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Lab 9

1. Streaming video systems can be classified into three categories. Name and briefly describe each of these categories.

* The three different streaming applications are: streaming stored audio/video, conversational voice/video over IP, and live streaming audio/video.
  1. Streaming stored data implies that the user is accessing prerecorded video/audio on demand from a server or machine that hosts the data. Once a connection is made, the host, mainly, a server has the audio/video files stowed and ready to share. One unique feature of streaming stored audio/video is the interactivity between the user and the experience. Users are able to pause, rewind, and/or fast-forward the information as they please (Kurose & Ross, 2016, p.679).
  2. Conversational voice/video over IP is the use of a streaming system to create Real-Time communications with others via the internet. This process of communication is more forgiving than its circuit-switch counterpart as it is loss-tolerant. Connections over this system are reluctant to disconnecting even through a huge bandwidth drop, however, quality may suffer (Kurose & Ross, 2016, p. 680).
  3. Live streaming audio/video is requesting and accessing audio/video from a live source. Users are able to use “broadcast-like applications” to receive data from local CDNs (Content Delivery Networks). Since the requested data is live, bandwidth loss may hinder user experience (Kurose & Ross, 2016, p. 681). For example, throughput of the CDN goes down for more than 10 seconds can make the stream source go offline.

1. List three disadvantages of UDP streaming
   1. The constant-rate of streaming heavily relies on the server-to-client’s bandwidth. If the connection is unstable, the playout may suffer (Kurose & Ross, 2016, p.683).
   2. Within the open source system, the client and server contain separate control commands. Cost of maintaining these services are quite expensive as they rely on media control protocols such as Real-Time Streaming Protocol (RTSP) and RTSP servers to assist with maintaining congruency between the client-server through the tracking of its control command state (Kurose & Ross, 2016, p.683).
   3. UDP is less secure than TCP which makes this protocol more vulnerable to being blocked by firewall and other security measures. Administrators must manually set rules to ensure that certain applications using UDP can successfully traverse packets throughout the network (Kurose & Ross, 2016, p.683).
2. Why is a packet that is received after its scheduled playout time considered lost?

* Real-time constraints do not make replaying delayed packets possible. The reconstruction of the delayed packets will take too long for the playout to serve any purpose (Kurose & Ross, 2016, p.694). I believe that replaying packets received out of schedule will also congest the communication line and take up buffer space; more appropriate methods have been applied such as loss anticipation schemes.

1. How are different RTP streams in different sessions identified by a receiver? How are different streams from with the same session identified?

* RTP streams in different sessions are identified by the receiver via different multi-cast addresses.
* Within the same session, the receiver may use the Synchronization source identifier (SSRC) field. SSRC is part of the RTP packet found within the UDP segment of the IP datagram (Kurose & Ross, 2016, p.702).

1. What is the role of a SIP registrar? How is the role of SIP registrar different from that of a home agent in Mobile IP?

* The Session Initiation Protocol (SIP) assists with connecting the caller and callee over an IP network. When a user first uses a SIP application a REGISTER command is sent to the SIP registrar, which stores and updates the current dynamic IP address of user using the SIP application (Kurose & Ross, 2016, pp703, 707).
* A home agent is a node, typically a router located within a person’s home network. Home agents establish communication via tunneling data to a mobile device’s permanent IP address; changes to the IP address may increase the likelihood of connectivity issues. The implication of call-of address (CoA) allows for mobile devices to connect to the home agent via a guest network.
* On the other hand, SIP registrar is a server which stores the most current IP address of the associated device, the address may be updated without any connectivity issues (Kurose & Ross, 2016, pp703, 707). SIP registrars, like DNS, translate an identifier to a dynamic IP address. In this case, a human identifier is translated, such as [will@gmail.com](mailto:will@gmail.com), to an IP address: 166.43.239.12.

References

Kurose, J. & Ross, K. (2016, May 6). Computer Networking: A Top-Down Approach (7th Edition). London, UK: Pearson.