Requirements for Installing Oracle Database 12.2 on Solaris 11 SPARC/ x86-64 (Doc ID 2242643.1)

In this Document

APPLIES TO:

Oracle Database - Standard Edition - Version 12.2.0.1 to 12.2.0.1 [Release 12.2]
Oracle Database Cloud Schema Service - Version N/A and later
Oracle Database Exadata Express Cloud Service - Version N/A and later
Gen 1 Exadata Cloud at Customer (Oracle Exadata Database Cloud Machine) - Version N/A and later
Oracle Cloud Infrastructure - Database Service - Version N/A and later
Oracle Solaris on x86-64 (64-bit)
Oracle Solaris on SPARC (64-bit)

PURPOSE

This note explains the requirements that need to be met for a successful installation of the Oracle Database 12.2 on Solaris 11 SPARC 64-Bit.

SCOPE

This procedure is meant for those planning/trying to install Oracle Server 12.2.0.1.0 on Solaris 11 SPARC 64-Bit/x86-64 . Please note that the document only lays down the minimum requirements. If your configuration is higher than as mentioned, you have met the pre-installation requirements. You may also need to customize certain parameters depending upon your database/application size which is out of scope of this document.

DETAILS

Requirements for Installing Oracle Database 12.2 on Solaris 11 SPARC 64-Bit/x86-64

Hardware Requirements:

Check	Task
Server Make and Architecture	Confirm that server make, model, core architecture, and host bus adaptors (HBA) or network interface controllers (NICs) are supported to run with Oracle Database and Oracle Grid Infrastructure. Ensure the server has a DVD drive, if you are installing from a DVD.
Runlevel	3
Server Display Cards	At least 1024 x 768 display resolution, which Oracle Universal Installer requires.
Minimum network connectivity	Server is connected to a network

* The following table describes the relationship between installed RAM and the configured swap space requirement:

RAM	Swap Space
Between 1 GB and 2 GB	1.5 times the size of RAM
Between 2 GB and 16 GB	Equal to the size of RAM
More than 16 GB	16 GB

Use following command to determine the swap space usage and size of the configured swap space:

```
/usr/sbin/swap -s
total: 1410784k bytes allocated + 374376k reserved = 1785160k used, 5144120k available
```

* 1 GB of free space in /tmp

Use following command to determine the amount of space available in the /tmp directory:

```
df -kh /tmp
Filesystem Size Used Available Capacity Mounted on
swap       5.6G 711M 4.9G        13%     /tmp
```

* The disk space requirements for software files for each installation type:

For Oracle Solaris on SPARC (64-Bit):
At least 7.8 GB for Oracle Database Enterprise Edition
At least 7.7 GB for Oracle Database Standard Edition 2

For Oracle Solaris on x86-64 (64-Bit):
At least 7.4 GB for Oracle Database Enterprise Edition
At least 7.3 GB for Oracle Database Standard Edition 2

* The system architecture must be 64-bit. To determine whether the system architecture is 64-bit, enter the following command:

```
# /bin/isainfo -kv
```

This command displays the processor type. For example:

```
64-bit sparcv9 kernel modules
```

```
64-bit amd64 kernel modules
```

Software Requirements :

Oracle Solaris 11.2 SRU 5.5 (Oracle Solaris 11.2.5.5.0) or later SRUs and updates.

For example the following command shows Solaris11 Update 2 version :pkg list entire

NAME(PUBLISHER)	VERSION	INFO
entire	0.5.11-0.175.2.15.0.5.1	i--

To determine the release level enter the following command:

```
cat /etc/release
Oracle Solaris 11.2 SPARC
Copyright (c) 1983, 2015, Oracle and/or its affiliates. All rights reserved.
Assembled 18 June 2015
```

Package Requirement

Automatically Configuring Oracle Solaris with Oracle Database Prerequisites Packages

Starting with Oracle Solaris 11.2, for Oracle Database 12c Release 1 (12.1) and later databases, use the Oracle Database prerequisites group package group/prerequisite/oracle/oracle-rdbms-server-12-1-preinstall to ensure that all the necessary packages required for an Oracle Database installation are present on the system.

