



Burst Timer Length Recommendation

Mohan Kalkunte

(Advanced Micro Devices, Inc.)

Mart Molle

(University of California, Riverside)

Previously...

AMD

- Investigated burst timer lengths for low and moderate loads
- Concluded that burst timer length of 24K bits was sufficient

Now...

AMD

- Investigated the effect of longer burst length at all loads
- Assessed performance impacts at low, moderate, and high loads

Why...

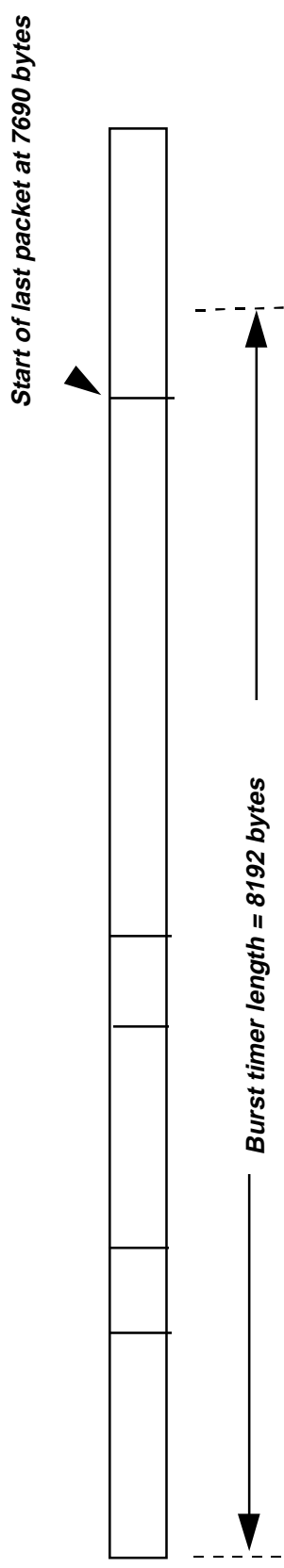
AMD

- Previous study shows that collision overhead is expensive
- *May be better to defer than to collide*
- Increasing burst length timer restores balance between collision backoff and successful transmission (same as lower speeds)

Why...

