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ROS Developer Learning Path

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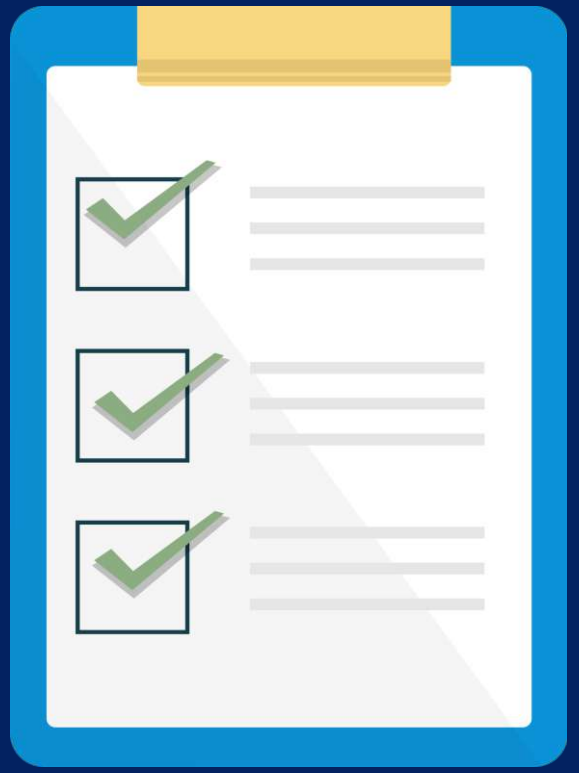
Learning Ubuntu/Linux

for ROS

ROS

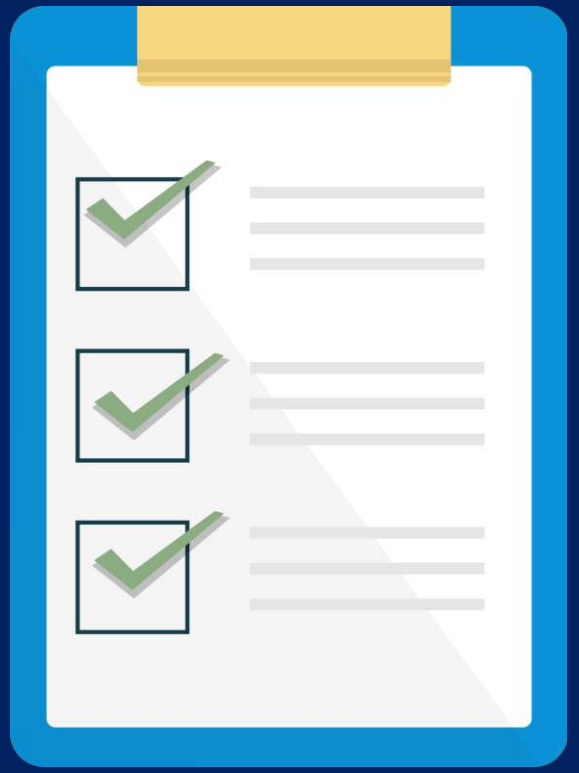
List of Topics

- What is GNU/Linux OS?
  - Introduction to GNU/Linux
  - Brief history of GNU/Linux OS
- What is a Linux distribution?
- What is Ubuntu OS?



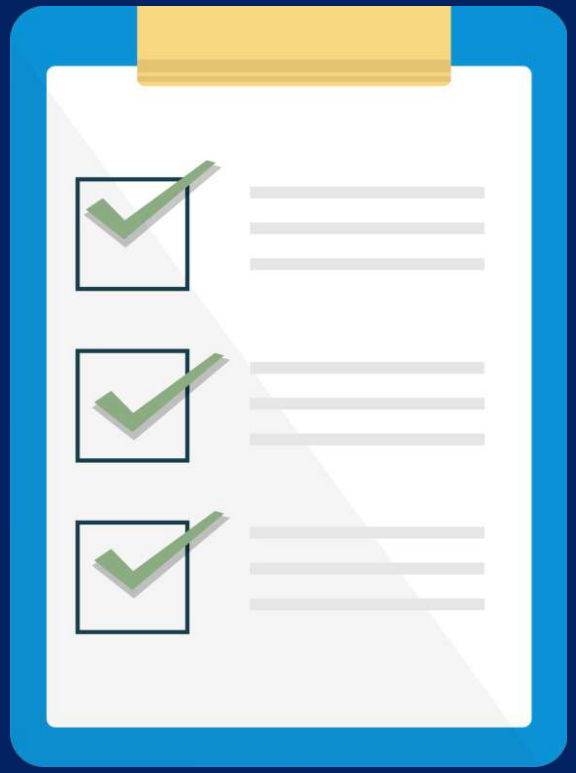
List of Topics

- Why we use GNU/Linux?
- Who is using Linux?
- Where Is Linux Used For?
- Frequently using Linux terminologies



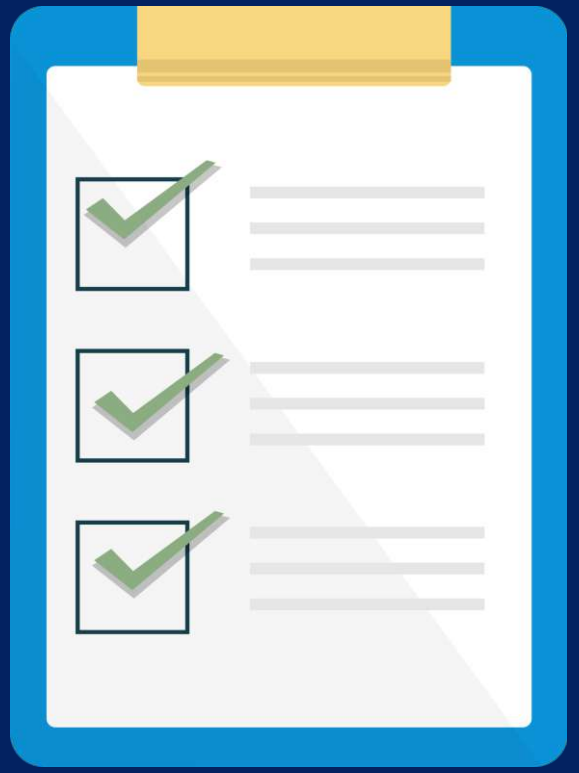
List of Topics

- Best 4 ways to install Ubuntu
- Installing Ubuntu using VM
  - What is VM Software?
  - Popular VM Software
  - Who should choose VM
  - Which VM is good for learning R.O.S



