Documentation

Linux Introduction

Linux is an open-source, Unix-like operating system kernel that serves as the foundation for a variety of distributions (distros). It was created by Linus Torvalds in 1991 and has since become one of the most widely used operating systems in the world, powering servers, desktops, mobile devices, and embedded systems.

Key Features of Linux

- Open-source and free to use
- Multi-user and multitasking capabilities
- Strong security and stability
- Extensive software support
- Customizability with various distributions
- Command-line interface (CLI) and graphical user interface (GUI) support

Popular Linux Distributions

- Ubuntu – User-friendly, widely used for desktops and servers
- Debian – Stable and reliable, preferred for servers
- Fedora – Cutting-edge technology, supported by Red Hat
- CentOS – Enterprise-grade, based on Red Hat Enterprise Linux (RHEL)
- Arch Linux – Minimalist and highly customizable
- Kali Linux – Security-focused, used for penetration testing

Basic Linux Commands

- `ls` – List files and directories
- `cd` – Change directory
- `pwd` – Print working directory
- `cp` – Copy files and directories
- `mv` – Move or rename files and directories
- `rm` – Remove files and directories
- `chmod` – Change file permissions
- `chown` – Change file ownership
- `ps` – Display active processes
- `kill` – Terminate a process
- `grep` – Search for patterns in text
- `tar` – Archive files
- `wget` – Download files from the web
- `apt` or `yum` – Package management commands for Debian and Red Hat-based distributions

File System Structure Linux follows a hierarchical file system structure:

`/` – Root directory

`/bin` – Essential user binaries

`/etc` – Configuration files

`/home` – User home directories

`/var` – Variable data such as logs

`/usr` – User applications and utilities

`/boot` – Boot-related files

`/dev` – Device files

`/tmp` – Temporary files

User and Permission Management

- Users: `adduser`, `deluser`, `passwd`
- Groups: `groupadd`, `groupdel`, `usermod`
- Permissions: `chmod`, `chown`, `chgrp`
- Access Control: `sudo`, `su`

Networking in Linux

- `ifconfig` or `ip` – Configure network interfaces
- `ping` – Test network connectivity
- `netstat` – Display network connections
- `ssh` – Secure remote login
- `scp` – Secure copy over SSH

Advantages of Linux

- Free and open-source
- Highly secure and stable
- Performance efficiency
- Scalability and flexibility
- Large community support