

```
team@itsfoss:~$ ls -la
total 128
drwxr-x--- 21 team team 4096 Mar  6 15:24 .
drwxr-xr-x  3 root root 4096 Mar  2 16:14 ..
-rw-----  1 team team 3382 Mar  6 15:25 .bash_history
-rw-r--r--  1 team team  220 Mar  2 16:14 .bash_logout
-rw-r--r--  1 team team 3963 Mar  6 15:10 .bashrc
drwx----- 15 team team 4096 Mar  6 15:15 .cache
drwx----- 19 team team 4096 Mar  6 15:25 .config
drwxr-xr-x  2 team team 4096 Mar  2 16:32 Desktop
drwxr-xr-x  2 team team 4096 Mar  2 16:32 Documents
drwxr-xr-x  4 team team 4096 Mar  6 15:11 Downloads
-rw-rw-r--  1 team team   39 Mar  6 10:24 files
drwxr-xr-x  2 team team 4096 Mar  6 09:37 .fontconfig
drwx-----  2 team team 4096 Mar  6 15:31 .gnupg
-rw-rw-r--  1 team team 15377 Mar  6 12:13 install.sh
drwxr-xr-x  3 team team 4096 Mar  6 10:14 .java
drwxr-xr-x  6 root root 4096 Dec 29 13:14 LanguageTool-6.0-stable
-rw-rw-r--  1 team team  265 Mar  6 10:21 languagetool.cfg
-rw-----  1 team team   20 Mar  6 15:24 .lesshst
```

# What is Unix?

Unix is a powerful and versatile operating system known for its portability and robust nature. It's the foundation of many modern operating systems like macOS and Linux, influencing the development of popular technologies like the internet.

 by Ranjeet Kaur

# History and Development

1

## Early Roots

Developed in the late 1960s at Bell Labs, Unix was initially a research project aimed at creating a user-friendly and efficient operating system.

2

## First Release

The first version of Unix, known as Version 7, was released in 1979, making it widely accessible and marking a significant milestone.

3

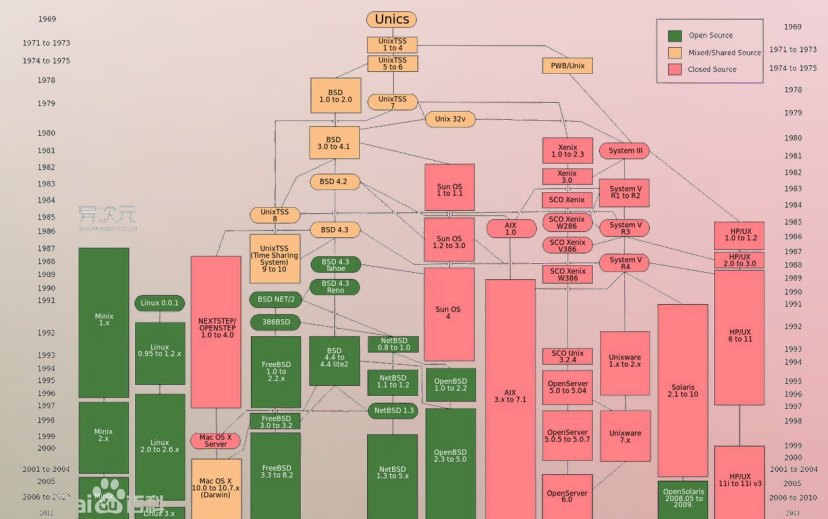
## Open Source Revolution

The open source movement played a pivotal role in the evolution of Unix. Linux, a Unix-like operating system, gained popularity due to its free and open-source nature.

4

## Modern Unix

Today, Unix continues to evolve, powering everything from servers to supercomputers and influencing the development of modern operating systems.



# Unix Operating System Fundamentals

## Kernel

The core of the Unix system, responsible for managing hardware resources and providing a platform for applications.

## Shell

A command-line interpreter that allows users to interact with the kernel and execute commands.

## Utilities

A collection of programs that perform various tasks, from file manipulation to system administration.

# Unix File System and Directory Structure

1

## Root Directory

The top-level directory represented by a forward slash (/), containing all other directories and files.

2

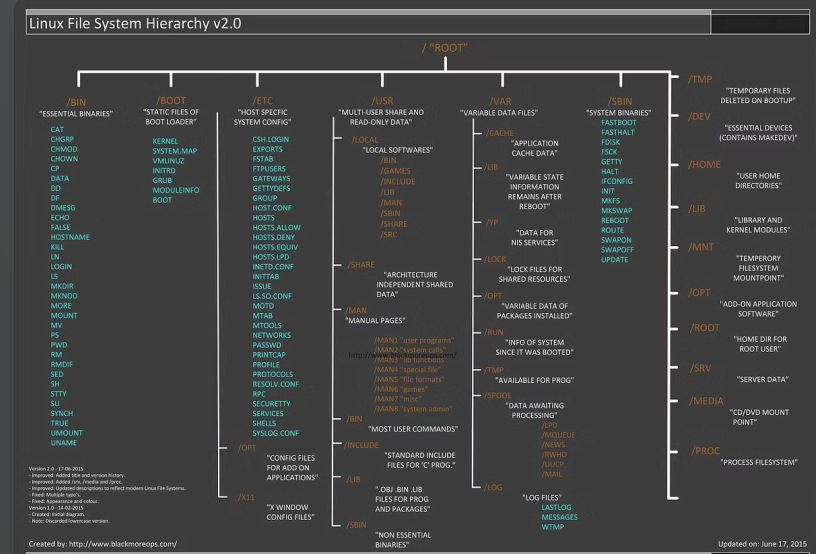
## Hierarchical Structure

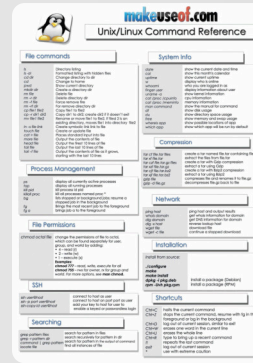
Organized in a tree-like structure, with directories branching out from the root directory.

