

# **The Range of Congestion Control Feedback**

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## Current congestion control feedback: for best effort traffic

- Packet drops.
- ECN:
  - A single bit, semantically equivalent to a drop.
  - In different diffserv classes, the semantics of the ECN codepoint could be modified (e.g., congestion-based pricing).
- Various proposals for more intelligence at the end-nodes:
  - Packet pair.
  - TCP Vegas.
  - Etc.

## The problems:

- Starting up quicker than slow-start.
- Making prompt use of newly available bandwidth.
- Finer-grained feedback for highspeed flows.
- Efficiency, stability, etc.

## The range of options:

- Info from routers about the initial window size/sending rate.
  - How far can we get with this,
  - along with the modifications to the response function?
- ...
- At the other end of the spectrum:
  - Fine-grained per-packet info along the lines of the Katabi proposal.
  - How pressing is the need to think about things like this?

## Larger initial windows

- An IP option in the SYN packet gives the sender's desired initial window.
  - Routers on the path decrement a counter,
  - and decrease the allowed initial window, if necessary.
- If all routers on the path participated:
  - The receiver sends the allowed initial window in the SYN/ACK packet, in the transport header.
- This is from a proposal by Amit Jain (from Netscaler).

**How urgent is it to go farther?**