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# Introduction

The following report highlights the implementation of Reliable-Data-Transfer Protocol, specifically., Alternating Bit Protocol, Go-Back-N Protocol, and Selective Repeat Protocol.

# Timeout Scheme

To choose a best-case Timeout value, we consider the case where all the protocols for ABT are run with messages as 1000, loss probability as 0.2, corruption probability as 0.2 Time between messages as 50.

ABT Protocol

| Timeout Value | Average Throughput |
|---|---|
| 20 | 0.0202243 |
| 22 | 0.020149 |
| 25 | 0.0201487 |
| 30 | 0.019953 |
| 35 | 0.0198461 |

Table 1: Timeout Determination for ABT Protocol

From table 1 we can deduce that timeouts 20 and 22 are giving us better results, ABT protocol is a stop and wait protocol, so the lesser the timeout value the better the application is we are considering timeout value as 22. Since, RTT = 22. Is a perfect value as it is not less enough to give us index out of range issue and not more to send multiple packets at home. Hence, the decided timeout value for ABT = 22.0.

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For GBN Protocol:

To choose the best-case Timeout Value, we consider the case where all the protocols are run with messages 1000, loss probability from 0.1 to 0.8, corruption probability is 0.2, time between messages is 50 and window size is 10.

GBN Protocol

| Loss | RTT=35 | RTT=45 | RTT=55 |
|---|---|---|---|
| 0.1 | 0.0199387 | 0.0200758 | 0.0200191 |
| 0.2 | 0.0197877 | 0.0199157 | 0.0197616 |
| 0.4 | 0.0196712 | 0.0166942 | 0.0139693 |
| 0.6 | 0.0116248 | 0.0094991 | 0.007731 |
| 0.8 | 0.0052126 | 0.003911 | 0.0035047 |

