



# Active Networking for Feedback Congestion Control

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Supported by the Defense Advanced Research Projects Agency



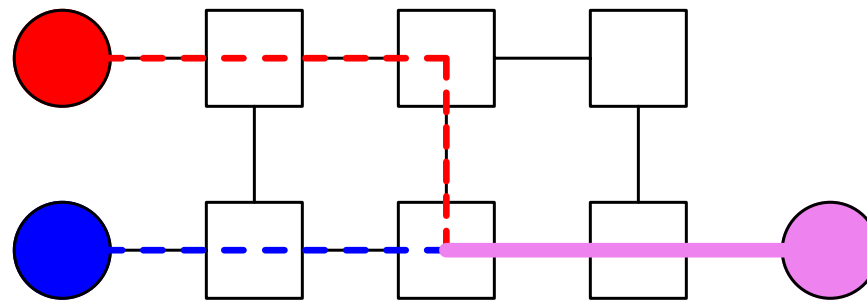
# Outline

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- The Idea:  
Using Active Nets To Shorten the Feedback Loop
- The Implementation:  
Requirements of an AN System for Feedback
- The First Steps:  
Early Simulation Results
- The End:  
Conclusions



# The Problem with Feedback

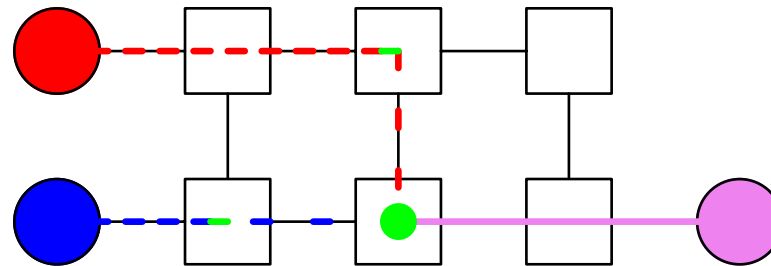


- Finding Congestion Takes 1 RTT
- Sources Aggravate Congestion Until They Adjust
- Bandwidth–Delay Product Is Distance



# Move Control to the Congestion

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- Traffic Adjusted at the Router
- Feedback Deletes “Unsent” Packets
- Sources Change Their State Retroactively



# Requirements

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- From the AN System
  - Drop Indication to Capsules
  - Packet Filtering Capability
- From the Software
  - Compact State Representation
  - Distributed Control Algorithms



