Gls resource, Cmdline resource, etc
app5	Starts up or stops Oracle instance userApplication (app1 and app2) simultaneously on all nodes. Optional	Controller resource

If userApplication app1 and app2 are stopped due to an Oracle RAC instance resource failure, Oracle Clusterware will also be stopped (when the KeepOnline flag is disabled).

Information

The controlling userApplication (app5) is optional and can be used to start up or stop userApplication (app1 and app2) for Oracle instances on all nodes at the same time.

Configuration C

The Oracle Clusterware is not registered.

(Select the configuration C if you want to make Oracle Clusterware automatically start up along with OS startup without registering it in an RMS resource.)
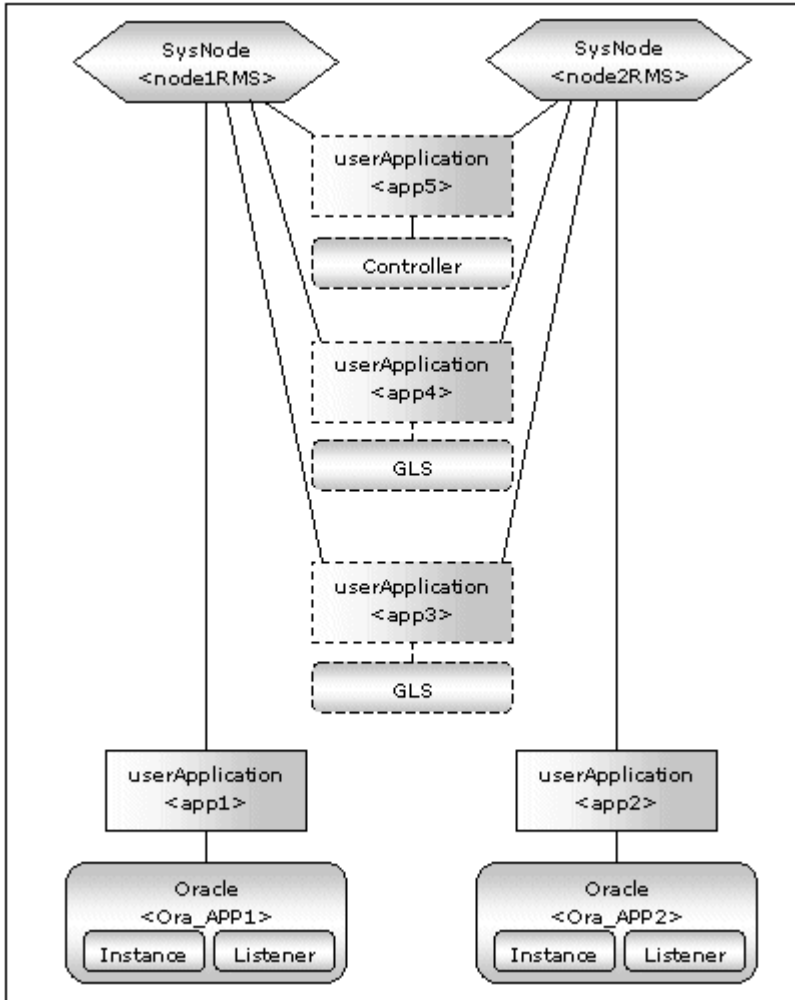
userApplication	Description	Resources
app1, app2	Controls Oracle instances ad listeners. It is created on each node.	Oracle resources (instances, listeners)
app3, app4	Used as standby for Gls or takeover network.(Option) Create them according to operating conditions.	Gls resource, Cmdline resource, etc
app5	Starts up or stops Oracle instance userApplication (app1 and app2) simultaneously on all nodes. Optional	Controller resource

Information

The controlling userApplication (app5) is optional and can be used to start up or stop userApplication (app1 and app2) for Oracle instances on all nodes at the same time

The flow of userApplication creation is as follows:

1. Create userApplication including Oracle Clusterware resources.
2. Create userApplication including Oracle RAC instances and listeners.
3. Register the other required resources

Configure userApplication using the RMS Configuration Wizard, which allows you to select information from the menu.　Execute the following command on any one of the nodes:

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

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

1. Application-Create   Create userApplication
2. Configuration-Generate   Generate userApplication
3. Configuration-Activate   Activate userApplication

The menu in capital letters (e.g. WIZSTANDBY) indicates the turnkey wizard in the application type selection menu.　This wizard allows for easy creation of userApplication.

Information

For details, refer to the PRIMECLUSTER manual.

Do not create multiple resources for the same Oracle instance, Listener or Oracle Clusterware.

2.3.4　　　userApplication with Oracle Clusterware

This section describes how to register the Oracle Clusterware in an RMS resource using the RMS Configuration Wizard.

If the Oracle Clusterware resource is not registered in an RMS resource (Configuration C), skip the procedure then go to "2.3.5 userApplication with Oracle RAC Instances and Listeners".

1. Select Application-Create in the Main configuration menu.

```
node1: Main configuration menu, current configuration: config_RAC
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
```

2.   Select WIZSTANDBY in the Application type selection menu.

```
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
```

Do not select ORACLE (all caps) in this screen.   This is for backward compatibility.

3.   Set up the turkey wizard in the "Settings of turnkey wizard "WIZSTANDBY"".

```
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
```

4.   Select Machines+Basics.

```
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
```

5. Set up the node and userApplication.

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

Information

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

- The Oracle Clusterware and Oracle RAC instance are registered in different userApplication (Configuration A)

Attributes	Values
AutoSwitchOver	No
PersistentFault	1

- The Oracle Clusterware and Oracle RAC instance are registered in the same userApplication (Configuration B)

Attributes	Values
AutoStartUp	Optional
	If you control userApplication startup and stop on all nodes by using the controlling userApplication, be sure to specify No.
AutoSwitchOver	No
PersistentFault	1

Information

PersistentFault setup

PersistentFault remains the same resource status (Faulted) even after RMS is restarted in the event of a resource failure. Users are supposed to locate the fault and check completion of recovery processing then start userApplication manually. For example, if a failure occurs, users can detect which userApplication failed even after server reboot. Even though AutoStartUp setup is set, userApplication will not be started, and automatic startup will prevent recurrence of the failure.

6. Select Oracle in the Setting of turnkey wizard "WIZSTANDBY".

```
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(-)
 7) CommandLines(-)                    15) LocalFileSystems(-)
 8) Procedure:Application(-)           16) Gds:Global-Disk-Services(-)
Choose the setting to process: 10
```

7. Add Oracle Clusterware in the Oracle setup screen.

```
Oracle (Ora_APP1:not yet consistent)
 1) HELP                                6) AdditionalListener
 2) -                                   7) AdditionalOracle10gService
 3) SAVE+EXIT                           8) AdditionalOracle10gNodeapps
 4) REMOVE+EXIT                         9) AdditionalOracle10gClusterware
 5) AdditionalInstance                 10) StartPriority=Same
Choose the setting to process: 9
```

8. Perform the detailed setup.

```
Setting menu : Detail setting for OracleRAC10g Clusterware resource
 1) HELP                 5) ScriptTimeout=600      9) (PostOfflineScript=)
 2) NO-SAVE+RETURN       6) (PreOnlineScript=)    10) (FaultScript=)
 3) -                    7) (PostOnlineScript=)   11) (Flags=K)
 4) OracleUser=          8) (PreOfflineScript=)
Choose the setting to process: 4
```

Enter a DBA user for Oracle control.

```
Setting menu : OracleUser for OracleRAC10g Clusterware resource
1) HELP
2) RETURN
3) FREECHOICE
Enter the name of OracleUser: 3
        >> rac10g
```

Attributes	Description
OracleUser	DBA user for Oracle control
ScriptTimeout	Timeout of Oracle instance resource startup and stop Default : 600s (300s - 86400s)
PreOnlineScript	Executed before online processing
PostOnlineScript	Executed after online processing
PreOfflineScript	Executed before offline processing
PostOfflineScript	Executed after offline processing

FaultScript		Executed in the event of a fault
Flags	KeepOnline (K)	Selects whether or not Online should remain without stopping resources when userApplication is stopped. If it is enabled, Online will remain. The Online state remains as default.

Information

- For details about *Scripts, refer to"2.4.1 Oracle Online/Offline Script".
- For details about Flags, refer to "9 Appendix – Attributes" of the "PRIMECLUSTER RMS Configuration and Administration Guide".

Note

- Flags=<Abbreviation> indicates that the flag attribute is enabled.
- If the "KeepOnline" flag is enabled, and userApplication is stopped, an Oracle Clusterware resource will look Offline on the Cluster admin view. Actually, it remains active.
- Stop of userApplication including Oracle RAC instance resource through PreOfflineScript

  When Oracle Clusterware and Oracle RAC instance are registered in different userApplication (Configuration A) and the "KeepOnline" flag is disabled, it is necessary to set the following script for PreOfflineScript of Oracle Clusterware resource;

  ```
  /opt/FJSVclora/sbin/clorastopwait <userApplication>
  ```

  <userApplication> : userApplication including Oracle RAC instance resource>
  userApplication name specifiable for *<userApplication>* are as follows "Configuration A":
  - app1 in process of creation in this section : specify app3
  - app2 in process of creation in this section : specify app4

  If there are multiple userApplications that include Oracle RAC instance resource, specify all of them space-delimited for *<userApplication>*.

9. Check the above settings then select SAVE+RETURN.

```
Setting menu : Detail setting for OracleRAC10g Clusterware resource
 1) HELP                       5) ScriptTimeout=600         9) (PostOfflineScript=)
 2) NO-SAVE+RETURN             6) (PreOnlineScript=)       10) (FaultScript=)
 3) SAVE+RETURN                7) (PostOnlineScript=)      11) (Flags=K)
 4) OracleUser=rac10g          8) (PreOfflineScript=)
Choose the setting to process: 3
```

10. Select SAVE+EXT to register the resource.

```
Oracle (Ora_APP1:consistent)
 1) HELP                                4) REMOVE+EXIT
 2) -                                   5) AdditionalOracle10gNodeapps
 3) SAVE+EXIT                           6) Oracle10gCLWResource[0]=Clusterware
Choose the setting to process: 3
```


Information

If you register the Oracle Clusterware and Oracle RAC instance in the same userApplication (Configuraiton B), select AddtionalOracle10gNodeapps then register Oracle RAC instances and listeners. For details, refer to Step 7 to 13 of "2.3.5 userApplicaiton with Oracle RAC Instances and Listeners".

