



Upgrade or migrate your Oracle databases to 12cR2: tools, methods and paths

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CLEVELAND PUBLIC AUDITORIUM, CLEVELAND, OHIO

WWW.NEOOUG.ORG/GLOC



- Technical Staff, Dell EMC Database Engineering
- 25+ years experience in IT Industry
- Specializing in Database, Cloud, Virtualization and IT Infrastructure
- Author and Speaker (150+ sessions)
- IOUG Cloud Computing SIG Co-founder & Vice President
- Oracle ACE Director since 2010,
- OAUG Innovator of Year (2011)
- Oracle Excellence Award-Technologist of the Year: Cloud Architect by Oracle Magazine (2012)
- My Blog: <http://kyuoracleblog.wordpress.com/>



Agenda

- Methods and Paths for Oracle database 12cR2 Upgrade
- Tools for Oracle Database 12cR2 Upgrade
- Upgrade Multitenant Database to Oracle 12cR2
- Oracle RAC Database Upgrade Examples

Oracle Database 12c Upgrade Methods

- Plan Your major upgrade Process
 - Prepare upgrade
 - Understand the new database release, research and select the upgrade path/method, develop the test plan, backup plan, prepare upgrade scripts
 - Test your upgrade process:
 - Perform test upgrade on your test database.
 - Test the upgraded test database
 - Perform the tests on the upgraded test database, identify/fix issues, test the upgraded test database: functionality tests/performance tests
 - Prepare and backup the production Database
 - Prepare the upgrade, backup the current production database
 - Upgrade the production Database
 - Perform the upgrade, make another backup after the upgrade
 - Tune and Adjust the New Production Database
 - Tune the database, use the database new features and adapt any new DBA procedures

Oracle Database 12c Upgrade Methods

- Methods to upgrade your database to Oracle 12c
 - Database Upgrade : upgrade your current database to Oracle 12c
 - Database Upgrade Assistance(DBUA)
 - Manual upgrade using parallel Upgrade Utility /command-line tools
 - Data Migration: migrate data from old database to 12cR2 database
 - Data pump: export data from old database and import
 - Create table as select
 - Transportable tablespaces, or transportable database
 - RMAN Duplicate
 - Special Methods to minimize database downtime during migration
 - Rolling upgrade
 - Rolling upgrade with Data Guard
 - GoldenGate
 - Upgrade PDB database using unplug/plug

Oracle Database 12c Upgrade Methods

- How to choose the proper upgrade or the migration methods factors to consider:
 - Choose between migration or upgrade
 - Migrate: move the database to new HW Infrastructure, DB version
 - Upgrade: DB version in-place upgrade on the same HW Infrastructure
 - Migration methods: upgrade source/destination: platform, servers, storage,
 - big endian vs little endian of the platforms
 - Acceptable database downtime requirement for upgrade
 - Database size : a large database migration takes long time
 - Upgrade path: from database version and to database version
 - Standalone database or RAC Database
 - Application certification on the new database version
 - New Database features to adapt

Oracle Database 12cR (18c) Upgrade Methods

- Oracle Database Upgrade Path to 12cR2
 - Supported Direct Upgrade by catctl.pl or DBUA:
11.2.0.3 or later, 12.1.0.1 or 12.1.0.2, 12.2.0.1 → 12.2.0.2 (18c)
 - Direct Upgrade not supported for below 11.2.0.3:
two steps upgrade cases:
 - 1) 11.2.0.2, 11.1.0.7 → 11.2.0.4 → 12.2
 - 2) 10.2.0.2, 10.2.0.3, 10.2.0.4, 10.2.0.5, 10.1.0.5 → 12.1.0.2 → 12.2
 - 3) 9.2.0.8 → 11.2.0.4 → 12.2



Tools for Oracle Database 12c Upgrade

- Data Migration Tools
 - Data pump: export data from old database and import
Migrate full or partial data, It takes time to migrate a large Database.
 - Transportable tablespaces, or transportable database:
Reduce the migration time by copying the datafile, not export/import rows,
Migration across the platforms and DB versions.
 - RMAN Duplicate: migrate the data to new servers, not upgrade DB version.
 - Create table as select
copy full or partial data to the new database
 - Use standby database , GoldenGate or shareplex to synchronize the data
(for minimal downtime)

Tools for Oracle Database 12c Upgrade

- Upgrade tools
 - Database Upgrade Assistance(DBUA)
 - GUI tool automates the upgrade process
 - launch during with Oracle installer or as a standalone tool any time later
 - Work with the direct upgrade path
 - GUI tool automates the upgrade
 - Pre-upgrade information tool : 12.2 introduced a java script preupgrade.jar
 - a single .jar file to replace preupgrd.sql and utluppkg.sql
 - Invoked from command line:
 - java -jar /tmp/preupgrade.jar TERMINAL TEXT
 - script location: \$ORACLE_HOME/rdbms/admin/preupgrade.jar
 - Advised to run this tool to check if the database is ready for upgrade
 - Output: preupgrade.log, pre-upgrade fixup scripts, post-upgrade fixups in text/XML
 - The fixup scripts help DBAs to trace, resolve the issues before upgrade.
 - Can run the fixup scripts many times.

Tools for Oracle Database 12c Upgrade

- Pre-upgrade information tool : preupgrade.jar
 - MOS note: 884522.1: [preupgrade_12201_cbuild_003.zip](#) from upgrade from 12.0.1,12.0.2, 11.2.0.3, 11.2.0.4 to 12cR2 (12.2.0.1)
- ```
$java -jar $ORACLE_HOME/rdbms/admin/preupgrade.jar TEXT
```
- Show: the current DB status information

```
$ java -jar /u01/app/oracle/product/12.2.0.1/rdbms/admin/preupgrade.jar TEXT
Report generated by Oracle Database Pre-Upgrade Information Tool Version
12.2.0.1.0

Upgrade-To version: 12.2.0.1.0

=====
Status of the database prior to upgrade
=====

Database Name: DB12
Container Name: DB12
Container ID: 0
Version: 12.1.0.2.0
Compatible: 12.1.0.2.0
Blocksize: 8192
Platform: Linux x86 64-bit
Timezone File: 18
Database log mode: NOARCHIVELOG
Readonly: FALSE
Edition: EE

Oracle Component Upgrade Action Current Status

Oracle Server [to be upgraded] VALID
Oracle Workspace Manager [to be upgraded] VALID
Oracle XML Database [to be upgraded] VALID
```

# Tools for Oracle Database 12c Upgrade

- Before Upgrade: Required Actions, Recommended Actions, Info

```
=====
BEFORE UPGRADE
=====

Run <preupgradeLogDirPath>/preupgrade_fixups.sql to complete all
of the BEFORE UPGRADE action items below marked with '(AUTOFIXUP)'.

REQUIRED ACTIONS
=====
+ Adjust TABLESPACE SIZES as needed.

Tablespace Size Auto 12.2.0.1.0
----- -
 Size Extend Min Size Action

SYSAUX 550 MB DISABLED 500 MB None
SYSTEM 700 MB ENABLED 765 MB None
TEMP 20 MB ENABLED 150 MB None
UNDOTBS1 295 MB ENABLED 400 MB None

Note that 12.2.0.1.0 minimum sizes are estimates.
If you plan to upgrade multiple pluggable databases concurrently,
then you must ensure that the UNDO tablespace size is equal to at least
the number of pluggable databases that you upgrade concurrently,
multiplied by that minimum. Failing to allocate sufficient space can
cause the upgrade to fail.
```

# Tools for Oracle Database 12c Upgrade

- Recommended Actions:

## RECOMMENDED ACTIONS

=====

+ (AUTOFIXUP) Gather stale data dictionary statistics prior to database upgrade in off-peak time using:

```
EXECUTE DBMS_STATS.GATHER_DICTIONARY_STATS;
```

Dictionary statistics do not exist or are stale (not up-to-date).

