Welcome To:
Module 3

System Access and File System

Important Things to Remember in Linux

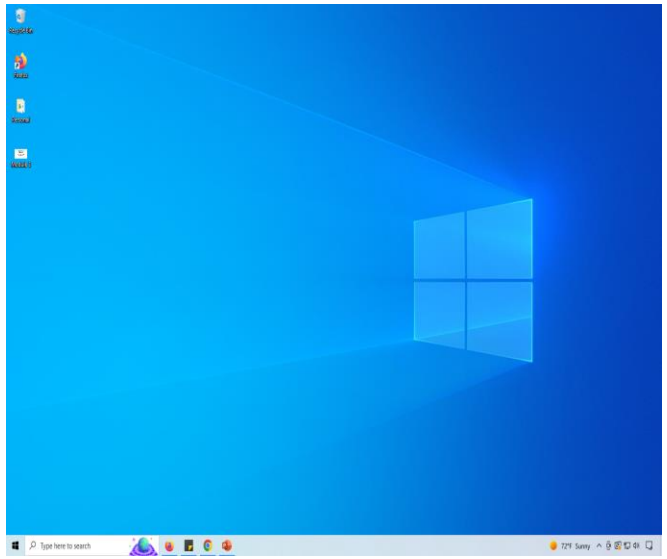
- Linux has super-user account called root
  - root is the most powerful account that can create, modify, delete accounts and make changes to system configuration files
- Linux is case-sensitive system
  - **ABC** is **NOT** same as **abc**
- Avoid using spaces when creating files and directories
- Linux kernel is not an operating system. It is a small software within Linux operating system that takes commands from users and pass them to system hardware or peripherals
- Linux is mostly CLI not GUI
- Linux is very flexible as compared to other operating systems.

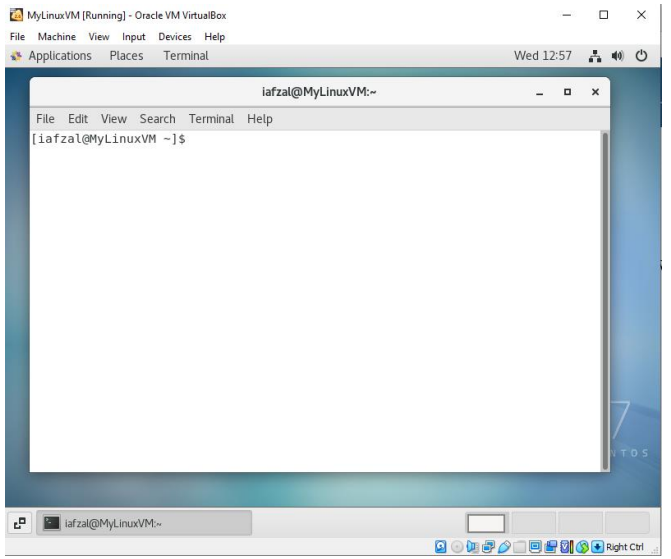
By: Imran Afzal
www.utclisolutions.com

Access to Linux System

There are 2 types of access
1. Console
2. Remote

The console is a direct access to an operating system when it is connected through VGA, HDMI, DVI etc.