11. Check that the Oracle resource is set then save the above settings by selecting SAVE+EXIT.

```
Settings of turnkey wizard "WIZSTANDBY" (APP1: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(-)
 7) CommandLines(-)              15) LocalFileSystems(-)
 8) Procedure:Application(-)     16) Gds:Global-Disk-Services(-)
Choose the setting to process: 3
```

12. Repeat from Step 1 to 11 for each node.

2.3.5 userApplication with Oracle RAC Instances and Listeners

This section describes how to register Oracle instance resources on each node using the RMS Configuration Wizard. Before resource registration, it is necessary to associate the Oracle instances with Oracle 10g RAC. Out of the Oracle 10g resources that are displayed with the "crs_stat" command, the ora.*.inst resources must be registered.

Refer to the following example:

```
$ crs_stat -t
Name            Type          Target    State     Host
--------------------------------------------------------------
ora....1.lsnr   application   ONLINE    ONLINE    node1
ora.node1.gsd   application   ONLINE    ONLINE    node1
ora.node1.ons   application   ONLINE    ONLINE    node1
ora.node1.vip   application   ONLINE    ONLINE    node1
ora....2.lsnr   application   ONLINE    ONLINE    node2
ora.node2.gsd   application   ONLINE    ONLINE    node2
ora.node2.ons   application   ONLINE    ONLINE    node2
ora.node2.vip   application   ONLINE    ONLINE    node2
ora....rac.db   application   ONLINE    ONLINE    node1
ora....1.inst   application   ONLINE    ONLINE    node1
ora....2.inst   application   ONLINE    ONLINE    node2
$
```

In the above configuration, "ora....1.inst" included in node1, and "ora....2.inst" included in node2 are registered as a resource respectively.

Before configuring userApplication, make sure that Oracle Clusterware has been activated on the node where RMS Configuration Wizard is running, so the "crs_stat" command can be executed correctly with Oracle DBA user.
If Oracle Clusterware has not been activated, execute the following command as a root user.

```
# /etc/init.d/init.crs start
```

When Oracle Clusterware startup is completed, be sure to confirm that the "crs_stat" command can be executed correctly.

```
# su - <Oracle User>
$ crs_stat
```

1. Select Application-Create in the "Main configuration menu" page.

```
node1: Main configuration menu, current configuration: config_RAC
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
```

2. Select WIZSTANDBY in the "Application type selection menu" page.

```
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
```

3. Specify a userApplication name of ApplicationName in the "Settings of turnkey wizard WIZSTANDBY" page.

```
Settings of turnkey wizard "WIZSTANDBY" (APP3:not yet consistent)
1) HELP                          4) REMOVE+EXIT
2) NO-SAVE+EXIT                  5) ApplicationName=APP3
3) SAVE+EXIT                     6) Machines+Basics(-)
Choose the setting to process: 5
```

4. Select Machies+Basics(-)

```
Settings of turnkey wizard "WIZSTANDBY" (APP3:not yet consistent)
1) HELP                          4) REMOVE+EXIT
2) NO-SAVE+EXIT                  5) ApplicationName=APP3
3) SAVE+EXIT                     6) Machines+Basics(-)
Choose the setting to process: 6
```

5. Set up nodes and following menu items.

   Set an operating node to Machines [0], and standby nodes to Machines [n]. Select AdditionalMachines when adding a new node. For other settings, refer to HELP or PRIMECLUSTER Installation and Administration Guide.

Information

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

- The Oracle Clusterware and Oracle RAC instance are registered in different userApplication (Configuration A)

Attributes	Values
AutoStartUp	Optional
	If you control userApplication startup and stop on all nodes by using the controlling userApplication, be sure to specify no.
AutoSwitchOver	No
PersistentFault	1

- The Oracle Clusterware resource is not registered in an RMS resource (Configuration C)

Attributes	Values
AutoStartUp	Optional
	If you control userApplication startup and stop on all nodes by using the controlling userApplication, be sure to specify no.
AutoSwitchOver	No
PersistentFault	1

Note

Be sure to set AutoStartUp=yes when the Oracle instance is activated from Oracle Clusterware right after OS startup, data inconsistency might occur (default: no). If the controlling userApplication is not used, select AutoStartUp=yes.

Save the above settings by selecting SAVE+EXIT.

```
Machines+Basics (app3:consistent)
 1) HELP                           14) (AutoStartUp=no)
 2) -                              15) (AutoSwitchOver=No)
 3) SAVE+EXIT                      16) (PreserveState=no)
 4) REMOVE+EXIT                    17) (PersistentFault=1)
 5) AdditionalMachine              18) (ShutdownPriority=)
 6) AdditionalConsole              19) (OnlinePriority=)
 7) Machines[1]=node1RMS           20) (StandbyTransitions=)
 8) (PreCheckScript=)              21) (LicenseToKill=no)
 9) (PreOnlineScript=)             22) (AutoBreak=yes)
10) (PostOnlineScript=)            23) (HaltFlag=no)
11) (PreOfflineScript=)            24) (PartialCluster=0)
12) (OfflineDoneScript=)           25) (ScriptTimeout=)
13) (FaultScript=)
Choose the setting to process: 3
```

Information

PersistentFault setup

PersistentFault remains the same resource status (Faulted) even after RMS is restarted in the event of a resource failure. Users are supposed to locate the fault and check completion of recovery processing then start userApplication manually. For example, if a failure occurs, the users can detect which userApplication failed even after server reboot. Even though AutoStartUp setup is set, userApplication will not be started, however, automatic startup will prevent recurrence of the failure.

6. Select Oracle in the "Settings of turnkey wizard "WIZSTANDBY"" page.

```
Settings of turnkey wizard "WIZSTANDBY" (APP3: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(-)
 7) CommandLines(-)                15) LocalFileSystems(-)
 8) Procedure:Application(-)       16) Gds:Global-Disk-Services(-)
Choose the setting to process: 10
```

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

```
Oracle (Ora_APP3:not yet consistent)
 1) HELP                            6) AdditionalListener
 2) -                              7) AdditionalOracle10gService
 3) SAVE+EXIT                      8) AdditionalOracle10gNodeapps
 4) REMOVE+EXIT                    9) AdditionalOracle10gClusterware
 5) AdditionalInstance            10) StartPriority=Same
Choose the setting to process: 8
```

Information

Based on the Oracle RAC 10g resource name that is set in the AdditionalOracle10gNodeapps, the Wizard for Oracle resource name is created on the RMS instance. For details, refer to"2.3.2 Oracle Software Installation and Configuration".

8. Select FREECHOICE and enter Oracle user name.

```
Setting menu : OracleUser for OracleRAC10g Nodeapps resource
1) HELP
2) RETURN
3) FREECHOICE
Enter the name of OracleUser: 3
        >> rac
```

9. From the result of the "crs_stat" command execution, a list of the Oracle instance resources will be displayed. Select the Oracle instance on the node that is set in the Machines+Basics.
The selected CRS resources here should exist on the node that has set on the step "4" "Machines+Basics" of "2.3.5".

```
Set Resource:Currently set:
1) HELP                              6) ora.rac.rac1.inst
2) NO-SAVE+RETURN                    7) ora.rac.rac2.inst
3) SAVE+RETURN                       8) ora.node1.LISTENER_NODE1.lsnr
4) FREECHOICE                        9) ora.node2.LISTENER_NODE2.lsnr
5) (ScopeFilter=node1:node2)
Choose one of the resources: 6
```

Do not register the resources of the other nodes at the same time.

It is possible to prevent it by specifying a node name as ScopeFilter. The following sample indicates that CRS resources on node1 are listed.

```
Set Resource:Currently set:
1) HELP                              6) ora.rac.rac1.inst
2) NO-SAVE+RETURN                    7) ora.rac.rac2.inst
3) SAVE+RETURN                       8) ora.node1.LISTENER_NODE1.lsnr
4) FREECHOICE                        9) ora.node2.LISTENER_NODE2.lsnr
5) (ScopeFilter=node1:node2)
Choose one of the resources: 5
```

```
Setting menu : ScopeFilter of OracleRAC10g resource
1) HELP
2) RETURN
3) NONE
4) FREECHOICE
Enter the word for filtering Scope: 4
        >> node1
```

```
Set Resource:Currently set:
1) HELP                              5) (ScopeFilter=node1)
2) NO-SAVE+RETURN                    6) ora.rac.rac1.inst
3) SAVE+RETURN                       7) ora.node1.LISTENER_NODE1.lsnr
4) FREECHOICE
Choose one of the resources:
```

The resource name begins with "Ora_<ApplicationName>_" instead of "ora" of the CRS resource name of Oracle RAC(displayed with "crs_stat" command).

The RMS resource name is generated based on the CRS resource name as follows:

- Oracle RAC instance resource

  Ora_<ApplicationName>_<inst_name>.i

- Listener resource

  Ora_<ApplicationName>_<lsnr_name>.l

  The default value of <lsnr_name> is "LISTENER_<node name>".

This resource name has the following convention and rules.

- The resource name must be up to 39 characters.
- For information on how to set up <ApplicationName>, refer to"2.3.4".
- <inst_name> indicated by bold type is part of CRS resource name.

  ora.rac.**rac1**.inst

- <lsnr_name> indicated by bold type is part of CRS resource name.

  ora.node1.**LISTENER_NODE1**.lsnr

Confirm that CRS resources selected at previous screen appear after "Currently set". After that, select SAVE+RETURN.

```
Set Resource:Currently set: ora.rac.rac1.inst ora.node1.LISTENER_NODE1.lsnr
1) HELP                              6) NOT:ora.rac.rac1.inst
2) NO-SAVE+RETURN                    7) ora.rac.rac2.inst
3) SAVE+RETURN                       8) NOT:ora.node1.LISTENER_NODE1.lsnr
4) FREECHOICE                        9) ora.node2.LISTENER_NODE2.lsnr
5) (ScopeFilter=node1:node2)
Choose one of the resources: 3
```

Do not register the resources of the other nodes at the same time.

