**Linux - Resource Manager - Processes limitations (/etc/security/limits.conf)**

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**1 – About**

**You should also check /etc/security/limits.d**

Limiting user processes is important for running a stable system. To limit user process, you have just to set [shell](http://gerardnico.com/wiki/sh/shell) limit by adding:

* a user name
* or group name
* or all users

to /etc/security/limits.conf file and impose then process limitations.

Example of /etc/security/limits.conf file

\* hard nofile 65535

\* soft nofile 4096

@student hard nproc 16384

@student soft nproc 2047

- a group name, with @group syntax.

A soft limit is like a warning and hard limit is a real max limit. For example, following will prevent anyone in the student group from having more than 50 processes, and a warning will be given at 30 processes.

@student hard nproc 50

@student soft nproc 30

@limited hard cpu 2

Above config applies a hard CPU limit of 2 minute to the limited group. Members of this group can log in and run programs; however, if one of those programs consumes more than two minute of **CPU time**, it will be terminated.

**CPU time** and total system access time are two entirely different things.  
CPU time is calculated based on the amount of time the CPU is actively  
processing a user’s data. Idle time (for instance, when a user’s shell is  
active but no CPU-intensive tasks are running) doesn’t count. Thus, a user  
can log in and remain logged in for hours even with a very low hard CPU  
time limit. This limit is intended to prevent problems caused by users who  
run very CPU-intensive programs on systems that shouldn’t be used for  
such purposes.

Hard limits are maintained by the [kernel](http://gerardnico.com/wiki/linux/kernel) while the soft limits are enforced by the [shell](http://gerardnico.com/wiki/sh/shell).

**2 - Articles Related**

* [OBIEE 11g - Oracle Business Intelligence 11.1 Simple installation steps on Windows and OEL Linux 32 bit](http://gerardnico.com/wiki/dat/obiee/installation_11.1)
* [OBIEE 10G - Linux OEL 5 x86 Installation version 10.1.3.4.1](http://gerardnico.com/wiki/dat/obiee/linux_installation)
* [Oracle Database - Installation 11g Release 2 (11.2) on Linux OEL 5 (X86)](http://gerardnico.com/wiki/database/oracle/install_11gr2_oel_linux)
* [Oracle Database 11gR2 - Installation on Linux OEL 5 Update 5 (x86\_64)](http://gerardnico.com/wiki/database/oracle/install_11gr2_oel_linux_x86_64)
* [EBS - E-Business Suite 12.1.1 Standard Installation on Linux OEL 5.3](http://gerardnico.com/wiki/ebs/installation)
* [Exalytics - Timesten Configuration](http://gerardnico.com/wiki/exalytics/timesten)
* [File System - File Descriptor (Open File)](http://gerardnico.com/wiki/file_system/file_descriptor)
* [Linux - ulimit (shell ressource control)](http://gerardnico.com/wiki/linux/ulimit)
* [PowerCenter - Installation and Configuration (9.0.1 for OEL Linux 64Bit)](http://gerardnico.com/wiki/powercenter/installation_901)

**3 - Syntax of the /etc/security/limits.conf file**

The /etc/security/limits.conf file contains a list line where each line describes a limit for a user in the form of:

<domain> <type> <item> <shell limit value>

Where:

* <domain> can be:
  + an [user name](http://gerardnico.com/wiki/linux/user)
  + a [group name](http://gerardnico.com/wiki/linux/group), with @group syntax
  + the wildcard \*, for default entry (which matches everybody)
  + the wildcard %, can be also used with %group syntax, for maxlogin limit
  + The domain field describes the entity to which the limit applies.
* <type> can have the two values:
  + “soft” for enforcing the soft limits (soft is like warning)
  + “hard” for enforcing hard limits (hard is a real max limit)
  + – for signifying that a limit is both hard and soft
* <item> can be one of the following:
  + core - limits the core file size (KB)
* <shell limit value> can be one of the following:
  + core - limits the core file size (KB)
  + data - max data size (KB). The size of a program’s data area.
  + fsize - maximum filesize (KB). The size of files created by the user.
  + memlock - max locked-in-memory address space (KB)
  + nofile - Maximum number of open [file descriptors](http://gerardnico.com/wiki/file_system/file_descriptor)
  + rss - max resident set size (KB)
  + stack - max stack size (KB) - Maximum size of the stack segment of the process
  + cpu - max CPU time (MIN)
  + nproc - Maximum number of concurrent processes available to a single user
  + as - address space limit
  + maxlogins - max number of logins for this user
  + maxsyslogins - max number of logins on the system
  + priority - the priority to run user process with
  + locks - max number of file locks the user can hold
  + sigpending - max number of pending signals
  + msgqueue - max memory used by POSIX message queues (bytes)
  + nice - max nice priority allowed to raise to
  + rtprio - max realtime priority
  + chroot - change root to directory (Debian-specific)

**4 - How to**

**4.1 - Set the limitations**

* Open the /etc/security/limits.conf file and change the existing values for “hard” and “soft” parameters as it's given in your installation documentation.
* Restart the system after making changes.

If the current value for any parameter is higher than the value listed in the installation document, then do not change the value of that parameter.

\* hard nofile 65535

\* soft nofile 4096

\* hard nproc 16384

\* soft nproc 2047

**4.2 - Verify the limitations**

To check the soft and hard limits, log as the user and enter the following [ulimit](http://gerardnico.com/wiki/linux/ulimit) command:

| **Limitation** | **Soft** | **Hard** |
| --- | --- | --- |
| file descriptor | ulimit -Sn | ulimit -Hn |
| number of processes available to a user | ulimit -Su | ulimit -Hu |
| stack | ulimit -Ss | ulimit -Hs |

**4.3 - Test the limitations**

The following bash function:

:(){

:|:&

};:

or

:(){ :|:& };:

is a recursive function and is often used by sys admin to test user processes limitations.