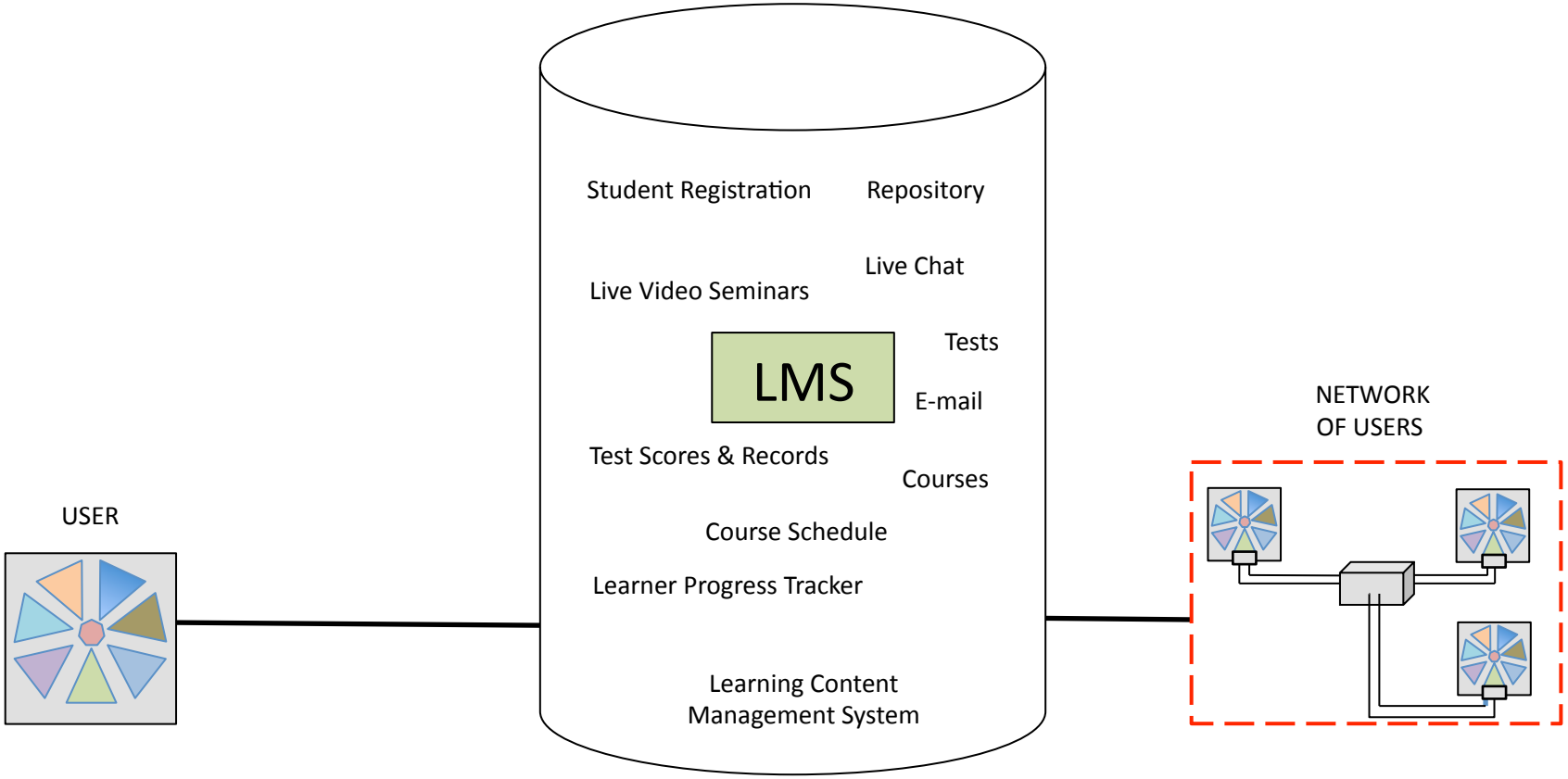
OSI Layers and the Learning Management System

Over view

A Learning Management System is an application located on a local network or the Internet, developed for the employment of electronic educational technology by students across distances from a building with multiple rooms to the world wide community.



