Name: Phong Tran

Class: CSCE 463

**Homework 3**

1. S = 1Gbps, RTT = 0.5, number of elements = 215

As shown above, it follows closely with the congestion control theory discussed in class. The flat part is where packet loss happens.

1. S = 1Gbps, number of elements = 217, W = 30 packets

The result matches with the theory. As the RTT increases, it will become slower in detecting package loss, resulting in smaller goodput.

1. Main: sender W = 8000, RTT 0.200 sec, loss 0 / 0, link 1000 Mbps

Main: initializing DWORD array with 2^20 elements... done in 0 ms

Main: connected to 127.0.0.1 in 0.219 sec, pkt 1472 bytes

[ 2.22] B 113 ( 0.2 MB) N 226 T 0 F 0 W 113 S 0.662 Mbps RTT 0.212

[ 4.22] B 239 ( 0.4 MB) N 478 T 0 F 0 W 239 S 0.738 Mbps RTT 0.212

[ 6.22] B 365 ( 0.5 MB) N 730 T 0 F 0 W 365 S 0.738 Mbps RTT 0.212

[ 8.23] B 491 ( 0.7 MB) N 982 T 0 F 0 W 491 S 0.738 Mbps RTT 0. 212

[10.25] B 617 ( 0.9 MB) N 1234 T 0 F 0 W 617 S 0.738 Mbps RTT 0.212

[12.26] B 744 ( 1.1 MB) N 1488 T 0 F 0 W 744 S 0.744 Mbps RTT 0.212

[14.28] B 883 ( 1.3 MB) N 1766 T 0 F 0 W 883 S 0.814 Mbps RTT 0.212

[16.29] B 1009 ( 1.5 MB) N 2018 T 0 F 0 W 1009 S 0.738 Mbps RTT 0.212

[18.30] B 1135 ( 1.7 MB) N 2270 T 0 F 0 W 1135 S 0.738 Mbps RTT 0.212

[20.31] B 1261 ( 1.9 MB) N 2522 T 0 F 0 W 1261 S 0.738 Mbps RTT 0.212

[22.33] B 1401 ( 2.1 MB) N 2802 T 0 F 0 W 1401 S 0.820 Mbps RTT 0.212

[24.34] B 1527 ( 2.2 MB) N 3054 T 0 F 0 W 1527 S 0.738 Mbps RTT 0.212

[26.35] B 1653 ( 2.4 MB) N 3306 T 0 F 0 W 1653 S 0.738 Mbps RTT 0.212

[28.37] B 1779 ( 2.6 MB) N 3558 T 0 F 0 W 1779 S 0.738 Mbps RTT 0.212

[30.38] B 1905 ( 2.8 MB) N 3810 T 0 F 0 W 1905 S 0.738 Mbps RTT 0.212

[32.39] B 2045 ( 3.0 MB) N 4090 T 0 F 0 W 2045 S 0.820 Mbps RTT 0.212

[34.40] B 2171 ( 3.2 MB) N 4342 T 0 F 0 W 2171 S 0.738 Mbps RTT 0.212

[36.42] B 2297 ( 3.4 MB) N 4594 T 0 F 0 W 2297 S 0.738 Mbps RTT 0.212

[38.42] B 2423 ( 3.6 MB) N 4846 T 0 F 0 W 2423 S 0.738 Mbps RTT 0.212

[40.42] B 2549 ( 3.8 MB) N 5098 T 0 F 0 W 2549 S 0.738 Mbps RTT 0.212

[42.44] B 2690 ( 4.0 MB) N 5380 T 0 F 0 W 2690 S 0.826 Mbps RTT 0.212

[44.45] B 2816 ( 4.1 MB) N 5632 T 0 F 0 W 2816 S 0.738 Mbps RTT 0.212

[45.46] <-- FIN-ACK 2865 window 05B0360D

Main: transfer finished in 44.697 sec, 750.71 Kbps, checksum 05B0360D

Main: estRTT 0.212, ideal rate 156420.83 Kbps

CPU configuration: Intel Core i3, 1.30GHz. I could not reach 1Gbps since my CPU configuration is not strong enough.

