FUJITSU

PRIMECLUSTER Wizard for Oracle 4.1

Configuration and Administration Guide

Oracle Solaris

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

This document is intended for system engineers and system administrators who design, configure, and manage PRIMECLUSTER systems. The reader should have expertise in the PRIMECLUSTER and Oracle system.

Outline

The document consists of the following six chapters and two appendices:

- Chapter 1 Feature

- Chapter 2 Environment setup

- Chapter 3 Operation

- Chapter 4 Command

- Chapter 5 Notice

- Chapter 6 Message

- Appendix A Setup Method with CUI

- Appendix B Using PRIMECLUSTER Wizard for Oracle in Oracle Solaris Zones Environments

Notational convention

The document conforms to the following notational conventions:

📑 Note
. . . .

Describes points where a user should take notice.
. . . .

📖 Information
. . . .

Describes information a user can refer to.
. . . .

📝 Example
. . . .

Describes settings using an example.
. . . .

📓 See
. . . .

Provides the names of manuals to be referenced.
. . . .

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Date of publication and edition

Editing Record

Additions and changes	Section	Edition
Added the description of using Oracle Solaris Legacy Containers(OSLC)	1.2 Operating Environment Appendix B Using PRIMECLUSTER Wizard for Oracle in Oracle Solaris Zones Environments	1.1
Added the clgetoralog command collects information	4.5 clgetoralog - Collect Troubleshooting Information	
Added the Notice of PRIMECLUSTER Wizard for Oracle.	Chapter 5 Notice	

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.

This is required for scalable operation and standby operation for cold standby Oracle instances. The scalable operation requires Oracle Real Application Clusters (Oracle9i 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 to Oracle as 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. This enables the detector to monitor logical failures as well as the processes state of the Oracle instance. When the Oracle instance hangs, and if the SQL command is not returned within a specified time, the detector times out to notify a user of the failure.

The two types of monitoring the Oracle listener are process detection and the "tnsping" command.

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.

1.2 Operating Environment

Scalable operation
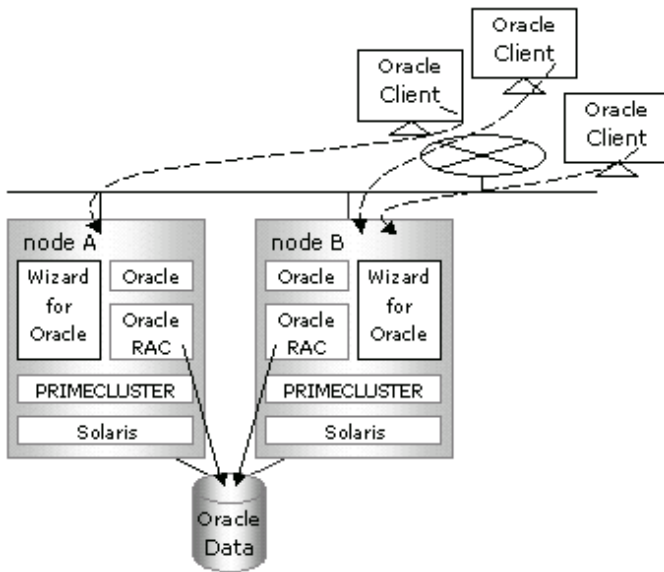
In scalable operation with Oracle9i RAC or Oracle RAC 10g, Oracle is operated on all nodes. The clients can access to the database regardless of which node they are connected to.

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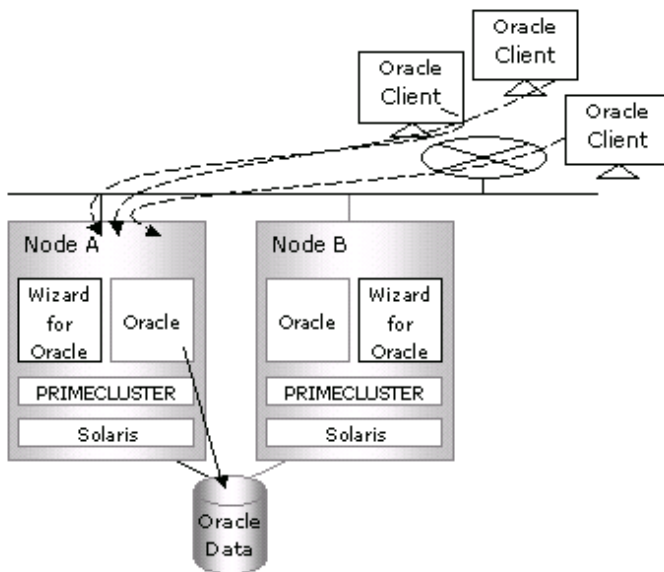
In standby operation, a cluster system consists of an operating node and standby nodes. On the operating node, the resources such as Oracle applications, a logical IP address and shared disks are active. On the standby node, these resources are inactive. In the event of a failure, userApplication is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

![Note] **Note**

....

When using PRIMECLUSTER Wizard for Oracle in Oracle Solaris Zones environments, refer to "Appendix B Using PRIMECLUSTER Wizard for Oracle in Oracle Solaris Zones Environments".

....

Chapter 2 Environment setup

2.1 Oracle Environment Setting

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

Scalable operation (Oracle9i RAC)

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 userApplication	-
5	Create and set up an Oracle database	-
6	-	Set up an Oracle database
7	Create and set up Oracle resources	-

Further details are given in the following section.

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	-

Further details are given in "2.7 Oracle RAC 10g" section.

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	-

Further details are given in the following section.

2.2 PRIMECLUSTER Installation and Configuration

This section explains how to install and configure PRIMECLUSTER.

Note

For scalable operation with Oracle RAC 10g, refer to "2.7 Oracle RAC 10g" section.

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 the "PRIMECLUSTER Installation Guide".
Then, install Oracle Wizard following the instructions of the "PRIMECLUSTER Wizard for Oracle Installation Guide".

Scalable operation requires the PRIMECLUSTER Enterprise Edition.
Standby operation requires the PRIMECLUSTER Enterprise Edition or PRIMECLUSTER HA Server.

Configure a cluster system

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

2.3 Oracle Installation and Configuration

This section explains how to install and configure Oracle.

Initial setup

- /etc/system
  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 the same on all the nodes.

Note

Before installing Oracle, it is necessary to change the "/etc/system" file and reboot the node.

Example

The setup examples for Oracle9i are shown below:

```
set shmsys:shminfo_shmmax=4294967295
set shmsys:shminfo_shmmin=1
set shmsys:shminfo_shmmni=100
set shmsys:shminfo_shmseg=10
set semsys:seminfo_semmni=100
set semsys:seminfo_semmsl=200
set semsys:seminfo_semmns=400
set semsys:seminfo_semopm=100
set semsys:seminfo_semvmx=32767
```

- /etc/services
  Set up a port number for the Oracle listener.

```
listener  1521/tcp  oracle
```

- Oracle User

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

```
# groupadd -g <group ID> dba
# useradd -u <user ID> -g dba -d /export/home/oracle -s /bin/sh -m oracle
# passwd oracle
```

Normally, the group name should be "dba".

Set up an environment variable of Oracle user.

(.profile)

```
ORACLE_BASE=/opt/oracle; export ORACLE_BASE
ORACLE_HOME=/opt/oracle/product/8.1.7; export ORACLE_HOME
ORACLE_TERM=sun-cmd; export ORACLE_TERM
ORA_NLS33=$ORACLE_HOME/ocommon/nls/admin/data; export ORA_NLS33
LD_LIBRARY_PATH=$ORACLE_HOME/lib; export LD_LIBRARY_PATH
PATH=$ORACLE_HOME/bin:/usr/bin:/usr/ccs/bin:/usr/ucb; export PATH
```

When "/usr/ucb" is contained in PATH, it needs to be set up after "/usr/ccs/bin".

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 resource monitoring or userApplication startup or shutdown.

- Environment that Oracle user's home directory and profile are located on the shared disk is not supported. Oracle user's home directory and profile must be located on the local disk of each node.

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, see the RAC Installation Guide.

See

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For further details, refer to the Oracle manual.

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2.4 userApplication Creation

This section explains how to set up userApplication creation and Non-Oracle resource setup.
Set up Oracle resources after configuring a database.
The resource tree (userApplication configuration) is described below:

- Scalable operation (Oracle RAC)
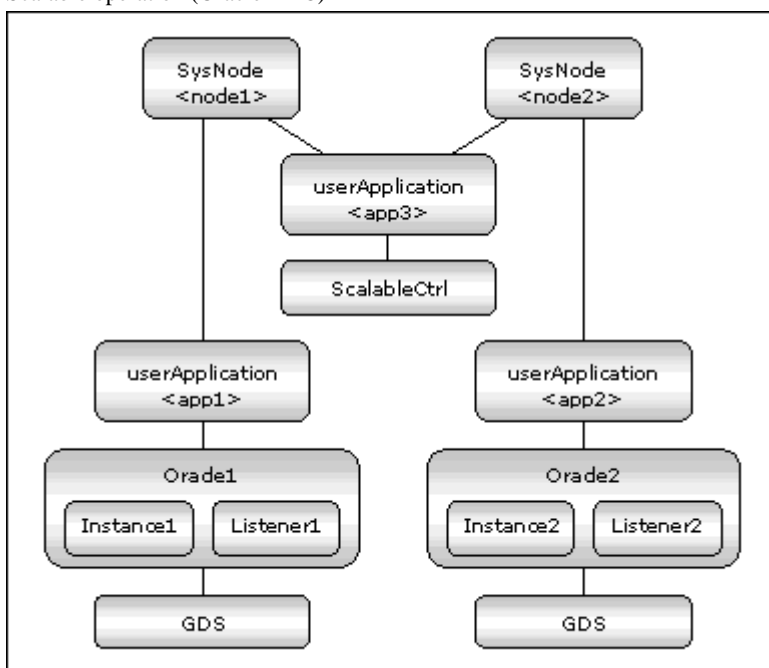
userApplication <app3> is management userApplication to start or stop the other userApplication <app1> and <app2>. It means that Oracle9i RAC on one or more nodes is controlled by management userApplication <app3>.

- Standby operation
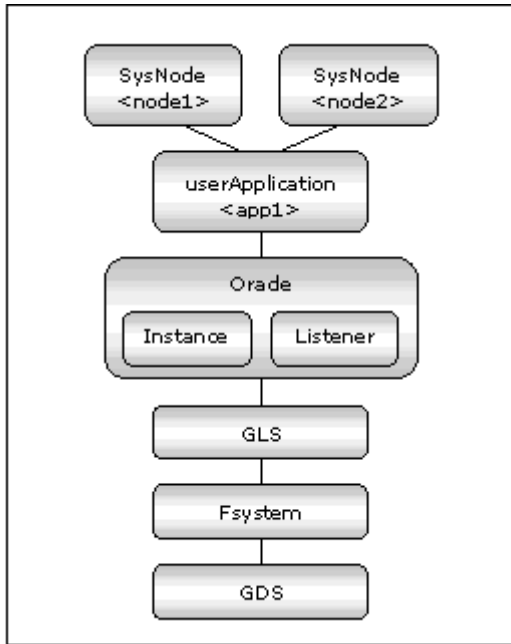
The flow of userApplication creation is as follows:

1. Creation of userApplication NOT including Oracle resources ("2.4.1 Application-Create")

2. Addition of Oracle resources to userApplication ("2.6 Oracle Resource Creation and Setting")

3. Creation of userApplication including Controller resources (in case of scalable operation)

Set up userApplication using the userApplication Configuration Wizard. This userApplication Configuration Wizard follows the Wizard format in which you can select the item from the menu and click the "Next" button.

See
....

See "Chapter 6 Building Cluster Applications" of the "PRIMECLUSTER Installation and Administration Guide" for the userApplication Configuration Wizard setup.
....

2.4.1 Application-Create

This section discusses the configuration of userApplication that does not include Oracle resources.

- Scalable operation (Oracle RAC)

  In scalable operation, userApplication that excludes management userApplication and Oracle resources is configured.
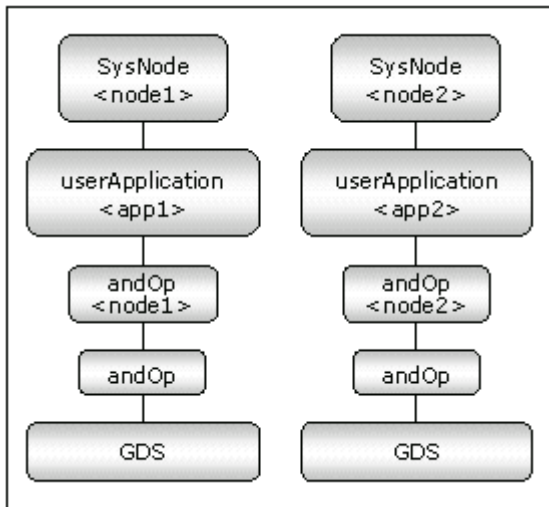
- Standby operation

  userApplication is configured as shown in the illustration.
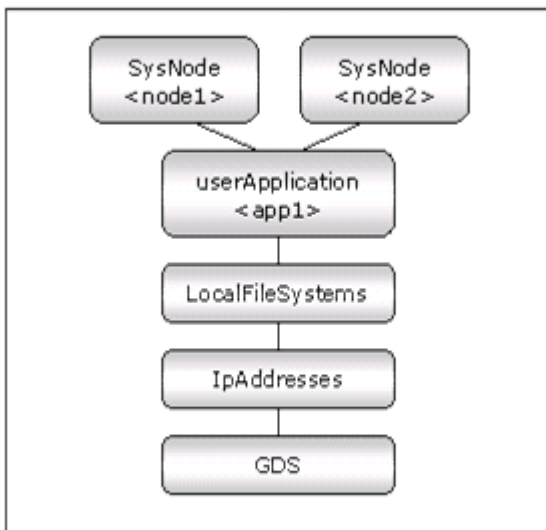
GDS setup

GDS configuration and settings vary depending on the mode of operation. For scalable operation, GDS is set as a shared disk. For standby operation, it is set as a switching disk.

Create disk classes to allocate Oracle system table space and other table space (non-Oracle space) respectively. Then, you can set "No" for the MONITORONLY attribute for the Oracle system table space, and "Yes" for the MONITORONLY attribute for the other data. If Oracle can continue to operate even if a disk failure occurs, the settings will ensure operational continuity without failover.

For example, if the other table space is allocated to the disk class where the MONITORONLY attribute is set to "YES", Oracle will bring the table space Offline and continues production operation.

userApplication setup

Create userApplication using the userApplication Configuration Wizard. See "6.6 Setting Up Cluster Applications" of the "PRIMECLUSTER Installation and Administration Guide". In scalable operation, userApplication should be created for each node. In standby operation, userApplication should be created for the operating node. The recommended values are as follows:

- Scalable operation

  Operation=Standby (indispensability)

  AutoStartup=No

PersistentFault = 1
Additional resources =Gds resource

- Standby operation
Operation =Standby
AutoSwitchOver = HostFailure|ResourceFailure|ShutDown
PersistentFault = 1
HaltFlag=Yes
Additional resources = Gds resource, Fsystem resource, Network resource

2.4.2 userApplication check

Start up userApplication and check if it is normally running on all the nodes by executing the "hvcm" command.

- Shared disk - Check access to the shared disk on the operating node. Be sure to check if file creation by Oracle user is available.

- Logical IP address - Check access to the operating node.

2.5 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	Local	Allocate on a local disk of each node
Server parameter file	Share	-
Control files	Share	-
Data files	Share	-
Redo log files	Share	-
Archive log files	Arbitrary	Allocate either on a local disk or a shared disk
Alert log files	Local	Allocate on a local disk of each node

Information
. . . .
Check if the Oracle user has privileges to write in a shared disk before creating the database.
. . . .

- Create a database (Scalable operation with Oracle RAC)
Create a database on any one of the nodes. The database must be accessible from the standby nodes.

See
. . . .
Refer to the Oracle RAC manual.
. . . .

- Create a database (Standby operation)

- Operating node

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

See
. . . .
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

  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.

See

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

. . . .

- 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.

Example

. . . .

