



# How to Upgrade Oracle from Version 11.2.0.3 and 11.2.0.4 to 12.1.0.2 for the Linux and Solaris Operating Systems

Version 9.2

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# 1

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## Pre-Upgrade Procedures

As part of the Voyager 9.2.x upgrade process, an upgrade to Oracle 12c is required. This section details the steps necessary to prepare for a successful upgrade from Oracle 11gR2 to Oracle 12c.

This section includes:

- **Prerequisites** on page 5
- **Downloading the Package** on page 5
- **Pre-Installation Checks** on page 7
- **Stopping Voyager and Oracle and Disabling SMF Services** on page 9
- **Disabling Enterprise Manager** on page 10
- **Disabling Oracle Archive Logging** on page 10
- **Configuring Kernel Parameters** on page 11
- **Configuring Kernel Parameters** on page 11

### Prerequisites

- Current version of Oracle – 11.2.0.3 or 11.2.0.4.
- `$INSTALL` is defined as `/m1/incoming/oracle` or another directory to be used for download and installation.
- The `INSTALL` variable is defined as `INSTALL=/m1/incoming/oracle`

### Downloading the Package

Before you can upgrade Oracle you must download the upgrade package:

### To download the package:

- 1 Switch to the voyager user:

```
su - voyager
```

- 2 Move to the incoming directory:

```
cd /ml/incoming
```

- 3 Create the INSTALL directory if it does not already exist:

```
export INSTALL=/ml/incoming/oracle  
mkdir -p $INSTALL
```

- 4 Set file permission 1777 for this directory:

```
chmod 1777 $INSTALL
```

- 5 Move to the oracle directory:

```
cd $INSTALL
```

- 6 Log on as the oracle user to the Ex Libris FTP server and download the o121020.server.<OS>.tar.bz2 package for the Oracle database server:

```
ftp downloads.exlibrisgroup.com  
User: oracle  
Password: <contact support>  
cd <OS>/12c  
bin  
hash  
get o121020.server.<OS>.tar.bz2
```

---

### NOTE:

To download the Oracle packages for Linux, change to `Linux_x86_64/12c`; and for Solaris SPARC, change to `SunOS/12c` on the FTP server.

---

- 7 If you have a separate Voyager application server, download the o121020.appsvr.<OS>.tar.bz2 package:

```
ftp downloads.exlibrisgroup.com  
User: oracle  
Password: <contact support>  
cd <OS>/12c  
bin  
hash  
mget o121020.appsvr.<OS>.tar.bz2
```

- 8 Log on as the `voyager` user to the Ex Libris FTP server and move to the `2009.2.0` directory to download the `2009.2.0.script.tar.bz2` and other packages and the `systemcheck` script:

```
ftp downloads.exlibrisgroup.com
User: voyager
Password: <contact support>
cd 2009.2.0
bin
hash
get 2009.2.0.release.conf
get vik.9.2.0.tar.bz
get 2009.2.0.ml_utility.tar.bz2
get 2009.2.0.script.tar.bz2
get systemcheck
```

- 9 Log on as `voyager` to the Ex Libris FTP server and move to the `<OS>/SHARED` directory to download the latest `SHARED` package:

```
ftp downloads.exlibrisgroup.com
User: voyager
Password: <contact support>
cd <OS>/SHARED
bin
hash
get 2015.08.1.SHARED.tar.bz2
```

---

**NOTE:**

For Linux, change to `Linux/SHARED`. For Solaris, change to `SunOS/SHARED`. The latest `SHARED` package contains a most recent date in its filename, in the format of `YYYY-MM-DD`.

---

## Pre-Installation Checks

Perform the following pre-installation database health checks before the Oracle upgrade. This is to ensure all tablespace datafiles are online and ready for the database upgrade. If any datafiles are found to be in "RECOVER" mode or corrupted, contact Ex Libris Voyager Support to have it fixed.

- 1 As oracle user, connect to the database:

```
sqlplus / as sysdba
```

- 2 Issue the query:

```
select * from v$recover_file;
```

If the return is not "no rows selected," open a Salesforce case with Ex Libris Voyager Support.

Perform the following pre-installation system checks in advance before installing the new version of Oracle.

- 1 Switch to the root user:

```
su - root
```

- 2 Move to the \$INSTALL directory and unpackage the script tar file:

```
cd /ml/incoming/oracle  
bzip2 -dc 2009.2.0.script.tar.bz2 | tar xvf -
```

- 3 Make the `systemcheck` script executable and run it to check the overall system environment required for the Oracle12c installation:

```
chmod 755 systemcheck  
./systemcheck
```

- 4 Review the output of the script and fix all conditions that are marked FAILED. After fixing, you can re-run the `systemcheck` script.

---

**IMPORTANT:**

You or your System Administrator are responsible for any system side upgrades and patches, such as an OS upgrade, the physical RAM, and installing all the required system packages and patches. If the system OS level does not meet the Oracle requirements, the Oracle 12c upgrade will fail and the database cannot run successfully. The Solaris system upgrade takes more time than Linux, so plan accordingly to allow at least three months to get the Solaris system upgrade completed.

---

See [Appendix A: Sample Output of systemcheck](#) on page 57 for a sample output of the script. See [Appendix B: Linux System Requirements for Oracle 12c](#) or [Appendix C: Solaris System Requirements for Oracle 12c](#) for your system preparation.

---

**NOTE:**

The rest of the instructions are only relevant for the Oracle database server. For Voyager application servers, skip to [Installing the Oracle Client](#) on page 47.

---



## Stopping Voyager and Oracle and Disabling SMF Services

Before you can upgrade Oracle, you must stop Voyager and Oracle and disable SMF services:

To stop Voyager and Oracle and disable SMF services:

- 1 Switch to the `root` user:

```
su -
```

- 2 Stop Voyager:

```
/etc/init.d/voyager stop
```

- 3 Stop Oracle:

```
/etc/init.d/dbora stop
```

---

**NOTE:**

For Solaris 10 only: `/etc/init.d/dbora` may not exist for some Voyager sites.

---

- 4 For Solaris 10 only: Run the SMF uninstaller script to remove Oracle SMF services:

```
cd $INSTALL/script/OS/SMF/  
./uninstaller_oracle
```

- 5 Switch to the `oracle` user:

```
su - oracle
```

- 6 Connect to the Oracle database:

```
sqlplus '/as sysdba'
```

- 7 Start the database:

```
startup;
```

- 8 Exit Oracle:

```
exit;
```

## Disabling Enterprise Manager

Before you can upgrade Oracle, you must disable Enterprise Manager (EM).

### To disable EM:

- 1 Switch to the oracle user:

```
su - oracle
```

- 2 Delete uncleaned Oracle objects related to DMSYS in 11g:

```
sqlplus / as sysdba  
delete from expkpgact$ where schema='DMSYS';  
quit;
```

- 3 Move to the \$ORACLE\_HOME directory and verify that the <hostname>\_VGER directory exists. If yes, that means that EM is configured; if not, okay.

```
cd $ORACLE_HOME  
ls | grep _VGER
```

- 4 Verify that EM is running:

```
cd $ORACLE_HOME/bin  
./emctl status dbconsole
```

- 5 If dbconsole is running, stop it:

```
./emctl stop dbconsole
```

## Disabling Oracle Archive Logging

Before you can upgrade Oracle, you must disable Oracle archive logging.

### To disable Oracle archive logging:

- 1 Switch to the oracle user:

```
su - oracle
```

- 2 Log on as the sysdba user:

```
sqlplus / as sysdba
```

**3** Confirm that archive logging is enabled:

```
archive log list;
```

**4** An output similar to the following is displayed:

Database log mode	Archive Mode
Automatic archival	Enabled
Archive destination	/oracle/arch
Oldest online log sequence	49578
Next log sequence to archive	49579
Current log sequence	49579

If Database log mode is in Archive Mode, then archive logging is enabled.  
If it is in No Archive mode then archive logging is not enabled.

**5** Shut down the Oracle VGER instance:

```
shutdown immediate
```

**6** Startup oracle in a mount state:

```
startup mount
```

**7** Disable archive logging:

```
alter database noarchivelog;
```

**8** Open the database:

```
alter database open;
```

## Configuring Kernel Parameters

Before you can upgrade Oracle, review and configure the kernel parameters.

- For Solaris 10:

- a Switch to the root user:

```
su - root
```

- b Verify the resource control is set for Oracle group.dba:

```
id -p oracle
cat /etc/project | grep dba
```

The following is the output with the minimum recommended values:

```
# id -p oracle
uid=100(oracle) gid=100(dba) projid=100(group.dba)

# cat /etc/project | grep dba
group.dba:100:Oracle Resources:::project.max-sem-
ids=(priv,256,deny);project.max-sem-
nsems=(priv,256,deny);project.max-shm-
ids=(priv,256,deny);project.max-shm-
memory=(priv,4294967296,deny)
```

---

**NOTE:**

Most Solaris customer sites already have these parameter settings set from the Oracle 11g upgrade and do not need to make further changes.

---

- c Create group.dba if it does not exist in /etc/project:

```
projadd -c 'Oracle Resources' -G dba group.dba
```

- d If kernel parameters are not set in /etc/project for group.dba, set the required kernel parameters to values greater or equal to the minimum values for the Oracle group.dba.

---

**NOTE:**

You may need to set even higher values based on the size of your databases and system resources.

---

```
projmod -sK "project.project.max-shm-memory=(priv,4G,deny)"
group.dba
projmod -sK "project.max-sem-ids=(priv,256,deny)" group.dba
projmod -sK "project.max-shm-ids=(priv,256,deny)" group.dba
projmod -sK "project.max-sem-nsems=(priv,256,deny)" group.dba
```

- e If kernel parameters are set, but some changes are needed, modify the values:

```
prctl -n project.max-shm-memory -v 4G -r -i project group.dba
prctl -n project.max-sem-ids -v 256 -r -i project group.dba
prctl -n project.max-shm-ids -v 256 -r -i project group.dba
prctl -n project.max-sem-nsems -v 256 -r -i project group.dba
```

- For Linux:

---

**NOTE:**

For more details, reference **Appendix C: Solaris System Requirements for Oracle 12c**.

---

- a** Verify the required parameter settings in `/etc/sysctl.conf` or using `sysctl -a | grep <kernel_parameter_name>`:

```
more /etc/sysctl.conf
sysctl -a | grep <kernel_parameter>
e.g., sysctl -a | grep kernel.shmmax
```

The following are the required minimum values.

---

**NOTE:**

On a dedicated DB server, `kernel.shmmax = 75%* physical RAM`; on a standalone DB/App server, `kernel.shmmax= 50% * physical RAM (unit: in bytes)`; and, `kernel.shmall = (kernel.shmmax /PAGE_SIZE)`, where `PAGE_SIZE` is 4096 by default (unit: in pages). Adjust based on the RAM on the system.

