Complete Checklist for Manual Upgrades to 11gR2 V_1

This document is created for use as a guideline and checklist when manually upgrading from Oracle 9iR2 (9.2), Oracle 10gR1 (10.1), Oracle 10gR2 (10.2) or Oracle 11gR1 (11.1) to Oracle 11gR2 (11.2).

Part 1:
Recommendations for Source database

1) Ensure that all cronjobs are disable.

2) Ensure that all database components/objects provided by Oracle are VALID in the source database prior to starting the upgrade.

```
select decode(object_type,
        'JAVA CLASS',  'alter JAVA CLASS '||owner||'.'||'"'||object_name||'" resolve;',
        'TYPE BODY',   'alter TYPE            '||owner||'.'||rpad(object_name,30)||' compile body;',
        'PACKAGE BODY','alter PACKAGE         '||owner||'.'||rpad(object_name,30)||' compile
body;',
        'alter '||rpad(object_type,20)||' '||owner||'.'||rpad(object_name,30)||' compile;')
invalid_sql
from dba_objects
where status='INVALID' and
    object_type in ('FUNCTION',
                'PACKAGE',
                'PACKAGE BODY',
                'PROCEDURE',
                'TRIGGER',
                'TYPE',
                'TYPE BODY',
                'SYNONYM',
                'VIEW')
order by owner,object_type,object_name
```

3) Ensure that you do not have duplicate objects in the SYS and SYSTEM schema.

The following objects are permissible duplicate objects:

```
 OBJECT_NAME OBJECT_TYPE
------------------------------ -------------------
AQ$_SCHEDULES TABLE
AQ$_SCHEDULES_PRIMARY INDEX
DBMS_REPCAT_AUTH PACKAGE
DBMS_REPCAT_AUTH PACKAGE BODY
```

Note: All these checks are done when you execute step 3 (dbupgdiag.sql)

4) Disable the custom triggers that would fire before/after DDL and enable them after the upgrade is complete.

```
select 'alter trigger '||owner||'.'||trigger_name||' disable;' from dba_triggers where owner='SYS' and
status='ENABLED';
```

5) Check below parameters, if those are not set in init file those parameters takes dynamic values on source db than it may take higher values on tartget db

```
parallel_max_servers            integer    5
parallel_min_servers            integer    0
```

6) Change Default profile limit:
alter profile default limit PASSWORD_VERIFY_FUNCTION NULL;

This may cause some invalid package which belongs to xml db. Details:

Install Several Database Components (JVM, XDB…) Fails Due to ORA-28003 [ID 1083338.1]

7) Truncate AUD$ table
truncate table sys.AUD$ drop storage;

8) Purge RECYCLEBIN;
PURGE RECYCLEBIN;

9) Check JOB_QUEUE value and set it to 0 **(After upgrade set old value as current value)**
alter system set job_queue_processes= 0 scope=spfile;

10) Ensure that you do not have duplicate objects in the SYS and SYSTEM schema.
The following objects are permissible duplicate objects:

```
 OBJECT_NAME OBJECT_TYPE
------------------------------ -------------------
AQ$_SCHEDULES TABLE
AQ$_SCHEDULES_PRIMARY INDEX
DBMS_REPCAT_AUTH PACKAGE
DBMS_REPCAT_AUTH PACKAGE BODY
```

Please refer to the following article for complete instructions to remove any other duplicates.
NOTE.1030426.6 HOW TO CLEAN UP DUPLICATE OBJECTS OWNED BY SYS AND SYSTEM

Below is a SQL*Plus generate an SQL script that contains the appropriate DROP commands:

```
set pause off
set heading off
set pagesize 0
set feedback off
set verify off
spool dropsys.sql
select 'DROP ' || object_type || ' SYSTEM.' || object_name || ';'
from dba_objects
where object_name not in
('AQ$_SCHEDULES_PRIMARY','DBMS_REPCAT_AUTH','AQ$_SCHEDULES','PRODUCT_USER_PROFILE','S
QLPLUS_PRODUCT_PROFILE','PRODUCT_PRIVS','HELP','HELP_TOPIC_SEQ') and
object_name||object_type in
(select object_name||object_type
from dba_objects
where owner = 'SYS')
and owner = 'SYSTEM';
```

Spool off

11) If your database has XML Database(XDB) installed or installing XDB, be sure to run the code mentioned in **Note 1573175.1 "Upgrading or Installing XDB could result in data loss if XDB_INSTALLATION_TRIGGER exists** " to determine if any objects need to be dropped. Please note, failure to follow the steps listed below could result in data loss of user objects like tables, indexes...

Requirements and recommendations for target database

- Check the certification of Oracle 11gR2 with your Platform/Operating system before downloading and installing Oracle 11gR2. Please check the certification information on My Oracle Support.
- Download and Install Oracle 11g Release 2 in a new Oracle Home and make sure there are no relinking errors.
- Install the latest available Patchset from Metalink (if available).
- Install the latest opatch available for your platform and database version (if available).
- Install the latest available Critical Patch Update (if available).
- Either take a Cold or Hot backup of your source database (advisable to have cold backup).
- If you have XDB installed then please install the PSE for 10368698 to the 11.2.0.2 Home before doing the upgrade . If there is not an existing one-off patch for your platform please open an SR to request the one-off patch. This defect can cause certain databases that are XDB enabled to take a great deal of time to upgrade. The bug 10368698 is fixed in 11.2.0.3 .
- If you have XDB installed then the install the fix for Bug 10419629 in the 11.2.0.2.0 home prior to upgrade . Please refer Note 1305561.1 While Upgrading From 10.2.0.4.0 To 11.2.0.2.0 Catupgrd.sql=ORA-31061 ORA-19202 LSX-23
- If the XML database (XDB) component is installed, you must set SHARED_POOL_SIZE = 250M and JAVA_POOL_SIZE = 250M or higher before upgrading otherwise you may run into the issue described in the following article
- Note 1127179.1 ORA-07445 [qmkmgetConfig()+52] During Catupgrd.sql (11.2.0.1).