Mutual standby

. . . .
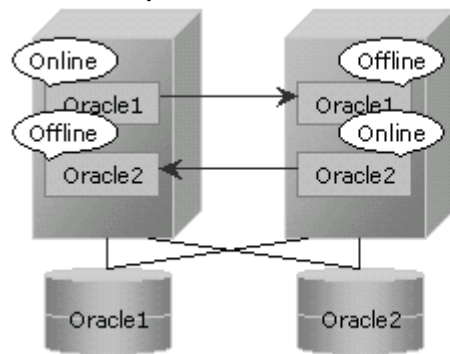
Example

. . . .

2:1 Standby

. . . .
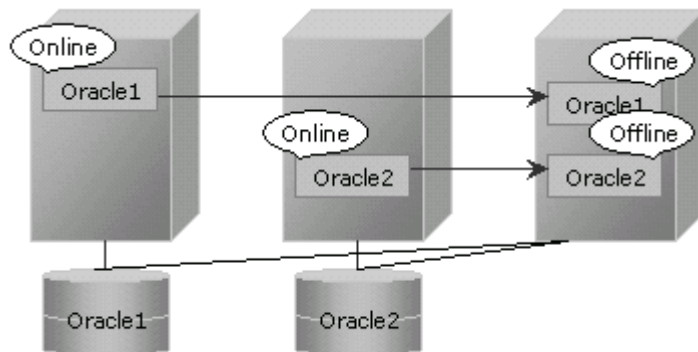
- Parameter file
  The initialized parameter LOCAL_LISTENER must be compatible with the listener.ora and tnsnames.ora settings. If it is not, Oracle
  startup might fail.

  If you use the Oracle server parameter file, set the file on the shared disk. If it is not, the operating node and standby nodes will not

be able to work properly. Specify where to set the server parameter file in the initialized parameter file.

📝 Example

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

```
spfile = /mnt2/o9idb/parameter/spfile.ora
```

･･･

📒 Note

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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 "2.4 userApplication Creation".

2. Move the server parameter file to the shared disk.

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

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

```
spfile=< shared disk >/spfile<SID>.ora
```

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

･･･

- Network setup
  Set up the Oracle network.

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

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

    📝 Example

    ･･

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

SID_LIST_LISTENER =
  (SID_LIST =
    (SID_DESC =
      (GLOBAL_DBNAME = ora9i)
      (ORACLE_HOME = /opt/oracle/product/9.0.1)
      (SID_NAME = ora9i)
    )
  )
```

    ･･

- Operating system authentication (OS authentication) of Listener must be enabled.
  OS authentication is enabled in default. If the following parameter is defined in listener.ora file, OS authentication is enabled.

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

- 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 = ora9i))
  )
```

- SYSTEM user password
  PRIMECLUSTER Wizard for Oracle accesses and monitors Oracle using the Oracle SYSTEM user's password. The password must be set in PRIMECLUSTER Wizard for Oracle. See "4.3 clorapass - Set Password for Monitoring".

- 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 when connecting at the connecting.

- The processes other than definition of system environment variables must not be added to login.sql of Oracle DBA users.
  SQL can be described in the SQL*Plus profile login.sql. However, it might automatically be executed and affect ongoing operations because Oracle 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.

2.6 Oracle Resource Creation and Setting

This section explains how to register an Oracle-related resource in userApplication.

Check if Oracle is properly running by starting and stopping manually before starting Oracle Resource Creation and Setting.

Before starting this procedure, Oracle instances, Oracle listeners and RMS on all the cluster nodes should stop.

2.6.1 Create Oracle resource

This section explains how to create Oracle resources using the userApplication Configuration Wizard.

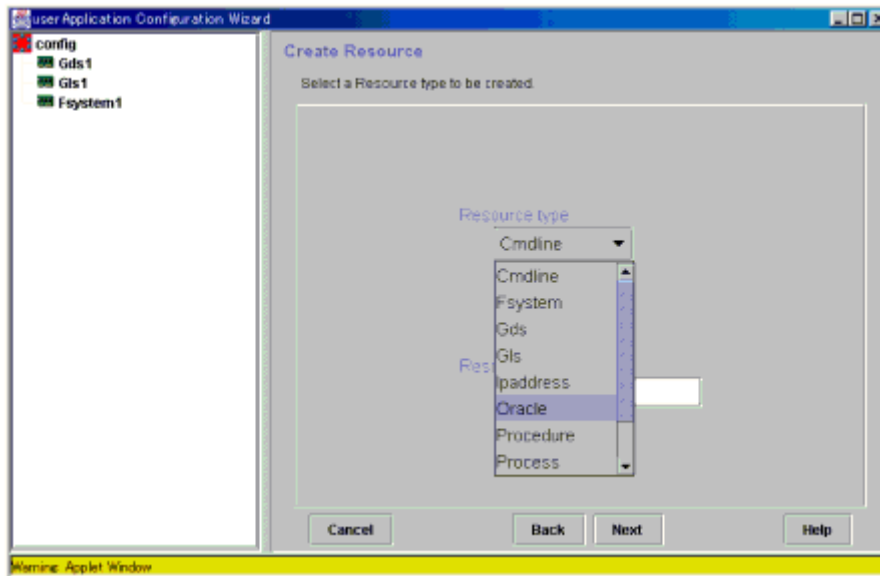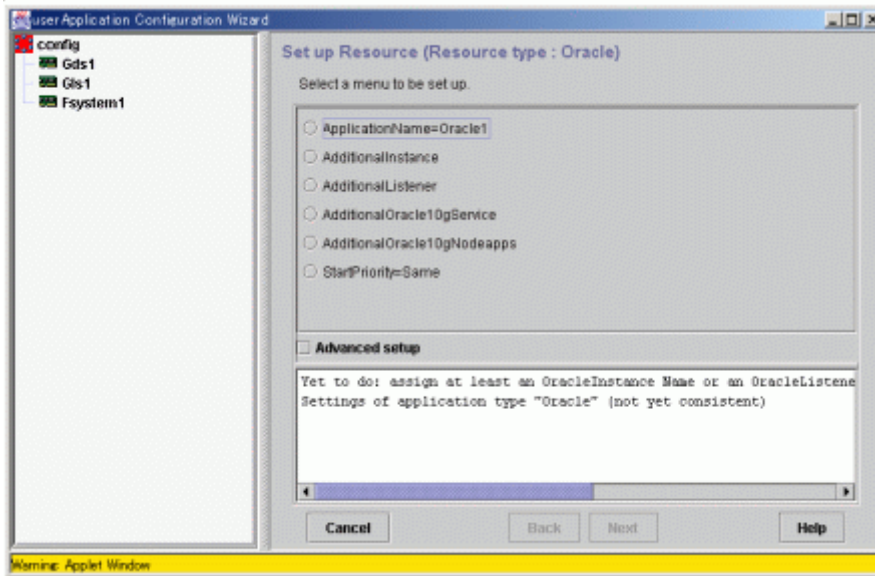1. Select "Create Resource" in the "userApplication Configuration" menu.
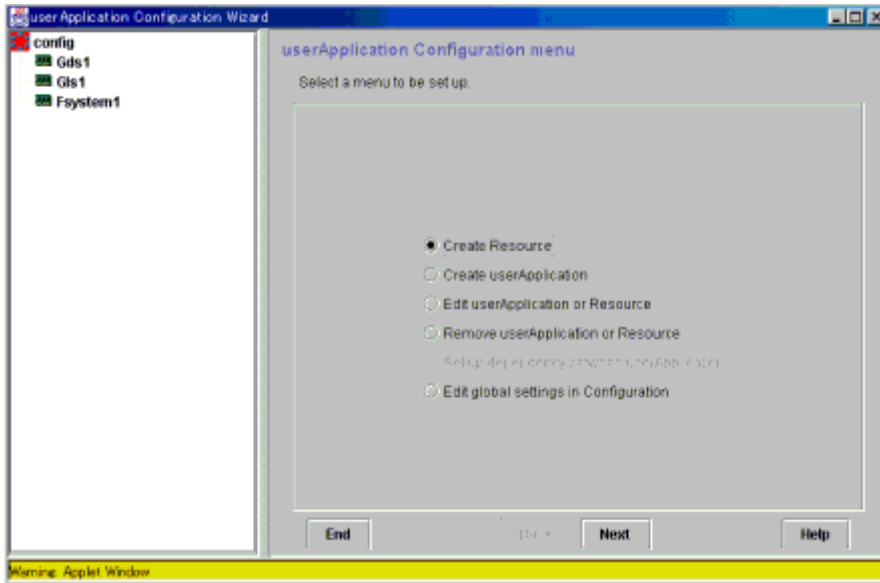
2. Select "Oracle" in the "Resource Type" menu.

3. Add the Oracle instance and Oracle listener in the "Set up Resource" menu.

ApplilcationName (SubApplicationName)
Change the application name.

Information

A resource name on RMS is based on the application name (SubApplicationName) entered in "ApplilcationName" on this step.

- Oracle instance resource/ASM instance resource
  ORACLE_<SubApplicationName>_<OracleSID>

- Oracle listener resource
  LISTENER_<SubApplicationName>_<ListenerName>

These resource names have the following convention and rules.

- Characters per resource name must be less than 40 characters.

- "ORACLE_" and "LISTENER_" are fixed words.

AdditionalInstance
Add an Oracle instance resource.

AdditionalListener
Add an Oracle listener resource.

AdditionalOracle10gService
Add an Oracle RAC 10g service resource.

AdditionalOracle10gNodeapps
Add an Oracle RAC 10g instance and listener resource.

StartPriority
Set up a startup order of the Oracle instance and Oracle listener.

Example

If you use the Oracle multi-threaded server (MTS), the Oracle listener must be started first.

4. Set up the Oracle instance as follows:
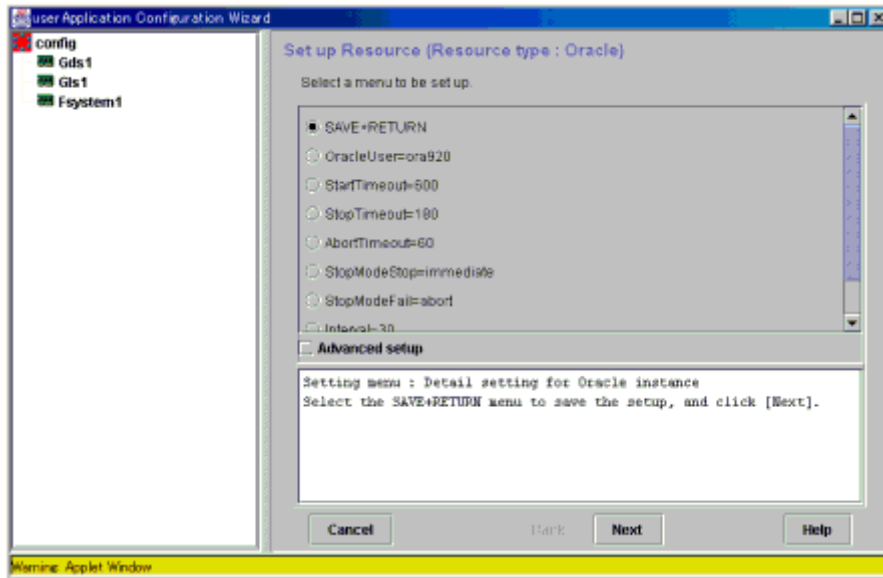
OracleSID
ORACLE_SID

OracleUser
Oracle Installation user

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)

5. Set up the Oracle listener as follows:

ListenerName
Listener name

OracleUser
Oracle installation user

StartTimeout
Timeout duration of Oracle startup.
Default: 180s (120s - 86400s)

StopTimeout
Timeout duration of Oracle stop.
Default: 60s (60s - 86400s)

Interval
Monitoring interval of Oracle instance.
Default: 30s (5s - 86400s)

WatchTimeout
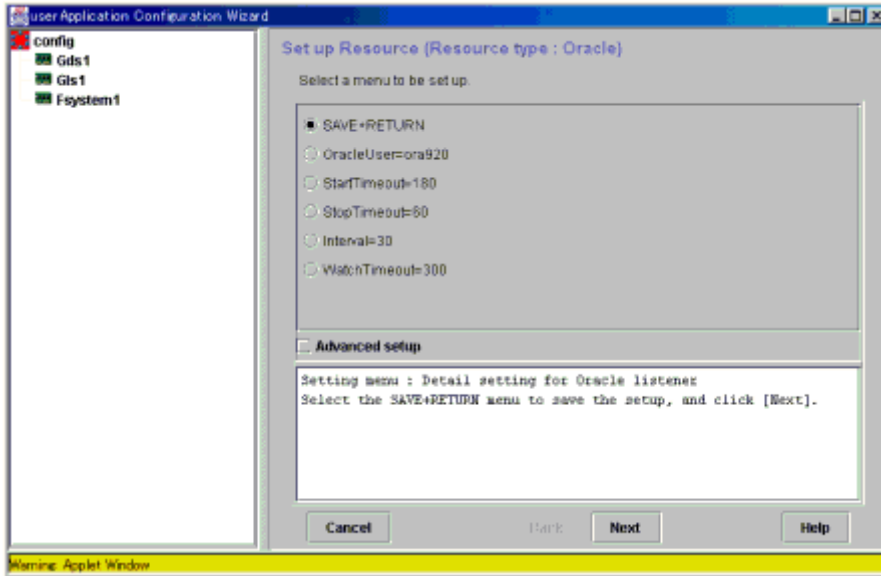No response time during monitoring Oracle.
Default: 300s (30s - 3600s)

6. Advanced setup
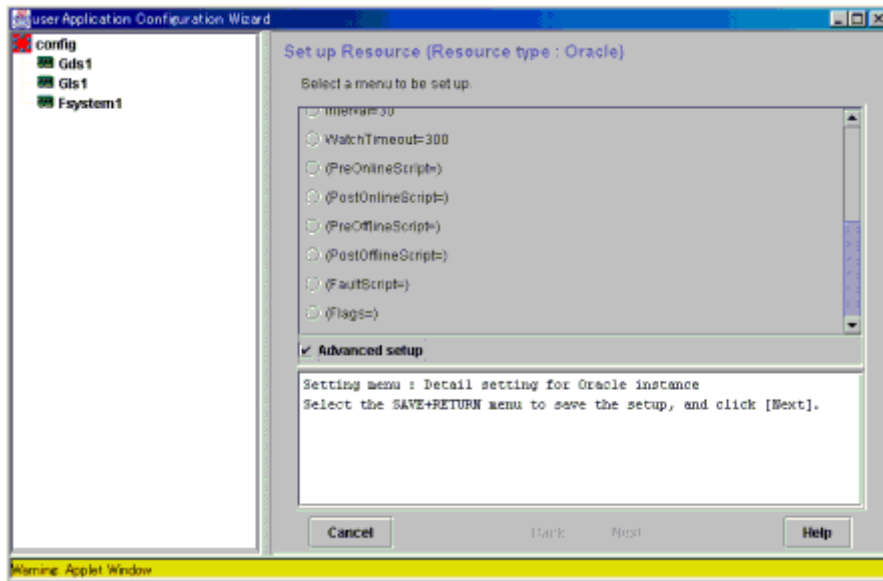
In the "Advanced setup" of the environment settings, TNSName is set for Oracle listeners only.

TNSName
Network service name to monitor the Oracle listener
Note: The "tnsping" command is used to monitor the Oracle listener if TNSName is set. This TNSName is set in tnsnames.ora.
When TNSName is omitted, the feature to monitor only the listener process is enabled (arbitrary).

