Which version of Oracle is being used?
Does it really matter?
Is upgrade mandatory?
Upgrading to Oracle RAC 12c

Best Practices
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What will be covered

- Why upgrade?
- 12c RAC New Features - synopsis
- Upgrade path & compatibility matrix
- Prepare to upgrade
- Grid Infrastructure and ASM upgrade
- Grid Infrastructure downgrade
- Database upgrade and Downgrade
- Post upgrade steps
- References

Upgrading to Oracle RAC 12c

Best Practices
Know your presenter

Syed Jaffer Hussain
Database Support Manager

**Over 20 years IT experience**

**14+ years** as an Oracle DBA

Oracle **ACE Director**

Oracle 10g Certified Master (**OCM**)  
Oracle 10g RAC Certified Expert

**OCP v8i,9i,10g & 11g**

**ITIL v3 Foundation** Certified

Oracle Database 12c **beta tester**

Twitter: @sjaffarhussain
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Know your presenter

Presented by: Syed Jaffer Hussain
red-gate/AllThingsOracle

Technologist of the Year, DBA 2011
Know your presenter

Co-authored

Expert Oracle RAC 12c

Oracle 11g R1/R2 Real Application Clusters Essentials

Certified Professional

Certified Expert

ACE Director

ITIL
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Upgrading to Oracle RAC 12c

Best Practices
Why upgrade? – A burning question

A million $ question comes into every DBA’s mind......

Shall I upgrade or not?
Why upgrade?

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NO to upgrade:

- Legacy application
- Can’t afford a lengthy outage of business critical application
- Risk factor – lack of proper test env.
- Lack of skills and support personnel
Why upgrade?

YES to upgrade:

- Organization standards
- Oracle lifetime support policy
- to benefit from exciting new features
- Bug fixes
<table>
<thead>
<tr>
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<td>✓ References</td>
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</tbody>
</table>

Upgrading to Oracle RAC 12c

Best Practices
Oracle 12c RAC New Features - synopsis

Standard Cluster

Flex Cluster

- 64 Hub Nodes
- Leaf Nodes can be many

Image from ‘Expert Oracle RAC 12c’
What will be covered

Oracle 12c RAC New Features - synopsis

Standard ASM

Node 1
- Database Instance 1
- Grid Infrastructure
- Clusterware
- ASM Instance

Node 2
- Database Instance 2
- Grid Infrastructure
- Clusterware
- ASM Instance

Node 3
- Database Instance 3
- Grid Infrastructure
- Clusterware
- ASM Instance

Node 4
- Database Instance 4
- Grid Infrastructure
- Clusterware

Shared Storage

ASM Disk Groups

Flex ASM

Node 1
- Database Instance 1
- Grid Infrastructure
- Clusterware
- ASM Instance

Node 2
- Database Instance 2
- Grid Infrastructure
- Clusterware
- ASM Instance

Node 3
- Database Instance 3
- Grid Infrastructure
- Clusterware
- ASM Instance

Node 4
- ASM Disk Groups

Shared Storage

Node 4 runs as ASM client to Node 1

Image from ‘Expert Oracle RAC 12c’
Upgrading to Oracle RAC 12c

Best Practices
To upgrade to Oracle Cluster 12c, your existing cluster must be:

- 10.1.0.5
- 10.2.0.3
- 11.1.0.6
- 11.2.0.2 (with patch set 11.2.0.2.3 (PSU))
What will be covered

- Why upgrade?
- 12c RAC New Features - synopsis
- Upgrade path & compatibility matrix

- Prepare to upgrade
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Upgrading to Oracle RAC 12c

Best Practices
Upgrade pattern

Grid Infrastructure + ASM

- Rolling upgrade
- Non-rolling upgrade
- Out-of-place upgrade
Upgrade pattern

Grid Infrastructure

+ ASM

Apply any latest CRS patches
Upgrade pattern

Grid Infrastructure + ASM

INSTALL Oracle 12c Database Software
Upgrade pattern

1. Grid Infrastructure + ASM
2. INSTALL Oracle 12c Database Software
3. Apply any latest PSU patches
Upgrade pattern

- Grid Infrastructure + ASM
- INSTALL Oracle 12c Database Software
- UPGRADE databases
Upgrade pattern

1. UPGRADE Clusterware + ASM
2. INSTALL Oracle 12c Database Software
3. UPGRADE databases
4. Post upgrade Task
Preparation is the **KEY** to every successful installation or upgrade projects.
✓ Verify:
  - OS certification for Oracle 12cR1.
  - OS kernel, packages.
  - Additional OS groups.
  - Oracle base location.
  - GI Home location.

