



>> Resilient Packet Ring Study Group (RPRSG) QoS Architecture

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July 11-13, 2000

IEEE 802 Plenary – La Jolla, CA: RPRSG

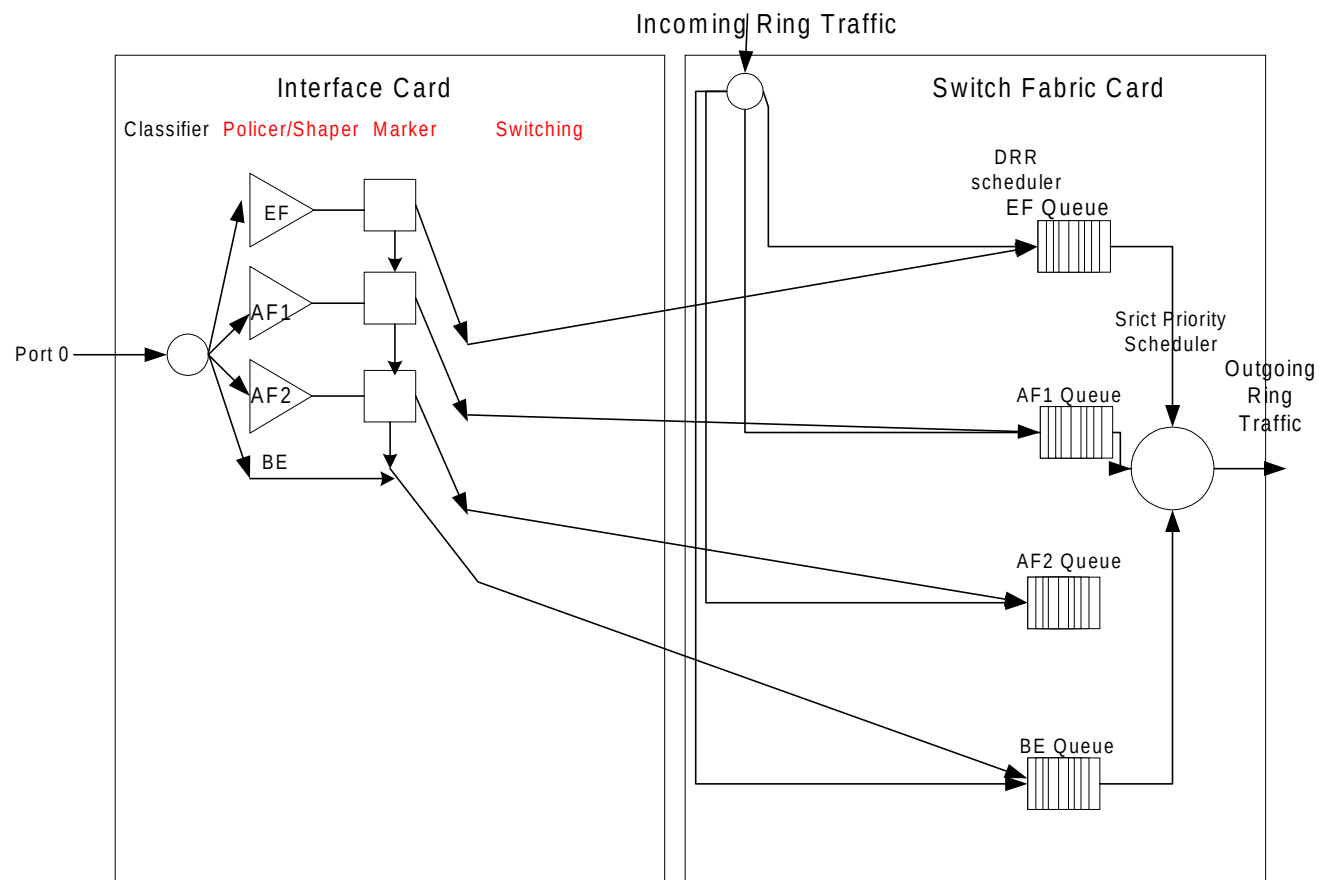
Multi-Service QoS Support

- SLA support using class based traffic separation
 - ◆ EF: Provisioned time sensitive class
 - ◆ AF1: Provisioned time insensitive class
 - ◆ AF2: Provisioned time insensitive class over-committed
 - ◆ BE: Best effort class
- Flow Control and Congestion Control
 - Random early discard (RED)
 - Penalty Box for UDP traffic

