

Short note on TCP/IP

The full name of TCP/IP is Transmission Control Protocol/Internet Protocol. And as name suggest it is responsible for transmission and internet protocol controlling.

TCP/IP is generally described as having four abstraction layers. The top most layers near the top are logically closer to the user application, while same thing true for those layers which near the bottom are logically closer to the physical transmission of the data.

In bellow I discussed on each layer in the TCP/IP networking model starting from the lowest level.

Link Layer. It is the networking scope of the local network connection to which a host is attached. This regime is called the link in Internet literature. This is the lowest component layer of the Internet protocols. The Link Layer is used to move packets between the Internet Layer interfaces of two different hosts on the same link.

Internet Layer. It originally defined; the Internet layer (or Network Layer) solves the problem of getting packets across a single network. With the advent of the concept of internetworking, additional functionality was added to this layer, namely getting data from the source network to the destination network. In the Internet Protocol Suite, IP performs the basic task of getting packets of data from source to destination. IP can carry data for a number of different upper layer protocols.

Transport Layer. This Layer's responsibilities include end-to-end message transfer capabilities independent of the underlying network, along with error control, fragmentation and flow control. The Transport Layer can be thought of literally as a transport mechanism e.g. a vehicle whose responsibility is to make sure that its contents reach its destination safely and soundly, unless a higher or lower layer is responsible for safe delivery. The Transport Layer provides this service of connecting applications together through the use of ports. Since IP provides only a best effort delivery, the Transport Layer is the first layer of the TCP/IP stack to offer reliability. Note that IP can run over a reliable data link protocol such as the High-Level Data Link Control (HDLC). Protocols above transport, such as RPC, also can provide reliability.

For example, TCP is a connection-oriented protocol that addresses numerous reliability issues to provide a reliable byte stream:

- data arrives in-order
- data has minimal error (i.e. correctness)
- duplicate data is discarded
- lost/discarded packets are resent
- includes traffic congestion control

Application layer. It is a most essential which refers to the higher-level protocols used by most applications for network communication. Examples of application layer protocols include the File Transfer Protocol (FTP) and the Simple Mail Transfer Protocol (SMTP). Data coded according to application layer protocols are then encapsulated into one or (occasionally) more transport layer protocols (such as the Transmission Control Protocol (TCP) or User Datagram Protocol (UDP)), which in turn use lower layer protocols to effect actual data transfer.

Application Layer protocols generally treat the transport layer (and lower) protocols as "black boxes" which provide a stable network connection across which to communicate.