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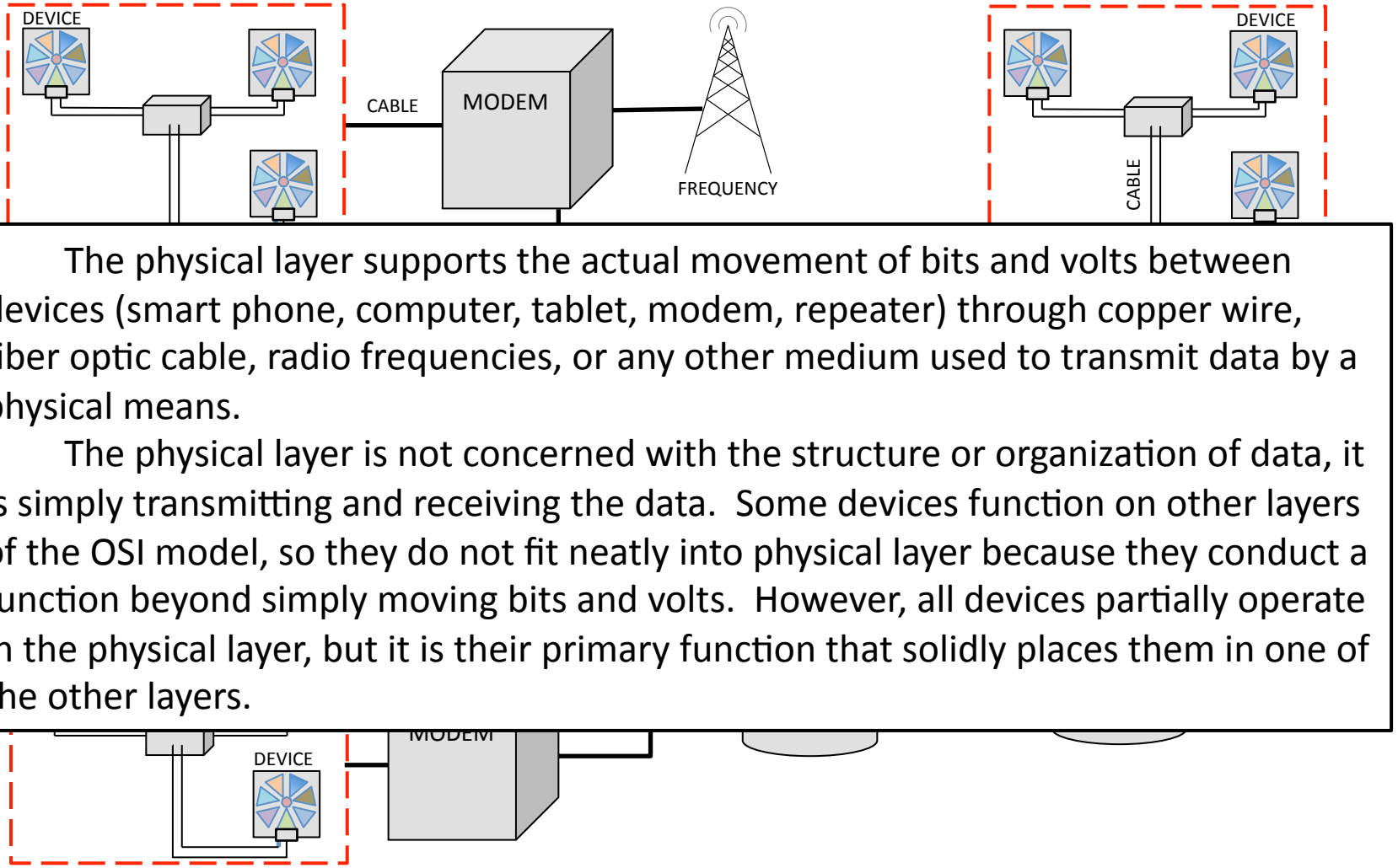
Physical Layer



The physical layer supports the actual movement of bits and volts between devices (smart phone, computer, tablet, modem, repeater) through copper wire, fiber optic cable, radio frequencies, or any other medium used to transmit data by a physical means.

