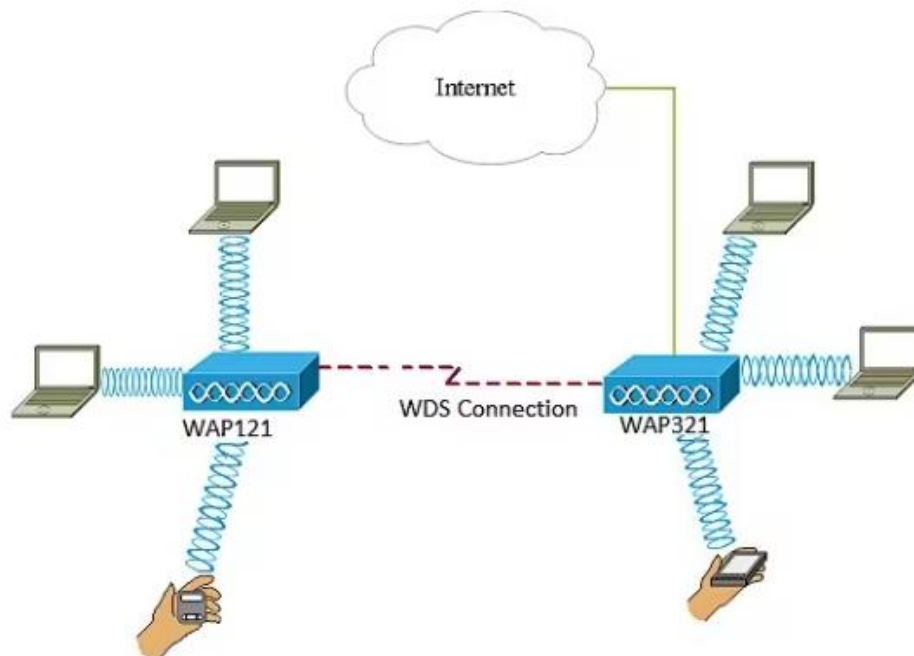


ASSIGNMENT- 01 : COMPUTER ARCHITECTURE - HARDWARE, NETWORK AND SOFTWARE

Assignment 1: Draw your Home Network Topology and explain how you are accessing the RPS Lab environment.

Home Network Topology:



1. Internet Connection:

- Connected to my home network is a broadband modem provided by my internet service provider (ISP). This modem connects to the internet via a cable or DSL line.

2. Router:

- The broadband modem is connected to a router, which serves as the central hub of my home network.

- The router manages the incoming and outgoing internet traffic for all devices connected to the network.

3. Devices:

- Various devices are connected to the router, including computers, smartphones, tablets, smart TVs, and IoT devices.

- These devices communicate with each other and access the internet through the router.

4. Wireless Access Point:

- The router also provides wireless connectivity through a built-in wireless access point (Wi-Fi).

- This allows wireless devices to connect to the network and access the internet without the need for physical cables.

5. Security Features:

- The router includes security features such as firewall protection, encryption, and access control to secure the network from unauthorized access and external threats.

Accessing the RPS Lab Environment:

To access the RPS (Remote Product Support) Lab environment, I use a secure VPN (Virtual Private Network) connection provided by my employer. Here's how it works:

1. VPN Client:

- I have a VPN client installed on my computer or mobile device, provided by my employer.

- This VPN client allows me to establish a secure, encrypted connection to the company's network.

2. Connection to VPN Server:

- When I initiate a VPN connection, the VPN client connects to a VPN server maintained by my employer.

- This server acts as a gateway to the company's internal network, including the RPS Lab environment.

3. Accessing RPS Lab Resources:

- Once connected to the VPN server, I can access the RPS Lab environment as if I were physically connected to the company's network.

- I can access servers, databases, applications, and other resources within the RPS Lab environment securely and remotely.

Overall, the VPN connection provides a secure and reliable way for me to access the RPS Lab environment from anywhere with an internet connection, ensuring that sensitive data remains protected while working remotely.

Assignment 2: Identify a real-world application for both parallel computing and networked systems. Explain how these technologies are used and why they are important in that context.

ANS:

A real-world application that combines parallel computing and networked systems is distributed data processing in large-scale web applications, such as social media platforms like Facebook or Twitter.

Parallel computing allows these platforms to handle the massive amounts of data generated by millions or even billions of users simultaneously. Tasks such as data processing, analysis, and recommendation algorithms can be divided into smaller sub-tasks and executed concurrently across multiple computing nodes or servers. This parallel processing significantly reduces the time it takes to analyze and process large datasets, allowing for real-time or near-real-time responses to user actions.

Networked systems play a crucial role in this context by connecting the distributed computing nodes together. These systems ensure efficient communication and coordination between the nodes, enabling them to work together seamlessly. Data can be exchanged between nodes quickly and reliably, allowing for efficient data sharing and synchronization across the network.

The combination of parallel computing and networked systems is important in this context for several reasons:

- **Scalability:** As user bases and data volumes grow, these platforms need to scale their computing resources to handle the increased load. Parallel computing allows them to distribute the workload across multiple nodes, enabling horizontal scalability without a significant drop in performance.
- **Fault tolerance:** By distributing tasks across multiple nodes, these systems can continue to operate even if some nodes fail or become unavailable. Networked systems facilitate fault tolerance by providing mechanisms for detecting failures, rerouting tasks to healthy nodes, and ensuring data consistency and integrity.
- **Performance:** Parallel computing and networked systems together enable high-performance data processing, analysis, and response times. By leveraging multiple computing nodes and efficient network communication, these platforms can deliver fast and responsive user experiences even under heavy load.

Overall, the combination of parallel computing and networked systems is essential for building scalable, fault-tolerant, and high-performance web applications that can handle the demands of modern, data-intensive environments.