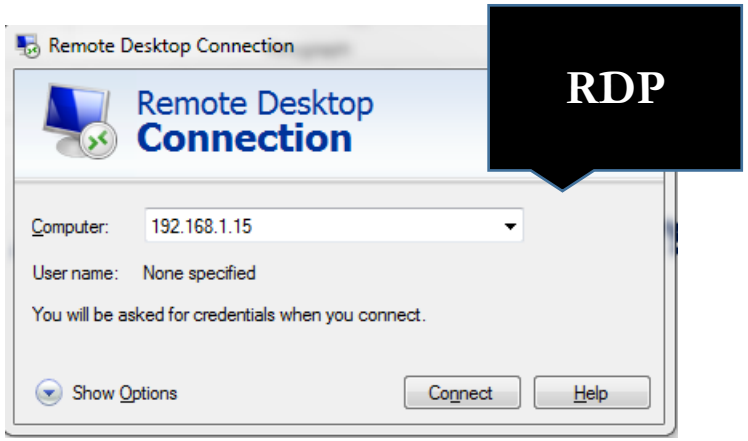


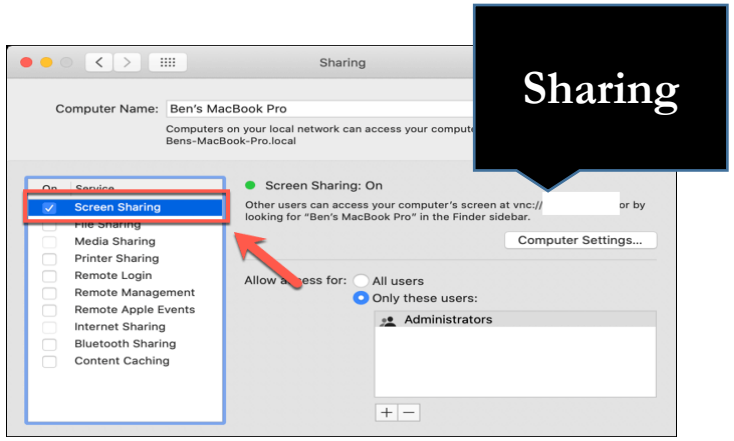


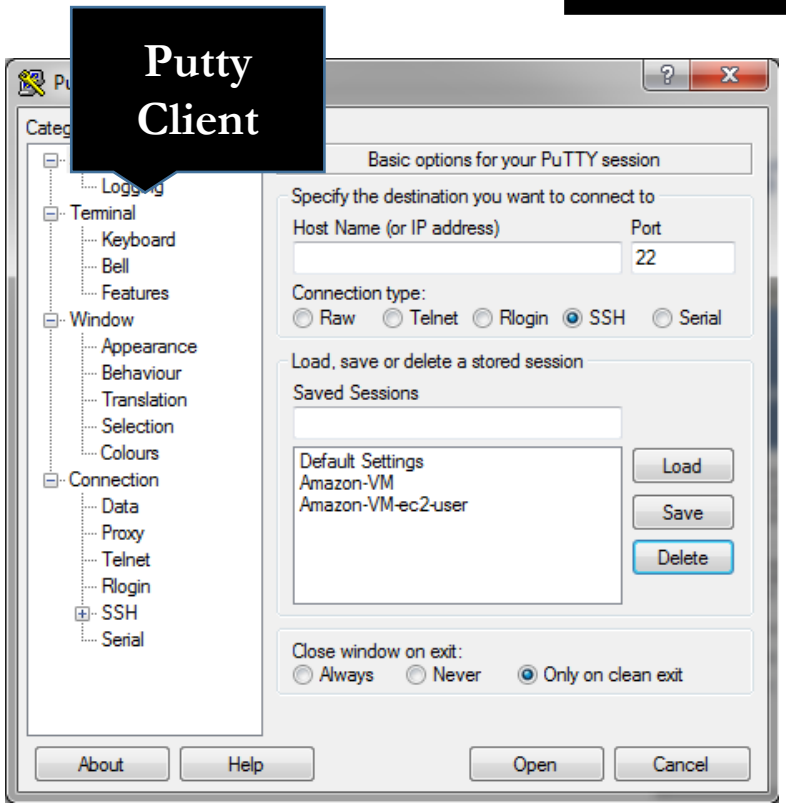
By: Imran Afzal
www.utclisolutions.com

Access to Linux System

The 2nd type of access is remote where you connect to your operating system remotely over the network





