PER SCHOLAS

300.1.2
Operating System Overview

Operating System Overview

Learning Objective:

By the end of this presentation, learners will be able to describe Operating Systems.

Agenda/Topics

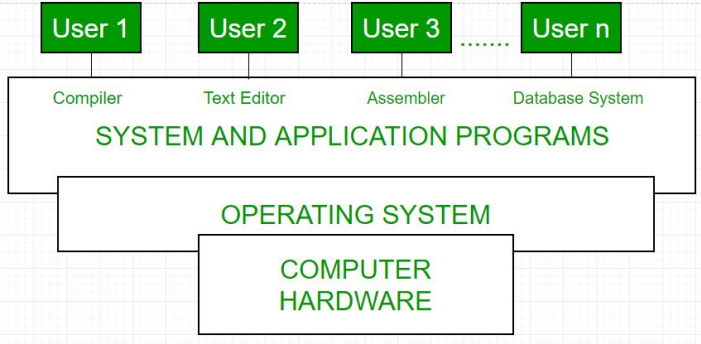
- Operating Systems.
- Operating System Functions.
- Operating System User Interfaces.
- Command Line Interface.
- Overview of Linux.
- Linux Distribution.
- Linux on various types of hardware.
- Overview - Windows Operating System.
- Overview - Macintosh Operating System.

Acronyms / Terminology

- OS: Operating System
- DB: Database
- HAL: Hardware Abstraction Layer
- GUI: Graphical User Interface

Operating Systems

- An Operating System (OS) is a software that acts as an interface between computer hardware components and the user. Every computer system must have at least one OS to run other programs.
- Applications such as Browsers, MS Office, Notepad Games, etc., need some environment to run and perform its tasks.
- The OS helps you to communicate with the computer without knowing how to speak the computer's language. It is not possible for the user to use any computer or mobile device without having an operating system.



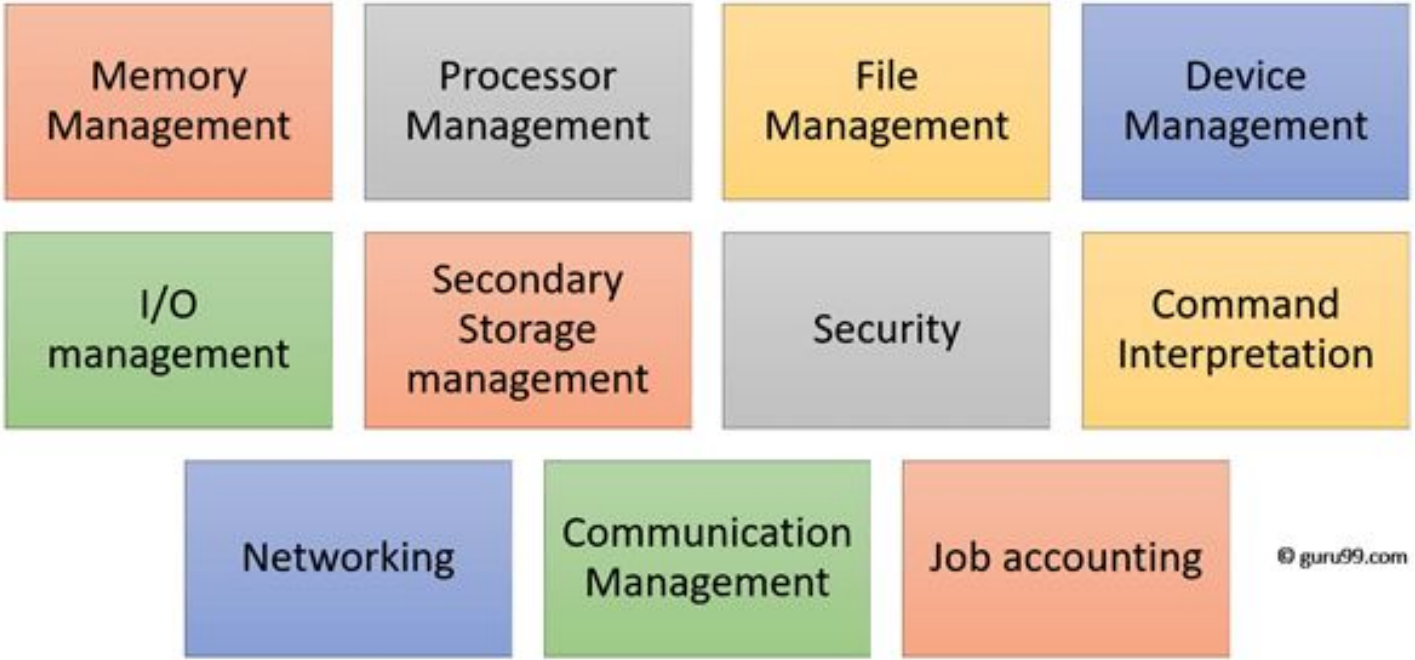
computerhope.com

Management and Support

What does an OS manage and support?

