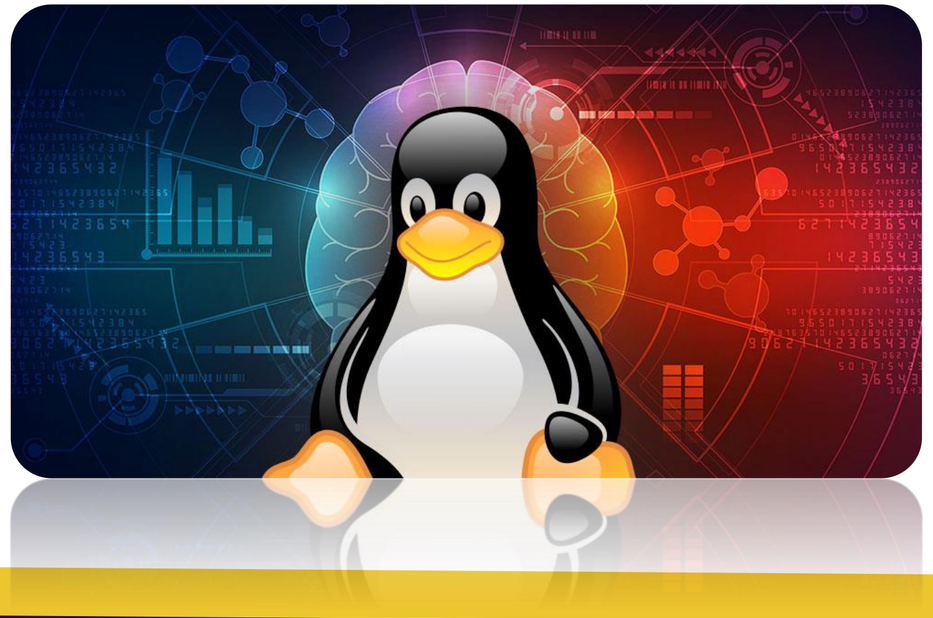
Linux

Presentation



Presented By:
Zahra Bakhshandeh

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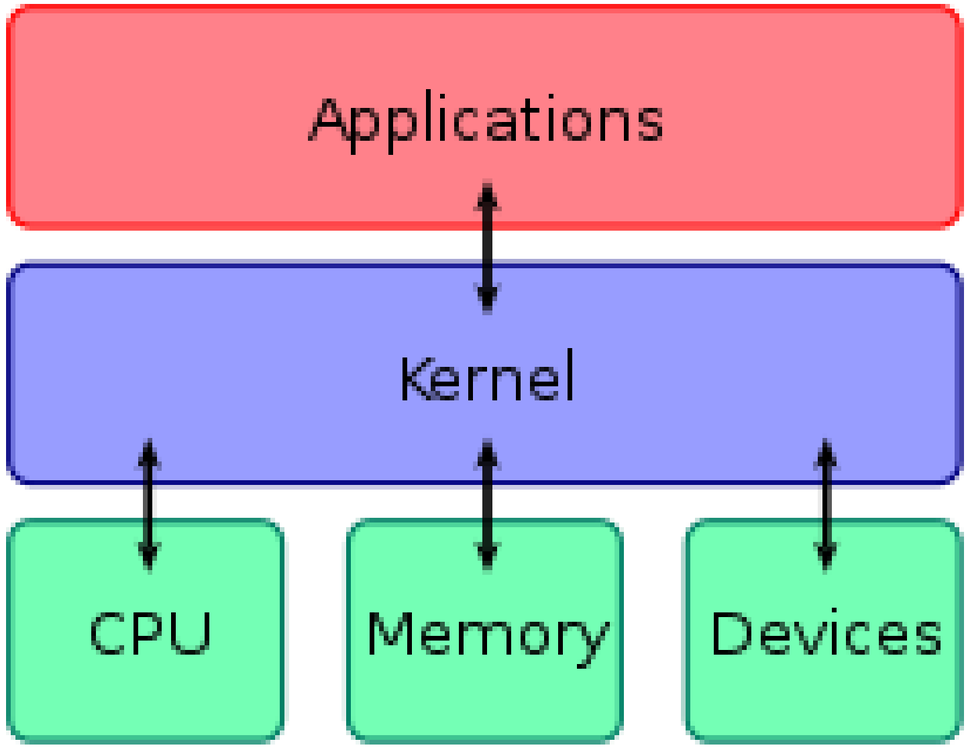
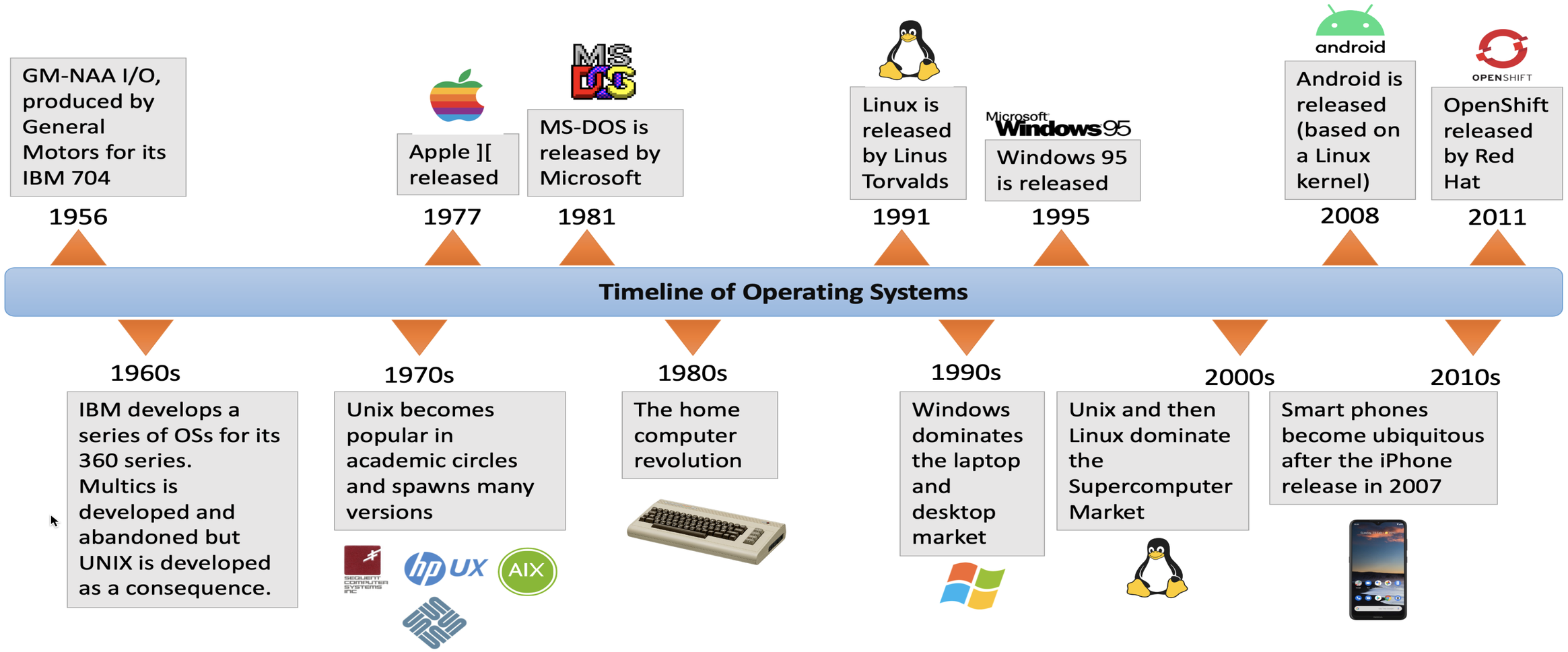
Introduction