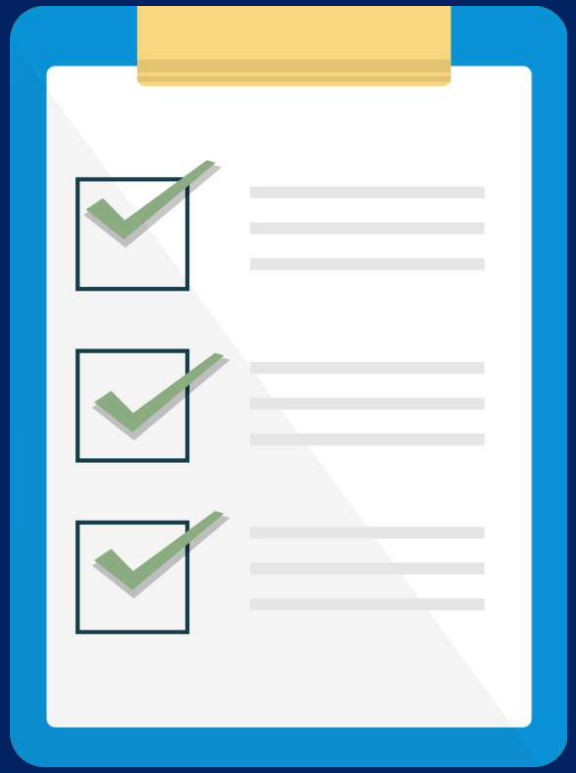
List of Topics

- Installing Ubuntu on external drive
- Installing Ubuntu on internal drive
- Ubuntu and Docker



List of Topics

- Hands-on Linux commands
- Discussion and giving support for installing Ubuntu on your system



What is GNU/Linux OS?

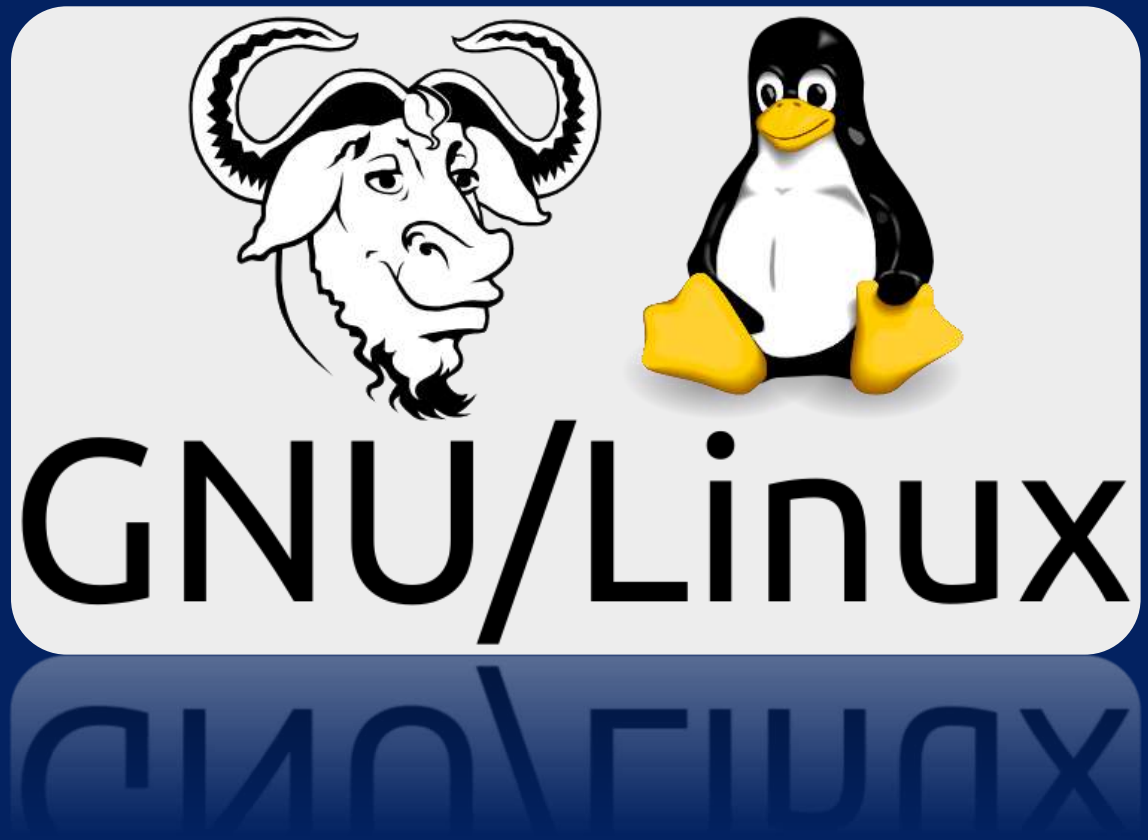
- Introduction to GNU/Linux
  - Free & Open-source operating system + series of free application to interact with your computer
  - GNU: GNU's Not Unix (recursive acronym)
  - GNU/Linux = Linux kernel + GNU Project programs
  - Linux is modelled on the Unix operating system

What is GNU/Linux OS?

- Introduction to GNU/Linux
  - Multi-tasking, multi-user capable
  - Nobody owns Linux
  - Developing by unpaid volunteers.

What is GNU/Linux OS?

- Introduction to GNU/Linux
  - GNU/Linux Logo
    - GNU: gnu head
    - Linux: tux (penguin)

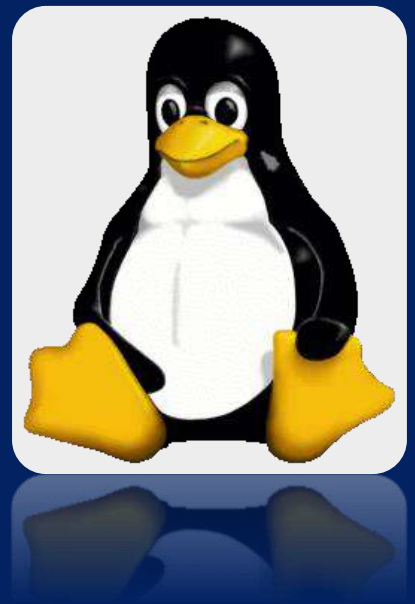


What is GNU/Linux OS?

- Brief History of GNU/Linux
  - GNU began in 1984 by Free Software Foundation
    - FSF Founder: Richard Stallman
  - GNU Project: Set of free software tools
  - Linux kernel first appeared in 1991
    - Created by Linus Torvalds

What is GNU/Linux OS?

