CCA-102: Data Communications
ASSIGNMENT

1. **What are the different types of networks?**

Solution:-

• A network is a set of devices (often referred to as nodes) connected by communication links to share the computing resources.

• A node can be a computer, printer, smart phone, refrigerator, car or any other device capable of sending and/or receiving data generated by other nodes on the network.

• Types of connections:

• Point-to-point

• Point-to-multipoint

LAN

• A local area network (LAN) is usually privately owned and links the devices in a single office, building, or campus

Depending on the needs of an organization and the type of technology used, a LAN can be as simple as two PCs and a printer in someone's home office; or it can extend throughout a company and include audio and video peripherals.

• Currently, LAN size is limited to a few Kms.

• LANs are designed to allow resources to be shared between personal computers or workstations.

• The resources to be shared can include hardware (e.g., a printer), software (e.g., an application program), or data.

WLAN (Wireless Ethernet IEEE802.11)

• IEEE has defined the specifications for a wireless LAN, called IEEE 802.11, which covers the physical and data link layers.

• A BSS without an AP is called an ad hoc network; a BSS with an AP is called an infrastructure network.

2. Explain the Shielded twisted pair (STP) and Unshielded twisted pair(UTP)

Solution:-

Unshielded Twisted Pair (UTP)

Unshielded Twisted Pair or UTP are twisted pair cables and are used to transmit both data and voice as their frequency range is suitable for transmission. UTPs are more cost effective and are not needed to be grounded.

Shielded Twisted Pair (STP)

Shielded Twisted Pair or STP are also a twisted pair cables but are required to be grounded, wants more maintenance, have high data trasmission capacity and are more costly then UTP.

Following are some of the important differences between Unshielded Twisted Pair (UTP) and Abstract Classes in Scala.

Sr. No.	Key	Unshielded Twisted Pair (UTP)	Shielded Twisted Pair (STP)
1	Full for	UTP stands for Unshielded Twisted Pair.	STP stands for Shielded Twisted Pair.
2	Grounding	Grounding cable in not required.	Grounding cable is required.
3	Data Transmission Rate	Data Transmission Rate is slower than STP.	Data Transmission Rate is very high.
4	Cost	UTP cables are cheaper.	STP cables are expensive.
5	Maintenance	Low maintenance cost in case of UTP.	High maintenance cost in case of STP.
6	Noise	Noise is high in UTP.	Noise is quite less in STP.
7	Crosstalk	Possibility of crosstalk is very high in UTP.	Possibility of crosstalk is quiet low in STP.

3. What is difference between baseband and broadband transmission?

Solution: -

Differences between Baseband and Broadband Explained

This tutorial explains the differences between the baseband and broadband transmissions in detail. Learn what the baseband and broadband transmissions are and how they differ from each other.

Both baseband and broadband describe how data is transmitted between two nodes. Baseband technology transmits a single data signal/stream/channel at a time while broadband technology transmits multiple data signals/streams/channels simultaneously at the same time.