AMDA

- 64K bits burst timer length can handle 8K bytes datagrams in single burst



Experiment

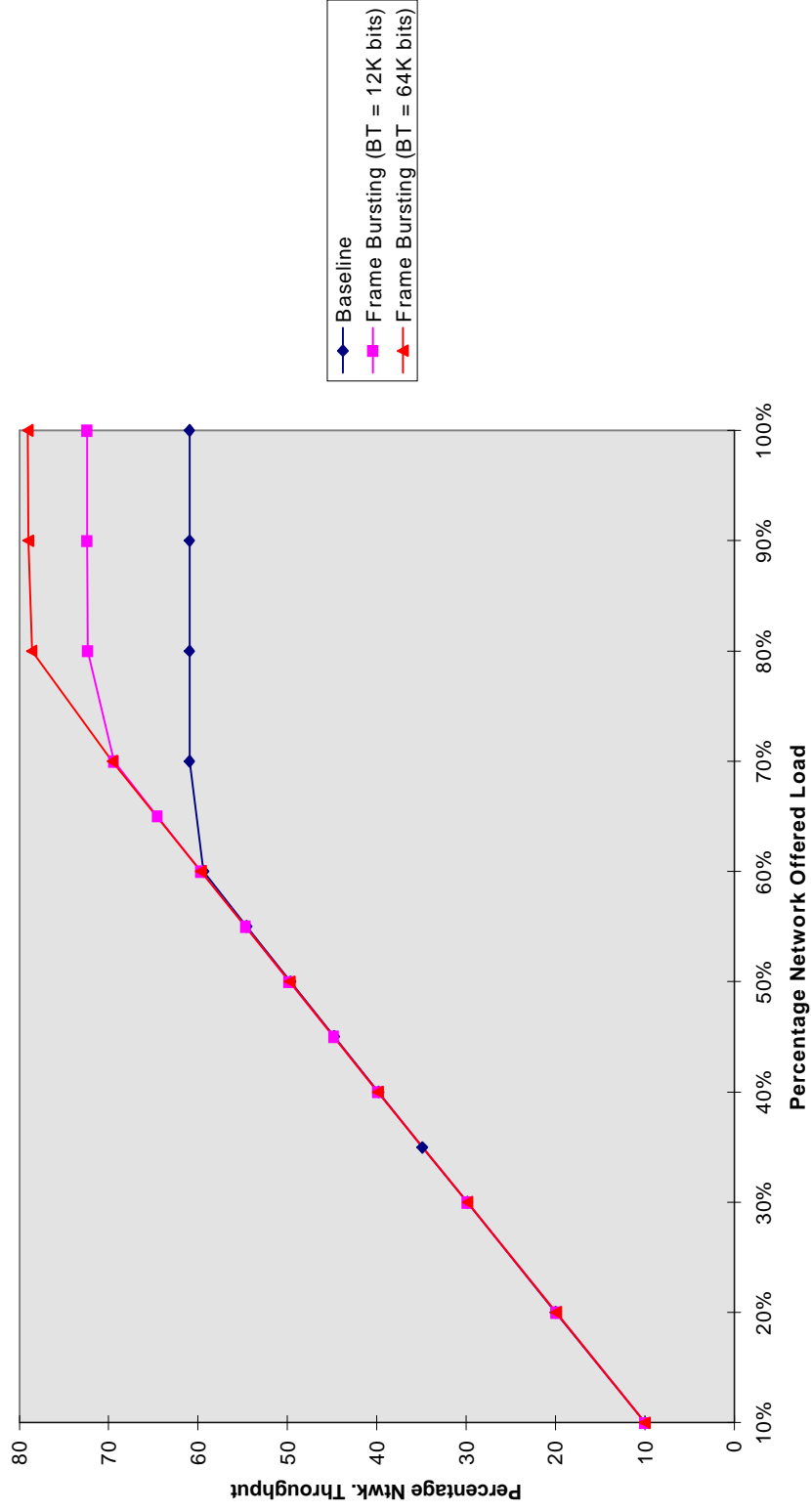


-
- Burst timer length = 64K bits
 - 15 station network
 - Network Offered Loads in from 10% to 100% in steps of 10%
 - Workgroup Average Packet Size Distribution

