Sample Output Trace (SR with Cumulative ACK)

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-- * Network Simulator v1.0 * --
Enter number of messages to simulate (> 0): [10] 1000
Enter packet loss probability (0.0 for no loss): [0.0] 0.1
Enter packet corruption probability (0.0 for no corruption): [0.0] 0.1
Enter average time between messages from sender's layer 5 (> 0.0): [1000] 200
Enter window size (> 0): [8] 8
Enter retransmission timeout (>0.0) [15.0] 30
Enter trace level (>= 0): [0] 3
Enter random seed: [0] 1234
SR timer interval is:30.0
generateNextArrival(): called
generateNextArrival(): time is 0.0
generateNextArrival(): future time for event 1 at entity 0 will be 43.4339426862392
EVENT time: 43.4339426862392 type: 1 entity: 0
generateNextArrival(): called
generateNextArrival(): time is 43.4339426862392
generateNextArrival(): future time for event 1 at entity 0 will be 67.36045411542099
Upper layer MSG at A:aaaaaaaaaaaaaaaaaaaaa
Current msg_buffer size:1
toLayer3: segnum: 0 acknum: 0 checksum: 424844876 payload: aaaaaaaaaaaaaaaaaaaa
toLayer3: scheduling arrival on other side
A Found empty slot in window, sending packet from buffer:segnum: 0 acknum: 0 checksum: 424844876
payload: aaaaaaaaaaaaaaaaaaa
stopTimer: stopping timer at 43.4339426862392
stopTimer: Warning: Unable to cancel your timer
startTimer: starting timer at 43.4339426862392
EVENT time: 45.66060365611743 type: 2 entity: 1
bInput(): B getting aaaaaaaaaaaaaaaaaaa
bInput(): Correct seg num. Expecting pkt0, got pkt0
        Moving window_base_b forward to:1 from 0
toLayer3: segnum: 0 acknum: 1 checksum: 1 payload:
toLayer3: scheduling arrival on other side
EVENT time: 47.569475386822106 type: 2 entity: 0
A got ACK from B, packet is:segnum: 0 acknum: 1 checksum: 1 payload:
ACK for seq. no.:0 to 0
Also dumping index 0:seqnum: 0 acknum: 0 checksum: 424844876 payload: aaaaaaaaaaaaaaaaaaaaaaa
stopTimer: stopping timer at 47.569475386822106
first non-empty index in window is:-1
EVENT time: 67.36045411542099 type: 1 entity: 0
generateNextArrival(): called
generateNextArrival(): time is 67.36045411542099
generateNextArrival(): future time for event 1 at entity 0 will be 83.31553086947233
Current msg buffer size:1
toLayer3: packet being lost
A Found empty slot in window, sending packet from buffer:segnum: 1 acknum: 0 checksum: 296390681
stopTimer: stopping timer at 67.36045411542099
stopTimer: Warning: Unable to cancel your timer
startTimer: starting timer at 67.36045411542099
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CASE 2 EVENT time: 17243.23071993164 type: 2 entity: 1 bInput(): Correct seq num. Expecting pkt6, got pkt6 Moving window base b forward to:7 from 6 Sending ACK for sequence toLayer3: segnum: 6 acknum: 1 checksum: 7 payload: no 6, but ACK is corrupted toLayer3: packet being corrupted toLayer3: scheduling arrival on other side EVENT time: 17252.397656178473 type: 2 entity: 0 at A A got Corrupted ACK/NAK from B EVENT time: 17264.967802972504 type: 1 entity: 0 generateNextArrival(): called generateNextArrival(): time is 17264.967802972504 generateNextArrival(): future time for event 1 at entity 0 will be 17638.23358867153 Upper layer MSG at A:jjjjjjjjjjjjjjjjjj Current msg_buffer size:1 with sequence no 7 toLayer3: seqnum: 7 acknum: 0 checksum: -731242881 payload: jijjjjjjjjjjjjjj toLayer3: scheduling arrival on other side A Found empty slot in window, sending packet from buffer:seqnum: 7 acknum: 0 checksum: -731242881 payload: jjjjjjjjjjjjjjjjjjj stopTimer: stopping timer at 17264.967802972504 startTimer: starting timer at 17264.967802972504 EVENT time: 17272.405713064974 type: 2 entity: 1 bInput(): B getting jjjjjjjjjjjjjjjj received. Sending ACK for bInput(): Correct seq num. Expecting pkt7, got pkt7 sequence number 7 Moving window_base_b forward to:8 from 7 toLayer3: segnum: 7 acknum: 1 checksum: 8 payload: toLayer3: scheduling arrival on other side EVENT time: 17276.00817896054 type: 2 entity: 0 A got ACK from B, packet is:seqnum: 7 acknum: 1 checksum: 8 payload: is ACK for Sequence no 6 as ACK for seq. no.:6 to 7 well. Sliding window by 2 Commulative ACK: ACKing packet with seq. no. 6 on receiving ACK 7 Also dumping index 1:seqnum: 7 acknum: 0 checksum: -731242881 payload: jjjjjjjjjjjjjjjj stopTimer: stopping timer at 17276.00817896054 first non-empty index in window is:-1 ... CASE 3:

EVENT time: 17816.827906125065 type: 1 entity: 0

generateNextArrival(): called

generateNextArrival(): time is 17816.827906125065

generateNextArrival(): future time for event 1 at entity 0 will be 18090.81087679678

Current msg_buffer size:1

toLayer3: packet being corrupted

but is corrupted

toLayer3: scheduling arrival on other side

A Found empty slot in window, sending packet from buffer:seqnum: 10 acknum: 0 checksum: -1116605466

stopTimer: stopping timer at 17816.827906125065 stopTimer: Warning: Unable to cancel your timer startTimer: starting timer at 17816.827906125065 EVENT time: 17820.703115939818 type: 2 entity: 1 bInput(): Checksum error in B, corrupted EVENT time: 17846.827906125065 type: 0 entity: 0 Timer interrupt A at local time: 17846.827906125065 Timer: A retrans segnum: 10 acknum: 0 checksum: -1116605466 payload: toLayer3: seqnum: 10 acknum: 0 checksum: -1116605466 payload: mmmmmmmmmmmmmmmmmmm toLayer3: scheduling arrival on other side stopTimer: stopping timer at 17846.827906125065 Timer interrupts and the stopTimer: Warning: Unable to cancel your timer packet is retransmitted startTimer: starting timer at 17846.827906125065 **CASE 4:** EVENT time: 30456.58912930692 type: 2 entity: 0 A got ACK from B, packet is:seqnum: 5 acknum: 1 checksum: 6 payload: ACK for seq. no.:5 to 5 EVENT time: 30701.095614490183 type: 1 entity: 0 generateNextArrival(): called generateNextArrival(): time is 30701.095614490183 generateNextArrival(): future time for event 1 at entity 0 will be 30712.082277901543 Upper layer MSG at A:uuuuuuuuuuuuuuuuu Current msg_buffer size:1 toLayer3: seqnum: 6 acknum: 0 checksum: -2144239038 payload: uuuuuuuuuuuuuuuuuu toLayer3: packet being lost A Found empty slot in window, sending packet from buffer:seqnum: 6 acknum: 0 checksum: -2144239038 payload: uuuuuuuuuuuuuuuuu stopTimer: stopping timer at 30701.095614490183 stopTimer: Warning: Unable to cancel your timer startTimer: starting timer at 30701.095614490183 EVENT time: 30712.082277901543 type: 1 entity: 0 generateNextArrival(): called generateNextArrival(): time is 30712.082277901543 generate Next Arrival (): future time for event 1 at entity 0 will be 30718.72310556352Sending seq. no. 7 Upper layer MSG at A:vvvvvvvvvvvvvvvvvvvv Current msg_buffer size:1 toLayer3: seqnum: 7 acknum: 0 checksum: 2022274063 payload: vvvvvvvvvvvvvvvvvvvv toLayer3: packet being lost A Found empty slot in window, sending packet from buffer:seqnum: 7 acknum: 0 checksum: 2022274063 payload: vvvvvvvvvvvvvvvvvvvv stopTimer: stopping timer at 30712.082277901543 startTimer: starting timer at 30712.082277901543 EVENT time: 30718.72310556352 type: 1 entity: 0 generateNextArrival(): called generateNextArrival(): time is 30718.72310556352 generateNextArrival(): future time for event 1 at entity 0 will be 31038.78902554399 Upper layer MSG at A:wwwwwwwwwwwwwwwwwww Current msg_buffer size:1

toLayer3: seqnum: 8 acknum: 0 checksum: 1893819868 payload: wwwwwwwwwwwwwwwwwwww toLayer3: scheduling arrival on other side A Found empty slot in window, sending packet from buffer:seqnum: 8 acknum: 0 checksum: 1893819868 payload: wwwwwwwwwwwwwwwww stopTimer: stopping timer at 30718.72310556352 startTimer: starting timer at 30718.72310556352 EVENT time: 30728.488540299688 type: 2 entity: 1 bInput(): B getting wwwwwwwwwwwwwwwwww bInput(): Expecting pkt6, got pkt8 putting packet into rcv_buffer[8] Sending ACK:5 toLayer3: segnum: 5 acknum: 1 checksum: 6 payload: toLayer3: scheduling arrival on other side EVENT time: 30731.151646473583 type: 2 entity: 0 A got ACK from B, packet is:seqnum: 5 acknum: 1 checksum: 6 payload: Duplicate ACK, resend the next unACK'ed packet: seqnum: 6 acknum: 0 checksum: -2144239038 payload: uuuuuuuuuuuuuuuuu toLayer3: seqnum: 6 acknum: 0 checksum: -2144239038 payload: uuuuuuuuuuuuuuuuuu toLayer3: scheduling arrival on other side seq. no. 5. Resending seq. no. 6 again **CASE 5:** VENT time: 32411.45054475539 type: 1 entity: 0 generateNextArrival(): called generateNextArrival(): time is 32411.45054475539 generateNextArrival(): future time for event 1 at entity 0 will be 32419.556260872214 Current msg_buffer size:1 toLayer3: packet being lost A Found empty slot in window, sending packet from buffer:seqnum: 3 acknum: 0 checksum: -474334493 payload: hhhhhhhhhhhhhhhhhhhhh stopTimer: stopping timer at 32411.45054475539 stopTimer: Warning: Unable to cancel your timer startTimer: starting timer at 32411.45054475539 EVENT time: 32419.556260872214 type: 1 entity: 0 generateNextArrival(): called generateNextArrival(): time is 32419.556260872214 generateNextArrival(): future time for event 1 at entity 0 will be 32424.29273354289 Current msg_buffer size:1 toLayer3: scheduling arrival on other side A Found empty slot in window, sending packet from buffer:seqnum: 4 acknum: 0 checksum: -602788688 stopTimer: stopping timer at 32419.556260872214 startTimer: starting timer at 32419.556260872214 EVENT time: 32424.29273354289 type: 1 entity: 0 generateNextArrival(): called generateNextArrival(): time is 32424.29273354289 generateNextArrival(): future time for event 1 at entity 0 will be 32615.375225074004 Upper layer MSG at A:jjjjjjjjjjjjjjjjjjj