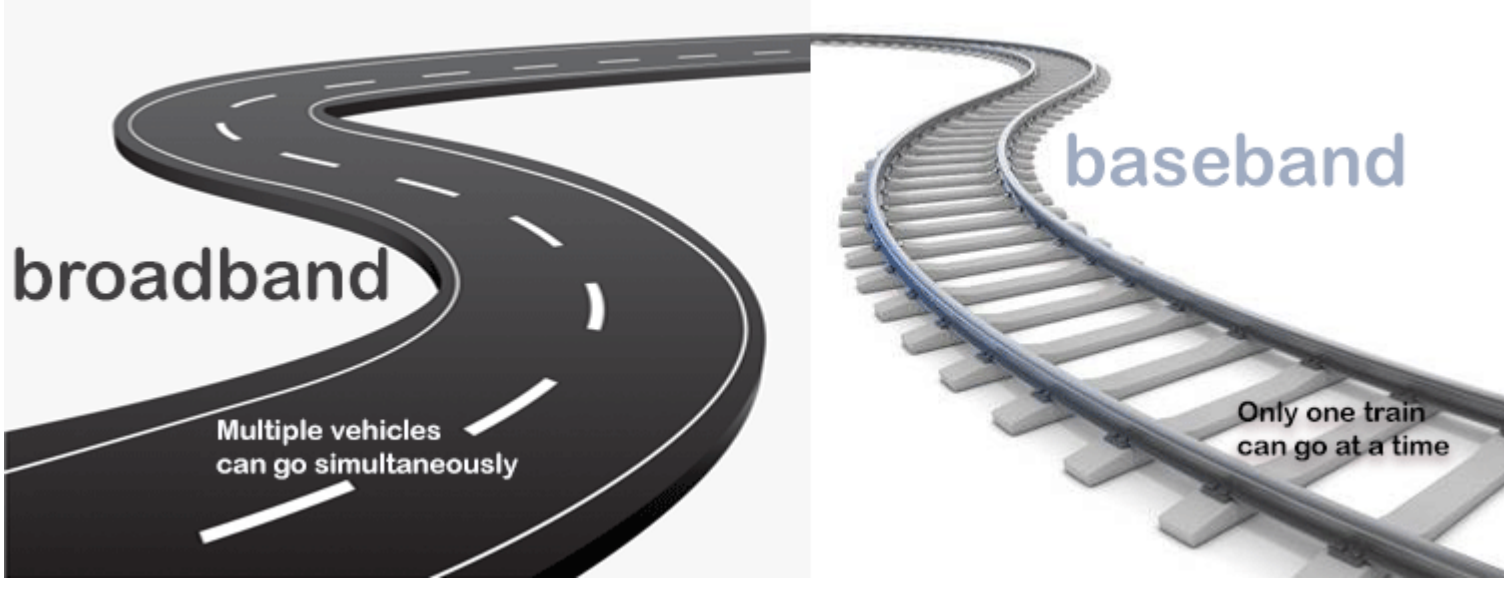
The following image shows an example of both technologies.

Baseband

Broadband

To understand the basic differences between both technologies, consider the baseband as a railway track and the broadband as a highway. Like, at a time, only one train can go on a railway track, in the baseband transmission only one data signal can be transmitted at a time.

Unlike a railway track on a highway, multiple vehicles can go simultaneously. For example, on a 3 lanes highway, 3 vehicles can go at the same time. Same as a highway, in the broadband transmission, multiple data signals can be transmitted at the same time.