---

```
kernel.shmmax = 4294967296
kernel.shmall = 1048576
kernel.shmmni = 4096
kernel.sem = 250 32000 100 128
net.ipv4.ip_local_port_range = 9000 65500
net.core.rmem_default = 262144
net.core.rmem_max = 4194304
net.core.wmem_default = 262144
net.core.wmem_max = 1048586
fs.aio-max-nr = 1048576
fs.file-max = 6815744
```

- b** Edit the `/etc/sysctl.conf` file manually to set the parameters to be greater or equal to the recommended minimum values displayed in the previous step, and make the changed parameters permanent:

```
vi /etc/sysctl.conf
/sbin/sysctl -p
```

- c** Check `/etc/security/limits.conf` and add the following to the end of the `/etc/security/limits.conf` file if it is not present; or if the customized `/etc/security/limits.d/exlibris.conf` exists, update this file instead with correct limits resource entries.

```
oracle soft nofile 4096
oracle hard nofile 65536
oracle soft nproc 4096
oracle hard nproc 32768
oracle soft memlock 3145728
oracle hard memlock 3145728
```

---

**NOTE:**

The minimum value for memlock is 3145728 (3GB). Adjust memlock = (RAM-1GB)\*1024\*1024 (unit in KB).

---

To edit the file, enter the following command:

```
vi /etc/security/limits.conf
```

---

**NOTE:**

After the root user made the change, become the oracle user. Check that all settings are correct by issuing `ulimit -a`. A server reboot is recommended.

---

- d** Add the following code to the `/etc/profile`, if it is not already present, before the `HOSTNAME=`/bin/hostname`` line:

```
if [ $USER = "oracle" ]; then
    if [ $SHELL = "/bin/ksh" ]; then
        ulimit -u 16384
        ulimit -n 65536
    else
        ulimit -u 16384 -n 65536
    fi
fi
umask 022
fi
```

To edit the file, enter the following command:

```
vi /etc/profile
```

---

**NOTE:**

For more details, reference [Appendix B: Linux System Requirements for Oracle 12c](#).

---

# 2

---

## Upgrading Oracle

This section describes the steps for upgrading to the new version of Oracle.

This section includes:

- **Prerequisites** on page 15
- **Installing the Oracle 12c Files** on page 15
- **Preparing the Database** on page 17
- **Configuring Oracle 12c with Oracle 11g VGER** on page 21
- **Upgrading the VGER Database to 12c** on page 23
- **Upgrading the Oracle Time Zone Definitions** on page 27
- **Update the Oracle Application Express Packaged Applications** on page 29
- **Upgrade the Oracle Text** on page 30

### Prerequisites

- Current version of Oracle – 11.2.0.3 or 11.2.0.4.
- `$INSTALL` is defined as `/m1/incoming/oracle` or another installation directory.
- The `INSTALL` variable is defined as `INSTALL=/m1/incoming/oracle`

### Installing the Oracle 12c Files

After you complete the pre-installation procedures, you can install Oracle 12c.

### To install Oracle 12.1.0.2:

- 1 Switch to the root user:

```
su -
```

- 2 Move to the /oracle directory:

```
cd /oracle
```

- 3 Set umask to 0022:

```
umask 0022
```

- 4 Delete etc and usr under /oracle if there and make the following directory and set ownership to oracle:dba:

```
rm -rf usr
rm -rf etc
mkdir -p /oracle/app/oracle/product/12.1.0.2/db_1
chown -R oracle:dba /oracle/app/oracle/product/12.1.0.2
```

- 5 Install Oracle 12c server software files:

```
bzip2 -dc $INSTALL/o121020.server.*.tar.bz2 |
tar xvf - ./app/oracle/product/12.1.0.2/db_1 \
./app/oracle/diag \
./app/oracle/checkpoints \
./etc ./usr
```

---

#### IMPORTANT:

Do not use the `tar xvf` command without including the text at the end of the command `./app/oracle/product/12.1.0.2/db_1` or you will corrupt the Oracle inventory.

---

- 6 Set the ownership on the Oracle 12c directory:

```
chown oracle:dba /oracle/app/oracle/product/12.1.0.2
chown -R oracle:dba /oracle/app/oracle/checkpoints
chown -R oracle:dba /oracle/app/oracle/diag
```

- 7 Switch to the oracle user:

```
su - oracle
```

- 8 Move to the bin directory:

```
cd /oracle/app/oracle/product/12.1.0.2/db_1/bin
```



- 9 Make a symbolic link from `dbshut` to `dbshut.i` only if the symlink is not present:

```
ls dbshut.i
ln -s dbshut dbshut.i
```

- 10 Change directories:

```
cd /oracle/app/oracle/product/12.1.0.2/db_1/clone/bin
```

- 11 Install the new Oracle Home. Enter the following as one command:

```
/oracle/app/oracle/product/12.1.0.2/db_1/perl/bin/perl ./
clone.pl \
ORACLE_HOME=/oracle/app/oracle/product/12.1.0.2/db_1 \
ORACLE_HOME_NAME=Ora12102db1 \
ORACLE_BASE=/oracle/app/oracle
```

- 12 Switch back to the root user:

```
su - root
```

- 13 Run the `root.sh` script to complete the Oracle setup:

```
/oracle/app/oracle/product/12.1.0.2/db_1/root.sh
```

## Preparing the Database

After installing the Oracle 12c server files, you must prepare the database.

### To prepare the database:

- 1 Switch to the `oracle` user:

```
su - oracle
```

- 2 Run the Oracle auto-tuner. It calculates approximate values for your upgrade automatically and prepares the database parameters properly. It will open a vi session to allow you to manually adjust the values. Then the `spfile` is reloaded:

```
$INSTALL/script/TOOLS/tune_oracle.ksh -m UPGRADE -c
${ORACLE_HOME}/dbs/initVGER.ora
```

---

**IMPORTANT:**

If the Oracle database cannot start up properly after the above tuning, contact Ex Libris Voyager Support for assistance.

---

**3** Connect to Oracle.

---

**NOTE:**

You are still connected to the Oracle 11g database.

---

```
sqlplus / as sysdba
```

**4** Remove the Oracle EM `dbcontrol` in the 11g database by running `emremove.sql` from the 12c database home directory.

---

**NOTE:**

One of Oracle 12c changes is to replace the Oracle Enterprise Manager `dbcontrol` with a much simplified Enterprise Manager Express. You need to manually remove the EM related schema and objects prior to the database upgrade.

---

At this point, if you still have `dbcontrol` running, check and stop it:

```
emctl status dbconsole
emctl stop dbconsole
```

Run `emremove.sql` against the 11g source database from the 12c Oracle home `rdbms/admin` directory, as follows:

```
cd /oracle/app/oracle/product/12.1.0.2/db_1/rdbms/admin
sqlplus / as sysdba
set echo on;
set serveroutput on;
spool /tmp/emremove.log
@emremove.sql
spool off
select comp_id, comp_name, status from dba_registry where
comp_id='EM';
quit
```

At the end, the EM component should be no longer present.

**5** Recompile invalid Oracle objects:

```
@?/rdbms/admin/utlsp.sql
```

6 Gather statistics on the Oracle fixed-objects:

```
exec dbms_stats.gather_dictionary_stats;
```

7 Run the Pre-Upgrade Information Tool (`preupgrd.sql`) for the Oracle 11g Database.

**NOTE:**

Oracle 12c introduces a new `preupgrd.sql` as a Pre-Upgrade Information Tool, which has the following new features:

- It creates a `preupgrade_fixups.sql` script and describes issues that can be fixed using SQL\*Plus in the source database. It also attempts to resolve trivial issues when you execute it.
- It creates a `postupgrade_fixups.sql` script to address issues that can be fixed after the database has been upgraded.
- With `ORACLE_BASE` defined, the generated scripts and log files will be created in the `ORACLE_BASE/cfgtoollogs/<SID>/preupgrade` directory.

Copy `preupgrd.sql` and `utluppkg.sql` from 12c Oracle home to the 11g database Oracle home:

```
mkdir -p $ORACLE_HOME/rdbms/admin/temp
cp /oracle/app/oracle/product/12.1.0.2/db_1/rdbms/admin/
preupgrd.sql $ORACLE_HOME/rdbms/admin/temp/
cp /oracle/app/oracle/product/12.1.0.2/db_1/rdbms/admin/
utluppkg.sql $ORACLE_HOME/rdbms/admin/temp/
```

Ensure the `ORACLE_BASE` variable is set to `/oracle/app/oracle`. If not, then do `export ORACLE_BASE=/oracle/app/oracle`:

```
echo $ORACLE_BASE
export ORACLE_BASE=/oracle/app/oracle
```

Run the `preupgrd.sql` script against the 11g Oracle database being upgraded and spool a log to the Oracle login home directory.

```
cd $ORACLE_HOME/rdbms/admin/temp
sqlplus / as sysdba
SQL> spool $HOME/pre12c_inventory.log
SQL> @preupgrd.sql
SQ>> spool off
SQL> exit
```

8 Review and read through the generated `pre12c_inventory.log` at Oracle login home. Review the fixed scripts generated to `/oracle/app/oracle/cfgtoollogs/VGER/preupgrade`. Particularly, inspect the following:

- a Review the Oracle component list. Ensure all components are VALID.
- b Review the tablespace size. Ensure all tablespaces meet the minimum required size. If not, adjust the tablespace size based on the recommendations.
- c Check and ensure that the processes parameter value is set to 300 if below that value.
- d Check and ensure that the `open_cursors` parameter value is set to 500 if below that value.
- e Review the MAMUAL ACTION SUGGESTED for errors, warnings and informational messages.
- f Skip the TimeZone DST section. You will upgrade it during the post-upgrade phase.

---

**NOTE:**

For a sample output of `preupgrd.sql`, see [Sample Output of preupgrd.sql](#) on page 79.

---

- 9 Execute the generated `preupgrade_fixups.sql` on the 11g database to resolve issues reported by the preupgrade process.

```
cd /oracle/app/oracle/cfgtoollogs/VGER/preupgrade
sqlplus / as sysdba
SQL>@preupgrade_fixups.sql
SQL> quit
```

- 10 Create Oracle pfile from spfile:

```
sqlplus / as sysdba
SQL> create pfile from spfile;
SQL> exit;
```

- 11 Review the Oracle text pfile and ensure that no hidden parameters are present that start with an underscore in the parameter name, such as `_optimizer_extended_cursor_sharing`. If yes, manually reset and update the database and recreate the pfile, as follows:

```
more $ORACLE_HOME/dbs/initVGER.ora
sqlplus / as sysdba
SQL> alter system reset "_optimizer_extended_cursor_sharing"
scope = spfile;
SQL> alter system reset
"_optimizer_extended_cursor_sharing_rel" scope = spfile;
SQL> create pfile from spfile;
SQL> shutdown immediate;
SQL> startup
```

**12** Purge Oracle recycle bin:

```
purge dba_recyclebin;
```

**13** Shut down Oracle:

```
shutdown immediate;
```

**14** Exit Sqlplus:

```
exit
```

**15** Ensure that no oracle service processes are running. If any are, stop them, including Listener services:

```
ps -fu oracle
```

## Configuring Oracle 12c with Oracle 11g VGER

Before you can configure Oracle 12c with Oracle 11g VGER, the following conditions must be met:

- VGER instance and Oracle Listener are stopped.
- Voyager is stopped.

