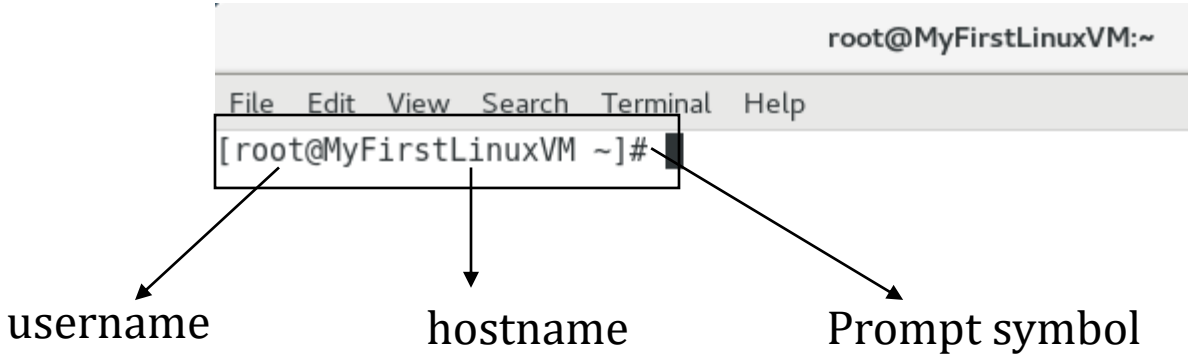
Welcome To:
Module 3

System Access and File System

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`**

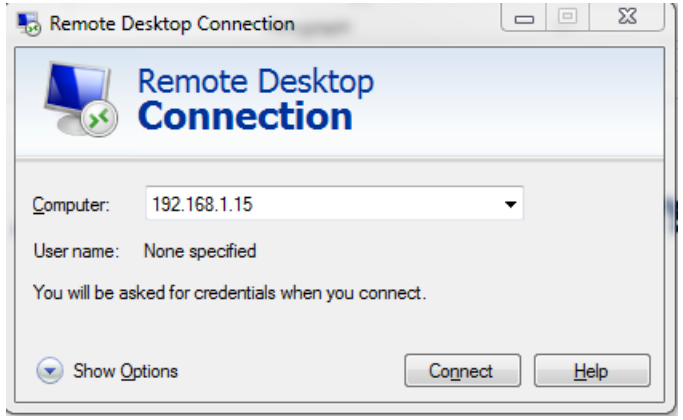
Access to Linux System

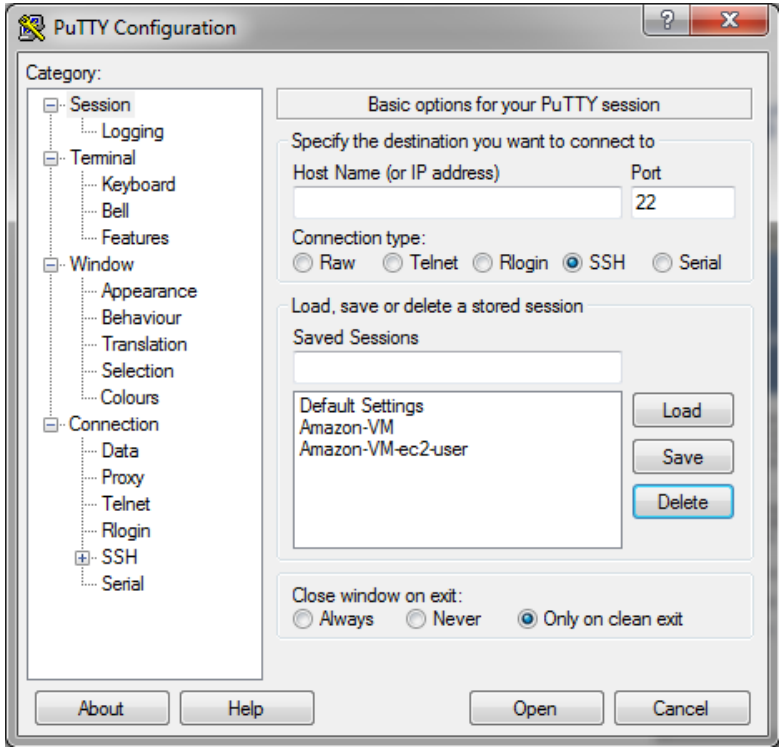
Each operating system has a different protocol or client that is used to access the system