- Manages hardware.
- Supports applications.
- Provides an interface for the user.
- Manages I/O.

Operating System Functions



Continue…

Operating System Functions Explained

continued

- **Process management:** Process management helps the OS to create and delete processes.
- **Memory management:** Memory management modules perform the task of allocation and deallocation of memory space to programs.
- **File management:** File management manages all the file-related activities such as organization storage, retrieval, naming, sharing, and protection of files.
- **Device management:** Device management keeps tracks of all devices. This module is also responsible for the task known as the I/O controller.
- **I/O System management:** One of the main objects of any OS is to hide the peculiarities of that hardware device from the user.

Operating System Functions Explained

continued

- **Secondary-Storage management:** Systems have several levels of storage, which includes primary storage, secondary storage, and cache storage. Instructions and data must be stored in primary storage or cache so that a running program can reference it.
- **Security:** Security module protects the data and information of a computer system against a malware threat, and unauthorized access.
- **Command Interpretation:** This module interprets commands given by the acting system resources to process that commands.
- **Networking:** A distributed system is a group of processors, which do not share memory, hardware devices, or a clock. The processors communicate with one another through the network.

Functions of Operating System Explained

continued

- **Job accounting:** Keeping track of time and resources used by various jobs and users.
- **Communication management:** Coordination and assignment of compilers, interpreters, and another software resources of the various users of the computer systems.

User Interfaces of Operating Systems

A **User Interface (UI)** facilitates communication between an application and its user by acting as an intermediary between them. The User Interface takes the inputs from the user to provide the output to the users.

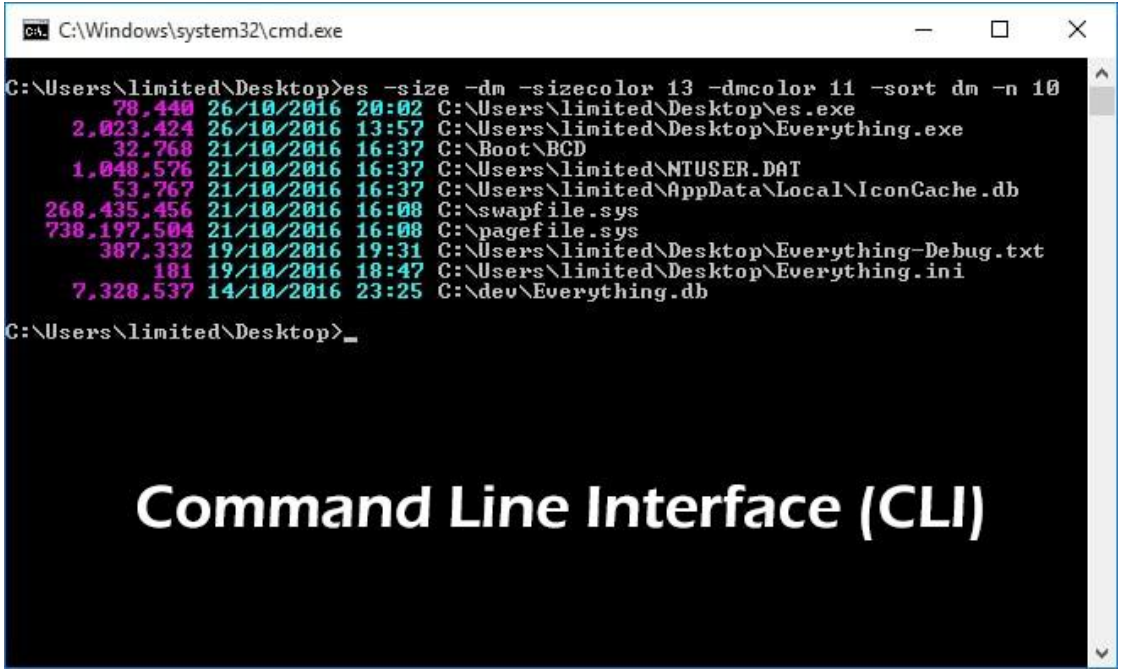
1) Graphical User Interface (GUI) : The Graphical User Interface is a type of interface that enables the users to interact with the operating system by means of point-and-click operations. GUIs is easy to understand and even new users can operate on them on their own.

