

OS_LAB_04_Assignment

CE_054

Aim : Study and implementation of ps command's basic functionality.

Theory :

TASK 1:

PS (Process Status) :-

- The ps command, short for Process Status, is a command line utility that is used to display or view information related to the processes running in a Linux system. As we all know, Linux is a multitasking and multiprocessing system. Therefore, multiple processes can run concurrently without affecting each other.
- Linux provides us a utility called ps for viewing information related with the processes on a system which stands as abbreviation for "Process Status". ps command is used to list the currently running processes and their PIDs along with some other information depends on different options. It reads the process information from the virtual files in /proc file-system. /proc contains virtual files, this is the reason it's referred as a virtual file system.
- ps provides numerous options for manipulating the output according to our need.

Some examples of ps command :

1 Simple Process selection :-

Syntax

\$ ps

Result contains four columns of information.

Where,

PID – the unique process ID

TTY – terminal type that the user is logged into

TIME – amount of CPU in minutes and seconds that the process has been running

CMD – name of the command that launched the process.

2 View Processes not associated with a terminal :- View all processes except both session leaders and processes not associated with a terminal.

Syntax :-

\$ ps -a

3 View Processes : View all the running processes use either of the following option with

Syntax :-

\$ ps -A

\$ ps -e

4 View all processes except those that fulfill the specified conditions

(negates the selection) :- If you want to see only session leader and processes not associated with a terminal. Then, run

Syntax :-

\$ ps -a -N

\$ ps -a -deselect

- 5 **View all processes owned by you :** Processes i.e same EUID as ps which means runner of the ps command, root in this case –

Syntax :-

\$ ps -x

- 6 **View all processes associated with this terminal :-**

Syntax :-

\$ ps -T

- 7 **\$ ps aux :-**

a:- This option prints the running processes from all users.

u:- This option shows user or owner column in output.

x:- This option prints the processes those have not been executed from the terminal.

- o Collectively the options "aux" print all the running process in system regardless from where they have been executed.

- 8 **\$ ps -ejH :-**

It will gives us PID, PGID, SID, TTY, TIME, CMD.

- 9 **\$ ps -eLf :-**

It will gives us UID, PID, PPID, LWP, C, NLWP, STIME, TTY, TIME, CMD.

TASK 2:

Proc file System :-

proc is very special in that it is also a virtual filesystem. It's sometimes referred to as a process information pseudo-file system. It doesn't contain 'real' files but runtime system information, For this reason it can be regarded as a control and information centre for the kernel. In fact quite a lot of system utilities are simply calls to files in this directory.

Inside the proc file there is a stat file inside this stat file there are all indormation about running processes of system.

Wakekill, Waiting and parked Status :

1. **Wakekill :-**

A process will be waken up when any fatal or deadly signal is received.

2. **Waiting :-**

To handle concurrent Wake-ups and release the rq-lock we put the process in this state, its guarantees that nobody will actually run it, and other external signal can not wake it up.

3. **Parked :-**

The process stays in the parked queue until the read request completes, and sometimes it stays there until the hardware or software error that prevented the request completion is repaired.

PROGRAMS :-

Write a program to print process id and process name of all current processes in the system.

CODE:-

```
/* Author : Dhruv B Kakadiya
 * Implementation of Basic ps command using c language
 */

#include<unistd.h>
#include<dirent.h>
#include<stdio.h>
#include<sys/types.h>
#include<string.h>
#include<stdlib.h>
#include<sys/stat.h>
#include<ctype.h>
#define FORMAT "Process ID : %5d\t Process Name : %30s\t Status : %c\n"

void execution_of_ps(char *main_dir, DIR *dir, struct dirent *dirp);

// function for ps command
void execution_of_ps(char *main_dir, DIR *dir, struct dirent *dirp)
{
    char main_path[100000];
    char process_name[100000];
    int pid;
    char status;
    if((dir = opendir(main_dir)) == NULL)
    {
        fprintf(stderr, "cannot open directory : %s\n", main_dir);
        return;
    }
    while(dirp = readdir(dir))
    {
        if(strcmp(dirp->d_name, ".") != 0 && strcmp(dirp->d_name, "..") != 0)
        {
            if(dirp->d_type == DT_DIR && atoi(dirp->d_name) > 0)
            {
                strcpy(main_path, main_dir);
                strcat(strcat(main_path, dirp->d_name), "/stat");
                FILE *fp;
                if (fp = fopen(main_path, "r"))
                {
                    fscanf(fp, "%d %s %c", &pid, process_name, &status);
                    printf(FORMAT, pid, process_name, status);
                }
            }
            else
                continue;
        }
    }
}
```

```

    }
}
closedir(dir);
return;
}

int main()
{
    DIR *dir;
    struct dirent *dirp;
    execution_of_ps("/proc/", dir, dirp);
    printf("\n\n");
    exit(0);
}

