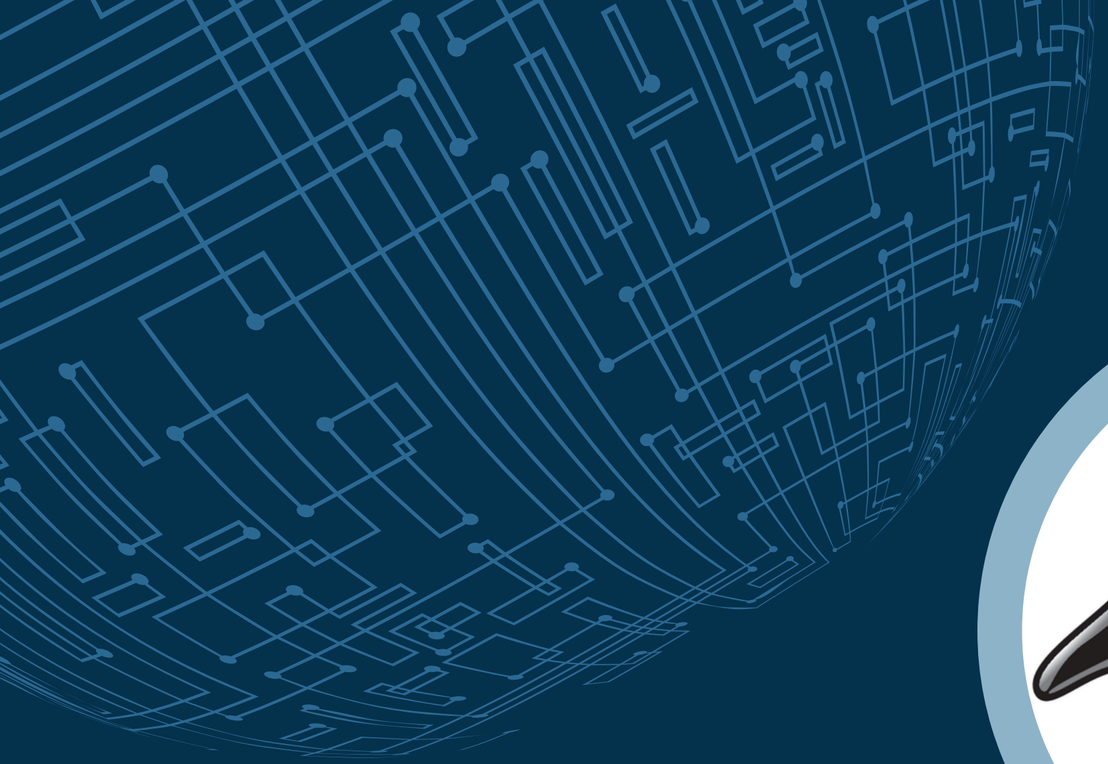

Welcome To
Linux for DevOps

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About Mentor

MD NASIR UDDIN

I am a DevOps engineer specializing in Cloud and DevOps practicies with 4x Kubernetes and 2x AWS certified. I have experience with various DevOps tools, including Docker, Kubernetes, Terraform, and CI/CD pipelines, etc which help me manage and deploy containerized applications effectively. I’m passionate about using DevOps practices to streamline development and deployment processes.

Md Nasir Uddin
Manager, DevOps
4x Kubernetes, 2x AWS, RHCSA, RHCE, NSE4

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History of Linux

BIRTH OF UNIX (1969)

Linux's origins trace back to Unix, a multiuser, multitasking OS created by AT&T Bell Labs

GNU PROJECT (1983)

Richard Stallman started the GNU Project to create a free Unix-like OS. Many tools used in Linux today originated from GNU.

BIRTH OF LINUX (1991)

Linus Torvalds, a Finnish student, developed Linux as a free, open-source kernel while studying at the University of Helsinki, starting as a personal project.

GROWTH (1990S-2000S)

Linux quickly gained popularity among developers for its open-source nature, stability adaptability, with community and organizational support driving its growth

MODERN LINUX

Today, Linux powers smartphones, web servers, supercomputers, cloud infrastructure, and IoT devices. Distributions like Ubuntu, CentOS, Kali Linux etc.

Why Linux is the Most Popular Operating System?

- Open Source: Free to use, modify, and distribute.
- Stability: Widely used in servers and critical applications for its robustness.
- Security: Quick identification & patching of vulnerabilities reduce malware risks.
- Flexibility: Customizable for various needs, from lightweight to powerful setups.
- Community Support: Extensive documentation and forums for troubleshooting.
- Diverse Ecosystem: Various distributions for different use cases.
- Industry Adoption: Used by major companies, reinforcing its credibility.

What is linux kernel?

- Kernel is the core component of the Linux operating system.
- It is responsible for managing system resources, such as memory, processes, input/output devices, and hardware drivers.
- The kernel acts as an interface between the hardware and the software running on a computer.

Here are some key functions of the Linux kernel

- Process Management: Handles the creation, scheduling, and termination of processes, ensuring efficient CPU usage.
- Memory Management: Manages system memory allocation and deallocation, including virtual memory, paging, and caching.
- File System Management: Provides a hierarchical file system interface, allowing for file operations like reading, writing, and permission handling.
- Device Management: Facilitates communication between the system and hardware devices through device drivers.
- Networking: Manages network connections, data transmission, and protocols, enabling communication between systems.
- Inter-process Communication (IPC): Provides mechanisms for processes to communicate and synchronize with each other.
- Security and Access Control: Implements user authentication, permissions, and security policies to protect system resources.