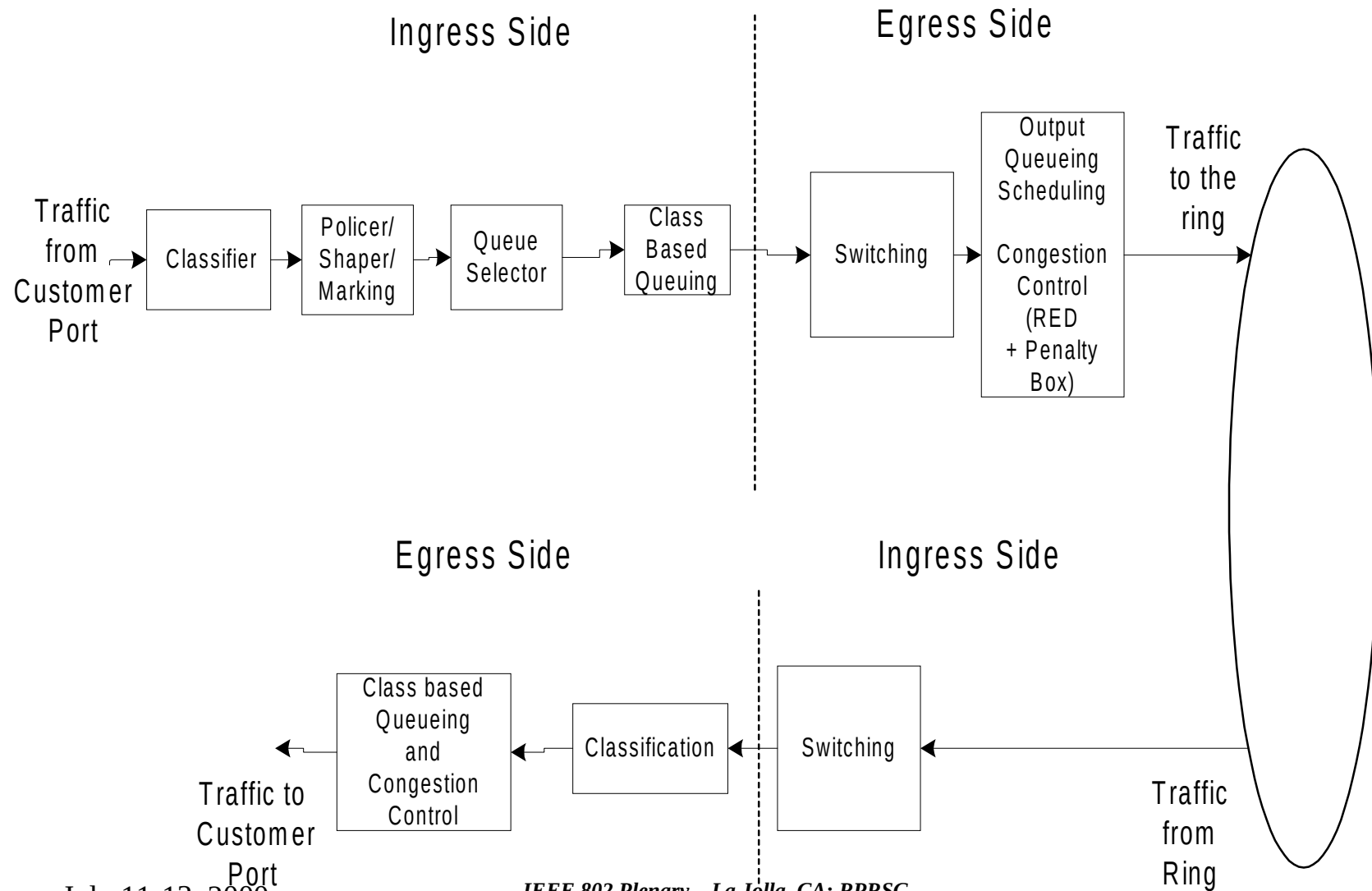
Multi-Service QoS Support

- Flow control and congestion control mechanism
 - ◆ Localized decision making
 - ◆ Uses proven congestion control algorithm
 - ◆ Inter-node messaging not required
 - ◆ Achieves fairness
 - Node based fairness
 - Provisioned unfairness

IP QoS Architecture



IP QoS Functional Blocks

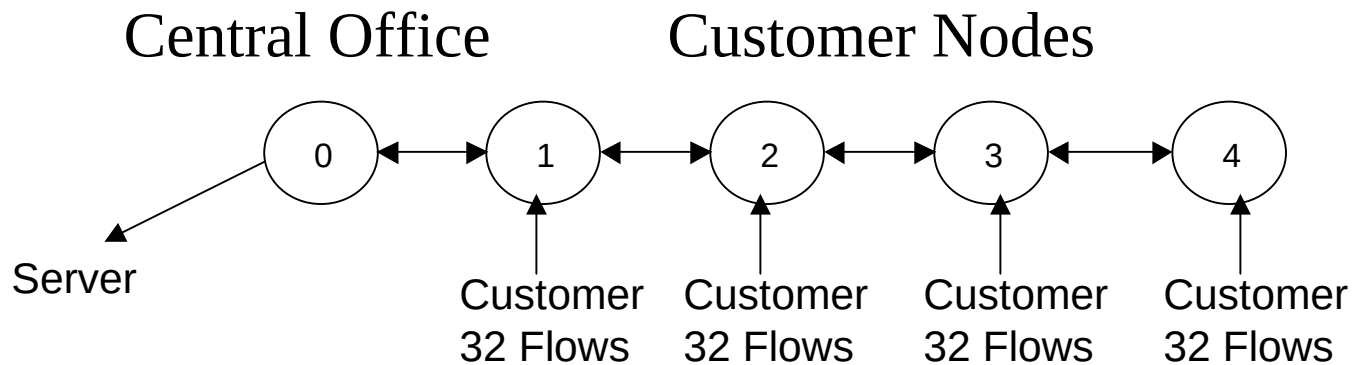


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Simulation Setup

- Simulation for only BE class (unprovisioned) traffic
- Results:
 - ◆ Sent and received throughput by each node
 - ◆ Sent and received throughput by each application



Simulation Parameters

Link Rate: 1Gbps

Link Delay: 1km (0.5ms), 10km (0.05ms), and 100km (0.005ms)

Queue Discipline: Drop Tail, RED

Number of flows per node: 32 ftp/TCP flows/node– all destined to the CO;

Packet size: 500 bytes

Simulation Setup

- Normally RED parameters:
 - ◆ Pipe Size = Link rate * Round Trip Time
 - ◆ Queue Size = (1 to 1.5) * Pipe Size
 - ◆ Min Threshold = (0.1 to 0.3) * Pipe Size
 - ◆ Max Threshold = (1 to 1.3) * Pipe Size