The physical layer is not concerned with the structure or organization of data, it is simply transmitting and receiving the data. Some devices function on other layers of the OSI model, so they do not fit neatly into physical layer because they conduct a function beyond simply moving bits and volts. However, all devices partially operate in the physical layer, but it is their primary function that solidly places them in one of the other layers.

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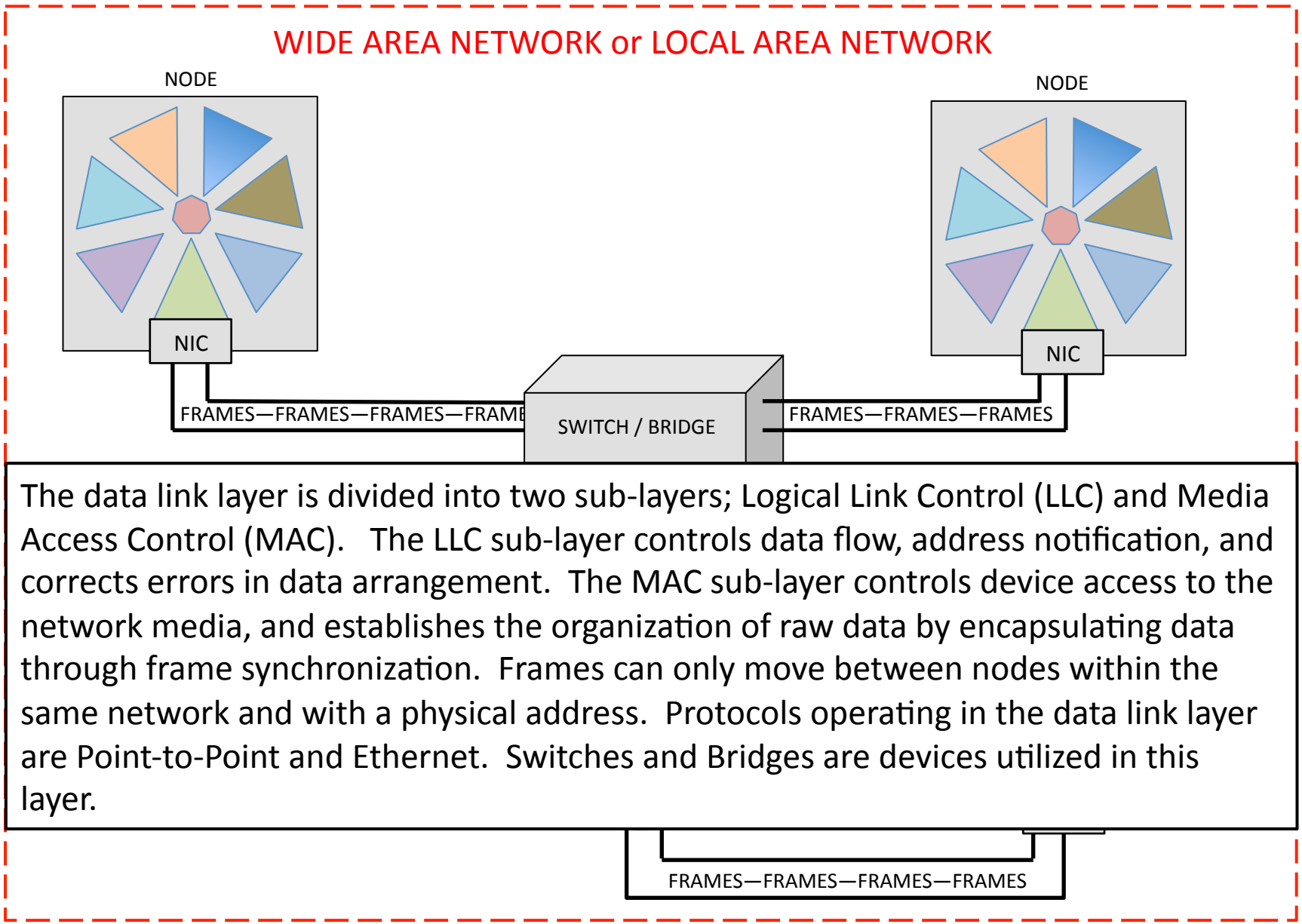
Data Link Layer