**To configure Oracle 12c with Oracle 11g VGER:****1** Switch to the Oracle user:

```
su - oracle
```

**2** Back up the old oracle user .profile file:

```
cp .profile profile_pre_12c
```

**3** Update the oracle user .profile file:

```
cp $INSTALL/script/OS/oracle_dot_profile .profile
```

**4** Move to the Oracle 12c dbs directory:

```
cd /oracle/app/oracle/product/12.1.0.2/db_1/dbs
```

**5** Copy the VGER database password file from the 11g dbs directory to the 12c dbs directory:

```
cp $ORACLE_HOME/dbs/orapwVGER .
```

- 6 Copy the `initVGER.ora` file from the 11g `db`s directory to the 12c `db`s directory:

```
cp $ORACLE_HOME/dbs/initVGER.ora .
```

- 7 Review the output from running the Pre-Upgrade Information Tool script and address any parameter concerns flagged in the new `initVGER.ora` file:

```
view $HOME/pre12c_inventory.log
```

- 8 Copy the `tnsnames.ora` and `listener.ora` files to the Oracle 12c home and then edit `listener.ora` and update the `oracle_home` line to point to 12c `ORACLE_HOME` path:

```
cp $ORACLE_HOME/network/admin/listener.ora \  
  $ORACLE_HOME/network/admin/sqlnet.ora \  
  $ORACLE_HOME/network/admin/tnsnames.ora \  
  /oracle/app/oracle/product/12.1.0.2/db_1/network/admin/.
```

```
vi oracle_home=/oracle/app/oracle/product/12.1.0.2/db_1/  
network/admin/listener.ora  
  
sid_list_listener=(sid_list=  
                    (sid_desc=  
                      (sid_name=VGER)  
                      (oracle_home=/oracle/app/oracle/product/  
12.1.0.2/db_1)  
                    )  
                  )
```

- 9 Update the `VGER` entry in `oratab` and change its path from 11.2.0.3/4 to 12.1.0.2 so that it looks like the following:

```
VGER:/oracle/app/oracle/product/12.1.0.2/db_1:Y
```

- For Sun:

```
vi /var/opt/oracle/oratab
```

- For Linux:

```
vi /etc/oratab
```

## Upgrading the VGER Database to 12c

Before you can upgrade the VGER database to 12c, the following conditions must be met:

- You have downloaded the package. (See [Downloading the Package](#) on page 5.)
- You have performed the pre-installation checks. (See [Pre-Installation Checks](#) on page 7)
- Oracle 11g VGER is not running.

### To upgrade the VGER database to 12c:

- 1 Switch to the `oracle` user, if necessary:

```
su - oracle
```

- 2 Reload the `.profile` file to pick up changes in `oratab`:

```
. $HOME/.profile VGER
```

- 3 Verify `$ORACLE_HOME` points to `ORACLE_HOME` for Oracle 12c:

```
echo $ORACLE_HOME
```

The following should be displayed:

```
/oracle/app/oracle/product/12.1.0.2/db_1
```

- 4 If the `$ORA_NLS10` parameter exists, unset it:

```
echo $ORA_NLS10  
unset ORA_NLS10
```

- 5 Go to `ORACLE_HOME` (12c) and connect to Oracle:

```
cd $ORACLE_HOME  
sqlplus / as sysdba
```

- 6 Create a new server parameter file to run this instance:

```
create spfile from pfile;
```

- 7 Start the instance in Upgrade mode:

```
startup upgrade
```

- 8 Exit from the sqlplus session:

```
exit
```

- 9 Use the Oracle 12c new perl `catctl.pl` script to perform the database upgrade. First, change to `$ORACLE_HOME/rdbms/admin` and run `catctl.pl` from that location with a command line as follows. (This process will run for about 1.5 to 2 hours depending on the OS and system resource.)

```
cd $ORACLE_HOME/rdbms/admin
$ORACLE_HOME/perl/bin/perl catctl.pl -l $HOME catupgrd.sql
```

---

**NOTE:**

`catupgrd.sql` is available but deprecated. The `catctl.pl` perl script runs parallel SQL processors (default is 4 and we use the default value) and therefore improves the upgrade performance. You must use `$ORACLE_HOME/perl/bin/perl` to invoke the script. And, the `-l` option is used to specify the path where upgrade spool logs will be written to. We specify `$HOME` (oracle user login home) for redirection. If the `-l` option is not specified, spool logs are written to `$ORACLE_HOME/rdbms/admin`.

---

- 10 Review the upgrade summary report in the following location and ensure all components are VALID. Refer to a sample output in [Appendix E: Sample Output of Upgrade Summary Log](#) on page 85.

```
vi /oracle/app/oracle/product/12.1.0.2/db_1/cfgtoollogs/VGER/
upgrade/upg_summary.log
```

- 11 Review the spooled upgrade logs in the oracle user `$HOME` directory. Specifically check for the `*.err` logs for possible upgrade errors.

```
cd $HOME
ls catupg*
```

- 12 Connect to Oracle:

```
sqlplus / as sysdba
```

---

**NOTE:**

The database is automatically shutdown after the upgrade.

---

- 13 Restart the database:

```
startup
```

- 14 Skip this step if your upgrade summary log indicates all successful. Run this step ONLY when the upgrade gives a warning about the `catuppst.sql` not



being run. A log file called `catuppst0.log` is generated in `$ORACLE_HOME/rdbms/admin`:

```
cd $ORACLE_HOME/rdbms/admin
$ORACLE_HOME/perl/bin/perl catcon.pl -n 1 -e -b catuppst -d
'''.''' catuppst.sql
```

---

**NOTE:**

12c uses the `catcon.pl` to run `catuppst.sql`. Use the command with the listed options carefully.

---

- 15** Run `utlrp.sql` to recompile any remaining stored PL/SQL and Java code:

```
cd $ORACLE_HOME/rdbms/admin
$ORACLE_HOME/perl/bin/perl catcon.pl -n 1 -e -b utlrp -d
'''.''' utlrp.sql
```

- 16** Check for invalid objects:

```
sqlplus / as sysdba
select owner, object_name, object_type from
dba_invalid_objects order by owner;
```

---

**NOTE:**

If the invalid objects are related to the application schema users, recompile and fix. If the nature of the invalid objects are unclear, create a case in Salesforce or JIRA for the DBA to review.

---

- 17** Run `postupgrade_fixups.sql` against the 12c database. The `postupgrade_fixups.sql` script was generated during the pre-upgrade stage and can be found in `/oracle/app/oracle/cfgtoollogs/VGER/preupgrade`.

```
cd /oracle/app/oracle/cfgtoollogs/VGER/preupgrade
sqlplus / as sysdba
@postupgrade_fixups.sql
quit
```

- 18** Run Oracle Post-Upgrade Status tool (`utlu121s.sql`) to verify the database status:

```
cd $ORACLE_HOME/rdbms/admin
sqlplus / as sysdba
spool $HOME/post_upgrade_status.log
@utlu121s.sql
spool off
exit
```

---

**NOTE:**

You can run `utlu121s.sql` as many times as needed to ensure all database components are shown as `VALID`.

---

- 19** Run `utluiobj.sql` to verify all expected packages and classes are valid:

```
cd $ORACLE_HOME/rdbms/admin
$ORACLE_HOME/perl/bin/perl catcon.pl -n 1 -e -b utluiobj -d
''.''' utluiobj.sql
```

- 20** Check the `compatible` and `optimizer_features_enable` parameters and ensure that their version is set to 12.1.0.2. If not, update the parameter as follows:

```
sqlplus / as sysdba
show parameter compatible
show parameter optimizer_features_enable

alter system set compatible='12.1.0.2' scope=spfile;
alter system set optimizer_features_enable='12.1.0.2'
scope=spfile;
```

- 21** Create an updated pfile from spfile and then shutdown and restart the database:

```
create pfile from spfile;
shutdown immediate
startup
```

- 22** Verify the `compatible` and `optimizer_feature_enable` parameter again. The sample outputs are as follows:

```
SQL> show parameter compatible
NAME                                TYPE                                VALUE
-----                                -
compatible                           string                               12.1.0.2

SQL> show parameter optimizer_features_enable
NAME                                TYPE                                VALUE
-----                                -
optimizer_features_enable            string                               12.1.0.2
```

- 23** Exit `sqlplus`:

```
exit
```

## Upgrading the Oracle Time Zone Definitions

Oracle 12.1.0.2 has by default all RDBMS DST updates from DSTv1 to DSTv18 included in the software installation, located in `$ORACLE_HOME/oracore/zoneinfo`. The latest DST version for 12.1.0.2 is version 18.

**To upgrade the Oracle time zone definitions:**

- 1 Connect to Oracle:

```
sqlplus / as sysdba
```

- 2 Shut down Oracle:

```
shutdown immediate
```

- 3 Start Oracle in Upgrade mode:

```
startup upgrade
```

- 4 Check the DST version and purge the dst related tables:

```
set serveroutput on

set linesize 130
col PROPERTY_NAME format a30
col value format a30
SELECT PROPERTY_NAME, SUBSTR(property_value, 1, 30) value
FROM DATABASE_PROPERTIES
WHERE PROPERTY_NAME LIKE 'DST_%'
ORDER BY PROPERTY_NAME;

purge dba_recyclebin;
TRUNCATE TABLE sys.dst$trigger_table;
TRUNCATE TABLE sys.dst$affected_tables;
TRUNCATE TABLE sys.dst$error_table;
```

- 5 Execute the following commands to upgrade the time zone to version 18:

```
EXEC DBMS_APPLICATION_INFO.SET_CLIENT_INFO('upg_tzv');

alter session set "_with_subquery"=materialize;
alter session set "_simple_view_merging"=TRUE;

EXEC DBMS_DST.BEGIN_UPGRADE(18);
```

- 6 Check for any errors with the time zone upgrade by issuing this query:

```
select * from sys.dst$error_table;
```

**7 Restart Oracle in normal mode:**

```
shutdown immediate;  
startup;
```

**8 Continue to upgrade all pending tables with following commands:**

```
alter session set "_with_subquery"=materialize;  
alter session set "_simple_view_merging"=TRUE;  
  
set serveroutput on  
VAR numfail number  
BEGIN  
DBMS_DST.UPGRADE_DATABASE(:numfail,  
parallel => TRUE,  
log_errors => TRUE,  
log_errors_table => 'SYS.DST$ERROR_TABLE',  
log_triggers_table => 'SYS.DST$TRIGGER_TABLE',  
error_on_overlap_time => FALSE,  
error_on_nonexisting_time => FALSE);  
DBMS_OUTPUT.PUT_LINE('Failures: ' || :numfail);  
END;  
/
```

**9 Complete the time zone upgrade:**

```
DECLARE  
    num_of_failures number;  
BEGIN  
    DBMS_DST.END_UPGRADE(num_of_failures);  
    dbms_output.put_line(num_of_failures);  
  
END;  
/
```

**10 Update the TZ\_VERSION in registry\$database and commit:**

```
update registry$database set TZ_VERSION = (select version  
FROM v$timezone_file);  
commit;
```

- 11** Confirm that the time zone version is completely updated to version 18 in the database by checking all the following:.

```

SELECT PROPERTY_NAME, SUBSTR(property_value, 1, 30) value
FROM DATABASE_PROPERTIES
WHERE PROPERTY_NAME LIKE 'DST_%'
ORDER BY PROPERTY_NAME;

-- expected output:
PROPERTY_NAME                                VALUE
-----
DST_PRIMARY_TT_VERSION                       18
DST_SECONDARY_TT_VERSION                     0
DST_UPGRADE_STATE                            NONE

SELECT * FROM v$timezone_file;

-- expected output:
FILENAME                                VERSION      CON_ID
-----
timezlrq_18.dat                          18           0

select TZ_VERSION from registry$database;

-- expected output
TZ_VERSION
-----
18

```

- 12** Exit from sqlplus:

```
exit;
```

## Update the Oracle Application Express Packaged Applications

To update the Oracle application express packaged applications:

- 1** Check if the APEX component exists and if its status is valid in the database:

```

sqlplus / as sysdba
select comp_id, comp_name, status, version from dba_registry
where comp_id='APEX';

```

```

--Sample output
COMP_ID    COMP_NAME                                STATUS      VERSION
-----
APEX       Oracle Application Express               VALID       4.2.5.00.08

```

- 2 If the APEX component does not exist, skip this step. If it exists, update the packaged applications by running the `apex_pkgapp_ins.sql` script at `$ORACLE_HOME/apex`:

```
cd $ORACLE_HOME/apex
sqlplus / as sysdba
@apex_pkgapp_ins.sql
```

---

**NOTE:**

This process takes 5-10 minutes to run. When completed, exit `sqlplus`.