Current msg_buffer size:1

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toLayer3: seqnum: 5 acknum: 0 checksum: -731242883 payload: jjjjjjjjjjjjjjjjjj
toLayer3: scheduling arrival on other side
A Found empty slot in window, sending packet from buffer:seqnum: 5 acknum: 0 checksum: -731242883
payload: jjjjjjjjjjjjjjjjjj
stopTimer: stopping timer at 32424.29273354289
startTimer: starting timer at 32424.29273354289
EVENT time: 32424.582598345893 type: 2 entity: 1
bInput(): Expecting pkt3, got pkt4
putting packet into rcv_buffer[4]
Sending ACK:2
                                                                                            duplicate ACK
toLayer3: segnum: 2 acknum: 1 checksum: 3 payload:
toLayer3: scheduling arrival on other side
EVENT time: 32429.08294930875 type: 2 entity: 1
bInput(): B getting jjjjjjjjjjjjjjjjj
bInput(): Expecting pkt3, got pkt5
putting packet into rcv_buffer[5]
                                                                                            duplicate ACK
Sending ACK:2
toLayer3: segnum: 2 acknum: 1 checksum: 3 payload:
toLayer3: scheduling arrival on other side
EVENT time: 32434.240638447212 type: 2 entity: 0
A got ACK from B, packet is:seqnum: 2 acknum: 1 checksum: 3 payload:
       Duplicate ACK, resend the next unACK'ed packet: seqnum: 3 acknum: 0 checksum: -
Sending seq. no 3
toLayer3: scheduling arrival on other side
EVENT time: 32437.282509842214 type: 2 entity: 0
A got ACK from B, packet is:segnum: 2 acknum: 1 checksum: 3 payload:
       Duplicate ACK, resend the next unACK'ed packet: segnum: 3 acknum: 0 checksum: -
toLayer3: scheduling arrival on other side
EVENT time: 32442.9249855037 type: 2 entity: 1
bInput(): Correct seq num. Expecting pkt3, got pkt3
       Moving window_base_b forward to:6 from 3
toLayer3: segnum: 5 acknum: 1 checksum: 6 payload:
                                                                                           Sending cumulative
toLayer3: scheduling arrival on other side
                                                                                            ACK till seq. no 5.
EVENT time: 32443.998596148558 type: 2 entity: 0
A got ACK from B, packet is:segnum: 5 acknum: 1 checksum: 6 payload:
ACK for seq. no.:3 to 5
        Commulative ACK: ACKing packet with seq. no. 3 on receiving ACK 5
        Commulative ACK: ACKing packet with seq. no. 4 on receiving ACK 5
                                                                                            by ACKing packet
Also dumping index 2:seqnum: 5 acknum: 0 checksum: -731242883 payload: jjjjjjjjjjjjjjjjjjjjjj
stopTimer: stopping timer at 32443.998596148558
first non-empty index in window is:-1
...
```

EVENT time: 198272.52943510227 type: 2 entity: 0

A got ACK from B, packet is:seqnum: 7 $\,$ acknum: 1 $\,$ checksum: 8 $\,$ payload: ACK for seq. no.:7 to 7 $\,$

stopTimer: stopping timer at 198272.52943510227

first non-empty index in window is:-1

EVENT time: 198414.69771416354 type: 1 entity: 0

generateNextArrival(): called

generateNextArrival(): time is 198414.69771416354

generateNextArrival(): future time for event 1 at entity 0 will be 198541.20303964344

Simulator terminated at time 198414.69771416354

======STATISTICS========

Number of original packets transmitted by A:1000

Number of retransmissions by A:483

Number of data packets delivered to layer 5 at B:1000

Number of ACK packets sent by B:1212

Number of corrupted packets:227

Ratio of lost packets: 0.09499072356215213

Ratio of corrupted packets:0.0930709307093071

Average RTT:12.14302023591649

Average communication time: 26.682909665211746

EXTRA:

All RTT:8293.682821130962

Counter RTT:683.0

Total time to communicate: 26682.909665211744

Counter for time to communicate: 1000.0