CS 372 Notes

**A network is a system for connecting computers using what?**

🡪 Single Transmission Technology

What are some components of the UDP protocol? (check all that apply)

🡪Connection-less, Congestion Control, Unreliable data transfer (Fire & Forget)

What does a protocol do?

🡪Specifies the format and order of messages sent and received among network entities.

🡪Specifies actions taken upon the transmission and receipt of messages

Devices in Network Core:

🡪Routers, Switches

Components of the TCP protocol?

🡪Connection-Oriented with 3-way connection-setup handshake

🡪Flow control

🡪Congestion Control

🡪Reliable, in-order data transfer

Devices in Network Edge:

🡪End-Systems

🡪Smartphones

🡪Laptops

🡪Servers

🡪Hosts

Client-Server model has a dedicated service provider.

Hybrid model uses a central server to setup connections between peers.

Peer to Peer model connects hosts to each other without the use of dedicated services.

Characteristics of TDM?

🡪Only one user may transmit at a time

A circuit switched network has a dedicated circuit through which information is sent, whereas a

Packet switched network sends information in “chunks” through a network on shared media

Units for network bandwidth AND transmission rate?

🡪 bps

Packet Construction, Transmission, and Interpretation are three important functions of a packet-switched network

FDM Characteristics:

🡪Spectrum divided up into bands of frequency

🡪 Multiple users can transmit, IF they use right frequency

Packet-switched network may be faster than a Circuit-switched network due to its more adaptive use of the transmission medium.

What are some characteristics of statistical multiplexing?

🡪Adaptive sharing of the transmission medium

🡪Is an outcome of using packet-switched networks

🡪Hosts with no data to share do not waste the transmission medium

A Circuit-switched network may be faster than a Packet-switched networks due to the packet header overhead of packet-switched networks

Congestion with packets:

🡪Packet delay and Packet loss

Access network allows a host to connect to the internet

Throughput is the rate at which bits are actually transferred between sender/receiver

Processing delay 🡪 Time spent processing header info.

Queuing delay 🡪 Waiting on transmission medium

Prop Delay 🡪 Traveling on physical medium

Trans delay 🡪 Being placed on the physical medium limited by the transmission protocol

Broadcast cabling utilize a greater range of frequencies in transferring information. This allows more data to be transferred over this type of cabling.

Guided media

Waveguide cabling (fiber-optic)

Correct answer.

Twisted pair copper wires

Correct answer.

Cups with a string connecting them

Correct answer.

Coaxial cables

Multiplexing physical media

🡪Merge multiple communcations streams onto the same medium

Physical media is a physical link in the chain between sender/receiver pairs.

Role of physical media in access networks: Analog signals relate to bits propagating over/through the physical media.

Internet Protocol Stack?

Layer 1: Physical Layer

Layer 2: Link/Data-Link

Layer 3: Network

Layer 4: Transport

Layer 5: Application

Responsibilities of the Application Layer?

🡪Determine destination IP address

🡪Support network applications

The Transport layer manages communications from process to process.

As a packet is being constructed and passed “down” to the next layer of the internet

protocol stack, a new “header” is added. This process is called Encapsulation

The payload (non-header portion) of a transport-layer segment is the data from the Application

layer.

Open Systems Interconnection (OSI)?

Layer 1: Physical Layer

Layer 2: Link/Data-Link

Layer 3: Network

Layer 4: Transport

Layer 5: Session

Layer 6: Presentation

Layer 7: Application

Socket connection requires:

🡪Local host IP address & Port Number plus Remote host IP address & Port Number

Application Layer specifies:

Everything regarding messages send and response/exchanged

Show requests, non—persistent HTTP:

RQ #1: TCP Connection Request

RQ #2: Website Index Request

RQ #3: TCP Connection Request

RQ #4: Image #1

Request ...

RQ #13: TCP Connection Request

RQ #14: Image #6 Request

Persistent vs Non, time:

(14 req – 8 req) \* 2 sec/req = 12 seconds. It takes 12 seconds longer

SMTP🡪 Push Protocol

IMAP and POP3🡪Pull Protocols

FTP protocol maintains these states:

🡪Current Directory

Correct answer.

Earlier Authentication

Correct answer.

Limit on Concurrent Connections

IP addresses🡪 2^32

Unique network interface hardware addresses possible:

16^12 (281,474,976,710,656)

.org TLD managed by NOT PIO

Demultiplexing, UDP socket identified by:

🡪Dest IP and Port Numbers]

Transport Layer🡪Edge

🡪Manages communications from process to process

Network Layer🡪Edge

Two Generals Problem🡪 If there is any possibility of error in the communications channel, it is impossible to guarantee 100% reliable data transfer.

RDT UDP protocol🡪Simple error detection

Max number of bytes in app data of UDP seg 🡪 65,527/65527.

TCP🡪Comnection oriented, full duplex, inorder delivery, pipelining, Flow+congestion control, reliable ddelivery

TCP🡪 Min: 20, Max: 60