✓ root or sudo user access

✓ UNSET the following
  - ORACLE_BASE
  - ORACLE_HOME
  - GI_HOME
  - TNS_ADMIN
  - ORA_NLS10
Prepare to upgrade – prerequisites checks

✓ Space:
  o Additional space for [/u00] mount point.
  o Enough /tmp space

✓ Back up:
  o Back up the Cluster and Oracle homes.
  o Back up OCR.

✓ CRS version:
  o Remember, the crs active and software version must be the same.
    crsctl query crs activeversion
    crsctl query crs softwareversion
HEADS-UP

• Standard cluster can’t be upgraded to 12c Flex Cluster type

• Standard cluster must be upgrade to 12c Standard cluster first and subsequently enable the 12c standard cluster to 12c Flex Cluster

• OCR/Voting files must resides in ASM diskgroup rather than raw/block devices
What will be covered

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Upgrading to Oracle RAC 12c

Best Practices
Validate nodes readiness for upgrade

Syntax

```bash
./runcluvfy.sh stage -pre crsinst -upgrade [-n nodelist] [-rolling]
-src_crshome src_Gridhome -dest_crshome dest_Gridhome -dest_version dest_release
[-fixup][-method {sudo|root} [-location dir_path] [-user user_name]] [-verbose]
```

```bash
./runcluvfy.sh stage -pre crsinst -upgrade -n rac1,rac2 -rolling -src_crshome
/u00/app/11.2.0.1/grid -dest_crshome /u00/app/12.0.1/grid -dest_version 12.1.0.1
-fixup -verbose
```
Grid Infrastructure and ASM upgrade

./runInstaller
Grid Infrastructure and ASM upgrade

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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:

<table>
<thead>
<tr>
<th>Node Name</th>
<th>Oracle Grid Infrastructure Home</th>
</tr>
</thead>
<tbody>
<tr>
<td>rac1</td>
<td>/u01/app/11.2.0/grid/11203</td>
</tr>
<tr>
<td>rac2</td>
<td>/u01/app/11.2.0/grid/11203</td>
</tr>
</tbody>
</table>

- Select the nodes for the upgrade.
- Check the box if you want to skip upgrade on unreachable nodes.

Slide # 33
As part of setting up Grid Infrastructure software you can optionally configure Grid Infrastructure Management Repository which is a special type of database that will assist in the management operations of Oracle Grid Infrastructure.

- Configure Grid Infrastructure Management Repository
  - Yes
  - No
Grid Infrastructure Management Repository

- Can be configured during a new GI stack installation or upgrade only
- A single instance MGMTDB will be created upon configuration
- The MGMTDB database which is managed by the Clusterware
- Always runs on a single node, and automatically failover to a surviving node when the hosting node goes down
- Collects and store the date of Cluster Health Monitor (CHM/OS, ora.crf)
- All features of CHM/OS are disabled if MGMTB db is not configured
- Uses the same shared storage as OCR/VD files to store the data files
- Use the `srvctl start/stop database` to stop/start the database
While configuring the software, certain operations have to be performed as "root" user. You can choose to have the installer perform these operations automatically by specifying inputs for one of the options below:

- **Automatically run configuration scripts**
  - Use "root" user credential
    - **Password:**
  - Use sudo
    - **Program path:** /usr/local/bin/sudo
    - **User name:** Oracle
    - **Password:**
Clusterware and ASM upgrade

During upgrade, you can sequence the automatic execution of root scripts by pooling the nodes into batches. A maximum of three batches can be specified.

Installer will execute root scripts on all the nodes in one batch before proceeding to next batch. It will ask for your confirmation before processing each batch.

<table>
<thead>
<tr>
<th>Node Name</th>
<th>Batch</th>
</tr>
</thead>
<tbody>
<tr>
<td>rac1</td>
<td>Batch 1</td>
</tr>
<tr>
<td>rac2</td>
<td>Batch 1</td>
</tr>
</tbody>
</table>
Grid Infrastructure and ASM upgrade

![Oracle Grid Infrastructure - Setting up Grid Infrastructure - Step 13 of 14](image)

**Install Product**

- Configuration scripts generated by the installer need to be run as a privileged user (root). Installer will run these scripts using the privileged user credentials provided earlier.

