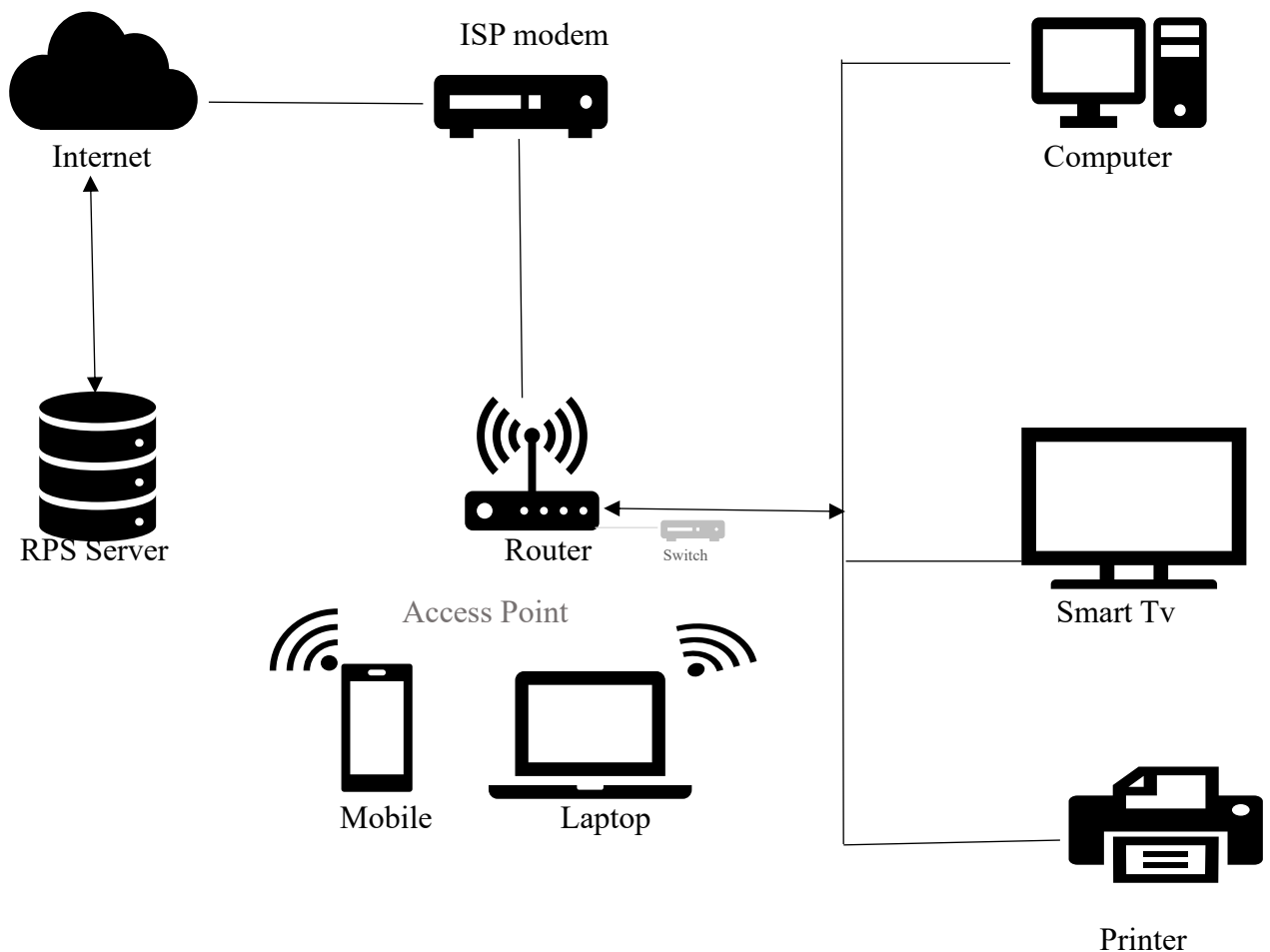


## Day 1 -29 April 2024

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

My Home Network



- 1. Internet:** Represents the global network of interconnected devices and servers.
- 2.ISP (Internet Service Provider):** Provides internet connectivity to your home.
- 3.Modem (Cable/DSL):** Converts the ISP's signal into a form usable by your network.
- 4.Router:** Directs network traffic between your local devices and the internet.
- 5.Switch (optional):** Expands the number of Ethernet ports available for wired connections.
- 6.Access Point:** Provides wireless connectivity for Wi-Fi-enabled devices.
- 7.Other Devices:** Represents any additional networked devices like computers, smartphones, smart TVs, IoT devices, etc.

**Accessing the RPS lab environment:**

- RPS lab environment is provided through the cloud.
- The cloud refers to a network of remote servers hosted on the internet that store, manage, and process data, rather than relying on local servers or personal computers. These servers are typically maintained by third-party providers (RPS) and are accessible over the internet.
- Cloud provides Data Storage, Data Backup and Recovery, SaaS, IaaS, PaaS, Content Delivery, Big Data Analytics etc...

**1.Establishing Internet Connectivity:** We have to connect our laptop to home network either using Ethernet cable or Wi-Fi.

**2.Authentication and Authorization:** After connected to network to access RPS cloud services using our laptop's web browser we need to authenticate ourselves by logging in with username and password.

**3.Accessing RPS Cloud Services:** Once connected to RPS cloud we can access the dedicated applications and other services provided by RPS.

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.

**Parallel Computing:**

Parallel computing is a type of computation in which many calculations or the execution of processes are carried out simultaneously. Large problems can often be divided into smaller ones, which can then be solved at the same time.

**Networked Systems:**

Networked systems refer to interconnected computing devices that can communicate and share resources with each other over a network. These systems enable data exchange, collaboration, and resource sharing among users and applications.

**Real-world Applications:**

- A real-world application that leverages both parallel computing and networked systems is distributed computing in scientific research, particularly in fields like genomics, climate modelling, and particle physics.
- In distributed scientific computing, massive amounts of data need to be processed and analyzed, often requiring intense computational power and storage resources. Parallel computing allows tasks to be divided into smaller sub-tasks that can be processed

simultaneously across multiple processors or computers. Networked systems facilitate communication and data exchange between these distributed resources.

- **Climate Modelling:** In climate modelling, scientists simulate complex climate systems to predict future climate trends and assess the impact of various factors such as greenhouse gas emissions. These simulations involve running numerous computational models in parallel across distributed computing resources. Networked systems enable the seamless exchange of data between these models and facilitate collaboration among researchers working on different aspects of the simulation.
- **Particle physics:** In particle physics, experiments like those conducted at the Large Hadron Collider (LHC) generate enormous amounts of data that require intensive processing and analysis. Parallel computing enables physicists to analyze this data by distributing tasks across multiple computing nodes, while networked systems facilitate the transfer of data between different processing stages and research institutions.
- **Genomics research:** In genomics research, scientists analyze vast datasets of DNA sequences to understand genetic variations and their implications for health and disease. Parallel computing enables the processing of these large datasets by breaking down the analysis into smaller tasks that can be executed concurrently on multiple computing nodes. Networked systems connect these nodes, allowing them to exchange data and coordinate their efforts, ensuring efficient collaboration and resource utilization.