---

## Upgrade the Oracle Text

Oracle 12c specifies to migrate Oracle Text related files from the previous 11g Oracle home to the 12c Oracle home based on a file list in `/oracle/app/oracle/product/12.1.0.2/db_1/ctx/admin/ctxf102.txt`.

**To upgrade the Oracle text:**

- 1** Copy the following script content and put into a script and save as `copyCTX.ksh` on the server:

```
#!/bin/ksh

function Usage {
    print "Syntax: $0 -s OLD_SOURCE_ORACLE_HOME -t
TARGET_ORACLE_HOME"
    print "Example: $0 -s /oracle/app/oracle/product/
11.2.0.4/db_1 -t /oracle/app/oracle/product/12.1.0.2/db_1"
    exit 1
}

# Options
OPTS="s:t:"
while getopts $OPTS TAG
do
    case $TAG in
        s) OLD_ORACLE_HOME=$OPTARG ;;
        t) ORACLE_HOME=$OPTARG ;;
        \?) print "Invalid option: $OPTARG" 1>&2
            Usage ;;
    esac
done
shift $OPTIND-1

if [[ -z ${OLD_ORACLE_HOME} || ! -d ${OLD_ORACLE_HOME} ]];
then
    print "ERROR: Source Oracle Home $OLD_ORACLE_HOME does
not exist"
    exit 1
fi

if [[ ! -f ${ORACLE_HOME}/ctx/admin/ctxf102.txt ]]; then
    echo "${ORACLE_HOME}/ctx/admin/ctxf102.txt not found."
    echo "No Oracle Text data files will be copied from
previous ${OLD_ORACLE_HOME}"
    exit
else
    while read line; do
        if [[ "$line" = "" || "`echo $line | grep '#`'"
!= "" ]];then
            continue
        fi

        if [[ -f ${OLD_ORACLE_HOME}/${line} ]]; then
            echo "(cd ${OLD_ORACLE_HOME} && tar cpf
- $line) | (cd ${ORACLE_HOME} && tar xpf - )"
            (cd ${OLD_ORACLE_HOME} && tar cpf -
$line) | (cd ${ORACLE_HOME} && tar xpf - )
        fi
    done < ${ORACLE_HOME}/ctx/admin/ctxf102.txt
    echo "Oracle text files are copied"
fi
exit
```



**2** Make the `copyCTX.ksh` script executable:

```
chmod 755 copyCTX.ksh
```

**3** Run the script with this syntax:

```
./copyCTX.ksh -s <11g_ORACLE_HOME> -t <12c_ORACLE_HOME>
```

Example:

```
./copyCTX.ksh -s /oracle/app/oracle/product/11.2.0.4/db_1 -t  
/oracle/app/oracle/product/12.1.0.2/db_1
```

**4** Connect to the database as the `ctxsys` user and load `$ORACLE_HOME/ctx/admin/ctxf102.sql`.

```
cd $ORACLE_HOME/ctx/admin  
sqlplus ctxsys/ctxsys  
@ctxf102.sql  
exit
```



# 3

---

## Post-Upgrade Procedures

This section describes the post-upgrade procedures.

This section includes:

- **Configuring Account and Password Information** on page 35
- **Retuning the Oracle Parameter Values** on page 36
- **Installing the Current Oracle 12c Critical Patch Update (PSU)** on page 36
- **Restoring Oracle Archive Logging (If Applicable)** on page 37
- **Testing Oracle Startup** on page 38
- **Setting Up the Oracle EM Express** on page 39
- **Migration Clean-Up** on page 43

## Configuring Account and Password Information

To configure account and password information:

- 1 Connect to Oracle:

```
sqlplus / as sysdba
```

- 2 Expire password for the anonymous account:

```
alter user anonymous password expire;
```

- 3 Set the password for dbsnmp account. This password is used later:

```
alter user dbsnmp identified by <password_for_dbsnmp> account  
unlock;
```

- 4 Unlock the `ctxsys` account and set the password:

```
alter user ctxsys identified by ctxsys account unlock;
```

- 5 Revoke excess permissions on supplied PL/SQL packages:

```
revoke execute on utl_file from public;  
revoke execute on dbms_random from public;  
revoke execute on utl_http from public;  
revoke execute on utl_smtp from public;  
revoke execute on utl_tcp from public;  
grant execute on utl_file to xdb;  
grant execute on ctxsys.ctx_ddl to public;
```

- 6 Exit from `sqlplus`:

```
exit;
```

## Retuning the Oracle Parameter Values

To retune the Oracle parameter values:

- 1 Backup the current `initVGER.ora` file:

```
cd $ORACLE_HOME/dbs  
cp -p initVGER.ora initVGER.bak
```

- 2 Re-tune the Oracle parameter values for typical conditions. This step recalculates the key tuning values and offers you the opportunity to manually adjust the tuning in `vi`. The `spfile` is then reloaded.

```
$INSTALL/script/TOOLS/tune_oracle.ksh -c ${ORACLE_HOME}/dbs/  
initVGER.ora
```

## Installing the Current Oracle 12c Critical Patch Update (PSU)

Refer to the Ex Libris Documentation Center for the latest version of the PSU Installation Documentation.

## Restoring Oracle Archive Logging (If Applicable)

---

**NOTE:**

If you are upgrading to Voyager 9.2, perform that upgrade first and then return to this step.

---

---

**IMPORTANT:**

This section is **ONLY** for servers that have archive logging enabled. If you try to setup archive logging without having archive logging enabled, you will cause harm to your Oracle database and possibly cause problems with your Voyager data. If you have any questions about Oracle archive logging, contact your Ex Libris Upgrade Engineer before proceeding.

---

### To restore Oracle archive logging:

- 1 Switch to the oracle user:

```
su - oracle
```

- 2 Log on as the sysdba user:

```
sqlplus / as sysdba
```

- 3 Shutdown the Oracle VGER instance:

```
shutdown immediate
```

- 4 Start up oracle in a mount state:

```
startup mount
```

- 5 Alter the database in noarchivelog mode:

```
alter database archivelog;
```

- 6 Open the database:

```
alter database open;
```

- 7 Verify that Oracle archive logging is enabled and that the archive log destination is properly defined:

```
archive log list

Database log mode           Archive Mode
Automatic archival         Enabled
Archive destination        /oracle/oradata/VGER/arch
Oldest online log sequence 49578
Next log sequence to archive 49579
Current log sequence        49579
```

## Testing Oracle Startup

To test oracle startup:

- 1 Switch to the oracle user:

```
su - oracle
```

- 2 Stop the Oracle listener:

```
lsnrctl stop
```

- 3 Log on as the sysdba user:

```
sqlplus / as sysdba
```

- 4 Shut down Oracle:

```
shutdown immediate
```

- 5 Exit sqlplus:

```
exit
```

- 6 Switch to the root user:

```
su -
```

- 7 Upgrade the `/etc/init.d/dbora` script:

```
cp $INSTALL/script/OS/dbora /etc/init.d/dbora
chmod 0754 /etc/init.d/dbora
```

- 8 For Solaris 10, run the Oracle SMF installer to reinstall the Oracle SMF services:

```
cd $INSTALL/script/OS/SMF/  
./installer_oracle
```

- 9 Start Oracle:

```
/etc/init.d/dbora start
```

- 10 Confirm that Oracle is running:

```
ps -fu oracle | grep ora_
```

- 11 Confirm that the listener is running:

```
ps -fu oracle | grep lsnr
```

## Setting Up the Oracle EM Express

Oracle Enterprise Manager (EM) dbcontrol in 11g is now replaced with a more simplified EM Express which requires no license to use. However, this EM Express has limited capability for web database management. If you want to set this up, perform the steps below.

### Prerequisites

- \$INSTALL is /ml/incoming/oracle or another installation directory.
- The current version of Oracle is 12.1.0.2.
- This is the database server and the Oracle 12c VGER database is running.
- The Oracle Listener is running.

### To configure the Oracle EM Express:

- 1 Switch to the oracle user:

```
su - oracle
```

- 2 Connect to the running Oracle database as sysdba:

```
sqlplus / as sysdba
```

**3 Check the dispatchers parameter to ensure that SERVICE=VGERXDB is configured with PROTOCOL=TCP. If not, update it with the command below:**

```
sqlplus / as sysdba
SQL> show parameter dispatchers

NAME                                TYPE                                VALUE
-----                                -
dispatchers                          string                              (PROTOCOL=TCP)
(SERVICE=VGERXDB)

-- If not properly configured, please update initVGER.ora for
the dispatchers parameter manually and restart the DB:

SQL> create pfile from spfile
SQL> shutdown immediate
SQL> exit

vi $ORACLE_HOME/dbs/initVGER.ora and set the dispatchers
parameters as follow:

*.dispatchers='(PROTOCOL=TCP)(SERVICE=VGERXDB)'

Then create spfile from pfile and restart the DB:

sqlplus / as sysdba
SQL> create spfile from pfile;
SQL> startup

Verify the dispatchers parameter and this is what is expected
for VGER:

SQL> show parameter dispatchers

NAME                                TYPE                                VALUE
-----                                -
dispatchers                          string
(PROTOCOL=TCP)(SERVICE=VGERXDB)
```



- 4 Check whether the http port or https port is configured for EM Express to use:

```
select dbms_xdb_config.gethttpport () from dual;

--expected output
DBMS_XDB_CONFIG.GETHTTPPORT()
-----
                                0

select dbms_xdb_config.gethttpsport () from dual;

--expected output
DBMS_XDB_CONFIG.GETHTTPSPORT()
-----
                                0
```

- 5 Configure EM Express using the SSL (HTTPS) connection (default port 5500) for the Voyager Database for security.

```
exec dbms_xdb_config.sethttpsport(5500);
```

- 6 Review the configuration and expect to see proper port information:

```
select dbms_xdb_config.gethttpsport () from dual;

DBMS_XDB_CONFIG.GETHTTPSPORT()
-----
                                5500
```

- 7 Review and update the local\_listener parameter. For the default Oracle Listener port 1521, reset the local\_listener. You need to perform a DB restart to take effect.

```
sqlplus / as sysdba
SQL> show parameter local_listener
SQL> alter system reset local_listener scope=spfile;
SQL> shutdown immediate;
SQL> startup

--Expected result for the default Listener port 1521
SQL> show parameter local_listener
local_listener                                string
```

---

**NOTE:**

If your database uses a non-standard Listener port, set the local\_listener to ORACLE\_SID (VGER) and restart the DB.

