MoQ Data Model

Christian Huitema

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Tracks and Compositions

- Tracks carry a specific encoding, compression, definition, encryption of a specific "media stream".
  - The same media stream, like "Video view of Real Madrid vs. Barcelona live from Madrid", can be presented as different tracks.
  - Users and their devices will pick the right track based on their preferences and capabilities. How exactly they do that is outside of MoQ.
- Multi media experiences typically involve multiple tracks, such as one, two or many per participant in a video conference.
  - We call this "composition", often represented by a catalog, sometime represented by a live stream
  - Different applications use catalog differently, how they do that is outside of MoQ.

Tracks, Objects and Groups

- The content of tracks is represented as series of Objects

- Objects:
  - Content as binary blob, possibly encrypted, not visible by relays
    - Typically atomic – no point handling half objects if encrypted.
    - Metadata used to manage transmission.
  - Different applications split the track content in objects in their own ways
    - Example, video, single frame encoded as object
    - Example, video, layered encoding, encoding layer of frame encoded as object

- Discussion: Groups of Objects

- Related Discussion: Congestion Control

We almost agree, but…

- How do we name tracks, exactly?

- Can we give a name to groups of tracks that are typically sent together?

- What are groups of objects?

Proposition 1:
Track Names are Opaque URLs

- A track name is a URL.
  - Users and relays use the URL to contact the origin, and to locate a copy of the content.
  - Same as HTTP.

- A track name is "opaque".
  - It may have components like origin ID, emitter reference, track reference
  - Relays and users identify the origin from the authority component of the URL, but cannot parse the remainder the URL

- The origin will have to authorize the user or the relay (TBD)

- The origin does not always provide the content.
  - Response from origin may carry URL with actual content location

Proposition 2:
Emissions tie multiple tracks

- Regardless of composition, tracks served by the same origin may be grouped into "emissions"
- Emission ID is an URL, just as opaque as a track URL
- Main objective would be to ease subscription:
  - Single request to Origin to provide single authorization, based on routing of emission's URL, instead of one per track.
  - Origin will respond with list of track URLs and possibly corresponding locations.
- Not clear whether the concept of emission is needed:
  - Subscription request could carry a list of track URLs pointing to same origin
  - About same properties, no impact on data model

Proposition 3:
Groups are Synchronization Points

- In theory, objects could be grouped in whichever way makes sense for the application, but...

- We need synchronization points
  - Rewind and Fast Forward functions for streaming media
  - Joining an ongoing Video Conference "at the current point"
  - Synchronizing after losses caused by network event

- Properties of groups:
  - Synchronization, means decoding group objects from the beginning always make sense.
  - Could be truncated, e.g., dropping the tail.

Proposition 4: Object and Group Metadata for Congestion Response

- The protocol specifies metadata associated to object and groups:
  - Sequence number of Group within Track
  - Sequence number of Object within Group
  - Flags, priorities or dependencies of Objects and possibly Groups
  - …
- But we have another session to discuss that.