12) Some Other checks. (This part is related with your source db components and also target db version)

- If ASMM is configured on the database, set both parameters as indicated above to guarantee a minimum value for those pools.

- For an awareness of performance-related issues in 11.2.0.2 . Please refer Note 1320966.1 "Things to Consider Before Upgrade to 11.2.0.2 in Relation to Database Performance"

- For an awareness of SQL profile related known issue , please refer BUG 13646689- SQL PROFILES LOST AFTER UPGRADE ORA-00001 (SYS.I_SQLOBJ$AUXDATA_PKEY) . Currently development is working on this bug . SQL PROFILES will be lost when upgrading from 10.2 releases if following SQL statement return rows .

```
select sp.signature, sp.category, count(*) from sqlprof$ sp,sqlprof$desc sd,sql$ s
where sp.signature = sd.signature(+) and sp.signature = s.signature
group by sp.signature, sp.category having count(*) > 1;
```

- For an awareness of Oracle Text related issues in 11.2.0.4 if using Text , then please refer Oracle Text Release 11.2.0.4.0 Mandatory Patches (Doc ID 1608029.1)

- If Mitigation Patch 1972130 is applied at source database, then Oracle JVM component has been disabled. You might get the following error while upgrading the database.
  ORA-02290 - check constraint (SYS.JAVA_DEV_DISABLED) violated.
  Enable Oralce JVM java component at the source database before start upgrading the database .
  Connect to the database as a SYSDBA user
  SQL> exec dbms_java_dev.enable;
  Refer:Database Upgrade failed with Errors "ORA-02290: check constraint (SYS.JAVA_DEV_DISABLED) violated" & "ORA-04045: SYS.DBMS_ISCHED" (Doc ID 1985725.1)

  NOTE : This step is ONLY applicable if you have applied Mitigation Patch on the source database

Part 2:
Compatibility Matrix

Minimum version of the database that can be directly upgraded to Oracle 11g Release 2 (11.2)

Source Database	Target Database
9.2.0.8 or higher	11.2.x
10.1.0.5 or higher	11.2.x
10.2.0.2 or higher	11.2.x
11.1.0.6 or higher	11.2.x

The following database versions will require an indirect upgrade path:

Source Database		Upgrade Path for Target Database		Target Database
7.3.3 (or lower)	---->	7.3.4 -> 9.2.0.8	---->	11.2.x
8.0.5 (or lower)	---->	8.0.6 -> 9.2.0.8	---->	11.2.x
8.1.7 (or lower)	---->	8.1.7.4 -> 10.2.0.2(or any higher 10GR2 version)	---->	11.2.x
9.0.1.3 (or lower)	---->	9.0.1.4 -> 10.2.0.2 (or any higher 10GR2 version)	---->	11.2.x
9.2.0.7(or lower)	---->	9.2.0.8	---->	11.2.x

For example:

If source database is 8.1.7.0.0, the upgrade path to be followed is as below:
8.1.7.0.0 --> 8.1.7.4 --> 10.2.0.2(or any higher 10GR2 version)--> 11.2.x.

You can find related patch number in below:
9.2.0.8 patchset : Patch:4547809
10.1.0.5 patchset : Patch:4505133
10.2.0.2 patchset : Patch:4547817
Note 753736.1 : Quick Reference to Patchset Patch Numbers

Part 3:
Pre-Upgrade Steps

In this section all the steps need to be performed after having set the environment of the previous version of the Oracle Database. Note that the database must be running in normal mode in the old release.

Step 1:

1) Download and use the latest Pre-Upgrade Information Tool see the following:

   How to Download and Run Oracle's Database Pre-Upgrade Utility Note 884522.1

1) Log into the system as the owner of the **Oracle Database 11g Release 2 (11.2) Oracle Home** directory.

   Copy the Pre-Upgrade Information Tool (utlu112i.sql) from the Oracle Database 11g Release 2 (11.2) ORACLE_HOME/rdbms/admin directory to a directory outside of the Oracle Home, such as the temporary directory on your system.

   $ORACLE_HOME/rdbms/admin/utlu112i.sql

   Failure to run the pre-upgrade tool (utlu112i.sql) will result in the following error while running the catupgrd.sql script :
   SQL> SELECT TO_NUMBER('MUST_BE_SAME_TIMEZONE_FILE_VERSION')
   FROM registry$database
   WHERE tz_version != (SELECT version from v$timezone_file);
   SELECT TO_NUMBER('MUST_BE_SAME_TIMEZONE_FILE_VERSION')
   *
   ERROR at line 1:
   ORA-01722: invalid number

   It is required to restore the database back to previous version in order to run the preupgrade tool (utlu112i.sql) .

Step 2:

Change to the directory where utlu112i.sql had been copied in the previous step.
Please note that the database should be started using the source Oracle Home .

```
$ sqlplus '/ as sysdba'
SQL> spool upgrade_info.log
SQL> @utlu112i.sql
SQL> spool off
```

Check the spool file and examine the output of the Upgrade Information Tool.

###IMPORTANT###
SYSAUX Tablespace
This section displays the minimum required size for the SYSAUX tablespace which is required in the new Oracle Database 11g release 2 (11.2). The SYSAUX tablespace must be created if it does not exist (in Oracle 9i) after the new release is started and before the upgrade scripts are invoked.

```
SQL>    CREATE TABLESPACE SYSAUX
   DATAFILE '<location>/sysaux01.dbf'
```

SIZE 500M REUSE
EXTENT MANAGEMENT LOCAL
SEGMENT SPACE MANAGEMENT AUTO
ONLINE;

Note : If SYSAUX was created in 9i then it must be dropped and re-created after starting in the new release. If created in 10g or later then it can be left there and used.

Part 4:
Preparing Database for Upgrade

Step 1:
Check for the integrity of the source database.

