

**Terna Engineering College**  
**Computer Engineering Department**  
**Program: Sem VIII**

**Course: Distributed Computing Lab (CSL802)**

**Faculty: Rohini Patil**

**Experiment No.1**

**A.1 Aim:** To Compare Network operating system and Distributed operating system.

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**PART B**  
**(PART B: TO BE COMPLETED BY STUDENTS)**

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<b>Grade:</b>	

**B.1 Observations and learning:**

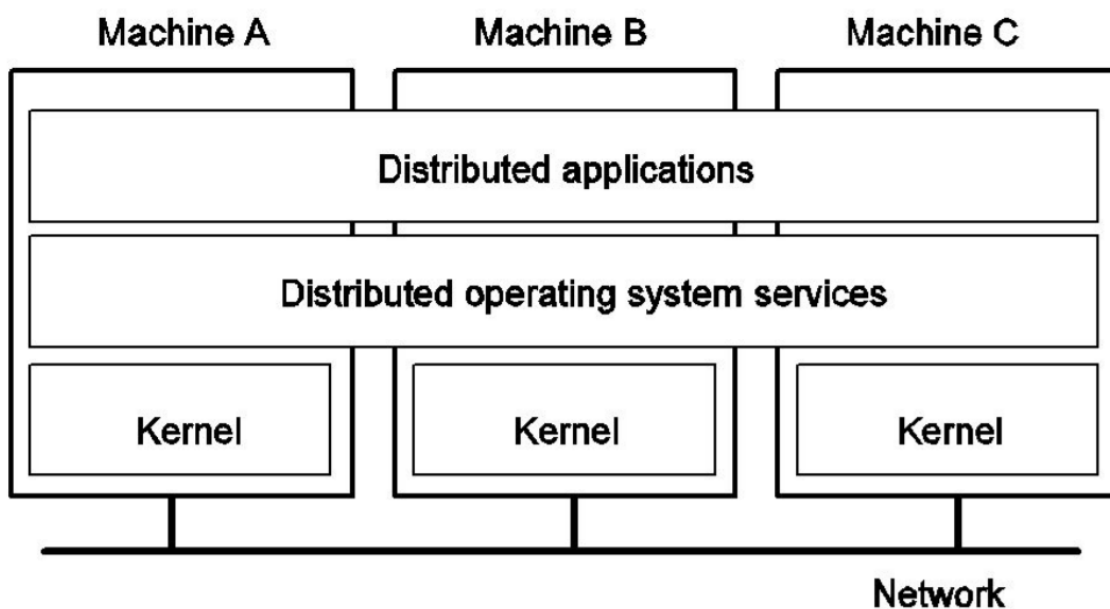
**Architecture of Distributed Systems**

A distributed operating system (DOS) is an essential type of operating system. Distributed systems use many central processors to serve multiple real-time applications and users. As a result, data processing jobs are distributed between the processors.

Types of Distributed Operating systems.

1. Client-Server System
  - This type of system requires the client to request a resource, after which the server gives the requested resource. When a client connects to a server, the server may serve multiple clients at the same time.
2. Peer-to-Peer System
  - The nodes play an important role in this system. The task is evenly distributed among the nodes. Additionally, these nodes can share data and resources as needed. Once again, they require a network to connect.

3. Middleware
  - Middleware enables the interoperability of all applications running on different operating systems. Those programs are capable of transferring all data to one other by using these services.
4. Three-tier
  - The information about the client is saved in the intermediate tier rather than in the client, which simplifies development. This type of architecture is most commonly used in online applications.
5. N-tier
  - When a server or application has to transmit requests to other enterprise services on the network, n-tier systems are used.



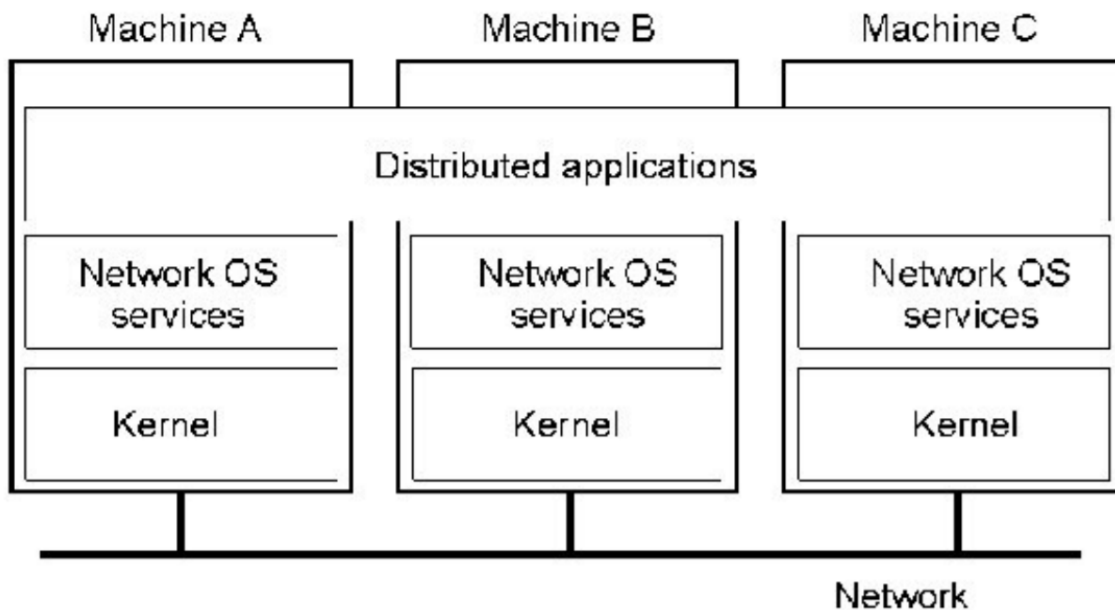
### **Architecture of Network Operating System**

