**Linux**

1.What is Linux and how is it different from other operating systems?

Linux is a free and open source operating widely used in computers,servers and other devices.It is created by Linus Torvalds in 1991.

Linux is different from other OS due to its open source nature,High customizability,high security,free cost.

2.Explain the Linux file system hierarchy.

Linux file system hirerachy is a standardized way of organizing files and directories on linux system.it is based on file system hirerachy standard,which defines the structures and organization of system.

Hirerachy provides standardized and organized way of managing files directories on linux system.

Root Directory( / ): Root directory is top most directory in file system hirerachy.

* Bin(/bin): essential command-line utilities and programs.
* Boot(/boot):Bootloader files and kernel images.
* Dev(/dev): device files,representing hardware devices.
* Home(/home): user home directories,containing personal files and settings.
* Lib(/lib): essential system libraries and modules.
* Media(/media): mount points for removable media ,such as CDs and USB drives.
* Mnt(/mnt): Temporary mount points for file system.
* Opt(/opt): Optional software packages and add-ones.
* Proc(/proc): Virtual file system,providing inforamation about running processes.
* Root(/root): Root users home directory.
* Run(/run): Temporary files and sockets for running processes.
* Sbin(/sbin): Essential system adminstration utilities and programs.
* Sr(/srv): Site-Specific data and services.
* Sys(/sys): Virtual file system,providing information about hardware devices.
* Temp(/temp): Temporary files and directories.
* Usr(/usr): User-spaceprograms,libraries and data.
* Var(/var): Variable data,such as logs,spool files and temporary data.

3.What are the basic Linux commands for file operations?

* Touch: create a nre empty file, syntax [touch filename.txt]
* vim/vi: Edit a file using text editor, syntax [vi/vim filename]
* cat : Display contents of file, syntax [cat filename]
* less: Display contents of file,one page ata time, syntax [less filename]
* Head: Display the first 10 lines of file, syntax [head filename]
* Tail: Display last 10 lines of file, syntax [tail filename]
* cp: Copy a file, syntax[ cp source.txt destination.txt]
* mv: Move or rename a file, syntax [mv source.txt destination.txt]
* rm: Delete a file, syntax [rm filename.txt]
* chmod; Change the permissions of file, syntax [chmod 755 filename.txt]
* chown:Change ownership of file ,syntax [ chown user:group filename.txt]

4.How do you change file permissions in Linux?

We change file permisions in linus by using chmod command:

* chmod u+x filename(add execute permision for user)
* chmod g+w filename(add write permision for group)
* chmod o-r filename(remove read permision for others)
* chmod 755 filename(set read,write,execute for user,read,execute for group and others)

5.What is the difference between chmod and chown?

* chmod: Changes file permission(read,write,execute)
* chown: Changes file ownership(user and group)

6.Explain the use of grep command.

* Searches for a pattern(string or regex)in one or more files
* Prints lines that match pattern
* Example: grep "keyword" filename
* Grep –c: this prints only a count of the lines that match a pattern.
* -h :display the matched lines,but do not display filenames
* -i : ignores,case for matching
* -l : disply list of filenames only
* -n: display the matched lines and their line numbers
* -v : display lines that do not matches the pattern

7.How do you check disk usage in Linux?

* df command: Display disk usage statstics (ex: df -h)
* du command: Estimates disk usage of files and directories(ex: du -sh)

8.What is the difference between soft link and hard link?

Hard link:

* Another name for same file
* same inode number
* file remains even if original file is deleted.

Softlink: (Symlink)

* shortcut to another file
* Different inode number
* Broken if original file is deleted.

9.How do you schedule a cron job in Linux?

* Open crintav editor: crontab -e
* Specify schedule: minute,hour,day,month,day of week
* Specify command: command\_to\_run [Ex: 59 23 \*\*\* /path/to/command(runs daily at 11:59pm)]

10.What is the purpose of the /etc/passwd file?

* Stores user account information
* Contains username,password hash,UID,GID,and home directory.
* Used for user authentication and account management.

11.Explain the basic features of the Linux OS.

* Open-Source: Linux is open-source, meaning its source code is freely available for modification and distribution.
* Multi-User: Linux is a multi-user operating system, allowing multiple users to access the system simultaneously.
* Multi-Tasking: Linux is a multi-tasking operating system, allowing multiple tasks to run concurrently.
* Portable: Linux is highly portable, meaning it can run on various hardware platforms.
* Secure: Linux is known for its strong security features, including user authentication, access control, and encryption.
* Customizable: Linux is highly customizable, allowing users to modify the kernel, install new software, and change the desktop environment.
* Free: Linux is free to download and use, with many distributions available at no cost.
* Community-Driven: Linux has a large and active community of developers and users, who contribute to its development and provide support.
* Scalable: Linux is highly scalable, meaning it can run on small embedded devices as well as large servers.
* Compatible: Linux is compatible with many file systems, including ext2, ext3, ext4, and others.
* Scriptable: Linux has a powerful scripting environment, allowing users to automate tasks and create custom solutions.
* Network-Ready: Linux has built-in networking capabilities, making it easy to connect to the internet and other networks.

12.What are the major differences between Linux and Windows?

