

# QoS Debate — Net Neutrality

Stanislav Shalunov <shalunov@internet2.edu>

Net@EDU, Tempe, 2006-02-06

# What is Quality of Service (QoS)?

- (I only discuss forms of QoS with elevated priority here.)
- One fundamental goal: increase quality
- Two fundamental tools: drop packets; delay packets
- Pessimistic view: zero-sum game, scarcity, rationing
- Two decades of research
- Almost no deployment in inter-domain setting

## QoS proponents' claims

- “QoS is necessary to provide guarantees of service”
  - Wrong: QoS guards against transaction failures due to network congestion at the cost of increasing the likelihood of other failures. Fiber networks don't need to have congestion.
- “QoS allows greater network use without degradation”
  - Misleading: while this can be literally true, the created capacity per dollar is lower with QoS.
- “QoS prevents transit service from being a commodity”
  - True (and not in the interests of the consumer).

## Nature of fiber networks

- Dark fiber is inexpensive
- Practically unlimited spectrum (and thus capacity) of any strand
- Lighting can differ vastly in cost (from very expensive with SONET to dirt-cheap with Gigabit Ethernet)
- Capacity can be extremely cheap and quite easy to add
- Removes the scarcity, without which QoS is worthless

## **Cost: QoS vs adequate provisioning**

- Largely meaningless “tradeoff” with fiber: you need to work to create scarcity with fiber
- Problem: Provide a certain level of service to a given traffic class
- Cheapest solution: Provide perfect service (near-zero loss and speed-of-light delay) to all traffic
- Cheap and can’t get any better than that
- QoS costs: support; billing; equipment; loss of robustness (configuration errors, equipment limitations, emergent behaviors of complex systems)
- Gigabit Ethernet service can cost tens of dollars per month (Wellington, Seoul, Taipei are getting there): two orders of magnitude better than with rationing!

## Two futures

Our world	Their world
Competition at the last mile	Duopoly
Abundant capacity	Artificial scarcity
New applications	Only with telcos' permission
Simple billing	Per-connection accounting
Simple, cheap networks	Complex, expensive networks
1 Gb/s to the home	10–30 Mb/s to the home