

Comparing Simulation and Network Monitoring Results

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Abstract

Here we present simulation results alongside those from a known state (as was reported by the network measurement tests we conducted). The aim is to establish a simulation baseline over which we shall compare future results obtained after modifying the underlying transport protocol.

1 The Simulations

We simulate two applications; iperf, a memory-to-memory transfer application and the e-VLBI Mark5 application, a bulk transfer application. We control parameters of telnet and ftp ns-2 applications to simulate iperf and e-VLBI respectively. We report results of congestion window and throughput for each transfer. We conducted four types of transfers; a single iperf flow, two parallel iperf flows, five parallel iperf flows and a single e-VLBI flow with no background traffic and with limited background traffic. We present

1.1 single iperf flow

Figure 1 and 2 show the CWND and throughput respectively obtained when a single flow is transferred. These results especially the ones with limited background traffic estimate closely with the ones we measured.

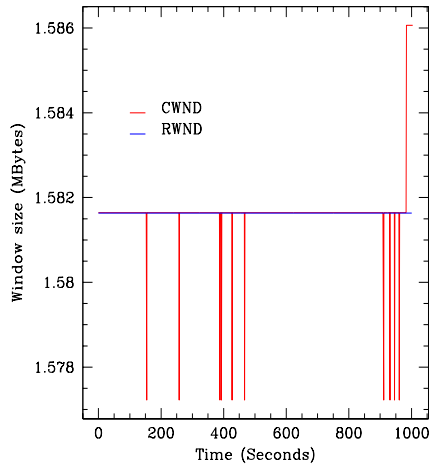
1.2 Two iperf flow

Figure 3 and 4 show the CWND and throughput respectively obtained when two flows are transferred. These results especially the ones with limited background traffic estimate closely with the ones we measured.

1.3 Five iperf flow

Figure 5 and 6 show the CWND and throughput respectively obtained when five flows are transferred. These results especially the ones with limited background traffic estimate closely with the ones we measured.

A



B

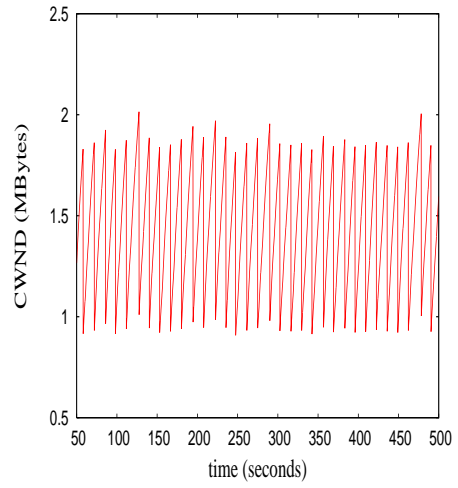
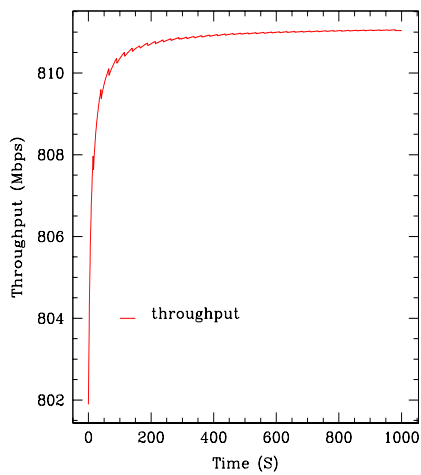


Figure 1: CWND for a single memory-to-memory data flow from a : A - Live Network Test run, B - Simulation with limited background traffic