---

- 8 Check the default XDB wallet directory in \$ORACLE\_BASE/admin/<SID>/xdb\_wallet and look for default XDB wallet certificates. If the directory

does not exist or XDB wallet certificates are missing from the directory, as the oracle user, do:

```
ls /oracle/app/oracle/admin/VGER/xdw_wallet
cd /oracle/app/oracle/admin/VGER
mkdir -p xdb_wallet
chmod 750 xdb_wallet
```

- 9 Use the `dbms_xdb.installDefaultWallet()` procedure to install. Ensure that the `ORACLE_BASE` variable is set properly to `/oracle/app/oracle`.

```
echo $ORACLE_BASE
/oracle/app/oracle

sqlplus / as sysdba
SQL> exec dbms_xdb_admin.installDefaultWallet;

PL/SQL procedure successfully completed.
```

- 10 Go to `/oracle/app/oracle/admin/VGER/xdw_wallet` directory and look for the installed default XDB wallet certificates. You shall see two wallet files in this location:

```
cd /oracle/app/oracle/admin/VGER/xdw_wallet
$ ls -ltr
-rw-r--r-- 1 oracle dba 3817 Dec 15 09:39 ewallet.p12
-rw-r--r-- 1 oracle dba 3862 Dec 15 09:39 cwallet.sso
```

- 11 Restart Oracle Listener to load the XDB HTTPS change :

```
lsnrctl stop
lsnrctl start
```

- 12 Verify Oracle Listener status for the HTTPS XDB service in 2-5 minutes after the listener restart:

```
lsnrctl status | grep HTTP
```

The following sample output shows that the HTTPS service is available and that the port 5500 is listening.:

```
(DESCRIPTION=(ADDRESS=(PROTOCOL=tcps)(HOST=us-
pip02.voylin.corp.exlibrisgroup.com)(PORT=5500))(Security=(my
_wallet_directory=/oracle/app/oracle/admin/VGER/
xdw_wallet))(Presentation=HTTP)(Session=RAW))
```

- 13 Use the Internet Explorer or Firefox browser to open the Oracle EM Express page using the HTTPS with the following connection URL:

```
https://hostname:5500/em/
```

- 
- 14 Login as `sys` with the `sys` user password and specify “as sysdba.”

---

**NOTE:**

If you receive the message *There is a problem with this website's security certificate* at login, click **Continue to this website**; and you can create an exception in the browser to accept Oracle's self-signed certificate. For the browser, also ensure to turn on TLS 1.0, TLS 1.1, and TLS 1.2 in the Advanced settings and clean up the cache if there are any problems.

---

- 15 In order to use EM Express, users need to be granted the `EM_EXPRESS_BASIC` role for read only access or the `EM_EXPRESS_FULL` role with all privileges.

```
sqlplus / as sysdba
grant EM_EXPRESS_BASIC to <user>;
grant EM_EXPRESS_FULL to system;
quit
```

---

**NOTE:**

For more information regarding EM Express setup, see: [https://blogs.oracle.com/db/entry/troubleshooting\\_why\\_em\\_express\\_is](https://blogs.oracle.com/db/entry/troubleshooting_why_em_express_is).

---

## Migration Clean-Up

### Prerequisites

- A backup of the current 12c database environment has been performed.
- VGER is the only Oracle 12c database on the server – the MRDN or other databases are not on the server.

---

**IMPORTANT:**

If any other database instance is sharing the 11g `ORACLE_HOME`, do not run this cleanup until the other instances are also upgraded to 12c.

---

### To remove the Oracle 11g home after the upgrade:

- 1 Switch to the `oracle` user:

```
su - oracle
```

- 2 Change to the previous 11g Oracle home deinstall directory (11.2.0.3 or 11.2.0.4):

```
cd /oracle/app/oracle/product/11.2.0.3/db_1/deinstall
```

- 3 Run the deinstall program within the 11g deinstall directory to uninstall the 11g database software and update the Oracle inventory:

```
./deinstall
```

- 4 At the prompt, enter 1 for Single Instance. For the rest, type y for yes or press **Enter** to accept the default values.

---

**NOTES:**

- Programs that require Oracle 11g stop working after this step.
  - Removing all files and directories under `/oracle/app/oracle/product/11.2.0.X/db_1`. without performing this step does not update the Oracle Inventory.
- 

- 5 Remove the remaining directories:

```
rm -rf /oracle/app/oracle/product/11.2.0.3
-- Or, for 11.2.0.4
rm -rf /oracle/app/oracle/product/11.2.0.4
```

- 6 View the Oracle inventory.xml to verify that the 11g Oracle home has been marked as REMOVED="T":

```
more /oracle/app/oracle/oraInventory/ContentsXML/
inventory.xml
```

```
--Sample output:
<!-- Copyright (c) 1999, 2014, Oracle and/or its affiliates.
All rights reserved. -->
<!-- Do not modify the contents of this file by hand. -->
<INVENTORY>
<VERSION_INFO>
  <SAVED_WITH>12.1.0.2.0</SAVED_WITH>
  <MINIMUM_VER>2.1.0.6.0</MINIMUM_VER>
</VERSION_INFO>
<HOME_LIST>
<HOME NAME="Ora12102db1" LOC="/oracle/app/oracle/product/
12.1.0.2/db_1" TYPE="O" IDX="3"/>
<HOME NAME="Ora11203db1" LOC="/oracle/app/oracle/product/
11.2.0.3/db_1" TYPE="O" IDX="2" REMOVED="T"/>
<HOME NAME="OraDb10g_home1" LOC="/oracle/app/oracle/product/
10.2.0/db_1" TYPE="O" IDX="1" REMOVED="T"/>
</HOME_LIST>
<COMPOSITEHOME_LIST>
</COMPOSITEHOME_LIST>
</INVENTORY>
```

---

**NOTE:**

Do NOT edit Oracle `inventory.xml` manually!

---



# 4

---

## Installing the Oracle Client

This section describes how to install the Oracle client.

This section includes:

- **Installing the Oracle 12c Client Files** on page 47
- **Testing the Oracle Connection via the Oracle Clients** on page 49

## Installing the Oracle 12c Client Files

To install the Oracle 12c client files:

- 1 Switch to the `root` user:

```
su -
```

- 2 Move to the `oracle` directory:

```
cd /oracle
```

- 3 Set `umask` to 0022:

```
umask 0022
```

- 4 Extract the Oracle 12c client files from the package:

```
bzip2 -dc /ml/incoming/oracle/o121020.appsvr.*.tar.bz2  
| tar xvf - ./usr ./var ./app/oracle/checkpoints ./app/  
oracle/diag ./app/oracle/product/12.1.0.2/client_1
```

---

### IMPORTANT:

Do not use `tar xvf -` without the listed text at end of the command `./app/oracle/product/12.1.0.2/client_1` or you will corrupt the Oracle inventory.

---

- 5** Be sure to set 777 on the following directory to fix an Oracle client-side bug:

```
chmod 777 $ORACLE_BASE/diag/plsql
```

- 6** Switch to the oracle user:

```
su - oracle
```

- 7** Transfer `sqlnet.ora` and `tnsnames.ora` from the 12c database server to the application client server, and place into the Oracle `network/admin` directory:

```
--On the application server
scp \
oracle@DB_SERVER_IP:/oracle/app/oracle/product/12.1.0.2/db_1/
network/admin/tnsnames.ora \
/oracle/app/oracle/product/12.1.0.2/client_1/network/admin/.
scp \
oracle@DB_SERVER_IP:/oracle/app/oracle/product/12.1.0.2/db_1/
network/admin/sqlnet.ora \
/oracle/app/oracle/product/12.1.0.2/client_1/network/admin/.
```

- 8** Change directories:

```
cd /oracle/app/oracle/product/12.1.0.2/client_1/clone/bin
```

- 9** Install new Oracle Home. (Enter the following as one command.)

```
/m1/shared/bin/perl ./clone.pl \
ORACLE_HOME=/oracle/app/oracle/product/12.1.0.2/client_1\
ORACLE_HOME_NAME=Oral2db1_client
ORACLE_BASE=/oracle/app/oracle
```

- 10** Switch to the root user:

```
su - root
```

- 11** Run the `root.sh` script on the `client_1` directory to complete the Oracle client setup:

```
/oracle/app/oracle/product/12.1.0.2/client_1/root.sh
```



**12** Update the `oratab` file and add or update the client entry.

For Solaris:

```
/var/opt/oracle/oratab
```

For Linux:

```
/etc/oratab
```

Verify that `oratab` contains the entry for the Oracle client that points to the `12c client_1` directory:

```
vi /var/opt/oracle/oratab

<On the application server>
VGER:/oracle/app/oracle/product/12.1.0.2/client_1:N
```

## Testing the Oracle Connection via the Oracle Clients

To test the oracle connection:

**1** Switch to the oracle user:

```
su - oracle
```

**2** Source the `.profile` with `ORACLE_SID=VGER`:

```
. ../profile VGER
```

**3** Connect to the database with `TNS_NAME=VGER`:

```
sqlplus system/<password>@VGER
```

**4** Exit `sqlplus`:

```
exit
```



# 5

---

## Upgrading the Voyager Application

This section describes how to upgrade the Voyager application.

This section includes:

- **Prerequisites** on page 51

### Prerequisites

- The Oracle upgrade has been completed successfully.
- The Voyager application has not yet been upgraded to release 2009.2.0 or later.

---

#### NOTE:

This is required on Voyager application servers and for all Voyager databases.