Linux:

* It is an open-source ,free and customized
* It is more secure with fewer malware threats
* Offers various desktop envirnoments (eg : GNOME,KDE)
* most software is free and open-source
* Can run on older hardware and various architectures
* Large community of developers and users

Windows:

* Closed-source,commercial and proprietary
* More vulnerable to malware and viruses
* Uses a propriatary interface
* Many software applications are commercial and proprietary
* Requires more modern hardware and specific architectures
* Commerical support and community forums.

13. Define the basic components of Linux.

Kernal :

* Manages hardware resources
* Handles system calls

Shell :

* Command-line interface (CLI)
* Executes commands and scripts

File system :

* Organizes and stores files
* Uses directories,files and permissions

Devices:

* Hardware components(eg : hard drives,printer)
* Manages by the kernel

Processes:

* Running programs or applications
* Manages by kernel

Users and Group:

* Manage access anfd permissions
* Use username,passwords and group IDs

System Libraries:

* Collections of pre-written code
* Used by applications and kernal

14. What is the chmod command in Linux, and how do you use it?

The chmod command in Linux is used to change the permissions of a file or directory.

Syntax : chmod [permissions] file\_name

permission types:

* - u: User (owner)
* - g: Group
* - o: Others (everyone else)
* - a: All (user, group, and others)

Permission Modes

* - r: Read permission
* - w: Write permission
* - x: Execute permission

Examples

* - chmod u+x file: Adds execute permission for the owner.
* - chmod g+w file: Adds write permission for the group.
* - chmod o-r file: Removes read permission for others.
* - chmod 755 file: Sets permissions to rwx (owner), r-x (group), and r-x (others).

Octal Notation:

Permissions can also be specified using octal notation:

* - 0: No permissions
* - 1: Execute permission
* - 2: Write permission
* - 4: Read permission
* - 5: Read and execute permissions
* - 6: Read and write permissions
* - 7: Read, write, and execute permissions

Example:

* - chmod 644 file: Sets permissions to rw-r--r--.

15. What are the most important Linux commands?

* **mkdir:**

Create new Directory with given name**.**

**syntax: [mkdir dirname]**

* **cd:**

Change to directory**.**

**syntax: [cd dirname]**

* **Touch:**

Create empty files**.**

**syntax: [touch filename]**

* **cat>filename:**

Create new file &write content & cntrl+D to save content into file.

**syntax: [cat>filename &content]**

* **cat f1 f2 >f3:**

Creates new file & content of both files will be copied into new file.

* **cat:**

Display content of file**.**

**syntax: [cat filename]**

* **tac:**

Display file content in reverse order**.**

**syntax: [tac filename]**

* **ls:**

Lists content of directory**.**

**syntax: ls**

* **ls\*.txt:**

List all files with given extension**.**

**syntax: ls\*.txt/py/etc**

* **pwd:**

Shows the current working directory**.**

**syntax: pwd**

* **cp:**

Copies a file or directory**.**

**syntax: cp file1 file2**

* **mv:**

Moves a file or directory**.**

**syntax: [mv file1 file2]**

* **Head:**

Display first 10 lines of file**.**

**syntax: head filename**

* **Tail:**

Display last 10 lines of file**.**

**syntax: tail filename**

* **More:**

Similar to cat & here we can display large content by using ENTER.

syntax: **more filename**

* **Less:**

opp of more**.**

**syntax: less filename**

* **Id:**

Display if of user/group**.**

**syntax: id**

* **Clear:**

Clear the screen**.**

**syntax: clear**

* **Vi/Vim:**

Text editor to write programs of text**.**

**syntax: vi/vim filename**

* **Grep:**

Filter to search given pattern in the file content.

**syntax: grep "content" filename**

* **Diff:**

Compares the content of two different files**.**

**syntax: diff file1 file2**

* **Ping:**

Check connectivity status of server.

syntax: **ping google.com**

* **History:**

Review all the commands which you have entered**.**

**syntax:history**

* **Hostname:**

Display hostname**.**

**syntax: hostname**

* **Hostname -i:**

Display host IP**.**

**syntax: hostname -i**

* **nl:**

Display Line numbers.

**syntax: nl filename**

* **wc:**

Given num of lines,Words and Characters avaliable in file content**.**

**syntax: wc filename**

* **uniq:**

Remove duplicates of file content/It can remove only continuous duplicates**.**

**uniq filename**

* **rmdir:**

Removes the Specified directory(Directory should be empty).

**syntax: rmdir dirname**

* **rm:**

Remove file**.**

**syntax: rm filename**

* **chmod:**

**c**hange user/group permissions to access file**.**

**syntax: chmod u=r/w/x filename**

* **man:**

It provides detailed view of cmnd includes name,synopisis,descrp,etc.

**syntax: man ls/nl,cat/etc**

* command: the name of command (ed: ls,cd,mkdir)
* options: modify the commands behavior(eg: -1,-a,-r)
* arguments: provide input to command(eg: file names,directories)
* -a or --all : show all files/directories,including hidden ones
* -l or --long : display detailed information
* -r or --recursive : perform command recursively
* -v or --verbose : display detailed output
* kill : terminate a process
* bg : run a process in backgroung
* fg : bring a process to foreground
* ssh : securely access a remote server
* scp : securely copy files between servers
* info : display info about command
* !:0 : repeat last command