

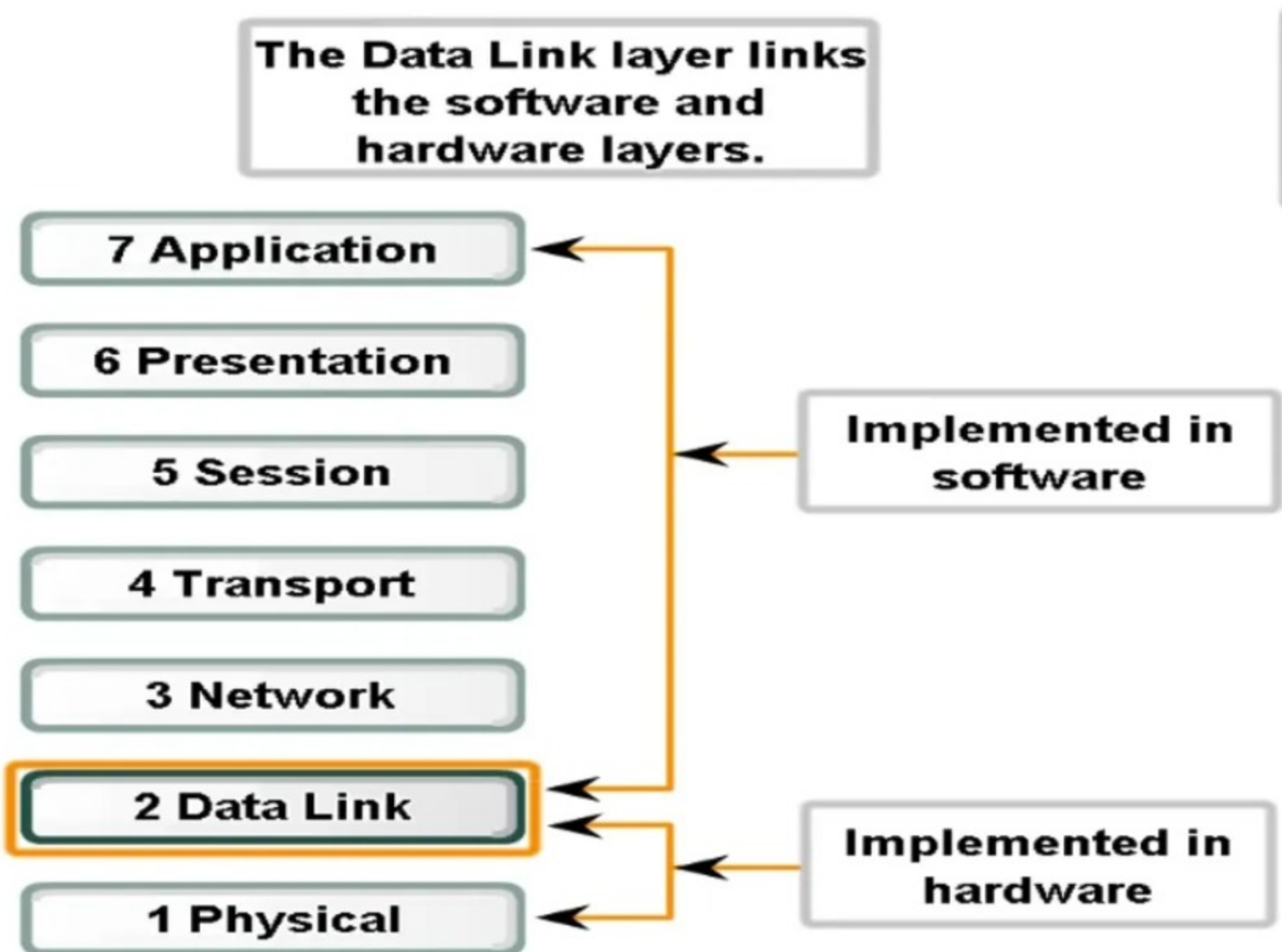
Lecture 2a - Data Link Layer

Type	Lecture
Materials	Empty
Reviewed	<input checked="" type="checkbox"/>

- I. Purpose of the Data Link Layer
2. Data link Layer
3. Topologies
4. WAN topologies
5. Lan Topologies

