



./b08901048 20 0.1 0 10 2

此為可能出現 loss 的 case，一旦 loss 在 A send pkt 的過程中發生，B 就不會收到順序正確的 pkt，因此會回傳和上一個 pkt 一樣的 ack2 的 pkt 給 A，A 會重複收到 ack2，直到 timeout，timeout 發生時，A 會 send buffer 中所有的 pkt，從 pkt3 到 pkt7，然後 B 會收到 pkt3 並回傳 ack3，A 的 base 會被更新到 4。

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MESSAGE: A output (cccccccccccccccccc)
MESSAGE: A    send (seq: 3 ack: 0)
0.100000      TOLAYER3: packet being lost

EVENT time: 60.917324, type: 1, fromlayer5 entity: 0
MESSAGE: A output (dddddddddddddddddd)
MESSAGE: A    send (seq: 4 ack: 0)

EVENT time: 66.189552, type: 2, fromlayer3 entity: 1
MESSAGE: B receive (seq: 4 ack: 0)
MESSAGE: B input (dddddddddddddddddd)
MESSAGE: B    send (seq: 4 ack: 2)

EVENT time: 69.502670, type: 1, fromlayer5 entity: 0
MESSAGE: A output (eeeeeeeeeeeeeeeeeee)
MESSAGE: A    send (seq: 5 ack: 0)

EVENT time: 70.392197, type: 2, fromlayer3 entity: 0
MESSAGE: A receive (seq: 4 ack: 2)

EVENT time: 77.157211, type: 2, fromlayer3 entity: 1
MESSAGE: B receive (seq: 5 ack: 0)
MESSAGE: B input (eeeeeeeeeeeeeeeeeee)
MESSAGE: B    send (seq: 5 ack: 2)

EVENT time: 80.570114, type: 2, fromlayer3 entity: 0
MESSAGE: A receive (seq: 5 ack: 2)

EVENT time: 87.321922, type: 1, fromlayer5 entity: 0
MESSAGE: A output (ffffffffffffffffffff)
MESSAGE: A    send (seq: 6 ack: 0)
0.100000      TOLAYER3: packet being lost

EVENT time: 89.063972, type: 1, fromlayer5 entity: 0
MESSAGE: A output (gggggggggggggggggggg)
MESSAGE: A    send (seq: 7 ack: 0)

EVENT time: 93.222557, type: 2, fromlayer3 entity: 1
MESSAGE: B receive (seq: 7 ack: 0)
MESSAGE: B input (gggggggggggggggggggg)
MESSAGE: B    send (seq: 7 ack: 2)
0.100000      TOLAYER3: packet being lost

EVENT time: 107.001053, type: 0, timerinterrupt entity: 0
MESSAGE: A timeout (index: 0)
MESSAGE: A    send (seq: 3 ack: 0)
MESSAGE: A    send (seq: 4 ack: 0)
MESSAGE: A    send (seq: 5 ack: 0)
MESSAGE: A    send (seq: 6 ack: 0)
0.100000      TOLAYER3: packet being lost
MESSAGE: A    send (seq: 7 ack: 0)
```

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B 在收 seq19 的時候收到 corrupted pkt，所以 B 會回傳 ack18 給 A，等到 timeout 時，A 重傳 seq19,seq20，B 收到 seq19 回傳 ack19，但 seq20 又 corrupted，所以再等到 timeout 時，A 回傳 seq20 給 B，B 收到 seq20 後，回傳 ack20。

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EVENT time: 261.120697, type: 2, fromlayer3 entity: 0
  MESSAGE: A receive (seq:16 ack:16)

EVENT time: 263.948792, type: 2, fromlayer3 entity: 1
  MESSAGE: B receive (seq:18 ack: 0)
  MESSAGE: B input (rrrrrrrrrrrrrrrrrrrr)
  MESSAGE: B send (seq:18 ack:18)

EVENT time: 267.659943, type: 2, fromlayer3 entity: 0
  MESSAGE: A receive (seq:17 ack:17)

EVENT time: 270.717255, type: 2, fromlayer3 entity: 1
  MESSAGE: B receive a corrupted packet!

EVENT time: 271.767700, type: 2, fromlayer3 entity: 0
  MESSAGE: A receive (seq:18 ack:18)

EVENT time: 274.435455, type: 2, fromlayer3 entity: 1
  MESSAGE: B receive (seq:20 ack: 0)
  MESSAGE: B input (ttttttttttttttttttt)
  MESSAGE: B send (seq:20 ack:18)

EVENT time: 281.716919, type: 2, fromlayer3 entity: 0
  MESSAGE: A receive (seq:20 ack:18)

EVENT time: 321.407166, type: 0, timerinterrupt entity: 0
  MESSAGE: A timeout (index: 0)
  MESSAGE: A send (seq:19 ack: 0)
  MESSAGE: A send (seq:20 ack: 0)
  TOLAYER3: packet being corrupted

EVENT time: 326.290619, type: 2, fromlayer3 entity: 1
  MESSAGE: B receive (seq:19 ack: 0)
  MESSAGE: B input (sssssssssssssssssss)
  MESSAGE: B send (seq:19 ack:19)

EVENT time: 327.434937, type: 2, fromlayer3 entity: 0
  MESSAGE: A receive (seq:19 ack:19)

EVENT time: 330.304993, type: 2, fromlayer3 entity: 1
  MESSAGE: B receive a corrupted packet!

EVENT time: 370.101959, type: 0, timerinterrupt entity: 0
  MESSAGE: A timeout (index: 0)
  MESSAGE: A send (seq:20 ack: 0)

EVENT time: 372.520325, type: 2, fromlayer3 entity: 1
  MESSAGE: B receive (seq:20 ack: 0)
  MESSAGE: B input (ttttttttttttttttttt)
  MESSAGE: B send (seq:20 ack:20)
```