Linux Boot Sequence

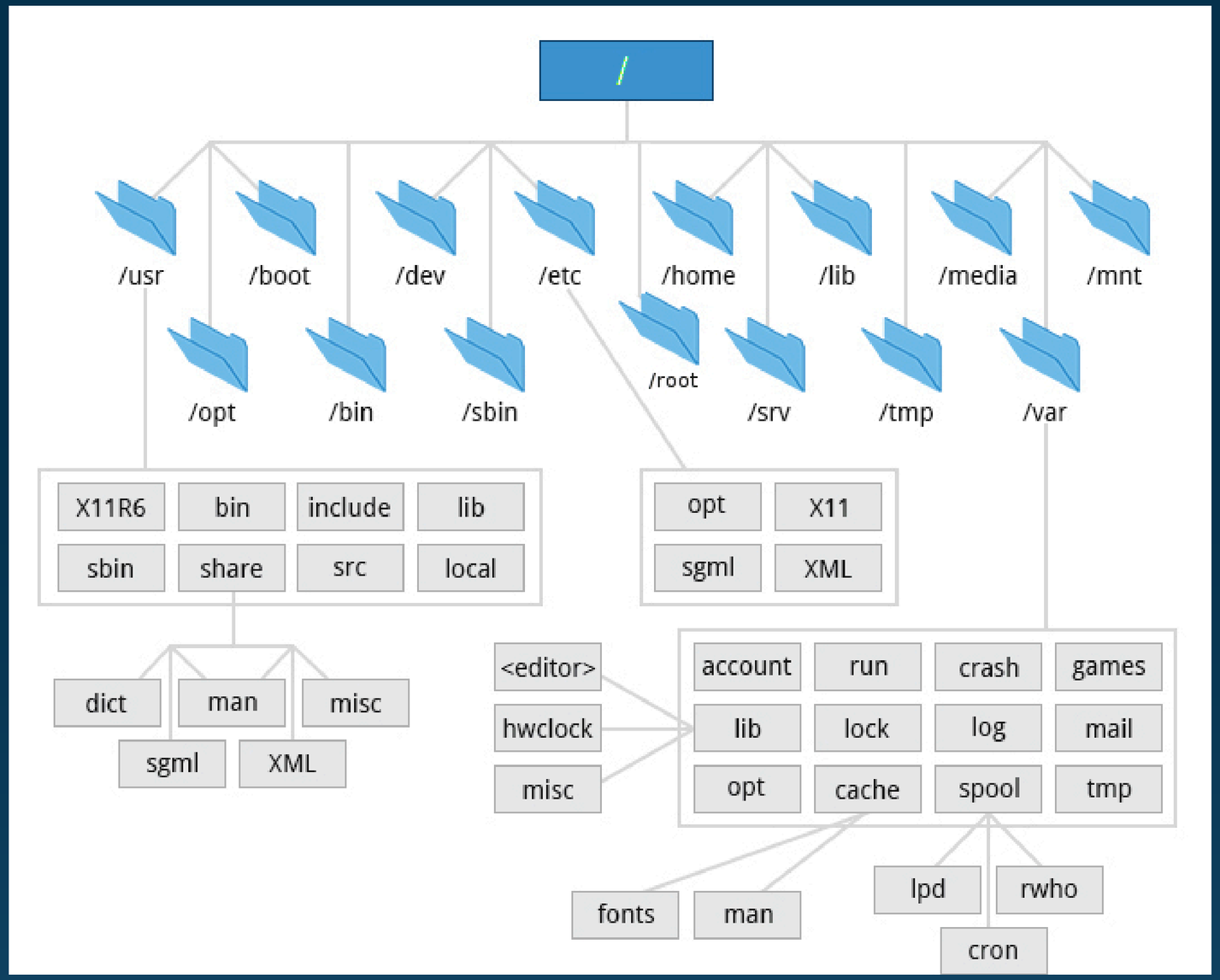
- BIOS/UEFI: Performs hardware checks (POST), initializes components, and locates the bootable device.
- Bootloader: Loads the Linux kernel (e.g., GRUB) and may present a menu for OS selection.
- Kernel Initialization: Loads the kernel, initializes hardware, mounts the root filesystem, and starts the first program.
- Init Process: Starts the init process (PID 1) to launch system services and user processes.
- System Initialization: Runs initialization scripts to configure services and networking.
- Runlevel/Target: Enters a specific runlevel or target to determine active services.
- User Login: Presents a login prompt for user authentication.
- User Session: Sets up the user environment, allowing access to applications.

Linux Filesystems and Hierarchy

Linux supports various filesystems, each with unique features. Some common ones include:

- ext4: The default filesystem for many Linux distributions, known for stability and performance.
- Btrfs: A modern filesystem with features like snapshots, volume management, and dynamic inode allocation.
- XFS: A high-performance filesystem optimized for large files and parallel I/O operations.
- FAT32: Commonly used for USB drives and compatibility with other operating systems.
- NTFS: Used primarily for Windows partitions but supported by Linux for read/write access.

Linux Filesystem Hierarchy



Kernel Space and User Space

- Kernel space is a privileged area of the operating system that runs in trusted mode.
- It includes the Linux kernel and its modules.
- The OS has direct access to hardware and performs critical operations.
- Kernel space code executes in a protected environment to ensure stability, security, and resource control.
- The user space is where user applications and processes run.
- It is a non-privileged area for applications and user-level programs.
- User space processes cannot directly access hardware resources or perform low-level operations.
- They interact with the kernel through system calls, requesting specific services or resources.

Thank You

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