

INFRASTRUCTURE

Friday, March 10, 2023 10:40 AM

Infrastructure

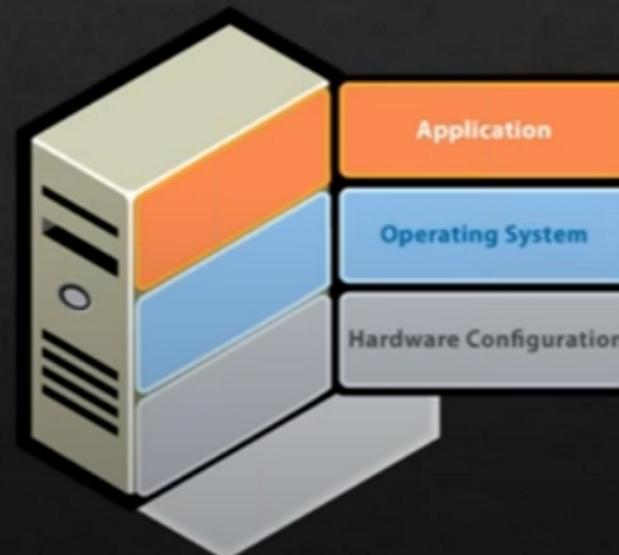
IT infrastructure is composed of physical and virtual resources that support the flow, storage, processing and analysis of data.