- Are you sure you want to continue?

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Grid Infrastructure and ASM upgrade

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

<table>
<thead>
<tr>
<th>Number</th>
<th>Script Location</th>
<th>Nodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>/u01/app/12.1.0/grid_1/rootupgrade.sh</td>
<td>rac1,rac2</td>
</tr>
</tbody>
</table>

To execute the configuration scripts:
1. Open a terminal window
2. Log in as "root"
3. Run the scripts in each cluster node
4. Return to this window and click "OK" to continue

Run the script on the local node first. After successful completion, you can run the script in parallel on all the other nodes, except a node you designate as the last node. When all the nodes except the last node are done successfully, run the script on the last node.
Grid Infrastructure and ASM upgrade

Install Product

Progress

90%

Execute root script on nodes of Batch 1 successful.

Status

- Install Grid Infrastructure for a Cluster Succeeded
- Prepare Succeeded
- Copy files Succeeded
- Link binaries Succeeded
- Setup Succeeded
- Perform remote operations Succeeded
- Update inventory Succeeded
- Execute root scripts Succeeded
- Execute root script on nodes of Batch 1 Succeeded
- Configure Oracle Grid Infrastructure for a Cluster In Progress
  - Update inventory Pending
  - Grid Infrastructure Management Database Pending
  - Management Database Configuration Assistant Pending

Oracle Database 12c

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Performing root user operation for Oracle 12c

The following environment variables are set as:
- ORACLE_OWNER= oracle
- ORACLE_HOME= /u01/app/12.1.0/grid_1

Enter the full pathname of the local bin directory: [/usr/local/bin]:
The file "dbhome" already exists in /usr/local/bin. Overwrite it? (y/n) [n]:
The file "oraenv" already exists in /usr/local/bin. Overwrite it? (y/n) [n]:
The file "coraenv" already exists in /usr/local/bin. Overwrite it? (y/n) [n]:

Entries will be added to the /etc/oratab file as needed by Database Configuration Assistant when a database is created

Finished running generic part of root script.

Now product-specific root actions will be performed.

Using configuration parameter file: /u01/app/12.1.0/grid_1/crs/install/crsconfig_params

ASM upgrade has started on first node.

OLR initialization - successful

CRS-4133: Oracle High Availability Services has been stopped.
CRS-4123: Oracle High Availability Services has been started.
CRS-2673: Attempting to stop 'ora.drivers.acfs' on 'rac1'
CRS-2677: Stop of 'ora.drivers.acfs' on 'rac1' succeeded

clscfg: EXISTING configuration version 5 detected.
clscfg: version 5 is 11g Release 2.
Successfully accumulated necessary OCR keys.
Creating OCR keys for user 'root', privgrp 'root'..
Operation successful.

ASM upgrade has started on first node.
OLR initialization - successful
2013/04/12 10:25:18 CLSRSC-329: Replacing Clusterware entries in file '/etc/inittab'

CRS-4133: Oracle High Availability Services has been stopped.
CRS-4123: Oracle High Availability Services has been started.
CRS-2673: Attempting to stop 'ora.drivers.acfs' on 'rac2'
CRS-2677: Stop of 'ora.drivers.acfs' on 'rac2' succeeded
2013/04/12 10:29:28 CLSRSC-343: Successfully started Oracle clusterware stack

clscfg: EXISTING configuration version 5 detected.
clscfg: version 5 is 11g Release 2.
Successfully accumulated necessary OCR keys.
Creating OCR keys for user 'root', privgrp 'root'..
Operation successful.
Start upgrade invoked..
Started to upgrade the Oracle Clusterware. This operation may take a few minutes.
Started to upgrade the OCR.
Started to upgrade the CSS.
The CSS was successfully upgraded.
Started to upgrade Oracle ASM.
Started to upgrade the CRS.
The CRS was successfully upgraded.

