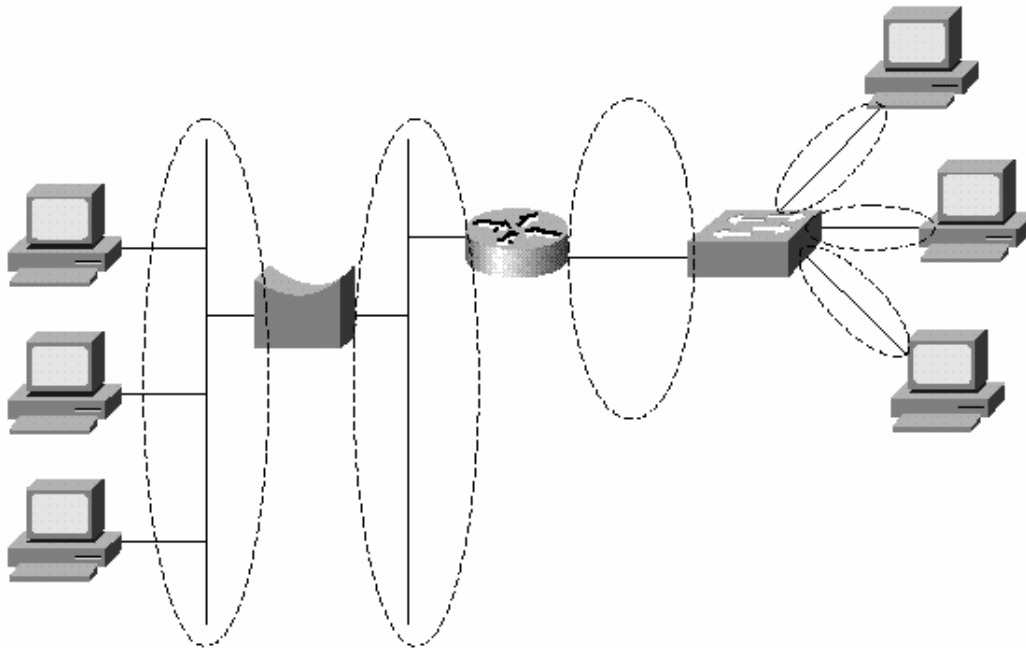


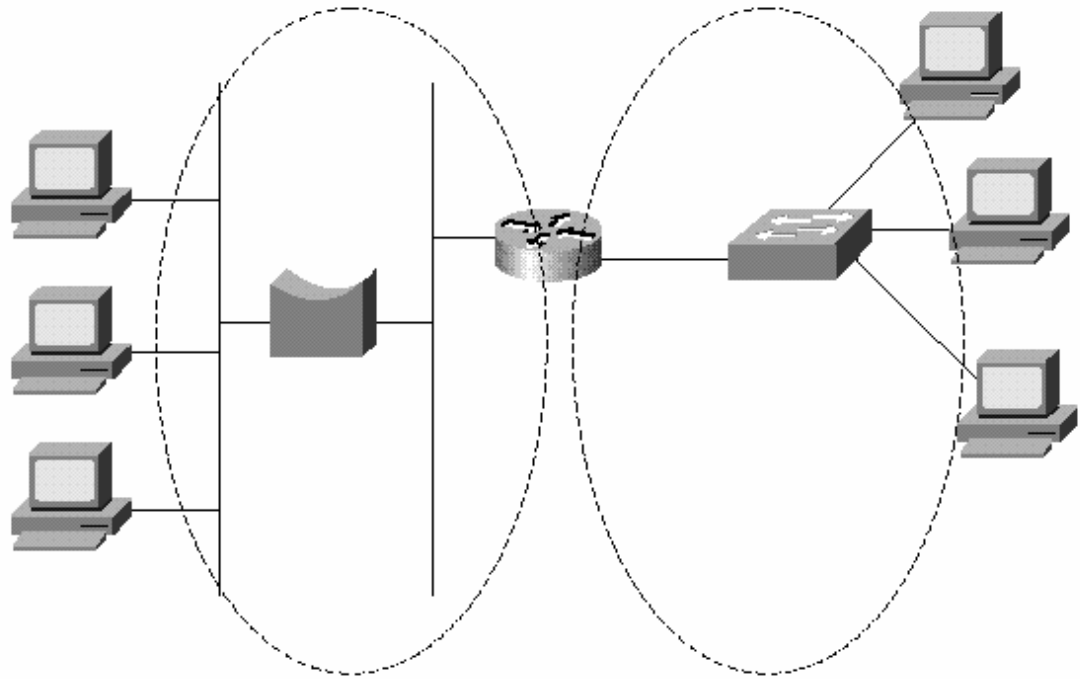
**A Comparison among Network Devices**

Device	Function	Address	Layer	Table
Repeater	Amplifies the Signal	None	Physical	None
Hub	<ol style="list-style-type: none"> <li>1. Multiport Repeater</li> <li>2. Shared bandwidth between attached devices</li> <li>3. Can not filter Traffic</li> <li>4. Fast propagation of the signal.</li> <li>5. Decreases Latency</li> </ol> <p>All the devices connected to a hub are part of the same segment or collision domain (frames sent by any device on that segment could collide with other frames on the segment.)</p>	None	Physical	None
Bridges	<ol style="list-style-type: none"> <li>1. LAN segmentation: breaks one collision domain into two smaller ones.</li> <li>2. capable of filtering traffic between segments based on the MAC address</li> <li>3. Increases Latency</li> <li>4. Each port has a dedicated bandwidth.</li> <li>5. forwards broadcast</li> <li>6. Layer 3 protocol independent</li> </ol>	Physical = MAC	Data Link	Builds and Utilizes a MAC Address Table
Switch	<ol style="list-style-type: none"> <li>1. Devices on separate switch ports are on separate Ethernet segments (which are separate collision domains).</li> <li>2. LAN Micro segmentation (One device in each collision domain)</li> <li>3. Capable of filtering traffic based on the MAC address.</li> <li>4. Increases latency</li> <li>5. Each port has a dedicated bandwidth</li> </ol>	Physical = MAC	Data Link	Builds and Utilizes a MAC Address Table

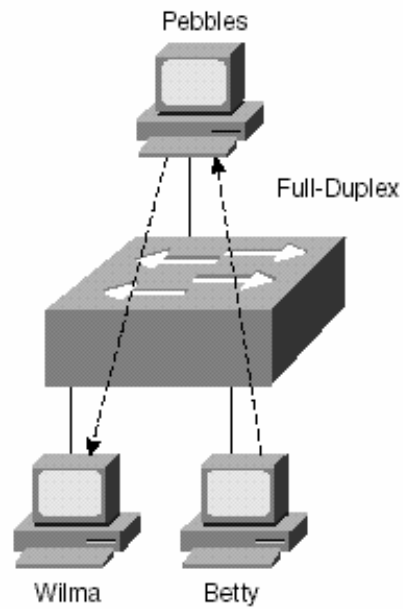
Device	Function	Address	Layer	Table
