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Linux Limit CPU Usage Per Process

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I don't want background process to eat all my CPU. I know how to find out CPU utilization [2] but how do I limit the cpu usage of a process under Linux operating system? How do I force a process to limit itself to 25% only?

You can use cpulimit program that attempts to limit the cpu usage of a process. Limits are expressed in **percentage** and not in *cpu time*. cpulimit does not act on the nice value or other scheduling priority stuff, but on the real cpu usage. Also, it is able to adapt itself to the overall system load, dynamically and quickly. [1]

Install cpulimit

Type the following commands to install latest stable release:

```
# cd /tmp
# wget 'http://downloads.sourceforge.net/cpulimit/cpulimit-1.1.tar.gz'
# tar -zxvf cpulimit-1.1.tar.gz
# cd cpulimit-1.1
# make
# cp cpulimit /usr/local/sbin/
# rm -rf cpulimit*
```

A note about Debian / Ubuntu Linux users

Type the following command to install cpulimit:

```
$ sudo apt-get update
$ sudo apt-get install cpulimit
```

How do I use cpulimit?

To limit CPU usage of the process called firefox to 30%, enter:

```
# cpulimit -e firefox -l 30
```

To limit CPU usage of the process to 30% by using its PID, enter:

```
# cpulimit -p 1313 -l 30
```

To find out PID of the process use any of the following:

```
# ps aux | less
# ps aux [3] | grep firefox
# pgrep [4] -u vivek php-cgi
# pgrep lighttpd
```

You can also use absolute path name of the executable, enter:

```
# cpulimit -P /opt/firefox/firebox -l 30
```

Where,

- -p : Process PID.
- -e : Process name.
- -l : percentage of CPU allowed from 0 to 100.
- -P: absolute path name of the executable program file.

Root vs Normal User Account

From the project webpage:

> cpulimit should run at least with the same user running the controlled process. But it is much better if you run cpulimit as root, in order to have a higher priority and a more precise control.

A Note About SMP (Multicore / MultiCpu) Systems

Again quoting from the project webpage:

> If your machine has one processor you can limit the percentage from 0% to 100%, which means that if you set for example 50%, your process cannot use more than 500 ms of cpu time for each second. But if your machine has four processors, percentage may vary from 0% to 400%, so setting the limit to 200% means to use no more than half of the available power. In any case, the percentage is the same of what you see when you run top.

Related Throttling Utilities

1. ionice utility [5] - Avoid sudden outburst of backup shell script / program disk I/O.
2. Limit disk [6] I/O for rsync tool.
3. Linux nice command [7]: Run Process With Modified Scheduling Priority (nicenesses)
4. renice command [8]: Change the Priority of a Already Running Process

Recommended Readings:

- cpulimit project

URLs in this post:

[1] Image: **http://www.cyberciti.biz/faq/category/linux/**
[2] CPU utilization: **http://www.cyberciti.biz/tips/how-do-i-find-out-linux-cpu-utilization.html**
[3] ps aux: **http://www.cyberciti.biz/faq/tag/ps-command/**
[4] pgrep: **http://www.cyberciti.biz/faq/tag/pgrep-command/**
[5] ionice utility: **http://www.cyberciti.biz/tips/linux-set-io-scheduling-class-priority.html**
[6] Limit disk: **http://www.cyberciti.biz/faq/throttle-disk-io-rate-limit-disk-io/**
[7] Linux nice command: **http://www.cyberciti.biz/faq/change-the-nice-value-of-a-process/**
[8] renice command: **http://www.cyberciti.biz/faq/howto-change-unix-linux-process-priority/**