30-Sep-2024

Internship Day – 51 Report:

Test Of CCNA Lab

1-Oct-2024

Internship Day – 52 Report:

What is Open Source?

Open source software is built on the principles of transparency, collaboration, and user freedom, allowing anyone to use, modify, and share the software, often under licenses that ensure these freedoms while enabling community-driven innovation and continuous improvement.

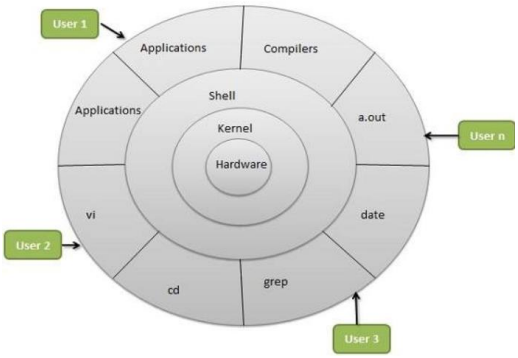
Key Points on Linux Origins:

- **1984**: The **GNU Project** and **Free Software Foundation** were established, aiming to create an open-source version of UNIX utilities and introducing the **General Public License (GPL)**, a license enforcing open-source principles.
- **1991**: **Linus Torvalds** developed an open-source, UNIX-like kernel, also licensed under the GPL, and integrated GNU utilities, seeking community support online.
- **Today**: The **Linux kernel combined with GNU utilities** forms a complete, open-source, UNIX-like operating system. It's packaged into various **distributions** tailored for specific users and needs.

Why Linux?

- Open Source
- Community Support
- Highly Customizable
- Server Dominance
- DevOps Integration
- Automation
- Security

Architecture of Linux:



Some Importaznt Directories:

- Home Directories: /root, /home/username
- User Executable: /bin, /usr/bin, /usr/local/bin
- System Executables: /sbin, /usr/sbin, /usr/local/sbin
- Other Mount points: /media, /mnt
- Configuration: /etc
- Temporary Files: /tmp
- Kernels and Bootloader: /boot
- Server Data: /var, /srv
- System Information: /proc, /sys
- Shared Libraries: /lib, /usr/lib, /usr/local/lib

Different Linux Distributions:

Desktop Linux OS:

- Ubuntu: User-friendly, strong community, frequent updates.
- Linux Mint: Stable, beginner-friendly, based on Ubuntu.
- Arch Linux: Minimalist, customizable, rolling-release.
- Fedora: Cutting-edge, developer-focused, Red Hat-sponsored.
- Debian: Stable, versatile, widely used in desktop/server.
- OpenSUSE: Robust system management, developer-friendly.

Server Linux OS:

- **Red Hat Enterprise Linux (RHEL):** Enterprise-grade, stable, secure.

- Ubuntu Server: Scalable, flexible, popular in cloud environments.
- CentOS: Free RHEL alternative, community-driven, stable.
- SUSE Enterprise Linux: High performance, enterprise-focused.

Most Used in IT:

- RPM-based: RHEL, CentOS (enterprise, stability).
- Debian-based: Ubuntu Server (cloud, DevOps, flexibility).

Linux Commands

File and Directory Operations:

1. **ls:** Lists all files and directories in the current directory.

```
ls
```

2. **cd:** Changes the current directory to the specified directory.

```
cd demo_dir
pwd
```

3. **pwd:** Prints the current working directory, showing the full path of the directory you are in. Useful for confirming your location within the file system.

```
pwd
```

4. **mkdir:** Creates a new directory with the specified name.

```
mkdir new_folder
ls
```

5. **rm:** Remove files

```
touch file_to_delete.txt
ls
rm file_to_delete.txt
ls
```

6. **rm -r:** Recursively removes a directory and all of its contents.

```
rm -r new_folder
ls
```

7. **cp:** Copy files

```
echo "Sample Content" > sample_file.txt
cp sample_file.txt copy_file.txt
ls
```

8. **mv:** Move or rename files.

```
mv copy_file.txt renamed_file.txt
ls
```

9. **touch**: Create an empty file.

```
touch new_file.txt
ls
```

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File Viewing and Editing:

- **cat:** Displays the entire contents of a file.

```
Input:  cat file.txt
Output: Displays entire contents of the file
-----------------------------------------------
$ cat file.txt
This is a sample text file.
It contains multiple lines of text.
Each line can contain data, information, or instructions.
This is the last line.
```

- **nano or vim:** Command-line text editors for creating and editing files.

```
Input:  nano file.txt
Output: Opens the file in the Nano text editor for editing (User can type or modify conte
-----------------------------------------------
$ nano file.txt
[Content of file.txt opens in the editor, user can modify and save]
```

```
Input:  vim file.txt
Output: Opens the file in the Vim text editor (allows for more advanced editing)
-----------------------------------------------
$ vim file.txt
[Content of file.txt opens in the editor]
(Press `i` to enter insert mode, type or edit, then press `Esc` and type `:wq` to save and
```

Filter Commands:

- **head:** Shows the first few lines of a file (default is 10 lines).

```
Input:  head file.txt
Output: Displays the first 10 lines of the file (default behavior)
-----------------------------------------------
$ head file.txt
This is the first line.
This is the second line.
This is the third line.
...
```

- **tail:** Shows the last few lines of a file (default is 10 lines).

```
Input:  tail file.txt
Output: Displays the last 10 lines of the file (default behavior)
-----------------------------------------------
$ tail file.txt
Line 11
Line 12
Line 13
...
```

