

Answers File

## P1:

Wired Connections:

Client:

```
[milindh@rockhopper-07] (8)$ java Iperfer -c -h 128.105.37.196 -p 5432 -t 10
Client Mode
received=1171506 KB rate=937.205 Mbps
```

Server:

```
[duff@rockhopper-06] (20)$ java Iperfer -s -p 5432
Server Mode
received=1171506 KB rate=937.017 Mbps
```

Wireless Connections:

Client:

```
C:\Users\Milindh\IdeaProjects\CS640\src>java Iperfer -c -h 10.140.91.162 -p 5432 -t 10
Client Mode
received=138879 KB rate=111.103 Mbps
```

Server:

```
C:\Users\Matt\Downloads>java Iperfer -s -p 5432
Server Mode
received=138879 KB rate=110.616 Mbps
```

## P3:

## Q2:

Throughput:

**Prediction:** Because the network isn't being shared, assuming no other bottlenecks between the links we'd see a relatively similar throughput to the min of L1, L2, and L3. L1 had the smallest throughput around ~20 Mbps.

**Actual:** The actual was 20.862 client side, so our prediction was correct.

Latency:

**Prediction:** Because the RTT would just be the combination of the RTT of L1, L2, and L3, I'd predict an RTT of ~ 140 ms.

**Actual:** 140.727 ms, my prediction was correct.

Q3:

2 Pairs:

Latency:

**Prediction:** The RTT would be almost completely unaffected. So ~140 ms.

**Actual:** Our prediction was correct.

H1-H4: 140.861 ms

H8-H9: 140.737 ms

Throughput:

**Prediction:** Speeds would be halved as they're sharing the bandwidth between 2 pairs. So each would have ~9-10 Mbps (half of L1 throughput).

**Actual:** The total that we predicted was correct as both sides added up to the total of L1's throughput. But the distribution was off as H1-h4 had almost double the throughput of H8-H9. We believe this is because H1-H4 was started first and therefore had a chance to queue up many more packets than H8-H9.

H1-H4: Client: 14.224 Mbps; Server: 12.103 Mbps

H8-H9: Client: 7.252 Mbps; Server: 6.171 Mbps

3 Pairs:

Latency:

**Prediction:** The RTT would be almost completely unaffected. So ~140 ms.

**Actual:** Our prediction was correct.

H1-H4: 140.674 ms

H8-H9: 140.677 ms

H7-H10: 140.684 ms

Throughput:

**Prediction:** With our knowledge obtained with the 2 pairs section, we will now predict that the pair that is started first will get the majority of the bandwidth while the other 2 will be approximately the same. They will total ~20 Mbps.

**Actual:** Our prediction was correct.

H1-H4: Client: 12.661 Mbps; Server: 10.588 Mbps

H8-H9: Client: 5.291 Mbps; Server: 4.447 Mbps

H7-H10: Client: 5.419 Mbps; Server: 4.532 Mbps

Q4:

Latency:

**Prediction:** Will be the total of the links RTT. For h1-h4 it should still be ~140 ms. For h5-h6 it should be ~80 ms.

**Actual:** These predictions were correct.

Throughput:

**Prediction:** h1-h4 will still be bottlenecked by L1 because it has a throughput less than half of the shared link, L2, which has 50 Mbps throughput. H5-h6 use L4 and L5, which are both ~30 Mbps. As h1-h4 will only use ~20 Mbps of L2, this will leave 30Mbps of bandwidth for h5-h6 so they will not be affected.

**Actual:** Prediction was correct.