




Workshop: Administering Oracle 11.2 RAC database na Linuxu

Zoran Jovanović - 
Technical Support Manager

Workshop agenda

2

- ◆ Presentation Implementing Oracle 11g RAC Database on Linux
- ◆ Creating single instance rconv database
- ◆ Converting single instance rconv database to RAC with rconfig and dbca
- ◆ Administering Clusterware
- ◆ Administering ASM

Workshop agenda

3

- ◆ For exercises participants will use Oracle 11g R2 RAC configuration on two Vmware virtual machines with Linux operating system
- ◆ Exercises will be performed in groups of two participants using separate Oracle 11g R2 RAC configurations
- ◆ Before exercises you will get an information about virtual machines, IP addresses and usernames/passwords for your group



Implementing Oracle 11g RAC Database on Linux

Zoran Jovanovic



Technical Support Manager

Prepare RAC implementation plan

Requirements definition

- ◆ defining project scope
- ◆ defining project team
- ◆ defining service-level requirements
- ◆ defining project schedule

Prepare RAC implementation plan

Technical architecture design and build

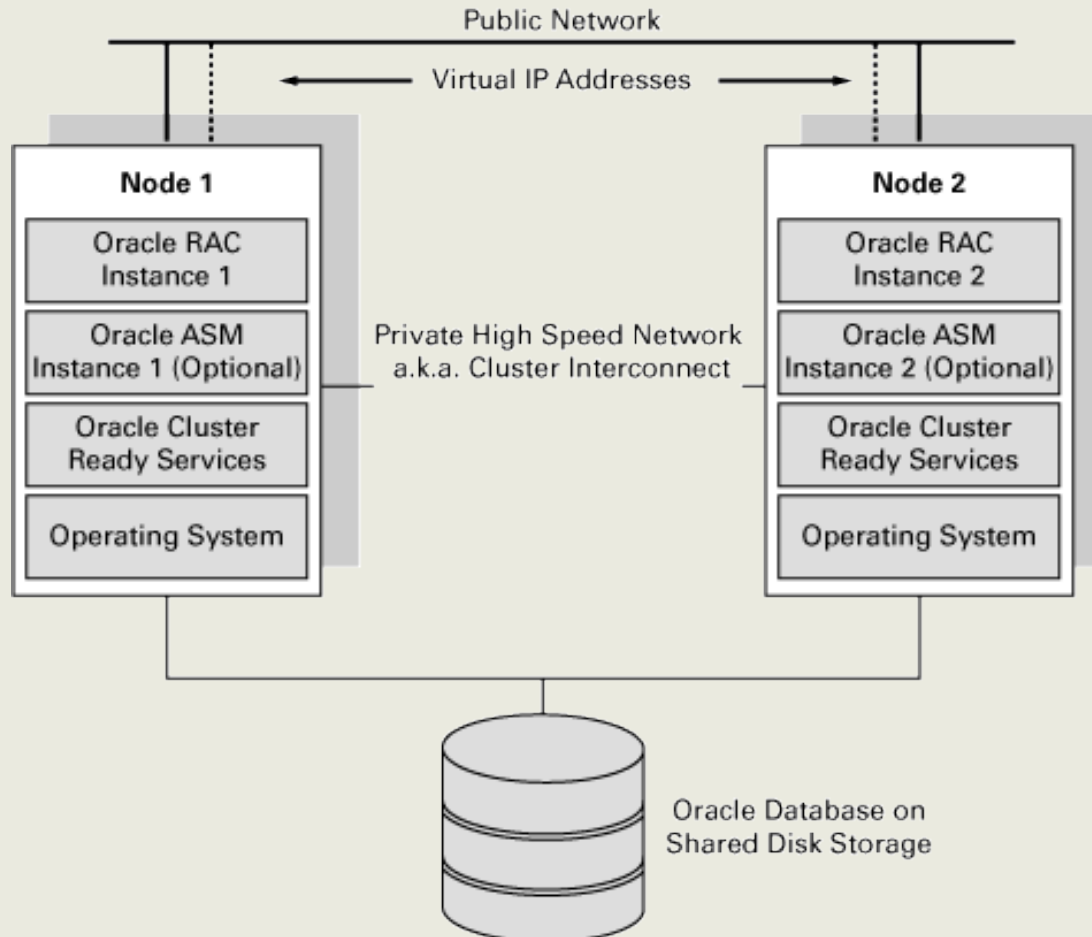
- ◆ determining the hardware and software specifications
- ◆ implementing the specifications
 - configure network environment
 - configure shared storage (NAS, SAN)
 - configure operating system
 - configure Oracle software
 - operational tasks
 - perform data loads
 - perform index builds
 - setup OS and database backups
 - install and configure performance monitoring utilities

Prepare RAC implementation plan

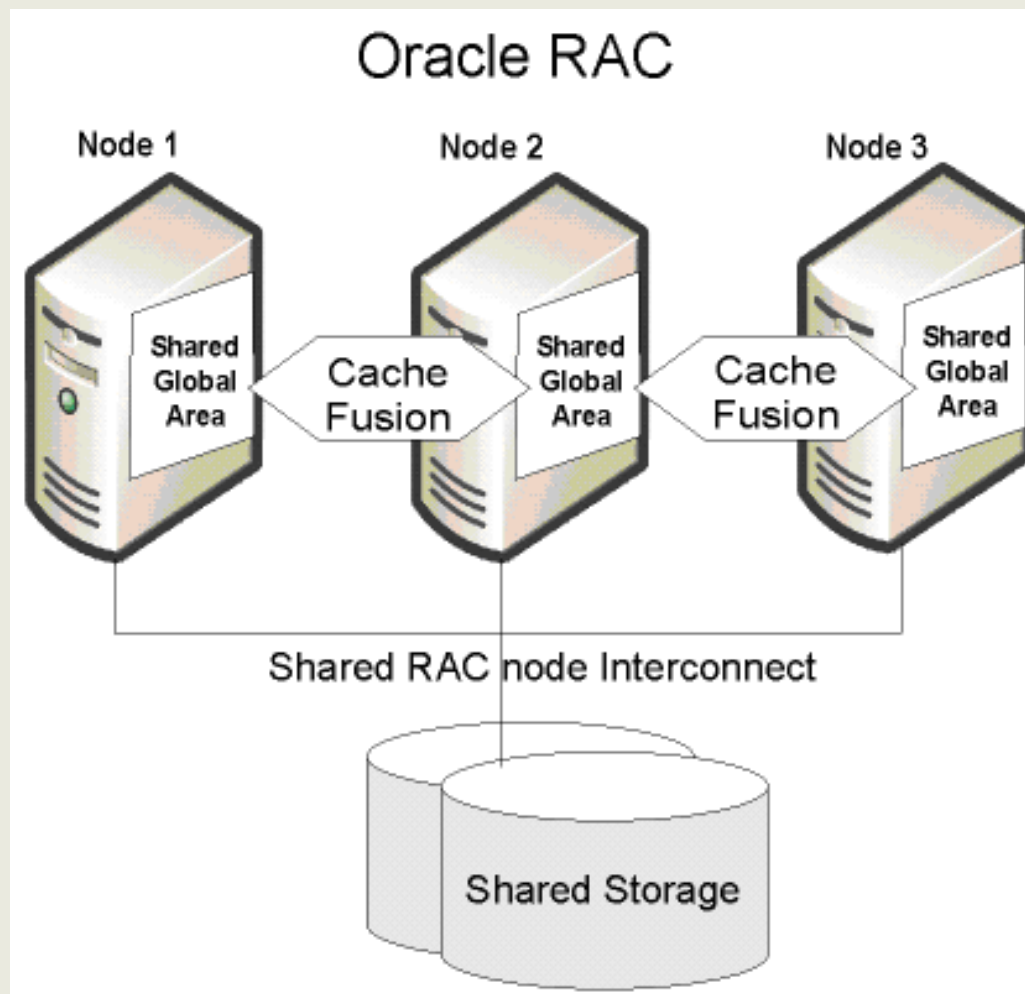
RAC system testing

- ◆ proof-of-concept testing
- ◆ unit testing
- ◆ integration testing
- ◆ stress testing

RAC architecture



RAC architecture



Preinstallation Considerations

Study documentation

- ◆ Installation documentation for Oracle RAC Database on Linux
- ◆ RAC and Oracle Clusterware Starter Kit and Best Practices: Generic [ID 810394.1] and Linux [ID 811306.1]
- ◆ Oracle Recommended Patches -- Oracle Database [ID 756671.1]
- ◆ Oracle Database 11g R1 Automatic Storage Management Overview and Technical Best Practices
- ◆ RACGuides Rac11gR1OnLinux or RACGuides Rac11gR1OnLinux

Preinstallation Considerations

- ◆ Eliminate any single points of failure in the architecture
- ◆ Review Oracle's Maximum Availability Architecture recommendations
- ◆ Plan capacity requirements for CPU, memory, network and storage based on expected production workload
- ◆ Oracle recommends using Oracle Clusterware
- ◆ Automatic Storage Management is recommended for database storage
- ◆ Check that all the components of the architecture (hardware, software, network, storage) are certified for Oracle 11g RAC database

Configure network environment

- ◆ Each node must have at least three NICs for:
 - Public IP
 - Virtual IP
 - Cluster interconnect
- ◆ Default gateway must be on the same subnet as Virtual IP
- ◆ NICs must have the same names on all nodes in the cluster
- ◆ Do not use underscore in host or domain names
- ◆ Configure NICs for fault tolerance (bonding/link aggregation)
- ◆ Configure NICs correctly in terms of speed, duplex ...

Configure network environment

- ◆ Use non-routable network addresses for cluster interconnect:
 - Class A: 10.0.0.0 to 10.255.255.255,
 - Class B: 172.16.0.0 to 172.31.255.255,
 - Class C: 192.168.0.0 to 192.168.255.255
- ◆ Configure Jumbo Frames for cluster interconnect if possible: 9.000 byte frames are used instead of 1.500 bytes
- ◆ Cluster interconnect must be connected to a switch (crossover cable is not supported) with a dedicated VLAN
- ◆ NIC names must not contain „.“

Configure shared storage

- ◆ Use correct mount options for NFS disks (see Mount Options for Oracle files when used with NAS devices [ID 359515.1])
- ◆ Implement multiple access paths to storage array using two or more HBAs or initiators with multi-pathing software
- ◆ Stripe and mirror shared disks with 1 MB stripe size (ASM stripe size)
- ◆ Configure disk groups with disks of same size and performance characteristics
- ◆ Configure disk groups with four or more disks

Configure shared storage

- ◆ Create two ASM disk groups on separate physical disks:
 - one for database area and
 - one for flash recovery area
- ◆ Place database and redo log files in database area
- ◆ It is recommended to utilize Oracle redundancy for the OCR and Voting Disks
- ◆ You must create odd number of Voting Disks
OCR and Voting disks can be stored on raw, block devices, OCFS or ASM (11gR2 only)

Configure shared storage

- ◆ For OCR and Voting disks you must have at least three LUNs each having the following minimal sizes:
 - 280 MB (for 11gR1)
 - 2 GB (for 11gR2)
- ◆ By default, Oracle uses the asynchronous I/O (AIO) on Linux
- ◆ Use of raw devices is not recommended – they will be removed from future Linux distributions

Configure operating system

17

- ◆ Install certified version of Linux OS
- ◆ Install all Linux packages required in Oracle install documentation
- ◆ Configure kernel parameters
- ◆ Create Linux groups dba, oinstall and oper
- ◆ Create Linux user to own Oracle installation (typically oracle)
- ◆ For CRS, ASM, and Oracle ensure one unique User ID with a single name, is in use across the cluster

Configure operating system

18

- ◆ Machine clocks must be synchronized on all nodes to the same NTP source
- ◆ Configure the system logger to log messages to one central server
- ◆ Hangcheck-timer Module is required on both oracle 10g and 11g RAC on Linux.
- ◆ Assuming the default setting of "CSS misccount" is set to either 30 or 60 seconds, the recommended hangcheck-timer settings are: `hangcheck_tick=1` `hangcheck_margin=10` `hangcheck_reboot=1`

Configure operating system

19

- ◆ For versions 10.2.0.4 and 11gR1, it is a best practice on all platforms to set the CSS diagwait parameter to 13 (not required in 11gR2)
- ◆ Set shell limits for oracle user in /etc/security/limits.conf:
 - oracle soft nproc 2047
 - oracle hard nproc 16384
 - oracle soft nofile 1024
 - oracle hard nofile 65536

Configure operating system

20

- ◆ Configure SELinux to disabled or permissive mode in /etc/selinux/conf:
 - „SELINUX=disabled“ or „SELINUX=permissive“
- ◆ Configure ssh equivalence for oracle user on cluster member nodes
- ◆ Create three Oracle home directories:
 - Clusterware home
 - ASM home
 - Database home
- ◆ Set ORACLE_BASE directory

Configure operating system

21

- ◆ Partition LUNs on shared disks used for: voting disks, OCR and ASM disks with fdisk
- ◆ Partitions used for ASM disks must be aligned to 1MB boundary:

fdisk /dev/sdb

Command (m for help): **u**

Changing display/entry units to sectors

Command (m for help): **p**

Command (m for help): **n**

Command action

e extended

p primary partition (1-4)

p

Partition number (1-4): **1**

First sector (63-4194303, default 63): **2048 <<<< Start at 1M**

Last sector or +size or +sizeM or +sizeK (32768-4194303, default 4194303):

Using default value 4194303

Configure operating system

22

- ◆ Install ASMLib (download from OTN)
- ◆ Install ASMLib driver that matches Linux kernel version:

oracleasm-2.6.18-128.el5-2.0.5-1.el5.i686.rpm ←- **kernel 2.6.18-128**

oracleasm-support-2.1.3-1.el5.i386.rpm

oracleasm-lib-2.0.4-1.el5.i386.rpm

- ◆ Configure ASMLib

```
# /etc/init.d/oracleasm configure
```

- ◆ Create ASM disks from shared disk partitions:

```
◆ # /etc/init.d/oracleasm createdisk
```

Configure operating system

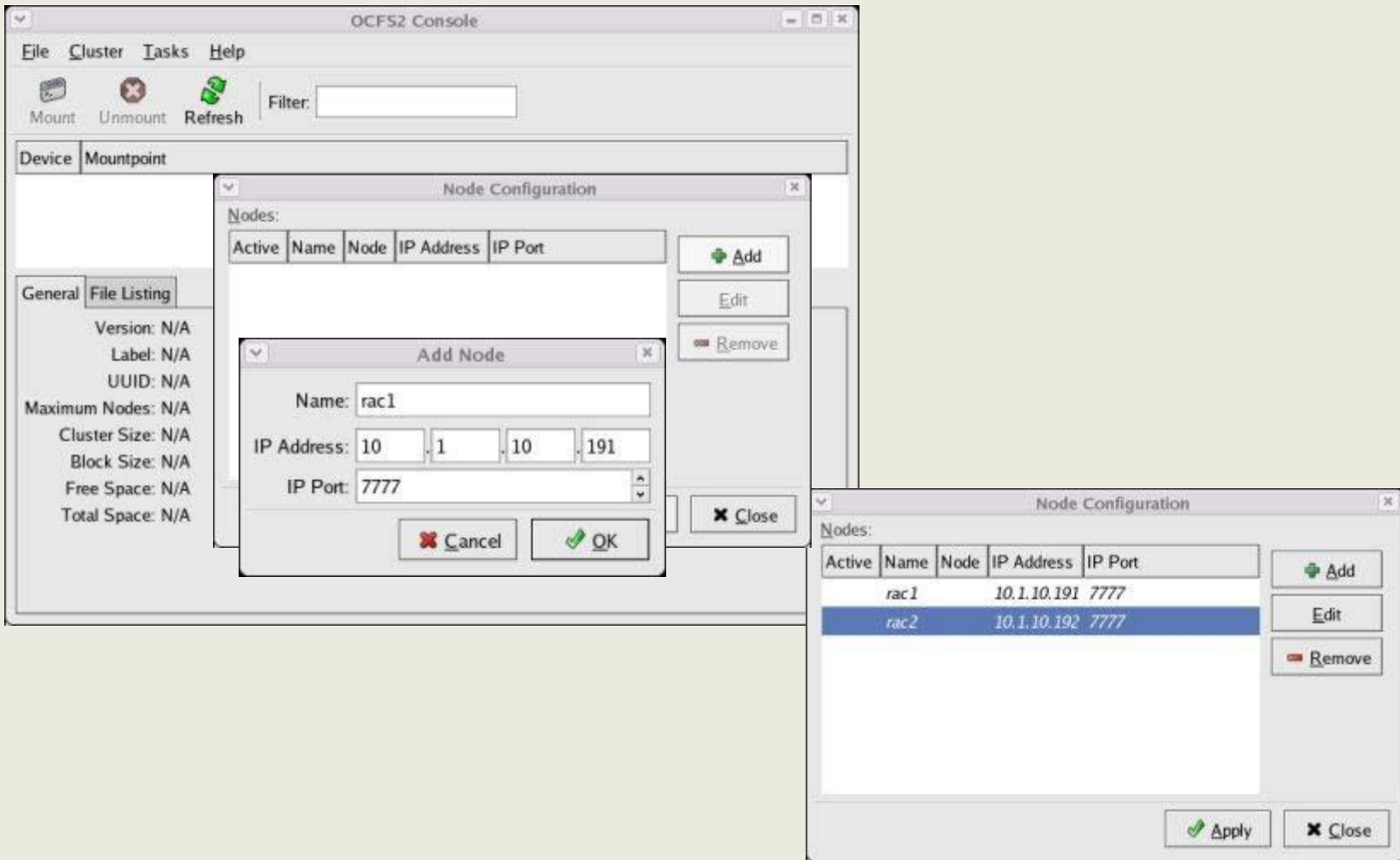
23

- ◆ Install OCFS for voting disks and OCR (download from OTN)
- ◆ Install OCFS driver that matches Linux kernel version:

```
# rpm -Uvh ocfs2-2.6.9-22.EL-1.2.1-1.i686.rpm \
ocfs2console-1.2.1-1.i386.rpm \
ocfs2-tools-1.2.1-1.i386.rpm \
ocfs2-tools-debuginfo-1.2.1-1.i386.rpm
```

- ◆ Configure cluster nodes for OCFS with ocfs2console

Configure operating system



The screenshot shows the OCF S2 Console interface with three overlapping windows:

- OCF S2 Console (Main Window):**
 - Menu: File, Cluster, Tasks, Help
 - Buttons: Mount, Unmount, Refresh
 - Filter:
 - Device: Mountpoint:
 - General File Listing:
 - Version: N/A
 - Label: N/A
 - UUID: N/A
 - Maximum Nodes: N/A
 - Cluster Size: N/A
 - Block Size: N/A
 - Free Space: N/A
 - Total Space: N/A
- Node Configuration (Top Window):**
 - Nodes table:

Active	Name	Node	IP Address	IP Port
	rac1		10.1.10.191	7777
	rac2		10.1.10.192	7777
 - Buttons: Add, Edit, Remove, Close
- Add Node (Bottom Window):**
 - Name: rac1
 - IP Address: 10.1.10.191
 - IP Port: 7777
 - Buttons: Cancel, OK, Close

Configure operating system

25

- ◆ Configure OCFS driver with:

```
# /etc/init.d/o2cb configure
```

- ◆ Create mount points for OCFS filesystems
 - ◆ Format disk partitions for OCFS filesystem with `ocfs2console`
 - ◆ Mount OSFS formatted disk partitions
 - ◆ Configure entries in `/etc/fstab` on each cluster node to automatically mount OCFS filesystems
- ```
/dev/sdb1 /u02 ocfs2 _netdev,datavolume 0 0
```

# Configure operating system

- ◆ Install Cluster Verification Utility to check installation prerequisites

```
cluvfy stage {-pre-post} [-verbose]
```

*SYNTAX (for Stages):*

```
cluvfy stage -post hwos -n [-s] [-verbose]
```

```
cluvfy stage -pre cfs -n -s [-verbose]
```

```
cluvfy stage -post cfs -n -f [-verbose]
```

```
cluvfy stage -pre crsinst -n [-r { 10gR1 10gR2 }]
```

```
[-c] [-q]
```

```
[-osdba]
```

```
[-orainv] [-verbose]
```

```
cluvfy stage -post crsinst -n [-verbose]
```

```
cluvfy stage -pre dbinst -n [-r { 10gR1 10gR2 }]
```

```
[-osdba] [-verbose]
```

```
cluvfy stage -pre dbcfg -n -d [-verbose]
```

# Configure operating system

27

- ◆ Configure NICs for public, private and interconnect Ips with ifconfig
- ◆ Configure /etc/hosts with hostnames and IP addresses

# Do not remove the following line, or various programs

# that require network functionality will fail.

192.168.78.51 rac11gtst1 rac11gtst1.tst.org

192.168.78.61 rac11gtst1-vip rac11gtst1-vip.tst.org

172.16.100.51 rac11gtst1-priv rac11gtst1-priv.tst.org

192.168.78.52 rac11gtst2 rac11gtst2.tst.org

192.168.78.62 rac11gtst2-vip rac11gtst2-vip.tst.org

172.16.100.52 rac11gtst2-priv rac11gtst2-priv.tst.org

192.168.78.53 rac11gr2tst rac11gr2tst.tst.org

:::1 localhost6.localdomain6 localhost6

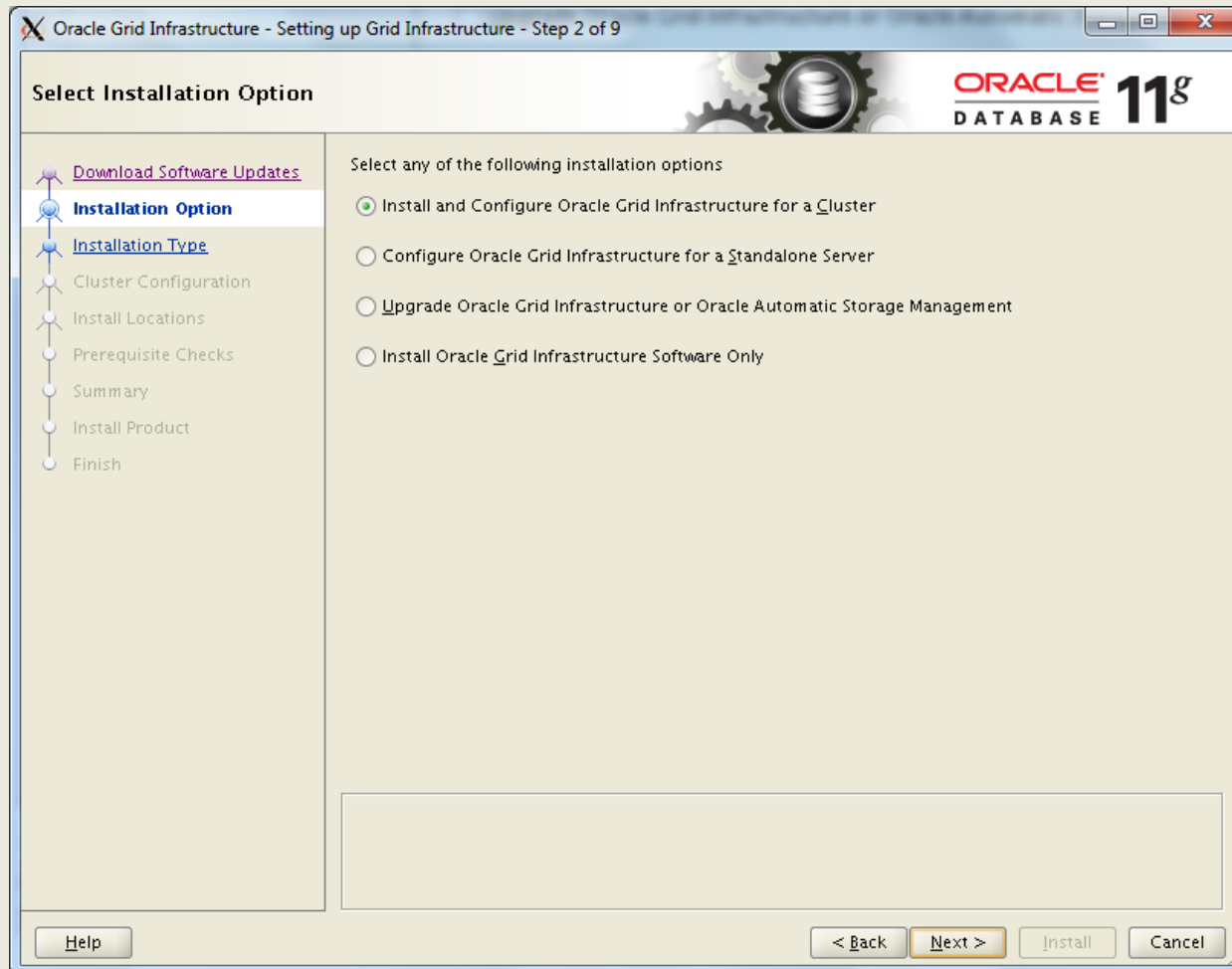
127.0.0.1 localhost.localdomain localhost

# Configure Oracle software

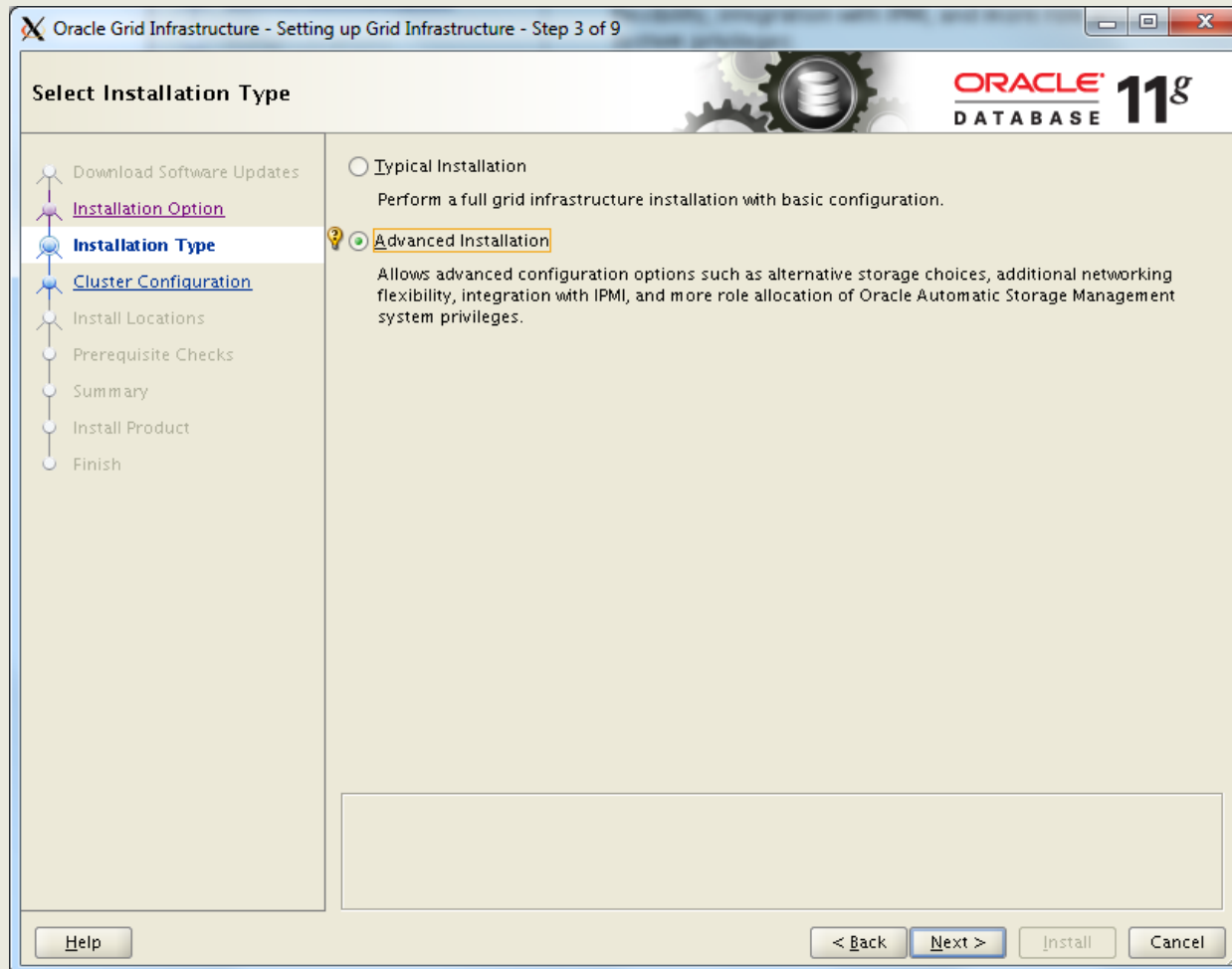
- ◆ Installation order:
- ◆ Clusterware home
  - Base version
  - Recommended patchset
  - Latest opatch version
  - Recommended patch set update
- ◆ ASM home
  - Base version
  - Recommended patchset
  - Latest opatch version
  - Recommended patch set update
- ◆ Database home
  - Base version
  - Recommended patchset
  - Latest opatch version
  - Recommended patch set update



# Clusterware install



# Clusterware install



# Clusterware install

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 5 of 16

**Grid Plug and Play Information**

ORACLE 11g DATABASE

Single Client Access Name (SCAN) allows clients to use one name in connection strings to connect to the cluster as a whole. Client connect requests to the SCAN name can be handled by any cluster node.

Cluster Name:

SCAN Name:

SCAN Port:

Configure GNS

GNS Sub Domain:   
For example: grid.example.com

GNS VIP Address:

Help < Back Next > Install Cancel

# Clusterware install

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 6 of 16

**Cluster Node Information**

Provide the list of nodes to be managed by Oracle Grid Infrastructure with their Public Node Name and Virtual Host Name.  
If Oracle Grid Naming Service (GNS) has been selected and DHCP is enabled, then the Virtual Host Name is automatically configured for each Public Node.

| Hostname   | Virtual IP Name |
|------------|-----------------|
| rac11gtst1 | rac11gtst1-vip  |
| rac11gtst2 | rac11gtst2-vip  |

SSH Connectivity... Use Cluster Configuration File... Add... Edit... Remove

OS Username:  OS Password:

User home is shared by the selected nodes

Reuse private and public keys existing in the user home

Test Setup

Help < Back Next > Install Cancel

# Clusterware install

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 7 of 16

**Specify Network Interface Usage**

ORACLE DATABASE 11g

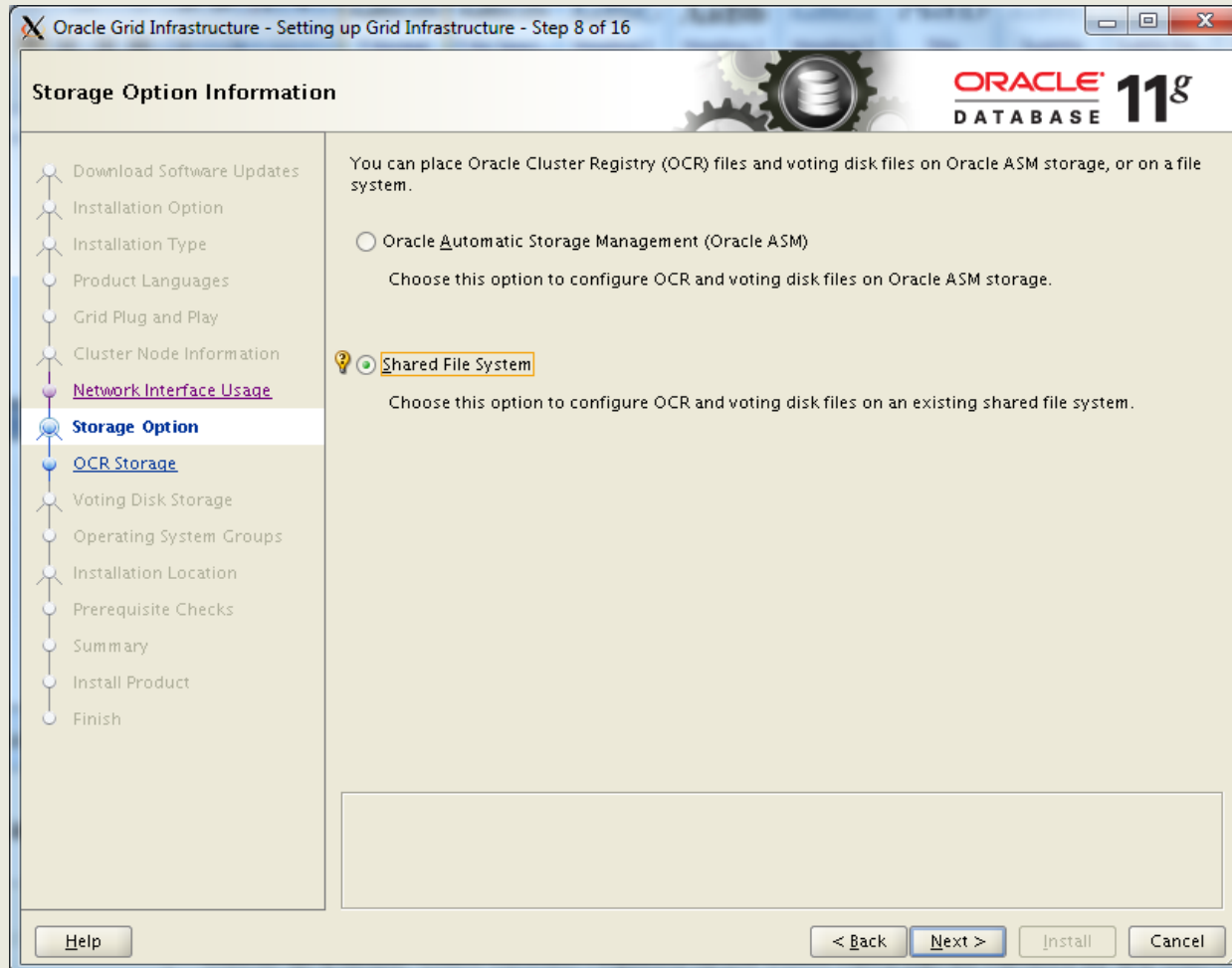
Identify the planned use for each global interface shown in the box below as Public, Private, or Do Not Use. Private interfaces are used by Oracle Grid Infrastructure for internode traffic.

If there is more than one subnet associated with an interface, then change the interface's attributes to associate the interface name with the additional subnets.

| Interface Name | Subnet       | Interface Type |
|----------------|--------------|----------------|
| eth0           | 192.168.78.0 | Public         |
| eth1           | 172.16.100.0 | Private        |

Navigation: Help, < Back, Next >, Install, Cancel

# Clusterware install



Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 8 of 16

**Storage Option Information**

ORACLE 11g  
DATABASE

You can place Oracle Cluster Registry (OCR) files and voting disk files on Oracle ASM storage, or on a file system.

Oracle Automatic Storage Management (Oracle ASM)  
Choose this option to configure OCR and voting disk files on Oracle ASM storage.

**Shared File System**  
Choose this option to configure OCR and voting disk files on an existing shared file system.

Download Software Updates  
Installation Option  
Installation Type  
Product Languages  
Grid Plug and Play  
Cluster Node Information  
Network Interface Usage  
**Storage Option**  
OCR Storage  
Voting Disk Storage  
Operating System Groups  
Installation Location  
Prerequisite Checks  
Summary  
Install Product  
Finish

Help < Back Next > Install Cancel

# Clusterware install

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 9 of 16

**OCR Storage Option**

Oracle Cluster Registry (OCR) files store cluster and database configuration information. Select OCR locations on shared Cluster File System (CFS) partitions that have an identical path on all nodes of the cluster with at least 256 MB of available space.

Normal Redundancy

OCR File Location

External Redundancy

OCR File Location

Help      < Back    Next >    Install    Cancel

# Clusterware install

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 10 of 17

**Voting Disk Storage Option**

ORACLE DATABASE 11g

Download Software Updates  
 Installation Option  
 Installation Type  
 Product Languages  
 Grid Plug and Play  
 Cluster Node Information  
 Network Interface Usage  
 Storage Option  
**OCR Storage**  
**Voting Disk Storage**  
 Failure Isolation  
 Operating System Groups  
 Installation Location  
 Prerequisite Checks  
 Summary  
 Install Product  
 Finish

Oracle Grid Infrastructure voting disk files contain cluster membership information. If a network failure occurs, then voting disks determine cluster ownership among cluster nodes. Select voting disk locations on shared Cluster File System (CFS) partitions that have an identical path on all nodes of the cluster, and with at least 256 MB of available space.

Normal Redundancy

Voting Disk File Location

/voting01/storage/vdsk1

/voting02/storage/vdsk2

/voting03/storage/vdsk3

External Redundancy

Use external redundancy with storage devices such as RAID, or other similar devices that provide their own data protection mechanisms.

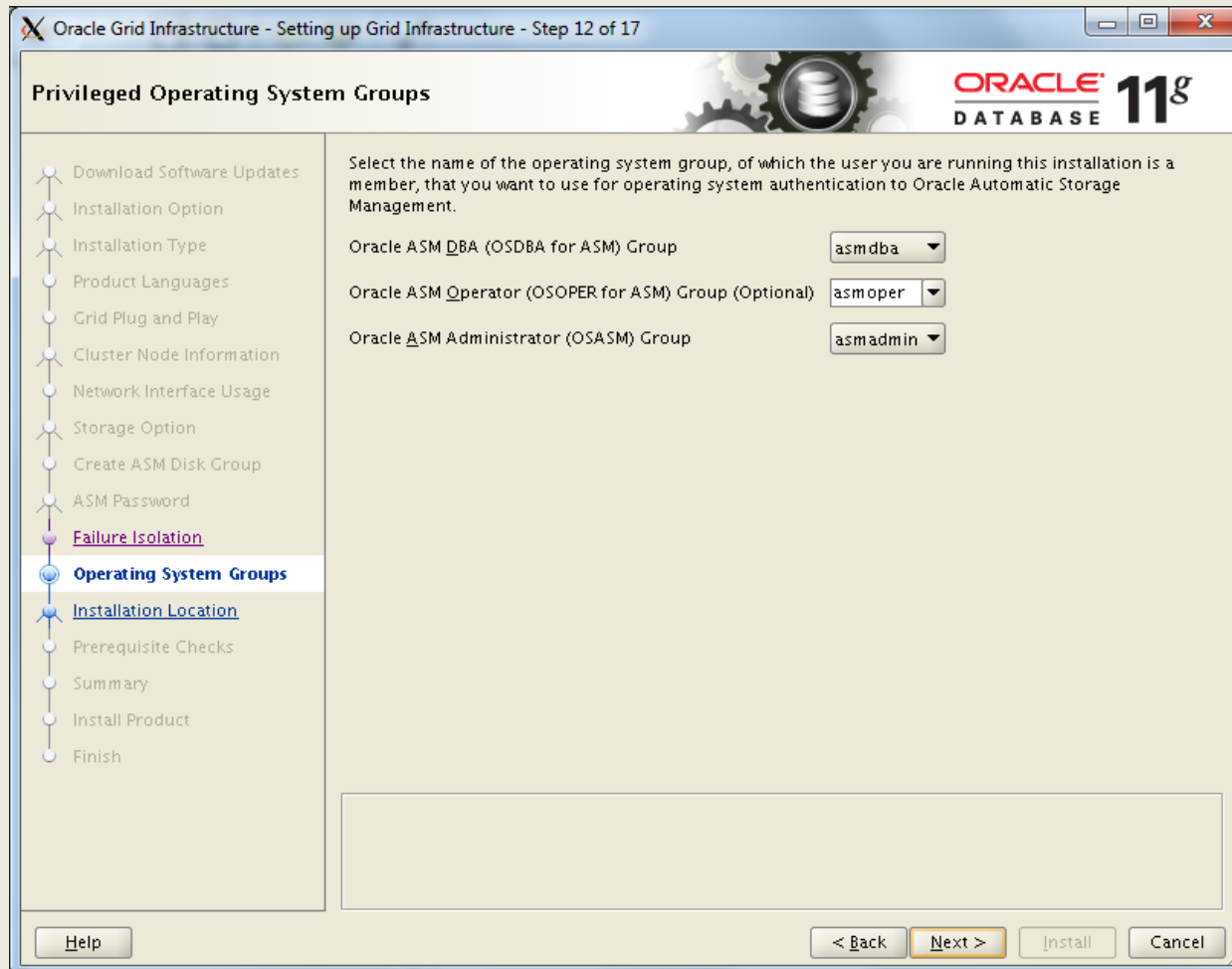
Voting Disk File Location

/voting01/storage/vdsk

Help < Back Next > Install Cancel



# Clusterware install



Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 12 of 17

**Privileged Operating System Groups**

ORACLE 11<sup>g</sup> DATABASE

Select the name of the operating system group, of which the user you are running this installation is a member, that you want to use for operating system authentication to Oracle Automatic Storage Management.

Oracle ASM DBA (OSDBA for ASM) Group

Oracle ASM Operator (OSOPER for ASM) Group (Optional)

Oracle ASM Administrator (OSASM) Group

Download Software Updates

Installation Option

Installation Type

Product Languages

Grid Plug and Play

Cluster Node Information

Network Interface Usage

Storage Option

Create ASM Disk Group

ASM Password

Failure Isolation

**Operating System Groups**

Installation Location

Prerequisite Checks

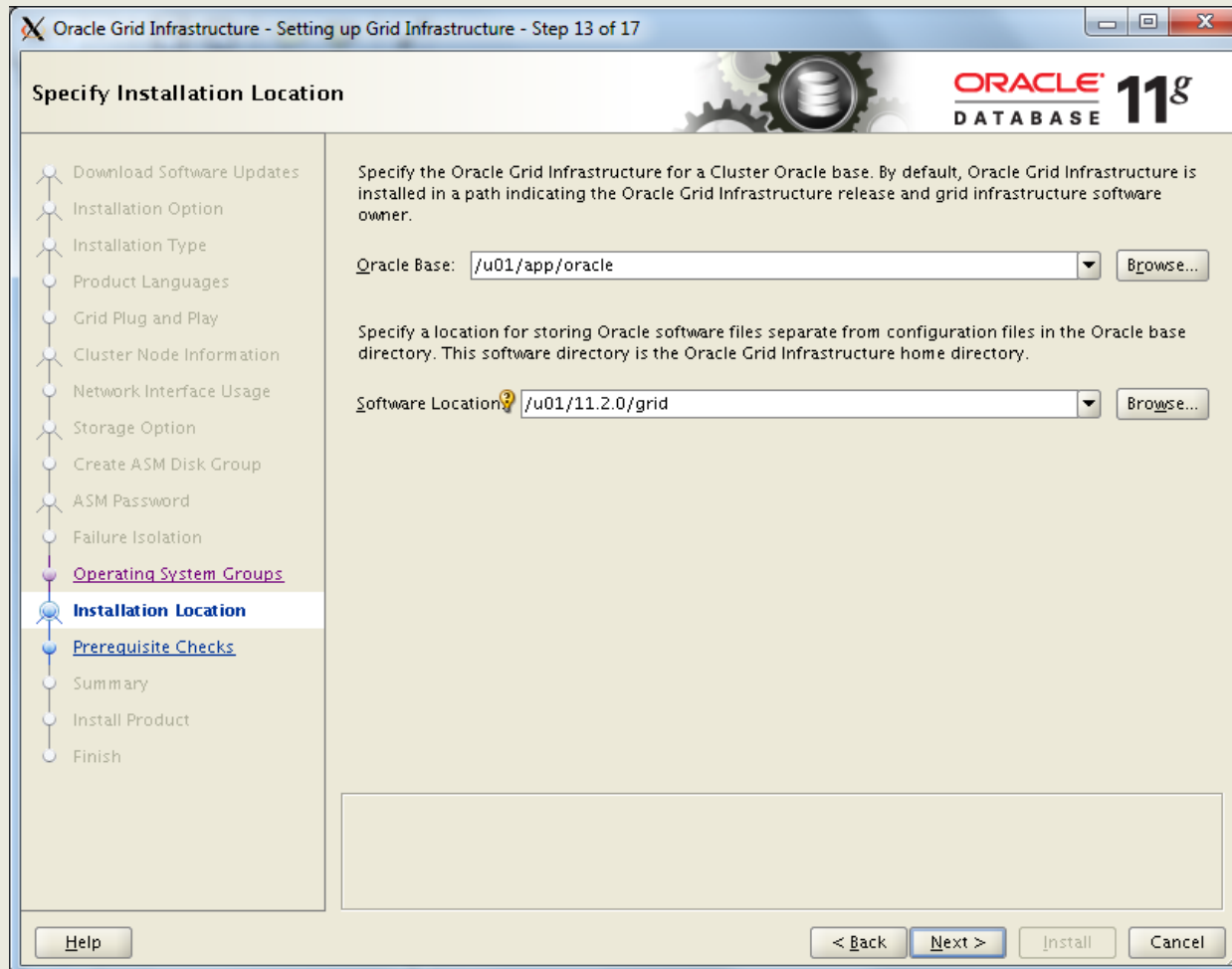
Summary

Install Product

Finish

Help < Back Next > Install Cancel

# Clusterware install




**Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 13 of 17**

**Specify Installation Location**

Specify the Oracle Grid Infrastructure for a Cluster Oracle base. By default, Oracle Grid Infrastructure is installed in a path indicating the Oracle Grid Infrastructure release and grid infrastructure software owner.

Oracle Base:

Specify a location for storing Oracle software files separate from configuration files in the Oracle base directory. This software directory is the Oracle Grid Infrastructure home directory.

Software Location 

**Navigation:**

- Download Software Updates
- Installation Option
- Installation Type
- Product Languages
- Grid Plug and Play
- Cluster Node Information
- Network Interface Usage
- Storage Option
- Create ASM Disk Group
- ASM Password
- Failure Isolation
- Operating System Groups
- Installation Location**
- Prerequisite Checks
- Summary
- Install Product
- Finish

**Buttons:** Help, < Back, Next >, Install, Cancel

# Clusterware install

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 14 of 18

## Create Inventory

You are starting your first installation on this host. Specify a directory for installation files. This directory is called the "inventory directory". The installer automatically sets up subdirectories for each product to contain inventory data. The subdirectory for each product typically requires 150 kilobytes of disk space.

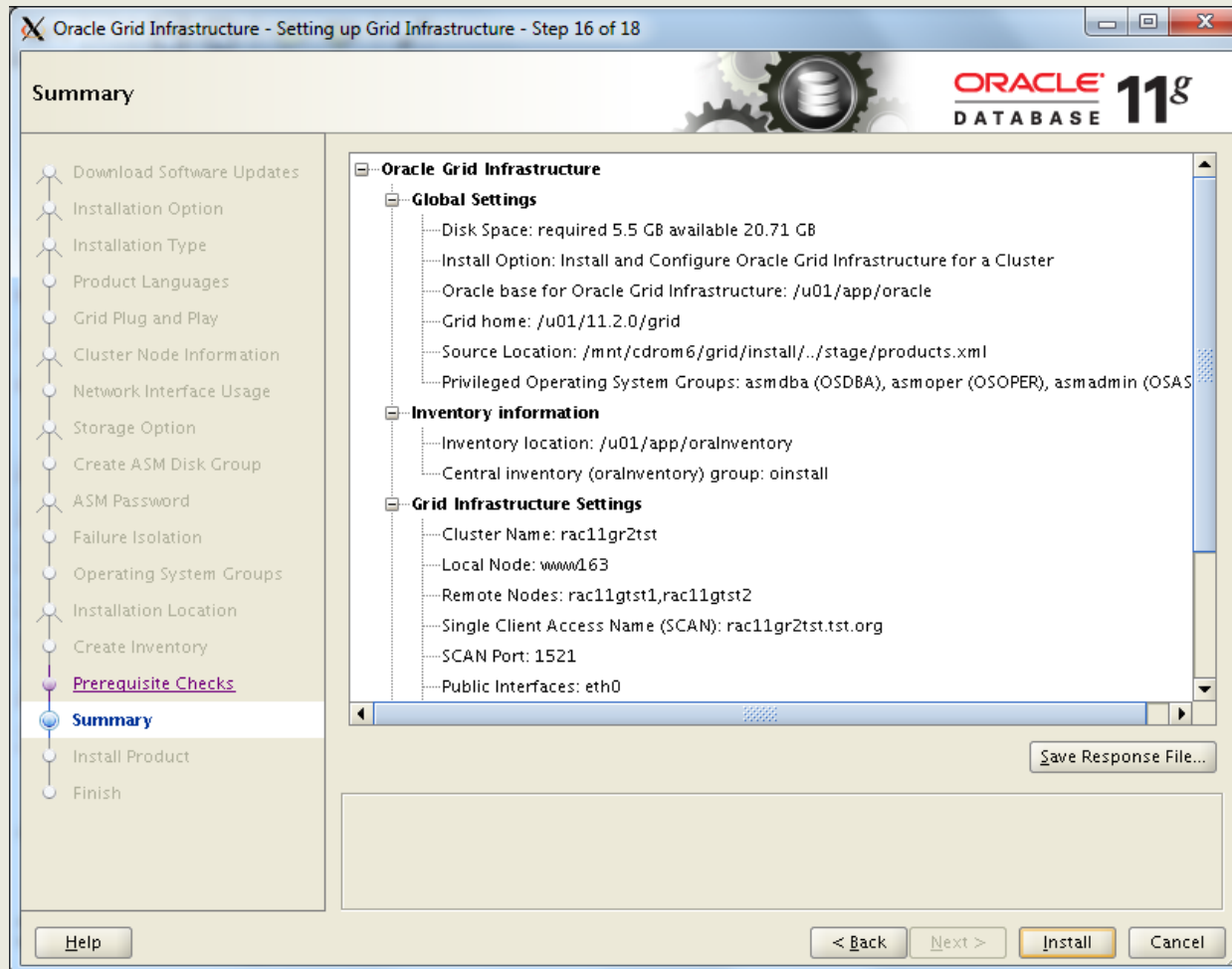
Inventory Directory:

Members of the following operating system group (the primary group) will have write permission to the inventory directory (orainventory).

oraInventory Group Name: oinstall

Help    < Back    Next >    Install    Cancel

# Clusterware install



Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 16 of 18

**Summary**

Download Software Updates  
 Installation Option  
 Installation Type  
 Product Languages  
 Grid Plug and Play  
 Cluster Node Information  
 Network Interface Usage  
 Storage Option  
 Create ASM Disk Group  
 ASM Password  
 Failure Isolation  
 Operating System Groups  
 Installation Location  
 Create Inventory  
**Prerequisite Checks**  
**Summary**  
 Install Product  
 Finish

**Oracle Grid Infrastructure**

- Global Settings**
  - Disk Space: required 5.5 GB available 20.71 GB
  - Install Option: Install and Configure Oracle Grid Infrastructure for a Cluster
  - Oracle base for Oracle Grid Infrastructure: /u01/app/oracle
  - Grid home: /u01/11.2.0/grid
  - Source Location: /mnt/cdrom6/grid/install/./stage/products.xml
  - Privileged Operating System Groups: asmdba (OSDBA), asmoper (OSOPER), asmadmin (OSAS)
- Inventory information**
  - Inventory location: /u01/app/orainventory
  - Central inventory (orainventory) group: oinstall
- Grid Infrastructure Settings**
  - Cluster Name: rac11gr2tst
  - Local Node: www163
  - Remote Nodes: rac11gtst1,rac11gtst2
  - Single Client Access Name (SCAN): rac11gr2tst.tst.org
  - SCAN Port: 1521
  - Public Interfaces: eth0

Save Response File...

