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Assignment 02

IT 386

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1. TCP is used more than UDP because of a difference in functionality. UDP is a lot simpler in nature, and therefore, cannot provide as much utility to the system in total. TCP offers benefits like congestion control and segment reliability. Since UDP doesn’t offer these things, it makes sense that the TCP is more frequently used in professional environments across the internet.
2. The problem with HOL in HTTP/1.1 is that once the parallel requests are full, the subsequent requests must wait for the original ones to finish. HTTP/2 uses a compression method to reduce redundant information in the packets, making the process of requests much faster
3. 1. iMessage uses a protocol that is called APNS, or Apple push notifications. This protocol is based on XMPP. This apple specific protocol uses a keep-alive connection with the servers at Apple, using a distinct code for each connection that acts as an identifier for the route a message takes going from device to device. For encryption, Apple uses TLS that works with a client-side certificate that is issued as a device connects to iMessage.
      1. URL = <https://apple.fandom.com/wiki/IMessage>
   2. SMS uses a TCP protocol to send data between devices. This protocol is used like that of the functions previously discussed. However, if the messages are being sent over the internet, the protocol used becomes an SMPP protocol. The combination of these protocols packages up a message into packets, then sends the data across the established connection where it is received at the other end.
      1. URL = [https://ozeki-sms-gateway.com/p\_260-introduction-to-the-sms-protocol.html#:~:text=In%20short%20SMS%20is%20a,Internet%20is%20called%20SMPP%20protocol.](https://ozeki-sms-gateway.com/p_260-introduction-to-the-sms-protocol.html%23:~:text=In%20short%20SMS%20is%20a,Internet%20is%20called%20SMPP%20protocol.)
   3. Like that of iMessage, WhatsApp uses a form of XMPP protocols.
   4. While all these systems are alike in structure, there are still key differences that sets them apart from one another. Apples protocol is an inhouse structure, one that is unique to Apple devices. The underlying function of the protocol is like that of a universal protocol but has specific differences that ties it to Apple’s own software/hardware. SMS uses the standard TCP protocol, which emphasizes a centralized structure. XMPP on the other hand, is a decentralized structure.
4. 1. A connection that is signaled to be closed will use a message header that states the connection is to not be persistent, or “closed”. This information can be found in section 14:10 in the connection information section on page 116. The client or server can signal for a closed connection.
   2. HTTP/1.1 uses TE (transfer encoding) which chunks up the data that is being sent to another location, and then adds a layer of encryption. This information is found in sections 14:39 and 14:41 which can be found on pages 141 and 142.
   3. A client should not open more than 2 connections. This is cited on page 46 just before section 8.2
   4. It is possible that one side of the server might terminate the connection while the other side is requesting or sending data. If this is to happen, the client should re-establish a connection and attempt the transaction again. This is cited at page 46 just before section 8.2
5. 1. Web caching reduces delay since the original server does not need to be referenced for every instance of the site being accessed. The transmission rate between a cache server versus the transmission rate between the original server is vastly different, the cache server being significantly faster. Provided the cache version is up to date, the client can simply access this server instead.
   2. The delay will be reduced for all objects that are included within the cache server. This is because if the version is up to date, the client accesses the page from the cache server that has a much lower delay in transmission.

X = 1,000,000 bits / 15,000,000 b/s = .67 s

a = 16req/s \* .67 = 1.072

avg delay = .67/(1-1.072) = .931

3 + .931 = **3.931**

**b.**

**on next page…**

miss rate = .4

avg delay = .067 / (1[.4 \* 1.072]) = .117 s

delay = 3 + .117 **= 3.117 s**

response = .4 \* 3.117 = **1.245 s**

This means that with the cache, our response time is cut down by a significant margin

1. 1. Text

      Description automatically generated
   2. We have to run the server first so that the client can create a connection. Without the server running first, the client will have nothing to connect with, and the program will not run properly. The difference with the server is that it waits for a connection, unlike the client application.
   3. //code attached to reggienet//