- Brief History of GNU/Linux
  - GNU Project + Linux kernel in 1992
  - It’s not “Linux”, its GNU/Linux
  - Non GNU/Linux: Android is powered by Linux kernel, but it’s a non GNU/Linux



What is a GNU/Linux Distributions?

- Introduction
  - A customized version of GNU/Linux based on different version of Linux Kernel + GNU Software + Desktop Environment
  - More than 600 distros exist

What is a GNU/Linux Distributions?

- Popular Linux Distros

Debian

Ubuntu

Linux Mint

What is Ubuntu Distro?

- Introduction
  - Linux distribution based on Debian
  - One of popular Linux distro
  - Mostly composed of Free & Open-Source software
  - Three editions:
    - Desktop: For desktop computers
    - Server: For Servers
    - Core: For IoT and robots

Ubuntu

Debian

What is Ubuntu Distro?

- Introduction
  - Developed by Canonical
  - Initial release: Oct 2004
  - Latest release: Ubuntu 20.04 LTS
  - Support Desktop Environments: GNOME, Xfce, LXDE, MATE, Cinnamon
  - Full support for R.O.S, Open-CV, PCL etc.

Ubuntu

Debian

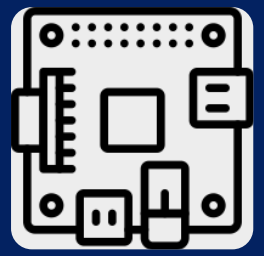
Why we use GNU/Linux?

Absolutely Free

Thousands of applications

Customization

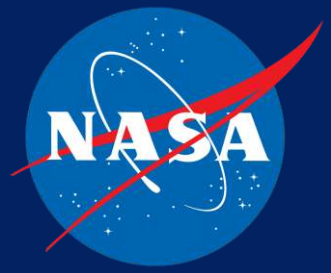
Safe & Secure



Work with SBC

Community

Who is using Linux?



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SAMSUNG

IBM

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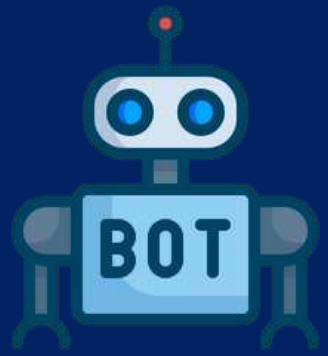
DELL

Where Is Linux Used For?

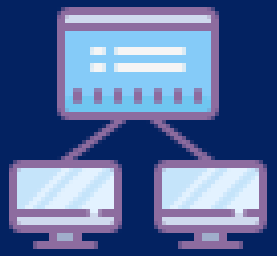
Web Serving



Robotics

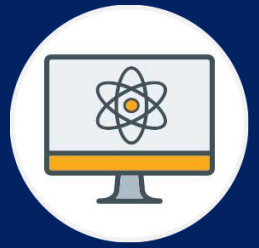
AI

Databases

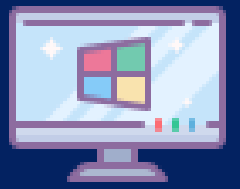


Networking

Computer Vision



Scientific computing



Desktop

Frequently using Linux terminologies

1. Commands
5. Unity
8. Package Manager
10. Kernel
3. GNOME
2. Distribution
6. Root
9. Binaries
11. Desktop Environment
4. GNU
7. Terminal

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Best 4 ways to install Ubuntu for R.O.S

1. Using Virtual Machine Software

Best 4 ways to install Ubuntu for R.O.S

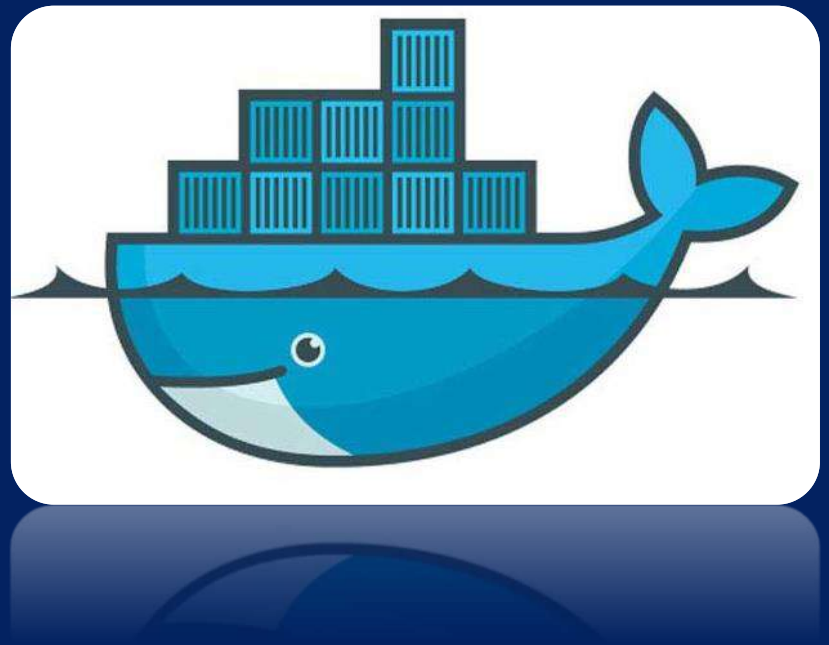
2. Installing Ubuntu to external drive/Thumb drive

Best 4 ways to install Ubuntu for R.O.S

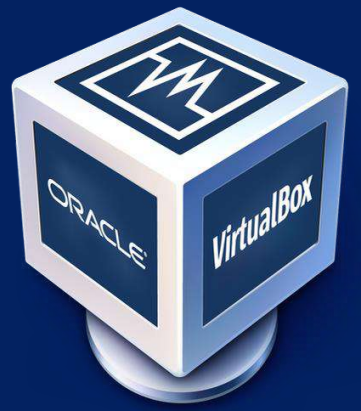
3. Installing Ubuntu to internal hard drive

