



# TOPIC 6A

## UBUNTU LINUX

## INSTALLATION

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- ❑ Linux Distributions
- ❑ Using VMware & KVM
- ❑ Installing UBUNTU Linux
- ❑ Other methods of installation

# Linux Operating System



# What is Linux OS?

- ❓ Just like Windows XP, Windows 7, Windows 8, and Mac OS X, Linux is an operating system. An operating system is software that manages all of the hardware resources associated with your desktop or laptop. To put it simply – the operating system manages the communication between your software and your hardware. Without the operating system (often referred to as the “OS”), the software wouldn’t function.

<https://www.linux.com/what-is-linux>

The OS is comprised of a number of pieces:

- ❑ **The Bootloader:** The software that manages the boot process of your computer. For most users, this will simply be a splash screen that pops up and eventually goes away to boot into the operating system.
- ❑ **The kernel:** This is the one piece of the whole that is actually called “Linux”. The kernel is the core of the system and manages the CPU, memory, and peripheral devices. The kernel is the “lowest” level of the OS.

- ❓ **Daemons:** These are background services (printing, sound, scheduling, etc) that either start up during boot, or after you log into the desktop.
- ❓ **The Shell:** You've probably heard mention of the Linux command line. This is the shell – a command process that allows you to control the computer via commands typed into a text interface. This is what, at one time, scared people away from Linux the most (assuming they had to learn a seemingly archaic command line structure to make Linux work).

- ❓ **Graphical Server:** This is the sub-system that displays the graphics on your monitor. It is commonly referred to as the X server or just “X”.
- ❓ **Desktop Environment:** This is the piece of the puzzle that the users actually interact with. There are many desktop environments to choose from (Unity, GNOME, Cinnamon, Enlightenment, KDE, XFCE, etc). Each desktop environment includes built-in applications (such as file managers, configuration tools, web browsers, games, etc).

- ❓ **Applications:** Desktop environments do not offer the full array of apps. Just like Windows and Mac, Linux offers thousands upon thousands of high-quality software titles that can be easily found and installed.



Most modern Linux distributions (more on this in a moment) include App Store-like tools that centralize and simplify application installation. For example: Ubuntu Linux has the Ubuntu Software Center which allows you to quickly search among the thousands of apps and install them from one centralized location.

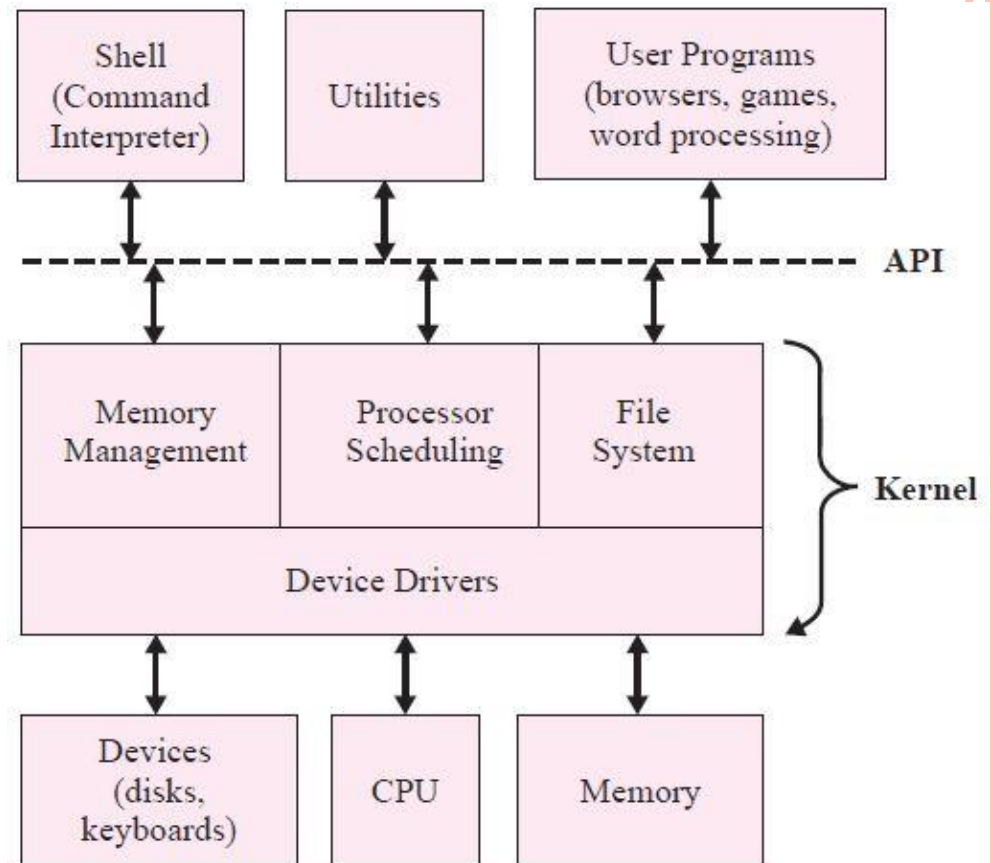
<https://help.ubuntu.com/community/UbuntuSoftwareCenter>

