សាកលវិទ្យាល័យភូមិន្ទភ្នំពេញ
មហាវិទ្យាល័យ វិស្វកម្ម

DATA COMUNICATION

Professor: CHHORN SYLUN

Topic:
HUB, SWITCH AND ROUTER

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CONTENT

Main Contents

- HUB
- SWITCH
- ROUTER

CONTENT

HUB

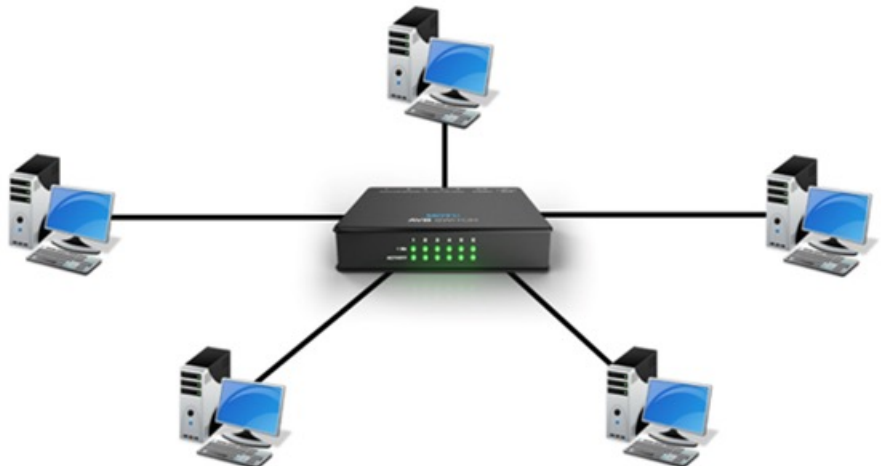
- About HUB
- How Does HUB Work?
- Types of HUB
- Pros and Cons of HUB
- Applications of HUB

ABOUT HUB

What is a network hub ?

- A network hub is a node that broadcasts data to

every computer or Ethernet-based device connected to it. A hub is less sophisticated than a switch, the latter of which can isolate data transmissions to specific devices.



What is an Ethernet hub ?

- An Ethernet hub, active hub, network hub, repeater

hub, multiport repeater, or simply hub is a network hardware device for connecting multiple Ethernet devices together and making them act as a single network

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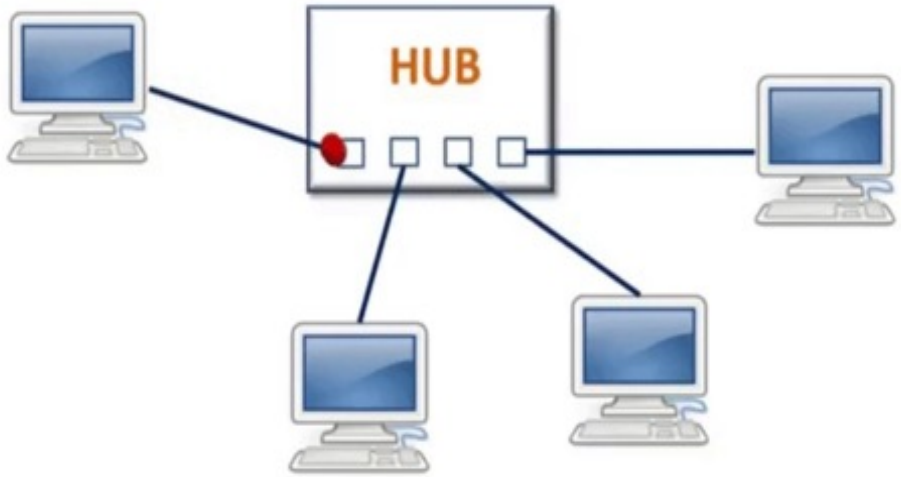
HOW DOES HUB WORK?



A hub receives data and then sends it in full to all connected devices (hosts).