Dictionary statistics help the Oracle optimizer find efficient SQL execution plans and are essential for proper upgrade timing. Oracle recommends gathering dictionary statistics in the last 24 hours before database upgrade.

For information on managing optimizer statistics, refer to the 12.1.0.2 Oracle Database SQL Tuning Guide.

```
SQL> @/u01/app/oracle/cfgtoollogs/DB12/preupgrade/preupgrade_fixups.sql
Executing Oracle PRE-Upgrade Fixup Script
```

```
Auto-Generated by: Oracle Preupgrade Script
 Version: 12.2.0.1.0 Build: 3
Generated on: 2017-03-07 13:46:51
```

```
For Source Database: DB12
Source Database Version: 12.1.0.2.0
For Upgrade to Version: 12.2.0.1.0
```

| Check Name       | Fixup  | Status | Further DBA Action |
|------------------|--------|--------|--------------------|
| -----            | -----  | -----  | -----              |
| dictionary_stats | Passed | None   |                    |

```
PL/SQL procedure successfully completed.
```



# Tools for Oracle Database 12c Upgrade

- After Upgrade: Required Actions, Recommended Actions, Info

```
=====
AFTER UPGRADE
=====
```

```
Run <preupgradeLogDirPath>/postupgrade_fixups.sql to complete all
of the AFTER UPGRADE action items below marked with '(AUTOFIXUP)'.
```

```
REQUIRED ACTIONS
```

```
=====
None
```

```
RECOMMENDED ACTIONS
```

```
+ Upgrade the database time zone version using the DBMS_DST package.
```

```
The database is using timezone datafile version 18 and the target
12.2.0.1.0 database ships with timezone datafile version 26.
```

```
Oracle recommends using the most recent timezone data. For further
information, refer to My Oracle Support Note 1585343.1.
```

```
+ (AUTOFIXUP) Gather dictionary statistics after the upgrade using the
command:
```

```
EXECUTE DBMS_STATS.GATHER_DICTIONARY_STATS;
```

```
Oracle recommends gathering dictionary statistics after upgrade.
```

```
Dictionary statistics provide essential information to the Oracle
optimizer to help it find efficient SQL execution plans. After a
database upgrade, statistics need to be re-gathered as there can now be
tables that have significantly changed during the upgrade or new tables
that do not have statistics gathered yet.
```

```
Preupgrade generated files:
```

```
/u01/app/oracle/cfgtoollogs/DB12/preupgrade/preupgrade_fixups.sql
/u01/app/oracle/cfgtoollogs/DB12/preupgrade/postupgrade_fixups.sql
```

# Tools for Oracle Database 12c Upgrade

## – Parallel Upgrade Utility: catctl.pl and dbupgrade Script

- Upgrade simultaneously components without in special order
- Reduce the upgrade time by running multiple SQL processes
- dbupgrade to start catctl.pl or run catctl.pl separately
- Use –c option to include a list of PDBs to upgrade –c 'PDB1 PDB2'
- -n specifies the number of processes to use for parallel operation
- Example: Use parallel/upgrade utility on multitenant databases

```
SQL> STARTUP UPGRADE
```

```
SQL> ALTER PLUGGABLE DATABASE ALL OPEN UPGRADE
```

```
cd $ORACLE_HOME/rdbms/admin
```

```
ORACLE_HOME/perl/bin/perl catctl.pl -n 4 -M
```

```
$ORACLE_HOME/rdbms/admin -n 16 -l /home/oracle catupgrd.sql
```

(-l location of the spool log file

-M: keeps CDB\$ROOT in UPGRADE mode while PDBS are upgraded)

(check \$ORACLE\_HOME/cfgtoollogs/<SID>/upgrade/upg\_summary.log

```
SQL>STARTUP
```

# Upgrade Multitenant Database to 12cR2

- Three options:
  - Non-CDB to PDB
  - Everything at once
  - Unplug/Plug
- Upgrade and Plug as PDB
  - 12cR1 non CDB → PDB in 12cR2
  - Steps:

- . Start 12cR1 database read-only

- . Create XML description file: exec

```
exec DBMS_PDB.DESCRIBE ('PDB1.xml');
```

- . Shutdown Database

- . Plugin database :

```
create pluggable database PDB1
using ('PDB1.xml') nocopy tempfile reuse;
```

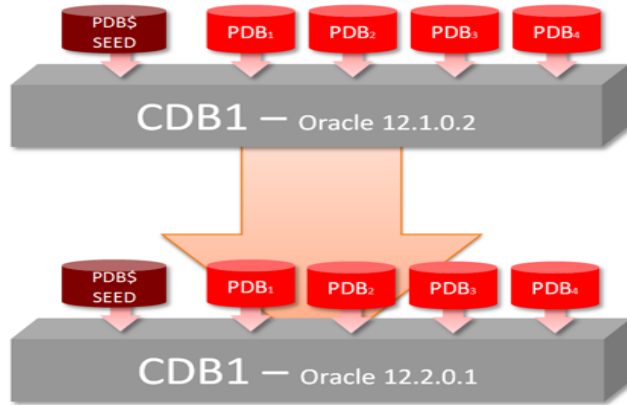
- . Sanity Operations:

```
start ?/rdbms/admin/noncdb_to_pdb.sql
```

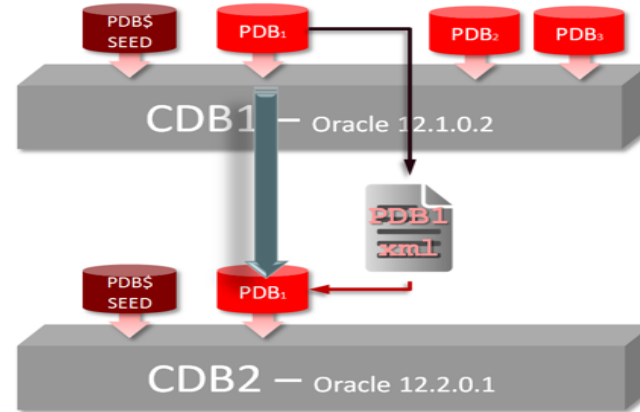
# Upgrade Multitenant Database to 12cR2

- Upgrade Options: Everything at Once vs. Unplug/Plug

## Everything at Once



## Unplug/Plug

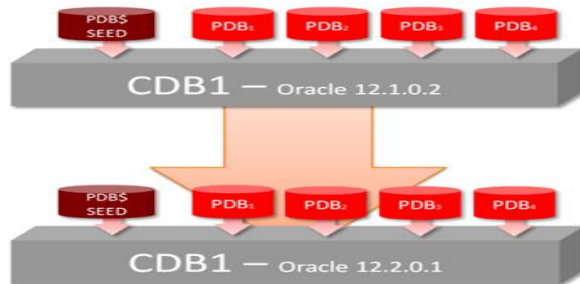


(Refer to Carol Tagliaferri's Database Upgrade presentation at Oracle Database 12.2 Beta User Group Test Event )



# Upgrade Multitenant Database to 12cR2

- Everything at Once



- Run preupgrade.jar

  - Ensure all PDBs are open

    - SQL> ALTER PLUGGABLE DATABASE ALL OPEN;

