



ACC: Active Congestion Control

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Outline

What is Active Congestion Control (ACC)?

ACC and ARP

Implementing ACC in ASP EE

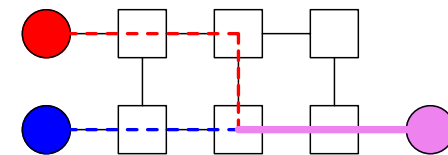


ACC Goals

- 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)

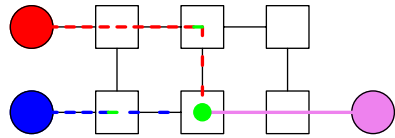


Finding congestion takes 1 RTT
Sources aggravate congestion until they adjust
Endpoint-based control must

- 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
- Detailed discussion at <http://www.isi.edu/~faber/pubs/active.ps>



ACC and ARP

Enabling features of ARP (ASP EE)

- Virtual network support (VNET)
- ABONE support
- Good development framework

Drawbacks

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



Drawbacks??

Performance

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

Transport

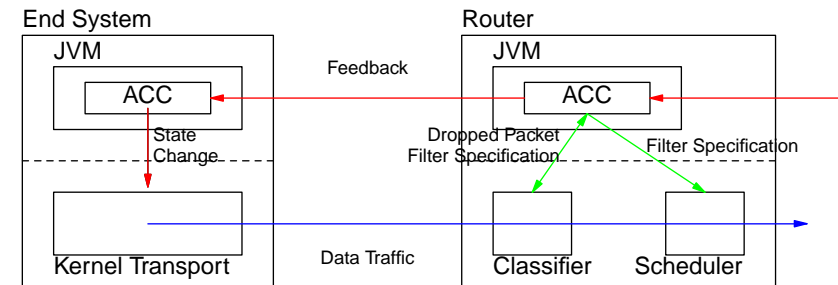
- Development friendliness
- Partridge's RDP

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