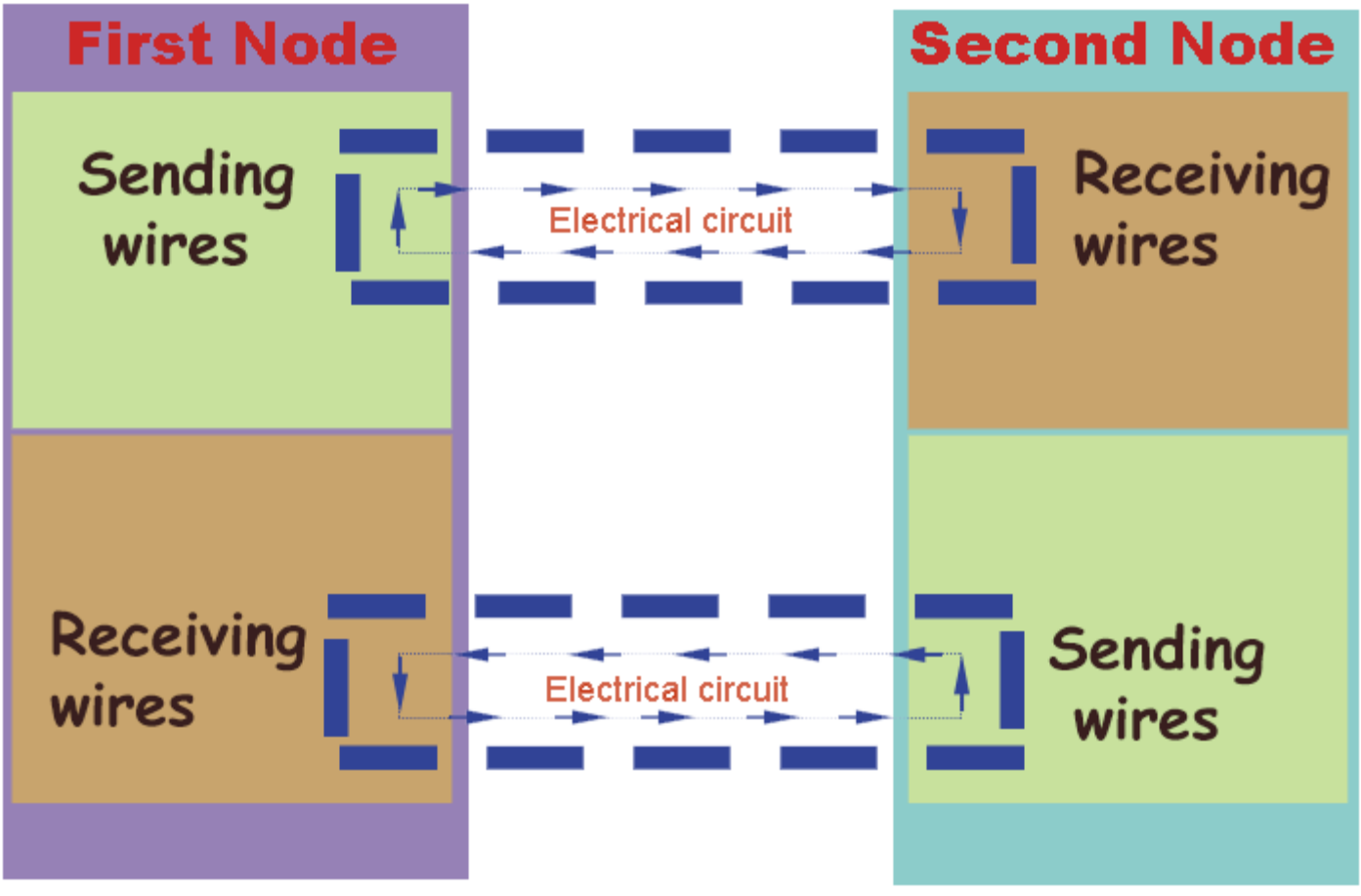


Technical differences between the baseband and broadband transmissions

Baseband technology uses digital signals in data transmission. It sends binary values directly as pulses of different voltage levels. Digital signals can be regenerated using repeaters in order to travel longer distances before weakening and becoming unusable because of attenuation.

Baseband supports bidirectional communication. It means, this technology can send and receive data simultaneously. To support bidirectional communication, this technology uses two separate electric circuits together; one for sending and another for receiving.

The following image shows an example of this.



Although baseband transmits only a single data stream at a time, it is possible to transmit signals of multiple nodes simultaneously. This is done by combining all the signals into a single data stream. To combine the signals of multiple nodes, a technology known as multiplexing is used. Baseband supports the Time Division Multiplexing (TDM).

4. What is the difference between a hub, modem, router and a switch?

Solution:-

Hubs, switches, and routers are all computer networking devices with varying capabilities. Unfortunately, the terms are often misused.

Best Of
The Best of Ask Leo!

What's the difference between a hub, a switch, and a router?

In a word, intelligence.

Hubs, switches, and routers are all devices that let you connect one or more computers to other computers, networked devices, or even other networks. Each

has two or more connectors called ports, into which you plug the cables to make the connection.

