

OSI AND TCP LAYERED MODELS

ISO/OSI

#	Layer	Function	PDU/Protocols	Hardware
7	Application	Provides services to the software through which the user requests network services	Data/HTTP, WWW, FTP, Telnet, SMTP	
6	Presentation	This layer is concerned with data representation session between computers	Data/ASCII, EBCDIC, MIDI, MPEG, JPEG	
5	Session	Establishes, maintains, and manages the communication session between computers	Data/SQL, RPC	
4	Transport	Provides for the reliable transmission of data segments, as well as the disassembly and assembly of the data before and after transmission	Segment/TCP or UDP	
3	Network	This is the layer on which routing takes place. The Network layer defines the processes used to route data across the network and the structure and use of logical addressing	Packet/IP, ICMP, ARP, PING, Traceroute	Routers
2	Data Link	This layer is concerned with the linkages and mechanisms used to move data about the network, including the topology, such as Ethernet or Token Ring, and deals with the ways in which data is reliably transmitted. The data link layer is divided into two sub layers: The MAC and LLC. The MAC sub layer controls how a computer on the network gains	Frame/IEEE 802.2, 802.3, 802.5	Network Interface Cards, Ethernet and Token Ring switches, Bridges

		access to the data and permission to transmit it. The LLC layer controls frame synchronization, flow control and error checking		
1	Physical	This layer defines the electrical and physical specifications for the networking media that carry the data bits across a network.	Bits/IEEE 802.2,802.5 ,Fast Ethernet, RS232, ATM	Wires, connector/pin assignments, network adapter, repeater, network hub, modem, wireless system components, parallel SCSI, Fiber Media Converter, Network Interface Cards

- The OSI (Open Systems Interconnection) model is a conceptual model that characterizes and standardizes the internal functions of a communication system by partitioning it into abstraction layers. The model is a product of the OSI project at the International Organization for Standardization (ISO).

TCP/IP

#	Layer	Function	PDU/Protocols	Hardware
4	Application	This layer is comparable to the application, presentation, and session layers of the OSI model all combined into one. It provides a way for applications to have access to networked services. This layer also contains the high level protocols	Data/FTP, HTTP, SMTP, DNS, TFTP	
3	Transport	This layer acts as the delivery service used by the application layer	Segment/TCP, UDP	
2	Internet	The routing and delivery of data is the responsibility of	Packet/IP, APR	Routers

		this layer and is the key component of this architecture. It allows communication across networks of the same and different types and carries out translations to deal with dissimilar data addressing schemes.		
1	Link, or Network Access	This is a combination of the data link and physical layers of the OSI model which consists of the actual hardware	Bits/CMSA/C D, IBM Token Passing, Frame Relay	Wires, network interface cards