    - java -jar \$<12.2\_ORACLE\_HOME>/rdbms/admin/preupgrade.jar TERMINAL TEXT

- Perform pre-upgrade fixups

  - Repeat the following steps for each PDB:

    - alter session set container PDB1;

    - @\$ORACLE\_BASE/cfgtoollogs/CDB1/preupgrade/preupgrade\_fixups\_pdb1.sql

- preupgrade.jar runs in every container: CDB\$ROOTPDB\$SEE, All PDBs

- Results get logged to consolidated preupgrade.log

  - \$ORACLE\_BASE/cfgtoollogs/CDB/preupgrade/preupgrade.log

- Specific changes for each container in preupgrade\_<PDB>.log

# Upgrade Multitenant Database to 12cR2

In CDB – Oracle 12.2.0.1:

```
SQL> STARTUP UPGRADE
```

```
SQL> ALTER PLUGGABLE DATABASE ALL OPEN UPGRADE;
```

```
cd $ORACLE_HOME/rdbms/admin
```

```
$ORACLE_HOME/perl/bin/perl catctl.pl -d $ORACLE_HOME/rdbms/admin -n 16 -M -l
/home/oracle/upgrade catupgrd.sql
```

See \$ORACLE\_HOME/cfgtoollogs/<SID>/upgrade/[upg\\_summary.log](#)

```
SQL> STARTUP
```

```
SQL> ALTER PLUGGABLE DATABASE ALL OPEN;
```

```
$ORACLE_HOME/perl/bin/perl $ORACLE_HOME/rdbms/admin/catcon.pl -n 1
```

```
-d $ORACLE_HOME/cfgtoollogs/cdbupgr/preupgrade
```

```
-l /home/oracle/upgrade
```

```
-b postupgrade_fixups postupgrade_fixups.sql
```

```
$ORACLE_HOME/perl/bin/perl catcon.pl -n 1 -e -b utlrp -d ""."" utlrp.sql
```

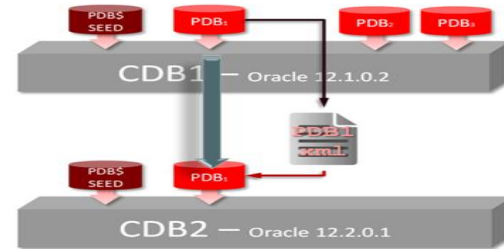
# Upgrade Multitenant Database to 12cR2

Upgrade one at a time:

- In CDB1:

- ❑ Copy new *preupgrade.jar* into CDB1's `$ORACLE_HOME/rdbms/admin`
- ❑ `SQL> alter pluggable database PDB1 open;`
- ❑ `java -jar /$ORACLE_HOME/rdbms/admin/preupgrade.jar TERMINAL TEXT -c PDB1`
- ❑ `SQL> alter session set container=PDB1;`
- ❑ `SQL> @/u01/app/oracle/cfgtoollogs/CDB1/preupgrade/preupgrade_fixups_pdb1.sql`
- ❑ `SQL> alter session set container=CDB$ROOT;`
- ❑ `SQL> alter pluggable database PDB1 close;`
- ❑ `SQL> alter pluggable database PDB1 unplug into '/stage/pdb1.xml';`
- ❑ `SQL> exit`

- Unplug/Plug



# Upgrade Multitenant Database to 12cR2

Upgrade one at a time:

- In CDB2:

```
SQL> alter session set container=CDB$ROOT;
```

- ❑ SQL> create pluggable database PDB1 using  
'/stage/pdb1.xml' file\_name\_convert=(  
'/oradata/CDB1/pdb1', '/oradata/CDB2/pdb1');
- ❑ SQL> alter pluggable database PDB1 open upgrade
- ❑ SQL> exit

```
$> cd $ORACLE_HOME/rdbms/admin
```

- ❑ \$> \$ORACLE\_HOME/perl/bin/perl catctl.pl  
-c 'PDB1' catupgrd.sql

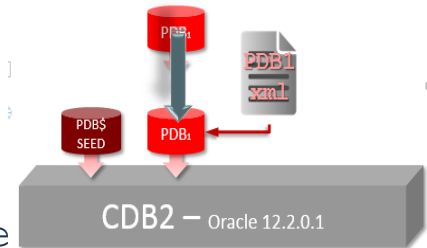
```
SQL> alter session set container=PDB1;
```

```
SQL> startup
```

```
SQL>
```

```
@/u01/app/oracle/cfgtoollogs/CDB1/preupgrade/postupgrade_
ixups_pdb1.sql
```

- ❑ SQL> @?/rdbms/admin/utl1rp.sql

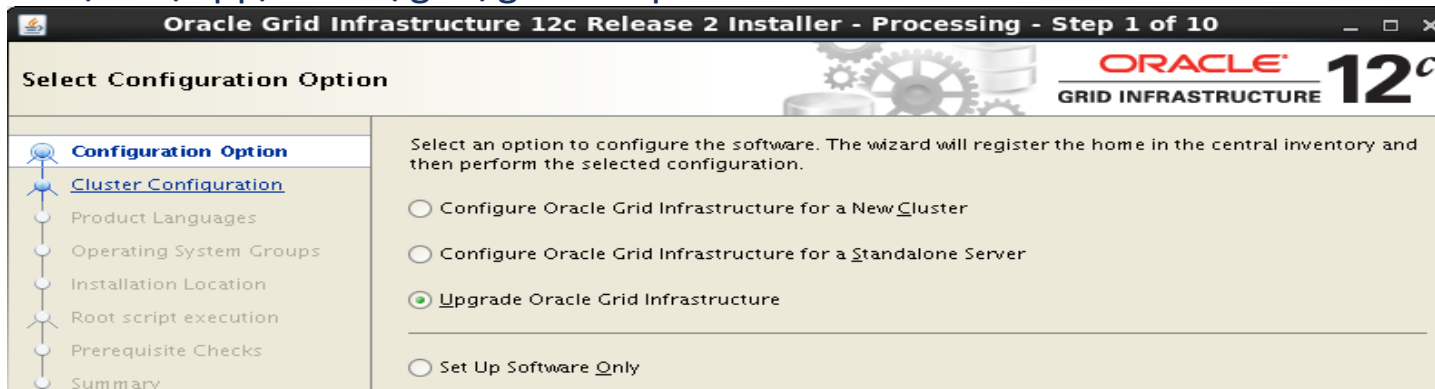




# Upgrade Oracle RAC Database to 12cR2

- Upgrade Oracle RAC Database
  - Upgrade Oracle Grid Infrastructure to 12.2.0.1 Grid Infrastructure
  - Install Oracle 12.2.0.1 RAC Software
  - Upgrade RAC to 12.2.0.1 RAC database
- Example 1: Upgrade 11.2.0.4 RAC database to 12.2.0.1 RAC
  - Upgrade Oracle Grid Infrastructure to 12.2.0.1 Grid Infrastructure

