FECN Performance for Multistage Output Generated Hotspot Configuration

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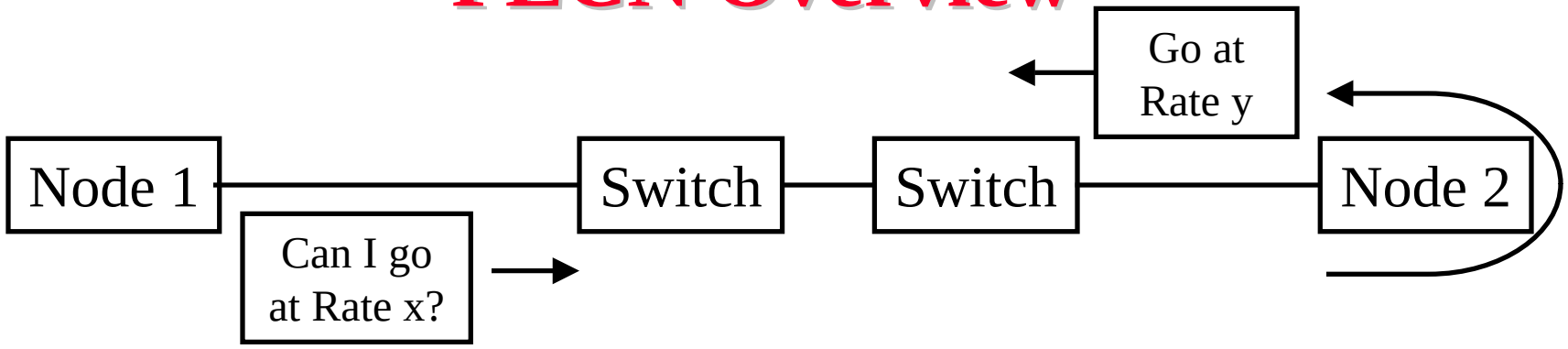
These slides are also available at:

http://www.cse.wustl.edu/~jain/ieee/fecn707a.htm

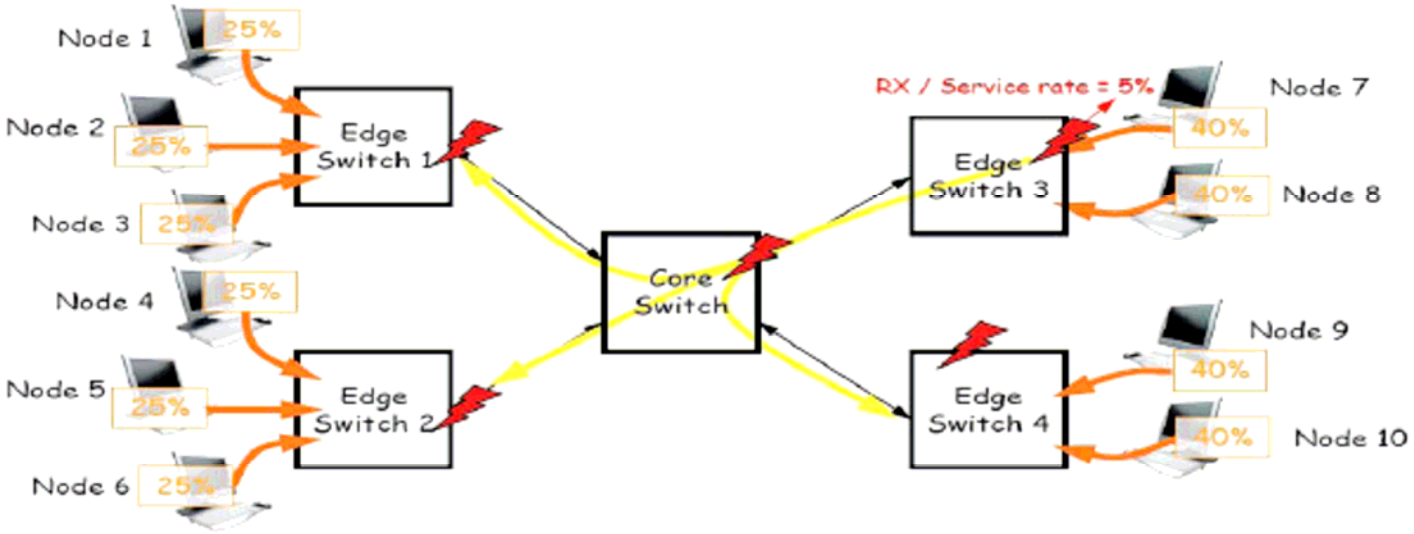
- Multistage Hot-Spot, Fast Start
- BCN
- FECN