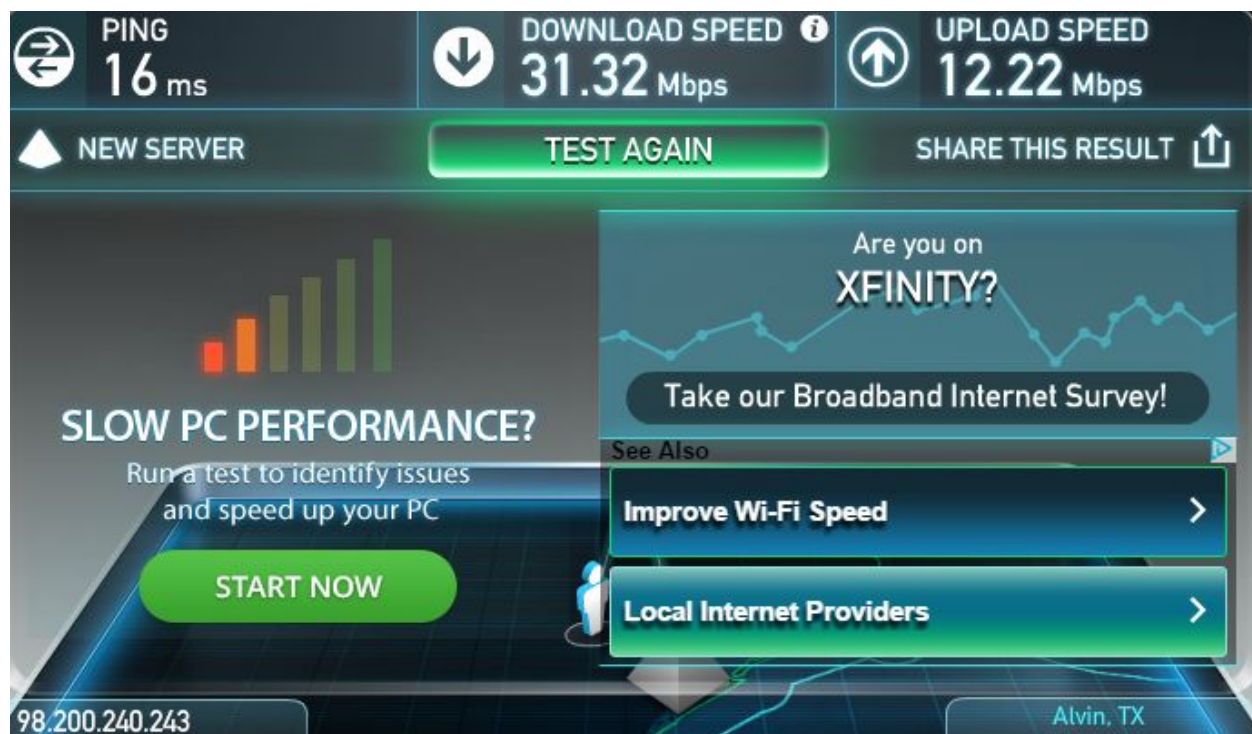
1. By OSI layer, which group sets the standards for each OSI layer?

Layer 1	Physical layer is set by groups like the ANSI, IEEE and the EIA/TIA
Layer 2	Data Link Layer is set by the IEEE and the EIA/TIA
Layer 3	Network Layer - IP the IETF
Layer 4	Transport Layer-TCP the IETF
Layer 5	Session Layer - POP is an IETF standard, SQL, is an ANSI Standard
Layer 6	Presentation Layer- MPEG - Moving Picture Coding Experts Group
Layer 7	Application Layer- HTML for example is governed by IETF, but companies can add their own functionality. SMTP is governed by IETF.

2. Describe, by device, how information from your computer's keyboard at home gets out to the Internet. Specifically, briefly describe each device and its function.

Keystrokes are input, sent from the keyboard to the CPU through a bus. The input goes into memory where an application like a browser can format and send the information to the internet. Packets go to a network card are sent out over Ethernet cable to a router out to the ISP where they are routed to the destination website.

3. Go to speedtest.net and test your internet connection speed. Report that on your assignment.



Vocabulary

1. **ANSI** - American National Standards Institute is a private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States.
2. **Backbone Network** - Part of computer network infrastructure that interconnects various pieces of network, providing a path for the exchange of information between different LANs or sub networks. A backbone can tie together diverse networks in the same building, in different buildings in a campus environment, or over wide areas. Normally, the backbone's capacity is greater than the networks connected to it.
3. **Broadband Circuit** - An analog communication circuit. Client The input-output hardware device at the user's end of a communication circuit. There are three major categories of clients: computers, terminals, and special-purpose terminals.
4. **Data Link Layer** - The data link layer manages the physical transmission circuit in layer 1 and transforms it into a circuit that is free of transmission errors as far as layers above are concerned.
5. **Extranet** - Using the Internet to provide access to information intended for a selected set of users, not the public at large. Usually done by requiring a password to access a selected set of Web sites.
6. **FCC** - Federal Communications Commission A board of seven commissioners appointed by the U.S. president under the Communication Act of 1934, having the

power to regulate all interstate and foreign electrical communication systems originating in the United States.

