

Introduction ubuntu and linux

Ubuntu



Ho Phu Quy

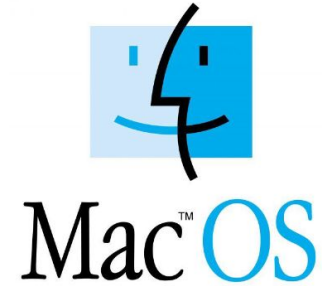


Topic

1. Summary about Linux and Ubuntu
2. Important Structures and Terminology in Linux
3. How to Install Linux
 - Install as a Primary Operating System
 - Install on a Virtual Machine (e.g., VirtualBox)
 - [Windows Subsystem for Linux \(WSL\)](#)

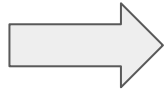
Summary about Linux and Ubuntu

Some popular Operating Systems



What is Linux Operating System?

Developed by Linus Torvalds in 1991, the Linux operating system is a powerful and flexible open-source software platform. It acts as the basis for a variety of devices, such as embedded systems, cell phones, servers, and personal computers

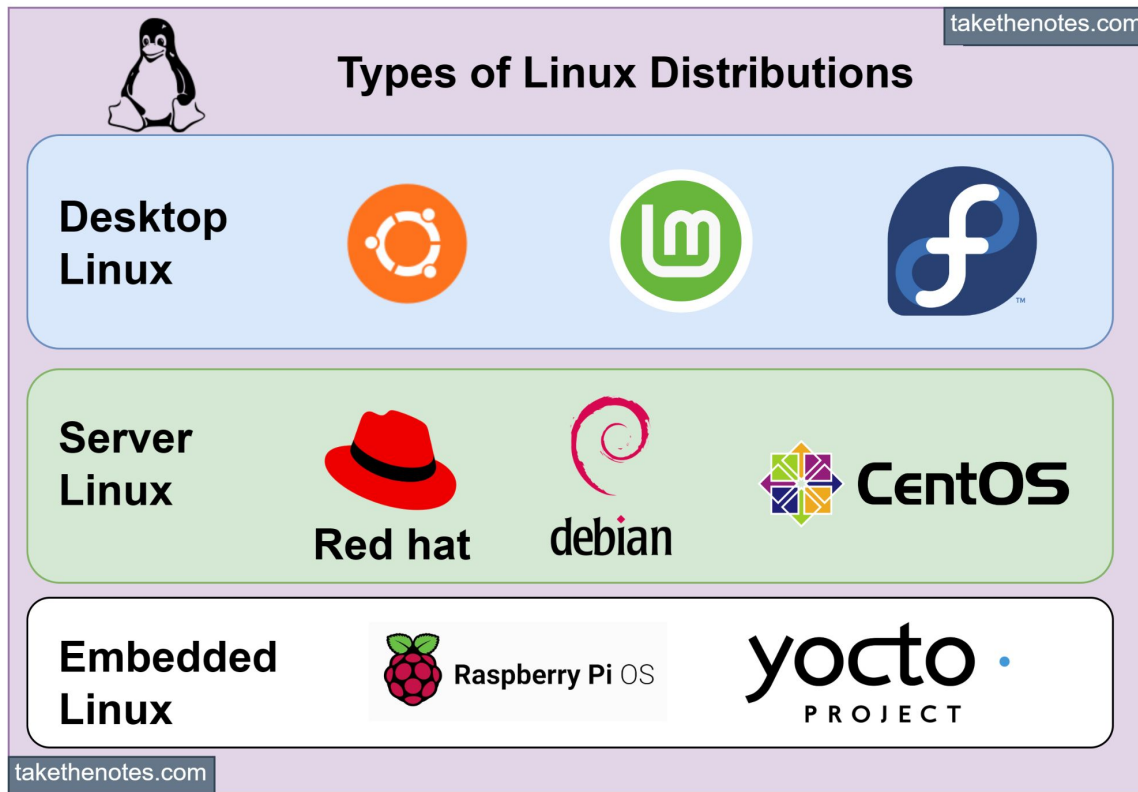


Just know Linux is an operating system like Windows.