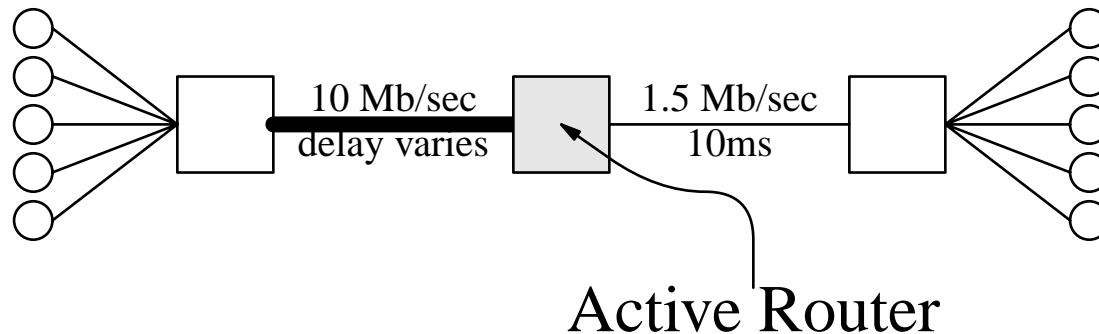
# Simulation Study

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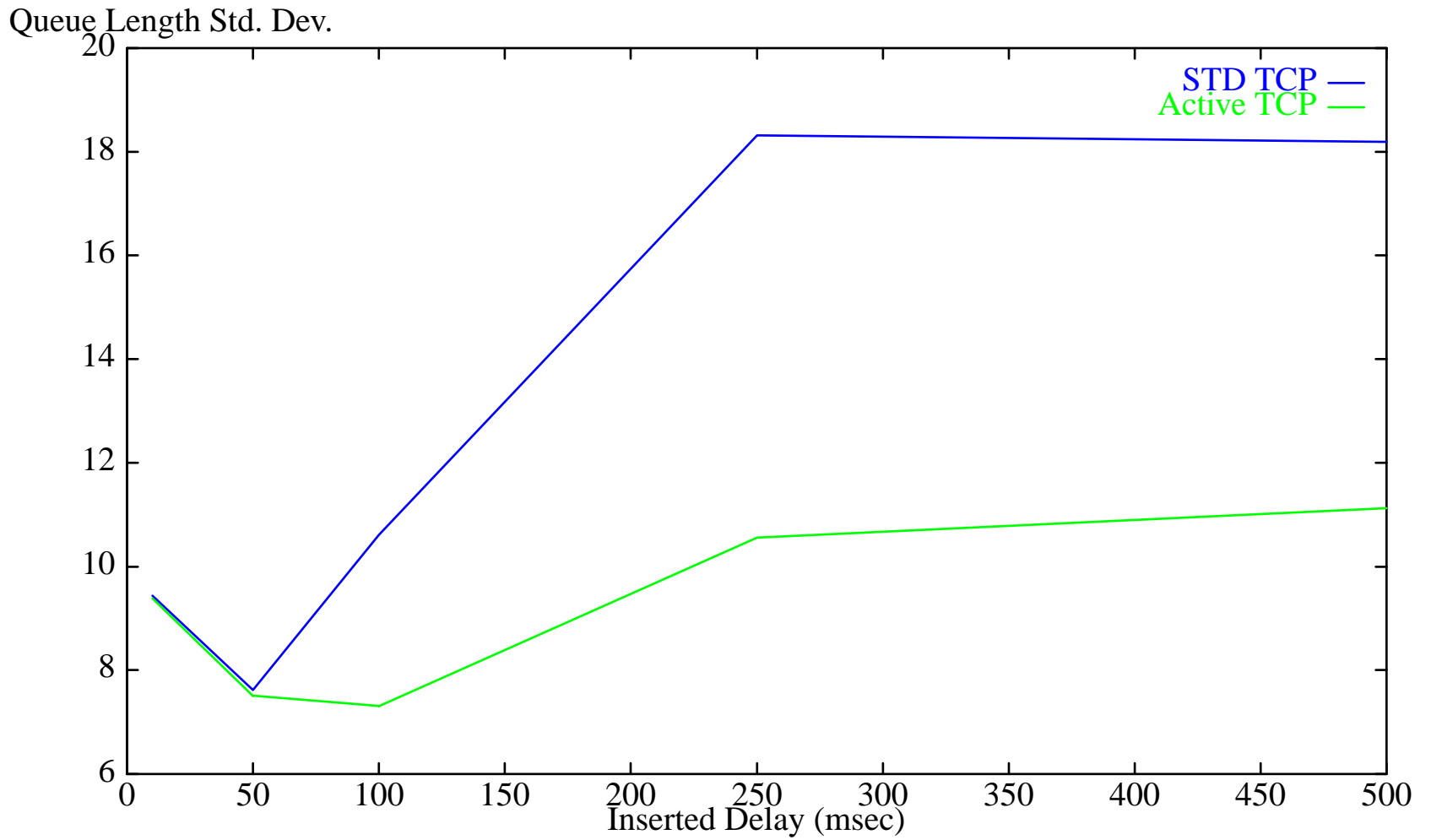
- Study System in High BW-Delay Environment
- Implemented Simplified System in ns :
  - Packet Loss → Close Window Message
  - Discard 1 Window
- ns : <http://www-mash.cs.berkeley.edu/ns/ns.html>
- Simulation Scripts: [faber@isi.edu](mailto:faber@isi.edu)