1. Number of element = 223, RTT = 200 ms, W = 300 packets, no loss.

Main: sender W = 300, RTT 0.200 sec, loss 0 / 0, link 10 Mbps

Main: initializing DWORD array with 2^23 elements... done in 47 ms

Main: connected to s8.irl.cs.tamu.edu in 0.250 sec, pkt 1472 bytes

[ 2.25] B 62 ( 0.1 MB) N 124 T 0 F 0 W 62 S 0.363 Mbps RTT 0.231

[ 4.25] B 234 ( 0.3 MB) N 468 T 0 F 1 W 234 S 1.007 Mbps RTT 0.231

[ 6.25] B 356 ( 0.5 MB) N 656 T 0 F 1 W 300 S 0.714 Mbps RTT 0.231

[ 8.26] B 469 ( 0.7 MB) N 769 T 0 F 1 W 300 S 0.662 Mbps RTT 0.231

[10.26] B 624 ( 0.9 MB) N 924 T 0 F 3 W 300 S 0.908 Mbps RTT 0.231

[12.27] B 754 ( 1.1 MB) N 1054 T 0 F 3 W 300 S 0.761 Mbps RTT 0.231

[14.27] B 864 ( 1.3 MB) N 1164 T 0 F 4 W 300 S 0.644 Mbps RTT 0.231

[16.28] B 992 ( 1.5 MB) N 1292 T 0 F 4 W 300 S 0.750 Mbps RTT 0.231

[18.29] B 1138 ( 1.7 MB) N 1438 T 0 F 6 W 300 S 0.855 Mbps RTT 0.231

[20.30] B 1268 ( 1.9 MB) N 1568 T 0 F 8 W 300 S 0.761 Mbps RTT 0.231

[22.31] B 1390 ( 2.0 MB) N 1690 T 0 F 9 W 300 S 0.714 Mbps RTT 0.231

[24.31] B 1522 ( 2.2 MB) N 1822 T 0 F 10 W 300 S 0.773 Mbps RTT 0.231

[26.32] B 1656 ( 2.4 MB) N 1956 T 0 F 12 W 300 S 0.785 Mbps RTT 0.231

[28.32] B 1745 ( 2.6 MB) N 2045 T 0 F 12 W 300 S 0.521 Mbps RTT 0.231

[30.32] B 1813 ( 2.7 MB) N 2113 T 0 F 14 W 300 S 0.398 Mbps RTT 0.231

[32.32] B 2045 ( 3.0 MB) N 2345 T 0 F 19 W 300 S 1.359 Mbps RTT 0.231

[34.32] B 2160 ( 3.2 MB) N 2460 T 0 F 19 W 300 S 0.673 Mbps RTT 0.231

[36.32] B 2297 ( 3.4 MB) N 2597 T 0 F 21 W 300 S 0.802 Mbps RTT 0.231

[38.32] B 2420 ( 3.6 MB) N 2720 T 0 F 21 W 300 S 0.720 Mbps RTT 0.231

[40.32] B 2522 ( 3.7 MB) N 2822 T 0 F 23 W 300 S 0.597 Mbps RTT 0.231

[42.32] B 2672 ( 3.9 MB) N 2972 T 0 F 24 W 300 S 0.878 Mbps RTT 0.231

[44.32] B 2802 ( 4.1 MB) N 3102 T 0 F 26 W 300 S 0.761 Mbps RTT 0.231

[46.32] B 2897 ( 4.3 MB) N 3197 T 0 F 27 W 300 S 0.556 Mbps RTT 0.231

[48.32] B 3066 ( 4.5 MB) N 3366 T 0 F 29 W 300 S 0.990 Mbps RTT 0.231

[50.32] B 3195 ( 4.7 MB) N 3495 T 0 F 29 W 300 S 0.755 Mbps RTT 0.231

[52.33] B 3317 ( 4.9 MB) N 3617 T 0 F 30 W 300 S 0.714 Mbps RTT 0.231

[54.34] B 3446 ( 5.1 MB) N 3746 T 0 F 30 W 300 S 0.755 Mbps RTT 0.231

[56.34] B 3570 ( 5.3 MB) N 3870 T 0 F 30 W 300 S 0.726 Mbps RTT 0.231

[58.35] B 3707 ( 5.5 MB) N 4007 T 0 F 31 W 300 S 0.802 Mbps RTT 0.231

[60.35] B 3832 ( 5.6 MB) N 4132 T 0 F 32 W 300 S 0.732 Mbps RTT 0.231

[62.36] B 3967 ( 5.8 MB) N 4267 T 0 F 32 W 300 S 0.791 Mbps RTT 0.231

[64.37] B 4089 ( 6.0 MB) N 4389 T 0 F 32 W 300 S 0.714 Mbps RTT 0.231

[66.37] B 4218 ( 6.2 MB) N 4518 T 0 F 33 W 300 S 0.755 Mbps RTT 0.231

[68.38] B 4353 ( 6.4 MB) N 4653 T 0 F 35 W 300 S 0.791 Mbps RTT 0.231

[70.39] B 4483 ( 6.6 MB) N 4783 T 0 F 35 W 300 S 0.761 Mbps RTT 0.231

[72.40] B 4608 ( 6.8 MB) N 4908 T 0 F 36 W 300 S 0.732 Mbps RTT 0.231

[74.40] B 4731 ( 7.0 MB) N 5031 T 0 F 37 W 300 S 0.720 Mbps RTT 0.231

[76.40] B 4860 ( 7.2 MB) N 5160 T 0 F 40 W 300 S 0.755 Mbps RTT 0.231

[78.40] B 4994 ( 7.4 MB) N 5294 T 0 F 41 W 300 S 0.785 Mbps RTT 0.231

[80.40] B 5120 ( 7.5 MB) N 5420 T 0 F 41 W 300 S 0.738 Mbps RTT 0.231

[82.40] B 5242 ( 7.7 MB) N 5542 T 0 F 42 W 300 S 0.714 Mbps RTT 0.231

[84.42] B 5351 ( 7.9 MB) N 5651 T 0 F 44 W 300 S 0.638 Mbps RTT 0.231

[86.43] B 5475 ( 8.1 MB) N 5775 T 0 F 44 W 300 S 0.726 Mbps RTT 0.231

[88.44] B 5607 ( 8.3 MB) N 5907 T 0 F 47 W 300 S 0.773 Mbps RTT 0.231

[90.44] B 5755 ( 8.5 MB) N 6055 T 0 F 48 W 300 S 0.867 Mbps RTT 0.231

[92.44] B 5856 ( 8.6 MB) N 6156 T 0 F 49 W 300 S 0.591 Mbps RTT 0.231

[94.46] B 6008 ( 8.8 MB) N 6308 T 0 F 51 W 300 S 0.890 Mbps RTT 0.231

[96.46] B 6152 ( 9.1 MB) N 6452 T 0 F 51 W 300 S 0.843 Mbps RTT 0.231

[98.46] B 6273 ( 9.2 MB) N 6573 T 0 F 52 W 300 S 0.709 Mbps RTT 0.231

[100.46] B 6396 ( 9.4 MB) N 6696 T 0 F 54 W 300 S 0.720 Mbps RTT 0.231

[102.47] B 6532 ( 9.6 MB) N 6832 T 0 F 55 W 300 S 0.796 Mbps RTT 0.231

[104.47] B 6629 ( 9.8 MB) N 6929 T 0 F 57 W 300 S 0.568 Mbps RTT 0.231