Simulation Results



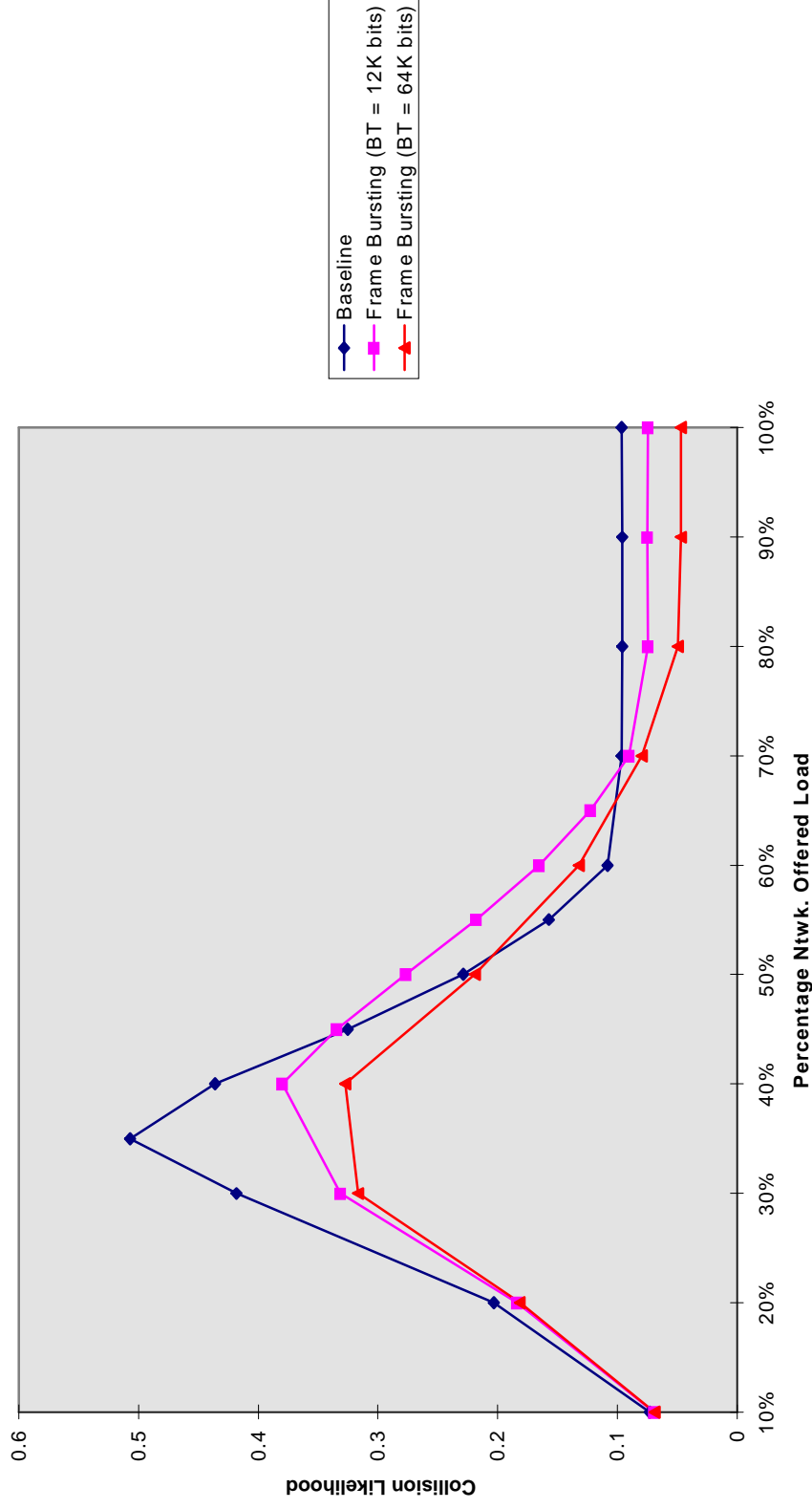
Network Throughput Vs. Offered Load
(15 stations, Uniform Traffic, Packet Size Distributions - Work group Average)



