Lab Exercise 5

Lab Exercise 5.1: Latency Around the World

What You Need

A Computer running a Windows OS (Preferably 10).

Description/Instruction

Your task is to follow the instructions and attach/paste images of what you did to satisfy the steps.

Tasks

In this chapter, you learned that latency is the delay caused by the time it takes messages to travel over network media from one place to another. This concept is easy to see in the real world, where it takes longer, for example, for you to travel across the country than it does to go to the grocery store. Even though network messages travel much faster than a car or a jet plane, it still takes time for them to get from one place to another.

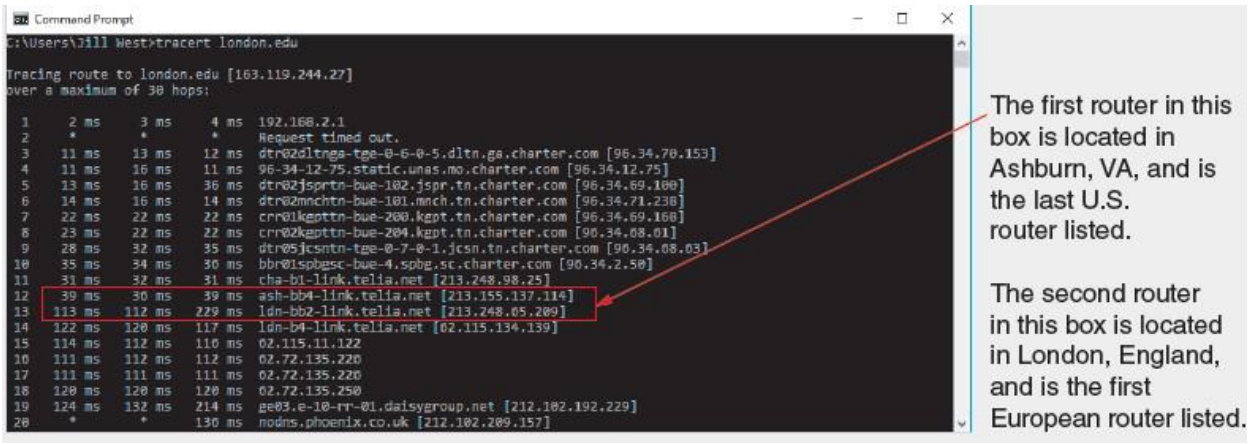
Complete the following steps to see how distance affects a message's RTT (round trip time):

1. Open a Command Prompt window and run tracert on a website whose servers are located on a different continent from you, across one ocean. If you're located in the Midwest or Eastern United States, for example, you can run the command tracert london.edu (London Business School). If you are on the West Coast, however, you might get more useful results for this step by targeting a server across the Pacific Ocean, such as tracert www.tiu.ac.jp (Tokyo International University). What command did you use?

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.18363.1082]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Windows\system32>tracert london.edu

Tracing route to london.edu [163.119.244.61]
over a maximum of 30 hops:

  1     5 ms     1 ms     1 ms  192.168.254.254
  2    64 ms    89 ms    27 ms  10.91.26.130
  3    26 ms    25 ms    25 ms  10.91.26.198
  4    28 ms    30 ms    25 ms  222.127.187.33
  5     *        *       33 ms  120.28.0.57
  6     *        *        *     Request timed out.
  7    92 ms    88 ms    86 ms  210.176.33.5
  8   101 ms    90 ms   104 ms  i-0-4-0-6.jtha-core02.telstraglobal.net [202.47.216.249]
  9   203 ms   194 ms   194 ms  i-10542.tlot-core02.bx.telstraglobal.net [202.84.141.202]
 10   282 ms   252 ms   284 ms  i-1.unse-core01.telstraglobal.net [202.84.252.86]
 11   320 ms   321 ms   332 ms  i-31.ulhc-core01.telstraglobal.net [202.84.252.90]
 12   349 ms   322 ms   326 ms  i-92.ulco01.telstraglobal.net [202.84.178.6]
 13   702 ms   356 ms   342 ms  te1-3.cr05.tn5.bb.gxn.net [195.66.224.29]
 14   365 ms   348 ms   357 ms  62.72.143.18
 15   347 ms   345 ms   362 ms  62.72.135.250
 16   380 ms   400 ms   664 ms  ge03.e-10-rr-01.daisygroup.net [212.102.192.229]
 17   383 ms     *        *     nodns.phoenix.co.uk [212.102.209.157]
 18     *        *        *     Request timed out.
 19     *        *        *     Request timed out.
 20     *        *        *     Request timed out.
 21     *        *        *     Request timed out.
 22     *        *        *     Request timed out.
 23     *        *        *     Request timed out.
 24     *        *        *     Request timed out.
 25     *        *        *     Request timed out.
```

2. Examine the output and find the point in the route when messages started jumping across the ocean. By what percentage does the RTT increase after the jump compared with before it? You can see an example in figure below.

