

Lessons Learned – RAC Upgrade to 11gr2 at Verizon Wireless

NYOUG – June 7,2011

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Verizon wireless & RAC environment

Prepare for the upgrade

Issues faced during pre upgrade validation

Issues faced during Clusterware upgrade

Issues faced after Clusterware upgrade

Issues faced during Database upgrade

Issues faced after Database upgrade

Major lessons learned

Q & A

- ✓ #1 wireless carrier with largest 3G network in the U.S.
- ✓ Most reliable wireless voice and data network in the U.S.
 - ✓ 104 million customers
- ✓ 87,000 employees
- ✓ More than 2,000 retail stores & kiosks
- ✓ Joint venture of Verizon Communications (NYSE: VZ) + Vodafone (NYSE: VOD)

Customers can manage their content, purchase additional services (Ringtones, Ring back tones, MP3's, Wallpaper, Games and Applications) from their PC's to be delivered directly to their handset.

MediaStore Catalog – 25M Items with 1.1M Artists and 1M Albums

- Ringtones 130K
- Ring back tones 120K
- MP3 songs 11M (Downloadable for players)
- Songs MOD 7M (Mobile device)
- Wallpaper 3 – 4k
- PC Games around 6 K

<http://mediastore.verizonwireless.com/onlineContentStore/index.html>

RAC Environment summary

- Operating system - **Solaris 10 U6** (5.10-2008.10) or later
- Veritas Version - SF RAC 5.1
- Oracle RDBMS - 10.2 to 11.2
- RAC - 4 node cluster

GI HOME

Grid infrastructure Home- New home with enough space

DNS configuration

- Scan name - <cluster>_scan
- Scan IP - Three static IP addresses configured
nslookup <cluster>_scan

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Backup

ocr and voting disk backup using dd command.
srvctl config service -d dbname
srvctl config database -d dbname -a
ocrconfig -export oracle10gr2_ocrbkup
ocr.loc, oratab, inittab owned by root
backup the database

Cluster verification

```
cd $GRID_HOME/bin  
./runcluvfy.sh stage -pre crsinst -n node1,node2  
./runcluvfy.sh comp nodecon -n node1,node2  
./runcluvfy.sh stage -post hwos -n node1,node2  
./runcluvfy.sh comp sys -n node1,node2 -p crs -osdba dba -orainv dba
```

Replace the node names with your actual public node names.

Running Cluster Verification Utility to Diagnose Install Problems [ID 339939.1]

Reference

- Review Note **161818.1** for the latest updates
- Read the Friendly Documentation
Note:**785351.1** Upgrade Companion 11g Release 2
- Check the famous OTN Upgrade Page
<http://www.oracle.com/technetwork/database/upgrade/index.html>
- Master Note For Oracle Database Upgrades and Migrations [ID **1152016.1**]
- RAC Assurance Support Team: RAC and Oracle Clusterware Starter Kit and Best Practices (Generic) (Doc ID **810394.1**)

Garbage in garbage out

- Beginning with 11.1.0.7 the comparison has been made easier
- Run the pre-upgrade check script `utlu112i.sql`
- Find the invalid objects in `registry$sys_inv_objs` and `registry$nonsys_inv_objs`
- Compare after the upgrade with: `utluiobj.sql`
- `DBA_INVALID_OBJECTS` contains a list of invalid objects after the upgrade
- `purge DBA_RECYCLEBIN;`

1 : OS related

- GCC runtime (package SUNWgccruntime) was missing
- SF RAC version 5.0 was found not certified for 11g R2 RAC (SF RAC)
- One of the OS patches for 11g R2 upgrade was missing
- /oracle file system used for installing 11gR2 s/w did not have 20G free space
- SCAN IP addresses and DNS update

2 : Cluster verify

- Network Time Protocol(NTP) failed due to missing Slew Option. Worked with sys admins to fix it

3 : Freezing VCS for Veritas

- Veritas Cluster Server (VCS) Service Groups should be frozen prior to making any configuration changes affecting CRS and/or databases, to prevent VCS from reporting those resources as “faulted” when they are stopped and started during the upgrade process:

```
# haconf -makerw
# hagrps -freeze oracle_group -persistent
# hagrps -freeze cvm_group -persistent
# haconf -dump -makero
```