Simulation Results



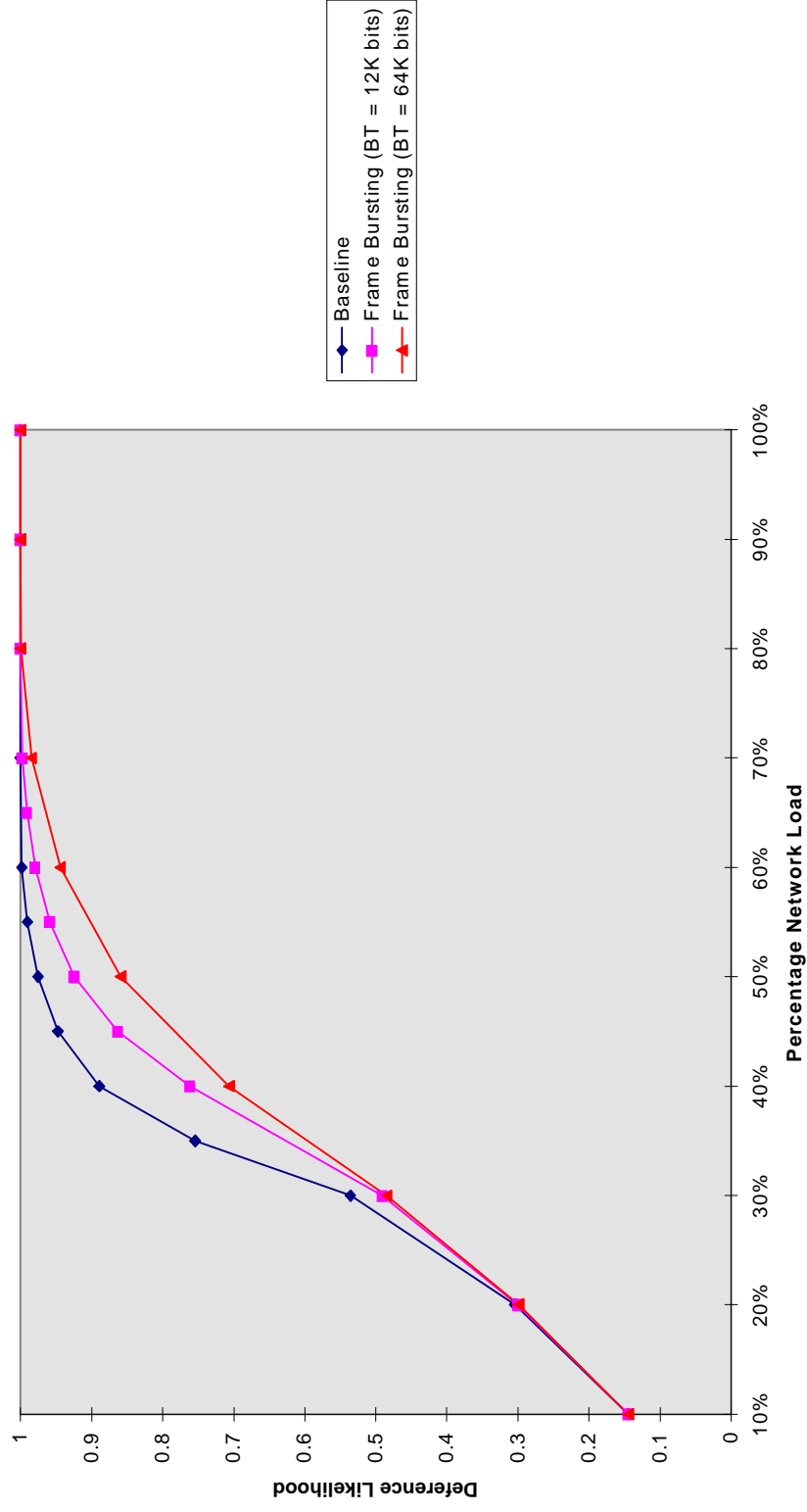
Collision Likelihood Vs. Offered Load
(15 stations, Uniform Traffic, Packet Size Distributions - Work group Average)