Successfully upgraded the Oracle Clusterware.
Oracle Clusterware operating version was successfully set to 12.1.0.0.2
2013/04/12 10:35:20 CLSRSC-325: Configure Oracle Grid Infrastructure for a Cluster ... succeeded
Grid Infrastructure and ASM upgrade

After successful rootupgrade.sh execution on first node:

./crsctl query crsactiveversion
Oracle Clusterware active version on the cluster is [11.2.0.3.0]

./crsctl query crssoftwareversion
Oracle Clusterware version on node [rac1] is [12.1.0.0.2]

After successful rootupgrade.sh execution on all nodes:

./crsctl query crs activeversion
Oracle Clusterware active version on the cluster is [12.1.0.0.2]

./crsctl query crs softwareversion
Oracle Clusterware version on node [rac1] is [12.1.0.0.2]
Post upgrade checks – b/g and daemon processes

```
[oracle@racl ~]$ ps -ef |grep d.bin
root 5228 1 0 01:44 ? 00:00:20 /u01/app/12.1.0/grid_1/bin/ohasd.bin reboot
oracle 6379 1 0 01:45 ? 00:00:06 /u01/app/12.1.0/grid_1/bin/evmd.bin
oracle 6379 1 0 01:45 ? 00:00:00 /u01/app/12.1.0/grid_1/bin/mdnsd.bin
oracle 6394 1 0 01:45 ? 00:00:09 /u01/app/12.1.0/grid_1/bin/gpnpsd.bin
oracle 6428 1 0 01:45 ? 00:00:41 /u01/app/12.1.0/grid_1/bin/gipcd.bin
oracle 6713 1 0 01:46 ? 00:01:44 /u01/app/12.1.0/grid_1/bin/ocssd.bin
root 6976 1 0 01:49 ? 00:00:05 /u01/app/12.1.0/grid_1/bin/octssd.bin
root 7433 1 0 01:52 ? 00:00:16 /u01/app/12.1.0/grid_1/bin/crsd.bin reboot
```

```
./crsctl stat res -t -init
```
What will be covered

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Upgrading to Oracle RAC 12c

Best Practices
**GI downgrade procedure for <11.2.0.1**

Execute the following across remote nodes from the 12c $GI_HOME:

$GRID_HOME/crs/install/rootcrs.pl -downgrade (on all nodes in sequence)
$GRID_HOME/crs/install/rootcrs.pl -downgrade [-force]

- This script will stop the 12c cluster stack on the node/s

After executing the script across all nodes in sequence, run the following on the LOCAL node:

$GRID_HOME/crs/install/rootcrs.pl -downgrade -lastnode

- This script downgrades the OCR

Update the registry:

```
./runInstaller -nowait -waitforcompletion -ignoreSysPrereqs -updateNodeList -silent CRS=false ORACLE_HOME=/u01/app/12.1.0/grid
./runInstaller -nowait -waitforcompletion -ignoreSysPrereqs -updateNodeList -silent CRS=false ORACLE_HOME=/u01/app/11.2.0/grid
```

- Run the root.sh to downgrade <=11.1 version from earlier Oracle CRS Home
Clusterware and ASM downgrade

**GI downgrade procedure for 11gR2**

```
./dbca -silent -deleteDatabase -sourceDB -MGMTDB
•  If GI Management Repository is configured
```

**From 12c $OH on FIRST node, execute the following as the root user:**

```
$GRID_HOME/crs/install/rootcrs.pl -downgrade (on all nodes in sequence)
$GRID_HOME/crs/install/rootcrs.pl -downgrade [-force]
•  This script will stop the 12c cluster stack on the node/s
```

**After executing the script across all nodes in sequence, run the following on the LOCAL node:**

```
$GRID_HOME/crs/install/rootcrs.pl -downgrade -lastnode
•  This script downgrades the OCR
```

**Update the registry:**

```
./runInstaller -nowait -waitforcompletion -ignoreSysPrereqs -updateNodeList -silent CRS=false ORACLE_HOME=/u01/app/12.1.0/grid
./runInstaller -nowait -waitforcompletion -ignoreSysPrereqs -updateNodeList -silent CRS=false ORACLE_HOME=/u01/app/11.2.0/grid
•  Run the root.sh to downgrade <=11.1 version
```

**Startup the cluster from the earlier release:**

```
$u01/app/11.2.0/grid/bin/crsctl start crs
```

Verify the **READINESS** of the nodes for DB software installation

```sh
cluvfy stage -pre dbinst -n rac1,rac2 -d $ORACLE_HOME -verbose
```
12cR1 RDBMS software installation

./runInstaller
## What will be covered

<table>
<thead>
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</tr>
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<tr>
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<td>Post upgrade steps</td>
</tr>
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<td>References</td>
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### Upgrading to Oracle RAC 12c

**Best Practices**
Database upgrade – **Precaution**

**Back up** the database before the upgrade
Database upgrade path

<table>
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<td>9.2.0.8</td>
<td>8.0.6</td>
<td>9.2.0.8</td>
<td>9.0.1.4</td>
<td>10.2.0.5</td>
<td>10.1.0.5</td>
<td>11.1.0.7</td>
<td>11.2.0.8</td>
<td>12.1.0.1</td>
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<tr>
<td>8.0</td>
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<td></td>
<td>8.1.7.4</td>
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</tbody>
</table>

Please note: This graph will apply to database upgrades only!

