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1. Explain the terms *circuit switching* and *packet switching*. Discuss the advantages and disadvantages of both.

Circuit switching requires a direct connection between two points. This is a dedicated line so it can’t be interrupted. This method is more efficient because all the data is being sent at once but it can fail. Since there is only one path to and from, if the connection fails, is busy, or some other problem occurs the data cannot be sent.

Packet switching breaks a document into packets a moves them to the destination individually. It is less efficient but fail safe since the packet has many routes it can take to the desired location. If one router goes down the packet can travel through another router without interruption. This method has a “time to live number” associated with the packets to they can’t be transferred forever.

1. How is an Ethernet network different from a token ring network? What is the role of a repeater, bridge, and switch in an Ethernet network?

Token Ring is a local network that works by transmitting nodes in succession. You can only submit the next node after receiving the prior one. Ethernet is also a local network but can have a direct connection and transmission.

An Ethernet repeater extends the distance of the network beyond its normal limitations. It regenerated the signal so it can cover longer distances. A bridge connects two local area networks that use the same protocol. Finally, an Ethernet switch allows different devices on the network to communicate. The switch is a central hub that is connects all devices on the network.

1. How is the Simple Mail Transfer Protocol (SMTP) different from either IMAP or POP mail client access protocols?

SMTP is the standard protocol for sending emails across the internet. IMAP and POP are both used for retrieving emails instead of sending.

1. There is the traditional seven-layer ISO networking model. What are the parallels and contrasts that you see with the five-layer Internet model that we discussed in class?

Both the seven and five-layer internet models have a physical layer as their first layer. The second layer in the seven-layer model is data link but the second in the five-layer and the third in the seven-layer are both a network layer. They also both have an application layer as their last layer. The rest of the layers are different.

1. What is a Datagram? Is there an advantage of using UDP over TCP?

A datagram is a basic transfer unit used in a packet switching network style. They provide a connectionless transfer across the network. UDP and TCP are protocols for sending packets over the internet. TCP stands for transmission control protocol and UDP stands for user datagram protocol. UDP doesn’t use error checking like TCP does so it speeds up the sending of packets.

1. What are the functionalities (services provided) of the Apache Web Server? How does that contrast with those of the IIS Web Server?

Apache is the most widely used web server software. It is available on a variety of platforms. Apache has the Apache Portable Runtime which allows the web server to run on any system with a C compiler. Some other features offered on both IIS and Apache are an independent request handler, multiple process request handlers, and thread support. IIS mostly uses active server pages for development. Apache sues a CGI model instead.

1. What are typical values for phone modem speeds? How do those compare with DSL modems, cable modems, ISDN, T1, T2, and T3. What are T2 and T3 lines? What are typical speeds for optic cables? How fast are bit rates for wireless LAN networks and satellite transmissions? Do a test of your home internet connection?

<http://www.att.com/speedtest/>

Phone modems have a maximum speed of 56 kbit/s when using the V.90 or V.92 protocol. The average speed is more around 40-50 kbit/s. DSL modems and ISDN can both have speeds up to 128 kbps whereas cable modems are slower with speeds of 38 mbps. T2 and T3 lines carry multiple T1 lines. A T3 line can carry up to 28 T1 lines. Each T1 line has a speed of 1.54 mbps. Optic fiber cables can run at 100mbps. Local area networks (LAN) have data transfer rates of 100 mbps and satellite transmission 50 mbps.

When I ran the internet connection test my download speed was only 3.41 mbps but the upload speed was 167 mbps. Since I live on west campus and so many people use the same internet, the connection is not very reliable. I’m not surprised that the download speed was lower than the average.

Out of curiosity I ran the analysis again since when I ran it the first time my internet was being very slow. The new download speed is 237 mbps and the new upload speed is 311 mbps. Since my internet fluctuates frequently I’m not surprised with the differences in speeds.

1. What is the purpose of a MIME type specification in a request / response transaction between a browser and a server?

MIME stands for multipurpose internet mail extensions and is an internet standard that provides email support. The web server uses a MIME header to begin transmissions. The client can then choose the right application for opening and viewing email attachments. Some viewers can be built into the browser so you can view a picture or video from the email itself without having to open a separate viewing application.

1. Discuss the steps in a HTTP transaction. How are the headers in GET and POST transactions different?

A simple HTTP transaction has 5 steps. First a DNS lookup is preformed to turn the URLs host name into an IP address. Next a connection between the client’s machine and the web server is made. The client machine sends the HTTP request to the web server. Next the client waits for the server to respond and then the content loads. Finally, a FIN packet is sent to close the connection. If the HTTP transaction is serial instead of simple, the connection stays open and multiple transfers of information can be made. The GET transaction uses a query string to send the message data where a POST transaction has an empty query string and a message body element with the information to be posted.

1. What is the purpose of the Common Gateway Interface?

Common gateway interface (CGI) is the standard way for sending and receiving data between a web server and a web user. CGI is a part of HTTP. To use CGI, the application name is added to the URL. CGI provides a consistent way for data to be to and from the web server and the clients application.