Quick-Start for TCP and IP

Draft-amit-quick-start-04.txt

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QuickStart with TCP, for setting the initial window:

- In an IP option in the SYN packet,

  the sender's desired sending rate:
  - Routers on the path decrement a TTL counter,
  - and decrease the allowed sending rate, if necessary.
- The receiver sends feedback to the sender in the SYN/ACK packet:
  - The sender knows if all routers on the path participated.
  - The sender has an RTT measurement.
  - The sender can set the initial congestion window.
  - The TCP sender continues using normal congestion control..
- From an initial proposal by Amit Jain

Changes from draft-amit-quick-start-03.txt:

- Added a citation to the paper on "Evaluating Quick-Start for TCP", and added pointers to the work in that paper.
  - Discussions of router algorithms.
  - Discussions of sizing Quick-Start requests.
- Added section on "Misbehaving Middleboxes”.
- Added section on "Attacks on Quick-Start".

“Evaluating Quick-Start for TCP”

- Router algorithms:
  - Minimal algorithms at routers.
  - Also “Extreme Quick-Start” -
    - Maintains per-flow state for Quick-Start flows
- Sizing the Quick-Start request.
  - Problems with overly-large Quick-Start requests.
  - Heuristics end-nodes could use in sizing requests.
- URL “http://www.icir.org/floyd/quickstart.html”

Attacks on Quick-Start:

- Attacks to increase router's processing load:
  - Easy to protect against -

    routers ignore Quick-Start when overloaded.
- Attacks with bogus Quick-Start requests:
  - Harder to protect against.
  - Extreme Quick-Start in routers can help..

Misbehaving Middleboxes:

- Traffic normalizers that rewrite IP TTLs along the path?
  - Interferes with Quick-Start mechanism for validating a Quick-Start request.

Feedback?

- Are we ready for Working Group Last Call?
- Experimental?

Extra viewgraphs:

Heuristics for Sizing Quick-Start Requests:

- The sender doesn't necessarily know the amount of data to be transmitted.
- The sender knows more after an idle period.
- End-hosts might know:
  - The capacity of last-mile hop.
  - The size of the local socket buffer.
  - The receiver's advertised window.
  - Information from the application.
  - Past history of Quick-Start requests.