

Introduction to Devops

project :-

- A project is like taking on a task that has a clear goal, a plan, and a deadline.
- Simply getting something done, step by step, to achieve a clear result.

* what is an Application?

- An application is a software program designed to perform specific tasks for the user.

types of application.

- mobile app
- web app
- desktop app.

components of application

- [Frontend] Client side → Runs in: Browser

Technologies :-

- HTML
- CSS
- JavaScript
- React
- Angular

Software development life cycle

(SDLC)

- 27 Backend C Server side → Runs on: Sm. logic, processing, API handling user request. Technologies:-

- Java

- Node.js

- Python

- .Net

- Gro

- 37 Database
Storage application data.

Planning

- Type :-
- SQL
- MySQL
- PostgreSQL
- Oracle
- microsoft SQL Server

Requirement Analysis

System requirements

- 27 No SQL :-
- mongoDB
- Dynamo DB
- Redis

Design

- Create a blueprint for the software architecture.
- Define system components, interfaces, and work flows.

Planning

Deployment

Analysis

Design

Development

Testing

Maintenance

- Ensure design meets functional and non-functional requirements.

5] Code.

- Write the code based on design specifications.

6] Build System components and integrate them.

- Follow coding standard and Practices

5] Test.

- Validate the software against requirement and fix bugs or defects.
- Perform various testing types Can't, integration, system, user acceptance,

DevOps

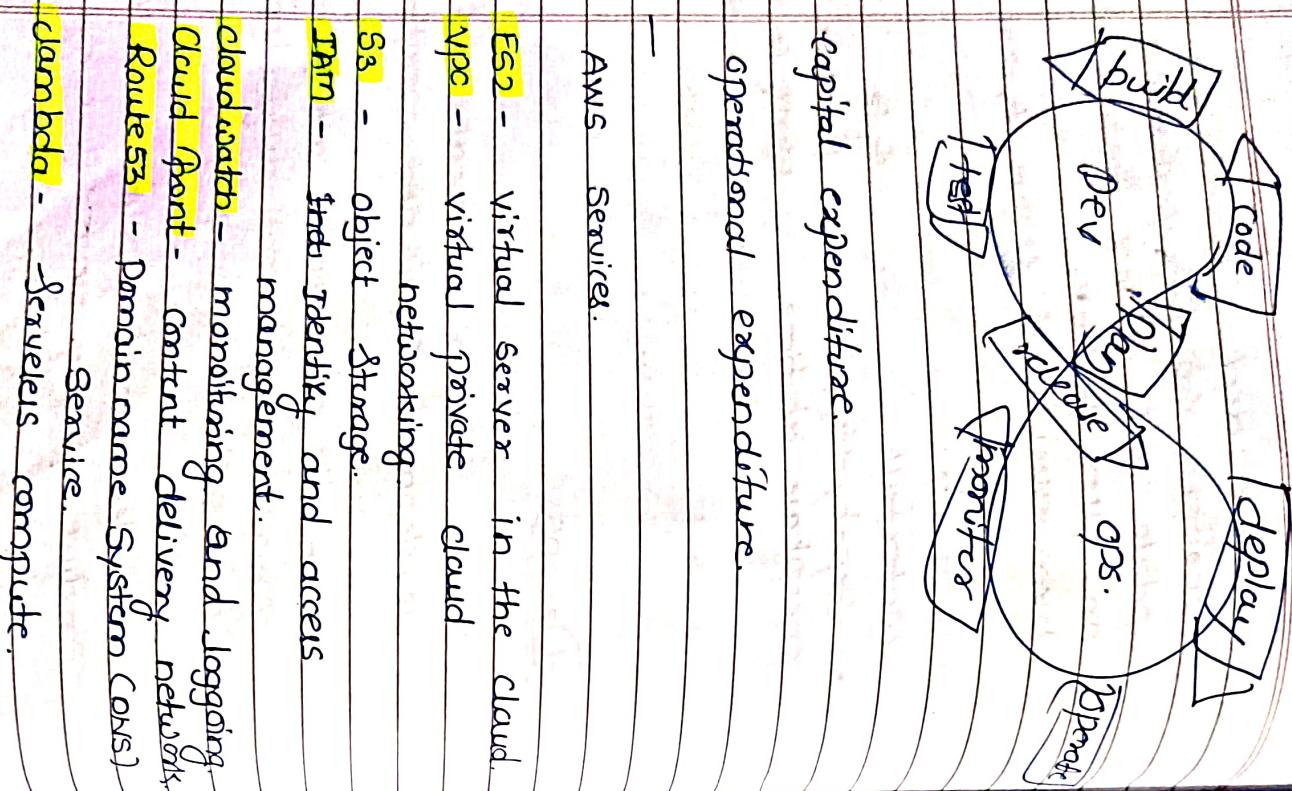
- DevOps is an combination of development (dev) and operations (ops) cycle.

