The Seven Layers of the OSI Model

REFERENCE :

▶ What is OSI Model? full Explanation | Networking

The Open Systems Interconnection (OSI) Reference Model is a modular framework for developing standards that are based on a division of network operations into seven, sets of network services. Most of the functionality in the OSI model exists in all communications systems, although two or three OSI layers may be incorporated into one.

Example of how the OSI Layers work using an email sent from the computer on the left. Data travels from the sending computer down through all the layers to the physical layer where the data is put onto the network cabling, and then sent to the physical layer of the receiving computer where the process reverses and the data travels up through the layers to the application layer of the receiving computer.

E-mail sent from John: Meet me at Carl's 1:30 John		E-mail received from John: Meet me at Carl's 1:30 John
Identifyavailable? sender and intended receiver there an e-mail application	**APPLICATION** **layer 7**	Identified sender and intended receiver; found e-mail application.
Encode data with X coding key; use ASCII characters.	**PRESENTATION** **layer 6**	Decoded data with X decoding key; used ASCII characters.
Initiate and terminate the session according to X protocol.	**SESSION** **layer 5**	Initiated and terminated the session according to X protocol.
Make sure all data is sent intact.	**TRANSPORT**	Make sure all data has arrived intact.

	layer 4	
Keep track of how many hops; open shortest path First; Go to IP address 255.65.0.123	**NETWORK** **layer 3**	Keep track of how many hops; opened the shortest path First; Went to IP address 255.65.0.123
Is the initial connection set up? Put data into frames according to X standard.	**DATA LINK** **layer 2**	The initial connection set up. Decoded data in frame according to X standard.
Send as electrical signal over the network cable at X voltage, and X Mbps.	**PHYSICAL** **layer 1**	Receive electrical signal over the network cable at X voltage, and X Mbps.

* A look at each of the OSI layers , and the role it plays.

APPLICATION layer 7	Gives user applications access to network. This layer represents the services, that directly support the user applications such as software for file transfers, database access, and E-mail
PRESENTATION layer 6	The presentation layer, usually part of an operating system, converts incoming and outgoing data from one presentation format to another. Presentation layer services include data encryption and text compression.
SESSION layer 5	Opens manages, and closes conversations between two computers. It performs name recognition and the functions such as security, needed to allow two applications to communicate over the network, also provides error handling.
TRANSPORT layer 4	This layer provides transparent transfer of data between end systems, or hosts, and is responsible for end-to-end error recovery and flow control. It ensures complete data transfer. Sequences data packets, and requests retransmission of missing packets. It also repackages messages for more efficient transmission over the network.
NETWORK layer 3	Establishes, maintains and terminates network connections. Routes data packets across network segments. Translates logical addresses and names into physical addresses.
DATA LINK layer 2	Transmits frames of data from computer to computer on the same network segment. Ensures the reliability of the physical link established at layer 1. Standards define how data frames are recognized and provide the necessary flow control and error handling at the frame set. The data link layer is divided into two sublayers: The Media Access Control (MAC) layer and the Logical Link Control (LLC) layer. The MAC sublayer controls how a computer on the network gains access to the data and permission to transmit it. The LLC layer controls frame synchronization, flow control and error checking.

PHYSICAL layer 1	The Physical layer defines all the electrical and physical specifications for devices. This includes the layout of pins, voltages, and cable specifications. Hubs, repeaters and network adapters are physical-layer devices. Defines cabling and connections. Transmits data over the physical media.

Some common network devices and protocols and where they are implemented in the OSI model.

OSI LAYER	DEVICES	PROTOCOLS
APPLICATION layer 7		SNMP, SMTP, FTP, TELNET, HTTP, NCP, SMB, AppleTalk
PRESENTATION layer 6		NCP, AFP, TDI
SESSION layer 5		NetBIOS
TRANSPORT layer 4		NetBEUI, TCP, SPX, NWlink
NETWORK layer 3	Routers, layer 3 (or IP) switches.	IP, IPX, NWlink, NetBEUI
DATA LINK layer 2	Bridges and switches, Ethernet incorporates both this layer and the Physical layer.	-
PHYSICAL layer 1	Hubs, repeaters, network adapters, Parallel SCSI buses. Various physical-layer Ethernet incorporates both this layer and the data-link layer. Token ring, FDDI, and IEEE 802.11.	-