





| | Range | Bandwidth (Mbps) | Latency (ms) |
|--------------|-------------|------------------|--------------|
| SAN | 1-10 m | 1000-10000 | 0.01-10 |
| LAN | 1-2 kms | 10-1000 | 1-10 |
| WAN | worldwide | 0.010-600 | 100-500 |
| MAN | 2-50 kms | 1-150 | 10 |
| Wireless LAN | 0.15-1.5 km | 2-11 | 5-20 |
| Wireless WAN | worldwide | 0.010-2 | 100-500 |
| Internet | worldwide | 0.010-2 | 100-500 |





















OSI protocol summary

| Layer | Description | Examples |
|--------------|---|--|
| Application | Protocols that are designed to meet the communication requirements of specific applications, often defining the interface to a service. | HTTP, FTP, SMTP CORBA IIOP |
| Presentation | Protocols at this level transmit data in a network representation that is independent of the representations used in individual computers, which may differ. Encryption is also performed in this layer, if required. | Secure Sockets (SSL),CORBA Data Rep. |
| Session | At this level reliability and adaptation are performed, such as detection of failures and automatic recovery. | |
| Transport | This is the lowest level at which messages (rather than packets) are handled. Messages are addressed to communication ports attached to processes, Protocols in this layer may be connection-oriented or connectionless. | TCP, UDP |
| Network | Transfers data packets between computers in a specific network. In a WAN or an internetwork this involves the generation of a route passing through routers. In a single LAN no routing is required. | IP, ATM virtual circuits |
| Data link | Responsible for transmission of packets between nodes that are directly connected by a physical link. In a WAN transmission is between pairs of routers or between routers and hosts. In a LAN it is between any pair of hosts. | Ethernet MAC, ATM cell transfer, PPP |
| Physical | The circuits and hardware that drive the network. It transmits sequences of binary data by analogue signalling, using amplitude or frequency modulation of electrical signals (on cable circuits), light signals (on fibre optic circuits) or other electromagnetic signals (on radio and microwave circuits). | Ethernet base- band signalling, ISDN |



