[106.47] B 6785 ( 10.0 MB) N 7085 T 0 F 59 W 300 S 0.914 Mbps RTT 0.231

[108.47] B 6925 ( 10.2 MB) N 7225 T 0 F 59 W 300 S 0.820 Mbps RTT 0.231

[110.47] B 7039 ( 10.4 MB) N 7339 T 0 F 60 W 300 S 0.668 Mbps RTT 0.231

[112.47] B 7175 ( 10.6 MB) N 7475 T 0 F 61 W 300 S 0.796 Mbps RTT 0.231

[114.47] B 7295 ( 10.7 MB) N 7595 T 0 F 62 W 300 S 0.703 Mbps RTT 0.231

[116.47] B 7437 ( 10.9 MB) N 7737 T 0 F 63 W 300 S 0.832 Mbps RTT 0.231

[118.47] B 7537 ( 11.1 MB) N 7837 T 0 F 63 W 300 S 0.586 Mbps RTT 0.231

[120.48] B 7694 ( 11.3 MB) N 7994 T 0 F 64 W 300 S 0.919 Mbps RTT 0.231

[122.48] B 7819 ( 11.5 MB) N 8119 T 0 F 64 W 300 S 0.732 Mbps RTT 0.231

[124.49] B 7948 ( 11.7 MB) N 8248 T 0 F 65 W 300 S 0.755 Mbps RTT 0.231

[126.49] B 8065 ( 11.9 MB) N 8365 T 0 F 66 W 300 S 0.685 Mbps RTT 0.231

[128.51] B 8205 ( 12.1 MB) N 8505 T 0 F 69 W 300 S 0.820 Mbps RTT 0.231

[130.51] B 8330 ( 12.3 MB) N 8630 T 0 F 74 W 300 S 0.732 Mbps RTT 0.231

[132.51] B 8453 ( 12.4 MB) N 8753 T 0 F 78 W 300 S 0.720 Mbps RTT 0.231

[134.51] B 8574 ( 12.6 MB) N 8874 T 0 F 81 W 300 S 0.709 Mbps RTT 0.231

[136.51] B 8710 ( 12.8 MB) N 9010 T 0 F 84 W 300 S 0.796 Mbps RTT 0.231

[138.51] B 8847 ( 13.0 MB) N 9147 T 0 F 86 W 300 S 0.802 Mbps RTT 0.231

[140.51] B 8972 ( 13.2 MB) N 9272 T 0 F 88 W 300 S 0.732 Mbps RTT 0.231

[142.51] B 9097 ( 13.4 MB) N 9397 T 0 F 90 W 300 S 0.732 Mbps RTT 0.231

[144.52] B 9229 ( 13.6 MB) N 9529 T 0 F 90 W 300 S 0.773 Mbps RTT 0.231

[146.53] B 9342 ( 13.8 MB) N 9642 T 0 F 90 W 300 S 0.662 Mbps RTT 0.231

[148.53] B 9476 ( 14.0 MB) N 9776 T 0 F 91 W 300 S 0.785 Mbps RTT 0.231

[150.54] B 9611 ( 14.1 MB) N 9911 T 0 F 91 W 300 S 0.791 Mbps RTT 0.231

[152.55] B 9734 ( 14.3 MB) N 10034 T 0 F 92 W 300 S 0.720 Mbps RTT 0.231

[154.55] B 9869 ( 14.5 MB) N 10169 T 0 F 92 W 300 S 0.791 Mbps RTT 0.231

[156.55] B 9985 ( 14.7 MB) N 10285 T 0 F 93 W 300 S 0.679 Mbps RTT 0.231

[158.55] B 10110 ( 14.9 MB) N 10410 T 0 F 93 W 300 S 0.732 Mbps RTT 0.231

[160.55] B 10253 ( 15.1 MB) N 10553 T 0 F 94 W 300 S 0.837 Mbps RTT 0.231

[162.55] B 10377 ( 15.3 MB) N 10677 T 0 F 94 W 300 S 0.726 Mbps RTT 0.231

[164.55] B 10512 ( 15.5 MB) N 10812 T 0 F 95 W 300 S 0.791 Mbps RTT 0.231

[166.55] B 10628 ( 15.6 MB) N 10928 T 0 F 96 W 300 S 0.679 Mbps RTT 0.231

[168.55] B 10767 ( 15.9 MB) N 11067 T 0 F 96 W 300 S 0.814 Mbps RTT 0.231

[170.56] B 10879 ( 16.0 MB) N 11179 T 0 F 101 W 300 S 0.656 Mbps RTT 0.231

[172.56] B 10987 ( 16.2 MB) N 11287 T 0 F 103 W 300 S 0.632 Mbps RTT 0.231

[174.56] B 11145 ( 16.4 MB) N 11445 T 0 F 105 W 300 S 0.925 Mbps RTT 0.231

[176.56] B 11277 ( 16.6 MB) N 11577 T 0 F 106 W 300 S 0.773 Mbps RTT 0.231

[178.57] B 11388 ( 16.8 MB) N 11688 T 0 F 108 W 300 S 0.650 Mbps RTT 0.231

[180.58] B 11517 ( 17.0 MB) N 11817 T 0 F 109 W 300 S 0.755 Mbps RTT 0.231

[182.58] B 11657 ( 17.2 MB) N 11957 T 0 F 112 W 300 S 0.820 Mbps RTT 0.231

[184.58] B 11783 ( 17.3 MB) N 12083 T 0 F 112 W 300 S 0.738 Mbps RTT 0.231

[186.59] B 11908 ( 17.5 MB) N 12208 T 0 F 114 W 300 S 0.732 Mbps RTT 0.231

[188.59] B 12048 ( 17.7 MB) N 12348 T 0 F 115 W 300 S 0.820 Mbps RTT 0.231

[190.60] B 12177 ( 17.9 MB) N 12477 T 0 F 115 W 300 S 0.755 Mbps RTT 0.231

[192.60] B 12307 ( 18.1 MB) N 12607 T 0 F 115 W 300 S 0.761 Mbps RTT 0.231

[194.60] B 12436 ( 18.3 MB) N 12736 T 0 F 115 W 300 S 0.755 Mbps RTT 0.231

[196.61] B 12567 ( 18.5 MB) N 12867 T 0 F 117 W 300 S 0.767 Mbps RTT 0.231

[198.61] B 12687 ( 18.7 MB) N 12987 T 0 F 117 W 300 S 0.703 Mbps RTT 0.231

[200.61] B 12811 ( 18.9 MB) N 13111 T 0 F 117 W 300 S 0.726 Mbps RTT 0.231

[202.61] B 12950 ( 19.1 MB) N 13250 T 0 F 117 W 300 S 0.814 Mbps RTT 0.231

[204.61] B 13069 ( 19.2 MB) N 13369 T 0 F 117 W 300 S 0.697 Mbps RTT 0.231

[206.62] B 13192 ( 19.4 MB) N 13492 T 0 F 119 W 300 S 0.720 Mbps RTT 0.231

[208.62] B 13331 ( 19.6 MB) N 13631 T 0 F 119 W 300 S 0.814 Mbps RTT 0.231

[210.62] B 13459 ( 19.8 MB) N 13759 T 0 F 119 W 300 S 0.750 Mbps RTT 0.231