Help < Back Next > Install Cancel

# Clusterware install

Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 17 of 18

**Install Product**

ORACLE DATABASE 11g

**Progress**

94%

Starting 'Oracle Cluster Verification Utility'

**Status**

|   |                                                                    |             |
|---|--------------------------------------------------------------------|-------------|
| ✓ | Install Grid Infrastructure for a Cluster                          | Succeeded   |
| ✓ | • Prepare                                                          | Succeeded   |
| ✓ | • Copy files                                                       | Succeeded   |
| ✓ | • Link binaries                                                    | Succeeded   |
| ✓ | • Setup files                                                      | Succeeded   |
| ✓ | • Perform remote operations                                        | Succeeded   |
| ✓ | Execute Root Scripts for Install Grid Infrastructure for a Cluster | Succeeded   |
| ➔ | Configure Oracle Grid Infrastructure for a Cluster                 | In Progress |
| ✓ | • Update Inventory                                                 | Succeeded   |
| ✓ | • Oracle Net Configuration Assistant                               | Succeeded   |
| ➔ | • Oracle Cluster Verification Utility                              | In Progress |

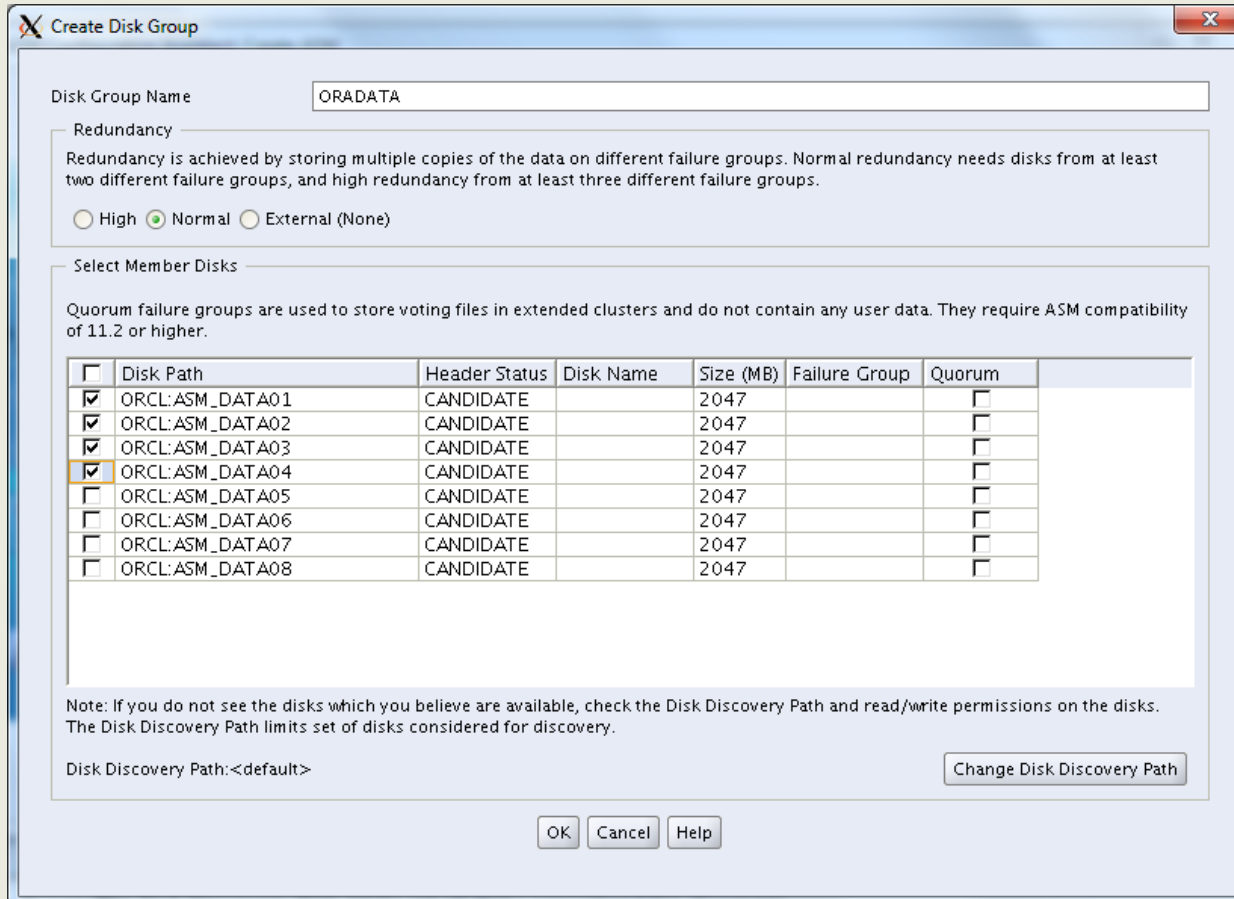
Details Retry Skip

ORACLE DATABASE 11g Security and Compliance

Control Data Access, Classification, and Encryption

Help < Back Next > Install Cancel

# Create and configure ASM instance



**Create Disk Group**

Disk Group Name:

**Redundancy**  
Redundancy is achieved by storing multiple copies of the data on different failure groups. Normal redundancy needs disks from at least two different failure groups, and high redundancy from at least three different failure groups.

High  Normal  External (None)

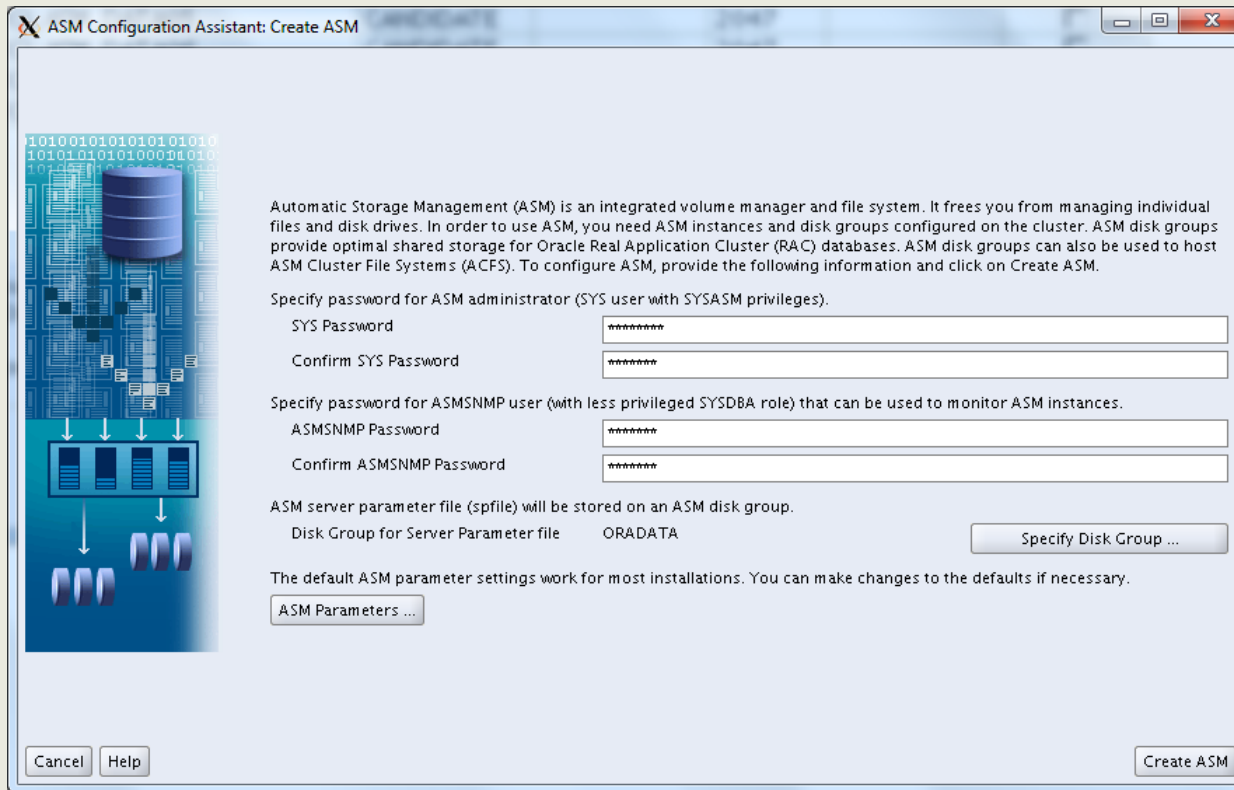
**Select Member Disks**  
Quorum failure groups are used to store voting files in extended clusters and do not contain any user data. They require ASM compatibility of 11.2 or higher.

| <input type="checkbox"/>            | Disk Path       | Header Status | Disk Name | Size (MB) | Failure Group | Quorum                   |
|-------------------------------------|-----------------|---------------|-----------|-----------|---------------|--------------------------|
| <input checked="" type="checkbox"/> | ORCL:ASM_DATA01 | CANDIDATE     |           | 2047      |               | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | ORCL:ASM_DATA02 | CANDIDATE     |           | 2047      |               | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | ORCL:ASM_DATA03 | CANDIDATE     |           | 2047      |               | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | ORCL:ASM_DATA04 | CANDIDATE     |           | 2047      |               | <input type="checkbox"/> |
| <input type="checkbox"/>            | ORCL:ASM_DATA05 | CANDIDATE     |           | 2047      |               | <input type="checkbox"/> |
| <input type="checkbox"/>            | ORCL:ASM_DATA06 | CANDIDATE     |           | 2047      |               | <input type="checkbox"/> |
| <input type="checkbox"/>            | ORCL:ASM_DATA07 | CANDIDATE     |           | 2047      |               | <input type="checkbox"/> |
| <input type="checkbox"/>            | ORCL:ASM_DATA08 | CANDIDATE     |           | 2047      |               | <input type="checkbox"/> |

Note: If you do not see the disks which you believe are available, check the Disk Discovery Path and read/write permissions on the disks. The Disk Discovery Path limits set of disks considered for discovery.

Disk Discovery Path: <default>

# Create and configure ASM instance



ASM Configuration Assistant: Create ASM

Automatic Storage Management (ASM) is an integrated volume manager and file system. It frees you from managing individual files and disk drives. In order to use ASM, you need ASM instances and disk groups configured on the cluster. ASM disk groups provide optimal shared storage for Oracle Real Application Cluster (RAC) databases. ASM disk groups can also be used to host ASM Cluster File Systems (ACFS). To configure ASM, provide the following information and click on Create ASM.

Specify password for ASM administrator (SYS user with SYSASM privileges).

SYS Password

Confirm SYS Password

Specify password for ASMSNMP user (with less privileged SYSDBA role) that can be used to monitor ASM instances.

ASMSNMP Password

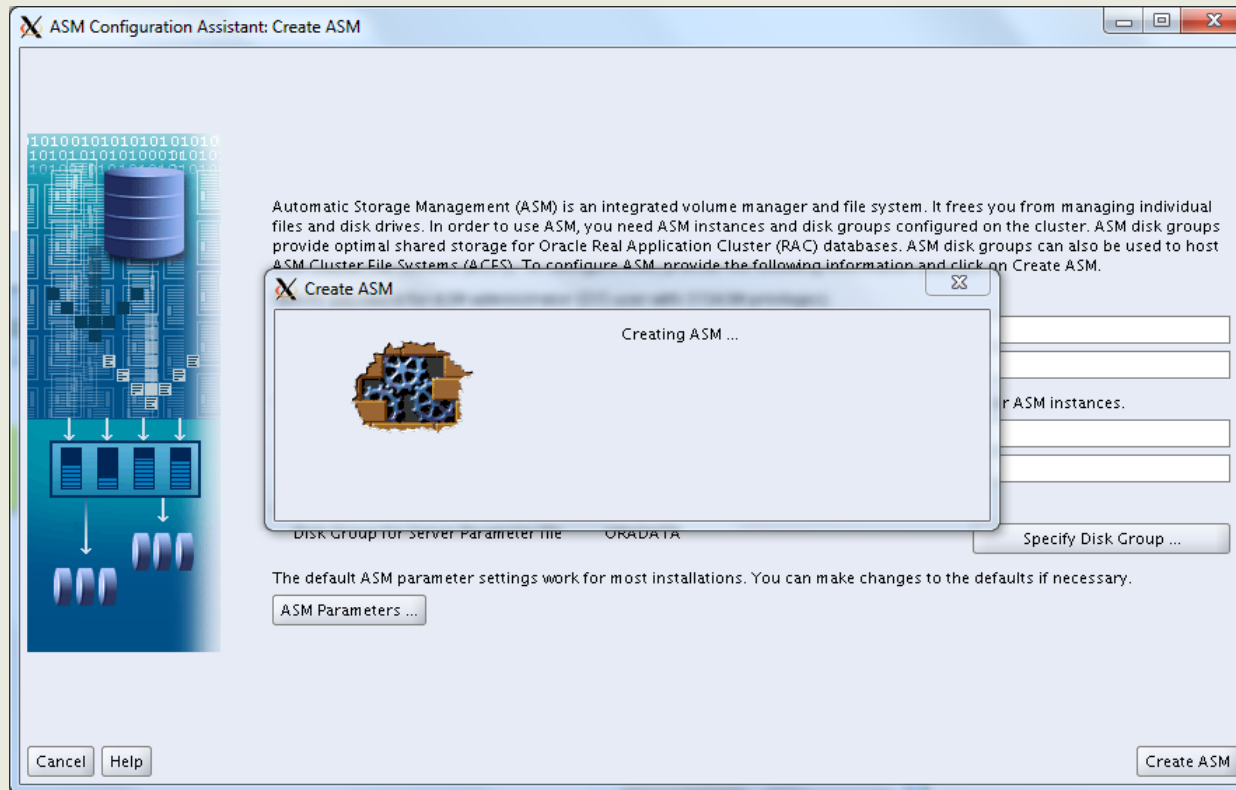
Confirm ASMSNMP Password

ASM server parameter file (spfile) will be stored on an ASM disk group.

Disk Group for Server Parameter file ORADATA

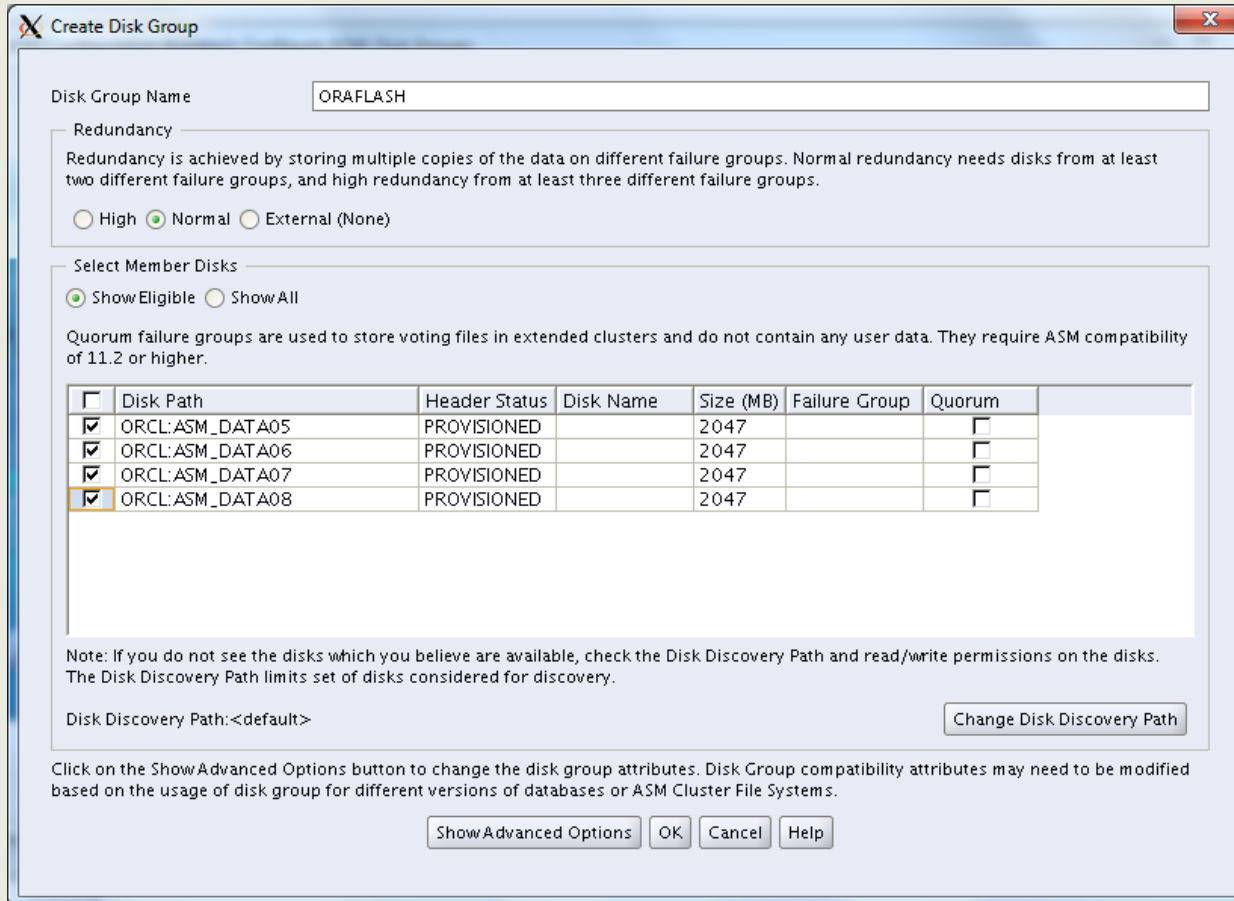
The default ASM parameter settings work for most installations. You can make changes to the defaults if necessary.

# Create and configure ASM instance





# Create and configure ASM instance



**Create Disk Group**

Disk Group Name:

**Redundancy**  
Redundancy is achieved by storing multiple copies of the data on different failure groups. Normal redundancy needs disks from at least two different failure groups, and high redundancy from at least three different failure groups.

High  Normal  External (None)

**Select Member Disks**  
 Show Eligible  Show All

Quorum failure groups are used to store voting files in extended clusters and do not contain any user data. They require ASM compatibility of 11.2 or higher.

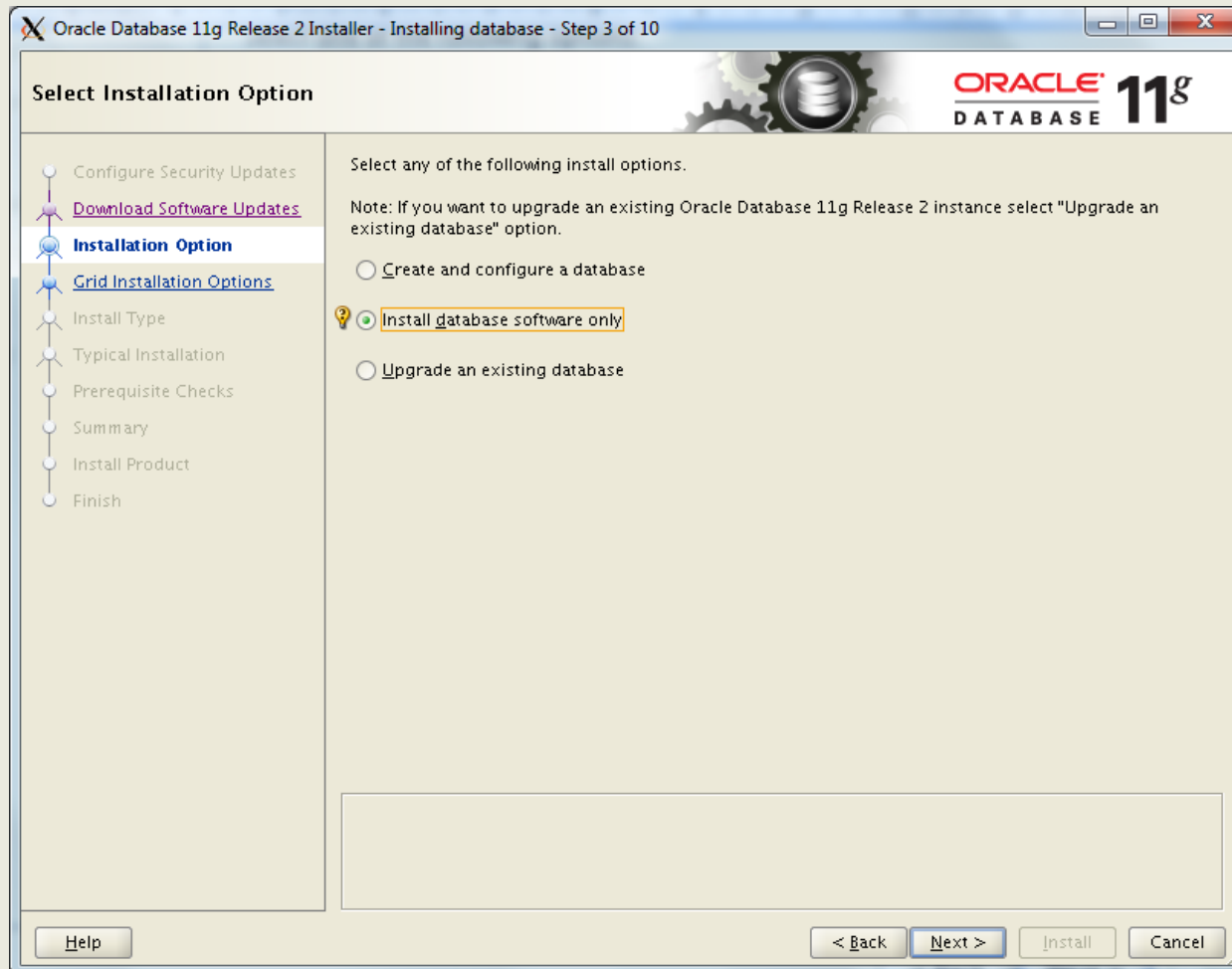
| <input type="checkbox"/>            | Disk Path       | Header Status | Disk Name | Size (MB) | Failure Group | Quorum                   |
|-------------------------------------|-----------------|---------------|-----------|-----------|---------------|--------------------------|
| <input checked="" type="checkbox"/> | ORCL:ASM_DATA05 | PROVISIONED   |           | 2047      |               | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | ORCL:ASM_DATA06 | PROVISIONED   |           | 2047      |               | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | ORCL:ASM_DATA07 | PROVISIONED   |           | 2047      |               | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | ORCL:ASM_DATA08 | PROVISIONED   |           | 2047      |               | <input type="checkbox"/> |

Note: If you do not see the disks which you believe are available, check the Disk Discovery Path and read/write permissions on the disks. The Disk Discovery Path limits set of disks considered for discovery.

Disk Discovery Path: <default>

Click on the Show Advanced Options button to change the disk group attributes. Disk Group compatibility attributes may need to be modified based on the usage of disk group for different versions of databases or ASM Cluster File Systems.

# Database home install



# Database home install

Oracle Database 11g Release 2 Installer - Installing database - Step 4 of 10

**Grid Installation Options**

ORACLE DATABASE 11g

Select the type of database installation you want to perform.

Single instance database installation  
 Oracle Real Application Clusters database installation  
 Oracle RAC One Node database installation

Select nodes (in addition to the local node) in the cluster where the installer should install Oracle RAC or Oracle RAC One.

|                                     | Node Name    |
|-------------------------------------|--------------|
| <input checked="" type="checkbox"/> | 1 rac11gtst1 |
| <input checked="" type="checkbox"/> | 2 rac11gtst2 |

SSH Connectivity... Select All Deselect All

OS Username:  OS Password:

User home is shared by the selected nodes  
 Reuse private and public keys existing in the user home

Test Setup

Help < Back Next > Install Cancel

# Database home install

Oracle Database 11g Release 2 Installer - Installing database - Step 11 of 12

**Install Product**

Configure Security Updates  
 Download Software Updates  
 Installation Option  
 Grid Installation Options  
 Product Languages  
 Database Edition  
 Installation Location  
 Operating System Groups  
 Prerequisite Checks  
 Summary  
**Install Product**  
 Finish

**Progress**

94%

Copying Oracle home '/u01/app/oracle/product/11.2.0/db\_1' to remote nodes 'rac11gtst2'.

**Status**

|   |                                                       |           |
|---|-------------------------------------------------------|-----------|
| ✓ | Oracle Database installation                          | Succeeded |
| ✓ | • Prepare                                             | Succeeded |
| ✓ | • Copy files                                          | Succeeded |
| ✓ | • Link binaries                                       | Succeeded |
| ✓ | • Setup files                                         | Succeeded |
|   | Execute Root Scripts for Oracle Database installation | Pending   |

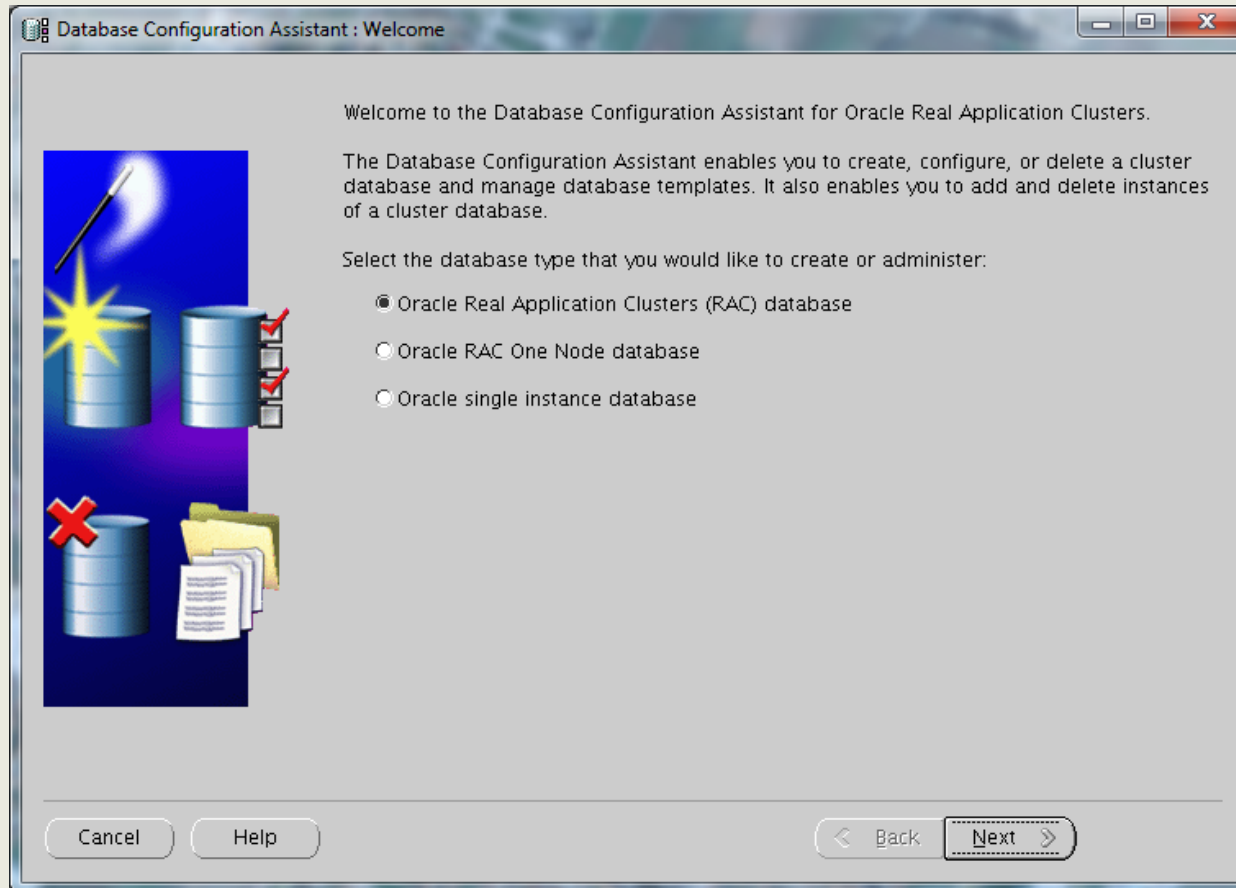
Details    Retry    Skip

ORACLE 11g DATABASE

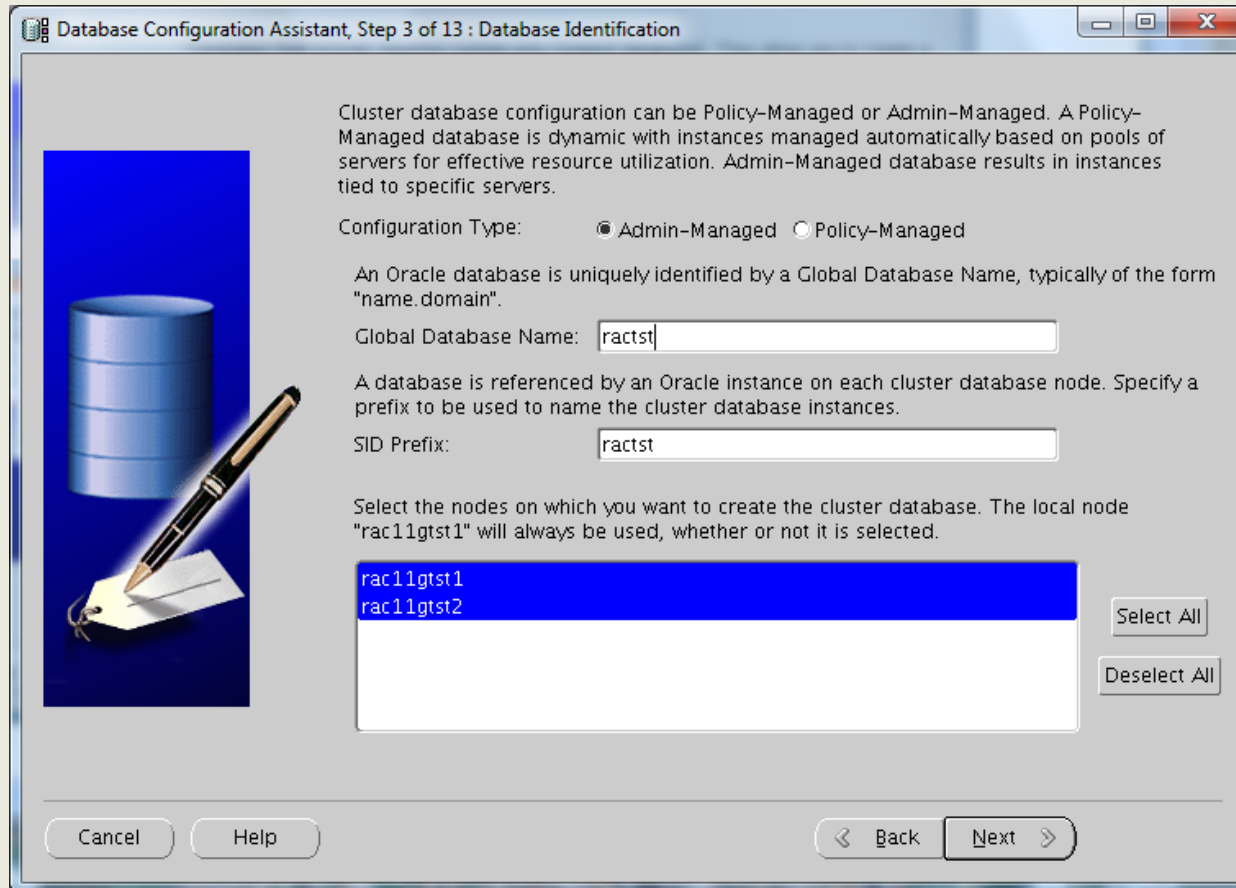
Consolidate  
Compress  
Control

Help    < Back    Next >    Install    Cancel

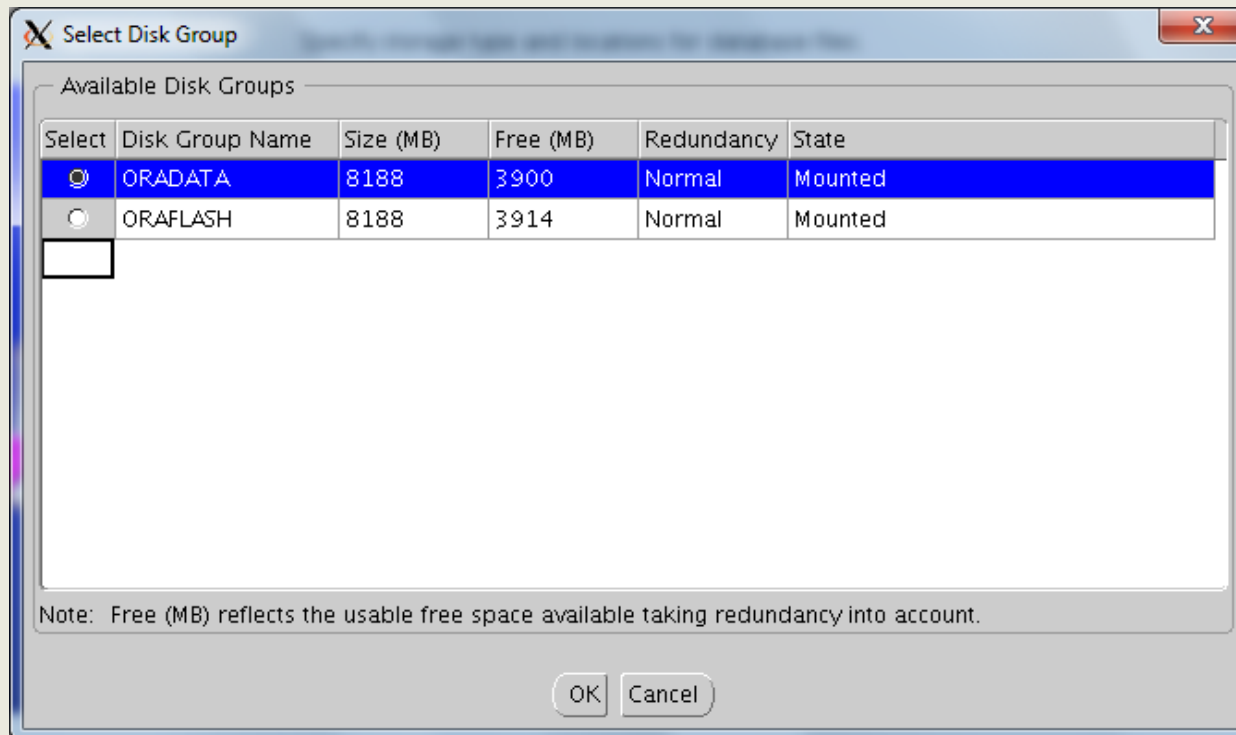
# Create RAC database



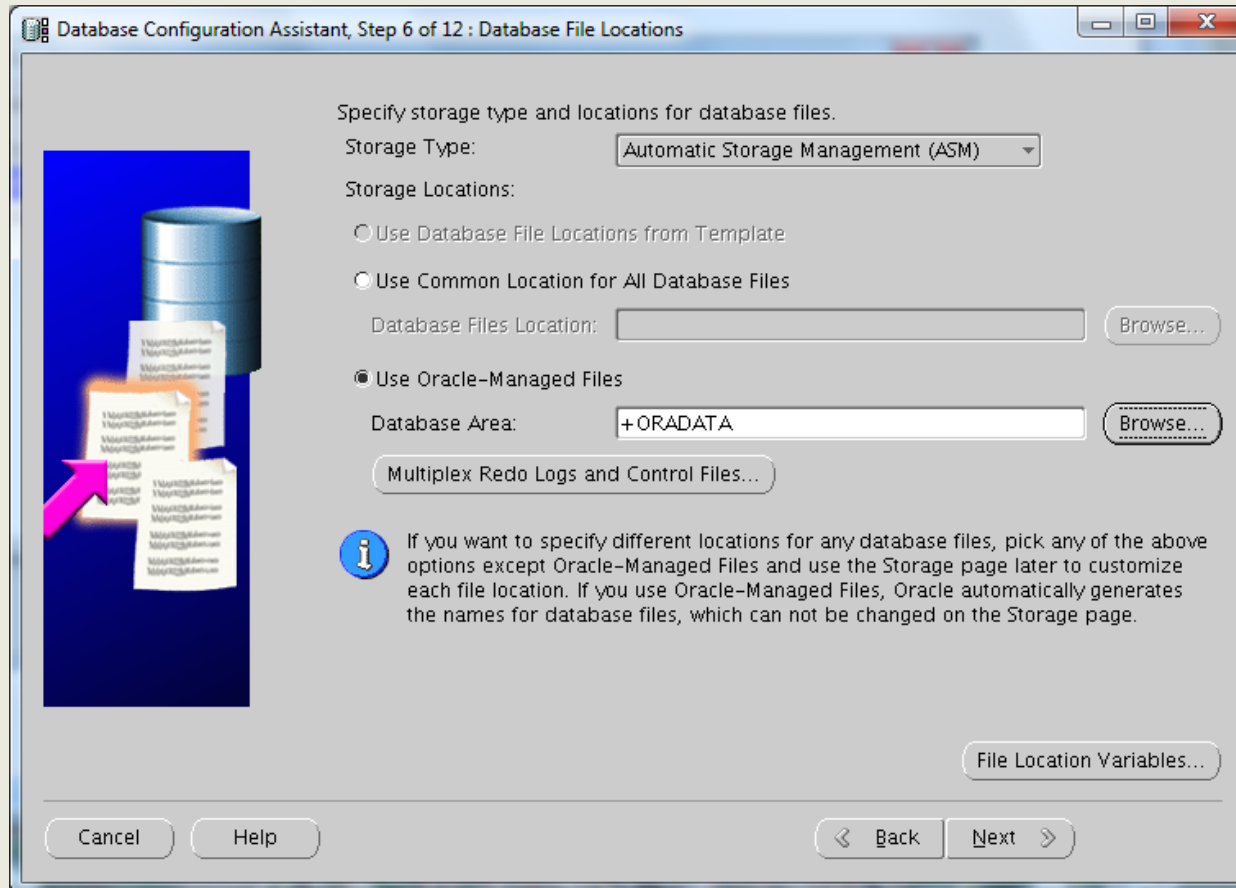
# Create RAC database



# Create RAC database

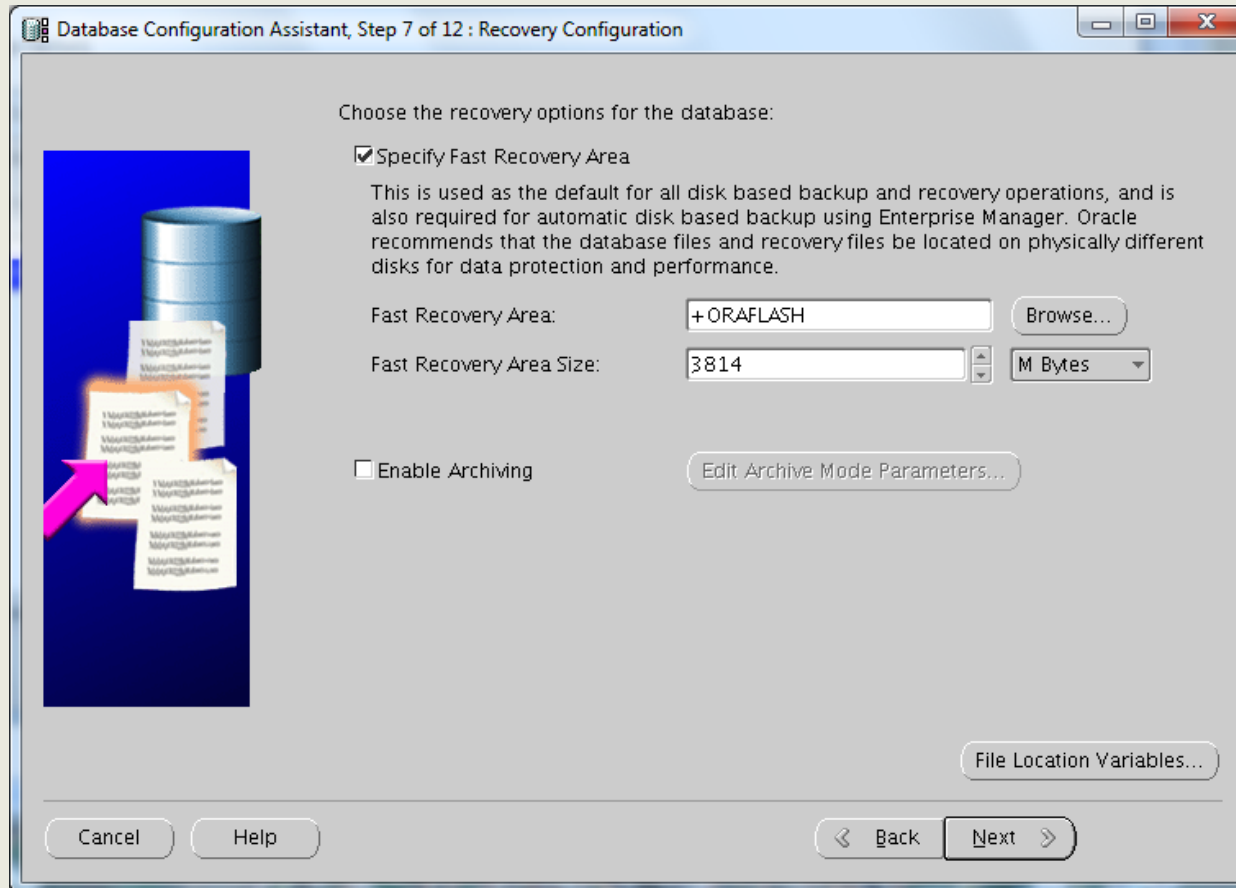


# Create RAC database

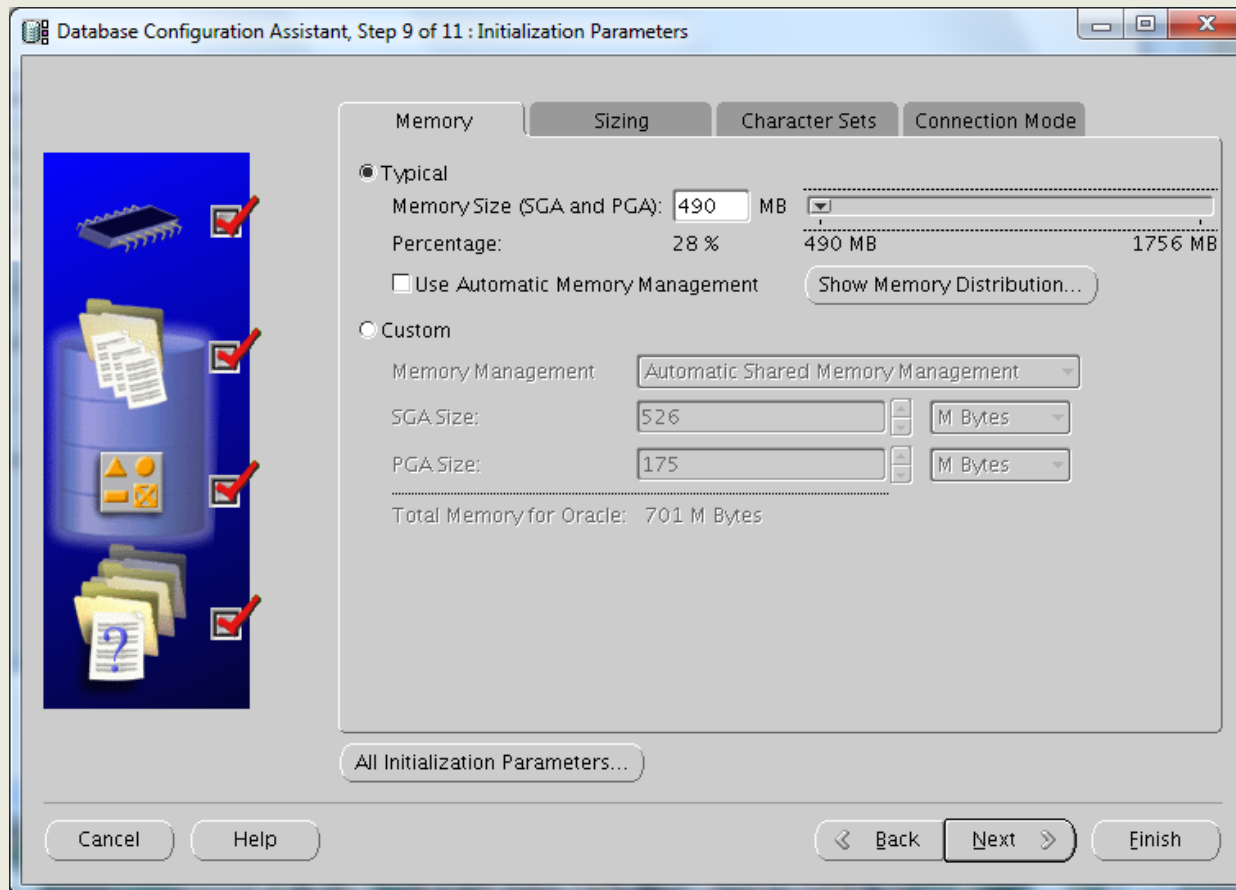




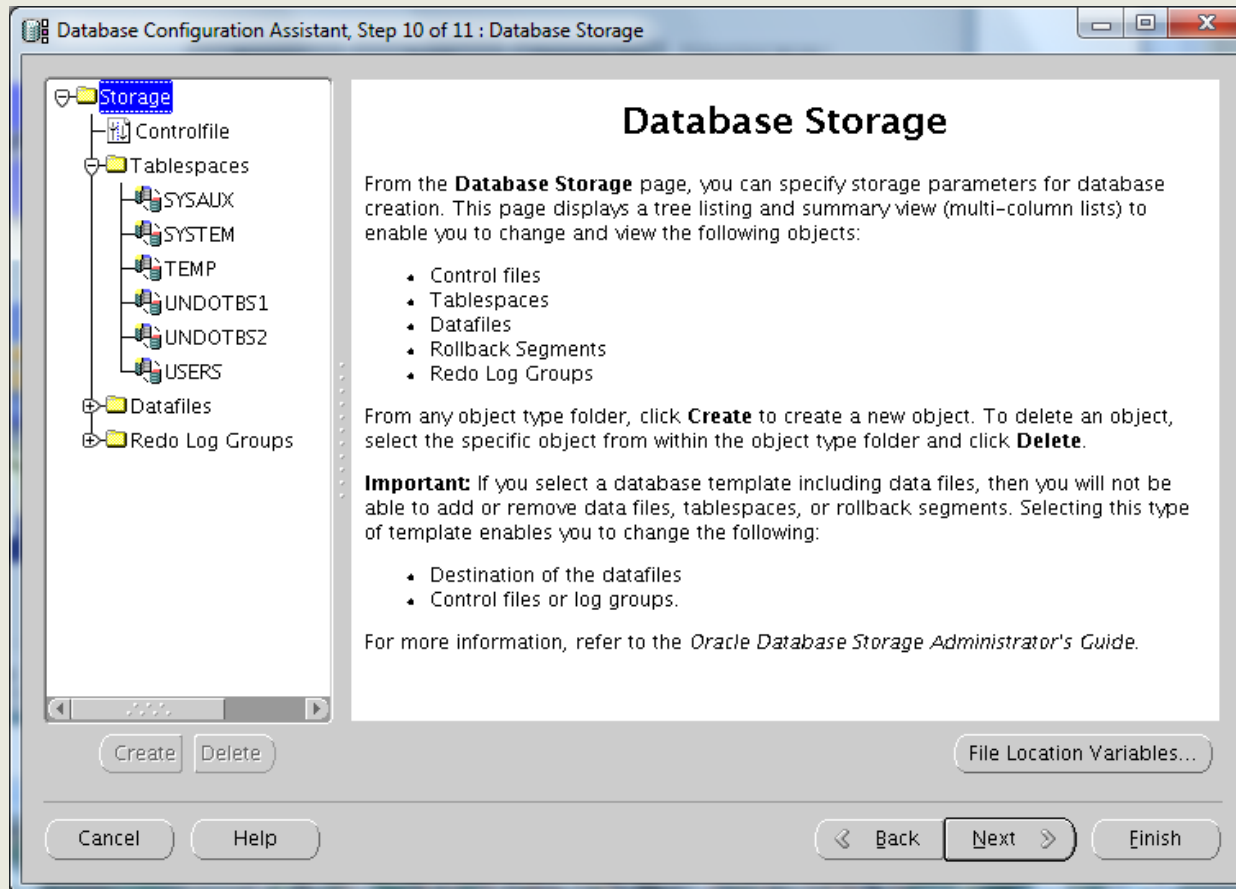
# Create RAC database



# Create RAC database



# Create RAC database



# RAC system testing

56

I/O throughput verification with Orion tool

- ◆ simulate the type of IO's an OLTP or DSS system does
- ◆ response times in terms of IOPS and MBPS.

