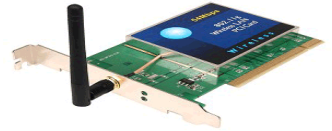


# *Network Interface Cards (NICs)*

# Network Interface Card (NIC)

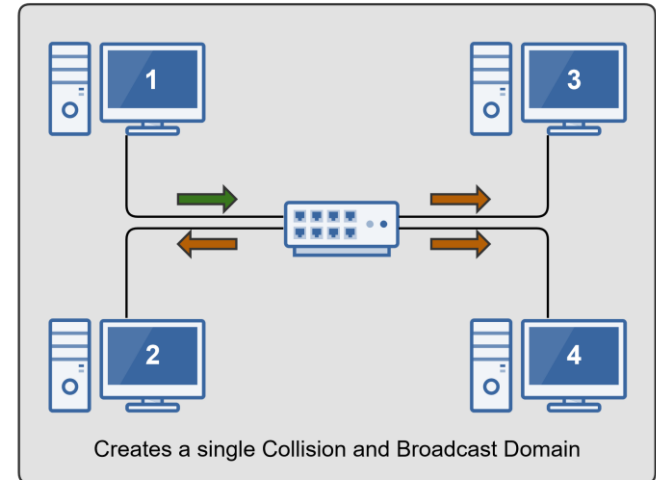
- The network adapter installed on your network device.
- Provides the physical and electrical, light or radio frequency connections to the network media.
- It can either be an expansion card, USB devices or built directly into the motherboard.



# Hubs

# Hubs

- Used to Connect Devices Together Within a Network
- Used in Early Networks; Replaced by Switches
- “Multi-Port Repeater”
  - Traffic goes in one port and is repeated (broadcasted) out every other port
  - OSI Layer 1 Device
  - Dumb Network Device
  - Causes increased network collision errors
- Much Less Efficient than a Switch
- Legacy Equipment No Longer Used



# *Switches*

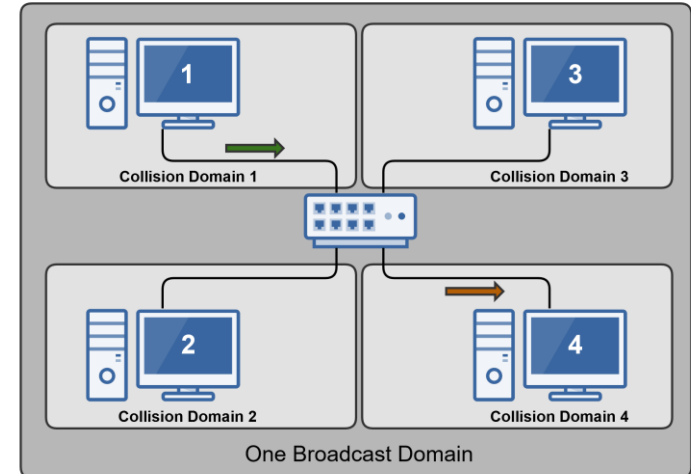
# Switches

- Connects Devices Together Just Like a Hub
- Intelligent Network Device (OSI Layer 2)
- Memorizes the **MAC Address** of Each Device Connected to It via a **MAC Address Table**, sometimes called a **Content Addressable Memory (CAM) Table**
- Pays attention to *Source* and *Destination* **MAC addresses** during Communication Process
- Use Application-Specific Integrated Circuitry (**ASIC**), which makes them Extremely Fast
- Breaks up Collision Domains