10. Selecting Oracle10gNAPResource[0] allows for more detailed setup.

```
Oracle (Ora_APP3:consistent)
1) HELP
2) -
3) SAVE+EXIT
4) REMOVE+EXIT
5) AdditionalOracle10gNodeapps
6) AdditionalOracle10gClusterware
7) Oracle10gNAPResource[0]=ora.rac.rac1.inst
8) Oracle10gNAPResource[1]=ora.node1.LISTENER_NODE1.lsnr
Choose the setting to process: 7
```

11. Select SELECTED.

```
Setting menu : Resource of OracleRAC10g Nodeapps resource
1) HELP
2) RETURN
3) NONE
4) FREECHOICE
5) SELECTED: ora.rac.rac1.inst
Choose an oracle service resource: 5
```

12. You can set up details.   Check the settings then select SAVE+RETURN.

```
Setting menu : Detail setting for Oracle10gNAPResource[0]=ora.rac.rac1.inst
 1) HELP                5) ScriptTimeout=600      9) (PreOfflineScript=)
 2) NO-SAVE+RETURN      6) WFTime=900            10) (PostOfflineScript=)
 3) SAVE+RETURN         7) (PreOnlineScript=)    11) (FaultScript=)
 4) OracleUser=rac10g   8) (PostOnlineScript=)   12) (Flags=)
Choose the setting to process: 3
```

Attributes	Description
OracleUser	Oracle DBA user name
ScriptTimeout	Timeout of Oracle RAC Instance and Listener resource startup and stop Default : 900 s (300s - 86400s)
WFTime	Waiting time for resource failure recovery through Oracle Clusterware - PersistentWarning : Notifies Warning until resource recovery

		- ImmediateFault : Notifies Faulted without waiting resource recovery - 60s - 86400s Default time for instance resources: 900s Default time for listener resources: PersistentWarning
PreOnlineScript		Executed before online processing. No default
PostOnlineScript		Executed after online processing. No default
PreOfflineScript		Executed before offline processing. No default
PostOfflineScript		Executed after offline processing. No default
FaultScript		Executed when a fault occurs. No default
Flags	NullDetector (D)	Selects whether or not a resource should be monitored. If it is enabled, the resource will be monitored. Resource monitoring is disabled as default.

Information

- For details about *Scripts, refer to"2.4.1 Oracle Online/Offline Script".
- For details about Flags, refer to "9 Appendix – Attributes" of the "PRIMECLUSTER RMS Configuration and Administration Guide".

Note

- **Startup of Oracle Clusterware userApplication through PreOnlineScript**

    If Oracle Clusterware and Oracle RAC instance are registered in different userApplication (Configuration A), set up the following script in PreOnlineScript of the Oracle RAC instance resource;

/opt/FJSVclora/sbin/clorastartwait <userApplication with Oracle Clusterware>

    Specify the following userApplication "Configuration A":

    For app3 : app1
    For app4: app2

- **WFTime**

    In Oracle RAC 10g, Oracle Clusterware will recover a failure of an RAC instance or listener instance.   PRIMECLUSTER Wizard for Oracle, the wait time for the failure recovery can be set for WFTime

    If WFTime=PersistentWarning is set, completion of the failure recovery will be waited forever.   In the meantime, an RMS resource will enter Warning, so userApplication will not be degenerated.   As soon as recovery is detected, the RMS resource will get back to Online.

    If WFTime=ImmediateFault is set, completion of the failure recovery will not be waited but an RMS resource will be considered as fault.   As soon as the RMS resource fails, userApplication will be degenerated.

    WFTime=<second> is set, completion of the failure recovery will be waited for a

certain period of time.   After the predetermined amount of wait time passes, an RMS resource will be considered as fault then userApplication will be degenerated. During the wait time, the RMS resource indicates Warning.   If recovery is detected within the wait time, the RMS resource will get back to Online.

- **Flags**
Flags=< Abbreviation > indicates that the flag attribute is enabled.

13. Select "SAVE+EXIT"

```
Oracle (Ora_APP3:consistent)
1) HELP
2) -
3) SAVE+EXIT
4) REMOVE+EXIT
5) AdditionalOracle10gNodeapps
6) AdditionalOracle10gClusterware
7) Oracle10gNAPResource[0]=ora.rac.rac1.inst
8) Oracle10gNAPResource[1]=ora.node1.LISTENER_NODE1.lsnr
Choose the setting to process: 3
```

14. Select "SAVE+EXIT"

```
Settings of turnkey wizard "WIZSTANDBY" (APP3:not yet consistent)
 1) HELP                              9) Procedure:BasicApplication(-)
 2) -                               10) Oracle(Ora_APP3)
 3) SAVE+EXIT                        11) Symfoware(-)
 4) -                               12) Procedure:SystemState3(-)
 5) ApplicationName=APP3            13) Procedure:SystemState2(-)
 6) Machines+Basics(app3)          14) Gls:Global-Link-Services(-)
 7) CommandLines(-)                 15) LocalFileSystems(-)
 8) Procedure:Application(-)        16) Gds:Global-Disk-Services(-)
Choose the setting to process: 3
```

15. Repeat the procedure from step 1 to 14 for each node.

2.3.6   Other Resource Registration

If there are other necessary resources, register them using the userApplication Configuration Wizard.   As described in "2.3.1 PRIMECLUSETER Installation and Configuration", PRIMECLUSTER GDS volumes on which OCR and Voting Disk Oracle databases are configured must not be registered as RMS resources.

2.3.7   Configuration-Generate and Configuration-Activate

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

```
node1: Main configuration menu, current configuration: config_RAC
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:
```

Information

You can check userApplication setup using the clorainfo -c command.   For details, refer to "4.6 clorainfo - Display Resource Configuration and Monitoring Status".

Note

Before creating and distributing RMS configuration , make sure that Oracle Clusterware has been activated on the node where RMS Configuration Wizard is running, so the "crs_stat" command can be executed correctly with Oracle DBA user.

If Oracle Clusterware has not been activated, execute the following command as a root user.

```
# /etc/init.d/init.crs start
```

When Oracle Clusterware startup is completed, be sure to confirm that the "crs_stat" command can be executed correctly.

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

2.3.8   userApplication Operation Check

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

   a. 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.
   b. Check if you can access the operating node from the client using the logical IP address.
   c. Check if you can access to Oracle running on the operating node from the client using the logical IP adders.

Information

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

2.4 Information

2.4.1 Oracle Online Script and Oracle Offline Script

In PRIMECLUSTER Wizard for Oracle, it is possible to make the original user's processing executed before and behind on the way of the start and the stop (Online processing and Offline processing) of the Oracle instance and the listener or that. For instance, the start, the stop, and the batch processing of the application can be executed by synchronizing with the start and the stop of the Oracle instance and the listener.

Script Type

Script			Description
startup	PreOnlineScript		Executed before OnlineScript. Set up in RMS Wizard ("hvw" command).
	OnlineScript		Starts resource up during userApplicatoin Online processing. It is impossible to setup by user.
		prestartup*	It is usable only for the Oracle instance resource in standby operation. Executed before Oracle instance startup. If the Oracle state (STATUS of the V$INSTANCE view) has to be checked Put the executable file that begins with "prestartup" in the "/opt/FJSVclora/usr" directory.
		nomount*	It is usable only for the Oracle instance resource in standby operation. Executed when the Oracle status (STATUS column in V$INSTANCE view) is "STARTED" during Oracle 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 status (STATUS column in V$INSTANCE view) is "MOUNTED" during Oracle 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 userApplicatoin 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).

For information on how to set up the script, refer to "these scripts, refer to step "5 or 6" of "2.2.9", step "8" of "2.3.4", step "12" of "2.3.5".

- **PreOnlineScript**
- **PostOnlineScript**
- **PreOfflineScript**
- **PostOfflineScript**
- **FaultScript**

For detail of these scripts, refer to "<u>3.1</u>".
- **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**	-	-
	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 prestartup*, 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 are executed, 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.

![Information]

For details of each script, refer to "2.6.3 Scripts" of 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 "5 or 6" of "2.2.9", step "8" of "2.3.4", step "12" of "2.3.5".

![Note]

The user scripts above are enabled in standby operation.
Note that they cannot be used in Oracle RAC scalable operation.

2.4.2 ASM (Automatic Storage Management)

Automatic Storage Management (hereafter ASM), which is one of the new Oracle 10g features, can be used for 1:1 standby operation or scalable operation only, but not for mutual standby operation and N:1 standby operation.

1:1 standby operation

Create an ASM instance resource.

The ASM instance will not be monitored, but only started or stopped

If the 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.

Scalable operation

Do not create an ASM instance resource if ASM is used for Oracle RAC.   The ASM instance will be controlled by Oracle Clusterware.

2.4.2.1   Environment configuration

Creation and configuration of ASM instances

Operation node

The 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.

ASM instance name must begin with "+".   The default name is "+ASM".

Refer to the Oracle 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/<ASM instance name>

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.

Set CSS daemon, and start it.   The operation node is set and started automatically.   In one side, standby node is not set and started automatically.

If required files on the operating node is backed up in the tar format with the /opt/FJSVclora/sbin/cloracpy command, configuration information of the ASM instance will not be backed up.   Copy the following file manually in the tar format:

$ORACLE_BASE/admin/<ASM instance name>

ASM initialization parameter check

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

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

userApplication creation

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

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

2.4.2.2   Precaution for ASM operation

A disk group that is used for the ASM instance must not be mounted or unmounted manually.   F the disk group is mounted, the following message might be output to the console when the 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 Control through PRIMECLUSTER Wizard for Oracle

3.1.1　Standby Operation

This section discusses how PRIMECLUSTER Wizard for Oracle controls Oracle in standby operation.

Oracle startup

Oracle is started through a shell script.　The startup procedure is as follows:

1. su - <Oracle DBA 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 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

A server parameter file should be located in the shared disk because the file contents are changed dynamically.　When a server parameter file is used, enter the full path of the server parameter file in an initialization parameter file.
It is recommended that the same values for initialization parameters are set between cluster nodes.

The server parameter file must be located on the shared disk device because it is dynamically changed.　When you use the server parameter file, enter the full path for the initialized parameter file.　Refer to "2.2.7 Oracle Database Creation and Setting".