FECN Overview



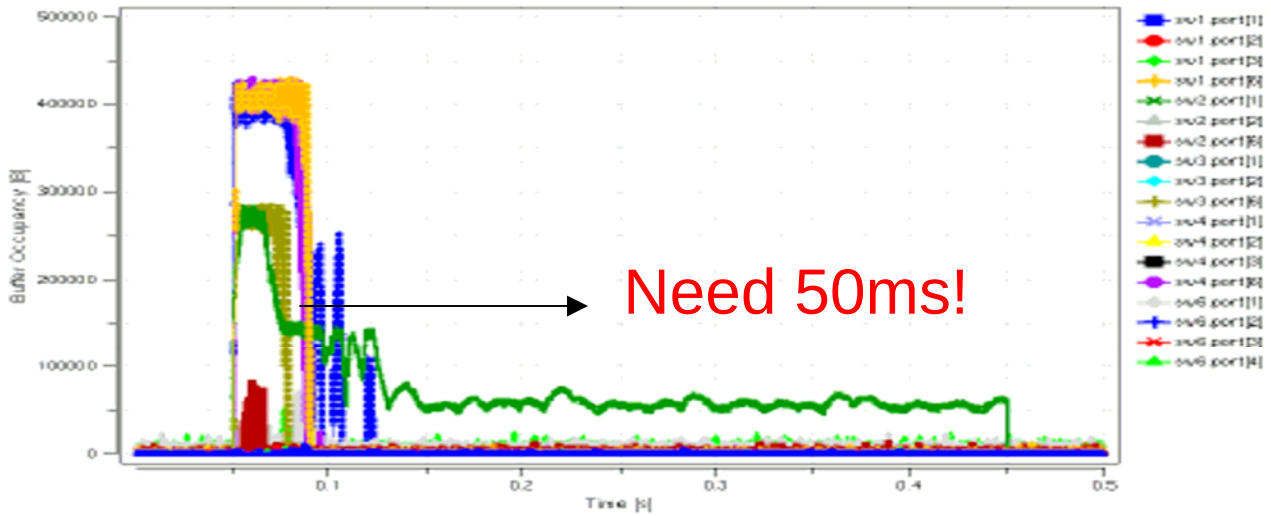
- Periodically, the sources probe the network for best available rate using "Rate Discovery packet"
- The probe contain only rate, Rate limiting Q ID
- The sender initializes the probes with rate=-1 ($\Rightarrow\infty$)
- Each switch computes an "advertised rate" based on its load
- The switches adjust the rate in probe packets down if necessary
- The receiver reflects the RD packets back to the source
- Source send at the rate received

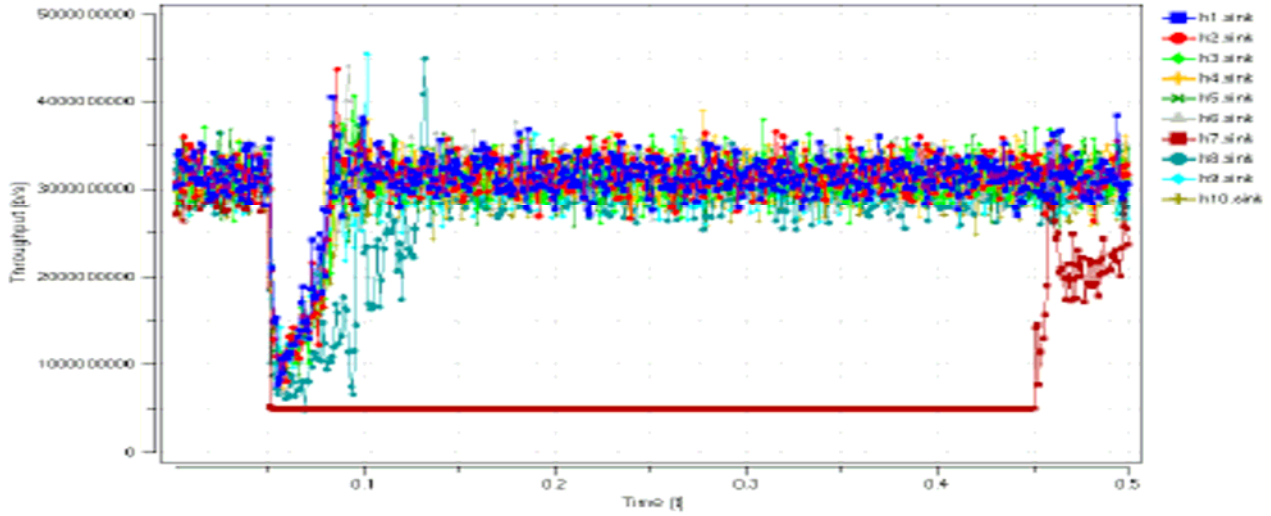
Simulation Results(Multi-Stage Hotspot)