[212.63] B 13584 ( 20.0 MB) N 13884 T 0 F 119 W 300 S 0.732 Mbps RTT 0.231

[214.63] B 13717 ( 20.2 MB) N 14017 T 0 F 119 W 300 S 0.779 Mbps RTT 0.231

[216.63] B 13844 ( 20.4 MB) N 14144 T 0 F 119 W 300 S 0.744 Mbps RTT 0.231

[218.65] B 13945 ( 20.5 MB) N 14245 T 0 F 121 W 300 S 0.591 Mbps RTT 0.231

[220.65] B 14105 ( 20.8 MB) N 14405 T 0 F 124 W 300 S 0.937 Mbps RTT 0.231

[222.65] B 14231 ( 21.0 MB) N 14531 T 0 F 126 W 300 S 0.738 Mbps RTT 0.231

[224.65] B 14351 ( 21.1 MB) N 14651 T 0 F 126 W 300 S 0.703 Mbps RTT 0.231

[226.65] B 14479 ( 21.3 MB) N 14779 T 0 F 126 W 300 S 0.750 Mbps RTT 0.231

[228.65] B 14616 ( 21.5 MB) N 14916 T 0 F 126 W 300 S 0.802 Mbps RTT 0.231

[230.65] B 14737 ( 21.7 MB) N 15037 T 0 F 127 W 300 S 0.709 Mbps RTT 0.231

[232.65] B 14871 ( 21.9 MB) N 15171 T 0 F 128 W 300 S 0.785 Mbps RTT 0.231

[234.65] B 14996 ( 22.1 MB) N 15296 T 0 F 130 W 300 S 0.732 Mbps RTT 0.231

[236.65] B 15093 ( 22.2 MB) N 15393 T 0 F 130 W 300 S 0.568 Mbps RTT 0.231

[238.65] B 15226 ( 22.4 MB) N 15526 T 0 F 132 W 300 S 0.779 Mbps RTT 0.231

[240.65] B 15383 ( 22.6 MB) N 15683 T 0 F 134 W 300 S 0.919 Mbps RTT 0.231

[242.66] B 15502 ( 22.8 MB) N 15802 T 0 F 135 W 300 S 0.697 Mbps RTT 0.231

[244.66] B 15600 ( 23.0 MB) N 15900 T 0 F 137 W 300 S 0.574 Mbps RTT 0.231

[246.66] B 15734 ( 23.2 MB) N 16034 T 0 F 139 W 300 S 0.785 Mbps RTT 0.231

[248.66] B 15889 ( 23.4 MB) N 16189 T 0 F 141 W 300 S 0.908 Mbps RTT 0.231

[250.67] B 15916 ( 23.4 MB) N 16216 T 0 F 141 W 300 S 0.158 Mbps RTT 0.231

[252.68] B 16135 ( 23.8 MB) N 16435 T 0 F 145 W 300 S 1.282 Mbps RTT 0.231

[254.68] B 16275 ( 24.0 MB) N 16575 T 0 F 146 W 300 S 0.820 Mbps RTT 0.231

[256.68] B 16404 ( 24.2 MB) N 16704 T 0 F 148 W 300 S 0.755 Mbps RTT 0.231

[258.68] B 16525 ( 24.3 MB) N 16825 T 0 F 149 W 300 S 0.709 Mbps RTT 0.231

[260.68] B 16655 ( 24.5 MB) N 16955 T 0 F 150 W 300 S 0.761 Mbps RTT 0.231

[262.68] B 16787 ( 24.7 MB) N 17087 T 0 F 150 W 300 S 0.773 Mbps RTT 0.231

[264.68] B 16925 ( 24.9 MB) N 17225 T 0 F 152 W 300 S 0.808 Mbps RTT 0.231

[266.69] B 17048 ( 25.1 MB) N 17348 T 0 F 152 W 300 S 0.720 Mbps RTT 0.231

[268.69] B 17170 ( 25.3 MB) N 17470 T 0 F 155 W 300 S 0.714 Mbps RTT 0.231

[270.69] B 17308 ( 25.5 MB) N 17608 T 0 F 155 W 300 S 0.808 Mbps RTT 0.231

[272.70] B 17406 ( 25.6 MB) N 17706 T 0 F 156 W 300 S 0.574 Mbps RTT 0.231

[274.70] B 17542 ( 25.8 MB) N 17842 T 0 F 158 W 300 S 0.796 Mbps RTT 0.231

[276.71] B 17684 ( 26.0 MB) N 17984 T 0 F 160 W 300 S 0.832 Mbps RTT 0.231

[278.71] B 17771 ( 26.2 MB) N 18071 T 0 F 162 W 300 S 0.509 Mbps RTT 0.231

[280.71] B 17941 ( 26.4 MB) N 18241 T 0 F 165 W 300 S 0.996 Mbps RTT 0.231

[282.71] B 18045 ( 26.6 MB) N 18345 T 0 F 166 W 300 S 0.609 Mbps RTT 0.231

[284.71] B 18196 ( 26.8 MB) N 18496 T 0 F 168 W 300 S 0.884 Mbps RTT 0.231

[286.71] B 18315 ( 27.0 MB) N 18615 T 0 F 169 W 300 S 0.697 Mbps RTT 0.231

[288.71] B 18465 ( 27.2 MB) N 18765 T 0 F 172 W 300 S 0.878 Mbps RTT 0.231

[290.71] B 18590 ( 27.4 MB) N 18890 T 0 F 172 W 300 S 0.732 Mbps RTT 0.231

[292.71] B 18702 ( 27.5 MB) N 19002 T 0 F 173 W 300 S 0.656 Mbps RTT 0.231

[294.73] B 18837 ( 27.7 MB) N 19137 T 0 F 175 W 300 S 0.791 Mbps RTT 0.231

[296.73] B 18958 ( 27.9 MB) N 19258 T 0 F 175 W 300 S 0.709 Mbps RTT 0.231

[298.73] B 19057 ( 28.1 MB) N 19357 T 0 F 175 W 300 S 0.580 Mbps RTT 0.231

[300.73] B 19185 ( 28.2 MB) N 19485 T 0 F 176 W 300 S 0.750 Mbps RTT 0.231

[302.74] B 19352 ( 28.5 MB) N 19652 T 0 F 178 W 300 S 0.978 Mbps RTT 0.231

[304.85] B 22573 ( 33.2 MB) N 22873 T 0 F 213 W 300 S 0.750 Mbps RTT 0.231

[306.85] B 22698 ( 33.4 MB) N 22998 T 0 F 213 W 300 S 0.732 Mbps RTT 0.231

[308.87] B 22826 ( 33.6 MB) N 23126 T 0 F 213 W 300 S 0.750 Mbps RTT 0.231

[310.46] <-- FIN-ACK 22920 window D70096AB

Main: transfer finished in 310.742 sec, 836.36 Kbps, checksum D70096AB

Main: estRTT 0.231, ideal rate 15293.67 Kbps

With loss p = 0.1 in the reverse direction:

Main: sender W = 300, RTT 0.200 sec, loss 0 / 0.1, link 10 Mbps

Main: initializing DWORD array with 2^23 elements... done in 63 ms

Main: connected to s8.irl.cs.tamu.edu in 3.265 sec, pkt 1472 bytes

[ 5.26] B 97 ( 0.1 MB) N 194 T 4 F 0 W 97 S 0.568 Mbps RTT 0.001

[ 7.26] B 222 ( 0.3 MB) N 444 T 29 F 1 W 222 S 0.732 Mbps RTT 0.001

[ 9.28] B 362 ( 0.5 MB) N 662 T 49 F 1 W 300 S 0.820 Mbps RTT 0.008

[11.29] B 499 ( 0.7 MB) N 799 T 79 F 1 W 300 S 0.802 Mbps RTT 0.007

[13.30] B 641 ( 0.9 MB) N 941 T 98 F 1 W 300 S 0.832 Mbps RTT 0.013

[15.30] B 774 ( 1.0 MB) N 1074 T 116 F 1 W 300 S 0.779 Mbps RTT 0.003

[17.30] B 911 ( 1.2 MB) N 1211 T 140 F 1 W 300 S 0.802 Mbps RTT 0.002

[19.31] B 1067 ( 1.4 MB) N 1367 T 164 F 1 W 300 S 0.914 Mbps RTT 0.001

[21.31] B 1204 ( 1.6 MB) N 1504 T 190 F 1 W 300 S 0.802 Mbps RTT 0.003

[23.32] B 1330 ( 1.8 MB) N 1630 T 217 F 2 W 300 S 0.738 Mbps RTT 0.002

[25.33] B 1488 ( 2.0 MB) N 1788 T 241 F 2 W 300 S 0.925 Mbps RTT 0.004

[27.33] B 1640 ( 2.2 MB) N 1940 T 261 F 2 W 300 S 0.890 Mbps RTT 0.003

[29.35] B 1772 ( 2.4 MB) N 2072 T 287 F 2 W 300 S 0.773 Mbps RTT 0.004

[31.35] B 1909 ( 2.5 MB) N 2209 T 314 F 2 W 300 S 0.802 Mbps RTT 0.006

[33.36] B 2060 ( 2.8 MB) N 2360 T 336 F 2 W 300 S 0.884 Mbps RTT 0.006

[35.38] B 2201 ( 2.9 MB) N 2501 T 362 F 2 W 300 S 0.826 Mbps RTT 0.002

[37.39] B 2342 ( 3.1 MB) N 2642 T 389 F 2 W 300 S 0.826 Mbps RTT 0.003

[39.40] B 2485 ( 3.3 MB) N 2785 T 413 F 2 W 300 S 0.837 Mbps RTT 0.005

[41.40] B 2615 ( 3.5 MB) N 2915 T 424 F 2 W 300 S 0.761 Mbps RTT 0.002

[43.41] B 2750 ( 3.7 MB) N 3050 T 441 F 2 W 300 S 0.791 Mbps RTT 0.007

[45.41] B 2890 ( 3.9 MB) N 3190 T 460 F 2 W 300 S 0.820 Mbps RTT 0.003

[47.42] B 3044 ( 4.1 MB) N 3344 T 477 F 2 W 300 S 0.902 Mbps RTT 0.007

[49.42] B 3187 ( 4.3 MB) N 3487 T 499 F 2 W 300 S 0.837 Mbps RTT 0.005

[51.42] B 3329 ( 4.5 MB) N 3629 T 521 F 2 W 300 S 0.832 Mbps RTT 0.001

[53.42] B 3436 ( 4.6 MB) N 3736 T 542 F 2 W 300 S 0.627 Mbps RTT 0.001

[55.42] B 3588 ( 4.8 MB) N 3888 T 565 F 3 W 300 S 0.890 Mbps RTT 0.010

[57.44] B 3813 ( 5.1 MB) N 4113 T 584 F 4 W 300 S 1.318 Mbps RTT 0.002

[59.44] B 3922 ( 5.3 MB) N 4222 T 606 F 4 W 300 S 0.638 Mbps RTT 0.001

[61.45] B 4097 ( 5.5 MB) N 4397 T 624 F 6 W 300 S 1.025 Mbps RTT 0.013

[63.46] B 4205 ( 5.6 MB) N 4505 T 645 F 6 W 300 S 0.632 Mbps RTT 0.002

[65.46] B 4288 ( 5.8 MB) N 4588 T 667 F 7 W 300 S 0.486 Mbps RTT 0.001

[67.47] B 4458 ( 6.0 MB) N 4758 T 688 F 9 W 300 S 0.996 Mbps RTT 0.003

[69.47] B 4628 ( 6.2 MB) N 4928 T 709 F 9 W 300 S 0.996 Mbps RTT 0.004

[71.47] B 4758 ( 6.4 MB) N 5058 T 733 F 9 W 300 S 0.761 Mbps RTT 0.005

[73.47] B 4866 ( 6.5 MB) N 5166 T 755 F 9 W 300 S 0.632 Mbps RTT 0.005

[75.49] B 5001 ( 6.7 MB) N 5301 T 776 F 10 W 300 S 0.791 Mbps RTT 0.002

[77.50] B 5133 ( 6.9 MB) N 5433 T 801 F 12 W 300 S 0.773 Mbps RTT 0.004

[79.52] B 5276 ( 7.1 MB) N 5576 T 819 F 12 W 300 S 0.837 Mbps RTT 0.001

[81.53] B 5409 ( 7.3 MB) N 5709 T 834 F 12 W 300 S 0.779 Mbps RTT 0.010

[83.53] B 5514 ( 7.4 MB) N 5814 T 854 F 13 W 300 S 0.615 Mbps RTT 0.005

[85.53] B 5593 ( 7.5 MB) N 5893 T 881 F 14 W 300 S 0.463 Mbps RTT 0.004

[87.55] B 5622 ( 7.5 MB) N 5922 T 897 F 15 W 300 S 0.170 Mbps RTT 0.004

[89.55] B 5670 ( 7.6 MB) N 5970 T 906 F 16 W 300 S 0.281 Mbps RTT 0.009

[91.55] B 5900 ( 7.9 MB) N 6200 T 932 F 20 W 300 S 1.347 Mbps RTT 0.004

[93.71] B 6022 ( 8.1 MB) N 6322 T 953 F 21 W 300 S 0.714 Mbps RTT 0.003