---

#### To upgrade the Voyager application:

- 1 Switch to the `voyager` user:

```
su - voyager
```

- 2 Backup the current `voyager` user `.profile` file:

```
mv ~/.profile ~/.profile.pre.oracle11
```

- 3 Copy the new Voyager `.profile` file into the `voyager` home directory:

```
cp /m1/incoming/oracle/script/OS/voyager_dot_profile |  
~/.profile
```

- 4 Review the newly installed `dot.profile` and verify that the `LD_LIBRARY_PATH` or `LIBPATH` match what is installed in `$ORACLE_HOME`. If they do not match, change it to match:

```
vi .profile
```

- 5 Move to the `TOOLS` directory:

```
cd /m1/incoming/oracle/script/TOOLS
```

- 6 Run the `configENV.pl` tool to update the voyager databases and image databases to oracle 11g:

```
./configENV.pl
```

- 7 Change the directory to package dir:

```
cd $INSTALL
```

- 8 Unpackage perl:

```
bzip2 -dc 2009.2.0.*SHARED.tar.bz2 |  
tar xvf - ./SHARED/perl
```

- 9 Move to the `/m1/shared/perl` directory:

```
cd /m1/shared/perl
```

- 10 Clean up the old perl installations:

```
rm -rf <old perl directories>
```

- 11 Move the perl directory into place:

```
mv $INSTALL/SHARED/perl/<latest_perl_version> /m1/shared/  
perl/.
```

- 12 Move to the `/m1/shared/bin` directory:

```
cd /m1/shared/bin/
```

- 13 Remove the existing perl file:

```
rm perl
```

- 14 Create a new symbolic link to the new perl directory:

```
ln -s /m1/shared/perl/<latest_perl_version>/bin/perl perl
```

- 15 Test the application to ensure that the Oracle environment is set correctly for the Voyager application. For more information, see the Voyager upgrade documentation.



---

# Appendixes

This guide contains the following appendixes:

- **Appendix A: Sample Output of systemcheck** on page 57
- **Appendix B: Linux System Requirements for Oracle 12c** on page 61
- **Appendix C: Solaris System Requirements for Oracle 12c** on page 71
- **Appendix D: Sample Output of preupgrd.sql** on page 79
- **Appendix E: Sample Output of Upgrade Summary Log** on page 85





# A

## Sample Output of systemcheck

```
[root@us-pip02 oracle]# ./systemcheck

Voyager systemcheck utility

Ex Libris Group Inc.
Searching for required files.....OK
#####
##          Upgrade Requirements for 2009.2.0          ##
#####
Checking:
OS.....Linux
Checking: OS Level.....6.6
Checking: /ml filesystemtype.....nfs
Checking: Package and Work Space >= 1000 (MB) on /ml.....OK
Checking: OS File System Size Total for /tmp (kb) >= 1000.....OK
Checking: OS Swap Required = 3700.....OK
Checking: Server
Type.....x86_64
Checking: Hardware Model = x86_64.....OK
Checking: psacct.....OK
Checking: mailx.....OK
Checking: Speed of Processors (MHZ) >= 500.....OK
Checking: OS Ram (mb) >= 3500.....OK
Checking: OS Release Level is
7.x.....WARNING
Checking: OS Release Level is 6.x.....OK
Checking: bc.....OK
Checking: sharutils.....OK
Checking: tcsh.....OK
Checking: xinetd.....OK
Checking: zlib.....OK
Checking: zlib (i686).....OK
Checking: zip.....OK
Checking: ncurses-libs.i686.....OK
```

```
#####  
## Checking oracle requirements 12.1.0.2.0 ##  
#####  
Checking: /oracle filesystem type.....nfs  
Checking: Checking Oracle is on 12.1.0.2.....OK  
Checking: Server 12.1.0.2 Oracle_Home for VGER.....OK  
Checking: Directory /oracle/oradata/VGER/data = true.....OK  
  Appears to be a Database Server  
Checking: OS Ram (mb) >= 2000.....OK  
Checking: kernel 2.6.32-71 or higher.....OK  
Checking: binutils 2.20.51.0.2-5.11 or higher.....OK  
Checking: compat-libcap1 1.10-1 or higher.....OK  
Checking: compat-libstdc++-33 3.2.3-69 or higher.....OK  
Checking: compat-libstdc++-33.i686 3.2.3-69 or higher.....OK  
Checking: gcc 4.4.4-13 or higher.....OK  
Checking: gcc-c++ 4.4.4-13 or higher.....OK  
Checking: glibc 2.12-1.7 or higher.....OK  
Checking: glibc.i686 2.12-1.7 or higher.....OK  
Checking: glibc-devel 2.12-1.7 or higher.....OK  
Checking: glibc-devel.i686 2.12-1.7 or higher.....OK  
Checking: ksh.....OK  
Checking: libgcc 4.4.4-13 or higher.....OK  
Checking: libgcc.i686 4.4.4-13 or higher.....OK  
Checking: libstdc++ 4.4.4-13 or higher.....OK  
Checking: libstdc++.i686 4.4.4-13 or higher.....OK  
Checking: libstdc++-devel 4.4.4-13 or higher.....OK  
Checking: libstdc++-devel.i686 4.4.4-13 or higher.....OK  
Checking: libaio 0.3.107-10 or higher.....OK  
Checking: libaio.i686 0.3.107-10 or higher.....OK  
Checking: libaio-devel 0.3.107-10 or higher.....OK  
Checking: libaio-devel.i686 0.3.107-10 or higher.....OK  
Checking: make 3.81-19 or higher.....OK  
Checking: sysstat 9.0.4-11 or higher.....OK  
Loading Voyager Versions.....OK  
Voyager Minimum  
Version.....2009.0.0
```

```
#####
##          Voyager Statistical Information          ##
#####

    XXXDB Detail
    -----
traindb: Status live
    Version: 2009.0.0
    BIB/AUTH/MFHD: 0/0/0
    DB Size (used MB/max MB, %): 791/900, 87%
    DB Regen Space Needed: 4 MB

#####
##          Voyager Summary                          ##
#####
Found 1 database(s)
    0 invalid database(s)
    0 unknown status database(s)
    1 live database(s)
    0 aliased database(s)

Found 0 large auth database(s)

Total BIB/AUTH/MFHD: 0/0/0
Max   BIB/AUTH/MFHD: 0/0/0

Regen Info:
    Total Regen Time: 0 days
    ...
```



# B

## Linux System Requirements for Oracle 12c

### 1. Linux System Requirements

Table 1. Linux System Requirements

Description	Requirement	Command
System architecture	Linux x86_64	uname -m
Platforms	Supported RHEL 7, 6, 5 for x86-64 32-bit packages required for 32-bit clients install.	cat /proc/version cat /etc/redhat-release
OS kernel level	RHEL 7: 3.10.0-54.0.1.el7.x86_64 or later RHEL 6: 2.6.32-71.el6.x86_64 or later RHEL 5 Update 6: 2.6.18-238.0.0.0.1.el5 or later	cat /etc/redhat-release uname -r
Disk space	6.4GB for enterprise edition software	df -h
Physical memory (RAM)	4GB and more	grep MemTotal /proc/meminfo free -b
Shared memory (/dev/shm)	4G	df -h /dev/shm
/tmp disk space	2GB and more	df -h /tmp

Table 1. Linux System Requirements

Description	Requirement	Command
swap space	swap=RAM when RAM>=2GB and <=16GB; swap=16GB when RAM > 16GB	grep SwapTotal /proc/meminfo df -h /dev/shm free -b
SSH requirement	OpenSSH is the required SSH software	
Packages for Linux 7	binutils-2.23.52.0.1-12.el7.x86_64 compat-libcap1-1.10-3.el7.x86_64 gcc-4.8.2-3.el7.x86_64 gcc-c++-4.8.2-3.el7.x86_64 glibc-2.17-36.el7.i686 glibc-2.17-36.el7.x86_64 glibc-devel-2.17-36.el7.i686 glibc-devel-2.17-36.el7.x86_64 ksh libaio-0.3.109-9.el7.i686 libaio-0.3.109-9.el7.x86_64 libaio-devel-0.3.109-9.el7.i686 libaio-devel-0.3.109-9.el7.x86_64 libgcc-4.8.2-3.el7.i686 libgcc-4.8.2-3.el7.x86_64 libstdc++-4.8.2-3.el7.i686 libstdc++-4.8.2-3.el7.x86_64 libstdc++-devel-4.8.2-3.el7.i686 libstdc++-devel-4.8.2-3.el7.x86_64 libXi-1.7.2-1.el7.i686 libXi-1.7.2-1.el7.x86_64 libXtst-1.2.2-1.el7.i686 libXtst-1.2.2-1.el7.x86_64 make-3.82-19.el7.x86_64 sysstat-10.1.5-1.el7.x86_64	Required or later version must be installed  rpm -qa package_name  rpm -qa --queryformat "%{NAME}-%{VERSION}-%{RELEASE} (%{ARCH})\n"   grep PACKAGE_NAME  # For multiple rpm -q binutils compat-libcap1 gcc glibc ksh libaio libgcc libstdc++ libXext libXtst libX11 libXau libXi make sysstat

Table 1. Linux System Requirements

Description	Requirement	Command
Packages for Linux 6	binutils-2.20.51.0.2-5.11.el6 (x86_64)	Required or later version must be installed
	compat-libcap1-1.10-1 (x86_64)	
	compat-libstdc++-33-3.2.3-69.el6 (x86_64)	rpm -qa package_name
	compat-libstdc++-33-3.2.3-69.el6 (i686)	rpm -qa --queryformat "%{NAME}-%{VERSION}-%{RELEASE} (%{ARCH})\n"
	gcc-4.4.4-13.el6 (x86_64)	grep package_name
	gcc-c++-4.4.4-13.el6 (x86_64)	
	glibc-2.12-1.7.el6 (i686)	
	glibc-2.12-1.7.el6 (x86_64)	# For multiple
	glibc-devel-2.12-1.7.el6 (x86_64)	rpm -q binutils compat-libcap1
	glibc-devel-2.12-1.7.el6 (i686)	compat-libstdc++ gcc gcc-c++
	ksh	glibc ksh libaio libgcc libstdc++
	libgcc-4.4.4-13.el6 (i686)	libXext libXtst libX11 libXau
	libgcc-4.4.4-13.el6 (x86_64)	libXi make sysstat
	libstdc++-4.4.4-13.el6 (x86_64)	
	libstdc++-4.4.4-13.el6 (i686)	
	libstdc++-devel-4.4.4-13.el6 (x86_64)	
	libstdc++-devel-4.4.4-13.el6 (i686)	
	libaio-0.3.107-10.el6 (x86_64)	
	libaio-0.3.107-10.el6 (i686)	
	libaio-devel-0.3.107-10.el6 (x86_64)	
	libaio-devel-0.3.107-10.el6 (i686)	
	libXext-1.1 (x86_64)	
	libXext-1.1 (i686)	
	libXtst-1.0.99.2 (x86_64)	
	libXtst-1.0.99.2 (i686)	
	libX11-1.3 (x86_64)	
	libX11-1.3 (i686)	

Table 1. Linux System Requirements

Description	Requirement	Command
Packages for Linux 6 (continued)	libXau-1.0.5 (x86_64) libXau-1.0.5 (i686) libxcb-1.5 (x86_64) libxcb-1.5 (i686) libXi-1.3 (x86_64) libXi-1.3 (i686) make-3.81-19.el6 sysstat-9.0.4-11.el6 (x86_64)	