- Multi-stage Output-Generated Hotspot Scenario
  - Link Speed = 10Gbps for all links
  - Loop Latency = 8us
- Traffic Pattern
  - 100% UDP (or Raw Ethernet) Traffic
  - Destination Distribution: Uniform distribution to all nodes (except self)
  - Frame Size Distribution: Fixed length (1500bytes) frames
  - Offered Load
    - Nodes 1-6 = 25% (2.5Gbps)
    - Nodes 7-10 = 40% (4Gbps)

BCN + BCNmax+ 2Qeq + HSSS

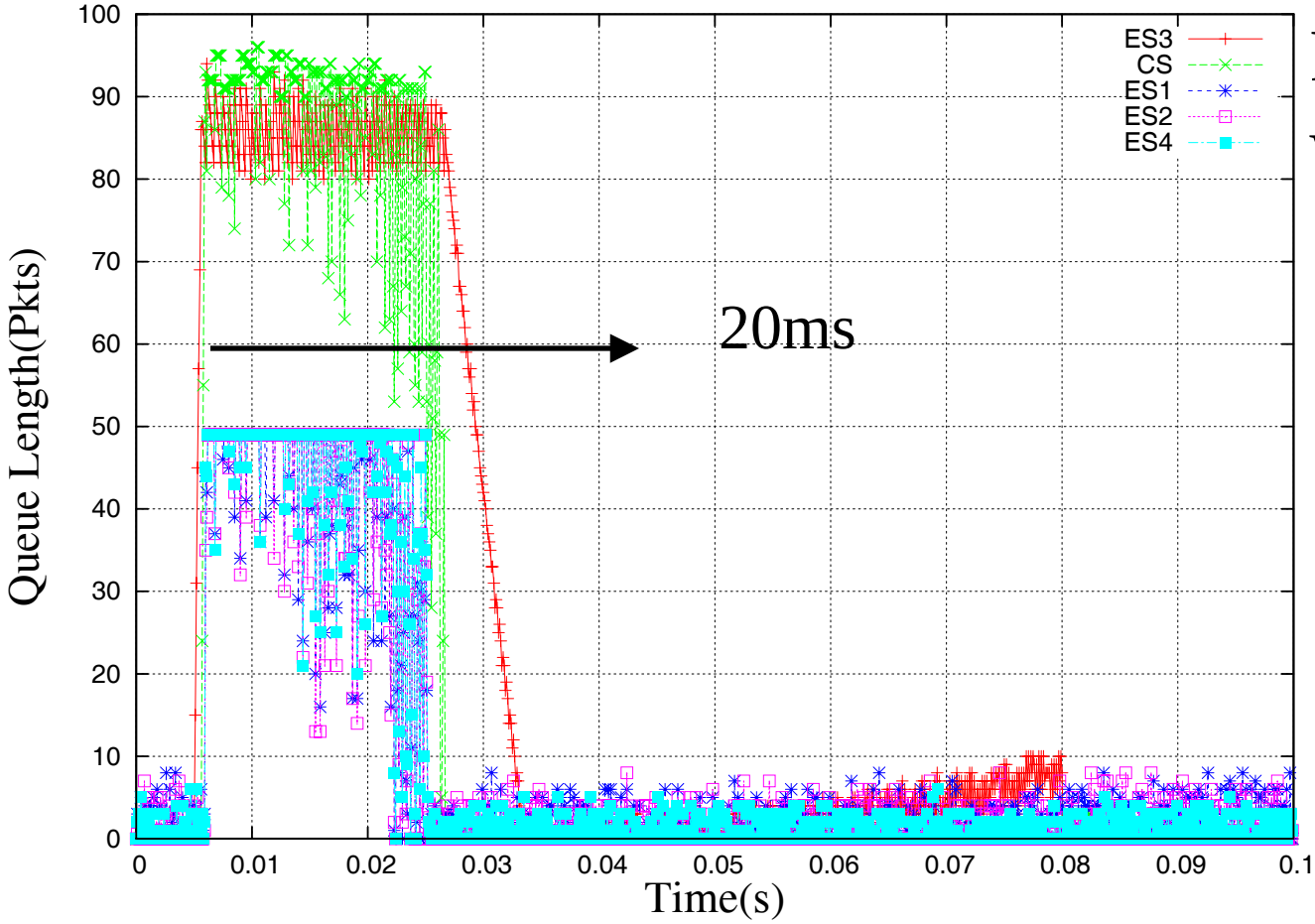




Up to 300ms in other versions

Ref: au-sim-bergamasco-multihop-output-generated-010407v1

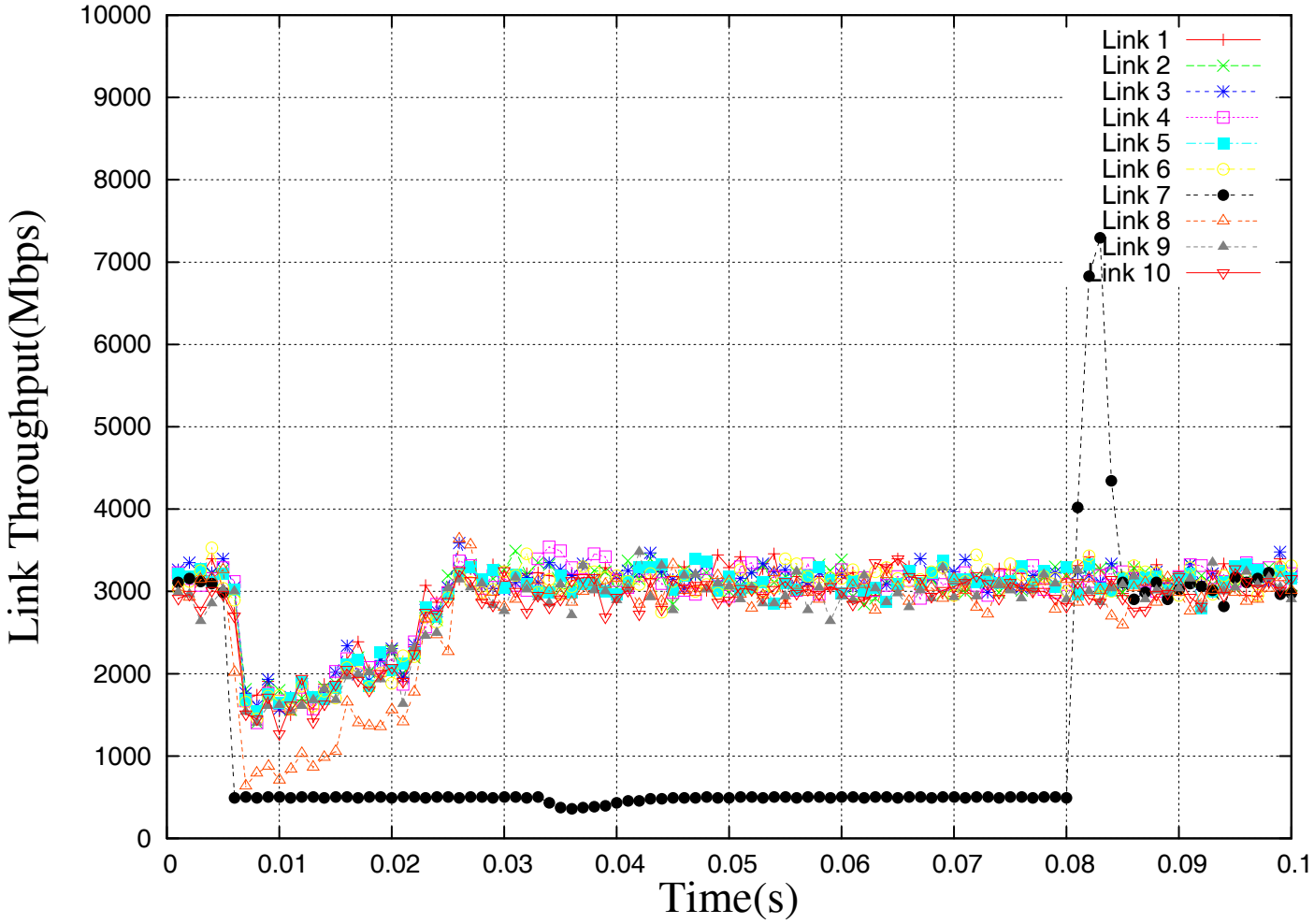
FECN Queue Lengths (T=1ms)