The data link layer is divided into two sub-layers; Logical Link Control (LLC) and Media Access Control (MAC). The LLC sub-layer controls data flow, address notification, and corrects errors in data arrangement. The MAC sub-layer controls device access to the network media, and establishes the organization of raw data by encapsulating data through frame synchronization. Frames can only move between nodes within the same network and with a physical address. Protocols operating in the data link layer are Point-to-Point and Ethernet. Switches and Bridges are devices utilized in this layer.

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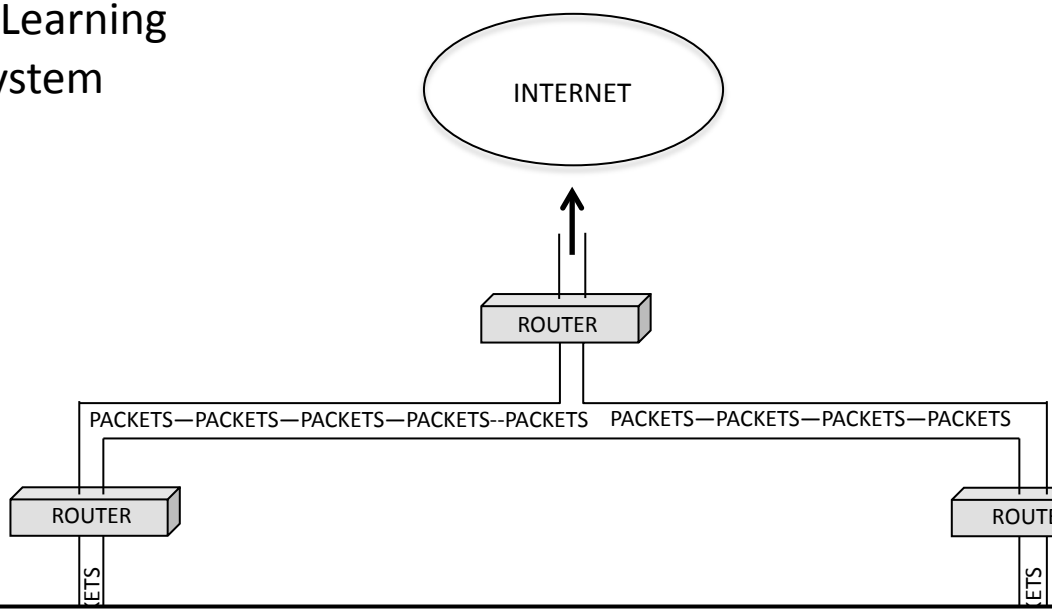
Network Layer



The network layer enables two or more networks to conduct end-to-end communications through data packets utilizing logical addresses. Some protocols utilized in the network layer are essentially the foundation of the Internet. Internet Protocol (IP) addresses and routes the packets throughout the network. The Internet Group Management Protocol (IGMP) enables multicasting, which permits one network to source many networks, exponentially increasing the sharing and streaming of data. The central device embedded in the network layer is the router, which permits the delivery of packets from the source device to a requesting node.