4 : Clusterware Upgrade

- Upgrade did not recognize old cluster ware and did not provide upgrade option. (This was because ora inventory file/location was messed up)
- OCR config files need to have correct group privilege as dba to avoid

PRVF-4175 : OCR config file "/var/opt/oracle/ocr.loc" check failed on the following nodes:server02:Group of file "/var/opt/oracle/ocr.loc" did not match the expected value. [Expected = "dba" ; Found = "oinstall"]

- Make sure of 10gb space at grid home file system to avoid ClusterVerification::checkFreeDiskSpace returned OPERATION_FAILED.

5 : Multicasting issue

- The Root Script failed to run on node 2 ,3 and 4 node cluster even though it was successful on node 1.
- The issue was a known problem with multicasting when trying to install CRS on multiple nodes.
- 11.2.0.2 Grid Infrastructure Install or Upgrade may fail due to Multicasting Requirement [**ID 1212703.1**].
- Prior to applying Patch: 9974223 it is recommended to use the mcasttest.pl perl program attached to this note to validate proper functionality of multicast on the 230.0.1.0 or 224.0.0.251 addresses for the private interconnect interface(s).
- Opatch install for multicast to follow instruction for Linux, not Solaris
opatch napply -local -oh <CRS_HOME> -id 9974223

6 : Apply the mcast patch

- Oracle Action Plan was to apply patch 9974223 using opatch
- Followed the opatch document for solaris. Unable to apply the patch
- Follow the linux opatch document – use opatch napply instead of auto

7 : Clusterware Upgrade (ora.crf – SFRAC release level issue)

- After completing CRS upgrade `./rootupgrade.sh` failed with “starting of resource "ora.crf”
- BUG : 10412901 was filed, upgrade of clusterware to 11.2
- Oracle gave us the patched `libdb-4.6.so`
- After applying the patch , ora.crf started

```
ps -ef|grep osysmond
```

```
root 14563 1 3 10:57:46 ? 0:14 /oracle/app/grid/bin/osysmond.bin
```

```
root 15294 10227 0 10:58:01 pts/4 0:00 grep osysmond
```

Actual issue :

- Veritas clusterware we had was v5.0
- Symantec told us the first official release of SFRAC is 5.1 SP1 for oracle 11Gr2

8 : Clusterware Upgrade (ora.crf - Os patch issue)

- After completing CRS upgrade
- Starting of resource "ora.crf" failed with the following message

```
2011-04-10 16:44:20.904: [ CRSPE][29] {0:0:100} CRS-2674: Start of 'ora.crf'
on 'sasneacssdt01' failed
```

```
2011-04-10 16:44:20.905: [UiServer][30] {0:0:100} Container [ Name: ORDER
MESSAGE:
  TextMessage[CRS-2674: Start of 'ora.crf' on 'sasneacssdt01' failed]
```

Actual issue :

- **Daemon Resource ora.crf fails to start in 11.2.0.2 [ID 1289922.1]**
- pkginfo -i SUNWgccruntime
- The SunOS package "SUNWgccruntime" was missing.
- The GCC runtime (SunOS package SUNWgccruntime) is needed for the Berkeley DB libraries which was missing.

9 : CRS Unique name

- After the upgrade node 4 crs does not come up.
- It was discovered that in 11.2.0.2 Clustware names residing on the same network and different RAC clusters must be unique.
- This is not a supported configuration and results in GPNP issues when publishing GPNP profiles. Unfortunately it took approximately 12 hours to identify the issue due to the Cisco, Veritas and Oracle components involved as multicast was assumed to be the cause

Solution :

- ✓ Deinstall CRS (GI) and reinstall with different crs name since there is no option during the upgrade to change the crs name.

10 : TNS_ADMIN

➤ CRS on Node 4 of the cluster was unable to start up and make connection with the other nodes in the cluster.

