# What is linux is

**Detecting and preparing hardware:** When the Linux system boots up (when you turn on your computer), it looks at the components on your computer (CPU, hard drive, network cards, and so on) and loads the software (drivers and modules)

**Managing processes:** The operating system must keep track of multiple processes running at the same time and decide which have access to the CPU and when. The system also must offer ways of starting, stopping, and changing the status of processes.

**Managing memory:** RAM and swap space (extended memory) must be allocated to applications as they need memory. The operating system decides how requests for memory are handled.

**Providing user interfaces: P**rovide ways of accessing the system. The first Linux systems were accessed from a CLI called a shell. Today, graphical desktop available

**Controlling filesystems:** Filesystem structures are built into the operating system (or loaded as modules). The operating system controls ownership and access to the files and directories (folders) that the filesystems contain.

# What is linux is..

**Offering administrative utilities:**In Linux, hundreds (perhaps thousands) of commands and graphical windows are available to do such things as *add users*, *manage disks*, *monitor the network*, *install software*, and *generally secure and manage your computer*. Web UI tools, such as *Cockpit*, have lowered the bar for doing complex administrative tasks.

**Starting up services:** To use printers, handle log messages, and provide a variety of system and network services, processes called daemon processes run in the background, waiting for requests to come in. Many types of services run in Linux. Linux provides different ways of starting and stopping these services. While Linux includes web browsers to view web pages, it can also be the computer that serves up web pages to others. Popular server features include *web, mail, database, printer, file, DNS, and DHCP servers.*

**Programming tools:** A wide variety of programming utilities for creating applications and libraries for implementing specialty interfaces are available with Linux.

# Advanced features in Linux..

**Clustering:** Linux can be configured to work in clusters so that multiple systems can appear as one system to the outside world. Services can be configured to pass back and forth between cluster nodes while appearing to those using the services that they are running without interruption.

**Virtualization:** To manage computing resources more efficiently, Linux can run as a *virtualization host.* On that host, you could run other Linux systems, Microsoft Windows, BSD, or other operating systems as *virtual guests*. To the outside world, each of those virtual guests appears as a separate computer. KVM and Xen are two technologies in Linux for creating virtual hosts.

**Cloud computing:** To manage large-scale virtualization environments, you can use full-blown cloud computing platforms based on Linux. Projects such as OpenStack and Red Hat Virtualization (and its upstream oVirt project) can simultaneously manage many virtualization hosts, virtual networks, user and system authentication, virtual guests, and networked storage. Projects such as *Kubernetes* can manage containerized applications across massive data centers

# Advanced features in Linux

**Specialized storage:** Instead of just storing data on the computer's hard disk, you can store it on many specialized local and networked storage interfaces that are available in Linux. Shared storage devices available in Linux include *iSCSI, Fibre Channel, and Infiniband.* Entire open source storage platforms include projects such as Ceph (www.ceph.io) and GlusterFS (www.gluster.org).

# Understanding the Linux shell

- Although the shell is less intuitive than common graphical user interfaces (GUIs), most Linux experts consider **the shell** to be much more powerful than GUIs.
- other shells are available:

-C shell (csh) (BSD UNIX)
- Korn shell (ksh)  (popular among UNIX System V)

Ubuntu uses the dash shell by default at boot time, faster than the Bash shell.
(*Linux also has a tcsh shell (an improved C shell) and an ash shell (another Bourne shell look-alike* )

mkdir dir1 dir2 dir3
mkdir -p dir4/dir5/dir6 ls
ls > output.txt

# Creating folders and files

- mkdir /tmp/tutorial
- cd /tmp/tutorial
- mkdir dir1 dir2 dir3

- mkdir -p dir4/dir5/dir6
  **Creating files:**
- ls > output.txt
  **‘concatenate’, meaning “to link together”:**
- cat output.txt  or  echo "This is a test" > test_1.txt

# Moving and manipulating files

- mv combined.txt dir1
- mv combined.txt  test_* dir3 dir2

Rename folder:
mv "folder 1" folder_1
mv "folder 2" folder_2

# Deleting files and folders

- rm dir4/dir5/dir6/combined.txt combined_backup.txt

Perhaps we should remove some of those excess directories as well:

- rm folder_*

  rmdir folder_*