A



B

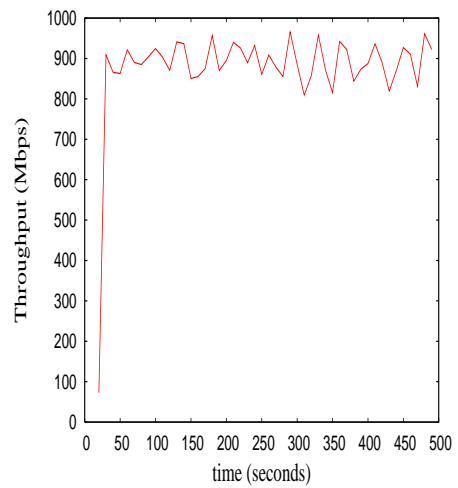


Figure 2: Throughput for a single memory-to-memory data flow from a : A - Live Network test run, B - Simulation with limited background traffic

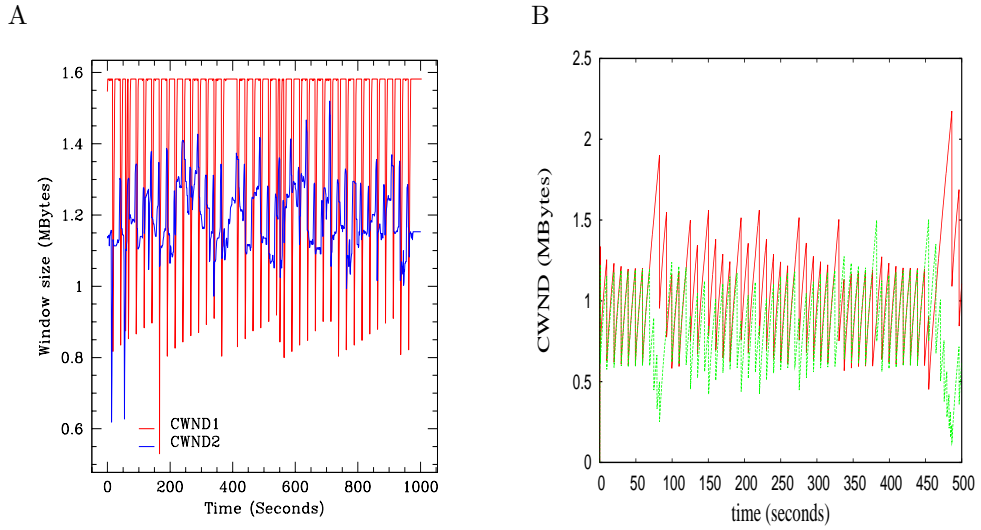


Figure 3: CWND for a two memory-to-memory data flows from a : A - Live Network test run, B - Simulation with limited background traffic

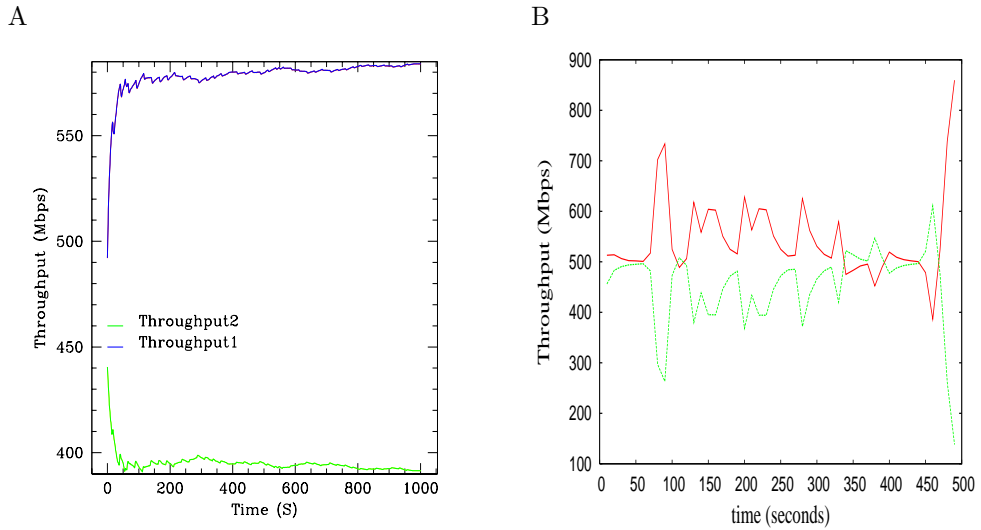


Figure 4: Throughput for a two memory-to-memory data flows from a : A - Live Network test run, B - Simulation with limited background traffic