```

Output :-

```

dhruvkadiya@kali:~/Desktop$ ps
Process ID : 1      Process Name : (system)      Status : S
Process ID : 2      Process Name : (kthreadd)    Status : S
Process ID : 3      Process Name : (rcu_gp)      Status : I
Process ID : 4      Process Name : (rcu_par_gp)   Status : I
Process ID : 5      Process Name : (kworker/0:0-events) Status : I
Process ID : 6      Process Name : (kworker/0:0H-kblockd) Status : I
Process ID : 7      Process Name : (kworker/0:1-events) Status : I
Process ID : 8      Process Name : (kworker/u8:0-events_unbound) Status : R
Process ID : 9      Process Name : (mm_percpu_wq) Status : I
Process ID : 10     Process Name : (ksoftirqd/0) Status : S
Process ID : 11     Process Name : (rcu_sched) Status : I
Process ID : 12     Process Name : (migration/0) Status : S
Process ID : 13     Process Name : (cpuhp/0) Status : S
Process ID : 14     Process Name : (cpuhp/1) Status : S
Process ID : 15     Process Name : (migration/1) Status : S
Process ID : 16     Process Name : (ksoftirqd/1) Status : S
Process ID : 17     Process Name : (kworker/1:0-ata_sff) Status : I
Process ID : 18     Process Name : (kworker/1:0H-kblockd) Status : I
Process ID : 19     Process Name : (cpuhp/2) Status : S
Process ID : 20     Process Name : (migration/2) Status : S
Process ID : 21     Process Name : (ksoftirqd/2) Status : S
Process ID : 22     Process Name : (kworker/2:0-events) Status : I
Process ID : 23     Process Name : (kworker/2:0H-kblockd) Status : I
Process ID : 24     Process Name : (cpuhp/3) Status : S
Process ID : 25     Process Name : (migration/3) Status : S
Process ID : 26     Process Name : (ksoftirqd/3) Status : S
Process ID : 27     Process Name : (kworker/3:0-ata_sff) Status : I
Process ID : 28     Process Name : (kworker/3:0H-kblockd) Status : I
Process ID : 30     Process Name : (kdevtmpfs) Status : S
Process ID : 31     Process Name : (netns) Status : I
Process ID : 32     Process Name : (kauditd) Status : S
Process ID : 33     Process Name : (khungtaskd) Status : S
Process ID : 34     Process Name : (oom_reaper) Status : S
Process ID : 35     Process Name : (writeback) Status : I
Process ID : 36     Process Name : (kcompactd0) Status : S
Process ID : 37     Process Name : (ksmd) Status : S
Process ID : 38     Process Name : (khugepaged) Status : S
Process ID : 40     Process Name : (kworker/i:1-events) Status : I
Process ID : 41     Process Name : (kworker/u8:1-events_unbound) Status : I
Process ID : 44     Process Name : (kworker/2:1-mm_percpu_wq) Status : I
Process ID : 51     Process Name : (kworker/3:1-events) Status : I
Process ID : 77     Process Name : (kintegrityd) Status : I
Process ID : 78     Process Name : (kblockd) Status : I
Process ID : 79     Process Name : (blkcg_punt_bio) Status : I
Process ID : 80     Process Name : (edac-poller) Status : I
Process ID : 81     Process Name : (devfreq_wq) Status : I
Process ID : 83     Process Name : (kswapd0) Status : S
Process ID : 84     Process Name : (kthrotld) Status : I
Process ID : 85     Process Name : (acpi_thermal_pm) Status : I

