

Operating Systems 3: Types of Operating Systems

Batch processing

Batch was the first operating system to be created. Today we talk of **Batch Processing** which is a method of running high-volume, repetitive data jobs. The batch method allows users to process data when computing resources are available, and with little or no user interaction.

Often programs that need no interaction are run in the background, when there are no interactive programs being processed or when their activity is low.

Batch processing is especially suited for handling frequent, repetitive tasks. Examples of jobs well suited for batch processing are:

- A company working salaries to thousands of employees.
- A bank working the daily transactions and upgrading the master file.
- A telephone company billing its subscribers.



Benefits of batch processing:

- Efficient: the processor does not have to change from one program to another.
- Companies can run time-sensitive and interactive jobs (e.g., a bank running Internet banking) during the day and batch processing programs during the night.
- Simplicity

Real-time Operating System

A **real-time operating system (RTOS)** is an operating system that guarantees that operations are performed in a particular amount of time. The characteristics of a RTOS are:

- a) Support application programs which are nonsequential in nature.
- b) Deal with events occurring concurrently.
- c) Process and produce a response within a guaranteed specified time interval.

d) Have hardware redundancy.

RTOSs are divided in:

- Hard RTOS:
 - Also called critical RTOS.
 - Time interval between start of operation and end of it must be strictly guaranteed.
 - Examples:
 - Inkjet printer system
 - Railway signaling system
 - Air traffic control systems
 - Nuclear reactor control systems
 - Anti-missile system.
- Soft RTOS:
 - Also called non-critical RTOS
 - Time interval between start of operation and end of it can be sometimes not adhered to.
 - Examples:
 - Airline reservation
 - Online transaction systems
 - Electronic games,
 - Web browsing
 - Mobile communication

