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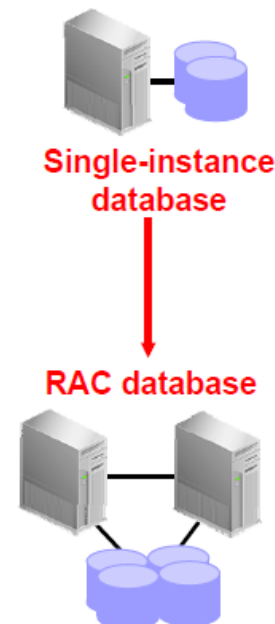
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**SINGLE INSTANCE TO RAC CONVERSION****INTRODUCTION**

In this example, we shall show how to convert from single instance (file system) to RAC (ASM).

**We shall use RCONFIG to convert from file system to RAC.**

- Single-instance databases can be converted to RAC using:
  - DBCA
  - Enterprise Manager
  - RCONFIG utility
- DBCA automates most of the conversion tasks.
- Before conversion, ensure that:
  - Your hardware and operating system are supported
  - Your cluster nodes have access to shared storage



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## SETUP – CREATE A SINGLE INSTANCE DATABASE (FILESYSTEM) USING DBCA

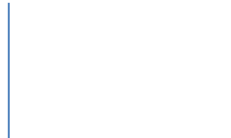
For practice, you can either clone the file system to one of the node or use DBCA to create a file system. In this exercise, we shall use DBCA to create a single instance file system on node1 and then convert to RAC. In real time environment you would clone from production environment to RAC environment using cold backup or RMAN backup etc.

On node1

Use DBCA to create single instance file system – PROD

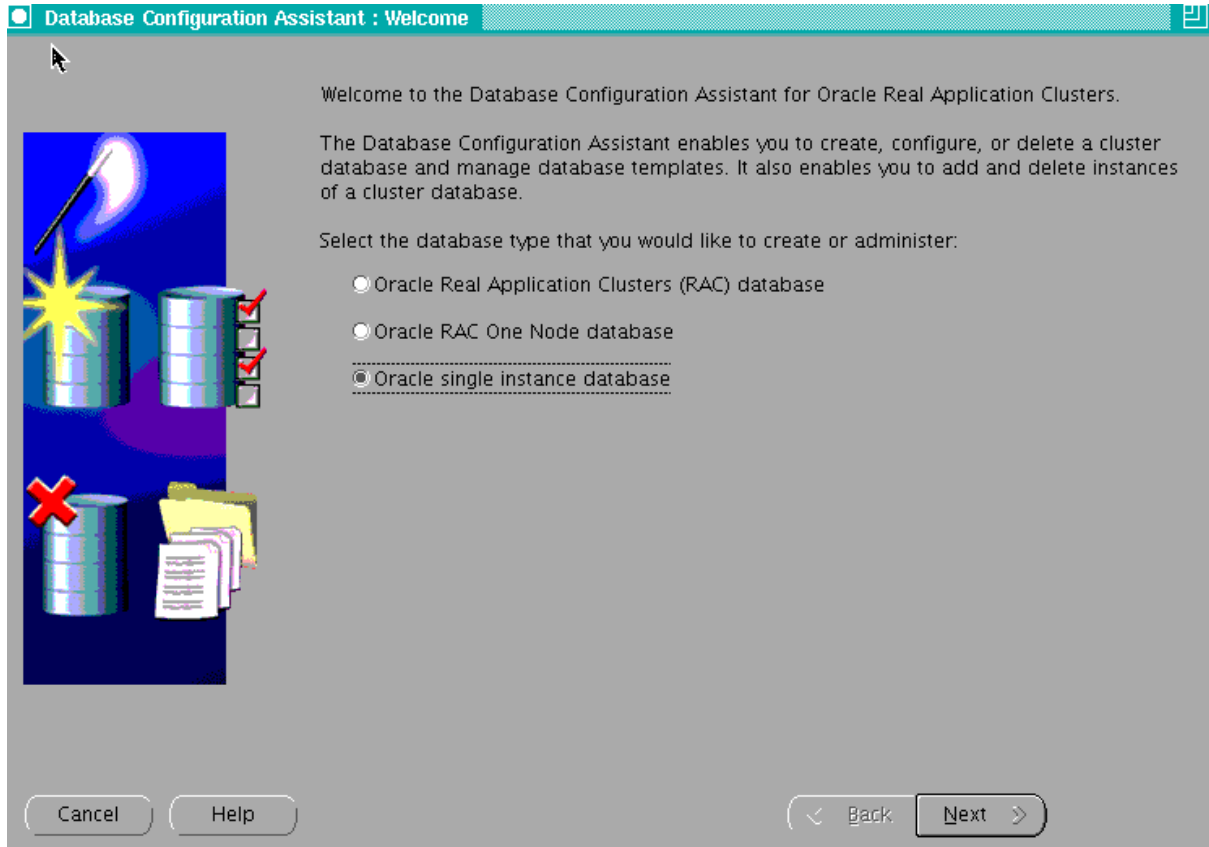
dbca &

```
[root@racnode1 ~]# xhost +
access control disabled, clients can connect from any host
[root@racnode1 ~]# su - oracle
[oracle@racnode1 ~]$ dbca &
[1] 23858
[oracle@racnode1 ~]$ █
```



