

Unique track token

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Problem

- MoQ requires objects with the same (track name, group, object) tuple to have identical content if they are re-published
- Imagine a protocol that publishes groups with IDs 0, 1, 2, 3, ...; if it crashes, and then starts publishing under the same name again, it will break the uniqueness rule.
- Applications can address this themselves in two ways:
 - By adding a distinguishing token into a track name.
 - By adding a distinguishing token into group IDs.

Observation

- This is fundamentally a transport issue, not an application issue
- Relays know when a new PUBLISH arrives, and are thus in a better position to solve this.

Proposal

- Introduce a new uint64 called track epoch
- Suggest to set it to time in ms.
- Sent in PUBLISH/SUBSCRIBE_OK
- Can be easily interpreted when a new PUBLISH for the same track is received:
 - old epoch = new epoch – redundant ingestion / seamless switchover
 - old epoch < new epoch – client crashed; new publishes replaces.
 - old epoch > new epoch – out-of-date client; reject.
- Need to communicate the epoch change event to the client somehow.

Proposal (subscriber side)

Requirements:

- Communicate the epoch once by default
- Communicate when it changes, with subscriber being able to “ack” receipt.

Proposal:

- Add NOTIFY_EPOCH_HIGHER_THAN parameter
- Parameter is set to the epoch value in SUBSCRIBE_OK by default
- If the epoch of the track is higher than the parameter, the publisher appends extension with the new epoch value to all objects.
- Use patterns:
 - NOTIFY_EPOCH_HIGHER_THAN set to latest received epoch for “ack”ing epoch change
 - NOTIFY_EPOCH_HIGHER_THAN set to UINT62_MAX to ignore epoch changes

Complexity analysis

Changes required:

- On original publisher side: minimal
 - Requires setting an epoch
- On subscriber side: minimal to moderate
 - Requires either setting epoch filter to “ignore” state, or acking logic.
- On relay side: it depends on what relay is doing, but moderate+
 - For caches, relays have to add epoch to the object key (between track name and group ID)
 - For routing, it depends on the exact routing performed by the relay.