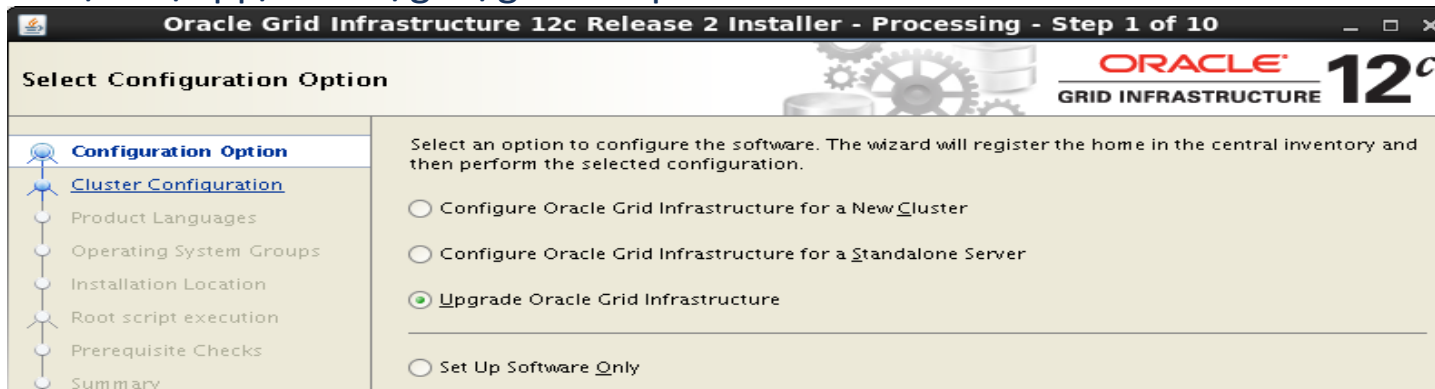
```
unzip grid_home1.zip -d /u01/app/12.2.0/grid
/u01/app/12.2.0/grid/gridSetup.sh &
```



# Upgrade Oracle RAC Database to 12cR2

- Upgrade Oracle RAC Database
  - Upgrade Oracle Grid Infrastructure to 12.2.0.1 Grid Infrastructure
  - Install Oracle 12.2.0.1 RAC Software
  - Upgrade RAC to 12.2.0.1 RAC database
- Example 1: Upgrade 11.2.0.4 RAC database to 12.2.0.1 RAC
  - Upgrade Oracle Grid Infrastructure to 12.2.0.1 Grid Infrastructure

```
unzip grid_home1.zip -d /u01/app/12.2.0/grid
/u01/app/12.2.0/grid/gridSetup.sh &
```



# Upgrade Oracle RAC Database to 12cR2

Oracle Grid Infrastructure 12c Release 2 Installer - Processing - Step 2 of 10

## Grid Infrastructure Node Selection

Select the Cluster nodes (in addition to the local node) in the hardware cluster where the Installer should upgrade Grid Infrastructure.

|                                     | Node Name | Oracle Grid Infrastructure Home |
|-------------------------------------|-----------|---------------------------------|
| <input checked="" type="checkbox"/> | bposvr107 | /u01/app/11.2.0/grid            |
| <input checked="" type="checkbox"/> | bposvr108 | /u01/app/11.2.0/grid            |

Configuration Option

Node Selection

Management Options

Operating System Groups

Installation Location

Oracle Grid Infrastructure 12c Release 2 Installer - Processing - Step 8 of 10

## Summary

Oracle Grid Infrastructure 12c Release 2 Installer

- Global Settings
  - Config Option: Upgrade Oracle Grid Infrastructure [\[Edit\]](#)
  - Oracle base for Oracle Grid Infrastructure: /u01/app/grid [\[Edit\]](#)
  - Grid home: /u01/app/12.2.0/grid
  - Privileged Operating System Groups: asmdba (OSDBA), asmoper (OSOPER), asmadmin (OSASM)
  - Root script execution configuration: Manual configuration [\[Edit\]](#)
  - Upgrade Oracle ASM: true
- Management Information
  - Management method: None [\[Edit\]](#)
- Grid Infrastructure Settings
  - Selected Nodes: bposvr107, bposvr108

Configuration Option

Node Selection

Management Options

Operating System Groups

Installation Location

Root script execution

Prerequisite Checks

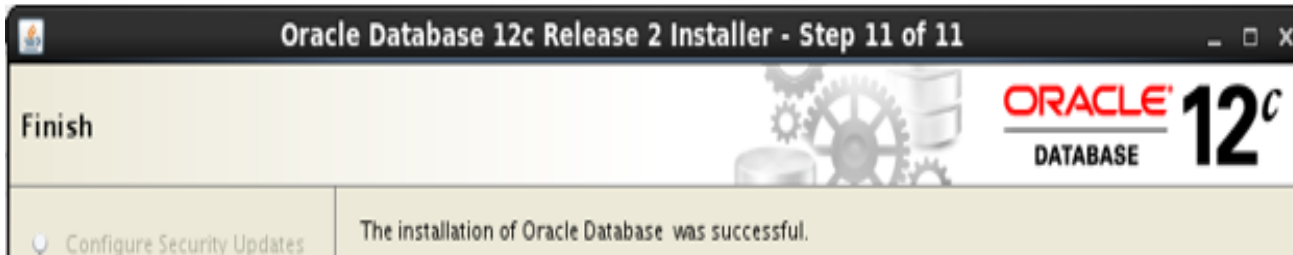
Summary

Install Product

Finish

# Upgrade Oracle RAC Database to 12cR2

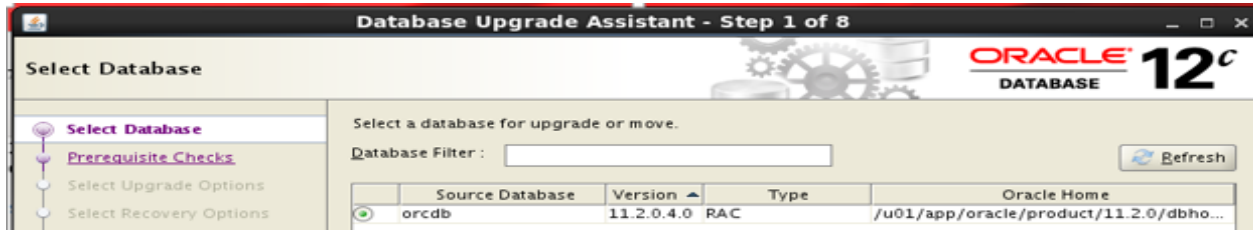
- Install Oracle 12.2.0.2 RAC Software





# Upgrade Oracle RAC Database to 12cR2

- Upgrade Oracle 11.2.0.4 RAC Database to 12.2.0.1  
[oracle@bposvr107 bin]\$ ./dbua &



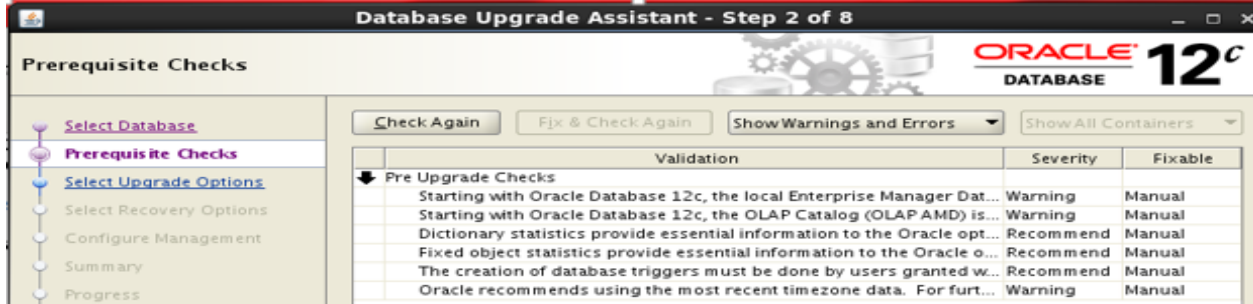
Database Upgrade Assistant - Step 1 of 8

Select Database

Select a database for upgrade or move.