```

```
dhruvkadiya@kali: ~/Desktop

File Actions Edit View Help

Process ID : 907      Process Name : (VBoxClient)      Status : S
Process ID : 912      Process Name : (VBoxClient)      Status : S
Process ID : 914      Process Name : (VBoxClient)      Status : S
Process ID : 921      Process Name : (ssh-agent)       Status : S
Process ID : 931      Process Name : (at-spi-bus-laun)  Status : S
Process ID : 936      Process Name : (dbus-daemon)     Status : S
Process ID : 940      Process Name : (xfconfd)         Status : S
Process ID : 945      Process Name : (at-spi2-registr) Status : S
Process ID : 952      Process Name : (gpg-agent)       Status : S
Process ID : 961      Process Name : (xfwm4)           Status : S
Process ID : 964      Process Name : (gvfsd)           Status : S
Process ID : 969      Process Name : (gvfsd-fuse)      Status : S
Process ID : 990      Process Name : (xfsettingsd)     Status : S
Process ID : 1003     Process Name : (upowerd)         Status : S
Process ID : 1099     Process Name : (xfce4-panel)     Status : S
Process ID : 1111     Process Name : (Thunar)          Status : S
Process ID : 1116     Process Name : (xfdesktop)       Status : S
Process ID : 1119     Process Name : (panel-1-whisker)  Status : S
Process ID : 1122     Process Name : (panel-15-systra)  Status : S
Process ID : 1123     Process Name : (panel-16-status)  Status : S
Process ID : 1124     Process Name : (panel-17-pulse)   Status : S
Process ID : 1125     Process Name : (panel-18-notifi)  Status : S
Process ID : 1126     Process Name : (panel-19-power-)  Status : S
Process ID : 1127     Process Name : (panel-21-action)  Status : S
Process ID : 1153     Process Name : (xfce4-notifyd)    Status : S
Process ID : 1158     Process Name : (qterminal)       Status : R
Process ID : 1162     Process Name : (tumblerd)        Status : S
Process ID : 1165     Process Name : (xfce4-power-man)  Status : S
Process ID : 1169     Process Name : (gvfs-udisks2-vo)  Status : S
Process ID : 1172     Process Name : (udisksd)         Status : S
Process ID : 1180     Process Name : (light-locker)     Status : S
Process ID : 1194     Process Name : (polkit-gnome-au)  Status : S
Process ID : 1195     Process Name : (applet.py)        Status : S
Process ID : 1200     Process Name : (dconf-service)    Status : S
Process ID : 1202     Process Name : (blueman-applet)       Status : S
Process ID : 1203     Process Name : (nm-applet)         Status : S
Process ID : 1208     Process Name : (xiccdd)           Status : S
Process ID : 1211     Process Name : (agent)           Status : S
Process ID : 1228     Process Name : (colord)           Status : S
Process ID : 1229     Process Name : (gvfs-goa-volume)  Status : S
Process ID : 1231     Process Name : (xcapex)           Status : S
Process ID : 1235     Process Name : (gvfs-afc-volume)  Status : S
Process ID : 1240     Process Name : (gvfs-mtp-volume)  Status : S
Process ID : 1253     Process Name : (bash)              Status : S
Process ID : 1254     Process Name : (gvfs-gphoto2-vo)  Status : S
Process ID : 1289     Process Name : (gvfsd-trash)             Status : S
Process ID : 1296     Process Name : (gvfsd-metadata)        Status : S
Process ID : 1308     Process Name : (blueman-tray)       Status : S
Process ID : 1313     Process Name : (obexd)              Status : S
Process ID : 1362     Process Name : (a.out)                Status : R

dhruvkadiya@kali: ~/Desktop$
```