

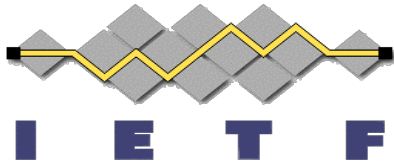
**I E T F**

**Faster Restart for TCP Friendly Rate Control (TFRC)**  
**draft-ietf-dccp-tfrc-faster-restart-02.txt**

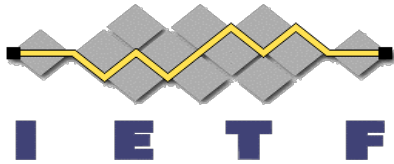
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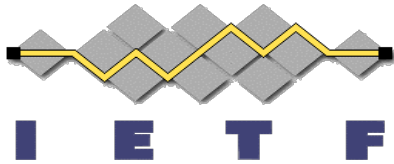
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- Idle period:
  - Sending rate reduces down to 4 packets per RTT.
  - Slowstart takes long for long delay paths/high rates.
- Sending rate limit
  - Can be at most twice receiver rate.
  - Not sufficient for when application is bursty.
- Not suitable for “bursty” applications that are data-limited or occasionally idle.

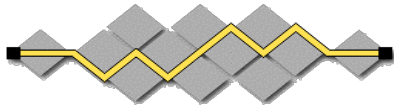


- Rapidly increasing rate to a previously achieved rate after idle or data-limited periods can be justified.
- FR modifies TFRC
  - Idle period:
    - Sending rate reduces down to 8 packets per RTT (for small packets) or 4 packets per RTT for large packets.
    - Quadruple the sending rate in absence of congestion.
  - Sending rate limit:
    - Allows four times the receiver rate.



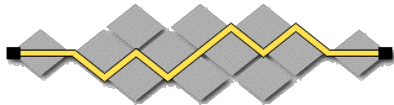
- Significantly updated Introduction to reflect FR's general applicability to idle and data-limited periods.
- Section 3.1 on min sending rate during *idle periods*
  - transport layer MUST send a minimum of  $X_{\text{ping}}/s$ ,
    - $X_{\text{ping}} = \min(X, s/4R)$
    - Must send a packet every 4 RTTs.
  - Provides endpoint RTT samples.
  - These packets are not reported to the application by the transport layer.
  - MUST use DCCP-Data or DCCP-DataAck packets with zero-length application data.

Notes: When feedback is received for these packets, sender should take the RTT samples, but should not use that to calculate sending rate?



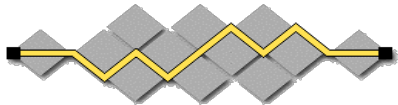
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- Section 3.2 on *Receive Rate Length*
  - RRL became an option.
  - Revised definition: "*Receive Rate Length* reports the number of packets used to calculate the *Receive Rate*, minus one."
  - Added *Send Receive Rate Length* Feature Negotiation.
  
- Added new variable `X_active_min_rate`
  - The minimum restart rate allowed by Faster Restart in the presence of idle and/or data-limited periods.
    - `X_active_min_rate := min(8*s, max(4*s, 8760 bytes))`.
  
- Updated the pseudocode in section 3.3
  - Added a new phase to make sure `X_rcv` does not drop too low as the result of a slow send rate.



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- Section 3.4 on *nofeedback* timer expiry
  - Sending rate never drops below 4 packets per RTT, or 8 packets per RTT for small packets, as the result of an idle period.
  - Changes Step 1 in Section 4.4 of RFC 3448:
    - If the sender has sent no data whatsoever since the time the nofeedback timer was set, and
    - $X_{\text{active\_min\_rate}}/2 \leq X_{\text{recv}} \leq X_{\text{active\_min\_rate}}$ ,  
 $X_{\text{recv}} := X_{\text{active\_min\_rate}}/2$ .
    - Else if  $X_{\text{calc}} > 2 * X_{\text{recv}}$ , then  
 $X_{\text{recv}} := \max(X_{\text{recv}}/2, s/(2 * t_{\text{mbi}}))$
    - Else  
 $X_{\text{recv}} := X_{\text{calc}}/4$ .
- Added simulation scenarios in Appendix.



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## Issues for the next rev

- Definitions for *data-limited* and *idle periods*.
- Fix NiTs in wording
- Simulations to be performed based on revised draft.
- >>>Other issues to be added...