- Hub works like an electric wire
- The hub does not interpret or process the data in any way.
- It works on star topology physically

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TYPES OF HUB

- There are 3 types of HUB:

1. Passive HUB

The passive hubs are the connection point for wires that helps to make the physical network. It is capable of determining the bugs and faulty hardware.

2. Active HUB

As compared to a passive hub, it includes some additional features. It is able to monitor the data sent to the connected devices

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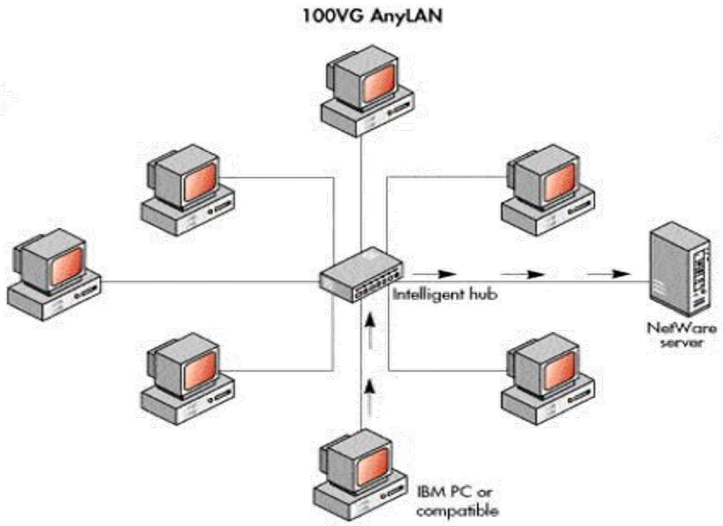
TYPES OF HUB

3. Intelligent HUB

It is a little smarter than passive and active hubs. These hubs have some kinds of management software that help to analyze the problem in the network and resolve them. It is beneficial to expend the business in networking.



PROS AND CONS OF HUB

Advantages of Using Hub	Disadvantages of Using Hub
• Easy to install • Very little delay • It is used for internal connectivity between the system • Cheaper • Hub device does not affect the performance of the network seriously • It can extend the total distance of the network	• Can not filter information • It can not connect different type of network architecture such as a token ring and Ethernet extra • It does not have a mechanism to reduce the network traffic • Passes packet to all connected segment • Can not reduce network traffic • It will broadcast to all the port • Extend the collision

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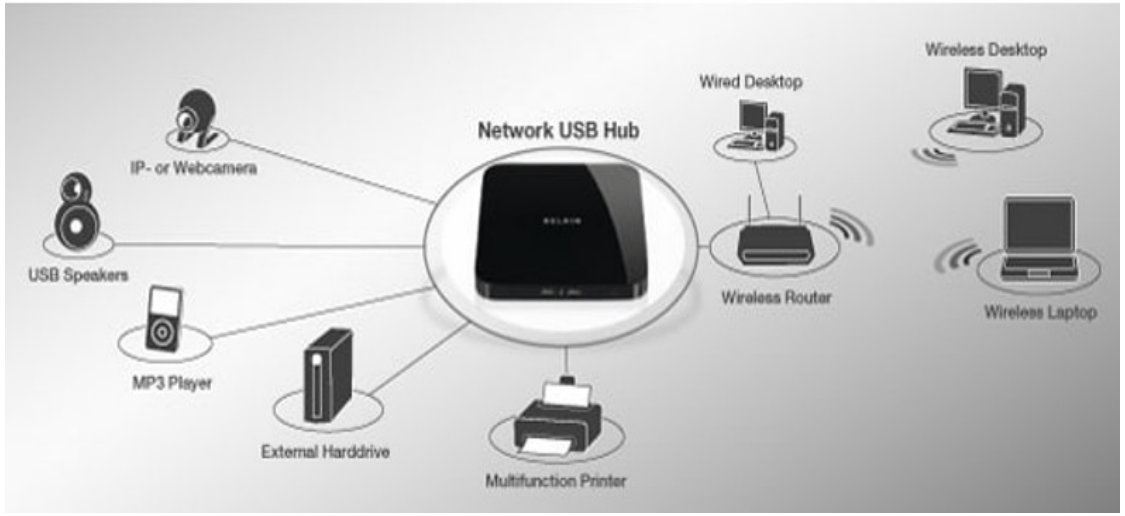
APPLICATIONS OF HUB