3

## File and Directory Permissions

Controls access to files and directories, granting specific permissions to users and groups.





# Unix Commands and Utilities

## 1 Basic Commands

Commands like ls, cd, mkdir, rm, and cp for file manipulation, directory navigation, and more.

## 2 Text Processing

Utilities like grep, sed, and awk for searching, replacing, and manipulating text data.

## 3 System Administration

Commands like top, ps, and kill for monitoring and managing system processes.

## 4 Networking Tools

Utilities like ping, netstat, and ifconfig for network connectivity testing and configuration.

# Unix Shells and Scripting

```
2. vagrant@m: ~ (ssh)
vagrant@m:~$ cat /etc/shells
# /etc/shells: valid login shells
/bin/sh
/bin/dash
/bin/bash
/bin/rbash
/usr/bin/screen
vagrant@m:~$
vagrant@m:~$ tail -4 /etc/passwd
sshd:x:109:65534::/var/run/sshd:/usr/sbin/nologin
vagrant:x:900:900:vagrant,,,:/home/vagrant:/bin/bash
vboxadd:x:999:1:./var/run/vboxadd:/bin/false
flood x:1000:1000:./home/flood:/bin/sh
vagrant@m:~$
vagrant@m:~$
vagrant@m:~$
vagrant@m:~$ sh
$
$
$

```

vboxadd is a service account and does not need a shell.

In order to disable login of this account shell is replaced with /bin/false

Use shell's name to change it in runtime.

Here shell is changed to sh from bash

## Bourne Shell (sh)

The original Unix shell, still widely used and serves as the basis for many other shells.

## Bourne Again Shell (bash)

A powerful and popular shell known for its extensive scripting capabilities and interactive features.

## C Shell (csh)

A shell that emphasizes scripting and features a syntax similar to the C programming language.

## Korn Shell (ksh)

A shell that combines features from both sh and csh, known for its advanced scripting capabilities.

# Unix Security and Permissions



## User Permissions

Controls what each user can do with files and directories.



## Other Permissions

Determines the access rights for users who are not the owner or part of the group.



## Group Permissions

Allows you to grant specific permissions to groups of users.



## Root User

The administrator account with unrestricted access to the system.

### Unix/Linux Command Reference

<b>File commands</b>	<b>System Info</b>
<code>ls</code> <code>ls -al</code> <code>cd dir</code> <code>cd</code> <code>pwd</code> <code>mkdir dir</code> <code>rm file</code> <code>rm -r dir</code> <code>rm -f file</code> <code>rm -rf dir</code> <code>cp file1 file2</code> <code>cp -r dir1 dir2</code> <code>mv file1 file2</code>  <code>ln -s file link</code> <code>touch file</code> <code>cat &gt; file</code> <code>more file</code> <code>head file</code> <code>tail file</code> <code>tail -f file</code>	<code>date</code> <code>cal</code> <code>uptime</code> <code>w</code> <code>whoami</code> <code>finger user</code> <code>uname -a</code> <code>cat /proc /cpuinfo</code> <code>cat /proc /meminfo</code> <code>man command</code> <code>df</code> <code>du</code> <code>free</code> <code>whereis app</code> <code>which app</code>
<b>Process Management</b>	<b>Compression</b>
<code>ps</code> <code>top</code> <code>kill pid</code> <code>killall proc</code> <code>bg</code>  <code>fg</code> <code>fg a</code>	<code>tar cf file.tar files</code> <code>tar xf file.tar</code> <code>tar czf file.tar.gz files</code> <code>tar xzf file.tar.gz</code> <code>tar cjf file.tar.bz2</code> <code>tar xjf file.tar.bz2</code> <code>gzip file</code> <code>gzip -d file.gz</code>
<b>File Permissions</b>	<b>Network</b>
<code>chmod octal file</code>	<code>ping host</code> <code>whois domain</code> <code>dig domain</code> <code>dig -x host</code> <code>wget file</code> <code>wget -c file</code>
<b>SSH</b>	<b>Installation</b>
<code>ssh user@host</code> <code>ssh -p port user@host</code> <code>ssh-copy-id user@host</code>	<code>dpkg -i pkg.deb</code> <code>rpm -Uvh pkg.rpm</code>
<b>Searching</b>	<b>Shortcuts</b>
<code>grep pattern files</code> <code>grep -r pattern dir</code> <code>command   grep pattern</code> <code>locate file</code>	<code>Ctrl+C</code> <code>Ctrl+Z</code> <code>Ctrl+D</code> <code>Ctrl+W</code> <code>Ctrl+U</code> <code>Ctrl+R</code> <code>!!</code> <code>exit</code> <code>*</code>

# Unix in the Modern Computing Landscape

## Servers

Unix-based systems are widely used as servers, handling web services, databases, and other critical applications.

## Supercomputers

Unix-based systems are often used for high-performance computing tasks, such as scientific simulations and data analysis.

## Embedded Systems

Unix-like operating systems are used in a variety of embedded systems, such as network routers and industrial control systems.

## Mobile Devices

Unix-based operating systems, such as Android, power millions of mobile devices worldwide.

