·IIIII CISCO



OSI Data Link Layer



Objectives

- Explain the role of Data Link layer protocols in data transmission.
- Describe how the Data Link layer prepares data for transmission on network media.
- Describe the different types of media access control methods.
- Identify several common logical network topologies and describe how the logical topology determines the media access control method for that network.
- Explain the purpose of encapsulating packets into frames to facilitate media access.
- Describe the Layer 2 frame structure and identify generic fields.
- Explain the role of key frame header and trailer fields including addressing, QoS, type of protocol and Frame Check Sequence.



The Data Link layer prepares network data for the physical network.



Data Link

The Data Link layer protocols describe methods for exchanging data frames between devices over a common media.

The Data Link Layer

Data link layer protocols govern how to format a frame for use on different media. Different protocols may be in use for different media.

At each hop along the path, an intermediary device accepts frames from one medium, decapsulates the frame and then forwards the packets in a new frame. The headers of each frame are formatted for the specific medium that it will cross.

rame

Transfer of Frames



Data Link Layer Services



Connecting Upper Layer Services to the Media



Media Access Control Methods





 Define Full Duplex and Half Duplex as it relates to Media Access Control for non-shared media



Media Access Control for Non-shared media

 Describe the purpose of a logical topology and identify several common logical topologies



Point-to-Point Topology



Logical Point-to-Point Topology





Logical Ring Topology



Media Access Control Addressing and Framing Data

Data Link Layer Protocols - The Frame

In a fragile environment, more controls are needed to ensure delivery. The header and trailer fields are larger as more control information is needed.

Greater effort needed to ensure delivery = higher overhead = slower transmission rates

In a protected environment, we can count on the frame arriving at its destination. Fewer controls are needed, resulting in smaller fields and smaller frames. Less effort needed to ensure delivery = lower overhead = faster transmission rates



Media access control addressing and framing data

The Role of the Header

The Role of the Header



Media access control addressing and framing data

Logical Multi-Access Topology





The role of the trailer

START FRAME	ADDRESS	TYPE/ LENGTH	Data	Trailer	
				FCS	Stop Frame

The Frame Check Sequence field is used for error checking. The source calculates a number based on the frame's data and places that number in the FCS field. The destination then recalculates the data to see if the FCS matches. If they don't match, the destination deletes the frame.

START FRAME	ADDRESS	TYPE/ LENGTH	Data	Trailer	
				FCS	Stop Frame

The Stop Frame field, also called the Frame Trailer, is an optional field that is used when the length of the frame is not specified in the Type/Length field. It indicates the end of the frame when transmitted.











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