Why linux for bioinformatic?

1. Easy to build simple pipelines (awk, bash, piping, bash redirection, texttools)
2. Simple to install and use software development tools
3. Multiple versions of a program can be installed by the user himself and switched on/off with sourcing some scripts without being administrator
4. A lot of good scientific software is written in a non-portable way for linux/unix (almost all short read aligners, samtools). This makes it necessary to use Unix for genomics.
5. Ability to perform analyses on computer clusters (important for big/long computational jobs)

Overview of different types of Linux distributions

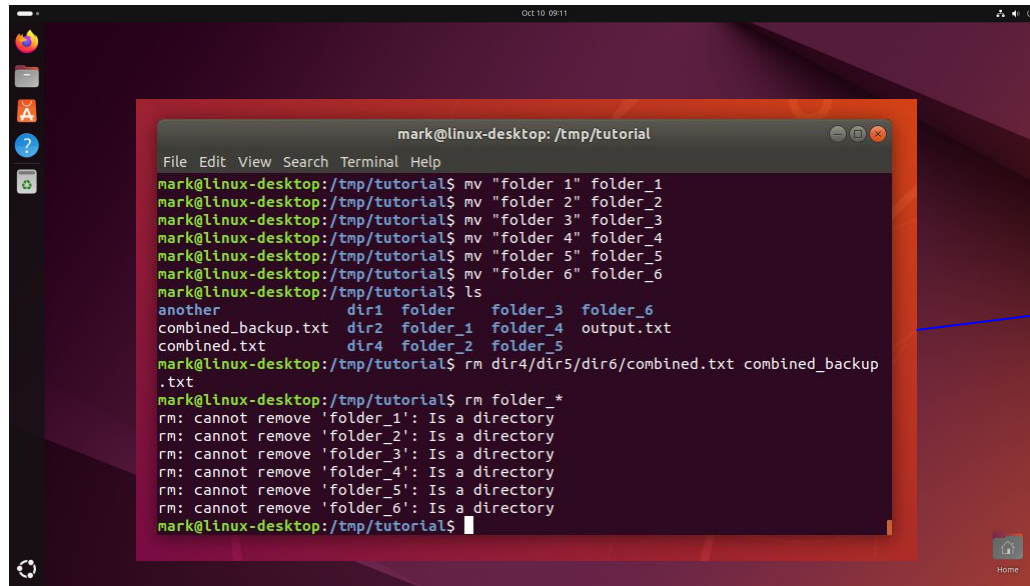


Desktop distributions

1. User-friendly graphical interface
2. Range of applications for everyday use
3. Easy to install and set up
4. Good hardware compatibility

What is Ubuntu?

Ubuntu is a consumer-pleasant, loose Linux-primarily based running machine. it's miles free of cost, unlike Windows and macOS, and everybody can make contributions to its improvement because it is open-supply.



The screenshot shows an Ubuntu desktop with a dark purple background. A terminal window is open in the center, titled 'mark@linux-desktop: /tmp/tutorial'. The terminal displays the following commands and outputs:

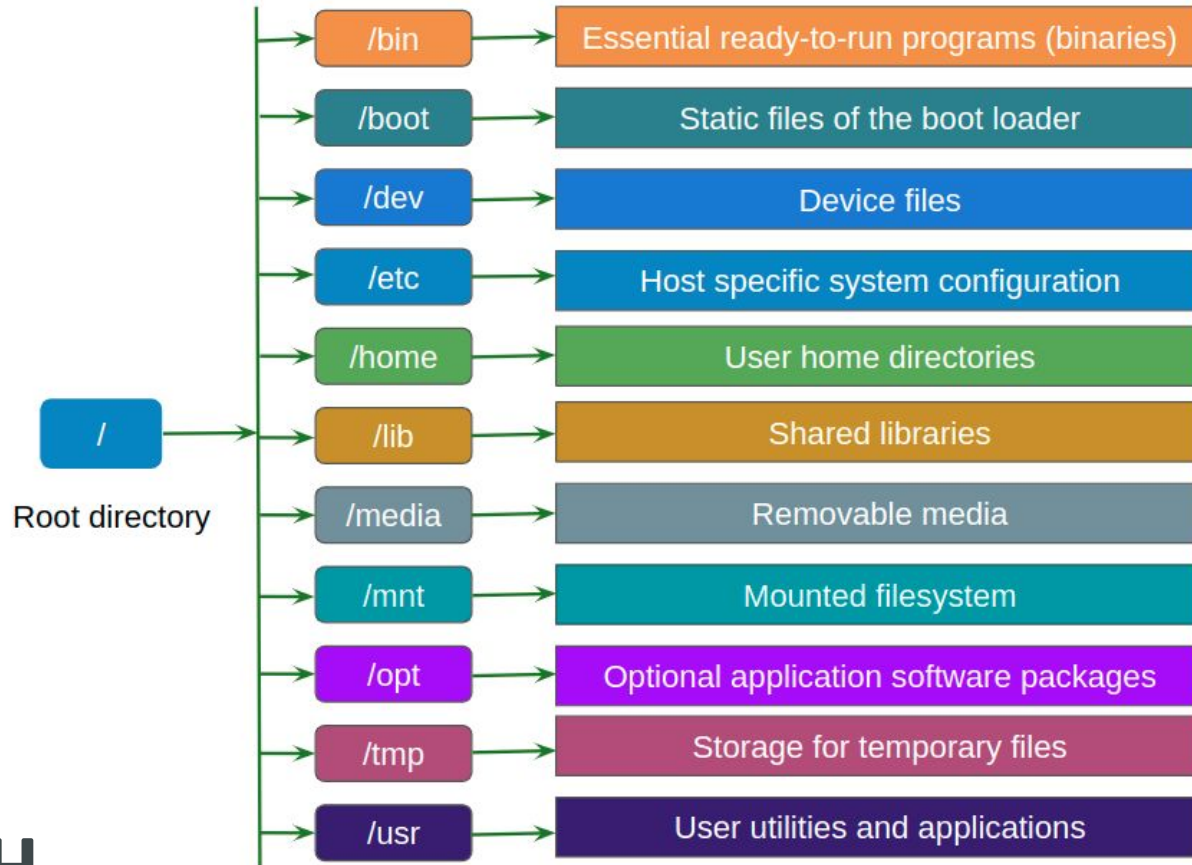
```
mark@linux-desktop: /tmp/tutorial$ mv "folder 1" folder_1
mark@linux-desktop: /tmp/tutorial$ mv "folder 2" folder_2
mark@linux-desktop: /tmp/tutorial$ mv "folder 3" folder_3
mark@linux-desktop: /tmp/tutorial$ mv "folder 4" folder_4
mark@linux-desktop: /tmp/tutorial$ mv "folder 5" folder_5
mark@linux-desktop: /tmp/tutorial$ mv "folder 6" folder_6
mark@linux-desktop: /tmp/tutorial$ ls
another      dir1  folder_3  folder_6
combined_backup.txt  dir2  folder_1  folder_4  output.txt
combined.txt  dir4  folder_2  folder_5
mark@linux-desktop: /tmp/tutorial$ rm dir4/dir5/dir6/combined.txt combined_backup.txt
mark@linux-desktop: /tmp/tutorial$ rm folder_*
rm: cannot remove 'folder_1': Is a directory
rm: cannot remove 'folder_2': Is a directory
rm: cannot remove 'folder_3': Is a directory
rm: cannot remove 'folder_4': Is a directory
rm: cannot remove 'folder_5': Is a directory
rm: cannot remove 'folder_6': Is a directory
mark@linux-desktop: /tmp/tutorial$
```

