Assignment 4– Process Management

1) List out highest priority process in the system

We use ps command to get the processes running with the -eo flag

-e flag = All processes

-o flag = Custom output format (i.e. PID,PPID,CMD,STATE)

Pri = Priority

NI = Nice value

Here we have to sort using priority so we have added a –sort flag equal to pri

```
ubuntu@ip-172-31-12-62:~$ sudo ps -eo pid,ppid,cmd,pri,ni --sort=pri
    PID    PPID CMD                         PRI  NI
     17       2 [migration/0]               139   -
    184       1 /sbin/multipathd -d -s      139   -
     18       2 [idle_inject/0]              90   -
     34       2 [irq/9-acpi]                 90   -
     42       2 [watchdogd]                  90   -
    211       2 [psimon]                     41   -
   1301       2 [psimon]                     41   -
      4       2 [kworker/R-rcu_g]            39 -20
      5       2 [kworker/R-rcu_p]            39 -20
      6       2 [kworker/R-slub_]            39 -20
      7       2 [kworker/R-netns]            39 -20
     10       2 [kworker/0:0H-events_highpr  39 -20
     12       2 [kworker/R-mm_pe]            39 -20
     21       2 [kworker/R-inet_]            39 -20
     27       2 [kworker/R-write]            39 -20
     31       2 [kworker/R-kinte]            39 -20
     32       2 [kworker/R-kbloc]            39 -20
     33       2 [kworker/R-blkcg]            39 -20
     36       2 [kworker/R-tpm_d]            39 -20
```

```
 37       2 [kworker/R-ata_s]            39 -20
 38       2 [kworker/R-md]               39 -20
 39       2 [kworker/R-md_bi]            39 -20
 40       2 [kworker/R-edac-]            39 -20
 41       2 [kworker/R-devfr]            39 -20
 43       2 [kworker/0:1H-kblockd]       39 -20
 46       2 [kworker/R-kthro]            39 -20
 47       2 [kworker/R-acpi_]            39 -20
 50       2 [kworker/R-nvme-]            39 -20
 51       2 [kworker/R-nvme-]            39 -20
 52       2 [kworker/R-nvme-]            39 -20
 53       2 [kworker/R-nvme-]            39 -20
 55       2 [kworker/R-scsi_]            39 -20
 57       2 [kworker/R-scsi_]            39 -20
 59       2 [kworker/R-mld]              39 -20
 60       2 [kworker/R-ipv6_]            39 -20
 68       2 [kworker/R-kstrp]            39 -20
 70       2 [kworker/u31:0]              39 -20
 83       2 [kworker/R-charg]            39 -20
 85       2 [kworker/R-ext4-]            39 -20
145       2 [kworker/R-kmpat]            39 -20
```

```
146       2 [kworker/R-kmpat]            39 -20
284       2 [kworker/R-ext4-]            39 -20
286       2 [kworker/R-ext4-]            39 -20
291       2 [kworker/R-ext4-]            39 -20
292       2 [kworker/R-ext4-]            39 -20
294       2 [kworker/R-ext4-]            39 -20
380       2 [kworker/R-crypt]            39 -20
125       1 /usr/lib/systemd/systemd-jo  20  -1
  1       0 /sbin/init                   19   0
  2       0 [kthreadd]                   19   0
  3       2 [pool_workqueue_release]     19   0
  9       2 [kworker/0:1-mm_percpu_wq]   19   0
 11       2 [kworker/u30:0-events_power  19   0
 13       2 [rcu_tasks_rude_kthread]     19   0
 14       2 [rcu_tasks_trace_kthread]    19   0
 15       2 [ksoftirqd/0]                19   0
 16       2 [rcu_sched]                  19   0
 19       2 [cpuhp/0]                    19   0
 20       2 [kdevtmpfs]                  19   0
 22       2 [kworker/u30:1-events_power  19   0
 23       2 [kauditd]                    19   0
```

```
   24       2 [khungtaskd]                  19   0
   25       2 [oom_reaper]                  19   0
   28       2 [kcompactd0]                  19   0
   35       2 [xen-balloon]                 19   0
   44       2 [kswapd0]                     19   0
   45       2 [ecryptfs-kthread]            19   0
   48       2 [xenbus]                      19   0
   49       2 [xenwatch]                    19   0
   54       2 [scsi_eh_0]                   19   0
   56       2 [scsi_eh_1]                   19   0
   84       2 [jbd2/xvda1-8]                19   0
  188       1 /usr/lib/systemd/systemd-ud   19   0
  283       2 [jbd2/xvdf6-8]                19   0
  285       2 [jbd2/xvdf2-8]                19   0
  289       2 [jbd2/xvdf1-8]                19   0
  290       2 [jbd2/xvdf5-8]                19   0
  293       2 [jbd2/xvda16-8]               19   0
  337       1 /usr/lib/systemd/systemd-re   19   0
  493       1 /usr/lib/systemd/systemd-ne   19   0
  537       1 /usr/sbin/acpid               19   0
  549       1 /usr/sbin/cron -f -P          19   0
```

```
  552       1 @dbus-daemon --system --add  19   0
  566       1 /usr/bin/python3 /usr/bin/n  19   0
  567       1 /usr/lib/polkit-1/polkitd -  19   0
  569       1 /snap/amazon-ssm-agent/9881  19   0
  570       1 /usr/sbin/apache2 -k start   19   0
  572     570 /usr/sbin/apache2 -k start   19   0
  573     570 /usr/sbin/apache2 -k start   19   0
  579       1 /usr/lib/snapd/snapd         19   0
  588       1 /usr/lib/systemd/systemd-lo  19   0
  599       1 /usr/libexec/udisks2/udisks  19   0
  617       1 /usr/sbin/atd -f             19   0
  730       1 /usr/sbin/rsyslogd -n -iNON  19   0
  752       1 /usr/sbin/chronyd -F 1       19   0
  761     752 /usr/sbin/chronyd -F 1       19   0
  791       1 /sbin/agetty -o -p -- \u --  19   0
  804       1 /usr/bin/python3 /usr/share  19   0
  818       1 /usr/sbin/ModemManager       19   0
  819       1 /sbin/agetty -o -p -- \u --  19   0
  954       1 sshd: /usr/sbin/sshd -D -o   19   0
  955     954 sshd: ubuntu [priv]          19   0
 1303       1 /usr/lib/systemd/systemd --  19   0
```

```
 1303       1 /usr/lib/systemd/systemd --  19   0
 1304    1303 (sd-pam)                     19   0
 1488     955 sshd: ubuntu@pts/0           19   0
 1489    1488 -bash                        19   0
 1521       2 [kworker/0:2-cgroup_destroy  19   0
 1578       2 [kworker/u30:3-events_unbou  19   0
 1621    1489 sudo ps -eo pid,ppid,cmd,pr  19   0
 1622    1621 sudo ps -eo pid,ppid,cmd,pr  19   0
 1623    1622 ps -eo pid,ppid,cmd,pri,ni   19   0
   29       2 [ksmd]                       14   5
   30       2 [khugepaged]                  0  19
```