Swingbench tool

- ◆ Stress and benchmark testing database

Real Application testing

- ◆ Capture application workload on pre 11g database and replay on 11g
- ◆ Used for migration to 11g testing

# Postinstallation steps

---

57

- ◆ Develop patching strategy
- ◆ Configure backup and recovery
- ◆ Monitor and tune database performance

# Exercise:

## Create ASM disk group ORADATA2

---

58

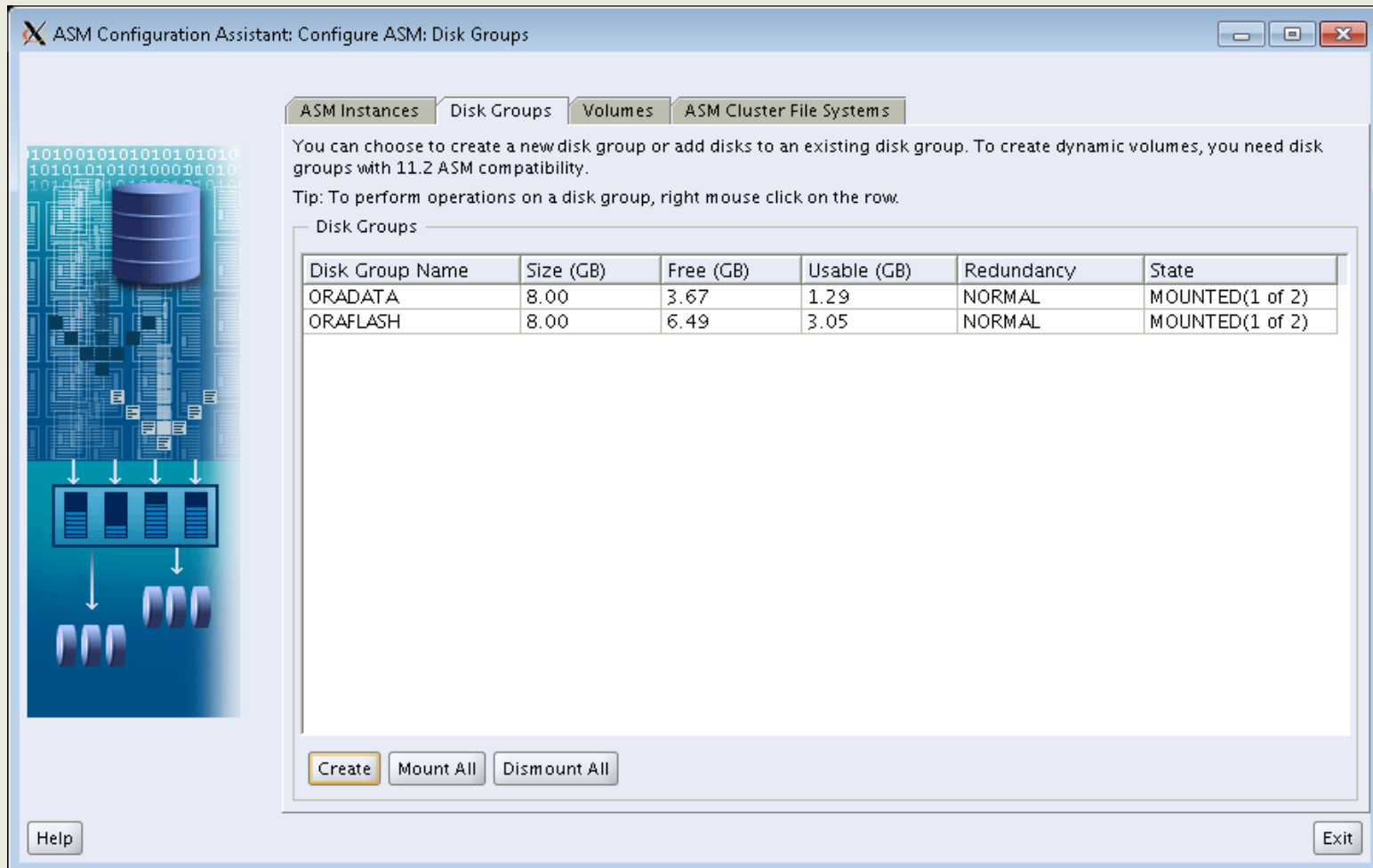
### ◆ Prerequisites:

- ASM instance on rac11gtst1 must be up and running

### ◆ Actions

- Connect to server rac11gtst1 as user grid and execute:  
\$ srvctl status asm  
ASM instance must be up  
Start ASM Configuration Assistant  
\$ asmca

# Exercise: Create ASM disk group ORADATA2



ASM Configuration Assistant: Configure ASM: Disk Groups

ASM Instances | **Disk Groups** | Volumes | ASM Cluster File Systems

You can choose to create a new disk group or add disks to an existing disk group. To create dynamic volumes, you need disk groups with 11.2 ASM compatibility.

Tip: To perform operations on a disk group, right mouse click on the row.

Disk Groups

| Disk Group Name | Size (GB) | Free (GB) | Usable (GB) | Redundancy | State           |
|-----------------|-----------|-----------|-------------|------------|-----------------|
| ORADATA         | 8.00      | 3.67      | 1.29        | NORMAL     | MOUNTED(1 of 2) |
| ORAFLASH        | 8.00      | 6.49      | 3.05        | NORMAL     | MOUNTED(1 of 2) |

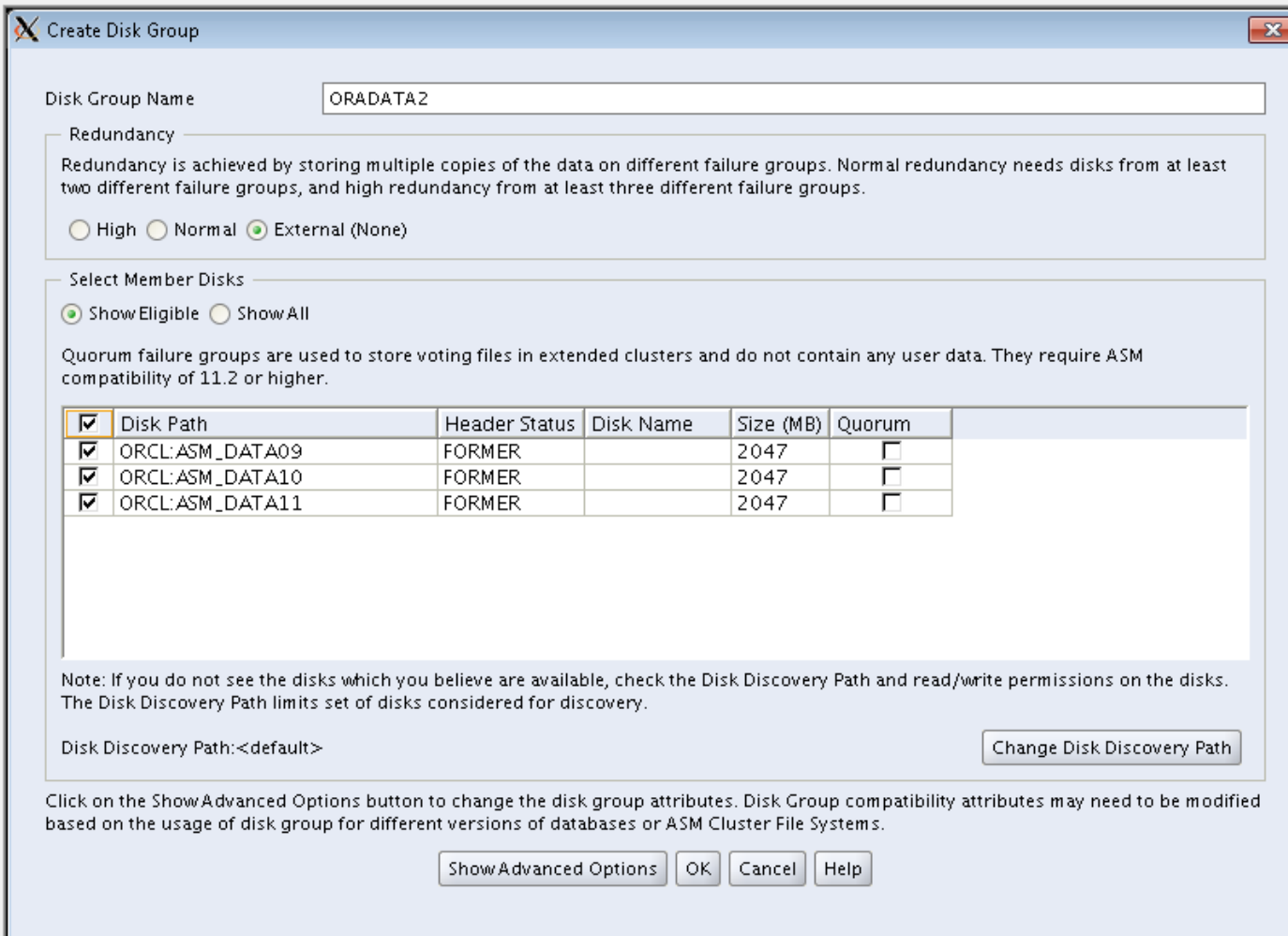
Create Mount All Dismount All

Help Exit

Click on Create to continue

# Exercise: Create ASM disk group ORADATA2

**Enter:**  
ORADATA2  
**Select:**  
External  
Select all  
three disks



**Create Disk Group**

Disk Group Name:

Redundancy  
 Redundancy is achieved by storing multiple copies of the data on different failure groups. Normal redundancy needs disks from at least two different failure groups, and high redundancy from at least three different failure groups.

High  Normal  External (None)

Select Member Disks  
 Show Eligible  Show All

Quorum failure groups are used to store voting files in extended clusters and do not contain any user data. They require ASM compatibility of 11.2 or higher.

| <input checked="" type="checkbox"/> | Disk Path       | Header Status | Disk Name | Size (MB) | Quorum                   |
|-------------------------------------|-----------------|---------------|-----------|-----------|--------------------------|
| <input checked="" type="checkbox"/> | ORCL:ASM_DATA09 | FORMER        |           | 2047      | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | ORCL:ASM_DATA10 | FORMER        |           | 2047      | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | ORCL:ASM_DATA11 | FORMER        |           | 2047      | <input type="checkbox"/> |

Note: If you do not see the disks which you believe are available, check the Disk Discovery Path and read/write permissions on the disks. The Disk Discovery Path limits set of disks considered for discovery.

Disk Discovery Path: <default>

Click on the Show Advanced Options button to change the disk group attributes. Disk Group compatibility attributes may need to be modified based on the usage of disk group for different versions of databases or ASM Cluster File Systems.

Click OK to Create disk group



## Exercise:

# Create ASM disk group ORADATA2

---

61

- ◆ Check status of disk group ORADATA2 with:  
\$ srvctl status diskgroup -g ORADATA2  
Disk Group ORADATA2 is running on rac11gtst1

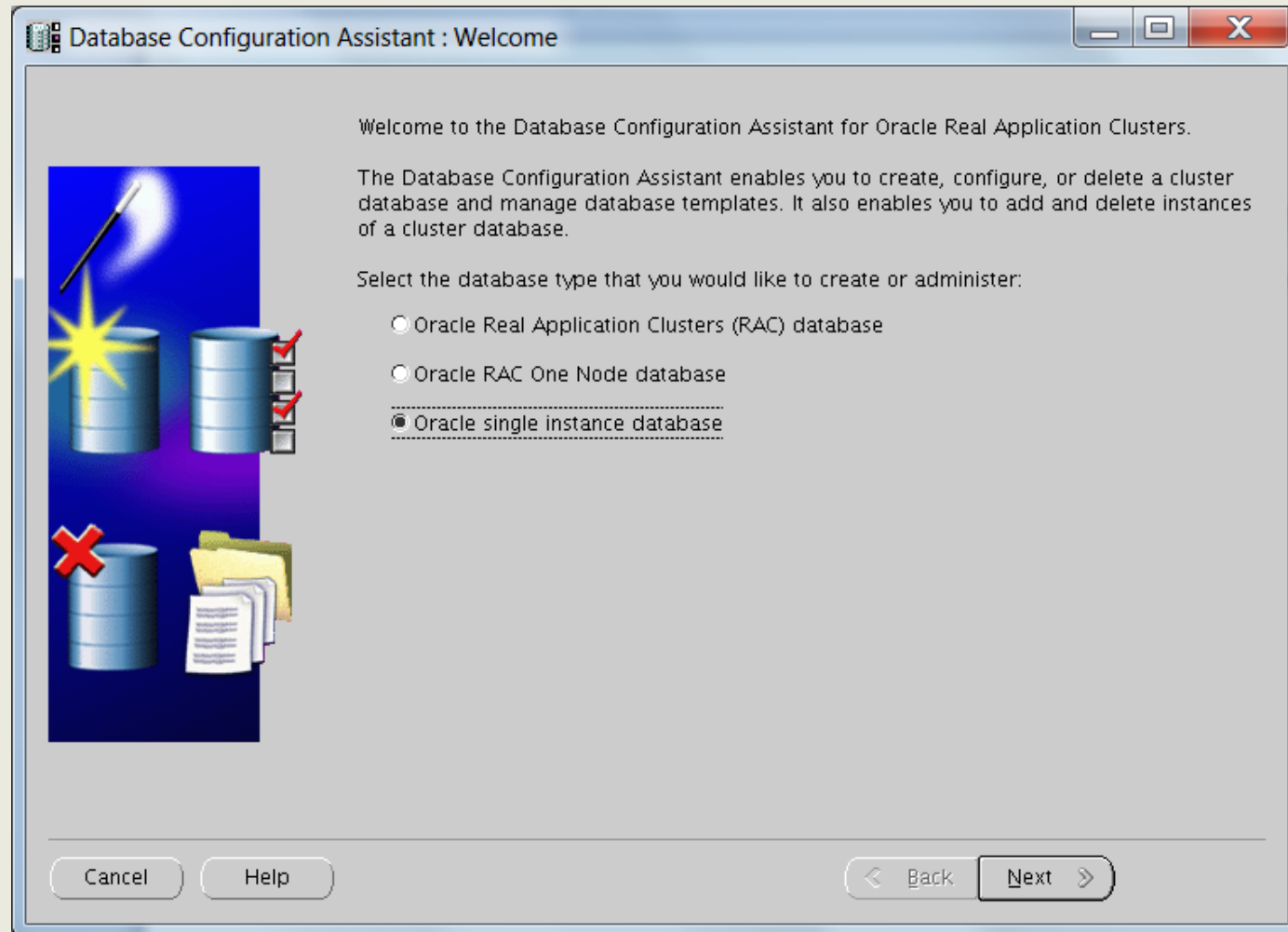
## Exercise: Create single instance database rconv

---

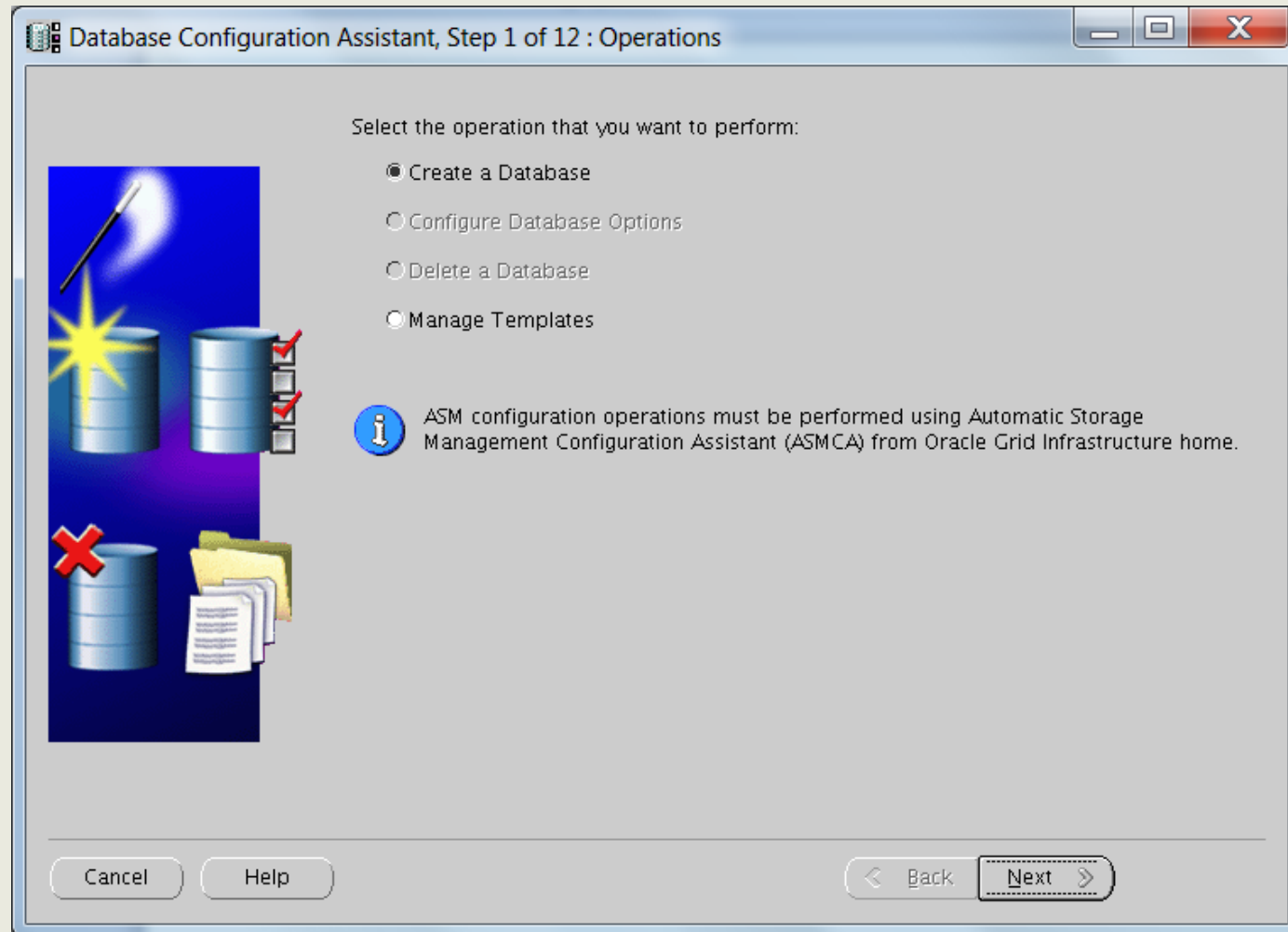
62

- ◆ Connect to server rac11gtst1 as user oracle and execute:
  - \$ . rconv.env
  - \$ dbca

# Exercise: Create single instance database rconv




# Exercise: Create single instance database rconv



# Exercise: Create single instance database rconv

Database Configuration Assistant, Step 2 of 12 : Database Templates

Templates that include datafiles contain pre-created databases. They allow you to create a new database in minutes, as opposed to an hour or more. Use templates without datafiles only when necessary, such as when you need to change attributes like block size, which cannot be altered after database creation.



| Select                           | Template                                  | Includes Datafiles |
|----------------------------------|-------------------------------------------|--------------------|
| <input type="radio"/>            | General Purpose or Transaction Processing | Yes                |
| <input checked="" type="radio"/> | Custom Database                           | No                 |
| <input type="radio"/>            | Data Warehouse                            | Yes                |
| <input type="radio"/>            | ractst                                    | No                 |

Show Details...

Cancel Help < Back Next >

# Exercise: Create single instance database rconv

66

Database Configuration Assistant, Step 3 of 12 : Database Identification

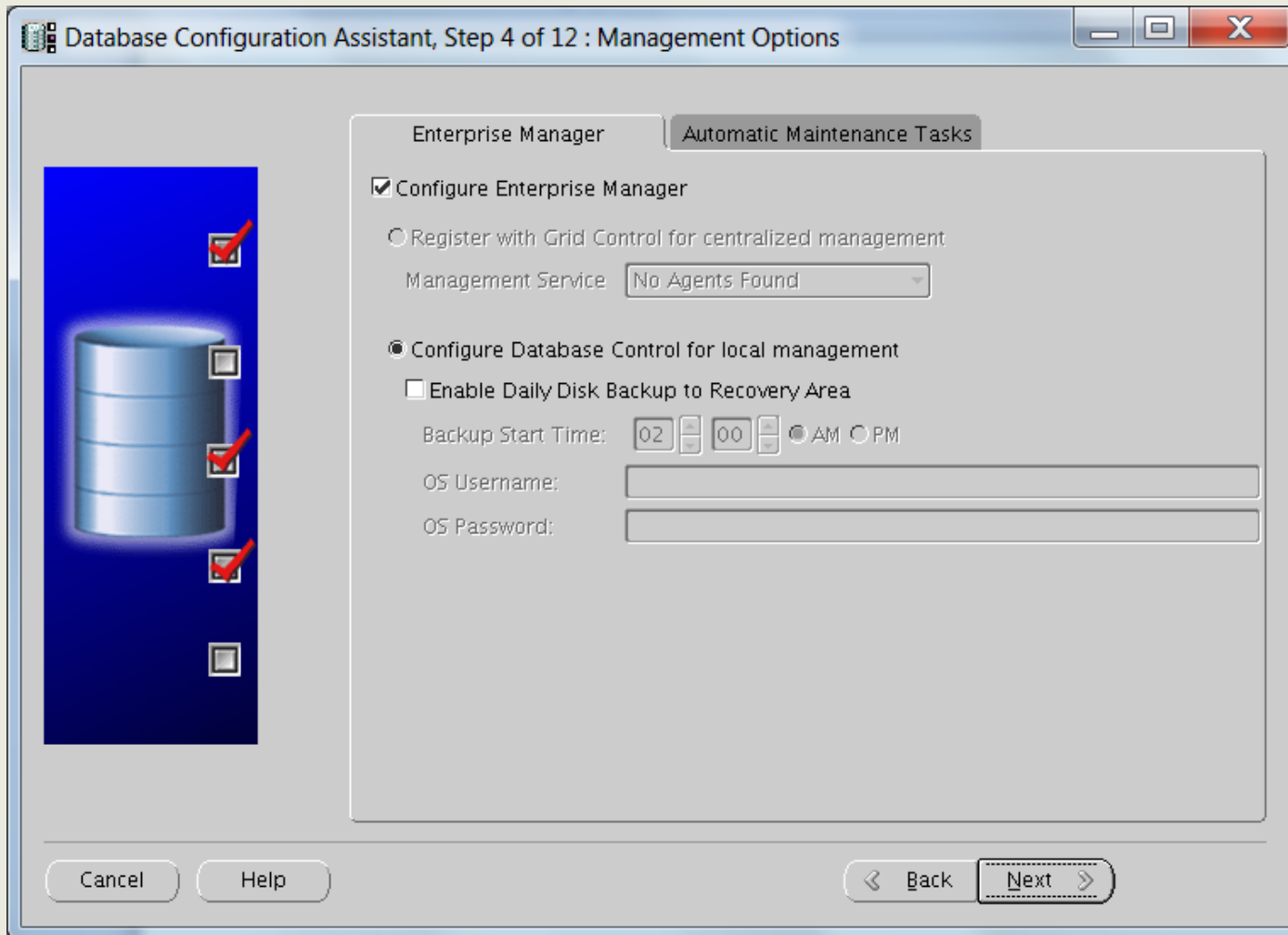
An Oracle database is uniquely identified by a Global Database Name, typically of the form "name.domain".

Global Database Name:

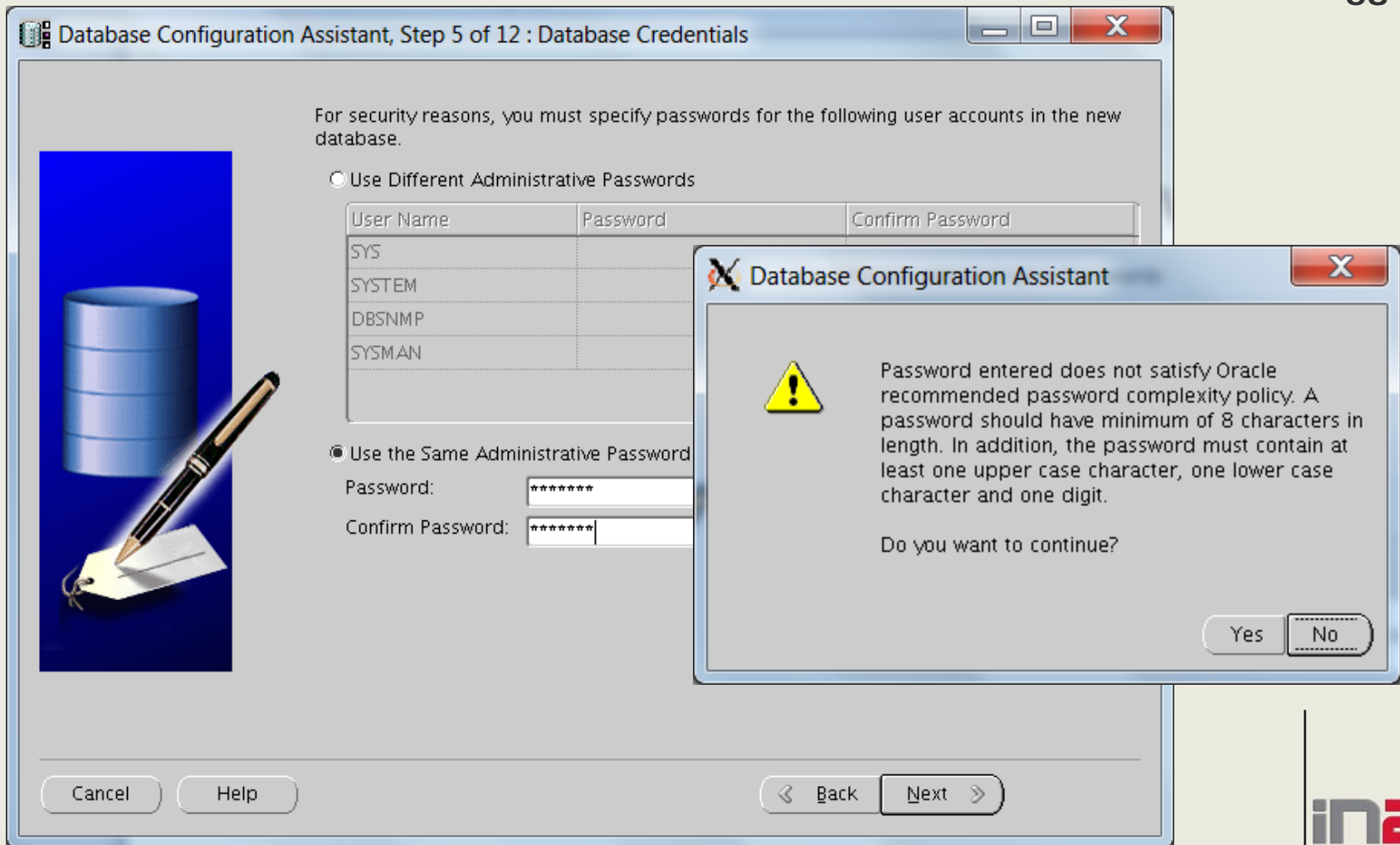
A database is referenced by at least one Oracle instance which is uniquely identified from any other instance on this computer by an Oracle System Identifier (SID).

SID:

# Exercise: Create single instance database rconv



# Exercise: Create single instance database rconv



For security reasons, you must specify passwords for the following user accounts in the new database.

Use Different Administrative Passwords


| User Name | Password | Confirm Password |
|-----------|----------|------------------|
| SYS       |          |                  |
| SYSTEM    |          |                  |
| DBSNMP    |          |                  |
| SYSMAN    |          |                  |

Use the Same Administrative Password

Password:

Confirm Password:

**Database Configuration Assistant**

 Password entered does not satisfy Oracle recommended password complexity policy. A password should have minimum of 8 characters in length. In addition, the password must contain at least one upper case character, one lower case character and one digit.

Do you want to continue?

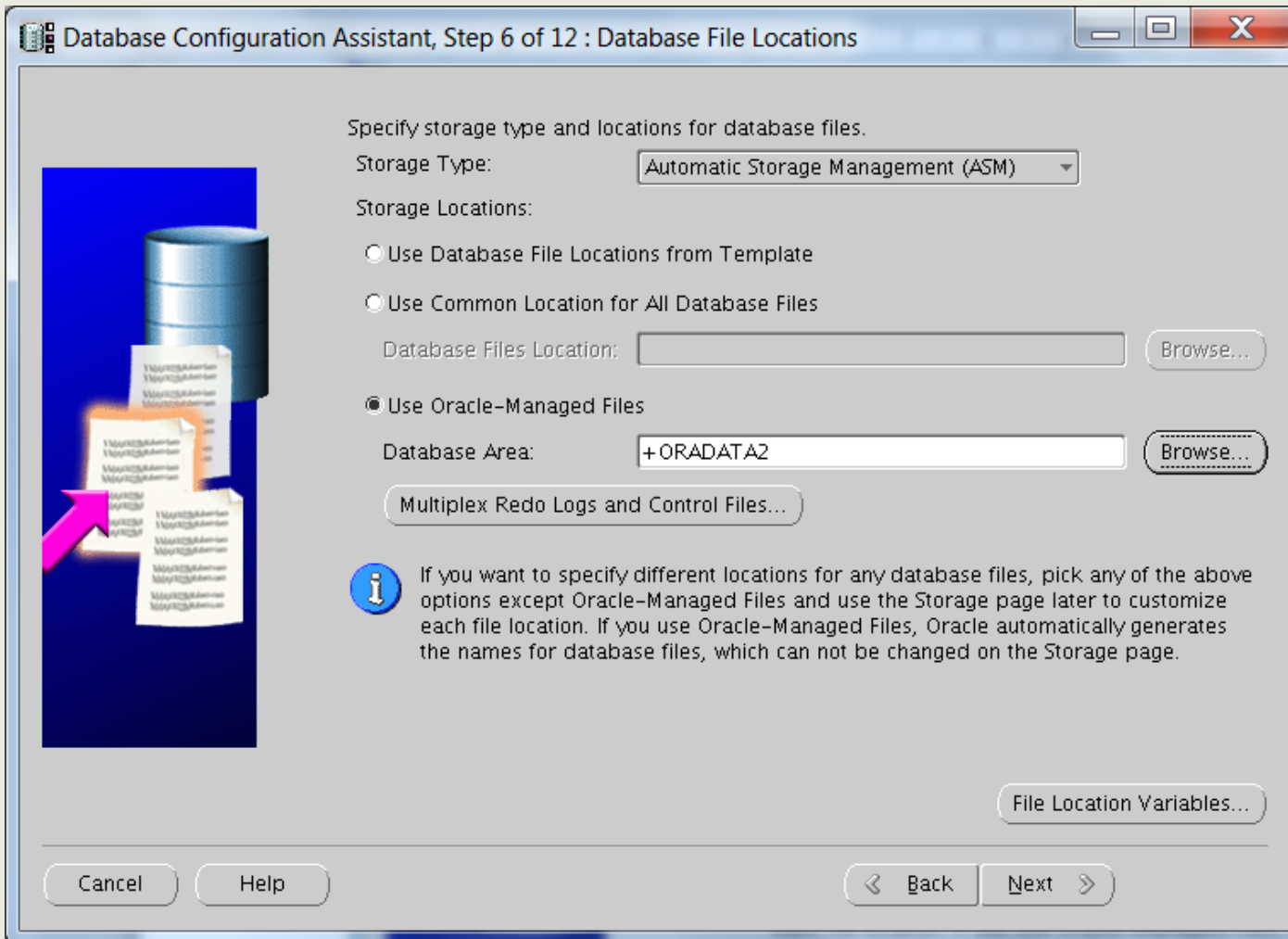
Yes No

Cancel Help Back Next

Password for all users is ractst1



# Exercise: Create single instance database rconv



Database Configuration Assistant, Step 6 of 12 : Database File Locations

Specify storage type and locations for database files.


Storage Type:

Storage Locations:

- Use Database File Locations from Template
- Use Common Location for All Database Files
- Use Oracle-Managed Files

Database Files Location:

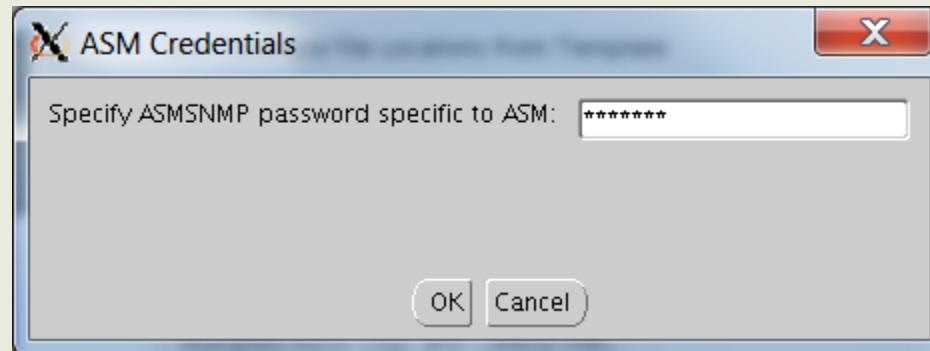
Database Area:

 If you want to specify different locations for any database files, pick any of the above options except Oracle-Managed Files and use the Storage page later to customize each file location. If you use Oracle-Managed Files, Oracle automatically generates the names for database files, which can not be changed on the Storage page.

# Exercise:

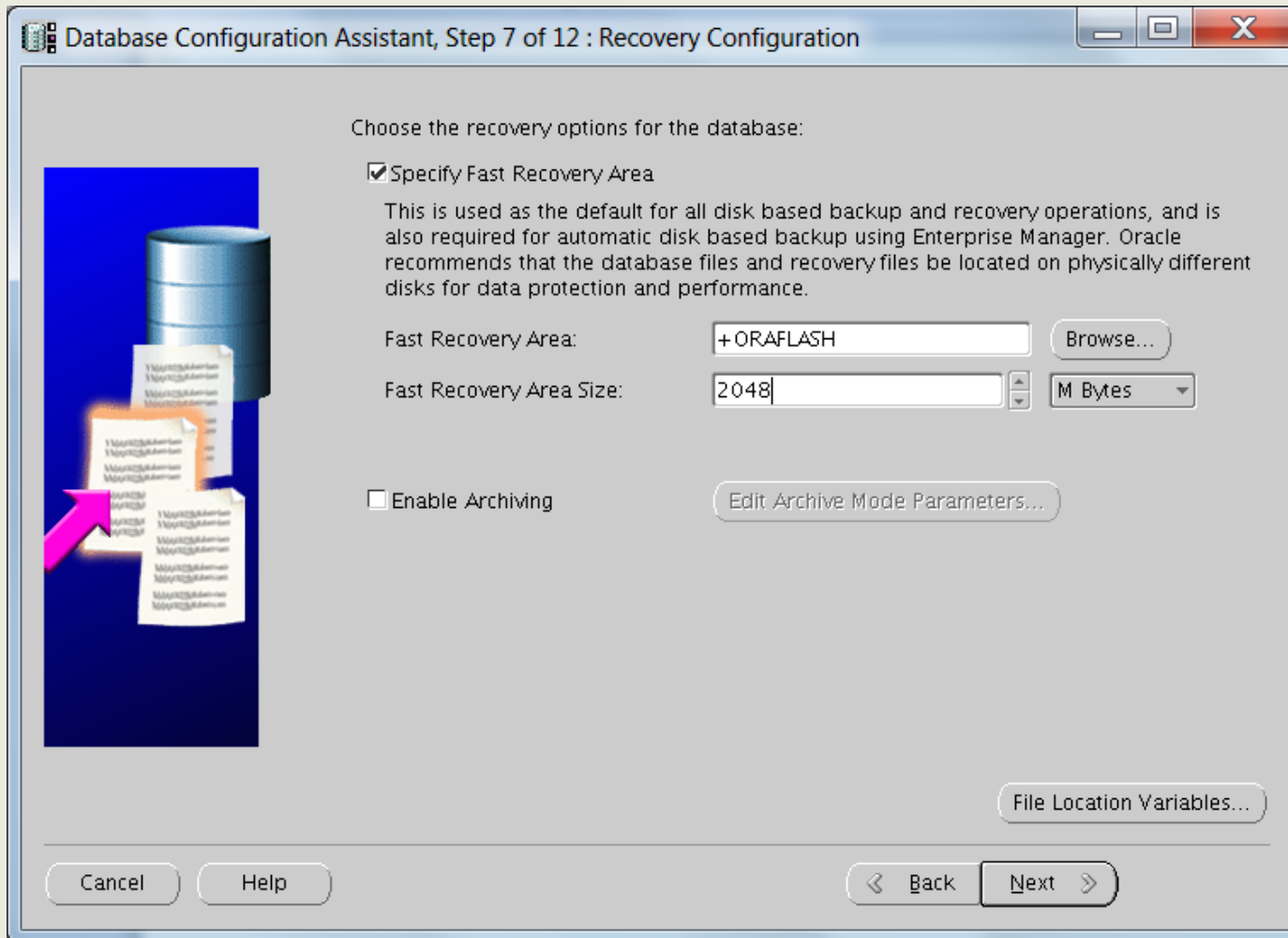
## Create single instance database rconv

70



Password is ractst1

# Exercise: Create single instance database rconv



Database Configuration Assistant, Step 7 of 12 : Recovery Configuration

Choose the recovery options for the database:

Specify Fast Recovery Area

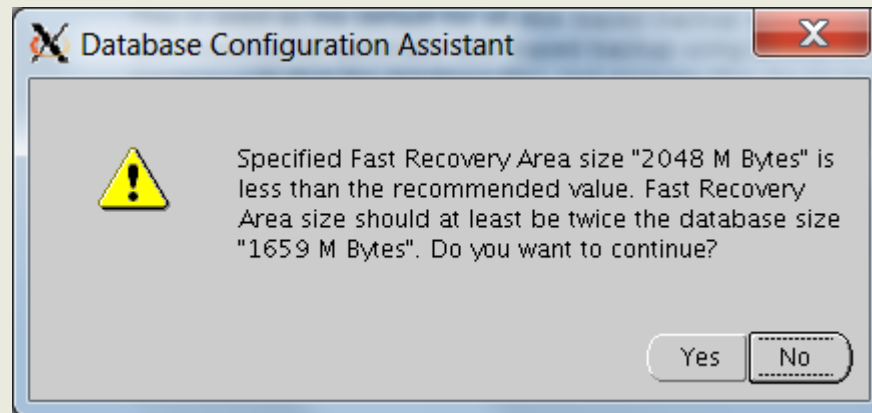
This is used as the default for all disk based backup and recovery operations, and is also required for automatic disk based backup using Enterprise Manager. Oracle recommends that the database files and recovery files be located on physically different disks for data protection and performance.

Fast Recovery Area:

Fast Recovery Area Size:

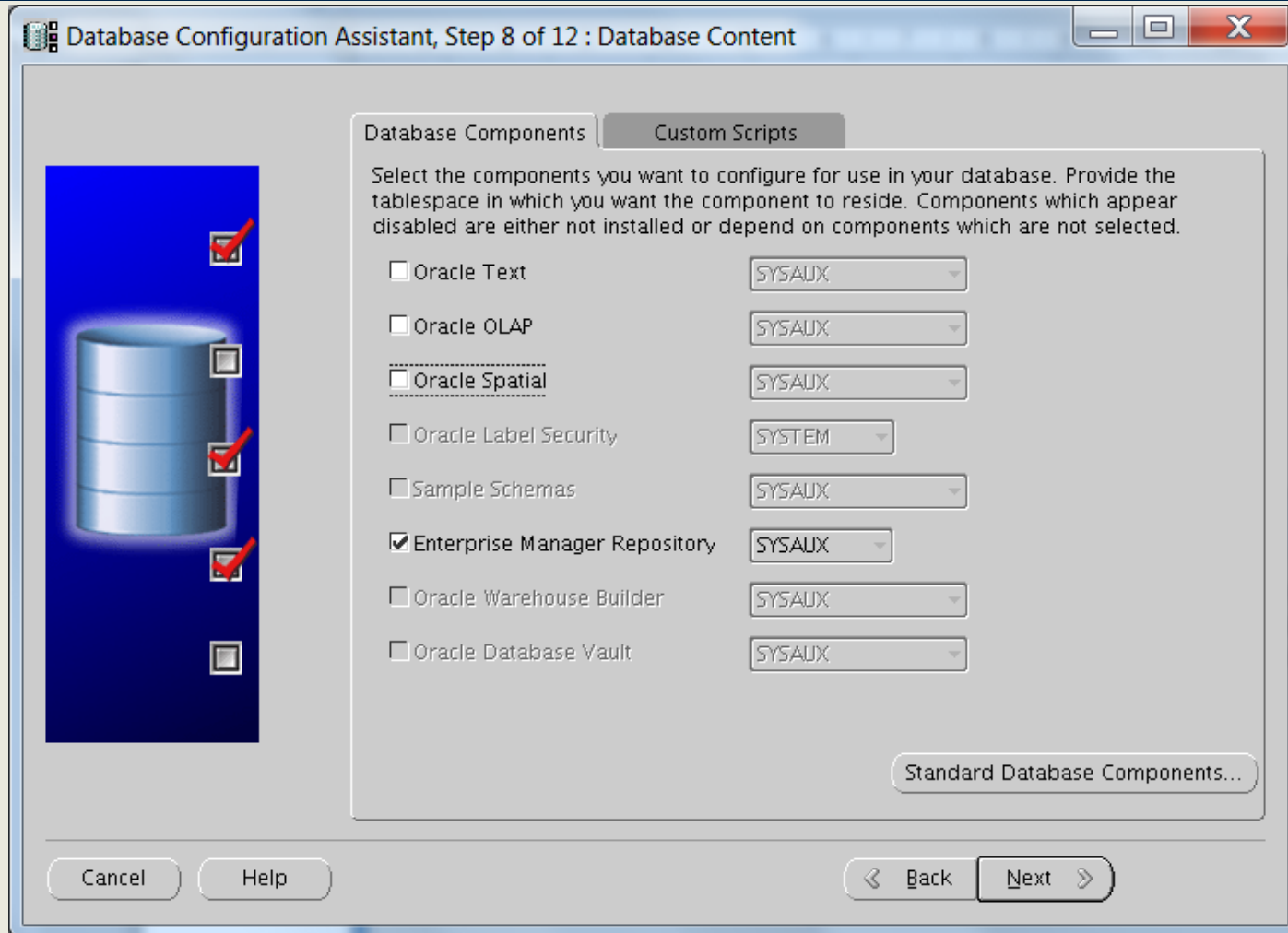
Enable Archiving

# Exercise: Create single instance database rconv

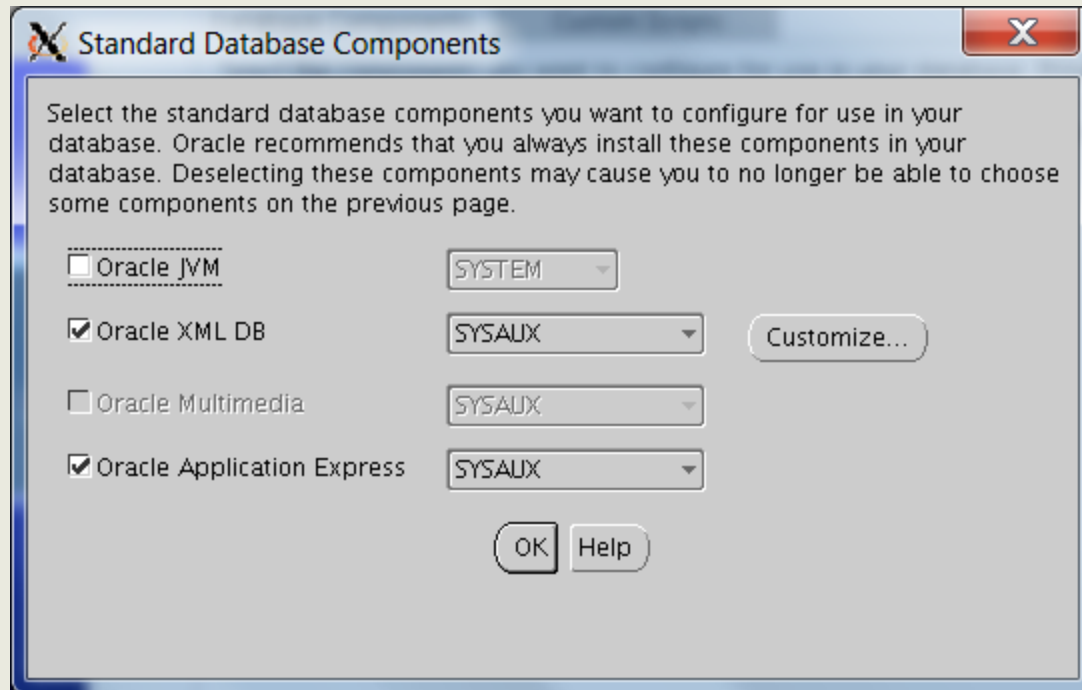


Click on Yes to continue

# Exercise: Create single instance database rconv

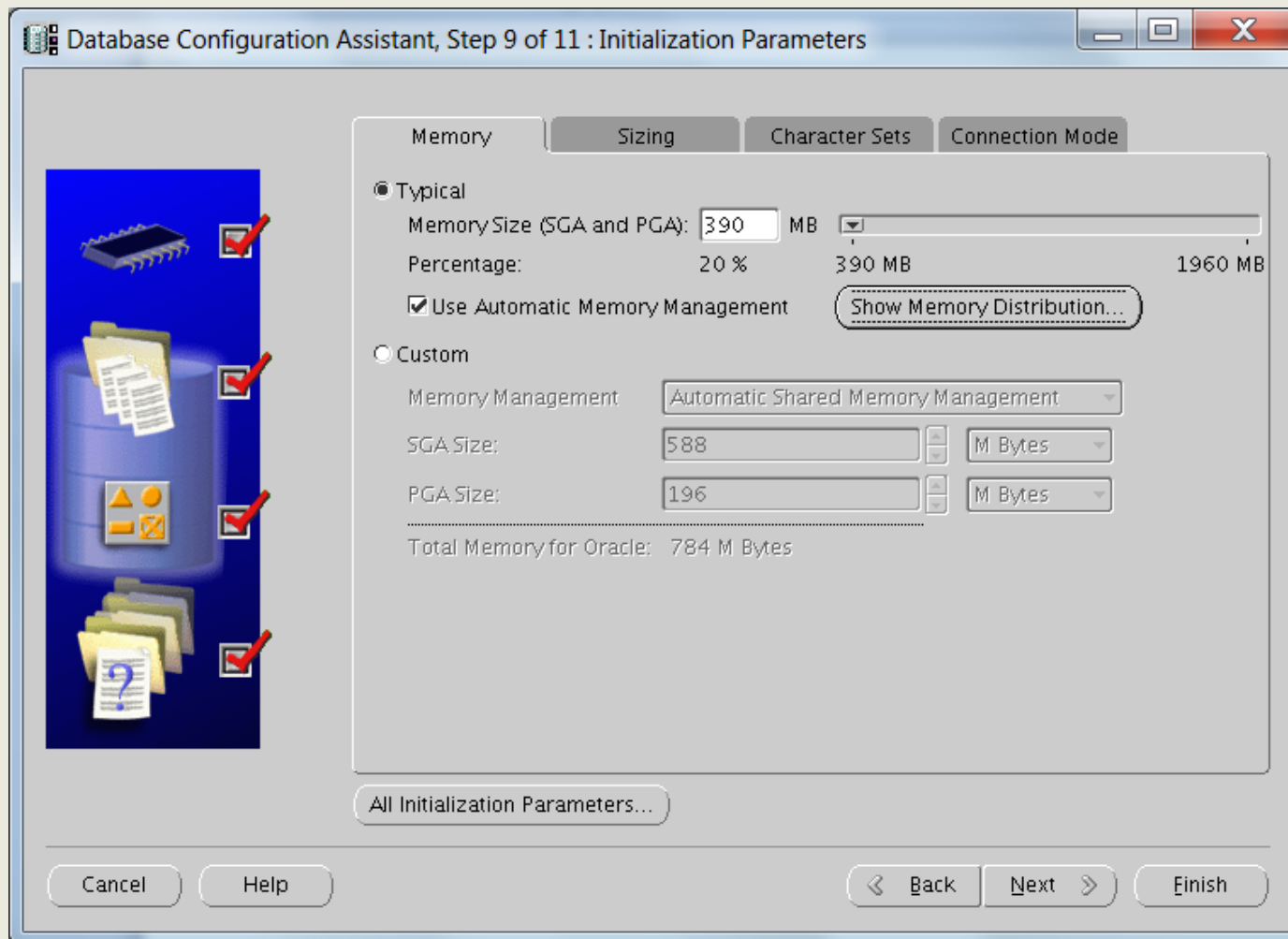


# Exercise: Create single instance database rconv



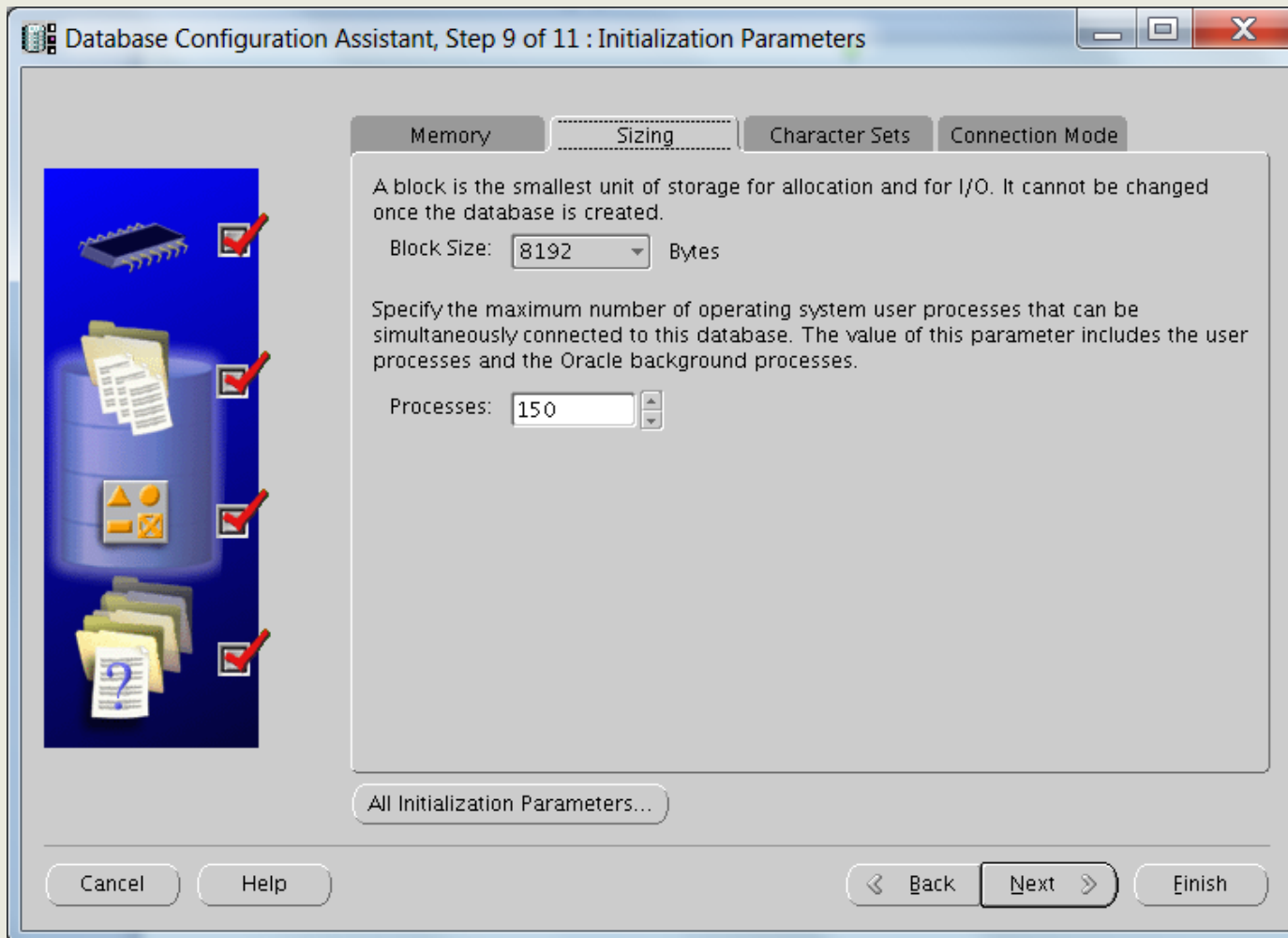
# Exercise: Create single instance database rconv