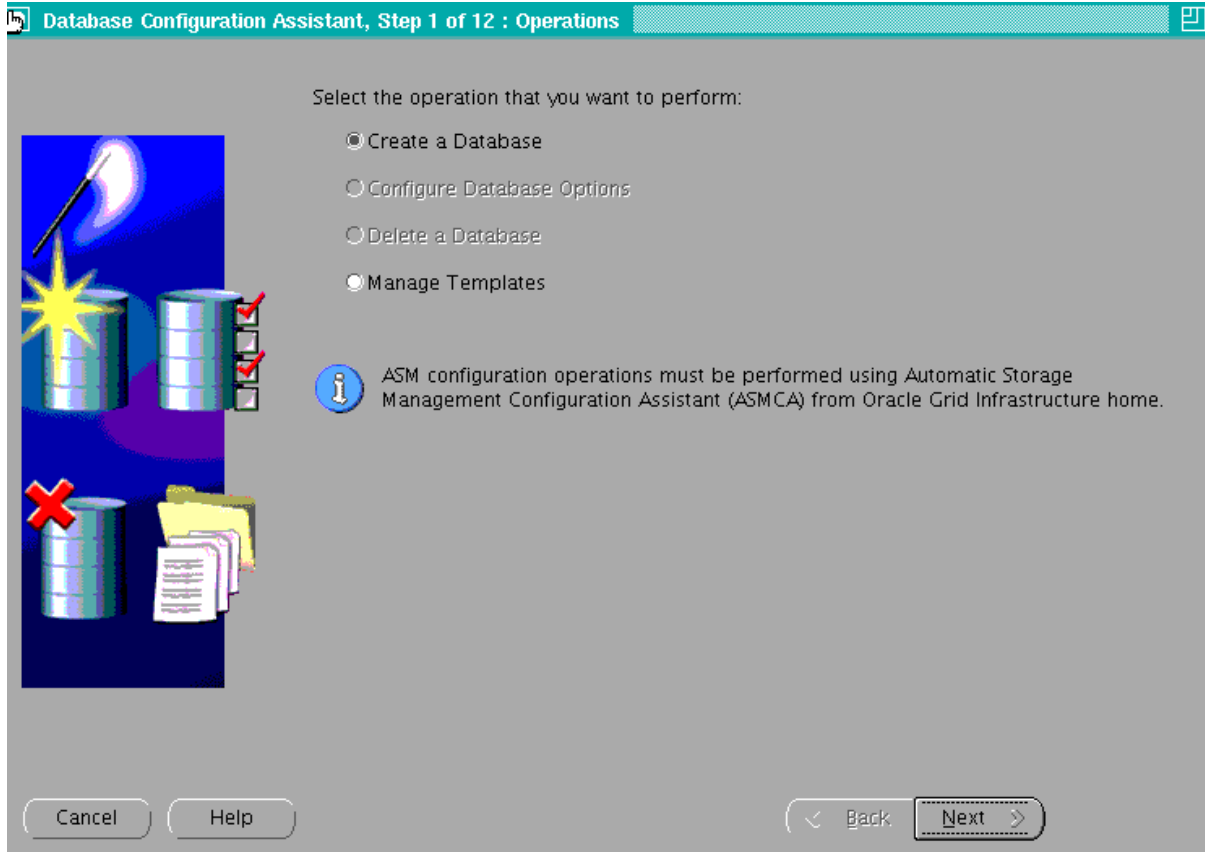
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Database Configuration Assistant, Step 2 of 12 : Database Templates