Table 2: Timeout Determination for GBN Protocol at W=10

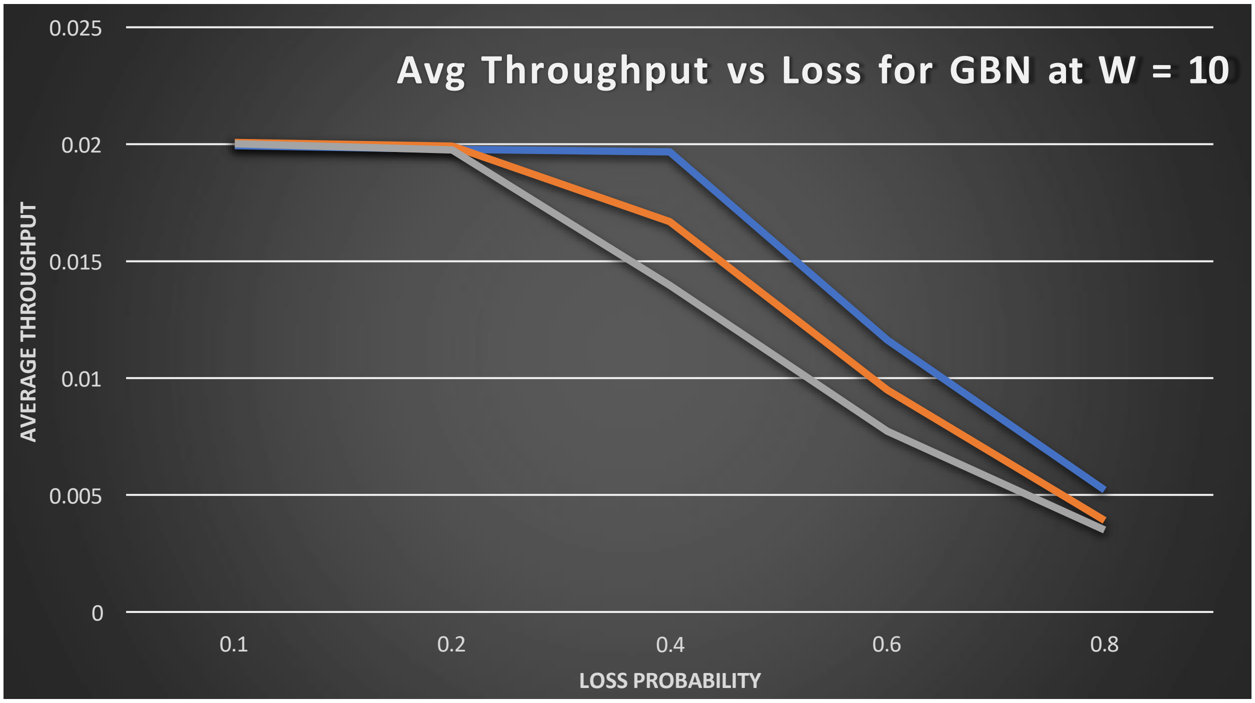


Fig1: Timeout Determination for GBN Protocol at W=10

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From Table2 and Fig1 we can see that for RTT = 45, we are getting better Throughput values for w=10. Hence, the timeout selected for gbn at w=10 is 45.

| Loss | RTT=35 | RTT = 45 | RTT = 55 |
|---|---|---|---|
| 0.1 | 0.019939 | 0.020138 | 0.019962 |
| 0.2 | 0.018109 | 0.019128 | 0.012653 |
| 0.4 | 0.008025 | 0.004557 | 0.004133 |
| 0.6 | 0.003076 | 0.003263 | 0.003496 |
| 0.8 | 0.003486 | 0.003521 | 0.003212 |

