Operating System Processing - Continued

6) Network Operating Processing

In the time sharing environment, it is not always possible that all the programs of all users reside in the main memory. Only the control program and some programs reside in the main memory. The remaining programs are loaded from the secondary memory as and when they are to be executed.

The Advantages are:

1. Centralized servers are highly stable.
2. Security is server managed.
3. Remote access to server is possible from different location & type of system.
4. Upgrade to new technologies and hardware can be easily integrated into the system.

Disadvantages are as follows:

1. High cost of buying and running a server.
2. Dependency on a central location for most operations.
3. Regular maintenance and updates are required.

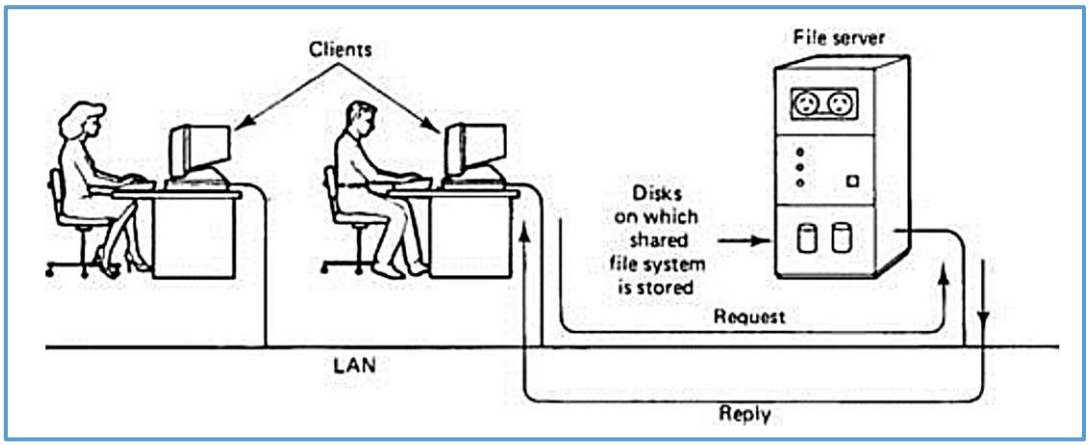

Fig. Network Operating Systems / Distributed operating systems

7) On line processing:

In on line processing the transaction data is directly sent to secondary online storage devices by the CPU without sorting, from the point where data is generated. The accessing and retroviral of data is very fast. In these systems devices are directly connected to the CPU for input or inquiry.

Online transaction processing (OLTP) applications are high throughput, insert/update-intensive systems. These systems are characterized by growing volumes of data that several hundred users access concurrently. Typical OLTP applications are airline reservation systems, large order-entry applications, and banking applications. The key goals of OLTP systems are availability (sometimes 7 day/24 hour availability); speed (throughput); concurrency; and recoverability.

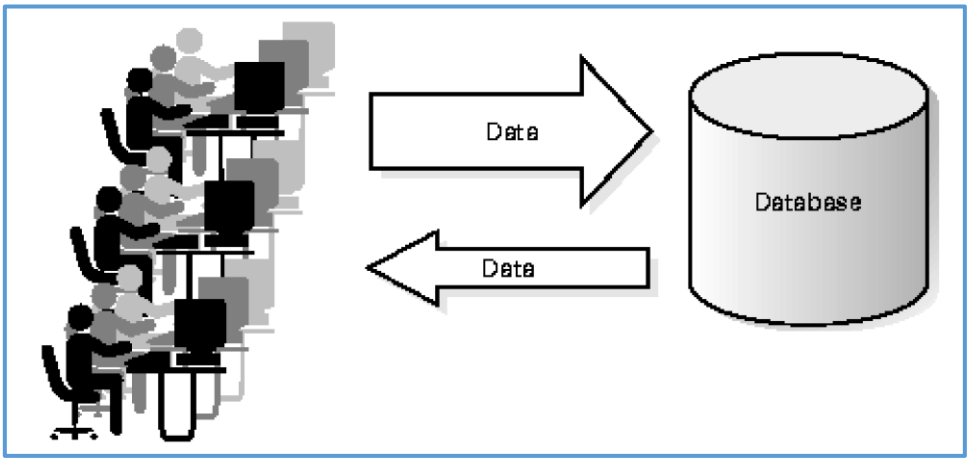

Fig. Online Transaction Processing Systems.

8) Real-time processing technique:

Real-time processing is an on-line processing system where the records are update and data is processed as soon as the transaction takes place-Real time systems allow the users to communicate with the computer during the processing itself.