Check for the integrity of the source database prior to starting the upgrade by downloading and running the dbupgdiag.sql script from the My Oracle Support article below:
Note 556610.1 Script to Collect DB Upgrade/Migrate Diagnostic Information (dbupgdiag.sql)

If the dbupgdiag.sql script reports any invalid objects, run $ORACLE_HOME/rdbms/admin/utlrp.sql (multiple times) to validate the invalid objects in the database until there is no change in the number of invalid objects.

```
$ cd $ORACLE_HOME/rdbms/admin
$ sqlplus "/ as sysdba"
SQL> @utlrp.sql
```

After validating the invalid objects, re-run dbupgdiag.sql in the database once again and make sure that everything is fine.
It is advisable to do a Health Check using "hcheck.sql" script .Please refer following article to download the script .
Note 136697.1 hcheck.sql" script to check for known problems in Oracle8i, Oracle9i, Oracle10g and Oracle 11g

Step 2:
Deprecated CONNECT Role

After upgrading to Oracle Database 11g Release 2 (11.2) from Oracle Database9i Release 2 (9.2) or Oracle Database 10g Release 1 (10.1), the CONNECT role has only the CREATE SESSION privilege; the other privileges granted to the CONNECT role in earlier releases are revoked during the upgrade. To identify which users and roles in your database are granted the CONNECT role, use the following query:

```
SELECT grantee FROM dba_role_privs
WHERE granted_role = 'CONNECT' and
grantee NOT IN ('SYS', 'OUTLN', 'SYSTEM', 'CTXSYS', 'DBSNMP','LOGSTDBY_ADMINISTRATOR',
'ORDSYS','ORDPLUGINS', 'OEM_MONITOR', 'WKSYS', 'WKPROXY','WK_TEST', 'WKUSER', 'MDSYS',
'LBACSYS', 'DMSYS','WMSYS', 'EXFSYS', 'SYSMAN', 'MDDATA','SI_INFORMTN_SCHEMA', 'XDB', 'ODM');
```

If users or roles require privileges other than CREATE SESSION, then grant the specific required privileges prior to upgrade.

Step 3:

Create script for DBLINK (in case the database has to be downgraded again).

During the upgrade to Oracle Database 11g Release 2 (11.2) from Oracle Database 9i Release 2 (9.2) or Oracle Database 10g Release 1 (10.1), any passwords in database links are encrypted. To downgrade to the original release, all of the database links with encrypted passwords must be dropped prior to the downgrade. Consequently, the database links do not exist in the downgraded database. If you anticipate a requirement to be able to downgrade to your original release, then save the information about affected database links from the SYS.LINK$ table, so that you can re-create the database links after the downgrade.

```
SELECT 'CREATE '||DECODE(U.NAME,'PUBLIC','public ')||'DATABASE LINK '||CHR(10)
||DECODE(U.NAME,'PUBLIC',Null, 'SYS',''',U.NAME||'.')|| L.NAME||chr(10)
||'CONNECT TO ' || L.USERID || ' IDENTIFIED BY "'||L.PASSWORD||'" USING
'''||L.HOST||''''
||chr(10)||';' TEXT
FROM SYS.LINK$ L, SYS.USER$ U
WHERE L.OWNER# = U.USER#;
```

Step 4:
Check for TIMESTAMP WITH TIMEZONE Datatype
TIMEZONE must be 4 or higher. If its not than you need to apply patch
There are now scripts available who do the steps 3) up to 6) in this note available in note 1585343.1 Scripts to automatically update the RDBMS DST (timezone) version in an 11gR2 or 12cR1 database .

The RDBMS DST patching has been greatly improved in 11gR2.Unlike upgrading for older versions (upgrading 10.2.0.4 to 11.1.0.7 for example) there is no need anymore to apply "dst patches" on the old version *before* the upgrade.

If you upgrade from an older RDBMS version to 11gR2 the DST version in 11gR2 after the upgrade will be simply the same as the DST version that was used in the older RDBMS version.

There are however a few situations where some extra steps are needed, so please do check below notes before upgrading to 11gR2., depending on to what 11gR2 version you upgrade to

If the note say's to apply a RDBMS DST patch to the new 11gR2 home before the upgrade then please do so before going further in this note.

Make sure that
SQL> conn / as sysdba
SQL> select TZ_VERSION from registry$database;

returns the RDBMS DST version of your old Oracle RDBMS version.

If this select gives an error or a different value then re-run the utlu112i.sql (Pre-Upgrade Information Tool) script and check again.

Step 5:
Check that the National Characterset (NLS_NCHAR_CHARACTERSET) is UTF8 or AL16UTF16.

select value from NLS_DATABASE_PARAMETERS where parameter = 'NLS_NCHAR_CHARACTERSET';

If this is UTF8 or AL16UTF16 then no action is needed.
If is not UTF8 or AL16UTF16 then refer to the following article:
Note 276914.1 The National Character Set in Oracle 9i and 10g.

Step 6:
Optimizer Statistics

To decrease the amount of downtime incurred when collecting statistics, you can collect statistics prior to performing the actual database upgrade. As of Oracle Database 10g Release 1 (10.1), Oracle recommends that you use the DBMS_STATS.GATHER_DICTIONARY_STATS procedure to gather these statistics. For example, you can enter the following:

$ sqlplus "/as sysdba"

SQL> EXEC DBMS_STATS.GATHER_DICTIONARY_STATS;

###RUN AS ONE LINE###

```
EXECUTE  bms_stats.gather_schema_stats('SYSTEM',options=>'GATHER',estimate_percent=>DBMS_STATS.AUTO_SAMPLE_SIZE,method_opt=>'FOR ALL COLUMNS SIZE AUTO',cascade=>TRUE);

EXECUTE dbms_stats.gather_schema_stats('SYS',options=>'GATHER',estimate_percent=>DBMS_STATS.AUTO_SAMPLE_SIZE,method_opt=>'FOR ALL COLUMNS SIZE AUTO',cascade=>TRUE);
```

If you are using Oracle Database 9i Release 2 (9.2), then you should use the BMS_STATS.GATHER_SCHEMA_STATS procedure to gather statistics.