Operating System

An Operating System (OS) is an interface between a computer user and computer hardware



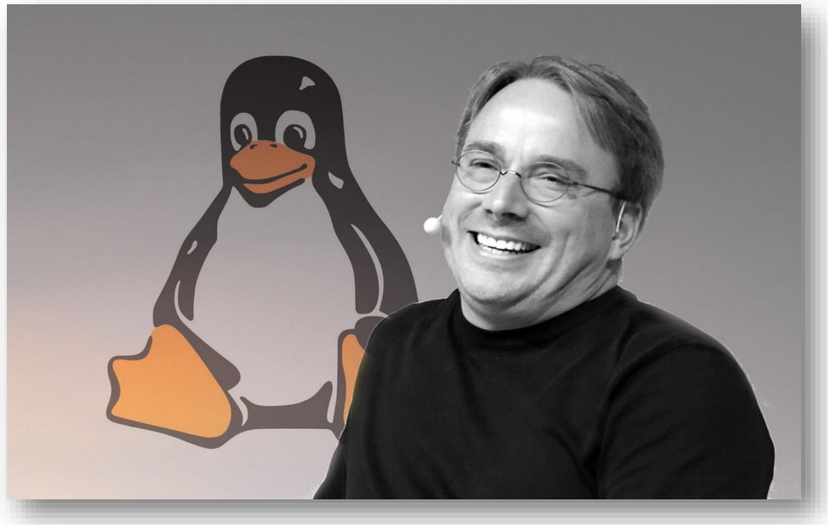
Os Time Line


GM-NAA I/O, produced by General Motors for its IBM 704
1956
Apple][released
1977
MS-DOS is released by Microsoft
1981
Linux is released by Linus Torvalds
1991
Windows 95 is released
1995
Android is released (based on a Linux kernel)
2008
OpenShift released by Red Hat
2011
Timeline of Operating Systems
1960s
IBM develops a series of OSs for its 360 series. Multics is developed and abandoned but UNIX is developed as a consequence.
1970s
Unix becomes popular in academic circles and spawns many versions
1980s
The home computer revolution
1990s
Windows dominates the laptop and desktop market
2000s
Unix and then Linux dominate the Supercomputer Market
2010s
Smart phones become ubiquitous after the iPhone release in 2007

Introduction

- Linux is a free and open-source operating system
  - ✓ developed by Linus Torvalds
  - ✓ in 1991

- Linus Torvalds wanted to create a Unix-like operating system that would be freely available and could be modified by anyone



Why Linux?

