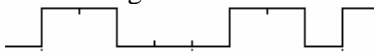


## The 5-layer TCP / IP Blend Model

Job: establish communication between any two computers, with

- 1) any software configuration (Operation Systems, applications, etc.) any hardware configuration
- 2) any way to connect to the Internet (wired, wireless, dial-up, cable modem, etc. ...)

Key concept: divide and conquer – all the work is divided into categories and the categories of work are arranged into layers.

Layer	Name	Specific Function	Data Unit (Figure 5-5, p 120)	Major Protocols	Equipments
5	Application	-- governs how two applications work with each other, even if they are from different vendors. (e.g. IE, Firefox, Netscape, etc.)	A request could be a html file, an email (with attachments) or others (depending on different web applications)	HTTP: hypertext transfer protocol (webpage) SMTP: simple mail transfer protocol FTP: file transfer protocol WAP: wireless application protocol DNS: Domain Name System	e.g. DNS server: converts domain names to IP addresses.  <b>Address: Domain Names</b> (e.g. <a href="http://www.csusm.edu">http://www.csusm.edu</a> ) – need to register for Domain names to be accessed.
4	Transport	-- governs aspects of <b>end-to-end</b> communication between two end hosts.	<b>Segments:</b> TCP header + piece of layer 5 data	TCP: Transmission Control Protocol (confirmation after each segment) UDP: User Datagram Protocol (non-confirmation)	
3	Internet	-- governs the transmission of packets across an internet – typically by sending them through several routers along the route.	<b>Packets:</b> IP header + Segment = IP header + TCP header + piece of layer 5 data	IP: Internet Protocol (read the IP header to find the destination IP address, find a rout to forward IP address)	Router: process packets, compute routes. (wired/wireless), contains a routing table <b>Address: IP Address – dynamically assigned when you get online (144.37.1.95)</b>
2	Data Link	-- governs the transmission of frames across a single network. A data link is a <b>point-to-point</b> link	<b>Frame:</b> Datalink Header + Packets = Datalink header + IP header + Segment = Datalink header + IP header + TCP header + piece of layer 5 data	Ethernet: IEEE 802.3 (for bus topology) Token-Ring: IEEE 802.5 (for ring topology) WLAN protocols (IEEE 802.11 family)	Network Card (MAC address is uniquely assigned to each card and used on data link layer to process frame) <b>Switches are complicated, could be used on 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> layers. (not required to know).</b> <b>Address: MAC Address – assigned by the NIC manufacturer.</b> ( <a href="http://www.ibm.com">http://www.ibm.com</a> )
1	Physical	-- governs transmission between adjacent devices connected by a transmission medium	Electric Signals 	Three topologies, pros and cons	Type of Wires, pros and cons. Hub and Modem: functions