6] Deploy

- Release the software to the production environment.
- Configure System and ensure smooth roll-out
- Provide user access and training if required.

T maintenance and Support

- monitor software performance.
- update and enhance features based on user feedback.
- Fix issues and ensure system reliable



Devops tool.

- 1) Git
- 2) Docker
- 3) Kubernetes (K8s)
- 4) Terraform
- 5) Jenkins
- 6) Patdag

Operating system:-

Q:- An (OS) is the system software that manages computer hardware and software resources.

hyper os

Batch os

Time-Sharing os.

Distributed os

Mobile os

what is server?

A Server is powerful computer or system that provide data, service, resources to the other computer.

I

Linux architecture has four components.

1] **Hardware :-** It consists of motherboard, CPU, HDD etc. I/O devices.

2] **Kernel :-** It is core part / core of OS. Kernel communicates with hardware.

3] **Shell :-** Provide interface to user to communicate with kernel by entering commands.
4] **Application / User :-** User interact with the system through variety application such as file manager etc.



Linux basic command.

↳ **su** - it switches to root user

↳ **Sudo -i**

↳ **whoami**

↳ **hostname**

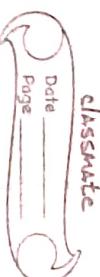
↳ **pwd**

↳ **ls**

↳ **uname -a**

Distribution of Linux.

- **Kali Linux**
- **Ubuntu**
- **Mint**
- **Suse**
- **Fedora**
- **Debian**



◦ display free memory.

↳ **free -h**

◦ display disk info.

↳ **df -h**

◦ list content

↳ **ls**

◦ shows command description.

↳ **man <command>**

◦ change dir.

↳ **cd <dir name>**

◦ back to previous

↳ **cd ..**

◦ check current shell

↳ **echo \$SHELL**

◦ exit the terminal

↳ **tskill exit**

◦ check CPU info.

↳ **lscpu**

◦ check disk / storage info.

↳ **df -h**

disk block devices

↳ **du -sh file/directory**

◦ check size of file /dir

↳ **du -sh file/directory**

files and dir

◦ creating files

↳ **touch example.txt**

→ create an empty file example.txt

↳ **cat > file2.txt**

→ creates a new file2.txt and waits for input. press control + D to save

Notes :-

◦ >; execute override the

File content

- >> will append

◦ echo "Hello world" > index.html

↳ create a file name index.html and write Hello world into it.

↳ echo "Hello world" > index.html

[2]

Vim Editor

default	Insert mode	Execution mode	visual mode
y - copy line	i → insert	: set nu	v → character
d - delete line	o → insert	→ set no.	b → character
cc - cut line	m → move	: set now	blk → block
p - paste	0 → insert below	remove no.	selection
	0 → insert above	:w → save	y → copy
gg or H → top	G or L → bottom	q → quite	d → delete
		sq → quite	
		sav and	
		quit or z	
gg → move to nth line			
dd → delete word	q! → forced		
uw → copy word	exit		
fw → highlight			
		g_o/oldword/newword	

- **Display file content**
 - ↳ cat index.html
- **Remove file / dir**
 - ↳ rm -rf file
 - ↳ rm -rf dir
 - ↳ r → recursive
- **verbose**
 - ↳ v → verbose
- **f → forcefully**
 - ↳ f → forcefully
- **copy file to another file and dir**
 - ↳ cp file1.txt file2.txt
- **moving a file to another dir**
 - ↳ mv index.html aux/
- **Renaming a file**
 - ↳ mv taylor.txt hello.txt
- **creating dir.**
 - ↳ mkdir
 - ↳ rm -rf

Types of user in Linux.

