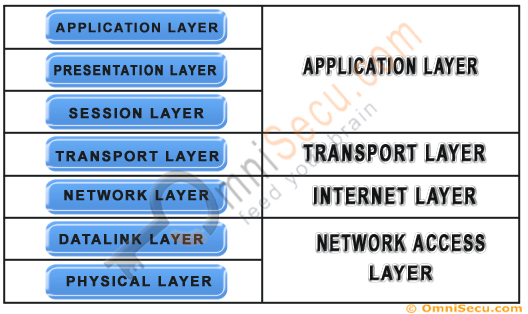
**What Is TCPI / IP (Protocol Architecture)?**

TCP/IP Protocol Architecture

TCP/IP protocols map to a four-layer conceptual model known as the DARPA model, named after the U.S. government agency that initially developed TCP/IP. The four layers of the DARPA model are: Application, Transport, Internet, and Network Interface. Each layer in the DARPA model corresponds to one or more layers of the seven-layer Open Systems Interconnection (OSI) model.

Like [OSI network model](http://www.omnisecu.com/tcpip/osi-model.php), TCP/IP also has a network model. TCP/IP was on the path of development when the OSI standard was published and there was interaction between the designers of [OSI](http://www.omnisecu.com/tcpip/osi-model.php) and TCP/IP standards. The TCP/IP model is not same as [OSI model](http://www.omnisecu.com/tcpip/osi-model.php). [OSI](http://www.omnisecu.com/tcpip/osi-model.php) is a seven-layered standard, but TCP/IP is a four layered standard. The model has been very influential in the growth and development of TCP/IP standard, and that is why much OSI terminology is applied to TCP/IP. The following figure compares the TCP/IP and OSI network models.



Comparison between seven layer OSI and four layer TCP/IP Models

As we can see from the above figure, presentation and session layers are not there in TCP/IP model. Also note that the [Network Access Layer](http://www.omnisecu.com/tcpip/network-access-layer.php) in TCP/IP model combines the functions of Datalink Layer and Physical Layer.

Layer 4. Application Layer

[Application layer](http://www.omnisecu.com/tcpip/application-layer.php) is the top most layer of four layer TCP/IP model. Application layer is present on the top of the [Transport layer](http://www.omnisecu.com/tcpip/transport-layer.php). Application layer defines TCP/IP application protocols and how host programs interface with [Transport layer](http://www.omnisecu.com/tcpip/transport-layer.php) services to use the network.

Application layer includes all the higher-level protocols like DNS (Domain Naming System), [HTTP (Hypertext Transfer Protocol)](http://www.omnisecu.com/tcpip/http-hypertext-transfer-protocol-what-is-http.php), Telnet, [SSH](http://www.omnisecu.com/ccna-security/how-to-configure-cisco-router-switch-to-enable-ssh-and-how-to-connect-cisco-router-switch-using-ssh.php), FTP (File Transfer Protocol), TFTP (Trivial File Transfer Protocol), SNMP (Simple Network Management Protocol), [SMTP (Simple Mail Transfer Protocol)](http://www.omnisecu.com/tcpip/smtp-simple-mail-transfer-protocol-how-smtp-works.php) , [DHCP (Dynamic Host Configuration Protocol)](http://www.omnisecu.com/tcpip/dhcp-dynamic-host-configuration-protocol-how-dhcp-works.php), X Windows, RDP (Remote Desktop Protocol) etc.

Layer 3. Transport Layer

[Transport Layer](http://www.omnisecu.com/tcpip/transport-layer.php) is the third layer of the four layer TCP/IP model. The position of the [Transport layer](http://www.omnisecu.com/tcpip/transport-layer.php) is between [Application layer](http://www.omnisecu.com/tcpip/application-layer.php) and [Internet layer](http://www.omnisecu.com/tcpip/internet-layer.php). The purpose of [Transport layer](http://www.omnisecu.com/tcpip/transport-layer.php) is to permit devices on the source and destination hosts to carry on a conversation. [Transport layer](http://www.omnisecu.com/tcpip/transport-layer.php) defines the level of service and status of the connection used when transporting data.

The main protocols included at Transport layer are [TCP (Transmission Control Protocol)](http://www.omnisecu.com/tcpip/transmission-control-protocol-tcp.php) and [UDP (User Datagram Protocol)](http://www.omnisecu.com/tcpip/udp-user-datagram-protocol.php).

