Table Of Contents

nixCraft: Linux Tips, Hacks, Tutorials, And Ideas In Blog Format
http://www.cyberciti.biz/

chrt command: Set / Manipulate Real Time Attributes of a Linux Process

Posted by Vivek Gite <vivek@nixcraft.com>

Q. How do I set the real time scheduling priority of a process under Linux operating system using a shell prompt?

A. You can use chrt command to set or retrieve the real-time scheduling attributes / scheduling priority of an existing PID. You can also run COMMAND with the given attributes.

Understanding Linux Scheduling Priorities [1]

From the man page:
The scheduler is the kernel part that decides which runnable process will be executed by the CPU next. The Linux scheduler offers three different scheduling policies, one for normal processes and two for real-time applications.

1. **SCHED_OTHER** - the default universal time-sharing scheduler policy used by most processes.
2. **SCHED_FIFO** or **SCHED_RR** - intended for special time-critical applications that need precise control over the way in which runnable processes are selected for execution
3. **SCHED_BATCH** - intended for "batch" style execution of processes

WARNING! These examples requires proper understanding of UNIX / Linux scheduling algorithms; don't try this on production systems; if you are not familiar with Linux scheduling algorithms.

Scheduling Algorithm

- SCHED_FIFO uses First In-First Out scheduling algorithm
- SCHED_RR uses Round Robin scheduling algorithm
- SCHED_OTHER uses Default Linux time-sharing scheduling algorithm
- SCHED_BATCH use Scheduling batch processes algorithm

WARNING! Standard Linux kernel is used in as a general-purpose operating system and can handle background processes, interactive applications, and soft real-time applications (applications that need to usually meet timing deadlines). chrt command is directed at these kinds of applications.

util-linux package

chrt command is part of **util-linux package** - low-level system utilities that are necessary for a Linux system to function. It is installed by default under Debian / Ubuntu / CentOS / RHEL / Fedora and almost all other Linux distributions.

How do I use chrt command to get real time attributes of a Linux process?

To get / retrieve the real-time attributes of an existing task / PID, enter:

```
# chrt -p pid
# chrt -p 112
# chrt -p 1
```

Output:

```
pid 1's current scheduling policy: SCHED_OTHER
pid 1's current scheduling priority: 0
```

Any user can retrieve the scheduling information. No special privileges required.

How do I use chrt command to set real time attributes of a Linux process (already running processes)?

Use the syntax as follows to set new priority:

```
# chrt -p prio pid
# chrt -p 1025
# chrt -p 55 1025
# chrt -p 1025
```

Before setting new scheduling policy, you need to find out minimum and maximum valid priorities for each scheduling algorithm, enter:

```
# chrt -m
```

Output:

```
SCHED_OTHER min/max priority    : 0/0
SCHED_FIFO min/max priority     : 1/99
SCHED_RR min/max priority       : 1/99
SCHED_BATCH min/max priority    : 0/0
```

How do I set SCHED_BATCH scheduling policy?

To set scheduling policy to SCHED_BATCH, enter:

```
# chrt -b -p 0 {pid}
# chrt -b -p 0 1024
```

How do I set SCHED_FIFO scheduling policy?

To set scheduling policy to SCHED_FIFO, enter:

```
# chrt -f -p [1..99] {pid}
```

Set policy to SCHED_FIFO with 50 priority:

```
# chrt -f -p 50 1024
# chrt -p 1024
```

How do I set SCHED_OTHER scheduling policy?

To set policy scheduling policy to SCHED_OTHER, enter:

```
# chrt -o -p 0 {pid}
# chrt -o -p 0 1024
# chrt -p 1024
```

How do I set SCHED_RR scheduling policy?

To set scheduling policy to SCHED_RR, enter:

```
# chrt -r -p [1..99] {pid}
```

Set policy to SCHED_RR scheduling with 20 priority:

```
# chrt -r -p 20 1024
# chrt -p 1024
```

Further readings:

If you run CPU-intensive processes, you should familiarize yourself with other tools:

- nice command to run a program with modified scheduling priority [2]

- renice command to alter priority of running processes [3]
- taskset command to retrieve or set a processes's CPU affinity [4]
- man pages nice, renice, chrt, taskset, sched_setaffinity and sched_setscheduler

URLs in this post:

[1] Image: **http://www.cyberciti.biz/faq/faq/category/linux/**
[2] nice command to run a program with modified scheduling priority: **http://www.cyberciti.biz/faq/change-the-nice-value-of-a-process/**
[3] renice command to alter priority of running processes : **http://www.cyberciti.biz/faq/howto-change-unix-linux-process-priority/**
[4] taskset command to retrieve or set a processes's CPU affinity: **http://www.cyberciti.biz/tips/setting-processor-affinity-certain-task-or-process.html**