It is recommended that the initialized parameter file settings are the same on the operating nodes and standby nodes.

Recovery processing

PRIMECLUSTER Wizard for Oracle recovers the Oracle instance in the following cases:
1. When there is ACTIVE table space in the V$BACKUP view.
2. When there are files required to be recovered in the V$RECOVER_FILE view.

When RAC is running, the above recovery processing is exception.

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 shutdown

When users shut down and switch Oracle, the procedure is as follows:

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

The procedure of stopping failed Oracle resources including non-Oracle resources is as follows:

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

Oracle monitoring

Oracle is monitored through binary programs.   The monitoring procedure is as follows:

1. Check the background process (PMON, SMON) periodically.   If the process status can be confirmed, go to step 2.
2. su - <Oracle DBA user>
3. Local connection to the Oracle instance as a system user
4. Check if Oracle status is OPEN
5. Check if the background process (PMON, SMON, DBWn, LGWR, CKPT) are alive.
6. Check if "insert", "update" and "delete" ca be properly executed using the monitoring table on the system user's default table space
7. Oracle is reconnected once every 24 hours.

If Oracle is stopped, 1 is executed at a 30 second interval (static).   If Oracle gets activated, 2 or after is executed.   If node startup is completed then the node is operating, only 5 and 6 are executed at a regular interval.   The default value is 30 seconds, and can be changed.   Note that "6" is executed at a 60-second interval at least.

System user password

PRIMECLUSTER Wizard for Oracle monitors Oracle as a system user.   Set the system user's password.   Refer to "2.2.7 Oracle Database Creation and Setting".

Monitoring table

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 is only a few bites, and will not be deleted.
Monitoring table name is generated as follows:

FAILSAFEORACLE_<ORACLE_SID>

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 cannot be connected due to incorrect system user's password that is registered with the "clorapass" command (ORA-01017 detected)

- Since the system user password is wrong, so Oracle connection is not allowed

- When the max session or max process error occurs, so Oracle connection is not allowed

- While monitoring SQL (e.g. insert and update) is not replied for a certain period of time, but Oracle connection is allowed, and the Oracle status is OPEN.

Monitoring timeout

If monitoring SQL (insert, update) is released, and there is no reply from Oracle after a certain period of time, the monitoring timeout will be considered then the Oracle instance resource will be put into Warning.   If the monitoring timeout occurs for twice in a row, a resource will be considered as fault then a failover or degradation will be performed.
The monitoring timeout (the wait time from Oracle) can be changed with WatchTimeout.

Listener startup

Listener is started through a shell script.   The startup procedure is as follows:
1.   su - <Oracle user>
2.   lsnrctl start <ListenerName>
3.   Make sure that a Listener process does exist.

Listener shutdown

Listener is shutdown through a shell script.   The startup procedure is as follows:
1.   su - <Oracle user>
2.   lsnrctl stop <ListenerName>
3.   Make 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 Listener process.

Listener monitoring

Listener is monitored through binary programs.   The monitoring procedure is as follows:
1.   Make sure that a Listener process does not exist.
2.   Make sure that the net service name is valid with tnsping if TNSName is set.

If a listener of a standby node is stopped, execute 1 at regular time intervals.   If the listener gets activated and becomes an operating node, execute "1" and "2" at regular time intervals.   The default interval time is 30 seconds, and it can be changed with Interval.   Note that "2" executed at a 60-second interval at least.

3.1.2   Oracle RAC 10g Scalable Operation

In Oracle RAC 10g, the Oracle instances and listeners are automatically started, monitored, and recovered through the Oracle Clusterware.   If PRIMECLUSTER Wizard for Oracle detects a resource failure, it will notify RMS of the "Warning" state then ask Oracle Clusterware to generate a failover or recover the failed resource (depending on the WFTime setting).

Also, the resources are started or stopped along with userApplication startup and stop.

Oracle RAC instance startup

Start an Oracle RAC instance as follows:

1. su - <Oracle user>
2. srvctl start instance -d *$DB_NAME* -i *$ORACLE_SID*

Oracle RAC instance stop

Stop an Oracle RAC instance as follows:

1. su - <Oracle user>
2. srvctl stop instance -d *$DB_NAME* -i *$ORACLE_SID*

Oracle RAC instance monitoring

The Oracle monitoring setup is the same as standby operation. However, the monitoring interval is 60 seconds and cannot be changed.

For details, refer to "Oracle monitoring" of "3.1.1 Standby Operation".

Listener startup

Start a Listener as follows:

1. su - <Oracle user>
2. srvctl start listener -n *$NODE_NAME* -l *$LSNR_NAME*

Listener shutdown

Listener stop depends on Oracle Clusterware, not PRIMECLUSTER Wizard for Oracle.

Listener monitoring

The Oracle monitoring setup is the same as standby operation.

However, the monitoring interval is fixed at 60 seconds, and tnsping monitoring is not performed.

For details, refer to "Oracle monitoring" of "3.1.1 Standby Operation".

Oracle Clusterware startup

Start Oracle Clusterware as follows:

1. /etc/init.d/init.crs start
2. Check if Oracle Clusterware is activated using crs_stat -t.

Oracle Clusterware stop

Stop Oracle Clusterware as follows:

1. /etc/init.d/init.crs stop

Oracle Clusterware monitoring

PRIMECLUSTER Wizard for Oracle does not monitor Oracle Clusterware. NullDetector flag is automatically enabled.

- Oracle listeners are started or stopped through Oracle Clusterware. The other resources such as vip, gsd, and ons are also started or stopped.

- If you want to startup, stop, or switch Oracle instances, execute hvswtich and hvutil on RMS userApplication.   If you execute the Oracle Clusterware srvctl command or shutdown command to the Oracle instance directly, PRIMECLUSETR will consider that the instance fails, and recovery processing might be initiated for the Oracle instance.   To executing the command, put userApplication into maintenance mode.

3.2   Oracle Maintenance

This section discusses how to change Oracle settings, apply Oracle patches, back up 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 startup and stop.

Oracle is monitored during userApplication operation.   If Oracle is stopped manually, then the cluster system will consider that the Oracle resource fails, so Oracle will be restarted or Oracle operation will be switched to the standby node.

While userApplication is not running, the shared disk is deactivated.

If you need to control Oracle manually for Oracle cold backup or other maintenance tasks, stop monitoring the Oracle instances and listeners temporarily.

The basic maintenance procedure is as follows:

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

2.   Stop monitoring
     Stop monitoring the Oracle instance and listener resources by executing the "hvoradisable" command.   This will prevent resource failures when Oracle is stopped manually.
     Before going on to the next step, be sure to check that resource monitoring is disrupted.

3.   Confirmation of stop monitoring
     Confirm stop monitoring was normally done.
     (Refer to note of "4.1 hvoradisable - Discontinue Monitoring Resources".)

4.   Stop Oracle-dependent resources
     Before stopping Oracle, stop Oracle-dependent resources manually if there are any.   If resource monitoring is disrupted with the "hvoradisable" command, stop monitoring the Oracle-dependent resources using the RMS command "hvdisable" then stop them manually.

5.   Stop Oracle
     Stop Oracle manually.

6.   Do maintenance on Oracle
     Change the Oracle settings, apply Oracle patches, back up and recovery Oracle databases.

7.   Start Oracle
     After the maintenance is completed, start Oracle.   Restart the Oracle 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-dependent resources
     If Oracle-dependent resources are stopped, start them manually before canceling maintenance mode or start resource monitoring again.   If resource monitoring is disrupted with the "hvoradisable" command, start resource monitoring the Oracle-dependent resources again using the RMS command "hvenable", then start them

manually.

9. Restart resource monitoring
   Start monitoring the Oracle instance and listener resources again using the hvoraenable command.

10. Confirmation of restart monitoring
    Confirm restart monitoring was normally done.
    (Refer to note of "4.2 hvoraenable - Restart Monitoring Resources".)

- Maintenance mode and resource monitoring
  To stop Oracle 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.

- Oracle RAC 10g
  To operate Oracle RAC 10g resources, control RMS userApplication without using the srvctl or shutdown command. If you execute the command to the Oracle instance directly, PRIMECLUSETR will consider that the resource fails, and recovery processing might be initiated for the Oracle resource. To executing the command, put userApplication into maintenance mode.

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

- 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.

- State transition during maintenance
  If Oracle monitoring is stopped with the "hvoradisable" command, the Oracle resources will fail, or the state transition will not occur even though the resources are stopped manually. However, the state transition might occur due to other reasons then Oracle.

- Resource state during monitoring
  If the "hvoradisable" command properly stops monitoring the resources, they will enter Warning.

3.2.1   Oracle Setting Change

You can change Oracle settings such as initialized parameters and data files using the

procedures described below.

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

3.2.1.1   Oracle must be stopped

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

1. Monitoring disruption

```
# hvoradisable -a <userApplication>
```

2. Oracle stop

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

3. Confirmation of stop monitoring
   Confirm stop monitoring was normally done.
   (Refer to note of "4.1 hvoradisable - Discontinue Monitoring Resources".)

4. Setup change
   Change Oracle settings such as initialized parameters and data files.

5. Oracle startup

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

6. Monitoring restart

```
# hvoraenable -a <userApplication>
```

7. Confirmation of restart monitoring
   Confirm restart monitoring was normally done.
   (Refer to note of "4.2 hvoraenable - Restart Monitoring Resources".)

If there are Oracle-dependent resources, the procedure with the monitoring disruption command might not work.   When Oracle resources are stopped with the monitoring disruption command then Oracle is stopped manually, the Oracle-dependent resource might fail.
You need to check the status of the Oracle-dependent resource when you stop Oracle manually.

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:

1. Monitoring disruption

   ```
   # hvoradisable -a <userApplication>
   ```

2. Oracle stop (if necessary)

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

3. Confirmation of stop monitoring
   Confirm stop monitoring was normally done.
   (Refer to note of "4.1 hvoradisable - Discontinue Monitoring Resources".)

4. Patch application
   Apply patches according to the Oracle manual.

5. Oracle startup (if stopped)

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

6. Monitoring restart

   ```
   # hvoraenable -a <userApplication>
   ```

7. Confirmation of restart monitoring
   Confirm restart monitoring was normally done.
   (Refer to note of "4.2 hvoraenable - Restart Monitoring Resources".)

