Analysis

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The following screen shot is from my own program, with a fixed buffer size 1000, file size ranges from 100MB-50MB
There looks like a huge jump from 70MB-80MB, in 70MB case the rate is around 44MB/s but in 80MB case , the speed is 117-118MB/s, fileSize greater than 80MB will exceed 100MB/s and file below 70MB have a speed around 44MB/s

I don't know if this difference is from my code, I observe the code and didn't possible cause of this jump, also there might be a property of TCP connection

100MB

```
Send Time : 850.173000 msecs , FileSize 102 MB, Speed 119.975581 MB per Sec
File Send Successful!
```

```
Recv Time : 870.266000 msecs , FileSize 102 MB, Speed 117.205544 MB per Sec
File Received
```

90MB

```
Send Time : 757.119000 msecs , FileSize 90 MB, Speed 118.871670 MB per Sec
File Send Successful!
```

```
Recv Time : 761.312000 msecs , FileSize 90 MB, Speed 118.216973 MB per Sec
File Received
```

80MB

```
Send Time : 682.140000 msecs , FileSize 81 MB, Speed 118.743953 MB per Sec
File Send Successful!
```

```
Recv Time : 692.261000 msecs , FileSize 81 MB, Speed 117.007892 MB per Sec
File Received
```

70MB

```
UPLOAD 0 70MB.txt
Send Time : 1638.877000 msecs , FileSize 71 MB, Speed 43.322348 MB per Sec
File Send Successful!
```

```
selectserver: new connection from ::ffff:128.205.36.8 on socket 4
Recv Time : 1605.759000 msecs , FileSize 71 MB, Speed 44.215851 MB per Sec
File Received
```

60MB

```
Send Time : 1381.826000 msecs , FileSize 61 MB, Speed 44.144487 MB per Sec
File Send Successful!
```

```
Recv Time : 1364.674000 msecs , FileSize 61 MB, Speed 44.699320 MB per Sec
File Received
```

50MB

```
Send Time : 1322.589000 msecs , FileSize 51 MB, Speed 38.560732 MB per Sec
File Send Successful!
```

```
Recv Time : 1290.514000 msecs , FileSize 51 MB, Speed 39.519137 MB per Sec
File Received
```

The following screen shot is from the iperf

The bandwidth number is way big then my codes's estimation, I think it's possible that iperf used another way to transmit file, or maybe it's because other time is counted in my program's estimation. like the time to establish connection and the time to read file, sending head message. The number estimated by iperf is much stable, 935-936Mb/s

50MB

```
------------------------------------------------------------
[  4] local 128.205.36.8 port 5001 connected with 128.205.35.24 port 55443
[ ID] Interval       Transfer     Bandwidth
[  4]  0.0- 0.4 sec  48.8 MBytes   935 Mbits/sec
```

60MB

```
[ ID] Interval       Transfer     Bandwidth
[  4]  0.0- 0.4 sec  48.8 MBytes   935 Mbits/sec
[  5] local 128.205.36.8 port 5001 connected with 128.205.35.24 port 55444
[  5]  0.0- 0.5 sec  58.6 MBytes   935 Mbits/sec
```

70MB

```
[  5] local 128.205.36.8 port 5001 connected with 128.205.35.24 port 55444
[  5]  0.0- 0.5 sec  58.6 MBytes   935 Mbits/sec
[  4] local 128.205.36.8 port 5001 connected with 128.205.35.24 port 55445
[  4]  0.0- 0.6 sec  68.4 MBytes   936 Mbits/sec
```

80MB

```
[  4] local 128.205.36.8 port 5001 connected with 128.205.35.24 port 55445
[  4]  0.0- 0.6 sec  68.4 MBytes   936 Mbits/sec
[  5] local 128.205.36.8 port 5001 connected with 128.205.35.24 port 55447
[  5]  0.0- 0.7 sec  78.1 MBytes   936 Mbits/sec
```

Packet Size vs Speed
I used packet size 300, 500,700,900,1100,1300 to estimated the speed.
The speed looks a little bit stable,the highest speed is in the case of 700, with around 123MB/s. I think the reason for this stableness is that the file transfer is between two servers in CSE department, so the time to establish connection and band width have good quality, as estimated by iperf the bandwidth is 935MB/s, which is pretty high.

I think for network without such a good quality, long time to set up connection would result in speed getting low for both small packet size and big packet size transfer

PacketSize:
300

```
Send Time : 409.998000 msecs , FileSize 51 MB, Speed 124.390851 MB per Sec
File Send Successful!
```

```
Recv Time : 431.324000 msecs , FileSize 51 MB, Speed 118.240580 MB per Sec
File Received
```

500

```
Send Time : 417.028000 msecs , FileSize 51 MB, Speed 122.293947 MB per Sec
File Send Successful!
```

```
Recv Time : 426.083000 msecs , FileSize 51 MB, Speed 119.694989 MB per Sec
File Received
```

700

```
Send Time : 412.493000 msecs , FileSize 51 MB, Speed 123.638462 MB per Sec
File Send Successful!
```

```
Recv Time : 428.754000 msecs , FileSize 51 MB, Speed 118.949328 MB per Sec
File Received
```

900

```
Send Time : 423.431000 msecs , FileSize 51 MB, Speed 120.444653 MB per Sec
File Send Successful!
```

```
Recv Time : 437.327000 msecs , FileSize 51 MB, Speed 116.617542 MB per Sec
File Received
```

1100

```
Send Time : 414.725000 msecs , FileSize 51 MB, Speed 122.973054 MB per Sec
File Send Successful!
```

```
Recv Time : 421.981000 msecs , FileSize 51 MB, Speed 120.858522 MB per Sec
File Received
```

1300

```
Send Time : 419.142000 msecs , FileSize 51 MB, Speed 121.677140 MB per Sec
File Send Successful!
```

```
Recv Time : 408.825000 msecs , FileSize 51 MB, Speed 124.747753 MB per Sec
File Received
```

The following estimation is by sending 3 files to a same server at a same time, the number is 667 174 253 , the sum is 1094, which is a little bit more than 935

```
 4] local 128.205.36.8 port 5001 connected with 128.205.36.4 port 55987
 5] local 128.205.36.8 port 5001 connected with 128.205.36.24 port 39602
 6] local 128.205.36.8 port 5001 connected with 128.205.35.24 port 44812
 4]  0.0-10.1 sec   802 MBytes   667 Mbits/sec
 5]  0.0-10.0 sec   208 MBytes   174 Mbits/sec
 6]  0.0-10.0 sec   302 MBytes   253 Mbits/sec
```

Together