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**Week 3 Homework**

**Review Questions:**

**R15)** FTP sends control information “out-of-band” because it uses a separate control connection.

**R16)** Alice sends an email to Bob’s email by first logging in (authentication), then sending the email to BOB (transaction), and then closes the POP3 connection (update). Bob can retrieve this message likewise by logging into his device (authentication), receiving the email (transaction), and then the connection closes (update).

**R17)** N/A

**R18)** From the user’s perspective “download and delete” means the user downloads the email and the server proceeds to delete the email from its database meaning the user will be unable to view the email from any other devices. “Download and keep” on the other hand, means the server keeps the email after the user has downloaded it allowing for the user to download the email on multiple devices.

**R19)** A web server and mail server can have the same alias for a hostname, however if this is the case the mail server would have a Type=NS RR value.

**R20)** Yes it is possible to determine the IP address of the host from the header of a .edu account and a Gmail account.

**R21)** Bob may not provide chucks at the same interval as Alice as it depends on what his upload speed is and it depends if Alice is providing data at the fastest rate for Bob to consider sending chucks to her.

**R22)** Alice will receive her first chunk as she can become optimistically unchoked or randomly chosen to receive chunks by another host opening a new connection.

**R23)** An overlay network is a logical network connecting peers that lies above the physical links (routers, hosts, etc.). The edges in an overlay network are the links between two peers.

**R24)** In using a mesh topology for an overlay network has advantages in that only a single query needs to be sent as each peer knows where each other is however, each peer needs to know where each other is. On the other hand, a circular overlay each peer only has to keep track of two peers, however N/2 queries are sent on average.

**R25)** Four application that are naturally suitable for P2P architectures include: online gaming, file sharing, media streaming, and online communication.

**R26)** A TCP server would require 2n sockets per connection as it needs a socket for receiving data and another socket for sending data while it receives data.

**R27)** In a TCP application the server must be active before a client program as the server needs to listen for a request in a TCP server. Opposing, a UDP client needs to be active before the server as the client sends a request to the server to open it first.

**Practice Problems:**

**P18)** a) A whois database is a system for holding information on users such as IP addresses and domain names.

b) <https://whois.icann.org/> - NS0.DNSMADEEASY.COM

<http://www.whois.com/> - MARY.NS.CLOUDFIRE.COM

c) FIOS\_Quantum\_Gateway.fios-router.com, whois.vip.icann.org, whois.com.

d) Microsoft.com has multiple IP addresses and MSJC.edu does not.

e) No results

f) Attackers can use whois databases to find the DNS hosts and IP addresses to perform attacks on institutions as well as nslookup to find out how many IP addresses the institution has.

g) A whois database should be publicly available as people who want to create a new website need to know what is being used as well as let the public know who owns what.

**P20)** You could find the most popular Web servers in your department using the DNS cache by recording the number of times a server’s IP address was stored in the cache to find which ones were stored the most times.

**P26)** a) Bob can receive a complete file if the file’s size is under 256 Kbytes or smaller.

b) Bob can make his “free-riding” more efficient with multiple computers in the computer lab because each will be receiving different chunks and each will share their different chunks together as they will have the highest speeds since they are all on the same network.

**P35)** Apache Web Server is a web server software first release in 1995 and most commonly used in Linux systems. It is free and open-source and its functionalities vary depending on the module you are using. It uses these modules to change what its core functionality is and what the server will be capable of.