75



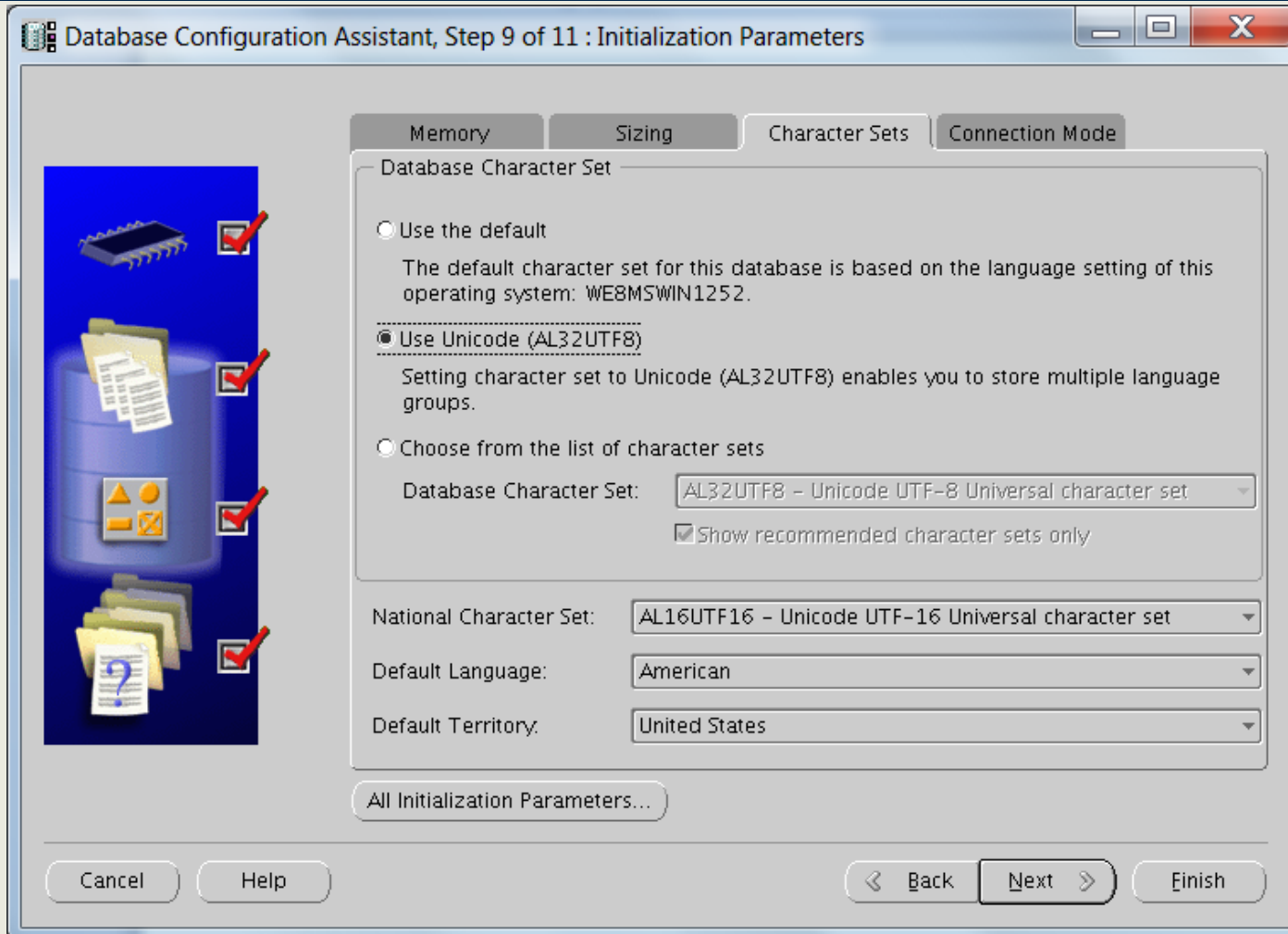
# Exercise: Create single instance database rconv

76





# Exercise: Create single instance database rconv



Database Configuration Assistant, Step 9 of 11 : Initialization Parameters

Memory Sizing **Character Sets** Connection Mode

Database Character Set

- Use the default  
The default character set for this database is based on the language setting of this operating system: WE8MSWIN1252.
- Use Unicode (AL32UTF8)  
Setting character set to Unicode (AL32UTF8) enables you to store multiple language groups.
- Choose from the list of character sets

Database Character Set: AL32UTF8 - Unicode UTF-8 Universal character set

Show recommended character sets only

National Character Set: AL16UTF16 - Unicode UTF-16 Universal character set

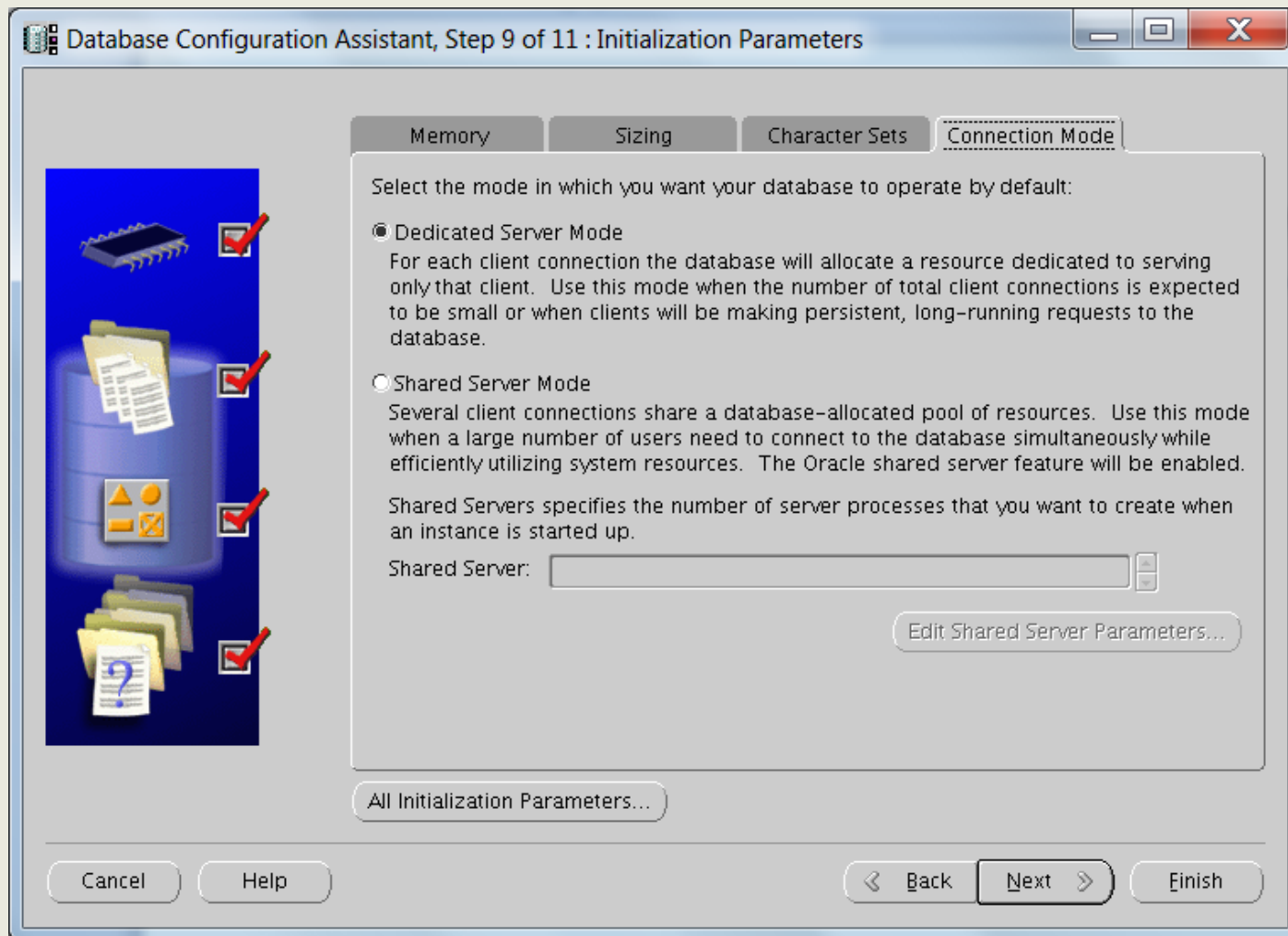
Default Language: American

Default Territory: United States

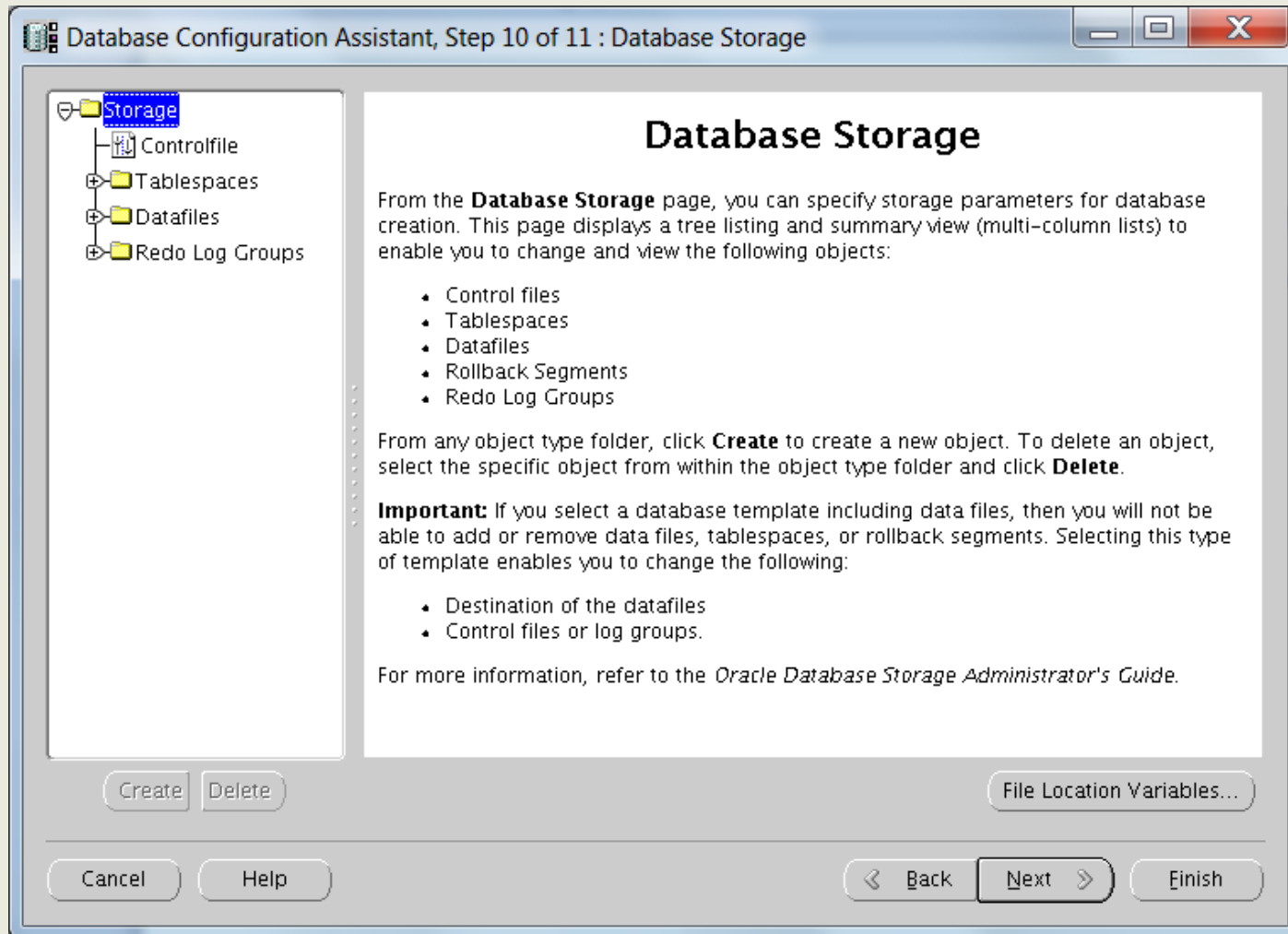
All Initialization Parameters...

Cancel Help < Back Next > Finish

# Exercise: Create single instance database rconv



# Exercise: Create single instance database rconv



Do not change default datafile sizes

# Exercise: Create single instance database rconv

80

Database Configuration Assistant, Step 11 of 11 : Creation Options

Select the database creation options:

Create Database

Save as a Database Template


Name:

Description:

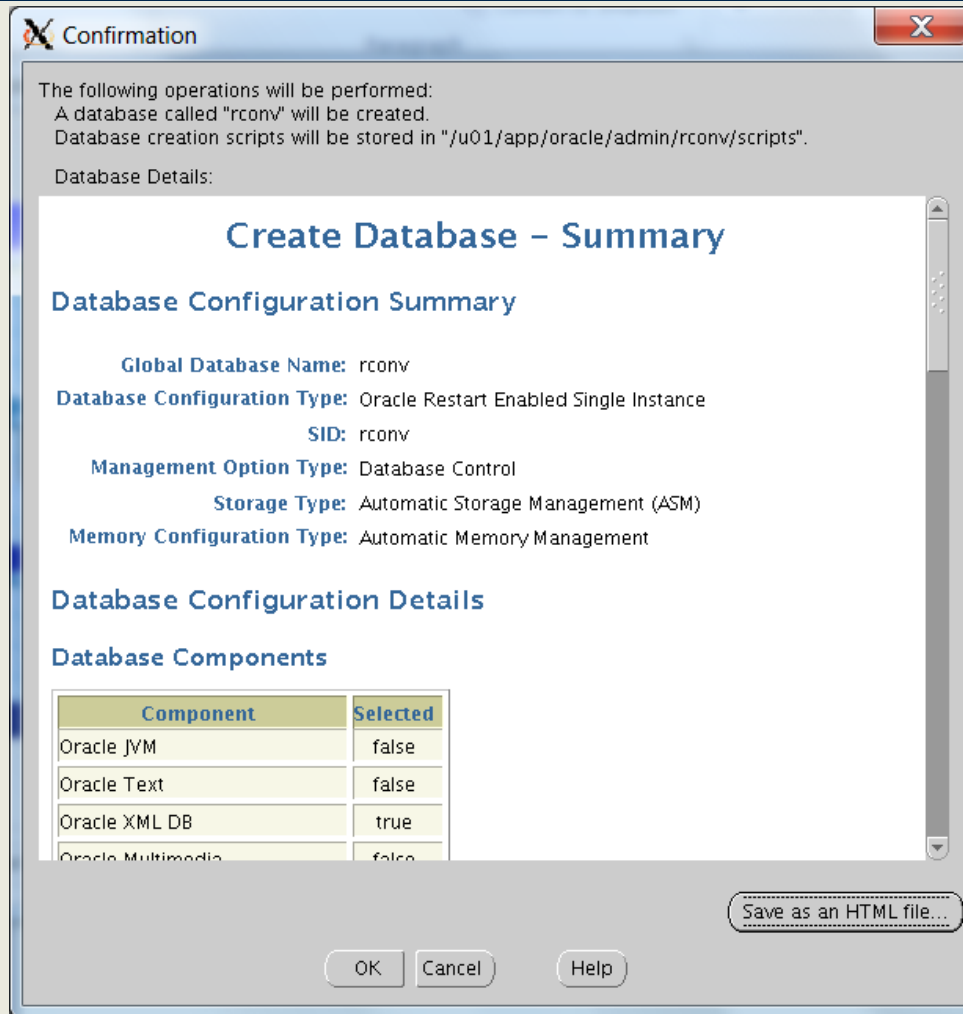
Generate Database Creation Scripts

Destination Directory:

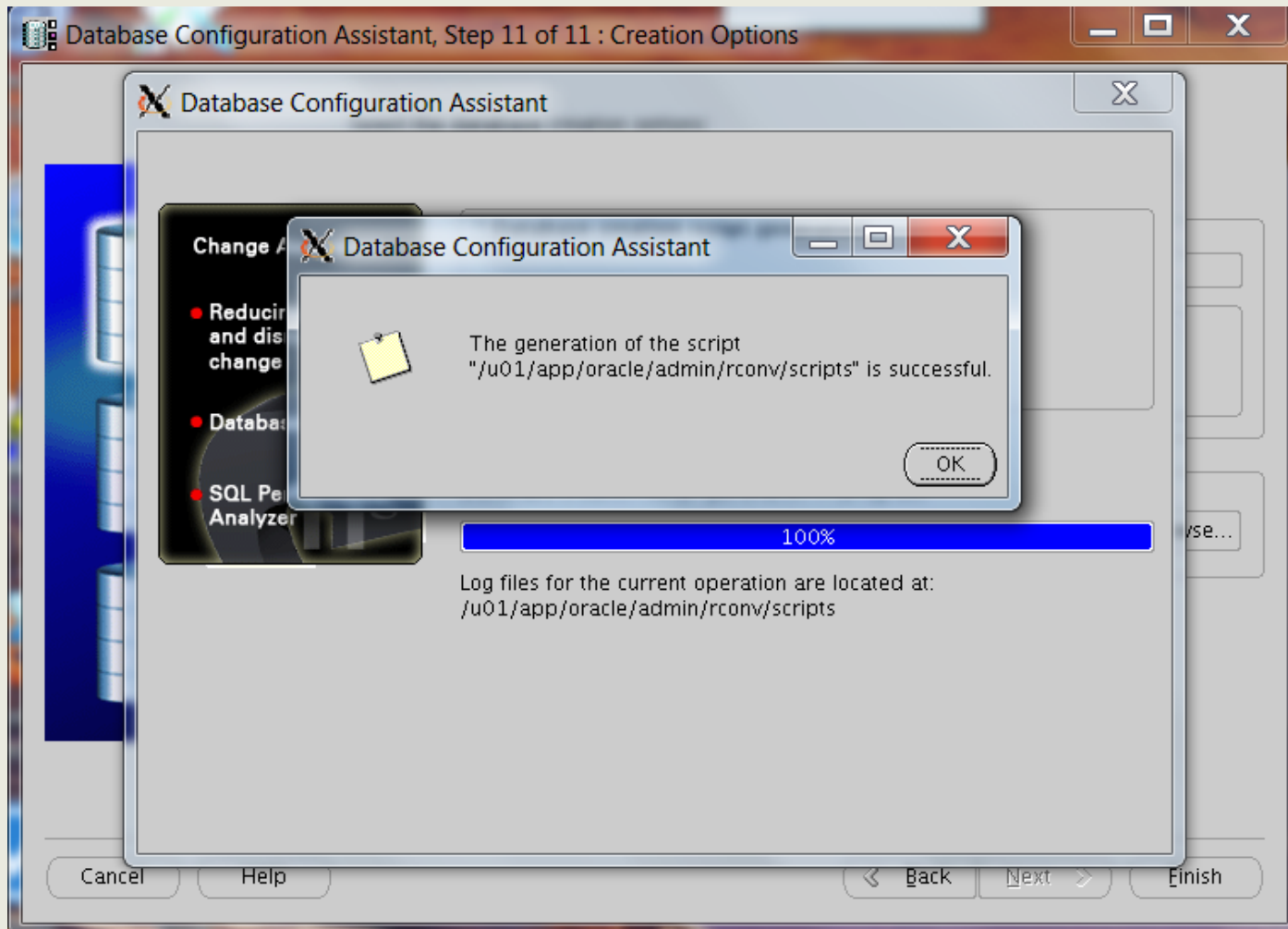
Cancel Help Back Next Finish



# Exercise: Create single instance database rconv

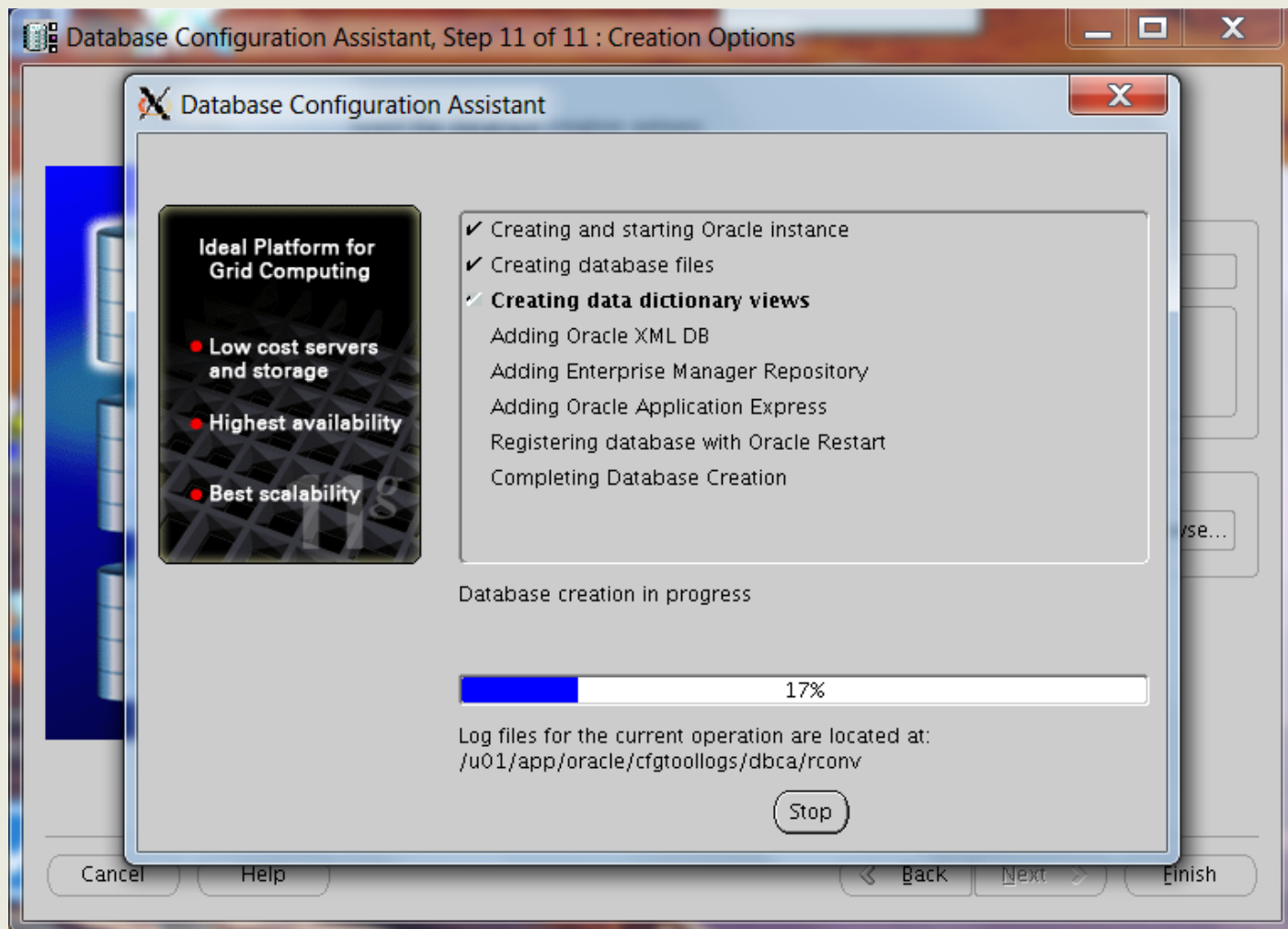


# Exercise: Create single instance database rconv



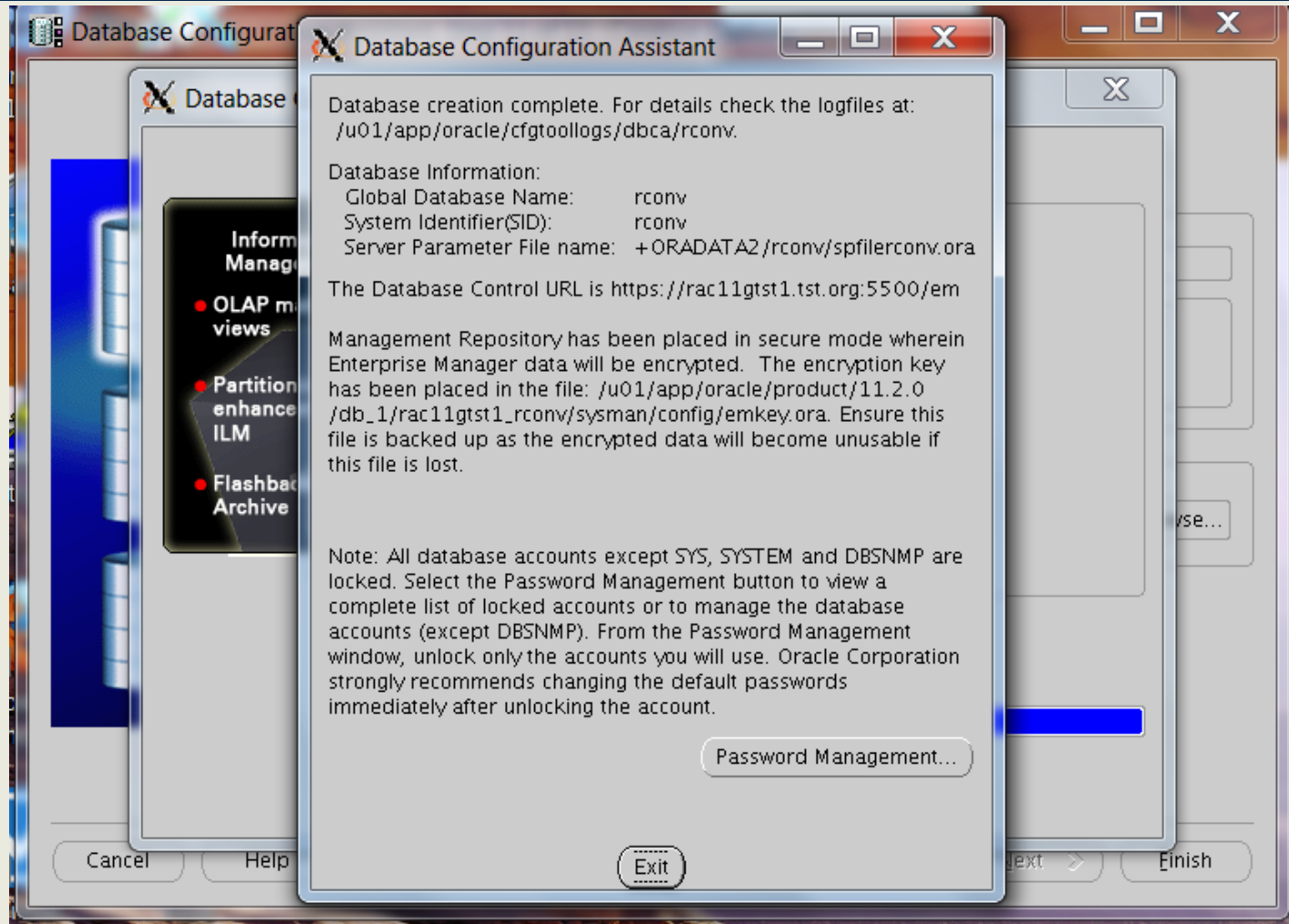
# Exercise: Create single instance database rconv

83



# Exercise: Create single instance database rconv

84





## Exercise:

### Create single instance database rconv

---

85

- ◆ Check rconv database status with:  
\$ srvctl status database -d rconv  
you should get an information that rconv database is running
- ◆ Check rconv database configuration with:  
\$ srvctl config database -d rconv

## Exercise:

# Create dbca template rconv database

---

86

### ◆ Prerequisites:

- Single node database rconv is created on server rac11gtst1
- rconv database is up and running

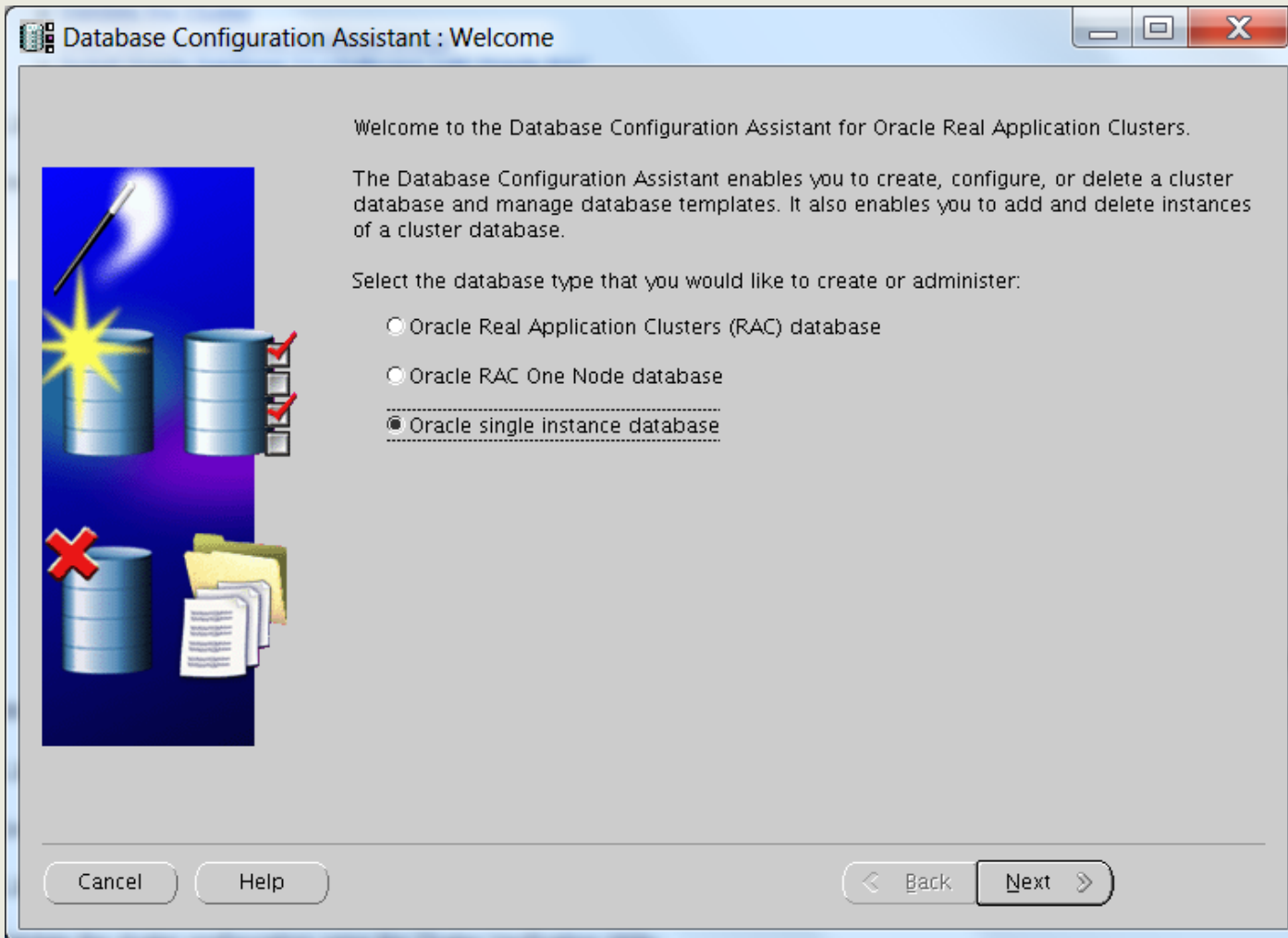
### ◆ Perform the following actions

- Connect to server rac11gtst1 as user oracle
- Run commands
 

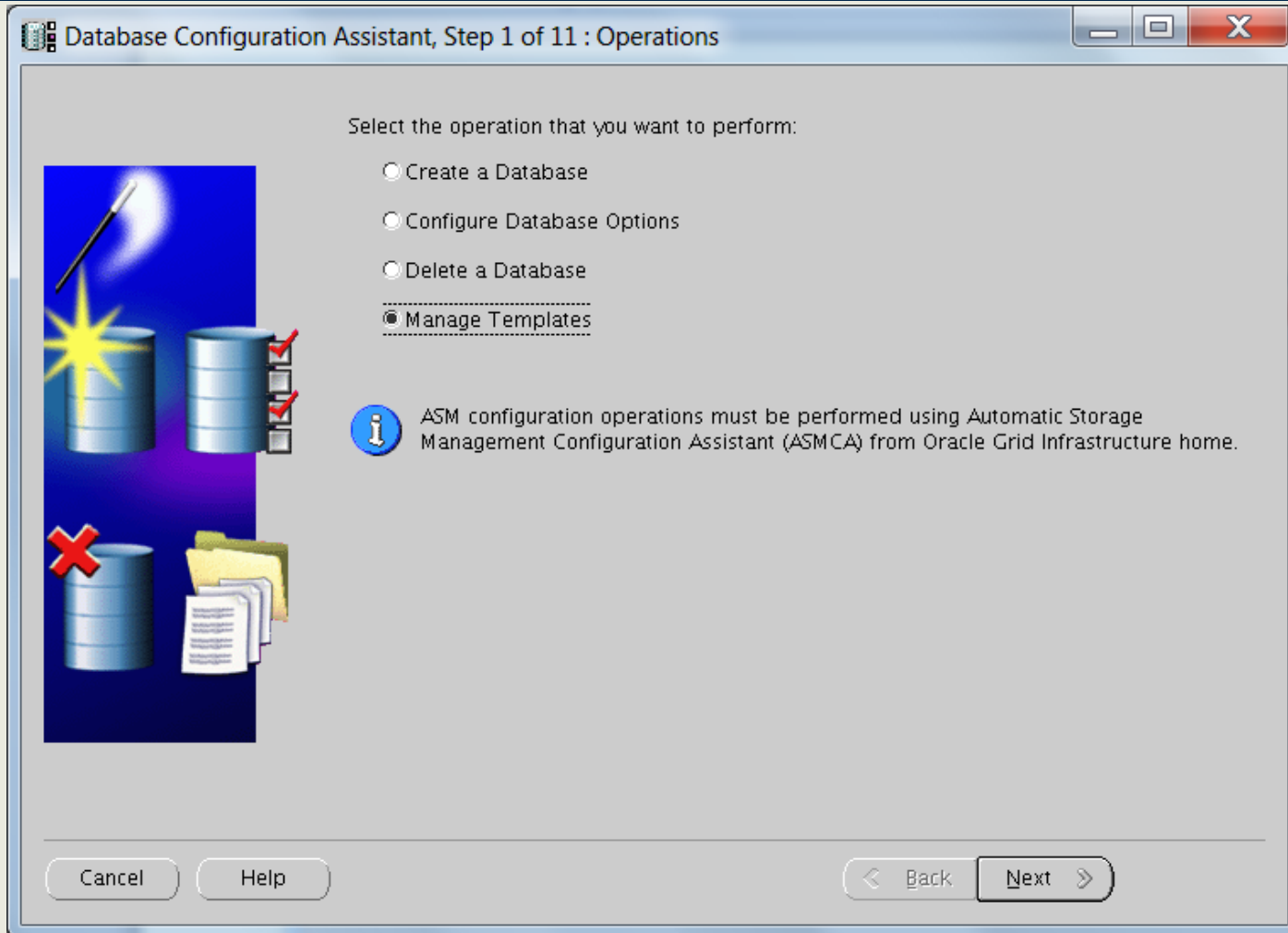
```
$. rconv.env
$ dbca
```

# Exercise: Create dbca template rconv database

87

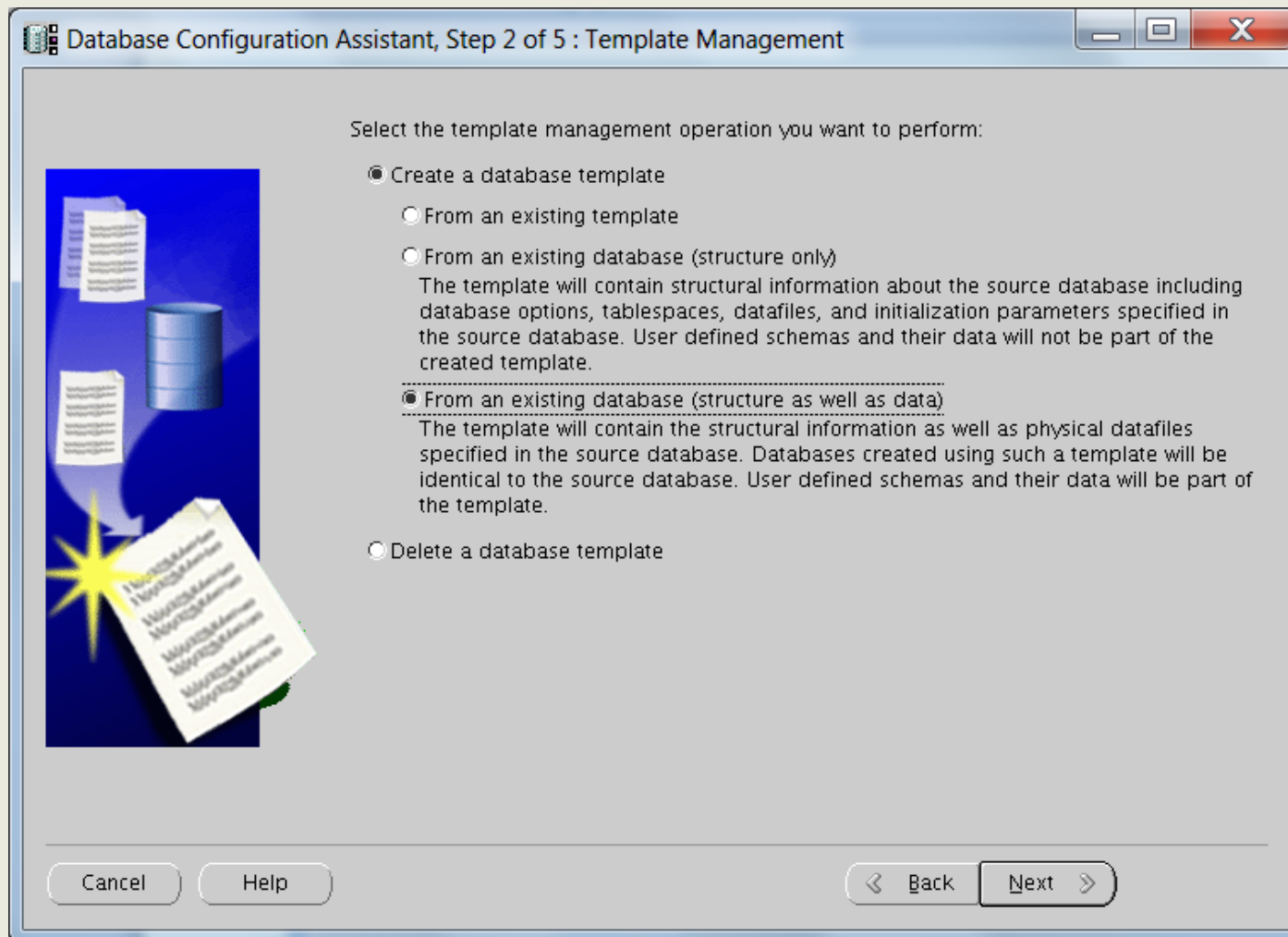


# Exercise: Create dbca template rconv database

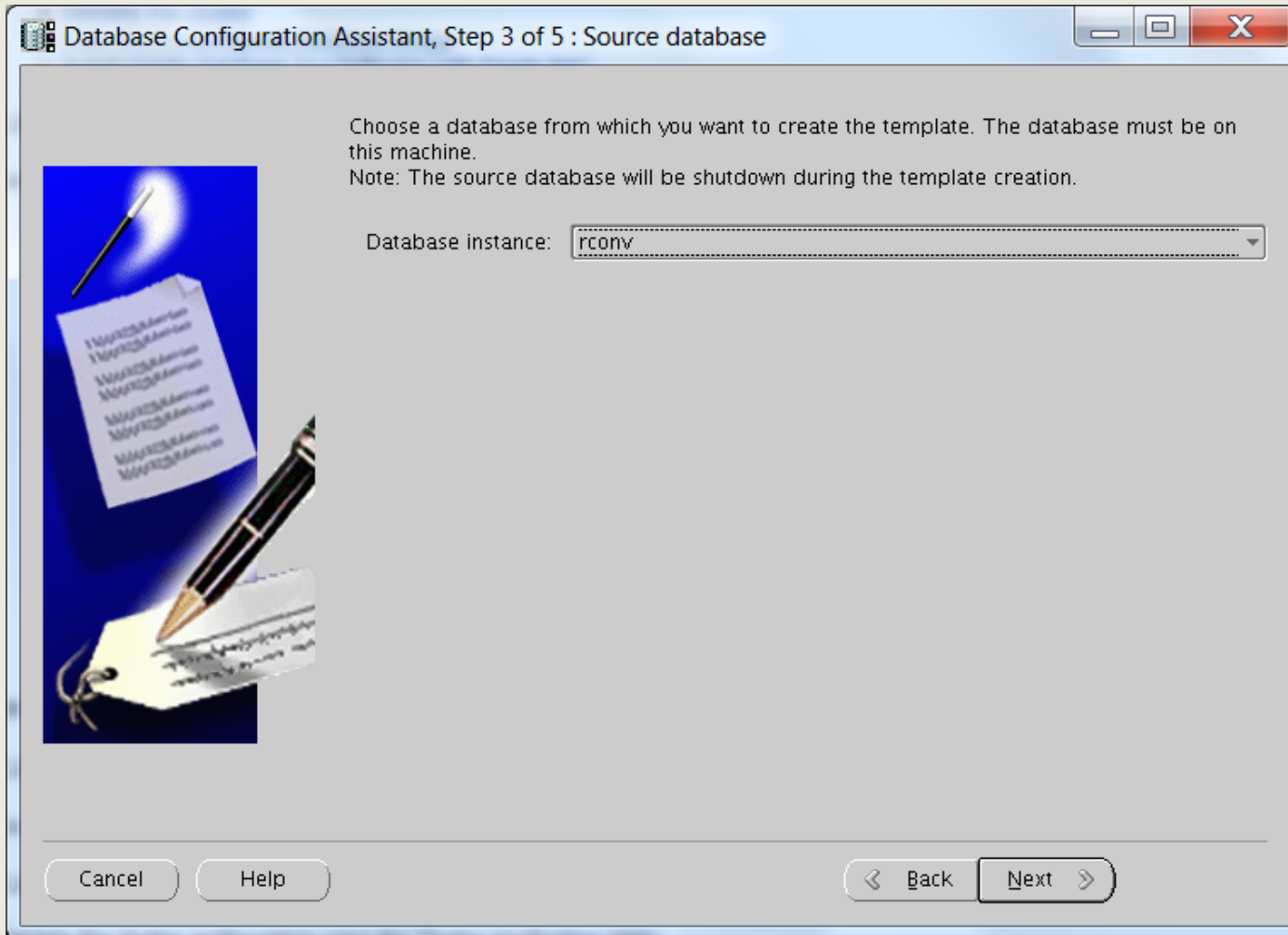


# Exercise: Create dbca template rconv database

89



# Exercise: Create dbca template rconv database



# Exercise: Create dbca template rconv database

91

Database Configuration Assistant, Step 4 of 5 : Template Properties


Specify name and description of the template you would like to create:

Name:

Description:

Specify a file name which will contain datafiles used in the template in a compressed format:

Template datafile:




# Exercise: Create dbca template rconv database

Database Configuration Assistant, Step 5 of 5 : Location of database related files

Specify whether you want to convert all database related file locations to Oracle Flexible Architecture (OFA), or you want to maintain the file locations in the template.

- Maintain the file locations**  
The location of the files in the template will be identical to the location of the files used in the source database. You'll be able to use this template for the same directory structure as the source database. If you use a different directory structure, you'll have to change the file locations in the template.
- Convert the file locations to use OFA structure**  
The location of the files in the template will be converted to OFA. The location of the files in the template to OFA is recommended if the source database using this template may not have same directory structure.



Cancel Help Back Next Finish

**Confirmation**

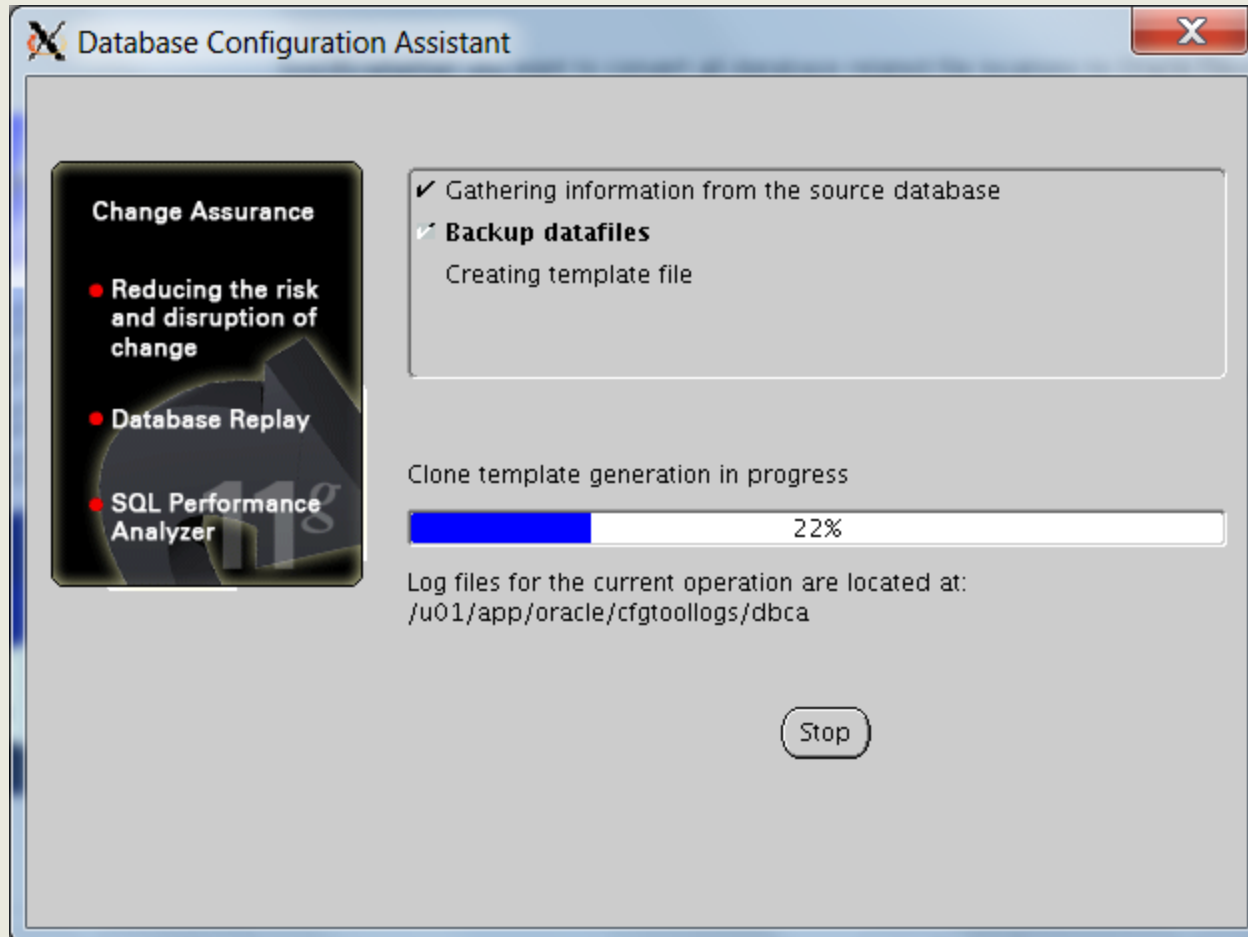
The following operations will be performed:  
Creation of clone template "rconv" from the source database "rconv". The data file information for this clone template will be at "{ORACLE\_HOME}/assistants/dbca/templates/rconv.dfb".  
Note: The source database "rconv" will be shutdown during the template creation.