Applications Of Hub

- Hubs are used to create small Home Networks.
- Hubs are used for monitoring the networks.
- Hubs are used in Organizations and Computer Labs for connectivity.
- It Makes one device or peripheral available throughout the whole network



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CONTENT

SWITCH

- About SWITCH
- How Does SWITCH Work？
- Type of SWITCHs
- Pros and Cons of SWITCHs
- Applications of SWITCH

ABOUT SWITCH

What is a switch ?

- A network switch is networking hardware that connects devices on a computer network by using packet switching to receive and forward data to the destination device.
- A network switch is a multiport network bridge that uses MAC addresses to forward data at the data link layer (layer 2) of the OSI model.
- A switch is a device in a computer network that connects other devices together.

Avaya ERS 2550T-PWR, a 50-port Ethernet switch
The first MAC Bridge was invented in 1983 by **MARK KEMPF**,

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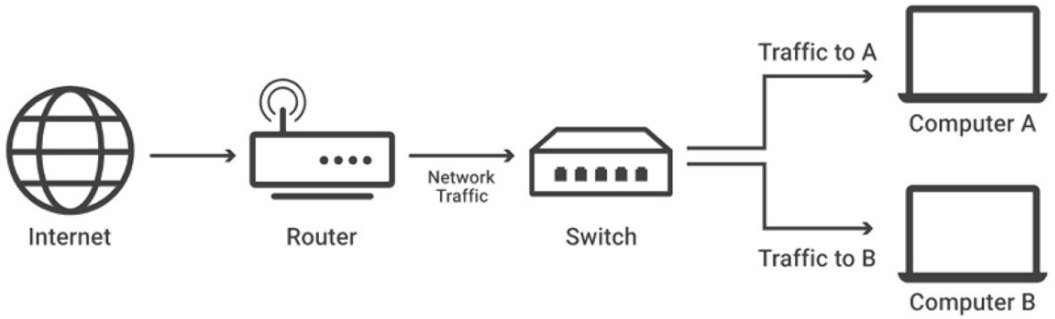
HOW DOES IT WORK?

Switch working by following all this step:

- Edge, or access, switches : These switches manage traffic either coming into or exiting the network. Devices like computers and APs connect to edge switches.

- Aggregation, or distribution, switches : These switches are placed within an optional middle layer in a network topology.

- Core switches : These network switches form the backbone of the network.



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TYPES OF SWITCH

There are 4 types of Switch:

1. Unmanaged Switch
2. Managed Switch
3. LAN Switch
4. PoE Switch

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TYPES OF SWITCH

1. Unmanaged Switch

These are the switches that are mostly used in home networks and small businesses. The type of unmanaged Switch depends on the type of Ports you want.

2. Managed Switch

These types of switches have many features like the highest levels of security, precision control, and full management of the network

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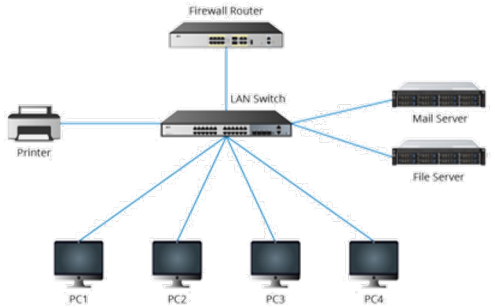
TYPES OF SWITCH

3. LAN Switch

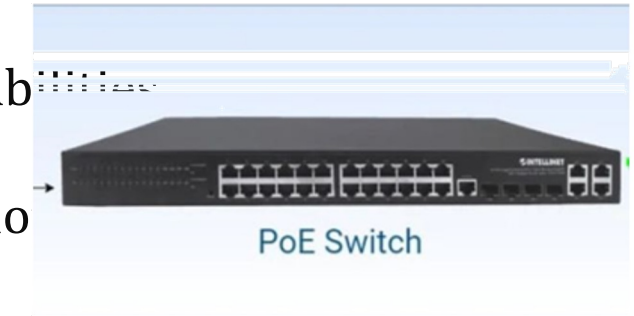
LAN switch is switch provide a separate connection for each node in a company's internal network..