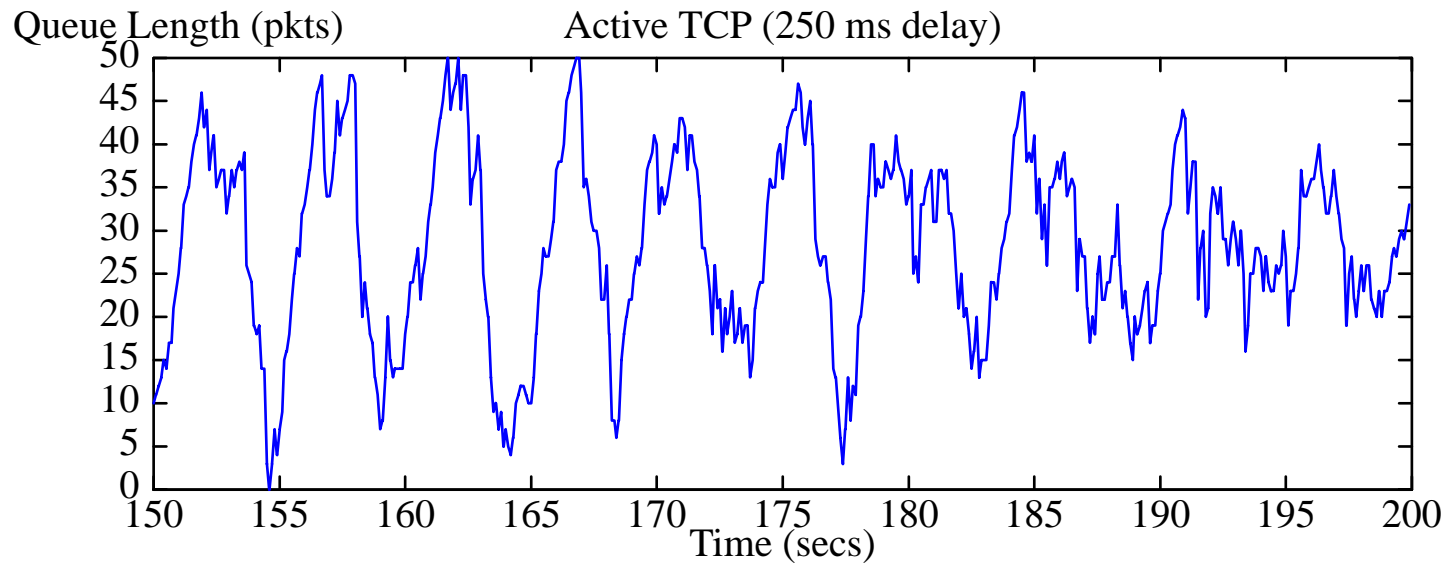
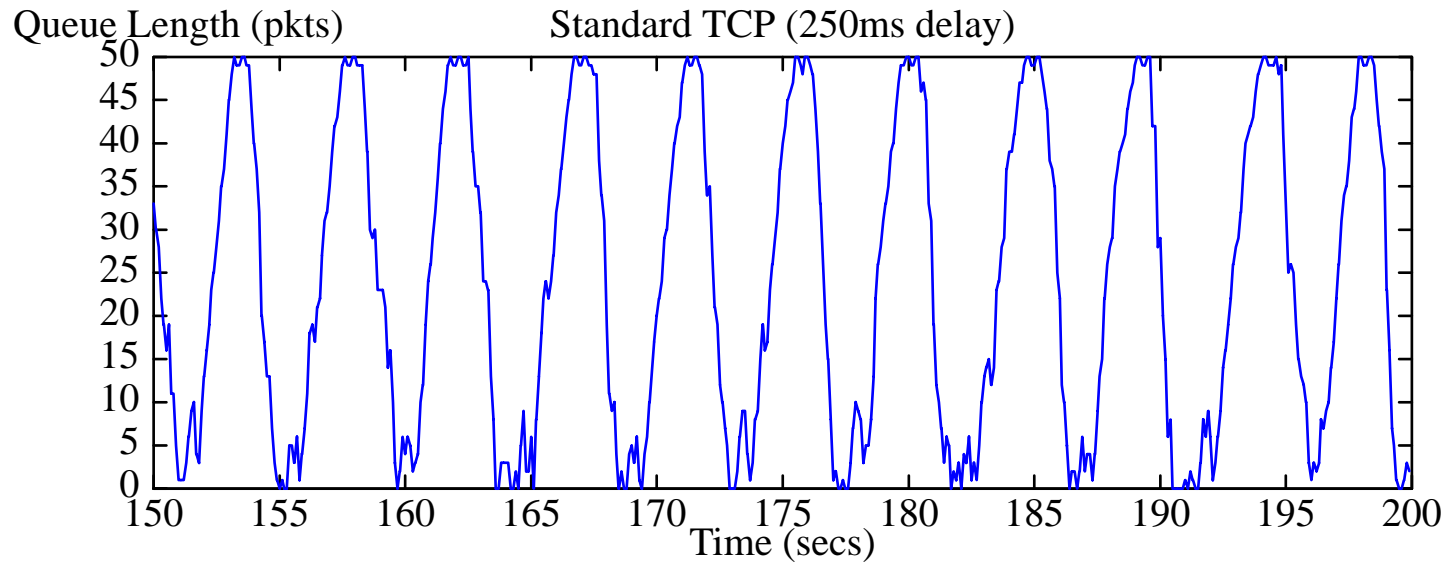


# Simulation Configuration



- TCP Reno Sources Extended for AN
- RED and DropTail Routers
- Access Lines are 10 Mb/sec 10 msec







# Conclusions

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- AN Can Extend Feedback Systems Into High BW/Delay Nets
- Small AN Infrastructure Produces Big Benefits
- Work In Progress: Watch This Space