OK Cancel



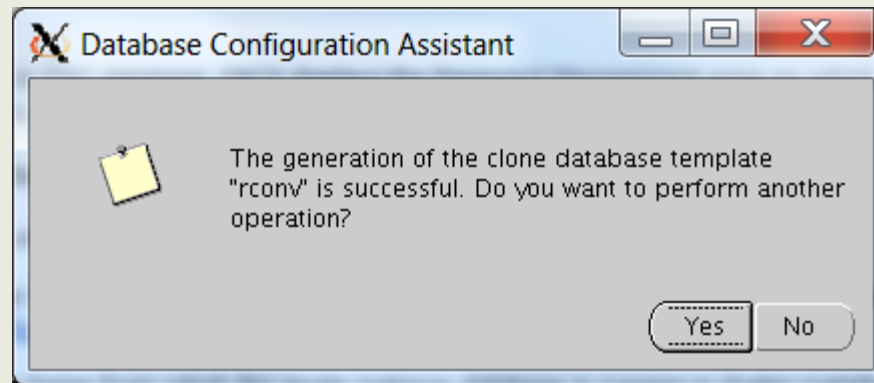
# Exercise: Create dbca template rconv database

93



# Exercise: Create dbca template rconv database

94



Click No to continue

## Exercise:

# Create dbca template rconv database

---

95

- ◆ Check your template with

```
$ cd $ORACLE_HOME
```

```
$ cd assistants/dbca/templates/
```

```
$ ls -l rconv.*
```

```
-rw-r----- 1 oracle asmadmin 9748480 Sep
22 05:14 rconv.ctl
```

```
-rw-r----- 1 oracle oinstall 4916 Sep 22
05:15 rconv.dbc
```

```
-rw-r----- 1 oracle asmadmin 281985024 Sep
22 05:14 rconv.dfb
```

## Exercise:

# Convert single node database rconv to RAC with rconfig

96

### ◆ Prerequisites:

- Single node database rconv is created on server rac11gtst1
- rconv database is up and running

### ◆ Perform the following actions

- Connect to server rac11gtst1 as user oracle
- Run command  
\$ cd \$ORACLE\_HOME/assistants/rconfig/sampleXMLs
- edit ConvertToRAC\_AdminManaged.xml file with information about our Oracle installation and database that we want to convert

## Exercise:

# Convert single node database rconv to RAC with rconfig

---

97

- ◆ <n:Convert verify="ONLY" >
- ◆ First time we will run rconfig with verify=„ONLY“ to check that conversion prerequisites are fulfilled
- ◆ If above check is successful then we will set <n:Convert verify=„YES" > and run conversion with rconfig

## Exercise:

# Convert single node database rconv to RAC with rconfig

98

```
<n: SourceDBHome> /u01/app/oracle/product/11.2.0/db_1
```

```
</n: SourceDBHome>
```

```
<n: TargetDBHome> /u01/app/oracle/product/11.2.0/db_1
```

```
</n: TargetDBHome>
```

```
<n: SourceDBInfo SID="rconv">
```

```
 <n: Credentials>
```

```
 <n: User> sys </n: User>
```

```
 <n: Password> ractst1 </n: Password>
```

```
 <n: Role> sysdba </n: Role>
```

```
 </n: Credentials>
```

```
</n: SourceDBInfo>
```

## Exercise:

# Convert single node database rconv to RAC with rconfig

99

```
<n: NodeList >
```

```
 <n: Node name="rac11gtst1"/>
```

```
 <n: Node name="rac11gtst2"/>
```

```
</n: NodeList >
```

```
<n: InstancePrefix>rconv</n: InstancePrefix >
```

```
<n: SharedStorage type="ASM" >
```

```
<n: TargetDatabaseArea> +ORADATA2</n: TargetDatabaseArea >
```

```
<n: TargetFlashRecoveryArea> +ORAFLASH</n: TargetFlashRecoveryArea >
```

## Exercise:

# Convert single node database rconv to RAC with rconfig

100

```
$ rconfig ConvertToRAC_rconv.xml (sa opcijom verify=ONLY)
```

```
<?xml version="1.0" ?>
```

```
<RConfig version="1.1" >
```

```
<ConvertToRAC>
```

```
 <Convert>
```

```
 <Response>
```

```
 <Result code="0" >
```

```
 Operation Succeeded
```

```
 </Result>
```

```
 </Response>
```

```
 <ReturnValue type="object">
```

```
There is no return value for this step
```

```
</ReturnValue>
```

```
 </Convert>
```

```
</ConvertToRAC></RConfig>
```



# Exercise:

## Convert single node database rconv to RAC with rconfig

101

```

$ rconfig ConvertToRAC_rconv.xml (sa opcijom verify=YES)
Converting Database "rconv" to Cluster Database. Target Oracle Home: /u01/app/oracle/product/11.2.0/db_1.
Database Role: PRIMARY.
Setting Data Files and Control Files
Adding Database Instances
Adding Redo Logs
Enabling threads for all Database Instances
Setting TEMP tablespace
Adding UNDO tablespaces
Adding Trace files
Setting Fast Recovery Area
Updating Oratab
Creating Password file(s)
Configuring Listeners
Configuring related CRS resources
Starting Cluster Database
<?xml version="1.0" ?>
<RConfig version="1.1" >
<ConvertToRAC>
 <Convert>
 <Response>
 <Result code="0" >
 Operation Succeeded
 </Result>
 </Response>
 <ReturnValue type="object">

```

# Exercise:

## Convert single node database rconv to RAC with rconfig

102

```

<Oracle_Home>
 /u01/app/oracle/product/11.2.0/db_1
</Oracle_Home>
<Database type="ADMIN_MANAGED" >
 <InstanceList>
 <Instance SID="rconv1" Node="rac11gtst1" >
 </Instance>
 <Instance SID="rconv2" Node="rac11gtst2" >
 </Instance>
 </InstanceList>
</Database> </ReturnValue>
</Convert>
</ConvertToRAC></RConfig>

```

## Exercise:

# Convert single node database rconv to RAC with rconfig

103

- ◆ If single instance database conversion to RAC database was successful you can check database status with:
 

```
$ srvctl status database -d rconv
```

Instance rconv1 is running on node rac11gtst1  
 Instance rconv2 is running on node rac11gtst2  
 as a result you should get an information that rconv database instances are running on servers rac11gtst1 and rac11gtst2

```
$ srvctl config database -d rconv
```

among other information you should also get that  
 Type: RAC

# Exercise:

## Convert single node databaze rconv to RAC with rconfig

---

104

- ◆ For RAC rconv database it is necessary to convert Enterprise Manager repositroy to cluster format using the following procedure:
  - Connect to server rac11gtst1 as user oracle
  - Run command  
\$ . rconv.env

# Exercise:

## Convert single node database rconv to RAC with rconfig

```

$ emca -config dbcontrol db -repos recreate -cluster
STARTED EMCA at Sep 24, 2011 6:41:30 AM
EM Configuration Assistant, Version 11.2.0.0.2 Production
Copyright (c) 2003, 2005, Oracle. All rights reserved.
Enter the following information:
Database unique name: rconv
Service name: rconv
Listener ORACLE_HOME [/u01/11.2.0/grid]:
Password for SYS user:
Database Control is already configured for the database rconv
You have chosen to configure Database Control for managing the database rconv
This will remove the existing configuration and the default settings and perform a
fresh configuration

WARNING : While repository is dropped the database will be put in quiesce mode.

Do you wish to continue? [yes(Y)/no(N)]: Y

```

## Exercise:

# Convert single node database rconv to RAC with rconfig

106

Password for DBSNMP user:

Password for SYSMAN user:

Cluster name: rac11gr2tst

Email address for notifications (optional):

Outgoing Mail (SMTP) server for notifications (optional):

ASM ORACLE\_HOME [ /u01/11.2.0/grid ]:

ASM port [ 1521 ]:

ASM username [ ASMSNMP ]:

ASM user password:

-----

# Exercise:

## Convert single node database rconv to RAC with rconfig

You have specified the following settings

Database ORACLE\_HOME ..... /u01/app/oracle/product/11.2.0/db\_1

Database instance hostname ..... Listener ORACLE\_HOME ..... /u01/11.2.0/grid

Listener port number ..... 1521

Cluster name ..... rac11gr2tst

Database unique name ..... rconv

Email address for notifications .....

Outgoing Mail (SMTP) server for notifications .....

ASM ORACLE\_HOME ..... /u01/11.2.0/grid

ASM port ..... 1521

ASM user role ..... SYSDBA

ASM username ..... ASMSNMP

-----

WARNING : While repository is dropped the database will be put in quiesce mode.

-----  
 Do you wish to continue? [yes(Y)/no(N)]: **Y**





# Exercise:

## Create RAC database with dbca template for single instance database rconv

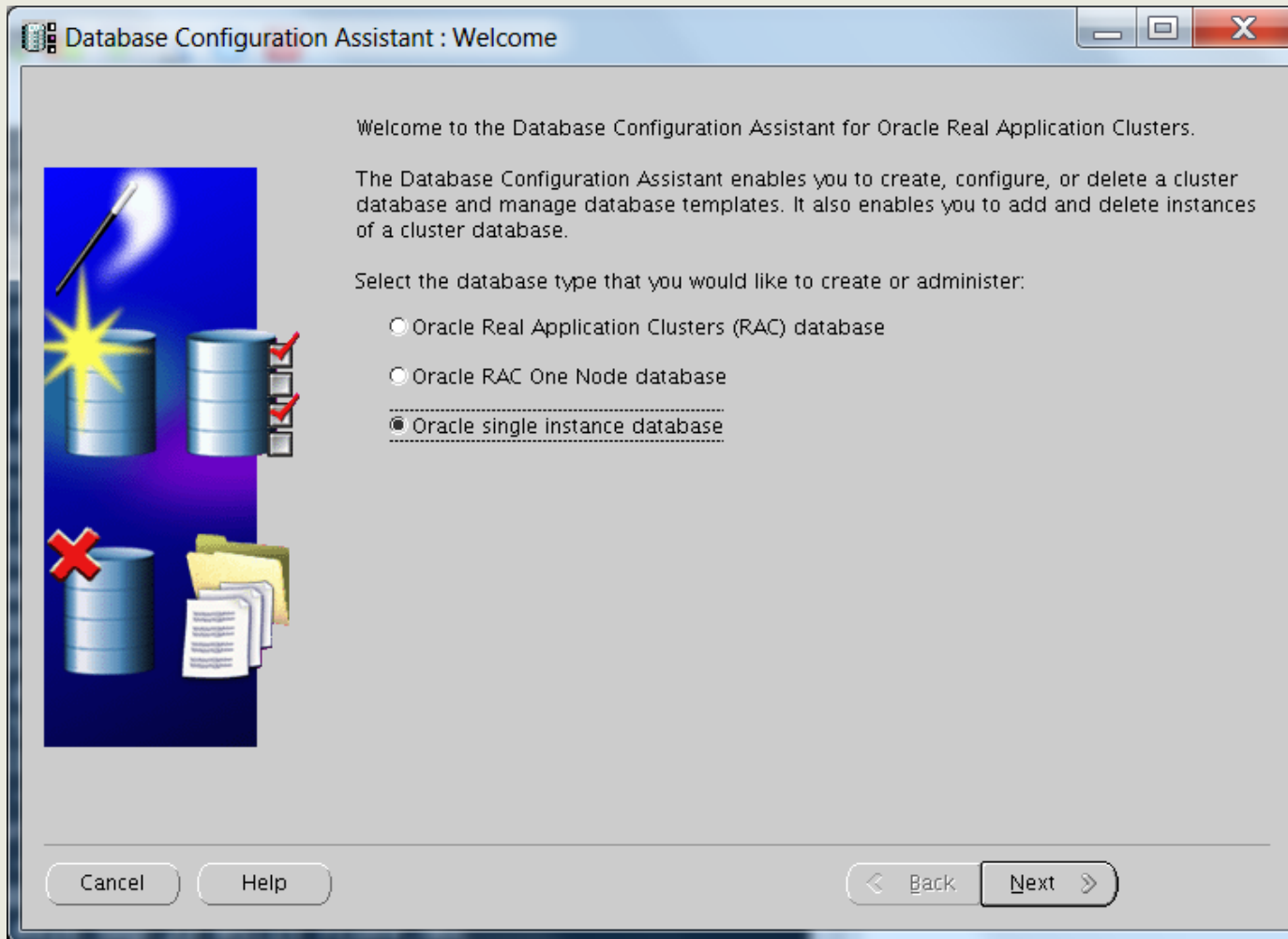
---

109

- ◆ Prerequisites:
  - Single node database rconv is created on server rac11gtst1
  - rconv database is up and running
  - dbca template rconv for single instance database rconv is created
- ◆ Perform the following actions
  - Connect to server rac11gtst1 as user oracle
  - Run commands
    - \$ . rconv.env
    - \$ dbca
  - Delete single instance database rconv with dbca
  - Create RAC database rconv with dbca template rconv

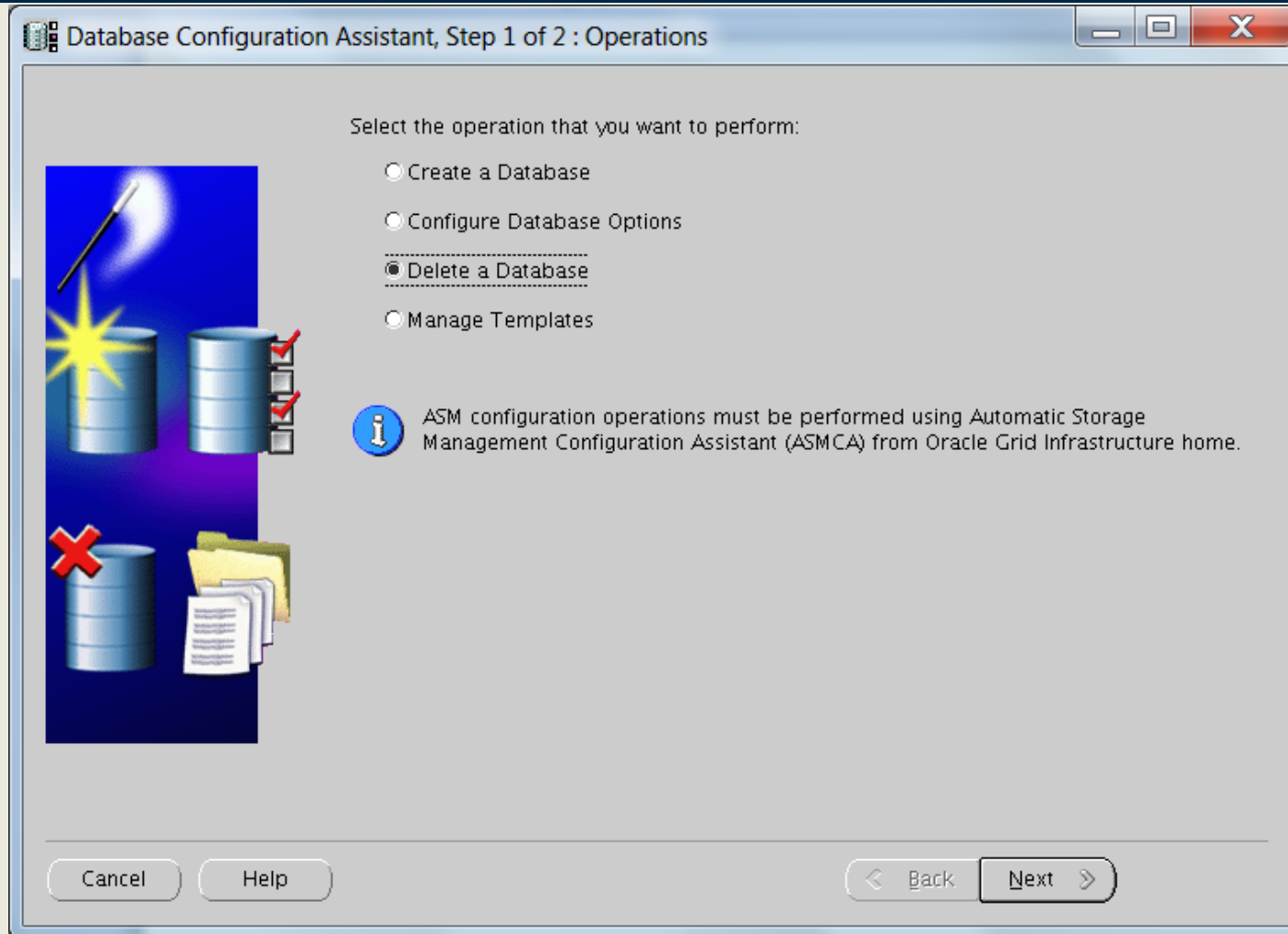
# Exercise: Create RAC database with dbca template for single instance database rconv

110

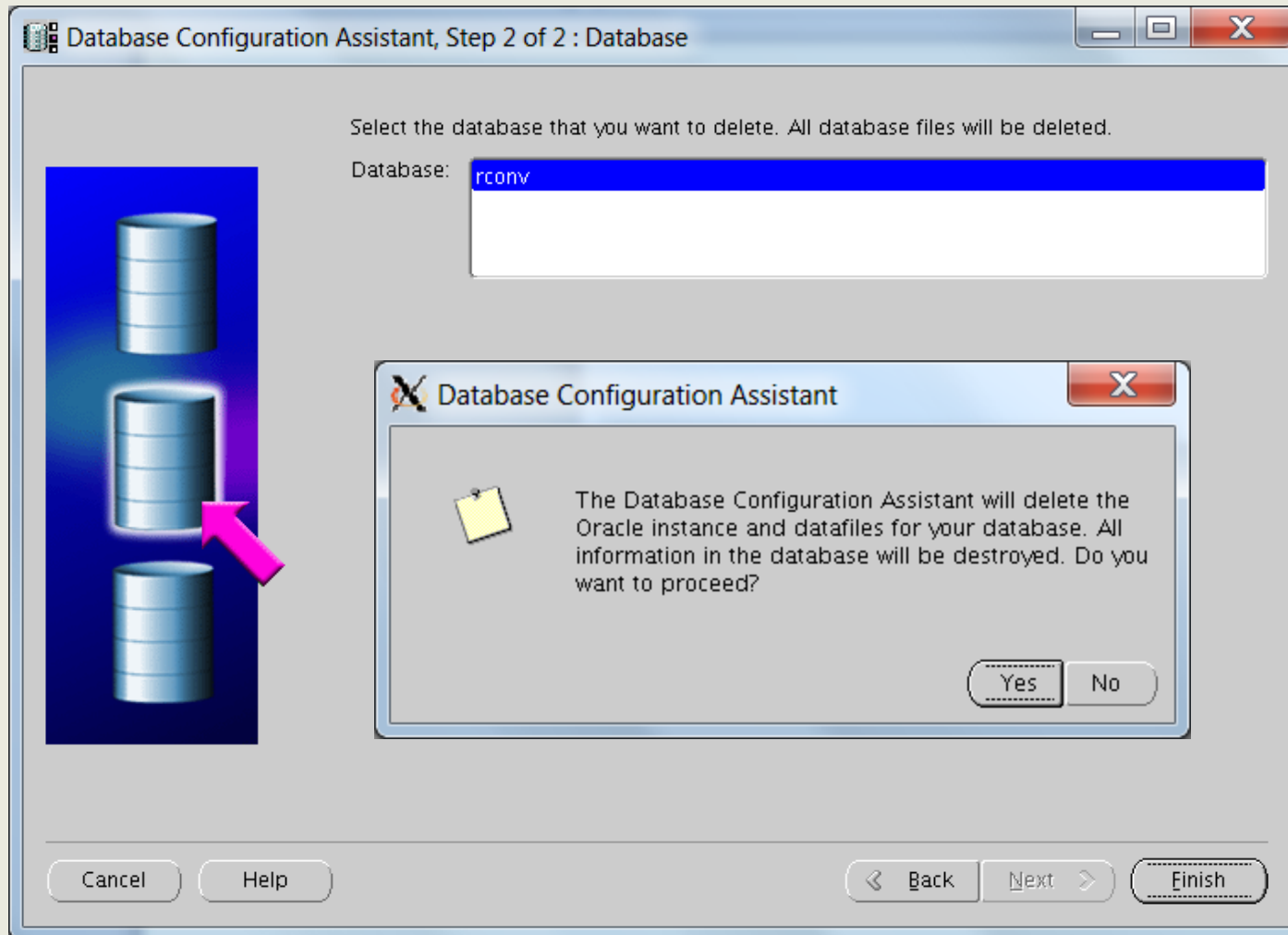


# Exercise: Create RAC database with dbca template for single instance database rconv

111



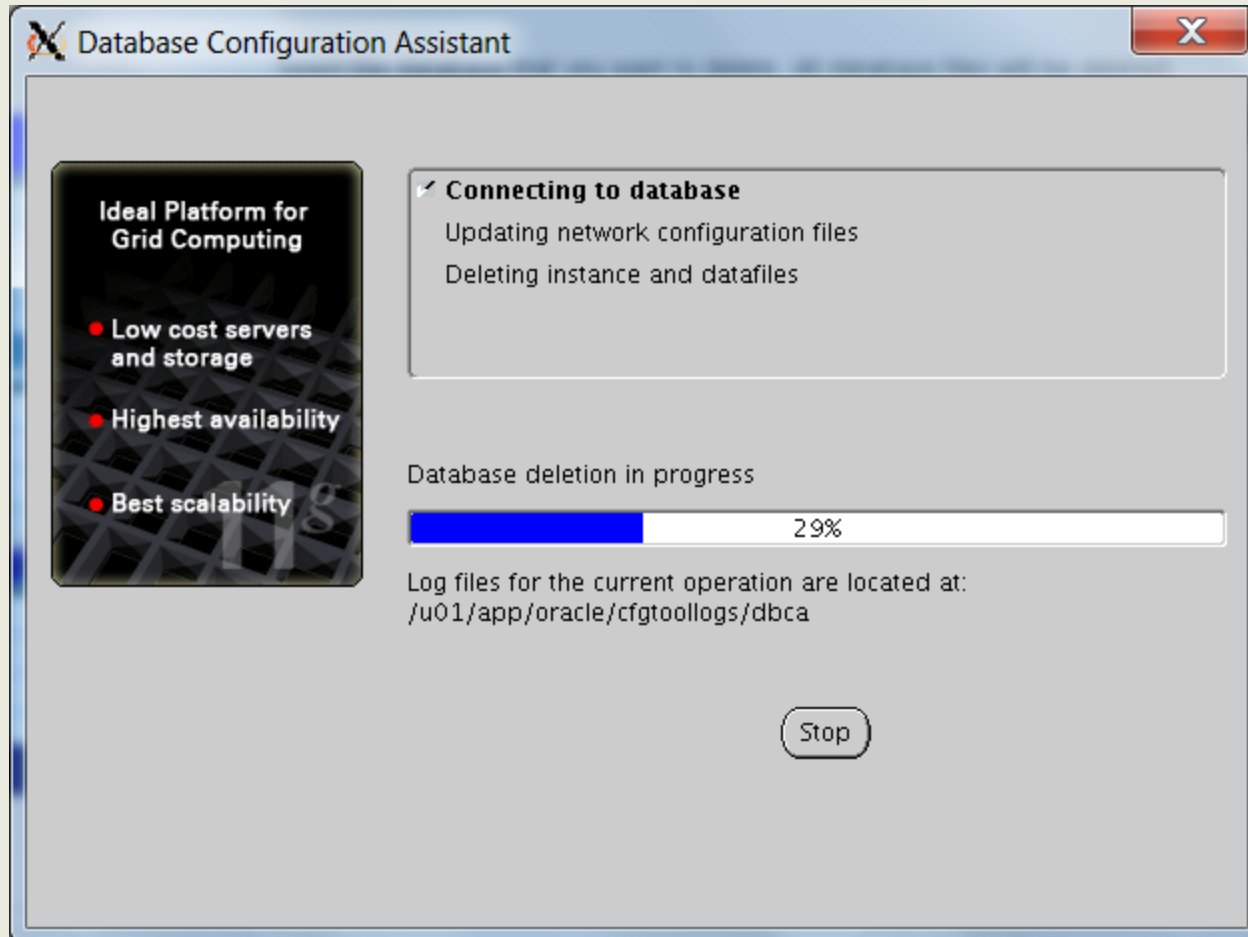
# Exercise: Create RAC database with dbca template for single instance database rconv



# Exercise:

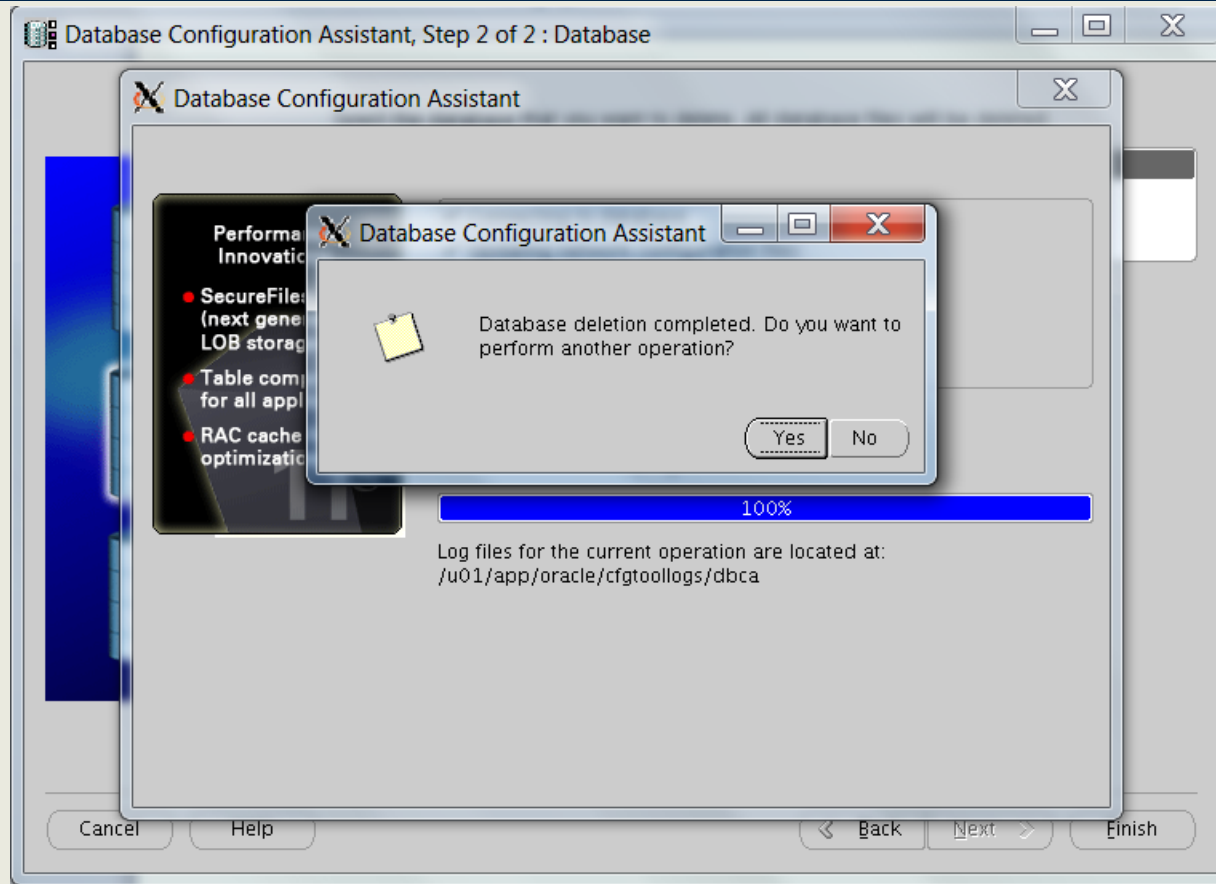
## Create RAC database with dbca template for single instance database rconv

113



# Exercise: Create RAC database with dbca template for single instance database rconv

114



Click No to continue

## Exercise:

# Create RAC database with dbca template for single instance database rconv

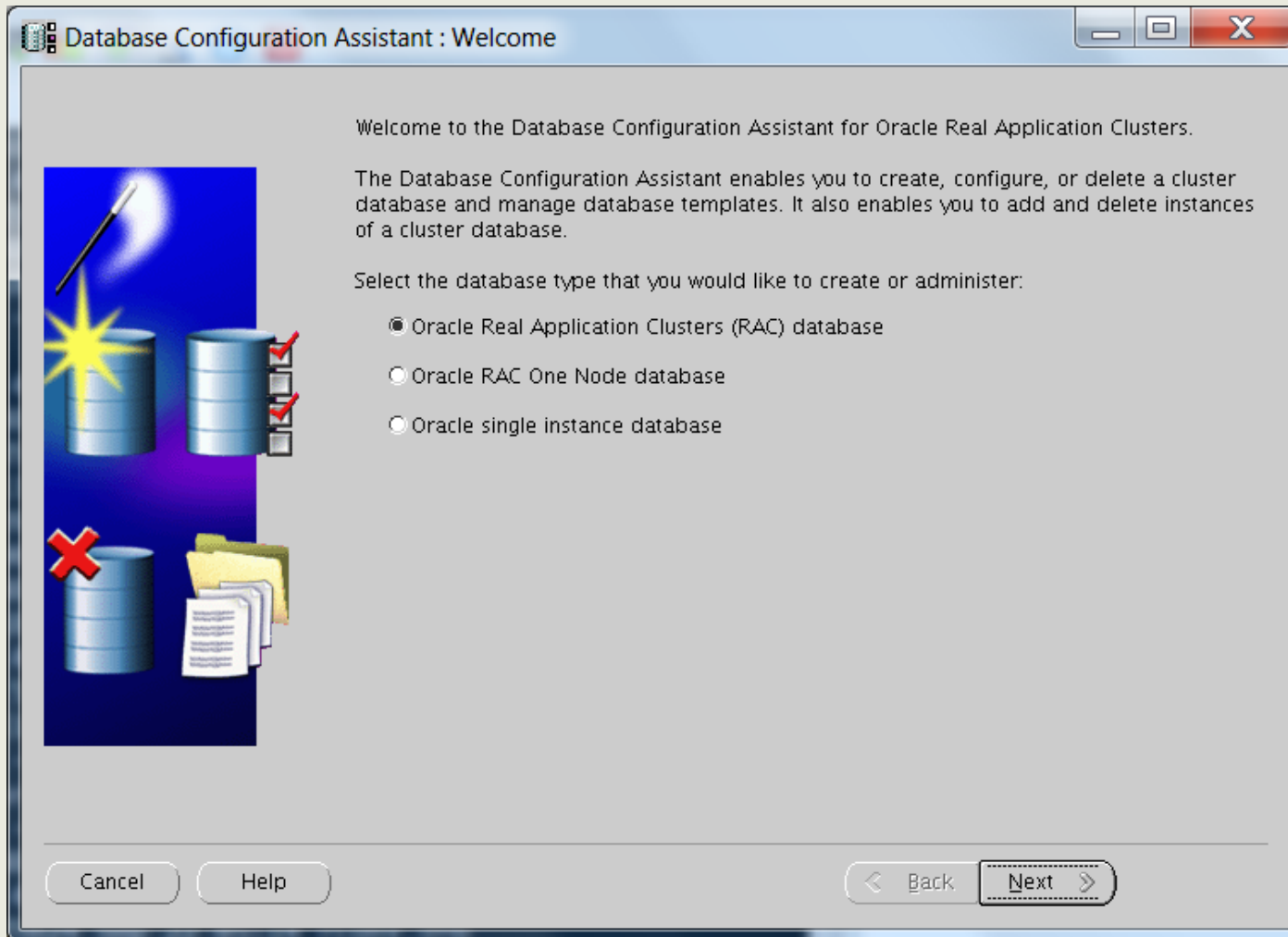
---

115

- ◆ Run dbca again and create RAC database rconv with dbca template rconv:  
\$ dbca

# Exercise: Create RAC database with dbca template for single instance database rconv

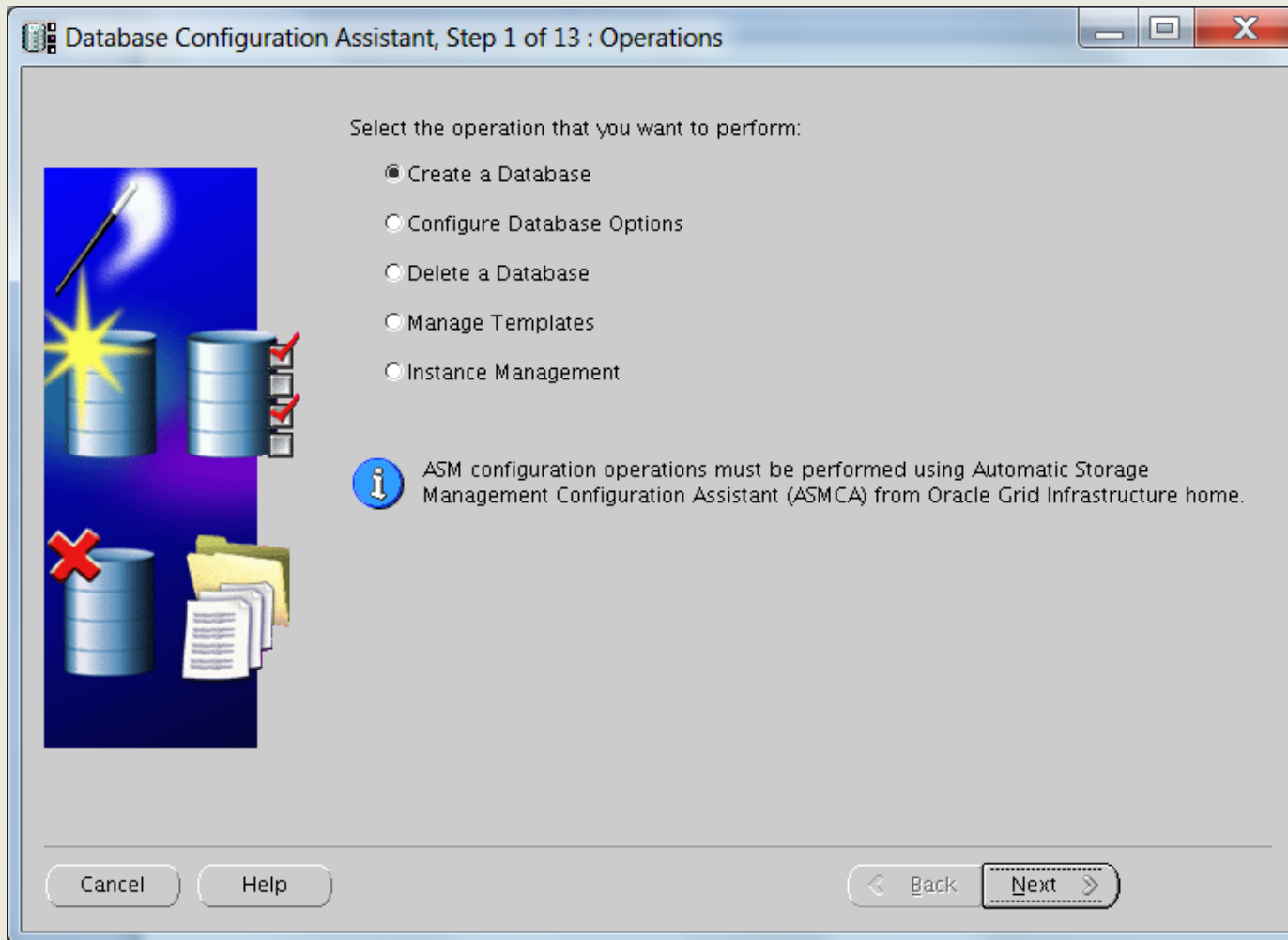
116





# Exercise: Create RAC database with dbca template for single instance database rconv


117



# Exercise: Create RAC database with dbca template for single instance database rconv

Database Configuration Assistant, Step 2 of 14 : Database Templates

Templates that include datafiles contain pre-created databases. They allow you to create a new database in minutes, as opposed to an hour or more. Use templates without datafiles only when necessary, such as when you need to change attributes like block size, which cannot be altered after database creation.

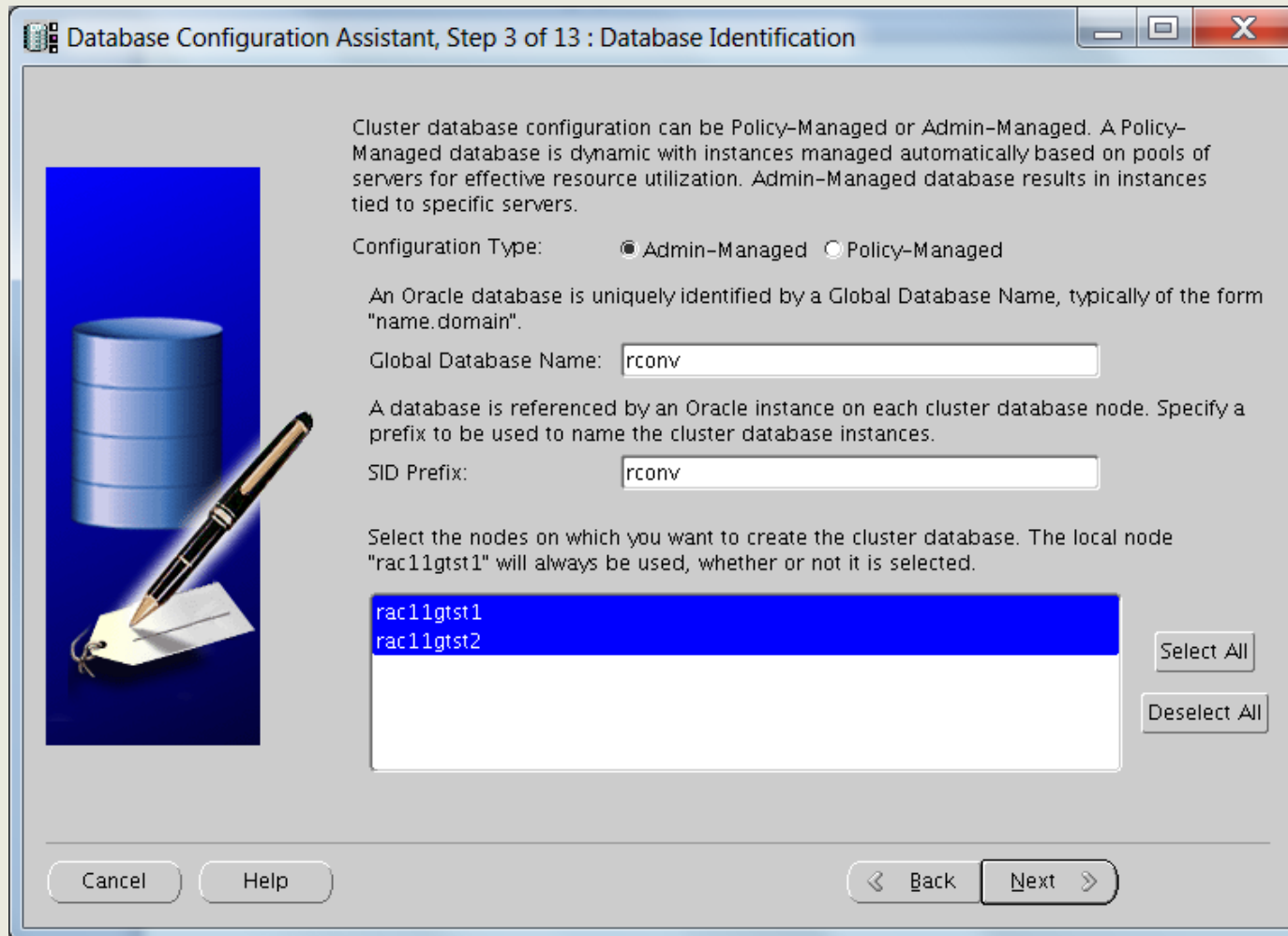


Select	Template	Includes Datafiles
<input type="radio"/>	General Purpose or Transaction Processing	Yes
<input type="radio"/>	Custom Database	No
<input type="radio"/>	Data Warehouse	Yes
<input type="radio"/>	ractst	No
<input checked="" type="radio"/>	rconv	Yes

Show Details...

Cancel Help < Back Next >

# Exercise: Create RAC database with dbca template for single instance database rconv



Database Configuration Assistant, Step 3 of 13 : Database Identification

Cluster database configuration can be Policy-Managed or Admin-Managed. A Policy-Managed database is dynamic with instances managed automatically based on pools of servers for effective resource utilization. Admin-Managed database results in instances tied to specific servers.

Configuration Type:  Admin-Managed  Policy-Managed

An Oracle database is uniquely identified by a Global Database Name, typically of the form "name.domain".

Global Database Name:

A database is referenced by an Oracle instance on each cluster database node. Specify a prefix to be used to name the cluster database instances.

SID Prefix:

Select the nodes on which you want to create the cluster database. The local node "rac11gtst1" will always be used, whether or not it is selected.

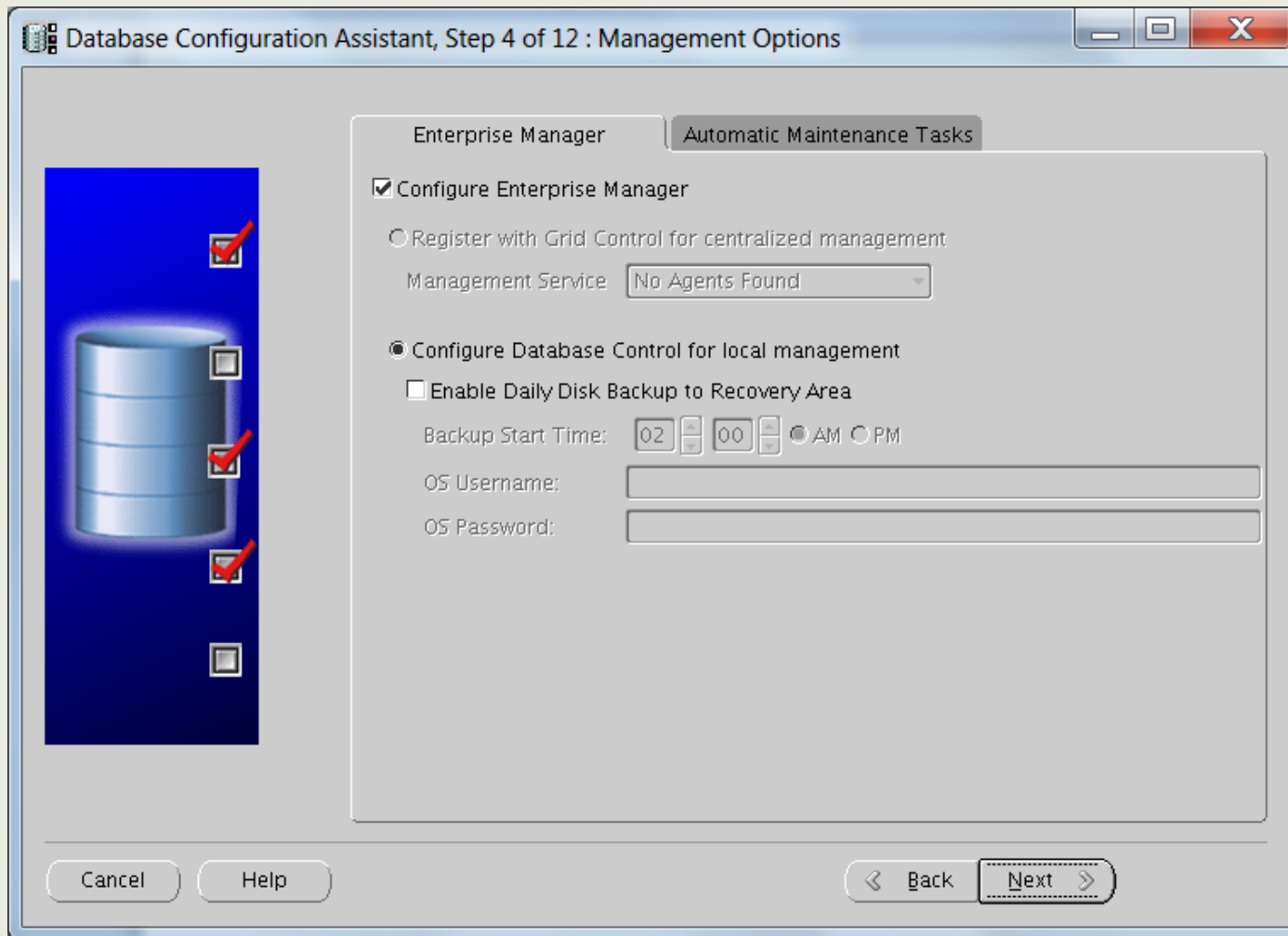
- rac11gtst1
- rac11gtst2

Select All  
Deselect All

Cancel Help Back Next

# Exercise: Create RAC database with dbca template for single instance database rconv

120



# Exercise: Create RAC database with dbca template for single instance database rconv

The screenshot shows the Database Configuration Assistant (DBCA) window at Step 5 of 12: Database Credentials. The main window has a blue sidebar with a database icon and a pen writing on a tag. The main area contains the following text:

For security reasons, you must specify passwords for the following user accounts in the new database.

Use Different Administrative Passwords

User Name	Password
SYS	
SYSTEM	
DBSNMP	
SYSMAN	

Use the Same Administrative Password

Password:

Confirm Password:

At the bottom of the main window are buttons for Cancel, Help, Back, and Next.

An error dialog box is overlaid on top of the main window. It has a yellow warning triangle icon and the following text:

**Database Configuration Assistant**

Password entered does not satisfy Oracle recommended password complexity policy. A password should have minimum of 8 characters in length. In addition, the password must contain at least one upper case character, one lower case character and one digit.

Do you want to continue?

Buttons: Yes, No

Password for all users is ractst1

# Exercise: Create RAC database with dbca template for single instance database rconv

Database Configuration Assistant, Step 6 of 12 : Database File Locations

Specify storage type and locations for database files.

Storage Type:

Storage Locations:

- Use Database File Locations from Template
- Use Common Location for All Database Files
- Use Oracle-Managed Files

Database Files Location:

Database Area:

**i** If you want to specify different locations for any database files, pick any of the above options except Oracle-Managed Files and use the Storage page later to customize each file location. If you use Oracle-Managed Files, Oracle automatically generates the names for database files, which can not be changed on the Storage page.

# Exercise:

## Create RAC database with dbca template for single instance database rconv

123



Password is ractst1

# Exercise: Create RAC database with dbca template for single instance database rconv

The screenshot shows the Database Configuration Assistant (DBCA) window at Step 7 of 12: Recovery Configuration. The main window has a title bar that reads "Database Configuration Assistant, Step 7 of 12 : Recovery Configuration".

On the left side, there is a graphic showing a blue database cylinder and several white documents with a pink arrow pointing to them.

The main content area contains the following text and controls:

- Choose the recovery options for the database:
- Specify Fast Recovery Area
  - This is used as the default for all disk based backup and recovery operations, and is also required for automatic disk based backup using Enterprise Manager. Oracle recommends that the database files and recovery files be located on physically different disks for data protection and performance.
  - Fast Recovery Area:
  - Fast Recovery Area Size:
- Enable Archiving

At the bottom of the main window, there are buttons for "Cancel", "Help", "Back", and "Next".

Overlaid on the bottom right of the main window is a smaller dialog box titled "Database Configuration Assistant" with a yellow warning icon. The dialog contains the following text:

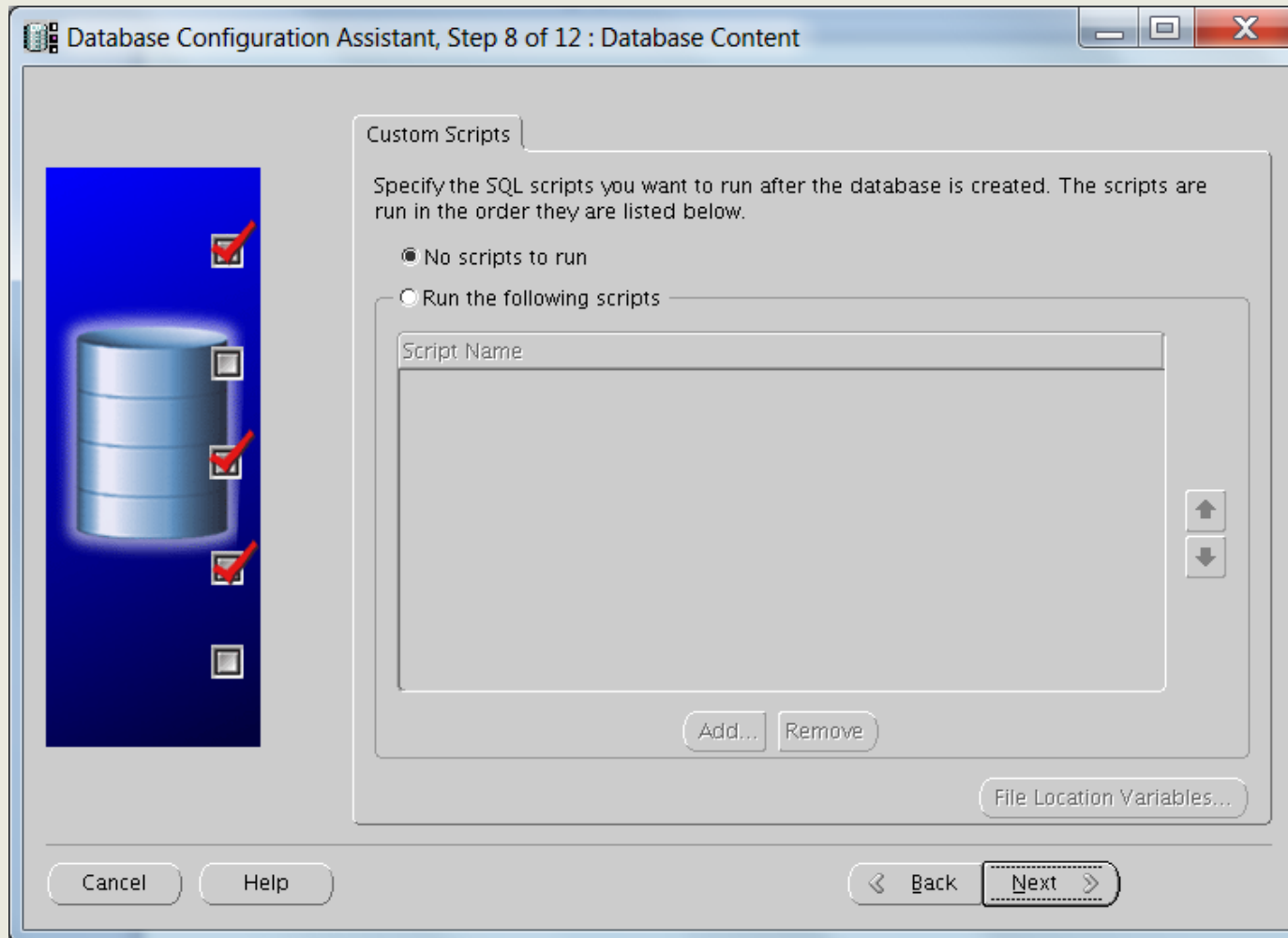
Specified Fast Recovery Area size "2048 M Bytes" is less than the recommended value. Fast Recovery Area size should at least be twice the database size "2419 M Bytes". Do you want to continue?

