



Mawlana Bhashani Science And Technology University

Lab-Report

Lab Report No: 03

Lab Report Name: Threads on operating system

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Objectives:

- i. What is Thread.*
- ii. Types of Thread*
- iii. Implementation of Thread*

Theory: *A thread is a flow of execution through the process code, with its own program*

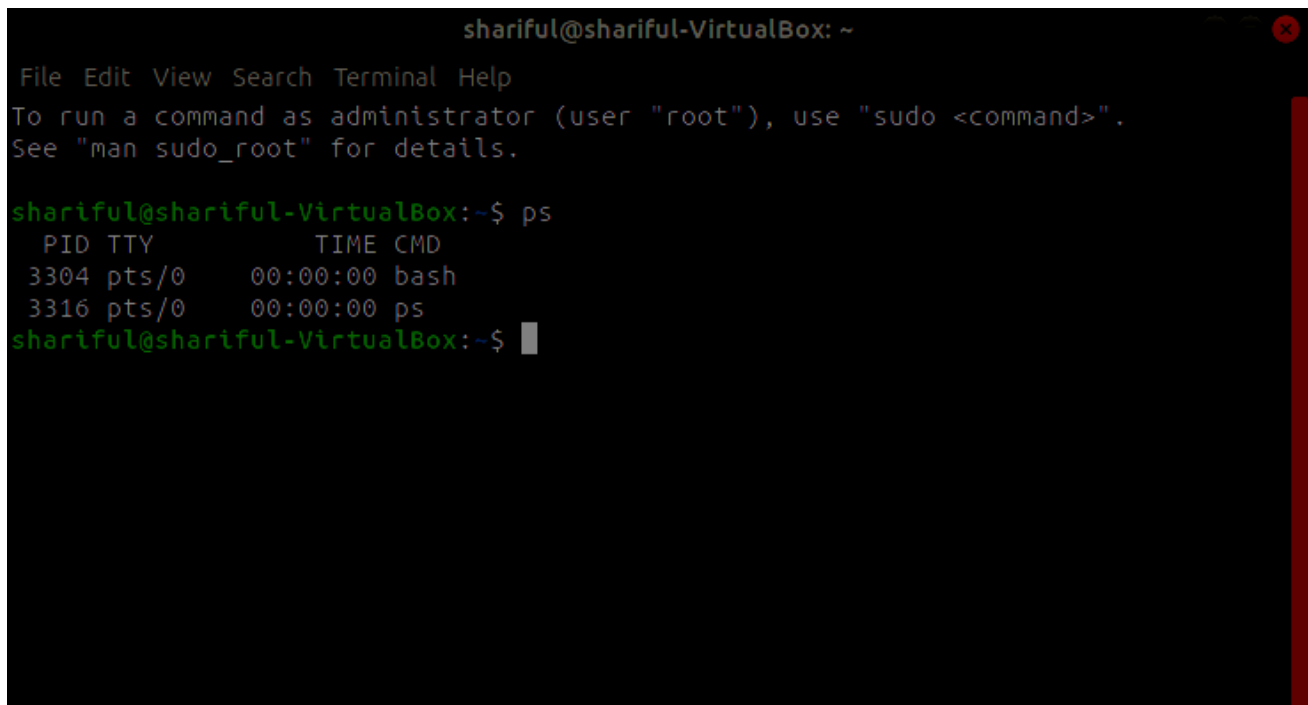
counter that keeps track of which instruction to execute next, system registers which hold

its current working variables, and a stack which contains the execution history

1: PS

In ps command, "-T" option enables thread views. The following command list all

threads created by a process with <pid>



```
shariful@shariful-VirtualBox: ~  
File Edit View Search Terminal Help  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo_root" for details.  
  
shariful@shariful-VirtualBox:~$ ps  
  PID TTY          TIME CMD  
 3304 pts/0    00:00:00 bash  
 3316 pts/0    00:00:00 ps  
shariful@shariful-VirtualBox:~$
```

2: Top:

The top command can show a real-time view of individual threads. To enable thread

views in the top output, invoke top with "-H" option. This will list all Linux threads.

```
shariful@shariful-VirtualBox: ~  
File Edit View Search Terminal Help  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo_root" for details.  
  
shariful@shariful-VirtualBox:~$ top  
  
top - 11:12:58 up 56 min,  1 user,  load average: 0.20, 0.27, 0.45  
Tasks: 227 total,   1 running, 188 sleeping,   0 stopped,   0 zombie  
%Cpu(s): 50.8 us,  3.3 sy,  0.0 ni, 45.8 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st  
KiB Mem : 3200144 total,  772936 free, 1331400 used, 1095808 buff/cache  
KiB Swap:  483800 total,  483800 free,      0 used. 1657012 avail Mem  
  
  PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM    TIME+  COMMAND  
1289 shariful  20   0 3481732 283940 104828 S   100.0   8.9   6:47.11 gnome-she+  
1137 shariful  20   0 563580 123292  53892 S    5.9   3.9   1:50.94 Xorg  
3381 shariful  20   0  51660   4128   3480 R    1.3   0.1   0:00.32 top  
  10 root      20   0      0      0      0 I    0.3   0.0   0:02.65 rcu_sched  
   1 root      20   0 225344   9144   6764 S    0.0   0.3   0:05.94 systemd  
   2 root      20   0      0      0      0 S    0.0   0.0   0:00.00 kthreadd  
   3 root       0 -20      0      0      0 I    0.0   0.0   0:00.00 rcu_gp  
   4 root       0 -20      0      0      0 I    0.0   0.0   0:00.00 rcu_par_gp  
   6 root       0 -20      0      0      0 I    0.0   0.0   0:00.00 kworker/0+  
   8 root       0 -20      0      0      0 I    0.0   0.0   0:00.00 mm_percpu+  
   9 root      20   0      0      0      0 S    0.0   0.0   0:00.61 ksoftirqd+  
  11 root      rt    0      0      0      0 S    0.0   0.0   0:00.03 migration+  
  12 root     -51   0      0      0      0 S    0.0   0.0   0:00.00 idle_inje+  
  14 root      20   0      0      0      0 S    0.0   0.0   0:00.00 cpuhp/0  
  15 root      20   0      0      0      0 S    0.0   0.0   0:00.00 cpuhp/1  
  16 root     -51   0      0      0      0 S    0.0   0.0   0:00.00 idle_inje+  
  17 root      rt    0      0      0      0 S    0.0   0.0   0:00.03 migration+
```

```
shariful@shariful-VirtualBox: ~
File Edit View Search Terminal Help
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

shariful@shariful-VirtualBox:~$ ps
  PID TTY          TIME CMD
 3304 pts/0    00:00:00 bash
 3316 pts/0    00:00:00 ps
shariful@shariful-VirtualBox:~$
```

03: pstree

You can also use `ps tree` to show threads per process. Here as you see linux thread count and check number of threads linux process

```
shariful@shariful-VirtualBox: ~
File Edit View Search Terminal Help
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

shariful@shariful-VirtualBox:~$ pstree
systemd--ModemManager--2*[{ModemManager}]
      |--NetworkManager--dhclient
      |                   |--2*[{NetworkManager}]
      |--accounts-daemon--2*[{accounts-daemon}]
      |--acpid
      |--avahi-daemon--avahi-daemon
      |--boltd--2*[{boltd}]
      |--colord--2*[{colord}]
      |--cron
      |--cups-browsed--2*[{cups-browsed}]
      |--cupsd--3*[{dbus}]
      |--dbus-daemon
      |--firefox--Web Content--19*[{Web Content}]
      |            |--Web Content--17*[{Web Content}]
      |            |--WebExtensions--18*[{WebExtensions}]
      |            |--49*[{firefox}]
      |--fwupd--4*[{fwupd}]
      |--gdm3--gdm-session-wor--gdm-wayland-ses--gnome-session-b--gnome-s+
      |                                     |--gsd-a11+
      |                                     |
      |                                     |--gvfsd-fuse--5*[{gvfsd-fuse}]
      |                                     |--gvfsd-metadata--2*[{gvfsd-metadata}]
      |                                     |--ibus-portal--2*[{ibus-portal}]
      |                                     |--oosplash--soffice.bin--4*[{soffice.bin}]
      |                                     |                   |--2*[{oosplash}]
      |                                     |--xdg-permission--2*[{xdg-permission-}]
      |                                     |--zeitgeist-daemo--2*[{zeitgeist-daemo}]
      |                                     |--zeitgeist-fts--2*[{zeitgeist-fts}]
      |--systemd-journal
      |--systemd-logind
      |--systemd-resolve
      |--systemd-timesyn--{systemd-timesyn}
      |--systemd-udev
      |--udisksd--4*[{udisksd}]
      |--unattended-upgr--{unattended-upgr}
      |--upowerd--2*[{upowerd}]
      |--whoopsie--2*[{whoopsie}]
      |--wpa_supplicant
```