Database Filter :  Refresh

| Source Database | Version    | Type | Oracle Home                            |
|-----------------|------------|------|----------------------------------------|
| orcl            | 11.2.0.4.0 | RAC  | /u01/app/oracle/product/11.2.0/dbho... |

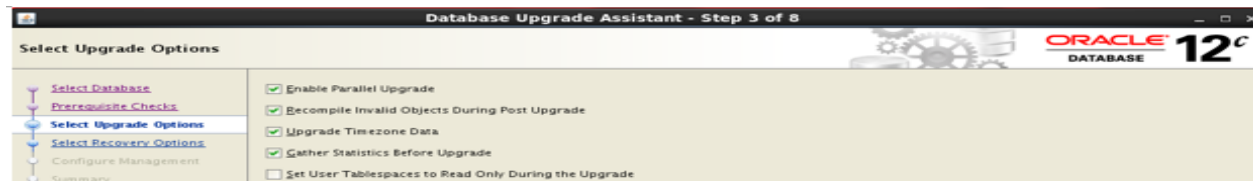


Database Upgrade Assistant - Step 2 of 8

Prerequisite Checks

Check Again Fjx & Check Again Show Warnings and Errors Show All Containers

| Validation                                                               | Severity  | Fixable |
|--------------------------------------------------------------------------|-----------|---------|
| Pre Upgrade Checks                                                       |           |         |
| Starting with Oracle Database 12c, the local Enterprise Manager Dat...   | Warning   | Manual  |
| Starting with Oracle Database 12c, the OLAP Catalog (OLAP AMD) is...     | Warning   | Manual  |
| Dictionary statistics provide essential information to the Oracle opt... | Recommend | Manual  |
| Fixed object statistics provide essential information to the Oracle o... | Recommend | Manual  |
| The creation of database triggers must be done by users granted w...     | Recommend | Manual  |
| Oracle recommends using the most recent timezone data. For furt...       | Warning   | Manual  |



Database Upgrade Assistant - Step 3 of 8

Select Upgrade Options

- Enable Parallel Upgrade
- Recompile Invalid Objects During Post Upgrade
- Upgrade Timezone Data
- Gather Statistics Before Upgrade
- Set User Tablespaces to Read Only During the Upgrade



# Upgrade Oracle RAC Database to 12cR2

## – Upgrade Oracle 11.2.0.4 RAC Database to 12.2.0.1

**Database Upgrade Assistant - Step 6 of 8**

**Summary**

[Select Database](#)  
[Prerequisite Checks](#)  
[Select Upgrade Options](#)  
[Select Recovery Options](#)  
[Configure Management](#)  
**Summary**  
[Progress](#)  
[Results](#)

**Database Upgrade Summary**

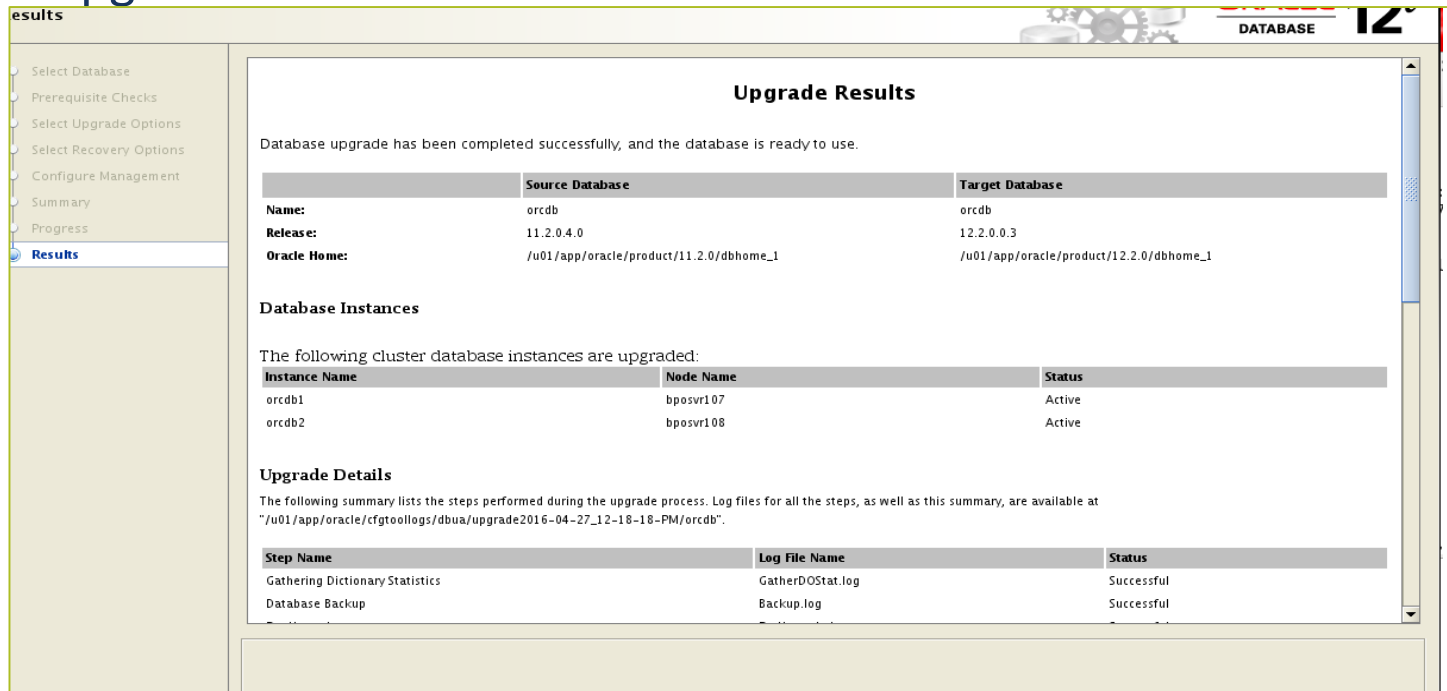
- Source Database**
  - Name: orcdb [Edit]
  - Release: 11.2.0.4.0
  - Oracle Home: /u01/app/oracle/product/11.2.0/dbhome\_1 [Edit]
- Target Database**
  - Name: orcdb
  - Release: 12.2.0.0.3
  - Oracle Home: /u01/app/oracle/product/12.2.0/dbhome\_1
- The following cluster database instances will be upgraded:**
  - Instance Name: orcdb1; Node Name: bposvr107: [Edit]
  - Instance Name: orcdb2; Node Name: bposvr108: [Edit]
- Pre-Upgrade Checks**
  - WARNING: Starting with Oracle Database 12c, the local Enterprise Manager Database Control does not exist anymore. The repository will be removed.
  - WARNING: Starting with Oracle Database 12c, the OLAP Catalog (OLAP AMD) is desupported and will be removed from the database during the upgrade.
  - RECOMMEND: Dictionary statistics provide essential information to the Oracle optimizer to help it find efficient SQL execution plans. After a database upgrade, you should run the dictionary statistics.
  - RECOMMEND: Fixed object statistics provide essential information to the Oracle optimizer to help it find efficient SQL execution plans. Those statistics are not updated during the database upgrade.
  - RECOMMEND: The creation of database triggers must be done by users granted with ADMINISTER DATABASE TRIGGER privilege. Privilege must be granted to the user performing the upgrade.
  - INFO: The Oracle database upgrade script upgrades most, but not all Oracle Database components that may be installed. Some components are not upgraded.
  - INFO: To reduce database upgrade time, you can upgrade APEX manually before the database upgrade. Refer to My Oracle Support Note 1089827.1.
  - WARNING: Oracle recommends using the most recent timezone data. For further information, refer to My Oracle Support Note 1509653.1. [Edit]
- Initialization Parameter Changes**
  - Parameters requiring an update:
    - processes: 300
- Selected Upgrade Options:**
  - Enable Parallel Upgrade: [Edit]
  - Recompile Invalid Objects During Post Upgrade: [Edit]
  - Upgrade Timezone Data: [Edit]

