Computer Hardware & Networking& Server Configurations (H7E3 04)

UNIT 05:
Network devices and protocols

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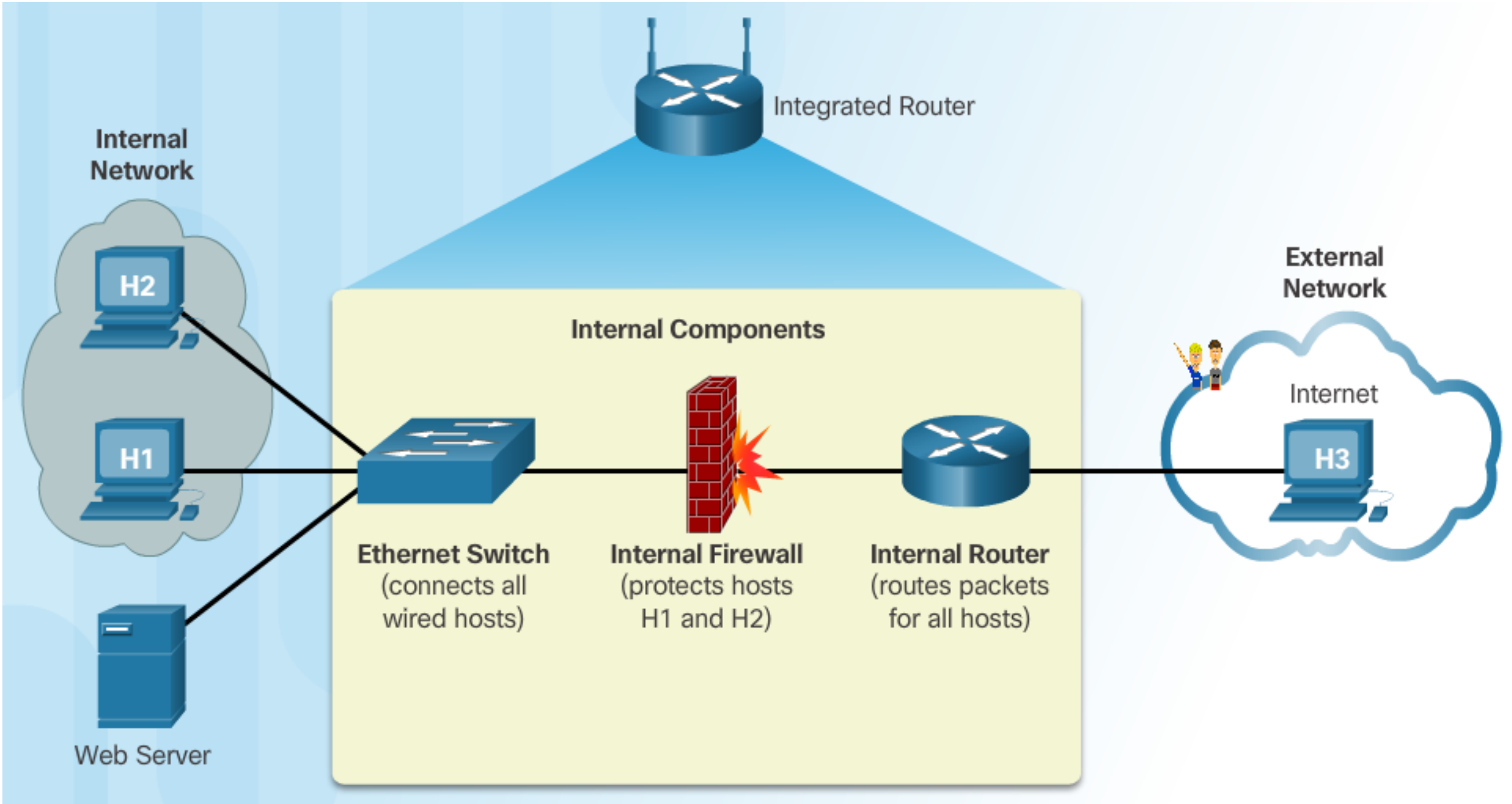
Introduction to network devices

Network Devices

- Modems convert a computer's digital data into a format that can be transmitted on the ISP's network.
- Switches microsegment LANs by sending data only to the computer that needs it.
- Wireless access points (APs) connect wireless devices. Routers use IP addresses to forward traffic to other networks.
- In a home or small office, a route often includes a switch, a firewall, and an AP.


Integrated Router
Internal Network
H2
H1
Web Server
Internal Components
Ethernet Switch
(connects all wired hosts)
Internal Firewall
(protects hosts H1 and H2)
Internal Router
(routes packets for all hosts)
External Network
Internet
H3

MODEM

- (modem) **(n.)** Short for ***mo****dulator-****dem****odulator.* A modem is advice or program that enables a computer to transmit data over, for example, telephone or cable lines. Computer information is stored digitally, whereas information transmitted over telephone lines is transmitted in the form of analog waves. A modem converts between these two forms.

REPEATER

- Used to boost the signal between two cable segments or wireless access points.
- Cannot connect different network architecture.
- Does not simply amplify the signal, it regenerates the packets and retimes them.
- Resides on Layer 1 of the OSI model.