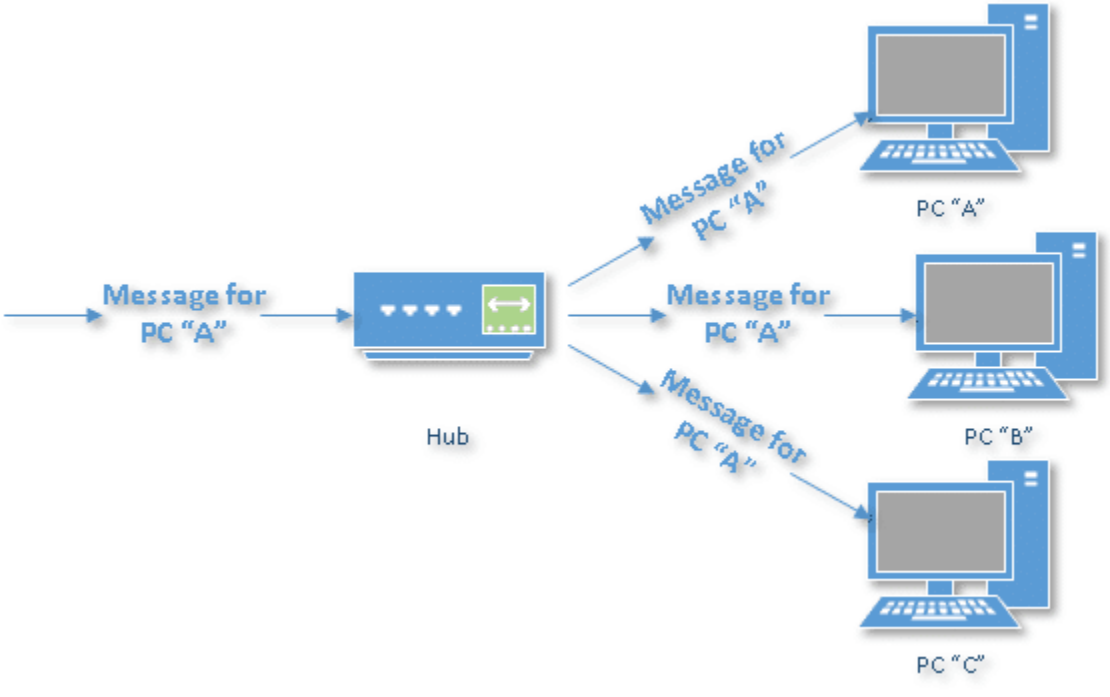
Varying degrees of magic happen inside each device — and therein lies the difference.

- Hubs are "dumb" devices that pass on anything received on one connection to all other connections.
- Switches are semi-intelligent devices that learn which devices are on which connection.
- Routers are essentially small computers that perform a variety of intelligent tasks.

Hubs

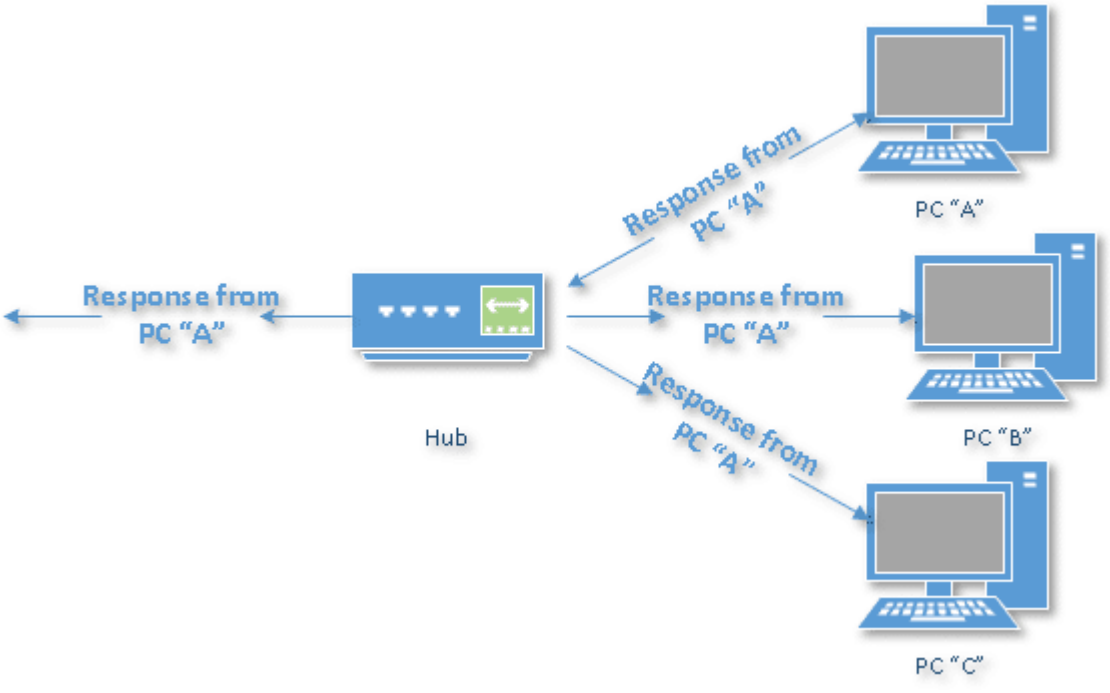
A hub is the least expensive, least intelligent, and least complicated of the three. Its job is very simple: anything that comes in one port is sent out to the others. That's it.

