

# **LINUX SYSTEM ADMINISTRATION**

# Linux File Editor

- A text editor is a program which enables you to create and manipulate data (text) in a Linux file
- There are several standard text editors available on most Linux systems
  - **vi** - Visual editor
  - **ed** - Standard line editor
  - **ex** - Extended line editor
  - **emacs** - A full screen editor
  - **pico** - Beginner's editor
  - **vim** - Advance version of vi
- Our editor = vi (available in almost every Linux distribution)

# Introduction to vi Editor

- vi supplies commands for:
  - Inserting and deleting text
  - Replacing text
  - Moving around the file
  - Finding and substituting strings
  - Cutting and pasting text
- Most common keys:
  - `i` - insert
  - `Esc` - Escape out of any mode
  - `r` - replace
  - `d` - delete
  - `:q!` - quit without saving
  - `:wq!` - quit and save

# User Account Management

## Commands

- `useradd`
- `groupadd`
- `userdel`
- `groupdel`
- `usermod`

## Files

- `/etc/passwd`
- `/etc/group`
- `/etc/shadow`

## Example:

```
useradd -g superheros -s /bin/bash -c "user description" -m -d  
/home/spiderman spiderman
```

# Switch Users and sudo Access

## Commands

- `su - username`
- `sudo command`
- `visudo`

## File

- `/etc/sudoers`

# Monitor Users

- who
- last
- w
- finger
- id

# System Utility Commands

- `date`
- `uptime`
- `hostname`
- `uname`
- `which`
- `cal`
- `bc`

# Process / Services Commands

- `systemctl` or `service`
- `ps`
- `top`
- `kill`
- `crontab`
- `at.`



# “ps” command

- **ps** command stands for process status and it displays all the currently running processes in the Linux system

Usage examples:

- **ps**        =        Shows the processes of the current shell

PID = the unique process ID

TTY = terminal type that the user logged-in to

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

CMD = name of the command

- **ps -e**                =        Shows all running processes
- **ps aux**                =        Shows all running processes in BSD format
- **ps -ef**                =        Shows all running processes in full format listing (*Most commonly used*)
- **ps -u username**        =        Shows all processes by username.

# “top” command

- top command is used to show the Linux processes and it provides a real-time view of the running system
- This command shows the summary information of the system and the list of processes or threads which are currently managed by the Linux Kernel
- When the top command is executed then it goes into interactive mode and you can exit out by hitting **q**
- **Usage: top**

**PID:** Shows task's unique process id

**USER:** Username of owner of task

**PR:** The “PR” field shows the scheduling priority of the process from the perspective of the kernel

**NI:** Represents a Nice Value of task. A Negative nice value implies higher priority, and positive Nice value means lower priority.

**VIRT:** Total virtual memory used by the task

**RES:** Memory consumed by the process in RAM

**SHR:** Represents the amount of shared memory used by a task

**S:** This field shows the process state in the single-letter form

**%CPU:** Represents the CPU usage

**%MEM:** Shows the Memory usage of task

**TIME+:** CPU Time, the same as “TIME”, but reflecting more granularity through hundredths of a second.

# “kill” command

- **kill** command is used to terminate processes manually
- It sends a signal which ultimately terminates or kills a particular process or group of processes

Usage:

**kill [OPTION] [PID]**

OPTION = Signal name or signal number/ID

PID = Process ID

**kill -l** = to get a list of all signal names or signal number

Most used signals are:

**kill PID** = Kill a process with default signal

**kill -1** = Restart

**kill -2** = Interrupt from the keyboard just like Ctrl C

**kill -9** = Forcefully kill the process

**kill -15** = Kill a process gracefully

# System Monitoring

- `top`
- `df`
- `dmesg`
- `iostat 1`
- `netstat`
- `free`
- `cat /proc/cpuinfo`
- `cat /proc/meminfo`

# Log Monitoring

Another and most important way of system administration is log monitor

Log Directory = `/var/log`

- `boot`
- `chronyd = NTP`
- `cron`
- `maillog`
- `secure`
- `messages`
- `httpd`

# System Maintenance Commands

- `shutdown`
- `init 0-7`
- `reboot`
- `halt`

# Changing System Hostname

- `hostnamectl --set-hostname newhostname`
- Version 7 = Edit `/etc/hostname`
- Version 6 = Edit `/etc/sysconfig/network`

# Finding System Information

- `cat /etc/redhat-release`
- `uname -a`
- `dmidecode`



# Terminal Control Keys

Several key combinations on your keyboard usually have a special effect on the terminal.

These "control" (CTRL) keys are accomplished by holding the CTRL key while typing the second key. For example, CTRL-c means to hold the CTRL key while you type the letter "c".

The most common control keys are listed below:

- `CTRL-u` - erase everything you've typed on the command line
- `CTRL-c` - stop/kill a command
- `CTRL-z` - suspend a command
- `CTRL-d` - exit from an interactive program (signals end of data).

# Terminal Commands

- **clear**

Clears your screen

- **exit**

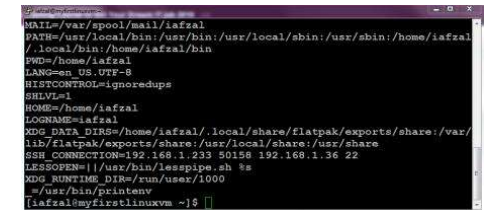
Exit out of the shell, terminal or a user session

- **script**

The script command stores terminal activities in a log file that can be named by a user, when a name is not provided by a user, the default file name, typescript is used

# Environment Variables

- To view all environment variables
  - **printenv OR env**
- To view ONE environment variable
  - **echo \$SHELL**
- To set the environment variables
  - **export TEST=1**
  - **echo \$TEST**
- To set environment variable permanently
  - **vi .bashrc**
  - **TEST='123'**
  - **export TEST**
- To set global environment variable permanently
  - **vi /etc/profile or /etc/bashrc**
  - **Test='123'**
  - **export TEST**

A terminal window showing the output of the 'printenv' command. The output lists various environment variables such as MAIL, PATH, PWD, LANG, HISTCONTROL, SHELL, HOME, LOGNAME, XDG\_DATA\_DIRS, XDG\_RUNTIME\_DIR, and XDG\_SESSION\_ID. The prompt at the bottom is '[iafzal@myfirstlinuxvm ~]\$'.