4: Htop:

A more user-friendly way to view threads per process is via htop, an ncurses-based interactive process viewer. This program allows you to monitor individual threads in tree views.

```
shariful@shariful-VirtualBox: ~  
File Edit View Search Terminal Help  
shariful@shariful-VirtualBox:~$ sudo apt install htop  
[sudo] password for shariful:  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
htop is already the newest version (2.1.0-3).  
0 upgraded, 0 newly installed, 0 to remove and 299 not upgraded.  
shariful@shariful-VirtualBox:~$
```

```
shariful@shariful-VirtualBox: ~
File Edit View Search Terminal Help

1 [|||||] ] Tasks: 137, 310 run; 1 running
2 [|||||] ] Load average: 0.96 1.38 0.71
Mem[|||||] ] Uptime: 00:05:06
Swp[ ]

PID USER PRI NI VIRT RES SHR S CPU% MEM% TIME+ Command
1311 shariful 20 0 3399M 268M 98M S 23.8 8.6 0:25.52 /usr/bin/gnome-s
1318 shariful 20 0 3399M 268M 98M S 9.6 8.6 0:02.01 /usr/bin/gnome-s
1317 shariful 20 0 3399M 268M 98M S 9.0 8.6 0:02.10 /usr/bin/gnome-s
1791 shariful 20 0 40912 4704 3920 R 3.9 0.1 0:00.50 http
1154 shariful 20 0 490M 64932 38284 S 1.3 2.0 0:04.20 /usr/lib/xorg/Xo
1327 shariful 20 0 3399M 268M 98M S 0.6 8.6 0:00.04 /usr/bin/gnome-s
1161 shariful 20 0 490M 64932 38284 S 0.0 2.0 0:00.39 /usr/lib/xorg/Xo
1 shariful 20 0 156M 4192 6672 S 0.0 0.3 0:04.52 /sbin/init splas
1628 shariful 20 0 782M 37204 28104 S 0.0 1.2 0:01.44 /usr/lib/gnome-t
1429 shariful 20 0 493M 23548 18252 S 0.0 0.7 0:00.36 /usr/lib/gnome-s
1314 shariful 20 0 3399M 268M 98M S 0.0 8.6 0:00.38 /usr/bin/gnome-s
1334 shariful 20 0 360M 18092 8548 S 0.0 0.3 0:00.32 ibus-daemon --xi
1553 shariful 20 0 216M 8644 7848 S 0.0 0.3 0:00.09 /usr/lib/ibus/ib
276 19 -1 87020 15664 14596 S 0.0 0.5 0:00.76 /lib/systemd/sys
334 20 0 47176 5420 3144 S 0.0 0.2 0:01.73 /lib/systemd/sys
443 20 0 142M 3248 2692 S 0.0 0.1 0:00.00 /lib/systemd/sys
403 20 0 142M 3248 2692 S 0.0 0.1 0:00.17 /lib/systemd/sys
404 20 0 78620 5152 4588 S 0.0 0.2 0:00.19 /lib/systemd/sys
536 20 0 187M 2052 1832 S 0.0 0.1 0:00.00 /usr/sbin/irqbal
527 20 0 187M 2052 1832 S 0.0 0.1 0:00.07 /usr/sbin/irqbal
F1Help F2Setup F3Search F4Filter F5Tree F6SortBy F7Nice -F8Nice +F9Kill F10Quit
```

Conclusion:

In computer science, a thread of execution is the smallest sequence of programmed instructions that **can** be managed independently by a scheduler, which is typically a part of the operating