Step 7-OPTIONAL
Disable Oracle Database Vault

When upgrading from Oracle Database release 10.2, if you have enabled the Oracle Database Vault option in your current Oracle Home, then you must disable Oracle Database Vault in the target Oracle Home where the new release 11.2 software is installed before upgrading the database, and enable it again when the upgrade is finished. If Database Vault is enabled, then DBUA will return an error asking you to disable Database Vault prior to upgrade.

You must do this before upgrading the database. Enable Oracle Database Vault again once the upgrade is completed.

Please refer to the following Documentation/Articles for complete information to Disable/Enable Oracle Database Vault.

Disabling and Enabling Oracle Database Vault

OR

You can also refer to the following documents for Disabling Oracle Database Vault before the upgrade and enabling it after the upgrade.
Note 453903.1 - Enabling and Disabling Oracle Database Vault in UNIX
Note 453902.1 - Enabling and Disabling Oracle Database Vault in WINDOWS

Step 8-OPTIONAL

Backing up Enterprise Manager Database Control Data. This can be skipped if EM Database Control Console is not being used or not configured.

After upgrading to Oracle Database 11g release 2 (11.2), if you want to downgrade Oracle Enterprise Manager Database Control you must save your Database Control files and data before upgrading your database. The emdwgrd utility can be used to keep a copy of your database control files and data before upgrading your database. The emdwgrd utility resides in the ORACLE_HOME/bin directory in the Oracle Database 11g release 2 (11.2) home.

1. Set ORACLE_HOME to your old Oracle Home
2. Set ORACLE_SID to the SID of the database being upgraded.
3. Set PATH, LD_LIBRARY_PATH and SHLIB_PATH to point to the Oracle home from which the database is being upgraded.
   Example : export SHLIB_PATH=$ORACLE_HOME/lib:$SHLIB_PATH
   export LD_LIBRARY_PATH=$ORACLE_HOME/lib:$LD_LIBRARY_PATH
4. Change directory to Oracle Database 11g release 2 (11.2) home.
5. Run the emdwgrd command.
   a. Run the following command for single instance database:

$ emdwgrd -save -sid old_SID -path save_directory

where old_SID is the SID of the database being upgraded and save_directory is the path to the storage place you have chosen for your Database Control files and data.
@Note 870877.1 How To Save Oracle Enterprise Manager Database Control Data Before Upgrading The Single Instance Database To Other Release ?

b. For RAC database, remote copy is required across the cluster nodes. Define an environment variable to indicate which remote copy is configured. For example: setenv EM_REMCP /usr/bin/scp

$ emdwgrd -save -cluster -sid old_SID -path save_directory

Note: If 10g Oracle Home is on a shared device, add -shared to the previous command line.

The above command(s) may core dump on the HP-UX Itanium platform, which is a known issue. For more information, refer to following article:
Note 562980.1 - emdwgrd core dumps : emdwgrd[228]: 10366 Memory fault(coredump)

6. Enter the SYS password for the database to be upgraded.
Note: On RAC databases you will be prompted to run '/tmp/racdwgrd_dbctl.sh' on each of the nodes.

Step 9-OPTIONAL:
Configuring Network ACL's

Oracle Database 11g Release 2 (11.2) includes fine-grained access control to the UTL_TCP, UTL_SMTP, UTL_MAIL, UTL_HTTP, or UTL_INADDR packages using Oracle XMLDB. If you have applications that use one of these packages, you must install OracleXML DB if it is not already installed. You must also configure network access control lists (ACLs) in the database before these packages can work as they did in prior releases

Step 10:
This optional check is introduced to spot any logical corruption in underlying objects and their dependencies.

If there is corruption the upgrade will most likely fail.

To check for corruption in the dictionary, use the following commands in SQL*Plus (connected as sys):

```
Set verify off
Set space 0
Set line 120
Set heading off
Set feedback off
Set pages 1000
Spool analyze.sql

SELECT 'Analyze cluster "'||cluster_name||'" validate structure cascade ;'
FROM dba_clusters
WHERE owner='SYS'
UNION
SELECT 'Analyze table "'||table_name||'" validate structure cascade ;'
FROM dba_tables
WHERE owner='SYS'
AND partitioned='NO'
AND (iot_type='IOT' OR iot_type is NULL)
UNION
SELECT 'Analyze table "'||table_name||'" validate structure cascade into invalid_rows;'
FROM dba_tables
WHERE owner='SYS'
AND partitioned='YES';
spool off
```

This creates a script called analyze.sql.

Now execute the following steps:
$ sqlplus "/ as sysdba"
SQL> @$ORACLE_HOME/rdbms/admin/utlvalid.sql
SQL> @analyze.sql

This script (analyze.sql) should not return any errors.

Note:
1. ORA-30657 might occur if there is any external table validated, which can be safely ignored as per Note 209355.1 ORA-30657: Using ANALYZE TABLE for an External Table

2. Errors shown below when executing analyze.sql can be ignored:
SP2-0734: unknown command beginning "SQL> SELEC..." - rest of line ignored.
SP2-0042: unknown command "SQL>" - rest of line ignored.
SP2-0734: unknown command beginning "SQL> spool..." - rest of line ignored.

3. "ORA-00054: resource busy and acquire with NOWAIT specified" may be returned when analyzing AWR tables (WRH$_...)
to workaround this error AWR can be temporarily disabled :
3.a) get current value for snapshot interval :
select snap_interval,retention from dba_hist_wr_control;
3.b) set this interval to zero to temporarily disable AWR :

exec dbms_workload_repository.modify_snapshot_settings(interval=>0);
3.c) Analyze the WRH$ tables
3.d) Revert back to initial value :
exec dbms_workload_repository.modify_snapshot_settings(interval=><value in mn of snap_interval returned at 3.a>);

Step 11-OPTIONAL:
Before upgrading Oracle Database, you must wait until all materialized views have completed refreshing and check that replication is stopped.

