Switching techniques are methods for connecting devices and transferring data in a network. They allow multiple devices to share a communication channel at the same time, which improves network efficiency.
Types of switching techniques

Circuit switching
Creates a dedicated channel between the sender and receiver. This method is similar to how a telephone works.
Message switching
Transfers a message as a single unit through intermediate nodes that store and forward it. There is no specific path between the sender and receiver.
Packet switching
Breaks a message into smaller bits called packets, and sends them separately. Each packet has a unique number to indicate its sequence at the receiving end.

Other switching techniques Time division switching, Space division switching, Datagram approach, Virtual circuit approach, and Cut-through.
Switching techniques also include error checking and correction mechanisms.

REST and SOAP are both technologies used to build application programming interfaces (APIs) that transmit data between web applications. The main difference between the two is that SOAP is a protocol, while REST is a set of architectural principles.
What they do

REST: Data-driven, using resource URLs to access data
SOAP: Function-based, using XML to encode data and access API functions

How they work

REST: Uses HTTP protocol to transfer data in formats like XML, HTML, JSON, and plain text
SOAP: Uses HTTP, HTTPS, TCP, SMTP, and UDP to transmit XML messages

When to use

REST: Popular for public APIs because it's simple and fast
SOAP: Used by large-scale enterprise systems like banking services because of its security features and message reliability

Features

REST: Statelessness, separation of concerns, layered architecture, cache support, consistent interface, scalability
SOAP: Built-in security measures, strongly typed messaging framework

Examples

REST: A URL called /employees could be used to create a new employee record
SOAP: A function called CreateEmployee could be used to create an employee

Multiplexing techniques are methods for combining multiple signals into one to be transmitted over a shared medium. There are several types of multiplexing techniques, including:

Frequency division multiplexing (FDM)
An analog technique that combines multiple signals with different frequencies for transmission over a shared medium
Time-division multiplexing (TDM)
A technique that divides time into slots, assigning each slot to a different data signal
Wavelength division multiplexing (WDM)
An analog technique that combines optical signals from different sources with different wavelengths for transmission in the light spectrum
Code division multiplexing (CDM)
A technique that distributes codes among different spectrums so that they can work simultaneously
Space-division multiplexing (SDM)
A technique that uses distinct electric conductors for each communicated channel
Polarization division multiplexing
A technique that uses the polarization of electromagnetic radiation to separate orthogonal channels

Multiplexing techniques are used in wired and wireless networks to handle various types of data and communication needs.

The main difference between client-server and peer-to-peer networks is that in a client-server network, a server provides services to clients, while in a peer-to-peer network, each device can provide and request services.
Client-server networks

Centralized management: The server manages and maintains the network.
Scalability: Client-server networks can be scaled to meet changing demands.
Security: Client-server networks can be more secure than peer-to-peer networks.
Communication: Client-server networks can improve communication and collaboration.
Cost: Client-server networks can be cost-effective.
Disadvantages: Servers can be expensive to buy and maintain, and a network technician may be required.

Peer-to-peer networks

Scalability: Peer-to-peer networks can be more scalable than client-server networks.

Privacy: Peer-to-peer networks can enhance the privacy and anonymity of nodes.
Resource availability: Peer-to-peer networks can increase the availability and reliability of resources.
Disadvantages: Peer-to-peer networks can be difficult to manage and secure. Network security must be applied to each computer separately.
Backup: Backup must be performed on each computer separately.

Quality of Service (QoS) is a networking technology that prioritizes network traffic to ensure that critical applications receive the bandwidth they need. QoS helps to optimize network resources and prevent network congestion.
How QoS works

Traffic prioritization
QoS allows network administrators to prioritize packet handling and allocate bandwidth to specific applications or traffic flows.
Bandwidth mana

Process VS Thread
Virtual Memory Management
Memory allocation strategies in an operating system (OS) include contiguous memory allocation, partitioned allocation, swapping, and worst fit allocation.
Contiguous memory allocation

All accessible memory is kept in one place
Memory partitions are not spread out across the entire memory space

Partitioned allocation
Primary memory is divided into partitions, each of which stores information for a specific task
A partition is assigned to a task when it starts and unassigned when it ends
Swapping
A process is temporarily moved from the main memory to secondary memory
This allows more processes to run at once

Worst fit allocation
A memory management strategy used to allocate memory resources to processes

Fragmentation
External fragmentation occurs when free memory is not contiguous
Internal fragmentation occurs when allocated memory blocks are larger than needed

Memory management
Involves keeping track of memory allocation and ensuring that processes do not interfere with each other
Efficient memory management helps applications run faster and more efficiently

DevOps is a set of practices that help organizations deliver software faster and with higher quality. It's important because it can improve collaboration, security, and product quality, and it can also help companies reduce costs and gain a competitive edge.

Improved collaboration

- DevOps encourages collaboration and communication between teams.
- It breaks down silos and encourages cross-functional teamwork.
- It helps ensure that all stakeholders are on the same page.

More security

- DevOps focuses on security during the designing and development stage.
- This minimizes the need to remedy security issues later on.

Increased product quality

- DevOps builds quality into the development process.
- It reduces instances of unplanned work.
- It helps teams detect and resolve defects early on in the development process.

Reduced costs

- DevOps can help lower overall costs.
- It can help manage a company's IT equipment.
- It can help expedite and simplify product deployment.

Competitive advantage

- DevOps can help IT businesses get to the front of the market faster.
- It can help companies fix bugs and offer updates quickly.

SQA

SQA can stand for Software Quality Assurance or Scottish Qualifications Authority.

Software Quality Assurance

- SQA is a process that ensures software meets requirements and functions as expected.
- It's a critical part of the software development lifecycle (SDLC).
- SQA is process-focused, while testing is product-focused.
- SQA's goal is to improve the development process to prevent problems before they become major issues.
- SQA involves activities like requirement analysis, coding, testing, and release management.
- SQA uses standards like ISO/IEC 9126, SPICE, and CMMI.

Scottish Qualifications Authority

- The SQA is an organization that sets qualifications for students in Scotland.
- The SQA offers qualifications, assessment support materials, and replacement certificates.
- The SQA also provides exam timetables and learner apps.