2) Open terminal with 2 tabs or sessions

Open the instance and connect to it 2 times. This will open 2 sessions

a) run command "vmstat 1"

```
ubuntu@ip-172-31-12-62:~$ vmstat 1
procs -----------memory---------- ---swap-- -----io---- -system-- -------cpu-------
 r  b   swpd   free   buff  cache   si   so    bi    bo   in   cs us sy id wa st gu
 0  0      0 404364  22908 348880    0    0    34     2   31    0  0  0 83  0 17  0
 0  0      0 404364  22908 348880    0    0     0     0   53   37  0  0 80  0 20  0
 0  0      0 404364  22908 348880    0    0     0     0   52   40  0  0 76  0 24  0
 0  0      0 404364  22908 348880    0    0     0     0   42   31  0  0 92  0  8  0
 0  0      0 404364  22908 348880    0    0     0     0   28   22  0  0 69  0 31  0
 0  0      0 404364  22908 348880    0    0     0     0   42   37  0  0 82  0 18  0
 0  0      0 404364  22908 348880    0    0     0     0   70   65  0  0 98  0  2  0
 0  0      0 404364  22908 348880    0    0     0     0   58   45  0  0 85  0 15  0
 0  0      0 404364  22908 348880    0    0     0     0   76   78  0  0 96  0  4  0
 0  0      0 404364  22908 349020    0    0    36     0  101   93  0  1 84  0 15  0
 1  0      0 404364  22908 349020    0    0     0     0   38   28  0  0 75  0 25  0
 0  0      0 404364  22908 349020    0    0     0     0   24   17  0  0 83  0 17  0
 1  0      0 404364  22908 349020    0    0     0     0   30   23  0  0 94  0  6  0
 1  0      0 404364  22908 349020    0    0     0     0   30   25  0  0 77  0 23  0
 1  0      0 404364  22908 349020    0    0     0     0   34   29  0  0 67  0 33  0
 0  0      0 404364  22908 349020    0    0     0     0   28   25  0  0 97  0  3  0
 1  0      0 404364  22908 349020    0    0     0     0   28   22  0  0 98  0  2  0
```

b) switch to another tab, pause running vmstat command for few seconds and resume it again use appropriate SIGNALS to do this activity.