Run the following query to determine if there are any materialized view refreshes still in progress:

SQL> select distinct(trunc(last_refresh)) from dba_snapshot_refresh_times;

SQL> select s.obj#,o.obj#,s.containerobj#,lastrefreshdate,pflags,xpflags,o.name,o.owner#, bitand(s.mflags, 8) from obj$ o, sum$ s
where o.obj# = s.obj# and o.type# = 42 AND bitand(s.mflags, 8) = 8;

If the second query returns any row, then use Note 1442457.1 : During 11g Upgrade, Mview refresh warning

Step 12:
Ensure that no files need media recovery and that no files are in backup mode.

SELECT * FROM v$recover_file;
SELECT * FROM v$backup WHERE status != 'NOT ACTIVE';
This should return no rows.

Step 13-OPTIONAL:
Password protected roles.

In version 11.2 password protected roles are no longer enabled by default,
if any of your applications relies on such roles being enabled by default and you take no measures to allow the user to enter the password with the set role command, it is recommended to remove the password from those roles to allow for existing privileges to remain available, for more information see :

Note 745407.1 : What Roles Can Be Set as Default for a User?
Oracle Database Security Guide 10g Release 2 (10.2) Part Number B14266-07
Oracle Database Security Guide 11g Release 1 (11.1) Part Number B28531-15
Oracle Database Security Guide 11g Release 2 (11.2) Part Number E16543-09

Step 14-OPTIONAL:
Resolve outstanding distributed transactions prior to the upgrade.

SQL> select * from dba_2pc_pending;

If this returns rows you should do the following:
SQL> SELECT local_tran_id FROM dba_2pc_pending;
SQL> EXECUTE dbms_transaction.purge_lost_db_entry('');
SQL> COMMIT;

Step 15-OPTIONAL:
To check if a standby database exists, issue the following query:

SELECT SUBSTR(value,INSTR(value,'=',INSTR(UPPER(value),'SERVICE'))+1)
FROM v$parameter
WHERE name LIKE 'log_archive_dest%' AND UPPER(value) LIKE 'SERVICE%';

If this query returns a row, then sync the standby database with the primary database.
1. Make sure all the logs are transported to the standby server after a final log switch
in the primary.
2. Start the recovery of the standby database with the NODELAY option.

Step 16:
Disable all batch and cron jobs.

About jobs initiated with Oracle the packages DBMS_JOB, DBMS_SCHEDULER can be used , regarding cron jobs (external jobs controlled at the OS level), this is a task for your Unix administrator

See also :
Note 404238.1 : How to Disable an Entry from DBMS_SCHEDULER
Note 1335741.1 : How To Stop A Running Job Using DBMS_JOB
Note 67695.1 : PROCEDURE DBMS_JOB.BROKEN Specification

Step 17:
Ensure the users SYS and SYSTEM have 'SYSTEM' as their default tablespace.

You must have sufficient space in the tablespace or be set to extents unlimited.
SQL> SELECT username, default_tablespace
FROM dba_users
WHERE username in ('SYS','SYSTEM');

If DEFAULT_TABLESPACE is anything other than SYSTEM tablespace, modify the default tablespace to SYSTEM by using the below command.

SQL> ALTER user SYS default tablespace SYSTEM;
SQL> ALTER user SYSTEM default tablespace SYSTEM;

Step 18:
Ensure that if the aud$ table exists that it is in the SYS schema and in the SYSTEM tablespace.

```
SQL> SELECT owner,tablespace_name
    FROM dba_tables
    WHERE table_name='AUD$';
```

If the AUD$ table is not in SYSTEM tablespace and not owned by the SYS user then before doing the upgrade put it back to the SYSTEM tablespace and it should be owned by SYS .

Note: If the AUD$ table exists and is in use, upgrade performance can be effected depending on the number of records in the table.

Step 19-OPTIONAL:
Check whether database has any externally authenticated SSL users.

```
SQL> SELECT name FROM sys.user$
    WHERE ext_username IS NOT NULL
    AND password = 'GLOBAL';
```

If any SSL users are found then Step 33 has to be followed after the upgrade.

Step 20:
Note down the location of datafiles, redo logs and control files. Also take a backup of all configuration files like listener.ora, tnsnames.ora, etc. from $ORACLE_HOME.

```
SQL> SELECT name FROM v$controlfile;
SQL> SELECT file_name FROM dba_data_files;
SQL> SELECT group#, member FROM v$logfile;.
```

Step 21:
If the you have upgraded the Grid Infrastructure then this step is not needed as it was done as part of the GI install / upgrade

a) Stop the listener for the database.
$ lsnrctl stop

Previous versions of the listener are not supported for use with an Oracle Database 11g Release 2 (11.2) database. However, it is possible to use the new version of the listener with previous versions of Oracle Databases.
###IMPORTANT###
If you are upgrading from 9i or upgrading manually without using DBUA, run Oracle Net Configuration Assistant before upgrading the Oracle RAC database.

This is a two-step option.
You must first run Oracle Net Configuration Assistant from the old Oracle Home to remove the old listener.
- Invoke the Netca
- Choose the configuration you want to do ==> Choose Listener Configuration
- Select what you want to do ==> Delete
- Select the listener you want to delete .

Then you must run Oracle Net Configuration Assistant again from the new Oracle Database 11g Release 2 (11.2) Home to create a new listener.

- Invoke the Netca
- Choose the configuration you want to do ==> Choose Listener Configuration
- Select what you want to do ==> Add
- Provide the detail that is required to configure the listener.

You must remove the old listener before creating a new one. If you attempt to create a new listener from the new Oracle Home first, and use the same name and port as the old listener, then Oracle Net Configuration Assistant returns an error.