Table 3: Timeout Determination for GBN Protocol at W=50

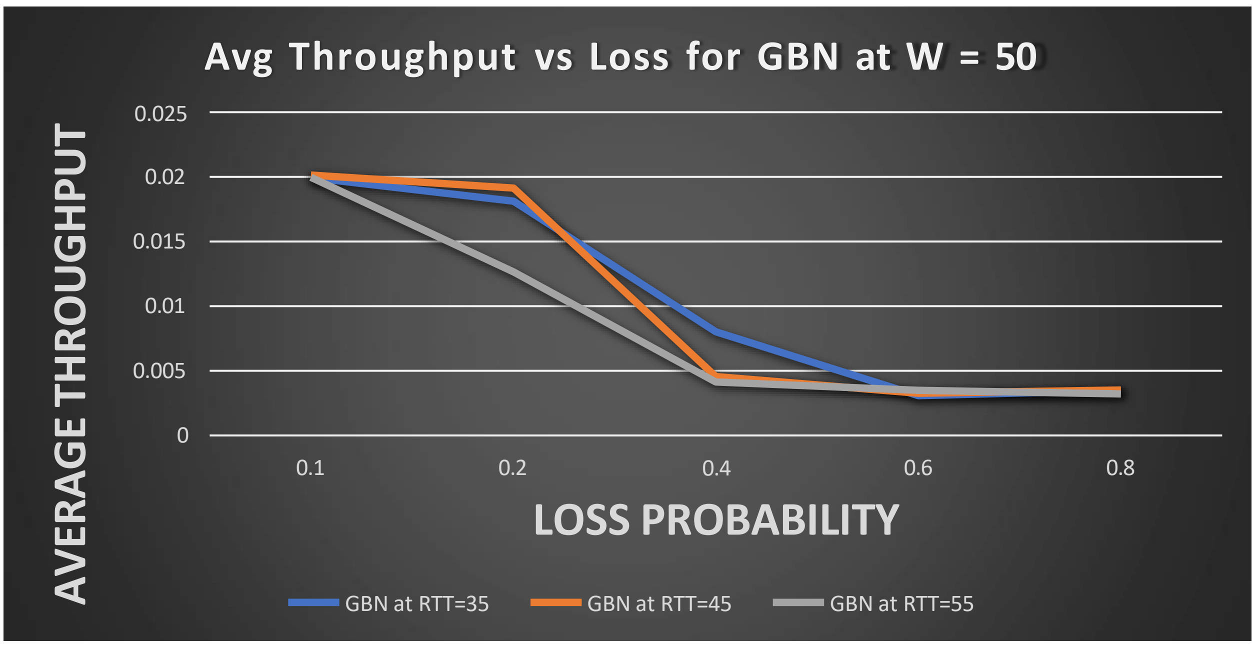


Fig2: Timeout Determination for GBN Protocol at W=50

From Table3 and Fig2 we can see that for RTT = 45, we are getting better Throughput values for w=50. Hence, the timeout selected for gbn at w=50 is 45.

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# Experiment 1

With loss probabilities: {0.1, 0.2, 0.4, 0.6, 0.8}, compare the 3 protocols' throughputs at the application layer of receiver B. Use 2 window sizes: {10, 50} for the Go-Back-N version and the Selective-Repeat Version.

A]

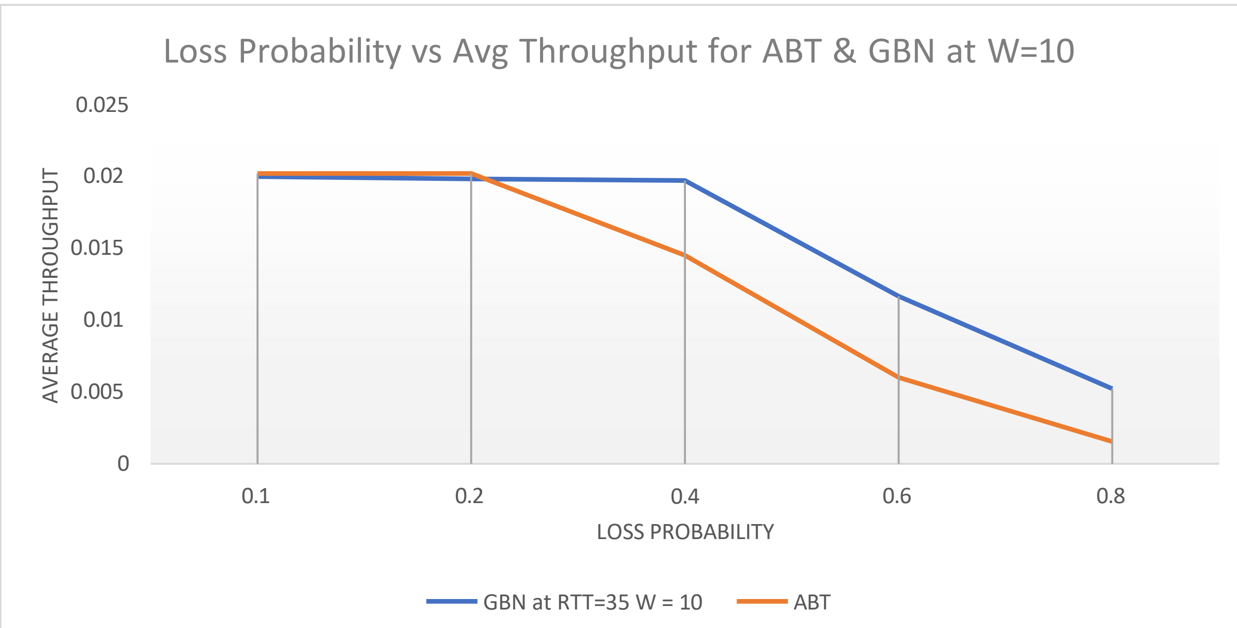


Fig3: Loss Probability vs Avg Throughput for ABT & GBN at W=10

| Loss | GBN at W = 10 | ABT |
|---|---|---|
| 0.1 | 0.0199387 | 0.020153 |
| 0.2 | 0.0197877 | 0.020149 |
| 0.4 | 0.0196712 | 0.014484 |
| 0.6 | 0.0116248 | 0.005994 |
| 0.8 | 0.0052126 | 0.001543 |

Table4: Loss Probability vs Avg Throughput for ABT & GBN at W=10

As we can see from Table 4 and Fig 3 clearly that GBN is a winner here, GBN works excellently with low value of Window size.

