Quick-Start for DCCP

draft-fairhurst-tsvwg-dccp-qs-00

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Similar to QS with TCP [RFC 4782].

Sender MAY use a Quick-Start request:
- At start of a connection.
- In the middle of a connection.

SHOULD send the request on a packet that requires an acknowledgement (DCCP-Request, DCCP-Response, or DCCP-Data).

MUST NOT make a subsequent Quick-Start Request within four RTTs.
- CCID-3 responds slowly to changes.
### CCID-3 Receiver

- **QS-Requests processed identical to TCP.**

- **On receipt of QS-Request:**
  - Receiver SHOULD immediately send a QS-Response (DCCP Option).

```plaintext
+--------+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|   Type= tbd |  Length=8     | Resv. | Rate | TTL Diff |   | Request|                |
+--------+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|               |                        |       |       |         | Request|                |
|               |                        |       |       |         |       |                |
+--------+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                        QS Nonce                           | R   |
+--------+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
Sender SHOULD NOT ignore a feedback packet with QS-Response option.

Sender enters QS-Mode.

- Sending host sets Quick-Start sending rate
  \[ QS\text{-sendrate} = R \times \frac{s}{s + H} \]

- CCID 3 is rate paced protocol.
  QS packets are naturally rate paced.

Sender exits QS Mode when either:

- A feedback packet acknowledging one or more Quick-Start packets.
- Detection of a loss event.
- A period of one RTT after receipt of QS-Response.

If no reported loss (or ECN marking), enters Quick-Start Validation Phase
Unlike TCP, TFRC receives a feedback once per RTT.

Add a new Quick-Start Validation Phase.
- Period to affirm capacity used by QS packets did not introduce congestion.
- Sender tentatively permitted to continue sending at QS-sendrate.
- Limited to a maximum of 1.5 RTTs (or loss, or feedback for QS Packets)

At the end of the Quick-Start Validation phase:
- Sender stops using the QS-sendrate.
- Uses the standard congestion control mechanisms.
Reported Loss during Quick-Start Mode or Validation Phase

- If no feedback received within Quick-Start Mode or Validation Phase:
  - MUST return to minimum of original rate (at start of QS Mode) and one half of QS-sendrate.

- If a feedback packet arrives reporting packet loss
  - MUST immediately leave the Quick-Start Mode or Validation Phase.
  - Enters congestion avoidance phase.
- CCID-3 feedback timer
  - Receiver can use window counter not feedback timer expiry.

- Add CCID-2 text (should be easy)

- Which WG?
  - TSVWG or DCCP?