4. PoE Switch

PoE Switches are used for networks and connected devices that need power and to transmit data.

- You only need one cable as it carries both power and network capab
- Can easily expand a network even when power is problematic.
- They are easy to maintain and checked - you can monitor them remo



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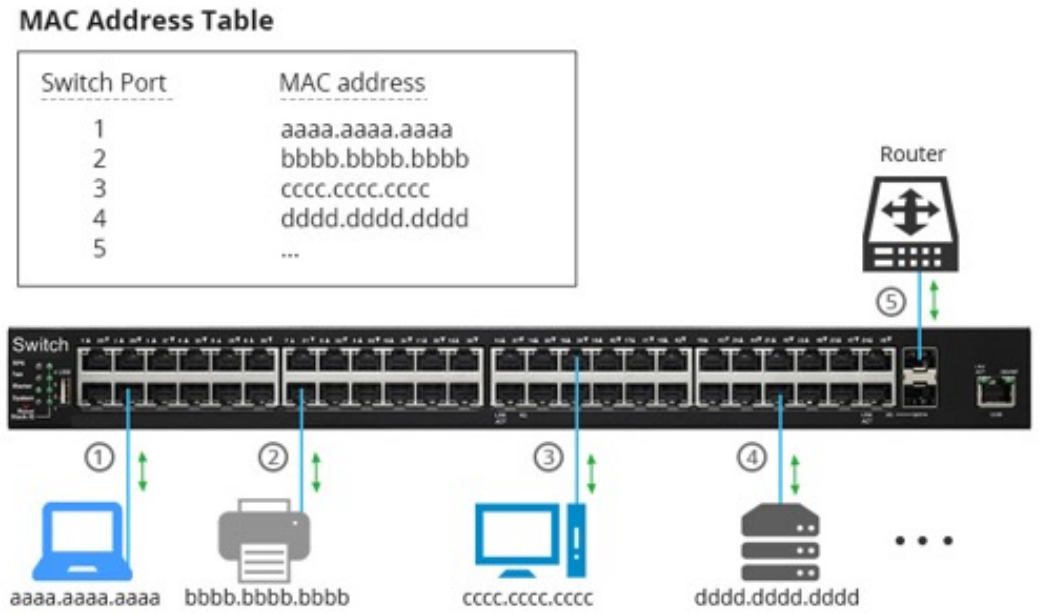
PROS AND CONS OF SWITCH

Advantages of Using Switch	Disadvantages of Using Switch
• It can make use CAM table for a port to MAP mapping • It helps in logical segmentation by supporting VLANs • The number of broadcast domains gets decreases • Support centralized management • They help in reducing the workload on individual host PCs • Permit multiple simultaneous conversations • Fairer than connection based technology • Switch interconnected individual node and also controlled access to media • Switch can be connected directly to work station • A network which uses switch will have fewer frame collisions • They increase the available bandwidth of the network	• High cost • Failure of switch bridge down the network • When we use a switch, a network connectivity problem can be difficult to trace through a switch • Broadcast traffic may be troublesome • While uses a limited broadcast, they are not as good as routers • Proper design and most important configuration is needed in order to handle multicast packets • If a switch is in promiscuous, they are vulnerable to security attacks

APPLICATIO OF SWITCH

- Connect multiple hosts
- Forwards a message to a specific host Manage traffic:
- Keep electrical signal undistorted
- Increase LAN bandwidth



