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# The OSI 7 Layer Model for Network Protocol

As we have pointed out already there is a real need for a communication protocol to established. There is clearly a need for a ***standardised*** protocol in the global context on networking -- otherwise the Internet could not exist in its current form.

Networking protocols need to be established for low level computer communication up to how application programs communicate. Each ***step*** in this protocol is called a ***layer***.

The International Standards Organisation (ISO) defines a ***7 layer model*** for network communication protocol. The model is more formally called the Open Systems Interconnection (OSI) model. This should exist in any network.

The advantage of breaking down the protocol into layers is twofold:

- Each layer can be regarded as a ***black box***.
  - Well defined inputs and outputs exist, **but**
  - The Inner workings of the layer can be regarded as being independent
  - **Thus**, New versions, updates or better methods can be written without affecting the whole system.
  - Network is ***Future Proofed*** to a great extent.
  - Benefits passed on to whole network.
- Communication need only take place at the layer appropriate for the task.

The OSI model consists of 7 layers. The seven layers must be organised in the specified order:

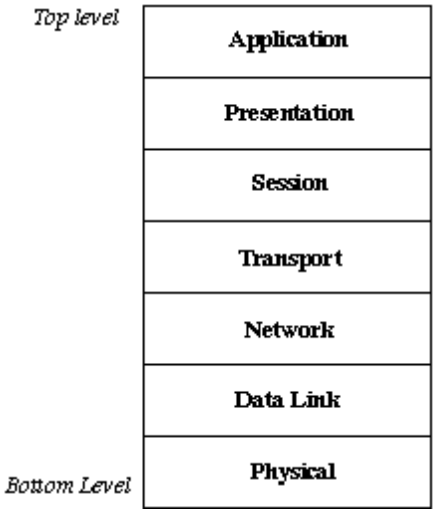


**Figure: The OSI 7 Layer Model**

The function of each layer (from bottom to top) is:

**Physical**
-- The interface between the medium and the device. The layer transmits bits (ones and zeros) and defines how the data is transmitted over the network, what control signals are used and the mechanical properties of the network (Cable size, connector for example.

**Data Link**
-- Provides low-level error detection and correction. For example if a packet is corrupted this layer is responsible for retransmitting the packet.

**Network**
-- Responsible for routing packets of data across the network. For example, a large email file will be divided up into ***packets***, each packet addressed and sent out at this layer.

**Transport**
-- An intermediate layer that higher layers use to communicate to the network layer. This layer hides the complexities of low-level networking communication from the higher levels.

**Session**
-- The User's (transparent) interface into the network. The layer manages the ``current'' connection (or session) to the network. Note: In packet-switched network a full-time network connection does exist, even though it may seem so. The Session layer keeps the communication flowing.

**Presentation**
-- Ensures computers speak the same language. They convert text to ASCII or EBCDIC form and also encode or decode binary data for transport.

**Application**
-- The programs you use directly may need to communicate.

E.g a file transfer or email program.

**Some Example Internet Protocols**

- Token ring -- low level network message passing.
- Telnet
- File Transfer Protocol (FTP)
- Archie -- FTP search
- Simple Mail Transfer Protocol (SMTP), Post-Office Protocol version 3 (POP3), IMAP -- email protocols
- Gopher - menu-based information, veronica
- WAIS - wide-area info server
- HTTP -- Hypertext Transfer Protocol basis of World Wide Web

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