- **free and open-source software**
  - ✓ anyone can use, modify, and distribute it without cost or restriction
- **stability, security, and flexibility**
  - ✓ making it a reliable choice for servers, supercomputers, and embedded systems
- **command-line interface (CLI) and graphical user interfaces (GUIs)**
  - ✓ Linux offers a powerful command-line interface (CLI) and a variety of graphical user interfaces (GUIs), making it suitable for both advanced users and beginners

Why Linux?

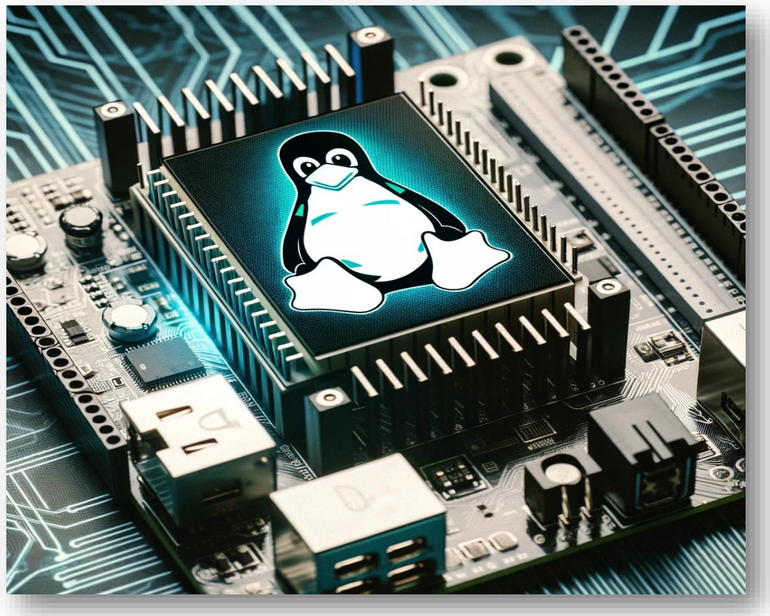
- **Hardware, software and community**
  - ✓ Linux supports a wide range of hardware and software, and has a large and active community of developers and users who contribute to its development and support
- **Linux is constantly evolving and improving**
- **Linux for server**
  - ✓ estimates ranging from 70% to 90% of all servers running on some form of Linux
- **desktop operating system**
  - ✓ Linux accounts for around 2% to 3% of the desktop operating system market share

Why Linux?

- ❖ **Install in Arduino**

- ❖ **Linux is everywhere**

✓ **Linux has since become a global phenomenon, powering everything from smartphones, tablets, and smart TVs, to cars, planes, and space stations**