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 checked="" type="radio"/>	General Purpose or Transaction Processing	Yes
<input type="radio"/>	Custom Database	No
<input type="radio"/>	Data Warehouse	Yes

Show Details...

Cancel Help Back Next

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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:

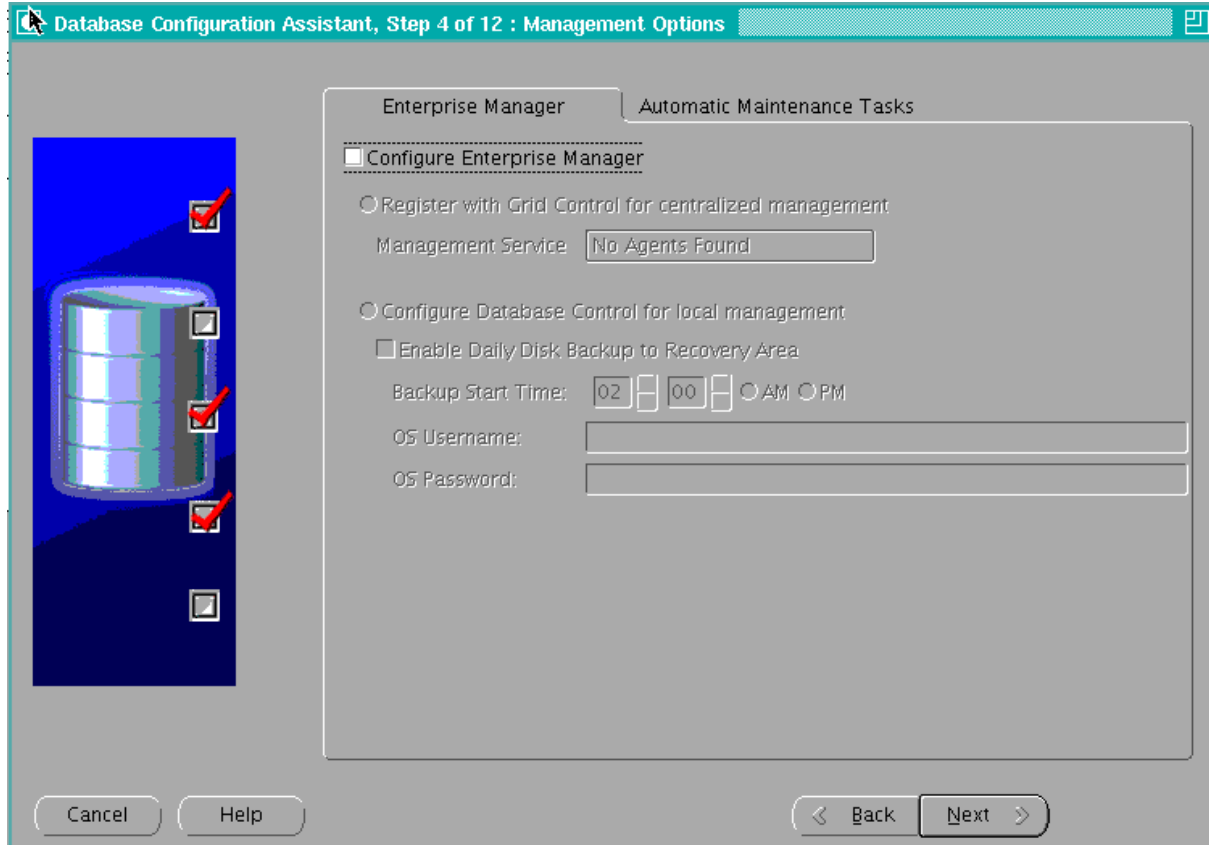
A database is referenced by at least one Oracle instance which is uniquely identified from any other instance on this computer by an Oracle System Identifier (SID).