- **less:** Allows you to view file contents page by page with scrolling.

```
Input:  less file.txt
Output: Displays the file content page by page, with scrolling ability
-----------------------------------------------
$ less file.txt
[Content of file.txt displayed page by page, user can scroll using the arrow keys or space
```

- **more:** Displays file content one screen at a time, allowing you to scroll down through long files using the spacebar.

```
Input:  more file.txt
Output: Displays the file content one screen at a time, allowing scrolling with the spaceb
-----------------------------------------------
$ more file.txt
[Content of file.txt displayed one screen at a time]
Press space to view more or `q` to quit.
```

- Display First 5 Lines and Pipe to less:

```
Input:  head -n 5 file.txt | less
Output: Displays the first 5 lines of the file, piped to `less` for scrolling
-----------------------------------------------
$ head -n 5 file.txt | less
This is the first line.
This is the second line.
This is the third line.
This is the fourth line.
This is the fifth line.
[Press space to scroll or `q` to quit]
```

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System Information:

- **uname -a:** Displays detailed system information, including the kernel name, version, and system architecture.

```
Input:  uname -a
Output: System Information (Kernel, OS, Architecture, etc.)
----------------------------------
$ uname -a
Linux my-computer 5.11.0-38-generic #42~20.04.1-Ubuntu SMP x86_64 GNU/Linux
```

- **df:** Shows disk space usage for all mounted filesystems; use `df -h` for human-readable format (e.g., GB, MB).

```
Input:  df -h
Output: Filesystem Disk Usage (Human-Readable)
----------------------------------
$ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/sda1       50G   20G   25G  40% /
tmpfs           2G     0    2G   0%  /dev/shm
```

- **top:** Displays a real-time view of running processes, CPU, and memory usage, helping monitor system performance.

```
Input:  top
Output: Real-time Process Monitoring
----------------------------------
$ top
Tasks: 110 total, 1 running, 109 sleeping
%CPU(s): 10.0 us, 0.5 sy
PID  USER      PR  NI  VIRT    RES    SHR S  %CPU %MEM TIME+ COMMAND
1001 user      20   0  1.5G  150M  15M  S   5.0   0.7  0:02.11 firefox
```

- **ps:** Lists currently running processes; use `ps aux` for detailed information about each process.

- **whoami:** Outputs the current user's username, indicating who is logged into the session.

File Permissions:

- **chmod**: Changes file or directory permissions, allowing you to set read, write, and execute permissions for the owner, group, and others.

```
Input:  chmod 755 file.txt
Output: Changes Permissions
----------------------------------
$ chmod 755 file.txt
$ ls -l file.txt
-rwxr-xr-x  1 user group 100 Nov 15 12:00 file.txt
```

- **chown**: Changes the ownership of a file or directory, assigning a different user or group as the owner.

Network:

- **ping**: Sends packets to another network host to check connectivity and measure response time, useful for network troubleshooting.

```
Input:  ping google.com
Output: Connectivity Check
----------------------------------
$ ping google.com
PING google.com (142.250.182.206): 56 data bytes
64 bytes from 142.250.182.206: icmp_seq=1 ttl=115 time=15 ms
```

- **ifconfig** or **ip addr or ip addr show**: Displays network interface configurations, including IP addresses, network masks, and MAC addresses.

```
Input:  ip addr show
Output: Network Interface Information
----------------------------------
$ ip addr show
2: enp0s3: <UP,BROADCAST,RUNNING> mtu 1500
inet 192.168.1.10/24 brd 192.168.1.255 scope global dynamic enp0s3
```

- **ssh**: Provides secure remote login to another machine over a network, commonly used for remote administration.

Package Management:

- **apt-get** (Debian/Ubuntu) or **yum** (Red Hat/CentOS): Installs, updates, or removes software packages from the system's package repositories.

- **apt-get update**: Refreshes the package list, ensuring access to the latest versions available in the repositories.

```
Input:  sudo apt-get update
Output: Refresh Package List
-----------------------------------
$ sudo apt-get update
Hit:1 http://archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://archive.ubuntu.com/ubuntu focal-updates InRelease
Fetched 15.3 MB in 3s
```

- **apt-get install**: Installs specified packages from the repository, resolving and downloading dependencies automatically.

```
Input:  sudo apt-get install curl
Output: Installs curl
-----------------------------------
$ sudo apt-get install curl
Reading package lists... Done
The following NEW packages will be installed:
curl
```

Other Useful Commands:

- **man**: Displays the manual page for a command, providing detailed information and usage options.

```
Input:  man ls
Output: Displays Manual for `ls` Command
-----------------------------------
$ man ls
LS(1)                  User Commands                  LS(1)
NAME
     ls - list directory contents
```

- **grep**: Searches files for lines that match a specified pattern, often used for text processing and filtering.

```
Input:  grep "pattern" file.txt
Output: Search for Pattern in File
---------------------------------
$ grep "Line 3" sample.txt
Line 3
```

- **sudo**: Runs commands with superuser privileges, required for tasks that affect system settings or protected files.

- **clear**: Clears the terminal screen, providing a clean workspace.

```
Input:  clear
Output: Clears Terminal Screen
---------------------------------
$ clear
```

- **history**: Lists previously executed commands in the terminal session, allowing easy recall or re-execution of commands.

```
Input:  history
Output: Lists Previously Executed Commands
---------------------------------
$ history
1  ls
2  uname -a
3  df -h
```