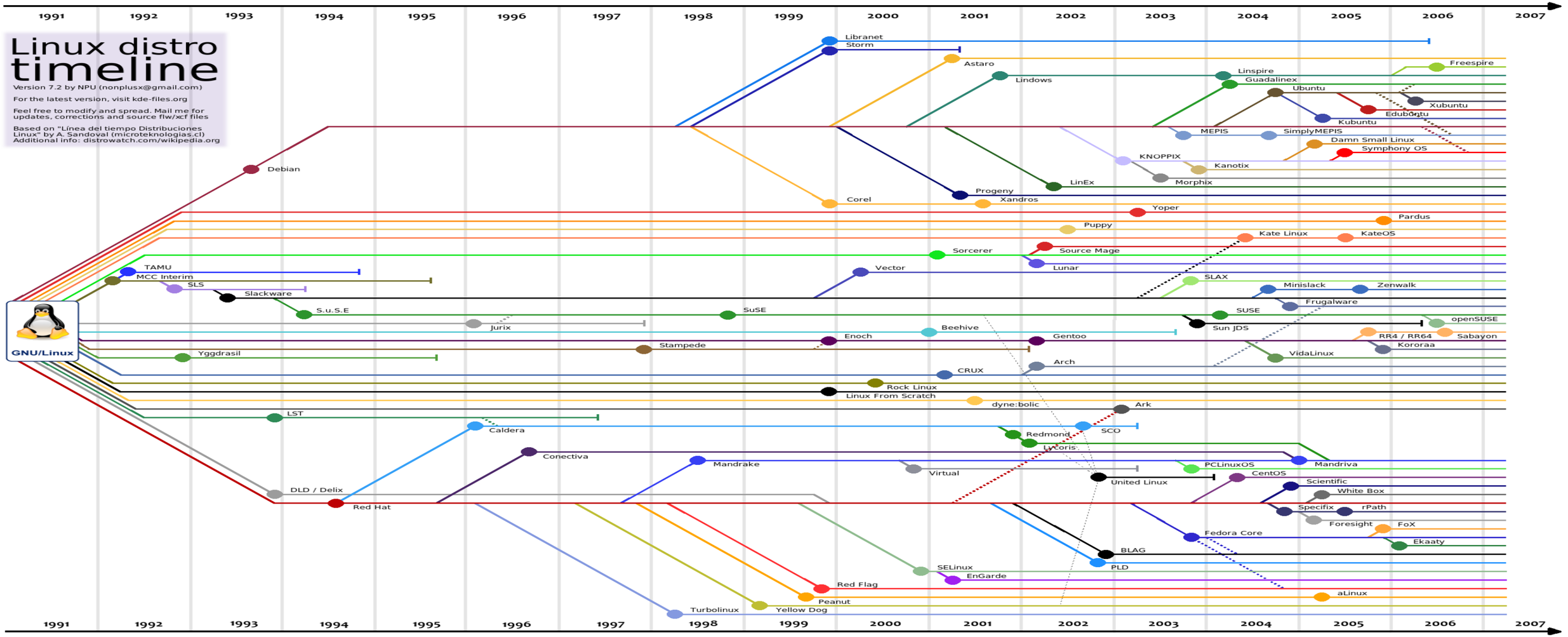
Linux Distributions

- Linux has multiple distribution.

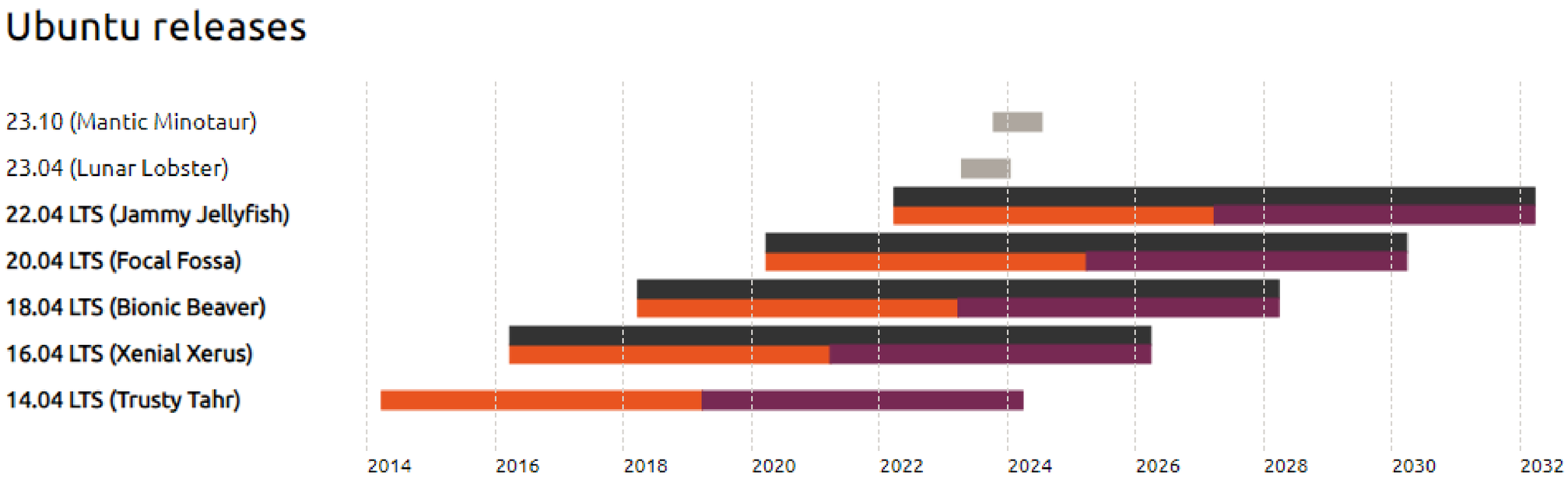
- Example:
  - ✓ Debian
  - ✓ Kali
  - ✓ Ubuntu
  - ✓ Read Hat
  - ✓ SUSE
  - ✓ openSUSE
  - ✓ Turbo