Old RED vs. New RED

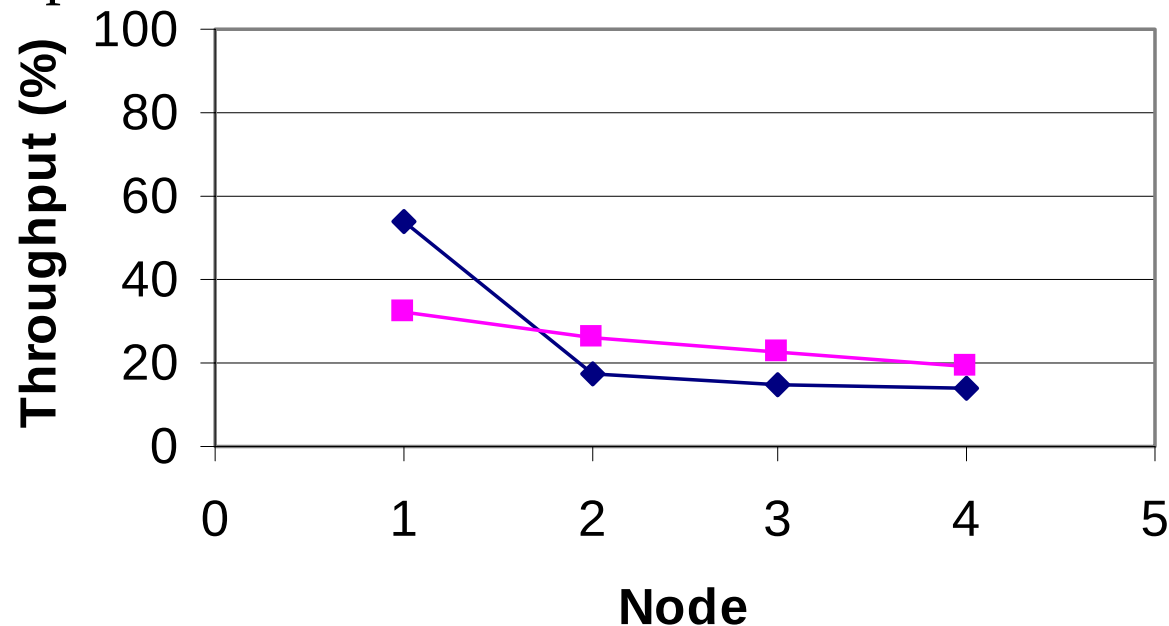


- New RED performs better than Old RED with
 - ◆ Increasing number of flows
 - ◆ Increasing link speeds
 - ◆ Different round trip times
 - ◆ Different traffic patterns: WEB vs. FTP
- NS2 implementation only available for old RED
- NS2 code for new RED expected to be released soon

Performance Results:

Bandwidth share of each node

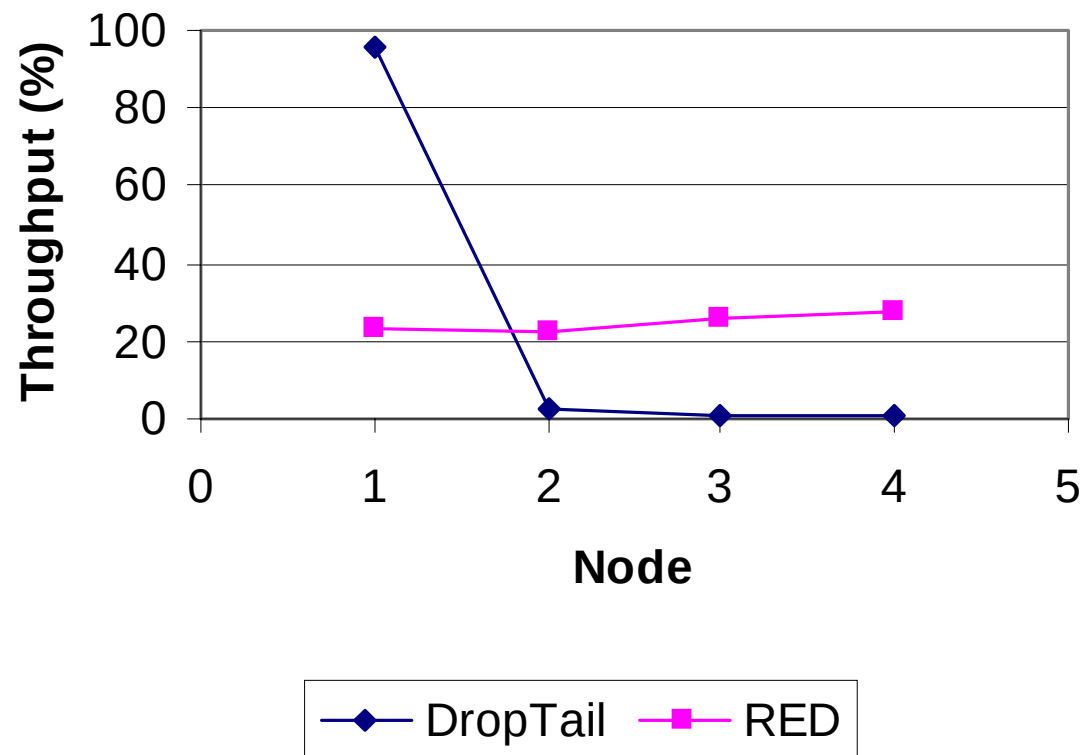
- 1000 Mbps, 100 km Links;
- Queue Size = 1000 Packets
- RED parameters: 150 and 1000 Packet Thresholds