Help    < Back    Next >    Finish    Cancel

# Upgrade Oracle RAC Database to 12cR2

## – Upgrade Oracle 11.2.0.4 RAC Database to 12.2.0.1

### Upgrade result:



**results**

**Upgrade Results**

Database upgrade has been completed successfully, and the database is ready to use.

|                     | Source Database                         | Target Database                         |
|---------------------|-----------------------------------------|-----------------------------------------|
| <b>Name:</b>        | orcdb                                   | orcdb                                   |
| <b>Release:</b>     | 11.2.0.4.0                              | 12.2.0.3                                |
| <b>Oracle Home:</b> | /u01/app/oracle/product/11.2.0/dbhome_1 | /u01/app/oracle/product/12.2.0/dbhome_1 |

**Database Instances**

The following cluster database instances are upgraded:

| Instance Name | Node Name | Status |
|---------------|-----------|--------|
| orcdb1        | bposvr107 | Active |
| orcdb2        | bposvr108 | Active |

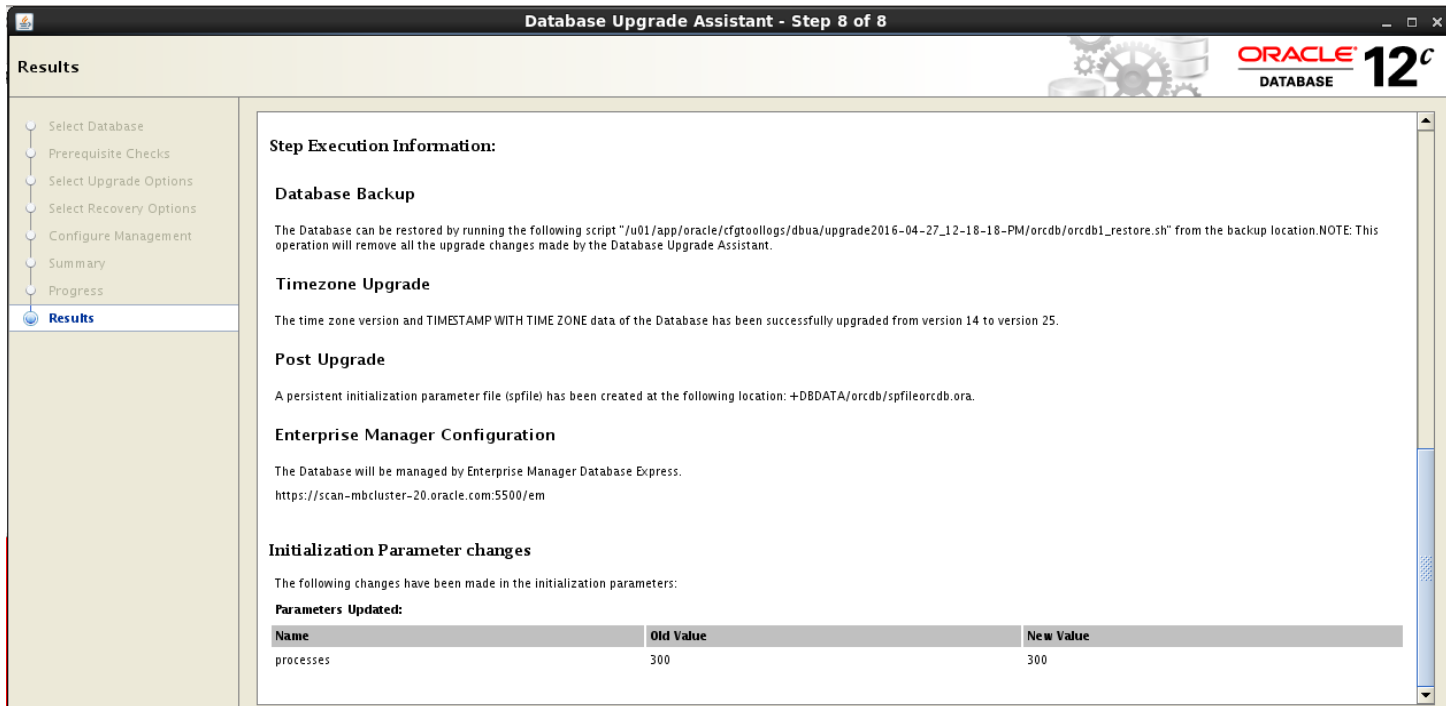
**Upgrade Details**

The following summary lists the steps performed during the upgrade process. Log files for all the steps, as well as this summary, are available at "/u01/app/oracle/cfgtoollogs/dbua/upgrade2016-04-27\_12-18-18-PM/orcdb".

| Step Name                       | Log File Name     | Status     |
|---------------------------------|-------------------|------------|
| Gathering Dictionary Statistics | GatherDOSStat.log | Successful |
| Database Backup                 | Backup.log        | Successful |

# Upgrade Oracle RAC Database to 12cR2

- Upgrade Oracle 11.2.0.4 RAC Database to 12.2.0.1  
Upgrade result: this upgrade process runs 95 minutes



**Results**

- Select Database
- Prerequisite Checks
- Select Upgrade Options
- Select Recovery Options
- Configure Management
- Summary
- Progress
- Results**

**Step Execution Information:**

**Database Backup**

The Database can be restored by running the following script "`"/u01/app/oracle/cfgtoollogs/dbua/upgrade2016-04-27_12-18-18-PM/orcdb/orcdb1_restore.sh"` from the backup location. NOTE: This operation will remove all the upgrade changes made by the Database Upgrade Assistant.

**Timezone Upgrade**

The time zone version and TIMESTAMP WITH TIME ZONE data of the Database has been successfully upgraded from version 14 to version 25.

**Post Upgrade**

A persistent initialization parameter file (spfile) has been created at the following location: `+DBDATA/orcdb/spfileorcdb.ora`.

**Enterprise Manager Configuration**

The Database will be managed by Enterprise Manager Database Express.  
<https://scan-mbcluster-20.oracle.com:5500/em>

**Initialization Parameter changes**

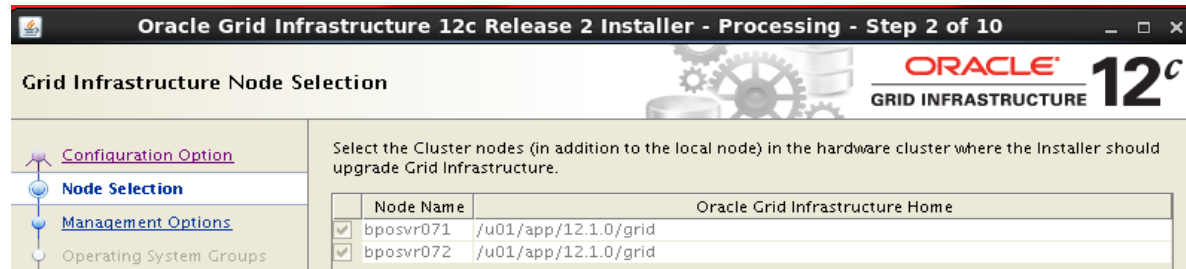
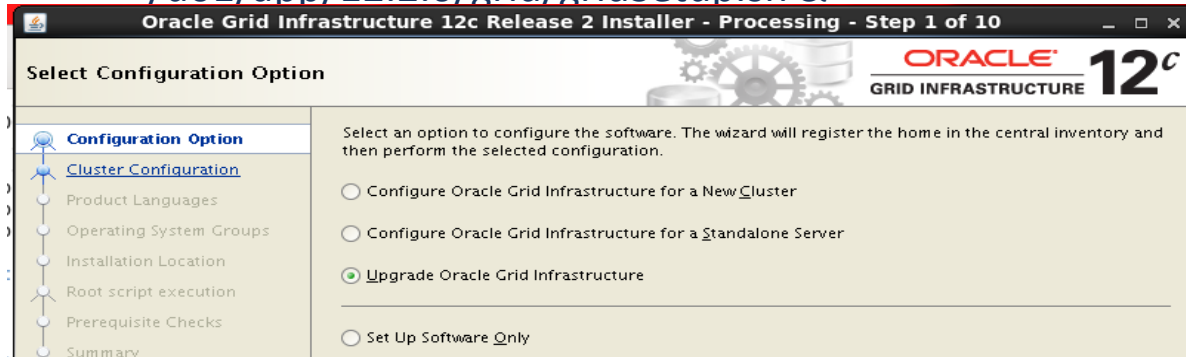
The following changes have been made in the initialization parameters:

**Parameters Updated:**

| Name      | Old Value | New Value |
|-----------|-----------|-----------|
| processes | 300       | 300       |

# Upgrade Oracle RAC Database to 12cR2

- Example 2: Upgrade 12.1.0.2 RAC database to 12.2.0.1 RAC
  - Upgrade Oracle Grid Infrastructure to 12.2.0.1 Grid Infrastructure  
`/u01/app/12.2.0/grid/gridSetup.sh &`



# Upgrade Oracle RAC Database to 12cR2

- Example 2: Upgrade 12.1.0.2 RAC database to 12.2.0.1 RAC

| Checks                                 | Status | Fixable |
|----------------------------------------|--------|---------|
| Disk group RDBMS compatibility setting | Failed | No      |

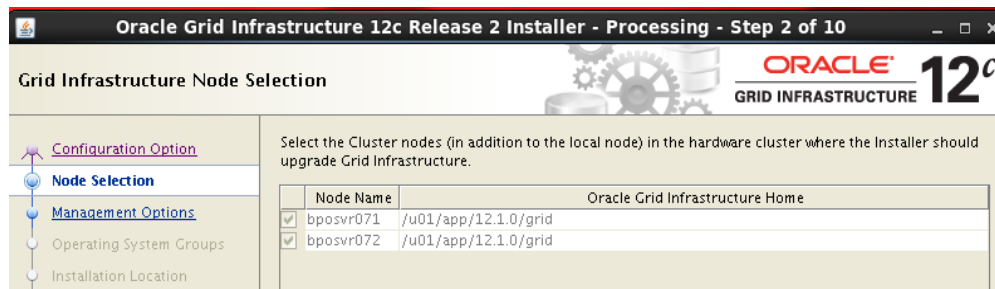
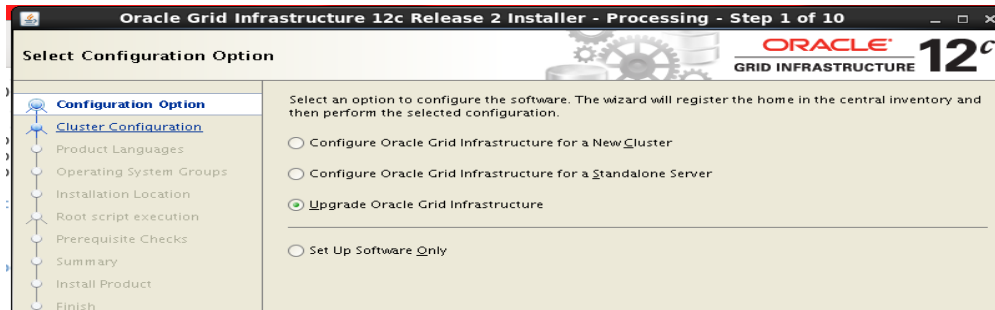
Disk group RDBMS compatibility setting - Check for disk group RDBMS compatibility setting  
Error:

- PRVE-3180 : RDBMS compatibility for ASM disk group "CDATA" is set to "10.1.0.0.0", which is less than the minimum supported value "11.2.0.0.0".
  - Cause: A query showed that the ASM disk group attribute "compatible.rdbms" for the indicated disk group was set to a value less than the minimum supported value.
  - Action: Ensure that the RDBMS compatibility of the indicated disk group is set to a value greater than or equal to the indicated minimum supported value by running the command "asmcmd setattr -G <diskgroup> compatible.rdbms <value>".
- PRVE-3180 : RDBMS compatibility for ASM disk group "DBDATA" is set to "10.1.0.0.0", which is less than the minimum supported value "11.2.0.0.0".
  - Cause: A query showed that the ASM disk group attribute "compatible.rdbms" for the indicated disk group was set to a value less than the minimum supported value.
  - Action: Ensure that the RDBMS compatibility of the indicated disk group is set to a value greater than or equal to the indicated minimum supported value by running the command "asmcmd setattr -G <diskgroup> compatible.rdbms <value>".



# Upgrade Oracle RAC Database to 12cR2

- Example 2: Upgrade 12.1.0.2 RAC database to 12.2.0.1 RAC
  - Upgrade Oracle Grid Infrastructure to 12.2.0.1 Grid Infrastructure  
`/u01/app/12.2.0/grid/gridSetup.sh &`



# Upgrade Oracle RAC Database to 12cR2

- Example 2: Upgrade 12.1.0.2 RAC database to 12.2.0.1 RAC

| Checks                                 | Status | Fixable |
|----------------------------------------|--------|---------|
| Disk group RDBMS compatibility setting | Failed | No      |

Disk group RDBMS compatibility setting - Check for disk group RDBMS compatibility setting  
Error:

- PRVE-3180 : RDBMS compatibility for ASM disk group "CDATA" is set to "10.1.0.0.0", which is less than the minimum supported value "11.2.0.0.0".
  - Cause: A query showed that the ASM disk group attribute "compatible.rdbms" for the indicated disk group was set to a value less than the minimum supported value.
  - Action: Ensure that the RDBMS compatibility of the indicated disk group is set to a value greater than or equal to the indicated minimum supported value by running the command "asmcmd setattr -G <diskgroup> compatible.rdbms <value>".
- PRVE-3180 : RDBMS compatibility for ASM disk group "DBDATA" is set to "10.1.0.0.0", which is less than the minimum supported value "11.2.0.0.0".
  - Cause: A query showed that the ASM disk group attribute "compatible.rdbms" for the indicated disk group was set to a value less than the minimum supported value.
  - Action: Ensure that the RDBMS compatibility of the indicated disk group is set to a value greater than or equal to the indicated minimum supported value by running the command "asmcmd setattr -G <diskgroup> compatible.rdbms <value>".

# Upgrade Oracle RAC Database to 12cR2

- Example 2: Upgrade 12.1.0.2 RAC database to 12.2.0.1 RAC  
Need to set the compatibility parameters for diskgroups

```
[grid@bposvr071 12.2-BETA]$ asmcmd
ASMCMDB> ls
CDATA/
DBDATA/
ASMCMDB> setattr -G CDATA compatible.rdbms 11.2.0.0.0
ASMCMDB> setattr -G DBDATA compatible.rdbms 11.2.0.0.0
```

Oracle Grid Infrastructure 12c Release 2 Installer - Processing - Step 7 of 10

Perform Prerequisite Checks

Verification Result Fixup Result

All minimum requirements are satisfied. You may proceed with the installation.