https://distrowatch.com/

Linux Time Line

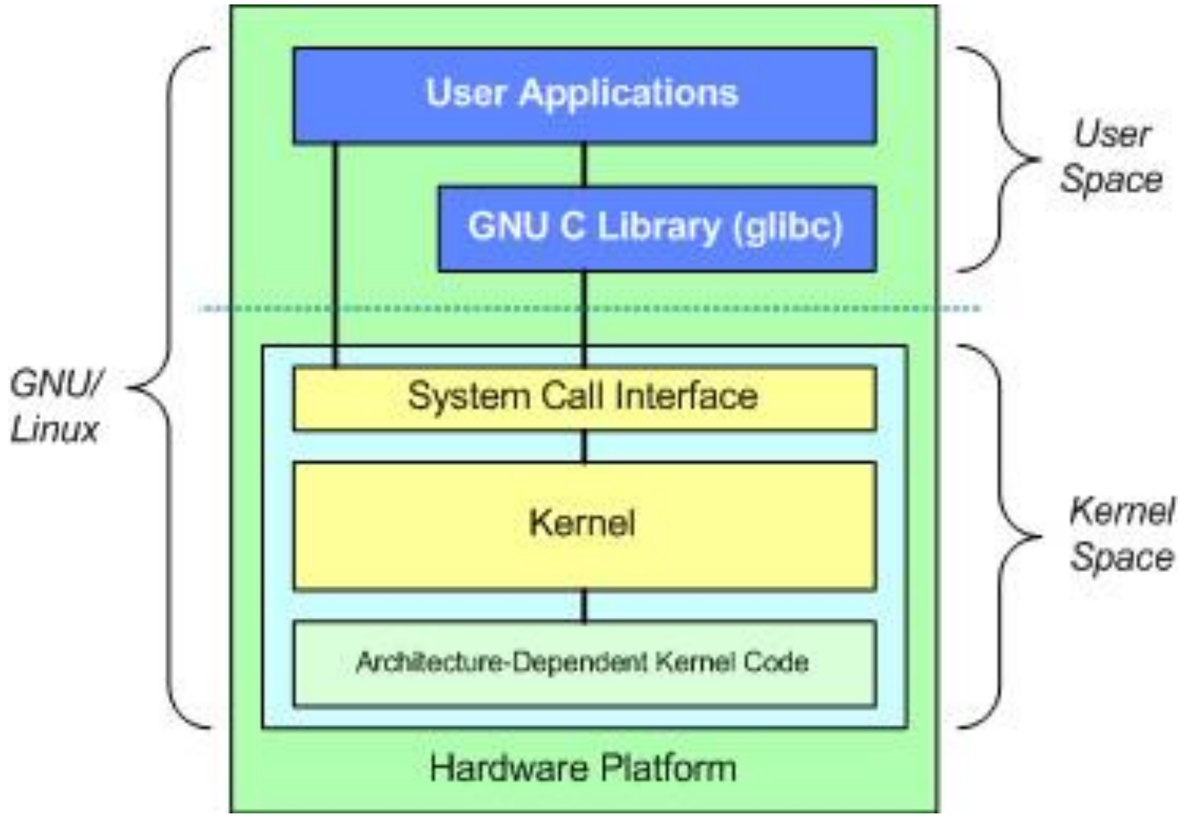


Ubuntu Time Line



https://ubuntu.com/about/release-cycle

Linux Kernel



https://github.com/torvalds/linux

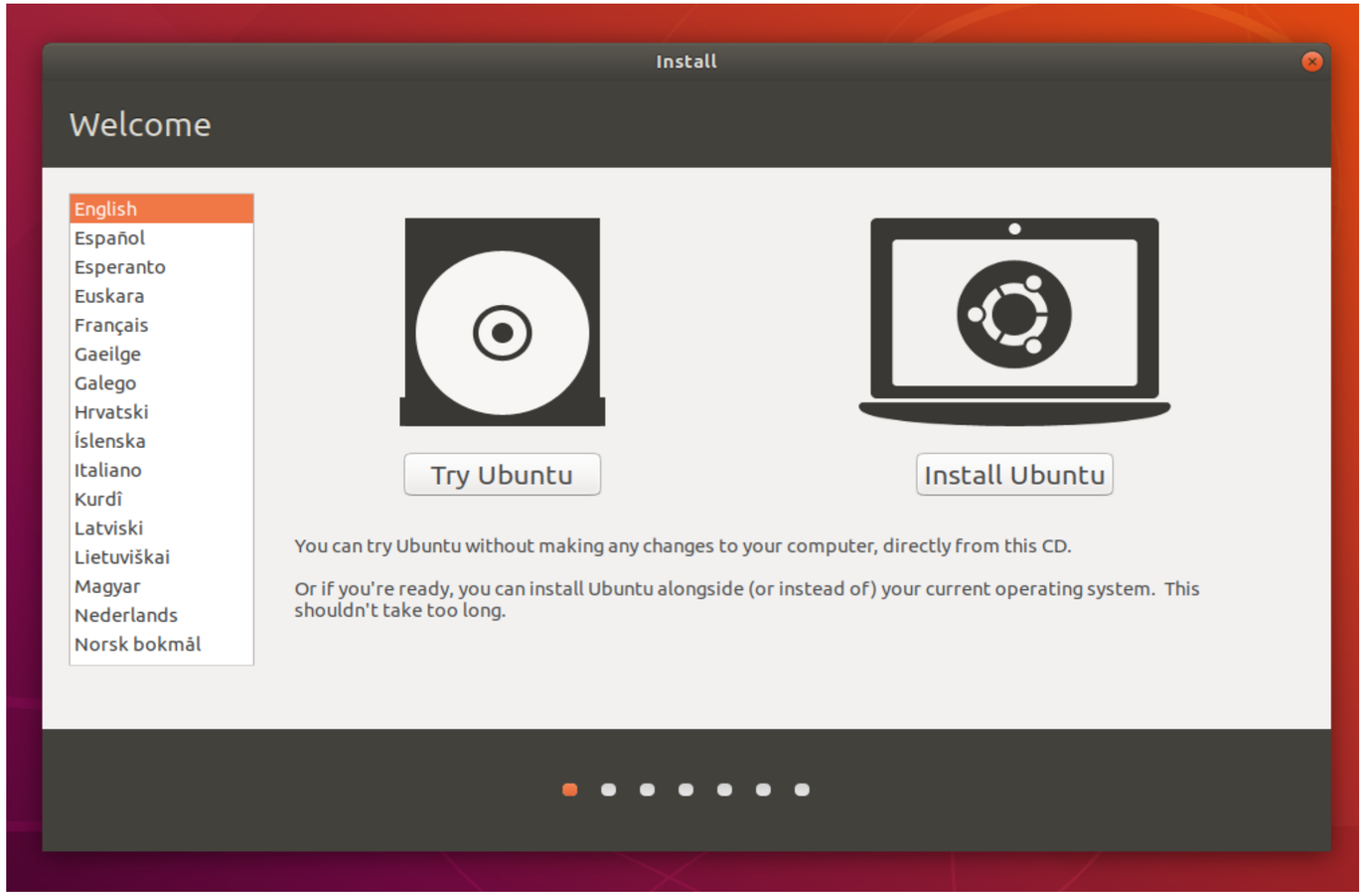
Linux Kernel

Because no one can really understand the kernel fully. It is a constantly changing ecosystem and one still has to learn something new. And, it is also the people. They taught me real programming.