Traffic Goes in One Port and Is Repeated out to Only Destination Port

Designed for High Bandwidth

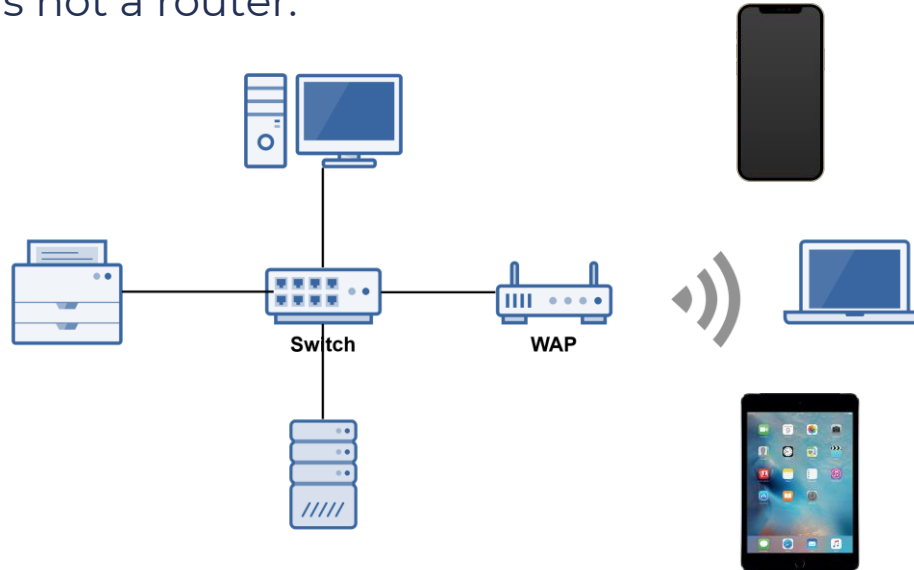
Standard in Today's Network Infrastructure



# *Wireless Access Points*

# Wireless Access Point (WAP)

- A wireless access point (WAP) is a bridge that extends the wired network to the wireless network.
- Just like a switch, it's a Data Link Layer 2 device.
- **Note:** A WAP is not a router.

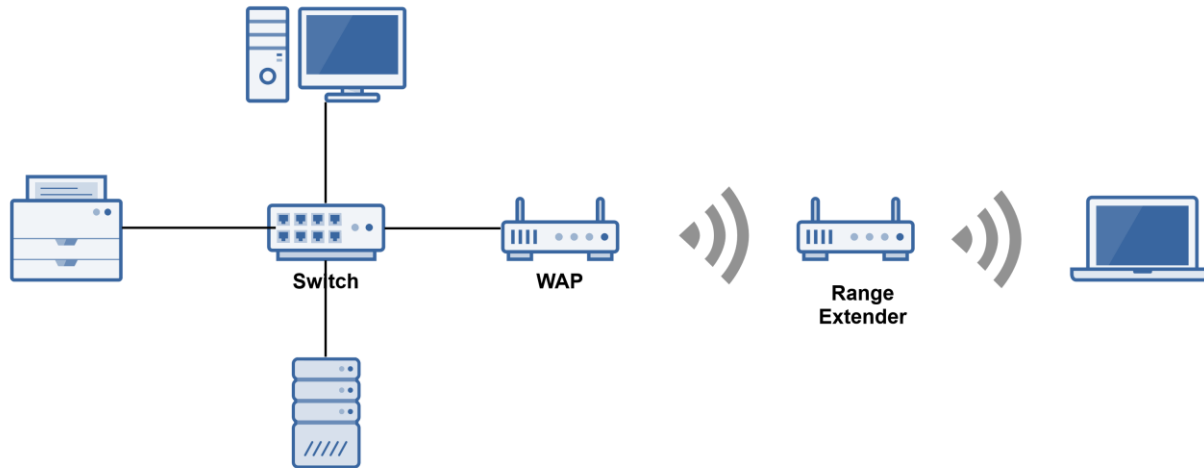




# *Wireless Range Extenders*

# Wireless Ranger Extender

- Extends the range of a wireless network by acting as a wireless repeater.
- Rebroadcasts radio frequencies from the wireless network it is associated with



