

Internet protocols: OSI & TCP/IP models

We can think of a computer as having several layers of operation, with the hardware at the bottom, the applications at the top and the operating system in the middle connecting the two. The layers are interlinked but also have a degree of independence. Applications, such as the Firefox browser, can run on various operating systems, and different operating systems, such as Windows or Linux, can run on different types of hardware. Computer networks also operate in layers in a similar way. The two main models for computer networks are OSI (Open Systems Interconnect) and TCP/IP (Transmission Control Protocol / Internet Protocol)

The OSI model, dating back to 1984, was based on an internationally agreed set of standards. It was away of making all kinds of different computers and networks able to interact with one another, a major problem at the time when most hardware made by a particular manufacturer only worked with other equipment from the same firm. In the OSI model the computer network has seven layers. The lower layers are closer to the hardware; the higher levels are closer to the human users.

Application. The level closest to the user, this includes things like e-mail programs, which use the network in a way that is meaningful to human users and their immediate objectives.

Presentation. This translates data produced by user-friendly applications into computer-friendly formats that are sent over the network. It can include things like compression of data, encryption or conversion of data between different character sets.

Session. This controls how different devices on the network establish temporary 'conversations' (sessions) so that they can exchange information.

Transport This controls how data is moved across the network in an efficient and reliable manner, ensuring all the bits of a given message are correctly delivered.

Network. This is concerned with how data is addressed and routed from one device to another.

Data link. This covers things like how data is packaged and how errors are detected and corrected.

Physical. This refers to the basic hardware of the network, including cables and connections, and how devices are linked up into a particular network arrangement (e.g. ring, bus etc.).