

The ISO-OSI Communication Model

As part of an effort to standardize communication protocols, The International Standards Organization (ISO) has defined a protocol stack with seven layers called the Open Systems Interconnect (OSI). The layers are

1. Physical: the network interface hardware, including connectors, signaling conventions, etc.
2. Data link: flow control over a single link, buffering, and error correction. Higher levels can assume a reliable communication medium.
3. Network: routing. This is the top layer used in intermediate routing nodes. Higher levels need not know anything about the network topology.
4. Transport: packetization and end-to-end verification. If a node fails along the way, the end-to-end checks will rectify the situation and re-send the required packet. Higher levels can assume a reliable connection.
5. Session: control over the dialog between end stations (often unused).
6. Presentation: handling the representation of data, e.g. compression and encryption.
7. Application: an interface for applications providing generally useful services, e.g. distributed database support, file transfer, and remote login.

In the context of operating systems, the most important are the routing and transport functions. In practice, the TCP/IP protocol suite became a de-facto standard before the OSI model was defined. It actually handles the central part of the OSI stack.

application	application
presentation	
session	TCP/UDP
transport	
network	IP
data link	network access
physical	physical

To read more: The OSI model is described briefly in Silberschatz and Galvin [1] section 15.6. Much more detailed book-length descriptions were written by Tanenbaum [3] and Stallings [2].

Bibliography

- [1] A. Silberschatz and P. B. Galvin, *Operating System Concepts*. Addison-Wesley, 5th ed., 1998.
- [2] W. Stallings, *Data and Computer Communications*. Macmillan, 4th ed., 1994.
- [3] A. S. Tanenbaum, *Computer Networks*. Prentice-Hall, 3rd ed., 1996.