I. Purpose of the Data Link Layer

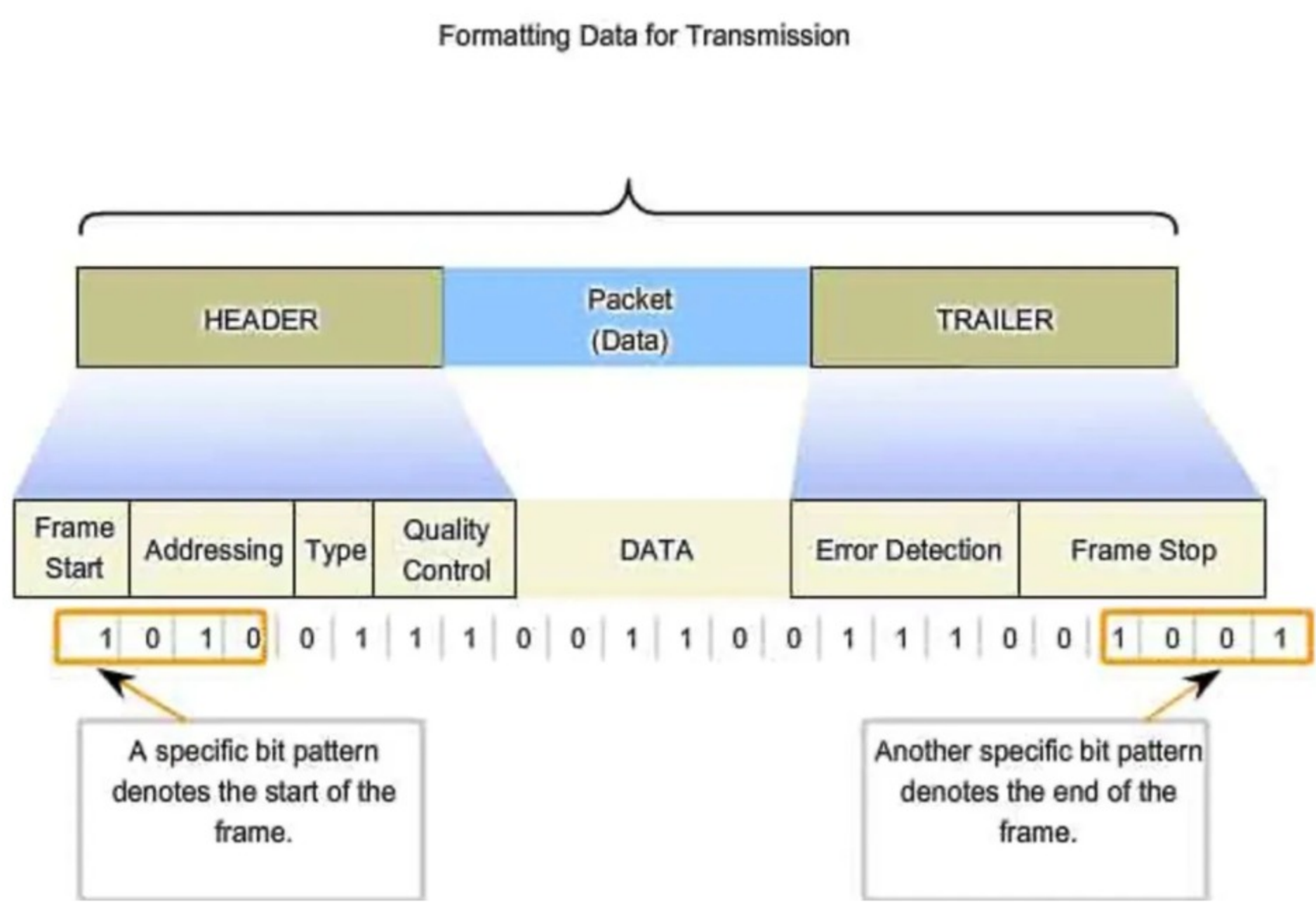
- The Data Link layer links the software and hardware layers



- Data Link layer has 2 sub-layer:
 - LLC (Logical Link Control): interact with the network layer
 - ⇒ add header to package
 - ⇒ Allows the same media and same NIC to be used by different layer 3 protocols.
 - MAC (medium access control): encapsulation
 - Data link layer protocols govern how to format a frame for use on different media.
- Data link layer also has error detection function.

2. Data link Layer

- Formatting Data for Transmission:

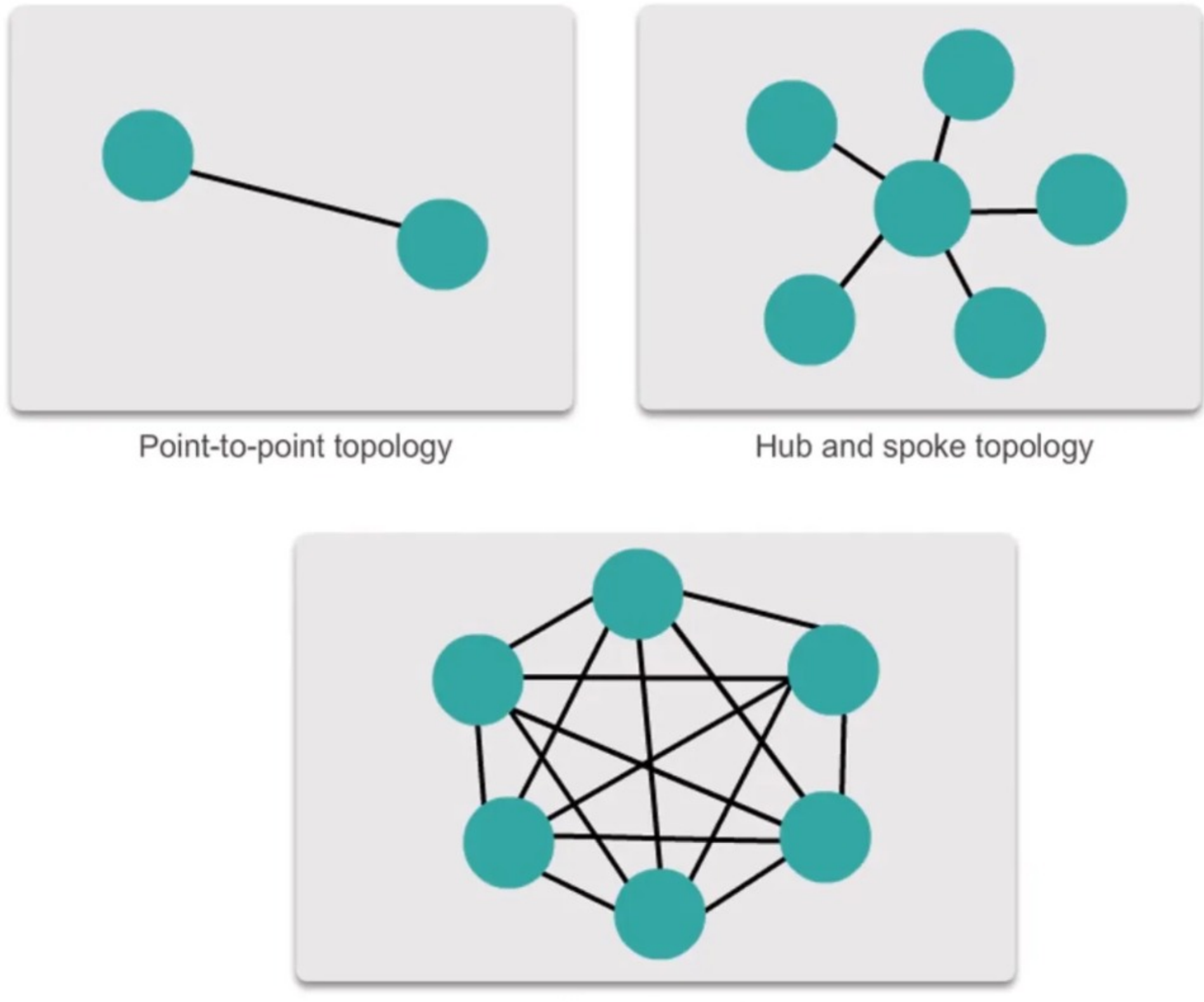


3. Topologies

- Physical:
 - Arrangement and physical connection between nodes
 - What the network *looks* like
- Logical:
 - Virtual arrangement of nodes independent of their physical activity
 - The data link layer *sees* the Logical topology
 - Influences network framing and MAC