7. **Firewall** - A router, gateway, or special-purpose computer that filters packets flowing into and out of a network. No access to the organization's networks is permitted except through the firewall. Two commonly used types of firewalls are packet level and application level.
8. **IEEE** - Institute of Electrical and Electronics Engineers A professional organization for engineers in the United States. Issues standards and belongs to the ANSI and the ISO. IEEE has defined numerous standards for networks IETF Internet Engineering Task Force
9. **IETF** - is a large, open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet. IETF operates through a series of working groups, which are organized by topic (e.g., routing, transport, security). The requests for comment (RFCs) that form the basis for Internet standards are developed
10. **ITU** - International Telecommunications Union—Telecommunications An international organization that sets worldwide communication standards. Its old name was Consultative Committee on International Telegraph and Telephone (CCITT).
11. **Internet** - The information superhighway. The network of networks that spans the world, linking more than 20 million users. Intranet Using Internet protocols on a network internal to an organization so that information is accessible using a browser, for example, but only by employees, not the public at large. Usually done by requiring a password to access a selected set of Web sites and protecting the site by a firewall so no outsiders can access it.
12. **ISP**- Internet Service Provider ISPs offer connections to the Internet. Some access providers charge a flat monthly fee for unlimited access (much like the telephone company), whereas others charge per hour of use (much like a long-distance telephone call).
13. **KB** - The kilobyte is a multiple of the unit byte for digital information. Although the SI prefix kilo- means 1000, the term kilobyte and symbol KB have historically been used to refer to either 1024 (2¹⁰) bytes or 1000 (10³) bytes.
14. **Kb** - The kilobit is a multiple of the unit bit for digital information. 1 kilobit = 103bits = 1000bits.
15. **LAN** - Local area network A network that is located in a small geographic area, such as an office, a building, a complex of buildings, or a campus, and whose communication technology provides a high-bandwidth, low-cost medium to which many nodes can be connected. These networks typically do not use common carrier circuits, and their circuits do not cross public thoroughfares or property owned by others. LANs are not regulated by the FCC or state public utilities commissions.
16. **Logical** - It describes the use of valid reasoning in some activity.

17. **Modem** - A contraction of the words modulator-demodulator. A modem is a device for performing necessary signal transformation between terminal devices and communication circuits. Modems are used in pairs, one at either end of the communication circuit.
18. **Open System** - Computer systems that provide some combination of interoperability, portability, and open software standards.
19. **Physical** - A 1981 album by Olivia Newton-John. Of or relating to things perceived through the senses as opposed to the mind; tangible or concrete.
20. **RFC** - Request for comment A proposed standard for the Internet on which anyone in the world is invited to comment.
21. **Router** - A device that connects two similar networks having the same network protocol. It also chooses the best route between two networks when there are multiple paths between them.
22. **Client** - The input–output hardware device at the user’s end of a communication circuit. There are three major categories of clients: computers, terminals, and special-purpose terminals.
23. **Switch** - Switches connect more than two LAN segments that use the same data link and network protocol. They may connect the same or different types of cable. Switches typically provide ports for 4, 8, 16, or 32 separate LAN segments, and most enable all ports to be in use simultaneously, so they are faster than bridges.
24. **VPN** - Virtual private network A hybrid network that includes both public and private facilities. The user leases a bundle of circuits and configures the VPN on an as-needed basis so that some traffic travels on the private leased network and some travels on the common carrier’s public network.
25. **WAN** - Wide area network A network spanning a large geographical area. Its nodes can span city, state, or national boundaries. WANs typically use circuits provided by common carriers.
26. **Wireless Access Point** - A device that allows wireless devices to connect to a wired network using Wi-Fi, or related standards. The AP usually connects to a router (via a wired network) as a standalone device, but it can also be an integral component of the router itself