KODEKLODE LINUX

What is linux?

Why we use linux?

Why do we care about operating system ?

Linux is by far the most widely used server operating system in the world, covering all its different versions and flavors like Ubuntu, CentOS, Red Hat. According to recent reports, all 500 of the fastest supercomputers run on Linux, 96.3% of the top websites are powered by Linux, and surprisingly, 86% of all smartphones use Linux-based operating systems. This shows how important and popular Linux is in modern technology

How does this relate to devops?

In the cloud and DevOps world, most new tools are first built for Linux. This is because Linux is widely used in servers and data centers. Later, some tools get support for Windows, but Mac is rarely used for servers.

For example, Docker, which helps run apps in containers, was only available on Linux for many years. Only recently did it start working on Windows.

When it comes to Kubernetes, which manages containers, the main part (called the control plane or master nodes) can only run on Linux. Even if your apps run on Windows servers, you still need Linux for the control plane. There are no plans to make a Kubernetes cluster that works only on Windows.

So, when you learn Kubernetes and set up a cluster, you always use Linux for the control plane. This is why Linux is very important for DevOps and cloud work.

Working in a Windows-dominant environment and switching to Linux can bring some challenges, including:

- The Linux command line is text-based and works differently than Windows, so it can feel confusing.

- Linux organizes files and folders in a different way, so finding things takes some getting used to.
- Text editors like vi or vim are keyboard-focused and not like Windows editors.
- There are many types of Linux (Ubuntu, CentOS, etc.), each with its own tools and commands.
- Installing software can be tricky because Linux uses different package managers (like apt, yum, rpm) and sometimes you get errors with missing files or dependencies.
- Setting up networking between Linux virtual machines can be harder than in Windows.
- Linux has strict permission settings, so you might run into issues with files or folders you can’t access.
- Without regular practice, it’s easy to forget commands and how things work.

What is linux shell?

The linux shell is a program that allows text-based interaction between the user and operating system

All types of shells in Linux??

- **Bash (Bourne Again Shell): is the most popular shell in Linux. It is widely used because it has useful features like it suggests commands as you type and lets you create multiple files or folders at once, which are not available in some other shells. Most Linux systems use Bash as the default shell.**
- **Zsh (Z Shell)**:
- **Ksh (Korn Shell):**
- **Csh (C Shell)**:

How can you check which shell you are currently using in Linux?

```
echo $SHELL  #$SHELL  is a environment variable
```

How do you change shell?

First check where the Bourne shell is installed (usually /bin/sh)

```
cat /etc/shells
```

Change Bob’s shell:

```
csudo chsh -s /path/to/shell #Replace /path/to/shell with the path of the shell you want, like /bin/bash or /bin/zsh.
csudo chsh -s /bin/sh  #-s stand for shell
```

Difference between a variable and an environment variable??

- A variable is like a small box where you can store a piece of information, like a name or a number, for use in your current program or terminal. If you close the program, the box disappears.
- An environment variable is a special kind of box that can be seen and used by many different programs and processes. It stays available as long as your computer is running and can be used by any program that needs it.
- So, use a variable for temporary storage in one program, and use an environment variable to share information between different programs.

How to share environment variable from one program to another??

On Linux/macOS:

```
export MY_VAR=value
#After this, you can use $MY_VAR in your shell or scripts.
```

On Windows:

```
set MY_VAR=value
```

How to check value of environment variable?

```
echo $variablename
```

How to see the list of all environment variable??

```
env
```

How to check path?

```
echo $PATH
```

Where is a user's home directory located in Linux, and how is it named?

In Linux, each user has a home directory, which is usually created under the /home folder. The name of the home directory is the same as the username. For example, if the user is named "Bhoomi," their home directory will be /home/bhoomi. Every user has their own unique home directory, so no two users share the same home folder.

Why do we need home directory??

In Linux, the home directory is a special place where each user can store their personal files and folders. Every user has their own unique home directory, and only that user can access it. This means no other user can see or change your files unless you give permission. You can quickly find your home directory by typing `~` (tilde) in the terminal.

