**Upon startup of Linux database get ORA-27102: out of memory Linux-X86\_64 Error: 28: No space left on device (Doc ID 301830.1)**

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**Applies to:**

Oracle Database - Enterprise Edition - Version 9.2.0.1 and later  
 Linux x86-64  
 \*\*\*Checked for relevance on 03-Jan-2013\*\*\*

**Symptoms**

When trying to increase the SGA to approach half available RAM with an Oracle 64-bit version on a Linux 64-bit operating system, even though SHMMAX is set to match half the amount of RAM, you get the following error when trying to start the instance:

SQL> startup nomount  
 ORA-27102: out of memory  
 Linux-x86\_64 Error: 28: No space left on device

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**Changes**

**shmall** is too small, most likely is set to the default setting of 2097152

$ cat /proc/sys/kernel/shmall  
 2097152

**Cause**

SHMALL is the total amount of shared memory, in pages, that the system can use at one time.

**Solution**

Set SHMALL equal to the sum of all the SGAs on the system, divided by the page size.

The page size can be determined using the following command:

$ getconf PAGE\_SIZE  
 4096

For example, if the sum of all the SGAs on the system is 16Gb and the result of  '$ getconf PAGE\_SIZE' is 4096 (4Kb) then set shmall to 4194304 pages

As the root user set the SHMALL to 4194304 in the /etc/sysctl.conf file:

kernel.shmall = 4194304

then run the following command:

$ sysctl -p  
 $ cat /proc/sys/kernel/shmall  
 4194304

**NOTE:  
 The above command loads the new value and a reboot is not necessary.**

Switch back to the oracle user and retry the startup command.

Modifying /etc/sysctl.conf is a permanent workaround (applies at boot time). If for some reason you DO NOT want to change the system wide configuration, you can do it on the fly by directly changing the kernel pseudo FS AKA procfs.

e.g. echo "4194304" > /proc/sys/kernel/shmall

Using HUGEPAGES does not alter the calculation for configuring shmall.

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