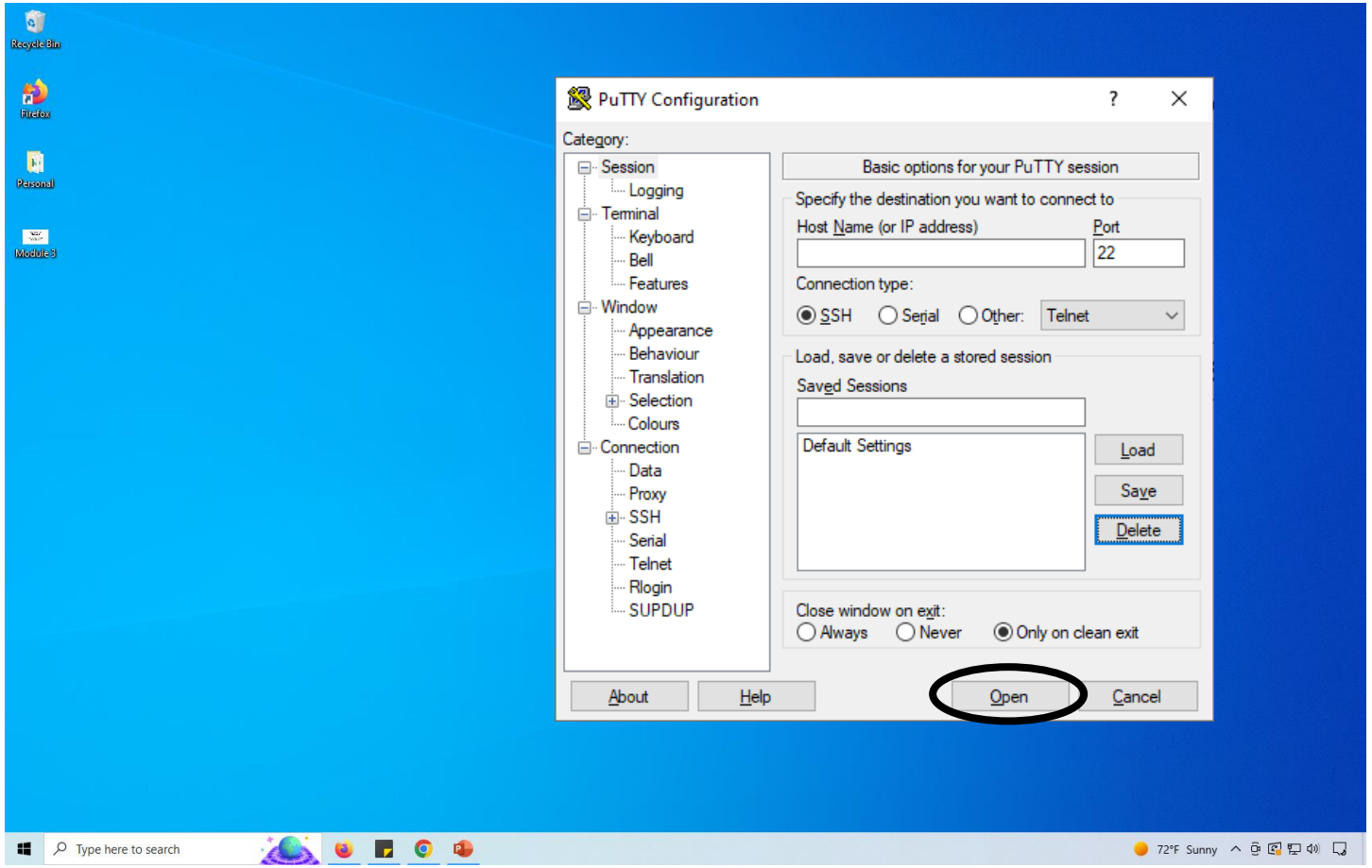


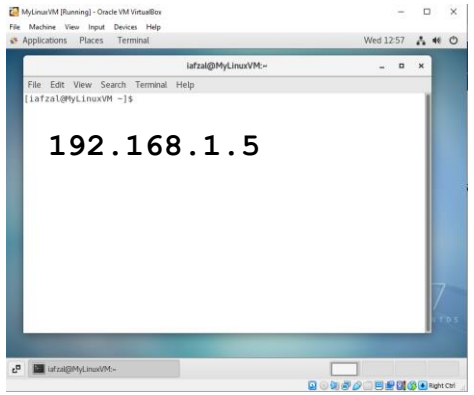
Linux to Linux
SSH 192.168.1.5

By: Imran Afzal
www.utclisolutions.com

Download and Install Putty

Putty is a software which allows you to connect from a Windows system to Linux system remotely