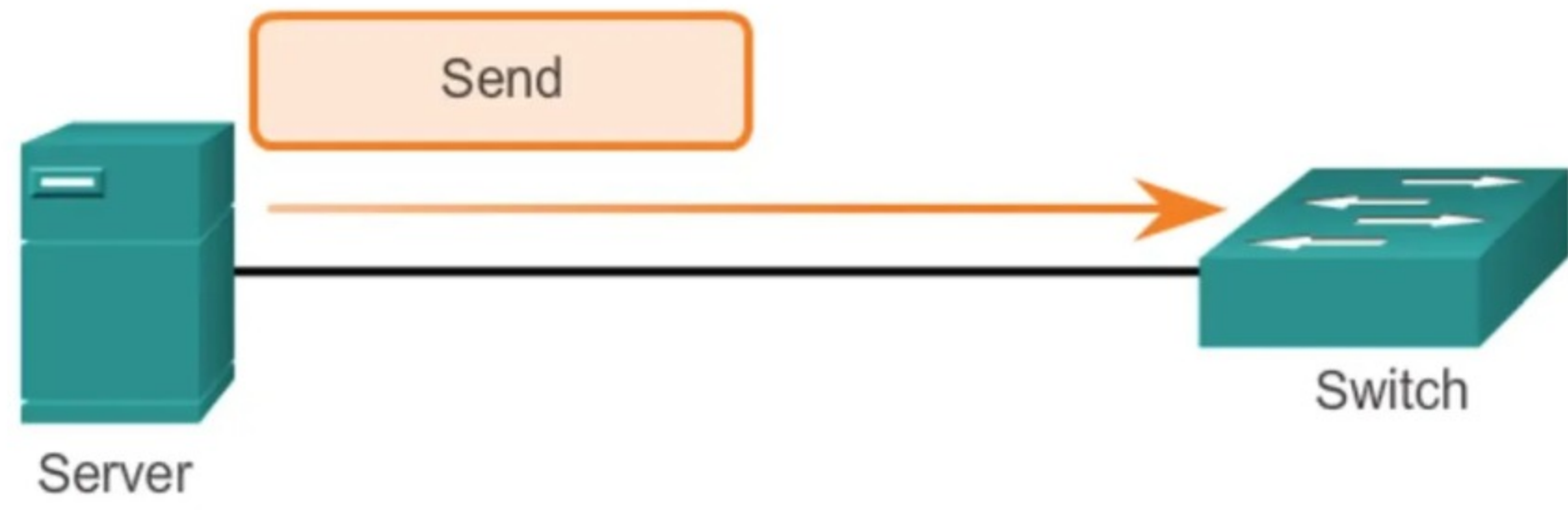
4. WAN topologies

- Common Physical WAN (Wide Area Network) Topology:
 - Hub-shared topology
 - p2p



- Physical Point-to-Point Topology:
 - No need MAC address in the frame (Data Link Layer) if only 2 nodes in the Topology
- Half-duplex vs Full duplex Communication:
 - Half-duplex: need to wait complete sending, then receive after that.
 - Full-duplex: sending and receiving at the same time.

Half-Duplex

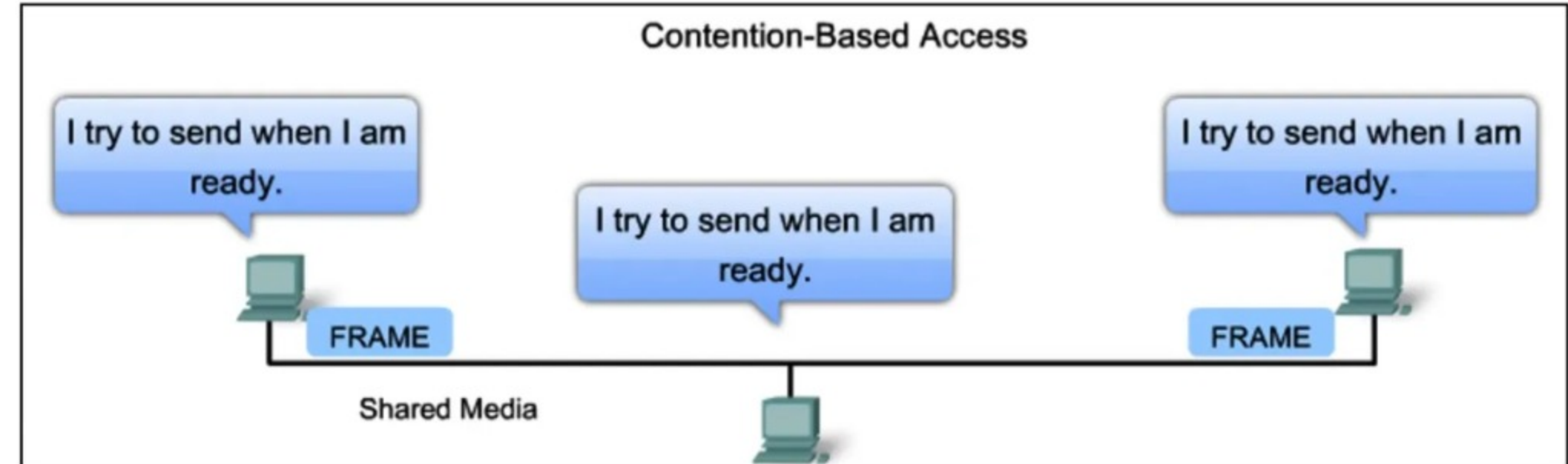


Full-Duplex



5. Lan Topologies

- Contention-based Access:
 - Stations can transmit at any time
 - Collision exist
 - There are mechanisms to resolve contention for the media
 - CSMA/CD, CSMA/CA



- Controlled Access:
 - Characteristics:
 - Only one station can transmit at a time
 - Devices wanting to transmit must wait their turn
 - No collisions
 - May use a token passing method
 - token ring