Best 4 ways to install Ubuntu for R.O.S

4. Installing Ubuntu on Docker

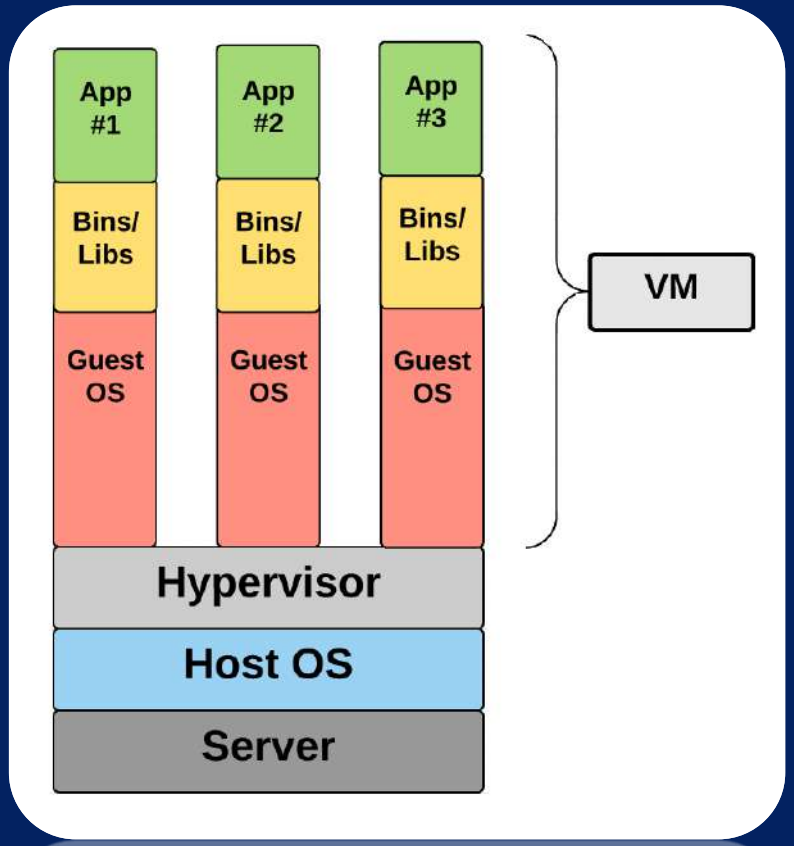


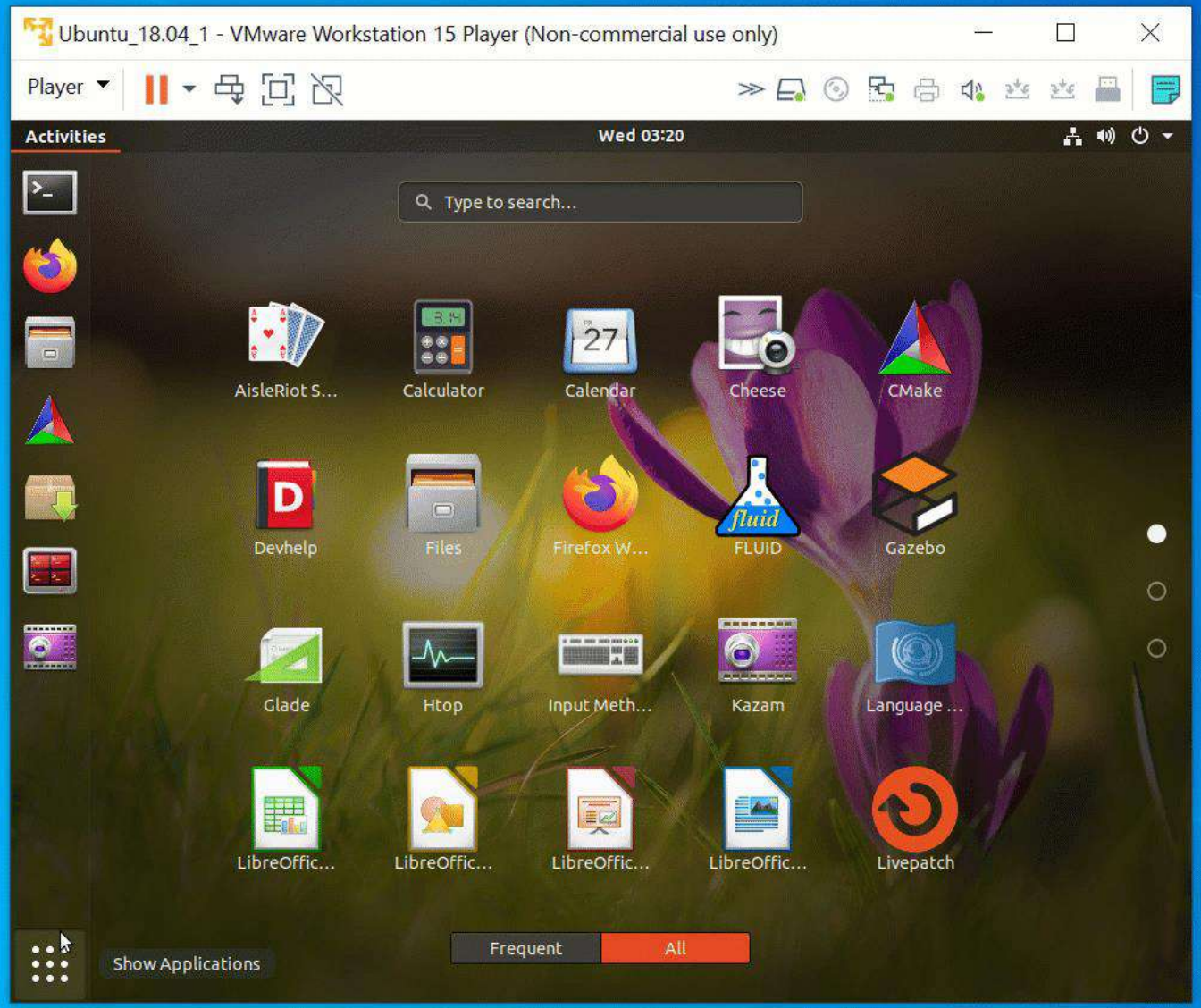
Installing Ubuntu Using Virtual Machine



Installing Ubuntu using Virtual Machines

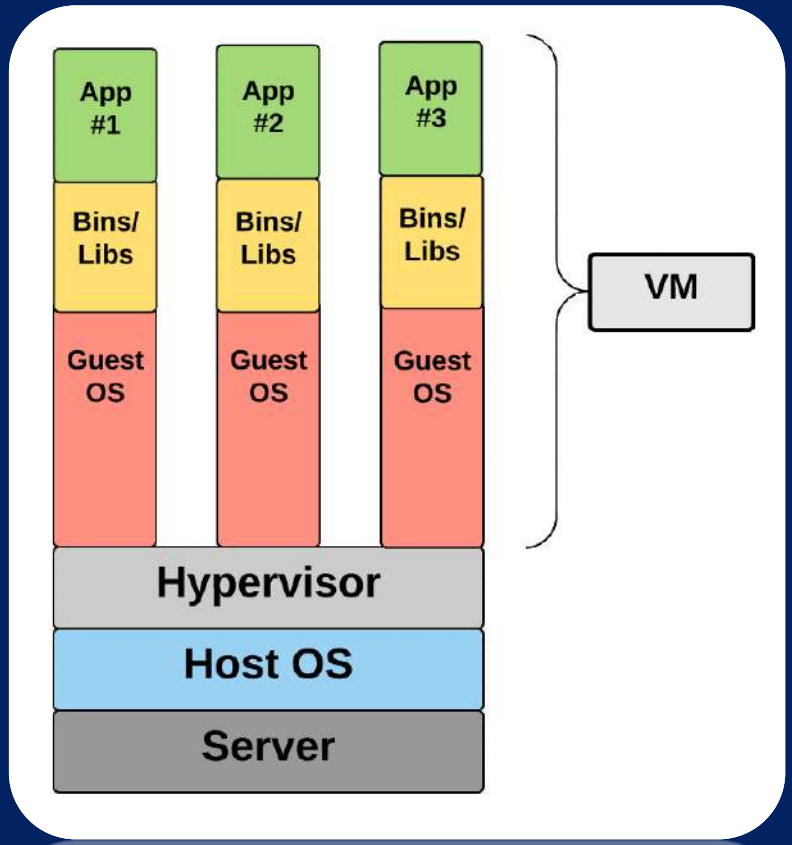
- What is Virtual Machine Software?
  - Imitate a Physical Computer System
  - Install OS virtually with the help of host OS
  - Multiple OS can run from a single VM Software




Ubuntu_18.04_1 - VMware Workstation 15 Player (Non-commercial use only)
Player
Activities
Wed 03:20
Type to search...
AisleRiot S...
Calculator
Calendar
Cheese
CMake
Devhelp
Files
Firefox W...
FLUID
Gazebo
Glade
Htop
Input Meth...
Kazam
Language ...
LibreOffic...
LibreOffic...
LibreOffic...
LibreOffic...
Livepatch
Frequent
All
Show Applications

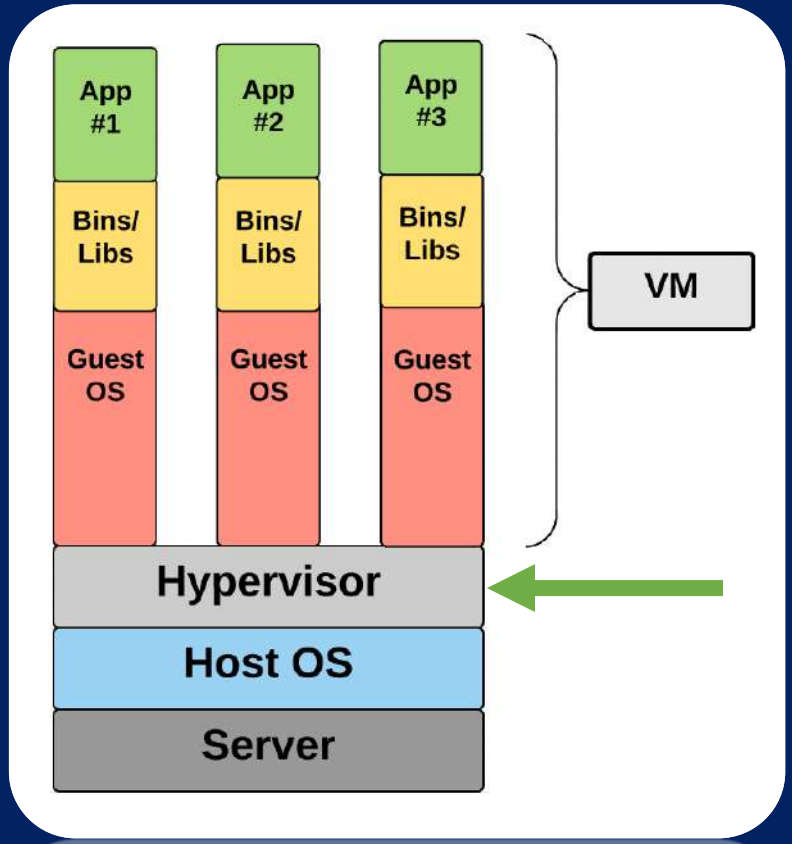
Installing Ubuntu using Virtual Machines

- What is Virtual Machine Software?
  - VM Software need host operating system to run E.g.: Windows/Linux/Mac
  - The Virtual OS/Guest OS share resources of the host OS.
  - Custom VM configuration



Installing Ubuntu using Virtual Machines

- What is Hypervisor in VM Software?
  - Program which helps to create and run one or more VM simultaneously
  - Virtual Machine Monitor (VMM)



Installing Ubuntu using Virtual Machines

- Popular VM Software
  - Oracle VirtualBox
  - VMWare Workstation Player

Installing Ubuntu using Virtual Machines

- What is Oracle VirtualBox?
  - Free & Open-source x86 and AMD 64/Intel 64 Virtualization Software from Oracle