Real-time processing is the process in which a system can input rapidly changing data and then provide output instantaneously so that the change over time can be seen very quickly. Real-time data processing is a method that is used when data input requests need to be dealt with quickly.

In off line processing, the data processing is not directly controlled by the CPU. In minicomputers a number of terminals are used to enter the data onto a

secondary storage like a tape or disk. The data is validated, and then entered into the main CPU in batch mode for processing. A Great examples of real-time data processing systems are bank ATMs, traffic control systems, radar systems, data streaming, and customer service systems.

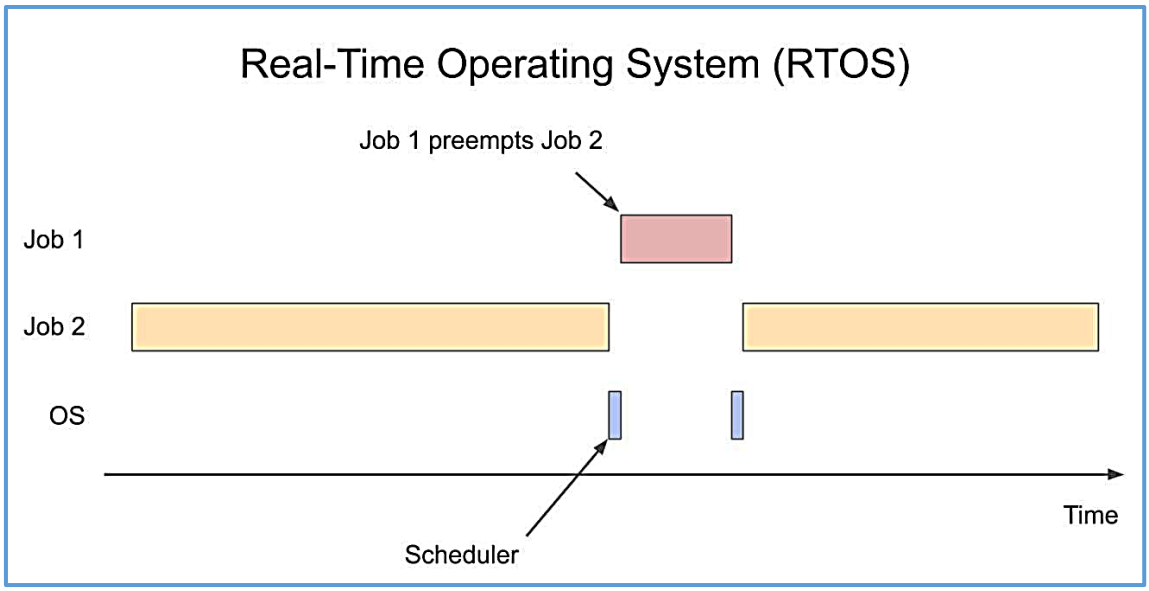

Fig. Real-time Operating System

9) Multi-tasking and Single-tasking Operating System

Multitasking is the methodology of executing multiple tasks or processes concurrently over a period of time. When a single program is allowed to run at a time, the system is grouped under a single-tasking system, while in case the operating system allows the execution of multiple tasks at one-time, it is classified as a multi-tasking operating system. Multi-tasking can be of two types namely, pre-emptive or co-operative.

In pre-emptive multitasking, the operating system slices the CPU time and dedicates one slot each of the programs. In other words, the operating system allows stopping the execution of the currently running process and allocating the CPU to some other process. UNIX, Linux, Windows 95, Windows NT (New Technology) OS are examples of pre-emptive multitasking.

In cooperative multitasking, the operating system never initiates context switching from the running process to another process. A context switch occurs only

when the processes voluntarily yield control periodically or when idle or logically blocked to allow multiple applications to execute simultaneously. Macintosh OS version 8.0-9.2.2 and Windows 3.x OS are examples of cooperative multitasking. Let's see, the biggest difference between preemptive multitasking and cooperative multitasking.

Pre-emptive multitasking interrupts applications and gives control to other processes outside the application's control.

In cooperative multitasking, process scheduler never interrupts a process unexpectedly.

Difference between Multi-programming and Multi-tasking:

Multi-programming	***Multi-tasking***
Concept of Context Switching is used.	Concept of Context Switching ***and*** Time Sharing is used.
In multiprogramming system, the operating system simply switches to, and executes, another job *when* current job needs to wait.	The processor is typically used in time sharing mode. Switching happens when either allowed time expires ***or*** where there other reason for current process needs to wait (example: when the process needs to do IO).