# What is LINUX?



# Layered Architecture

- 1) Functions divided into layers
- 2) Each layer higher abstraction
- 3) New device drivers could be added to the kernel without drastically affecting the other OS modules, which provide memory management, processor scheduling, and the file system interface.



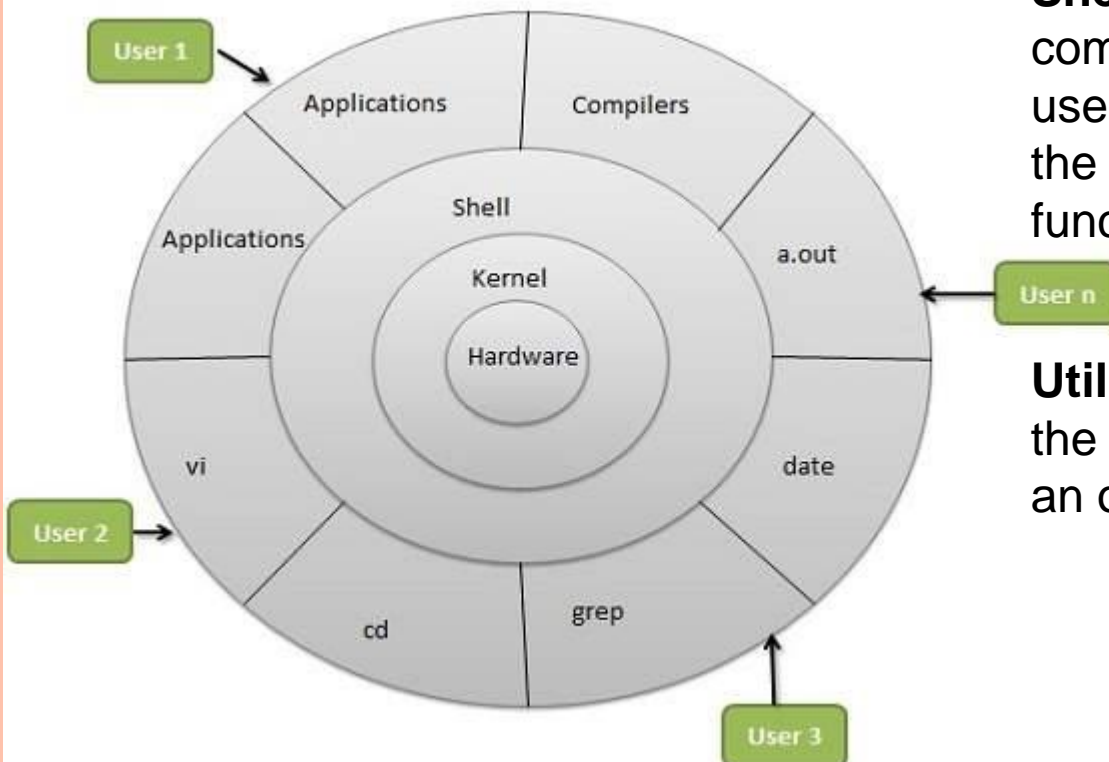
# Linux Architecture

The architecture of a Linux System consists of the following layers –  
**Hardware layer** – Hardware consists of all peripheral devices (RAM/ HDD/ CPU etc).