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
The following resource attributes can be set:
- **NULLDETECTOR**
Determines whether or not Detector monitors resources. The Detector does not monitor the resources if it is available (on).
Oracle instance resource default value : off (on, off)
Oracle listener resource default value : off (on, off)
- **AUTORECOVER**
Determines whether or not RMS attempts to restart resources before failover if a resource failure occurs. RMS attempts to restart the resources if it is available (on).
Oracle instance resource default value : off (on, off)
Oracle listener resource default value : on (on, off)
- **MONITORONLY**
Determines whether or not failover of userApplication occurs by default. Failover does not occur if it is available (on).
Oracle instance resource default value : off (on, off)

Oracle listener resource default value : off (on, off)

 See

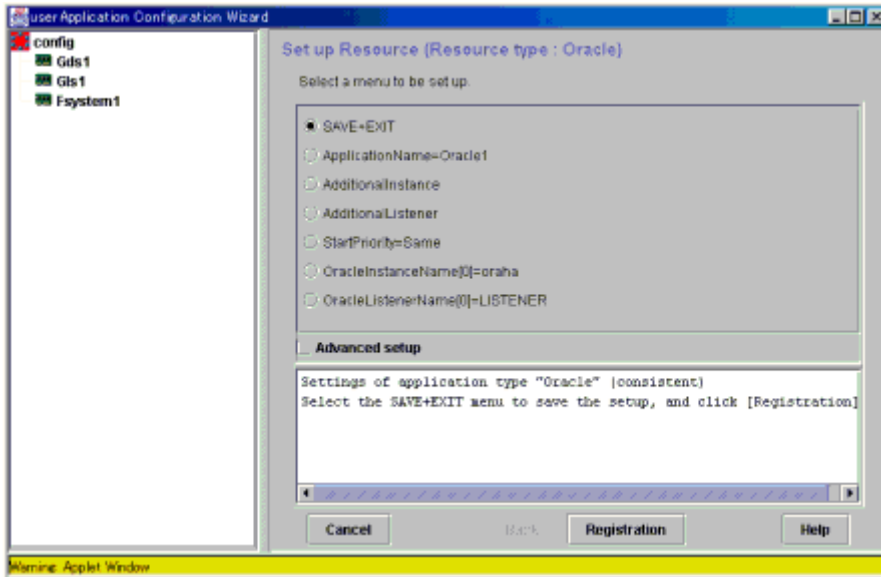. . . . .

For the above attributes, refer to "9 Appendix - Attributes" of the "PRIMECLUSTER Reliant Monitor Services (RMS) with Wizard Tools (Solaris®, Linux®) Configuration and Administration Guide".

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

When using Oracle9i RAC, follow the setup procedure from 1 through 6 for each userApplication.
Check that the Oracle resource is set then save the settings by selecting SAVE+EXIT.

 Note

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For settings of "OracleSID" and "ListenerName" that have been already configured, the settings will be cleared if you select "NONE" and click the "NEXT" button.
HELP description is common to GUI and CUI, so a part of them includes a description about CUI.

. . . .

 See

. . . .

After set up userApplication, the settings in this section can be confirmed with clorainfo -c command. See "4.7 clorainfo - Display Resource Configuration and Monitoring Status" for details.

. . . .

2.6.2 Set up userApplication

This section explains how to create userApplication and Oracle resources, referring to "8.1.1 Changing the Cluster Application Configuration" of the "PRIMECLUSTER Installation and Administration Guide".
In scalable operation, it is necessary to set up Scalable Cluster Application. For Scalable Cluster Application, refer to "6.6.2.2 Creating Scalable Cluster Applications" of the "PRIMECLUSTER Installation and Administration Guide".
The resource structure of userApplication is described below:

- Scalable operation (Oracle RAC)
  In scalable operation, userApplication is configured as follows:
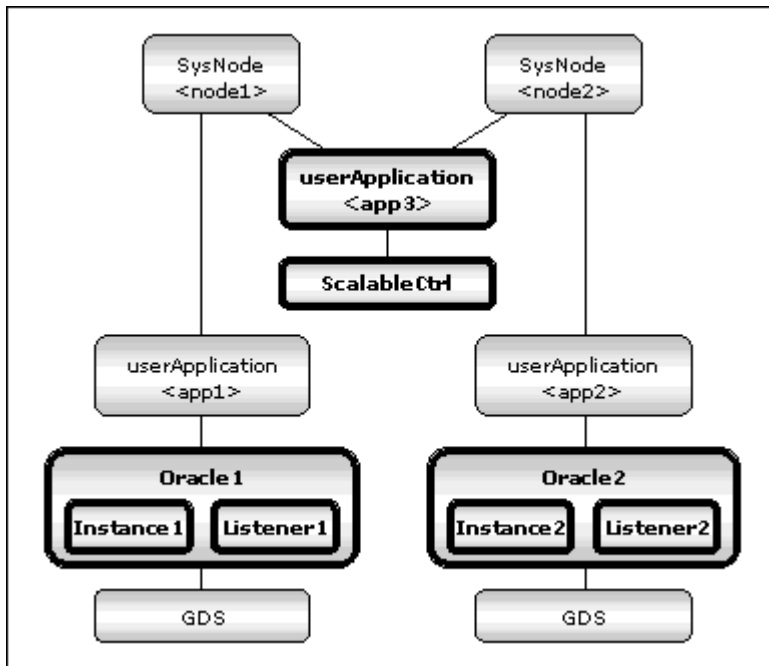
- Standby operation
  In standby operation, userApplication is configured as follows:
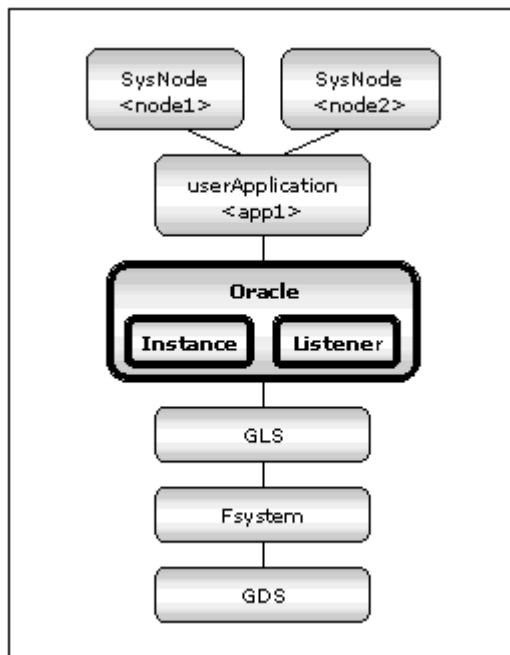
2.6.3 Check userApplication

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

- 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.

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

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

2.7 Oracle RAC 10g

2.7.1 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.

Note
....

In Oracle RAC 10g, Cluster Ready Services (CRS) is started during OS startup then connected to the shared disk device, so volumes on the shared disk must be activated during CRS startup.

When the Oracle database is operated on PRIMECLUSTER GDS, be sure to activate the GDS volumes during OS startup without registering it as a PRIMECLUSTER RMS resource.

When the NAS device is operated as a shared disk, be sure to activate the NFS mount point during OS startup without registering it as a PRIMECLUSTER RMS resource.
The following volumes are required on the shared disk:

  - For the Oracle Cluster Registry

  - For the Voting Disk

  - For a database

....

2.7.2 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.

  Also, be to set $ORACLE_HOME/bin and $ORACLE_CRS_HOME/bin for the DBA user PATH.

Example
....

The following shows a setting example.

```
PATH=/opt/oracle/product/10.1.0/bin:/opt/oracle/product/10.1.0/crs/bin; export PATH
```
....

- CRS installation

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

- Oracle 10g installation

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

> **📒 Note**
> ....
>
> PRIMECLUSTER Wizard for Oracle controls Oracle as the Oracle DBA user.
>
> - Be sure to include ORACLE_HOME/bin and $ORACLE_CRS_HOME/bin in the PATH environment variable of the DBA 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 resource monitoring or userApplication startup or shutdown.
>
> - Environment that Oracle user's home directory and profile are located on the shared disk is not supported. Oracle user's home directory and profile must be located on the local disk of each node.
>
> ....

- Database or service creating and settings

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

- Operation check

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

> **📋 Example**
> ....
>
> The following example shows the operation results:

```
% crs_stat -t

Name            Type         Target   State    Host
----------------------------------------------------------
ora....e1.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.ora10.db    application   ONLINE   ONLINE   node2
ora....01.inst  application   ONLINE   ONLINE   node1
ora....02.inst  application   ONLINE   ONLINE   node2
ora.....pcl.cs  application   ONLINE   ONLINE   node2
ora....101.srv  application   ONLINE   ONLINE   node1
ora....102.srv  application   ONLINE   ONLINE   node2
ora....e1.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
```

> ....

2.7.3 userApplication and Resource Configuration

In Oracle RAC 10g, Oracle instances and listeners are managed as PRIMECLUSTER RMS resources. RMS does not manage the listeners, but CRS controls and monitors them.

- Scalable operation
  userApplication is configured as follows.
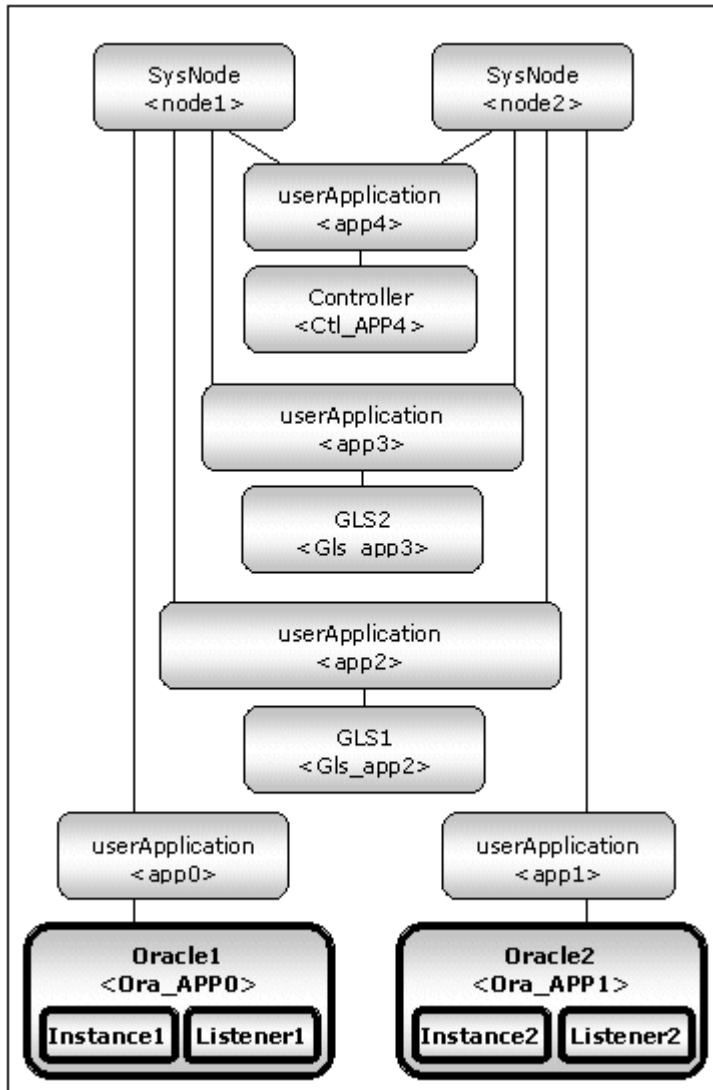
- userApplication<App_0> and userApplication<App_1> are userApplication that controls the Oracle instance and the Oracle listener. The recommended values are as follows:
  Operation=Standby (indispensability)
  AutoStartup=No
  PersistentFault = 1

- userApplication<App_2> and userApplication<App_3> are userApplication that controls the GLS resources. The recommended values are as follows:
  Operation =Standby
  AutoSwitchOver = HostFailure|ResourceFailure|ShutDown
  PersistentFault = 1
  HaltFlag=Yes

- userApplication<App_4> is userApplication that controls Oracle resources startup and stop on multiple nodes.

The flow of userApplication creation is as follows:

1. Register Oracle instance and listener resources

2. Register the other required resources

3. Create userApplication

userApplication is configured with the RMS Configuration Wizard. This RMS Configuration Wizard forms Wizard format as follows:
Menu à Settings à Next button

See
∙∙
For setting the userApplication Configuration Wizard, see "Chapter 6 Cluster application configuration" of the "PRIMECLUSTER Installation/Administration Guide".
∙∙

2.7.4 Oracle Instance and Listener Resource Registration

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

Example
∙∙
See the following example:

```
% crs_stat -t

Name            Type         Target    State     Host
-----------------------------------------------------------
ora....e1.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.ora10.db   application    ONLINE    ONLINE    node2
ora....01.inst application    ONLINE    ONLINE    node1
ora....02.inst application    ONLINE    ONLINE    node2
ora.....pcl.cs application    ONLINE    ONLINE    node2
ora....101.srv application    ONLINE    ONLINE    node1
ora....102.srv application    ONLINE    ONLINE    node2
ora....e2.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
```
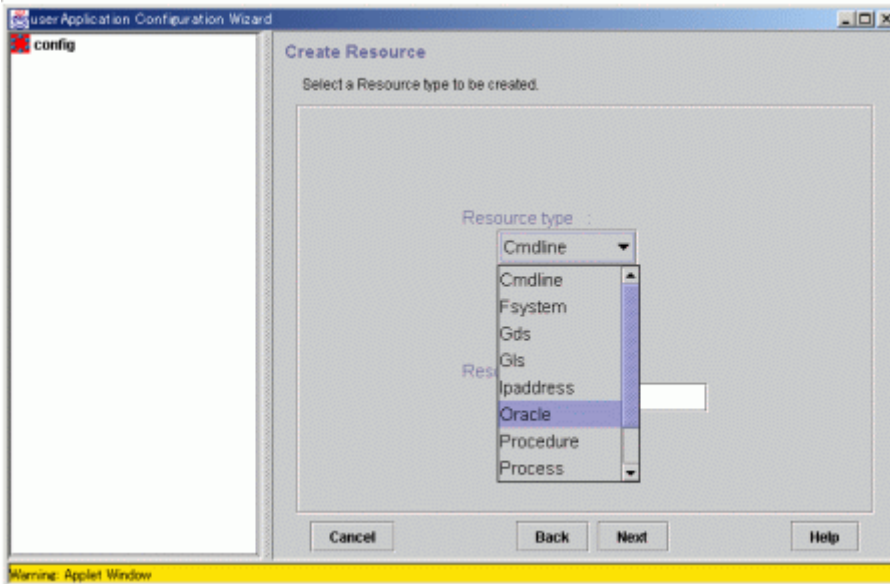
In the above configuration, "ora⋯.01.inst" and "ora⋯.e1.lsnr" included in node 1, and "ora⋯.02.inst" and "ora⋯.e2.lsnr" included in Node2 are registered as a resource respectively.
∙∙
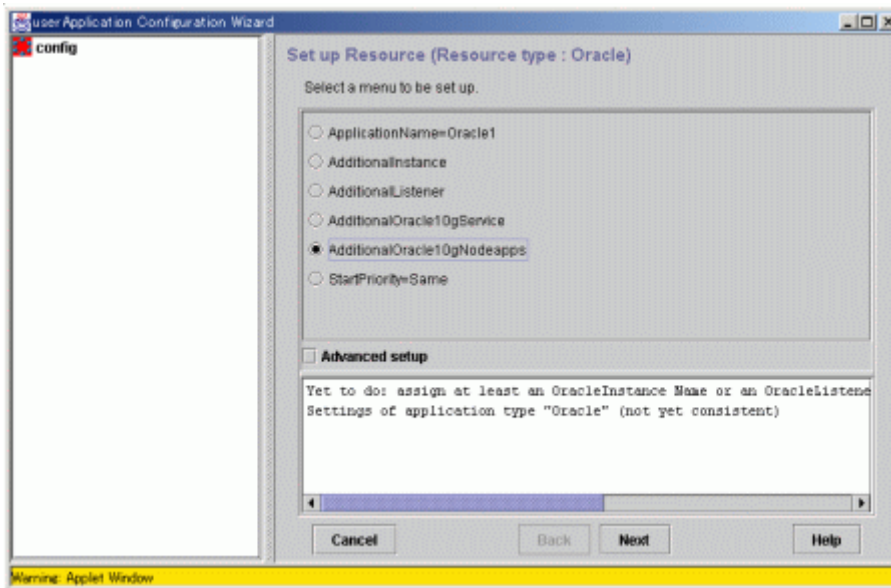
1. Select "Create Resource".
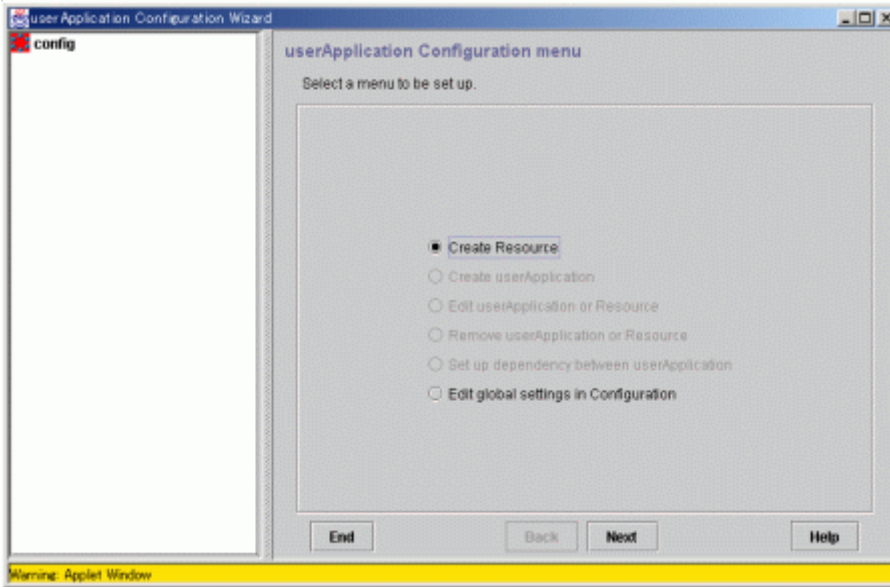
2. Select "Oracle" of "Resource type".