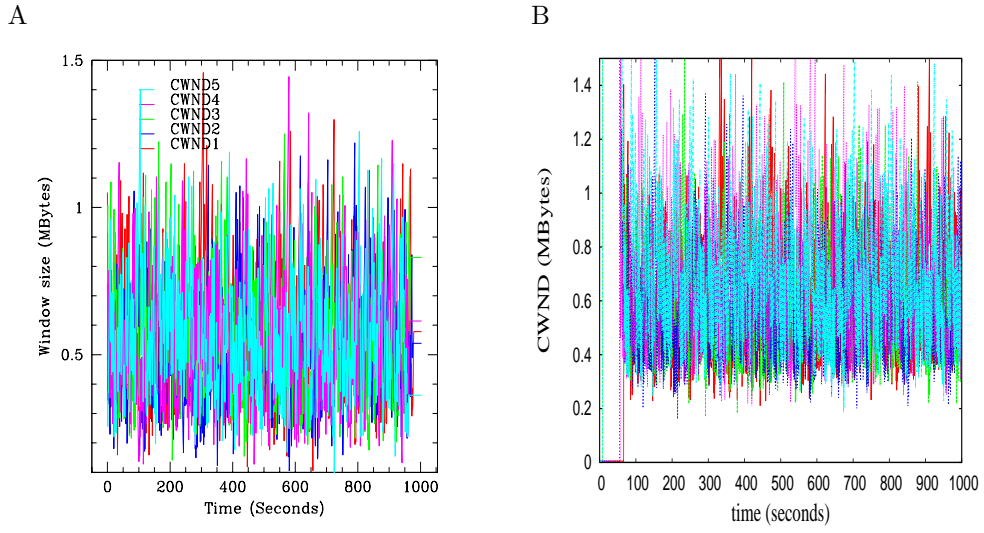


Figure 5: CWND for five memory-to-memory data flows from a : A - Live Network test run, B - Simulation with no background traffic

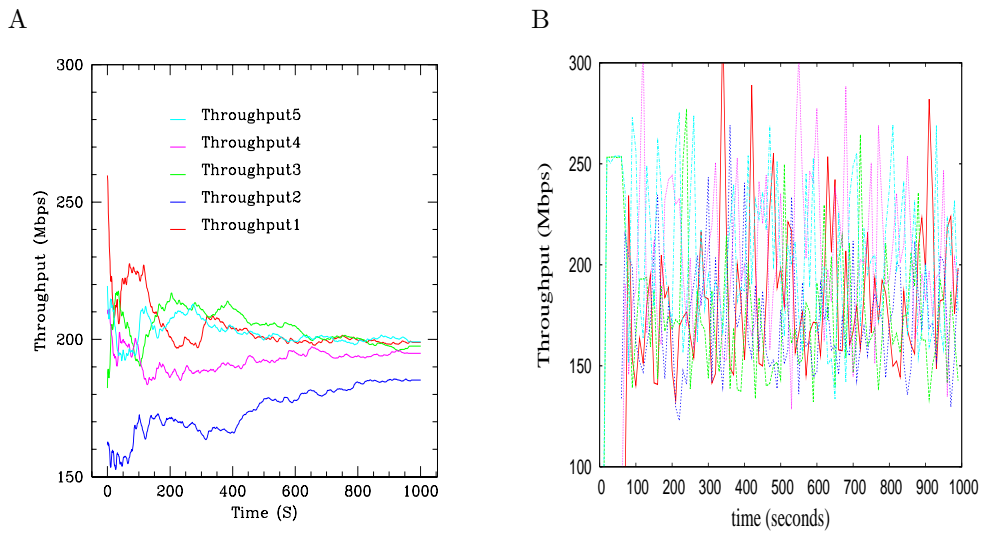


Figure 6: Throughput for five memory-to-memory data flows with : A - no background traffic, B - with limited background traffic

1.4 e-VLBI flow

Figures 7 and 8 show the achieved CWND and throughput respectively for a single e-VLBI data flow. Clearly these plots differ significantly from the ones we obtained in the measurements. The simulation seems not to correctly estimate the e-VLBI flow transfer. On further simulation when background traffic is increased drastically the achieved CWND and throughput values estimate closer to what we obtained in the tests are shown in figure 9.