Example:

Windows	=	Remote Desktop (RDP)
VMware ESX	=	vSphere client
Linux	=	Putty, SecureCRT
		SSH from Linux to Linux

Access to Linux System





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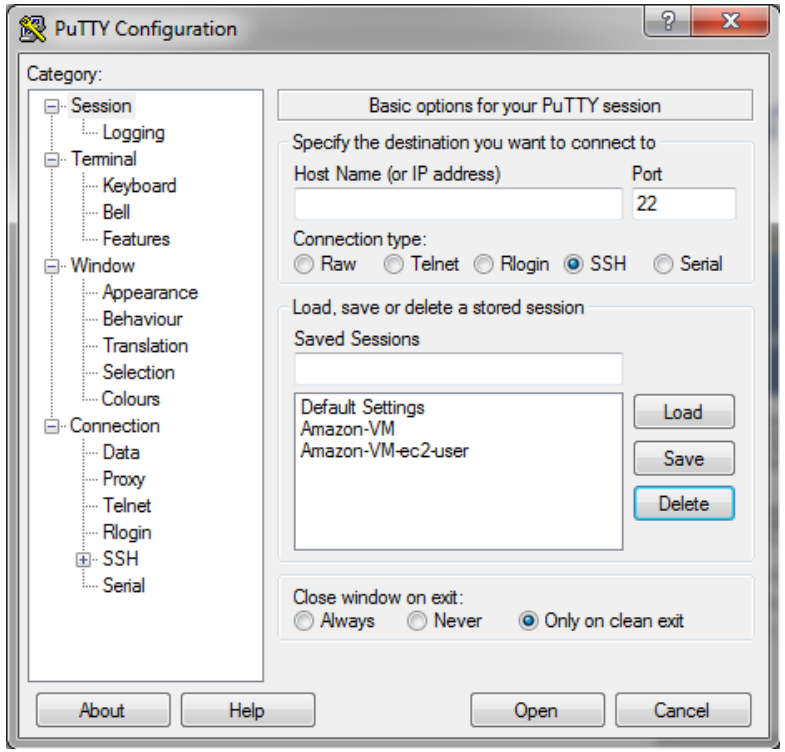
Download and Install Putty