SID:

Cancel Help < Back Next >

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**Database Configuration Assistant, Step 5 of 12 : Database Credentials**

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		

Use the Same Administrative Password for All Accounts

Password:

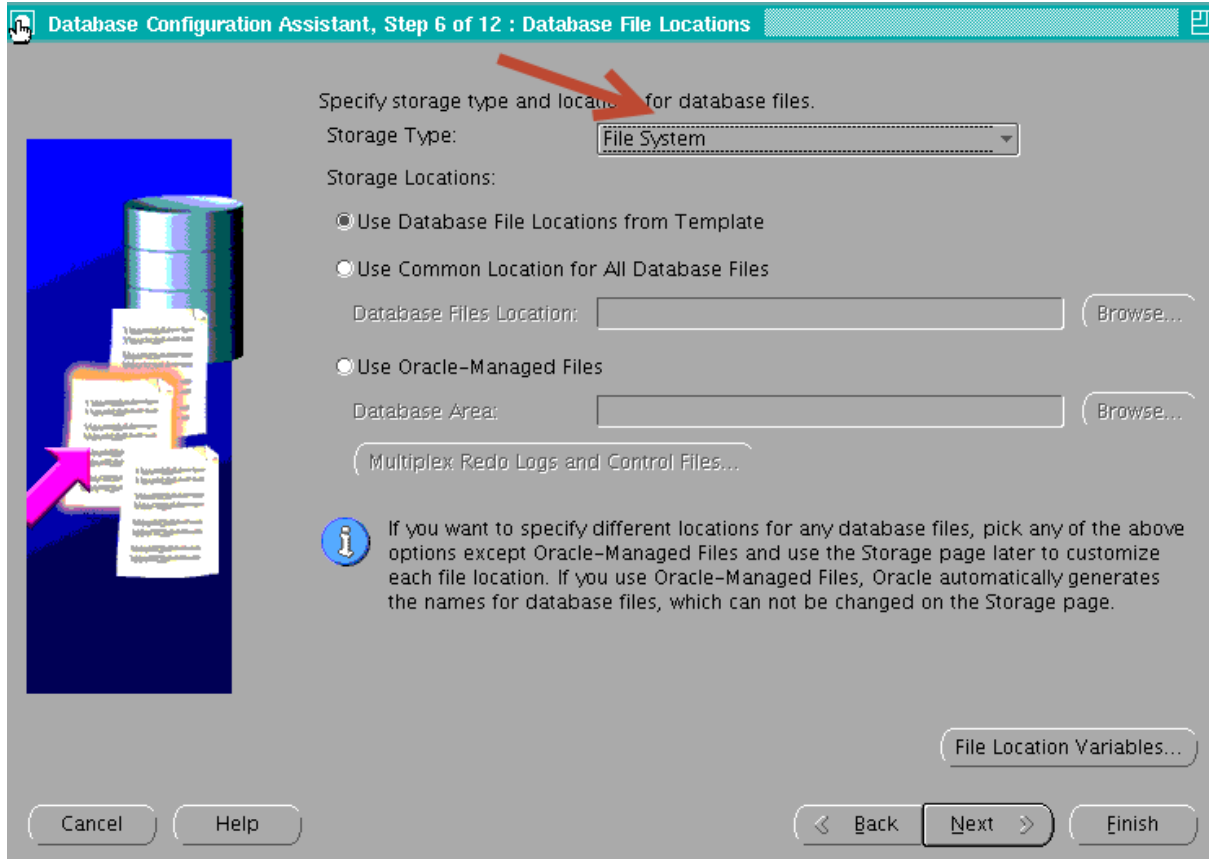
Confirm Password:

Cancel Help < Back Next >



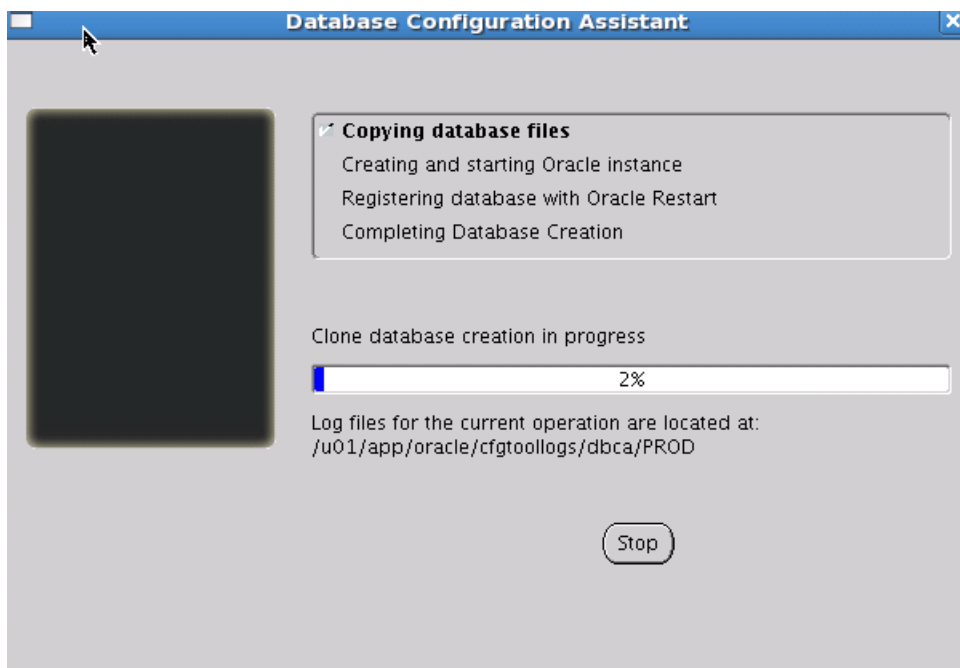
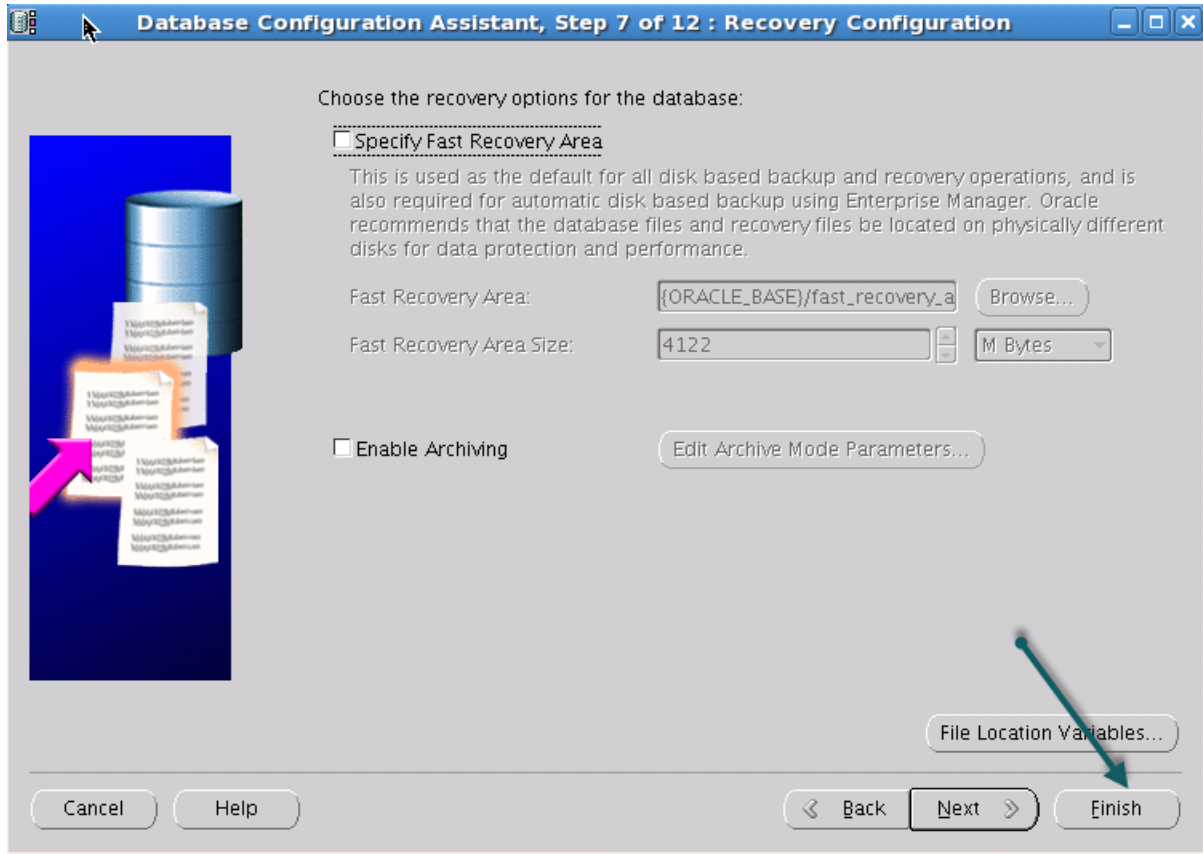