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CONTENT

ROUTER

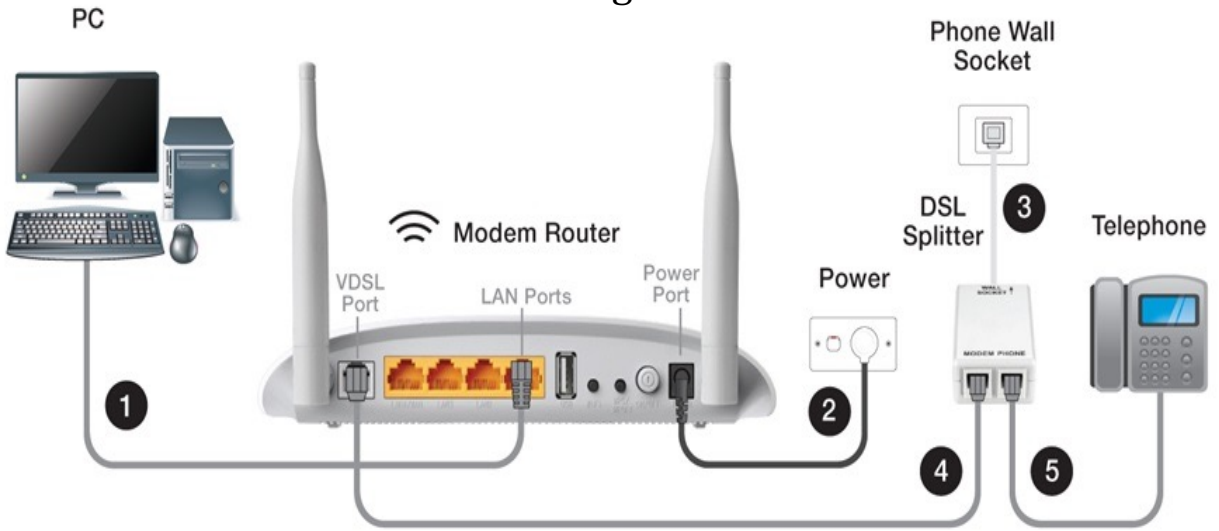
- About ROUTER
- How Does ROUTER Work？
- Pros and Cons of HUBs
- Applications of HUBs

ABOUT RUOTER

What is a router ?

- A router is a device that connects two or more packet-switched networks or subnetworks.
- There are several types of routers, but most routers pass data between LAN (local area network) and WAN (wide area network).
- A router is connected to two or more data lines from different IP network.

The first true IP router was developed by GINNY STRAZISAR at BBN, as part of that DARPA-initiated effort during 1975–1976



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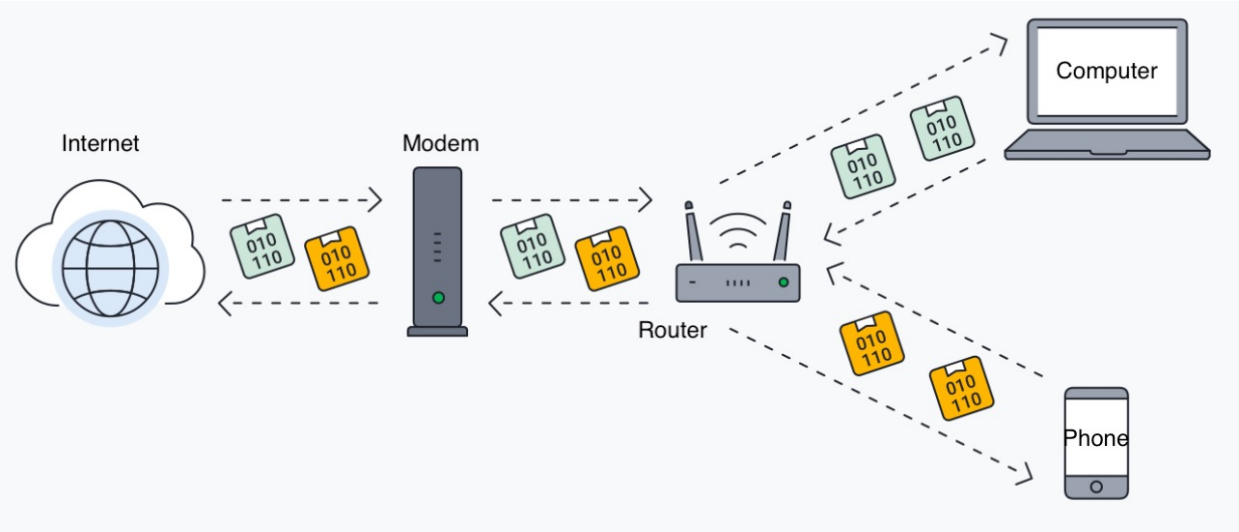
HOW DOES ROUTERS WORK ?