Jiri Slaby

https://www.linux.com/news/30-linux-kernel-developers-30-weeks-jiri-slaby/

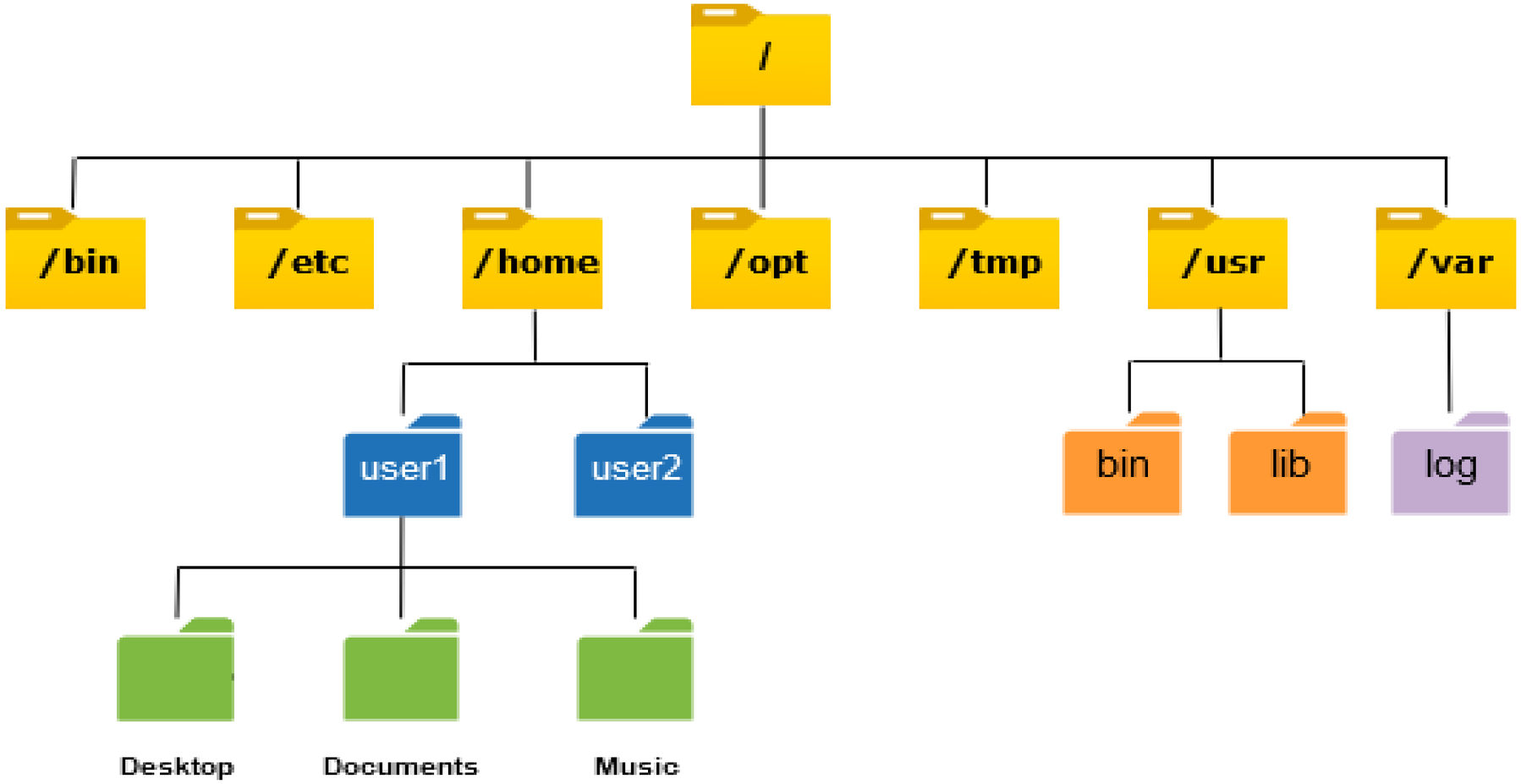
Install Ubuntu



https://ubuntu.com/download/desktop

https://ubuntu.com/tutorials/install-ubuntu-desktop

Linux File System

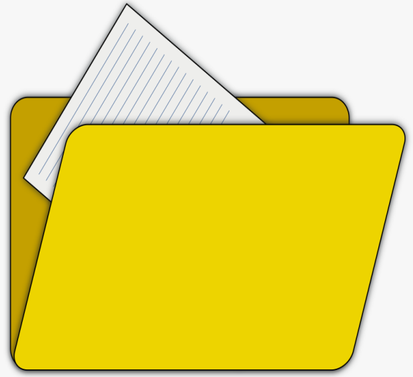


Basic Commands

- pwd Where am I in the system.
- ls [path] Perform a listing of the given path or your current directory. Common options: -l, -h, -a
- cd [path] Change into the given path or into your home directory.
- ~ (tilde) Used in paths as a reference to your home directory (eg. ~/Documents).
- . (dot) Used in paths as a reference to your current directory (eg. ./bin).
- .. (dot dot) Used in paths as a reference to your current directories parent directory (eg. ../bin).

Basic Commands

- mkdir <directory name> Create a directory
- touch <file name> Create a blank file.
- rmdir <directory name> Remove a directory (only if empty).
- rm <path> Remove a file or directory. Common options: -r
- cp <source> <destination> Copy the source file to the destination.
- mv <source> <destination> Move the source file to the destination. May also be used to rename files or directories.



1. Add
2. Remove
3. Rename
4. Copy
5. Cut
6. Search

Install

- **Ping 4.2.2.4** Tests your internet connection with a reliable DNS server.
- **Ping google.com** Checks if you can reach the internet and Google's servers.
- **sudo apt update** Updates the local package index, which is a database of available packages and their versions.
- **sudo apt upgrade** upgrades all installed packages to their latest versions.
- **sudo apt install <package>** This command installs a package or packages specified by name.
- **sudo apt remove <package>** This command removes a package or packages specified by name.
- **sudo apt autoremove** removes any packages that were installed as dependencies of other packages, but are no longer needed.
- **apt list –installed** lists all packages that are currently installed on the system.

Search(find)

A powerful tool for searching files and directories.

- **find . -type f -name**
  - Finds files by name.
  - Example: find . -type f -name "*.txt" finds all .txt files.