We use the command pgrep to find the processid of the vmstat process

```
ubuntu@ip-172-31-12-62:~$ pgrep vmstat
2309
```

Then we use kill command and SIGSTOP flag to pause the process

```
ubuntu@ip-172-31-12-62:~$ kill -SIGSTOP 2309
```

This is reflected in the other tab where the vmstat is showing output

```
 1  0      0 404364  22908 349020    0    0     0     0   36   27  0  0 77  0 23  0
 1  0      0 404364  22908 349020    0    0     0     0   38   28  0  0 98  0  2  0

[1]+  Stopped                 vmstat 1
```

Now we use SIGCONT flag to continue the process

```
ubuntu@ip-172-31-12-62:~$ kill -SIGCONT 2309
```

This is also reflected in the other tab

```
ubuntu@ip-172-31-12-62:~$  0  0      0 411200  22948 349016    0    0     0     0   84   60   57  0  0 80  0 20  0
 0  0      0 411200  22948 349016    0    0     0     0   48   30  0  0 91  0  9  0
 0  0      0 411200  22948 349016    0    0     0     0   30   19  0  1 85  0 14  0
 0  0      0 411200  22948 349016    0    0     0     0   44   39  0  0 100  0  0  0
 0  0      0 411200  22948 349016    0    0     0     0   35   19  0  0 94  0  6  0
 0  0      0 411200  22948 349016    0    0     0     0   38   31  0  0 80  0 20  0
 0  0      0 411200  22948 349016    0    0     0     0   28   17  0  0 93  0  7  0
 0  0      0 411200  22948 349016    0    0     0     0   46   31  0  0 77  0 23  0
 0  0      0 411200  22948 349016    0    0     0     0   28   24  0  0 98  0  2  0
 0  0      0 411200  22948 349016    0    0     0     0   36   24  0  0 82  0 18  0
 0  0      0 411200  22948 349016    0    0     0     0   28   21  0  0 85  0 15  0
 0  0      0 411200  22948 349016    0    0     0     0   36   28  0  0 88  0 12  0
 0  0      0 411200  22948 349016    0    0     0     0   30   19  0  0 100  0  0  0
 0  0      0 411200  22948 349016    0    0     0     0   30   23  0  0 81  0 19  0
 0  0      0 411200  22948 349016    0    0     0     0   30   26  0  0 75  0 25  0
 0  0      0 411200  22948 349016    0    0     0     0   34   28  0  0 98  0  2  0
```

3) Find the process which is sleeping in "wait" state.

We use ps command to get the processes running with the -eo flag

-e flag = All processes

-o flag = Custom output format (i.e. PID,PPID,CMD,STATE)

State = Process State (S=Sleep, D=Interruptable Wait)
grep '[SD]$' = Matches processes in wait or sleeping state

```
ubuntu@ip-172-31-12-62:~$ ps -eo pid,ppid,cmd,state | grep '[SD]$'
    PID    PPID CMD                         S
      1       0 /sbin/init                   S
      2       0 [kthreadd]                   S
      3       2 [pool_workqueue_release]     S
     15       2 [ksoftirqd/0]                S
     17       2 [migration/0]                S
     18       2 [idle_inject/0]              S
     19       2 [cpuhp/0]                    S
     20       2 [kdevtmpfs]                  S
     23       2 [kauditd]                    S
     24       2 [khungtaskd]                 S
     25       2 [oom_reaper]                 S
     28       2 [kcompactd0]                 S
     29       2 [ksmd]                       S
     30       2 [khugepaged]                 S
     34       2 [irq/9-acpi]                 S
     35       2 [xen-balloon]                S
     42       2 [watchdogd]                  S
     44       2 [kswapd0]                    S
     45       2 [ecryptfs-kthread]           S
     48       2 [xenbus]                     S
     49       2 [xenwatch]                   S
     54       2 [scsi_eh_0]                  S
     56       2 [scsi_eh_1]                  S
     84       2 [jbd2/xvda1-8]               S
    125       1 /usr/lib/systemd/systemd-jo S
    184       1 /sbin/multipathd -d -s       S
    188       1 /usr/lib/systemd/systemd-ud S
    211       2 [psimon]                     S
    283       2 [jbd2/xvdf6-8]               S
    285       2 [jbd2/xvdf2-8]               S
    289       2 [jbd2/xvdf1-8]               S
    290       2 [jbd2/xvdf5-8]               S
    293       2 [jbd2/xvda16-8]              S
    337       1 /usr/lib/systemd/systemd-re S
    493       1 /usr/lib/systemd/systemd-ne S
    537       1 /usr/sbin/acpid              S
    549       1 /usr/sbin/cron -f -P         S
    552       1 @dbus-daemon --system --add S
    566       1 /usr/bin/python3 /usr/bin/n S
```