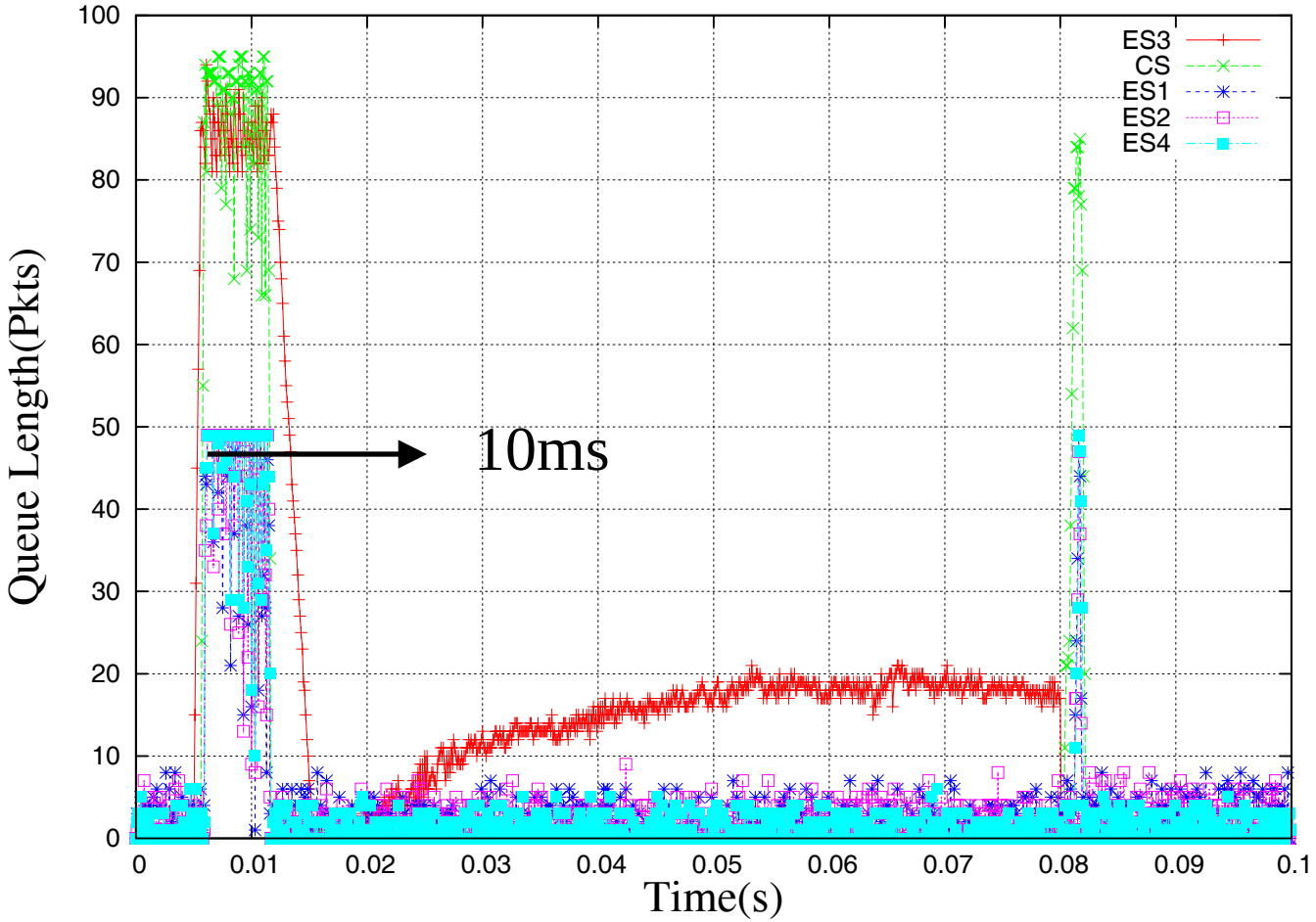
Fast start with Pause

- FECN's transient response is 2.5 times faster
  => Higher overall throughput.