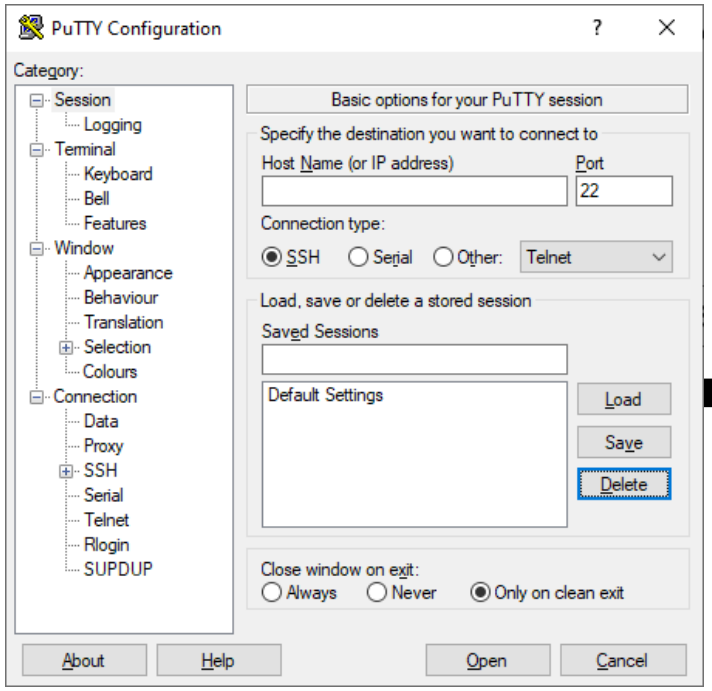
By: Imran Afzal
www.utclisolutions.com

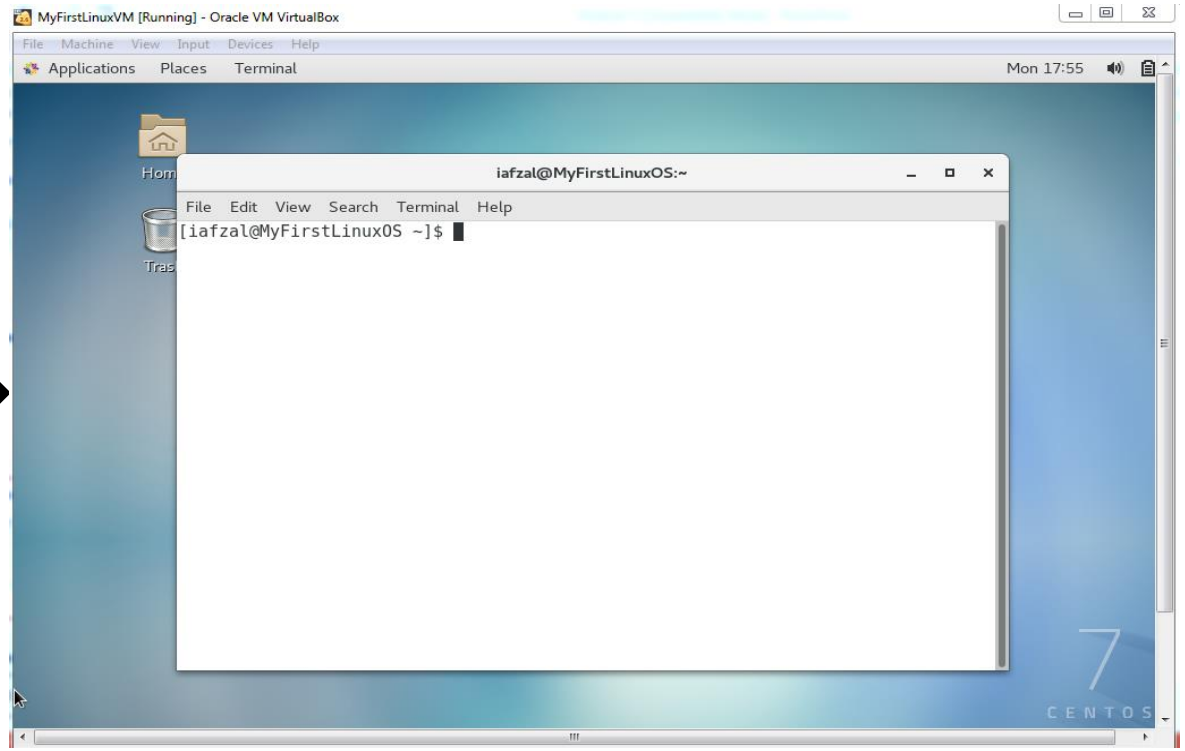
Access to Linux from MAC

- Open a terminal on your MAC
- Run the following command
  - **`# ssh -l iafzal 192.168.1.5`**

By: Imran Afzal

Access to Linux via Putty



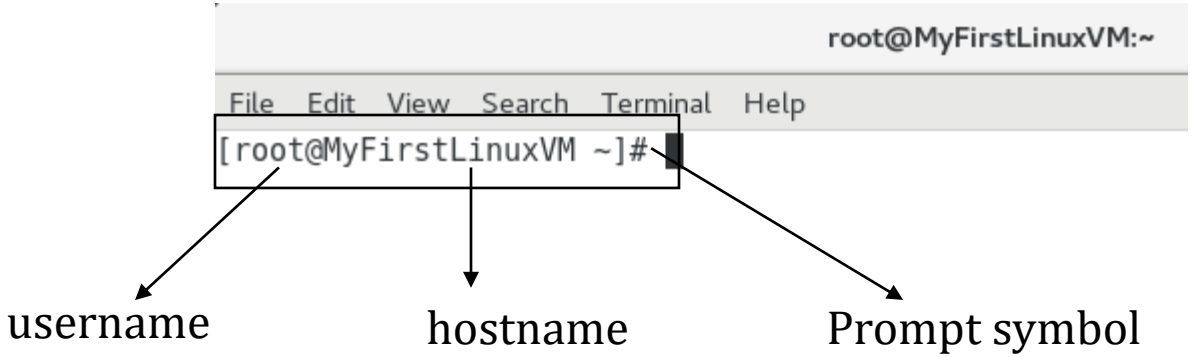


- The newer version of CentOS might not have the **`ifconfig`** command, therefore, use "**`ip addr`**" command instead
- To use **`ifconfig`** in 7.5 or later version then run = "**`yum install net-tools`**"

By: Imran Afzal

Command Prompts and Getting Prompts Back

- What are command prompts?
  - A command prompt, also referred to simply as a prompt, is a short text at the start of the command line followed by prompt symbol on a command line interface



- To get your prompt back
  - **`Ctrl + c`**

Introduction to Filesystem

- What is a Filesystem?
  - It is a system used by an operating system to manage files. The system controls how data is saved or retrieved

By: Imran Afzal
www.utclisolutions.com

Introduction to Filesystem

- What is a Filesystem?
  - It is a system used by an operating system to manage files. The system controls how data is saved or retrieved