~~1 home~~

#add user Rasheed

Root user

- The root user is the superuser in Linux with unrestricted access to the entire system.
- They can perform any administrative task, including creating and deleting user, modifying files and configuring the system.

User id 0

[sudo -i]

(2)

System user.

- These are service account created by the system to manage and run specific processes or services.
- Do not have login shell by default
- Limited privileges, ensuring security for system services.

user id range 1 - 999
user id 1000 - 65535

Local user.

- These are the standard user operations.
- Each user have their own home directory (`/home/username`) and specific permission.

add a new user

→ adduser tony

or

Note :- using useradd home dir is not created.

↳ useradd <username>

use → useradd -m username

Set or change the password.

passwd <username>

Delete user

userdel -r username

- List all user
 - ↳ `cat /etc/passwd`
- Important file for users.
 - ↳ **/etc/passwd**
- Stores user account information.
 - ↳ Steve:x:1001:1001:Steve user:/home/steve:/bin/bash.
 - Field in /etc/passwd
- username :- The name of the user account.
- Password Placeholder
 - ↳ typically ~~x~~; indicating the password is stored in /etc/shadow.
- user id (uid)
 - A unique identifier assigned to the user

- 5) Group ID (GID)
 - The primary group associated with the user.
- 6) User info (Command Field)
 - Additional information, such as the full name of the user.
- 7) Home directory for the user
 - The default directory for the user
- 8) Login shell
 - The shell assigned to the user (e.g. /bin/bash)
- 9) Username
 - Encrypted password
- 10) Last time password change.
- 11) Min days between password change.
- 12) Max days between password change.
- 13) Warning days.
- 14) Inactive days.
- 15) Account expiry.
- 16) Future user.

Group management

Create a group.

change pass Policy. Description command -l username :- List current pass- aging info for the username.

change -m 30 username :- Set maximum number

of days between password changes to 30.

change -m 7 username :- Set minimum to 7

change -w 5 username :- Set the no. of days of warning before the password expires.

change -I 10 username :- Set account inactive after 10 days of password expiration.

change -E "2025-07-1"

username :- Set account expiration date.

[groupadd avengers]

Important files for groups.

Field in /etc/group

① Group name :- The name of the group. (e.g. avengers)

② password holders

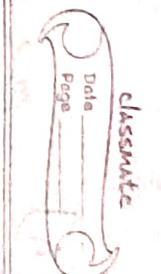
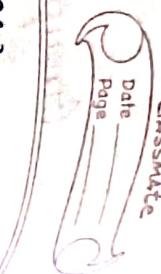
:- usually x, meaning the actual password (or any) is stored in etc/gshadow

③ Groups in card

:- A ~~seperated~~ unique numerical no. for the group.

④

Groups members. :- A comma-separated list of users in the group.



field in /etc/group
group name : The name of the group.

2) encrypted password :- if a group has a password, it is stored here,

3) Group administrators - users who can manage the group.

4) Group members :- Regular users in the group.

Add a user to a group

* usermod -aG groupname username
example :-

usermod -aG avengers natasha

or

→ gpasswd -a username groupname
→ gpasswd -d natasha avengers

* Remove user from the group

gpasswd -R steve, thor, bruce avengers

→ Remove user from a group

gpasswd -A ' ' avengers

Add multiple users to a group
Note :- this will remove previous users.

→ gpasswd -m steve, thor, bruce avengers

→ Remove user from the group

→ gpasswd -d bruce avengers.

→ assign an admin to a group

→ gpasswd -A ' ' avengers.

→ Remove an admin from a group.

→ gpasswd -A ' ' avengers.

→ Delete a group.

→ groupdel -f avengers.

(4) Linux file permission

- permission / determine who can access the file.

- And specify who can read/write, modify files/directories on a system.