IBM

HP

DELL

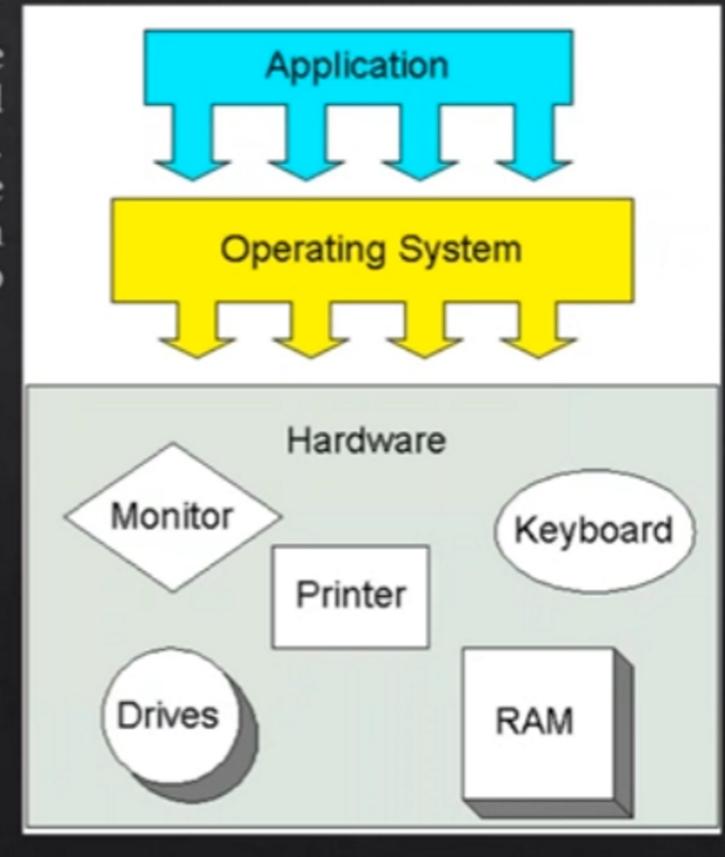
EMC



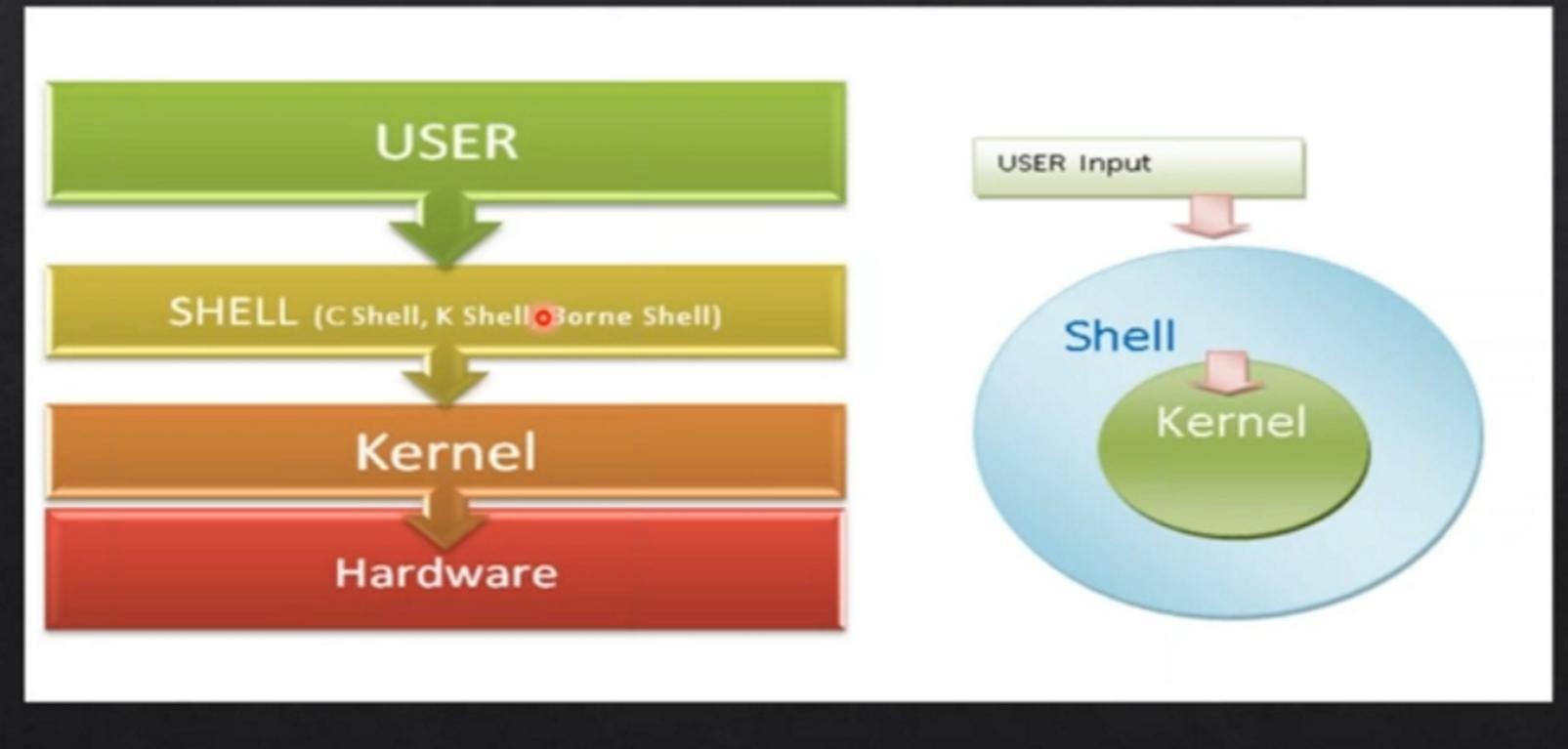
Operating System (OS)

- ❖ An operating system (OS) is a collection of software that manages computer hardware resources and provides common services for computer programs. The operating system is a vital component of the system software in a computer system. Application programs usually require an operating system to function.

- ❖ Windows
- ❖ Linux
 - ❖ Red-hat, Ubuntu, fedora, suse, debian , centos, etc...
- ❖ IBM AIX
- ❖ Solaris
- ❖ HP-UX