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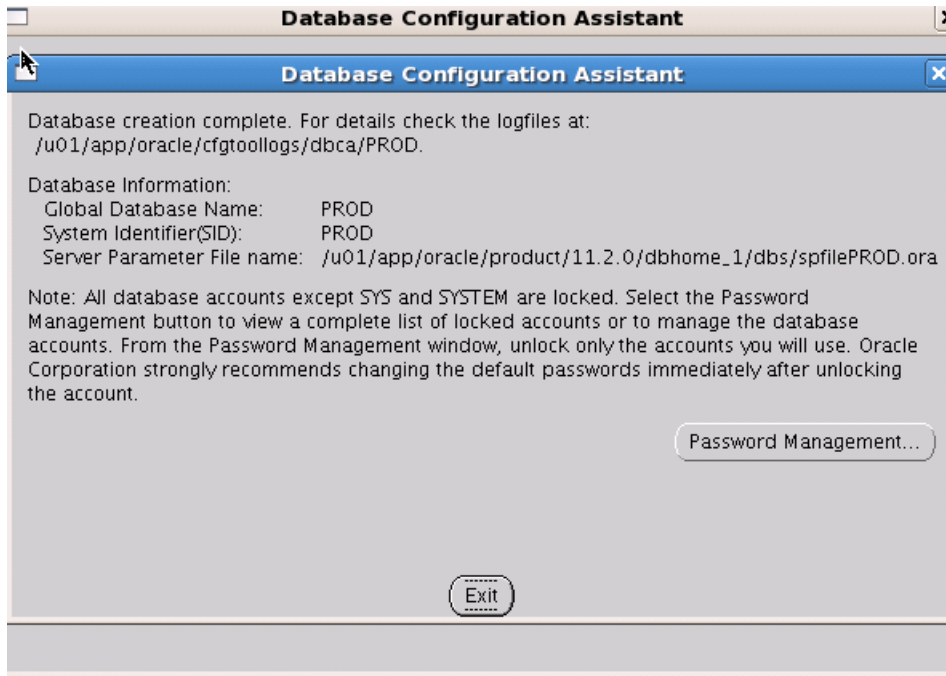