- **find . -type d -name**
  - Locates directories by name.
  - Example: find . -type d -name "docs" locates docs directories.
- **find . -type d -mtime**
  - Searches directories by modification time.
  - Examples:
    - -mtime -7: modified in the last 7 days.
    - -mtime +7: not modified in the last 7 days.
- **find . -type d -size**
  - Finds directories by size.
  - Example: find . -type d -size +50M locates directories over 50 MB.

Search(wc)

- **A command for counting lines, words, characters, and the maximum line length in files.**
- **wc**
  - Counts lines, words, and characters in a file.
  - Example: wc filename displays all three counts for filename.
- **wc -l**
  - Counts only lines.
  - Example: wc -l filename shows the number of lines in filename.
- **wc -w**
  - Counts only words.
  - Example: wc -w filename shows the number of words in filename.
- **wc -c**
  - Counts only characters.
  - Example: wc -c filename shows the number of characters in filename.
- **wc -L**
- Finds the length of the longest line.
- Example: wc -L filename shows the longest line length in filename.

Search(grep)

- **A powerful tool used for searching text using patterns.**
- **grep 'pattern' filename**
  - Searches for a pattern in a file.
  - Example: grep 'hello' file.txt finds occurrences of 'hello' in file.txt.
- **grep -i 'pattern' filename**
  - Ignores case while searching.
  - Example: grep -i 'hello' file.txt finds 'hello', 'Hello', etc., in file.txt.
- **grep -c 'pattern' filename**
  - Counts occurrences of the pattern.
  - Example: grep -c 'hello' file.txt shows the count of 'hello' in file.txt.
- **grep -n 'pattern' filename**
  - Shows line numbers along with the matching lines.
  - Example: grep -n 'hello' file.txt displays lines with 'hello' and their numbers.
- **grep -r 'pattern' directory**
  - Recursively searches files in a directory.
  - Example: grep -r 'hello' /path/to/dir/ searches all files under the specified directory for 'hello'.
- **Combining Options**
  - Options can be combined for more specific searches.
  - Example: grep -inr 'hello' /path/to/dir/ searches recursively, ignoring case, and displays line numbers.