# *Routers*

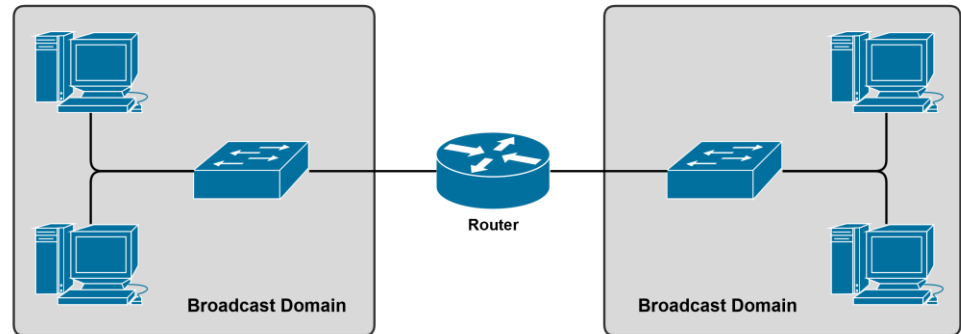
# Routers

- Used to Connect Different Networks Together
- Routes Traffic Between Networks using **IP Addresses**
- Uses Intelligent Decisions (Routing Protocols) to Find the Best Way to Get a Packet of Information from One Network to Another.
- Break Up Broadcast Domains
- **OSI Layer 3 Device**

Layer 3 = Router

Layer 2 = Switch

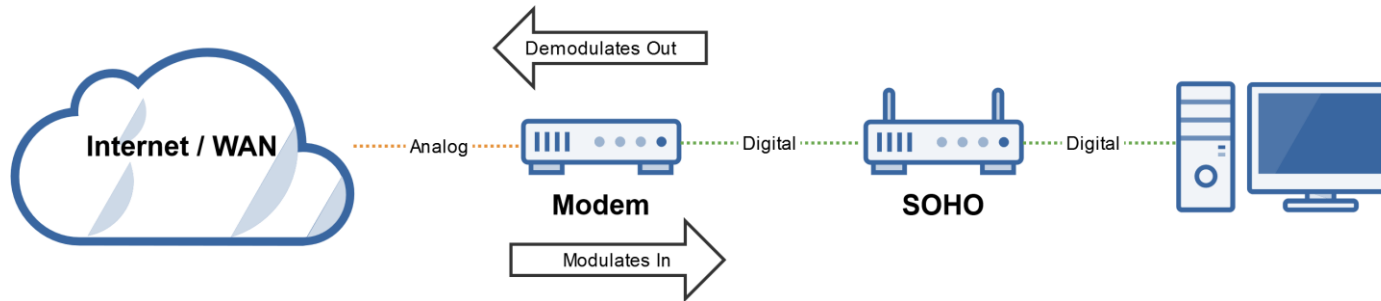
Layer 1 = Hub



# *Modems*

# Modems (Modulators/Demodulators)

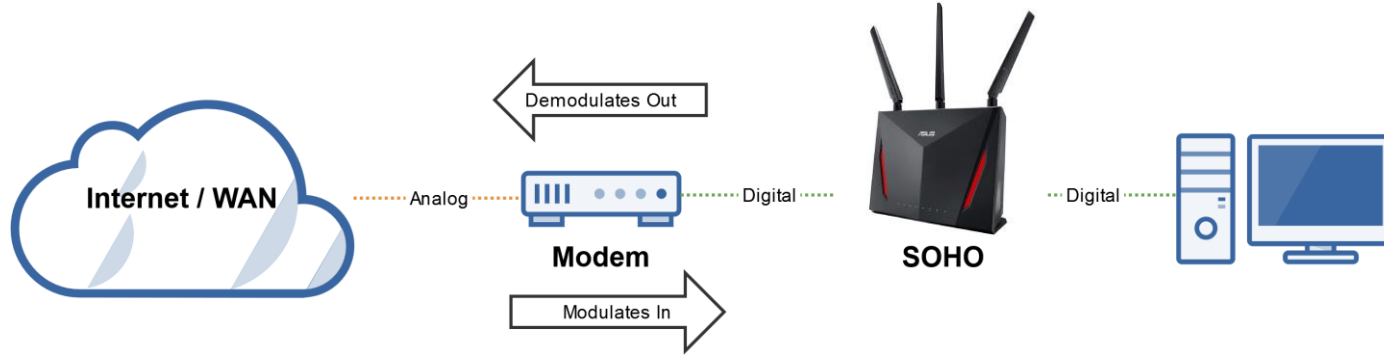
- Modems modulate one signal to another, such as analog to digital.
- For example, modulating a telephone analog signal into a digital signal that a router can understand.