3. For changing a resource name, select "ApplicationName", and change the name. If you register the resource without changing the name, select "AdditionalOracle10gNodeapps".

Information

A resource name on RMS is based on the application name (SubApplicationName) entered in "ApplilcationName" on this step.
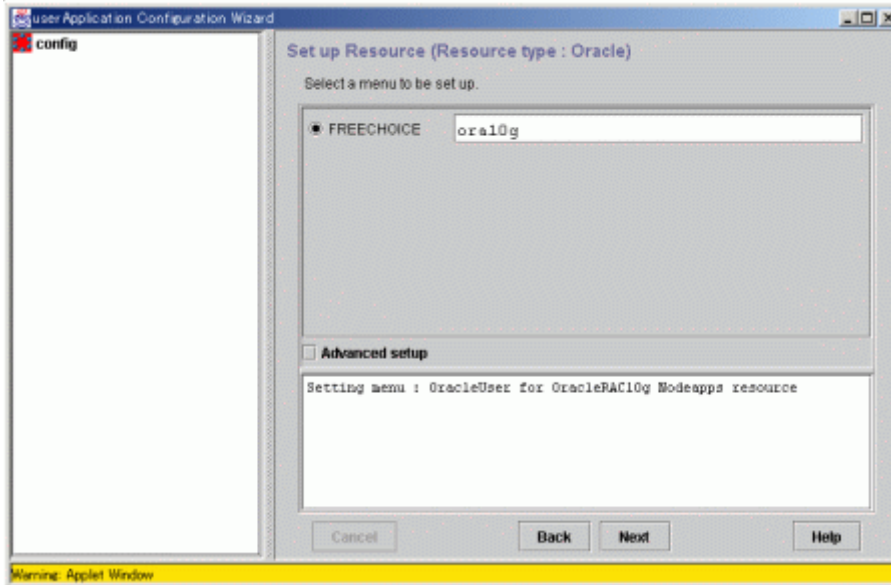
- Oracle instance resource
  <SubApplicationName>_<inst_name>.i

- Oracle listener resource
  <SubApplicationName>_<lsnr_name>.l

The RMS resource name is based on the Oracle 10g resource name which is output of crs_stat command, and the first part ("ora.") of the Oracle 10g resource name is replaced by "<SubApplicationName>_".
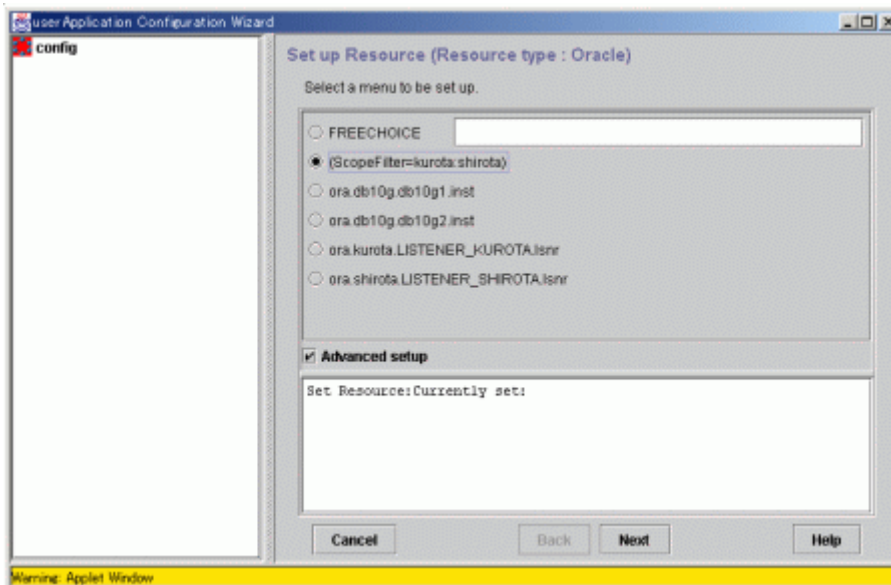The RMS resource name of Oracle 10g instance resource has the following convention and rules.

- Characters per resource name must be less than 40 characters.

- "<SubApplicationName>_" can be changed in "ApplilcationName" on this step.

4. Enter the Oracle DBA user name.

5. A list of available resources is displayed. If it is not displayed, check "Advanced setup", then specify a node with "ScopeFilter".

6. Input the name of a host where the resource belongs.
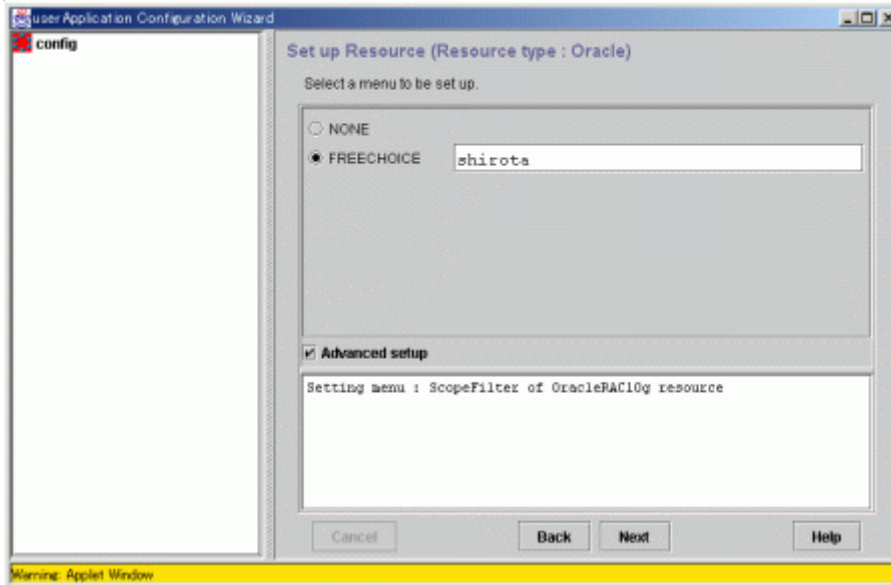
7. Select the resource (Oracle instance).
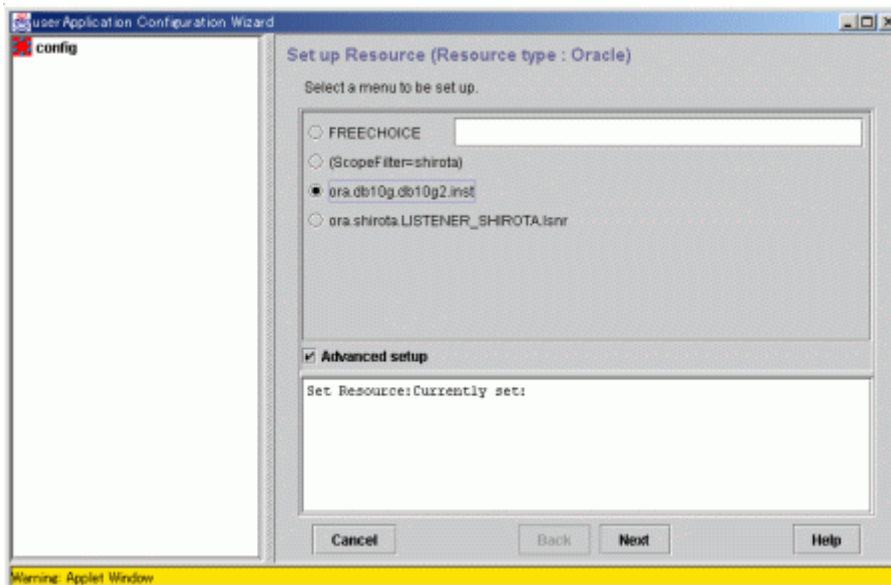
8. The resource will be displayed in the following message box, "Set Resource: Currently set:".
   Note that the Oracle listeners (ora.*.lsnr) must not be selected in this screen because CRS will control and monitor them. Also, do

not register the resources on two or more nodes at the same time.
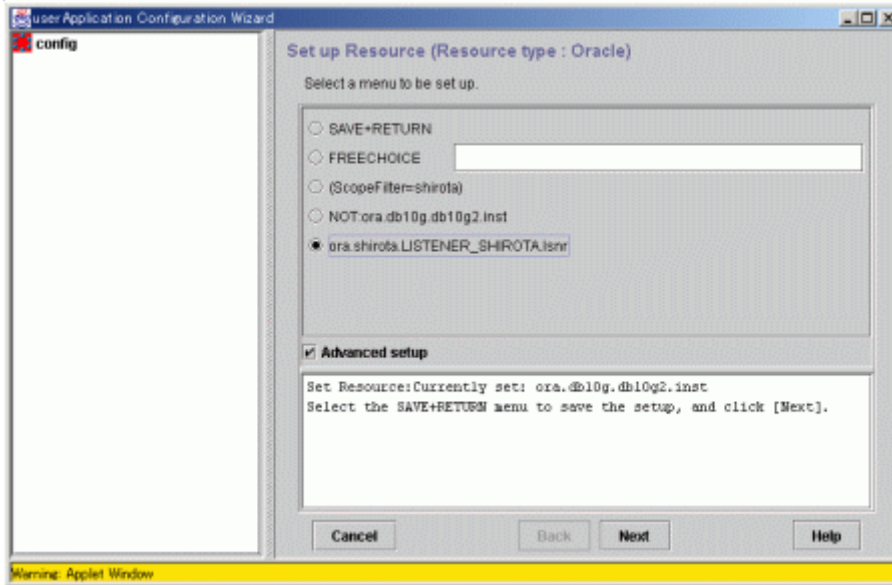
9. Select "SAVE+RETURN".
   Check that the Oracle resource is set then save the settings by selecting SAVE+RETURN.

10. Select "SAVE+EXIT", then click the "Registration" button. The registration will be completed. If you want to further set it, select each resource, then click the "Next" button.

11. Select "SELECTED:<Resource>", then click the "Next" button.

12. Select the menu, then click the "Next" button. Selecting the "Advanced setup" allows you to set more details.

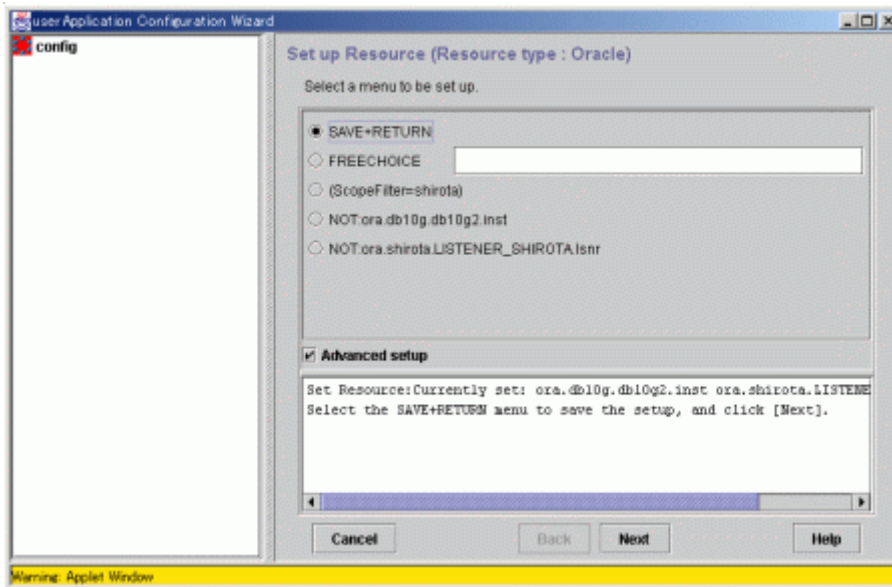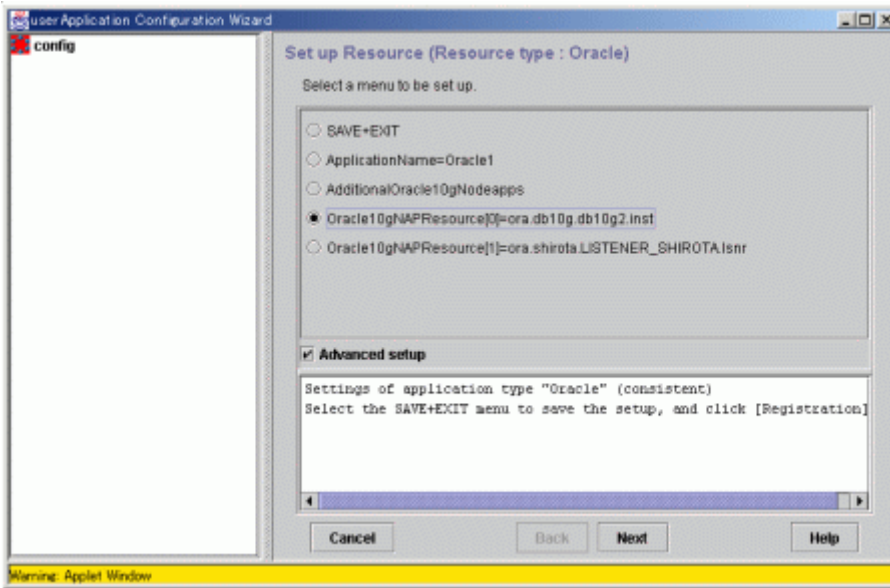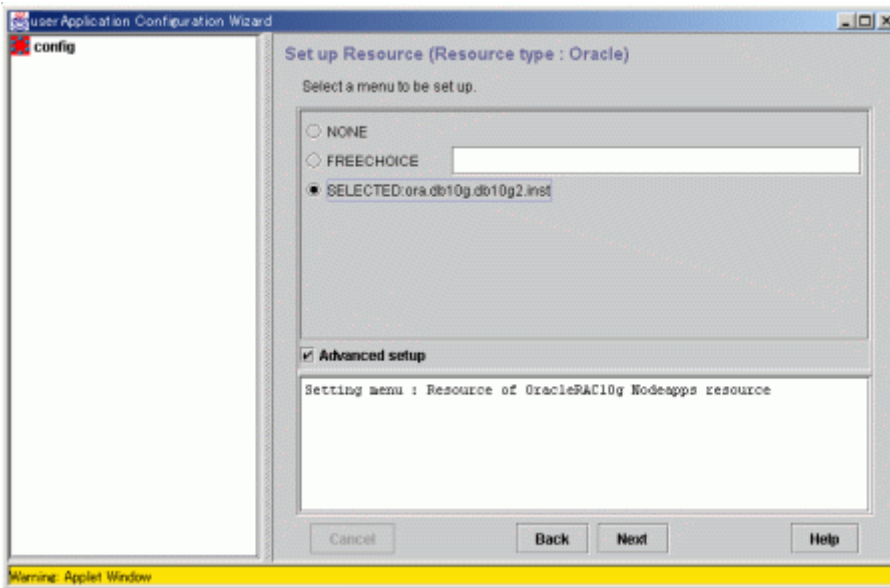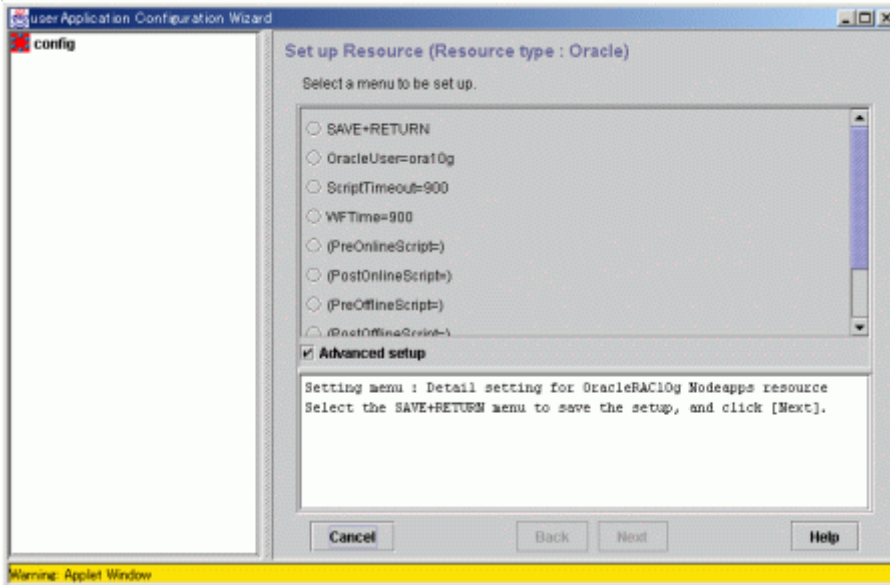| Settings (clorainfo -c)	Descriptions
Oracle user (OracleUser)	Input an Oracle DBA user name on UNIX.
ScriptTimeout (ScriptTimeout)	Timeout of each resource startup and stop Default : 900 s (300s - 86400s)
WFTime (WFTime)	Judgment time of the OracleRAC10g resource failure default of Oracle instance resource : 900 s default of Oracle listener resource : PersistentWarning -PersistentWarning(notice warning) -ImmediateFault(notice failure as soon as) -60s - 86400s
PreOnlineScript (PreOnlineScript)	Script that is executed before online processing
PostOnlineScript (PostOnlineScript)	Script that is executed before online processing
PreOfflineScript (PreOfflineScript)	Script that is executed before online processing
PostOfflineScript (PostOfflineScript)	Script that is executed before online processing
FaultScript (FaultScript)	Script that is executed after offline processing
Flags (Flags)	The following resource attributes can be set: o NULLDETECTOR If the flag is set, resources are monitored. Default: Resources are monitored.

