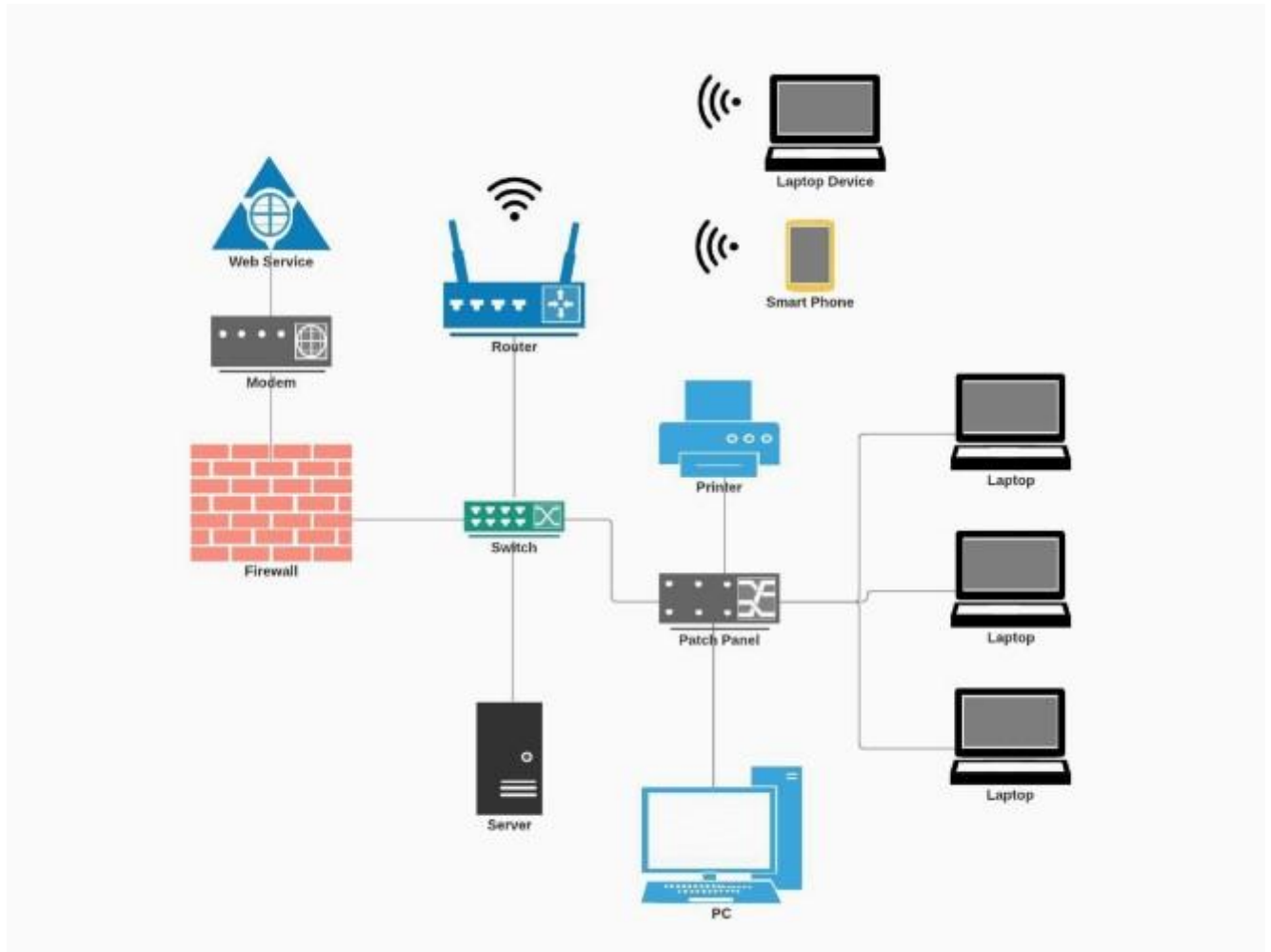


Assignment-1

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

Solution:



Home Network Topology:

Internet: Typically, the home network starts with an internet connection provided by an ISP (Internet Service Provider). This could be through a cable modem, DSL modem, fiber optic connection, or other means.

Router: The internet connection is then connected to a router, which serves as the gateway for all devices on the home network. The router typically handles tasks such as assigning IP addresses to devices, managing network traffic, and providing a firewall for security.

Switches: In larger home networks or networks with many wired devices, switches may be used to provide additional Ethernet ports for connecting devices.

Wireless Access Point : For wireless connectivity, a wireless access point may be connected to the router. This allows devices such as laptops, smartphones, and tablets to connect to the network wirelessly.

Devices: Various devices such as computers, smartphones, tablets, smart TVs, gaming consoles, and IoT devices connect to the network via wired or wireless connections.

Accessing the RPS Lab Environment:

1. VPN (Virtual Private Network): If the RPS (Remote Physical Systems) Lab environment is hosted on a private network, accessing it remotely typically requires connecting to a VPN first. The VPN establishes a secure, encrypted connection between your device and the lab network, allowing you to access resources as if you were physically connected to the network.

2. Remote Desktop Protocol (RDP) or SSH (Secure Shell) **: Once connected to the VPN, you can use remote desktop software like RDP (for Windows-based systems) or SSH (for Unix-based systems) to access the servers or systems in the lab environment. These protocols allow you to control the remote systems as if you were sitting in front of them, enabling you to perform tasks, run experiments, or conduct tests remotely.-

3. Firewall and Security: Access to the RPS Lab environment may be restricted by firewalls and other security measures to ensure that only authorized users can connect. This helps protect sensitive data and resources from unauthorized access or malicious attacks.

Assignment-2

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.

Solution:

One real-world application that utilizes both parallel computing and networked systems is weather forecasting.

Networked Systems: Weather data is collected from a vast network of sensors around the globe. These sensors include ground stations, buoys, satellites, and even aircraft. The collected data includes temperature, pressure, humidity, wind speed, and direction. This network of sensors allows for comprehensive data gathering, capturing weather patterns across vast geographical areas.

Parallel Computing: Weather forecasting relies on complex computer models that simulate atmospheric conditions. These models involve massive datasets and intricate calculations. By distributing the workload across multiple processors in parallel computing systems, meteorological agencies can process these models much faster. This allows for:

Higher Resolution Forecasts: Parallel computing enables models to incorporate more data points, leading to more accurate and detailed weather predictions.

Faster Simulations: Running simulations on multiple processors significantly reduces processing time, allowing for more frequent updates and forecasts that are closer to real-time.

Ensemble Forecasting: Parallel computing facilitates running multiple simulations with slightly different initial conditions. This "ensemble forecasting" approach helps assess the likelihood of various weather scenarios.

Importance of the Combination:

The synergy of networked systems and parallel computing is crucial for modern weather forecasting. The vast network provides the essential data, while parallel computing allows for processing this data to generate comprehensive and timely weather forecasts. This combination is vital for various purposes, including:

Public Safety: Accurate weather forecasts can warn communities of impending severe weather events, allowing them to take precautions and minimize loss of life and property damage.

Agriculture: Farmers can use weather forecasts to plan their planting and harvesting schedules, optimizing crop yields and reducing losses due to unexpected weather conditions.

Aviation: Accurate weather forecasts are essential for safe air travel, allowing airlines to plan routes and avoid hazardous weather conditions.

The collaboration between networked systems for data collection and parallel computing for processing empowers modern weather forecasting to provide crucial information impacting public safety, agriculture, aviation, and many other sectors.