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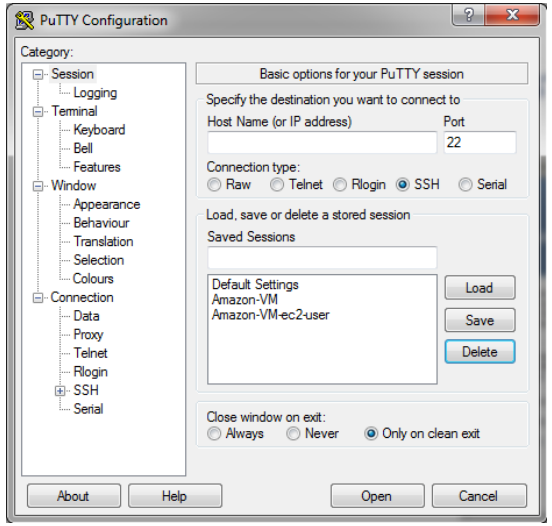
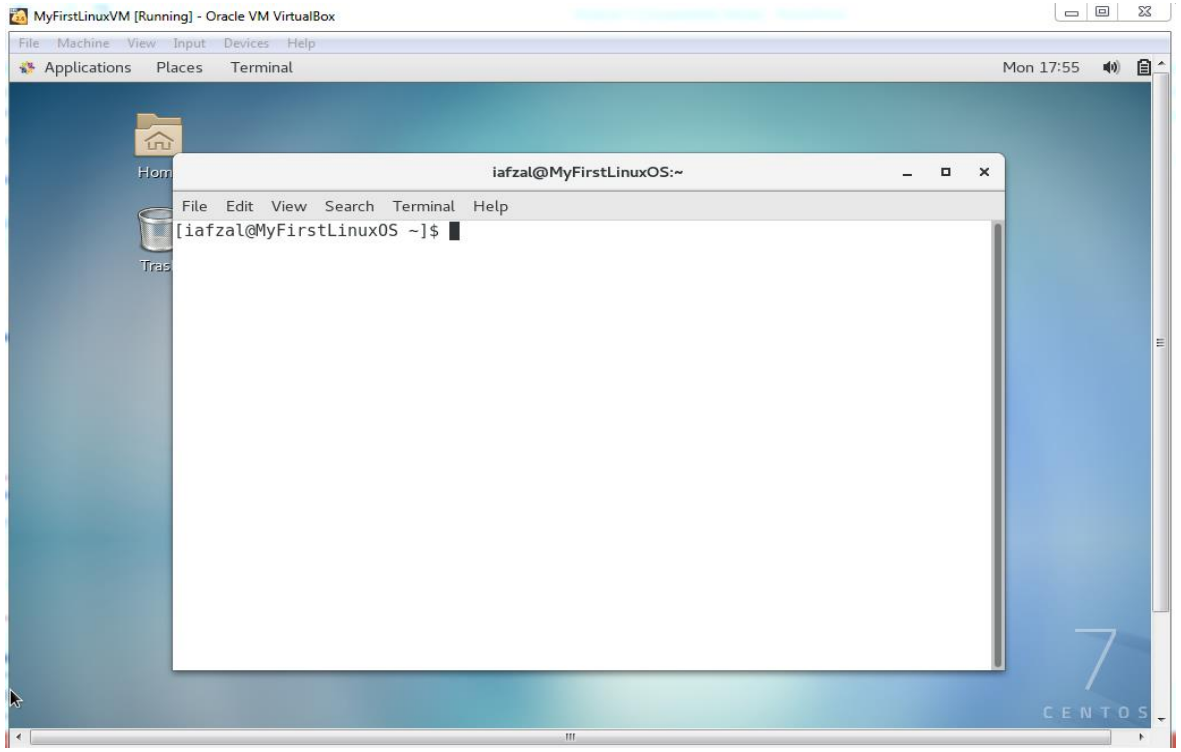
Access to Linux from MAC

- Openup a terminal on your MAC
- Run the following command
  - **# ssh –l iafzal 192.168.56.101**

Access to Linux via Putty





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New Network Command (ip)

- CentOS/RHEL 5 or 6 = **ifconfig**
- CentOS/RHEL 7 = **ip**
- CentOS/RHEL 7.5 and up = **ifconfig** command has been deprecated
- To use ifconfig in 7.5 = "**yum install net-tools**"

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.

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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