🖙 Note
. . . .

When startup or stop of the CRS daemon is controlled, set "/opt/FJSVclora/sbin/cloracrs <OracleUser>" for PreOnlineScript of the instance resource. Also, prevent the CRS daemon from automatically being started by executing the following;

/etc/init.d/init.crs disable.

· ·

13. After setting, select "SAVE+RETURN". Clicking the "Registration" button completes the setting.
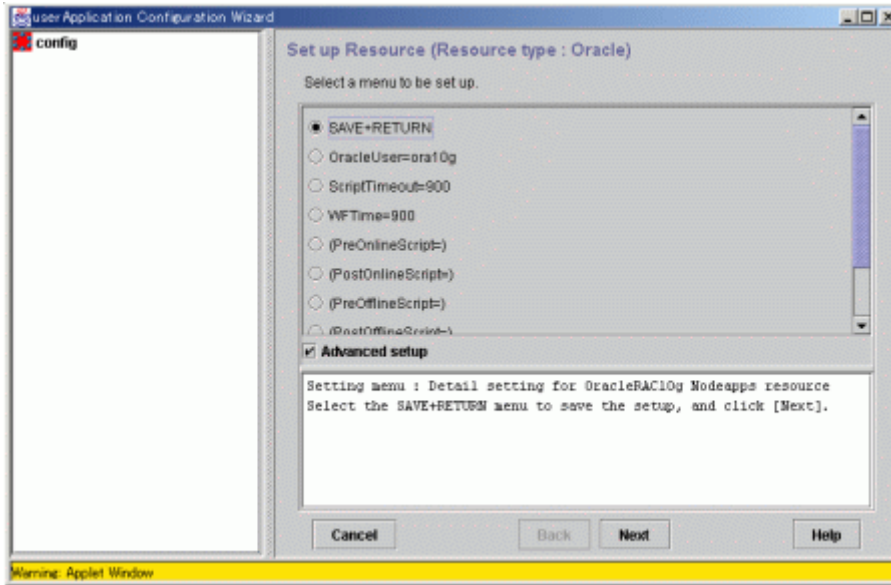
14. Repeat steps 1 through 13 for each node.

2.7.5 Other Resource Registration

If there are other necessary resources, register them using userApplication Configuration Wizard.

2.7.6 userApplication Creation

Create userApplication using userApplication Configuration Wizard. See 2.7.3.

Chapter 3 Operation

3.1 Oracle Control through PRIMECLUSTER Wizard for Oracle

This section discusses how PRIMECLUSTER Wizard for Oracle controls Oracle in standby operation or scalable operation (Oracle9i RAC).

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

  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. See "2.5 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.

Oracle shutdown

Oracle is shut down through a shell script. The shutdown procedure is as follows:

1. su - <Oracle DBA user>

2. sqlplus / nolog

3. connect / as sysdba

4. shutdown <immediate/abort>

5. shutdown abort (if shutdown failed at step 4.)

- **How to shutdown Oracle**

  Normally, PRIMECLUSTER Wizard for Oracle will shut down Oracle with immediate mode (default) if operators stop or switch operation manually. If a failover is generated in the event of a failure, Oracle will be shut down with abort mode (default). If shutdown with immediate mode fails, Wizard for Oracle will use abort mode.

Oracle monitoring

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

1. su - <Oracle DBA user>

2. Local connection to the Oracle instance as a SYSTEM user

3. Check if Oracle status is OPEN

4. Check if "insert", "update" and "delete" ca be properly executed using the monitoring table on the SYSTEM user's default table space

- SYSTEM user password

PRIMECLUSTER Wizard for Oracle monitors Oracle as a SYSTEM user. Set the SYSTEM user's password. See "2.5 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.

- 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.

- 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.

3.2 Oracle RAC 10g Operation

In Oracle RAC 10g, the Oracle instances and listeners are automatically started, monitored, and recovered through the Oracle Cluster Ready Service (CRS). If PRIMECLUSTER Wizard for Oracle detects a resource failure, it will notify RMS of the "Warning" state and asks CRS to generate a failover or recover the failed resource.

Information

PRIMECLUSTER Wizard for Oracle uses the following commands to control CRS resources.

- Oracle instance resource

srvctl start instance -d $DB_NAME -i $ORACLE_SID
srvctl stop instance -d $DB_NAME -i $ORACLE_SID

Note

- Oracle listeners are started or stopped through CRS control. 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 CRS 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.

3.3 userApplication Management in Scalable Operation

Scalable operation consists of groups of userApplication. Some groups include Oracle resources and management userApplication that bundles userApplication, and support scalable operation. Resource tree structure is described below:

"userApp_3" in the center is the management userApplication that bundles the other groups of userapplication.
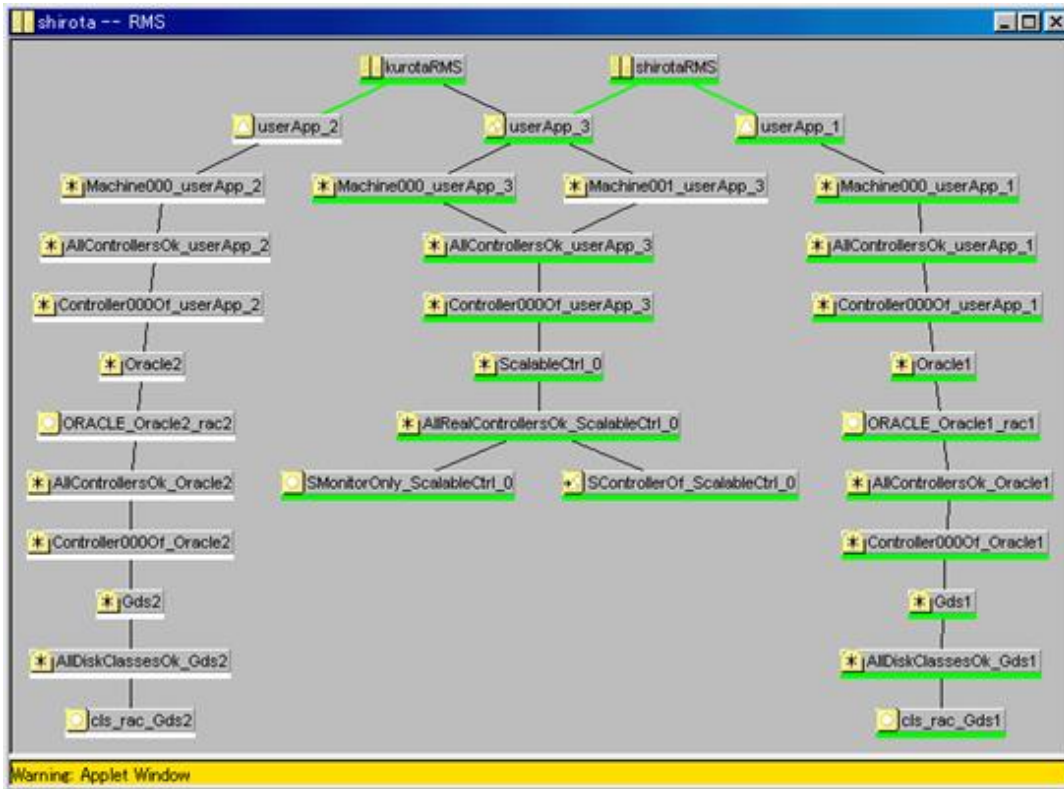
All the bundled userApplication start or stop if the management userApplication is started or stopped.

📑 **See**
....

For information on how to start or stop userApplication, see "7.2.1 RMS Operation" of the "PRIMECLUSTER Installation and Administration Guide".
....

📗 **Note**
....

To start or stop userApplication on each node, start or stop each userApplication directly.
....

3.4 Oracle Online/Offline Script

PRIMECLUSTER starts of stops each resource using a script file. PRIMECLUSTER Wizard for Oracle also supports control of Oracle instances and listeners using scripts. If you set a script that will be executed along with each resource startup and stop, the scripts will be able to execute user applications and batch process.

Script Type

- **PreOnlineScript**

  Executed before Online processing

- **PostOnlineScript**

  Executed after Online processing

- **PreOfflineScript**

  Executed before Offline processing

- **PostOfflineScript**

  Executed after Offline processing

- **FaultScript**

  Executed when failures occur

Notice

- 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.

See
. . . .
For details of each script, see "2.6.3 Script" of the "PRIMECLUSTER RMS Configuration and Administration Guide".
. . . .

3.5 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, put PRIMECLUSTER in maintenance mode, or 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. Put userApplication into maintenance mode or stop monitoring
   Put userApplication into maintenance mode or 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 userApplication is put into maintenance mode or resource monitoring is disrupted.

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

4. Stop Oracle
   Stop Oracle manually.

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

6. 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.

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

8. Cancel maintenance mode and restart resource monitoring

   Cancel maintenance mode of userApplication, or start monitoring the Oracle instance and listener resources again using the hvoraenable command.

Information

- Maintenance mode and resource monitoring

   To stop Oracle with userApplication active, use "Maintenance mode" of PRIMECLUSTER or the "monitoring disruption" function of PRIMECLUSTER Wizard for Oracle.

   "Maintenance mode" - Stop monitoring all resources registered in userApplication so that users can perform maintenance of all the resources including 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.

- Maintenance mode of userApplication

   For information on how to put userApplication into maintenance mode, see "5.4.11 Maintenance mode" of the "PRIMECLUSTER RMS Configuration and Administration Guide".

- Oracle instance and listener monitoring

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

Note

- Monitoring restart

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

- 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.

3.5.1 Oracle setting change

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

Note

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

3.5.1.1 Oracle must be stopped

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

1. Maintenance mode / Monitoring disruption

```
# hvutil -m on <userApplication> (Maintenance mode)
# hvoradisable -a <userApplication> (Monitoring disruption)
```

2. Oracle stop

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

3. Setup change

Change Oracle settings such as initialized parameters and data files.

4. Oracle startup

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

5. Monitoring restart / Maintenance mode stop

```
# hvoraenable -a <userApplication> (Monitoring restart)
# hvutil -m off <userApplication> (Maintenance mode stop)
```

Note

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.

3.5.2 Patch application

If an Oracle patch (e.g. Oracle PSR - Patch Set Release) is applied, the procedure will vary depending on database mounting. If the database does not have to be mounted before and after patch application, apply the Oracle patch after RMS is completely stopped. If the database must be mounted before and after patch application, apply the Oracle patch after putting userApplication into maintenance mode.

1. Maintenance mode / Monitoring disruption

```
# hvutil -m on <userApplication> (Maintenance mode)
# hvoradisable -a <userApplication> (Monitoring disruption)
```

2. Oracle stop (if necessary)

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

3. Patch application

Apply patches according to the Oracle manual.

4. Oracle startup (if stopped)

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

5. Monitoring restart / Maintenance mode stop

```
# hvoraenable -a <userApplication> (Monitoring restart)
# hvutil -m off <userApplication> (Maintenance mode stop)
```

3.5.3 **Backup**

This section discusses how to back up Oracle databases.

3.5.3.1 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. Maintenance mode / Monitoring disruption

```
# hvutil -m on <userApplication> (Maintenance mode)
# hvoradisable -a <userApplication> (Monitoring disruption)
```

2. Oracle stop

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

3. Cold backup

   Perform cold backup of the database.

4. Oracle startup

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

5. Monitoring restart / Maintenance mode stop

```
# hvoraenable -a <userApplication> (Monitoring restart)
# hvutil -m off <userApplication> (Maintenance mode stop)
```

Note

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.

3.5.3.2 Hot backup

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

1. Maintenance mode / Monitoring disruption

```
# hvutil -m on <userApplication> (Maintenance mode)
# hvoradisable -a <userApplication> (Monitoring disruption)
```

2. 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.

3. Monitoring restart / Maintenance mode stop

```
# hvoraenable -a <userApplication> (Monitoring restart)
# hvutil -m off <userApplication> (Maintenance mode stop)
```

3.5.4 Recovery

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

Information

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, see the Oracle manual

3.5.4.1 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. userApplication startup

```
# hvswitch <userApplication>
```

4. Recovery

   Recover the database.

5. Oracle startup

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

6. Monitoring restart

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

3.5.4.2 Oracle does not need to be stopped

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

1. Maintenance mode / Monitoring disruption

```
# hvutil -m on <userApplication> (Maintenance mode)
# hvoradisable -a <userApplication> (Monitoring disruption)
```

2. Recovery

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

3. Monitoring restart / Maintenance mode stop

```
# hvoraenable -a <userApplication> (Monitoring restart)
# hvutil -m off <userApplication> (Maintenance mode stop)
```

3.6 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
   Discontinue monitoring the Oracle instance resources using the hvoradisable command. For the hvoradisable command, see "4.1 hvoradisable - Discontinue Monitoring Resources". Be sure to check the following message in syslog before going to the next step:

   [Info] [0101] Fault Watching is disable

2. Change the Oracle SYSTEM user password
   Change the Oracle SYSTEM user password. For information on how to change the Oracle SYSTEM user password, refer to the Oracle manual.

3. Set up the Oracle SYSTEM user password to Wizard for Oracle
   Set up the Oracle SYSTEM user password to Wizard for Oracle using the clorapass command. For the clorapass command, refer to "4.3 clorapass - Set Password for Monitoring".

4. Restart monitoring the Oracle instance resources
   Restart monitoring the Oracle instance resources using the hvoraenable command.
   For the hvoradisable command, refer to "4.2 hvoraenable - Restart Monitoring Resources".
   Be sure to check the following message in syslog after execution:

   [Info] [0102] Fault Watching is enable

📝 Note

If the Oracle SYSTEM user password is changed in scalable operation with Oracle9i RAC, discontinue monitoring the Oracle instance resources on all the nodes where password is changed. Set up passwords for all the Oracle instance resources where their passwords are changed with the clorapass command.

