



- Linux is an open-source, Unix-like operating system (OS) that is widely used in servers, desktops, and embedded devices. It was created by Linus Torvalds in 1991 and has grown into one of the most popular OS platforms due to its flexibility, stability, and security.



## Key features of linux

- **Open source**
- **Multiuser and multi-tasking**
- **Highly secure**
- **Portability**
- **Customisation ( ex-RHEL, ubuntu, Debian, etc)**

- **RHEL 9**



- **Red Hat Enterprise Linux (RHEL)** is a commercial distribution designed for businesses and enterprises. RHEL 9 offers:
  - **High stability** and support for enterprise-grade applications.
  - **Enhanced security** with features like SELinux and firewall.
  - **Performance optimizations** for servers and cloud environments.



## 1. File system in RHEL 9

The file system in Linux determines how files are named, stored, and organized on storage devices.

# Key components

- **Ext4** (Fourth Extended File System): Default file system in RHEL 9.
- **XFS**: High-performance journaling file system, preferred for large storage systems.
- **/ (Root Directory)**: Top-level directory of the file system.
- **Mount Points**: Points where storage devices (like partitions) are integrated into the directory tree.

# Directory structure

**/home**: User data and personal files.

**/etc**: Configuration files.

**/var**: Log files and variable data.

**/usr**: User programs and system utilities.

**/tmp**: Temporary files.

## 2. Configuration files



Configuration files define how services and applications behave on the system.



# Examples:

**/etc/fstab**: Auto-mount partitions during boot.

**/etc/hosts**: Maps IP addresses to hostnames.

**/etc/passwd**: User account information.

**/etc/shadow**: Stores encrypted passwords.

**/etc/systemd/system/**: Configuration for system services.



### **3. Basic commands in RHEL 9**

Linux commands are essential to interact with the system. Some Basic commands for different operations are listed below.

# File operations :

List	Copy	Move/rename	Remove
<b>Ls</b> : List files and directories.	<b>Cp</b> : Copy files.	<b>Mv</b> : Move/rename files.	<b>Rm</b> : Remove files.

# Directory operations:

## Create

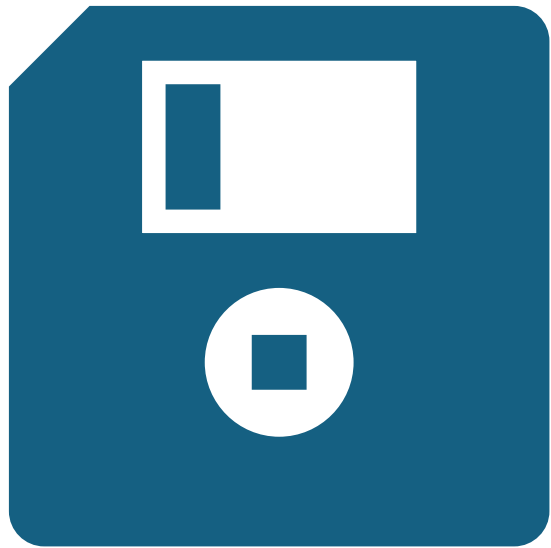
**mkdir**: Create directories.