Linux is organized

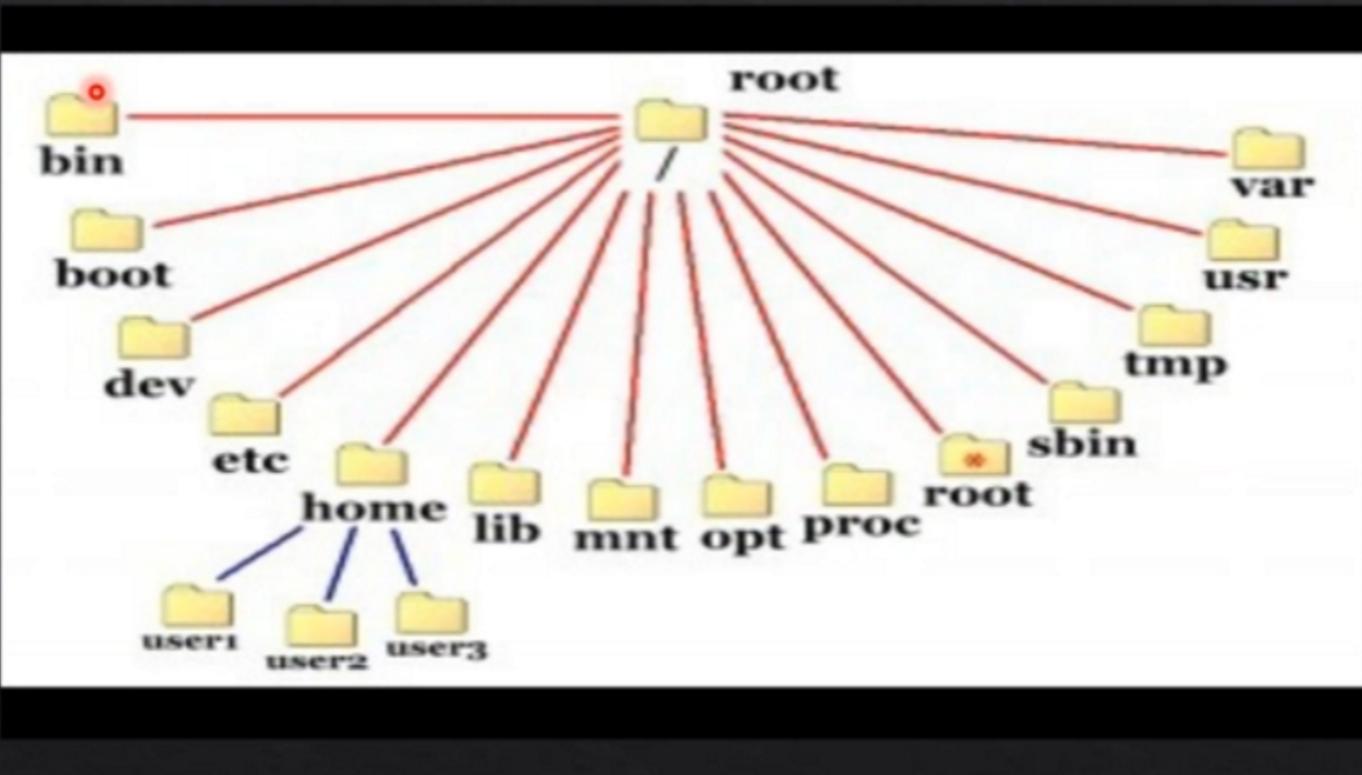


Run Level

The init process, by default, runs the system in one of the eight run levels.

	Run Level
Runlevel 0	Halt System - To shutdown the system
Runlevel 1	Single user mode
Runlevel 2	Basic multi user mode without NFS
Runlevel 3	Full multi user mode (CLI)
Runlevel 4	Unused
Runlevel 5	Multi user mode with Graphical User Interface
Runlevel 6	Reboot System

Linux Directory Structure



USER MANAGEMENT

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User Management

- ❖ Creating a user and setting password

```
useradd <username>
```

```
passwd <username>
```

- ❖ User names and uids stored in /etc/passwd
- ❖ Users are assigned a home directory and a program that is run when they login

Groups:

- ❖ Users are assigned to groups with unique group ID number (gid)
- ❖ gid are stored in /etc/group
- ❖ Each user is given their own private group. They are also added to other group to gain additional access.
- ❖ All users in a group can share files that belongs to the group

Root User

- ❖ Root user is administrative account on Linux system.
- ❖ Root is sometime called super user.
- ❖ Root has complete control over the system.

User Information Commands

- ❖ `whoami` - Find out who you are
- ❖ `Groups or id` - Use to find out what group you belong to
- ❖ `users, who, w` - find out who is logged in
- ❖ `su` - to start a new shell as a different user
- ❖ `history` - last executed commands
- ❖ `last` - who logged into system

Files Information

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Files Information

- ❖ File name may be upto 255 characters
- ❖ File names are case-sensitive
- ❖ To create a file

`touch <filename>`

`cat <filename>`

`nano <filename>`

Type of viewing files

- ❖ `cat` - contents are displayed sequentially with no break.
- ❖ `less` - Display the content of a text file one screen at a time

Syntax: `less [options] filename`

- ❖ `more` – Display content page by page

Syntax: `head [options] filename`

- ❖ `tail` - Displays last few lines of a text in a file

Syntax: `tail [options] filename`

- ❖ **tail** - Displays last few lines of a text in a file

Syntax: tail [options] filename



- ❖ **head**: Displays first few lines of text in a file.