The dialog has "Yes" and "No" buttons at the bottom right.

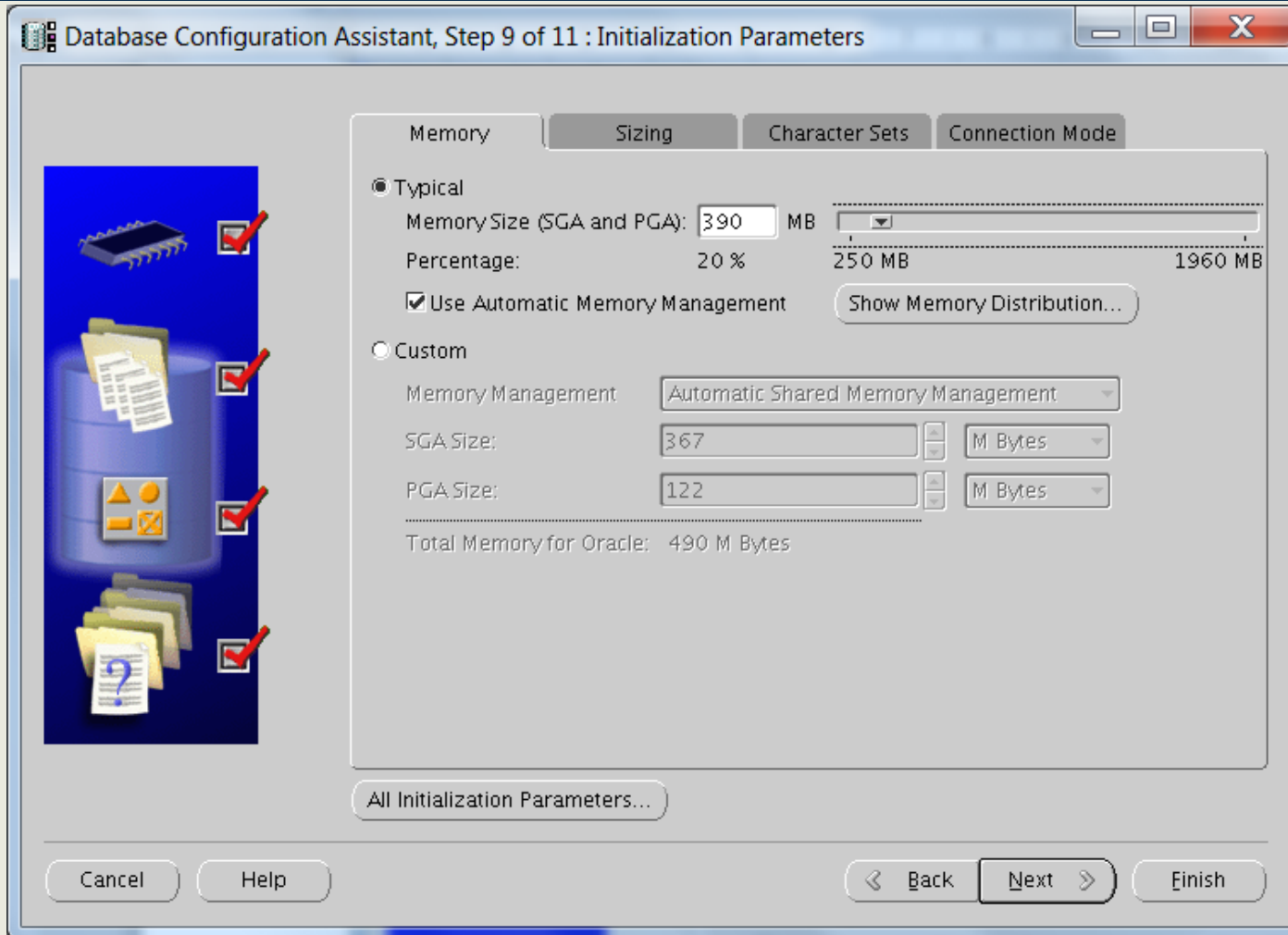


# Exercise: Create RAC database with dbca template for single instance database rconv

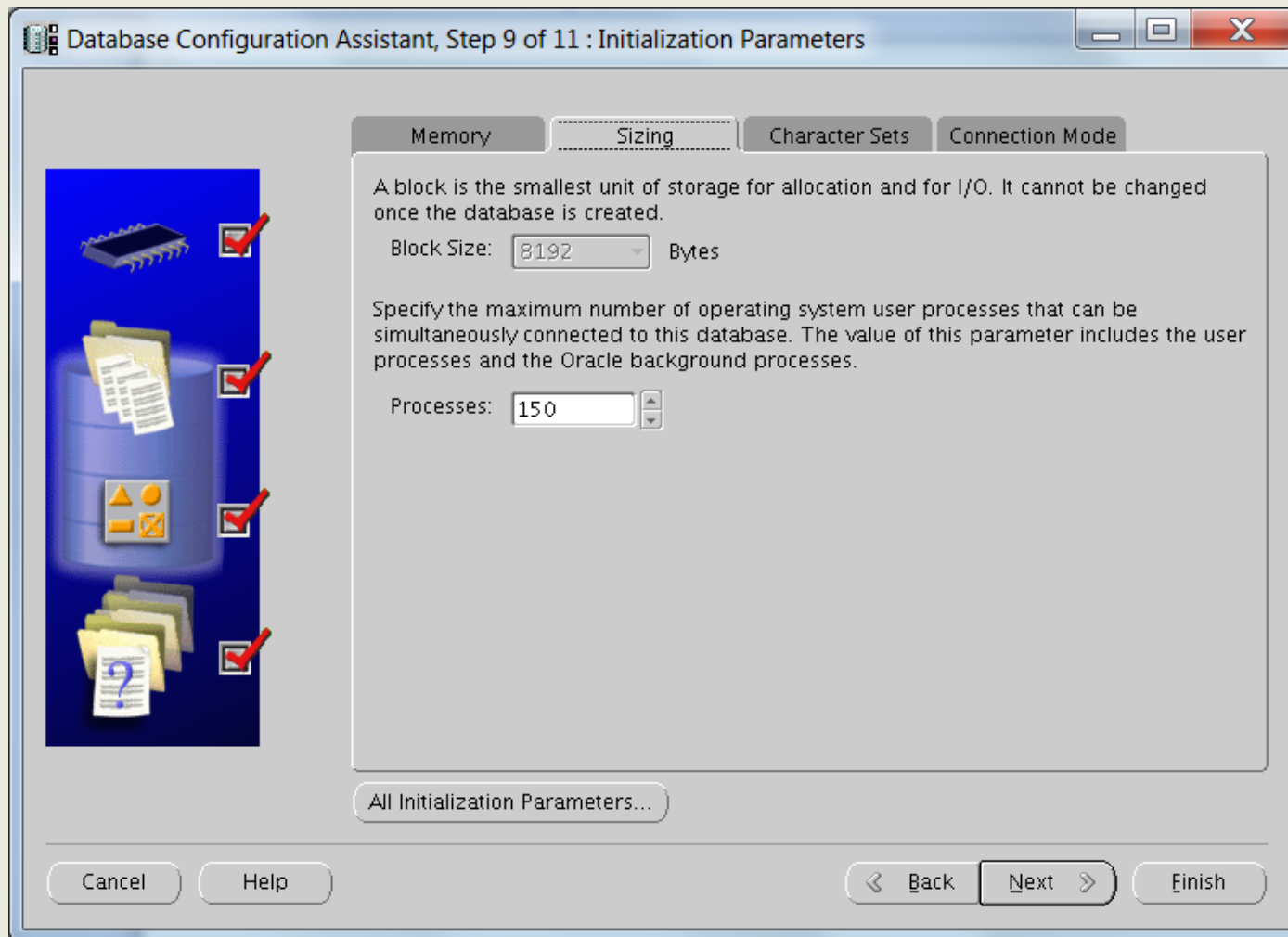
125



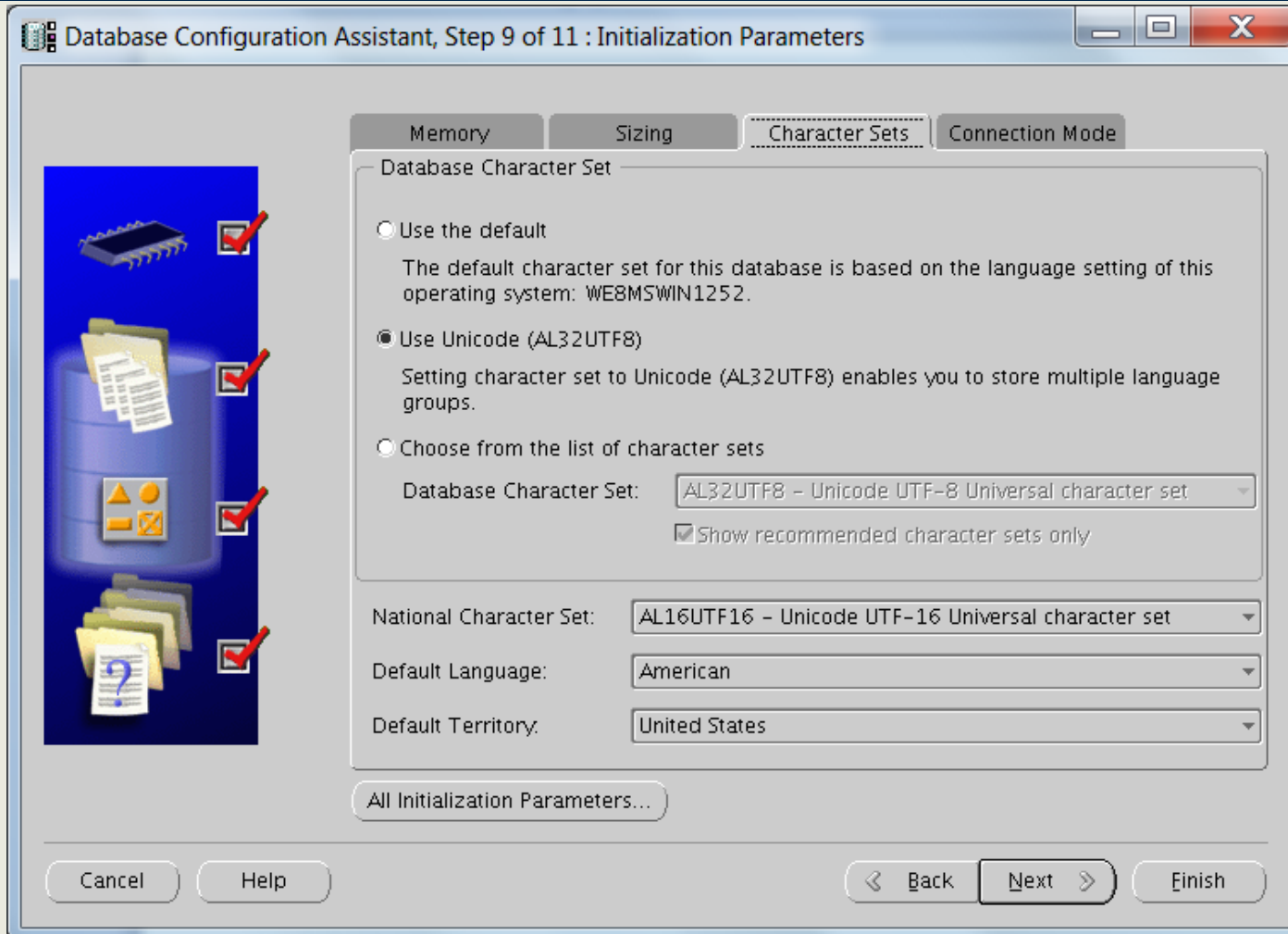
# Exercise: Create RAC database with dbca template for single instance database rconv



# Exercise: Create RAC database with dbca template for single instance database rconv

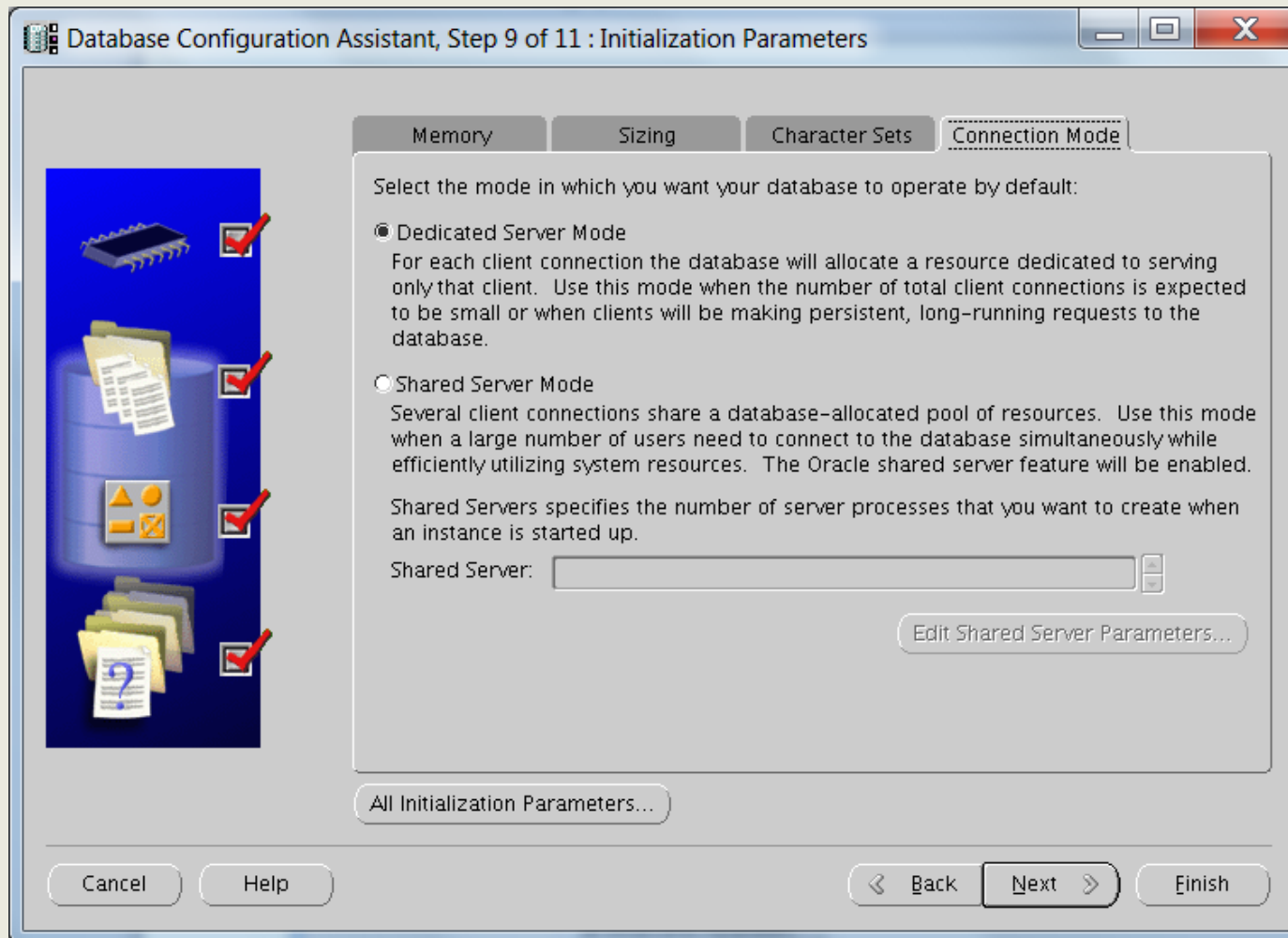


# Exercise: Create RAC database with dbca template for single instance database rconv



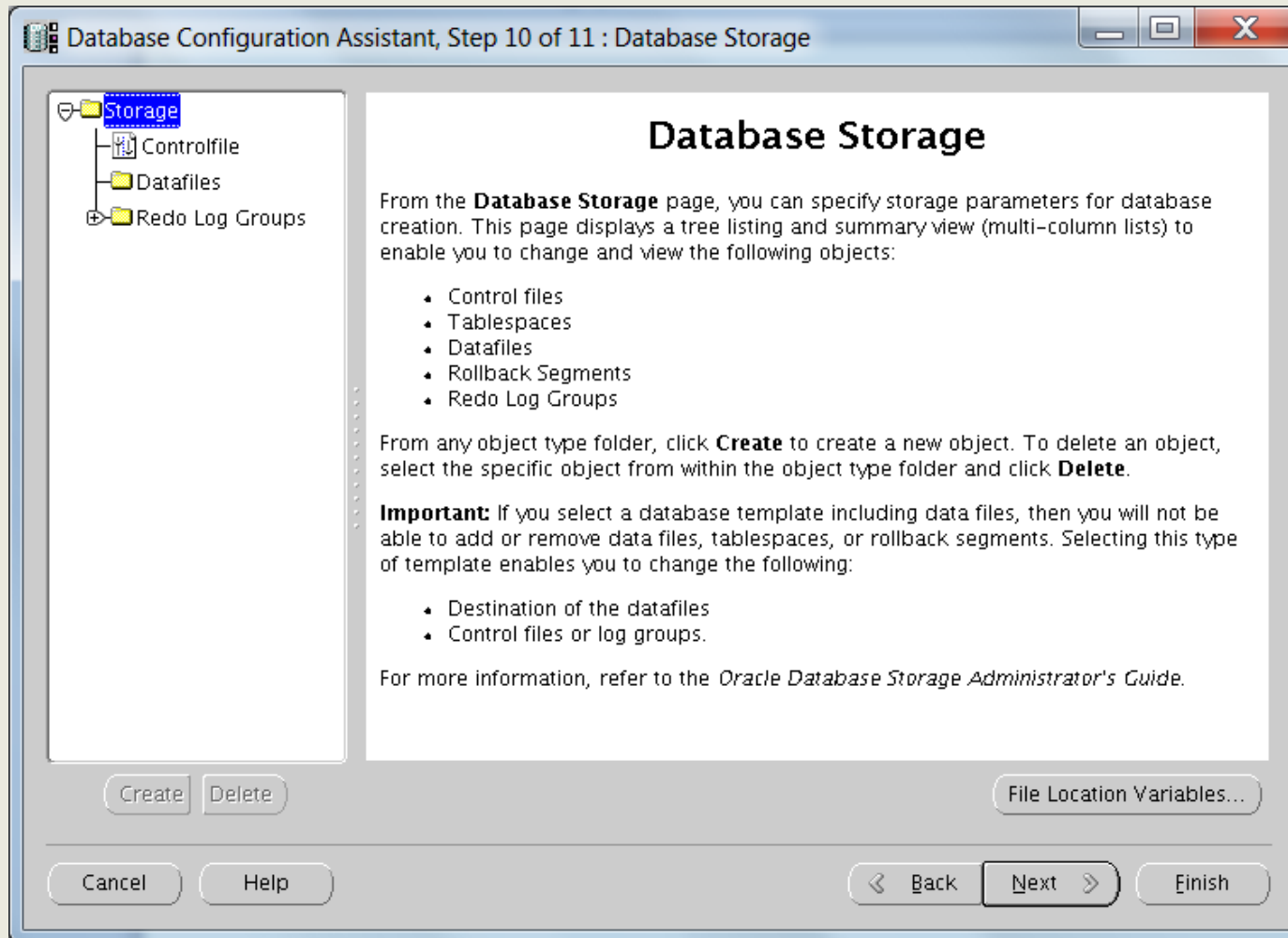
# Exercise: Create RAC database with dbca template for single instance database rconv

129



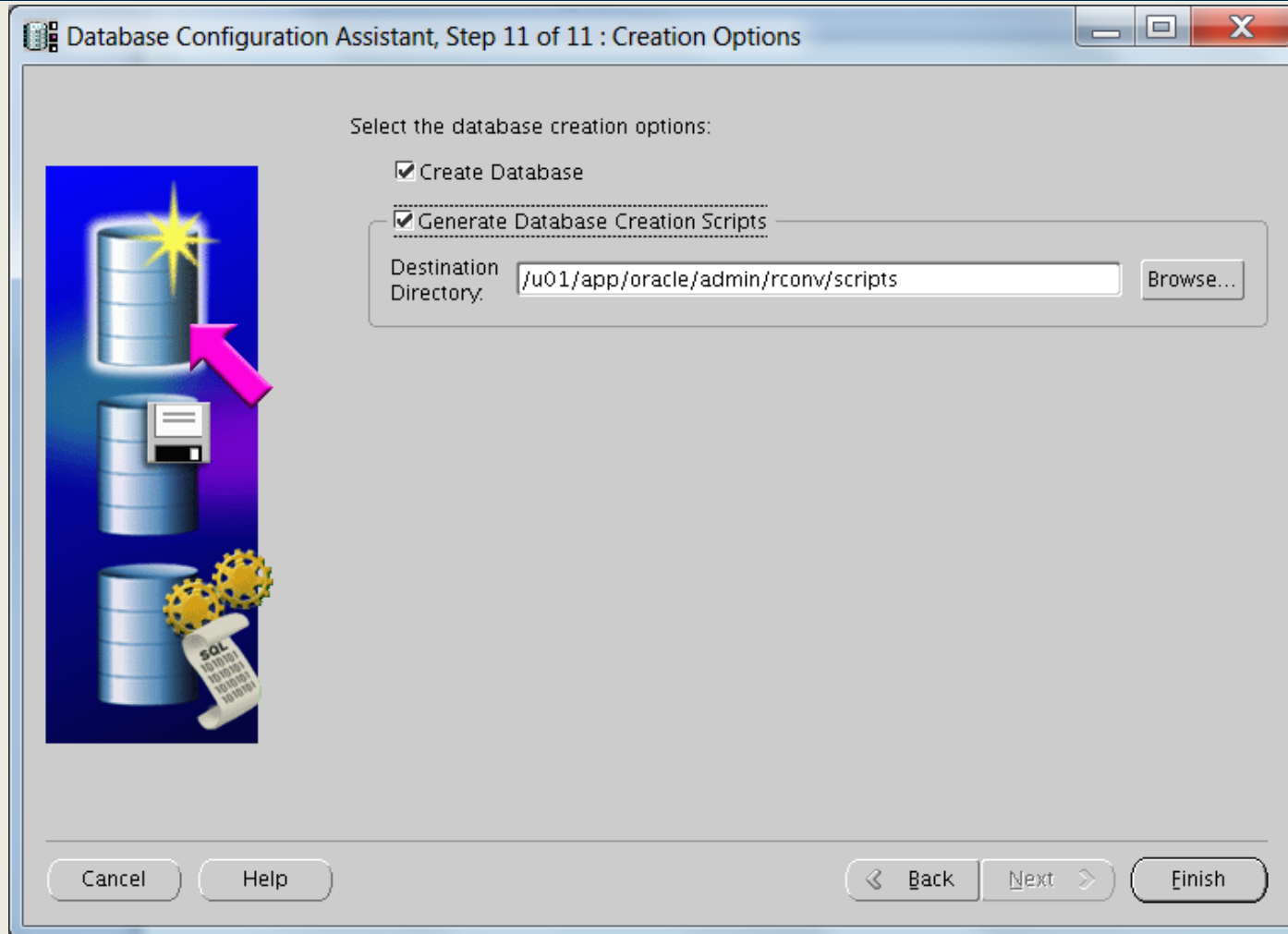
# Exercise: Create RAC database with dbca template for single instance database rconv

130

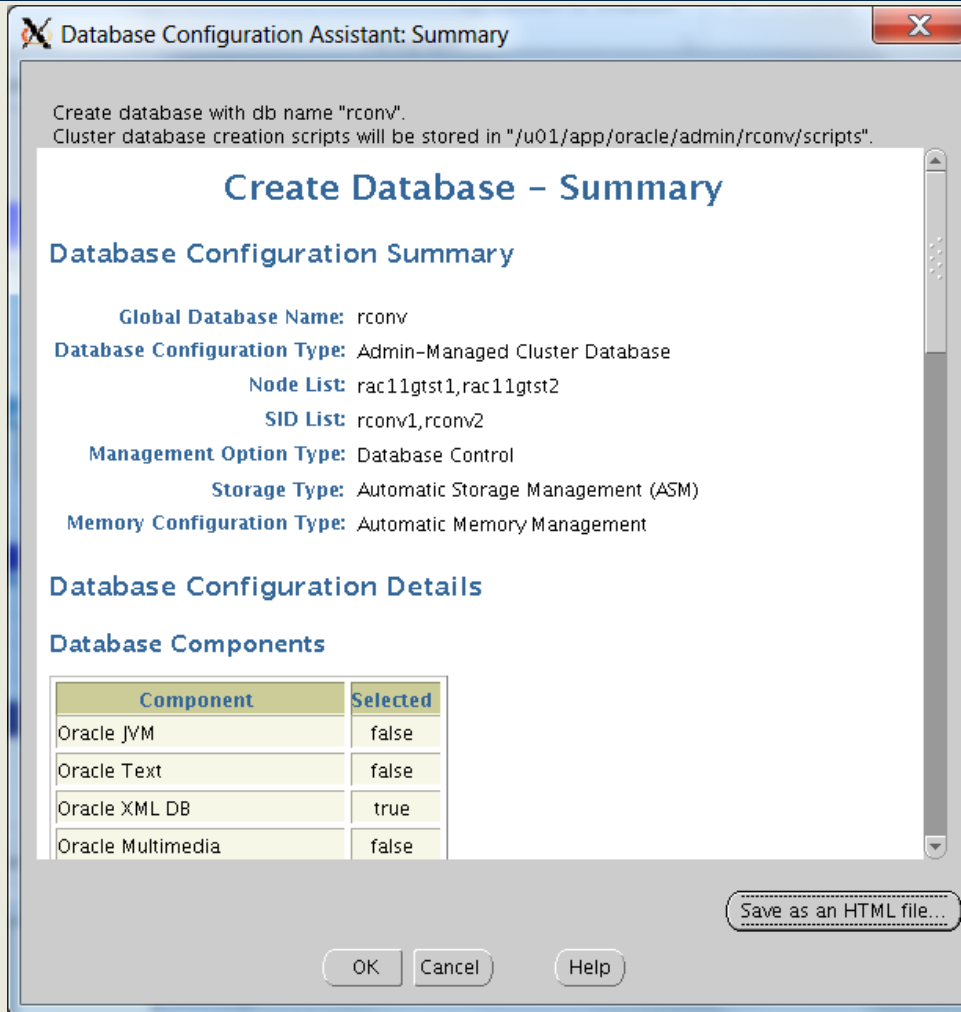


# Exercise: Create RAC database with dbca template for single instance database rconv

131



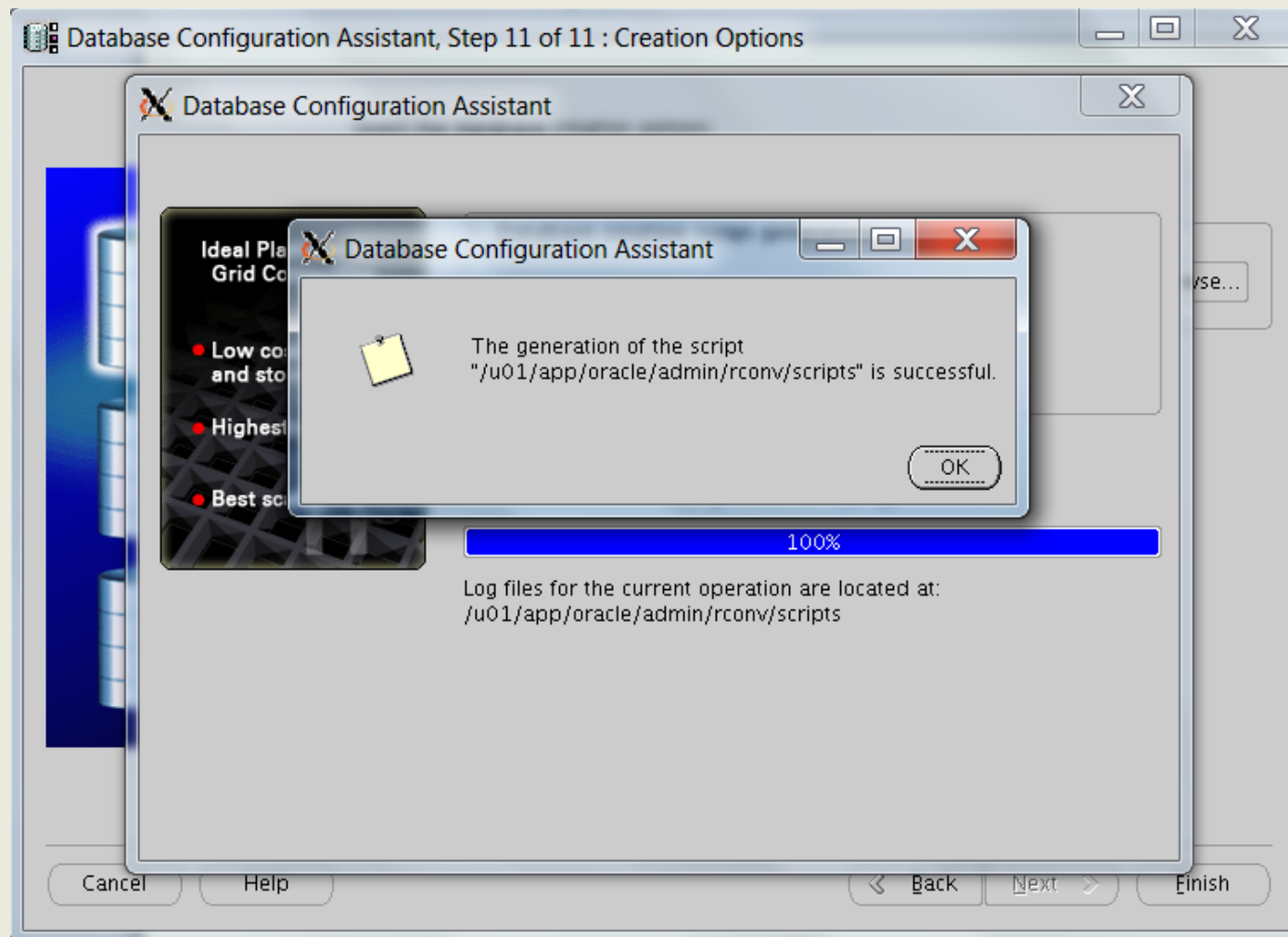
# Exercise: Create RAC database with dbca template for single instance database rconv



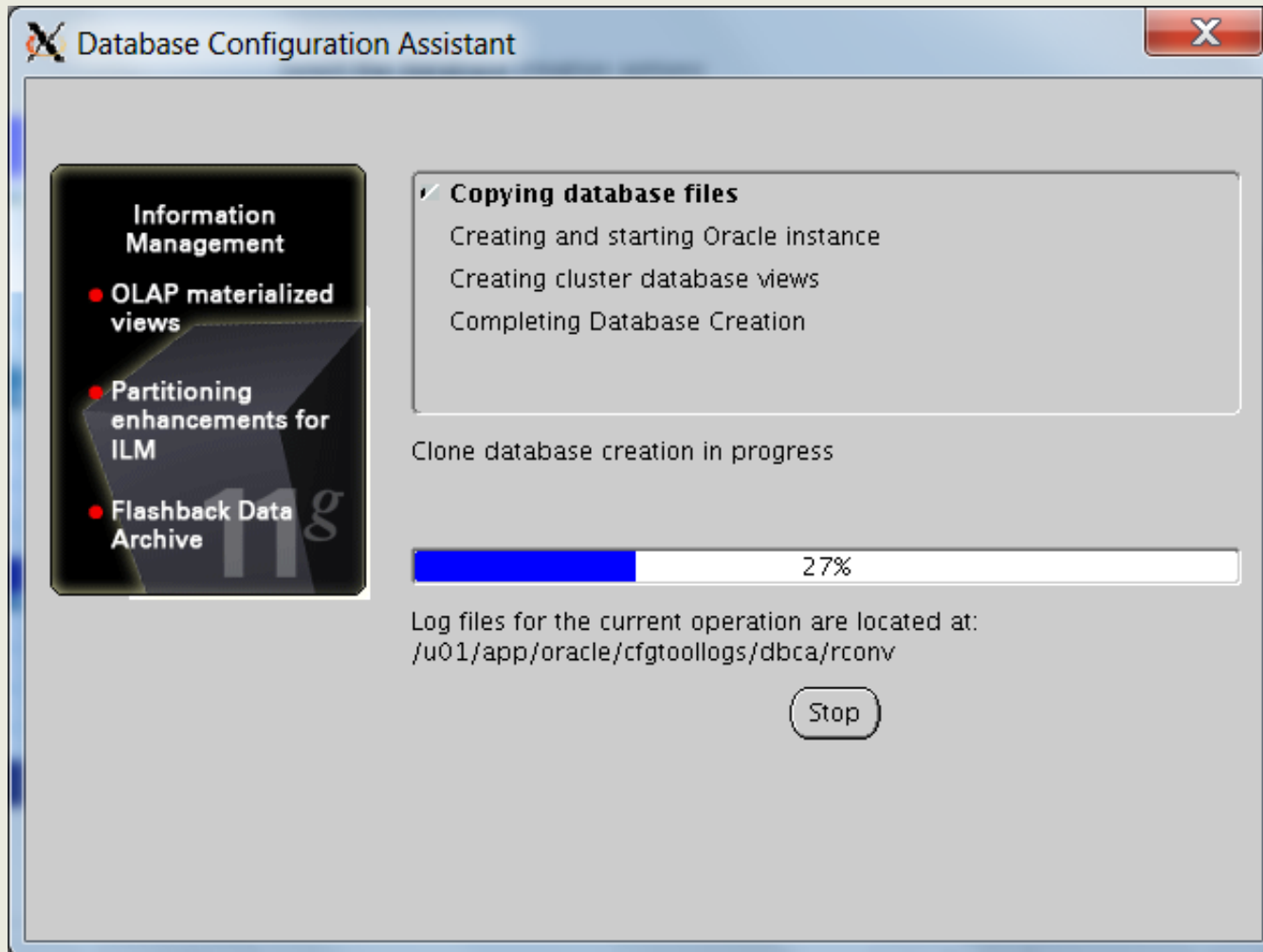


# Exercise: Create RAC database with dbca template for single instance database rconv

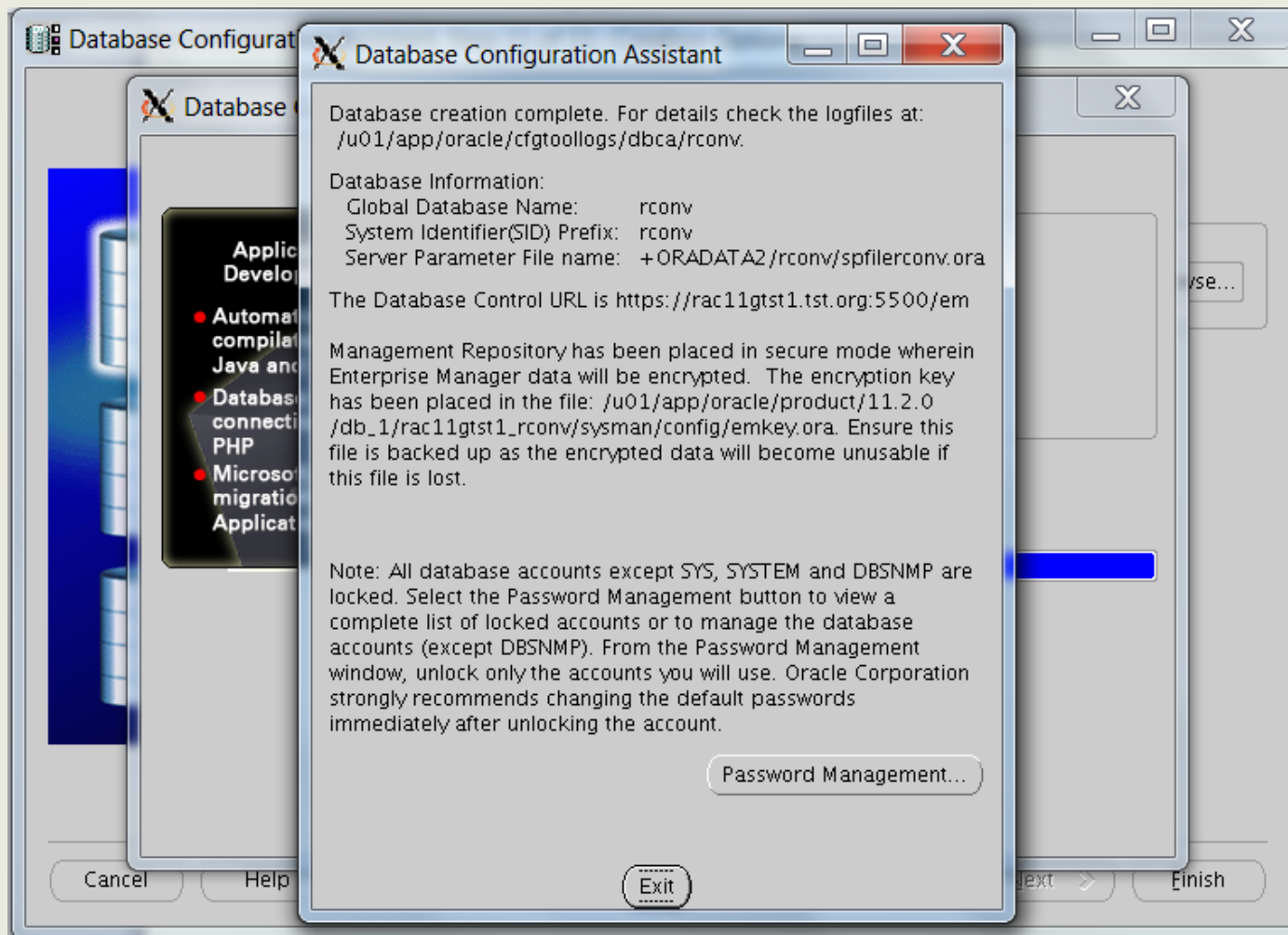
133



# Exercise: Create RAC database with dbca template for single instance database rconv



# Exercise: Create RAC database with dbca template for single instance database rconv



## Exercise:

# Create RAC database with dbca template for single instance database rconv

---

136

- ◆ Check RAC database status and configuration  
\$ srvctl status database -d rconv  
Instance rconv1 is running on node rac11gtst1  
Instance rconv2 is running on node rac11gtst2

# Exercise:

## Create RAC database with dbca template for single instance database rconv

137

```

$ srvctl config database -d rconv
Database unique name: rconv
Database name: rconv
Oracle home: /u01/app/oracle/product/11.2.0/db_1
Oracle user: oracle
Spfile: +ORADATA2/rconv/spfilerconv.ora
Domain:
Start options: open
Stop options: immediate
Database role: PRIMARY
Management policy: AUTOMATIC
Server pools: rconv
Database instances: rconv1,rconv2
Disk Groups: ORADATA2,ORAFLASH
Mount point paths:
Services:
Type: RAC
Database is administrator managed

```

## Exercise:

# Create RAC database with dbca template for single instance database rconv

---

138

- ◆ Check if Enterprise Manager console is running with
  - \$ . Rconv.env
  - \$ emctl status dbconsole
- ◆ Login to Enterprise Manager URL <https://rac11gtst1.tst.org:5500/em> from web browser as user sys
- ◆ Click on Database and then Cluster tab and check that pages are similar to those on the following two slides

# Exercise: Create RAC database with dbca template for single instance database rconv

139

ORACLE Enterprise Manager 11g Database Control

Cluster Database: rconv

Home Performance Availability Server Schema Data Movement Software and Support Topology

Latest Data Collected From Target 22-Sep-2011 06:33:19 o'clock CEST Refresh View Data Automatically (80 sec)

General

Status Up  
Instances 2 (↑ 2)  
Availability (%) 100 (Last 24 hours)  
Database Name rconv  
Version 11.2.0.2.0  
Cluster rac11gts1

Host CPU

Load 0.81

Active Sessions

Maximum CPU 4

Diagnostic Summary

Interconnect Alerts 0  
ADDM Findings No ADDM run available  
Active Incidents 0  
Key SQL Profiles 0

Space Summary

Database Size (GB) 2.183  
Problem Tablespace 0  
Segment Advisor Recommendations 0  
Policy Violations 0

High Availability

Console Details  
Last Backup n/a  
Usable Fast Recovery Area (%) 83.16  
Flashback Database Logging Disabled

Alerts

Severity	Target Name	Target Type	Category	Name	Impact	Message	Alert Triggered
Warning	roonv_roonv1	Database Instance	Waits by Wait Class	Database Time Spent Waiting (%)		Metrics "Database Time Spent Waiting (%)" is at 31.09157 for event class "Concurrency"	22-Sep-2011 08:29:37
Warning	roonv_roonv2	Database Instance	User Audit	Audited User		User SYS logged on from rac11gts2.tst.org	22-Sep-2011 08:23:31
Warning	roonv_roonv1	Database Instance	User Audit	Audited User		User SYS logged on from rac11gts1.tst.org	22-Sep-2011 08:18:58

Policy Violations

All Critical Rules Violated 7 Critical Security Patches 0 Compliance Score (%) 99

Security

Last Security Evaluation 22-Sep-2011 06:24:52 CEST Compliance Score (%) 99 Enterprise Security At a Glance

Job Activity

Status	Submitted to the Cluster Database	Submitted to any member
Scheduled	0	0
Running	0	0
Suspended	0	0
Problem	0	0

Critical Patch Advisories for Oracle Homes

Patch Advisories 0  
Affected Oracle Homes 0  
Oracle MetaLink Credentials Not Configured

Instances

Name	Status	Host Name	Alerts	Policy Violations	Compliance Score (%)	ASM Instance	ADDM Findings
roonv_roonv1	⊕	rac11gts1.tst.org	0 2	0 25 0	99	+ASM1_rac11gts1.tst.org ⊕ 0 0	n/a
roonv_roonv2	⊕	rac11gts2.tst.org	0 1	1 25 1	98	+ASM2_rac11gts2.tst.org ⊕ 0 0	n/a

Related Links

Access Add Exadata Cell Targets Advisor Central  
Alert History All Metrics Blackouts

# Exercise: Create RAC database with dbca template for single instance database rconv

ORACLE Enterprise Manager 11g Database Control

Cluster: rac11gr2st

Home | Performance | Targets | Administration | Interconnects | Topology

Latest Data Collected From Target 22-Sep-2011 06:33:31 o'clock CEST

View Data Automatically (60 sec)

### General

Status: Up  
 Hosts: 2 (↑ 2)  
 Availability (%): 100.0 (Last 24 hours)  
 Cluster Name: rac11gr2st  
 Clusterware Status: Up (↑ 2)  
 Clusterware Version: 11.2.0.2.0  
 Oracle Home: /u01/11.2.0/grid  
[View All Properties](#)

Shutdown | Black Out

### Configuration

View: Operating Systems

Operating Systems	Hosts/OS Patches
Red Hat Enterprise Linux Server release 5.5 (Tikanga) 2.0.18 i54.el5	2 Not available

### Diagnostic Summary

Interconnect Alerts: 0

### Cluster Databases

View Cluster Databases only

Name	Status	Alerts	Policy Violations	Compliance Score (%)	Version
rconv	Up	0	1	50	97 11.2.0.2.0

### Alerts

Category: All | Critical: 2 | Warnings: 0

Severity	Target Name	Target Type	Category	Name	Impact	Message	Alert Triggered
Critical	rac11gr2st	Cluster	Resource State	State Change		ora_rac1st.db has instances in OFFLINE State	22-Sep-2011 06:17:31
Critical	rac11gr2st	Cluster	Resource State	State Change		ora_oad has instances in OFFLINE State	22-Sep-2011 06:17:31

### Security

Last Security Evaluation: 22-Sep-2011 06:24:42 CEST | Compliance Score (%): 75 | Enterprise Security At a Glance

### Job Activity

Create Job | OS Command | Go

Job executions scheduled to start no more than 7 days ago

Status	Submitted to the Cluster	Submitted to any member
Scheduled	0	0
Running	0	0
Suspended	0	0
Problem	0	0

### Critical Patch Advisories for Oracle Homes

Current: 0

Affected Oracle Homes: 0

Oracle MetaLink Credentials: Not Configured

Warning: Patch Advisory information may be stale. Oracle MetaLink credentials are not configured.

Home | Performance | Targets | Administration | Interconnects | Topology

### Hosts

Name	Status	Clusterware Status	Alerts	Policy Violations	Compliance Score (%)	ASM Instance	CPU Util %	Mem Util %	Total IO/sec
rac11gst1.tst.org	Up	Up	0	0	82	+ASM1_rac11gst1.tst.org	10.53	57.81	175.3
rac11gst2.tst.org	Up	Up	0	0	82	+ASM2_rac11gst2.tst.org	8.32	72.13	135.58

### Related Links

Access | Blackouts | Metric Collection Errors | Alert History | Deployments | Monitoring Configuration | All Metrics | Metric and Policy Settings | Target Properties

Cluster | Database | Setup | Preferences | Help | Logout

https://rac11gst1.tst.org:5500/em/console/cluster/home?tabType=cluster



# Administering Clusterware

141

- ◆ Oracle Clusterware is a software-based cluster manager that allows a group of physically separate servers to be combined into one logical server.
- ◆ The physical servers are connected together by a dedicated private network and are attached to shared storage.
- ◆ Oracle Clusterware consists of a set of additional processes and daemons that run on each node in the cluster and that utilize the private network and shared storage to coordinate activity between the servers

# Administering Clusterware

142

- ◆ The goal of Clusterware is to manage local and cluster resources.
- ◆ Oracle 11.2 has many different types of
- ◆ resources, including the following:
  - Networks
  - VIP addresses
  - Local listeners
  - SCAN listeners
  - ASM instances
  - Databases
  - Database instances
  - Services
  - User-defined resources

# Administering Clusterware

---

143

- ◆ Oracle Clusterware is responsible for determining the nodes on which resources should run.
- ◆ It can start, stop, and monitor resources; and it can optionally relocate resources to other nodes.
- ◆ Clusterware can also restart any processes that fail on their current node.
- ◆ Oracle Clusterware protects against hardware and software failures by providing failover capabilities.

# Administering Clusterware

144

- ◆ In the event that a node or resource fails, Clusterware can be configured to relocate resources to other nodes in the cluster.
- ◆ Some resources that are tied to a specific node (an ASM instance, for example) cannot be relocated
- ◆ Clusterware can be used to reduce or eliminate planned downtime for hardware and software maintenance
- ◆ Oracle Clusterware can increase overall throughput by enabling the application to run on multiple nodes concurrently

# Administering Clusterware

145

- ◆ Oracle Clusterware is also responsible for monitoring which nodes are currently members of the cluster.
- ◆ When a node joins or leaves the cluster this event will be detected by Oracle Clusterware and reported to all other nodes in the cluster.
- ◆ Clusterware allows the number of nodes in a cluster to be increased or decreased dynamically, thereby providing application scalability

# Storing Cluster Information with the Oracle Cluster Registry

- ◆ The Oracle Cluster Registry (OCR) is used to store cluster configuration information.
- ◆ The OCR contains information about the resources controlled by Oracle Clusterware, including the following:
  - ASM disk groups, volumes, file systems, and instances
  - RAC databases and instances
  - SCAN listeners and local listeners
  - SCAN VIPs and local VIPs
  - Nodes and node applications
  - User-defined resources
  - Its own backups

# Storing Cluster Information with the Oracle Cluster Registry

147

- ◆ Logically, the OCR represents a tree structure; physically, each element of data is stored in a separate 4096 byte physical block
- ◆ In Oracle 11gR2 and later, it is possible to configure up to five mirrored copies of the OCR.
- ◆ If there is more than one OCR mirror, then it is possible to replace a failed OCR mirror without an outage.
- ◆ In 11gR2, the OCR can be stored in an ASM disk group or a cluster file system

# Storing Cluster Information with the Oracle Cluster Registry

148

- ◆ The OCR should only be updated by Oracle Clusterware processes, Enterprise Manager, supported utilities such as crsctl, srvctl, ocrconfig; and configuration tools such as the OUI, dbca, and netca



# Storing Information in the Oracle Local Registry

- ◆ The Oracle Local Registry is the OCR's local counterpart and a new feature introduced with Grid Infrastructure.
- ◆ The information stored in the OLR is needed by the *Oracle High Availability Services daemon* (OHASD) to start; this includes data about GPnP wallets, Clusterware configuration, and version information.
- ◆ The OLR is maintained by the same command-line utilities as the OCR, with the appended `-local` option.
- ◆ Interestingly, the OLR is automatically backed up during an upgrade to Grid Infrastructure, whereas the OCR is not.