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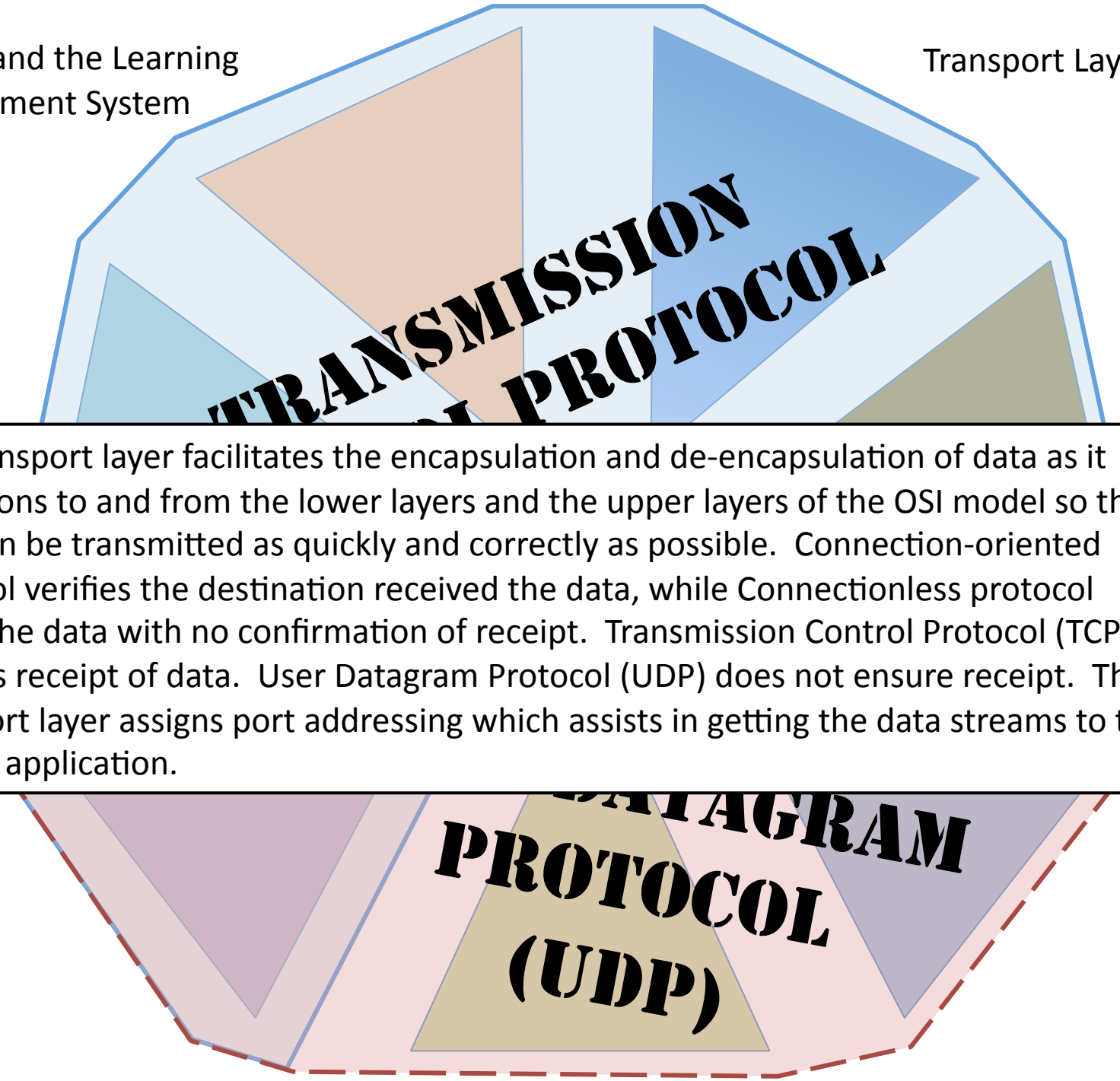
Transport Layer



The transport layer facilitates the encapsulation and de-encapsulation of data as it transitions to and from the lower layers and the upper layers of the OSI model so the data can be transmitted as quickly and correctly as possible. Connection-oriented protocol verifies the destination received the data, while Connectionless protocol sends the data with no confirmation of receipt. Transmission Control Protocol (TCP) ensures receipt of data. User Datagram Protocol (UDP) does not ensure receipt. The transport layer assigns port addressing which assists in getting the data streams to the correct application.