Note: Once you are logged into bash shell, the line you see is called the bash prompt

~ = present working directory

$ = User prompt symbol

File Permissions:

Linux is a multiuser system. Every file and directory in your account can be protected from other users by changing its access permissions.

Type of permissions

- r - read → 4
- w - write → 2
- x - execute = running a program ⟶ 1

Total sum = 1+2+4 = 7 (all permissions)

Each permission (rwx) can be controlled at three levels.

- u - user = yourself
- g - group = can be people in the same Project
- o - other = everyone on the system

Command to change the permission

- **chmod 777 <file/dir>**
- First 7 → for User
- Second 7→ for group
- Third 7 → other group

How you give permission to files or folders in Linux

To give permission to files or folders in Linux, you use commands like chmod and chown:

1. Change ownership (if needed):

Use the chown command to assign a specific user or group as the owner.

Example:

```
sudo chown username:groupname filename
#Replace username and groupname with the actual names
```

2. Set permissions:

Use the chmod command to set read, write, and execute permissions.

```
chmod u+rwx filename
# This gives the owner (user) read, write, and execute permissions.
```

3. For numeric mode (common for scripts):

```
chmod 755 filename
# Here,7 means read+write+execute for the owner,5 means read+execute for group and others.
```

4. Check permissions:

Use the “ ls -l” filename command to see the current permissions and ownership.

5. Best practices:

- Only give the minimum permissions needed.

```
chmod -R 755 foldername
#chmod changes permissions on files and folders.
#-R means "recursive," so it applies the permission change to all files and sub folders inside the specified folder.
#The owner (you) gets read, write, and execute permissions (7).
#Group members and all other users get read and execute permissions (5),but cannot write or modify files.
```

This is commonly used for folders because it lets everyone see and open files inside, but only the owner can add, delete, or change files. For example, if you run ”chmod -R 755 myfolder”, every file and folder inside myfolder will have these permissions.

Why is the Linux command-line interface important compared to the graphical interface?

The Linux command-line interface (also called the shell) lets you work on your Linux computer more effectively. While the graphical interface looks easier and more attractive for new users, it has limits in what it can do. The command-line is more powerful and gives you more control to perform tasks and manage your system.

What is graphical interface?

A graphical interface, also called a GUI (Graphical User Interface), is a way to interact with a computer using visual elements like icons, buttons, windows, and menus instead of typing commands. You can click on these elements with a mouse or touchpad to open files, run programs, or change settings, making it easier for beginners to use computers. Most operating systems like Windows, macOS have a graphical interface to help users work without needing to remember complex commands

why graphical interface not good?

A graphical interface (GUI) is not always good because it can be slow and doesn’t let you do everything you need, especially on servers. It uses more computer power, which is not good for systems that need to run fast and smoothly.

Linux has a GUI to help beginners use the system easily by clicking icons and menus. But for advanced work, servers, and cloud environments, Linux mostly uses the command-line (CLI) because it is faster, uses less power, and gives more control over the system.

What are type of command in linux?

1. Internal or build-in Commands: Internal commands are built right into the shell, so they work immediately and don't need any extra files. they are always available when you use the shell.

```
echo,cd,pwd etc
```

1. External Commands: External commands are separate programs or scripts stored as files in the system, usually in directories like `/bin` or `/usr/bin`. so your system must find them to run them

```
ls,cat,grep #These can be pre-installed with the OS or added by the user.
```

Note: To check if a command is internal or external, use the type command. For example,

"type echo" will say it's a shell built-in (internal), but "type ls" will show a file path (external)

what is command, option, flags, switch ,argument??

```
cp -r folder1 folder2

#Option/Flag/Switch: Extra settings you add to change how the command wor
ks.
#Argument: The specific file, folder, or value the command works on.
```

- `cp` is the command (copy).
- `r` is the option/flag/switch
- `folder1` and `folder2` are the arguments (the folders to copy from and to).

So, options/flags/switches are extra instructions, and arguments are the things the command acts on.