3.2.3　　Backup

This section discusses how to back up Oracle databases.

3.2.3.1　　　Cold backup

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

1. Monitoring disruption

```
# hvoradisable -a <userApplication>
```

2. Confirmation of stop monitoring
   Confirm stop monitoring was normally done.
   (Refer to note of "4.1 hvoradisable - Discontinue Monitoring Resources".)

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

4. Cold backup
   Perform cold backup of the database.

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

6. Monitoring restart
```
# hvoraenable -a <userApplication>)
```

7. Confirmation of restart monitoring
   Confirm restart monitoring was normally done.
   (Refer to note of "4.2 hvoraenable - Restart Monitoring Resources".)

If there are Oracle-dependent resources, the procedure with the monitoring disruption command might not work.   When Oracle resources are stopped with the monitoring disruption command then Oracle is stopped manually, the Oracle-dependent resource might fail.
You need to check the status of the Oracle-dependent resource when you stop Oracle manually.

3.2.3.2   Hot backup

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

1. Monitoring disruption
```
# hvoradisable -a <userApplication>
```

2. Confirmation of stop monitoring
   Confirm stop monitoring was normally 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

hvoraenable -a <userApplication>

5. Confirmation of restart monitoring
    Confirm restart monitoring was normally 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 stop.

When Oracle 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 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 manual

3.2.4.1 Oracle must be stopped

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

1. userApplication stop

hvutil -f <userApplication>

2. Monitoring disruption

hvoradisable -a <userApplication>

3. Confirmation of stop monitoring
    Confirm stop monitoring was normally done.
    (Refer to note of "4.1 hvoradisable - Discontinue Monitoring Resources".)

4. userApplication startup

hvswitch <userApplication>

5. Recovery
    Recover the database.

6. Oracle startup

# su - < Oracle user >
$ lsnrctl start <listener name>

```
$ sqlplus /nolog
SQL> connect / as sysdba
SQL> startup
```

7. Monitoring restart

```
# hvoraenable -a <userApplication>
```

8. Confirmation of restart monitoring
    Confirm restart monitoring was normally done.
    (Refer to note of "4.2 hvoraenable - Restart Monitoring Resources".)

3.2.4.2   Oracle does not need to be stopped

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

1. Monitoring disruption

```
# hvoradisable -a <userApplication>)
```

2. Confirmation of stop monitoring
    Confirm stop monitoring was normally 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

```
# hvoraenable -a <userApplication>
```

5. Confirmation of restart monitoring
    Confirm restart monitoring was normally 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 command as follows on all the cluster nodes.

    ```
    # 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.
    In standby operation, change the password on the operating node.   In scalable operation with Oracle RAC 10g, change the password on any one of the nodes.

    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
    ```

3. Register the Oracle system user password to Wizard for Oracle
    Register the Oracle system user password to Wizard for Oracle using the clorapass command.
    In standby operation, register the password on the operating node.   In scalable operation with Oracle RAC 10g, register the passwords for each instance on any one of the nodes.

    ```
    # /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 command as follows on all the cluster nodes.

    ```
    # hvoraenable -a <userApplication>
    ```

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

    > INFO: 0102: Fault Watching is enabled

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

- For information on how to change the Oracle system user password, refer to the Oracle manual.
- For the "clorapass" command, refer to "4.3 clorapass - Register Password for Monitoring".
- For the "hvoraenable" command, refer to "4.2 hvoraenable - Restart Monitoring Resources".

3.4   Corrective Action against Failover

Oracle logging

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

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 delete the files.

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 information

Configuration files

$ORACLE_HOME/network/admin/*.ora

$ORACLE_HOME/dbs/*.ora

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

Log files

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

$ORACLE_BASE/admin/$ORACLE_SID/bdump/alert_$ORACLE_SID.log

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

$ORA_CRS_HOME/crs/log/<nodename>.log (Oracle RAC 10g)

PRIMECLUSTER information

You can collect troubleshooting information by executing the "fjsnap" command of PRIMECLUSTER.   Refer to the "PRIMECLUSTER Configuration and Administration Guide".

PRIMECLUSTER Wizard for Oracle information

Configuration files

/opt/FJSVclora/etc/*

/usr/opt/reliant/etc/hvgdconfig

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

Log files

/var/opt/reliant/log/*

Information

You can collect troubleshooting information for Oracle and PRIMECLUSTER Wizard for Oracle using the 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 information can be collected only if PRIMECLUSTER Wizard for Oracle is correctly set.

For information on how to collect troubleshooting information of PRIMECLUSTER Wizard for Oracle only, refer to "4.5 clgetoralog – Collect Troubleshooting Information".

3.6   Log Files

PRIMECLUSTER Wizard for Oracle provides user interfaces that allow users to perform unique operation during Oracle instance startup.

- /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.

  Information
  Refer to "PRIMECLUSTER Installation and Administration Guide".

- /var/opt/FJSVclora
  Log files having information about monitoring are stored in this directory.
  Required disk space for the directory is described below;
  - Oracle instance resource
    6.0 MB per resource
  - Listener resource
    5.0 MB per resource
  - ASM instance resource
    0.0 MB per resource (no output)
  - Oracle Clusterware 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 consumption management by RMS is not performed, because of these logs are out of management of RMS. the amount of consumption management by RMS is not performed because these logs are management outside in RMS.

Do not delete or edit these log files.   They are required for investigation.

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 will automatically cancel resource monitoring.

The ASM instance resource and Oracle Clusterware resource are not monitored, so it is not necessary to discontinue monitoring the resource with the command.   For further details about ASM instance resources, refer to "2.4.2 ASM (Automatic Storage Management)".

Parameter

userApplication   Resource
Specify userApplication including Oracle resources that will be disrupted monitoring for *userApplication*.
Specify either of the Oracle instance or Oracle listener that will be disrupted monitoring for *Resource*.
Specify all the resources them on the local node.

-a   [*userApplication*]
The option discontinues monitoring all Oracle instance and 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
Non-0: Abnormal termination

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

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

- Do not execute the command during the 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-seconds interval is necessary.)
- Do not operate Oracle instance and listener by the manual operation right after execution of the command.
  By the following, It can be confirmed that monitoring is disrupted by the hvoradisable command became effective

  - The message of "INFO: 0101: Fault Watching is disabled" was output to syslog.
  - The resource state enters Warning.
  - The results of clorainfo -m enters 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.

The ASM instance resource is and Oracle Clusterware resource are not monitored, so it is not necessary to cancel resource monitoring for them with the command.
For further details about ASM instance resources, refer to "2.4.2 ASM (Automatic Storage Management)".

Parameter

userApplication   Resource
Specify userApplication including Oracle resources that will be disrupted monitoring for *userApplication*.
Specify either of the Oracle instance or Oracle listener that will be disrupted monitoring for *Resource.*
Specify all the resources them on the local node.

-a   [*userApplication*]
The option restarts monitoring all Oracle instance and 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
Non-0: Abnormal termination
2: Abnormal termination (disruption of resource monitoring with the -a option fails)

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.
- Please do not start of userApplication and do not stop immediately after the execution of this command (Please put for about five seconds).
- The Oracle instance and the listener must start manually before executing this command while the watch is interrupting when the manual operation has stopped.
- By the following, It can be confirmed that monitoring is restart by the hvoraenable command became effective

    - The message of "INFO: 0102: Fault Watching is enabled" was output to syslog.
    - The resource state enters Online.
    - The results of clorainfo -m enters 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.   In scalable operation (RAC) with multiple Oracle instances, execute the command for each Oracle instance then register the Oracle SYSTEM user password.

Parameter

None.

Exit status

0: Normal termination

Non-0: Abnormal termination

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

For scalable operation, the Oracle SYSTEM user password needs to be registered for each instance.

Example: In case of DB_NAME=ora, ORACLE_SID=ora1, ORACLE_SID=ora2,

Execute the command twice then register password for ora1 and ora2 respectively.

4.4 cloracpy - Create Backup File for Oracle Database Setup

User

Oracle DBA user

Format

/opt/FJSVclora/sbin/cloracpy

Function

cloracpy enables users to back up 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:
- The $ORACLE_HOME and $ORACLE_BASE settings are the same between the operating node and the standby nodes.
- The Oracle 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/

The files on the operating node will be stored in the "/tmp/oracle.$ORACLE_SID.tar" file. Then, they will be deployed on the standby node with the "tar xvfP /tmp/oracle.$ORACLE_SID.tar" command.
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 information for troubleshooting.　"clgetoralog" command collects Oracle setup 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 alert log
background_dump_dest/*.log
$ORACLE_BASE/admin/$ORACLE_SID/bdump/*.log
$ORACLE_HOME/rdbms/log/*.log
$ORACLE_HOME/dbs/*.log
- listener.ora, tnsnames.ora
$ORACLE_HOME/network/admin/*.ora
- Listener log
$ORACLE_HOME/network/log/*.log
- Oracle Clusterware information
$ORA_CRS_HOME/crs/admin/*
$ORA_CRS_HOME/crs/log/* ($ORA_CRS_HOME/log/<hostname>/crsd/*)
- 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, ps -ewm -o (process information)
ntpq -p (NTP information)
/var/log/messages file

Info·mation

"pclsnap" command can also be used to collect troubleshooting information.

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/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" 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

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

Exit status

0: Normal termination

Non-0: Abnormal termination

This command gets the value of background_dump_dest parameter from the initialized parameter file or the server parameter file, and searches the Oracle alert log. However, if these parameter files can not be read (e.g. the server parameter file exists on a shared disk that is not mounted), the alert log is not also collected.

To prevent it, define the alert log in /opt/FJSVclora/etc/clgetoralog.conf using the full path so that you can acquire the alert log. Where the alert log is stored is defined in background_dump_dest

parameter. (background_dump_dest parameter can be found in the initialized parameter file or the server parameter file. It can be also displayed by SQL "show parameter background_dump_dest".)