# *All-in-One SOHO Devices*

# Small Office Home Office (SOHO) Device

- All-In-One Wireless Router with Expanded Capabilities:  
Router, Wireless Access Point, Firewall, Switch, DHCP Server, NAT Device, File Server, etc.

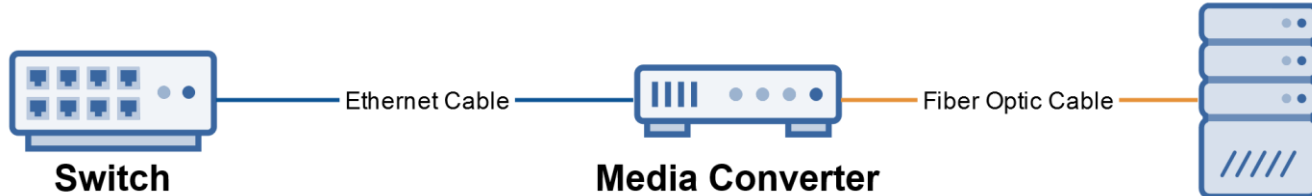




# *Media Converters*

# Media Converters

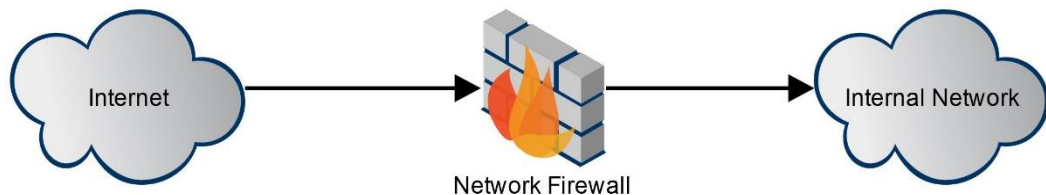
- Like its name implies, it converts one media type to another
- **Layer 1 Device:** Performs physical layer signal conversion.
- Ethernet to fiber optic media converters are commonly used



# *Firewalls*

# Firewalls

- Firewalls are the foundation of a defense-in-depth network security strategy.
- They protect your network from malicious activity on the Internet.
- Prevent unwanted network traffic on different networks from accessing your network.
- Firewalls do this by filtering data packets that go through them.
- They can be a standalone network device or software.



# *Types of Firewalls*

## **Packet Filtering Firewalls**

- 1<sup>st</sup> Generation & Most Basic
- Basic Filtering Rules

## **Circuit-Level Firewalls**

- 2<sup>nd</sup> Generation
- Monitors Valid/Invalid TCP Sessions

## **Application Layer 7 (NGFW) Firewalls**

- 3<sup>rd</sup> Generation
- Much more Advanced; Covered Later in Course

# *DHCP Servers*

# DHCP Server

- Dynamic Host Configuration Protocol (DHCP) Server
- Automatically Assigns IP Addresses to Hosts
- Makes Administering a Network Much Easier
- An Alternative is Static IP addressing
- We'll Talk More About DHCP Later in the Course



# *VoIP Endpoints*



# Voice over IP (VoIP) Endpoints

- Most phone systems run over IP networks via dedicated protocols, such as the Session Initiation Protocol (SIP), both in-home and office environments.
- VoIP endpoint devices are hardware devices (phones) or software, such as Cisco Jabber, that allow you to make phone calls.

