Initial Simulations
IEEE 802 RPR Study Group

Khaled Amer

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Agenda

- Objectives and goals of presentation
- Suggestions for starting common simulations scenarios
- Discussions

Objectives

- Establish starting point for simulation scenarios (subset of metrics presented before)
- Discuss comparison simulations of RPR vs. Ethernet solution?

Suggestions for Starting Simulation Scenarios

- Testing Basic Ring Parameters
  - Ring Performance
  - Congestion Control
  - Fairness

Suggestions for Later Simulation Scenarios

- Comparison of RPR vs. Ethernet Switches
  - Performance characteristics
  - Switch-over characteristics
- Spatial reuse

Ring Performance

- Metrics:
  - Link utilization under heavy loads
    - Flow control overhead
  - Global throughput

Congestion Control

- Metrics:
  - Per class throughput in the presence of congestion
  - Per node throughput in the presence of congestion
  - Per conversation (or flow) throughput in the presence of congestion

Fairness

- Metrics:
  - Per class throughput and end-to-end packet delay and jitter
  - Per node throughput and end-to-end packet delay and jitter
  - Per conversation (or flow) throughput and end-to-end packet delay and jitter

Scenarios that demonstrate fairness in overload conditions

Suggested Starting Configuration

- Dual Ring
- 16 nodes (0 - 15)?
- Ring running under capacity and well as over capacity (overload)
- Ring circumference (100Km, 1000Km)?
- Ring rate: 10G

Suggested Starting Applications

- Hub application
  - 50% of the traffic is generated by all nodes and flows to the hub node (let's say node #15)
  - 50% of the traffic is generated by the hub node and flows to all the other nodes
- Random source/destination pairs
  - Would demonstrate spatial reuse effect better than hub application
  - Need to come up with some common way of generating the random source/dest pairs

Suggested Traffic Scenarios

- Scenario #1:
  - Multimedia (no upper layer protocol or UDP)
- Scenario #2 (later):
  - Data (using TCP)
- Scenario #3 (later):
  - Data (using TCP)
  - Multimedia (no upper layer protocol or UDP)

Suggested Traffic Characteristics

- Packet size distributions:
  - Trimodal (40% 64B, 40% 512B, 20% 1518B)
  - Bimodal (50% 64B, 50% 9KB)
- Committed rate per node
  - 30% of ring capacity / # nodes
  - 60% of ring capacity / # nodes

Suggested Traffic Characteristics ...

- Offered load
  - Each node provides 200% of ring capacity/# nodes
  - Staggered traffic input for each port
- Traffic distribution
  - 10 conversations (flows) per node
  - On/Off with staggering period (more discussion on the reflector)

Suggested Simulation output results

- Throughput per node, per class, per flow
- ETE delay per node, per class, per flow
- Jitter per node:
  - 99.9th percentile of delays (preferred)
- Present the curves and the numbers

Discussions