FECN Link Throughputs (T=1ms)

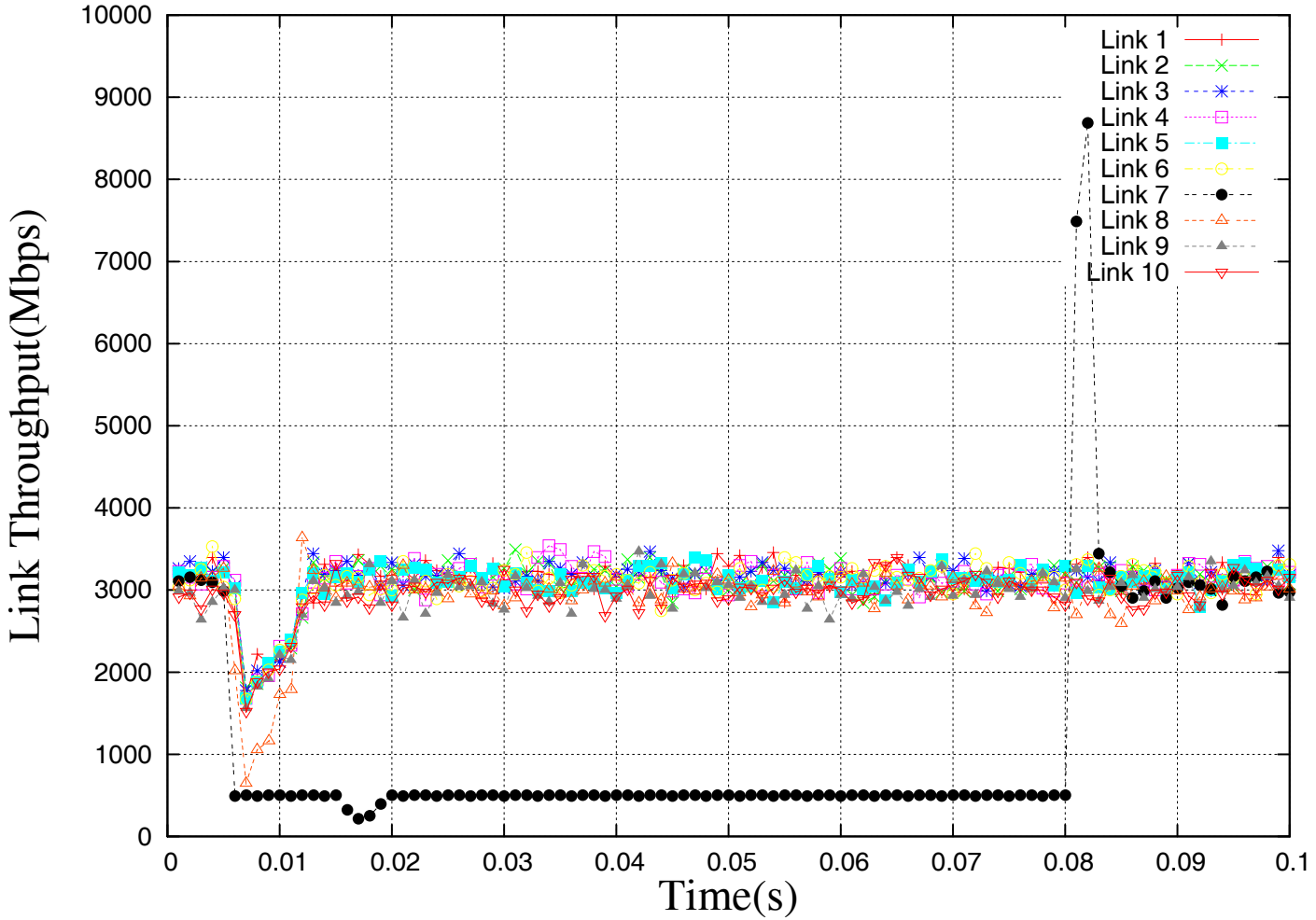


FECN Queue Lengths (T=0.25ms)

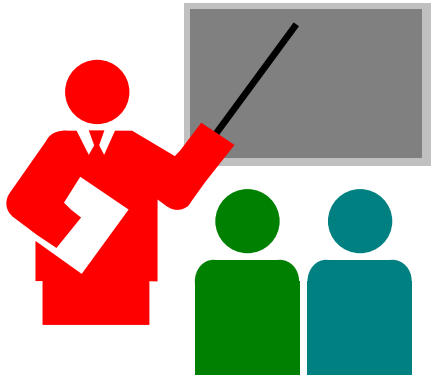


- Conclusion: FECN's transient response is 5 times faster than BCN => Higher throughput

FECN Link Throughput (T=0.25ms)



Summary



1. FECN by itself works well even with Fast start
2. FECN is 2.5 faster than BCN in multi-stage hot-spot cases
3. FECN has ten times lower overhead than BCN with 10% sampling
4. FECN can be made even faster by decreasing the sampling interval