By: Imran Afzal
www.utclisolutions.com

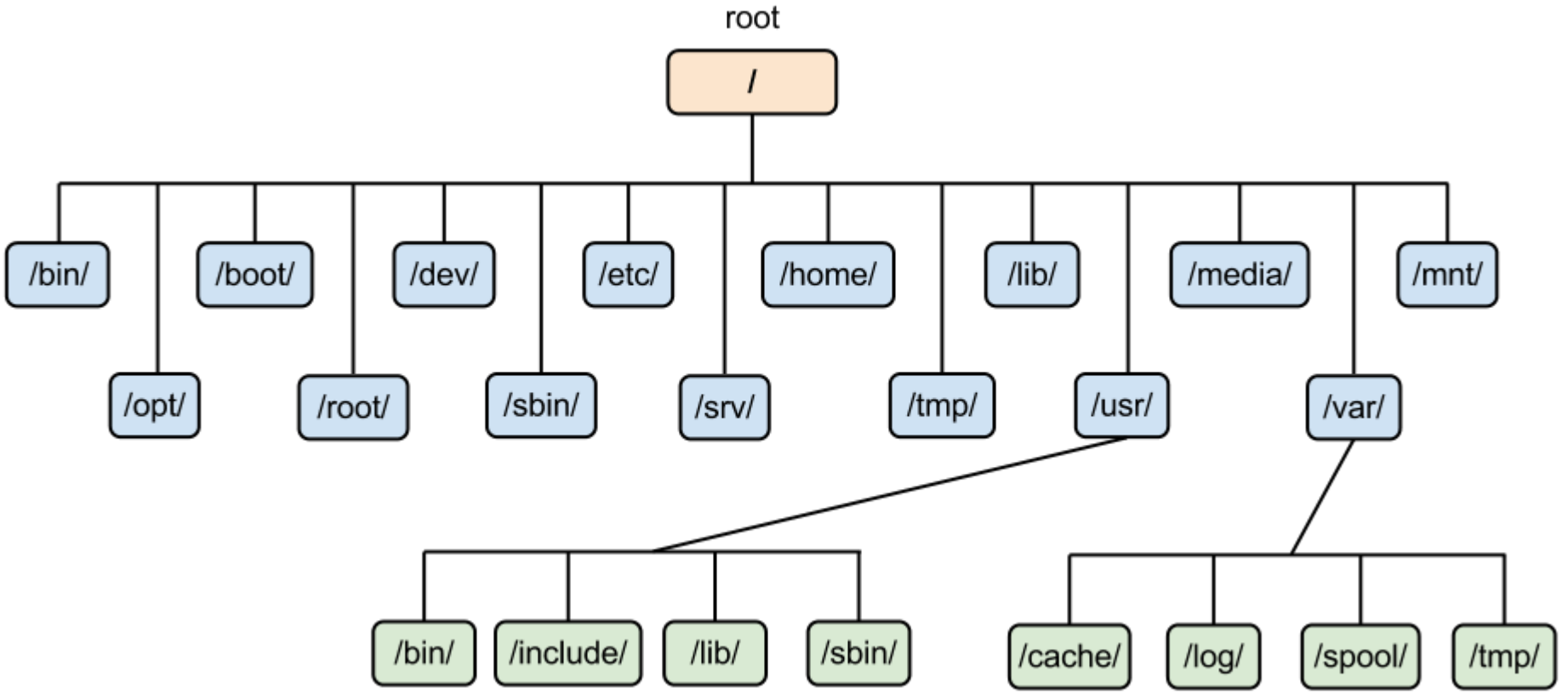
Introduction to Filesystem

- Operating system stores files and directories in an organized and structured way
  - System configuration file = Folder A
  - User files = Folder B
  - Log files = Folder C
  - Commands or scripts = Folder D and so on

- There are many different types of filesystems. In general, improvements have been made to filesystems with new releases of operating systems and each new filesystem has been given a different name
  - e.g. **ext3, ext4, xfs, NTFS, FAT etc.**