Courtesy from Oracle Corporation
Thanks to Roy Swonger & Mike Dietrich
Some of the upgrade tools/methods

- Manual
- Database Upgrade Assistant (DBUA)
- Data Pumps
- Golden Gate
- Streams
- Transportable Tablespace
- CTAS
UPGRADE

SQL> @catupgrade.sql

- RAC aware and most recommended for RAC dbs.
- Also can be run in --silent mode.
**Database upgrade**

**What's new in upgrade**

- **The pre-upgrade information tool**
  - utlu121i.sql is replaced with **preupgrd.sql**
  - Performs DB upgrade checks
  - Generates
    - preupgrade.log
    - preupgrade.fixups.sql
    - postupgrade_fixups.sql
  - Must execute manually from 12c $OH for manual database upgrade method

- **Parallel upgrade utility – catctl.sql**
  - Loads the data dictionary and db components in parallel
  - Reduces the overall upgrade time (downtime)
  - Takes full advantage of CPU
    - perl catctl.sql -n 3 -l /tmp catupgrd.log
Database upgrade – manual method

1. srvctl stop database –d MYPRDB
2. Run the following tasks:
   - SQL> STARTUP MOUNT
   - SQL> alter database noarchivelog;
   - SQL> alter system set cluster_database=false scope=spfile;
   - SQL> shutdown immediate
3. Ensure the password file, SPFILE/Pfile/TNS file copied in 12c $OH
4. From 12c $OH, startup the database in UPGRADE state
   - SQL> STARTUP UPGRADE
   - SQL> exit
5. Upgrade the database in parallel
   - $ORACLE_HOME/perl/perl catctl.pl -n 4 -l /tmp dbupgrade.log
6. Upon completion of the script, run the following tasks:
   - SQL> STARTUP MOUNT
   - SQL> alter database archivelog;
   - SQL> alter system set cluster_database=true scope=spfile;
   - SQL> alter system set COMPATIBLE=12.1.0 scope=spfile;
   - SQL> shutdown immediate
   - SQL> exit
7. Upgrade the cluster information and startup the database
   - $ srvctl upgrade database –d MYPRDB –o $12C_OH
   - $ srvctl start database –d MYPRDB
Database upgrade – using DBUA tool

The Database Upgrade Assistant (DBUA) interactively steps you through the process of upgrading your Oracle database to Oracle Database 12c Release 1 (12.1).

DBUA performs major release upgrades of Oracle Database that are supported for direct upgrade. Additionally, DBUA can be used to upgrade databases created using any edition of Oracle Database, including Oracle Express Edition (Oracle XE).

DBUA can also be used to move an Oracle database from different Oracle home within the same release.

Select the operation that you want to perform:

- Upgrade Oracle Database
- Move Database from a Different Release 12.1 Oracle Home
Database upgrade – using DBUA tool
Database upgrade – using DBUA tool
Database upgrade

Database upgrade – using DBUA tool
Database upgrade – using DBUA tool
Database upgrade

**Database upgrade – using DBUA tool**

![Database Upgrade Assistant - Validation Details - Step 8 of 11](image)

**Recovery Options**

- **Select Operation**
- **Select Database**
- **Prerequisite Checks**
- **Upgrade Options**
- **Management Options**
- **Move Database Files**
- **Network Configuration**
- **Recovery Options**
- **Summary**
- **Progress**
- **Results**

Select an option to recover database in case of upgrade problem:

- **Use RMAN Backup**
  - **Create a New Offline RMAN Backup**
    - **Backup Location**: `/u01/app/oracle/admin/orclbackup`

- **Use Existing RMAN Backup**
  - **Latest RMAN Backup Timestamp**: 

- **Use Flashback and Guaranteed Restore Point**
  - **Create a New Guaranteed Restore Point**
  - **Use Existing Guaranteed Restore Point**

- **I have my own backup and restore strategy**

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Presented by: Syed Jaffer Hussain

red-gate/AllThingsOracle
Database upgrade

Database upgrade – using DBUA tool

Upgrade Results

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

<table>
<thead>
<tr>
<th>Source Database</th>
<th>Target Database</th>
</tr>
</thead>
<tbody>
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<td></td>
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</tr>
</tbody>
</table>

Warnings Ignored

The "ORACLE_OCM" war is present in the database. This is an internal account used by the Oracle Configuration Manager. Oracle recommends dropping this war prior to upgrading the database.

