ACC: Active Congestion Control

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Outline

What is Active Congestion Control (ACC)?
ACC and ARP
Implementing ACC in ASP EE

ACC Goals

- Show that active networking techniques can improve feedback-based congestion control
- Expand the ASP framework to support congestion control
- Explore the design space of active feedback congestion control

The Problem with Feedback
(w/ High BW-Delay)

Finding congestion takes 1 RTT
Sources aggravate congestion until they adjust
Endpoint-based control must
- Infer congestion
- Change future behavior
Move Control to the Congestion

Feedback deletes “unsent” packets
Sources change their state retroactively
Active control allows
  - Explicit congestion detection
  - Immediate behavior modification

ACC Algorithms

Each packet includes endpoint state information

On packet loss the router:
  - Sends the new state to the endpoint
  - Filters traffic from the network

ns Simulation Studies

Simple TCP style algorithms
  - Notify host
  - Filter one window of traffic

Results
  - As much as 18% throughput improvement on high BW-delay paths with bursty traffic

Drawbacks
  - Uncertain performance
  - No existing active transport protocol
  - No existing endpoint support

ACC and ARP

Enabling features of ARP (ASP EE)
  - Virtual network support (VNET)
  - ABONE support
  - Good development framework
Drawbacks??

Performance
- 4-5 Mbps host-to-host on a crowded ethernet
- Implementation can be further tuned

Transport
- Development friendliness
- Partridge's RDP

Endpoint
- Endpoint as another router
- User agent is another AA

ACC Implementation

Implementation Phases

Phase 1
- VNET implementations of kernel features

Phase 2
- Optimize performance-critical functions

Motivation
- Fast prototype
- Develop high performance ASP features

Current and Future Work

- Implement transport (well underway)
- Activate congestion control
- Evaluate congestion algorithms
- Optimize critical functions