If a message[1] comes in destined for computer "A", that message is sent out to all the other ports, regardless of which computer "A" is.



Incoming data passing through a hub.

When computer "A" responds, its response also goes out to every other port on the hub.



Returned response passing through a hub.

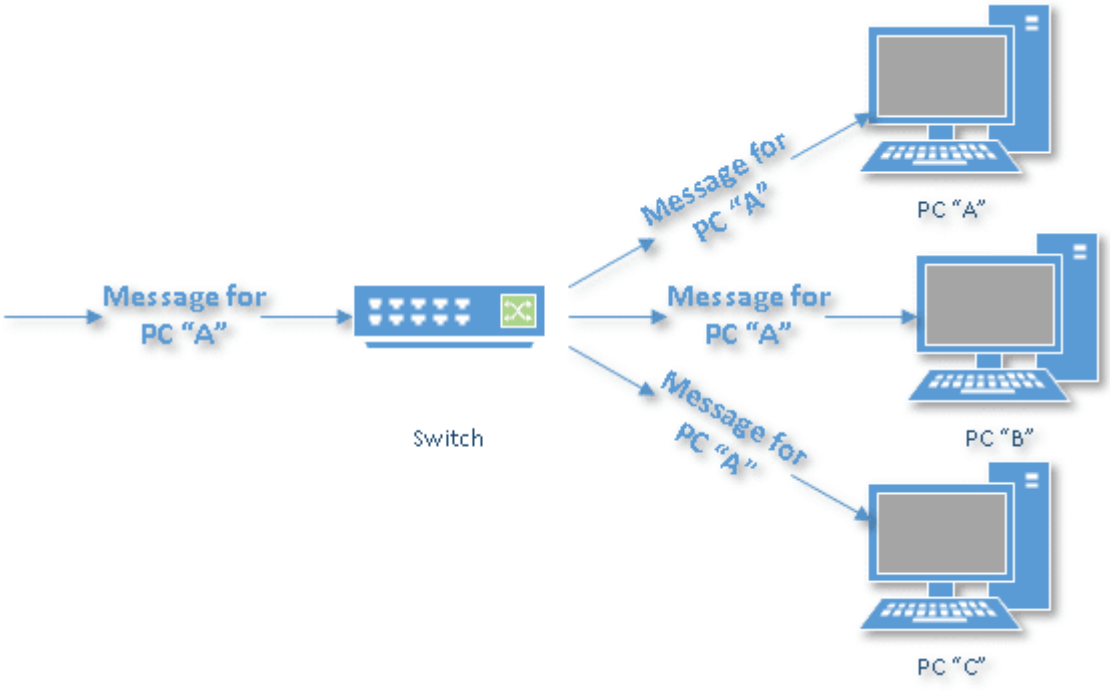
Every computer connected to the hub "sees" everything every other computer on the hub does. It's up to the computers themselves to decide if a message is for them and whether or not it should be paid attention to. The hub itself is blissfully ignorant of the data being transmitted.

For many years, hubs were quick and easy ways to connect computers in small networks. In recent years, hubs aren't as common, and switches have come into greater use.