Table 1. Linux System Requirements

Description	Requirement	Command
Packages for Linux 5	binutils-2.17.50.0.6 compat-libstdc++-33-3.2.3 compat-libstdc++-33-3.2.3 (32 bit) gcc-4.1.2 gcc-c++-4.1.2 glibc-2.5-58 glibc-2.5-58 (32 bit) glibc-devel-2.5-58 glibc-devel-2.5-58 (32 bit) ksh libaio-0.3.106 libaio-0.3.106 (32 bit) libaio-devel-0.3.106 libaio-devel-0.3.106 (32 bit) libgcc-4.1.2 libgcc-4.1.2 (32 bit) libstdc++-4.1.2 libstdc++-4.1.2 (32 bit) libstdc++-devel 4.1.2 libXext-1.0.1 libXext-1.0.1 (32 bit) libXtst-1.0.1 libXtst-1.0.1 (32 bit) libX11-1.0.3 libX11-1.0.3 (32 bit) libXau-1.0.1 libXau-1.0.1 (32 bit) libXi-1.0.1 libXi-1.0.1 (32 bit) make-3.81 sysstat-7.0.2	Required or later version must be installed  rpm -qa package_name  rpm -qa --queryformat "%{NAME}-%{VERSION}-%{RELEASE} (%{ARCH})\n"   grep PACKAGE_NAME

## 2. Oracle Recommended NFS Mount Options

Table 2. Oracle Recommended NFS Mount Options

OS	Mount Options for Binaries	Mount Options for Oracle Datafiles
Linux x86-64	rw,bg,hard,rsize=32768,wsiz=32768,vers=3,nointr,timeo=600,tcp	rw,bg,hard,rsize=32768,wsiz=32768,vers=3,nointr,timeo=600,tcp

Reference: Mount Options for Oracle files when used with NFS on NAS devices (Doc ID 359515.1)

**NOTE:**

Ex Libris NFS mount options for Dedicated DB

rw,noatime,nodiratime,bg,nolock,hard,nointr,tcp,vers=3,timeo=6000,rsiz=32768,wsiz=32768,actimeo=6000,retrans=6000,noacl,intr

## 3. Configure Kernel Parameters

Table 3. Kernel Parameters

Parameter	Minimum Value	File and Command
semmsl	250	/proc/sys/kernel/sem
semmns	32000	/sbin/sysctl -a   grep sem
semopm	100	
semmni	128	This command displays the semaphore parameters values in the order listed.  To change, type: echo 250 32000 100 128 > /proc/sys/kernel/sem  Alternatively, type: sysctl -w kernel.sem="250 32000 100 128"

Table 3. Kernel Parameters

Parameter	Minimum Value	File and Command
shmmx	<p>On a standalone DB/App server, set shmmx to half the size of physical memory (RAM) in bytes.</p> <p>Formula: <math>shmmx = RAM * 0.5</math> (bytes)</p>	<p>/proc/sys/kernel/shmmx</p> <p>/sbin/sysctl -a   grep shmmx</p>
shmall	<p>On a Dedicated DB server, set shmmx to 75% the size of physical memory (RAM) in bytes.</p> <p>Formula: <math>shmmx = RAM * 0.75</math> (bytes)</p> <p>Oracle recommends 40% of the size of physical memory (RAM) in pages.</p> <p>Formula: <math>shmall = \frac{RAM * 0.4}{\text{getconf PAGE\_SIZE}}</math></p> <p>For convenience, you can set <math>shmall = \frac{\text{value\_of\_shmmx}}{\text{PAGE\_SIZE}}</math> (unit: in pages)</p> <hr/> <p><b>NOTE:</b> On UNIX, you can type <code>getconf PAGE_SIZE</code> to find the <code>page_size</code>. The default is 4096.</p> <hr/> <p><b>NOTE:</b> If the server supports multiple databases, or uses a large SGA, set this parameter to a value equal to the total amount of shared memory, in 4K pages, that the system can use at one time.</p> <hr/>	<p>/proc/sys/kernel/shmall</p> <p>/sbin/sysctl -a   grep shmall</p>
shmmni	4096	<p>/proc/sys/kernel/shmmni</p> <p>/sbin/sysctl -a   grep shmmni</p>

Table 3. Kernel Parameters

Parameter	Minimum Value	File and Command
panic_on_oops	1	/proc/sys/kernel/panic_on_oops  /sbin/sysctl -a   grep panic_on_oops
file-max	6815744	/proc/sys/fs/file-max  /sbin/sysctl -a   grep file-max
ip_local_port_range	Minimum: 9000 Maximum: 65500	/proc/sys/net/ipv4/ ip_local_port_range  /sbin/sysctl -a   grep ip_local_port_range
rmem_default	262144	/proc/sys/net/core/ rmem_default  /sbin/sysctl -a   grep rmem_default
rmem_max	4194304	/proc/sys/net/core/rmem_max  /sbin/sysctl -a   grep rmem_max
aio-max-nr	1048576  Note: This value limits concurrent outstanding requests and should be set to avoid I/O subsystem failures.	/proc/sys/fs/aio-max-nr  /sbin/sysctl -a   grep aio-max-nr
Sample of kernel parameter settings for /etc/sysctl.conf (Linux 5-6); /usr/lib/sysctl.d/00-system.conf for Linux 7.		
<pre>kernel.shmmax = RAM (bytes) * 0.5 (in bytes) kernel.shmall = &lt;value of kernel.shmmax&gt;/\$(getconf PAGE_SIZE) (in pages) kernel.shmmni = 4096 kernel.sem = 250 32000 100 128 net.ipv4.ip_local_port_range = 9000 65500 net.core.rmem_default = 262144 net.core.rmem_max = 4194304 net.core.wmem_default = 262144 net.core.wmem_max = 1048586 fs.aio-max-nr = 1048576 fs.file-max = 6815744</pre>		

**NOTE:**

If the current value of any parameter is higher than the minimum value listed in this table, use the larger value.

For convenience, set `/etc/sysctl.conf` as follows:

Do `/sbin/sysctl -p` to make the change permanent and issue `/sbin/sysctl -a` to confirm that all the values are set correctly.

## 4. Configure Resource Limits

Table 4. Resource Limits

Resource Shell Limit	Resource	Soft Limit (KB)	Hard Limit (KB)	Command
Open file descriptors	<code>nofile</code>	At least 4096	At least 65536	<code>ulimit -Sn</code> <code>ulimit -Hn</code>
Number of processes available to a single user	<code>nproc</code>	At least 2047	At least 16384	<code>ulimit -Su</code> <code>ulimit -Hu</code>
Size of the stack segment of the process	<code>stack</code>	At least 10240	at least 10240 and at most 32768	<code>ulimit -Ss</code> <code>ulimit -Hs</code>
Maximum Locked Memory Limit	<code>memlock</code>	at least 90% of current RAM when HugePages memory is enabled and at least 3145728 KB (3 GB) when HugePages is disabled. By default, set <code>memlock = RAM - 1G</code> or <code>2G</code> and enter the value in KB.	at least 90% of current RAM when HugePages memory is enabled and at least 3145728 KB (3 GB) when HugePages is disabled. By default, set <code>memlock = RAM - 1G</code> or <code>2GB</code> and enter the value in KB.	<code>ulimit -l</code>
Sample of resource limit settings for oracle in <code>/etc/security/limits.conf</code>				

Table 4. Resource Limits

Resource Shell Limit	Resource	Soft Limit (KB)	Hard Limit (KB)	Command
# Standard resource limits for Oracle 12c on Voyager DB server				
# Please adjust memlock value for large database or for database using HugePages (its UNIT is in KB)				
	oracle soft nfile	4096		
	oracle hard nfile	65536		
	oracle soft nproc	4096		
	oracle hard nproc	32768		
	oracle soft memlock	3145728		
	oracle hard memlock	3145728		

---

**NOTE:**

After the `root` user made the change, become the `oracle` user. Check that all the settings are correct by issuing `ulimit -a`. A server reboot is recommended.

---

# C

## Solaris System Requirements for Oracle 12c

### 1. Solaris System Requirements

Table 5. Solaris System Requirements

Description	Requirement	Command
System architecture	Oracle Solaris on SPARC (64-bit)	<code>isainfo -kv</code> 64-bit sparcv9 kernel modules
Platforms	Supported Oracle Solaris 11 Release for SPARC (64-bit) Supported Oracle Solaris 10 Release for SPARC (64-bit)	<code>uname -a</code>
OS version and release level	Oracle Solaris 11 SRU 14.5 or later SRUs and updates Oracle Solaris 10 Update 11 (Oracle Solaris 10 1/13 s10s_u11wos_24a) or later updates	<code>uname -r</code> <code>cat /etc/release</code>
Disk space	6.5GB for enterprise edition software	<code>df -h</code>
Physical memory (RAM)	4GB and more	To determine the RAM size <code>/usr/sbin/prtconf   grep "Memory size"</code>  To determine available RAM size <code>sar -r 2 5</code>

Table 5. Solaris System Requirements

Description	Requirement	Command
/tmp disk space	2GB and more	df -h /tmp
swap space	swap=RAM when RAM>=2GB and <=16GB; swap=16GB when RAM > 16GB	To determine configured swap space size /usr/sbin/swap -l  To determine available swap space sar -r 2 5
SSH requirement	Solaris 11: Secure Shell is configured at installation for Oracle Solaris  Solaris 10: OpenSSH is the required SSH software.	
Packages for Oracle Solaris 11	pkg://solaris/system/dtrace  pkg://solaris/developer/assembler  pkg://solaris/developer/build/make  pkg://solaris/system/xopen/xcu4 (if not already installed as part of standard Oracle Solaris 11 installation)  pkg://solaris/x11/diagnostic/x11-info-clients  pkg://solaris/compress/unzip	pkg list pkg_name  pkg verify [-Hqv] [pkg_pattern ...]  If a package required for your system architecture is not installed, then download and install it from My Oracle Support



Table 5. Solaris System Requirements

Description	Requirement	Command
Packages and Patches for Oracle Solaris 10	SUNWarc	To verify pkginfo
	SUNWbtool	pkginfo -i pkg_name
	SUNWcsl	
	SUNWdtrc	pkginfo -i SUNWarc
	SUNWeu8os	SUNWbtool SUNWeu8os
	SUNWhea	SUNWlibC
	SUNWi1cs (ISO8859-1)	SUNWlibm SUNWlibms
	SUNWi15cs (ISO8859-15)	SUNWsprout \
	SUNWi1of	SUNWtoo SUNWi1of
	SUNWlibC	SUNWi1cs SUNWi15cs
	SUNWlibm	SUNWxwfont SUNWcsl
	SUNWlibms	SUNWdtrc
	SUNWsprout	To verify patch number
	SUNWtoo	patchadd -p   grep
	SUNWxwfont	patch_number
147440-25	If a OS patch not installed, download and install it from "My Oracle Support" (access license is needed)	
Program Environment for Solaris 10 and 11	JDK 7	

**NOTE:**

Solaris 10 Premier Support ends January 2018, Extended Support January 2021. Voyager customers with Solaris are highly encouraged to upgrade to Solaris 11.

If packages are missing, use `pkgadd -d . <pkgname>` to add them.

If OS patches are not installed, download them from Oracle Support and apply them. You need to have Oracle-licensed Solaris "packages OS access" to download.

The system upgrade needs to be taken before the Oracle database upgrade.