Solution :

✓ It was recommended not to use TNS_ADMIN when in a grid infrastructure environment, this can cause cluster communication issues and listener issues due to the shared sqlnet.ora file and the non-default location of the listener.ora and endpoints_listener.ora.

Issues faced during Database upgrade

DBUA Issue

During the install of the 11.2 , we were not able to select the option upgrade database since it was complaining "libskgxn2.so" file not found. So we went ahead and just installed the s/w .

When we start dbua and select the db to upgrade , dbua starts the database in migrate and then displays shutdown in progress.

Problem/Resolution : Oratab had a '/' after the Oracle DB Home in the oratab file. This caused issues during upgrade
srvctl config database entry also had '/' for Oracle DB Home.

Few more suggestions:

Before running the upgrade, make sure LD_LIBRARY_PATH has correct vales to connect to the 10g database with 11g s/w using TNS

Password case sensitivity by default is set to TRUE. This needs to be set to OFF after the upgrade , so all application / individual users can login.

remote_listener and local_listener values need to be verified for listener to function as expected.

DBUA Issue

dbua shuts down the 10.2 db, and then upon startup fails with "instance terminated with error 304".

error prkp-1037: failed to create clustered database

Problem/Resolution :

- We reregistered the 10.2 db with 11.2 grid using 10.2 srvctl .
- Oratab had a '/' after the Oracle DB Home in the oratab file.

DBUA Issue

- All the pre-validation scripts were run
- The 11g environment was set and the DBUA was invoked.
- The DBUA displayed the list of DB's that can be upgraded on the box.
- DBUA screen displays error "Null" and comes out. 😊

Problem/Resolution :

- create the link to the odm
- In -s /opt/VRTSodm/lib/sparcv9/libodm.so \${ORACLE_HOME}/lib/libodm11.so
- Dbua worked fine after creating this link and we were able to complete the upgrade.

Manual upgrade without DBUA

- Unable to connect as sysdba
\$ sqlplus / as sysdba

SQL*Plus: Release 11.2.0.2.0 Production on Sun Dec 19 23:18:55 2010

Copyright (c) 1982, 2010, Oracle. All rights reserved.

Id.so.1: oracle: fatal: libskgxn2.so: open failed: No such file or directory
ERROR:
ORA-12547: TNS:lost contact

Problem/Resolution :

- Problem was due to LD_LIBRARY_PATH
- Unset the PATH or remove the 10g reference

SQL Plans

- The SQL Plans that were captured in the export were SQL Plans from the AWR report that was created in the last 30 days.
- Sql plans that were not part of the captured plans started behaving bad.
- Optimizer NOT using SQL PLAN baselines even on FIXED or ACCEPTED plans
- Multiple Plans are FIXED with sql plan baseline

Solution :

- Due to Oracle cardinality feedback feature it was not using our fixed sql plans.
- We turned off this by setting `*._optimizer_use_feedback=FALSE`
- If there are multiple fixed plans, than the optimizer will pick the one with the lowest cost.

Parallel_instance_group

- In 10g, the only valid values for PARALLEL_INSTANCE_GROUP were the values found in that instance's setting of INSTANCE_GROUPS.
- During the precheck oracle warns about the deprecated parameters
--> instance_groups 11.2 DEPRECATED
- If you don't remove this, dbua will fail during upgrade.
- After the upgrade to 11g it was not using parallel.
- In 11g, the list has expanded to include the names of all currently enabled services.

Flashback & Guaranteed restore point

- For our 2nd prod. Environment we enabled guaranteed restore point
- After the upgrade , Production site was open to public but froze
- Issue was due to guaranteed restore point , db_recovery_file_dest_size.