The following example shows how to define /opt/FJSVclora/etc/clgetoralog.conf:

```
COLLECTOBJ=/oracle/admin/orclsid/bdump/alert_orclsid.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 wild card characters are frequently used, and the data size becomes larger than 10MB, you can not collect troubleshooting information.

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 setup information on the local node.

Information

When a Listener resource created in Oracle RAC scalable operation, it is impossible to set TNSName attribute of the resource even if "TNS name registered in RMS" item is displayed by "clorainfo -e" command.

```
# /opt/FJSVclora/bin/clorainfo -e
   :
 node1 : Ora_APP1_LISTENER_NODE1.l
 ------------------------------------------------------------
 User registered in RMS (uid) : oracle (504)
 User Group (gid)             : oinstall (504)
                              : dba (505)
 ORACLE_HOME                  : /u01/app/oracle/product/db
 Listener registered in RMS   : LISTENER_NODE1
 Protocol Addresses           : (DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)...
                              : (DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)...
 TNS name registered in RMS   : ----
   :
```

-m ［ *ResourceName* ］

The option displays whether or not Wizard for Oracle resources is 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.

- Operating several different versions of Oracle products on a PRIMECLUSTER system is not supported.   For the Oracle 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.
- If multiple ORACLE_HOME are configured on one server, a different user name must be assigned respectively.
- An Oracle database must be configured on the shared disk.
- Setting Oracle log output on the shared disk is not recommended.   When a disk device fails, log might not be output, or the Oracle instance might not be started.
- For Oracle archive log files, you should pay close attention to the following points:
    - In the case of allocating the file on a local disk
      If Oracle recovery is required, the Oracle archive log files on both nodes will be put together.
    - In the case of allocating the file on a shared disk
      You should pay close attention to insufficient space to archive.
- The Oracle "TWO_TASK" environment variable cannot be used.   For details, refer to "2.2.7 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 "2.2.7 Oracle Database Creation and Setting".
- The password file authentication cannot be used.   Use OS 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.   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 "2.2.9 userApplication with Oracle Resources" or "2.3.5 userApplication with Oracle RAC Instances and Listeners" 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 cannot be used.   Use OS 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 failure of userApplication startup or shutdown.
    For details, refer to "2.2.2 Oracle Installation and Configuration" or "2.3.2 Oracle

Installation and Configuration".

- In Oracle 10g or later environment, operating system authentication of Listener should be enabled.   For details, refer to "2.2.7 Oracle Database Creation and Setting".

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 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 in the following situations:
  - A DBA user is being connected to the Oracle instance, or
  - Online backup is the Oracle instance is in progress
  If this occurs, Wizard for Oracle will shut down the Oracle instance with "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.   Note that if Oracle RAC is used in a system, automatic recovery will not be performed.

Example

```
# cd /opt/FJSVclora/usr
# mv ./_mount10EndBackup.sh ./mount10EndBackup.sh
# mv ./_mount20EndBackup.sh ./mount20EndBackup.sh
# mv ./mount05EndBackup_MediaRecover.sh
      ./_mount05EndBackup_MediaRecover.sh
```

Information

For details, refer to "2.4.1 Oracle Online/Offline Script".

- In Oracle RAC 10g scalable operation, an RMS resource is created based on the resource name of Oracle RAC 10g.   For details, refer to"2.3.2 Oracle Software Installation and Configuration".
- MonitorOnly can be enabled in the following cases.   For details, refer to "2.2.9 userApplication with Oracle Resources".
  - One resource of "Instance" type and one resource of "Listener" type exist, and StartPriority is set to "Same".   In this case, MonitorOnly only for the one of them can be enabled.
  - More than one resources of "Instance" type exist.   In this case, MonitorOnly for the one of them cannot be enabled, but all of the others can be enabled.
  - More than one resources of "Listener" type exist.   In this case, MonitorOnly for the one of them cannot be enabled, but all of the others can be enabled.
- Do not execute "srvctl" or "sqlplus" commands to shut down Oracle instance.   It might cause mismatched status between RMS and Oracle RAC.

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, and FaultScript. For details, refer to "2.4.1 Oracle Online/Offline Script".

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".

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.

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=xx**

  [Content]

  The "errno" setting of the action definition file is incorrect.

  [Corrective action]

  Check the "errno" setting of "line=%d" in the action definition file.

- **ERROR: 1205: Corrupted actionlist: Invalid status, line=xx**

  [Content]

  The "status" setting of the action definition file is incorrect.

  [Corrective action]

  Check the "status" setting of "line=%d" in the action definition file.

- **ERROR: 1206: Corrupted actionlist: Invalid action, line=xx**

  [Content]

  The "action" setting of the action definition file is incorrect.

  [Corrective action]

  Check the "action" setting of "line=%d" in the action definition file.

- **ERROR: 1208: <Oracle process> process error**

  [Content]

  An Oracle process error was detected.

  [Corrective action]

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

- **ERROR: 1213: Action error detected: Offline**
  [Content]
  The "Offline" state of the resource will be notified.
  [Corrective action]
  Check if Oracle is properly running by referring to the Oracle alert log.

- **ERROR: 1214: Action error detected: Faulted**
  [Content]
  The "Faulted" state of the resource will be notified.
  [Corrective action]
  Check if Oracle is properly running by referring to the Oracle alert log.

- **ERROR: 1215: Action error detected: Restart**
  [Content]
  Monitoring will be retried.
  [Corrective action]
  Check if Oracle is properly running by referring to the Oracle alert log.

- **ERROR: 1219: Cannot read hvgdconfig**
  [Content]
  The RMS configuration file (hvgdconfig file) cannot be read.
  [Corrective action]
  Modify the RMS configuration file manually then check the file settings.

- **ERROR: 1220: Not Found xx setting in hvgdconfig**
  [Content]
  The "%s" 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 error "ORA-xxxxx" is output.
  [Corrective action]
  Check if Oracle is properly running by referring to the Oracle alert log.

- **WARN: 1302: Action error detected: Warning**
  [Content]
  The warning state of the resource will be notified.
  [Corrective action]
  Check if Oracle is properly running by referring to the Oracle alert log.

- **ERROR: 3402: clorainstance detected Oracle error! (ORA-xxxxx:)**
  [Content]
  An Oracle error occurred while Oracle startup or shutdown was in progress (svrmgrl).
  [Corrective action]
  Check if Oracle is properly running by referring to the Oracle alert log.

- **ERROR: 3403: clorainstance detected Oracle error! (ORA-xxxxx:)**
  ERROR: 7301: clasminstance detected Oracle error! (ORA-xxxxx:)
  [Content]
  An Oracle error occurred while Oracle startup or shutdown was in progress (sqlplus).
  [Corrective action]
  Check if Oracle is properly running by referring to the Oracle 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]
Modify the RMS configuration file manually then check the file settings.

- **ERROR: 2205: Not Found xx setting in hvgdconfig**
  [Content]
  The "%s" 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 (xx)**
  [Content]
  Listener monitoring with the 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 the hvoraenable command to restart resource monitoring.

- **INFO: 0102: Fault Watching is enabled**
  [Content]
  Resource monitoring was restarted after the "hvoraenable" command was executed.
  [Corrective action]
  None.

For details of the commands, refer to "4.1 hvoradisable - Discontinue Monitoring Resources", "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 xx 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 xx**
  [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]
  The problem might be due to insufficient system resource. Check the system environment.

- **ERROR: 0225: Receiving of monitoring result failed (*detail*)**
  [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: 0226: Watch Timeout occurred (*count*)**
  [Content]
  Since there's no response from Oracle or Listener, timeout occurs.
  [Corrective action]
  Check if Oracle or Listener is properly running by referring to the Oracle 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.

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]
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]
  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]
  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 continue 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 cluster application
  (userApplication) 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 is 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 your system administrator.

- **command: ERROR: Failed to disable/enable resource monitoring - resource_name**
  [Content]
  Cannot disable or enable monitoring.
  [Corrective action]
  Contact your system administrator.

- **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 execute an 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 cluster application (userApplication) 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 is 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 exists on this node! - SysNode_name**
  [Content]
  There is 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.

- ***ORACLE_BASE*/admin/*ORACLE_SID* is invalid.**
  [Content]
  ORACLE_BASE/admin/*ORACLE_SID* directory does not exist.
  [Corrective action]
  Check if the directory exists.

- **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 and stop failure	A.1.1
	Failover	A.1.2
	Warning status	A.1.3
Oracle listeners	Startup and stop failure	A.2.1
	Failover	A.2.2
	Warning status	A.2.3

A.1   Oracle instances

A.1.1   Startup and stop failure

Oracle instance startup or stop failed.

[Case 1] (Standby, Oracle RAC Scalable)

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

Check the resource setup information by executing the "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] (Standby)

Oracle instance startup or stop fails when user script settings in /opt/FJSVclora/usr are incorrect.

Check if the user scripts behave correctly.

[Case 3] (Standby, Oracle RAC Scalable)

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

Check the Oracle alertlog, so you might be able to detect the cause of the failure.

Also, check if Oracle can be started or stopped properly.   If you discontinue Oracle instance resource monitoring, you can operate Oracle manually.   Refer to "3.2.4.1 Oracle must be stopped".

[Case 4] (Oracle RAC Scalable)

When starting userApplication with Oracle RAC Instances resource in the state where Oracle Clusterware is not running, the resource state enters Wait until exceeds the time set as ScriptTimeout (refer to step "12" - 2.3.5). If it exceeds the time set as ScriptTimeout with the resource state maintain Wait, the resource state will enter Faulted.

Execute the following methods according to each pattern.
- In the case of configuration that the Oracle Clusterware and Oracle RAC instance are registered in different userApplication. (It matches "Configuration A" in "2.3.3 userApplication Creation".)

At first, check whether Oracle Clusterware is running.
The following command execution, you can check whether Oracle Clusterware is running.

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

When the following message is outputted, Oracle Clusterware may be not running.

