CS436 Introduction to Networking

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Homework - Part I

1. Provide a couple reasons for Internet growth in recent years. (3 pts)

The internet provides a way to share resources efficiently, saving time and money. For example, instead of waiting in line to use a printer or giving everyone a printer, one printer could be shared.

The internet provides a way for one to access and share information instantly with just the tip of their fingertips.

The internet provides a way to communicate with others across the world; this brought the rise of social media, consumption of online video entertainment and ecommerce.

1. What is a protocol suite, and what is the advantage of a suite? (3 pts)

A protocol suite is a set of protocols that work together to specify how data should be packetized, addressed, transmitted, routed, and received. The advantage of a protocol suite is abstraction and simplicity.

1. List the layers in the TCP/IP model, and give a brief explanation of each. (10 pts)

Application

* The highest layer of the TCP/IP model. it contains a variety of high-level protocols that are needed by users to process and communicate across the network. Protocols include HTTP (Hyper text transfer protocol), SMTP (electronic mail) FTP (file transfer protocol), and DNS (domain main servers).

Transport

* It provides host to host communication services for applications. It is designed to allow peer entities on the source and destination hosts to carry on a conversation. protocols include TCP (transfer control protocol) and UDP (user data protocol).

Internet

* It holds the whole architecture together. It's job is to allow hosts to send packets into any network and have them travel independently to the destination. Protocols include IP (internet protocol) and ICMP(Internet control message protocol)

Link

* The lowest layer of the TCP/IP model. It provides a way for a host to connect through a channel. protocol include ethernet, DSL, and 802.11.

1. What is the main difference between TCP and UDP? (2 pts)

The main difference between the two is that TCP is a connection-oriented network protocol, while UDP is a connectionless network protocol.

1. An image is 1600x1200 pixels with 3 bytes per pixel. How long does it take to transmit an image over the various channels? (4 pts)

1600 x 1200 x 3 = 5760000 bytes = 46080000 bits total

1. 56-kbps modem channel

46080000 bits / 56k bits = 822.857 seconds

1. 1-Mbps channel

46080000 bits / 1 mbits = 46.08 seconds

1. 10-Mbps channel

46080000 bits / 10 mbits = 4.608 seconds

1. 100- Mbps channel

46080000 bits / 100 mbits = 0.4608 seconds

1. Suppose the algorithms used to implement the operations at layer *k* is changed. How does this impact the operations at layers *k -1* and *k +1*? (2 pts).

There is no impact on the operations on both layers.

1. Suppose there is a change in the service provided by layer *k*. How does this impact the services at layers *k -1* and *k +1*? (2 pts).

There is an impact on layer k + 1 as it relies on k for its services. As for k - 1, there is no impact on the operations.

1. What are the two basic communication paradigms used in the Internet? (2 pts)

The two basic communication paradigms are connection-oriented and connectionless oriented.

* connection-oriented (1 to 1), must establish an endpoint to send data.
* connectionless-oriented (M to M), can send data to multiple endpoints without making prior arrangement.

1. If a sender wants to have copies of each data block being sent to three recipients, which paradigm should the sender choose? Explain your answer. (3 pts)

The sender should choose the connectionless transport diagram because it allows transfer to multiple recipients.

1. When two applications communicate over the Internet, which one is typically identified as the server? (4 pts)

The application that waits for contact to provide a service is identified as the server.