What is absolute path and relative path?

- An absolute path is the full path to a file or directory, starting from the root directory (/). It always begins with a / and gives the complete address. For example, if you are in /home/bhoomi and want to go to a directory called asia inside your home directory, the absolute path would be /home/bhoomi/asia.
- A relative path is the path in relation to your current directory. It does not start with a / and is based on where you are right now. For example, if you are in /home/bhoomi, you can simply run cd asia to enter the asia directory. Here, asia is a relative path because it is relative to your current locatio

Note: The alternative of this is “pushd” command

Difference between dir and pwd?

- The dir command is used to list the contents of a directory, showing files and folders inside it, similar to the ”ls” command in Linux.
- The pwd command stands for "print working directory." It shows the full path of the directory you are currently in. For example, if you are in /home/bhoomi, running pwd will display /home/bhoomi

What is mv Command??

Moves a file or directory from one place to another. The original is removed from its old location and placed in the new location. It can also be used to rename files

This command require two argument

1. The first argument is the source directory, current file location
2. The second argument is the destination directory, Where we want it to be moved

Using absolute path, this can be done easily using the command

```
mv /home/bhoomi/Europe/Morroco /home/bhoomi/africa/
```

or

Using relative path

```
mv Europe/Morroco Africa/
```

How to renamed directory name?

We use “mv” command

```
# mv source directory destination directory
mv Asia/India/Mumbai Asia/India/delhi
```

What is cp command do??

Makes a duplicate of a file or directory. The original stays in place, and a copy is created in the new location.

```
# mv source directory destination directory
mv Asia/India/delhi/city.txt Africa/Egypt/Cairo
```

The main difference between cp and mv in Linux is

- **cp (copy)**: Makes a duplicate of a file or directory. The original stays in place, and a copy is created in the new location.
- **mv (move)**: Moves a file or directory from one place to another. The original is removed from its old location and placed in the new location. It can also be used to rename files

How do you check if something is file or folder?

```
ls -l foldername/filename
```

You can tell if something is a file or a directory by looking at the very first character in the output of ls -l:

- If the first character is a -, it means it's a regular file.
- If the first character is a d, it means it's a directory.

What rm command do??

```
rm Cairo
```

This will delete the file named Cairo from your current directory.

Note: The rm command deletes files permanently, so be careful. If the file is protected, you may need to confirm before deleting it

What cat command do?

The cat command is used to display the contents of a file. For example, cat filename shows what’s inside that file

```
cat file.txt
```

What is “cat > filename” command do?

```
cat > file.txt
# > forward arrow symbol
```

The cat > command is used to create a new file or overwrite an existing file with new content.

For example, cat > filename lets you type text, and when you press Ctrl+D, it saves that text in the file. If the file already exists, its content will be replaced

What touch command do?

The touch command in Linux is used to create empty files

```
touch myfile.txt
```

what vim command do?

The vim command opens the Vim text editor, which lets you create, edit, and manage text files directly from the termina

```
vim file.txt
```

Some basic vim commands:

- “i” to enter insert mode and start typing.
- “Esc” to exit insert mode and return to command mode.
- “:wq” to save changes and quit.
- “:q!” to quit without saving.
- “dd” to delete a line.
- “u” to undo the last change.
- “yy” to copy (yank) a line, p to paste it.

What “more” or “less” command do?

you can view text file in scrollable manner

```
more file.txt
```

What ls(Long list) command do??

ls is useful to list the contents of directory in the linux file system

```
ls
ls -l #provide more details related for file and folder such as ownership or che
ck something is file or folder
ls -a #list all files including hidden and hidden files are those that start with a d
ot (.)
ls -ltr #to do reverse and print files from oldest to newest, use the
```

what mkdir(make directories) command do?

The mkdir command in Linux is used to create new directories (folders)

```
mkdir directories_name
mkdir snake frog  # This creates two directories: snake and frog (both at the s
ame level), not nested inside each other.
mkdir -p /home/bob/fish/salmon  # this is nested directories one inside anoth
er
#-p stand for parents
```