Check Again Fix & Check Again Show Succeeded All Nodes Ignore All

| Checks                                                   | Status    | Fixable |
|----------------------------------------------------------|-----------|---------|
| Physical Memory                                          | Succeeded |         |
| Available Physical Memory                                | Succeeded |         |
| Swap Size                                                | Succeeded |         |
| Free Space                                               |           |         |
| Free Space: bposvr072:/usr,bposvr072:/var,bposvr072:/etc | Succeeded |         |
| Free Space: bposvr072:/u01/app/grid                      | Succeeded |         |
| Free Space: bposvr071:/usr,bposvr071:/var,bposvr071:/etc | Succeeded |         |
| Free Space: bposvr071:/u01/app/grid                      | Succeeded |         |
| User Existence                                           |           |         |
| User Existence: grid                                     | Succeeded |         |
| Group Existence                                          |           |         |
| Group Existence: asmadmin                                | Succeeded |         |
| Group Existence: asmoper                                 | Succeeded |         |
| Group Existence: asmdba                                  | Succeeded |         |
| Group Existence: oinstall                                | Succeeded |         |
| Group Membership                                         |           |         |

# Upgrade Oracle RAC Database to 12cR2

- Example 2: Upgrade 12.1.0.2 RAC database to 12.2.0.1 RAC

Oracle Grid Infrastructure 12c Release 2 Installer - Processing - Step 8 of 10

**Summary**

- [Configuration Option](#)
- [Node Selection](#)
- [Management Options](#)
- [Operating System Groups](#)
- [Installation Location](#)
- [Root script execution](#)
- [Prerequisite Checks](#)
- Summary**
- Install Product
- Finish

**Oracle Grid Infrastructure 12c Release 2 Installer**

- Global Settings**
  - Config Option: Upgrade Oracle Grid Infrastructure [Edit]
  - Oracle base for Oracle Grid Infrastructure: /u01/app/grid [Edit]
  - Grid home: /u01/app/12.2.0/grid
  - Privileged Operating System Groups: asmdba (OSDBA), asmoper (OSOPER), asmadmin (OSASM)
  - Root script execution configuration: Manual configuration [Edit]
  - Upgrade Oracle ASM: true
- Management information**
  - Management method: None [Edit]
- Grid Infrastructure Settings**
  - Selected Nodes: bposvr071, bposvr072

Save Response File...

Help < Back Next > Install Cancel

**Execute Configuration Scripts**

The following configuration scripts need to be executed as the "root" user on each listed cluster node. Each script in the list below is followed by a list of nodes on which it has to be executed.

| Scripts                             | Nodes                |
|-------------------------------------|----------------------|
| /u01/app/12.2.0/grid/rootupgrade.sh | bposvr071, bposvr072 |

# Upgrade Oracle RAC Database to 12cR2

- Example 2: Upgrade 12.1.0.2 RAC database to 12.2.0.1 RAC

```
[root@bposvr071 grid]# ./rootupgrade.sh
Performing root user operation.
The following environment variables are set as:
 ORACLE_OWNER= grid
 ORACLE_HOME= /u01/app/12.2.0/grid
```

```
CRS-1131: The cluster was successfully set to rolling upgrade mode.
```

```
CLSRSC-482: Running command: '/u01/app/12.2.0/grid/bin/asmca -silent -upgradeNodeASM -
nonRolling false -oldCRSHome /u01/app/12.1.0/grid -oldCRSVersion 12.1.0.2.0 -firstNode true -
startRolling false'
```

.....

```
CLSRSC-474: Initiating upgrade of resource types
CLSRSC-482: Running command: 'srvctl upgrade model -s 12.1.0.2.0 -d 12.2.0.0.3 -p first'
CLSRSC-475: Upgrade of resource types successfully initiated.
CLSRSC-595: Executing upgrade step 19 of 19: 'PostUpgrade'.
CLSRSC-325: Configure Oracle Grid Infrastructure for a Cluster ... succeeded
```



# Upgrade Oracle RAC Database to 12cR2

- Example 2: Upgrade 12.1.0.2 RAC database to 12.2.0.1 RAC

**Oracle Grid Infrastructure 12c Release 2 Installer - Processing - Step 9 of 10**

**Install Product**

Progress: 49%  
Starting 'Update Inventory'

Status:

|   |                                                                            |             |
|---|----------------------------------------------------------------------------|-------------|
| ✓ | Configure Local Node                                                       | Succeeded   |
| ✓ | • Prepare                                                                  | Succeeded   |
| ✓ | • Link binaries                                                            | Succeeded   |
| ✓ | • Setup                                                                    | Succeeded   |
| ✓ | Copy Files to Remote Nodes                                                 | Succeeded   |
| ✓ | Configure Remote Nodes                                                     | Succeeded   |
| ✓ | • Prepare                                                                  | Succeeded   |
| ✓ | • Setup                                                                    | Succeeded   |
| ✓ | Setup Oracle Base                                                          | Succeeded   |
| ✓ | Execute Root Scripts                                                       | Succeeded   |
| → | Configure Oracle Grid Infrastructure for a Cluster                         | In Progress |
| → | • Update Inventory                                                         | In Progress |
|   | • Preparing for deploying Oracle Grid Infrastructure Management Repository | Pending     |

Buttons: Details, Retry, Skip

Oracle Grid Infrastructure 12c Consolidate. Compress. Control.

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


# Agenda

- Methods and Paths for Oracle database 12cR2 Upgrade
- Tools for Oracle Database 12cR2 Upgrade
- Upgrade Multitenant Database to Oracle 12cR2
- Oracle RAC Database Upgrade Examples

# Thank You and QA


- Contact me at [kai\\_yu@dell.com](mailto:kai_yu@dell.com) or visit my Oracle Blog at <http://kyuoracleblog.wordpress.com/>

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Technologist of the Year  
Oracle Database Award 2012



Archives

- May 2015
- April 2015
- December 2014
- October 2014

## High Performance Oracle Database with the Dell Acceleration Appliances for Databases

Leave a comment

The performance of many business critical applications like Oracle database is often limited by bottlenecks in the infrastructure components—CPU, memory, network, and storage. Although CPU, memory, and network performance has improved dramatically over time, storage performance improvements have lagged due to the limitations of latency and throughput.

The Dell Acceleration Appliances for Databases (DAAD) combines Dell servers with Sandisk's flash storage technology to significantly improve storage latency and throughput. The appliance provides an adaptable, flexible, highly available, and scalable storage solution to various IT organizations' database implementation. The Oracle RAC database on the DAAD delivers the highly available and high-performance database solution to business critical applications

Dell Acceleration Appliances for Databases (DAAD) Overview:

The Dell Acceleration Appliances for Databases (DAAD) is a pre-built, pre-integrated appliance designed to accelerate leading database environments such as Oracle Database. This appliance combines Dell PowerEdge R720 Server, Dell networking, and ioMemory cards and ION Accelerator software from Fusion-io to improve database performance.

DAAD Architecture:

High-level appliance architecture:

- The appliance is built on the industry leading Dell PowerEdge R720 server.
- The appliance supports high-speed Fibre channel or iSCSI networking between database servers and the appliance nodes.
- Each appliance node is equipped with four cards, each of which has 3.0TB of usable, persistent flash storage in the PCIe slots of the R720 server. These cards are also known as ioMemory cards.
- The ION Accelerator software installed on each appliance node enables management and configuration including HA.
- For High Availability, the ION HA Clustering configuration consists of a pair of two appliance nodes connected with a private 40GbE point-to-point Interconnection network. The appliances provide