[95.71] B 6274 ( 8.4 MB) N 6574 T 964 F 21 W 300 S 1.476 Mbps RTT 0.004

[97.72] B 6451 ( 8.6 MB) N 6751 T 982 F 22 W 300 S 1.037 Mbps RTT 0.006

[99.73] B 6584 ( 8.8 MB) N 6884 T 998 F 22 W 300 S 0.779 Mbps RTT 0.007

[101.74] B 6710 ( 9.0 MB) N 7010 T 1021 F 22 W 300 S 0.738 Mbps RTT 0.012

[103.75] B 6843 ( 9.2 MB) N 7143 T 1041 F 22 W 300 S 0.779 Mbps RTT 0.007

[105.75] B 6975 ( 9.3 MB) N 7275 T 1056 F 22 W 300 S 0.773 Mbps RTT 0.008

[107.76] B 7098 ( 9.5 MB) N 7398 T 1076 F 22 W 300 S 0.720 Mbps RTT 0.004

[109.76] B 7205 ( 9.6 MB) N 7505 T 1098 F 22 W 300 S 0.627 Mbps RTT 0.005

[111.76] B 7324 ( 9.8 MB) N 7624 T 1124 F 22 W 300 S 0.697 Mbps RTT 0.003

[113.77] B 7480 ( 10.0 MB) N 7780 T 1147 F 22 W 300 S 0.914 Mbps RTT 0.003

[115.77] B 7598 ( 10.2 MB) N 7898 T 1169 F 22 W 300 S 0.691 Mbps RTT 0.004

[117.77] B 7740 ( 10.4 MB) N 8040 T 1190 F 22 W 300 S 0.832 Mbps RTT 0.004

[119.79] B 7869 ( 10.5 MB) N 8169 T 1210 F 22 W 300 S 0.755 Mbps RTT 0.015

[121.79] B 7992 ( 10.7 MB) N 8292 T 1232 F 22 W 300 S 0.720 Mbps RTT 0.005

[123.80] B 8132 ( 10.9 MB) N 8432 T 1239 F 22 W 300 S 0.820 Mbps RTT 0.011

[125.80] B 8256 ( 11.1 MB) N 8556 T 1254 F 22 W 300 S 0.726 Mbps RTT 0.008

[127.81] B 8388 ( 11.2 MB) N 8688 T 1262 F 22 W 300 S 0.773 Mbps RTT 0.015

[129.81] B 8519 ( 11.4 MB) N 8819 T 1262 F 22 W 300 S 0.767 Mbps RTT 0.013

[131.83] B 8648 ( 11.6 MB) N 8948 T 1286 F 22 W 300 S 0.755 Mbps RTT 0.006

[133.83] B 8775 ( 11.8 MB) N 9075 T 1299 F 22 W 300 S 0.744 Mbps RTT 0.009

[135.84] B 8905 ( 11.9 MB) N 9205 T 1321 F 22 W 300 S 0.761 Mbps RTT 0.011

[137.84] B 9025 ( 12.1 MB) N 9325 T 1344 F 23 W 300 S 0.703 Mbps RTT 0.004

[139.85] B 9158 ( 12.3 MB) N 9458 T 1366 F 23 W 300 S 0.779 Mbps RTT 0.005

[141.85] B 9285 ( 12.4 MB) N 9585 T 1380 F 23 W 300 S 0.744 Mbps RTT 0.015

[143.86] B 9411 ( 12.6 MB) N 9711 T 1402 F 23 W 300 S 0.738 Mbps RTT 0.004

[145.87] B 9535 ( 12.8 MB) N 9835 T 1425 F 23 W 300 S 0.726 Mbps RTT 0.005

[147.87] B 9668 ( 12.9 MB) N 9968 T 1455 F 23 W 300 S 0.779 Mbps RTT 0.001

[149.88] B 9803 ( 13.1 MB) N 10103 T 1480 F 23 W 300 S 0.791 Mbps RTT 0.006

[151.88] B 9918 ( 13.3 MB) N 10218 T 1503 F 23 W 300 S 0.673 Mbps RTT 0.005

[153.90] B 10059 ( 13.5 MB) N 10359 T 1520 F 24 W 300 S 0.826 Mbps RTT 0.012

[155.90] B 10188 ( 13.6 MB) N 10488 T 1546 F 24 W 300 S 0.755 Mbps RTT 0.003

[157.91] B 10313 ( 13.8 MB) N 10613 T 1568 F 24 W 300 S 0.732 Mbps RTT 0.012

[159.93] B 10446 ( 14.0 MB) N 10746 T 1588 F 24 W 300 S 0.779 Mbps RTT 0.014

[161.93] B 10577 ( 14.2 MB) N 10877 T 1596 F 24 W 300 S 0.767 Mbps RTT 0.004

[163.94] B 10705 ( 14.3 MB) N 11005 T 1625 F 24 W 300 S 0.750 Mbps RTT 0.005

[165.95] B 10818 ( 14.5 MB) N 11118 T 1645 F 24 W 300 S 0.662 Mbps RTT 0.001

[167.95] B 10960 ( 14.7 MB) N 11260 T 1673 F 24 W 300 S 0.832 Mbps RTT 0.007

[169.96] B 11091 ( 14.8 MB) N 11391 T 1693 F 24 W 300 S 0.767 Mbps RTT 0.005

[171.96] B 11213 ( 15.0 MB) N 11513 T 1720 F 24 W 300 S 0.714 Mbps RTT 0.001

[173.97] B 11343 ( 15.2 MB) N 11643 T 1739 F 24 W 300 S 0.761 Mbps RTT 0.007

[175.98] B 11475 ( 15.4 MB) N 11775 T 1771 F 24 W 300 S 0.773 Mbps RTT 0.002

[177.98] B 11600 ( 15.5 MB) N 11900 T 1805 F 24 W 300 S 0.732 Mbps RTT 0.001

[180.00] B 11734 ( 15.7 MB) N 12034 T 1826 F 24 W 300 S 0.785 Mbps RTT 0.007

[182.00] B 11862 ( 15.9 MB) N 12162 T 1850 F 24 W 300 S 0.750 Mbps RTT 0.004

[184.00] B 11992 ( 16.0 MB) N 12292 T 1874 F 24 W 300 S 0.761 Mbps RTT 0.003

[186.01] B 12124 ( 16.2 MB) N 12424 T 1902 F 24 W 300 S 0.773 Mbps RTT 0.002