Syntax: head [options] filename

Listing Directories

- ❖ Listing Directory Contents

ls or **ll** : Lists the contents of the current directory or a specified directory

ls -l : long listing of contents of information in directory

ls -a : listing of hidden files and directories whose file begin with a dot.

ls -R : recourses through the subdirectory it encounters, listing the contents too.

ls -help : for help

Changing permissions - Numeric method

- ◊ chmod - to change access modes
- ◊ Syntax : `chmod [mode] filename`

```
chmod 644 filename
```



- ◊ `chmod -R`:

This mode traverse an entire directory tree to change the permission of all its files and directories

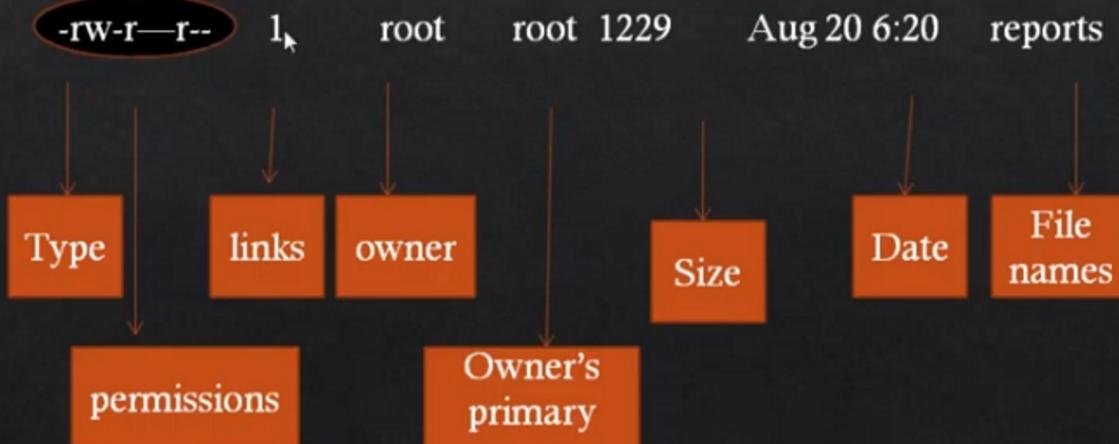
File Security

- ◊ Every file is owned by a user and associated with a group
- ◊ File type and file access permissions are symbolized by a 10-character string

File and Directory Attributes

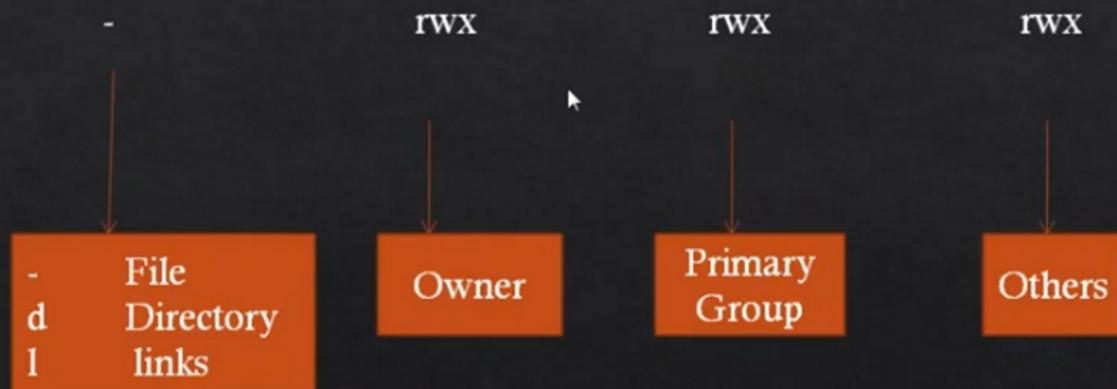
-Unix/Linux files have 8 attributes that can be seen with ls -l command.

```
root@powerpc# ls -l reports
```



Note: only the owner or the root can change the permissions.

Access Levels



User Categories

- ◊ File permission / access has three general categories. Each category is denoted by one symbol
 - ◊ U - the file's owner
 - ◊ G - other users in the file's group
 - ◊ O - everyone else

Access Modes

Access Mode	File	Directory
r	4	To display the content of the file
w	2	To modify or append to the file
x	1	To execute the file

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Copy file between servers

Windows to Linux

Mobaxterm or winscp

Linux to Linux

SCP (secure copy) is a command-line utility that allows you to securely copy files and directories between two systems.

```
scp source_file_name username@destination_host:destination_folder
```

Example: `scp file1 root@10.20.30.40:/tmp`

```
scp root@10.20.30.40:/tmp /home/ec2-user/
```

DIRECTORIES

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- ◊ **pwd** - Displays the absolute path to the current directory
- ◊ Location of directory can be specified by two methods.
- ◊ **Absolute pathname:**
 - ◊ Absolute pathname start with /. It is complete road map to a location.
- ◊ **Relative Pathname:**
 - ◊ Relative pathname do not begin with/. Specifies location relative to your current directory.

