2.1.6 Network Topology Facts

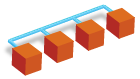
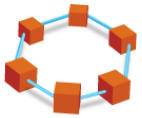
Topology describes how devices are connected and how messages flow from device to device.

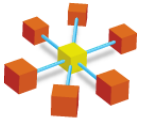
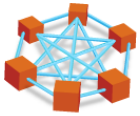
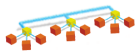
This lesson covers the following topics:

- Physical topology
- Logical topology

Physical Topology

The physical topology describes the way the network is wired. The following table describes several common physical topologies:

Topology	Description
 Bus	A bus topology consists of a trunk cable with nodes either inserted directly into the trunk or tapped into the trunk using offshoot cables called drop cables. When using a bus topology: • Signals travel from one node to all other nodes. • A device called a terminator is placed at both ends of the trunk cable. • *Terminators* absorb signals and prevent them from reflecting repeatedly back and forth on the cable. • It can be difficult to isolate cabling problems. A broken cable anywhere on the bus breaks the termination and prevents communications between all devices on the network.
 Ring	A ring topology connects neighboring nodes until they form a ring. Signals travel in one direction around the ring. Each device on the network acts as a repeater to send the signal to the next device. With a ring: • Installation requires careful planning to create a continuous ring. • Problem isolation can require going to several physical locations along the ring.

	• A node malfunction or cable break can prevent signals from reaching nodes beyond the malfunction.
 Star	A star topology uses a hub or switch to connect all network connections to a single physical location. Star is the most commonly used type of topology for a LAN. With a star: • All network connections are located in a single place. This makes it easy to troubleshoot and reconfigure. • You can easily add or remove nodes from the network. • Cabling problems usually affect only one node.
 Mesh	A mesh topology exists when there are multiple paths between any two nodes on a network. Mesh topologies are created using point-to-point connections. This increases the network's fault tolerance because alternate paths can be used when one path fails. Two variations of mesh topologies exist: • Partial mesh—Some redundant paths exist. • Full mesh—Every node has a point-to-point connection with every other node. Full mesh topologies are usually impractical because: • The number of connections increases dramatically with every new node added to the network of a standard LAN. • They require a separate network interface and cable for each host on the network. A full mesh topology is commonly used to: • Interconnect routers. This provides alternate paths should one path go down or become overloaded. • Create redundant paths between access points in a wireless network. This provides alternate paths back to the wireless controller should one access point go down or become overloaded. With this topology, every access point can communicate directly with any other access point on the wireless network.
 Hybrid	A hybrid topology combines two or more topologies together to help with scalability. These combinations often include bus topology, star topology, ring topology, mesh topology (full or partial), or wireless topology.

	• One of the more popular hybrid topologies is the star-bus. It can also be called a tree topology. In this combination, the bus becomes the backbone of the network and each switch connects a traditional star to the bus. • Another very common hybrid topology is the star-ring. In this combination, two or more star topologies are connected together through a ring topology.

Logical Topology

The logical topology describes the way messages are sent. You should be able to identify the physical topology by looking at the way devices are connected. However, it is not as easy to identify the logical topology. As the following table shows, there is often more than one way for messages to travel in a given physical topology.

Logical Topology	Physical Topology	Description
Bus	Bus	Messages are sent to all devices connected to the bus.
	Star	
Ring	Ring	Messages are sent from device to device in a predetermined order until they reach the destination device.
	Star	
Star	Star	Messages are sent directly to (and only to) the destination device.
Mesh	Mesh	Messages are sent from one device to the next until they reach the destination device.