# Fencing with the Voting Disk

150

- ◆ The voting disk is used to provide fencing and to determine cluster-node membership.
- ◆ During normal operations, the OCSSD daemon on each node in the cluster updates the voting disk once a second with the current status of that node.
- ◆ It then reads back the status structures of all other nodes in the cluster.
- ◆ In the event of an interconnect failure, all nodes in the cluster attempt to place a lock in the voting disk.
- ◆ If a node can lock a majority of the voting disks, then it gains control of the cluster

# Fencing with the Voting Disk

151

- ◆ In 11gR2, the voting disk can be stored in an ASM disk group or a cluster file system
- ◆ In any configuration, there should always be an odd number of voting disks.
- ◆ In the event of an interconnect failure in a two node-cluster, this ensures that one node always secures a majority of voting disks.
- ◆ For clusters containing three or more nodes, a more complex algorithm is used to determine which node ultimately controls the cluster

# Recording Information with the Grid Plug and Play Profile

152

- ◆ The GPnP profile is an important part of the new 11.2 Grid Infrastructure, and it records a lot of important information about the cluster itself.
- ◆ The file is signed to prevent modifications, and administrators generally should not edit it by administrators.
- ◆ The profile is an XML document, which is the main reason why adding nodes requires a lot less input from the administrator
- ◆ Oracle uses the GPnP profile and the information stored in the OCR when adding a node to the cluster.

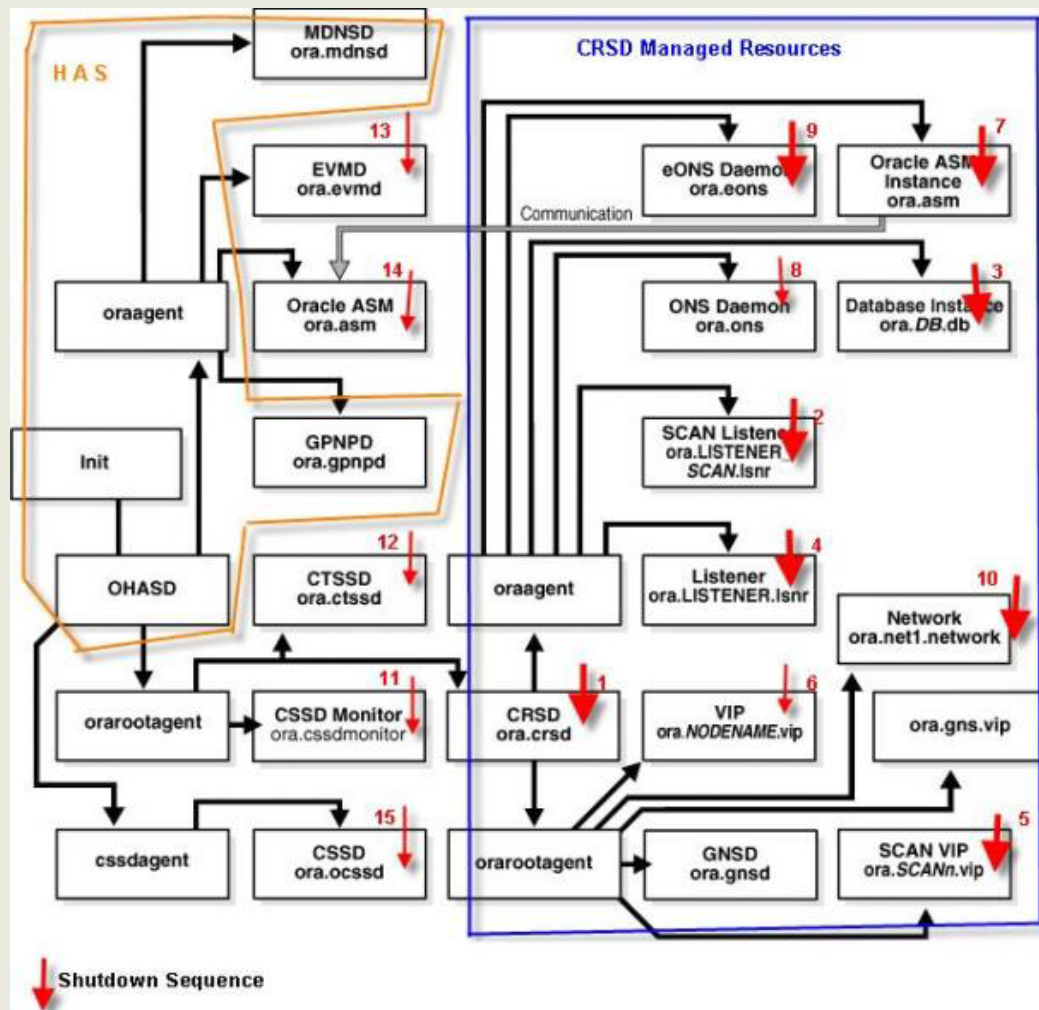
# Grid Infrastructure Software Stacks

- ◆ Oracle re-architected Grid Infrastructure into two different stacks.
- ◆ The official documentation refers to them as the High Availability Services stack and the Cluster Ready Services stack
- ◆ The High Availability Services stack consists of daemons that communicate with their peers on the other nodes.
- ◆ As soon as the High Availability Services stack is up, the cluster node can join the cluster and use the shared components (e.g., the OCR).

# Grid Infrastructure Software Stacks

- ◆ The startup sequence of the High Availability Services stack is stored partly in the Grid Plug and Play profile, but that sequence also depends on information stored in the OLR.

# Grid Infrastructure Software Stacks



# Managing Oracle Clusterware

- ◆ Oracle provides a comprehensive set of tools that can be used to manage Oracle Grid Infrastructure, including the following:
  - Enterprise Manager
  - The crsctl utility
  - The srvctl utility
  - Cluster Verification Utility
  - The oifcfg utility
  - The ocrconfig utility
  - The ocrcheck utility
  - The ocrdump utility



# Using the Enterprise Manager



157

- ◆ Both Enterprise Manager Database Control and Enterprise Manager Grid Control can be used to manage Oracle Clusterware environments.
- ◆ The functionality of Enterprise Manager Database Control is restricted to managing a single database that may have multiple instances.
- ◆ If Enterprise Manager Database Control is deployed, then the management repository must be stored in the target database

# Using the Enterprise Manager

- ◆ Enterprise Manager Grid Control provides a much more flexible management solution, and many Oracle sites now use this tool to manage their entire Oracle estate.
- ◆ The Enterprise Manager Grid Control management repository can be stored in a separate database, outside the cluster.
- ◆ Enterprise Manager Grid Control supports a wider range of administrative tasks, such as the ability to configure and maintain Data Guard.

# Using the Enterprise Manager



159

ORACLE Enterprise Manager 11g Database Control

Cluster: rac11gr2tst

Home Performance Targets Administration Interconnects Topology

Latest Data Collected From Target 17-Sep-2011 16:29:20 o'clock CEST Refresh

View Data Automatically (60 sec)

### General

Status **Up** Shutdown Black Out

Hosts 2 (↑ 2)

Availability (%) 100.0 (Last 24 hours)

Cluster Name **rac11gr2tst**

Clusterware Status **Up** (↑ 2)

Clusterware Version **11.2.0.2.0**

Oracle Home **u01/11.2.0/grid**

Reconfiguration Activities 4 [View All Properties](#)

### Configuration

View Operating Systems

Operating Systems	Hosts OS Patches
Red Hat Enterprise Linux Server release 5.5 (Tikanga) 2.6.18-194.el5	2 Not available

### Diagnostic Summary

Interconnect Alerts **0**

### Resource Summary

Problem Resources **1**

### Cluster Databases

View Cluster Databases only

Name	Status	Alerts	Policy Violations	Compliance Score (%)	Version
rac11gr2tst	⊕	2 5	7 54 4	96	11.2.0.2.0

### Alerts

Category All Critical **21** Warnings **45**

Severity	Target Name	Target Type	Category	Name	Impact	Message	Alert Triggered
<b>x</b>	rac11gts2.tst.org	Host	CRS Alert Log	Clusterware Service Alert Log Error		[cssd(5532)]CRS-1603:CSSSD on node rac11gts2 shutdown by user. See /u01/11.2.0/grid/loq/ra...	17-Sep-2011 14:38:46
<b>x</b>	rac11gts2.tst.org	Host	CRS Alert Log	Clusterware Service Alert Log Error		[cssd(5509)]CRS-1603:CSSSD on node rac11gts2 shutdown by user. See /u01/11.2.0/grid/loq/ra...	17-Sep-2011 13:37:47
<b>x</b>	rac11gts1.tst.org	Host	CRS Alert Log	Clusterware Service Alert Log Error		[cssd(5506)]CRS-1603:CSSSD on node rac11gts1 shutdown by user. See /u01/11.2.0/grid/loq/ra...	17-Sep-2011 13:27:24
<b>x</b>	rac11gr2tst	Cluster	Clusterware Alert Log	Voting Disk Alert Log Error		[cssd(5550)]CRS-1605:CSSSD voting file is online. /noting03/storage/vdisk3. details in /u01/...	17-Sep-2011 13:26:28
<b>x</b>	rac11gts2.tst.org	Host	CRS Alert Log	Clusterware Service Alert Log Error		[cssd(5731)]CRS-1603:CSSSD on node rac11gts2 shutdown by user. See /u01/11.2.0/grid/loq/ra...	15-Sep-2011 12:59:41
<b>x</b>	rac11gts2.tst.org	Host	CRS Alert Log	Clusterware Service Alert Log Error		[cssd(5599)]CRS-1603:CSSSD on node rac11gts2 shutdown by user. See /u01/11.2.0/grid/loq/ra...	15-Sep-2011 11:25:35
<b>x</b>	rac11gr2tst	Cluster	Clusterware Alert Log	Voting Disk Alert Log Error		[cssd(5572)]CRS-1605:CSSSD voting file is online. /noting03/storage/vdisk3. details in /u01/...	15-Sep-2011 11:23:21
<b>x</b>	rac11gr2tst	Cluster	Clusterware Alert Log	Voting Disk Alert Log Error		[cssd(5572)]CRS-1604:CSSSD voting file is offline. /noting01/storage/vdisk1. details in /CS...	15-Sep-2011 11:23:21
<b>x</b>	rac11gr2tst	Cluster	Clusterware Alert Log	Voting Disk Alert Log Error		[cssd(5572)]CRS-1606:The number of voting files available, 0, is less than the minimum num...	15-Sep-2011 11:23:21
<b>x</b>	rac11gts1.tst.org	Host	CRS Alert Log	Clusterware Service Alert Log Error		[cssd(5609)]CRS-1603:CSSSD on node rac11gts1 shutdown by user. See /u01/11.2.0/grid/loq/ra...	15-Sep-2011 11:15:57

### Security

Last Security Evaluation 17-Sep-2011 14:38:45 CEST Compliance Score (%) 75 Enterprise Security At a Glance



# Using the Enterprise Manager



Name	Status	Alerts	Policy Violations	Compliance Score (%)	Version
rac1st		<b>3</b>	<b>7</b> <b>54</b>	96	11.2.0.2.0

## Alerts

Category All Critical **21** Warnings **45**

Severity	Target Name	Target Type	Category	Name	Impact	Message	Alert Triggered
<b>X</b>	rac11gts2.tst.org	Host	CRS Alert Log	Clusterware Service Alert Log Error		[cssd(5532)]CRS-1603:CSSD on node rac11gts2 shutdown by user. See /u01/11.2.0/orid/loq/ra...	17-Sep-2011 14:38:46
<b>X</b>	rac11gts2.tst.org	Host	CRS Alert Log	Clusterware Service Alert Log Error		[cssd(5509)]CRS-1603:CSSD on node rac11gts2 shutdown by user. See /u01/11.2.0/orid/loq/ra...	17-Sep-2011 13:37:47
<b>X</b>	rac11gts1.tst.org	Host	CRS Alert Log	Clusterware Service Alert Log Error		[cssd(5506)]CRS-1603:CSSD on node rac11gts1 shutdown by user. See /u01/11.2.0/orid/loq/ra...	17-Sep-2011 13:27:24
<b>X</b>	rac11gr2st	Cluster	Clusterware Alert Log	Voting Disk Alert Log Error		[cssd(5550)]CRS-1605:CSSD voting file is online: Voting03/storage/vdsk3. details in /u01/...	17-Sep-2011 13:26:28
<b>X</b>	rac11gts2.tst.org	Host	CRS Alert Log	Clusterware Service Alert Log Error		[cssd(5731)]CRS-1603:CSSD on node rac11gts2 shutdown by user. See /u01/11.2.0/orid/loq/ra...	15-Sep-2011 12:59:41
<b>X</b>	rac11gts2.tst.org	Host	CRS Alert Log	Clusterware Service Alert Log Error		[cssd(5599)]CRS-1603:CSSD on node rac11gts2 shutdown by user. See /u01/11.2.0/orid/loq/ra...	15-Sep-2011 11:25:35
<b>X</b>	rac11gr2st	Cluster	Clusterware Alert Log	Voting Disk Alert Log Error		[cssd(5572)]CRS-1605:CSSD voting file is online: Voting03/storage/vdsk3. details in /u01/...	15-Sep-2011 11:23:21
<b>X</b>	rac11gr2st	Cluster	Clusterware Alert Log	Voting Disk Alert Log Error		[cssd(5572)]CRS-1604:CSSD voting file is offline: Voting01/storage/vdsk1. details at /CS...	15-Sep-2011 11:23:21
<b>X</b>	rac11gr2st	Cluster	Clusterware Alert Log	Voting Disk Alert Log Error		[cssd(5572)]CRS-1606:The number of voting files available, 0, is less than the minimum num...	15-Sep-2011 11:23:21
<b>X</b>	rac11gts1.tst.org	Host	CRS Alert Log	Clusterware Service Alert Log Error		[cssd(5609)]CRS-1603:CSSD on node rac11gts1 shutdown by user. See /u01/11.2.0/orid/loq/ra...	15-Sep-2011 11:15:57

## Security

Last Security Evaluation 17-Sep-2011 14:38:15 CEST Compliance Score (%) 75 [Enterprise Security At a Glance](#)

## Job Activity

Create Job OS Command

Job executions scheduled to start no more than 7 days ago

Status	Submitted to the Cluster	Submitted to any member
Scheduled	0	0
Running	0	0
Suspended	0	0
Problem	0	0

## Critical Patch Advisories for Oracle Homes

Current **26**  
Affected Oracle Homes **4**

[Home](#) [Performance](#) [Targets](#) [Administration](#) [Interconnects](#) [Topology](#)

## Hosts

Name	Status	Clusterware Status	Alerts	Policy Violations	Compliance Score (%)	ASM Instance	CPU Util %	Mem Util %	Total IO/sec
rac11gts1.tst.org			<b>2</b> <b>20</b>	<b>7</b> <b>0</b> <b>0</b>	63	+ASM1_rac11gts1.tst.org <b>0</b> <b>0</b>	7.49	74.14	165.98
rac11gts2.tst.org			<b>4</b> <b>16</b>	<b>7</b> <b>0</b> <b>0</b>	63	+ASM2_rac11gts2.tst.org <b>0</b> <b>0</b>	5.76	78.32	143.22

## Related Links

<a href="#">Access</a>	<a href="#">Alert History</a>	<a href="#">All Metrics</a>
<a href="#">Blackouts</a>	<a href="#">Deployments</a>	<a href="#">Metric and Policy Settings</a>
<a href="#">Metric Collection Errors</a>	<a href="#">Monitoring Configuration</a>	<a href="#">Target Properties</a>

[Cluster](#) | [Database](#) | [Setup](#) | [Preferences](#) | [Help](#) | [Logout](#)



# Using the Enterprise Manager

ORACLE Enterprise Manager 11g Database Control

Cluster: rac11gr2tst

Home Performance Targets Administration Interconnects Topology

Latest Data Collected From Target 17-Sep-2011 16:43:24 o'clock CEST Refresh

View Data Real Time: 15 Second Refresh Customize

Summary Chart Tile Chart

### CPU Utilization

### Memory Utilization

### Disk I/O Utilization

Hosts	Name	Status	Clusterware Status	Alerts	Policy Violations	Compliance Score (%)	ASM Instance	CPU Util %	Mem Util %	Total IO/sec
	rac11gtst1.tst.org	<span style="color: blue;">i</span>	<span style="color: blue;">i</span>	2 20	7 0 0	63	+ASM1_rac11gtst1.tst.org <span style="color: blue;">i</span> 0 0	8.07 <span style="color: green;">✓</span>	74.2 <span style="color: green;">✓</span>	154.14 <span style="color: green;">✓</span>

# Using the Enterprise Manager



ORACLE Enterprise Manager 11g Database Control Setup Preferences Help Logout

**Cluster** Database

Cluster: rac11gr2stst Latest Data Collected From Target 17-Sep-2011 16:44:20 o'clock CEST Refresh

Home Performance **Targets** Administration Interconnects Topology

Name	Host	Oracle Home	Availability	Alerts	Policy Violations	Compliance Score (%)	Type	Last Load Time
rac1st_ractst2	rac11gtst2.tst.org	/u01/app/oracle/product/11.2.0/db_1	⊕	1 3	1 29 2	97	Database Instance	17-Sep-2011 16:41:07
rac1st_ractst1	rac11gtst1.tst.org	/u01/app/oracle/product/11.2.0/db_1	⊕	1 2	0 25 2	99	Database Instance	17-Sep-2011 16:44:01
rac1st	rac11gtst1.tst.org *	/u01/app/oracle/product/11.2.0/db_1	⊕	2 5	7 54 4	96	Cluster Database	17-Sep-2011 16:40:24
rac11qtst2.tst.org	rac11gtst2.tst.org	Not Applicable	⊕	4 16	7 0 0	63	Host	17-Sep-2011 16:40:20
rac11qtst1.tst.org	rac11gtst1.tst.org	Not Applicable	⊕	2 20	7 0 0	63	Host	17-Sep-2011 16:44:20
LISTENER_rac11qtst2.tst.org	rac11gtst2.tst.org	/u01/11.2.0/grid	⊕	0 0	7 5 0	88	Listener	17-Sep-2011 16:39:53
LISTENER_rac11qtst1.tst.org	rac11gtst1.tst.org	/u01/11.2.0/grid	⊕	0 0	8 5 0	88	Listener	17-Sep-2011 16:41:14
LISTENER_SCAN1_rac11gr2stst	rac11gtst1.tst.org	/u01/11.2.0/grid	⊕	0 0	8 4 0	88	Listener	17-Sep-2011 16:43:09
+ASM2_rac11qtst2.tst.org	rac11gtst2.tst.org	/u01/11.2.0/grid	⊕	0 0	0 0 0		Automatic Storage Management	17-Sep-2011 16:41:17
+ASM1_rac11qtst1.tst.org	rac11gtst1.tst.org	/u01/11.2.0/grid	⊕	0 0	0 0 0		Automatic Storage Management	17-Sep-2011 16:42:25

⊕ TIP \* indicates the host that is currently elected to monitor the metrics for Cluster Database or Cluster target shown in the table.  
 ⊕ TIP \*\* indicates targets marked for deletion. The corresponding crs resource was deleted and user can permanently delete the target.

Home Performance **Targets** Administration Interconnects Topology

**Hosts**

Name	Status	Clusterware Status	Alerts	Policy Violations	Compliance Score (%)	ASM Instance	CPU Util %	Mem Util %	Total IO/sec
rac11qtst1.tst.org	⊕	⊕	2 20	7 0 0	63	+ASM1_rac11qtst1.tst.org ⊕ 0 0	8.07 ✓	74.2 ✓	154.14 ✓
rac11qtst2.tst.org	⊕	⊕	4 16	7 0 0	63	+ASM2_rac11qtst2.tst.org ⊕ 0 0	5.76 ✓	78.32 ✓	143.22 ✓

**Related Links**

<a href="#">Access</a>	<a href="#">Alert History</a>	<a href="#">All Metrics</a>
<a href="#">Blackouts</a>	<a href="#">Deployments</a>	<a href="#">Metric and Policy Settings</a>
<a href="#">Metric Collection Errors</a>	<a href="#">Monitoring Configuration</a>	<a href="#">Target Properties</a>

Cluster | Database | Setup | Preferences | Help | Logout

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[About Oracle Enterprise Manager](#)





# Using the Enterprise Manager

ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout Cluster Database

Cluster: rac11gr21st >

### Manage Resources

Oracle Clusterware provides high availability framework to protect any application that is registered with the Clusterware. You can create, administer and monitor the Clusterware resources using this interface.

Resources 15 ( 14 up 1 down )  
(Including Oracle Resources)

Search  Go Advanced Search

Show Oracle Resources

Add Resource Add Application VIP

Select	Details	Name	Cardinality	Current State	Target State	Running Hosts	Resource Type	Owner
<input type="checkbox"/>	<a href="#">Show</a>	ora.gsd	Runs on all servers	↓	↓	n/a	ora.gsd.type	grid
<input type="checkbox"/>	<a href="#">Show</a>	ora.LISTENER.lsnr	Runs on all servers	↑	↑	rac11gst1,rac11gst2	ora.listener.type	grid
<input type="checkbox"/>	<a href="#">Show</a>	ora.LISTENER_SCAN1.lsnr	1	↑	↑	rac11gst1	ora.scan_listener.type	grid
<input type="checkbox"/>	<a href="#">Show</a>	ora.ORAADATA.dg	Runs on all servers	↑	↑	rac11gst1,rac11gst2	ora.diskgroup.type	grid
<input type="checkbox"/>	<a href="#">Show</a>	ora.ORAFLASH.dg	Runs on all servers	↑	↑	rac11gst1,rac11gst2	ora.diskgroup.type	grid
<input type="checkbox"/>	<a href="#">Show</a>	ora.asm	Runs on all servers	↑	↑	rac11gst1,rac11gst2	ora.asm.type	grid
<input type="checkbox"/>	<a href="#">Show</a>	ora.cvu	1	↑	↑	rac11gst1	ora.cvu.type	grid
<input type="checkbox"/>	<a href="#">Show</a>	ora.net1.network	Runs on all servers	↑	↑	rac11gst1,rac11gst2	ora.network.type	root
<input type="checkbox"/>	<a href="#">Show</a>	ora.oc4j	1	↑	↑	rac11gst1	ora.oc4j.type	grid
<input type="checkbox"/>	<a href="#">Show</a>	ora.ons	Runs on all servers	↑	↑	rac11gst1,rac11gst2	ora.ons.type	grid
<input type="checkbox"/>	<a href="#">Show</a>	ora.rac11qtst1.vip	1	↑	↑	rac11gst1	ora.cluster_vip_net1.type	root
<input type="checkbox"/>	<a href="#">Show</a>	ora.rac11qtst2.vip	1	↑	↑	rac11gst2	ora.cluster_vip_net1.type	root
<input type="checkbox"/>	<a href="#">Show</a>	ora.ractst.db	2	↑	↑	rac11gst1,rac11gst2	ora.database.type	oracle
<input type="checkbox"/>	<a href="#">Show</a>	ora.registry.acfs	Runs on all servers	↑	↑	rac11gst1,rac11gst2	ora.registry.acfs.type	root
<input type="checkbox"/>	<a href="#">Show</a>	ora.scan1.vip	1	↑	↑	rac11gst1	ora.scan_vip.type	root

Return

Cluster | Database | Setup | Preferences | Help | Logout

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[About Oracle Enterprise Manager](#)



# Using the Enterprise Manager



ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout  
Cluster Database

Cluster: rac11gr2tst

Home Performance Targets Administration Interconnects Topology

Latest Data Collected From Target 17-Sep-2011 16:44:20 o'clock CEST Refresh

The interconnect configuration and internode communication will influence the performance of cluster databases. The tables below show network interfaces on all hosts and network interfaces currently in use by cluster databases. It is important that cluster databases are configured to use a private interconnect for message and block transfers.

Private Interconnect Transfer Rate (MB/Sec) 0.077 View Data Manually

Transfer rate on the private network in the last 5 minutes.

### Interfaces by Hosts

View Private

Expand All | Collapse All

Name	Type	Subnet	Interface Type	Total I/O Rate (MB/Sec) (Last 5 Minutes)	Total Error Rate (%) (Last 5 Minutes)
rac11gr2tst	Cluster				
rac11qtst1.tst.org	Host				
eth1	Interface	172.16.100.0	Private	0.77	0
rac11qtst2.tst.org	Host				
eth1	Interface	172.16.100.0	Private	0.77	0

### Interfaces in Use by Cluster Databases

Expand All | Collapse All

Name	Target Type	Interface Name	Host Name	IP Address	Interface Type	Source	Transfer Rate (MB/Sec) (Last 5 Minutes)
rac1st	Cluster Database						
rac1st1	Database Instance	eth1.1	rac11qtst1.tst.org	169.254.255.97	Private	n/a	n/a
rac1st2	Database Instance	eth1.1	rac11qtst2.tst.org	169.254.44.207	Private	n/a	n/a

TIP The Transfer Rate is the estimated traffic contributed by the instance assuming uniform block size in the database.

Home Performance Targets Administration Interconnects Topology

### Hosts

Name	Status	Clusterware Status	Alerts	Policy Violations	Compliance Score (%)	ASM Instance	CPU Util %	Mem Util %	Total IO/sec
rac11qtst1.tst.org	⊕	⊕	2 20	Z 0 0	63	+ASM1_rac11qtst1.tst.org ⊕ 0 0	7.49 ✓	74.14 ✓	165.98 ✓
rac11qtst2.tst.org	⊕	⊕	4 16	Z 0 0	63	+ASM2_rac11qtst2.tst.org ⊕ 0 0	5.76 ✓	78.32 ✓	143.22 ✓

### Related Links

Access	Alert History	All Metrics
Blackouts	Deployments	Metric and Policy Settings
Metric Collection Errors	Monitoring Configuration	Target Properties



# Using the Enterprise Manager

ORACLE Enterprise Manager 11g Database Control

Cluster: rac11gr2tst

Home Performance Targets Administration Interconnects Topology

Latest Data Collected From Target 17-Sep-2011 16:44:20 o'clock CEST Refresh

Overview

Cluster ASM Interconne...

Selection Details

Name: **rac1st**  
 Type: **Cluster Database**  
 Up Instances: 2/2  
 Critical Alerts: 2  
 Warning Alerts: 5  
 Status: [Up](#)

Summary

Status	<a href="#">Up</a>
Hosts	2 (↑ 2)
Clusterware Status	<a href="#">Up</a> (↑ 2)
Alerts	21 45

Legend

Home Performance Targets Administration Interconnects Topology

Hosts

Name	Status	Clusterware Status	Alerts	Policy Violations	Compliance Score (%)	ASM Instance	CPU Util %	Mem Util %	Total IO/sec
rac11qts11.tst.org	<a href="#">Up</a>	<a href="#">Up</a>	2 20	7 0 0	63	+ASM1_rac11qts11.tst.org <a href="#">Up</a> 0 0	7.49 <a href="#">Up</a>	74.14 <a href="#">Up</a>	165.98 <a href="#">Up</a>
rac11qts12.tst.org	<a href="#">Up</a>	<a href="#">Up</a>	4 16	7 0 0	63	+ASM2_rac11qts12.tst.org <a href="#">Up</a> 0 0	5.76 <a href="#">Up</a>	78.32 <a href="#">Up</a>	143.22 <a href="#">Up</a>

Related Links

<a href="#">Access</a>	<a href="#">Alert History</a>	<a href="#">All Metrics</a>
<a href="#">Blackouts</a>	<a href="#">Deployments</a>	<a href="#">Metric and Policy Settings</a>
<a href="#">Metric Collection Errors</a>	<a href="#">Monitoring Configuration</a>	<a href="#">Target Properties</a>

Cluster | Database | Setup | Preferences | Help | Logout

# Exercise: Managing clusterware with Enterprise Manager



167

- ◆ Connect to Enterprise Manager Database Control
- ◆ Navigate through clusterware pages: General, Performance, Targets, Administration, Interconnects, Topology

# Using the Clusterware Control Utility

- ◆ The Clusterware Control Utility `crsctl` is the primary command-line tool for managing Oracle Clusterware
- ◆ In Oracle 11gR2, `crsctl` has been extended to include cluster-aware commands that can be used to start and stop Clusterware on some or all nodes in the cluster.
- ◆ It can also be used to monitor and manage the configuration of the voting disks and to configure and manage individual cluster resources.

# Using the Clusterware Control Utility

- ◆ The crsctl utility also supports new functionality, such as the configuration of administrative privileges to ensure role separation.
- ◆ To manually start and stop Oracle Clusterware on all nodes in the cluster, execute the following commands as the root user:

```
crsctl start cluster -all
```

```
crsctl stop cluster -all
```

Alternatively, you could use the `-n` switch to start Grid Infrastructure on a specific (not local) node

# Using the Clusterware Control Utility

- ◆ To check the current status of all nodes in the cluster, execute the following command  
`# crsctl check cluster -all`
- ◆ In Oracle 11gR2 and later, the `crs_stat` utility has been deprecated.
- ◆ However, this utility is still shipped to provide backwards compatibility.
- ◆ The functionality of `crs_stat` has been integrated into the `crsctl` utility.
- ◆ You can use  
`# crsctl status resource -t`  
to list the current status of all resources

# Using the Clusterware Control Utility

- ◆ The output of the `crsctl status resource` command does not list the daemons of the High Availability Services stack!
- ◆ You must use the initially undocumented `-init` option to accomplish this:  
`# crsctl status resource -t -init`
- ◆ you can initiate a resource using  
`# crsctl start resource resourceName`  
and stop it using  
`# crsctl stop resource resourceName.`

# Using the Clusterware Control Utility

- ◆ If Oracle Support recommends doing so, you can stop resources of the High Availability Services stack by appending the `-init` parameter to `crsctl start/stop resource resourceName`



# Using the Clusterware Control Utility

**\$ crsctl**

**Usage: crsctl check crs - checks the viability of the CRS stack**

**crsctl check cssd - checks the viability of CSS**

**crsctl check crsd - checks the viability of CRS**

**crsctl check evmd - checks the viability of EVM**

**crsctl set css <parameter> <value> - sets a parameter override**

**crsctl get css <parameter> - gets the value of a CSS parameter**

**crsctl unset css <parameter> - sets CSS parameter to its default**

**crsctl query css votedisk - lists the voting disks used by CSS**

**crsctl add css votedisk <path> - adds a new voting disk**

**crsctl delete css votedisk <path> - removes a voting disk**

**crsctl enable crs - enables startup for all CRS daemons**

**crsctl disable crs - disables startup for all CRS daemons**

**crsctl start crs - starts all CRS daemons.**

**crsctl stop crs - stops all CRS daemons. Stops CRS resources in case of cluster.**

**crsctl start resources - starts CRS resources.**

**crsctl stop resources - stops CRS resources.**

# Using the Clusterware Control Utility



174

`crsctl debug statedump evm` - dumps state info for evm objects

`crsctl debug statedump crs` - dumps state info for crs objects

`crsctl debug statedump css` - dumps state info for css objects

`crsctl debug log css [module:level]{,module:level} ...`

- Turns on debugging for CSS

`crsctl debug trace css` - dumps CSS in-memory tracing cache

`crsctl debug log crs [module:level]{,module:level} ...`

- Turns on debugging for CRS

`crsctl debug trace crs` - dumps CRS in-memory tracing cache

`crsctl debug log evm [module:level]{,module:level} ...`

- Turns on debugging for EVM

`crsctl debug trace evm` - dumps EVM in-memory tracing cache

`crsctl debug log res <resname:level>` turns on debugging for **resources**

`crsctl query crs softwareversion [<nodename>]` - lists the version of **CRS software installed**

`crsctl query crs activeversion` - lists the CRS software operating **version**

`crsctl lsmodules css` - lists the CSS modules that can be used for **debugging**

`crsctl lsmodules crs` - lists the CRS modules that can be used for **debugging**

`crsctl lsmodules evm` - lists the EVM modules that can be used for **debugging**

# Exercise:

## Managing clusterware with crsctl

---

175

- ◆ Connect to rac11gtst1 or rac11gtst2 as user grid
- ◆ Check status of clusterware modules
  - \$ crsctl check cluster -all
  - \$ crsctl status resource -t -init
  - \$ crsctl check crs
  - \$ crsctl check css
  - \$ crsctl check evm
  - \$ crsctl query css votedisk

# Managing Resources with srvctl

- ◆ The `srvctl` utility is a command-line tool that manages Oracle resources configured in the cluster
- ◆ In Oracle 11gR1 and earlier, `srvctl` managed six object types: `asm`, `database`, `instances`, `services`, `node applications`, and `listeners`.
- ◆ Oracle 11gR2 adds an additional ten object types: `GNS`, `VIP Addresses`, `SCAN VIP addresses`, `SCAN listeners`, `Oracle homes`, `OC4J`, `servers`, `server pools`, `ASM disk groups`, and `ASM file systems`.
- ◆ The same options are available in Oracle 11gR2 that were available in previous releases: `enable`, `disable`, `start`, `stop`, `relocate`, `status`, `add`, `remove`, `modify`, `config`, `getenv`, `setenv`, and `unsetenv`

# Managing Resources with srvctl

	enable	disable	start	stop	relocate	status	add	remove	modify	config	getenv	setenv	unsetenv
database	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
instance	✓	✓	✓	✓		✓	✓	✓	✓				
service	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
nodeapps	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
vip	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓
asm	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
diskgroup	✓	✓	✓	✓		✓		✓					
listener	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓

# Managing Resources with `srvctl`

	enable	disable	start	stop	relocate	status	add	remove	modify	config	getenv	setenv	unsetenv
scan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
scan_listener	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
srvpool						✓	✓	✓	✓	✓			
server					✓	✓							
oc4j	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
home			✓	✓		✓							
filesystem	✓	✓	✓	✓		✓	✓	✓	✓	✓			
gns	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			

# Managing Resources with srvctl

- ◆ In Oracle 11.1 and earlier, you could stop an ASM instance, which resulted in a dismount command and a shutdown of the instance.
- ◆ In Oracle 11.2 the `srvctl stop asm` command does not work, especially if voting disks and OCR are located in ASM itself.
- ◆ To stop ASM in Oracle RAC 11.2, you need to shut down all clients of ASM, including CSSD.
- ◆ The only way to do this is to stop the High Availability Services stack on the node.
- ◆ The same applies to the `srvctl stop home` command when the Oracle home is the ASM home

# Managing Resources with srvctl

- ◆ Useful command to know is srvctl's config option.
- ◆ This option retrieves information about a system, reporting all database resources if no additional arguments are provided.
- ◆ If an object such as a database, asm, scans, or scan listener is passed, then this option provides detailed information about the specified resource.
- ◆ For example, you could use the following to find out which IP addresses are used for the SCAN:  
\$ srvctl config scan



# Managing Resources with `srvctl`

- ◆ The `srvctl stop home` command simplifies patching the RDBMS.
- ◆ This command records which resources are currently started from the current node.
- ◆ This information is stored in a state file that the administrator specifies.
- ◆ Upon patch completion, you can use the `srvctl start home` command when the Grid Infrastructure restarts, and then use the state file and all resources that were active before the patch application is brought online again.

# Exercise:

## Managing clusterware with srvctl

- ◆ Connect to server rac11tst1 or rac11gtst2 as user oracle
- ◆ Check statuses of different modules with:
  - \$ srvctl status server -n rac11gtst1,rac11gtst2
  - \$ srvctl status nodeapps
  - \$ srvctl config nodeapps
  - \$ srvctl status asm -a -v
  - \$ srvctl config asm -a
  - \$ srvctl status listener
  - \$ srvctl config listener
  - \$ srvctl config scan
  - \$ srvctl status scan
  - \$ srvctl config scan\_listener
  - \$ srvctl status scan\_listener
  - \$ srvctl config database -d rconv -a -v
  - \$ srvctl status database -d rconv -v

# Verifying the Cluster with the CVU

- ◆ The Cluster Verification Utility (CVU) is a command-line tool that was introduced in Oracle 10gR2.
- ◆ The CVU checks the configuration of a cluster and reports whether each component is successfully configured.
- ◆ The CVU checks operating system versions and patches, kernel parameters, user limits, operating system groups and users, secure shell configuration, networking configuration, and shared storage devices.
- ◆ The CVU can be invoked at a number of stages during the installation and configuration process
- ◆ The CVU should also be run following the completion of administrative tasks, such as node addition and deletion

# Stages at which to Execute the cluvfy Utility

Stage description	Before	After
After hardware and operating system configuration		-post hwos
CFS setup	-pre cfs	-post crs
CRS installation	-pre crsinst	-post crsinst
HA configuration	-pre hacfg	-post hacfg
Before database installation	-pre dbinst	
ACFS configuration	-pre acfscfg	-post acfscfg
Before database configuration	-pre dbcfg	
Node addition	-pre nodeadd	-post nodeadd

# The CVU Component Checks

Component	Description
nodereach	Reachability between nodes
nodecon	Node connectivity
cfs	Cluster file system integrity
ssa	Shared storage accessibility
space	Space availability
sys	Minimum space requirements
clu	Cluster manager integrity
ocr	OCR integrity
olr	OLR integrity
ha	HA integrity
crs	CRS integrity

# The CVU Component Checks

Component	Description
nodeapp	Node application existence
admprv	Administrative privileges
peer	Compares properties with peers
software	Software distribution
asm	ASM integrity
acfs	ACFS integrity
gpnv	GPNP integrity
gns	GNS integrity
scan	SCAN configuration
ohasd	OHASD integrity
clocksync	Clock synchronization
vdisk	Voting disk udev settings

# Verifying the Cluster with the CVU

- ◆ The CVU is implemented as a set of Java classes.
- ◆ On Linux, the CVU can be executed using the
- ◆ `runcluvfy.sh` shell script.
- ◆ After the installation has completed, the `cluvfy` file can be found in `$GRID_HOME/bin`
- ◆ The default form of the command includes a list of nodes that should be checked.
- ◆ For example, the following snippet verifies the configuration of the hardware and the operating system on nodes `london1` and `london2`:  

```
$ cluvfy stage -pre hwos -n london1,london2
```
- ◆ You can append the `-verbose` switch to generate more detailed output

# Verifying the Cluster with the CVU

- ◆ In Oracle 11gR2 and later, the CVU can optionally generate fixup scripts to resolve a limited subset of errors.
- ◆ In Linux, fixup scripts can be generated to adjust kernel parameters and modify user limits.
- ◆ The resulting scripts must be executed by the root user.
- ◆ The CVU must be executed by a regular user (e.g., grid or oracle; it cannot be executed by the root user).



# Exercise: Managing Clusterware with CVU

- ◆ Connect to rac11gtst1 or rac11gtst2 as user grid
- ◆ Check prerequisites to configure database:  
\$ cluvfy stage -pre dbcfg -n rac11gtst1,rac11gtst2 -d /u01/app/oracle/product/11.2.0/db\_1
- ◆ List of components that you can check with cvu  
\$ cluvfy comp -list -help  
\$ cluvfy comp ocr -verbose  
\$ cluvfy comp vdisk -verbose
- ◆ Check some of the components of your choice with cluvfy

# Configuring Network Interfaces with oifcfg

- ◆ The Oracle Interface Configuration Tool (oifcfg) is a command-line tool that can be used to configure network interfaces within Oracle Clusterware.
- ◆ The oifcfg utility can be used to add new public or private interfaces, as well as to modify existing subnet information.
- ◆ Prior to Oracle 11gR2, oifcfg updated the OCR only. In Oracle 11gR2, oifcfg has been extended to update the OLR and the GPNP profile.

# Exercise: Managing Clusterware with oifcfg

- ◆ Connect to rac11gtst1 or rac11gtst2 as user grid
- ◆ Check your Clusterware network configuration with:  
\$ oifcfg getif -global  
\$ oifcfg iflist -p -n

# Administering the OCR and OLR with ocrconfig

- ◆ The Oracle Cluster Registry Configuration tool ocrconfig is a command-line utility that can be used to administer the OCR and OLR.
- ◆ The ocrconfig tool has a number of options, including the ability to add and delete OCR mirrors, perform manual backups of the OCR, restore OCR backups, and export and import OCR configuration data.
- ◆ Many of the options for ocrconfig are also applicable to maintaining the OLR; options that target the OLR use the -local switch.

# Administering the OCR and OLR with ocrconfig

```
$ ocrconfig -help
```

Name:

ocrconfig - Configuration tool for Oracle Cluster Registry.

Synopsis:

```
ocrconfig [option]
```

option:

```
-export <filename> [-s online]
```

- Export cluster register contents to a file

```
-import <filename>
```

- Import cluster registry contents from a file

```
-upgrade [<user> [<group>]]
```

- Upgrade cluster registry from previous version

```
-downgrade [-version <version string>]
```

- Downgrade cluster registry to the specified version

```
-backuploc <dirname> - Configure periodic backup location
```

```
-showbackup - Show backup information
```

```
-restore <filename> - Restore from physical backup
```

```
-replace ocr|ocrmirror [<filename>]
```

- Add/replace/remove a OCR device/file

```
-overwrite - Overwrite OCR configuration on disk
```

```
-repair ocr|ocrmirror <filename> - Repair local OCR configuration
```

```
-help - Print out this help information
```

# Exercise:

## Managing Clusterware with ocrconfig

---

194

- ◆ Connect to rac11gtst1 or rac11gtst2 as user grid
- ◆ Show OCR backups with:  
\$ ocrconfig –showbackup
- ◆ Export OCR contents to file with:  
\$ ocrconfig –export ractst.ocr
- ◆ Connect to rac11gtst1 or rac11gtst2 as user root
- ◆ Export OCR contents with:  
# cd /u01/11.2.0/grid/bin  
# ./ocrconfig –export /root/ractst.ocr
- ◆ Check contents of OCR export with:  
# strings /root/ractst.ocr|more
- ◆ Backup OCR manually with:  
# ./ocrconfig –manualbackup  
# ./ocrconfig -showbackup

# Checking the State of the OCR and its Mirrors with ocrcheck

- ◆ The Oracle Cluster Registry Check tool, ocrcheck, checks the state of the OCR and its mirrors.
- ◆ The behavior of ocrcheck is determined by the user that invokes it.
- ◆ When invoked by a regular user, such as grid or oracle, ocrcheck checks the accessibility of all OCR mirror copies.
- ◆ It also reports on the current size and free space in the OCR.
- ◆ When invoked by the root user, ocrcheck also performs a structural check on the contents of the OCR and reports any errors.
- ◆ The ocrcheck command is most useful when trying to determine logical corruption in the OCR.

# Exercise:

## Managing Clusterware with ocrcheck

---

196

- ◆ Connect to rac11gtst1 or rac11gtst2 as user grid
- ◆ Show OCR configuration with:  
\$ ocrcheck -config
- ◆ Check OCR with:  
\$ ocrcheck
- ◆ Connect to rac11gtst1 or rac11gtst2 as user root
- ◆ Check OCR with:  
\$ ocrcheck
- ◆ What is the difference between those two checks?



# Dumping Contents of the OCR with ocrdump

- ◆ The Oracle Cluster Registry Dump tool, ocrdump, can be used to dump the contents of the OCR to a text or XML file.
- ◆ ocrdump can only be executed by the root user.
- ◆ If requested, ocrdump can also dump the OLR to a file.
- ◆ The dump file name will default to OCRDUMP; however, this name can be changed by specifying an alternative file name on the command line.

# Dumping Contents of the OCR with ocrdump

- ◆ If desired, ocrdump can write to standard output.
- ◆ A very useful option is to extract the contents of a backed up OCR or OLR.
- ◆ This enables you to perform before and after comparisons when applying patchsets, for example.
- ◆ If you are unsure where your backup files are located, consult the output of ocrconfig -showbackup [-local].
- ◆ For very specific troubleshooting needs, ocrdump offers the option to print only a specific key from the registry.

## Exercise: Managing Clusterware with ocrdump

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199

- ◆ Connect to rac11gtst1 or rac11gtst2 as user root and change directory to:  
# cd /u01/11.2.0/grid/bin
- ◆ Dump OCR to text file  
# ./ocrdump /root/ractst.txt
- ◆ Dump OCR to xml file  
# ./ocrdump /root/ractst.xml
- ◆ View contents of text and xml dump files

# CLSCFG

- ◆ Another useful but poorly documented 11g Clusterware tool is the Clusterware configuration tool or CLSCFG.
- ◆ This utility provides a host of features for managing and updating your Oracle 11g RAC Clusterware configurations, allowing you to perform the following administration tasks for the Oracle 11g Clusterware:
  - Creating a new 11g Clusterware configuration
  - Upgrading existing Clusterware
  - Adding or removing nodes from the current 11g Clusterware

# CLSCFG

201

- ◆ Another nifty feature of the CLSCFG utility is to provide basic self documentation and self help on the Oracle 11g Clusterware environment, by using the concepts parameter for the clscfg utility as shown here:

```
$ clscfg -concepts
```

# Exercise:

## Managing Clusterware with clscfg

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202

- ◆ Connect to rac11gtst1 or rac11gtst2 as user grid
- ◆ View Clusterware concepts with:  
\$ clscfg -concepts

# Maintaining Automatic Storage Management

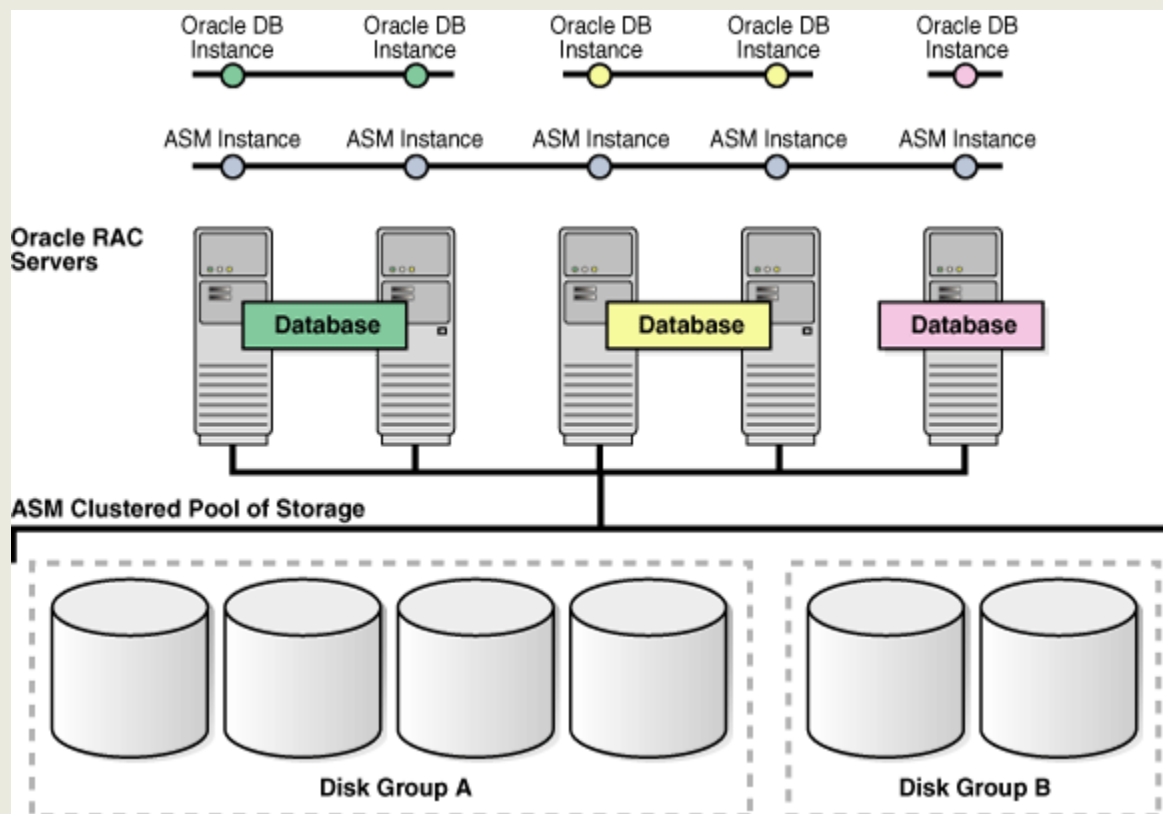
- ◆ Oracle Automatic Storage Management (ASM) concepts
  - Instances,
  - disk groups,
  - disks,
  - files
- ◆ Tools for ASM maintenance:
  - Enterprise Manager
  - ASMCA – ASM Configuration Assistant
  - ASMCMD – command line utility

# ASM concepts

- ◆ ASM is a volume manager and a file system for Oracle database
- ◆ supports single-instance and RAC Oracle Database configurations
- ◆ ASM uses disk groups to store data files;
- ◆ ASM disk group is a collection of disks that Oracle ASM manages as a unit.
- ◆ Within a disk group, ASM exposes a file system interface for Oracle database files
- ◆ You can add or remove disks from a disk group while a database continues to access files from the disk group
- ◆ ASM volume manager functionality provides flexible server-based mirroring options
- ◆ ASM uses the Oracle Managed Files (OMF) feature to simplify database file management



# ASM Concepts

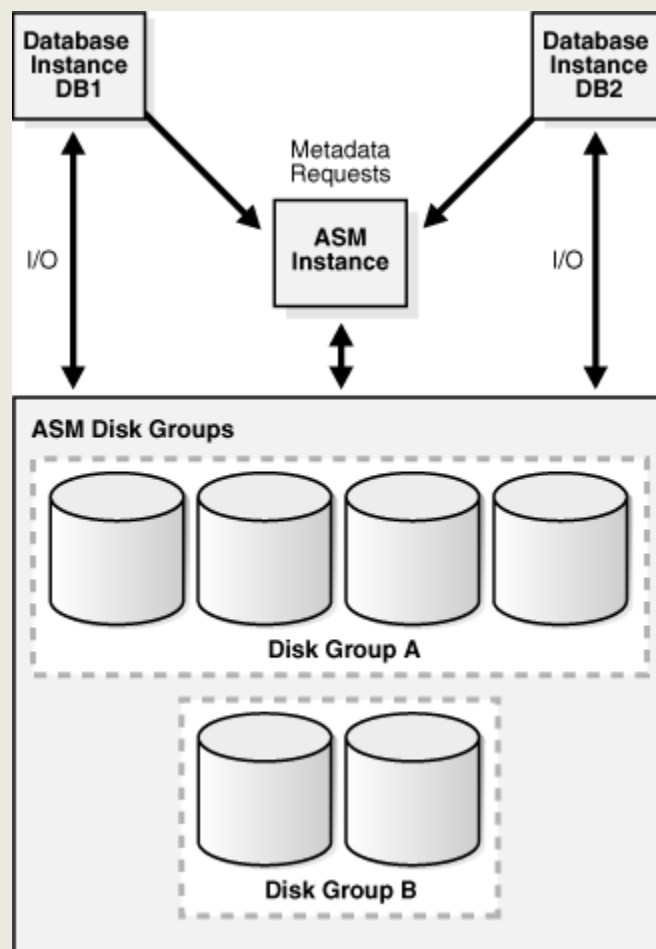


# ASM concepts

## ◆ ASM Instances

- A separate ASM instance must be running on each node in a RAC cluster.
- The ASM instance maintains metadata in the ASM disk groups and supports with the database instances.
- The ASM instance must be started before database instances can access files located in ASM storage.
- If the ASM instance is terminated, all client database instances will also be terminated.
- The ASM instance also handles adding and dropping disks and rebalancing operations,
- The database instance communicates with the ASM instance to obtain information about files stored in ASM.
- The ASM instance does not perform I/O directly for applications.
- Application I/O is still performed by the server processes and background processes associated with the database instances.
- The ASM instance performs I/O only during rebalancing operations

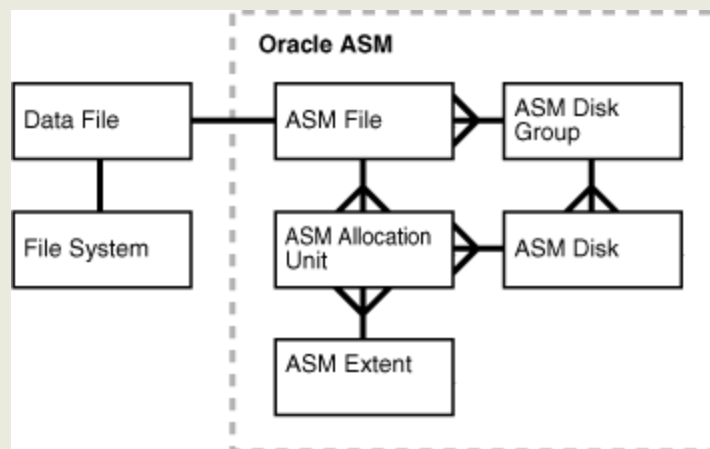
# ASM concepts



# ASM concepts

- ◆ A disk group is a logical container for one or more ASM disks and is the highest level of data structure in ASM
- ◆ The disk group can be used to place various database file types, such as datafiles, online redo, archivelogs, RMAN backupsets, OCR and Voting disks (in 11g R2)
- ◆ when a datafile is created in a disk group, the datafile extents are striped/ distributed evenly across the available disks of the disk group
- ◆ you can also set the following specified mirroring level at the disk group to protect the data integrity
  - External redundancy: Relies on the STORAGE (RAID)-level mirroring redundancy option to protect the data
  - Normal redundancy: Provides a default two-way mirroring option
  - High redundancy: Provides a three-way mirroring redundancy option of ASM files

# ASM concepts



# Creating ASM instance

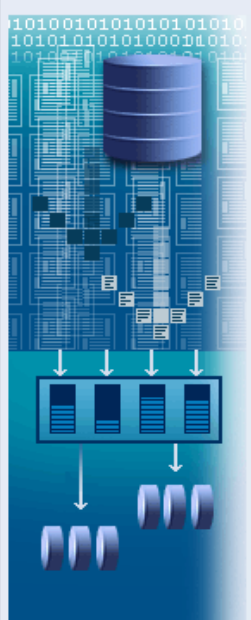
---

210

- ◆ You can create an ASM instance initially using various methods: manual, interactive GUI tools such as DBCA (in 11g R1), ASMCA (from 11g R2 onwards), and Grid Control.