A network operating system (NOS) is a computer operating system (OS) that is designed primarily to support workstations, personal computers and, in some instances, older terminals that are connected on a local area network (LAN).

There are two basic types of network operating systems, the peer-to-peer NOS and the client/server NOS:

1. Peer-to-peer network operating systems allow users to share network resources saved in a common, accessible network location. In this architecture, all devices are treated equally in terms of functionality. Peer-to-peer usually works best for small to medium LANs and is cheaper to set up.

2. Client/server network operating systems provide users with access to resources through a server. In this architecture, all functions and applications are unified under one file server that can be used to execute individual client actions regardless of physical location. Client/server tends to be most expensive to implement and requires a large amount of technical maintenance. An advantage to the client/server model is that the network is controlled centrally, making changes or additions to technology easier to incorporate.



## B.2 Conclusion:

We have learnt about the various types of Distributed Operating Systems and Network Operating Systems as well as Middlewares.

## B.3 Question of Curiosity

Q1: Give a specific application of NOS AND DOS.

ANS:

Applications of network operating systems:

- Microsoft Windows Server 2003
- Microsoft Windows Server 2008
- UNIX
- Linux
- Mac OS X

Applications of the distributed operating system:

1. Network Applications
  - DOS is used by many network applications, including the Web, peer-to-peer networks, multiplayer web-based games, and virtual communities.

2. Telecommunication Networks
  - DOS is useful in phones and cellular networks. A DOS can be found in networks like the Internet, wireless sensor networks, and routing algorithms.
3. Parallel Computation
  - DOS is the basis of systematic computing, which includes cluster computing and grid computing, and a variety of volunteer computing projects.
4. Real-Time Process Control
  - The real-time process control system operates with a deadline, and such examples include aircraft control systems.

Q2: Describe advantages and disadvantages of NOS/DOS

ANS:

### Network Operating System

#### Advantages

1. It is possible to gain remote access to servers from various locations and system types.
2. New technologies, upgradation, and hardware may be easily integrated into this operating system.
3. The servers handle its security concerns.

#### Disadvantages

1. Network operating systems are very expensive.
2. It needs regular maintenance and updates.
3. The user must rely on the central location for most processes.

### Distributed Operating System

#### Advantages

1. It may share all resources from one site to another, increasing data availability across the entire system.
2. The entire system operates independently of one another, and as a result, if one site crashes, the entire system does not halt.
3. It increases the speed of data exchange from one site to another site.

#### Disadvantages

1. The system must decide which jobs must be executed when they must be executed, and where they must be executed. A scheduler has limitations, which can lead to underutilized hardware and unpredictable runtimes.
2. The underlying software is extremely complex and is not understood very well compared to other systems.
3. It is hard to implement adequate security in DOS since the nodes and connections must be secured.

Q3: Compare Network Operating System and Distributed Operating System.

ANS:

Sr. No.	Key	Network OS	Distributed OS
1	Objective	Network OS provides local services to remote clients.	Distributed OS manages the hardware resources.
2	Communication	Communication is file-based, shared folder based.	Communication is message-based or shared memory-based.
3	Scalability	Network OS is highly scalable. A new machine can be added very easily.	Distributed OS is less scalable. The process to add new hardware is complex.
4	Fault tolerance	Less fault tolerance as compared to distributed OS.	Distributed OS has a very high fault tolerance.
5	Autonomy	Each machine can act on its own thus autonomy is high.	Distributed OS has a poor rate of autonomy.
6	Implementation	Network OS-based systems are easy to build and maintain.	Distributed OS implementation is difficult.
7	Operating System	Network OS-based systems have their own copy of operating systems.	Distributed OS-based nodes have the same copy of the operating system.