By: Imran Afzal
www.utclisolutions.com

File System Structure



By: Imran Afzal
www.utclisolutions.com

File System Structure and its Description

/boot	Contains file that is used by the boot loader (grub.cfg)
/root	root user home directory. It is not same as /
/dev	System devices (e.g. disk, cdrom, speakers, flashdrive, keyboard etc.)
/etc	Configuration files
/bin → /usr/bin	Everyday user commands
/sbin → /usr/sbin	System/filesystem commands
/opt	Optional add-on applications (Not part of OS apps)
/proc	Running processes (Only exist in Memory)
/lib → usr/lib	C programming library files needed by commands and apps **strace -e open pwd**
/tmp	Directory for temporary files
/home	Directory for user
/var	System logs
/run	System daemons that start very early (e.g. systemd and udev) to store temporary runtime files like PID files
/mnt	To mount external filesystem. (e.g. NFS)
/media	For cdrom mounts.

By: Imran Afzal
www.utclisolutions.com

Navigating File System

- When navigating a UNIX filesystem, there are a few important commands:

  "cd"

  "pwd"

  "ls"

- "cd" stands for change directory. It is the primary command for moving you around the filesystem.
- "pwd" stands for print working directory. It tells you where you current location is.
- "ls" stands for list. It lists all the directories/files within a current working directory
- Using of TAB key to auto-complete

By: Imran Afzal
www.utclisolutions.com

Linux File or Directory Properties

Each file or directory in Linux has detail information or properties

Type	# of Links	Owner	Group	Size	Month	Day	Time	Name
drwxr-xr-x.	21	root	root	4096	Feb	27	13:33	var
lrwxrwxrwx.	1	root	root	7	Feb	27	13:15	bin
-rw-r—r--	1	root	root	0	Mar	2	11:15	testfile

The second column is the number of hard links to the file. For a directory, the number of hard links is the number of immediate subdirectories it has plus its parent directory and itself

By: Imran Afzal
www.utclisolutions.com

Linux File Types

File Symbol	Meaning
-	Regular file
d	Directory
l	link
c	Special file or device file
s	socket
p	Named pipe
b	Block device

What is Root?

- There are 3 types of root on Linux system
  1. Root account: root is an account or a username on Linux machine and it is the most powerful account which has access to all commands and files

  2. Root as /: the very first directory in Linux is also referred as root directory

  3. Root home directory: the root user account also has a directory located in /root which is called root home directory

Changing Password

- You should change your initial password as soon as you login

Command = **passwd userid**

Old password: - enter your current password

New password: - enter your new password

Retype new password: - re-enter your new password

File System Paths

- There are two paths to navigate to a filesystem
  - ✓ Absolute Path
  - ✓ Relative Path

- An absolute path always begins with a "/". This indicates that the path starts at the root directory. An example of an absolute path is

  cd /var/log/httpd

- A relative path does not begin with a "/". It identifies a location relative to your current position. An example of a relative path is:

  cd /var

  cd log

  cd httpd

Creating Files and Directories

- Creating Files
  - ✓**`touch`**
  - ✓**`cp`**
  - ✓**`vi`**

- Creating Directories
  - ✓**`mkdir`**

Copying Directories

- Command to copy a directory
  - **`cp`**

- To copy a directory on Linux, you have to execute the “cp” command with the “-R” option for recursive and specify the source and destination directories to be copied
  - **`cp -R <source_folder> <destination_folder>`**

Find Files and Directories

- Two main commands are used to find files/directories
  - find
  - locate

Difference Between find and locate

- **locate** uses a prebuilt database, which should be regularly updated, while **find** iterates over a filesystem to locate files. Thus, locate is much faster than find , but can be inaccurate if the database (can be seen as a cache) is not updated

- To update locate database run **updatedb**

WildCards

- A wildcard is a character that can be used as a substitute for any of a class of characters in a search

  - * - represents zero or more characters
  - ? - represents a single character
  - [] - represents a range of characters

Soft and Hard Links

- inode = Pointer or number of a file on the hard disk
- Soft Link = Link will be removed if file is removed or renamed
- Hard Link = Deleting renaming or moving the original file will not affect the hard link

  - ln
  - ln -s