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```
export ORACLE_SID=PROD
```

---

#### VERIFY THE SINGLE INSTANCE FILE SYSTEM

```
select member from v$logfile  
union  
select name from v$controlfile  
union  
select name from v$datafile  
union  
select name from v$tempfile;
```

NAME
-----
/u01/app/oracle/oradata/PROD/control01.ctl
/u01/app/oracle/oradata/PROD/control02.ctl
/u01/app/oracle/oradata/PROD/redo01.log
/u01/app/oracle/oradata/PROD/redo02.log
/u01/app/oracle/oradata/PROD/redo03.log
/u01/app/oracle/oradata/PROD/sysaux01.dbf

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```

/u01/app/oracle/oradata/PROD/system01.dbf
/u01/app/oracle/oradata/PROD/temp01.dbf
/u01/app/oracle/oradata/PROD/undotbs01.dbf
/u01/app/oracle/oradata/PROD/users01.dbf

```

VERIFY YOU HAVE SUFFICIENT SPACE IN THE DISKGROUP

SQL&gt; select name,state,type,total\_mb,free\_mb from v\$asm\_diskgroup;

NAME	STATE	TYPE	TOTAL_MB	FREE_MB
DATA	MOUNTED	NORMAL	20456	10745

MODIFY THE XML FILE AND VERIFY THE ENTERED FIELDS

```

cd /u01/app/oracle/product/11.2.0/dbhome_1/assistants/rconfig/sampleXMLs
cp ConvertToRAC_AdminManaged.xml ConvertToRAC_AdminManaged.xml_org

```

[oracle@racnode1 sampleXMLs]\$ cat ConvertToRAC\_AdminManaged.xml

&lt;?xml version="1.0" encoding="UTF-8"?&gt;

&lt;n:RConfig xmlns:n="http://www.oracle.com/rconfig"

xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

xsi:schemaLocation="http://www.oracle.com/rconfig"&gt;

&lt;n:ConvertToRAC&gt;

&lt;!-- Verify does a precheck to ensure all pre-requisites are met, before the conversion is attempted. Allowable values are: YES|NO|ONLY --&gt;

&lt;n:Convert verify="ONLY"&gt;

&lt;!--Specify current OracleHome of non-rac database for SourceDBHome --&gt;

&lt;n:SourceDBHome&gt;/u01/app/oracle/product/11.2.0/dbhome\_1&lt;/n:SourceDBHome&gt;

&lt;!--Specify OracleHome where the rac database should be configured. It can be same as SourceDBHome --&gt;

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```
<n:TargetDBHome>/u01/app/oracle/product/11.2.0/dbhome_1</n:TargetDBHome>
<!--Specify SID of non-rac database and credential. User with sysdba role is required to perform conversion -->
<n:SourceDBInfo SID="PROD">
  <n:Credentials>
    <n:User>sys</n:User>
    <n>Password>oracle11g</n>Password>
    <n:Role>sysdba</n:Role>
  </n:Credentials>
</n:SourceDBInfo>
<!--Specify the list of nodes that should have rac instances running for the Admin Managed Cluster Database.
LocalNode should be the first node in this nodelist. -->
<n:NodeList>
  <n:Node name="racnode1"/>
  <n:Node name="racnode2"/>
</n:NodeList>
<!--Instance Prefix tag is optional starting with 11.2. If left empty, it is derived from db_unique_name.-->
<n:InstancePrefix>PROD</n:InstancePrefix>
<!-- Listener details are no longer needed starting 11.2. Database is registered with default listener and SCAN
listener running from Oracle Grid Infrastructure home. -->
<!--Specify the type of storage to be used by rac database. Allowable values are CFS|ASM. The non-rac
database should have same storage type. ASM credentials are no needed for conversion. -->
<n:SharedStorage type="ASM">
<!--Specify Database Area Location to be configured for rac database.If this field is left empty, current storage
will be used for rac database. For CFS, this field will have directory path. -->
<n:TargetDatabaseArea>+DATA</n:TargetDatabaseArea>
<!--Specify Flash Recovery Area to be configured for rac database. If this field is left empty, current recovery
area of non-rac database will be configured for rac database. If current database is not using recovery Area,
the resulting rac database will not have a recovery area. -->
<n:TargetFlashRecoveryArea>+DATA</n:TargetFlashRecoveryArea>
</n:SharedStorage>
</n:Convert>
</n:ConvertToRAC>
</n:RConfig>
```

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**VALIDATE THE XML PARAMETERS USING RCONFIG****rconfig ConvertToRAC\_AdminManaged.xml**

```
[oracle@racnode1 sampleXMLs]$ rconfig ConvertToRAC_AdminManaged.xml
<?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>
```

---

**MODIFY THE XML PARAMETER****Modify ConvertToRAC\_AdminManaged.xml**

**<n:Convert verify="ONLY">** to **<n:Convert verify="YES">**

