TCP-Friendly Congestion Control Algorithms

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Review: Wireless Congestion Control

- Problem
  - TCP interprets packet loss as congestion signal → so it reduces cwnd
  - Reduction in congestion window reduces throughput
- Two basic types of approaches
  - Hide wireless packet losses from TCP
  - Make TCP aware of wireless loss
- Three implementation schemes
  - Link layer proposals: hide link loss
    - local retransmission
    - FEC: reduce packet loss
  - End-to-end proposals: distinguish reasons of loss and detect multiple losses
    - SACK, ELN
  - Split-connection
TCP-friendly CC: What is the Problem?

- TCP congestion control is successful
  - One major reason for the remarkable stability of the Internet despite rapid growth in traffic, topology, and applications
  - 90-95% of current Internet traffic is TCP
- New applications are better served by a smoother bandwidth usage profile
- How to design new congestion control algorithms to share bandwidth with TCP flows?
  - Which TCP?

Evaluation of the Problem

- Is the problem important now? In the future?
- What are the risks in solving this problem?
  - In other words, what can make the problem not important?
- What make the problem difficult?
- If you can solve the problem perfectly, what should the solution look like?
  - In other words, what are the requirements?
**A Classification of TCP-friendly CC Algorithms**

- Binomial\((k, l)\)
  \(l < 1; k+l=1\)

- TEAR

- AIMD\((a, b)\)
  \(a = \frac{4(2b-b^2)}{3}\)
  \(b < 0.5\)

- TFRC\((6)\)

- TCP-compatible

- TCP-equivalent
  - RAP
  - TCP

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**Evaluation of Slow-Responsive TCP-Friendly CC**

- **Concerns (the “bad”)**
  - What are the concerns, potential bad effects?
  - Did the authors evaluated the concern?
  - Is the evaluation satisfactory?

- **Benefits (the “good”)**