Linux File System

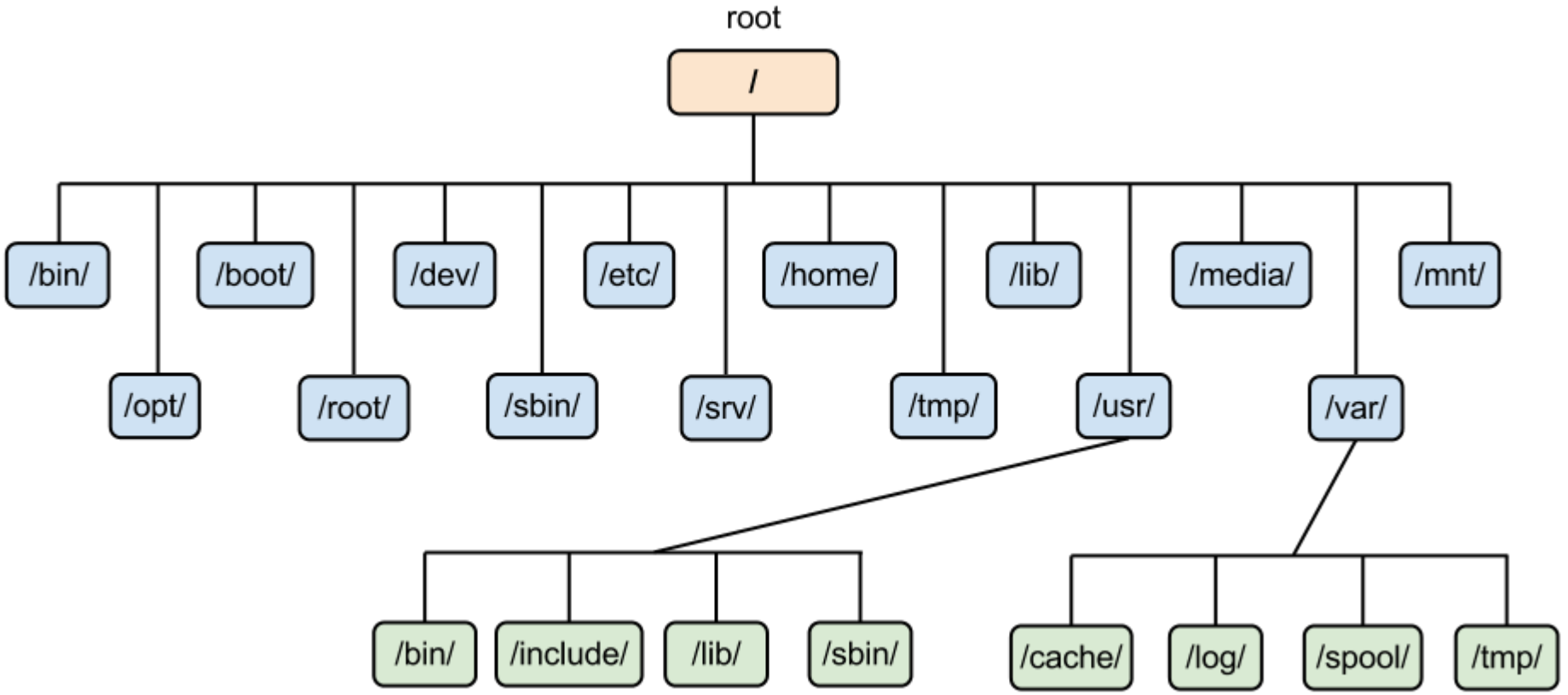
- OS store data on disk drives using a structure called a filesystem, consisting of files, directories, and the information needed to access and locate them.

- 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.

- Linux filesystems store information in a hierarchy of directories and files

File System Structure



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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.

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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

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

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

Directory Listing Attributes

Total columns = 9

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

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

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>`**

The “echo” command

- “echo” is one of the most commonly and widely used built-in command for Linux
- Just like the word echo, the command echo does the same thing
- “echo” command outputs the strings it is being passed as arguments
  - **E.g.** `echo hello world`
- It is also used to create add contents in a file using file redirects
  - **E.g.** `echo hello world > filename1.`

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

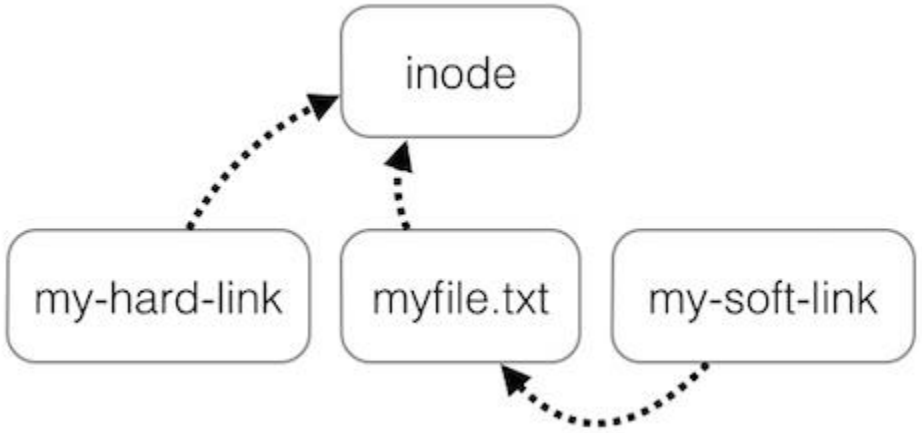
- A wildcard is a character that can be used as a substitute for any of a class of characters in a search