User APQGROUPS present in database

There are materialized view refreshes in progress. Ensure all materialized view refreshes are complete prior to upgrade.

Database contains schemas with objects dependent on DBMS_LGRP package. Refer to the Oracle Database Upgrade Guide for instructions to configure Network ACLs.

Database is using an old time zone file version. After the upgrade, patch the database time zone file version.
Downgrading database compatibility

- major releases that support the database downgrade:
  - Oracle 11.2.0.2
  - Oracle 11.2.0.3
  - Oracle 11.1.0.7

- Oracle 10.2.0.5 can’t be downgraded
Downgrading steps

- Take a full backup of current database
- Complete any pre-downgrade steps
- Downgrade the database
**Database downgrade**

**Downgrading procedure**

1. Set the ORACLE_SID, 12c ORACLE_HOME on the prompt
2. Connect to the database ‘as / sysdba’
3. Shutdown and startup the database in DOWNGRADE mode
4. Run the downgrade script from /rdbms/admin home
   - SQL> spool /tmp/downgrade.log
   - SQL> @?/rdbms/admin/catdwdgrd.sql
5. Shutdown and exit from the database upon script completion
6. Set the previous $OH and modify the PATH accordingly
7. As a sysdba, connect to the database and Start up in UPGRADE mode and run the reload script from
   - SQL> STARTUP UPGRADE
   - SQL> spool /tmp/downgrade2.log
   - SQL>@?/rdbms/admin/catreload.sql
8. Upon completion, shutdown, start up the database and recompile objects
   - SQL> SHUTDOWN IMMEDIATE
   - SQL> STARTUP
   - SQL>@?/rdbms/admin/utlrlp.sql
9. Perform post-downgrade steps
What will be covered

- Why upgrade?
- 12c RAC New Features - synopsis
- Upgrade path & compatibility matrix
- Prepare to upgrade
- Grid Infrastructure and ASM upgrade
- Grid Infrastructure downgrade
- Database upgrade and Downgrade

- Post upgrade steps
- References

Upgrading to Oracle RAC 12c

Best Practices
Run `@utlrp.sql` to compile ANY invalid objects.

Run `@utlu121s.sql` to check post upgrade components status.

Adjust **time zone data** in the database.

Gather statistics for **system** and **fixed objects**.

Amend scripts [if any] to affect the new OH settings.

Verify the database upgrade

```
srvctl config database -d <DBNAME>
```

Back up the database.

Modify the COMPATIBLE init. Parameter to 12cR1.
What will be covered

- Why upgrade?
- Oracle 12c New Features - synopsis
- Upgrade path & compatibility matrix
- Prepare to upgrade
- Grid Infrastructure and ASM upgrade
- Grid Infrastructure downgrade
- Database upgrade and Downgrade
- Post upgrade steps

✓ References

Upgrading to Oracle RAC 12c

Best Practices

Presented by: Syed Jaffer Hussain
red-gate/AllThingsOracle
- Complete Checklist for Manual Upgrades to Oracle Database 12c Release 1 (12.1) (Doc ID 1503653.1)
- Oracle Database 12c Release 1 (12.1) Upgrade New Features (Doc ID 1515747.1)
- Oracle Database 12c Release 1 (12.1) DBUA : Understanding New Changes With All New 12.1 DBUA (Doc ID 1493645.1)
- Master Note For Oracle Database Upgrades and Migrations (Doc ID 1152016.1)
- Master Note For Oracle Database 12c Release 1 (12.1) Database/Client Installation/Upgrade/Migration Standalone Environment (Non-RAC) (1520299.1)
- FAQ: 12c Grid Infrastructure Management Repository (Doc ID 1568402.1)
- Database downgrade guide - [http://docs.oracle.com/cd/E16655_01/server.121/e17642/downgrade.htm#i1010243](http://docs.oracle.com/cd/E16655_01/server.121/e17642/downgrade.htm#i1010243)
A big thanks to AllThingsOracle and you all

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