3.7 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 definition file name and path

```
/opt/FJSVclora/etc/FJSVclorafm.actionlist
```

- File format

```
errno/Status/Action/Message
  18    Cn   Wa "maximum number of sessions exceeded"
  20    Cn   Wa "maximum number of processes (%s) exceeded"
 470    All  Of "LGWR process terminated with error"
 471    All  Of "DBWR process terminated with error"
 472    All  Of "PMON process terminated with error"
 942    Ol   Np "table or view does not exist"
1012    All  Rs "not logged on"
1034    All  Of "ORACLE not available"
```

- errno
  Indicates the Oracle error number (ORA-xxxxx).

- Status
  Indicates the detector state
  CnWhen connecting to an Oracle instance.
  OlUnder connection with an Oracle instance.
  DcWhen disconnecting to an Oracle instance.
  AllAny status of above.

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

🔶 **Note**

. . . .

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

  indicates text of the error code

3.8 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 logo r trace log.

PRIMECLUSTER Wizard for Oracle logging

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

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

The log file formats are as follows:

```
Date/type/ID/text
2002/04/25 15:18:40 [Info] [1101] Starting Oracle detector
```

```
2002/04/25 15:18:40 [Info] [1102] Connected to Oracle
2002/04/25 15:18:40 [Error] [1299] ORA-01034 Oracle not available.
```

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

- Type
  Indicates classification. (Information, Error, Warning)

- ID
  Indicates a message number.

- Text
  Indicates message content.

📑 Note

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

📘 Information

RIMECLUSTER Wizard for Oracle also outputs the following trace file for troubleshooting information as well as log files.

```
/var/opt/FJSVclora/FJSVclora_<OracleSID>_*.trclog
/var/opt/FJSVclora/FJSVclora_<ListenerName>_*.trclog
```

📑 Note

The log files and trace files will be used for troubleshooting. Do not delete or delete the files.

3.9 Troubleshooting Information Collection

This section describes what files you can check to collect troubleshooting information.

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
  $ORACLE_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/*
/var/opt/FJSVclora/*

📖 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, see "4.5 clgetoralog - Collect Troubleshooting Information".

. . . .

3.10 User scripts in Oracle startup processing

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

- **prestartup script**

    Called 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 script**

    Called 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 script**

    Called 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.

The rules for the user interfaces are as follows:

- 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. See step 4 of "2.6.1 Create Oracle resource".

- Using of the "su -" command is not supported for user scripts(prestartup*, nomount*, mount*) under /opt/FJSVclora/usr.

3.11 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 10g. The ASM instance will be controlled by CRS.

3.11.1 Environment configuration

- Creation and configuration of ASM instances

    - Operating 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.

    ### 📖 Note

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

    ### 📖 See

    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
    Under $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.

    ### 📖 Note

    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".

    ### 📖 See

    For the initialized parameter of the ASM instance, see the Oracle manual.

- userApplication creation

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

    ### 📘 Information

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

3.11.2 Precaution for ASM operation

The disk group for the ASM instance must not be mounted or dismounted manually. If the disk group is already mounted, the following message might be output to the console while ASM resource activation:

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 4 Command

4.1 hvoradisable - Discontinue Monitoring Resources

User

    Super user

Format

    /opt/FJSVclora/sbin/hvoradisable *application_name resource_name*
    /opt/FJSVclora/sbin/hvoradisable -a [*application_name*]

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.

📑 See

The ASM instance resource is not monitored, so it is not necessary to discontinue monitoring the resource with the command. For further details about ASM instance resources, see "3.11 ASM (Automatic Storage Management)".

Parameter

    application_name
    Specify userApplication including Oracle resources that will be disrupted monitoring.

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

    application_name and *resource_name*
    Specify all the resources on the local node.

    -a [*application_name*]
    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 *application_name*.

    If *application_name* 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

Do not execute the command during the state transition of userApplication.

4.2 hvoraenable - Restart Monitoring Resources

User

Super user

Format

/opt/FJSVclora/sbin/hvoraenable *application_name resource_name*
/opt/FJSVclora/sbin/hvoraenable -a [*application_name*]

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.

See

The ASM instance resource is not monitored, so it is not necessary to cancel resource monitoring with the command. For further details about ASM instance resources, see "3.11 ASM (Automatic Storage Management)".

Parameter

application_name
Specify userApplication including Oracle resources that will be disrupted monitoring.

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

application_name and *resource_name*
Specify all the resources on the local node.

-a [*application_name*]
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 *application_name*.
If *application_name* 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

Do not execute the command during the state transition of userApplication.

4.3 clorapass - Set Password for Monitoring

User

Super user

Format

/opt/FJSVclora/sbin/clorapass

Function

clorapass sets 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 set, 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 set the Oracle SYSTEM user password.

Parameter

None.

Exit status

0: Normal termination

Non-0: Abnormal termination

📑 See
. . . .

For information on how to change the password of the Oracle SYSTEM operating on a cluster system, see "3.6 Oracle SYSTEM User Password Change ".
. . . .

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/
- $ORACLE_HOME/network/admin/*.ora

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.

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. The "clgetoralog" command collects Oracle setup information and log files on a PRIMECLUSTER system.
The information will be collected in the "<hostname>_<yymmddHHMMSS>_clgetoralog.tar" file.

The "clgetoralog" command collects

- initialization 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

- CRS information
  $ORACLE_CRS_HOME/crs/admin/*
  $ORACLE_CRS_HOME/crs/log/*

- V/L, configuration, and log files of PRIMECLUSTER Wizard for Oracle

- V/L and log files (switchlog) of RMS

- V/L, configuration, and patch information of PRIMECLUSTER

- System information
  uname -a (system basic information)
  uptime (system operating time)
  psrinfo -v
  /usr/platform/`arch -k`/sbin/prtdiag (*1)
  cat /etc/release (Solaris version)
  cat /var/sadm/ptf/newprev/Rcontents (PTF information)
  pkgparam -v FJSVbse (ESF information)
  sysdef -i (kernel parameter)
  ipcs (shared resources)
  swap -l (swap information)
  ptree -a, ps -ef (process information)ntpq -p (NTP information)
  /var/adm/messages files

In the environment that applied the patch 914248-05 or later of PRIMECLUSTER Wizard for Oracle, the following information is gathered.

- System information (Solaris 10 only)
  ptree -a, ps -efZ, ps -efL -o (process information)
  zonename, zoneadm list -vc (zone information)

(*1) In the environment that applied the patch 914248-05 or later of PRIMECLUSTER Wizard for Oracle, it is not gathered in a non-global zone or the Solaris 8 environment (OS patch 111792-17 applied).

Note

When this command is executed in Solaris 8 environment (OS patch 111792-17 applied), the prtdiag command of OS terminates abnormally by incompatible OS and display the character string of "Killed" on the screen. You can ignore it.

Information

The fjsnap command can also be used to collect troubleshooting information.

Parameter

[-n *RMSconfiguration*]
Specify RMS configuration name for *RMSconfiguration*.
If this option is specified, clgetoralog command collects RMS configuration information in addition to the information described in "Function". When the cluster application has been built by using GUI (userApplication Configuration Wizard), the RMS configuration name is "config". The RMS configuration name can be confirmed by the following command while RMS is running.

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

If this option is not specified, clgetoralog command collects only information described in "Function".

[-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" 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/adm/messages*
- /etc/hosts, /etc/inet/hosts
- /etc/passwd
- /etc/services, /etc/inet/services
- /etc/system
- /etc/vfstab
- # showrev -p

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

Exit status

0: Normal termination

Non-0: Abnormal termination

The clgetoralog command searches the Oracle alert log in background_dump_dest or $ORACLE_BASE/admin/<SID>/bdump/*.log of the initialized parameter file ($ORACLE_HOME/dbs/init<SID>.ora). If the server parameter files is being used or there is no definition in the initialized parameter file (background_dump_dest), the Oracle alert log cannot be acquired. Define the alert log in /opt/FJSVclora/etc/clgetoralog.conf using the full path so that you can acquire the alert log. The following example shows how to define /opt/FJSVclora/etc/clgetoralog.conf:

```
COLLECTOBJ=/oracle/admin/orclsid/bdump/alert_orclsid.log
COLLECTOBJ=/oracle/admin/orclsid/bdump/*.trc
```

Where the alert log is stored will be defined in background_dump_dest of the initialized parameter file (init<SID>.ora) or server parameter file (spfile<SID>.ora).

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

Wild cad 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 large, troubleshooting information might not be collected.

4.6 clorabr - Integrated Backup and Restoration of Configuration Files

User

Super user

Format

/opt/FJSVclora/bin/clorabr { backup | restore } [-d *backup_directory*]

Function

PRIMECLUSTER Wizard for Oracle supports integrated backup and restoration (cfbackup/cfrestore) of PRIMECLUSTER systems. The clorabr command can only back up and restore PRIMECLUSTER Wizard for Oracle configuration information.

For integrated backup and restoration of PRIMECLUSTER systems, refer to "Chapter 11 Backing Up and Restoring a PRIMECLUSTER System" of the "PRIMECLUSTER Installation and Administration Guide".

The following files can be backed up and restored:

- /opt/FJSVclora/etc/FJSVclora.pwd
- /opt/FJSVclora/etc/FJSVclorafm.actionlist
- /opt/FJSVclora/usr/_mount10EndBackup.sh
- /opt/FJSVclora/usr/mount10EndBackup.sh
- /opt/FJSVclora/usr/_mount20MediaRecover.sh
- /opt/FJSVclora/usr/mount20MediaRecover.sh
- /opt/FJSVclora/usr/mount05EndBackup_MediaRecover.sh

Parameter

backup
Backs up PRIMECLUSTER Wizard for Oracle configuration information. With this option, a list of configuration files that will be backed up in standard output is displayed. The configuration information will be stored in FJSVclora on the specified directory or the directory (current directory) that is created with the clorabr command. For example, if this command is executed when the current directory is /var/tmp, the backup information will be stored in /var/tmp/FJSVclora.

restore

Restores the PRIMECLUSTER Wizard for Oracle configuration information that have previously been configured. With this option, a list of configuration files that will be restored in standard output is displayed. Check that backed up configuration information are stored in the specified directory or in FJSVclora in the directory (current directory) that is created with the clorabr command. For example, if the backup information is stored in /var/tmp/FJSVclora, execute the command after moving it to /var/tmp.

[-d *backup_directory*]

Specifies the directory where data will be backed up or restored using the full path. With the backup option, the FJSVclora directory will be created on the specified directory, and data will be stored in the FJSVclora. With the restore option, data will be restored from the FJSVclora.

Without this option, data will be backed up or restored in the current directory where the command is executed.

Exit status

0: Normal termination

Non-0: Abnormal termination

4.7 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.

-m [*ResourceName*]

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

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

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

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

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

-v

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

Exit status

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

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

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

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

Other than the above values: Abnormal termination

Chapter 5 Notice

Particular attention should be given to the following:

Prerequisites and requirements

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

- More than one Oracle product which version/release is different can be installed on the same node. However, the version and release should be same on an operating node and standby nodes.
  For the Oracle products supported, see "Installation Guide" and "Handbook".

- An Oracle database must be allocated to a shared disk.

- 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.

- Setting Oracle log output on the shared disk is not recommended. When a disk device fails, log is not output, and the trouble may be unable to be investigated.

- Oracle archive log files can be set on local disks. In such a case, if Oracle recovery is required, the Oracle archive log files on both nodes must be put together.

- The Oracle "TWO_TASK" environment variable cannot be used. For details, see "2.5 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, see "2.5 Oracle Database Creation and Setting".

- PRIMECLUSTER Wizard for Oracle connects to Oracle instance with SYSDBA system privilege to start up or stop Oracle instance/database. In this case, local connection in operating system authentication is used. Therefore, the following requirements should be satisfied. (If not, startup and stop of Oracle instance/database might fail.)

    - Oracle user that is set for Oracle instance resource in "2.6.1 Create Oracle resource" or "2.7.4 Oracle Instance and Listener Resource Registration" should belong to OSDBA group.

    - SQLNET.AUTHENTICATION_SERVICES parameter should not be defined in sqlnet.ora file.

  The other connections (e.g. user own connection for maintenance) can use the password file authentication.

- A command (e.g. script) that has interactive mode should not be described in Oracle user's profile(e.g. /etc/profile, .bash_profile, .cshrc, .profile). It may cause failure of resource monitoring or userApplication startup or shutdown.
  For details, refer to "2.3 Oracle Installation and Configuration" or "2.7.2 Oracle Software Installation and Configuration".

- Environment that Oracle user's home directory and profile are located on the shared disk is not supported. Oracle user's home directory and profile must be located on the local disk of each node.

- Operating system authentication of Listener should be enabled. For details, refer to "2.5 Oracle Database Creation and Setting".

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

- Using of the "su -" command is not supported for user scripts(prestartup*, nomount*, mount*) under /opt/FJSVclora/usr.

Features and functions

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

- To monitor the Oracle instances, the detector connects to the database by using SYSTEM user. The detector also creates a table for monitoring in the SYSTEM user's default tablespace to check Oracle operation. Size of the table is few bytes.

- The Oracle instances fail to stop in the "immediate" mode in the following situations:
  1. DBA user is connected to the Oracle instance, or
  2. Oracle instance backup is in progress
  In these cases, Wizard for Oracle shuts down 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.
  RMS command "hvshut" has own timeout value. Offline processing of userApplication caused by RMS stop continues even though hvshut timeout has occurred.

- When a database failure is detected during Oracle instance startup, the database is automatically recovered. Note that if Oracle9iRAC is used in a system, this automatic recovery is not supported. If recovery is required, the file names in the "/opt/FJSVclora/usr" directory should be replaced as follows:
  _mount10EndBackup.sh -> mount10EndBackup.sh
  _mount20MediaRecover.sh -> mount20MediaRecover.sh
  mount05EndBackup_MediaRecover.sh -> _mount05EndBackup_MediaRecover.sh

- Do not execute "srvctl" or "sqlplus" commands to shut down Oracle instance. It might cause mismatched status between RMS and Oracle RAC 10g.

- The Oracle RAC 10g resource name is generated on RMS as follows:

  - Oracle instance resource
    <SubApplicationName>_<inst_name>.i

  - Oracle listener resource
    <SubApplicationName>_<lsnr_name>.l

  The RMS resource name is based on the Oracle 10g resource name which is output of crs_stat command, and the first part ("ora.") of the Oracle 10g resource name is replaced by "<SubApplicationName>_".
  The RMS resource name of Oracle 10g instance resource has the following convention and rules.

  - Characters per resource name must be less than 40 characters.

  - "<SubApplicationName>_" can be changed in "ApplilcationName" on this step.

Configuration

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

- Be aware of the exit code and timeout duration when the following scripts are set:
  PreOnlineScript, PostOnlineScript, PreOfflineScript, PostOfflineScript, FaultScript

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 password of the Oracle SYSTEM operating on a cluster system, see "3.6 Oracle SYSTEM User Password Change ".

Others

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

- If the Oracle instance is stopped in the "abort" mode, automatic recovery runs when the Oracle instance is restarted next time.

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 correct 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 disable

[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 enable

[Content]

Resource monitoring was restarted after the "hvoraenable" command was executed.

[Corrective action]

None.

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: Invalied 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 error 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.

Note

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

clgetoralog messages

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

Cannot make a temporary directory. Check the system environment.

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

The specified RMS configuration RMS_configuration does not exist. Retry with a correct RMS configuration name.

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

Not enough disk space in path_name. Check the system environment.

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

Cannot make a directory directory_name where collected information is stored. Check the system environment.

clgetoralog [ERROR] "file_name" already exists!

Cannot make file_name because the same name file already exists. 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!"

Cannot create an archive file file_name. 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!

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

clgetoralog [WARN] Execution of hvw failed!

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

clgetoralog [WARN] Result of hvw is invalid!

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

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

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

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

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

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

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

clorainfo messages

clorainfo: ERROR: Obtaining local SysNode Name failed!

Cannot get a local SysNode name. Check if CF (Cluster Foundation) has been configured and is "UP" state.

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

Cannot check if RMS is running or not. Check if PRIMECLUSTER installation, cluster setup and building a cluster application (userApplication) have been completed.

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

Cannot get an RMS configuration name. Check if building a userApplication (cluster application) has been completed.

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

CONFIG.rms file does not exist. Check if building a userApplication (cluster application) has been completed.

clorainfo: ERROR: Wizard for Oracle resources not found

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

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

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

The specified resource resource_name is not a Wizard for Oracle resource. Retry with a correct resource name.

clorainfo: ERROR: Invalid RMS Configuration.