```
CRS-0184: Cannot communicate with the CRS daemon.
```

When Oracle Clusterware is not running, there is a possibility that the setting that Oracle Clusterware starts earlier than Oracle RAC Instance is incorrect.

Check whether the script which starts Oracle Clusterware resource is set as the PreOnlineScript of Oracle RAC Instance (refer to "note" of step "8" of "2.3.5 userApplication with Oracle RAC Instances and Listeners").

- In the case of configuration that the Oracle Clusterware and Oracle RAC instance are registered in the same userApplication. (It matches "Configuration B" in "2.3.3 userApplication Creation".)

There is a possibility that starting of Oracle RAC Instance resource is failed.

Check whether you have no mistakes in setting of Oracle RAC Instance resource (2.3.5 userApplication with Oracle RAC Instances and Listeners).
In addition, check whether you have no mistakes in setting of PRIMECLUSTER RMS and Oracle (refer to "Case 1" and "Case 3").

- In the case of configuration that the Oracle Clusterware is not registered. (It matches "Configuration C" in "2.3.3 userApplication Creation".)

Check whether Oracle Clusterware is running.

The following command execution, you can check whether Oracle Clusterware is running.

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

When the following messages are outputted, Oracle Clusterware may be not running.

```
CRS-0184: Cannot communicate with the CRS daemon.
```

Clear Faulted state of the resource, after that, execute the following commands and start Oracle Clusterware.

```
# /etc/init.d/init.crs start
```

After that, start userApplication.

A.1.2   AutoRecover or Failover

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

[Case 1] (Standby, Oracle RAC Scalable)

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

Check the Oracle alertlog, so you might be able to detect the cause of the failure.

Also, back up archive logs then reserve enough disk space.

[Case 2] (Standby, Oracle RAC Scalable)

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 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

An Oracle instance resource has entered Warning.

[Case 1] (Standby, Oracle RAC Scalable)

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, or
- 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] (Standby, Oracle RAC Scalable)

An Oracle instance resource enters Warning when the Oracle system user account is locked, so you are not allowed to connect to Oracle.

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.

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 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.   If this is the 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] (Standby, Oracle RAC Scalable)

An Oracle instance resource enters Warning when instance 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 Oracle 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] (Standby, Oracle RAC Scalable)

In Oracle instance monitoring, an Oracle instance resource enters Warning if there is no reply from SQL (e.g. insert, update, etc.) within a specified time, but you can access Oracle, 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 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.

[Case 5] (Standby, Oracle RAC Scalable)

In Oracle instance monitoring, an Oracle instance resource enters Warning if you cannot access Oracle 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.

For details, refer to the Oracle manual.

[Case 6] (Oracle RAC Scalable)

The monitoring of Oracle RAC Instance resource becomes failure when setting of WFTime is the followings, the resource state enter Warning until it is recovered by Oracle Clusterware.

- [PersistentWarning]
- [<second>]

It is possible to check setting of WFTime by the "clorainfo -c" command. (For detail of "WFTime", refer to step "12" of"2.3.5 userApplication with Oracle RAC Instances and Listeners").

Check whether the cause of resource failure is reported referring to the Oracle alert log or log files.

A.2   Oracle listeners

A.2.1   Startup and stop failure

Oracle listener startup or stop failed.

[Case 1] (Standby, Oracle RAC Scalable)

Oracle listener startup or stop fails when the PRIMECLUSTER RMS resource settings are invalid.
Check the following resource setup information by executing the "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] (Standby, Oracle RAC Scalable)

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.
Also, check if the listener can be started or stopped properly.   If you discontinue Oracle instance resource monitoring, you can operate Oracle manually.   Refer to "3.2.4.1 Oracle must be stopped".

[Case 3] (Oracle RAC Scalable)

When starting userApplication with listener resource in the state where Oracle Clusterware is not running, the resource state enters Warning until exceeds the time set as ScriptTimeout (refer to step "12" - 2.3.5).   If it exceeds the time set as ScriptTimeout with the resource state maintain Wait, the resource state will enter Faulted.

Execute the following methods according to each pattern.

- In the case of configuration that the Oracle Clusterware and Oracle RAC instance are registered in different userApplication. (It matches "Configuration A" in "2.3.3 userApplication Creation".)

At first, check whether Oracle Clusterware is running.
The following command execution, you can check whether Oracle Clusterware is running.

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

When the following message is outputted, Oracle Clusterware may be not running.

```
CRS-0184: Cannot communicate with the CRS daemon.
```

When Oracle Clusterware is not running, there is a possibility that the setting that Oracle Clusterware starts earlier than Oracle RAC Instance is incorrect.

Check whether the script which starts Oracle Clusterware resource is set as the PreOnlineScript of Oracle RAC Instance (refer to "note" of step "8" of "2.3.5 userApplication with Oracle RAC Instances and Listeners").

- In the case of configuration that the Oracle Clusterware and Oracle RAC instance are registered in the same userApplication. (It matches "Configuration B" in "2.3.3 userApplication Creation".) There is a possibility that starting of listener resource is failed.

  Check whether you have no mistakes in setting of listener resource (2.3.5 userApplication with Oracle RAC Instances and Listeners).
  In addition, check whether you have no mistakes in setting of listener (refer to "Case 2").

- In the case of configuration that the Oracle Clusterware is not registered. (It matches "Configuration C" in "2.3.3 userApplication Creation".)
  Check whether Oracle Clusterware is running.

  The following command execution, you can check whether Oracle Clusterware is running.

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

  When the following messages are outputted, Oracle Clusterware may be not running.

  ```
  CRS-0184: Cannot communicate with the CRS daemon.
  ```

  Clear Faulted state of the resource, after that, execute the following commands and start Oracle Clusterware.

  ```
  # /etc/init.d/init.crs start
  ```

  After that, start userApplication.

A.2.2   AutoRecover or Failover

A userApplication AutoRecover or failover or degeneration occurred because of Oracle listener resource failure.

[Case 1] (Standby, Oracle RAC Scalable)
A userApplication failover or degeneration occurs when the PRIMECLUSTER RMS resource settings (especially TNSName) are invalid.
Check the following resource setup information by executing the "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] (Standby, Oracle RAC Scalable)
It occurs that the net service setting of tnsnames.ora file is incorrect.
Check the setting of tnsnames.ora file.

A.2.3 Warning state

A listener resource has entered Warning.

[Case 1] (Standby, Oracle RAC Scalable)

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] (Standby)

In listener monitoring using the tnsping command of the Oracle, 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.

[Case 3] (Oracle RAC Scalable)

The monitoring of listener resource becomes failure when setting of WFTime is the followings, the resource state enter Warning until it is recovered by Oracle Clusterware.

- [PersistentWarning]
- [<second>]

It is possible to check setting of WFTime by the "clorainfo -c" command. (For detail of "WFTime", refer to step "12" of"2.3.5 userApplication with Oracle RAC Instances and Listeners").

Check whether the cause of resource failure is reported referring to the listener log or log files.

Appendix B Change Oracle Resource Settings

This section explains how to change the Oracle resource settings.

![Note icon]

If you perform the procedure in the environment updated to 4.2A30 from previous version ("4.1A40" or"4.2A00"), it is necessary to replace prompt characters in screens with another.

- Settings of turnkey wizard "WIZSTANDBY"
  Replace "Settings of turnkey wizard "ORACLE""

This replacement is not necessary if your userApplication has been created newly in 4.2A30.

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 icon]

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 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 icon]

- In the Standby Operation
  If you create and register an Oracle instance resource or an ASM instance resource, select AdditionalInstance here, and edit advanced settings of the resource according to the step "5" of "2.2.9".
  If you create and register a Listener resource, select AdditionalListener here, and edit advanced settings of the resource according to the step "6" of "2.2.9".

```
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 Oracle RAC Scalable Operation
  If you create and register an Oracle Clusterware resource, select AdditionalOracleClusterware here, and edit advanced settings of the resource

according to the step "3" - "5" of "2.3.4".
If you create and register an Oracle RAC instance resource or a Listener resource, select AdditionalRACInstance/Listener here, and edit advanced settings of the resource according to the step "8" - "12" of "2.3.5".

```
Oracle (Ora_APP3:consistent)
1) HELP
2) -
3) SAVE+EXIT
4) REMOVE+EXIT
5) AdditionalOracle10gNodeapps
6) AdditionalOracle10gClusterware
7) Oracle10gNAPResource[0]=ora.rac.rac1.inst
8) Oracle10gNAPResource[1]=ora.node1.LISTENER_NODE1.lsnr
Choose the setting to process:
```

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 "2.2.9.

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 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                          6) AdditionalListener
2) -                             7) AdditionalOracle10gService
3) SAVE+EXIT                     8) AdditionalOracle10gNodeapps
4) REMOVE+EXIT                   9) AdditionalOracle10gClusterware
5) AdditionalInstance            10) StartPriority=Same
Choose the setting to process:
```

-    In the Standby Operation
     If you create and register an Oracle instance resource or an ASM instance resource,

select AdditionalInstance here, and edit advanced settings of the resource according to the step "5" of "2.2.9".
If you create and register a Listener resource, select AdditionalListener here, and edit advanced settings of the resource according to the step "6" of "2.2.9".

- In the Oracle RAC Scalable Operation
If you create and register an Oracle Clusterware resource, select AdditionalOracle10gClusterware here, and edit advanced settings of the resource according to the step "3" - "5" of "2.3.4".
If you create and register an Oracle RAC instance resource or a Listener resource, select AdditionalOracle10gNodeapps here, and edit advanced settings of the resource according to the step "8" - "12" of "2.3.5".

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 "StartTimeout" attribute of an existing Oracle instance resource changes it from 30 to 60 in the Standby Operation ("StartTimeout" replace "ScriptTimeout" in the Oracle RAC Scalable 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 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

- In the Standby Operation
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
```

- In the Oracle RAC Scalable Operation
  Select RACInstance/Listener[*n*]=<target resource name>.

```
Oracle (Ora_APP3:consistent)
1) HELP
2) -
3) SAVE+EXIT
4) REMOVE+EXIT
5) AdditionalOracle10gNodeapps
6) AdditionalOracle10gClusterware
7) Oracle10gNAPResource[0]=ora.rac.rac1.inst
8) Oracle10gNAPResource[1]=ora.node1.LISTENER_NODE1.lsnr
Choose the setting to process:
```

Select the registered CRS resource name in the next screen.

