



Everyone thinks their baby is cute...

But they all have their quirks....

- **HPACK**
 - Bad HOLB
 - Doesn't like stream cancellation
- **QPACK**
 - Similar-but-different wire format versus HPACK
 - Deletes are complex
- **QCRAM**
 - Requires tracking ACKs of HEADERS frames
 - Dealing with stream resets is tricky; handles edge-cases by sending HEADERS on control stream



How Deletion is Handled

Agreed: Delete can't happen until all references have been received and processed. Therefore, Encoder tracks these references.

QPACK – Decoder controls

- Explicit deletion
- Encoder serializes state, sends as part of delete instruction
 - Entry is immediately unusable
 - Space is still considered allocated
- Decoder tracks arrival of enumerated references, responds when delete “completes”
 - Space becomes free upon receipt

QCRAM – Encoder controls

- Variant of HPACK eviction
 - If oldest entry is subject to eviction, no new inserts until the eviction can be sent
 - Introduces duplicate command to selectively delete
- Encoder listens to ACKs to identify successful arrival of all references
- Encoder signals eviction only when no references outstanding

How Stream Reset is Mitigated

Agreed: Request streams will be reset from time to time, which causes data loss. This data loss must not cause the shared compression state to get out of sync. Some set of critical streams are required to address this.

QPACK – Avoid the Problem

- Separate streams
 - Dedicated control stream(s) for table manipulation
 - Request streams contain only “safe” instructions
- Header control stream(s) still can't be reset

QCRAM – Correct the Problem

- Encoder detects potential losses
 - Tracks ACKs/stream resets
 - Identifies HEADERS (et al.) frames which *might* have been lost
- Recover using control stream
 - Possibly-lost frames get retransmitted on control stream
 - Control stream already can't be reset
 - Decoder tolerates duplicative frames on control stream

Wire Encoding

Agreed: HPACK wire encoding is insufficient for the requirements of HTTP/QUIC.

QPACK – Redefine

- Given separate streams, defines:
 - Table manipulation commands for control streams
 - Header emission commands for request streams
- Always uses absolute indices
- Similar in spirit to HPACK, but not the same encoding

QCRAM – Augment

- Adds fields to HEADERS (et al.) frames before HPACK data
 - Offset to adapt HPACK's relative references to absolute ones
 - Delete offset to signal deletes
- Table size change replaced by insert-duplicate command
 - Also modifies size accounting to require de-duplication



Everything else is prose and bike sheds.

Can we overcome our distaste and just pick one already?

(Plenty of time to fix the chosen one later.)