Ack Frequency

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

QUIC WG, San Francisco, July 2023

Frame Formats in -11

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

```
IMMEDIATE_ACK Frame {
    Type (i) = 0x1f
}
```

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.

Recent changes since -05 are quite small

- One byte frametype for IMMEDIATE_ACK and two byte frametype for ACK_FREQUENCY ([#181](#))
- IMMEDIATE_ACK is good PTO ([#214](#))
- Recommend sending IMMEDIATE_ACK after long idle periods ([#217](#))
- Clarifies when to send an immediate ACK ([#319](#))

Open Issues

Immediate ACKs on 'missing' packets ([#321](#))

For packets within 'Reordering Threshold', they would only be spuriously declared lost if too much time passed

- Difficult to know what 'too much' time is, but it must be at least 'Request Max Ack Delay' from the time the ACK is received.

For packets farther than 'Reordering Threshold' less than Largest Acked, they are already declared lost.

- Only value in an immediate ACK is if it arrives before the data is retransmitted.

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Next Steps?