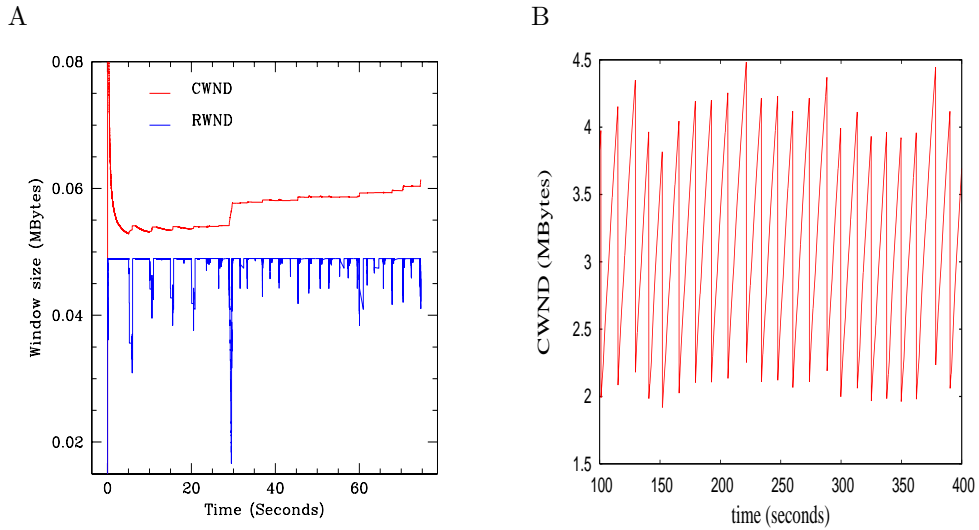
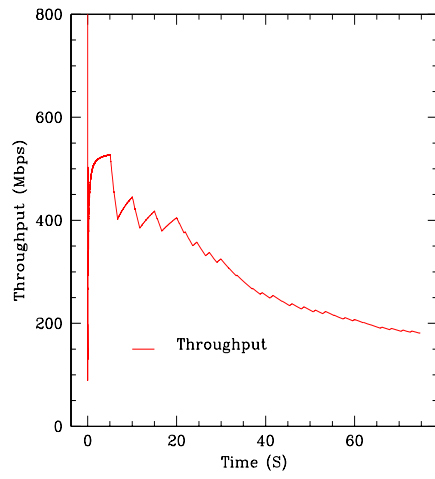


Figure 7: CWND for a single e-VLBI data flow from a : A - Live Network test run, B - Simulation with significant background traffic

A



B

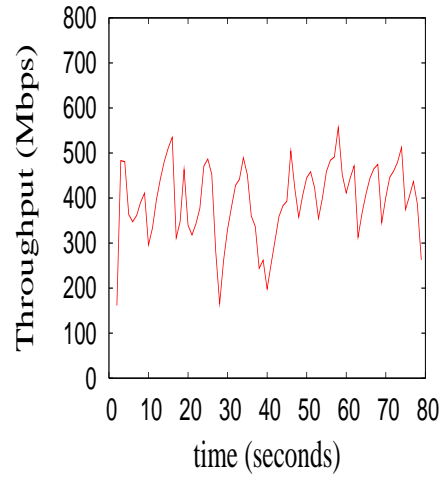


Figure 8: Throughput for a single e-VLBI data flow from a : A - Live Network test run, B - Simulation with significant background traffic