RMS configuration is invalid. Check if building a userApplication (cluster application) has been completed.

clorainfo: ERROR: RMS_configuration does not exist.

The specified RMS configuration does not exist. Retry with a correct RMS configuration name.

hvoradisable/hvoraenable messages

command: ERROR: Internal error! (details)

Internal error occurred. Contact your system administrator.

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

Cannot disable or enable monitoring. Contact your system administrator.

command: ERROR: hvgdconfig does not exist!

hvgdconfig file does not exist. Check if building a userApplication (cluster application) has been completed.

command: ERROR: Obtaining local SysNode Name failed!

Cannot get a local SysNode name. Check if CF (Cluster Foundation) has been configured and is "UP" state.

command: ERROR: Obtaining RMS configuration Name failed!

Cannot get an RMS configuration name. Check if building a userApplication (cluster application) has been completed.

command: ERROR: Execution of hvw failed!

Cannot execute an RMS command hvw(1M) correctly. Check if building a userApplication (cluster application) has been completed.

command: ERROR: Result of hvw is invalid!

Cannot execute an RMS command hvw(1M) correctly. Check if building a userApplication (cluster application) has been completed.

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

Cannot disable or enable monitoring because of details. 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

There are no Wizard for Oracle resources in the specified userApplication userApplication_name. Retry with a correct userApplication name.

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

There are no Wizard for Oracle resources in the current RMS configuration. Check if building a userApplication (cluster application) has been completed or Oracle instance resources or Listener resources are included in the userApplication.

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

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

The specified userApplication name or resource name is invalid. Retry with a correct userApplication name and resource name.

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

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

The monitoring is disabled or enabled although RMS is not running. This setting will become effective in the next RMS startup.

Appendix A Setup Method with CUI

This appendix explains how to create the environment configuration using CUI.

A.1 Create userApplication following the procedure of "2.4 userApplication Creation"

A.2 Create the Oracle resource following the procedure of "2.6 Oracle Resource Creation and Setting"

The resource tree (userApplication configuration) and setup flow are described below. (The resource tree differs slightly from resource tree created using GUI. Resource name in parentheses <> is default value.)

- Scalable operation (Oracle9i RAC)
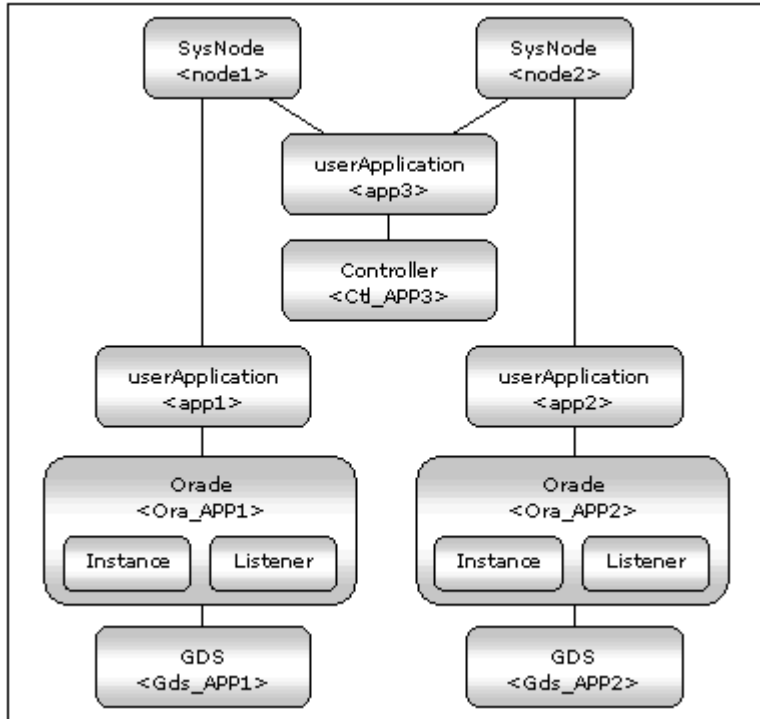
The flow of setup procedure of scalable operation (Oracle9i RAC) with CUI is described below. (The procedure slightly differs than that with GUI.)

1. Creation of userApplication (app1, app2) not including Oracle resources
(procedure 1 to 7 in "A.1.2 Set up scalable operation (Oracle 9i RAC)")
2. Creation of userApplication (app3) including Controller resources
(procedure 8 to 14 in "A.1.2 Set up scalable operation (Oracle 9i RAC)")
3. Generate and Activate
("A.1.4Configuration-Generate and Configuration-Activate")
4. Creation of Oracle databases
("2.5 Oracle Database Creation and Setting")
5. Addition of Oracle resources to userApplication app1 and app2
(step 1 to 7 in "A.2.1 Application-Edit")
6. Generate and Activate again
("A.2.2 Configuration-Generate and Configuration-Activate")

- Standby operation
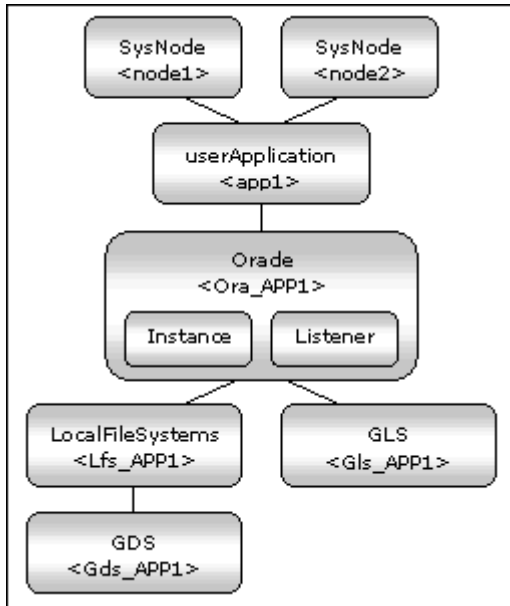
The flow of setup procedure of standby operation with CUI is described below.

1. Creation of userApplication (app1) not including Oracle resources
("A.1.3 Set up standby operation")
2. Generate and Activate
("A.1.4 Configuration-Generate and Configuration-Activate")
3. Creation of Oracle databases
("2.5 Oracle Database Creation and Setting")
4. Addition of Oracle resources to userApplication app1
(procedure 1 to 7 in "A.2.1 Application-Edit")
5. Generate and Activate again
("A.2.2 Configuration-Generate and Configuration-Activate")

A.1 Create userApplication

This section explains userApplication creation and non-Oracle resource setup. Oracle resources must be set after a database is created. userApplication is configured with the RMS Configuration Wizard. This RMS Configuration Wizard forms Wizard format.

Execute the following command on any one of the nodes.

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

You can configure an environment by selecting a number from the following menu:

1. Application-Create

2. Configuration-Generate

3. Configuration-Activate

The menu designated by capital letters is a turnkey wizard that facilitates creation of userApplication.

See

For further details, refer to the PRIMECLUSTER manuals.

A.1.1 Application-Create

The examples of Oracle environment setup are provided as follows:
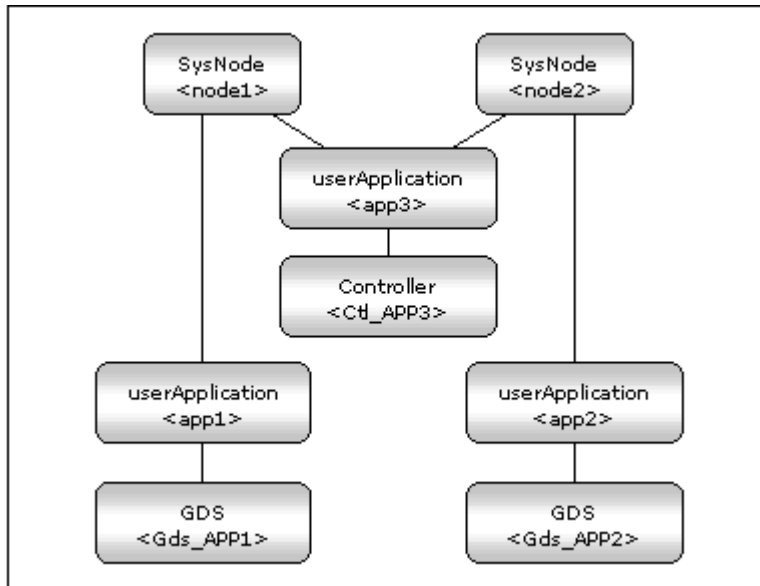
- Scalable operation (Oracle9i RAC)
  In scalable operation, userApplication is configured as shown in the illustration.

- Standby operation
  In standby operation, userApplication is configured as shown in the illustration.
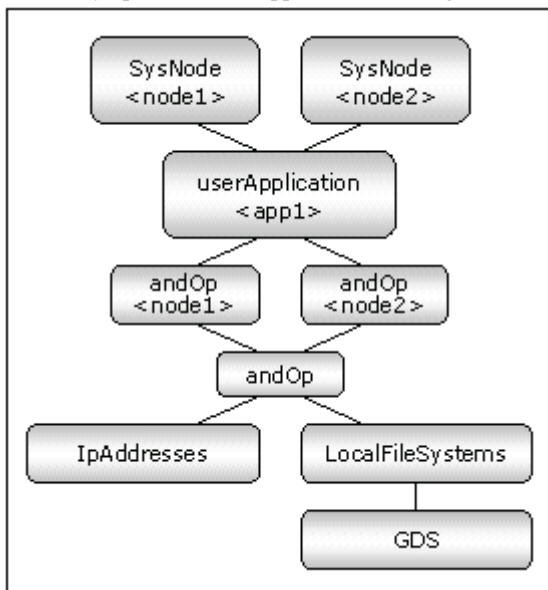
A.1.2 Set up scalable operation (Oracle 9i RAC)

1. Create userApplication by selecting Application-Create in "Main RMS management menu".

```
host1: Main configuration menu, current configuration: oracle1
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-
   5) Application-Remove          14) Configuration-Consistency-
   6) Application-Clone           15) Configuration-ScriptExecut
   7) Configuration-Generate      16) RMS-CreateMachine
   8) Configuration-Activate      17) RMS-RemoveMachine
   9) Configuration-Copy
Choose an action: 3
```

2. Select ORACLE (all caps) in "Application type selection menu".

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

3. Specify the userApplication name of ApplicationName in "Settings of turnkey wizard ORACLE".

```
Settings of turnkey wizard "ORACLE"
   1) HELP
   2) NO-SAVE+EXIT
   3) SAVE+EXIT
   4) REMOVE+EXIT
   5) ApplicationName=APP1
   6) BeingControlled=no
   7) Machines+Basics(-)
Choose the setting to process: 5
```

4. Set up a node and the following menu items by selecting Machines+Basics. Create userApplication for each Oracle instance. Set up a node for each userApplication. For other settings, refer to HELP or the "PRIMECLUSTER Reliant Monitor Services (RMS) with Wizard Tools (Solaris®, Linux®) Configuration and Administration Guide".

📘 Information
• •

Recommended setting
AutoStartup = no
AutoSwitchOver = no
PersistentFault = 1

• •

•••

AutoStartUp, be sure to specify No.

•••

Save the above settings by selecting SAVE+EXIT.

```
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]=host1RMS    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
```

5. Set up a resource required for a shared disk (ex. GDS) in "Setting of turnkey wizard ORACLE".

```
Settings of turnkey wizard "ORACLE"
 1) HELP                    10) LocalFileSystems(-)
 2) -                       11) RemoteFileSystems(-)
 3) SAVE+EXIT               12) IpAddresses(-)
 4) -                       13) RawDisks(-)
 5) ApplicationName=APP1    14) RC-VolumeManagement(-)
 6) Machines+Basics(app1)   15) VERITAS-VolumeManagement(-)
 7) CommandLines(-)         16) Gds:Global-Disk-Services(-)
 8) Controllers(-)          17) Gls:Global-Link-Services(-)
 9) ORACLE(-)
Choose the setting to process:16
```

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

7. With the procedure from 1) to 6), node setting is done. For scalable operation, create userApplication for each node. This setup procedure must be completed for each node.

8. After userApplication creation is done on all the nodes, create userApplication app3 by selecting Application Create in "Main configuration menu".

9. Set up nodes and GENERIC in "Application type selection menu" by selecting Machines+Basics. Save the settings by selecting SAVE+EXIT.

```
Machines+Basics (app3:consistent)
 1) HELP                         14) (FaultScript=)
 2) -                            15) (AutoStartUp=no)
 3) SAVE+EXIT                    16) (AutoSwitchOver=No)
 4) REMOVE+EXIT                  17) (PreserveState=no)
 5) AdditionalMachine            18) (PersistentFault=0)
 6) AdditionalConsole            19) (ShutdownPriority=)
 7) Machines[0]=host1RMS         20) (OnlinePriority=)
 8) Machines[1]=host2RMS         21) (StandbyTransitions=)
 9) (PreCheckScript=)            22) (LicenseToKill=no)
10) (PreOnlineScript=)           23) (AutoBreak=yes)
11) (PostOnlineScript=)          24) (HaltFlag=no)
12) (PreOfflineScript=)          25) (PartialCluster=0)
13) (OfflineDoneScript=)         26) (ScriptTimeout=)
Choose the setting to process: 3
```

10. Select the Controllers in "Settings of turnkey wizard "GENERIC".

```
Settings of turnkey wizard "GENERIC"
 1) HELP                          9) LocalFileSystems(-)
 2) -                            10) RemoteFileSystems(-)
 3) SAVE+EXIT                    11) IpAddresses(-)
 4) -                            12) RawDisks(-)
 5) ApplicationName=APP3         13) RC-VolumeManagement(-)
 6) Machines+Basics(app3)        14) VERITAS-VolumeManagement(-)
 7) CommandLines(-)              15) Gds:Global-Disk-Services(-)
 8) Controllers(-)               16) Gls:Global-Link-Services(-)
Choose the setting to process: 8
```

11. Select the AdditionalAppToControl and add controlled userApplicatoin (app1 and app2).

```
Settings of application type "Controller" (not yet consistent)
1) HELP
2) -
3) SAVE+EXIT
4) REMOVE+EXIT
5) ControlPolicy=FOLLOW
6) AdditionalAppToControl
7) (InParallel=)
8) (FaultScript=)
Choose the setting to process: 6
```

12. Select the ControlPolicy and change FOLLOW to SCALABLE.

13. Save the settings by selecting SAVE+EXIT in "Settings of application type "Controller".

```
Settings of application type "Controller" (consistent)
 1) HELP
 2) -
 3) SAVE+EXIT
 4) REMOVE+EXIT
 5) ControlPolicy=SCALABLE
 6) AdditionalAppToControl
 7) Controllers[0]=T180:app1
 8) Controllers[1]=T180:app2
 9) (FaultScript=)
10) (ApplicationSequence=)
11) (StateChangeScript=)
Choose the setting to process: 3
```

14. Go back to "Main configuration menu" by selecting SAVE+EXIT in "Settings of turnkey wizard "GENERIC".

```
Settings of turnkey wizard "GENERIC"
 1) HELP                           9) LocalFileSystems(-)
 2) -                             10) RemoteFileSystems(-)
 3) SAVE+EXIT                     11) IpAddresses(-)
 4) -                            12) RawDisks(-)
 5) ApplicationName=APP3          13) RC-VolumeManagement(-)
 6) Machines+Basics(app3)         14) VERITAS-VolumeManagement(-)
 7) CommandLines(-)               15) Gds:Global-Disk-Services(-)
 8) Controllers(Ctl_APP3)         16) Gls:Global-Link-Services(-)
Choose the setting to process: 3
```

A.1.3 Set up standby operation

1. Create userApplication by selecting Application-Create in "Main RMS manage menu".

```
host1: Main configuration menu, current configuration: oracle1
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-
 5) Application-Remove            14) Configuration-Consistency-
 6) Application-Clone             15) Configuration-ScriptExecut
 7) Configuration-Generate        16) RMS-CreateMachine
 8) Configuration-Activate        17) RMS-RemoveMachine
 9) Configuration-Copy
Choose an action: 3
```

2. Select ORACLE (in capitals) in the "Application type selection menu" page.

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

3. Specify the userApplication name of ApplicationName in "Settings of turnkey wizard ORACLE".

```
Settings of turnkey wizard "ORACLE"
1) HELP
2) NO-SAVE+EXIT
3) SAVE+EXIT
4) REMOVE+EXIT
5) ApplicationName=APP1
6) BeingControlled=no
7) Machines+Basics(-)
Choose the setting to process: 5
```

4. Set up nodes and the following menu items by selecting Machines+Basics.
   Set the operating node to Machines[0], and the standby nodes to Machines[n]. Select AdditionalMachines to add the nodes. For other settings, refer to HELP or the "PRIMECLUSTER Reliant Monitor Services (RMS) with Wizard Tools (Solaris®, Linux®) Configuration and Administration Guide".