```
C:\Windows\system32>
C:\Windows\system32>
C:\Windows\system32>tracert www.tiu.ac.jp

Tracing route to ccl-ew-lb-1031329483.ap-northeast-1.elb.amazonaws.com [52.196.35.167]
over a maximum of 30 hops:

  1     1 ms     2 ms     1 ms  192.168.254.254
  2    45 ms    56 ms    50 ms  10.91.26.130
  3    43 ms    26 ms    25 ms  10.91.26.198
  4    37 ms    28 ms    36 ms  222.127.187.33
  5     *        *        *     Request timed out.
  6     *       91 ms    79 ms  120.28.0.6
  7    77 ms    92 ms    94 ms  as16509-3.ix.jpix.ad.jp [210.171.224.211]
  8   137 ms     *      171 ms  52.93.66.24
  9   144 ms   142 ms   155 ms  52.93.66.33
 10     *        *        *     Request timed out.
 11     *        *        *     Request timed out.
 12     *        *        *     Request timed out.
 13    80 ms    94 ms    90 ms  52.95.31.21
 14   125 ms   139 ms   128 ms  52.95.31.171
 15    80 ms    79 ms   103 ms  52.95.31.164
 16   123 ms   136 ms   104 ms  52.95.31.78
 17   139 ms   116 ms   124 ms  52.93.250.8
 18     *        *        *     Request timed out.
 19     *        *        *     Request timed out.
 20     *        *        *     Request timed out.
 21     *        *        *     Request timed out.
 22     *        *        *     Request timed out.
 23     *        *        *     Request timed out.
 24     *        *        *     Request timed out.
 25  ^C
C:\Windows\system32>
```



Note that the latency time increases significantly as the messages start to cross the ocean. To calculate the percentage for this jump, you would select a time from just after the jump (229, for example) and divide it by a time from just before the jump (such as 39), then multiply by 100 percent: 229/39 × 100% = 587%. In this case, the sample data would yield a 587 percent increase. It takes nearly six times as long for a message to go round-trip across the Atlantic from the United States to London, England (the location of this first European router) as it does for a message to travel round trip between two servers that are both located on the U.S. East Coast (this local computer, and the last U.S. router in the route).

3. Choose a website whose servers are on a continent even farther away from you. For example, if you are in the United States, you could trace the route to the University of Delhi in India at the address du.ac.in. What command did you use? How many hops did it take until the route crossed an ocean? What other anomalies do you notice about this global route?

> on this we have 16 hoops the trace complete, but it doesn't look like it trace the same IP address location that we want to trace

```
C:\Windows\system32>tracert www.msu.ru

Tracing route to www.msu.ru [188.44.50.103]
over a maximum of 30 hops:

  1     1 ms     1 ms     1 ms  192.168.254.254
  2    26 ms    25 ms    31 ms  10.91.26.130
  3    52 ms    29 ms    30 ms  10.91.26.178
  4     *       25 ms    25 ms  222.127.187.37
  5     *        *        *     Request timed out.
  6    45 ms    46 ms    45 ms  120.28.4.134
  7    45 ms    47 ms    45 ms  hnk-b2-link.telia.net [62.115.9.222]
  8   270 ms   273 ms   272 ms  mei-b4-link.telia.net [62.115.116.9]
  9   330 ms   334 ms   317 ms  ffm-bb2-link.telia.net [62.115.114.202]
 10   258 ms   260 ms   258 ms  s-bb4-link.telia.net [62.115.138.104]
 11   303 ms   312 ms   322 ms  sap-b3-link.telia.net [80.91.250.98]
 12   282 ms   282 ms   281 ms  fgau-ic-332919-sap-b3.c.telia.net [80.239.194.255]
 13   348 ms   317 ms   317 ms  msk-m9-1-gw.RUNNet.ru [194.85.40.206]
 14   312 ms   313 ms   311 ms  msu.msk.runnet.ru [194.190.254.118]
 15   324 ms   315 ms   315 ms  93.180.0.191
 16   325 ms   325 ms   325 ms  188.44.50.103

Trace complete.
```

(Lomonosov Moscow State University website)

IP Address	Country	Region	City
194.190.254.118	Russia	St.-Petersburg	Saint Petersburg
ISP	**Organization**	**Latitude**	**Longitude**
The federal state autonomous educational establishment of additional professional education Center of Realization of State Educational Policy and Informational Technologies	Federal University Computer Network (runnet.ru)	59.9386	30.3141

4. Choose one more website as close to directly across the globe from you as possible. U.S. locations might want to use the University of Western Australia at uwa.edu.au. What command did you use? How many hops are in the route? Did the route go east or west around the world from your location? How can you tell?

>the no. of hoops to locate the site is 17.