Simulation Results



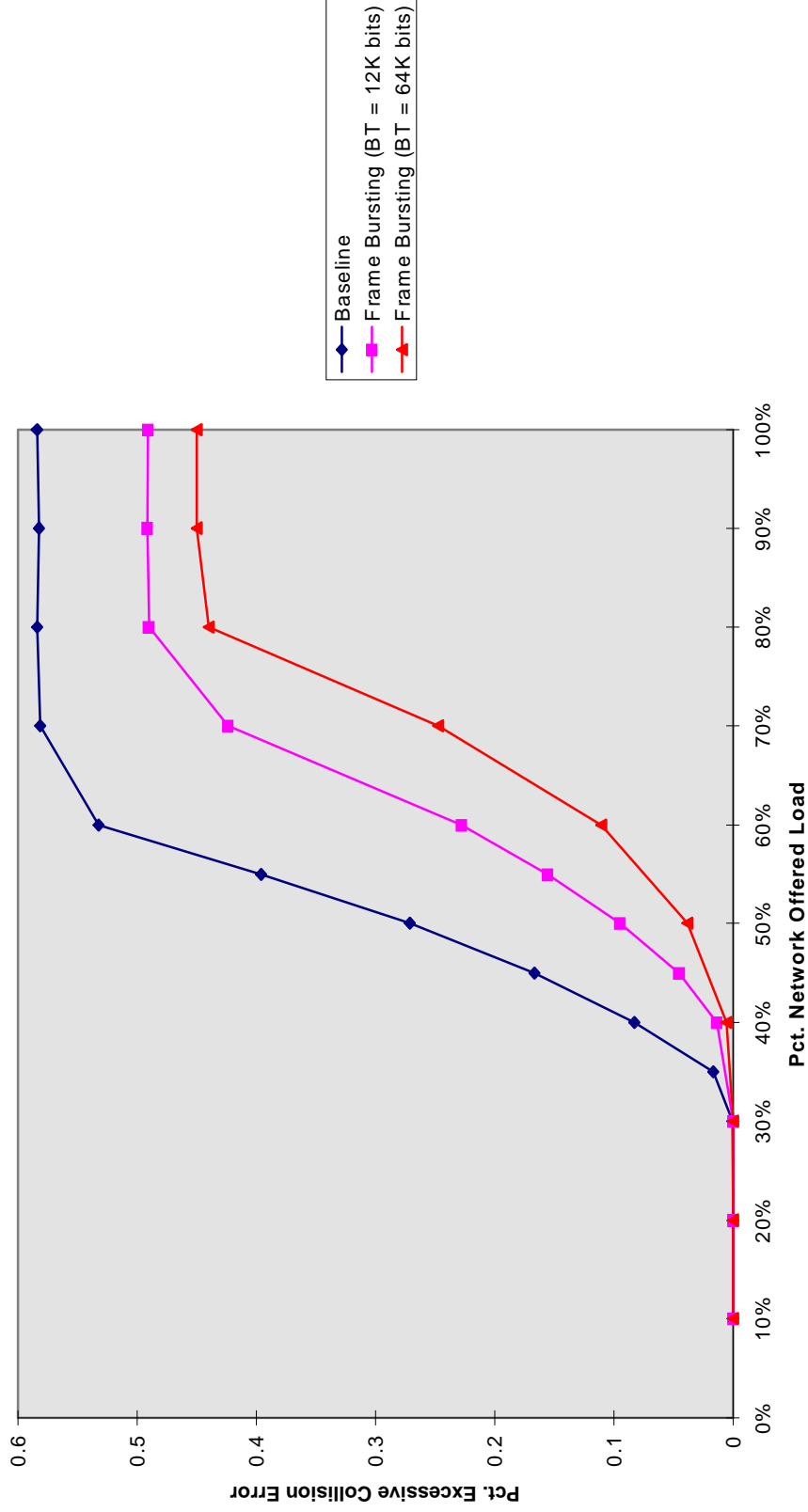
Deference Likelihood Vs. Offered Load
(15 stations, Uniform Traffic, Packet Size Distributions - Work group Average)