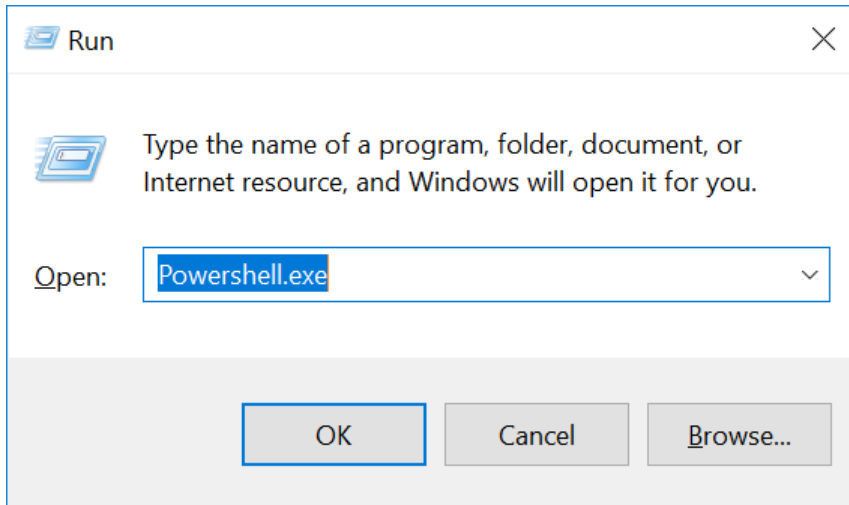
**Kernel** – It is the core component of Operating System, interacts directly with hardware, provides low level services to upper layer components.

**Shell** – An interface to kernel, hiding complexity of kernel's functions from users. The shell takes commands from the user and executes kernel's functions.

**Utilities** – Utility programs that provide the user most of the functionalities of an operating systems.



# Windows PowerShell



```
Windows PowerShell
PS C:\> pwd

Path
----
C:\

PS C:\> cd \
PS C:\> ls

Directory: C:\

Mode                LastWriteTime         Length Name
----                -
d-----          1/2/2019    9:00 AM             AI
d-----         23/11/2018    4:53 PM             Ama
d-----          3/1/2019   10:03 AM             CCS
d-----         10/12/2017   10:44 AM             dat
d-----          6/5/2018    9:05 AM             Dat
d-----         17/1/2018    4:34 PM             DBa
d-----         25/4/2018    5:05 PM             HO
d-----          6/7/2018   10:17 AM             ine
d-----         14/2/2018   11:18 AM             IO
d-----         20/9/2018   10:26 AM             LE
d-----         12/4/2018    7:38 AM             Per
d-----         23/11/2018   11:07 AM             Pia
d-r---          3/1/2019    7:59 AM             Pro
d-r---         31/1/2019    8:56 AM             Pro
d-----         20/3/2018    3:06 PM             Pro
d-----          3/12/2018    9:49 AM             too
d-r---          1/11/2018    7:39 AM             Use
d-----         10/8/2018   10:23 AM             WE
d-----         23/1/2019   10:30 AM             Win
d-----         22/2/2018    4:39 PM             2
```

# Linux Shell

## Sample usage [\[ edit \]](#)

The following example demonstrates the output of the `ls` command given two different arguments ( `pwd` is a command that shows the present working directory, or in other words, the folder you are currently in):

```
$ pwd
/home/fred
$ ls -l
drwxr--r--  1 fred  editors   4096  drafts
-rw-r--r--  1 fred  editors  30405  edition-32
-r-xr-xr-x  1 fred   fred    8460  edit
$ ls -F
drafts/
edition-32
edit*
```

In this example, the user `fred` has a directory named `drafts`, a regular file called `edition-32`, and an executable named `edit` in his home directory. `ls` uses [Unix file permission notation](#) to indicate which users or groups are allowed to access each file or directory.

```
drwxr--r--  1 fred  editors   4096  Mar 1  2007 drafts
```