  - Supported host Platform: Windows, Linux, Macintosh and Solaris
  - Supported guest Platform: Windows, Linux, DOS, Mac, Solaris, OpenBSD etc.

Installing Ubuntu using Virtual Machines

- What is Oracle VirtualBox?
  - Website: https://www.virtualbox.org/

Oracle VM VirtualBox

virtualbox.org

VirtualBox

Welcome to VirtualBox.org!

search...

Login Preferences

- About
- Screenshots
- Downloads
- Documentation
  - End-user docs
  - Technical docs
- Contribute
- Community

VirtualBox is a powerful x86 and AMD64/Intel64 virtualization product for enterprise as well as home use. Not only is VirtualBox an extremely feature rich, high performance product for enterprise customers, it is also the only professional solution that is freely available as Open Source Software under the terms of the GNU General Public License (GPL) version 2. See "About VirtualBox" for an introduction.

Presently, VirtualBox runs on Windows, Linux, Macintosh, and Solaris hosts and supports a large number of guest operating systems including but not limited to Windows (NT 4.0, 2000, XP, Server 2003, Vista, Windows 7, Windows 8, Windows 10), DOS/Windows 3.x, Linux (2.4, 2.6, 3.x and 4.x), Solaris and OpenSolaris, OS/2, and OpenBSD.

VirtualBox is being actively developed with frequent releases and has an ever growing list of features, supported guest operating systems and platforms it runs on. VirtualBox is a community effort backed by a dedicated company: everyone is encouraged to contribute while Oracle ensures the product always meets professional quality criteria.

