Issues editors believe are resolved

To be merged and closed soon:

- **Rename** 'Packet Tolerance' to 'ACK-Eliciting Threshold' #55
- **Change** 'Update Max Ack Delay' to 'Request Max Ack Delay' #56
- **Set limits to** `min_ack_delay` and `max_ack_delay` #57
FYI: Tweaking ACK-Eliciting Threshold’s meaning

Issue #49 Off-by-one in packet tolerance (PR#58)

Adjusts the meaning of this field by 1 and changes 0 from an invalid value to meaning ACK every packet.

NOTE: This changes interop, so the PR changes the min_ack_delay Transport Parameter codepoint
FYI: Cap ACK-Eliciting Threshold if it’s too large

Issue #45 Maximum Values for Frame Fields (PR#59)

If a receiver receives an ACK-Eliciting Threshold larger than what it wants to store (ie: it uses a uint8), what should it do?

Proposed Resolution:

MUST cap the received value to the largest supported value.
Where can ACK_FREQUENCY appear? (#22)

- Should min_ack_delay be remembered for 0-RTT? (#40)

**Key Question:** Can it appear in 0-RTT?

=> If so, must remember min_ack_delay

Otherwise you could accidentally send an invalid ACK_FREQUENCY frame.
Where can ACK_FREQUENCY appear? (#22)

Pros of allowing ACK_FREQUENCY in 0-RTT:

- Why forbid it?
- Reduction of ACKs for large client to server 0-RTT flights

Pros of forbidding ACK_FREQUENCY in 0-RTT:

- max_ack_delay isn’t remembered, so more consistent
- min_ack_delay may vary by server platform/OS, Causing 0-RTT rejections

Recommendation: Make ACK_FREQUENCY 1-RTT only
Eliciting an immediate ACK (#34)

Problem: ‘Ignore_order’ = true

=> skipping packet numbers no longer elicits an ACK

Solutions

1. Use an unused bit in the header
2. Use a 1 byte frame
3. Use a 1 byte frame and offer a STREAM frame codepoint that elicits an immediate ACK
Eliciting an immediate ACK (#34)

1) Use an unused bit in the header

Pros:
- Re-packetization is easy, since no extra frames are necessary for retransmission of a packet’s payload
- No byte overhead

Cons:
- Not many header bits left
Eliciting an immediate ACK (#34)

2) Use a 1 byte frame

Pros:
- Simple to implement and understand
- Lots more 1 byte frame types than header bits

Cons:
- Retransmitting previously sent payloads may not fit into a single packet. ie: PTO-ing a full packet of data
Eliciting an immediate ACK (#34)

3) Use a 1 byte frame AND offer a STREAM frame codepoint that elicits an immediate ACK

Pros:

- Fairly simple to implement and understand
- Lots more 1 byte frame types than header bits

Cons:

- Retransmitting data fits into a single packet.
- More complex than a 1 byte frame
Eliciting an immediate ACK (#34)

Solutions

1. Use an unused bit in the header
2. Use a 1 byte frame
3. Use a 1 byte frame and offer a STREAM frame codepoint that elicits an immediate ACK

Proposal: Add a 1 byte frame now and evaluate whether we need the STREAM frame codepoint
Replace Ignore Order with Packet Threshold (#35)

Idea: Send the local Packet Threshold used for loss detection to the peer, so it avoids sending immediate ACKs earlier than when packets can be declared lost. (ie: twiddles)
Replace Ignore Order with Packet Threshold (#35)

Pros:
- Reduces unnecessary ACK-only packets in some cases.
- Causes immediate ACKs that enable loss detection earlier in some cases.

Cons:
- More complex than Ignore Order, which may be prone to implementation errors.

Recommendation: No changes until this has proven value
Next Steps

Merge outstanding PRs and close most issues

=> Ship a -01 draft

Request: If you haven’t already implemented 00, wait for 01, because the inflight changes are breaking.