[188.02] B 12250 ( 16.4 MB) N 12550 T 1927 F 24 W 300 S 0.738 Mbps RTT 0.004

[190.03] B 12380 ( 16.6 MB) N 12680 T 1955 F 24 W 300 S 0.761 Mbps RTT 0.003

[192.04] B 12505 ( 16.7 MB) N 12805 T 1986 F 24 W 300 S 0.732 Mbps RTT 0.005

[194.05] B 12637 ( 16.9 MB) N 12937 T 2016 F 24 W 300 S 0.773 Mbps RTT 0.002

[196.05] B 12762 ( 17.1 MB) N 13062 T 2042 F 24 W 300 S 0.732 Mbps RTT 0.001

[198.07] B 12897 ( 17.3 MB) N 13197 T 2061 F 24 W 300 S 0.791 Mbps RTT 0.003

[200.07] B 13026 ( 17.4 MB) N 13326 T 2081 F 24 W 300 S 0.755 Mbps RTT 0.008

[202.07] B 13154 ( 17.6 MB) N 13454 T 2100 F 24 W 300 S 0.750 Mbps RTT 0.005

[204.08] B 13283 ( 17.8 MB) N 13583 T 2126 F 24 W 300 S 0.755 Mbps RTT 0.003

[206.08] B 13414 ( 18.0 MB) N 13714 T 2141 F 24 W 300 S 0.767 Mbps RTT 0.010

[208.09] B 13537 ( 18.1 MB) N 13837 T 2165 F 24 W 300 S 0.720 Mbps RTT 0.005

[210.10] B 13670 ( 18.3 MB) N 13970 T 2186 F 24 W 300 S 0.779 Mbps RTT 0.005

[212.10] B 13791 ( 18.5 MB) N 14091 T 2207 F 24 W 300 S 0.709 Mbps RTT 0.000

[214.10] B 13926 ( 18.6 MB) N 14226 T 2238 F 24 W 300 S 0.791 Mbps RTT 0.005

[216.11] B 14055 ( 18.8 MB) N 14355 T 2259 F 24 W 300 S 0.755 Mbps RTT 0.007

[218.11] B 14183 ( 19.0 MB) N 14483 T 2287 F 24 W 300 S 0.750 Mbps RTT 0.003

[220.12] B 14306 ( 19.1 MB) N 14606 T 2310 F 24 W 300 S 0.720 Mbps RTT 0.007

[222.12] B 14437 ( 19.3 MB) N 14737 T 2335 F 24 W 300 S 0.767 Mbps RTT 0.004

[224.13] B 14567 ( 19.5 MB) N 14867 T 2363 F 24 W 300 S 0.761 Mbps RTT 0.004

[226.13] B 14691 ( 19.7 MB) N 14991 T 2388 F 24 W 300 S 0.726 Mbps RTT 0.013

[228.14] B 14823 ( 19.8 MB) N 15123 T 2409 F 24 W 300 S 0.773 Mbps RTT 0.006

[230.15] B 14953 ( 20.0 MB) N 15253 T 2435 F 24 W 300 S 0.761 Mbps RTT 0.006

[232.17] B 15082 ( 20.2 MB) N 15382 T 2461 F 24 W 300 S 0.755 Mbps RTT 0.002

[234.18] B 15210 ( 20.4 MB) N 15510 T 2491 F 24 W 300 S 0.750 Mbps RTT 0.004

[236.19] B 15341 ( 20.5 MB) N 15641 T 2515 F 24 W 300 S 0.767 Mbps RTT 0.006

[238.21] B 15468 ( 20.7 MB) N 15768 T 2537 F 24 W 300 S 0.744 Mbps RTT 0.003

[240.22] B 15602 ( 20.9 MB) N 15902 T 2565 F 24 W 300 S 0.785 Mbps RTT 0.004

[242.23] B 15726 ( 21.1 MB) N 16026 T 2580 F 24 W 300 S 0.726 Mbps RTT 0.012

[244.24] B 15855 ( 21.2 MB) N 16155 T 2606 F 24 W 300 S 0.755 Mbps RTT 0.005

[246.25] B 15986 ( 21.4 MB) N 16286 T 2625 F 24 W 300 S 0.767 Mbps RTT 0.010

[248.25] B 16107 ( 21.6 MB) N 16407 T 2646 F 24 W 300 S 0.709 Mbps RTT 0.012

[250.26] B 16241 ( 21.7 MB) N 16541 T 2672 F 24 W 300 S 0.785 Mbps RTT 0.003

[252.27] B 16364 ( 21.9 MB) N 16664 T 2696 F 24 W 300 S 0.720 Mbps RTT 0.002

[254.28] B 16501 ( 22.1 MB) N 16801 T 2702 F 24 W 300 S 0.802 Mbps RTT 0.013

[256.28] B 16612 ( 22.2 MB) N 16912 T 2723 F 24 W 300 S 0.650 Mbps RTT 0.001

[258.30] B 16751 ( 22.4 MB) N 17051 T 2748 F 24 W 300 S 0.814 Mbps RTT 0.003

[260.31] B 16884 ( 22.6 MB) N 17184 T 2771 F 24 W 300 S 0.779 Mbps RTT 0.000

[262.31] B 17007 ( 22.8 MB) N 17307 T 2795 F 24 W 300 S 0.720 Mbps RTT 0.001

[264.33] B 17140 ( 22.9 MB) N 17440 T 2820 F 24 W 300 S 0.779 Mbps RTT 0.004

[266.34] B 17264 ( 23.1 MB) N 17564 T 2849 F 24 W 300 S 0.726 Mbps RTT 0.005

[268.36] B 17394 ( 23.3 MB) N 17694 T 2875 F 24 W 300 S 0.761 Mbps RTT 0.008

[270.36] B 17517 ( 23.4 MB) N 17817 T 2897 F 24 W 300 S 0.720 Mbps RTT 0.013

[272.36] B 17650 ( 23.6 MB) N 17950 T 2922 F 24 W 300 S 0.779 Mbps RTT 0.009

[274.37] B 17779 ( 23.8 MB) N 18079 T 2943 F 24 W 300 S 0.755 Mbps RTT 0.000