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A send pkt20 會 lost，然後 B 回傳 ack19 的時候會 corrupted，因此 A 沒收到 ack19，等到 timeout 後 A 重傳 seq19,seq20，B 收到 seq19 回傳 ack19，B 收到 seq20 回傳 ack20，A 收到 ack19,ack20。

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EVENT time: 245.124084, type: 2, fromlayer3 entity: 1
  MESSAGE: B receive (seq:20 ack: 0)
  MESSAGE: B input (tttttttttttttttttt)
  MESSAGE: B send (seq:20 ack:18)

EVENT time: 250.342422, type: 2, fromlayer3 entity: 0
  MESSAGE: A receive (seq:18 ack:18)

EVENT time: 252.830719, type: 2, fromlayer3 entity: 0
  MESSAGE: A receive (seq:20 ack:18)

EVENT time: 298.684296, type: 0, timerinterrupt entity: 0
  MESSAGE: A timeout (index: 0)
  MESSAGE: A send (seq:19 ack: 0)
  MESSAGE: A send (seq:20 ack: 0)
0.100000 TOLAYER3: packet being lost

EVENT time: 306.444275, type: 2, fromlayer3 entity: 1
  MESSAGE: B receive (seq:19 ack: 0)
  MESSAGE: B input (ssssssssssssssssss)
  MESSAGE: B send (seq:19 ack:19)
  TOLAYER3: packet being corrupted

EVENT time: 313.836639, type: 2, fromlayer3 entity: 0
  MESSAGE: A receive a corrupted packet!

EVENT time: 344.537872, type: 0, timerinterrupt entity: 0
  MESSAGE: A timeout (index: 0)
  MESSAGE: A send (seq:19 ack: 0)
  MESSAGE: A send (seq:20 ack: 0)

EVENT time: 346.956238, type: 2, fromlayer3 entity: 1
  MESSAGE: B receive (seq:19 ack: 0)
  MESSAGE: B input (ssssssssssssssssss)
  MESSAGE: B send (seq:19 ack:19)

EVENT time: 349.971069, type: 2, fromlayer3 entity: 1
  MESSAGE: B receive (seq:20 ack: 0)
  MESSAGE: B input (tttttttttttttttttt)
  MESSAGE: B send (seq:20 ack:20)

EVENT time: 352.689301, type: 2, fromlayer3 entity: 0
  MESSAGE: A receive (seq:19 ack:19)

EVENT time: 362.294037, type: 2, fromlayer3 entity: 0
  MESSAGE: A receive (seq:20 ack:20)
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2.我的 timeout interval 採用  $2 * \text{EstimatedRTT}$ ，以下的圖橘色的是 SampleRTT，藍色的則是 EstimatedRTT，我在執行程式時有發現一件事，在我的電腦上執行時，time 有時候會變成亂數（或是很長的數）而我完全沒有改動到 time 的值，我在同學的電腦可以正常使用，因此我在實作這部分時，SampleRTT 有時會因為 time 值變成亂數而爆掉，所以我這邊做了一個判斷是如果 SampleRTT 過大的時候會讓他回到 1.6 倍的 EstimatedRTT，太小的話則是變成 0.8 倍的 EstimatedRTT，我知道這樣的做法和課本上或課堂上有些出入，但我目前能做的處置是這樣，然後調整好的 SampleRTT 再利用 EWMA 的公式生成 EstimatedRTT。因為這個公式的用意應該是讓 time interval 可以隨著 EstimatedRTT 進行彈性修正，我的作法應該也可以達到類似的效果，還請助教斟酌。