## Change

**Cd**: Change directory.

## Print

**Pwd**: Print the current directory

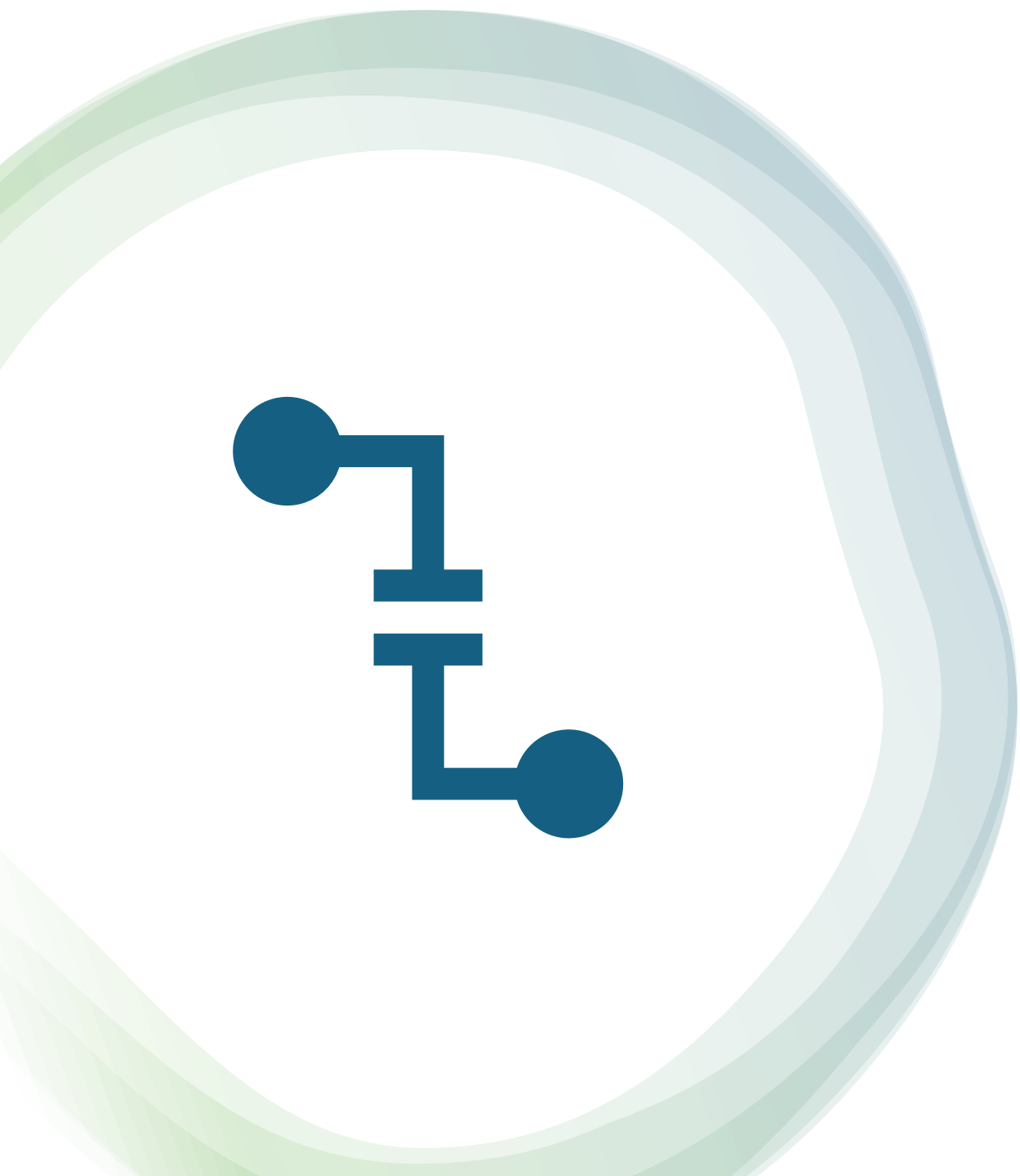


## System information:

**Uname -a:** Display system information.

**Df -h:** Show disk space usage.

**Free -m:** Display memory usage.



## User management:

**Whoami:** Show current user.

**Adduser:** Add new user.

**Passwd:** Change user password.

## 4. Linux security in RHEL 9



RHEL provides various tools and practices to ensure system security.



# SELinux (Security-Enhanced Linux):

- Mandatory Access Control (MAC) mechanism to restrict unauthorized actions.

## Commands:

**getenforce**: Check SELinux mode.

**Setenforce 1/0**: Enable or disable SELinux.

# Firewall (firewalld):

Controls incoming and outgoing network traffic.

## Commands:

**firewall-cmd --state**: Check firewall status.

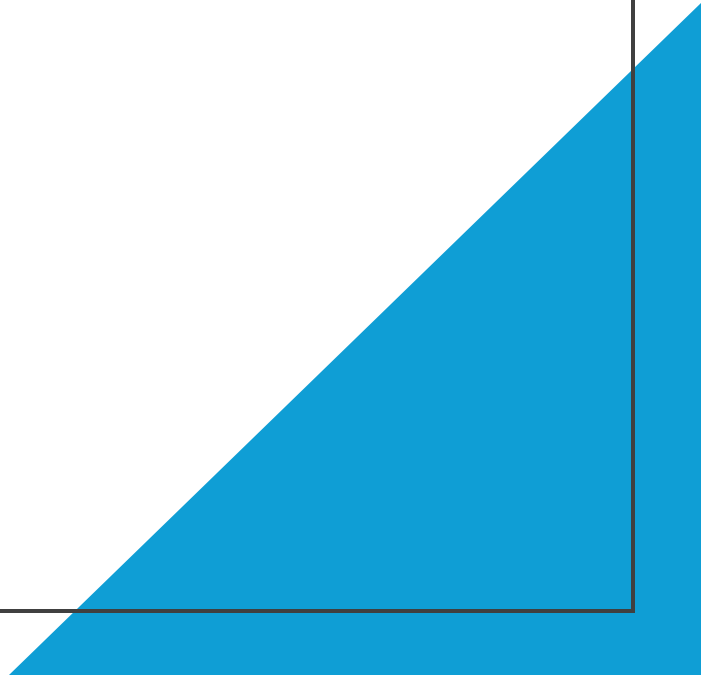
**Firewall-cmd --add-port=80/tcp --permanent**: Open HTTP port.