Install oracle-rdbms-server-12-1-preinstall even if you installed Oracle Solaris using any of the below server package groups:

solaris-minimal-server
solaris-small-server
solaris-large-server
solaris-desktop

Configuring a server using Oracle Solaris and the Oracle Database prerequisites group package

Below steps are for configuring a server using Oracle Solaris and the Oracle Database prerequisites group package

1. Install the recommended Oracle Solaris version for Oracle Database.

2. Install the Oracle Database prerequisites group package oracle-rdbms-server-12-1-preinstall.

3. Create role-allocated groups and users.

4. Complete network interface configuration for each cluster node candidate.

5. Complete system configuration for shared storage access as required for each standard or core node cluster candidate.

Checking the Oracle Database Prerequisites Packages Configuration

To check if oracle-rdbms-server-12-1-preinstall is already installed:

```
pkg list oracle-rdbms-server-12-1-preinstall
```

To check for the latest version of oracle-rdbms-server-12-1-preinstall:

```
pkg list -n oracle-rdbms-server-12-1-preinstall
```

To install the oracle-rdbms-server-12-1-preinstall group packages, log in as root, and run the following command on Oracle Solaris 11.2.5.5.0 and later systems::

```
pkg install -nv oracle-rdbms-server-12-1-preinstall (Use the -nv option to check for installation errors.)

pkg install oracle-rdbms-server-12-1-preinstall
```

To view the packages installed by oracle-rdbms-server-12-1-preinstall:

```
pkg contents -ro type,fmri -t depend oracle-rdbms-server-12-1-preinstall
```

```
root@solaris:~# pkg contents -ro type,fmri -t depend oracle-rdbms-server-12-1-preinstall
TYPE    FMRI
group   x11/diagnostic/x11-info-clients
group   x11/library/libxi
group   x11/library/libxtst
group   x11/session/xauth
require compress/unzip
require developer/assembler
require developer/build/make
root@solaris:~#
```

* The following packages (or later versions) must be installed :

pkg://solaris/system/library/openmp
pkg://solaris/compress/unzip
pkg://solaris/developer/assembler
pkg://solaris/developer/build/make
pkg://solaris/system/dtrace
pkg://solaris/system/header
pkg://solaris/system/kernel/oracka (Only for Oracle Real Application Clusters installations)
pkg://solaris/system/library
pkg://solaris/system/linker
pkg://solaris/system/xopen/xcu4 (If not already installed as part of standard Oracle Solaris 11 installation)
pkg://solaris/x11/diagnostic/x11-info-clients

Starting with Oracle Solaris 11.2, if you have installed the Oracle Database prerequisites group package oracle-rdbms-server-12-1-preinstall, then you do not have to install these packages, as oracle-rdbms-server-12-1-preinstall installs them for you.

Packages can be checked as:

```
pkg info -i package_name

For Example

pkg info consolidation/osnet/osnet-incorporation /x11/diagnostic/x11-info-clients
/developer/build/make system/xopen/xcu4 | egrep -i 'Name|installed'
```

```
root@solaris:~# pkg info consolidation/osnet/osnet-incorporation /system/library/openmp /compress/unzip /developer/assembler /developer/build/make system/dtrace system/
header system/library system/linker system/xopen/xcu4 /x11/diagnostic/x11-info-clients | egrep -i 'Name|installed'
          Name: compress/unzip
         State: Installed
          Name: consolidation/osnet/osnet-incorporation
         State: Installed
          Name: developer/assembler
         State: Installed
          Name: developer/build/make
         State: Installed
          Name: system/dtrace
         State: Installed
          Name: system/header
         State: Installed
          Name: system/library
         State: Installed
          Name: system/library/openmp
         State: Installed
          Name: system/linker
         State: Installed
          Name: system/xopen/xcu4
         State: Installed
          Name: x11/diagnostic/x11-info-clients
         State: Installed
root@solaris:~#
```

