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## TCP/IP and the OSI Model

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<i>OSI Model Layer</i>	<i>TCP/IP Protocol(s)</i>
Upper Layers	Telnet, FTP, SMTP, POP3, IMAP and HTTP
Transport Layer	TCP, DNS and UDP
Network Layer	IP, ICMP, ARP, OSPF and RIP
Data Link Layer	NIC driver and ODI/NDIS
Physical Layer	Physical hardware device connectivity

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The TCP/IP suite protocols included are:

- **Telnet:** A terminal emulation program for TCP/IP networks.
  - **FTP (File Transfer Protocol):** The protocol used to transfer files to and from a server running the FTP client software.
  - **SMTP (Simple Mail Transfer Protocol):** Provides the foundation services for email transfer across the Internet. SMTP makes sure that email messages are delivered from the sender's server to the addressee's server.
  - **POP3 (Post Office Protocol):** Protocol used in downloading email messages from the mail server to the client computer, and is used mainly when email is retrieved mainly at one particular computer.
  - **IMAP (Interactive Mail Access Protocol):** Unlike the POP3 protocol, the IMAP protocol is used when email is to remain on the mail server until expressly deleted, allowing a user to gain access to their email from any workstation on the network.
  - **HTTP (Hypertext Transfer Protocol):** The protocol used and popularized by web browsers for transferring web pages encoded in HTML (Hypertext Markup Language).
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- **TCP (Transmission Control Protocol):** The primary TCP/IP transport protocol that accepts messages from the upper OSI layers and provides reliable delivery to its TCP peer on a remote network. TCP operates at the Transport layer.
  - **DNS (Domain Naming System):** A Transport layer Internet name-to-address resolution service that allows users to use human-friendly names.
  - **UDP (User Datagram Protocol):** Another Transport layer protocol that can be used in place of TCP to transport simple single-packet messages.

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- **IP (Internet Protocol):** A Network layer protocol that provides source and destination addressing and routing.
  - **ICMP (Internet Control Message Protocol):** A Network layer protocol that carries control messages, such as error or confirmation messages.
  - **ARP (Address Resolution Protocol):** A Network layer protocol that converts IP addresses to MAC physical addresses.
  - **OSPF (Open Shortest Path First):** Used by TCP/IP routers to determine the best path through a network.
  - **RIP (Routing Information Protocol):** Helps TCP/IP routers to use the most efficient routes to nodes on the network.

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- **ODI/NDIS (Open Data-Link Interface/Network Driver-Interface Specifications):** A Data Link layer interface that enables NIC drivers to connect to dissimilar networks and have them appear as one. ODI is the Novell protocol, and NDIS is the Microsoft protocol for NIC inter-connection.