2) Command Line Interface (CLI): The Command Line Interface is a type of user interface that enables the users to interact with the OS by issuing some specific commands. The disadvantages of the CLI is that the user needs to remember a lot to interact with the OS. Therefore, these types of interfaces are not considered very friendly from a user perspective.

Example: *In order to perform a task, we need to type a command at the command prompt denoted by* **C:\>** *dir.*

Command Line Interface

During the early days of computers, there was no mouse available for the operating system, and users could only interact with the system by typing commands in the Command Line Interface (CLI).



List of Operating Systems

Click here to see the list of Operating Systems.

Overview of Linux

- Linux is an **operating system** or the **Kernel** – **the central controller.**
- Linux is also distributed under an open-source license. Open-source licenses follow these key tenets:
  - You can install Linux on as many computers as you like without paying any fees for software or server licensing.
  - You have the freedom to run the program, for any purpose.
  - You have the freedom to study how the program works, and change it to make it do what you wish.
  - You have the freedom to redistribute copies so you can help others.
  - You have the freedom to distribute copies of your modified versions to others.

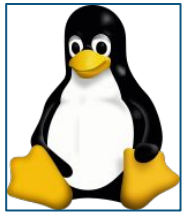


Image source: wikipedia

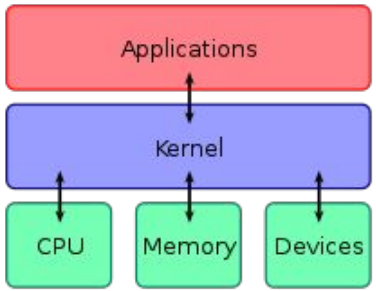
View the Wiki document for more information about Linux OS.

Overview of Linux

continued

- **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.

  Visit the Wiki document for more information about the Kernel.



- **Shell** − An interface to Kernel that hides the complexity of the Kernel's functions from users. The shell takes commands from the user and executes the Kernel's functions.

Linux Distribution

- Linux has a number of different versions to suit any type of user. New users and hard-core users will find a "flavor" of Linux to match their needs. These versions are called **distributions** (or, in the short form, "distros"). Nearly every distribution of Linux can be downloaded for free, burned onto disk (or USB thumb drive), and installed (on many machines).
- Popular Linux OS distributions include:
  - LINUX MINT
  - MANJARO
  - DEBIAN
  - UBUNTU
  - ANTERGOS
  - SOLUS
  - FEDORA
  - ELEMENTARY OS
  - OPENSUSE

Visit Distrowatch for the Top 100 distributions.