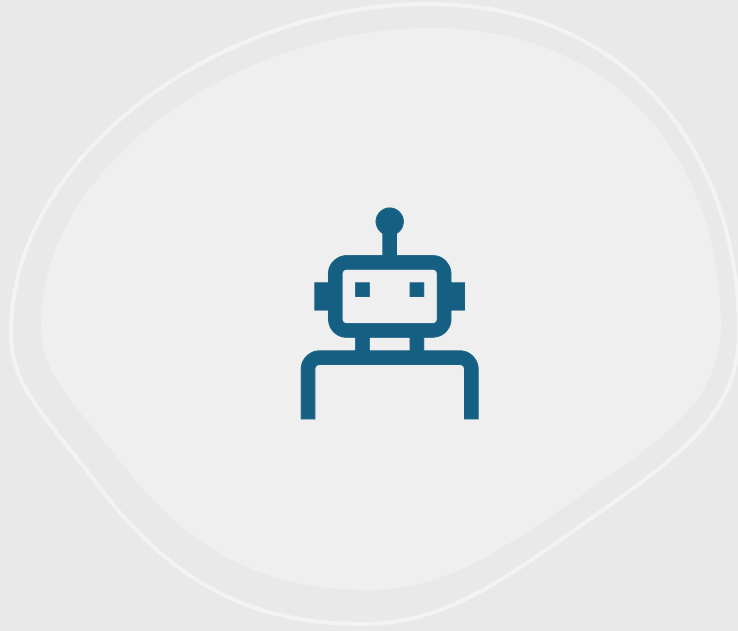


# User permission:

**Chmod:** Change file permissions.

**Chown:** Change file ownership.





## **5. File type in RHEL 9:**

Linux supports different types of files that serve various purposes.

# File type:



1. **Regular File (-)**: Stores data (e.g., text, binaries). Example: `/home/vicky/document.txt`
2. **Directory (d)**: Contains other files or directories. Example: `/etc`
3. **Symbolic Link (l)**: Points to another file or directory. Example: `/home/vicky/link_to_file`
4. **Block Device (b)**: Represents block devices like hard drives. Example: `/dev/sda`
5. **Character Device (c)**: Represents character-based devices like terminals. Example: `/dev/tty`
6. **Socket (s)**: Used for inter-process communication. Example: `/var/run/docker.sock`
7. **FIFO/Named Pipe (p)**: Used for communication between processes. Example: `/tmp/named_pipe`

# Physical disk and logical disk

## Physical disk :

It Refers to the actual hardware device used for storage, such as a hard disk drive (HDD), solid-state drive (SSD), or external storage device.


## Logical disk :

It Refers to an abstract or virtual representation of storage created by organizing multiple physical storage units. This includes:

Partition, RAID volume ,  
Filesystems,etc.



# Creating Logical Disks from Physical Disks



**Logical Volume Manager (LVM)** in RHEL 9 allows the creation of flexible logical disks.

# Steps to Create a Logical Disk:

1. Identify Physical Disk:

**Command:** `lsblk`

2. Create Physical Volume (PV):

`pvcreate /dev/sdX`

3. Create Volume Group (VG):

`vgcreate my_vg /dev/sdX`

4. Create Logical Volume (LV):

`lvcreate -L 10G -n my_lv my_vg`

5. Format the Logical Volume:

`mkfs.ext4 /dev/my_vg/my_lv`

6. Mount the Logical Volume:

`mkdir /mnt/my_lv`

`mount /dev/my_vg/my_lv /mnt/my_lv`

# Thank you

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