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B]

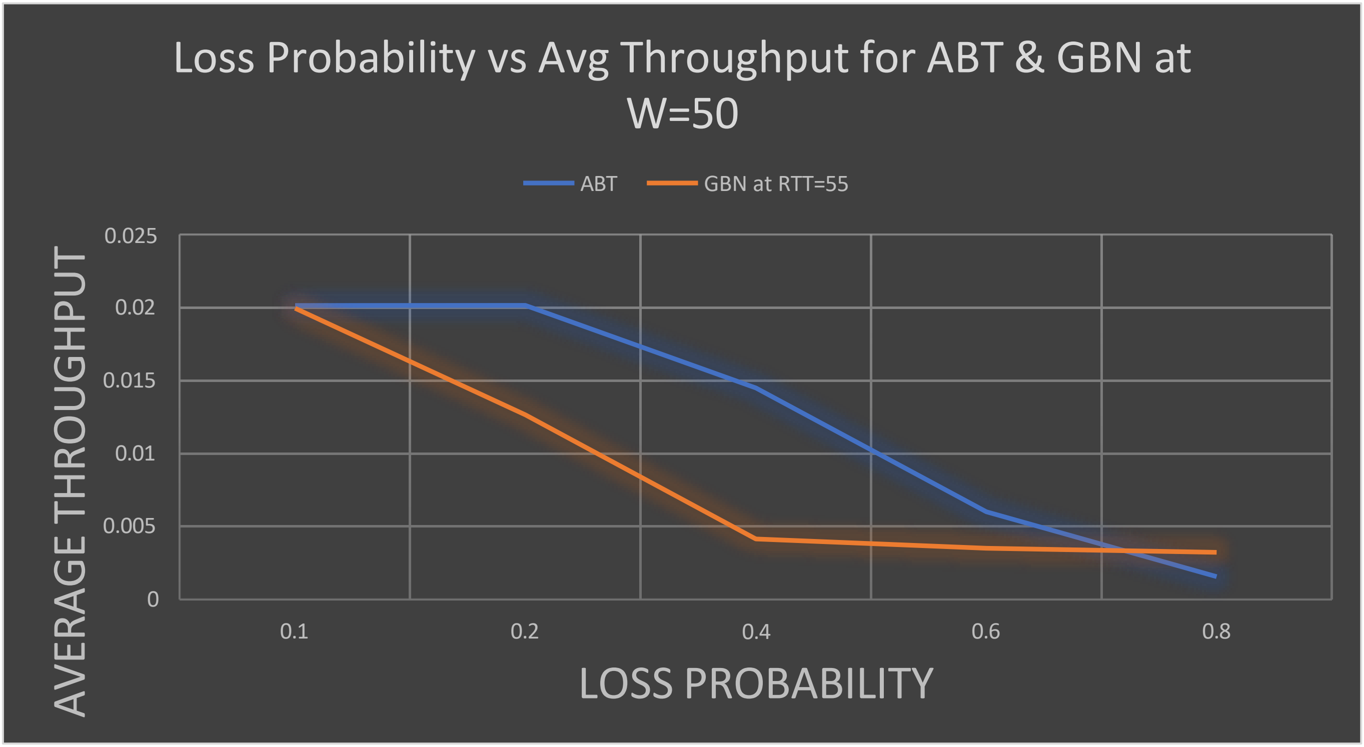


Fig4: Loss Probability vs Avg Throughput for ABT & GBN at W=50

| Loss | GBN at W=50 | ABT |
|---|---|---|
| 0.1 | 0.019962 | 0.020153 |
| 0.2 | 0.012653 | 0.020149 |
| 0.4 | 0.004133 | 0.014484 |
| 0.6 | 0.003496 | 0.005994 |
| 0.8 | 0.003212 | 0.001543 |

Table5: Loss Probability vs Avg Throughput for ABT & GBN at W=50

GBN is better than ABT for lesser values of loss probability. But, for 0.6 and 0.8 ABT is better than GBN, in broader view, GBN is worse than ABT as it is slow retransmission is high for larger corruption and Loss probability. Hence, ABT is better than GBN in this scenario.