Switches

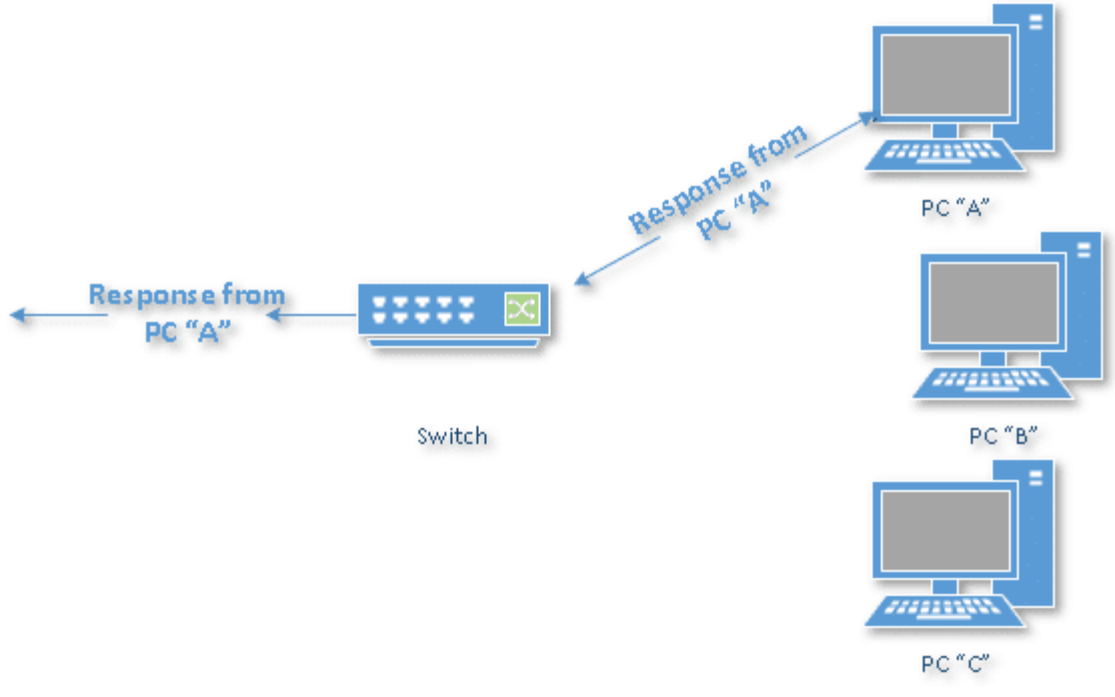
A switch does what a hub does, but more efficiently. By paying attention to the traffic that comes across it, it learns which computers are connected to which port.

Initially, a switch knows nothing, and simply sends on incoming messages to all ports.



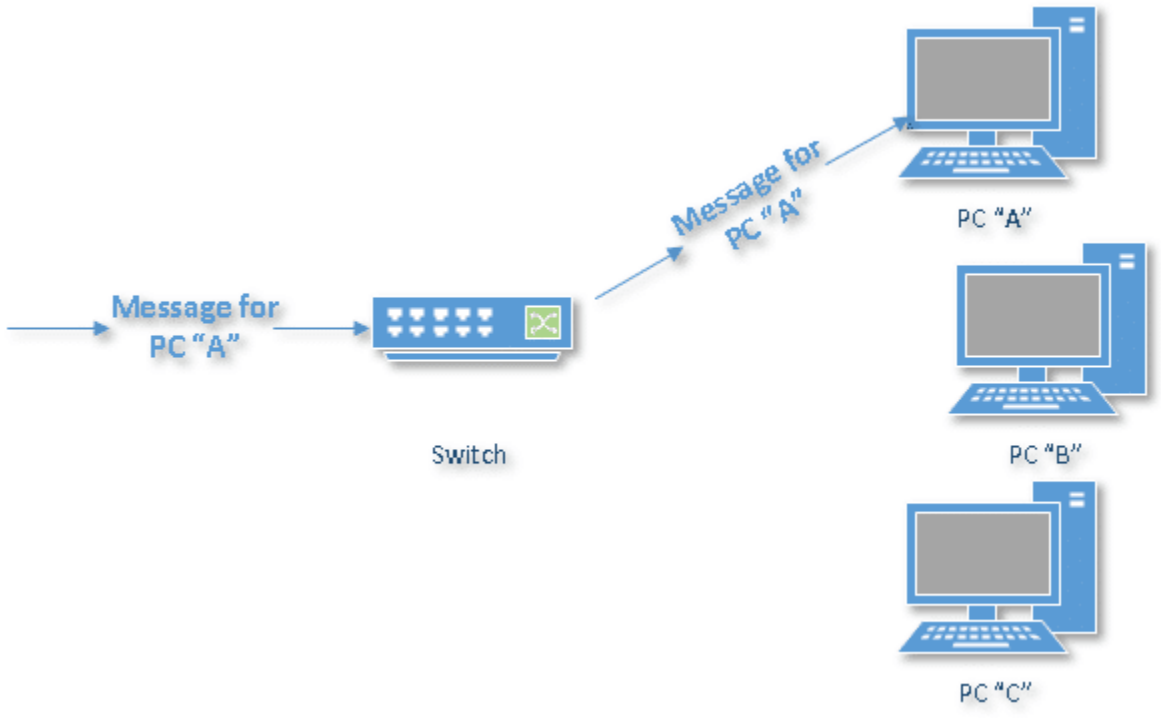
Incoming data passing through a switch.