Pipeline(|)

- **A powerful tool for combining commands: it takes the output of one command as the input to another.**

- **Using grep with wc**
  - This combination is great for counting specific occurrences in files.
- **Example_1: grep 'pattern' filename | wc -l**
  - This command chain finds the occurrences of 'pattern' in 'filename' and counts them.
  - **grep 'python' filename** searches for 'python' in 'filename'.
  - **| wc -l** counts the number of lines that contain the search term.
- **Process Flow**
  - **grep** filters the text and passes only matching lines.
  - wc -l counts the number of these lines.
- **Example_2: ps aux | grep python** filters and shows processes related to Python.

Permission

- ls -l [path]
  - View the permissions of a file or all items in a directory.
- chmod
  - Change permissions. Permissions can be either shorthand (eg. 754) or longhand (eg. g+x)

drwxrwxrwx

d = Directory
r = Read
w = Write
x = Execute

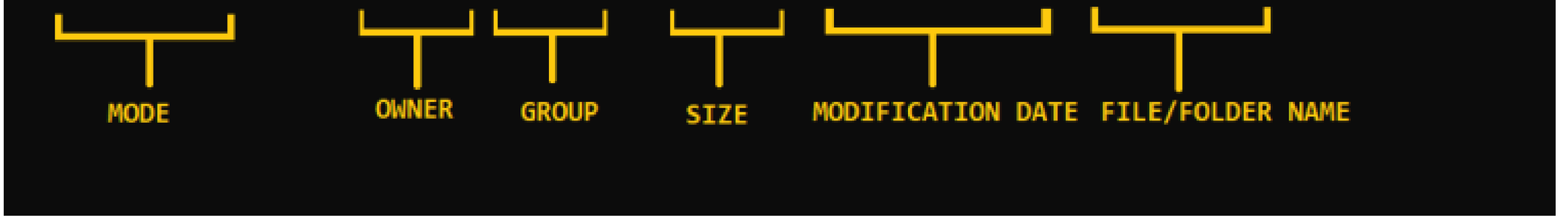
chmod 777

rwx | rwx | rwx
Owner | Group | Others

7	rwx	111
6	rw-	110
5	r-x	101
4	r--	100
3	-wx	011
2	-w-	010
1	--x	001
0	---	000

Ls -l

```
zaira@Zaira:~/freeCodeCamp$ ls -l
total 3856
-rw-r--r--    1 zaira zaira      89 Apr  5 20:46 CODE_OF_CONDUCT.md
-rw-r--r--    1 zaira zaira     210 Apr  5 20:46 CONTRIBUTING.md
-rw-r--r--    1 zaira zaira    1513 Apr  5 20:46 LICENSE.md
-rw-r--r--    1 zaira zaira   19933 Apr  5 20:46 README.md
drwxr-xr-x    4 zaira zaira    4096 Apr  6 22:45 api-server
-rw-r--r--    1 zaira zaira      67 Apr  5 20:46 babel.config.js
drwxr-xr-x   10 zaira zaira    4096 Apr  6 22:55 client
drwxr-xr-x    5 zaira zaira    4096 Apr  6 22:54 config
```



Users

- **Id**
  - displays information about the current user, including their username and group membership.
- **Whoami**
  - prints the username of the current user.
- **adduser**
  - add a new user to the system.
- **userdel**
  - delete a user from the system.

- **/etc/passwd**: The main file that contains group information.

Groups

- groupadd:
  - **Purpose**: Used to create a new group.
  - **Example**: sudo groupadd mygroup creates a new group named mygroup.
- groupdel:
  - **Purpose**: Used to delete a group.
  - **Example**: sudo groupdel mygroup deletes the group named mygroup.
- usermod:
  - **Purpose**: Used to add a user to a group or modify a user's group memberships.
  - **Example**: sudo usermod -G mygroup username adds the user username to the group mygroup.
- groups:
  - **Purpose**: Displays the groups a user is a member of.
  - **Example**: groups username shows all groups that username is a member of.
- /etc/group: The main file that contains group information.

Resources

- **OS book:**

  Silberschatz, A., Galvin, P.B., & Gagne, G. (2012). Operating System Concepts, Ninth Edition. John Wiley & Sons, Inc.

- **linux Distribution :**

  https://distrowatch.com/

- **Install Ubuntu:**

  https://ubuntu.com/download/desktop

- **Linux Command Cheat sheet:**

  https://ryanstutorials.net/linuxtutorial/cheatsheet.php
  https://cheatography.com/davechild/cheat-sheets/linux-command-line/
  https://www.guru99.com/linux-commands-cheat-sheet.html

Resources

- **Others:**

  https://askubuntu.com/

  https://ubuntuforums.org/

  https://ubuntu-mate.community/

  https://www.ubuntubuzz.com/

- **Bash Script:**

  https://www.shellscript.sh/

  https://devhints.io/bash

THANK YOU!

Keep Your Learning