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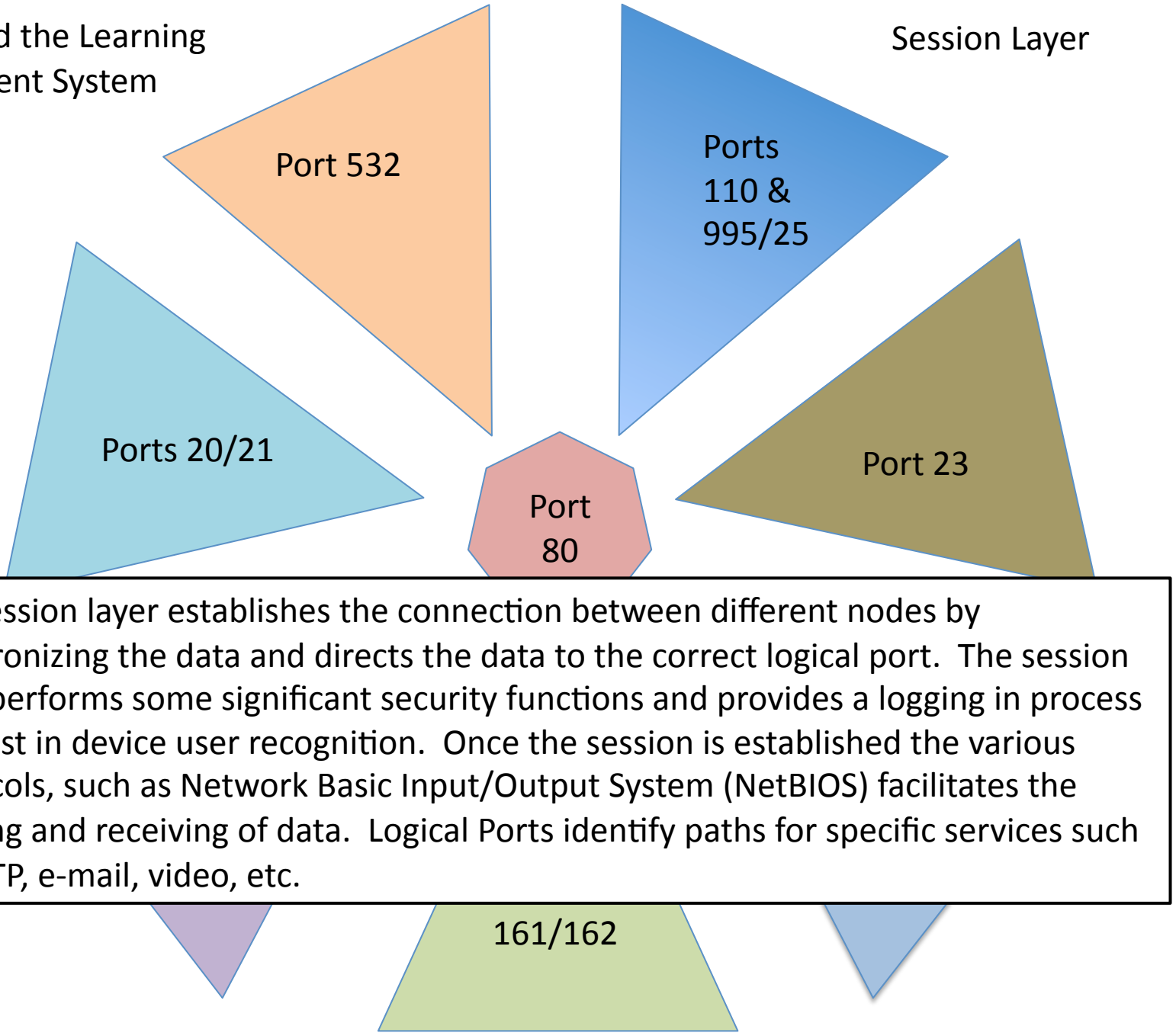
Session Layer