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# Experiment 2

With window sizes: {10, 50, 100, 200, 500} for GBN and SR, compare the 3 protocols' throughputs at the application layer of receiver B. Use 3 loss probabilities: {0.2, 0.5, 0.8} for all 3 protocols.

A] Loss = 0.2

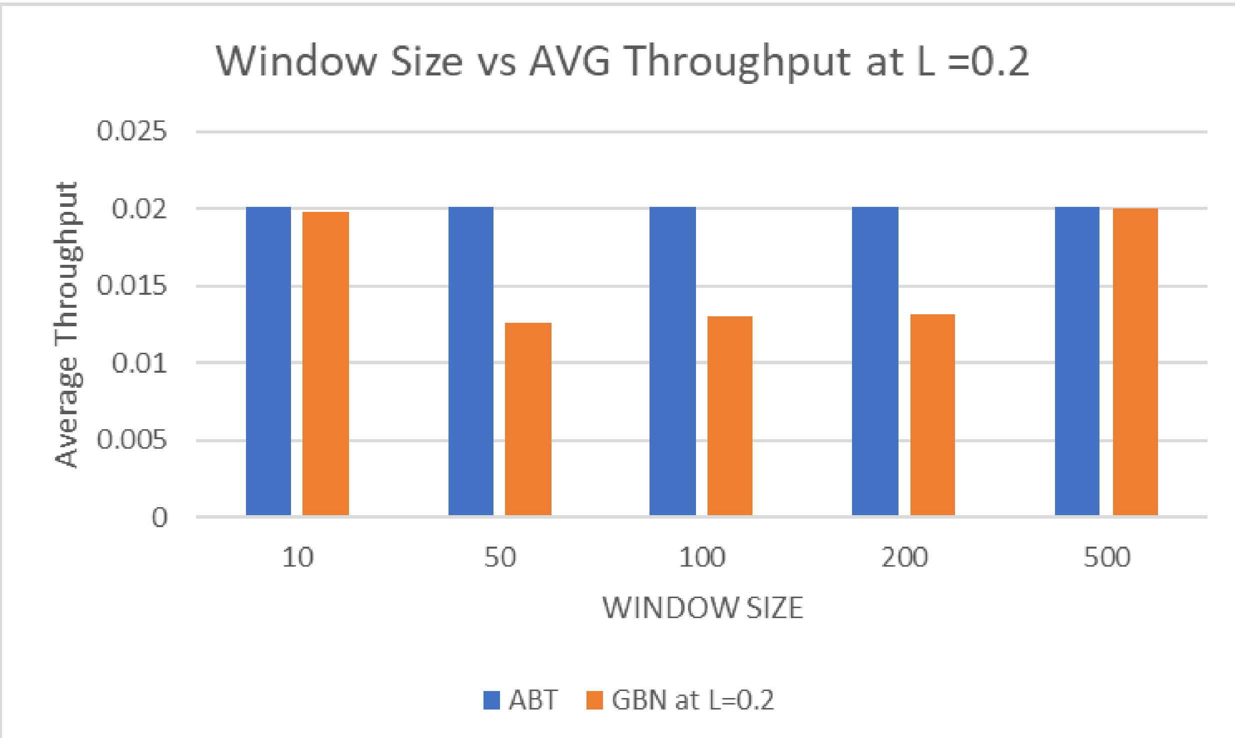


Fig4: Window Size vs AVG Throughput at L =0.2

| WINDOW SIZE | GBN | ABT |
|---|---|---|
| 10 | 0.019762 | 0.020149 |
| 50 | 0.012653 | 0.020149 |
| 100 | 0.01305 | 0.020149 |
| 200 | 0.013172 | 0.020149 |
| 500 | 0.020067 | 0.020149 |

Table5: Window Size vs AVG Throughput at L =0.2

Comparing Fig4 and Table5 we can say that GBN is better than ABT for low loss low window size, whereas ABT is not getting affected by the window size.

