

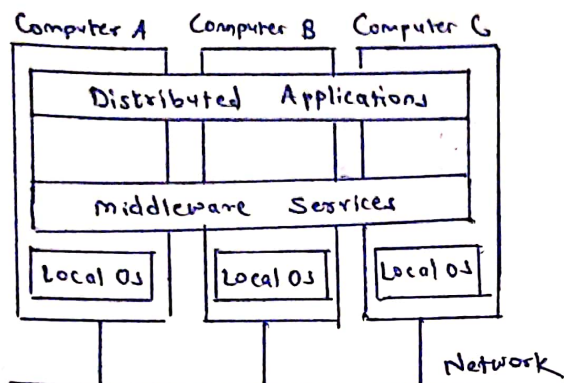
Distributed Computing

Module 1

Chapter 1 - Introduction to Distributed Computing

Distributed Systems

- It is a collection of autonomous computers linked with a communication network and equipped with a distributed system software.



Distributed system organized as middleware

Characteristics of Distributed Systems.

- ① Resource Sharing
- ② Heterogeneity
- ③ Openness
- ④ Concurrency
- ⑤ Scalability
- ⑥ Fault Tolerance
- ⑦ Transparency.

Challenges of Distributed Systems

- ① Support of Heterogeneity
- ② Lack of Failure Handling mechanism
- ③ Scalability
- ④ Openness
- ⑤ Security - DDoS Attack

Goals of Distributed System

- ① Support of heterogeneous hardware and software.
- ② Resources are easily accessible across the network.
- ③ Distributed systems should be scalable.
- ④ The system follows open standards so that they use standard syntax and semantics.
- ⑤ The system should be capable to detect and recover from failure, it should be fault tolerant and robust.

Examples of Distributed system

- ① Internet
- ② Intranet

Types of Distributed system.

- ① Distributed Computing system
 - ↳ (a) Cluster Computing
 - ↳ (b) Grid Computing
- ② Distributed Information system
- ③ Distributed Pervasive system.

① Distributed Computing system.

- The distributed system uses group of computers that share a common computation problem among them so as to generate an efficient result in short time span.

(a) Cluster Computing

- It is a form of distributed computing where group of computers are linked together in a network to perform a single task and act like a single entity.

- Characteristics

- ① High availability
- ② Load Balancing

- Disadvantage

- ① It only supports homogeneous infrastructure.

(b) Grid Computing

- It is a network of computers working together to perform a task that would rather be difficult for a single machine
- Grid computing network mainly consists of three types of machines
 - ① Control node
 - ② Provider
 - ③ User

② Distributed information system

- It is used to keep track of the information about application running over the network which are distributed among various entities.

- It is used for management and integration of business information.

- Applications:

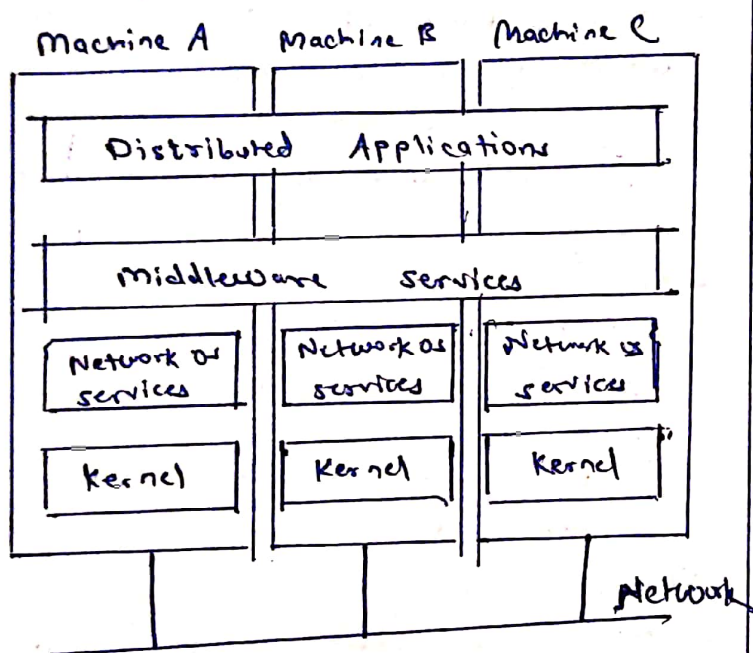
- (a) Transaction Processing system
- (b) Enterprise App Integration

③ Distributed Pervasive System.

- It is basically used with mobile and embedded devices.
- Characterized by small battery powered device having only wireless connection. It is related to system that has lack of human control.
- Example: Home systems

Middleware

- middleware is an additional layer at the top of Network operating system.
- It is used to implement general purpose services.
- Example of middleware OS.



Goal: To provide distribution transparency
middleware services

- ① Communication services
- ② Information system service
- ③ Control services
- ④ Security services.