```
[oracle@racnode1 sampleXMLs]$ cat ConvertToRAC_AdminManaged.xml
<?xml version="1.0" encoding="UTF-8"?>
<n:RConfig xmlns:n="http://www.oracle.com/rconfig"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.oracle.com/rconfig">
  <n:ConvertToRAC>
```

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```
<!-- Verify does a precheck to ensure all pre-requisites are met, before the conversion is attempted. Allowable
values are: YES|NO|ONLY -->
  <n:Convert verify="YES">
<!--Specify current OracleHome of non-rac database for SourceDBHome -->
  <n:SourceDBHome>/u01/app/oracle/product/11.2.0/dbhome_1</n:SourceDBHome>
<!--Specify OracleHome where the rac database should be configured. It can be same as SourceDBHome -->
  <n:TargetDBHome>/u01/app/oracle/product/11.2.0/dbhome_1</n:TargetDBHome>
<!--Specify SID of non-rac database and credential. User with sysdba role is required to perform conversion -->
  <n:SourceDBInfo SID="PROD">
    <n:Credentials>
      <n:User>sys</n:User>
      <n>Password>oracle11g</n>Password>
      <n:Role>sysdba</n:Role>
    </n:Credentials>
  </n:SourceDBInfo>
  <n:NodeList>
    <n:Node name="racnode1"/>
    <n:Node name="racnode2"/>
  </n:NodeList>
<!--Instance Prefix tag is optional starting with 11.2. If left empty, it is derived from db_unique_name.-->
  <n:InstancePrefix>PROD</n:InstancePrefix>
<!-- Listener details are no longer needed starting 11.2. Database is registered with default listener and SCAN
listener running from Oracle Grid Infrastructure home. -->
<!--Specify the type of storage to be used by rac database. Allowable values are CFS|ASM. The non-rac
database should have same storage type. ASM credentials are no needed for conversion. -->
  <n:SharedStorage type="ASM">
<!--Specify Database Area Location to be configured for rac database.If this field is left empty, current storage
will be used for rac database. For CFS, this field will have directory path. -->
  <n:TargetDatabaseArea>+DATA</n:TargetDatabaseArea>
<!--Specify Flash Recovery Area to be configured for rac database. If this field is left empty, current recovery
area of non-rac database will be configured for rac database. If current database is not using recovery Area,
the resulting rac database will not have a recovery area. -->
  <n:TargetFlashRecoveryArea>+DATA</n:TargetFlashRecoveryArea>
</n:SharedStorage>
</n:Convert>
</n:ConvertToRAC>
</n:RConfig>
```



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**RUN RCONFIG TO CONVERT FROM SINGLE INSTANCE DATABASE TO RAC****rconfig ConvertToRAC\_AdminManaged.xml**

Converting Database "PROD" to Cluster Database. Target Oracle Home:  
/u01/app/oracle/product/11.2.0/dbhome\_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 Flash 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">
```

```
<Oracle_Home>
```

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

```
</Oracle_Home>
```

```
<Database type="ADMIN_MANAGED" >
```

```
<InstanceList>
```

```
<Instance SID="PROD1" Node="racnode1" >
```

```
</Instance>
```

```
<Instance SID="PROD2" Node="racnode2" >
```

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```
</Instance>
</InstanceList>
</Database> </ReturnValue>
</Convert>
</ConvertToRAC></RConfig>
```

---

**VERIFY FROM BACK END**

```
select member from v$logfile
```

```
union
```

```
select name from v$controlfile
```

```
union
```

```
select name from v$datafile
```

```
union
```

```
select name from v$tempfile;
```

**MEMBER**

```
-----
+DATA/prod/controlfile/current.278.888838631
+DATA/prod/datafile/sysaux.273.888838541
+DATA/prod/datafile/system.272.888838509
+DATA/prod/datafile/undotbs1.274.888838567
+DATA/prod/datafile/undotbs2.289.888838877
+DATA/prod/datafile/undotbs3.290.888838881
+DATA/prod/datafile/users.275.888838567
+DATA/prod/onlinelog/group_1.282.888838723
+DATA/prod/onlinelog/group_2.283.888838725
+DATA/prod/onlinelog/group_3.284.888838725
+DATA/prod/onlinelog/group_4.279.888838729
+DATA/prod/onlinelog/group_5.280.888838731
+DATA/prod/onlinelog/group_6.281.888838733
+DATA/prod/onlinelog/group_7.285.888838733
+DATA/prod/onlinelog/group_8.286.888838733
```

```
+DATA/prod/online/onlinegroup_9.287.888838733
+DATA/prod/tempfile/temp.288.888838837
```

Wow – we have converted from Single instance filesystem to RAC ☺