HUB

- An unintelligent network device that sends one signal to all of the stations connected to it.
- All computers/devices are competing for attention because it takes the data that comes into a port and sends it out all the other ports in the hub.
- Traditionally, hubs are used for star topology networks, but they are often used with other configurations to make it easy to add and remove computers without bringing down the network.
- Resides on Layer 1 of the OSI model

SWITCH

- Split large networks into small segments, decreasing the number of users sharing the same network resources and bandwidth.
- Understands when two devices want to talk to each other, and gives them a *switched* connection
- Helps prevent data collisions and reduce network congestion, increasing network performance.
- Most home users get very little, if any, advantage from switches, even when sharing a broadband connection.
- Resides on Layer 2 of the OSI model.

BRIDGE

- Connects two LANs and forwards or filters data packets between them.
- Creates an extended network in which any two workstations on the linked LANs can share data.
- Transparent to protocols and to higher level devices like routers.
- Forward data depending on the Hardware (MAC) Address, not the Network addresses (IP).
- Resides on Layer 2 of the OSI model.

ROUTER

- A device that connects any number of LANs.
- Uses standardized protocols to move packets efficiently to their destination.
- More sophisticated than bridges, connecting networks of different types (for example, star and token ring)
- Forwards data depending on the Network address
- (IP), not the Hardware (MAC) address.
- Routers are the only one of these four devices that will allow you to share a single IP address among multiple network clients.
- Resides on Layer 3 of the OSI model.

AP (Access Point)

- Short for **A**ccess **P**oint, a hardware device or a computer's software that acts as a communication hub for users of a wireless device to connect to a wired LAN. APs are important for providing heightened wireless security and for extending the physical range of service a wireless user has access to.

- Also see infrastructure mode and ad-hoc mode.

FIREWALL

- A firewall is a protective system that lies, in essence, between your computer network and the Internet. When used correctly, a firewall prevents unauthorized use and access to your network. The job of a firewall is to carefully analyze data entering and exiting the network based on your configuration. It ignores information that comes from an unsecured, unknown or suspicious locations. A firewall plays an important role on any network as it provides a protective barrier against most forms of attack coming from the outside world.

Network HOSTS

DESKTOP COMPUTER

- A **desktop computer** is a personal computer designed for regular use at a single location on or near a desk or table due to its size and power requirements. The most common configuration has a case that houses the power supply, motherboard (a printed circuit board with a microprocessor as the central processing unit (CPU), memory, bus, and other electronic components), disk storage (usually one or more hard disk drives, optical disc drives, and in early models floppy disk drives); a keyboard and mouse for input; and computer monitor and printer for output. The case may be oriented horizontally and placed atop a desk or vertically and placed underneath or beside a desk

NOTEBOOK COMPUTER

- A **laptop**, often called a **notebook** or "notebook computer", is a small, portable personal computer with a "clamshell" form factor, an alphanumeric keyboard on the lower part of the "clamshell" and a thin LCD or LED computer screen on the upper portion, which is opened up to use the computer. Laptops are folded shut for transportation, and thus are suitable for mobile use. Although originally there was a distinction between laptops and notebooks, the former being bigger and heavier than the latter, as of 2014, there is often no longer any difference. Laptops are commonly used in a variety of settings, such as at work, in education, and for personal multimedia and home computer use.

SERVER

- In a technical sense, a **server** is an instance of a computer program that accepts and responds to requests made by another program, known as a client. Less formally, any device that runs server software could be considered a server as well. Servers are used to manage network resources. For example, a user may setup a server to control access to a network, send/receive e-mail, manage print jobs, or host a website.

NAS

- **Network-attached storage** (**NAS**) is a file-level computer data storage server connected to a computer **network** providing data access to a heterogeneous group of clients. **NAS** is specialized for serving files either by its hardware, software, or configuration.

IP CAMERA

- An Internet protocol **camera**, or **IP camera**, is a type of digital video **camera commonly** employed for surveillance, and which unlike analog closed circuit television (CCTV) **cameras** can send and receive data via a computer network and the Internet.

NETWORK PRINTER

- A **printer** connected to a wired or wireless **network**. It may be Ethernet enabled and be cabled to an Ethernet switch, or it may connect to a Wi-Fi (wireless) **network**, or both. See print server, Ethernet, Wi-Fi and production **printer**.

NETWORK (IP) SPEAKER

- A conventional loudspeaker is an electromechanical transducer that converts an electrical signal into sound. If locally powered, this can also be termed an active loudspeaker, meaning it contains an audio amplifier that can drive power to the speaker drivers. Network **speaker** implies the ability to drive audio to such a device from a network connection, usually over an Ethernet network or the Internet. In many cases this type of speaker also contains digital signal processing (DSP) to provide the audio crossover and other signal processing to provide frequency division and other tonal functions that exist in conventional speakers. Network speakers are also known as **IP speakers**.

MULTIMEDIA PROJECTOR

- A **projector** or **image projector** is an optical device that projects an image (or moving images) onto a surface, commonly a projection screen.

- Most projectors create an image by shining a light through a small transparent lens, but some newer types of projectors can project the image directly, by using lasers. A virtual retinal display, or retinal projector, is a projector that projects an image directly on the retina instead of using an external projection screen.

- The most common type of projector used today is called a video projector. Video projectors are digital replacements for earlier types of projectors such as slide projectors and overhead projectors. These earlier types of projectors were mostly replaced with digital video projectors throughout the 1990s and early 2000s (decade), but old analog projectors are still used at some places. The newest types of projectors are handheld projectors that use lasers or LEDs to project images. Their projections are hard to see if there is too much ambient light.

- Movie theaters used a type of projector called a movie projector, nowadays mostly replaced with digital cinema video projectors.

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THANK YOU