The session layer establishes the connection between different nodes by synchronizing the data and directs the data to the correct logical port. The session layer performs some significant security functions and provides a logging in process to assist in device user recognition. Once the session is established the various protocols, such as Network Basic Input/Output System (NetBIOS) facilitates the sending and receiving of data. Logical Ports identify paths for specific services such as HTTP, e-mail, video, etc.

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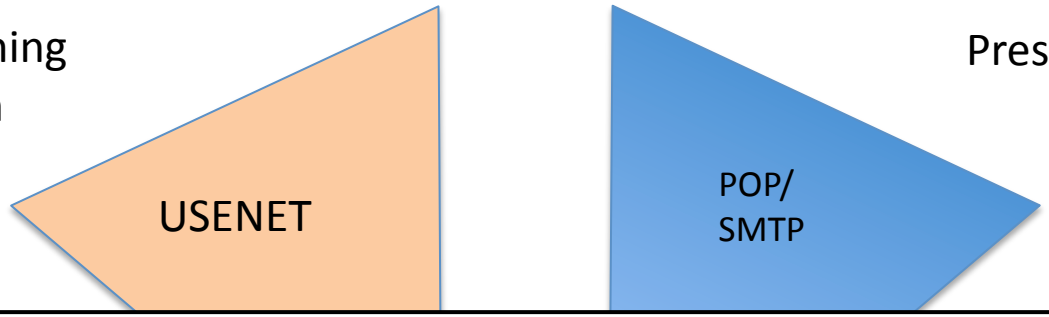
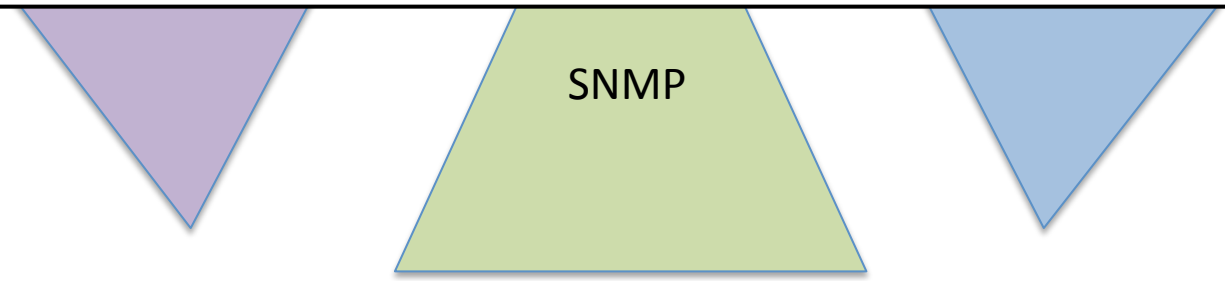
Presentation Layer



The presentation layer translates, compresses and encrypts data for the various applications.
POP = Post Office Protocol/SMTP = Simple Mail Transfer Protocol are mail servers
TELNET = is a terminal emulation program that permits a device to communicate with other servers
NFS = Network File System permits the uploading and storage of files on a server
SNMP = Simple Network Management Protocol manages the network and its devices
DNS = Domain Name Servers is the phonebook for IP addresses
FTP = File Transfer Protocol designed to transfer files from one host to another
USENET = A worldwide system for discussions and posting information, such as forums
HTTP = Hypertext Transfer Protocol is for distributing communication data throughout the Internet