The following screen shot indicates the case of an Oracle RAC instance.

```
Setting menu : OracleSID for OracleRAC10g Nodeapps resource
1) HELP                          4) FREECHOICE
2) RETURN                        5) SELECTED: ora.rac.rac1.inst
3) NONE
Choose an oracle Nodeapps resource: 5
```

7. Change settings in the "Detail setting for *xxx*" screen.
   - In the Standby Operation : Oracle instance resource or ASM instance resource
     Change advanced settings of the resource according to the step "5" of "2.2.9".
   - In the Standby Operation : Listener resource
     Change advanced settings of the resource according to the step "6" of "2.2.9".
   - In the Oracle RAC Scalable Operation : Oracle Clusterware resource
     Change advanced settings of the resource according to the step "8" of "2.3.4".
   - In the Oracle RAC Scalable Operation : Oracle RAC instance resource or Listener resource
     Change advanced settings of the resource according to the step "12" of "2.3.5".

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 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 in standby operation

```
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                          5) AdditionalInstance
2) -                             6) AdditionalListener
3) SAVE+EXIT                     7) StartPriority=Same
4) REMOVE+EXIT                   8) OracleListenerName[0]=LISTENER
Choose the setting to process:
```

- Listener resource deletion in Oracle RAC scalable operation

```
Oracle (Ora_APP3:consistent)
1) HELP
2) -
3) SAVE+EXIT
4) REMOVE+EXIT
5) AdditionalOracle10gNodeapps
6) AdditionalOracle10gClusterware
7) Oracle10gNAPResource[0]=ora.rac.rac1.inst
8) Oracle10gNAPResource[1]=ora.node1.LISTENER_NODE1.lsnr
Choose the setting to process: 8
```

```
Setting menu : OracleSID for OracleRAC10g Nodeapps resource
1) HELP                            4) FREECHOICE
2) RETURN                          5) SELECTED: ora.rac.rac1.inst
3) NONE
Choose an oracle Nodeapps resource: 3
```

```
Oracle (Ora_APP3:consistent)
1) HELP
2) -
3) SAVE+EXIT
4) REMOVE+EXIT
5) AdditionalOracle10gNodeapps
6) AdditionalOracle10gClusterware
7) Oracle10gNAPResource[0]=ora.rac.rac1.inst
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

When delete an Oracle resource and a Listener resource 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 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 Procedure for Updating of the CRS Control

This section describes the procedure for updating the CRS control (Oracle Clusterware control) in PRIMECLUSTER Wizard for Oracle 4.1A40 environment to 4.2A30 version. It might be necessary for the procedure to see "2.3 Oracle RAC 10g Scalable Operation".

The procedure depends on the management of the CRS (hereinafter called "Oracle Clusterware") after updating.

- Configuration A (Creation of a new userApplication including an Oracle Clusterware resource)
  It matches "Configuration A" in "2.3.3 userApplication Creation".
- Configuration B (Addition of an Oracle Clusterware resource to an existing userApplication including an Oracle RAC instance resource)
  It matches "Configuration B" in "2.3.3 userApplication Creation".
- Configuration C (Modification of a PreOnlineScript attribute of an existing Oracle RAC instance resource)
  It matches "Configuration C" in "2.3.3 userApplication Creation".

- It is necessary to grasp userApplication configuration (relation of SysNode, userApplication and resources) before updating. It should be done in PRIMECLUSTER Wizard for Oracle 4.1A40 environment (before updating to 4.2A30) by Cluster Admin or hvdisp command.
- "Case of Configuration *X*" in the following steps is the direction only for Configuration *X*. If the direction is not written clearly, it suits all cases.
- The following steps should be done after completing the installation of PRIMECLUSTER Wizard for Oracle 4.2A30.

1. Stop RMS on all nodes if it is running.

   ```
   # hvshut -a <Return>
   ```

2. Start up Oracle Clusterware.
   Execute the following commands in super user authority on a node where execute "hvw" command.

   ```
   # /etc/init.d/init.crs start <Return>
   ```

   When Oracle Clusterware startup is completed, be sure to confirm that "crs_stat" command can be executed correctly.

   ```
   # su - <Oracle User>
   $ crs_stat
   ```

3. Execute the following command on a node where Oracle Clusterware startup is completed.

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

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

5. Select userApplication name including target resources in the "Application selection menu" screen.

6. Select Oracle(Ora_*xxx*) in the "Settings of turnkey wizard "WIZSTANDBY"" screen.

7. Select the target resource name in the "Oracle (Ora_*xxx*:consistent)" screen.
   (*e.g.* Oracle10gNAPResource=ora.rac.rac1.inst)

```
Oracle (Ora_APP3:consistent)
1) HELP
2) -
3) SAVE+EXIT
4) REMOVE+EXIT
5) AdditionalOracle10gNodeapps
6) AdditionalOracle10gClusterware
7) Oracle10gNAPResource[0]=ora.rac.rac1.inst
8) Oracle10gNAPResource[1]=ora.node1.LISTENER_NODE1.lsnr
Choose the setting to process: 7
```

8. Select "SELECTED: *xxx*" in the "Setting menu" screen.

```
Setting menu : Resource of OracleRAC10g Nodeapps resource
1) HELP
2) RETURN
3) NONE
4) FREECHOICE
5) SELECTED: ora.rac.rac1.inst
Choose an oracle service resource: 5
```

9. Select "PreOnlineScript=XXX" in the " Setting menu:Detail setting for Oracle10gNAPResource[*x*]=*xxx* " screen.

```
Setting menu : Detail setting for Oracle10gNAPResource[0]=ora.rac.rac1.inst
 1) HELP
 2) NO-SAVE+RETURN
 3) SAVE+RETURN
 4) OracleUser=rac10g
 5) ScriptTimeout=600
 6) WFTime=900
 7) (PreOnlineScript='/opt/FJSYclora/sbin/cloracrs rac10g')
 8) (PostOnlineScript=)
 9) (PreOfflineScript=)
10) (PostOfflineScript=)
11) (FaultScript=)
12) (Flags=)
Choose the setting to process: 7
```

10. Remove or modify the PreOnlineScript.
    - Case of Configuration A or B
        Select "NONE" in the "Setting menu:PreOnlineScript for OracleRAC10g Nodeapps resource" screen.

```
Setting menu : PreOnlineScript for OracleRAC10g Nodeapps resource
1) HELP
2) RETURN
3) NONE
4) FREECHOICE
Enter the command line to start prior to the application becoming ONLINE: 3
```

Confirm that the PreOnlineScript has been removed, and then select "SAVE+RETURN".

```
Setting menu : Detail setting for Oracle10gNAPResource[0]=ora.rac.rac1.inst
 1) HELP
 2) NO-SAVE+RETURN
 3) SAVE+RETURN
 4) OracleUser=rac10g
 5) ScriptTimeout=600
 6) WFTime=900
 7) (PreOnlineScript=)
 8) (PostOnlineScript=)
 9) (PreOfflineScript=)
10) (PostOfflineScript=)
11) (FaultScript=)
12) (Flags=)
Choose the setting to process: 3
```

- Case of Configuration C

  Select "FREECHOICE" and enter the command in the "Setting menu:PreOnlineScript for OracleRAC10g Nodeapps resource" screen.

```
Setting menu : PreOnlineScript for OracleRAC10g Nodeapps resource
1) HELP
2) RETURN
3) NONE
4) FREECHOICE
Enter the command line to start prior to the application becoming ONLINE: 4
     →    >> /opt/FJSVclora/sbin/cloracrs rac10g start
```

Confirm that the PreOnlineScript has been modified, and then select "SAVE+RETURN".

```
Setting menu : Detail setting for Oracle10gNAPResource[0]=ora.rac.rac1.inst
 1) HELP
 2) NO-SAVE+RETURN
 3) SAVE+RETURN
 4) OracleUser=rac10g
 5) ScriptTimeout=600
 6) WFTime=900
 7) (PreOnlineScript='/opt/FJSVclora/sbin/cloracrs rac10g start')
 8) (PostOnlineScript=)
 9) (PreOfflineScript=)
10) (PostOfflineScript=)
11) (FaultScript=)
12) (Flags=)
Choose the setting to process: 3
```

11. Perform the procedure appropriate for a configuration.
    - Case of Configuration A
    Jump to next.
    - Case of Configuration B
    Add Oracle Clusterware resource to the Oracle resource of existence.   Refer to step "3-6"

of "2.3.4 userApplication with Oracle Clusterware".
- Case of Configuration C
Jump to next.

12. Select SAVE+EXIT for registration.
- Case of Configuration A
● Repeat the step 4 to 11 for other Oracle RAC instance resources if necessary.
● Jump to next.
- Case of Configuration B or C
● Repeat the step 4 to 11 for other Oracle RAC instance resources if necessary.
● Finally, jump to the step 14".

13. Create an Oracle Clusterware resource and userApplication newly. (This step is only for Configuration A.)

1) Create an Oracle Clusterware resource.
Perform the step 1 to 11 in "2.3.4 userApplication with Oracle Clusterware".
2) Edit the Oracle RAC instance resource.
Perform the same procedure of the step 4 to 8, and jump to the screen of the PreOnlineScript.
In the step 5, the Oracle RAC instance resource that exists on the same node as the userApplication including the Oracle Clusterware resource created in the step 2) should be selected.
3) Set the PreOnlineScript of the Oracle RAC instance resource.
Select "FREECHOICE", and enter the path as follows, referring to the step 9 in "2.3.5 userApplication with Oracle RAC Instances and Listeners".

/opt/FJSVclora/sbin/clorastartwait <userApplication name created in the step 2)>

4) Confirm that the PreOnlineScript has been set, and then select "SAVE+RETURN".
5) Select SAVE+EXIT for registration.
6) Repeat the step 2) to 5) above for other Oracle RAC database if necessary.

14. Execute Configuration-Generate and Configuration-Activate in the "Main configuration menu" screen.

Appendix D (Information) Action Definition File

The Oracle instance-monitoring detector of RIMECLUSTER Wizard for Oracle determines what corrective action should be taken from the error code.   The action definition file provides Oracle error numbers, corrective actions, and error descriptions.

Action definitions 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 detector state
  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 detector operation
  Np : Ignores any detected errors.
  Of : Notifies Offline.
  Wa : Notifies Warning.
  Rs : Restarts detector.
  Fa : Notifies Faulted.

  NOP error
  If subsequent processing is not allowed with the SQL command while the corrective action is Np, the Rs processing will be performed.

- Message
  Message indicates text of the error code

Information

The errno that are not defined in the Action Definition File will be handled as Np.