In this example, `drafts` is a directory (denoted by the file descriptor `d`), and the characters after this indicate the permissions:

- `rw`: the owner (`fred`) has the right to read (`r`), write (`w`) and execute (`x`)
- `r--`: group members (users part of the `editors` group) have read-only permissions; write and execute are not permitted, as denoted by the hyphen characters (`-`)
- `r--`: others (users aside from the owner or members of `editors`) have read-only permissions; write and execute are not permitted

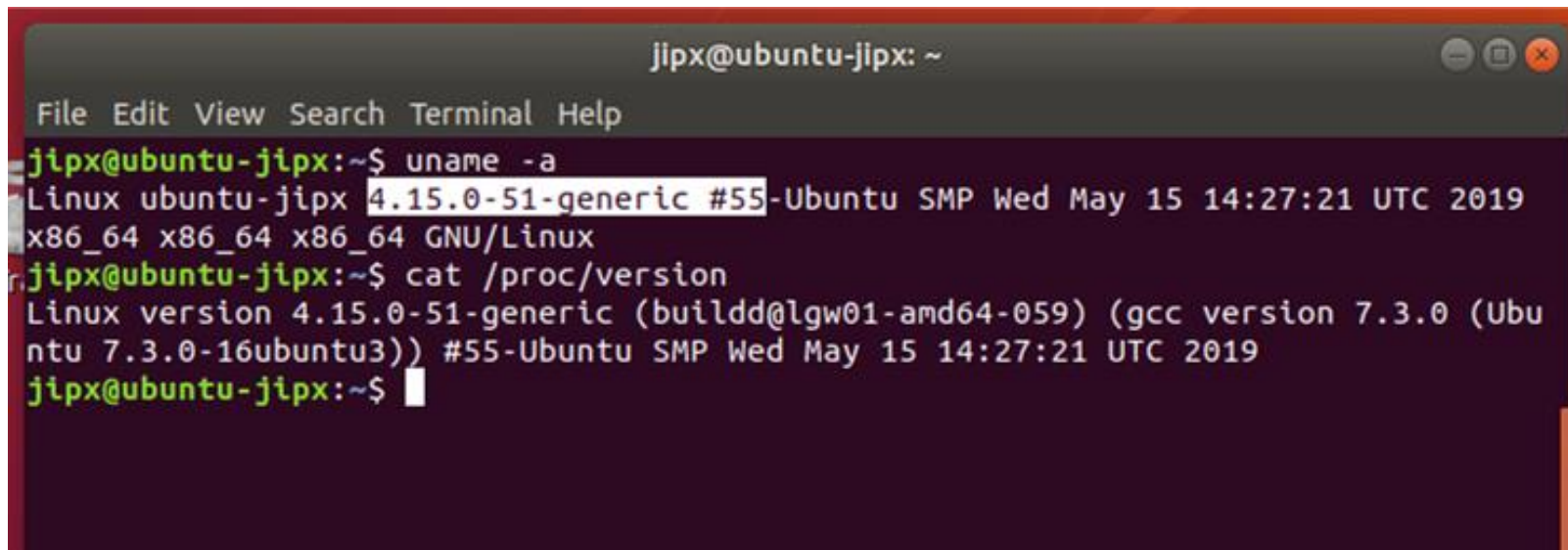
## See also [\[ edit \]](#)

- [chown](#)

# Linux Distributions

- ❓ Linux comes in different variations, called distributions
  - Red Hat Enterprise Linux (RHEL) – commercial support by subscription
  - Fedora (Red Hat sponsored and community-based open source)
  - Ubuntu
  - Scientific Linux
  - CentOS
  - ...