```
C:\Windows\system32>tracert vnu.edu.vn

Tracing route to vnu.edu.vn [112.137.142.4]
over a maximum of 30 hops:

  1    <1 ms    <1 ms    <1 ms  192.168.254.254
  2    31 ms    58 ms    25 ms  10.91.26.130
  3    26 ms    26 ms    26 ms  10.91.26.178
  4     *        41 ms    25 ms  222.127.187.37
  5     *        *        *     Request timed out.
  6   194 ms   185 ms   185 ms  120.28.10.66
  7   193 ms   189 ms   184 ms  hu0-2-0-2.1108.ccr41.lax04.atlas.cogentco.com [38.104.210.241]
  8   190 ms   185 ms   186 ms  38.122.147.154
  9   405 ms   402 ms   402 ms  DESKTOP-CMRL22P [27.68.250.13]
 10   405 ms   403 ms   411 ms  DESKTOP-CMRL22P [27.68.250.98]
 11   407 ms   408 ms   417 ms  DESKTOP-CMRL22P [27.68.244.49]
 12   425 ms   418 ms   418 ms  DESKTOP-CMRL22P [27.68.255.37]
 13   411 ms   442 ms   410 ms  DESKTOP-CMRL22P [27.68.228.190]
 14   420 ms   416 ms   418 ms  DESKTOP-CMRL22P [27.68.228.189]
 15     *        *      411 ms  DESKTOP-CMRL22P [27.68.229.10]
 16   395 ms   397 ms   392 ms  112.137.143.2
 17   427 ms   426 ms   430 ms  VNUWEB [112.137.142.4]

Trace complete.

C:\Windows\system32>
```

(Vietnam National University, Hanoi website)

Geolocation data from ipinfo.io (Product: API, real-time)

IP Address	Country	Region	City
112.137.142.4	Vietnam	Hanoi	Hanoi
ISP	**Organization**	**Latitude**	**Longitude**
VietNam National University Ha Noi	VietNam National University Ha Noi (vnu.edu.vn)	21.0245	105.8412

Geolocation data from DB-IP (Product: Full, 2020-9-1)

IP Address	Country	Region	City
112.137.142.4	Vietnam	Hanoi	Hanoi
ISP	**Organization**	**Latitude**	**Longitude**
VietNam National University	VietNam National University	21.0278	105.834

5. Scott Base in Antarctica runs several webcams from various research locations. Run a trace to the Scott Base website at antarcticanz.govt.nz. What's the closest router to Scott Base's web server that your trace reached? If you can't tell from the command output where the last response came from, go to iplocation.net in your browser. Enter the final IP address to determine that router's location.

```
C:\Windows\system32>tracert antarcticanz.govt.nz

Tracing route to antarcticanz.govt.nz [120.138.19.149]
over a maximum of 30 hops:

  1    35 ms     4 ms     1 ms  192.168.254.254
  2    24 ms    25 ms    45 ms  10.91.26.130
  3    27 ms    31 ms    36 ms  10.91.26.198
  4    25 ms    26 ms    25 ms  222.127.187.33
  5     *        *        *     Request timed out.
  6   209 ms   211 ms   208 ms  120.28.10.178
  7   176 ms   180 ms   174 ms  xe-1-0-1.GW2.SEA1.ALTER.NET [157.130.180.233]
  8   198 ms   192 ms   193 ms  0.ae3.BR1.SJC7.ALTER.NET [140.222.7.133]
  9   198 ms   221 ms   203 ms  unknown.telstraglobal.net [210.176.40.26]
 10   228 ms   227 ms   228 ms  i-92.eqnx-core02.telstraglobal.net [202.84.247.18]
 11   236 ms   255 ms   241 ms  i-0-0-0-1.tlot-core02.telstraglobal.net [202.84.143.205]
 12   356 ms   356 ms   356 ms  202.84.138.81
 13   334 ms   334 ms   338 ms  i-0-0-1-0.tauc-core02.telstraglobal.net [202.84.142.125]
 14   356 ms   390 ms   353 ms  unknown.telstraglobal.net [210.176.42.82]
 15     *        *        *     Request timed out.
 16   328 ms   329 ms   328 ms  swp47.wal1-dist1.sitehost.co.nz [120.138.31.131]
 17   338 ms   334 ms   334 ms  rdns.120.138.19.149.sth.nz [120.138.19.149]

Trace complete.