Note: This is your only option if you want to upgrade your Oracle RAC database manually.

b) Stop other executable such as dbconsole, isqlplus, etc.
$ emctl stop dbconsole
$ isqlplusctl stop

Step 22:
Backup Database

Shutdown the database.
$ sqlplus "/as sysdba"
SQL> shutdown immediate;

Back up the Database

1. Perform Cold Backup
(or)
2. Take a backup using RMAN
Connect to RMAN:
rman "target / nocatalog"

RUN
{
ALLOCATE CHANNEL chan_name TYPE DISK;
BACKUP DATABASE FORMAT '<db_backup_directory>%U' TAG before_upgrade;
BACKUP CURRENT CONTROLFILE TO '<controlfile_backup_directory>';
}

--> backup_directory >> Location of the Database backup.
--> controlfile_backup_directory >> Location of the Controlfile backup.

Step 23:

- copy the initialization file from source Oracle Home to <target 11GR2 home>/dbs (<target 11GR2 home>\database on Windows)
- then process in target 11GR2 directory (<target 11GR2 home>/dbs for unix and <target 11GR2 home>\database for Windows) to the needed modiciations :

* The DIAGNOSTIC_DEST initialization parameter replaces the USER_DUMP_DEST, BACKGROUND_DUMP_DEST.

According to Bug 8937877, CORE_DUMP_DEST is not deprecated.

Refer to the below article for understanding directory structure in 11g and DIAGNOSTIC_DEST.
Note 454442.1 11g Install : Understanding about Oracle Base, Oracle Home and Oracle Inventory locations

* If you are upgrading from 9.2.0.x, the COMPATIBLE initialization parameter must be set to at least 10.0.0, which is the lowest possible setting for Oracle Database11g Release 2 (11.2) prior to the upgrade. This value must remain throughout the upgrade and can be changed to the higher value after the upgrade has been completed successfully.

(Please note, once you set the COMPATIBLE to 10.1 there is no way to downgrade to 9iR2 because of symptoms described in Note 388604.1 : ORA-00201 while downgrading from 10gR2 to 10gR1 or 9iR2

Oracle recommends increasing the COMPATIBLE parameter only after complete testing of the upgraded database has been performed.

If you are upgrading from 10.1.0.x or 10.2.0.x then you can leave the COMPATIBLE parameter set to it's current value until the upgrade has been completed successfully.

This will avoid any unnecessary ORA-942 errors from being reported in SMON trace files during the upgrade (because the upgrade is looking for 10.2 objects that have not yet been created).

* Adjust the values of the initialization parameters to at least the minimum value indicated by the Pre-Upgrade Information Tool.
Make sure all path names in the parameter file are fully specified. You should not have relative path names in the parameter file.

* If you are upgrading a cluster database, set the parameter CLUSTER_DATABASE=FALSE during the upgrade and set it back to true after the upgrade.

Step 24-If you are on WINDOWS:
If your operating system is Windows then complete the actions in this step, else skip to the next step.

Stop the OracleServiceSID Oracle service of the database you are upgrading, where SID is the instance name. For example, if your SID is ORCL, then enter the following at a command prompt:
Set the environment to Source/Previous version (9.2 / 10.1 / 10.2 /11.1)

1. Stop the Oracle database service.
C:\> NET STOP OracleServiceORCL

2. Delete Oracle service using ORADIM binary from which the database is upgraded to 11.2.
C:\> ORADIM -DELETE -SID ORCL

3. Create the Oracle Database 11g Release 2 (112) service at a command prompt using the ORADIM command of the new Oracle Database release:
C:\> ORADIM -NEW -SID SID -INTPWD PASSWORD -STARTMODE AUTO -PFILE %ORACLE_HOME%\DATABASE\INIT<SID>.ORA

For Instance,

C:\> ORADIM -NEW -SID ORCL -INTPWD <PASSWORD> -STARTMODE AUTO -PFILE %ORACLE_HOME%\DATABASE\INIT<SID>.ORA

Step 25-If you are on UNIX:
If your operating system is UNIX then complete this step, else skip to the next step.

1. Make sure the following environment variables point to the Oracle 11g Release 2 (11.2) directories:

- ORACLE_BASE
- ORACLE_HOME
- PATH, LD_LIBRARY_PATH , SHLIB_PATH and LIBPATH (for AIX)
For example:

$ export ORACLE_HOME=<location of Oracle 11.2>
$ export PATH=$ORACLE_HOME/bin:$PATH
$ export ORACLE_BASE=<Oracle_Base set during installation>
$ export LD_LIBRARY_PATH=$ORACLE_HOME/lib:$LD_LIBRARY_PATH
$ export SHLIB_PATH=$ORACLE_HOME/lib:$SHLIB_PATH
$ export LIBPATH=$ORACLE_HOME/lib:$LIBPATH

Note : If ORACLE_BASE is not known, after setting PATH to 11gR2 Oracle Home, execute 'orabase', which will point the location of the base.
Note : Unset/Remove the ORA_TZFILE environment variable if it is set in your environment .

$ orabase
/uo1/app/oracle

2. Update the oratab entry to set the new ORACLE_HOME pointing to ORCL and disable automatic startup.
Sample /etc/oratab

#orcl:/opt/oracle/product/10.2/db_1:N
orcl:/opt/oracle/product/11.2/db_1:N

Note: After /etc/oratab is updated to have SID and Oracle Home (11.2), you can execute oraenv (/usr/local/bin/oraenv) and set the environment. The input has to be the SID which is entered in /etc/oratab against the 11gR2 home.

For example:
[oracle@localhost ~]$. oraenv
ORACLE_SID = [orcl] ? orcl
The Oracle base for ORACLE_HOME=/opt/oracle/product/11.2/db_1 is /u01/app/oracle

Step 25a:

If you are upgrading database from 10g, verify following information

SQL> select DBMS_STATS.GET_PARAM('METHOD_OPT') from dual;

DBMS_STATS.GET_PARAM('METHOD_OPT')

FOR COLUMNS ID SIZE 1

If it reports "FOR COLUMNS ID SIZE 1", it might create issues during upgrade. Hence as a workaround execute
SQL>exec DBMS_STATS.SET_PARAM('METHOD_OPT','FOR ALL COLUMNS SIZE AUTO');

Refer: Unpublished BUG 22454765 - CARRYING METHOD_OPT = "FOR COLUMNS ID SIZE 1" FROM 10G WILL BREAK UPGRADE Upgrading Database to 11gR2

Step 26-UPGRADE /POST UPGRADE STEP:

At the operating system prompt, change to the $ORACLE_HOME/rdbms/admin directory of 11gR2 Oracle Home.