# Demo: find the kernel info

A terminal window titled 'jipx@ubuntu-jipx: ~' with a menu bar (File, Edit, View, Search, Terminal, Help). The terminal shows the execution of 'uname -a' and 'cat /proc/version'. The output of 'uname -a' is 'Linux ubuntu-jipx 4.15.0-51-generic #55-Ubuntu SMP Wed May 15 14:27:21 UTC 2019 x86\_64 x86\_64 x86\_64 GNU/Linux'. The output of 'cat /proc/version' is 'Linux version 4.15.0-51-generic (bulld@lgw01-amd64-059) (gcc version 7.3.0 (Ubuntu 7.3.0-16ubuntu3)) #55-Ubuntu SMP Wed May 15 14:27:21 UTC 2019'.

```
jipx@ubuntu-jipx: ~  
File Edit View Search Terminal Help  
jipx@ubuntu-jipx:~$ uname -a  
Linux ubuntu-jipx 4.15.0-51-generic #55-Ubuntu SMP Wed May 15 14:27:21 UTC 2019  
x86_64 x86_64 x86_64 GNU/Linux  
jipx@ubuntu-jipx:~$ cat /proc/version  
Linux version 4.15.0-51-generic (bulld@lgw01-amd64-059) (gcc version 7.3.0 (Ubuntu 7.3.0-16ubuntu3)) #55-Ubuntu SMP Wed May 15 14:27:21 UTC 2019  
jipx@ubuntu-jipx:~$
```

Kernel Name	hostname	Kernel release	Machine Architecture	Processor architecture	Operating system Architecture
Linux	ubuntu-jipx	4.15.0-51-generic #55-Ubuntu	x86_64	x86_64	x86_64



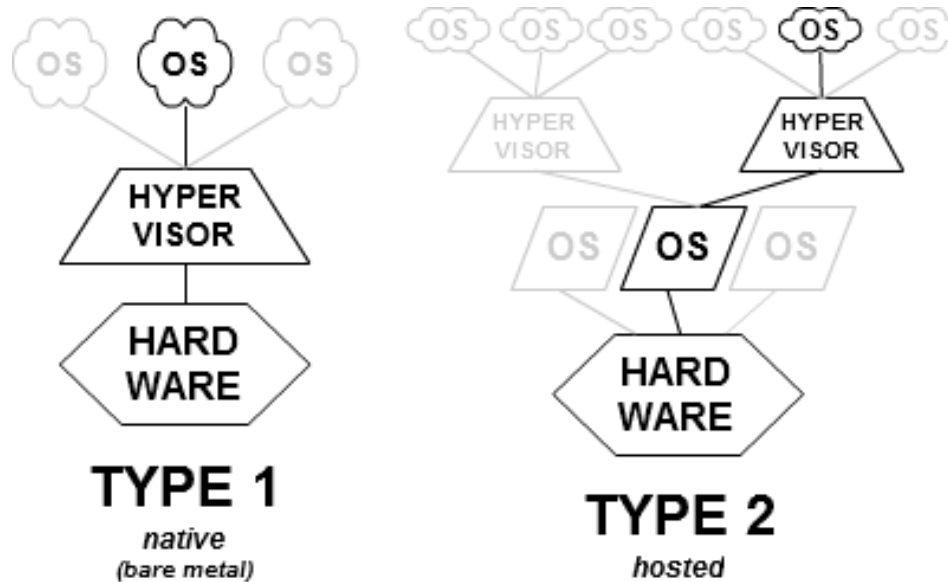
# Using VMware

- ❑ As our computers are installed with Windows operating system, we will run Linux in VMware
- ❑ VMware can run multiple operating systems on a single physical computer

# Using VMware

- ❓ The virtual network adapter on the VM (Virtual machine) can be configured with different settings
  - Bridged – VM appears as a separate system on the physical network
  - NAT – VM is hidden behind the host. VM can see the network but the rest of the network can not see the VM.
  - Host only – VM is hidden behind the host. VM can not access the network beyond the host and the rest of the network can not see the VM

# KVM



A hypervisor or virtual machine monitor (VMM) is a piece of computer software, firmware or hardware that creates and runs virtual machines.

A computer on which a hypervisor is running one or more virtual machines is defined as a **host** machine. Each virtual machine is called a **guest** machine. The hypervisor presents the guest operating systems with a virtual operating platform and manages the execution of the guest operating systems. Multiple instances of a variety of operating systems may share the virtualized hardware resources.

Kernel-based Virtual Machine (KVM) are implemented as Type 2 (hosted), with the hypervisor as a kernel module for Linux.

# Practical : Installing Ubuntu Linux on your VMware Workstation