10) Distributed Operating System:

An operating system that manages a group of independent computers and makes them appear to be a single computer is known as a distributed operating system.

A distributed computer system consists of multiple software components that are on multiple computers, but run as a single system. The computers that are in a distributed system can be physically close together and connected by a local network, or they can be geographically distant and connected by a wide area network.

A distributed system can consist of any number of possible configurations, such as mainframes, personal computers, workstations, minicomputers, and so on. The goal of distributed computing is to make such a network work as a single computer.

Distributed computing systems can run on hardware that is provided by many vendors, and can use a variety of standards-based software components. Such systems are independent of the underlying software. They can run on various

operating systems, and can use various communications protocols. Some hardware might use UNIX or Linux as the operating system, while other hardware might use Windows operating systems or Ubuntu.

Distributed systems offer many benefits over centralized systems, including the following:

a) Sharing resource facility, a user at one site may be able to use the resources available at another.
b) Speedup the exchange of data with one another via electronic mail.
c) If one site fails in a distributed system, the remaining site can potentially continue operating.
d) Reduction of the load on the host computer.
e) Reduction of delays in data processing.

Types of distributed systems

The two main distributed systems according to architecture models are:

a) Client-server.
b) Peer-to-peer.

a) Client-server: Clients contact the server for data, then format it and display it to the end-user. The end-user can also make a change from the client-side and commit it back to the server to make it permanent. The term "client/server" describes a type of distributed processing in which an application is divided into two parts, each possibly residing on separate operating systems, but working together to provide a service to the end user.

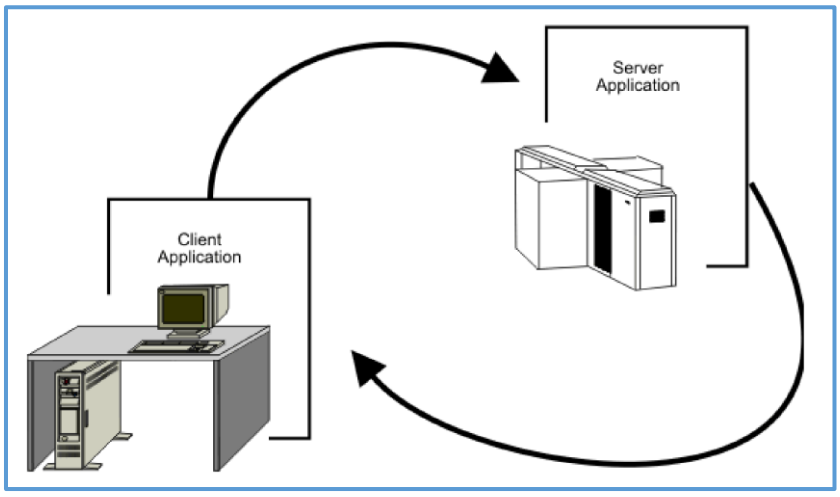

Fig. The Client/Server distributed system.

b) Peer-to-peer: (known as peers or P2P, which can serve as either client or server). Peer-to-peer computing or networking is a distributed application architecture that partitions tasks or workloads between peers. Peers are equally privileged, equipotent participants in the application. They are said to form a peer-to-peer network of nodes. There are no additional machines used to provide services or manage resources. Responsibilities are uniformly distributed among machines in the system, known as peers, which can serve as either client or server.

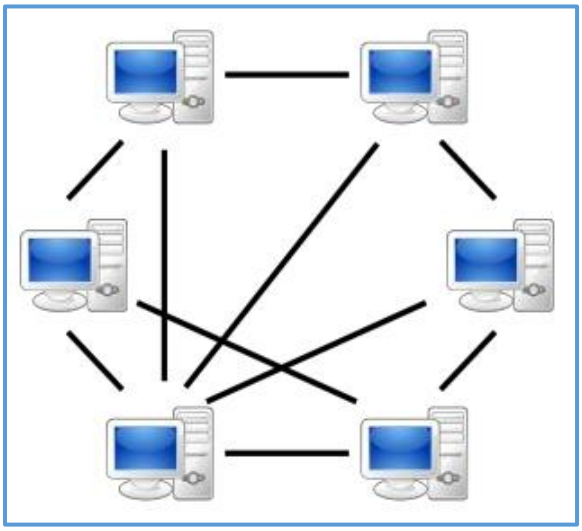

Fig. The peer-to-peer distributed system.