$ cd $ORACLE_HOME/rdbms/admin
$ sqlplus "/ as sysdba"
SQL> startup UPGRADE

Set the system to spool results to a log file for later verification after the upgrade is completed and start the upgrade script.
SQL> set echo on
SQL> SPOOL upgrade.log
SQL> @catupgrd.sql
SQL> spool off

Run the Post-Upgrade Status Tool $ORACLE_HOME/rdbms/admin/utlu112s.sql which provides a summary of the upgrade at the end of the spool log. It displays the status of the database components in the upgraded database and the time required to complete each component upgrade. **Any errors that occur during the upgrade are listed with each component and must be addressed.**

$ sqlplus "/as sysdba"
SQL> STARTUP
SQL> @utlu112s.sql

Run catuppst.sql, located in the $ORACLE_HOME/rdbms/admin directory, to perform upgrade actions that do not require the database to be in UPGRADE mode.
SQL> @catuppst.sql

This script can be run concurrently with utlrp.sql. Run utlrp.sql to recompile any remaining stored PL/SQL and Java code in another session.
SQL> @utlrp.sql

Check for the integrity of the upgraded database by running dbupgdiag.sql script from the below article:
Note 556610.1 Script to Collect DB Upgrade/Migrate Diagnostic Information (dbupgdiag.sql)

If the dbupgdiag.sql script reports any invalid objects, run $ORACLE_HOME/rdbms/admin/utlrp.sql (multiple times) to validate the invalid objects in the database, until there is no change in the number of invalid objects.

After validating the invalid objects, re-run dbupgdiag.sql in the upgraded database once again and make sure that everything is fine.

Part 4:
Post Upgrade Steps

Step 1:
Verify the listener.ora file.

For the upgraded instance(s) Verify the ORACLE_HOME parameter to point to the new ORACLE_HOME. Start the listener.
lsnrctl start

Step 2:
Environment Variables

1. Make sure the following environment variables point to the Oracle 11g Release 2 (11.2) directories:

- ORACLE_BASE
- ORACLE_HOME
- PATH, LD_LIBRARY_PATH, SHLIB_PATH and LIBPATH (for AIX)

2. Modify /etc/oratab entry to use automatic startup.
SID:ORACLE_HOME:Y

For Instance,
orcl:/opt/oracle/product/11.2/db_1:Y

Step 3:
After the upgrade
Check the current version of the Oracle time zone definitions in the upgraded database:
SQL> conn / as sysdba

Connected.
SQL>SELECT version FROM v$timezone_file;

VERSION

4

This should be the same as the value found before the upgrade.

*For 11.2.0.1 : update to DSTv11 (standard DST version of 11.2.0.1) by using the scripts in Note 1585343.1 Scripts to automatically update the RDBMS DST (timezone) version in an 11gR2 or 12cR1 database .
OR
following Note 977512.1 Updating the RDBMS DST version in 11g Release 2 (11.2.0.1 and up) using DBMS_DST (from step 3a) onwards using "11" as (<the new DST version number>) in that note.

*For 11.2.0.2 , 11.2.0.3 and 11.2.0.4 : update to DSTv14 (standard DST version of (for 11.2.0.2 , 11.2.0.3 and 11.2.0.4) by using the scripts in Note 1585343.1 : Scripts to automatically update the RDBMS DST (timezone) version in an 11gR2 or 12cR1 database .
OR
following Note 977512.1 Updating the RDBMS DST version in 11g Release 2 (11.2.0.1 and up) using DBMS_DST (from step 3a) onwards using "14" as (<the new DST version number>) in that note.)
note that :

* it is supported to use a lower DST version in 11gR2, but there is no technical reason to use a lower DST version, hence we *strongly* recommend to update to the highest DST version included in the 11gR2 version you upgraded

* Optionally you can update to the lastest dst version available.
The latest available DST patch is found in Note 412160.1 : Updated DST transitions and new Time Zones in Oracle Time Zone File patch

Step 4-OPTIONAL:
Upgrade Statistics Tables Created by the DBMS_STATS Package.

If you created statistics tables using the DBMS_STATS.CREATE_STAT_TABLE procedure, then upgrade these tables by executing the following procedure:
EXECUTE DBMS_STATS.UPGRADE_STAT_TABLE('SYS','dictstattab');

In the example, 'SYS' is the owner of the statistics table and 'dictstattab' is the name of the statistics table. Execute this procedure for each statistics table.

Step 5-OPTIONAL:
Upgrade Externally Authenticated SSL Users.

If you have upgraded from Oracle 9.2.0.x or 10.1.0.x, and you are using externally authenticated SSL users, then you must run the following command to upgrade those users:
ORACLE_HOME/rdbms/bin/extusrupgrade --dbconnectstring
<hostname:port_no:sid> --dbuser <db admin> --dbuserpassword <password> -a
If you are upgrading from 10.2.0.x (or higher), then you are not required to run this command.

Step 6-OPTIONAL:
Enable Database Vault

Refer to the following documents for enabling Oracle Database Vault:
Note 453903.1 - Enabling and Disabling Oracle Database Vault in UNIX
Note 453902.1 - Enabling and Disabling Oracle Database Vault in WINDOWS

Step 7-OPTIONAL:
Configure Fine-Grained Access to External Network Services.

To avoid "ORA-24247: network access denied by access control list (ACL)" when executing UTL packages (Network related packages), access has to be granted to user using these packages.

