Oliver Luo

Sprint 1 Parts 1-3

Part 1

Data Bandwidth: 80 Mb/sec $= 80 \cdot 2^{20}$ bits/sec
RTT: 20ms

Q: total expected time required to transmit a 1 Mbyte file
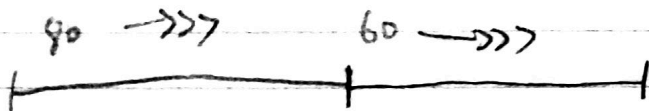from source host to destination.

1 Mbyte = 8 Mbits

$.8$ Mb $/80$ Mb $= 0.1$ seconds $= 100$ milliseconds

100ms + 20ms = 120ms
travel time   RTT

Part 2

First Bandwidth: 80 Mb/sec
Second Bandwidth: 60 Mb/sec

80 →>>   60 —>>>

8 Mb $/60$ Mb $= 0.133 = 133$ms

100ms + 133ms + 20ms = 253ms
     ↑   ↑   ↑

1st link   2nd Link
travel time   travel time   RTT

Part 3

Time taken for 1MB file arrival at 2nd link = __100ms__

```
              80mb/s            60mb/s
Source  |-----------------|----------------| Dest.
        |_____|_____|
              1st         |      2nd
                          |
                          └── 512KB queued
```
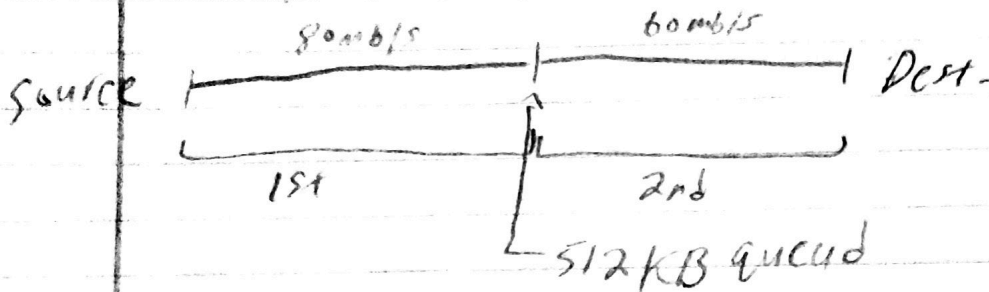
$512KB = 4096Kb = 4.096Mb / 60Mb = 0.068$ seconds

$0.068s. = $ __60.8ms__ to transfer queued file on 2nd link

$1MB = 8Mb / 60Mb = 0.133ms$

$0.133s = $ __133ms__ to transfer __1__ MB file on 2nd link

Total time taken $= 100ms + 60.8ms + 133ms + 20ms$
                      ↑   ↑   ↑   ↑
                   1MB file   512KB   1MB file
                   across   across   across   RTT
                   1st link   2nd link 2nd link

__= 313.8ms__