**Command

二、

on 11

* to check perpendicular finite dir

permission.

ll -d dirname

↳ check particular file permission

All filename

~~Line file~~ ~~Line count~~ ~~Line file~~

-rwxr--r-- 1 abhi abhi 9482 July 05 19

filename directory file or directory.

Permissions group file create
: add per owner file and

grows finer

File types in linux

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Date _____
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Symbol	file type	Description
-	Normal file	Text files, binary files etc.
d	directory	represents a folder containing other files or folders.
l	link file	symbolic link pointing to another file or folders.
b	block device	used for block storage devices like hard disks.
c	character device	handles data characters eq. keyboards
p	Pipe	used for inter-process communication.

- * permission break down.
- | permission | symbol value | Description |
|------------|--------------|---|
| Read | 4 | open, view, |
| Write | 2 | list the files |
| Execute | 1 | run the file or edit, modify a program. |
- * example
- The directory demo is owned by user root. To change ownership to user abhi use the command.
- 1) change owner =
Syntax :- chown username filename
chown abhi demofile.txt.

- 2) change group owner =
chgrp groupname filename
chgrp dev demofile.txt.

* ownership in linux

- In Linux, file ownership is divided into three categories.
- ① **owner** : The user who created the file
 - ② **Group** : The primary group of the file owner
 - ③ **Other** : All other users on the system

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4 Umask

The **Umask** command is used to set default permission for files and directories.

Root User: Umask 022

- ① File permission $644 \rightarrow rwo-rw-r-$
- ② Director $\rightarrow 755 \rightarrow rwx-rx-r-$

* Example :- (Directory)

maximum permission - default permission = Umask

$$\begin{array}{l} \circ 777 - 755 = 022 \\ \circ 777 - 032 = 745 \end{array}$$

* Ex (file)

$$666 - 644 = 022$$

- ① Directory 755
- ② Symbolic

chmod 0 = rwx, g = rwx, o = rwx

- ① File $664 \rightarrow rwo-rwo-r--$
- ② Director $775 \rightarrow rwx-rwx-r-x$

$$775 \rightarrow rwx-rwx-r-x$$
$$\rightarrow 777 - 775 = 002$$

5 Root user

- ① file $\rightarrow 664 \rightarrow rwo-rw-r-$
- ② dir $\rightarrow 775 \rightarrow rwx-rwx-r-x$

6 Local user

- ① file $\rightarrow 664 \rightarrow rwo-rw-r-$
- ② dir $\rightarrow 775 \rightarrow rwx-rwx-r-x$

7 Root User

- ① File permission 664 (rwo-rwo-r--)
- ② Symbolic

chmod 0 = rwo, g = rwo, o = r demo.txt

- Numeric

chmod 664 demo.txt

- ② Directory 755

Symbolic

chmod 0 = rwx, g = rwx, o = rwx

- ① File $666 - 664 = 002$

chmod 755 <dir>

numeric

chmod 755 <dir>



local user 664 Crw-rw-r--)

① File

Symbolic

chmod ~~664~~ u=rw, g=rw, o=r demo.txt

• numeric

chmod 664 demo.txt.

② Directory

6755 Crwx rwx rwx

chmod u=rwx, g=rwx, o=rwx /dir

• numeric

chmod 775 /dir

View permission

getfacl filename

Remove permission

setfacl -x u:username filename

Hard Link

Soft Link
Ask as backup
Ad as Shortcut

file size. Same as original
File.

Different.

inode no.
Same as original no. Different from original.

File deletion:- The hard link remains. The soft link becomes unaffected if the original is deleted. If the original file is deleted.

Act :- Access Control List

It is used to grant specific

permission to user for particular files

or directories

command :-

Set permission,

setfacl -m u:username:rwx filename

Directions: Hardlink to directory & soft are possible
are not possible.

Link
Affects the link
count
does not affect
the link count.

Count
Increase or decrease
by 1

* Hard Link command
ln filename hardlink

* Soft link File.
ln -s filename softlink

- c → create new archive
- v → verbose
- p → filename
- z → gzip (Reduce the file size)
- j → -bzip compression

archiving & compile all
compression ? reduce file size