Just by accepting that first message, however, the switch has learned something: it knows on which connection the *sender* of the message is located. Thus, when machine "A" responds to the message, the switch only needs to send that message out to the one connection.



Returned response passing through a switch.

By processing the response, the switch has learned something else: it now knows on which connection machine "A" is located. That means subsequent messages destined for machine "A" need only be sent to that one port.



Second incoming message passing through a switch.

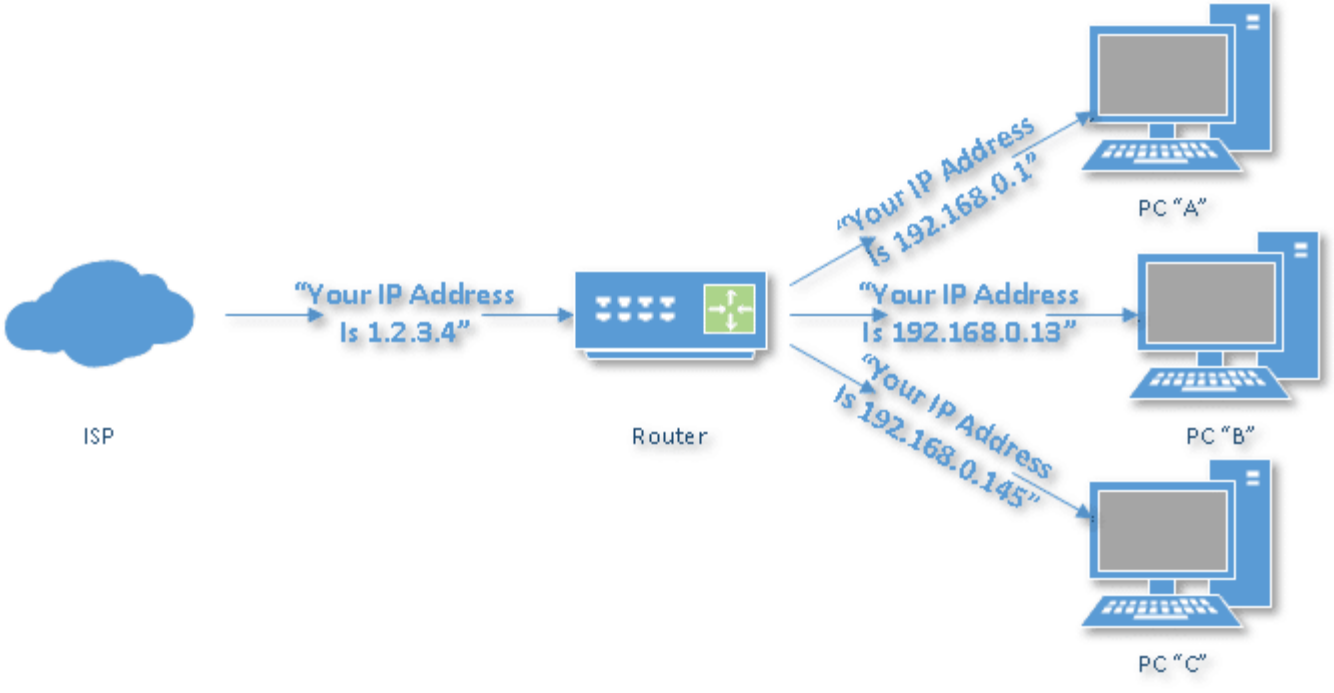
Switches learn the location of the devices they are connected to almost instantaneously. The result is, most network traffic only goes where it needs to, rather than to every port. On busy networks, this can make the network *significantly* faster.

Routers

A router is the smartest and most complicated of the three. Routers come in all shapes and sizes, from small, four-port broadband routers to large industrial-strength devices that drive the internet itself.
One way to think of a router is as a computer[2] that can be programmed to understand, manipulate, and act on the data it handles.
A router operates as a switch for basic routing: it learns the location of the computers sending traffic, and routes information only to the necessary connections.