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B] Loss=0.5

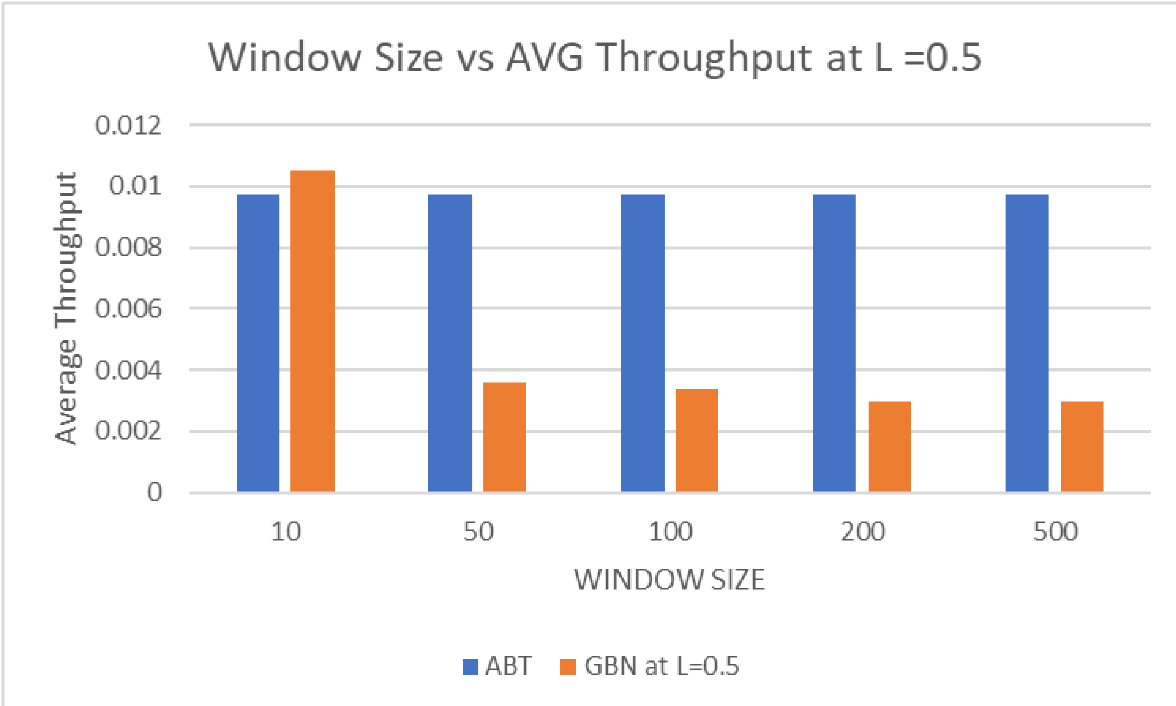


Fig5: Window Size vs AVG Throughput at L =0.5

| WINDOW SIZE | GBN | ABT |
|---|---|---|
| 10 | 0.010493 | 0.009724 |
| 50 | 0.003569 | 0.009724 |
| 100 | 0.003376 | 0.009724 |
| 200 | 0.002985 | 0.009724 |
| 500 | 0.002992 | 0.009724 |

Table6: Window Size vs AVG Throughput at L =0.5

Comparing Fig5 and Table6 we can say that GBN is better than ABT for low loss low window size, whereas ABT is not getting affected by the window size. So ABT is good at some levels as for other window size ABT throughput is better than GBN.

