Ack Frequency

draft-ietf-quic-ack-frequency
https://github.com/quicwg/ack-frequency

QUIC WG, Yokohama, March 2023
Current Frame Formats

ACK_FREQUENCY Frame {
    Type (i) = 0xaf,
    Sequence Number (i),
    Ack-Eliciting Threshold (i),
    Request Max Ack Delay (i),
    Reordering Threshold (8)
}

IMMEDIATE_ACK Frame {
    Type (i) = 0xac
}

Sequence Number: Allows receivers to ignore obsolete frames after reordering.

Ack-Eliciting Threshold: The maximum number of ack-eliciting packets the recipient of this frame can receive before sending an acknowledgment.

Request Max Ack Delay: The value to which the endpoint requests the peer update its max_ack_delay

Reordering Threshold: An 8-bit field representing an unsigned integer that indicates how out of order packets can arrive before eliciting an immediate ACK. 0 indicates the peer should ignore reordering.
Resolved Issues
Reordering Threshold (#96)

In London, we decided to change Ignore Order to Reordering Threshold

● Proposal (#100) and clarifications (#152) merged.
● #155 Adds examples, #172 fixes formatting
MUST -> SHOULD (#144, #151)

Changed some unenforceable MUSTs to SHOULDs

These were SHOULDs in RFC9000 Section 13.2.2

Ack-Eliciting Threshold: ... A receiving endpoint SHOULD send at least one ACK frame when more than this number of ack-eliciting packets have been received.

An endpoint that receives an ACK_FREQUENCY frame with a Reordering Threshold value other than 0x00, SHOULD immediately send an ACK frame...
**Musts for Multiple Ack Frequency frames (#149)**

One Normative Change:

No longer require Sequence Number to start at 0

A sending endpoint MUST send monotonically increasing values in the Sequence Number field
Smaller Changes

- Add Security Considerations (#139, #125) added.
- Add IANA Considerations (#130)
- Remove an unnecessary MUST about bursts (#157)
  - Ack Frequency doesn’t change burst behavior from RFC9002
- Clarify the default Reordering Threshold (#145)
- Rev the Transport Param codepoint (#173)
- Remove an unnecessary MUST (#174)
Open Issue
Is One ACK per RTT enough? (#168)

Current text:
... a sender SHOULD cause a receiver to send an acknowledgement at least once per RTT if there are unacknowledged ack-eliciting packets in flight.

- If $\text{min\_ack\_delay} > \text{RTT}$, this can be tricky
- Proposal is to change it to 2, but 3 or 4 are typically better

Options: Do nothing, update to 2, drop normative text, add a RECOMMENDED value of 4, ?