Consumer-grade routers perform (at minimum) two additional and important tasks: DHCP and NAT.
DHCP — Dynamic Host Configuration Protocol — is how dynamic IP addresses are assigned. When it first connects to the network, a device asks for an IP address to be assigned to it, and a DHCP server responds with an IP address assignment. A router connected to your ISP-provided internet connection will ask your ISP's server for an IP address; this will be your IP address on the internet.

Your local computers, on the other hand, will ask the router for an IP address, and these addresses are local to your network.



IP address assignments to and through a router.

5. When you move the NIC cards from one PC to another PC, does the MAC address gets transferred as well?

Solution:-

When **you move the NIC cards from one PC to another PC**, **does the MAC address gets transferred as well**? Yes, that's because **MAC addresses** are hard-wired into the **NIC** circuitry, not the **PC**. This also means that a **PC** can have **a different MAC address** when **another one** replaced the **NIC card**.

6. When troubleshooting computer network problems, what common hardware-related problems can occur?

Solution:-

When troubleshooting computer network problems, what common hardware-related problems can occur? A large percentage of a **network** is made up of **hardware**. **Problems** in these areas **can** range from malfunctioning hard drives, broken NICs **and** even **hardware** startups.

7. In a network that contains two servers and twenty workstations, where is the best place to install an Anti-virus program?

Solution:-

In a network that contains two servers and twenty workstations, where is the best place to install an Anti-virus program? The **best** solution is to **install anti-virus** on all the computers in the **network**.

8. Define Static IP and Dynamic IP? Discuss the difference between IPV4 and IPV6.

Solution:-

Static ip address does not change any time, it means if a **static ip** address is provided then it can't be changed or modified. While **dynamic ip** address change any time.

9. Discuss TCP/IP model in detail.

Solution:-

TCP/IP Reference **Model** is a four-layered suite of communication protocols. ... Internet Layer −It defines the protocols for logical transmission of data over the network. The main **protocol** in this layer is Internet **Protocol** (**IP**) and it is supported by the protocols ICMP, IGMP, RARP, and ARP.

10. What is a Web Browser (Browser)? Give some example of browsers.

Solution:-

Featured snippet from the web

A web browser, or simply "browser," is an application used to access and view websites. Common web browsers include Microsoft Internet Explorer, **Google Chrome**, **Mozilla Firefox**, and **Apple Safari**. The primary function of a web browser is to render HTML, the code used to design or "mark up" webpages

11. What is a search engine? Give example.

Solution:-

A **search engine** is a web based **tool** that is used by people to locate information on the internet. Some of the most popular **examples** of **search engines** are Google, Bing, Yahoo!, & MSN **Search**. Google is the most used **search engine** worldwide with a 92 percent market share in mid-2019.

12. What is the Internet & WWW? What are the uses of internet in our daily life?

Solution:-

Today, the **internet** has become unavoidable in **our daily life**. Appropriate **use** of the **internet** makes **our life** easy, fast and simple. The **internet** helps us with facts and figures, information and knowledge for personal, social and economic development

13. What is an Internet Service Provider? Give some example of ISP in India.

Solution:-

An **Internet Service Provider** (**ISP**) is a **company** that provides **Internet access** by using ... It only takes a **few** minutes to setup and you can cancel any time. ... how the **ISP** connects customers, and what type of services the **ISPs provide**. ... For **example**, FEMA used a satellite terminal during Hurricane Katrina, ...

14. Discuss the difference between MAC address, IP address and Port address.

Solution:-

Both **MAC Address** and **IP Address** are used to uniquely identify a machine on the internet. **MAC Address** ensure that physical **address** of the computer is unique. ... **IP Address** is a logical **address** of the computer and is used to uniquely locate computer connected via a network

15. How do we view my Internet browser's history?

Solution:-

Android phone or tablet running Google Chrome

1. Open the Google Chrome **Internet browser**.
2. In the upper-right corner of the screen tap the. icon.
3. In the drop-down menu that appears, select **history** and shown in the image.
4. The following page contains your device's **history**.