C] Loss = 0.8

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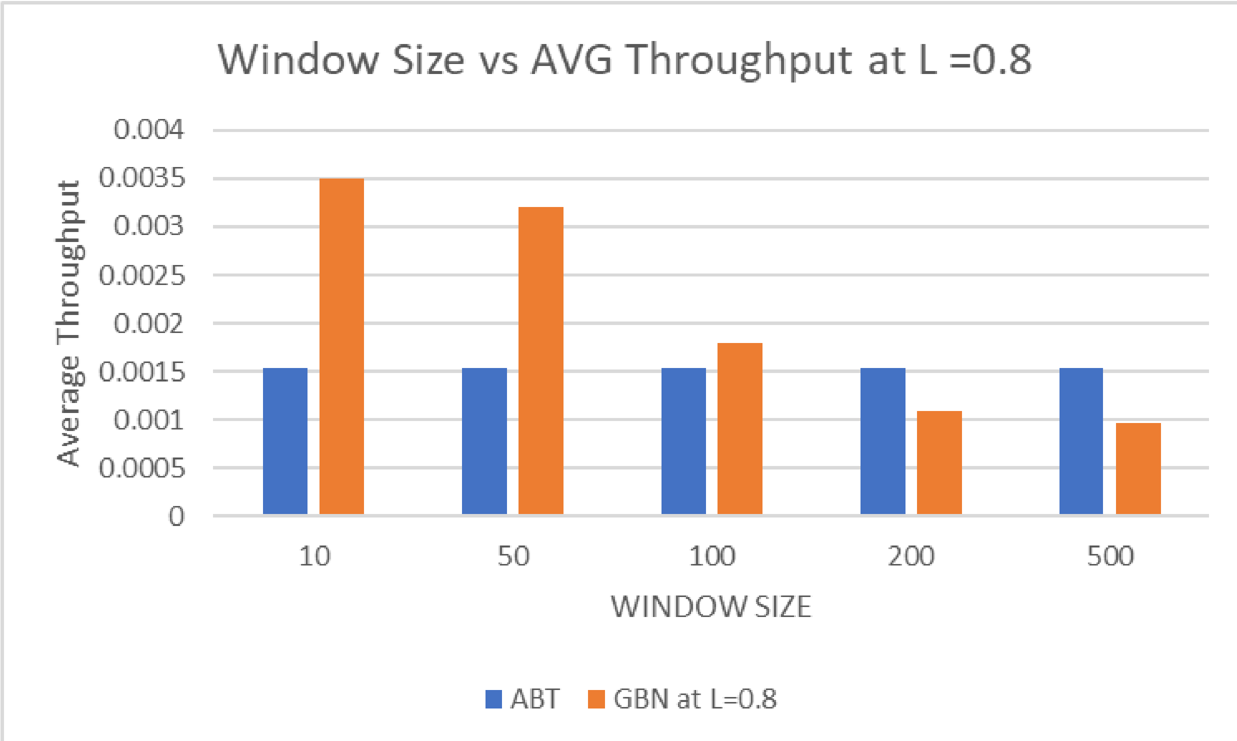


Fig6: Window Size vs AVG Throughput at L =0.8

| WINDOW SIZE | GBN | ABT |
|---|---|---|
| 10 | 0.010493 | 0.009724 |
| 50 | 0.003569 | 0.009724 |
| 100 | 0.003376 | 0.009724 |
| 200 | 0.002985 | 0.009724 |
| 500 | 0.002992 | 0.009724 |

Table7: Window Size vs AVG Throughput at L =0.8

Comparing Fig6 and Table7 we can say that GBN is better than ABT for low loss low window size, whereas ABT is not getting affected by the window size. So ABT is good at some levels as for other window size ABT throughput is better than GBN. This particularly is happening at higher loss and window size.