A Case for Exogenous Losses

Exogenous Losses
- Produced outside of the transmission control system
- Independent from the source behavior
- Independent from its long-term fair share
- Unavoidable Problematic “Noise”
- Wireless and cross-traffic losses

Level of Impact

Why low levels of exogenous losses help?
- Impose an upper limit on TCP throughput
- Randomness in losses prevent monopoly

Model
- Extend a fluid Model
- Quiescent loss rate

Active Tuning of Exogenous Losses
- Exogenous Losses are changing with time
- Ex: Sinusoidal (long and short term behavior)
- Long-Term Adjustments
  - Inefficiency to efficiency
- Short-Term Compensation
  - Smoothness

Leveraging Exogenous Losses

XQM (eXogenous aware Queue Management)
- To be placed at the edges of the Network
- Will maintain state for flows passing through
- Estimated RTTs are measured from the middle
- Estimated throughput is measured every Measurement Period MP
- Control is applied every control period CP
- MP and CP are decoupled

XQM Principles

Simulations with different number of congested links

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Model Derivations

Conclusions
- Small level of exogenous losses improve fairness while remain efficient
- Noise should not be filtered out blindly (SNOOP and ITP)
- XQM can achieve fairness and efficiency through tuning exogenous losses


This work was supported in part by NSF grants ANI-0095988, ANI-9986397, EIA-0202067 and ITR ANI-0205294, and by grants from Sprint Labs and Motorola Labs.