MIVA
OPEN UNIVERSITY

DISTRIBUTED COMPUTING

Weekly Summary

01

School of Computing

Introduction to Distributed Systems

A distributed system is a network of independent computers that work together as one unified system.

The system enables resource sharing and coordination through middleware and network connections.

Key Characteristics of Distributed Systems

Concurrency
Multiple processes or users can operate simultaneously on shared resources without interference.

No Global Clock
Each system component operates independently, with no shared timing across nodes.

Independent Failures
If one component fails, the entire system continues functioning, ensuring fault isolation.

Resource Sharing
Distributed systems enable shared access to resources, such as files, databases, and printers.

Scalability
The system can grow by adding more nodes without compromising performance or reliability.

Transparency
The complexities of the system are hidden from users, making it appear as a single, unified entity.

Examples of Distributed Systems

Banking Systems
Platforms like NIBSS and NIP process interbank transactions securely and efficiently.

E-commerce
Platforms like Jumia and Konga distribute the workload across multiple servers, especially during peak demand.

Social Media Messaging
Apps like WhatsApp use distributed systems to send messages in real time across different regions.

Cloud Storage
Services such as Google Drive and iCloud use distributed architectures to store and access data globally.

Government Infrastructure
Organizations like NIMC and INEC rely on distributed systems for managing citizen data nationwide.

Importance of Distributed Systems in Nigeria

Digital Transformation
Distributed systems are vital for Nigeria's digital transformation, from banking and e-commerce to government services.

Scalable Solutions
These systems enable scalable solutions that meet the increasing demands of digital services in the country.

Reflection Questions

- How do distributed systems improve the efficiency of interbank financial transactions?

- In what ways does concurrency in distributed systems improve the performance of social media platforms like WhatsApp?

- What are the challenges associated with maintaining scalability in distributed systems across different geographical regions?

- How does the lack of a global clock affect data consistency and system synchronization in distributed systems?

- What role does independent failure play in the reliability of government platforms and e-commerce websites?

Call to Action

Review the material
to fully understand the characteristics and applications of distributed systems in real-world contexts.

Reflect on how distributed systems
are shaping Nigeria's digital infrastructure and the global technology landscape, and consider their implications for your future work.

Questions to Ponder On

How does the absence of a global clock affect synchronisation in distributed systems?

What measures can be implemented to ensure fault tolerance in critical distributed systems?

How does the scalability of distributed systems contribute to growth and operational efficiency in digital platforms?

What are the risks and challenges of resource sharing in highly competitive environments within distributed systems?

How can distributed systems be optimised for performance in regions with limited internet infrastructure?

Skills and Competencies Acquired After This Lesson

Analytical skills

System design and architecture

Network coordination and management

Fault tolerance strategies

Scalability analysis

Cloud infrastructure management

Global data synchronisation

Resource optimisation and load balancing