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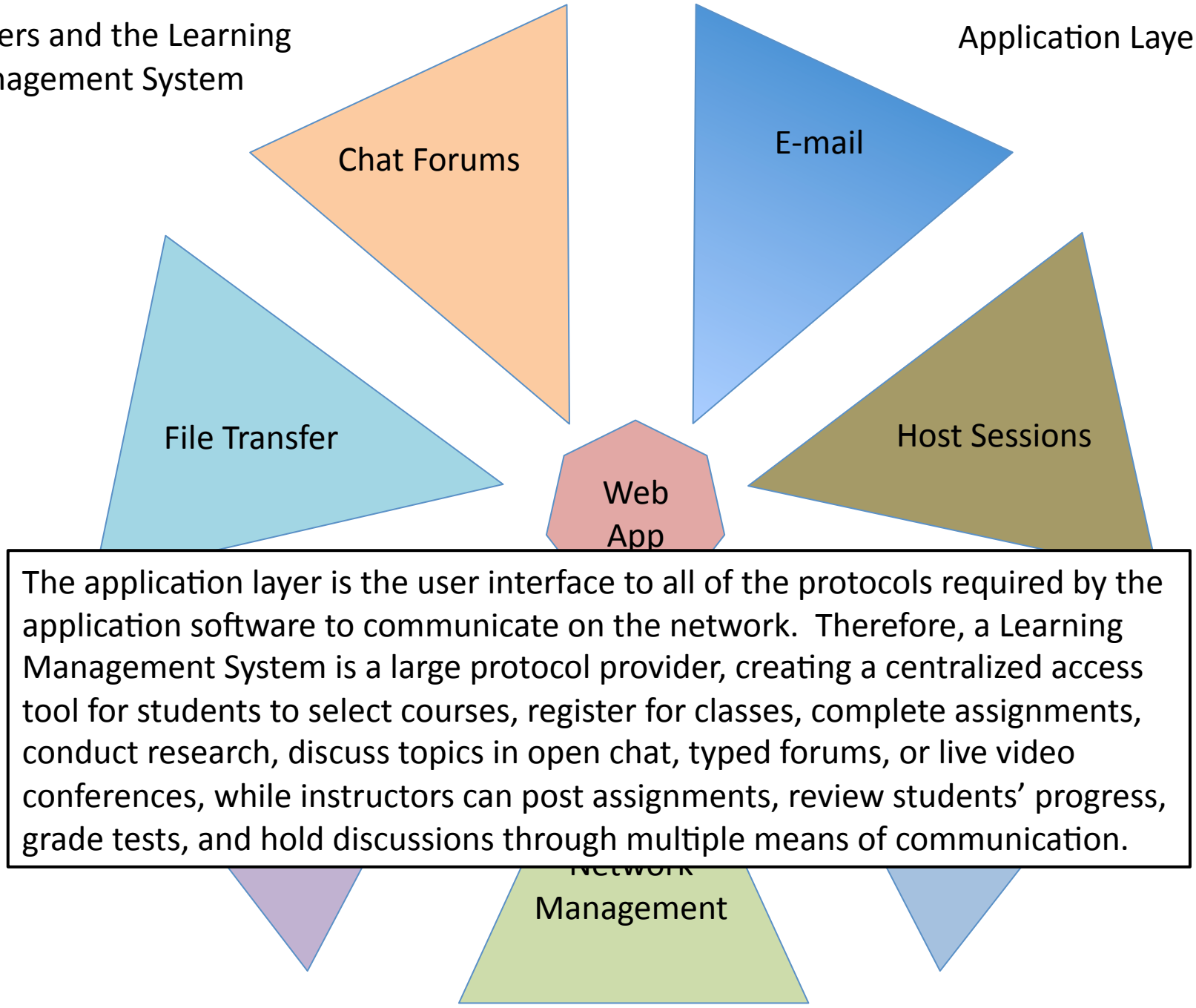
Application Layer



The application layer is the user interface to all of the protocols required by the application software to communicate on the network. Therefore, a Learning Management System is a large protocol provider, creating a centralized access tool for students to select courses, register for classes, complete assignments, conduct research, discuss topics in open chat, typed forums, or live video conferences, while instructors can post assignments, review students' progress, grade tests, and hold discussions through multiple means of communication.