Requirements for Programming Environments for Oracle Solaris

Programming Environments	**Support Requirements**
Java Database Connectivity/Oracle Call Interface (OCI)	JDK 8 (Java SE Development Kit) with th Connectivity. Note: Starting with Oracle Database 12c Relea on Oracle Solaris. Features that use Jav Solaris.
C Compiler Patches	118683-14 Oracle Solaris Studio 12.4 pa 119961-15 Oracle Solaris Studio 12.4 pa 124861-15 Compiler Common patch for 126498-15 Compiler Common patch for 124867-11 C 5.9 Compiler 124868-10 C 5.9 Compiler 126495 Debuginfo Handling 126496-02 Debuginfo Handling 139556-08
Oracle C++ Oracle C++ Call Interface Pro*C/C++ Oracle XML Developer's Kit (XDK)	Oracle Solaris Studio 12.4 (formerly Su 124863-12 C++ 5.9 compiler

	124864-12 C++ 5.9 Compiler Download Oracle Solaris Studio from th http://www.oracle.com/technetwork/se storage/solarisstudio/overview/index.ht
Pro*COBOL	Micro Focus Server Express 5.1 Micro Focus Visual COBOL for Eclipse 2.
Pro*FORTRAN	Oracle Solaris Studio 12 (Fortran 95)

OS Environment:

Kernel Parameters

Solaris 11 uses the resource control facility to implement the System V IPC. However, Oracle recommends that you set both resource control and /etc/system/ parameters.
Operating system parameters not replaced by resource controls continue to affect performance and security on Solaris 11 systems.

Resource Control	**Minimum Value**
project.max-sem-ids	100
process.max-sem-nsems	256
project.max-shm-memory	This value varies according to the RAM size
project.max-shm-ids	100
tcp_smallest_anon_port	9000
tcp_largest_anon_port	65500
udp_smallest_anon_port	9000
udp_largest_anon_port	65500

Guidelines for Setting Resource Control Parameters

- The kernel parameter values in the preceding table are minimum values only. Verify that the kernel parameters shown in the preceding table are set to values greater than or equal to the minimum value shown. For production database systems, Oracle recommends that you tune these values to optimize the performance of the system. See your operating system documentation for more information about kernel resource management.
- If the current value for any parameter is greater than the value listed in the preceding table, then the Fixup scripts do not change the value of that parameter.
- On Oracle Solaris 11, you are not required to make changes to the /etc/system file to implement the System V IPC. Oracle Solaris 11 uses the resource control facility for its implementation.
- The project.max-shm-memory resource control value assumes that no other application is using the shared memory segment from this project other than the Oracle instances. If applications, other than the Oracle instances are using the shared memory segment, then you must add that shared memory usage to the project.max-shm-memory resource control value.
- project.max-shm-memory resource control = the cumulative sum of all shared memory allocated on each Oracle database instance started under the corresponding project.
- Ensure that memory_target or max_sga_size does not exceed process.max-address-space and project.max-shm-memory. For more information, see My Oracle Support Note 1370537.1.

Requirements for Shared Memory Resources project.max-shm-memory

RAM	project.max-shm-memory setting
1 GB to 16 GB	Half the size of physical memory
Greater than 16 GB	At least 8 GB

To view the current value of project.max-shm-memory set for a project and system-wide:

```
# prctl -n project.max-shm-memory -i project default
```

Where default is the project ID obtained by running the id -p command.

For example, to change the setting for project.max-shm-memory to 6 GB for the project default without a reboot:

```
prctl -n project.max-shm-memory -v 6gb -r -i project default
```

Displaying Resource Control Values

To display the current values of the resource control:

```
$ id -p // to verify the project id
uid=100(oracle) gid=100(dba) projid=1 (group.dba)
$ prctl -n project.max-shm-memory -i project group.dba
$ prctl -n project.max-sem-ids -i project group.dba
```

To change the current values use the prctl command. For example:

To modify the value of max-shm-memory to 6 GB:

```
# prctl -n project.max-shm-memory -v 6gb -r -i project group.dba
```

To modify the value of max-sem-ids to 256:

```
# prctl -n project.max-sem-ids -v 256 -r -i project group.dba
```

Note:
When you use the prctl command (Resource Control) to change system parameters, you do not have to restart the system for these parameter changes to take effect. However, the changed parameters do not persist after a system restart.

