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

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1 - About

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/bash/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    nfile      65535
*          soft    nfile      4096
@student  hard    nproc      16384
@student  soft    nproc      2047
```

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
```

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/bash/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 or Handle (Open File) (http://gerardnico.com/wiki/file_system/file_descriptor)
- SAP Hana - Indexserver service (<http://gerardnico.com/wiki/hana/indexserver>)
- Linux - ulimit (shell resource 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
 - the wildcard %, can be also used with %group syntax, for maxlogin limit
- <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)
- <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)

- o `fsz` - maximum filesize (KB)
- o `memlock` - max locked-in-memory address space (KB)
- o `nofile` - Maximum number of open file descriptors (http://gerardnico.com/wiki/file_system/file_descriptor)
- o `rss` - max resident set size (KB)
- o `stack` - max stack size (KB) - Maximum size of the stack segment of the process
- o `cpu` - max CPU time (MIN)
- o `nproc` - Maximum number of processes available to a single user
- o `as` - address space limit
- o `maxlogins` - max number of logins for this user
- o `maxsyslogins` - max number of logins on the system
- o `priority` - the priority to run user process with
- o `locks` - max number of file locks the user can hold
- o `sigpending` - max number of pending signals
- o `msgqueue` - max memory used by POSIX message queues (bytes)
- o `nice` - max nice priority allowed to raise to
- o `rtprio` - max realtime priority
- o `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	<code>ulimit -Sn</code>	<code>ulimit -Hn</code>
number of processes available to a user	<code>ulimit -Su</code>	<code>ulimit -Hu</code>
stack	<code>ulimit -Ss</code>	<code>ulimit -Hs</code>

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.





5 - Documentation / Reference

- Understanding Bash `fork()` bomb `~ :(){ :|:& };:` (<http://www.cyberciti.biz/faq/understanding-bash-fork-bomb/>)
-  (<http://del.icio.us/post?title=Linux+-+Resource+Manager+-+Processes+limitations+%28%2Fetc%2Fsecurity%2Flimits.conf%29&url=http%3A%2F%2Fgerardnico.com%2Fwiki%2Flinux%2Flimits.conf>)
-  (<http://digg.com/submit?phase=2&title=Linux+-+Resource+Manager+-+Processes+limitations+%28%2Fetc%2Fsecurity%2Flimits.conf%29&url=http%3A%2F%2Fgerardnico.com%2Fwiki%2Flinux%2Flimits.conf>)
-  (<http://myjeeves.ask.com/mysearch/BookmarkIt?v=1.2&t=webpages&title=Linux+-+Resource+Manager+-+Processes+limitations+%28%2Fetc%2Fsecurity%2Flimits.conf%29&url=http%3A%2F%2Fgerardnico.com%2Fwiki%2Flinux%2Flimits.conf>)
-  (<http://www.google.com/bookmarks/mark?op=add&title=Linux+-+Resource+Manager+-+Processes+limitations+%28%2Fetc%2Fsecurity%2Flimits.conf%29&bkmk=http%3A%2F%2Fgerardnico.com%2Fwiki%2Flinux%2Flimits.conf>)
-  (<http://www.stumbleupon.com/submit?title=Linux+-+Resource+Manager+-+Processes+limitations+%28%2Fetc%2Fsecurity%2Flimits.conf%29&url=http%3A%2F%2Fgerardnico.com%2Fwiki%2Flinux%2Flimits.conf>)
-  (<http://www.technorati.com/faves?add=http%3A%2F%2Fgerardnico.com%2Fwiki%2Flinux%2Flimits.conf>)
-  (<https://favorites.live.com/quickadd.aspx?market=1&mkt=en-us&title=Linux+-+Resource+Manager+-+Processes+limitations+%28%2Fetc%2Fsecurity%2Flimits.conf%29&url=http%3A%2F%2Fgerardnico.com%2Fwiki%2Flinux%2Flimits.conf&top=1>)
-  (<http://myweb2.search.yahoo.com/myresults/bookmarklet?title=Linux+-+Resource+Manager+-+Processes+limitations+%28%2Fetc%2Fsecurity%2Flimits.conf%29&popup=true&u=http%3A%2F%2Fgerardnico.com%2Fwiki%2Flinux%2Flimits.conf>)

-  (<http://www.facebook.com/sharer.php?u=http%3A%2F%2Fgerardnico.com%2Fwiki%2Flinux%2Flimits.conf&t=Linux+-+Resource+Manager+-+Processes+limitations+%28%2Fetc%2Fsecurity%2Flimits.conf%29>)
-  (<http://bookmarks.yahoo.com/toolbar/savebm?opener=tb&u=http%3A%2F%2Fgerardnico.com%2Fwiki%2Flinux%2Flimits.conf&t=Linux+-+Resource+Manager+-+Processes+limitations+%28%2Fetc%2Fsecurity%2Flimits.conf%29>)
-  (<http://twitter.com/home?status=Linux+-+Resource+Manager+-+Processes+limitations+%28%2Fetc%2Fsecurity%2Flimits.conf%29:http%3A%2F%2Fgerardnico.com%2Fwiki%2Flinux%2Flimits.conf>)
-  (<http://favorites.my.aol.com/ffclient/AddBookmark?url=http%3A%2F%2Fgerardnico.com%2Fwiki%2Flinux%2Flimits.conf&title=Linux+-+Resource+Manager+-+Processes+limitations+%28%2Fetc%2Fsecurity%2Flimits.conf%29&favelet=true>)

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