Download VirtualBox 6.1

Hot picks:

News Flash

- **New May 15th, 2020, 2020 VirtualBox 6.1.8 released!** Oracle today released a 6.1 maintenance release which improves stability and fixes regressions. See the Changelog for details.
- **New May 15th, 2020, 2020 VirtualBox 6.0.22 released!** Oracle today released a 6.0 maintenance release which improves stability and fixes regressions. See the Changelog for details.
- **New May 15th, 2020 VirtualBox 5.2.42 released!** Oracle today released a 5.2 maintenance release which improves stability and fixes regressions. See the Changelog for details.
- **New April 14th, 2020, 2020 VirtualBox 6.1.6 released!** Oracle today released a 6.1 maintenance release which improves stability and fixes regressions. See the Changelog for details.
- **New April 14th, 2020, 2020 VirtualBox 6.0.20 released!**

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Installing Ubuntu using Virtual Machines

- What is VMWare Workstation?
  - Developed by VMWare
  - Workstation Player: Freeware (non-commercial use)
  - Workstation Pro: Trialware and commercial
  - Host OS support: Windows & Linux OS 64 bit

Installing Ubuntu using Virtual Machines

- What is VMWare Workstation?
  - Guest OS: Windows & Linux
  - Website: https://www.vmware.com/

VMware – Official Site

vmware.com

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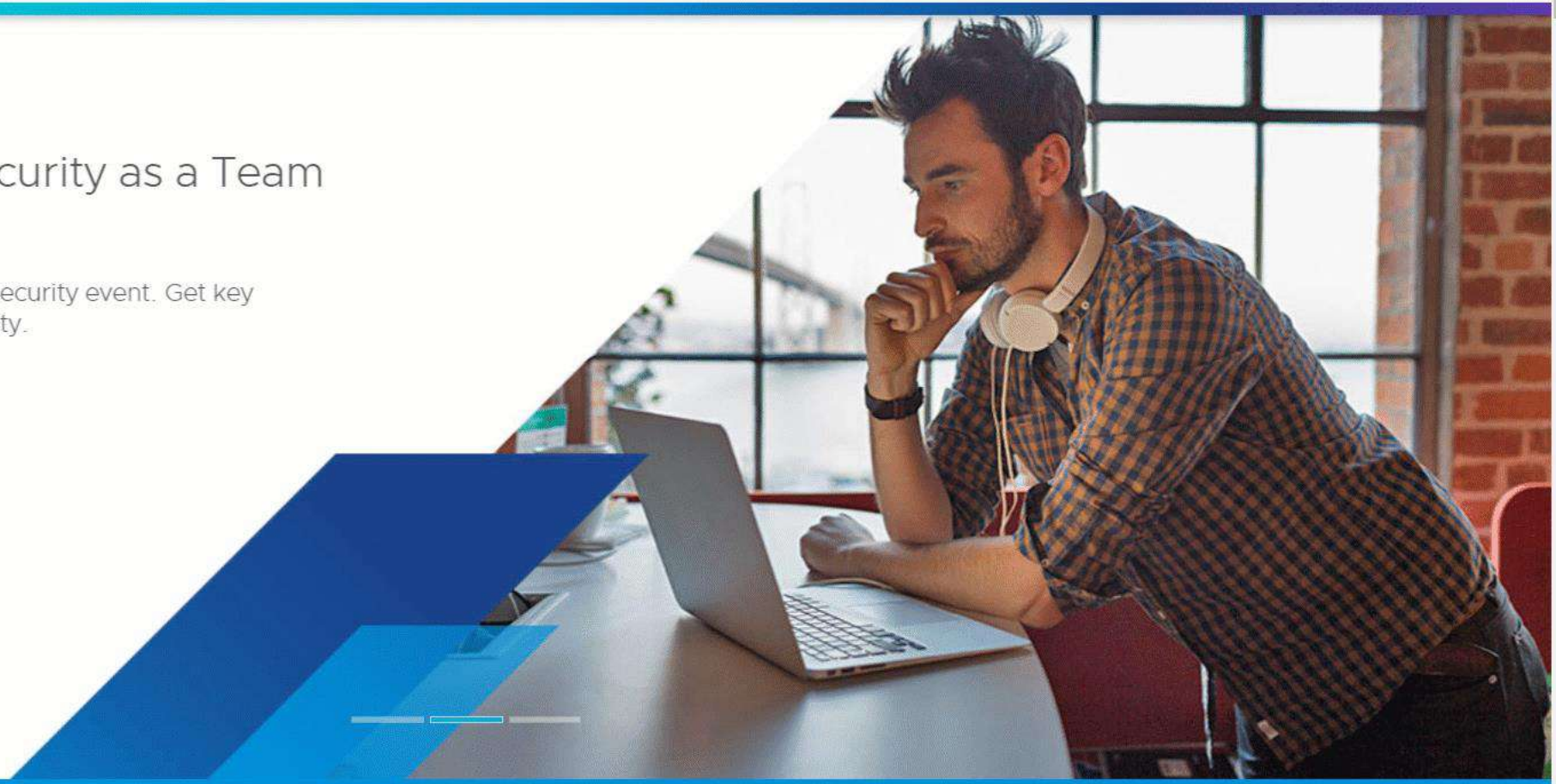
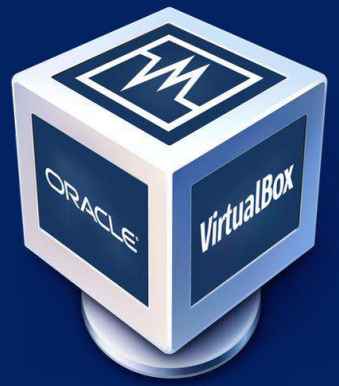


A message to our VMware community about COVID-19 ›

AdChoices

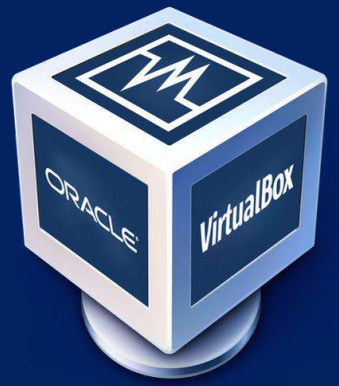
Installing Ubuntu using Virtual Machines

- Who should choose VM for installing Ubuntu and R.O.S.?
  - R.O.S Educators and students
  - ROS developers