How does Router work ?

- Internet routers work in tandem with a modem data packets arrive from connected devices, the router forwards them to the modem.
- When the internet traffic arrives at your router via the modem, it’s then forwarded to a particular IP address, ensuring it reaches the correct device.



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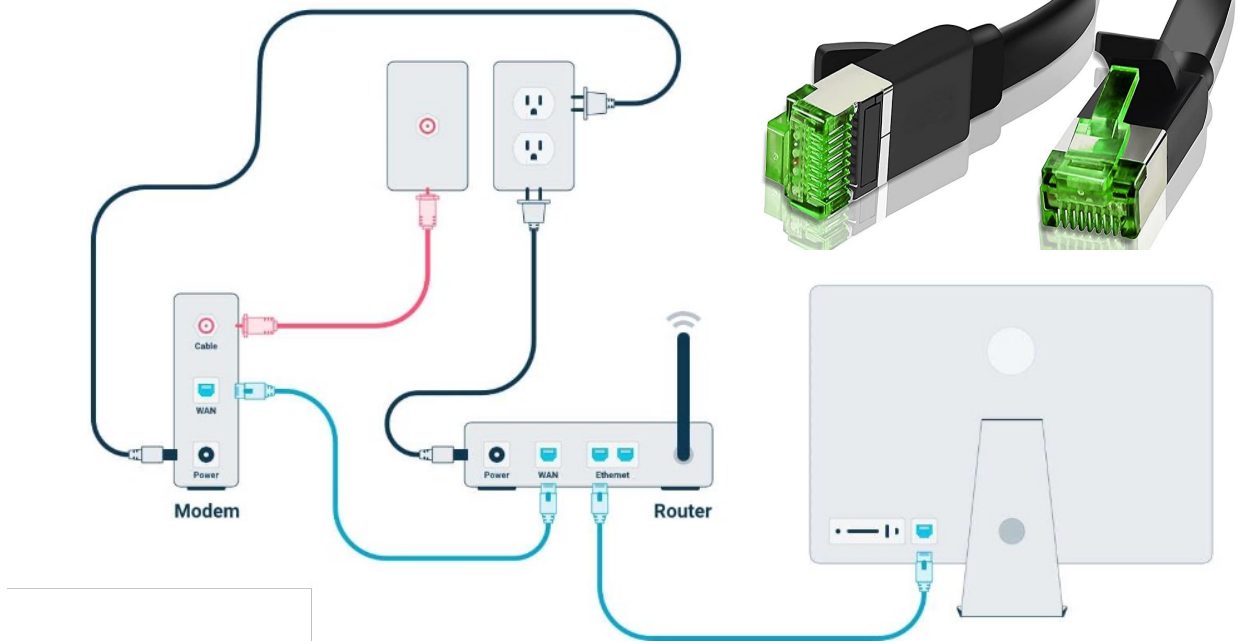
HOW DOES ROUTERS WORK ?

Wired router

- Router devices that connect via network cables are called wired routers.
- only have LAN router cable ports,



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HOW DOES ROUTERS WORK ?