Terminal window
is where you
type commands

Open:
Ctrl + Alt + T keys
on the keyboard

Important Structures and Terminology in Linux

linux file system structure



Linux File Permissions

Binary	Octal	String Representation	Permissions
000	0 (0+0+0)	- - -	No Permission
001	1 (0+0+1)	- - x	Execute
010	2 (0+2+0)	- w -	Write
011	3 (0+2+1)	- wx	Write + Execute
100	4 (4+0+0)	r - -	Read
101	5 (4+0+1)	r - x	Read + Execute
110	6 (4+2+0)	rw -	Read + Write
111	7 (4+2+1)	rwX	Read+Write+Execute

Group
r w -

Other
r - x

Owner
r w x

r	Read	4	6
w	Write or Edit	2	
-	No Permission	0	

r	Read	4	5
-	No Permission	0	
x	Execute	1	

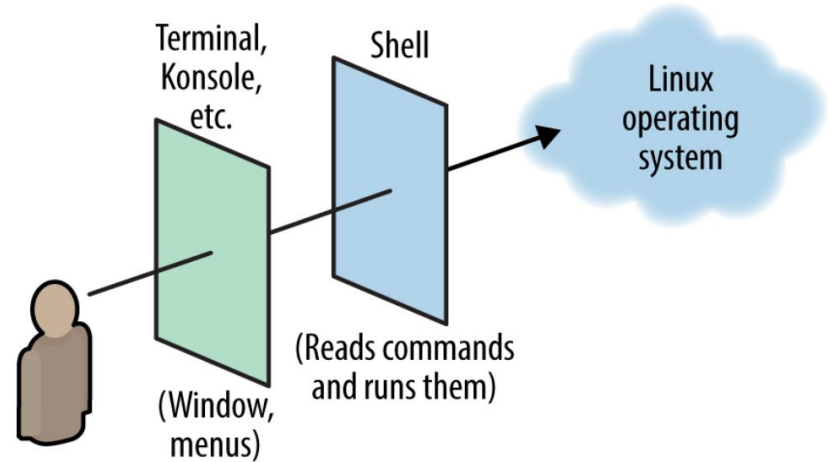
r	Read	4	7
w	Write or Edit	2	
x	Execute	1	



BASH
THE BOURNE-AGAIN SHELL

What is Shell?

- A shell is a special user program that provides an interface for the user to use operating system services.
- Terminal is where we interact with the shell through commands.
- Several types of Shell:
 - + Bourne Shell (sh)
 - + C Shell (csh)
 - + **Bourne Again Shell (bash)**: most popular
 - + Z Shell (zsh)



(Daniel J. Barrett, Linux pocket guide)

How to Install Linux

Some ways to get the Terminal

easy to
install

1. macOS: How to open Terminal:

<https://support.apple.com/en-vn/guide/terminal/apd5265185d-f365-44cb-8b09-71a064a42125/mac>

Windows 10/11: Install Ubuntu on Windows Subsystem for Linux (WSL): Recommended for beginners

<https://canonical-ubuntu-wsl.readthedocs-hosted.com/en/latest/guides/install-ubuntu-wsl2/>

2. Install Ubuntu on virtual machine (VM):

Windows: Install Ubuntu on VirtualBox: <https://www.youtube.com/watch?v=ngJQPt-xEeo>

macOS: Install Ubuntu on VirtualBox: https://www.youtube.com/watch?v=b_tOialCSXE

3. Install Ubuntu on physical computer: Best for long term use

Delete Windows & install Ubuntu: https://www.youtube.com/watch?v=oZcvqfWf_ps&t=100s

If you don't want to delete windows:

or a) Dual boot: Ubuntu and Windows on the same hard drive:

<https://www.youtube.com/watch?v=GXxTxBPKecQ&t=229s>

or b) Dual boot: Ubuntu and Windows on the separate hard drive:

(Ubuntu on hard drive 1, Windows on hard drive 2)

<https://www.youtube.com/watch?v=KX85vZ3ANV>

Recommended method b) if you want dual-boot.

Warning: backup your data before install!!!

More reference: https://www.youtube.com/watch?v=oZcvqfWf_ps&t=100s

a bit
difficult
to install

Thank you