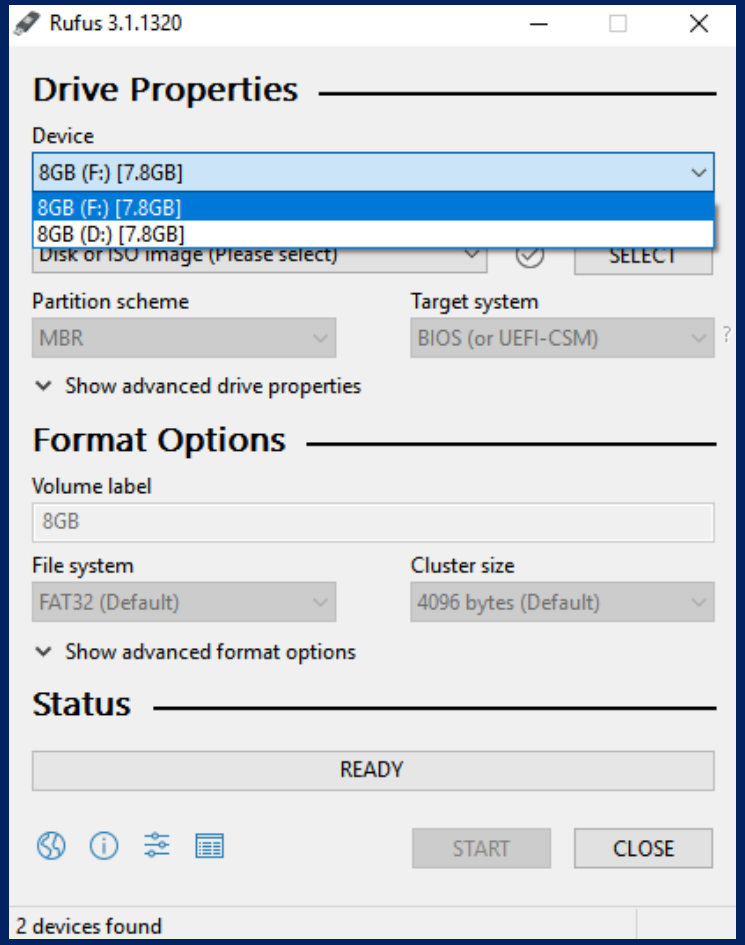
Installing Ubuntu using Virtual Machines

- Which VM software will be good for working on Ubuntu and R.O.S?
  - VMWare Workstation is my choice for learning R.O.S
    - Better Graphics
    - USB Device sharing



Installing Ubuntu on your real PC

- Rufus
  - https://rufus.ie/



Installing Ubuntu on external drive

Inserting Ubuntu USB Bootable drive

Inserting external hard disk for installing Ubuntu

Installing Ubuntu on your real PC

https://ubuntu.com/tutorials/create-a-usb-stick-on-windows#1-overview

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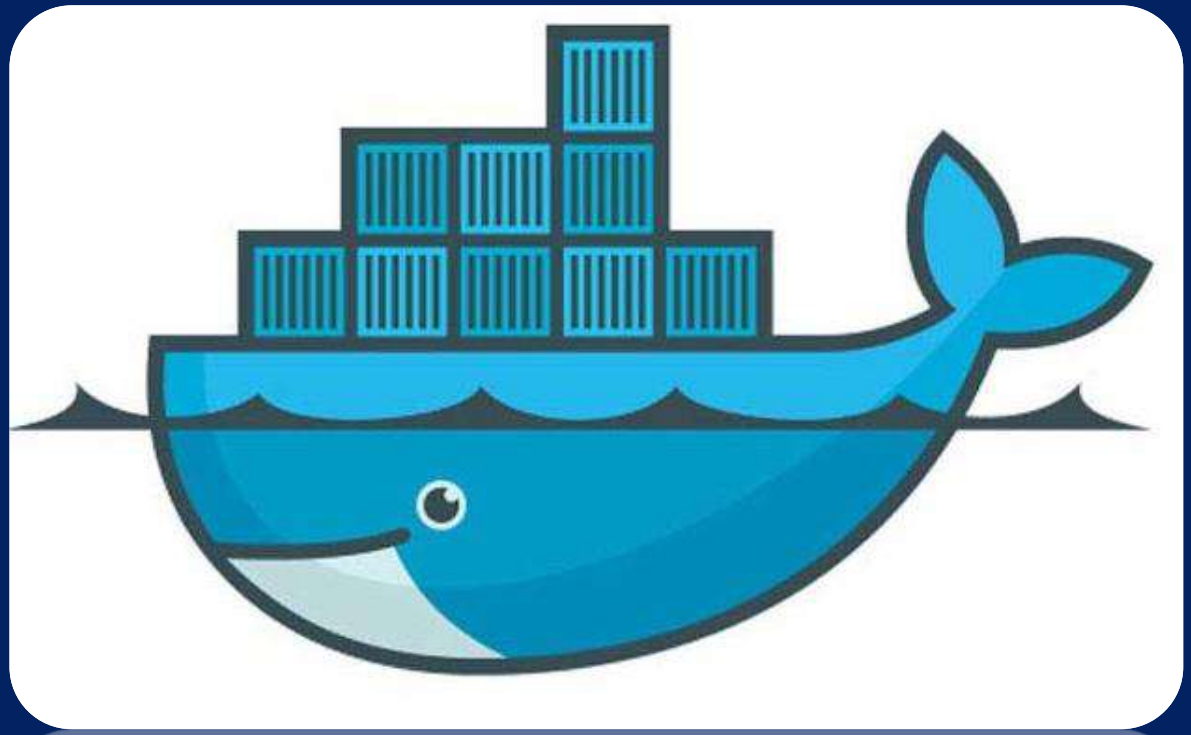
Installing Ubuntu on Mac