Modifying Resource Control Values

Use the following procedure to modify the resource control project settings, so that they persist after a system restart:

A project with the name group.dba is created to serve as the default project for the oracle user. Run the id command to verify the default project for the oracle user:

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

To set the maximum shared memory size to 2 GB, run the projmod command:

```
# projmod -sK "project.max-shm-memory=(privileged,2G,deny)" group.dba
```

Alternatively, add the resource control value project.max-shm-memory=(privileged,2147483648,deny) to the last field of the project entries for the Oracle project.

Check the values for the /etc/project file:

```
# cat /etc/project
```

The output is similar to the following:

```
system:0::::
user.root:1::::
noproject:2::::
default:3::::
group.staff:10::::
group.dba:100:Oracle default project ::: project.max-shm-memory=(privileged,2147483648,deny)
```

To verify that the resource control is active, check process ownership, and run the commands id and prctl:

```
# su - oracle
$ id -p
uid=100(oracle) gid=100(dba) projid=100(group.dba)
$ prctl -n project.max-shm-memory -i process $$
process: 5754: -bash
NAME PRIVILEGE VALUE FLAG ACTION RECIPIENT
project.max-shm-memory privileged 2.00GB - deny
```

Note:
The value for the maximum shared memory depends on the SGA requirements and should be set to a value greater than the SGA size.

UDP and TCP Kernel Parameters

use the ipadm command to check your current range for ephemeral ports:

```
# ipadm show-prop -p smallest_anon_port,largest_anon_port tcp

PROTO PROPERTY         PERM CURRENT PERSISTENT DEFAULT POSSIBLE
tcp smallest_anon_port rw   32768     --        32768  1024-65535
tcp largest_anon_port  rw   65535     --        65535  32768-65535
```

In the preceding examples, the ephemeral ports are set to the default range (32768-65535).

If necessary for your anticipated workload or number of servers , update the UDP and TCP ephemeral port range to a broader range. For example:

```
# ipadm set-prop -p smallest_anon_port=9000 tcp
# ipadm set-prop -p largest_anon_port=65500 tcp
# ipadm set-prop -p smallest_anon_port=9000 udp
# ipadm set-prop -p largest_anon_port=65500 udp
```

Please refer to the following document for checking/setting kernel parameter values using resource control:

Note 429191.1 Kernel setup for Solaris 10 and Solaris 11 using project files.

Umask

The 'umask' setting for the "oracle" user has to be 022.

Hostname

Hostname command should return the fully qualified hostname as shown below:

```
# hostname
hostname.domainname
```

Shell Limits

Oracle recommends that you set shell limits and system configuration parameters as documented below:

Note: The shell limit values in this section are minimum values only.
For production database systems, Oracle recommends that you tune these values to optimize the performance of the system.
See your operating system documentation for more information on configuring shell limits.

Shell Limit	**Description**	**Soft Limit (KB)**	**Hard Limit (K**
STACK	Size of the stack segment of the process (KB)	at least 10240	at most 32768
NOFILES	Open file descriptors	at least 1024	at least 65536
`MAXUPRC` or `MAXPROC`	Maximum user processes	at least 2047	at least 16384

To display the current value specified for these shell limits enter the following commands:

```
# ulimit -s
# ulimit -n
```

Install Oracle Database

Use the runInstaller command to start the installation.

Log in as the Oracle installation owner user account that own the software binaries.

On the installation media, or where you have downloaded the installation binaries, run the runInstaller command to start Oracle Universal Installer.

For example:

On installation media:

```
/dev/dvd-rw/media/runInstaller
```

On a hard disk:

```
$ cd /home/oracle_sw/
$ ./runInstaller
```

REFERENCES

NOTE:429191.1 - Kernel setup for Solaris 10 and Solaris 11 using project files