Changing Directories

- ◊ **cd** - change directories
 - cd /home/john/work** : To an absolute path
 - cd ..** : To a directory one level up
 - cd** : To your home directory
 - cd -** : To your previous working directory

Coping Files and directories

- ◊ `cp` - copy files and directories
- ◊ Syntax: `cp [options] source_file destination_file`
- ◊ `cp -r` : recursive copy
- ◊ `cp -p` : Preserve time and date information when making a copy

Moving and Removing files and directories

- ◊ `mv` - move and/or rename files and directories
- ◊ `mv` - must always be given at least two arguments.
- ◊ syntax: `mv [options] source_file destination_file`

Creating & Removing files and directories

- ❖ `touch` - create empty files or update file timestamps
- ❖ `mkdir` - create a directory
- ❖ `rmdir` - remove an empty directory
- ❖ `rm` - remove files
 - i - interactive
 - r - recursive

Location Files

- ❖ Find:
 - ❖ Find can also be used to search for files by type, owner, modification date and many other criteria
- ❖ Syntax: `find <dirs> [condition] [action]`

Compression Utilities

- ◊ `gzip` and `gunzip`:

standard Linux compression utility, Up to 75% compression of text files. When a filename is compressed with utility carry the extension .gz. The file compressed by this utility is uncompressed by gunzip.

Creating Extracting Archive

- ◊ Archiving places many file into one target file. It is easier to backup store and transfer.
- ◊ Tar - Standard Linux archiving command.
 - ◊ Creating an archive
 - ◊ Syntax: `tar -cvf archive_name file[s]`
 - c - create a new archive
 - v - produce verbose messages
 - f – archive_name is name of new file
- ◊ Extracting an Archive:
 - ◊ `tar -xvf archive_name.tar`
 - x - extract a archive file

String processing Commands

- ❖ **wc** (word count) : It is used to count lines and characters
- ❖ **sort**: Sort is used to sort data. This data can be in a file or the output of another command.

- ❖ Syntax: `sort [options] file(s)`

grep

Used as filter

Syntax:

```
grep <expression> filename
```

- ❖ command options used with the grep command includes
- ❖ -v returns lines that do not contain the pattern

PROCESS

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Process States

- ❖ Inti is the first process started at boot time - always has PID 1.
- ❖ signals can be specified by their name, such as KILL, or by their number such as 9
- ❖ `kill -9 pid`
- ❖ `ps -a` : display all process, not including process not controlled by a terminal
- ❖ `ps` : display information about processes on the system

services

- ❖ Apache httpd – start/stop/restart httpd service status,
`service httpd start`
`service httpd stop`

```
service httpd stop  
service httpd status  
service httpd restart
```

Similar commands work onsshd service

Important configuration files

- ❖ /etc/sshd/sshd_config
- ❖ /etc/hosts ↗
- ❖ /etc/sudoers

Networking commands

- ◊ **ping**: ping command is used to test network connectivity and reliability.
- ◊ **traceroute**: shows network path between location and remote systems
- ◊ **hostname**: host name of a system
- ◊ **telnet**: it is useful for checking and troubleshooting services
- ◊ **ssh**: It allows remote login and remote command execution via a secure encrypted connection.

Info commands

- ❖ `free` : displays free and used memory
- ❖ `cat /proc/cpuinfo`
- ❖ `top`: performance of system
- ❖ `ifconfig` – IP Address of server
- ❖ `/etc/redhat-releases:`
- ❖ `uptime` – System uptime

- ❖ cron job
 - ❖ `min hour day_of_month month week_of_day command`
 - ❖ `* * * * * <Command>`

YUM

- ◊ yum package installation

```
yum install <package_name>
```

- ◊ yum package update

```
yum update all/package_name
```

- ◊ yum package removal

```
yum remove package_name
```

RPM Queries

- ◊ enables a set to build and query software package
- ◊ RPM package installation:

```
rpm -ivh package_name
```

- ◊ RPM package Upgrade

```
rpm -Uvh package_name
```

- ◊ RMP package Removal

```
rpm -e package_name
```