[276.37] B 17908 ( 24.0 MB) N 18208 T 2968 F 24 W 300 S 0.755 Mbps RTT 0.004

[278.38] B 17970 ( 24.0 MB) N 18270 T 2988 F 24 W 300 S 0.363 Mbps RTT 0.003

[280.39] B 18167 ( 24.3 MB) N 18467 T 2999 F 25 W 300 S 1.154 Mbps RTT 0.013

[282.40] B 18284 ( 24.5 MB) N 18584 T 3020 F 26 W 300 S 0.685 Mbps RTT 0.005

[284.41] B 18424 ( 24.7 MB) N 18724 T 3048 F 26 W 300 S 0.820 Mbps RTT 0.006

[286.41] B 18549 ( 24.8 MB) N 18849 T 3073 F 27 W 300 S 0.732 Mbps RTT 0.007

[288.42] B 18683 ( 25.0 MB) N 18983 T 3102 F 27 W 300 S 0.785 Mbps RTT 0.001

[290.42] B 18812 ( 25.2 MB) N 19112 T 3127 F 27 W 300 S 0.755 Mbps RTT 0.007

[292.43] B 18904 ( 25.3 MB) N 19204 T 3144 F 28 W 300 S 0.539 Mbps RTT 0.000

[294.43] B 19034 ( 25.5 MB) N 19334 T 3170 F 31 W 300 S 0.761 Mbps RTT 0.000

[296.44] B 19196 ( 25.7 MB) N 19496 T 3194 F 34 W 300 S 0.949 Mbps RTT 0.003

[298.45] B 19327 ( 25.9 MB) N 19627 T 3219 F 35 W 300 S 0.767 Mbps RTT 0.001

[300.46] B 19453 ( 26.0 MB) N 19753 T 3251 F 35 W 300 S 0.738 Mbps RTT 0.004

[302.46] B 19579 ( 26.2 MB) N 19879 T 3277 F 35 W 300 S 0.738 Mbps RTT 0.003

[304.48] B 19713 ( 26.4 MB) N 20013 T 3296 F 35 W 300 S 0.785 Mbps RTT 0.006

[306.49] B 19837 ( 26.6 MB) N 20137 T 3321 F 35 W 300 S 0.726 Mbps RTT 0.001

[308.49] B 19971 ( 26.7 MB) N 20271 T 3351 F 35 W 300 S 0.785 Mbps RTT 0.000

[310.50] B 20101 ( 26.9 MB) N 20401 T 3378 F 35 W 300 S 0.761 Mbps RTT 0.003

[312.50] B 20212 ( 27.1 MB) N 20512 T 3405 F 35 W 300 S 0.650 Mbps RTT 0.001

[314.50] B 20338 ( 27.2 MB) N 20638 T 3423 F 37 W 300 S 0.738 Mbps RTT 0.002

[316.51] B 20481 ( 27.4 MB) N 20781 T 3444 F 40 W 300 S 0.837 Mbps RTT 0.001

[318.52] B 20608 ( 27.6 MB) N 20908 T 3468 F 40 W 300 S 0.744 Mbps RTT 0.002

[320.53] B 20740 ( 27.8 MB) N 21040 T 3494 F 40 W 300 S 0.773 Mbps RTT 0.002

[322.54] B 20873 ( 28.0 MB) N 21173 T 3515 F 41 W 300 S 0.779 Mbps RTT 0.004

[324.54] B 21002 ( 28.1 MB) N 21302 T 3537 F 41 W 300 S 0.755 Mbps RTT 0.001

[326.54] B 21122 ( 28.3 MB) N 21422 T 3565 F 41 W 300 S 0.703 Mbps RTT 0.003

[328.55] B 21258 ( 28.5 MB) N 21558 T 3579 F 41 W 300 S 0.796 Mbps RTT 0.015

[330.56] B 21371 ( 28.6 MB) N 21671 T 3600 F 41 W 300 S 0.662 Mbps RTT 0.002

[332.57] B 21512 ( 28.8 MB) N 21812 T 3625 F 41 W 300 S 0.826 Mbps RTT 0.004

[334.58] B 21636 ( 29.0 MB) N 21936 T 3648 F 43 W 300 S 0.726 Mbps RTT 0.009

[336.58] B 21772 ( 29.2 MB) N 22072 T 3666 F 44 W 300 S 0.796 Mbps RTT 0.006

[338.59] B 21899 ( 29.3 MB) N 22199 T 3691 F 44 W 300 S 0.744 Mbps RTT 0.004

[340.59] B 22028 ( 29.5 MB) N 22328 T 3715 F 44 W 300 S 0.755 Mbps RTT 0.010

[342.60] B 22156 ( 29.7 MB) N 22456 T 3734 F 44 W 300 S 0.750 Mbps RTT 0.002

[344.61] B 22285 ( 29.9 MB) N 22585 T 3753 F 44 W 300 S 0.755 Mbps RTT 0.005

[346.61] B 22393 ( 30.0 MB) N 22693 T 3775 F 44 W 300 S 0.632 Mbps RTT 0.001

[348.62] B 22538 ( 30.2 MB) N 22838 T 3799 F 44 W 300 S 0.849 Mbps RTT 0.004

[350.62] B 22639 ( 30.3 MB) N 22939 T 3822 F 44 W 300 S 0.591 Mbps RTT 0.003

[352.64] B 22802 ( 30.5 MB) N 23102 T 3842 F 44 W 300 S 0.955 Mbps RTT 0.004

[354.66] <-- FIN-ACK 22920 window D70096AB

Main: transfer finished in 350.933 sec, 764.92 Kbps, checksum D70096AB

Main: estRTT 0.250, ideal rate 14131.78 Kbps

The rates are just slightly different in the two traces. The reason is because of packet loss.

1. The receiver increases the window by one for every packet received. In TCP, this algorithm is called additive increase/multiplicative decrease or AIMD.