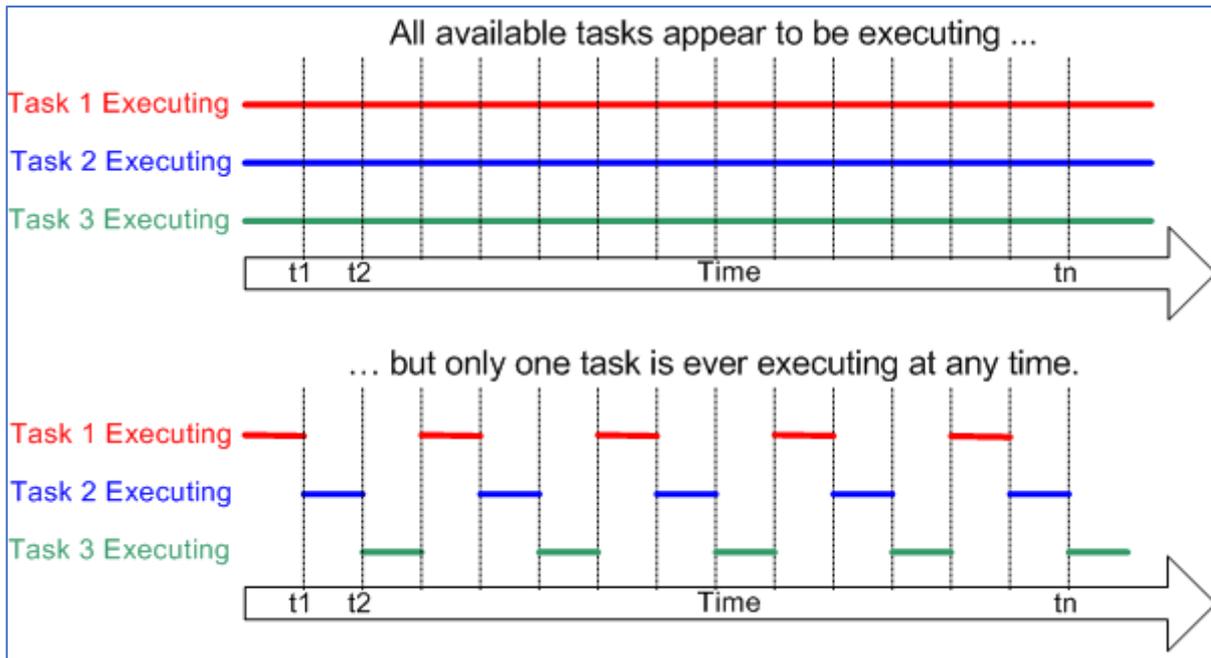


Multi-Tasking (Time-Sharing) Operating System

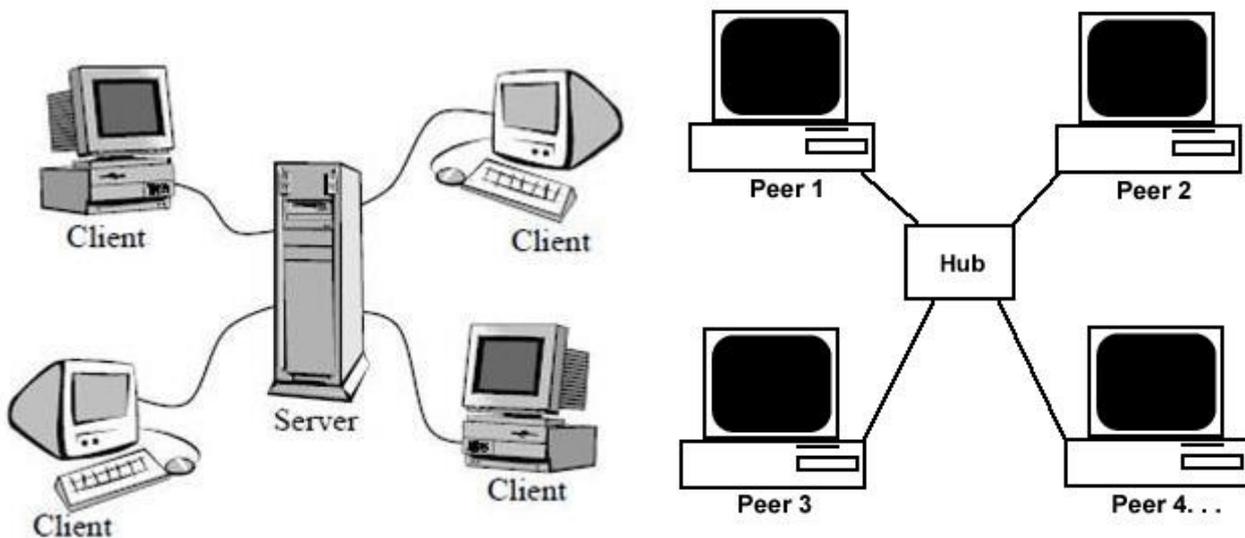
In a multi-tasking OS several applications may be simultaneously loaded and used in the memory. While the processor handles only one application at a particular time it is capable of switching between the applications effectively to apparently simultaneously execute each application. This type of operating system is seen everywhere today and is the most common type of OS.

Time-sharing systems run programs that are interactive.

A time-sharing system is also called **on-line**.



Network Operating System (NOS)



Client-Server and Peer-To-Peer Networks

A network operating system provides services for computers connected to a network. Examples include shared file access, shared applications, and printing capabilities. A NOS may either be a **peer-to-peer** (P2P) OS, which is installed on each computer, or a **client-server** model, where one machine is the server and others have client software installed.

An NOS manages concurrent requests from clients and provides the security necessary in a multiuser environment.

Other Terms

A **single user** OS as the name suggests is designed for one user while a **multi-user** OS allows multiple users to simultaneously use the system.

Multiprocessing supports the running of a program on more than one CPU.

Multithreading allows different parts of a single program to run concurrently.

In **multi-programming** more than one process can reside in the main memory at a time. Thus, when process P1 goes for I/O operation the CPU is not kept waiting and is allocated to some another process (lets say P2). This keeps the CPU busy at all times.