Performance Results:

Bandwidth share of each node

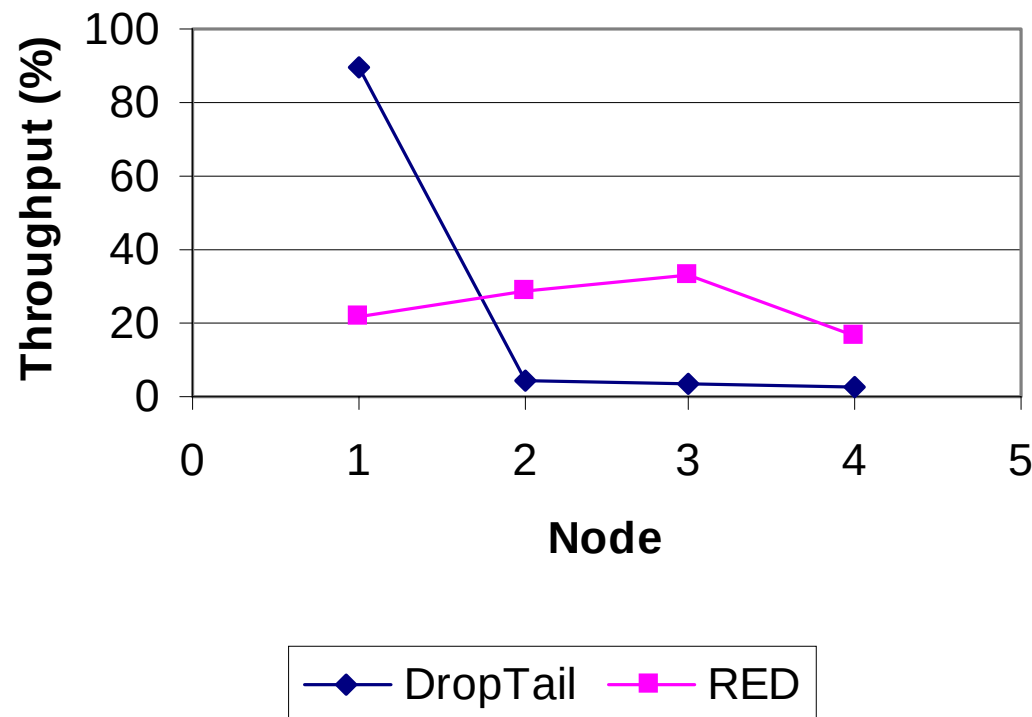
- 1000 Mbps, 10 km Links;
- Queue Size = 200 Packets
- RED Parameters: 30 and 130 Packet Thresholds



Performance Results:

Bandwidth share of each node

- 1000 Mbps, 1 km Links;
- Queue Size = 100 Packets
- RED Parameters: 10 and 30 Packet Thresholds



Conclusion

- RED creates fairness in best effort class
 - ◆ Across distances and link rates
- RED can create provisioned unfairness
 - ◆ Need simulations
- New RED simulations should improve results
- Need Penalty Box implementation for UDP flows
 - ◆ Simulate CHOKe