Capgemini

UNIX

Processes and Related Commands

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Lesson Objectives

- UNIX processes:
  - Parent and Child processes
  - Process Status Command – ps
  - Running processes in background mode
  - Terminate process
  - Process scheduling

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What is a Process?

Characteristics of processes:

- Process is an instance of program in execution.
- Many processes can run at the same time.
- Processes are identified by the Process Identifier.
- PID is allocated by kernel.

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Concepts

On logging to a system, a process is set up due to execution of shell.

Shell is the parent process for every other process setup due to the execution of commands.

Every process, with the exception of PID 0 processes, has a parent process.

Parent process waits for death of child process before resuming execution.

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Running a Command

ls command: Steps for running a Unix command

- The shell performs a fork. This creates a new process that the shell uses to run the ls program.
- The shell performs an exec of the ls program. This replaces the shell program and data with the program and data for ls and then starts running that new program.
- The ls program is loaded into the new process context, replacing the text and data of the shell.
- The ls program performs its task, listing the contents of the current directory .

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PS Command

ps command displays characteristics of a process.

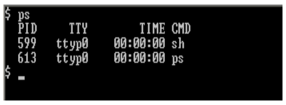
Syntax:

```
ps [ option [ arguments ] ...]
```

Options:

- -f - full form
- -u- details of only users processes
- -a- all processes details
- -l - detailed listing
- -e- system processes

ps



```
$ ps
  PID    TTY        TIME CMD
  599   ttyp0   00:00:00 sh
  613   ttyp0   00:00:00 ps
$
```

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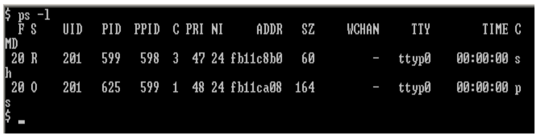
Example

Output of ps –l command:



```
$ ps -l
  F S    UID   PID  PPID  C PRI NI     ADDR   SZ     WCHAN    TTY      TIME C
MD
 20 R    201   599   598  3  47 24 fb11c8b0   60         -  ttyp0  00:00:00 s
h
 20 O    201   625   599  1  48 24 fb11ca08  164         -  ttyp0  00:00:00 p
s
$ _
```

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Process in Background Mode

Processes can run in foreground or background mode.

- Only one process can run in foreground mode but multiple processes can run in background mode.
- The processes, which do not require user intervention can run in background mode, e.g. sort, find.
- To run a process in background, use & operator
  - $sort -0 emp.lst emp.lst &

nohup (no hangup) - permits execution of process even if user has logged off.

- $nohup sort emp.lst &   (sends output to nohup.out)

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Kill Command

Kill Command- Used to terminate a process

Syntax :

- kill [-signumber] pid ...

Example:

- $kill 1005 (default signal 15) - kills job with pid 1005
- $kill -9 1005 - sure killing of job

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Details

Scheduling Policy:

- *time-sharing* technique
- *S*everal processes are allowed to run "concurrently," which means that the CPU time is roughly divided into "slices," one for each runnable process.
- The scheduling policy is also based on process priority
- In UNIX, process priority is dynamic.

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Continued…

Processes are traditionally classified as "I/O-bound" or "CPU-bound."

- **I/O-bound Processes:**
  Make heavy use of I/O devices and spend much time waiting for I/O operations to complete.
- **CPU-bound Processes:**
  Are number-crunching applications that require a lot of CPU time.

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Continued…

Processes can also be classified as:

- **Interactive processes**:
  These interact constantly with their users, and therefore spend a lot of time waiting for key presses and mouse operations.
- **Batch processes**:
  These do not need user interaction, and hence they often run in the background.
- **Real-time processes:**
  - Should never be blocked by lower-priority processes.
  - Should have a short response time.

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nice and wait command

nice - runs a program with modified scheduling priority.

Syntax

```
nice [OPTION] [COMMAND [ARG]...]
```

- $ nice cat chap?? | nice wc –l > wclist &

Wait - waits for child process to complete.

Syntax :

```
wait  [ process id…  ]
```

- $wait 138 - waits for background job with pid 138

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cron

- A system daemon which performs a specific task at regular intervals
- The command and schedule information is kept in the directory /var/spool/cron/crontabs or in /usr/spool/cron/crontabs.
- Each user has a crontab file. cron wakes up periodically and executes any job that are scheduled for that minute.
- Only users who are listed in /etc/cron.allow or not listed in cron.deny can make an entry in the crontab.

Crontab <filename>   -used to make an entry in the crontab file.

- where the file contains the commands to execute

MIN	HOUR	DOM	MOY	DOW	COMMAND
(0-50)	(0-23)	(1-31)	(1-12)	(0-6)	---
$ 0	18	*	*	*	/home/gather

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Summary

Unix processes

Process related commands

- ps
- nohup
- wait
- kill
- nice

Background processes

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Review Questions

Complete The Following :

- A unique number called the _______________ identifies each process.
- Processes using heavy i/o are called as ______________

True / False

- A signal number of 9 is used, by default, by the kill command to terminate a process.
- You can kill any process, including the system process, using the kill command.

iGate Sensitive

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