The following example first looks for any ACL currently assigned to host_name. If one is found, then the example grants user_name the CONNECT privilege in the ACL only if that user does not already have it. If no ACL exists for host_name, then the example creates a new ACL called ACL_name, grants the CONNECT privilege to user_name, and assigns the ACL to host_name.

```
DECLARE
acl_path VARCHAR2(4000);
BEGIN
SELECT acl INTO acl_path FROM dba_network_acls
WHERE host = 'host_name' AND lower_port IS NULL AND upper_port IS NULL;
IF DBMS_NETWORK_ACL_ADMIN.CHECK_PRIVILEGE(acl_path,'principal','privilege') IS NULL THEN
DBMS_NETWORK_ACL_ADMIN.ADD_PRIVILEGE(acl_path,'principal', is_grant, 'privilege');
END IF;
EXCEPTION
WHEN no_data_found THEN
DBMS_NETWORK_ACL_ADMIN.CREATE_ACL('ACL_name.xml','ACL description', 'principal', is_grant, 'privilege');
DBMS_NETWORK_ACL_ADMIN.ASSIGN_ACL('ACL_name.xml','host_name');
END;

COMMIT;


acl_name.xml => Enter a name for the access control list XML file.
ACL description => 'file description',
principal => 'user_or_role',
is_grant => TRUE|FALSE,
privilege => 'connect|resolve',
host_name => host name
```

Refer to the below note on how to use DBMS_NETWORK_ACL_ADMIN package and also to avoid ORA-24247 : network access denied by access control list (ACL).
Note 453786.1 ORA-24247 When Executing UTL_HTTP UTL_INADDR Packages

Step 7-IF ITS RAC:
Edit init.ora
If you changed the CLUSTER_DATABASE parameter prior the upgrade set it back to TRUE
Migrate your initialization parameter file to a server parameter file.
Create a server parameter file with an initialization parameter file.
SQL> create spfile from pfile;

This will create an spfile as a copy of the init.ora file located in $ORACLE_HOME/dbs (UNIX) & %ORACLE_HOME%\database (Windows).

Step 8-OPTIONAL:
Change passwords for Oracle-Supplied Accounts.

Depending on the release from which you upgraded, there might be new Oracle-supplied accounts. Oracle recommends that you lock all Oracle supplied accounts except for SYS and SYSTEM, and expire their passwords, thus requiring new passwords to be specified when the accounts are unlocked.

You can view the status of all accounts by issuing the following SQL statement:
SQL> SELECT username, account_status FROM dba_users ORDER BY username;

To lock and expire passwords, issue the following SQL statement:
SQL> ALTER USER username PASSWORD EXPIRE ACCOUNT LOCK;

Step 9-OPTIONAL:
Upgrading Oracle Text

This is only needed if Oracle Text is in use.

NOTE : These steps are NOT required if you are upgrading the database within a same release (patchset upgrade) Example : 11.2.0.1 to 11.2.0.2.

Copy the following files from the previous Oracle Home to the new Oracle Home:

* Stemming user-dictionary files
* User-modified KOREAN_MORPH_LEXER dictionary files
* USER_FILTER executables

To obtain a list of the above files, use:

$ORACLE_HOME/ctx/admin/ctxf<version>.txt
$ORACLE_HOME/ctx/admin/ctxf<version>.sql

where version is 920, 101, 102

For instance, if upgrading from 10.2.0:
1. For User Extended Knowledge Base files check
$ORACLE_HOME/ctx/admin/ctxf102.txt
2. Execute the script as database user SYS,SYSTEM, or CTXSYS
$ORACLE_HOME/ctx/admin/ctxf102.sql

If your Oracle Text index uses KOREAN_LEXER which was deprecated in Oracle 9i and desupported in Oracle 10g Release 2, see below note for further information on manual migration from KOREAN_LEXER to KOREAN_MORPH_LEXER:
Note 300172.1 Obsolescence of KOREAN_LEXER Lexer Type

If you are upgrading to the 11.2.0.3 then please refer the following article for Support Note for Lexer Feature Updates

Note 1354793.1 Oracle Text 11.2.0.3 Support Note for Lexer Feature Updates
Note 1319592.1 Upgrading Oracle Text Post 10.2.0.4 To 11.2.0.2 Upgrade

Step 10:
Upgrade the Oracle Clusterware Configuration

If you are upgrading a cluster database from releases 10.2, 11.1, or 11.2.0.1, then upgrade the database configuration in Oracle Clusterware using the following command:

$ srvctl upgrade database -d db-unique-name -o oraclehome

where db-unique-name is the database name assigned to it (not the instance name), and oraclehome is the Oracle home location in which the database is being upgraded.

Step 11-OPTIONAL:
Configure Enterprise Manager

This step is only required if Dbconsole is used for the database , if Dbconsole is not configured or if database is monitored with the Grid Control then this step does not apply.

Step 12-OPTIONAL:
TDE (Transparent Data Encryption)

If your are using Transparent Data Encryption then you will have to rekey the master key as follows:
SQL> alter system set encryption key identified by "<wallet password>";

Step 13-OPTIONAL:
Gather Fixed Object Statistics

Please create stats on fixed objects two weeks after the upgrade using the below command
SQL>EXECUTE DBMS_STATS.GATHER_FIXED_OBJECTS_STATS;

Step 14
Enable cronjobs and set JOB_QUEUE value (After upgrade set old value as current value)

Source:
https://docs.oracle.com/cd/E18283_01/server.112/e17222/upgrade.htm
Using the Pre-Upgrade Information Tool
https://docs.oracle.com/cd/E18283_01/server.112/e17222/upgrade.htm#CACHIDJD
https://docs.oracle.com/cd/E18283_01/server.112/e17222/upgrade.htm#insertedID7
How to Truncate, Delete, or Purge Rows from the Audit Trail Table AUD$ (Doc ID 73408.1)
Complete Checklist for Manual Upgrades to 11gR2 (Doc ID 837570.1)