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

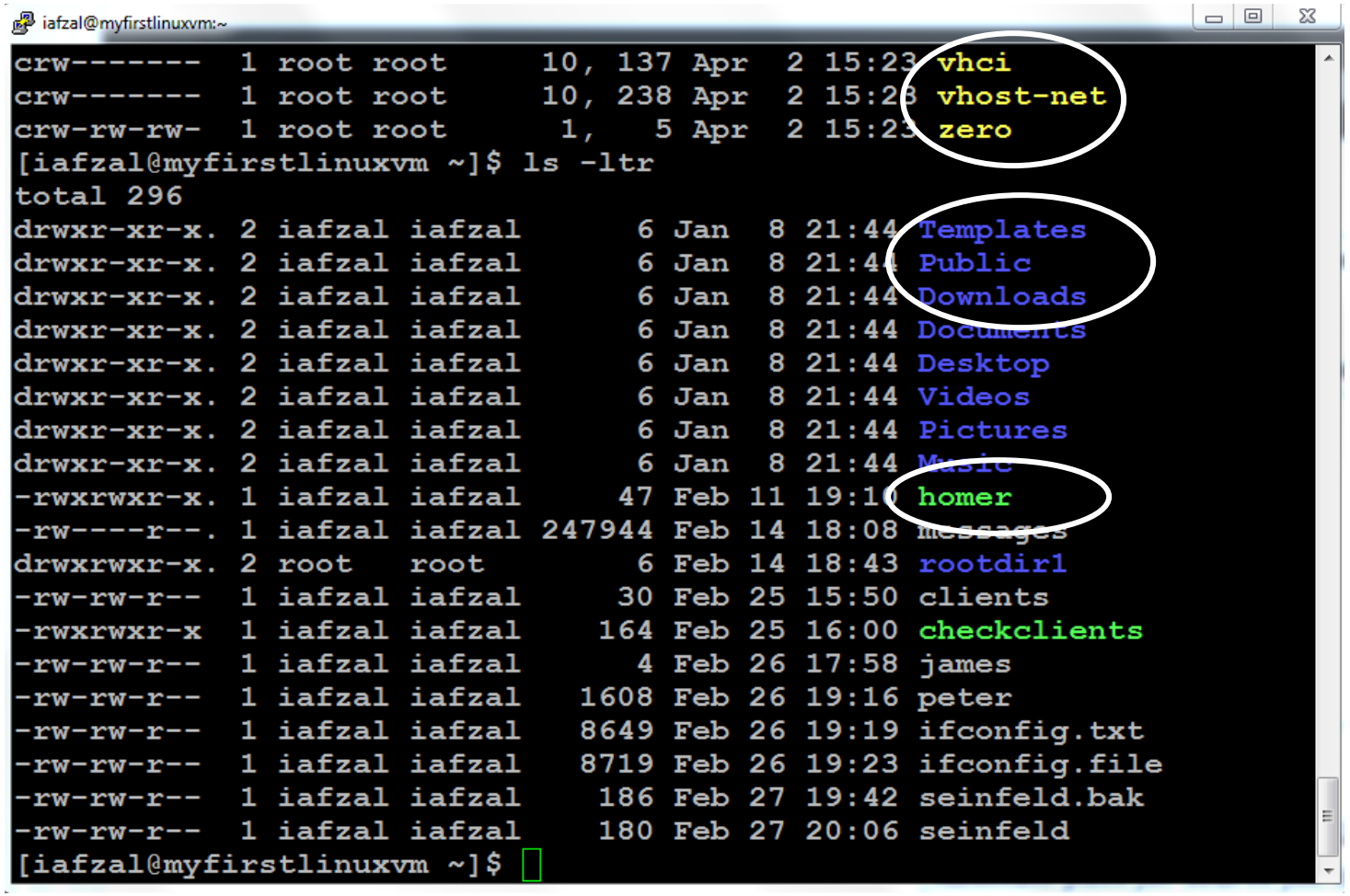
Soft and Hard Links

- 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



Filesystem Color Definition



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Filesystem Color Definition

- **Blue** = Directory
- **Green** = Executable or recognized data file
- **Sky Blue** = Symbolic link file

```
e.g. cd /home/iafzal
touch ca
cd /tmp
ln –s /homeiafzal/ca
```

- Yellow with black background = Device
- **Pink** = Graphic image file
- **Red** = Archive file (tar)
- Red with black background = Broken Link

```
e.g. cd /home/iafzal
touch ihulk
ln –s ihulk /tmp/ihulk
Absolute path for source file is missing
```

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