電腦網路導論 hw2 電機三 b08901048 陳宥辰 ./b08901048 10 0 0 10 2

此為最正常,沒有 loss pkt 或 corrupted 的 case,B 收到應當收到的 seqnum 之後會回傳該 seqnum 作為 acknum 的 pkt 給 A,而 A 會把 A.base 更新到 pkt.acknum+1。

```
the number of messages to simulate: 10
packet loss probability: 0.000000
packet corruption probability: 0.000000
average time between messages from sender's layer5: 10.000000
TRACE: 2
EVENT time: 18.705740, type: 1, fromlayer5 entity: 0
       MESSAGE: A output (aaaaaaaaaaaaaaaaa)
       MESSAGE: A send (seq: 1 ack: 0)
EVENT time: 24.170835, type: 2, fromlayer3 entity: 1 MESSAGE: B receive (seq: 1 ack: 0)
       MESSAGE: B input (aaaaaaaaaaaaaaaaaa)
       MESSAGE: B send (seg: 1 ack: 1)
EVENT time: 29.402449, type: 2, fromlayer3 entity: 0
       MESSAGE: A receive (seq: 1 ack: 1)
EVENT time: 35.124840, type: 1, fromlayer5 entity: 0
       MESSAGE: A send (seq: 2 ack: 0)
EVENT time: 37.145336, type: 2, fromlayer3 entity: 1
       MESSAGE: B receive (seq: 2 ack: 0)
       MESSAGE: B
                    send (seq: 2 ack: 2)
EVENT time: 41.612602, type: 2, fromlayer3 entity: 0
       MESSAGE: A receive (seq: 2 ack: 2)
EVENT time: 52.094032, type: 1, fromlayer5 entity: 0
       MESSAGE: A output (cccccccccccccc)
       MESSAGE: A
                  send (seg: 3 ack: 0)
EVENT time: 56.957436, type: 2, fromlayer3 entity: 1
       MESSAGE: B receive (seq: 3 ack: 0)
       MESSAGE: B input (cccccccccccccc)
       MESSAGE: B
                   send (seq: 3 ack: 3)
EVENT time: 60.917324, type: 1, fromlayer5 entity: 0
       MESSAGE: A output (ddddddddddddddddddd)
       MESSAGE: A send (seq: 4 ack: 0)
EVENT time: 63.255848, type: 2, fromlayer3 entity: 0
       MESSAGE: A receive (seq: 3 ack: 3)
EVENT time: 68.034302, type: 1, fromlayer5 entity: 0
       MESSAGE: A output (eeeeeeeeeeeee)
       MESSAGE: A send (seq: 5 ack: 0)
```

./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。

```
MESSAGE: A output (cccccccccccccc)
       MESSAGE: A send (seq: 3 ack: 0)
                TOLAYER3: packet being lost
0.100000
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 (ddddddddddddddddddd)
       MESSAGE: B
                    send (seq: 4 ack: 2)
EVENT time: 69.502670, type: 1, fromlayer5 entity: 0
       MESSAGE: A output (eeeeeeeeeeeee)
       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 (eeeeeeeeeeeee)
       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 send (seq: 6 ack: 0)
                TOLAYER3: packet being lost
0.100000
EVENT time: 89.063972, type: 1, fromlayer5 entity: 0
       MESSAGE: A output (gggggggggggggggggg)
       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)
       MESSAGE: A
0.100000
          TOLAYER3: packet being lost
       MESSAGE: A send (seq: 7 ack: 0)
```

./b08901048 20 0 0.1 10 2

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。

```
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 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 (ttttttttttttttt)
       MESSAGE: B send (seq:20 ack:18)
EVENT time: 281.716919, type: 2, fromlayer3 entity: 0
       MESSAGE: A receive (seg: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 (sssssssssssssssss)
       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)
                    send (seq:20 ack: 0)
       MESSAGE: A
EVENT time: 372.520325, type: 2, fromlayer3 entity: 1
       MESSAGE: B receive (seq:20 ack: 0)
       MESSAGE: B input (ttttttttttttttt)
       MESSAGE: B send (seq:20 ack:20)
```

./b08901048 20 0.1 0.1 10 2

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。

```
EVENT time: 245.124084, type: 2, fromlayer3 entity: 1
       MESSAGE: B receive (seq:20 ack: 0)
       MESSAGE: B input (tttttttttttttt)
       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 (seg: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)
                   send (seq:19 ack: 0)
       MESSAGE: A
       MESSAGE: A
                     send (seq:20 ack: 0)
EVENT time: 346.956238, type: 2, fromlayer3 entity: 1
       MESSAGE: B receive (seg:19 ack: 0)
       MESSAGE: B input (sssssssssssssssss)
       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 (ttttttttttttttt)
       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)
```

2.我的 timeout interval 採用 2*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 EstimateRTT,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。