Information

・・・

Recommended setting
AutoSwitchOver = HostFailure|ResourceFailure|ShutDown
PersistentFault = 1

・・・

```
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: 3
```

5. Set up a resource required for a shared disk (ex. GDS) by selecting LocalFileSystems and IpAddress in "Settings of turnkey wizard ORACLE".

```
Settings of turnkey wizard "ORACLE"
 1) HELP                        10) LocalFileSystems(-)
 2) -                           11) RemoteFileSystems(-)
 3) SAVE+EXIT                   12) IpAddresses(-)
 4) -                           13) RawDisks(-)
 5) ApplicationName=APP1        14) RC-VolumeManagement(-)
 6) Machines+Basics(app1)       15) VERITAS-VolumeManagement(-)
 7) CommandLines(-)             16) Gds:Global-Disk-Services(-)
 8) Controllers(-)              17) Gls:Global-Link-Services(-)
 9) ORACLE(-)
Choose the setting to process: 16
```

6. Return to the Main RMS management menu by selecting SAVE+EXIT. (Any settings related to Oracle should not be done here.)

A.1.4 Configuration-Generate and Configuration-Activate

Set up userApplication by selecting Configuration-Generate.
Enable the userApplication settings by selecting Configuration-Activate.

Main RMS management menu

```
host1: Main configuration menu, current configuration: oracle1
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-
 5) Application-Remove          14) Configuration-Consistency-
 6) Application-Clone           15) Configuration-ScriptExecut
 7) Configuration-Generate      16) RMS-CreateMachine
 8) Configuration-Activate      17) RMS-RemoveMachine
 9) Configuration-Copy
Choose an action: 7
```

A.1.5 Check userApplication

Start up userApplication and check if it is normally running on all the nodes by executing the "hvcm" command.

- Shared disk - Check access to the shared disk on the operating node.

- Logical IP address - Check access to the operating node.

🔖 See
. . . .
For the RMS command, see "11.6 RMS" of the "PRIMECLUSTER Reliant Monitor Services (RMS) with Wizard Tools (Solaris®, Linux®) Configuration and Administration Guide".
. . . .

A.2 Create and set up Oracle resource

The Oracle-related resources are registered in userApplication that is created in "2.4 userApplication Creation".

Execute the following command on any one of the nodes.

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

🔖 See
. . . .
For further details, refer to the "PRIMECLUSTER Reliant Monitor Services (RMS) with Wizard Tools (Solaris®, Linux®) Configuration and Administration Guide".
. . . .

A.2.1 Application-Edit

The examples of the Oracle environment setup are as follows:

1. Edit userApplication by selecting Application-Edit in "Main RMS management menu".

```
host1: Main configuration menu, current configuration: oracle1
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-
  5) Application-Remove          14) Configuration-Consistency-
  6) Application-Clone           15) Configuration-ScriptExecut
  7) Configuration-Generate      16) RMS-CreateMachine
  8) Configuration-Activate      17) RMS-RemoveMachine
  9) Configuration-Copy
Choose an action: 4
```

2. Select userApplication created in "Application selection menu" of Chapter 2.4.

```
Edit: Application selection menu (restricted):
  1) HELP
  2) QUIT
  3) RETURN
  4) OPTIONS
  5) APP1
  6) APP2
  7) APP3
Application Name: 5
```

3. Select ORACLE in "Settings of turnkey wizard ORACLE".

```
Settings of turnkey wizard "ORACLE"
  1) HELP                        10) LocalFileSystems(-)
  2) -                           11) RemoteFileSystems(-)
  3) SAVE+EXIT                    12) IpAddresses(-)
  4) -                           13) RawDisks(-)
  5) ApplicationName=APP1         14) RC-VolumeManagement(-)
  6) Machines+Basics(app1)        15) VERITAS-VolumeManagement(-)
  7) CommandLines(-)              16) Gds:Global-Disk-Services(Gds_…)
  8) Controllers(-)               17) Gls:Global-Link-Services(-)
  9) ORACLE(-)
Choose the setting to process:9
```

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

   AdditionalInstance
   Add the Oracle instance resources

   AdditionalListener
   Add the Oracle listener resources

   StartPriority
   Set up a startup order of the Oracle instances and Oracle listeners

📝 **Example**

・・

If you use the Oracle multi-threaded server (MTS), the Oracle listener needs to be started first.

・・

5. Set up the Oracle instances.
   See 4 of "2.6.1 Create Oracle resource" for details.

6. Set up the Oracle listeners.
   See 5 and 6 of "2.6.1 Create Oracle resource" for details.

7. Save the settings by selecting SAVE+EXIT. When using Oracle9i RAC, follow the setup procedure from 1) to 6) for each userApplication.

A.2.2 Configuration-Generate and Configuration-Activate

Set up userApplication by selecting Configuration-Generate.
Then, enable the userApplication settings by selecting Configuration-Activate.

Main RMS management menu

```
host1: Main configuration menu, current configuration: oracle1
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-
 5) Application-Remove           14) Configuration-Consistency-
 6) Application-Clone            15) Configuration-ScriptExecut
 7) Configuration-Generate       16) RMS-CreateMachine
 8) Configuration-Activate       17) RMS-RemoveMachine
 9) Configuration-Copy
Choose an action: 7
```

In scalable operation, userApplication is configured as follows:

SysNode <node1>   SysNode <node2>

userApplication <app3>

Controller <Ctl_APP3>

userApplication <app1>   userApplication <app2>

Oracle <Ora_APP 1>
Instance   Listener

Oracle <Ora_APP 2>
Instance   Listener

GDS <Gds_APP1>   GDS <Gds_APP2>

In standby operation, userApplication is configured as follows:

SysNode <node1>   SysNode <node2>

userApplication <app1>

Oracle <Ora_APP 1>
Instance   Listener

LocalFileSystems <Lfs_APP1>   GLS <Gls_APP1>
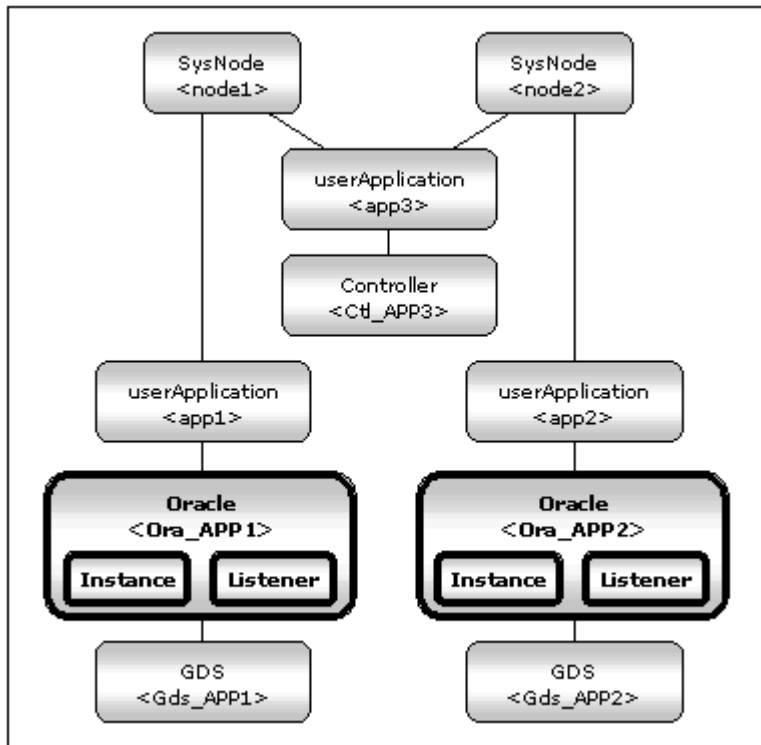
GDS <Gds_APP1>
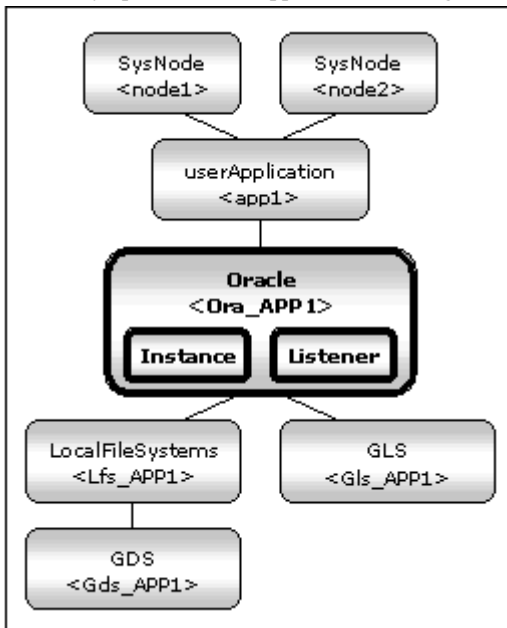
A.2.3 Check userApplication operation

Start up userApplication and check if it is normally running by executing the "hvcm" command on all the nodes.

- Shared disk

  Check if you can access to the shared disk from the operating node.

- Logical IP address

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

- Oracle

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

See
....
For the RMS command, see "11.6 RMS" of the "PRIMECLUSTER Reliant Monitor Services (RMS) with Wizard Tools (Solaris®, Linux®) Configuration and Administration Guide".
....

Appendix B Using PRIMECLUSTER Wizard for Oracle in Oracle Solaris Zones Environments

This section explains notices, construction procedures, and maintenance procedures in the case of using PRIMECLUSTER Wizard for Oracle in Oracle Solaris Zones environments.

Information
....
About the method of installing PRIMECLUSTER in Oracle Solaris Zones environment, refer to "Chapter 13 Using PRIMECLUSTER in Oracle Solaris Zones Environments" of the "PRIMECLUSTER Installation and Administration Guide".
....

B.1 Notice of System Configuration

- Oracle RAC cannot be made a cluster in non-global zone.

- When you allocate the image of non-global zone on shared disks, create the volume for Oracle Database allocated on the shared disk class for non-global zone where Oracle is installed.
  When you allocate the image of non-global zone on a local disk, create the volume for Oracle Database allocated on shared disk class, and enable it to access from non-global zone.

- The configurations which support PRIMECLUSTER Wizard for Oracle 4.1A40 operating on an Oracle Solaris Zones environment are as follows.

global zone OS(*1)	Non-global zone type(*2)	Oracle Database Edition	Version and/or level
Oracle Solaris 10	Oracle Solaris 8 Containers (OSLC) Oracle Solaris 9 Containers (OSLC)	Enterprise Edition Standard Edition	R8.1.7(32bit/64bit) R9.2.0(32bit/64bit) R10.1.0 (64bit) R10.2.0 (64bit)

- (*1) You need PRIMECLUSTER 4.3A20.

- (*2) You need PRIMECLUSTER 4.1A30 or PRIMECLUSTER 4.1A40.

B.2 Construction Procedure

This section explains construction procedure of Oracle and PRIMECLUSTER Wizard for Oracle in non-global zone.
It needs to be beforehand completed to the setup of PRIMECLUSTER in non-global zone. (Before "13.3.4.10 Installing Middleware Products to Non-Global Zones" of "13.3.4 Creating Non-Global Zones" of "PRIMECLUSTER Installation and Administration Guide")

B.2.1 PRIMECLUSTER Wizard for Oracle Installation

Mount the media of PRIMECLUSTER Wizard for Oracle on non-global zone, or copy to non-global zone, and install PRIMECLUSTER Wizard for Oracle. About the installation procedure of PRIMECLUSTER Wizard for Oracle, refer to the PRIMECLUSTER Wizard for Oracle Installation Guide.

Note
....
When the global zone is Solaris 10, the existing systems running on Solaris 8 or Solaris 9 can also be run on Solaris 10 by migrating them to the non-global zone with Oracle Solaris Legacy Containers (OSLC).
If PRIMECLUSTER Wizard for Oracle 4.1A40 is used with the cluster system on Solaris 8/9 on migration source node, it is necessary to uninstall the PRIMECLUSTER Wizard for Oracle 4.1A40 before uninstall the PRIMECLUSTER on the Oracle Solaris zones environments.

Refer to the "PRIMECLUSTER Wizard for Oracle Installation Guide", and uninstall it.
Install PRIMECLUSTER Wizard for Oracle after it completes before "13.3.4.10 Installing Middleware Products to Non-Global Zones" of "13.3.4 Creating Non-Global Zones" of "PRIMECLUSTER Installation and Administration Guide".

. . . .

After installing the packages, apply the newest patch of PRIMECLUSTER Wizard for Oracle. Procedure for applying the patch refer to the README provided with the patch. The versions necessary for applying the patch to the non-global zone is as follows.

Solaris 8 Containers
Solaris 9 Containers
914248-05 or later

B.2.2 Oracle Installation and Oracle Database Creation

Install Oracle software and create Oracle Database. Refer to the following chapters.

- 2.3 Oracle Installation and Configuration

- 2.5 Oracle Database Creation and Setting

Note

. . . .

Be careful of the following points at the time of Oracle installation, and database creation.

- About the allocation of Oracle software and a database, read description of the above-mentioned chapter as follows.

    - It is necessary to replace "local disk" with "Volume for root file system of non-global zone".

    - It is necessary to replace "shared disk" with "Volume for Oracle data allocation".

- When non-global zone image is shared, because the operation node and standby node shares the root file system of non-global zone, installation/setup of Oracle software, and creation/setup of a database are only once carried out by operation node.
  When non-global zone image is not shared, installation/setup of Oracle software are carried out by all the nodes. creation/setup of database are only once carried out by operation node, and database setup of operation node is copied to standby node using the cloracpy command.

- Carry out registration of the SYSTEM user's password by the clorapass command in every non-global zone.

- Oracle listeners' IP address is set up according to the use existence or nonexistence of the Gls resource on non-global zone. When you don't use Gls resource, specify the IP address of non-global zone. When you use a Gls resource, specify the virtual IP (taking over IP).

- In order to use ASM in Oracle Solaris Zones environment, for the specification of Oracle Database, it is necessary to add a proc priocntl privilege toward non-global zone in advance.
  Execute the following commands.

```
# zonecfg -z <zone name> set limitpriv=default,proc_priocntl
```

. . . .

B.3 Maintenance Procedure

This section explains maintenance procedure of Oracle and PRIMECLUSTER Wizard for Oracle in non-global zone.

B.3.1 Oracle Maintenance

To stop Oracle of non-global zone for maintenance work, such as cold backup, it is necessary to interrupt Oracle monitoring temporarily. Refer to the following chapter.

- 3.5 Oracle maintenance

Note

Note at the time of the Oracle maintenance work in non-global zone.

- In the above-mentioned chapter, although it is indicated that both the maintenance mode of PRIMECLUSTER and stop monitoring / restart monitoring command of PRIMECLUSTER Wizard for Oracle(hvoradisable, hvoraenable) are used, use only command of PRIMECLUSTER Wizard for Oracle(hvoradisable, hvoraenable) in non-global zone.

B.3.2 Patch Application to PRIMECLUSTER Wizard for Oracle

When applying a patch to PRIMECLUSTER Wizard for Oracle in non-global zone, set non-global zone as single user mode.
At this time, use maintenance mode in global zone. Refer to "13.5.1 Maintenance Operations on the Non-Global Zone" of "PRIMECLUSTER Installation and Administration Guide".

B.3.3 Troubleshooting Information

If the failure about Oracle and PRIMECLUSTER Wizard for Oracle that are operated in non-global zone occur, login the non-global zone by zlogin from a global zone, and collect troubleshooting Information using the clgetoralog command. Refer to the following chapters.

- 4.5 clgetoralog - Collect Troubleshooting Information

B.4 Uninstallation Procedure

About the uninstallation procedure of PRIMECLUSTER Wizard for Oracle, refer to the "PRIMECLUSTER Wizard for Oracle Installation Guide". About the back out procedure of patch, refer to the README provided with the patch.