Wenjie Xu LAB 9

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

Answer: Streaming video systems can be classified into three categories. They are

* HTTP streaming:

HTTP means *H*yper *T*ext *T*ransfer Protocol. It is used to store videos in the server as an ordinary file. This server provides the specific URL of the file. This URL link is used by users to connect the server and receive video information.

One client side, the bytes are collected in a client application buffer and start to playback when the buffer exceeds a predetermined threshold. The client also can pre-fetch video frames that are to be consumed in the future. Different from the TCP receiving buffer, the application buffer works together with the TCP buffer to smooth the playback. HTTP streaming does not require a control connection. HTTP byte-range header is used to specify the range of bytes the client currently wants to retrieve from the desired video. Using this header, the user can reposition the video playout.

* UDP streaming:

UDP means *U*ser *D*atagram *P*rotocol. It is used to stream the video by the connection of server.

UDP streaming typically uses a small client-side buffer, big enough to hold less than a second of video. Before passing the video chunks to UDP, the server will encapsulate the video chunks within transport packets specially designed for transporting audio and video, using the RTP or a similar scheme. In addition to the server-to-client video stream, the client and the server also maintain, in parallel, a separate control connection over which the client sends commands regarding session state changes.

* Adaptive HTTP streaming:

It provides the band width of video stream. It is used to stream the data as per the client’s bandwidth.

Dynamic Adaptive Streaming over HTTP (DASH) is developed for improving the problem that the client cannot choose the version of the video which is encoded into the version from high-definitions to low-definitions. With DASH, each video version is stored in the HTTP server with different URL. The HTTP server also has a manifest file, which provides a URL for each version along with its bit rate. The client first requests the manifest file and learns about the various versions. Then the client selects one chunk at a time by specifying the URL.

While downloading chunks, the client also measures the received bandwidth and runs a rate determination algorithm to select the chunk to request next. DASH therefore allows the client to freely switch among different quality levels. By dynamically monitoring the available bandwidth and client buffer level, and adjusting the transmission rate with version switching, DASH can often achieve continuous playout at the best possible quality level without frame freezing or skipping. Moreover, the client can also dynamically select audio chunks with different version. The client can locally synchronize audio and video playout.

2. List three disadvantages of UDP streaming

Answer:

* Many firewalls block UDP.
* Due to the unpredictable and varying amount of available bandwidth between server and client, constant-rate UDP streaming can fail to provide continuous playout.
* It requires a media control server, such as an RTSP server, to process client-to-server interactivity requests and to track client state (e.g., the client’s playout point in the video, whether the video is being paused or played, and so on) for each ongoing client session.

3. What is a packet that is received after its scheduled playout time considered lost?

Answer: A packet that arrives after its scheduled playout time cannot be played out. Therefore, from the perspective of the application, the packet has been lost.

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

Answer: RTP streams in different sessions are identified by different multicast addresses;

RTP streams in the same session are identified by SSRC field.

5. 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?

Answer:

* The role of a SIP registrar: The role is to keep track of the users’ records which contain the details of their corresponding IP addresses which they are currently using. Each SIP registrar keeps track of the users that belong to its same domain. It also forwards INVITE messages (for users in its domain) to the IP address which the user is currently using. In this regard, its role is similar to that of an authoritative name server in DNS.
* The difference between SIP registrar and a home agent in Mobile IP:

Every SIP user has an associated registrar. Whenever a user launches a SIP application on a device, the application sends a SIP register message to the registrar, informing the registrar of its current IP address. The registrar keeps track of the user’s current IP address. When the user switches to a new SIP device, the new device sends a new SIP register message, indicating the new IP address.

In [Mobile IP](https://searchmobilecomputing.techtarget.com/definition/Mobile-IP), a home agent is a [router](https://searchnetworking.techtarget.com/definition/router) on a [mobile node](https://searchmobilecomputing.techtarget.com/definition/mobile-node)'s [home network](https://searchnetworking.techtarget.com/definition/home-network). The home agent delivers datagrams to departed mobile nodes that maintains information about the device's current location, as identified in its [care-of address](https://searchnetworking.techtarget.com/definition/care-of-address), say, a temporary [IP address](https://searchwindevelopment.techtarget.com/definition/IP-address) for a [mobile node](https://searchmobilecomputing.techtarget.com/definition/mobile-node). The home agent uses [tunneling](https://searchenterprisewan.techtarget.com/definition/tunneling) mechanisms to forward Internet traffic so that the device's [IP address](https://searchwindevelopment.techtarget.com/definition/IP-address) doesn't have to be changed each time the device connects from a different location. In sum, the device can remain unchanged the home IP address that is assigned for an extended period of time to a mobile node, regardless of where the device is attached to the Internet.