	6. Layer 3 Protocol independent 7. Forwards broadcast			
Router	1. Creates multiple broadcast domains 2. Devices on separate router ports are on separate broadcast domains 3. Does not forward broadcast 4. Uses IP address to make routing decisions 5. Increases latency.	Logical = IP	Network	Routing Table or Network Address Table

- A collision domain is a set of interface cards (NICs) for which a frame sent by one NIC could result in a collision with a frame sent by any other NIC in the collision domain. **(Examine Figure 1)**
- A broadcast domain is a set of NICs for which a broadcast frame sent by one NIC will be received by all other NICs in the broadcast domain. **(Examine Figure 2)**





*Full-Duplex Ethernet and Switches*



<b>Feature</b>	<b>Bridging</b>	<b>Switching</b>	<b>Routing</b>
Forwards LAN broadcasts?	Yes	Yes	No
Forwards LAN multicasts?	Yes	Yes; can be optimized with CGMP	No <sup>1</sup>
OSI layer used when making forwarding decision	Layer 2	Layer 2	Layer 3
Internal processing variants	Store-and-forward	Store-and-forward, cut-through, FragmentFree	Store-and-forward
Frame/packet fragmentation allowed?	No	No	Yes
Multiple concurrent equal-cost paths to same destination allowed?	No	No	Yes

<b>Feature</b>	<b>Bridging</b>	<b>Switching</b>	<b>Routing</b>
Greater cabling distances allowed	Yes	Yes	Yes
Decrease in collisions, assuming equal traffic loads	Yes	Yes	Yes
Decreased adverse impact of broadcasts	No	No	Yes
Decreased adverse impact of multicasts	No	Yes, with CGMP	Yes
Increase in bandwidth	Yes	Yes	Yes
Filtering on Layer 2 header allowed	Yes	Yes	Yes
Filtering on Layer 3 header allowed	No	No	Yes