

CH. 5: Protocol Architecture

📄 OVERVIEW

- » Protocol reference model
- » Logical link layer (LLC)
- » Medium Access Control (MAC)
- » Bridges and Routers

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CH. 5: Protocol Architecture

📄 Layer 1: Physical Layer

- » Encoding/decoding of signals
- » Preamble generation/removal (for synchronization)
- » Bit transmission/reception

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Layer 2: Data Link Layer

- ✎ Provides reliable data transfer across the physical layer
 - » Provides one or more service access points (SAPs)
 - In IEEE 802 this task is provided by LLC
 - » Provides Flow Control
 - » Assemble data into frames with address and error-detection fields
 - » Provides Error Control
 - » Provides and controls access to transmission media

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Flow Control

- ✎ Sender does not flood the receiver, but maximizes throughput
- ✎ Sender throttled until receiver grants permission
- ✎ Example: Sliding Window

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Error Control

- ✍ Deliver frames without error, in the proper order to network layer
- ✍ Error control Mechanisms:
 - » Ack/Nak: Provide sender some feedback about other end
 - » Time-out: for the case when entire packet or Ack is lost
 - » Sequence numbers: to distinguish retransmissions from originals
- ✍ Example: Automatic Repeat Request (ARQ)

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IEEE 802 Standards

- ✍ 802.1 Network management and bridging
- ✍ 802.2 Logical link control
- ✍ 802.3 Ethernet (CSMA/CD)
- ✍ 802.4 Token Bus
- ✍ 802.5 Token Ring
- ✍ 802.6 DQDB
- ✍ 802.7 Broadband technical advisory group
- ✍ 802.8 Fiber-optic technical advisory group
- ✍ 802.9 Integrated data and voice
- ✍ 802.10 Security and privacy
- ✍ 802.11 Wireless LANs
- ✍ 802.14 Broadband Wireless Access

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IEEE LAN Standards

IEEE LAN defines two sublayers :

- » Logical Link Control (LLC)
- » Medium Access Control (MAC)

Why?

- » To support different transmission medium
- » To support different data rate
- » To allow control accesses to share channels among autonomous computers

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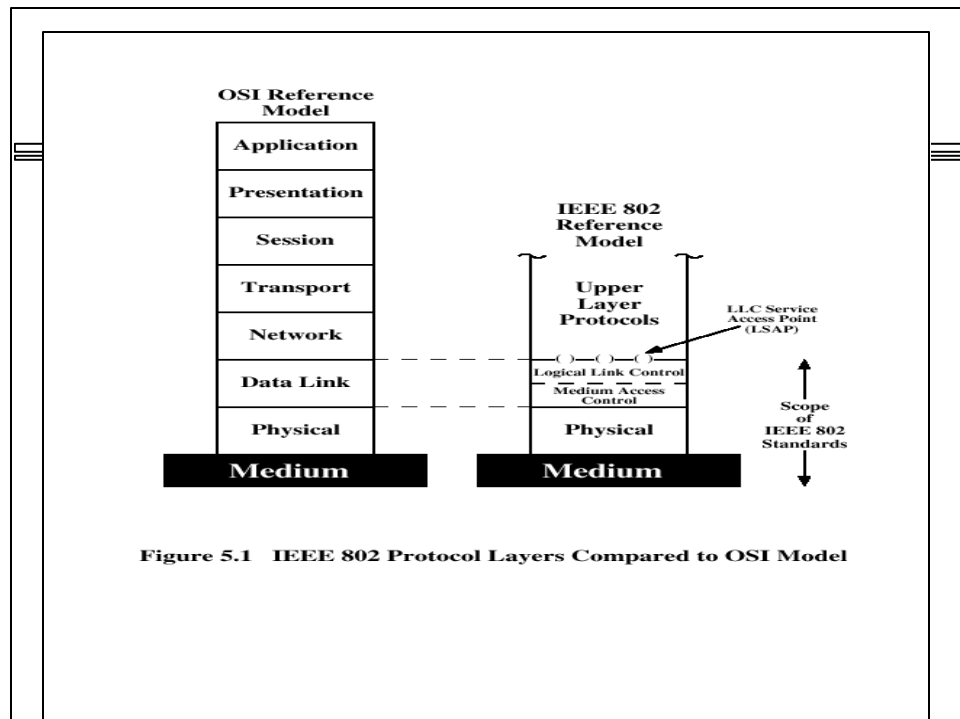


Figure 5.1 IEEE 802 Protocol Layers Compared to OSI Model

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LLC	IEEE 802.2 LLC Services: »Unacknowledged Connectionless »Acknowledge Connectionless »Connection-Oriented				
MAC	CSMA/CD MAC IEEE 802.3	Token-Bus MAC IEEE 802.4	Token-Ring MAC IEEE 802.5	MAN MAC IEEE 802.6	Token-Ring MAC FDDI
Phy	802.3 physical	802.4 physical	802.5 physical	802.6 physical	Optical fiber 100Mbps
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LLC Sublayer	
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<ul style="list-style-type: none"> ✎ Provides interface between the network layer and MAC ✎ Offers a common service access point (SAP) to all MAC sublayer protocols ✎ Fundamental Services: <ul style="list-style-type: none"> » Connectionless Service: No establishing overhead (real-time) » Connection-Oriented: establishing overhead » Multiplexing: 	
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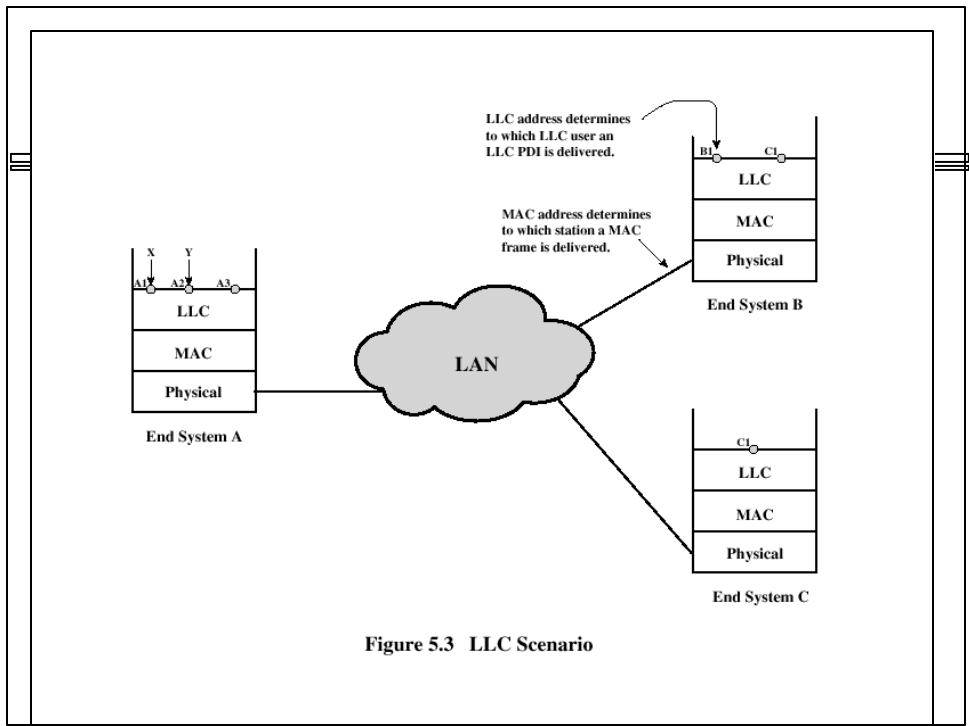


Figure 5.3 LLC Scenario