

7-Layer OSI Protocol Stack

Created by ISO – the International Standards Organization

OSI – Open Systems Interconnect

The original intention was that this model would be used. However, it was used in the creation of other models, such as TCP/IP.

As data is passed down the protocol stack, more and more junk gets added on to it.

Application Layer

Network redirector – intercepts system requests. Passes request either to the disk OS (local device) or down the protocol stack.

The network redirector + the network application (e-mail, IM, browser, FTP, etc.) make up the application layer.

Presentation Layer

Ensures that information that being sent is readable by the receiving application. Ex: removal of control characters. Raw data is passed on to the layer below.

Session Layer

Port addresses are added on to the stripped file passed to it from the presentation layer.

Manages things like logon and password verification.

Transport Layer

Takes the data passed down to it and breaks the data up into *segments* of appropriate size for transmission across the network. Sequence numbers will likely be attached to the segments.

When receiving, it is the transport layer's responsibility to put the segments in the proper sequence.

Guarantees that error-free data is being received and can provide error control.

Flow control. Every time a receiver receives a packet, it sends a special control / status command back to the transmitter. This is called an ACK. Every time a packet is sent, it starts up a timer. If it does not receive the ACK back from the receiver before the timer times out, it will resend the packet.

This is the layer at which the TCP protocol could be implemented. TCP is a connection oriented protocol. Before beginning transmission data to the receiving end, handshaking must occur.

UDP is a connectionless protocol. It doesn't need to establish a link between the two ends – it just starts sending the data.

Network Layer

Adds hardware addresses. For example: IP address. This is used for computer to computer data transfers.

The data is broken down further into *datagrams*. Additional header information is added to the data.

Routers operate here.

Protocols at this layer are connectionless. Example: IP protocol (Internet Protocol).

Data Link Layer

More concerned with communication between local computers - devices that are on the same network.

MAC addresses are added to the header at this layer.

Protocols include: Ethernet, Token Ring, HDLC (High level data link control)

HDLC is by far the most complicated of protocols. It has flow control and error control built in.

Physical Layer

Connects the computer to the network. We'll spend a significant amount of time here.

Determines things like what kind of cable is needed – wireless, twisted pair, fiber, coax, etc.

Treats the data as a bunch of bits. Doesn't care what it means. Doesn't try to interpret it. Manchester Encoding is done here.