Simulation Results



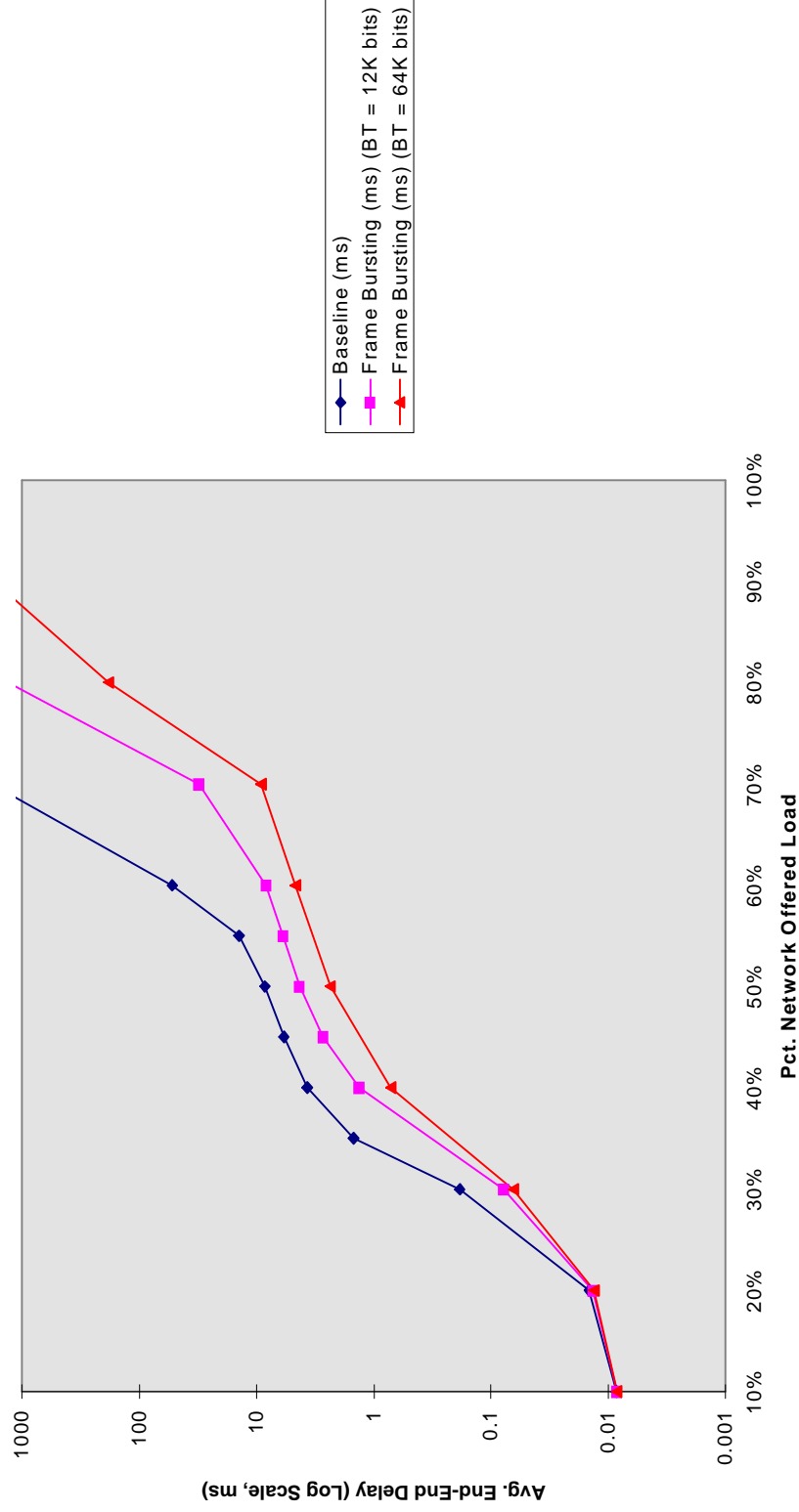
Percentage Excessive Collision Error Vs. Offered Load
(15 stations, Uniform Traffic, Packet Size Distributions - Work group Average)