## 2. Oracle Recommended NFS Mount Options

Table 6. Oracle Recommended NFS Mount Options

OS	Mount Options for Binaries	Mount Options for Oracle Datafiles
Sun Solaris * (8, 9, 10, 11)	rw,bg,hard,rsize=32768,wsiz=32768,vers=3,nointr,proto=tcp,suid	rw,bg,hard,rsize=32768,wsiz=32768,vers=3,[forcedirectio or llock],nointr,proto=tcp

Reference: Mount Options for Oracle files when used with NFS on NAS devices (Doc ID 359515.1)

## 3. Configure Kernel Parameters

Table 7. Kernel Parameters

Resource Control	Minimum Value	File and Command
project.max-sem-ids	100	prctl -n project.max-sem-ids -i project group.dba
process.max-sem-nsems	256	prctl -n process.max-sem-nsems \$\$

Table 7. Kernel Parameters

Resource Control	Minimum Value	File and Command
project.max-shm-memory	<p>The cumulative sum of all shared memory allocated on each Oracle database instance started under the corresponding project.</p> <ul style="list-style-type: none"> <li>•When RAM is 4GB to 16GB, set project.max-shm-memory &gt; total of DB memory and &lt;= 50%*RAM (no more than 75%RAM on a DB server)</li> <li>•When RAM &gt; 16GB, set project.max-shm-memory at least = 8GB or &gt;= Total of DB memory, whichever is greater, but no more than 75%RAM</li> </ul> <p>Note 1: If the server supports multiple databases, like VGER and MRDN, this parameter value must be &gt;= total of VGER and MRDN DB memory.</p> <p>Note 2: If applications run on same server, must add shared memory resource to / etc/project for applications.</p>	<p>To check:</p> <pre>prctl -n project.max-shm-memory -i project.group.dba</pre> <p>To set using "projmod":</p> <pre>projmod -sK "project.max-shm-memory=(privileged,4G,deny)" group.dba</pre> <p>To reset to 6GB max-shm-memory for group.dba without a system reboot:</p> <pre>prctl -n project.max-shm-memory -v 6G -r -i project.group.dba</pre>
project.max-shm-ids	100	prctl -n project.max-shm-ids -i project.group.dba
tcp_smallest_anon_port	9000	ndd /dev/tcp tcp_smallest_anon_port
tcp_largest_anon_port	65500	ndd /dev/tcp tcp_largest_anon_port
udp_smallest_anon_port	9000	ndd /dev/udp udp_smallest_anon_port
udp_largest_anon_port	65500	ndd /dev/udp udp_largest_anon_port

Table 7. Kernel Parameters

Resource Control	Minimum Value	File and Command
Sample of resource control settings in /etc/project		
system:0:::		
user.root:1:::		
noproject:2:::		
default:3:::		
group.staff:10:::		
group.dba:100:Oracle Default::dba:project.max-sem-ids=(privileged,256,deny);project.max-sem-nsems=(privileged,256,deny);project.max-shm-ids=(privileged,100,deny);project.max-shm-memory=(privileged,8589934592,deny)		

## Notes

To get user project ID, type:

```
id -p
uid=100(oracle) gid=101(dba) projid=100(group.dba)
```

To list all available projects:

```
projects -l
```

To delete user.oracle or group.dba project

```
projdel user.oracle
Projdel group.dba
```

To add group.dba project to /etc/project with projid = 100.

```
projadd -p 100 -G dba -c "Oracle Default" \
-K "project.max-sem-nsems=(privileged,256,deny)" group.dba
```

---

### NOTE:

Open another session and verify as user oracle and type:

```
id -p
```

---

To set complete resource control values to `/etc/project`, using `projmod -sK`, refer to the following example:

```
projmod -sK "project.max-sem-nsems=(privileged,256,deny)" \
-sK "project.max-sem-ids=(privileged,256,deny)" \
-sK "project.max-shm-ids=(privileged,100,deny)" \
-sK "project.max-shm-memory=(privileged,8G,deny)"
group.dba
```

To verify resource control is active for `group.dba`, as oracle, type:

```
prctl -n project.max-shm-memory -i process $$
```

To check and set TCP/UDP ports, use the `ndd` command. For example:

```
ndd /dev/tcp tcp_largest_anon_port-- check
ndd /dev/udp udp_largest_anon_port
ndd -set /dev/tcp tcp_largest_anon_port 65500-- set
ndd -set /dev/udp udp_largest_anon_port 65500
```

## 4. Configure Shell Limits

Table 8. Resource Limits

Description	Shell Limit	Soft Limit (KB)	Hard Limit (KB)	Command
Open file descriptors	nofile	At least 4096 (Default 8192 for VGER)	At least 65536	ulimit -Sn ulimit -Hn
Number of user processes	Maxuprc or maxproc	At least 2047	At least 16384	ulimit -Su ulimit -Hu
Size of the stack segment of the process	stack	At most 10240	at least 10240 and at most 32768	ulimit -Ss ulimit -Hs

### Notes

On Solaris, to specify the number of file descriptors, you can either set it in oracle's `dot.profile` or add to `/etc/system`.

For oracle `dot.profile`, be sure to set:

```
ulimit -Sn 4096// or 8092
ulimit -Hn 65536
```

For /etc/system:

```
rlim_fd_cur= 4096 # soft limit, or 8092
rlim_fd_max= 65536 # hard limit
```

After the `root` user made the change, become the `oracle` user. Check that all the settings are correct. A server reboot is recommended.

```
ulimit -a
ulimit -Sa
ulimit -Ha
```

## 5. Additional Checks for Solaris VM Server

Table 9. Additional Checks for Solaris VM Server

Description	Check Command	Notes
Check if Solaris VM		
Check zones and status	<code>zoneadm list -cv</code>	
Collect global physical memory	<code>zonestat -z global -r physical-memory 2</code>	Do “man zonestat” for query other resources
Collect specific zone physical memory	<code>zonestat -z &lt;zonename&gt; -r physical-memory 2</code>	

# D

## Sample Output of preupgrd.sql

```
Oracle Database Pre-Upgrade Information Tool 11-17-2015 14:43:19
Script Version: 12.1.0.2.0 Build: 006
*****
***
Database Name:  VGER
Container Name:  Not Applicable in Pre-12.1 database
Container ID:   Not Applicable in Pre-12.1 database
Version:       11.2.0.3.0
Compatible:    11.2.0.3
Blocksize:     8192
Platform:      Linux x86 64-bit
Timezone file: V14
*****
***
                [Update parameters]
                [No parameters to update]
*****
***
*****
***
                [Renamed Parameters]
                [No Renamed Parameters in use]
*****
***
*****
***
```

```

                                [Obsolete/Deprecated Parameters]
--> sec_case_sensitive_logon      12.1      DESUPPORTED

                                [Changes required in Oracle Database init.ora or spfile]

*****
***

                                [Component List]
*****
***
--> Oracle Catalog Views          [upgrade]  VALID
--> Oracle Packages and Types     [upgrade]  VALID
--> JServer JAVA Virtual Machine  [upgrade]  VALID
--> Oracle XDK for Java           [upgrade]  VALID
--> Oracle Workspace Manager      [upgrade]  VALID
--> Oracle Text                   [upgrade]  VALID
--> Oracle XML Database           [upgrade]  VALID
--> Oracle Java Packages          [upgrade]  VALID
--> Expression Filter             [upgrade]  VALID
--> Rule Manager                  [upgrade]  VALID

```



```

*****
***
                                [Tablespaces]
*****
***
--> SYSTEM tablespace is adequate for the upgrade.
    minimum required size: 1054 MB
--> UNDOTBS1 tablespace is adequate for the upgrade.
    minimum required size: 400 MB
--> SYSAUX tablespace is adequate for the upgrade.
    minimum required size: 619 MB
--> TEMP tablespace is adequate for the upgrade.
    minimum required size: 60 MB

                                [No adjustments recommended]

*****
***
*****
***
                                [Pre-Upgrade Checks]
*****
***
ERROR: --> Invalid Oracle supplied table data found in your
database.

    Invalid data can be seen prior to the database upgrade
    or during PDB plug in. This table data must be made
    valid BEFORE upgrade or plug in.

- To fix the data, load the Preupgrade package and execute
  the fixup routine.
  For plug in, execute the fix up routine in the PDB.

@?/rdbms/admin/utluppkg.sql
SET SERVEROUTPUT ON;
exec dbms_preup.run_fixup_and_report('INVALID_SYS_TABLEDATA')
SET SERVEROUTPUT OFF;

INFORMATION: --> Older Timezone in use

    Database is using a time zone file older than version 18.
    After the upgrade, it is recommended that DBMS_DST package
    be used to upgrade the 11.2.0.3.0 database time zone version
    to the latest version which comes with the new release.
    Please refer to My Oracle Support note number 977512.1 for
    details.

```

```
*****
***
                                [Pre-Upgrade Recommendations]
*****
***
                                *****
                                ***** Dictionary Statistics *****
                                *****

Please gather dictionary statistics 24 hours prior to
upgrading the database.
To gather dictionary statistics execute the following command
while connected as SYSDBA:
    EXECUTE dbms_stats.gather_dictionary_stats;

^^^ MANUAL ACTION SUGGESTED ^^^

*****
***
                                [Post-Upgrade Recommendations]
*****
***
                                *****
                                ***** Fixed Object Statistics *****
                                *****

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

^^^ MANUAL ACTION SUGGESTED ^^^
```

```
*****  
***  
                ***** Summary *****  
  
1 ERROR exist that must be addressed prior to performing your  
upgrade.  
0 WARNINGS exist in your database.  
1 INFORMATIONAL message that should be reviewed prior to your  
upgrade.  
  
After your database is upgraded and open in normal mode you must  
run  
rdbms/admin/catuppst.sql which executes several required tasks and  
completes  
the upgrade process.  
  
You should follow that with the execution of rdbms/admin/utlrbp.sql,  
and a  
comparison of invalid objects before and after the upgrade using  
rdbms/admin/utlriobj.sql  
  
If needed you may want to upgrade your timezone data using the  
process  
described in My Oracle Support note 1509653.1  
                *****
```



# E

## Sample Output of Upgrade Summary Log

```
Oracle Database 12.1 Post-Upgrade Status Tool          11-10-2015
16:24:05

Component                               Current          Version
Elapsed Time                             Status          Number
HH:MM:SS

Oracle Server                             UPGRADED        12.1.0.2.0
00:10:54
JServer JAVA Virtual Machine             VALID           12.1.0.2.0
00:02:52
Oracle Workspace Manager                 VALID           12.1.0.2.0
00:01:15
Oracle XDK                               VALID           12.1.0.2.0
00:00:36
Oracle Text                             VALID           12.1.0.2.0
00:01:06
Oracle XML Database                     VALID           12.1.0.2.0
00:01:47
Oracle Database Java Packages            VALID           12.1.0.2.0
00:00:12
Oracle Application Express               VALID           4.2.5.00.08
00:41:33
Final Actions
00:01:16
Post Upgrade
00:01:18

Total Upgrade Time: 01:03:16

PL/SQL procedure successfully completed.

Elapsed: 00:00:00.15
Grand Total Upgrade Time:    [0d:1h:5m:11s]
```