Wireless router

- Wireless routers create a wireless signal in your home or office. So, any PC within range of Wireless routers can connect it and use your Internet.
- In order to secure your Wireless routers, you simply need to come secure it with password or get your IP address. Then, you'll log on into your router with the user ID and passwords will that come with your router.

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PROS AND CONS OF ROUTER

Advantages of Using Routers	Disadvantages of Using Routers
• Determines the most efficient path between source and destination using dynamic routing algorithms such as OSPF, BGP, RIP, etc. • Reduces network traffic by creating the collision domains and broadcast domains. • Provides connection among different network architecture. • Connects multiple users to a single network connection. • Uses alternative parts to avoid problems in routing networks if an external network component fails.	• Hardware-based routers are vulnerable to cyber attackers since they contain software called firmware. Unpatched routers are quite vulnerable to cyber attacks. • Since routers analyze data transmission from physical to network layer, they are slower than repeaters and bridges. • There is less bandwidth for user data since dynamic router communications cause additional network overhead. • Routers also face compatibility issues with 5GHz frequency.

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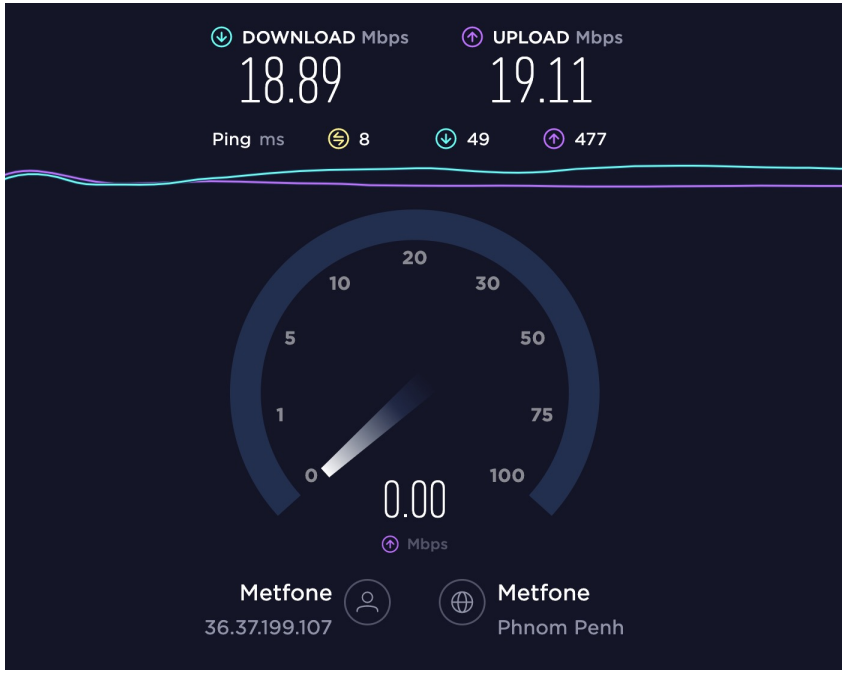
APPLICATION OF ROUTER

- Routers are used to connect hardware equipment with remote location networks like KingCorp Inc , EZECOM limited, WiCAM Corporation Ltd., Angkor Data Communication, and other servers.
- It provides support for a fast rate of data transmission because it uses high STM links for connectivity; that's why it is used in both wired or wireless communication.
- Internet service providers widely use routers to send the data from source to destination in the form of e-mail, a web page, image, voice, or a video file. Furthermore, it can send data all over the world with the help of an IP address of the destination.
- Routers offer access restrictions. It can be configured in a way that allows for few users to access the overall data and allows others to access



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CONCLUSION

Hope that this article has been helpful in understanding routers in detail. These are smart networking devices that can offer a single network, but have limitations related to low speed and bandwidth. While choosing a networking device, you should consider a device that suits your requirement with minimum limitations.

THANK YOU !

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