# Creating ASM instance with ASMCA

ASM Configuration Assistant: Create ASM



Automatic Storage Management (ASM) is an integrated volume manager and file system. It frees you from managing individual files and disk drives. In order to use ASM, you need ASM instances and disk groups configured on the cluster. ASM disk groups provide optimal shared storage for Oracle Real Application Cluster (RAC) databases. ASM disk groups can also be used to host ASM Cluster File Systems (ACFS). To configure ASM, provide the following information and click on Create ASM.

Specify password for ASM administrator (SYS user with SYSASM privileges).

SYS Password

Confirm SYS Password

Specify password for ASMSNMP user (with less privileged SYSDBA role) that can be used to monitor ASM instances.

ASMSNMP Password

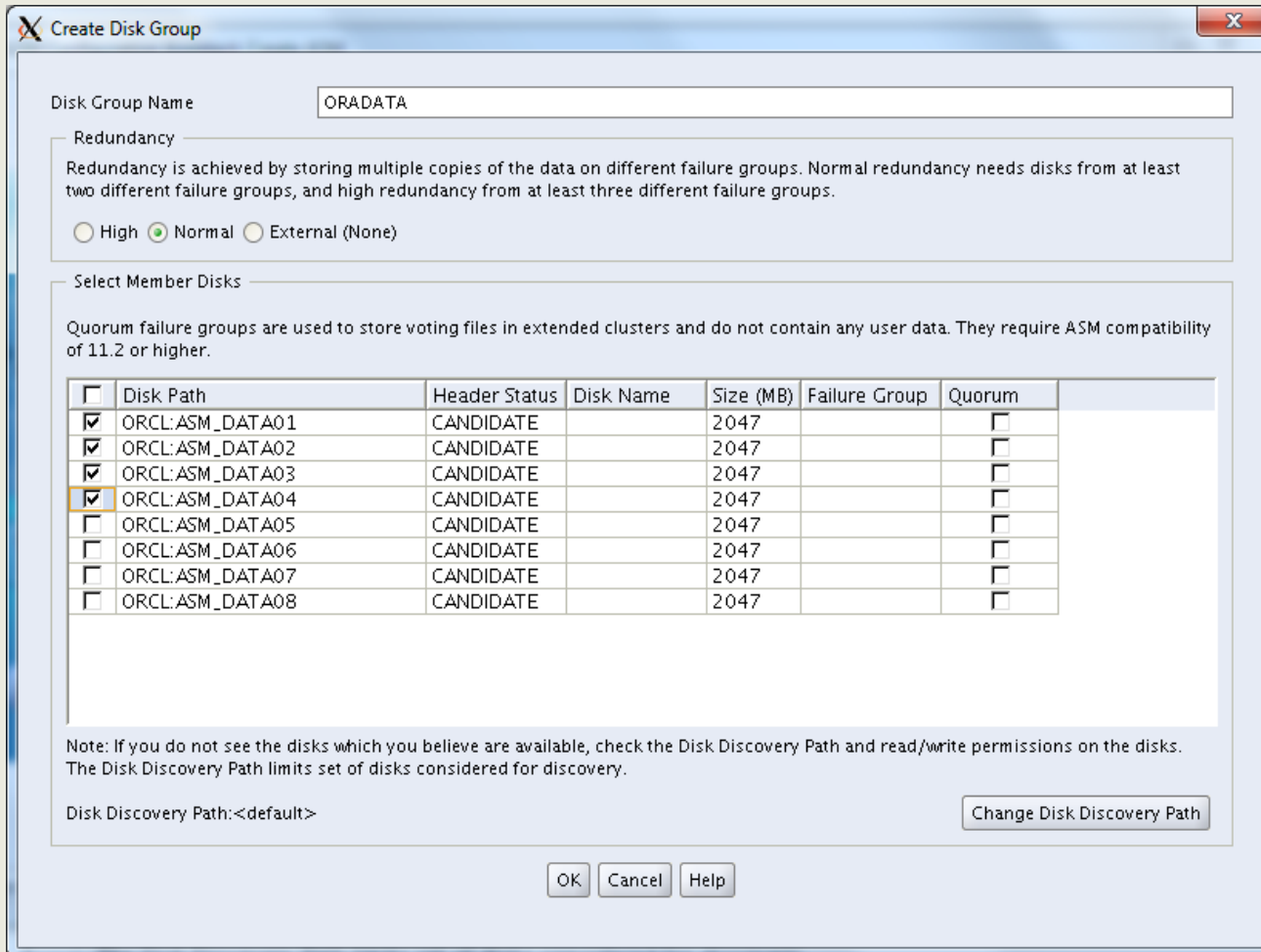
Confirm ASMSNMP Password

ASM server parameter file (spfile) will be stored on an ASM disk group.

Disk Group for Server Parameter file    ORADATA   

The default ASM parameter settings work for most installations. You can make changes to the defaults if necessary.

# Creating ASM instance with ASMCA



**Create Disk Group**

Disk Group Name:

**Redundancy**  
Redundancy is achieved by storing multiple copies of the data on different failure groups. Normal redundancy needs disks from at least two different failure groups, and high redundancy from at least three different failure groups.

High  Normal  External (None)

**Select Member Disks**  
Quorum failure groups are used to store voting files in extended clusters and do not contain any user data. They require ASM compatibility of 11.2 or higher.

<input type="checkbox"/>	Disk Path	Header Status	Disk Name	Size (MB)	Failure Group	Quorum
<input checked="" type="checkbox"/>	ORCL:ASM_DATA01	CANDIDATE		2047		<input type="checkbox"/>
<input checked="" type="checkbox"/>	ORCL:ASM_DATA02	CANDIDATE		2047		<input type="checkbox"/>
<input checked="" type="checkbox"/>	ORCL:ASM_DATA03	CANDIDATE		2047		<input type="checkbox"/>
<input checked="" type="checkbox"/>	ORCL:ASM_DATA04	CANDIDATE		2047		<input type="checkbox"/>
<input type="checkbox"/>	ORCL:ASM_DATA05	CANDIDATE		2047		<input type="checkbox"/>
<input type="checkbox"/>	ORCL:ASM_DATA06	CANDIDATE		2047		<input type="checkbox"/>
<input type="checkbox"/>	ORCL:ASM_DATA07	CANDIDATE		2047		<input type="checkbox"/>
<input type="checkbox"/>	ORCL:ASM_DATA08	CANDIDATE		2047		<input type="checkbox"/>

Note: If you do not see the disks which you believe are available, check the Disk Discovery Path and read/write permissions on the disks. The Disk Discovery Path limits set of disks considered for discovery.

Disk Discovery Path:<default>



# Creating ASM instance with ASMCA

ASM Configuration Assistant: Create ASM

Automatic Storage Management (ASM) is an integrated volume manager and file system. It frees you from managing individual files and disk drives. In order to use ASM, you need ASM instances and disk groups configured on the cluster. ASM disk groups provide optimal shared storage for Oracle Real Application Cluster (RAC) databases. ASM disk groups can also be used to host ASM Cluster File Systems (ACFS). To configure ASM, provide the following information and click on Create ASM.

Creating ASM ...

Specify Disk Group ...

Cancel Help Create ASM

# ASM instance startup/shutdown

- ◆ it is strongly recommended that you use the SRVCTL utility for managing the (start/stop) ASM instance in an RAC environment.
- ◆ To start asm instance on server raclinux1 you use command:  
\$ srvctl start asm -n raclinux1
- ◆ To start asm instance on server raclinux1 you use command:  
\$ srvctl start asm -n raclinux1

# Exercise:

## Managing asm with srvctl

- ◆ Connect to server rac11gtst1 or rac11gtst2 as user oracle
- ◆ Check status of asm instances  
\$ srvctl status asm -a -v
- ◆ Check configuration of asm instances  
\$ srvctl config asm -a
- ◆ Check configuration of asm disk groups  
\$ srvctl status diskgroup -g ORADATA -a  
\$ srvctl status diskgroup -g ORADATA2 -a  
\$ srvctl status diskgroup -g ORAFLASH -a
- ◆ Check status of listener  
\$ srvctl status listener

# Managing ASM with Enterprise Manager

Oracle Enterprise Manager (SYS) - Database Instance: rconv\_rconv1 - Mozilla Firefox

https://rac11gts1.tst.org:5500/em/console/database/instance/sitemap?event=doLoad&target=rconv\_rconv1&type=oracle\_database&pageNum=1&refreshHome=RT\_60

ORACLE Enterprise Manager 11g Database Control

Cluster Database: rconv > Database Instance: rconv\_rconv1

Home Performance Availability Server Schema Data Movement Software and Support

Page Refreshed Sep 24, 2011 4:23:05 PM CEST Refresh View Data Automatically (60 sec)

### General

↑ Shutdown Black Out

Status **Up**  
 Up Since **Sep 24, 2011 4:04:36 AM CEST**  
 Instance Name **rconv1**  
 Version **11.2.0.2.0**  
 Host [rac11gts1.tst.org](#)  
 Listener [LISTENER\\_SCAN1\\_rac11gr2tst](#)  
 ASM [+ASM1\\_rac11gts1.tst.org](#)

[View All Properties](#)

### Host CPU

Load [5.08](#) Paging [0.04](#)

### Active Sessions

Core Count **2**

### SQL Response Time

Reference collection is empty.  
 SQL Response Time (%) Unavailable  
[Reset Reference Collection](#)

### Diagnostic Summary

Interconnect Alerts **0**  
 ADDM Findings **0**  
 Alert Log **No ORA- errors**  
 Active Incidents **0**  
 Key SQL Profiles **Unavailable**

[Database Instance Health](#)

### Space Summary

Dump Area Used (%) **48**

### Alerts

Category All Go Critical 0 Warning **1**

Severity	Category	Name	Impact	Message	Alert Triggered
Warning	User Audit	Audited User		User SYS logged on from rac11gts1.tst.org.	Sep 24, 2011 7:10:15 AM

### Related Alerts

Policy Violations

# ASM instance Home page

217

Oracle Enterprise Manager (SYS) - Automatic Storage Management: +ASM1\_rac11gtst1.tst.org - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://rac11gtst1.tst.org:5500/em/console/database/osm/osmSitemap?fromAsm=true&type=osm\_instance&target=%2BASM1\_rac11gtst1.tst.org&event=doLoad

Most Visited Enterprise Linux Linux Technolog... Oracle University Feature: Faster Li... OSS from Oracle ULN: Login Dist. sources E-Delivery: Enter...

ORACLE Enterprise Manager 11g Database Control Setup Preferences Help Logout Cluster Database

Automatic Storage Management: +ASM1\_rac11gtst1.tst.org

Home Performance Disk Groups Configuration Users ASM Cluster File System

Data Retrieved Sep 24, 2011 4:23:56 PM CEST Refresh

### General

Current Status **Up**  
 Up Since **Sep 24, 2011 4:03:59 AM CEST**  
 Availability (%) **96.06**  
 (Last 24 hours)  
 Instance Name **+ASM1**  
 Version **11.2.0.2.0**  
 Host **rac11gtst1.tst.org**  
 Oracle Home **/u01/11.2.0/gnid**

### Diagnostic Summary

Alert Log **No ORA- errors**  
 Active Incidents **0**

### Serviced Databases

Name	Disk Groups	Failure Groups	Allocated Space (GB)	Availability	Alerts
rconv_rconv1	ORADATA2, ORAFLASH	4 (0 down)	5		1 0
RAC11GR2TST	ORADATA	4 (0 down)	0		Not Monitored
RACTST	ORAFLASH, ORADATA	8 (0 down)	451		Not Monitored

### Serviced ASM Cluster File Systems

Mount Point	Availability	State	Used (%)	Used (GB)	Size (GB)	Allocated Space (GB)	Volume	Disk Group
(No ASM Cluster File Systems)								

### Other Volumes

Volume	Volume Device	Usage	State	Disk Group	Size (GB)	Allocated Space (GB)	Redundancy
No object found							

### Alerts

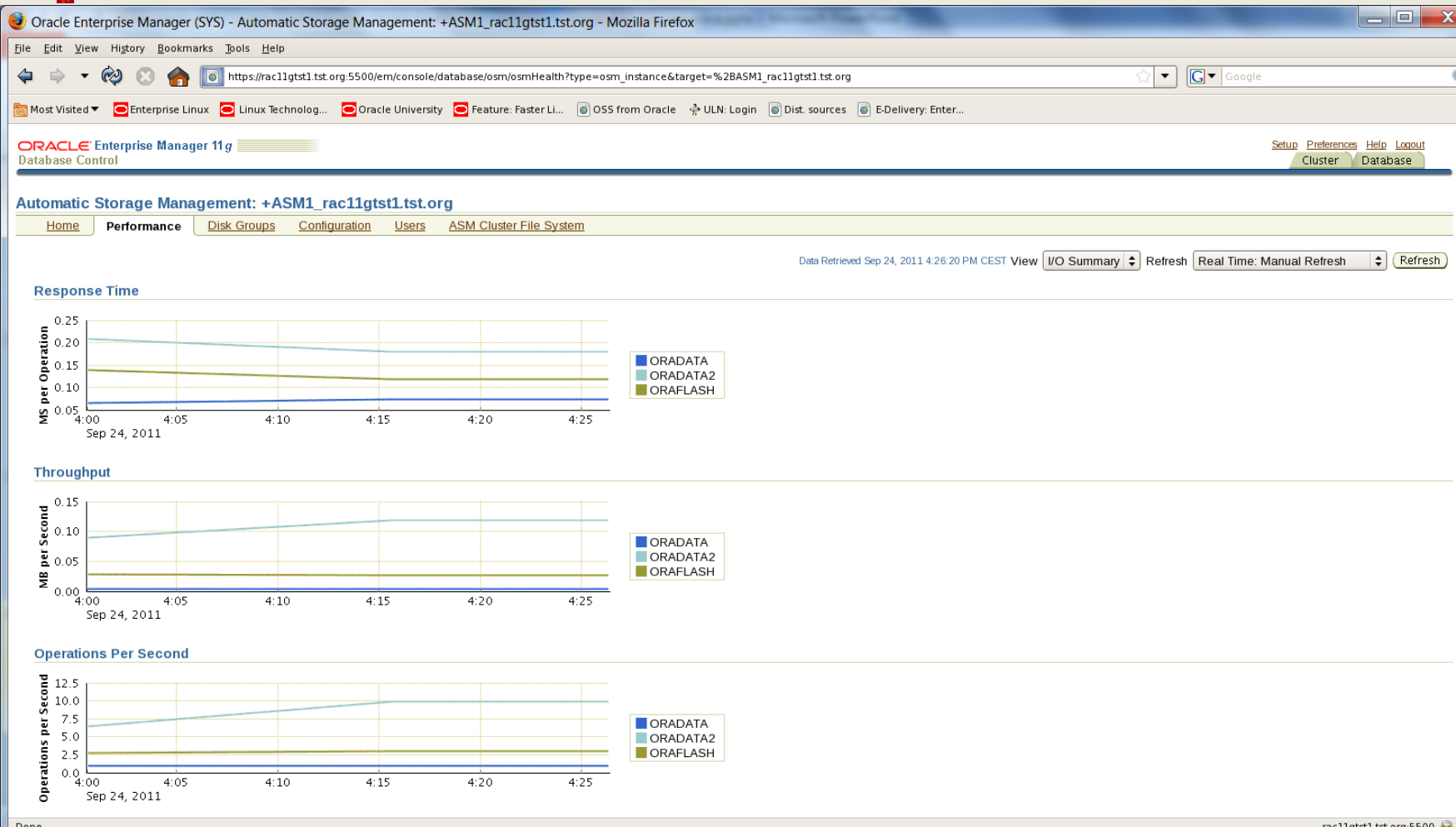
Severity	Category	Name	Impact	Message	Alert Triggered
(No alerts)					

### Disk Group Usage (GB)

Disk Group	Unallocated	Internal	RAC11GR2TST	RACTST	rconv_rconv1
ORAFLASH	~6.5	~0.5	~0.5	~0.5	~0.5
ORADATA2	~1.5	~0.5	~0.5	~0.5	~3.5
ORADATA	~3.5	~0.5	~0.5	~4.5	~0.5

# ASM instance Performance page

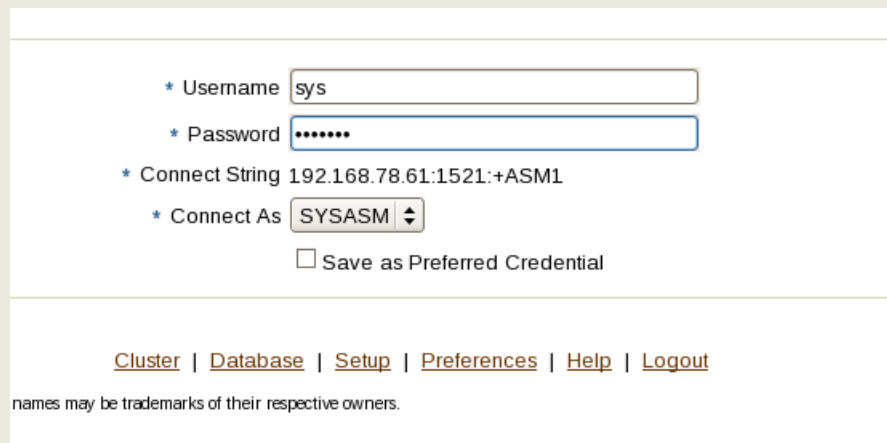
218



# ASM instance Disk Groups page

219

- ◆ To access disk groups page you must login to ASM instance with user sys



\* Username   
 \* Password   
 \* Connect String 192.168.78.61:1521:+ASM1  
 \* Connect As    
 Save as Preferred Credential

[Cluster](#) | [Database](#) | [Setup](#) | [Preferences](#) | [Help](#) | [Logout](#)

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# ASM instance Disk Groups page

Oracle Enterprise Manager (SYS) - Automatic Storage Management: +ASM1\_rac11gtst1.tst.org - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://rac11gtst1.tst.org:5500/em/console/database/osm/osmAdmin?type=osm\_instance&target=%2BASM1\_rac11gtst1.tst.org

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ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout Cluster Database

Logged in As SYS / SYSASM

Automatic Storage Management: +ASM1\_rac11gtst1.tst.org

Home Performance **Disk Groups** Configuration Users ASM Cluster File System

Create Mount All Dismount All

Mount Dismount Rebalance Check Delete

Select All Select None

Select	Name	State	Redundancy	Size (GB)	Used (GB)	Used (%)	Usable Free (GB)	Member Disks
<input type="checkbox"/>	ORADATA	MOUNTED	NORMAL	8.00	4.33	54.15	1.29	4
<input type="checkbox"/>	ORADATA2	MOUNTED	EXTERN	6.00	4.38	73.03	1.62	3
<input type="checkbox"/>	ORAFLASH	MOUNTED	NORMAL	8.00	1.51	18.84	3.05	4

TIP The usable free space specifies the amount of space that can be safely used for data. A value above zero means that redundancy can be properly restored after a disk failure.  
TIP Mount All and Dismount All operation will only mount and dismount the disk groups specified in the Auto Mount Disk Groups parameter.

Home Performance **Disk Groups** Configuration Users ASM Cluster File System

Related Links

- Access
- All Metrics
- Metric Collection Errors
- Alert History
- Blackouts
- Monitoring Configuration
- Alert Log Contents
- Metric and Policy Settings
- Target Properties

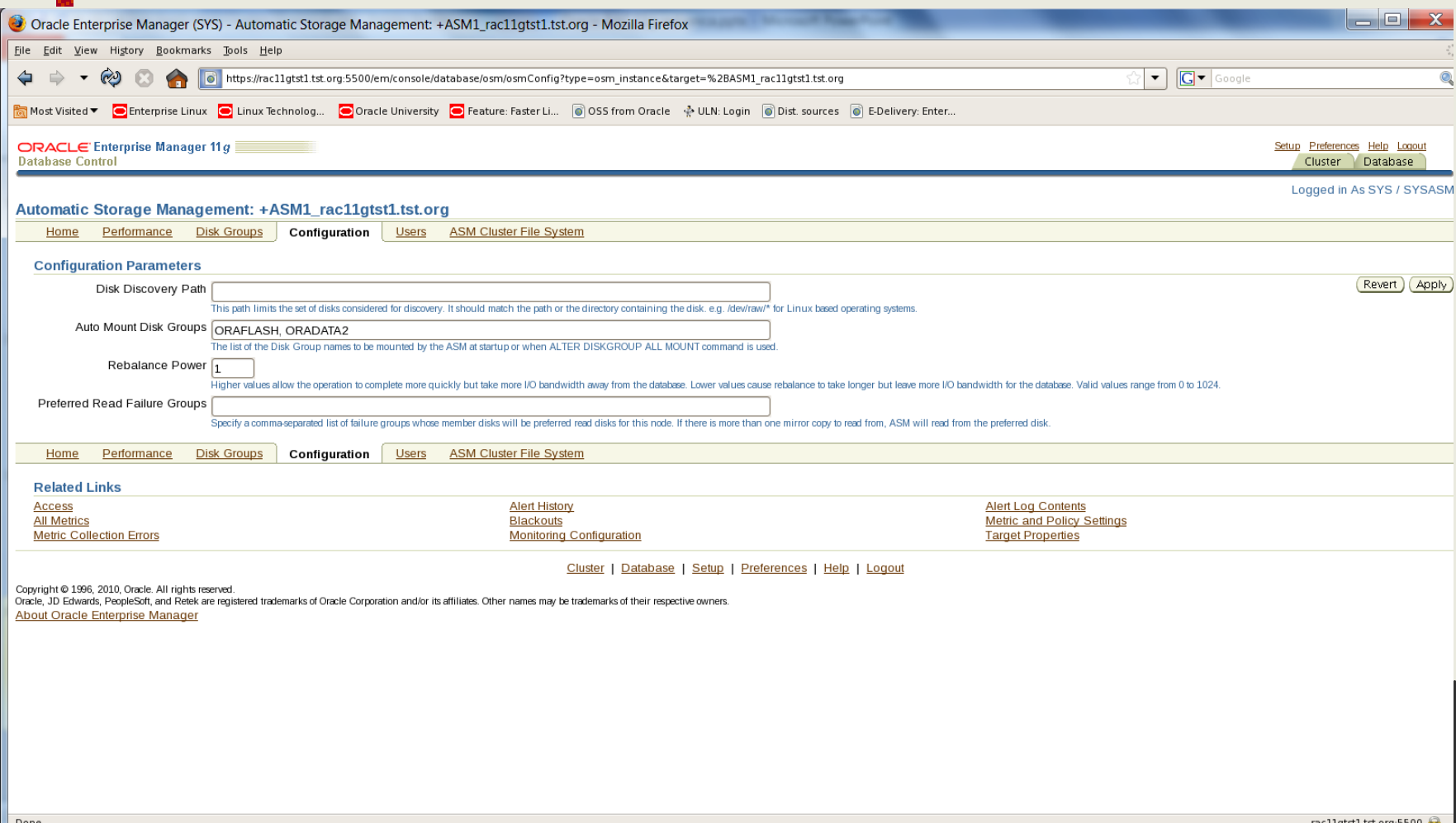
Cluster | Database | Setup | Preferences | Help | Logout

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# ASM instance Configuration page

221



Oracle Enterprise Manager (SYS) - Automatic Storage Management: +ASM1\_rac11gtst1.tst.org - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://rac11gtst1.tst.org:5500/em/console/database/osm/osmConfig?type=osm\_instance&target=%2BASM1\_rac11gtst1.tst.org

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ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout

Cluster Database

Logged in As SYS / SYSASM

Automatic Storage Management: +ASM1\_rac11gtst1.tst.org

Home Performance Disk Groups Configuration Users ASM Cluster File System

Configuration Parameters

Disk Discovery Path  Revert Apply  
This path limits the set of disks considered for discovery. It should match the path or the directory containing the disk. e.g. /dev/raw/\* for Linux based operating systems.

Auto Mount Disk Groups   
The list of the Disk Group names to be mounted by the ASM at startup or when ALTER DISKGROUP ALL MOUNT command is used.

Rebalance Power   
Higher values allow the operation to complete more quickly but take more I/O bandwidth away from the database. Lower values cause rebalance to take longer but leave more I/O bandwidth for the database. Valid values range from 0 to 1024.

Preferred Read Failure Groups   
Specify a comma-separated list of failure groups whose member disks will be preferred read disks for this node. If there is more than one mirror copy to read from, ASM will read from the preferred disk.

Home Performance Disk Groups Configuration Users ASM Cluster File System

Related Links

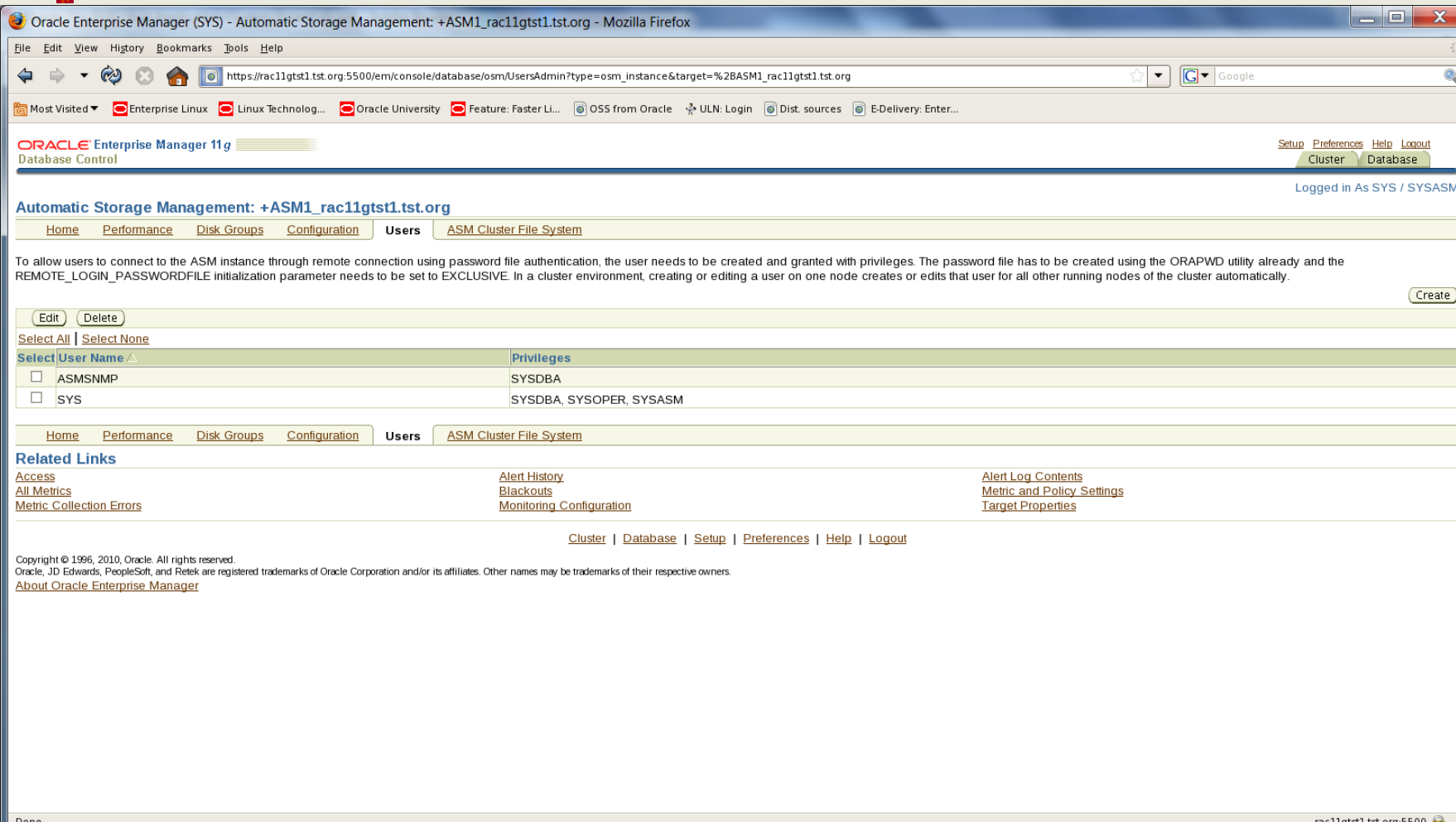
<a href="#">Access</a>	<a href="#">Alert History</a>	<a href="#">Alert Log Contents</a>
<a href="#">All Metrics</a>	<a href="#">Blackouts</a>	<a href="#">Metric and Policy Settings</a>
<a href="#">Metric Collection Errors</a>	<a href="#">Monitoring Configuration</a>	<a href="#">Target Properties</a>

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# ASM instance Users page

222



Oracle Enterprise Manager (SYS) - Automatic Storage Management: +ASM1\_rac11gtst1.tst.org - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://rac11gtst1.tst.org:5500/em/console/database/osm/UsersAdmin?type=osm\_instance&target=%2BASM1\_rac11gtst1.tst.org

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ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout

Cluster Database

Logged in As SYS / SYSASM

Automatic Storage Management: +ASM1\_rac11gtst1.tst.org

Home Performance Disk Groups Configuration Users ASM Cluster File System

To allow users to connect to the ASM instance through remote connection using password file authentication, the user needs to be created and granted with privileges. The password file has to be created using the ORAPWD utility already and the REMOTE\_LOGIN\_PASSWORDFILE initialization parameter needs to be set to EXCLUSIVE. In a cluster environment, creating or editing a user on one node creates or edits that user for all other running nodes of the cluster automatically.

Create

Edit Delete

Select All Select None

Select	User Name	Privileges
<input type="checkbox"/>	ASMSNMP	SYSDBA
<input type="checkbox"/>	SYS	SYSDBA, SYSOPER, SYSASM

Home Performance Disk Groups Configuration Users ASM Cluster File System

Related Links

<a href="#">Access</a>	<a href="#">Alert History</a>	<a href="#">Alert Log Contents</a>
<a href="#">All Metrics</a>	<a href="#">Blackouts</a>	<a href="#">Metric and Policy Settings</a>
<a href="#">Metric Collection Errors</a>	<a href="#">Monitoring Configuration</a>	<a href="#">Target Properties</a>

Cluster Database Setup Preferences Help Logout

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# ASM instance Disk Group I/O Cumulative Statistics page

223

Oracle Enterprise Manager (SYS) - Disk Group I/O Cumulative Statistics - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://rac11gtst1.tst.org:5500/em/console/database/osm/osmHealth?pageIndex=2&type=osm\_instance&target=%2BASM1\_rac11gtst1.tst.org&event=goCumulative

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ORACLE Enterprise Manager 11g Database Control

Automatic Storage Management: +ASM1\_rac11gtst1.tst.org > Disk Group I/O Cumulative Statistics

Setup Preferences Help Logout Cluster Database

Logged in As SYS / SYSASM

Data Retrieved Sep 24, 2011 4:37:41 PM CEST Refresh Real Time: Manual Refresh Refresh

Expand All | Collapse All

Disk Groups	Average Response Time (ms)	Average Throughput (MB per second)	Total I/O Calls	Reads				Writes			
				Total	Hot	Cold	Errors	Total	Hot	Cold	Errors
Automatic Storage Management - +ASM1_rac11gtst1.tst.org	16.07	0.02	592872	283067	0	282759	0	309805	0	205594	0
ORADATA	9.84	0	44696	92	0	0	0	44604	0	0	0
ORADATA2	19.08	0.04	386292	281988	0	281877	0	104304	0	89345	0
ORAFASH	10.6	0.01	161884	987	0	882	0	160897	0	116249	0

Cluster | Database | Setup | Preferences | Help | Logout

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rac11gtst1.tst.org:5500

# ASM disk group ORADATA2 General page

Oracle Enterprise Manager (SYS) - Disk Group: ORADATA2 - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://rac11gtst1.tst.org:5500/em/console/database/osm/diskGroup?type=osm\_instance&target=%2BASM1\_rac11gtst1.tst.org&name=ORADATA2&event=disksTab

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ORACLE Enterprise Manager 11g Database Control Setup Preferences Help Logout Cluster Database

Automatic Storage Management: +ASM1\_rac11gtst1.tst.org > Logged in As SYS / SYSASM

### Disk Group: ORADATA2

General Performance Templates Files Access Control Volumes

**General**

Name **ORADATA2**  
 State **MOUNTED**  
 Redundancy **EXTERN**  
 Total Size (GB) **6**  
 Pending Operations **0**  
 Allocation Unit (MB) **1**

**Advanced Attributes** Edit

Database Compatibility **10.1.0.0.0**  
 ASM Compatibility **11.2.0.0.0**  
 ASM Volume Compatibility  
 Smart Scan Capability **Disabled**  
 File Access Control **Disabled**

**Member Disks** Add

Resize Online Offline Recover Bad Blocks Remove

Select All | Select None

Select	Disk	Failure Group	Path	Library	Read/Write Errors	State	Mode	Size (GB)	Used (GB)	Used (%)	Failgroup Type
<input type="checkbox"/>	ASM_DATA09	ASM_DATA09	ORCL:ASM_DATA09	ASM LIBRARY - GENERIC LINUX, VERSION 2.0.4 (KABI_V2)	0	NORMAL	✓	2.00	1.46	73.08	REGULAR
<input type="checkbox"/>	ASM_DATA10	ASM_DATA10	ORCL:ASM_DATA10	ASM LIBRARY - GENERIC LINUX, VERSION 2.0.4 (KABI_V2)	0	NORMAL	✓	2.00	1.46	73.08	REGULAR
<input type="checkbox"/>	ASM_DATA11	ASM_DATA11	ORCL:ASM_DATA11	ASM LIBRARY - GENERIC LINUX, VERSION 2.0.4 (KABI_V2)	0	NORMAL	✓	2.00	1.46	72.94	REGULAR

✓ Online ✗ Offline

**Current Disk Group Usage (GB)**

Free (1.62)  
Internal (0.10)  
RCONV (4.28)

**Disk Group Daily Space Usage History (Last 7 Days)**

No data is currently available.

General Performance Templates Files Access Control Volumes

Cluster | Database | Setup | Preferences | Help | Logout

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# ASM disk group ORADATA2 Performance page

Oracle Enterprise Manager (SYS) - Disk Group: ORADATA2 - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://rac11gtst1.tst.org:5500/em/console/database/osm/diskGroupHealth?type=osm\_instance&target=%2BASM1\_rac11gtst1.tst.org&oname=ORADATA2&event=performanceTab

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ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout Cluster Database

Automatic Storage Management: +ASM1\_rac11gtst1.tst.org > Logged in As SYS / SYSASM

### Disk Group: ORADATA2

General Performance Templates Files Access Control Volumes

This page shows cluster-wide performance information. Use the links under the graphs to view graphs that show the performance of individual cluster members.

Collected From Target Sep 24, 2011 4:44:18 PM CEST View Real Time: Manual Refresh Refresh

#### Response Time

Time	I/O Response Time (MS)	Read Response Time (MS)	Write Response Time (MS)
4:15:01	~0.195	~0.155	~0.145
4:15:02	~0.195	~0.155	~0.145
4:15:03	~0.195	~0.155	~0.145

#### Throughput

Time	I/O Throughput (MB/s)	Read Throughput (MB/s)	Write Throughput (MB/s)
4:15:01	~0.15	~0.10	~0.05
4:15:02	~0.15	~0.10	~0.05
4:15:03	~0.15	~0.10	~0.05

#### Operations Per Second

Time	I/O Operations	Reads Per Second	Writes Per Second
4:15:01	~10.5	~7.5	~3.0
4:15:02	~10.5	~7.5	~3.0
4:15:03	~10.5	~7.5	~3.0

# ASM disk group ORADATA2 Templates page

Oracle Enterprise Manager (SYS) - Disk Group: ORADATA2 - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://rac11gts1.tst.org:5500/em/console/database/osm/diskGroup?type=osm\_instance&target=%2BASM1\_rac11gts1.tst.org&name=ORADATA2&event=templatesTab

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ORACLE Enterprise Manager 11g Database Control Setup Preferences Help Logout Cluster Database

Automatic Storage Management: +ASM1\_rac11gts1.tst.org > Logged in As SYS / SYSASM

Disk Group: ORADATA2

General Performance **Templates** Files Access Control Volumes

Edit Delete Create

Select	Name	Redundancy	Striped	Internal	Primary Region
<input checked="" type="radio"/>	<a href="#">ONLINELOG</a>	Unprotected	Coarse	Yes	COLD
<input type="radio"/>	<a href="#">OCRFILE</a>	Unprotected	Coarse	Yes	COLD
<input type="radio"/>	<a href="#">FLASHFILE</a>	Unprotected	Coarse	Yes	COLD
<input type="radio"/>	<a href="#">CONTROLFILE</a>	Unprotected	Fine	Yes	COLD
<input type="radio"/>	<a href="#">DUMPSET</a>	Unprotected	Coarse	Yes	COLD
<input type="radio"/>	<a href="#">ASMPARAMETERFILE</a>	Unprotected	Coarse	Yes	COLD
<input type="radio"/>	<a href="#">PARAMETERFILE</a>	Unprotected	Coarse	Yes	COLD
<input type="radio"/>	<a href="#">DATAFILE</a>	Unprotected	Coarse	Yes	COLD
<input type="radio"/>	<a href="#">TEMPEFILE</a>	Unprotected	Coarse	Yes	COLD
<input type="radio"/>	<a href="#">BACKUPSET</a>	Unprotected	Coarse	Yes	COLD
<input type="radio"/>	<a href="#">AUTOBACKUP</a>	Unprotected	Coarse	Yes	COLD
<input type="radio"/>	<a href="#">XTRANSPORT</a>	Unprotected	Coarse	Yes	COLD
<input type="radio"/>	<a href="#">CHANGETRACKING</a>	Unprotected	Coarse	Yes	COLD
<input type="radio"/>	<a href="#">FLASHBACK</a>	Unprotected	Coarse	Yes	COLD
<input type="radio"/>	<a href="#">DATAGUARDCONFIG</a>	Unprotected	Coarse	Yes	COLD
<input type="radio"/>	<a href="#">ARCHIVELOG</a>	Unprotected	Coarse	Yes	COLD

General Performance **Templates** Files Access Control Volumes

Cluster | Database | Setup | Preferences | Help | Logout

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rac11gts1.tst.org:5500

# ASM disk group ORADATA2 Files page

The screenshot shows the Oracle Enterprise Manager (SYS) interface for the Disk Group: ORADATA2. The browser address bar shows the URL: [https://rac11gtst1.tst.org:5500/em/console/database/osm/filesAdmin?type=osm\\_instance&target=%2BASM1\\_rac11gtst1.tst.org&oname=ORADATA2&event=filesTab](https://rac11gtst1.tst.org:5500/em/console/database/osm/filesAdmin?type=osm_instance&target=%2BASM1_rac11gtst1.tst.org&oname=ORADATA2&event=filesTab). The page title is "Oracle Enterprise Manager 11g Database Control". The breadcrumb trail is "Automatic Storage Management: +ASM1\_rac11gtst1.tst.org > Disk Group: ORADATA2". The "Files" tab is selected, showing a list of files and directories associated with the disk group. The table below lists the files and their properties.

The following are the directories, files and aliases associated with the serviced databases in this disk group.

[Create Alias](#) [Create Directory](#) [Rename](#) [Edit File](#) [Delete](#)

[Select All](#) | [Select None](#) | [Expand All](#) | [Collapse All](#)

Select Name	Physical Size (KB)	Logical Size (KB)	Primary Region	Permissions			Ownership	
				Owner	Group	Other	Owner	Group
<input type="checkbox"/> ORADATA2								
<input type="checkbox"/> RCONV								
<input type="checkbox"/> sp_rconv_backup	1024	96 COLD		Read-write	Read-write	Read-write		
<input type="checkbox"/> spfilerconv.ora	1024	4.5 COLD		Read-write	Read-write	Read-write		

[General](#) [Performance](#) [Templates](#) **[Files](#)** [Access Control](#) [Volumes](#)

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# Exercise:

## Using Enterprise Manager ASM pages

---

228

- ◆ Connect to Enterprise Manager Database Control  
<https://rac11gtst1:5500/em>
- ◆ Navigate through ASM pages: Home, Performance, Disk Groups, Configuration, Users, Disk Group I/O Cumulative Statistics
- ◆ Navigate through ASM disk group OARADATA2 pages: General, Performance, Templates, Files



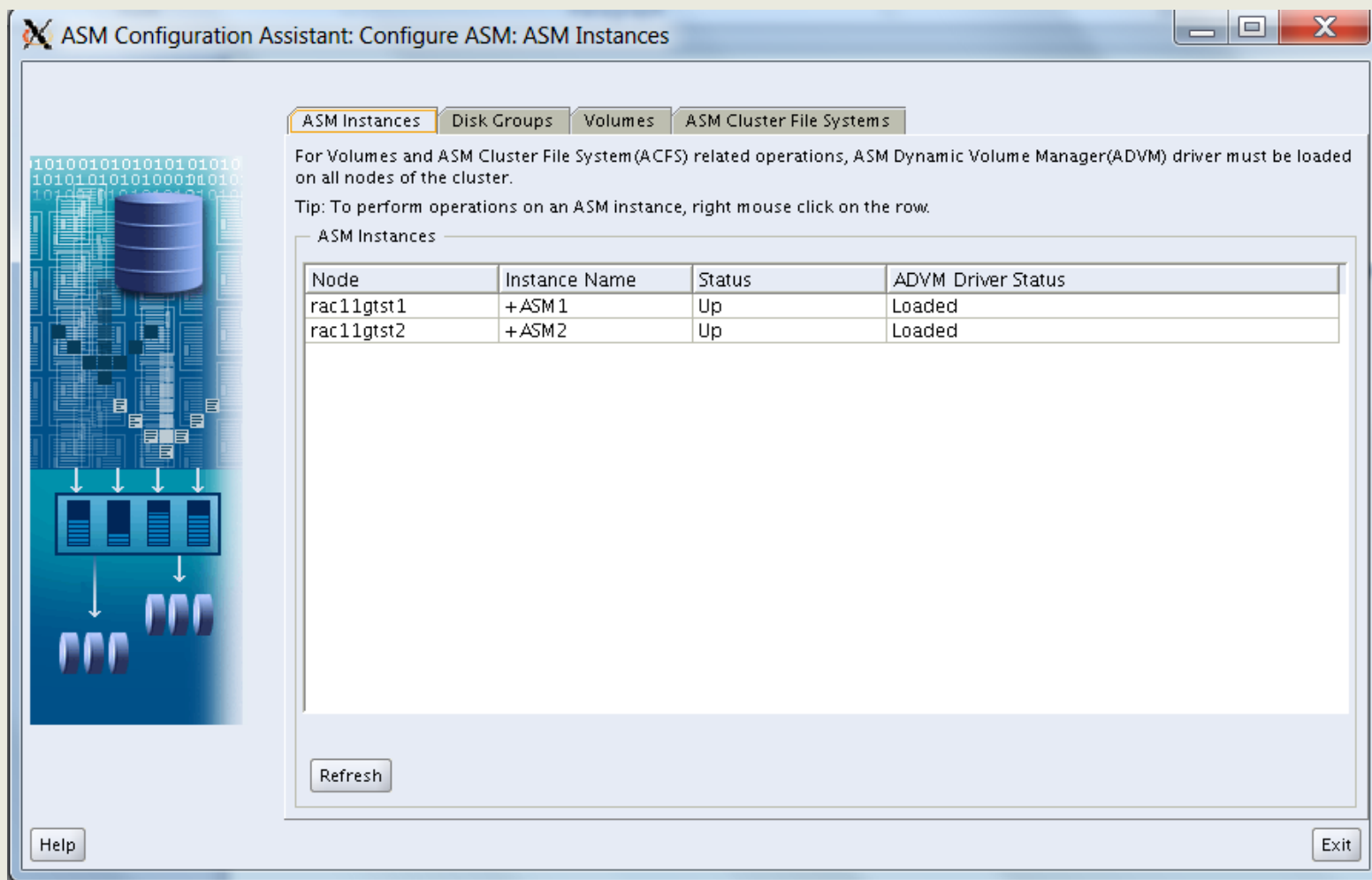
# Managing ASM with ASM Configuration Assistant

229

- ◆ You must login to rac11gtst1 or rac11gtst2 as user grid
- ◆ To run asmca you should execute  
\$ asmca

# ASM Configuration Assistant ASM Instances

230



ASM Configuration Assistant: Configure ASM: ASM Instances

ASM Instances | Disk Groups | Volumes | ASM Cluster File Systems

For Volumes and ASM Cluster File System (ACFS) related operations, ASM Dynamic Volume Manager (ADVM) driver must be loaded on all nodes of the cluster.

Tip: To perform operations on an ASM instance, right mouse click on the row.

ASM Instances

Node	Instance Name	Status	ADVM Driver Status
rac11gtst1	+ASM1	Up	Loaded
rac11gtst2	+ASM2	Up	Loaded

Refresh

Help Exit

# ASM Configuration Assistant Disk Groups

ASM Configuration Assistant: Configure ASM: Disk Groups

ASM Instances | **Disk Groups** | Volumes | ASM Cluster File Systems

You can choose to create a new disk group or add disks to an existing disk group. To create dynamic volumes, you need disk groups with 11.2 ASM compatibility.

Tip: To perform operations on a disk group, right mouse click on the row.

Disk Groups

Disk Group Name	Size (GB)	Free (GB)	Usable (GB)	Redundancy	State
ORADATA2	6.00	1.62	1.62	EXTERN	MOUNTED(2 of 2)
ORADATA	8.00	3.67	1.29	NORMAL	MOUNTED(2 of 2)
ORAFLASH	8.00	6.49	3.05	NORMAL	MOUNTED(2 of 2)

Create Mount All Dismount All

Help Exit

# Exercise:

## Managing ASM with ASMCA

---

232

- ◆ Check status of ASM instances and disk groups with asmca