Installing Ubuntu using Docker

https://robocademy.com/2020/05/17/best-4-ways-to-install-ubuntu-for-ros/



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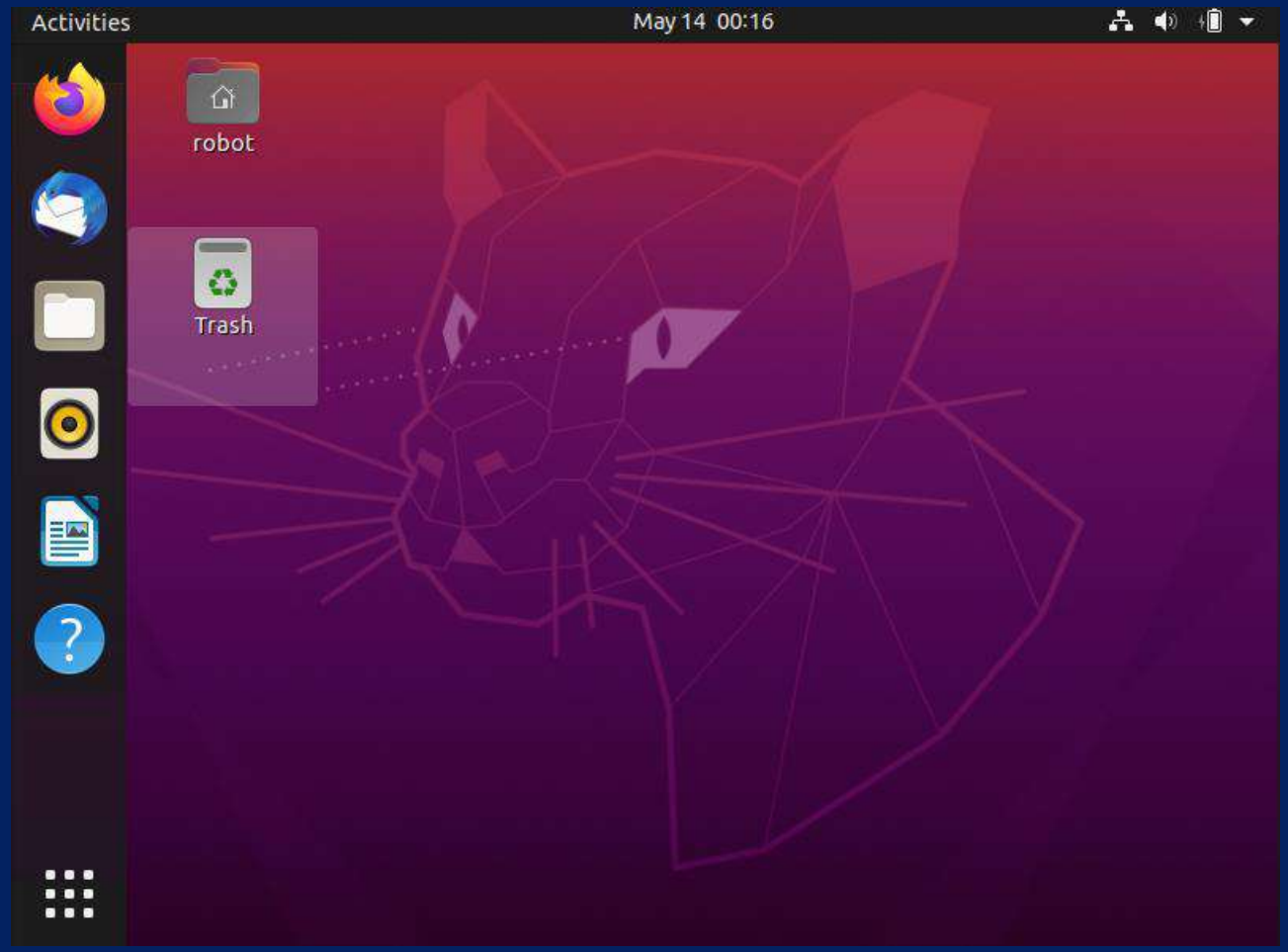
Hands-on with Ubuntu Desktop Environment



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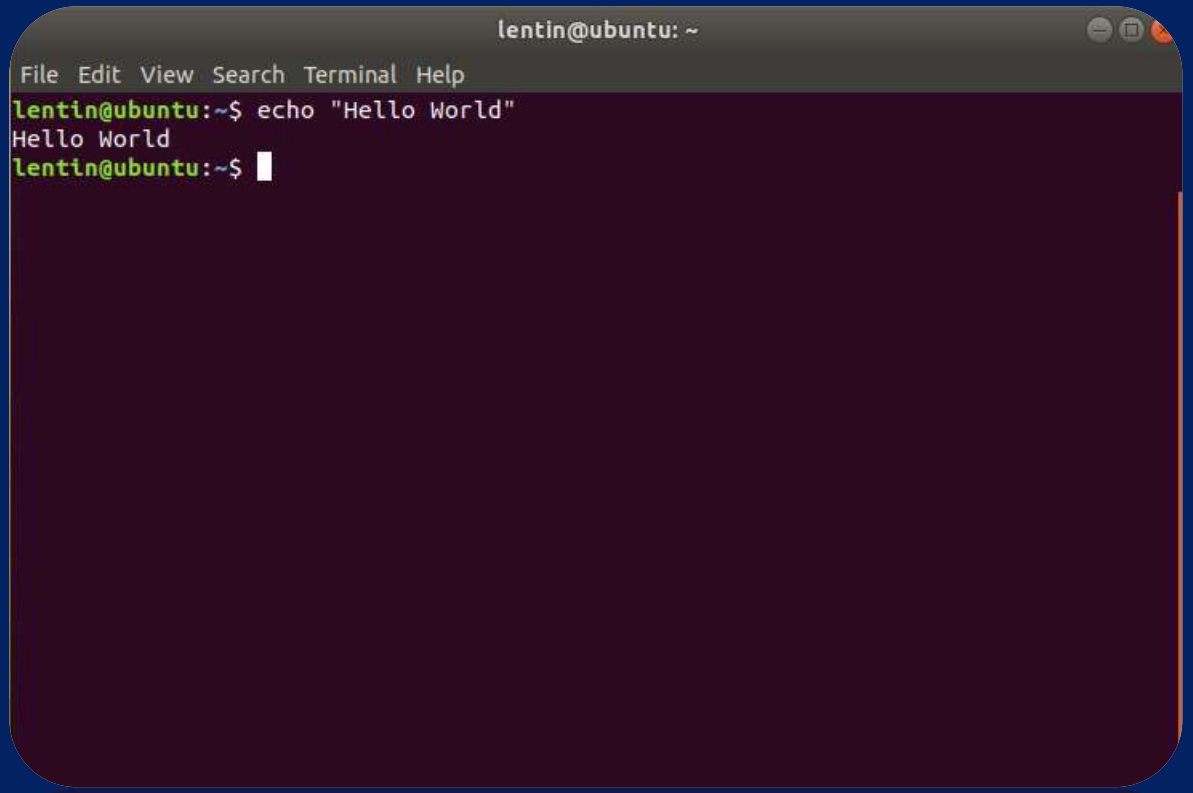
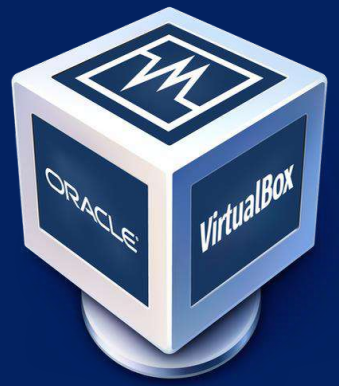
Hands-on with Linux terminal Commands



Reference

- Getting started with Ubuntu/Linux, Linux Terminal commands
  [ROS for Absolute Beginners, Chapter 1]

- PDF is included in Robocademy Git repository



Time for Discussions

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Thank You!