Controlfile auto backup

rman backup problem

```
channel ORA_SBT_TAPE_1: backup set complete, elapsed time: 00:04:26
```

```
RMAN-00571:=====
```

```
RMAN-00569: ===== ERROR MESSAGE STACK FOLLOWS =====
```

```
RMAN-00571: =====
```

```
RMAN-03009: failure of backup command on ORA_SBT_TAPE_8 channel at  
03/20/2011 20:08:17
```

```
ORA-00245: control file backup operation failed
```

```
RMAN>
```

```
Recovery Manager complete.
```

This is due to the bug

Oracle Database 11g Release 11.2.0.2.0

ORACLE DATABASE Patch for **Bug# 10317487** for Solaris-64 Platforms

Rman incremental backup problem

- Incremental backups suddenly started failing with following messages

```
RMAN-00571: =====  
RMAN-00569: ===== ERROR MESSAGE STACK FOLLOWS =====  
RMAN-00571: =====
```

RMAN-03009: failure of backup command on ORA_SBT_TAPE_1 channel at
06/03/2011 17:18:21

ORA-19754: error reading from change tracking file

ORA-19750: change tracking file:

'/cmpdb/bkup/flashback/backup/block_tracking/cmpwprd_bt.dbf'

ORA-19756: corrupt block number 1108101 found in change tracking file

This is due to the bug

- Ora-19756 In Block Change Tracking File When Doing Db Inc Backups After Upgrade To 11.2.0.2 [ID **1301823.1**]
- Bug 10094823 is fixed in 11.2.0.3 Patchset and might have one-off patches available for 11.2.0.2

Creating Spfile from memory fails

```
SQL> create spfile from memory;  
File created.
```

```
SQL> shutdown immediate;  
Database closed.  
Database dismounted.  
ORACLE instance shut down.
```

```
SQL> startup  
ORA-32004: obsolete or deprecated parameter(s) specified for RDBMS instance  
ORA-00600: internal error code, arguments: [kck_rls_check must use (11,0,0,0,0) or  
lower], [kdt.c], [9576], [11.2.0.2.0], [], [], [], [], [], [], []
```

WORKAROUND

1. Edit the pfile, add parameter:
_compression_compatibility= "11.2.0"

Rac Instance shutdown

- Instance was shutdown using “srvctl stop database –d dbname –o immediate”
- After Applying Oracle Jan PSU Patch 10248523 in Oracle 4 node RAC production , We could NOT start up the database . We are getting the following error.
- SQL> startup
ORA-01092: ORACLE instance terminated. Disconnection forced
ORA-00604: error occurred at recursive SQL level 1
ORA-01578: ORACLE data block corrupted (file # 1, block # 111)
ORA-01110: data file 1: '/xxx/data1/xxx/xxxprd_system01.dbf'
Process ID: 25454
Session ID: 96 Serial number: 3

Solution

- Apply fix for bug 10205230
- Bug 10205230 is now alerted in Note 1318986.1

Issues faced after Database upgrade

Logical Schema export

If the 10g database had olap, and 11g does not, you may see the following errors:

ORA-39127: unexpected error from call to

"SYS"."DBMS_CUBE_EXP"."INSTANCE_EXTENDED_INFO_EXP"

ORA-44002: invalid object name

ORA-06512: at "SYS.DBMS_ASSERT", line 316

ORA-06512: at "SYS.DBMS_METADATA", line 7251

ORA-39127: unexpected error from call to

"SYS"."DBMS_CUBE_EXP"."INSTANCE_EXTENDED_INFO_EXP"

The export will work, but will give the above error messages .

The registry shows that olap is at version 10.20.4 even though the database is at 11.2.

COMP_NAME	VERSION	STATUS
-----	-----	-----
OLAP Analytic Workspace	10.2.0.4.0	OPTION OFF
Oracle OLAP API	10.2.0.4.0	OPTION OFF
OLAP Catalog	10.2.0.4.0	OPTION OFF

Follow the steps in doc [811934.1](#) to clear up the errors.

Issues faced after Database upgrade

Flashback to 10.2.0 after upgrade to 11.2.0

We wanted to use Flashback as our back out strategy.