Simulation Results



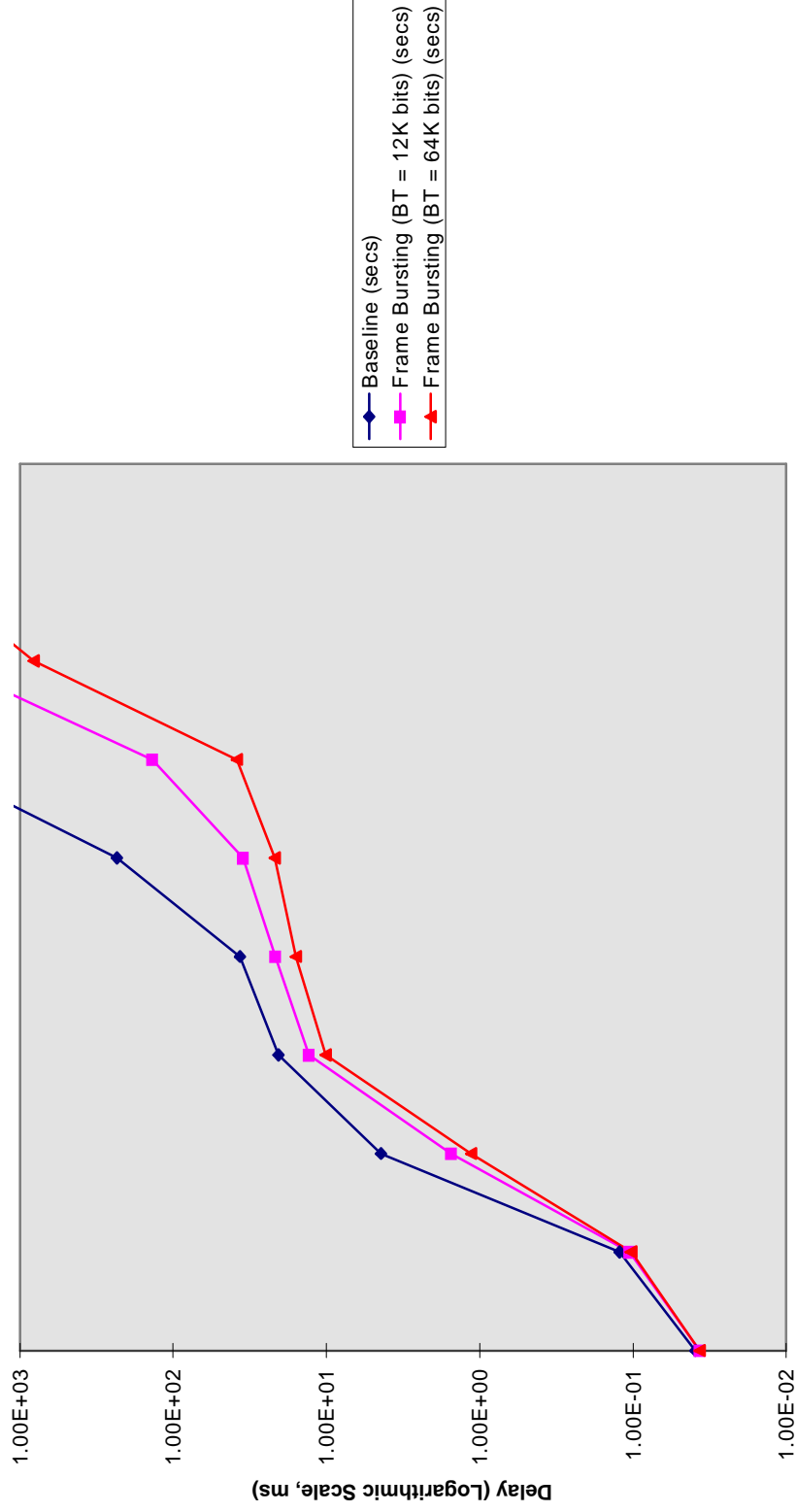
Avg. End-End Delay Vs. Offered Load
(15 stations, Uniform Traffic, Packet Size Distributions - Work group Average)



Simulation Results



99th Percentile. End-End Delay Vs. Offered Load
(15 stations, Uniform Traffic, Packet Size Distributions - Work group Average)



Pct. Ntwk Offered Load

Results



Percentage Improvement in Throughput Performance over Baseline (carrier extension)

Network Offered Load	BT = 12K bits	BT = 64K bits
60%	0.43%	0.48%
70%	13.9%	14.2%
80%	18.6%	28.9%
90%	18.7%	29.5%
100%	18.8%	29.6%

Results



Percentage Reduction in Avg. End-End Delay over Baseline (carrier extension)

Network Offered Load	BT = 12K bits	BT = 64K bits
60%	84.2%	91.1%
70%	98.3%	99.5%
80%	67.8%	95.5%
90%	40.4%	63.7%
100%	29.9%	47.0%

Results Summary



- **Burst Timer Length of 64K bits improves performance across board**
 - Throughput performance increases 29% over baseline
 - Average packet end-end delay drops by 47% - 91%.
- **We recommend the increase in burst timer length to 64K bits**

Issues



- **Clause 41, (41.3.2.1.4) - Jabber Timer**
 - *“Timer for length of carrier which must be present before the jabber state is entered (41.3.1.7). The timer is done when it reaches 40,000 - 75,000 BT”*
 - **Recommendation**
 - » **Set jabber timer length range to 80000 - 150,000 BT for 1000 Mb/s operation**

Issues



- **Clause 5 (5.2.4.1) - maxDeferTime**
 - “*maxDeferTime* = {2 x (*maxFrameSize* x8) in bits, error timer limit for *maxDeferTime*}”
 - **Recommendation**
 - » **Set maxDeferTime = {2 x ((burst_timer + maxFrameSize) x8) in bits} for 1000 Mb/s operation**