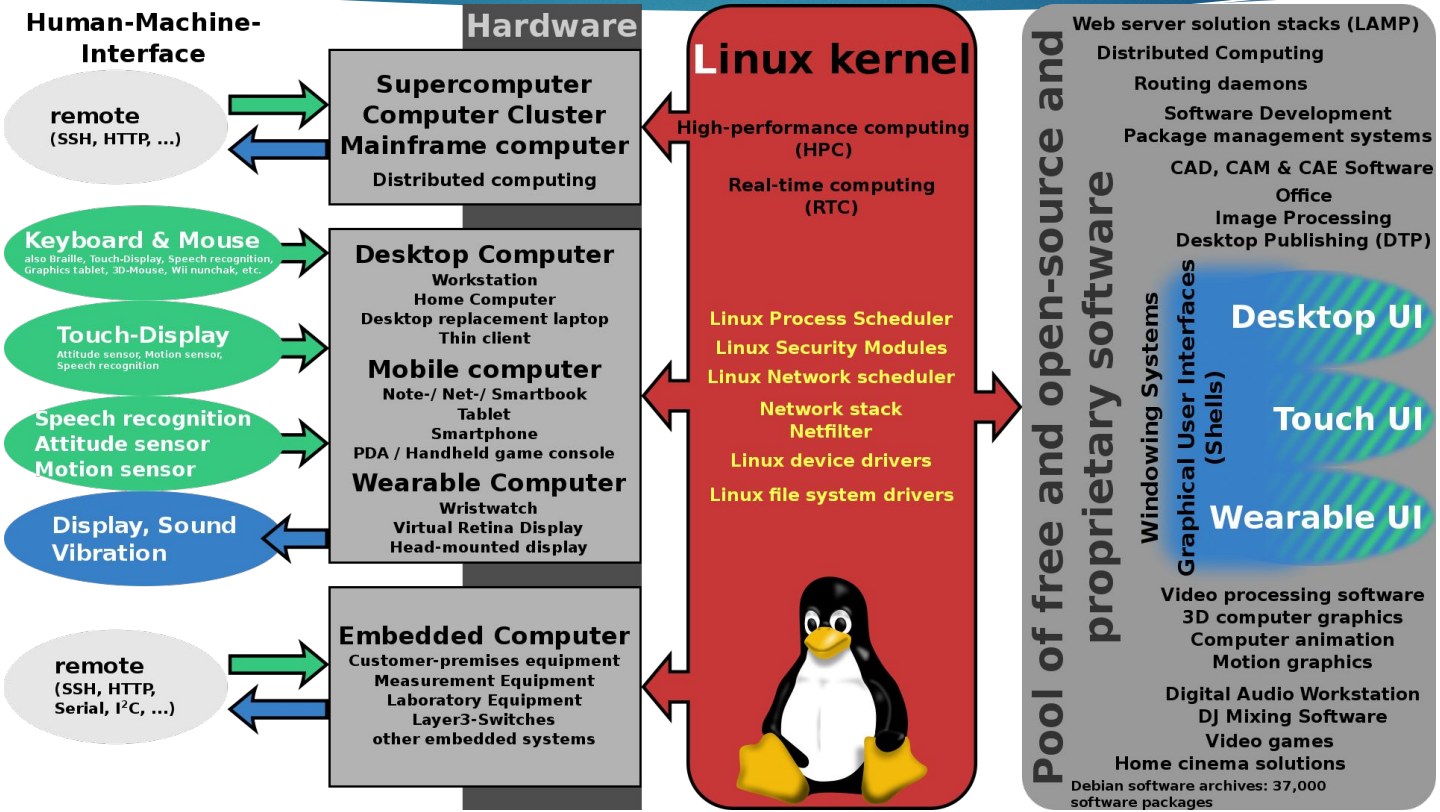
Linux Distribution (continued)

Linux Server OS includes:

- Red Hat Enterprise Linux
- Ubuntu Server
- Centos
- SUSE Enterprise Linux

Some of the above server distributions are free (e.g., Ubuntu Server and CentOS), and some have an associated price (e.g., Red Hat Enterprise Linux and SUSE Enterprise Linux).

Linux on Various Types of Hardware



Source: byjus.com

Overview - Windows Operating System

- Windows is a graphical OS developed by Microsoft. It allows users to view and store files, run software, play games, watch videos, and it provides a way to connect to the internet. It was released for both home computing and professional work.
- There are two common editions of Windows:
  - Windows Home
  - Windows Professional
- **Windows Server** (formerly **Windows NT Server**) is a group of OS for servers that Microsoft has been developing since July 27, 1993.
- Windows comes in three architectures: 32-bit, 64-bit, and x86-bit.
  - The 86-bit version of Windows handles large amounts of random access memory (RAM) more effectively than a 64-bit system. To run an 86-bit version of Windows, your computer must have an 86-bit-capable processor.
- The Windows OS License is distributed under a Proprietary commercial software license.

Visit the Wiki document for more information about the Windows OS architecture.

Overview - Macintosh Operating Systems

- **The Macintosh Operating System MacOS** (previously **Mac OS X**, and later **OS X**) is built on top of a Unix operating system, developed and marketed by Apple Inc. (2001). It is the primary OS for Apple's Macintosh computers. Within the market of desktop and laptop computers, it is the second most widely used desktop OS after Microsoft Windows.
- MacOS is a GUI-based OS that has since been released in multiple different versions.
- Apple's business model is mainly based on differentiation and exclusivity. Unlike Microsoft, Apple makes both the hardware and software of their products, and Apple's software runs only on their machines.

Knowledge Check

- Define an OS.
- Define a Linux OS.
- Define the Windows OS.
- What does “open-source” mean?

Summary

An Operating System (OS) is a software that acts as an interface between computer hardware components and the user. Every computer system must have at least one OS to run other programs.

- Linux is an **operating system** or the **kernel** – ***the central controller.***
- Microsoft Windows (also referred to as Windows or Win) is **a graphical operating system developed and published by Microsoft**.

The User Interface takes the inputs from the user to provide the output to the users.

References

- Linux.com: Everything you need to know about Linux (news, tutorials and more)
- Howtoforge: Linux tutorials
- Linux Documentation Project: How-tos, guides, and FAQs
- Linux Knowledge Base and Tutorial: Plenty of tutorials and in-depth guides
- LWN.net: Linux kernel news and more
- https://kernel.org/