Layer 2. Internet Layer

[Internet Layer](http://www.omnisecu.com/tcpip/internet-layer.php) is the second layer of the four layer TCP/IP model. The position of [Internet layer](http://www.omnisecu.com/tcpip/internet-layer.php) is between [Network Access Layer](http://www.omnisecu.com/tcpip/network-access-layer.php) and [Transport layer](http://www.omnisecu.com/tcpip/transport-layer.php). [Internet layer](http://www.omnisecu.com/tcpip/internet-layer.php) pack data into data packets known as [IP datagrams](http://www.omnisecu.com/tcpip/internet-layer.php), which contain source and destination address (logical address or IP address) information that is used to forward the datagrams between hosts and across networks. The [Internet layer](http://www.omnisecu.com/tcpip/internet-layer.php) is also responsible for routing of [IP datagrams](http://www.omnisecu.com/tcpip/internet-layer.php).

Packet switching network depends upon a connectionless internetwork layer. This layer is known as [Internet layer](http://www.omnisecu.com/tcpip/internet-layer.php). Its job is to allow hosts to insert packets into any network and have them to deliver independently to the destination. At the destination side data packets may appear in a different order than they were sent. It is the job of the higher layers to rearrange them in order to deliver them to proper network applications operating at the Application layer.

The main protocols included at [Internet layer](http://www.omnisecu.com/tcpip/internet-layer.php) are [IP (Internet Protocol)](http://www.omnisecu.com/tcpip/internet-layer.php), [ICMP (Internet Control Message Protocol)](http://www.omnisecu.com/tcpip/internet-control-message-protocol-icmp.php), [ARP (Address Resolution Protocol)](http://www.omnisecu.com/tcpip/address-resolution-protocol-arp.php), RARP (Reverse Address Resolution Protocol) and IGMP (Internet Group Management Protocol).

Layer 1. Network Access Layer

[Network Access Layer](http://www.omnisecu.com/tcpip/network-access-layer.php) is the first layer of the four layer TCP/IP model. [Network Access Layer](http://www.omnisecu.com/tcpip/network-access-layer.php) defines details of how data is physically sent through the network, including how bits are electrically or optically signaled by hardware devices that interface directly with a network medium, such as coaxial cable, optical fiber, or twisted pair copper wire.

The protocols included in [Network Access Layer](http://www.omnisecu.com/tcpip/network-access-layer.php) are [Ethernet](http://www.omnisecu.com/basic-networking/lan-technologies-ethernet.php), [Token Ring](http://www.omnisecu.com/basic-networking/lan-technologies-token-ring.php), [FDDI](http://www.omnisecu.com/basic-networking/lan-technologies-fibre-distributed-data-interface-fddi.php), X.25, Frame Relay etc.

The most popular LAN architecture among those listed above is [Ethernet](http://www.omnisecu.com/basic-networking/lan-technologies-ethernet.php). Ethernet uses an [Access Method](http://www.omnisecu.com/basic-networking/network-access-methods.php) called CSMA/CD (Carrier Sense Multiple Access/Collision Detection) to access the media, when Ethernet operates in a [shared media](http://www.omnisecu.com/cisco-certified-network-associate-ccna/what-are-collision-domain-and-broadcast-domain.php). An [Access Method](http://www.omnisecu.com/basic-networking/network-access-methods.php)determines how a host will place data on the medium.

IN [CSMA/CD Access Method](http://www.omnisecu.com/basic-networking/network-access-methods.php), every host has equal access to the medium and can place data on the wire when the wire is free from network traffic. When a host wants to place data on the wire, it will check the wire to find whether another host is already using the medium. If there is traffic already in the medium, the host will wait and if there is no traffic, it will place the data in the medium. But, if two systems place data on the medium at the same instance, they will collide with each other, destroying the data. If the data is destroyed during transmission, the data will need to be retransmitted. After [collision](http://www.omnisecu.com/cisco-certified-network-associate-ccna/what-are-collision-domain-and-broadcast-domain.php), each host will wait for a small interval of time and again the data will be retransmitted.

In this lesson, you have learned about the four layers of [TCP/IP model](http://www.omnisecu.com/tcpip/tcpip-model.php) and the comparison between four layered TCP/IP model and seven layered [OSI model](http://www.omnisecu.com/tcpip/osi-model.php).