

TASK - 1

QNO1:

/proc/:

/proc/ directory is also known as running window on Linux Kernel because, it:

- tells which processes are running on Linux Kernel.
- the process IDs of processes running on Kernel.
- contains different directories and files.

Version:

Version is a file which contains details of Kernel;

- * how kernel was built
- * who built the kernel
- * which machine built the kernel.
- * compilation date and time of kernel.
- * compiler release.

/proc/cmdline:

- ★ cmdline in /proc directory, is a file which contain commands which Linux kernel pass to itself, in boot time.
- ★ This automatic passing of commands are managed through boot loaders/boot managers.
- ★ Boot managers could be of multiple types; GRUB, LILO, etc.
- ★ Boot time is the time taken from switching on the system/device to the time it takes to become ready to operate.

/proc/uptime:

It contains two fields;

- (1) the amount of time (in secs) in which the process is running
- (2) the amount of time it spent being idle.

/proc/cpuinfo:

It gives information of CPU:

- ★ the model of CPU.
- ★ speed of CPU.
- ★ family of CPU.
- ★ cache of CPU.

/proc/devices:

- ★ It contains major number of characters and block special files.
- ★ There is a numeric value against every file, which is related to the process / Linux Kernel.

These include:

- 1 mem
- 4 /dev/vc/0
- 4 tty
- 4 ttyS
- 5 /dev/tty
- 5 /dev/console
- 5 /dev/ptmx
- 5 ttyprintk
- 6 lp
- 7 vcs
- 10 misc
- 13 input
- 21 sg
- 29 fb
- 89 i2c

/proc/modules:

- ★ This file contains a test list of modules, which are loaded by linux kernel/system.
- ★ Modules are junk of codes, which are executed by linux when required.

QNO2:

cmdline:

- It is a file which is present in the directory of almost all the processes running on linux kernel.
- It contains information of the commands which we pass to run a particular process.
- It contains those arguments/commands as strings, which we pass whenever we run a file in bash shell.
- If no command is passed, then it simply contains bash.

Environ:

- It is a file which exist in the directories of almost every process.
- It contains the environmental variables of processes.

- It also has a long listing containing different fields, which are separated by colons (:).
- It contains the environmental variables in fields which are needed by processes to run.

Limits:

- also exist in the directories of all processes.
- It contains the information of resources which the process can utilize.
- These resources include:
 - number of files that can be opened when process runs.
 - number of files that can be locked through that process (memory that can be utilized)
 - It has fields; which contains soft limits, hard limits, and units.

stat :

- This file gives the information of the status of processes.
- It has multiple fields, such as:
 - PID of that process.
 - Name of process.
 - State of process:
 - s = sleeping
 - r = running
 - z = zombie
 - t = stopped
 - x = grid
 - d = waiting for uninterrupt
- stat contains information in machine program readable format.

Status :

- status file contains information of status of processes, in human readable format.

statm :

- It provides information about memory usage.
- It gives us different columns, which contain information of pages.

- It contains different numeric values;
 - 1) size of program
 - 2) resident size
 - 3) group size, etc.
- These values are not usually accurate due to optimization of kernel.

Q No 3:

/proc/pid/fd:

- File descriptor directory contains different links, three of them are default/standard links.
- Files which we open in it, come as a link in it.
 - 0 → stdin (linked with keyboard)
 - 1 → stdout (linked with terminal)
 - 2 → stderr (linked with terminal as well)
- If fd of the PID of bash is open, and we redirect its output, then it will basically be written at terminal.

/proc/pid/task :

- This file must present in the PIDs of every process.
- Task file is used for management of threads.
- It contains numeric files (tids) named after their pids.
- If the process is single threaded, it contains only one file/directory (tid).
And, if the process is multi-threaded, it contains multiple files/directories (tids).
- Task directory must contain the numeric file (tid) of the PID of process in which we are currently in.
- TIDs contain all the content of PID except the task directory.

Usage in Linux System:

- * fd directory is used for management of descriptors.
- * Task directory is used for management of Threads.

Q NO4:

syscall:

In every PID of process, there is a file "syscall", which contains nine numeric values.

- First numeric value is the count of number of system calls made by the process during its execution/running.
- A few numeric values refer to the arguments and registers.
- Some numeric values refer to the number of count of stack pointer and program counter.
- If a process is blocked, but its system call is not blocked, then '-1' will appear against first numeric value in 'syscall' file.
- File is present only if kernel was configured with `CONFIG_HAVE_ARCH_TRACEBOOK`