After completing the upgrade when tried to flashed back returned **ORA-201**

Ran into problem due to the **Bug 8475069**

Metalink reference (Doc ID 8475069.8)

This issue is fixed in 11.2.0.1,11.2.0.2

ORA-04031 Unable to allocate -

- Remove any hidden parameters that appears in pfile after your upgrade is done
- They are being added automatically during upgrade
- If you leave it there, your original share pool size will be overridden by this parameter
- You will end up with the following error

ORA-04031: unable to allocate ORA-04031: unable to allocate 4128 bytes of shared memory ("shared pool","DBMS_SWRF_INTERNAL","PLMCD^99088606","BAMIMA: Bam Buffer")

Issue in our case was

Following three were added in spfile (11gR2).

```
#xxxprod.__db_cache_size=16777216  
#xxxprod.__oracle_base='/u01/app/oracle'#ORACLE_BASE set from environment  
#xxxprod.__shared_pool_size=1862270976
```

Issues faced after Database upgrade

Rman duplicate issue -

- Duplicate database using rman fails with the following error

RMAN-04014: startup failed: ORA-00600: internal error code, arguments:
[kck_rls_check must use (11,0,0,0,0) or lower], [kdt.c], [9576], [11.2.0.2.0], [], [], [], [],
[], [], [], []

Solution:

- This was due to software defect 9149857 which relates to an internal check on the compression compatibility.
- Set the parameter `_compression_compatibility= "11.2.0"`
- Refer to note [ID 1064264.1](#)

11.2.0.1 to 11.2.0.2 rootupgrade hangs

rootupgrade.sh

Running Oracle 11g root script...

The following environment variables are set as:

ORACLE_OWNER= oracle

ORACLE_HOME= /u01/app/grid/11.2.0.2

Enter the full pathname of the local bin directory: [/usr/local/bin]:

The contents of "dbhome" have not changed. No need to overwrite.

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 /var/opt/oracle/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/grid/11.2.0.2/crs/install/crsconfig_params

Creating trace directory

Failed to add (property/value):('OLD_OCR_ID/'-1') for checkpoint:ROOTCRS_OLDH

INFO.Error code is 256

The fixes for bug 9413827 are not present in the 11.2.0.1 crs home

Apply the patches for these bugs in the 11.2.0.1 crs home and then run rootupgra de.sh

/u01/app/grid/11.2.0.2/perl/bin/perl -l/u01/app/grid/11.2.0.2/perl/lib -l/u01/app/grid/11.2.0.2/crs/install

/u01/app/grid/11.2.0.2/crs/install/rootcrs.pl execution failed

11.2.0.1 to 11.2.0.2 Catupgrd failed with ORA-1722 error

Pre-Upgrade Info Tool utlu112i.sql actually changes SYS.PROPS\$ table, and it is not optional to run, as one might assume.

As noted in comments in script \$ORACLE_HOME/rdbms/admin/catupstr.sql:

"The following statement will cause:

- "ORA-00942: table or view does not exist" ; or
- "ORA-00904: "TZ_VERSION": invalid identifier"" ; or
- "ORA-01722: invalid number"

if the pre-upgrade utility (utlu112i.sql) has not been run...

"... run utlu112i.sql to populate registry\$database with the database timezone file version used by the lower version database and to populate sys.props\$ with Day Light Saving Time (DST) properties information."

Since we did not run utlu112i.sql in one of our database it resulted in ORA-01722 error.

- Always the first place to go ...
- <http://www.oracle.com/technology/documentation/database.html>
 - View Library (though you can download the whole set)
- Check the Installing and Upgrading Section
 - Oracle Grid Infrastructure Installation Guide
 - Real Application Clusters Installation Guide for Linux and UNIX
 - Clusterware Administration and Deployment Guide
 - Real Application Clusters Administration and Deployment Guide
 - Storage Administrator's Guide
 - 11g Upgrade Guide
 - New Features Guide
- Check MOS for Upgrade Issues
- Check Upgrade Companion Note: 785351.1
- Check Certification Matrix
 - <http://www.oracle.com/technology/support/metalink/index.html>



Q U E S T I O N S
A N S W E R S

The graphic features a large black 'Q' at the top left and a large black 'A' at the bottom right. A red ampersand (&) is positioned in the center, overlapping the 'Q' and 'A'. The words 'QUESTIONS' and 'ANSWERS' are written in a smaller, black, sans-serif font across the middle of the graphic, with 'QUESTIONS' on the top line and 'ANSWERS' on the bottom line.