C:\Windows\system32>
```

> closest router to Scott Base's web server

Geolocation data from ipinfo.io (Product: API, real-time)

IP Address	Country	Region	City
120.138.31.131	New Zealand	Auckland	Auckland
ISP	**Organization**	**Latitude**	**Longitude**
SiteHost New Zealand	SiteHost New Zealand (sitehost.co.nz)	-36.8485	174.7635

Geolocation data from DB-IP (Product: Full, 2020-9-1)

IP Address	Country	Region	City
120.138.31.131	New Zealand	Auckland	Auckland (Ellerslie)
ISP	**Organization**	**Latitude**	**Longitude**
SiteTech Solutions Limited	SiteTech Solutions Limited	-36.8978	174.809

6. Think about other locations around the world that might be reached through an interesting route. Find a website hosted in that location and trace the route to it. Which website did you target? Where is it located? What are some locations along the route of your trace?

>mangapanda.com (website)

```
C:\Windows\system32>tracert mangapanda.com

Tracing route to mangapanda.com [93.123.73.162]
over a maximum of 30 hops:

  1     3 ms     1 ms     1 ms  192.168.254.254
  2    26 ms    29 ms    30 ms  10.91.26.130
  3    27 ms    28 ms    26 ms  10.91.26.198
  4    89 ms    42 ms    39 ms  222.127.187.33
  5     *        *        *     Request timed out.
  6    47 ms    45 ms    46 ms  120.28.0.90
  7    46 ms    44 ms    47 ms  103.203.158.126
  8   246 ms   245 ms   243 ms  ae3-2.RT.TLP.SOF.BG.retn.net [87.245.233.122]
  9   327 ms   311 ms   316 ms  GW-Verdina.retn.net [87.245.248.213]
 10   311 ms   312 ms   312 ms  93.123.73.162

Trace complete.

C:\Windows\system32>
```

>located in Bulgaria

IP Address	Country	Region	City
93.123.73.162	Bulgaria	Sofia (stolitsa)	Sofia
ISP	**Organization**	**Latitude**	**Longitude**
BitDedi LTD	Not Available	42.6975	23.3242

Geolocation data from ipinfo.io (Product: API, real-time)

IP Address	Country	Region	City
93.123.73.162	Belize	Belize	Belize City
ISP	**Organization**	**Latitude**	**Longitude**
Verdina Ltd.	BitDedi LTD (bitdedi.com)	17.4995	-88.1976

Geolocation data from DB-IP (Product: Full, 2020-9-1)

IP Address	Country	Region	City
93.123.73.162	Bulgaria	Sofia-grad	Sofia
ISP	**Organization**	**Latitude**	**Longitude**
Verdina Ltd.	BitDedi LTD	42.6977	23.3219

> finland

IP Address	Country	Region	City
87.245.248.213	Finland	Uusimaa	Helsinki
ISP	**Organization**	**Latitude**	**Longitude**
RETN Limited	Not Available	60.1695	24.9354

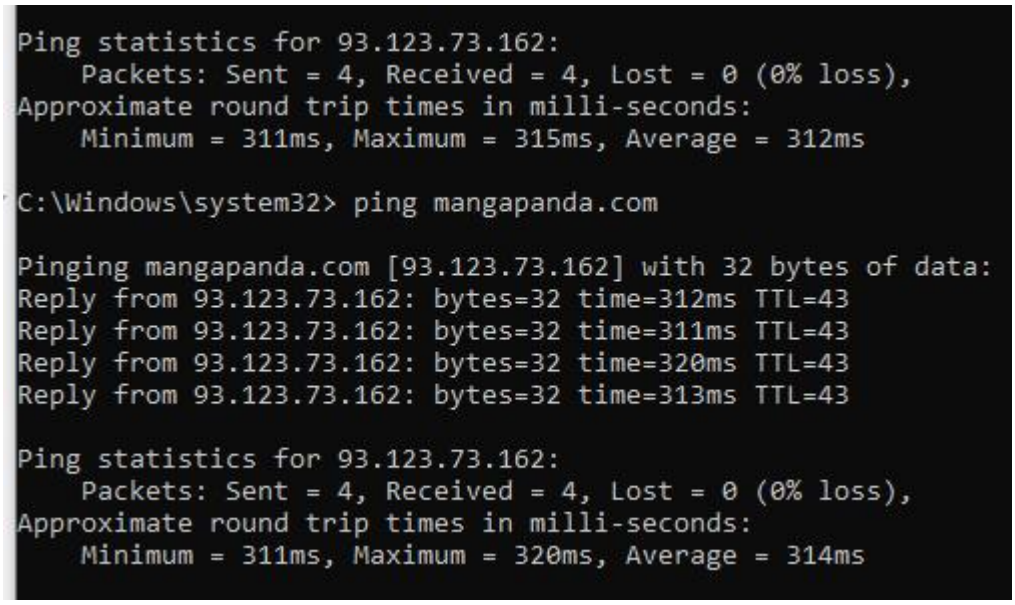
Geolocation data from ipinfo.io (Product: API, real-time)

IP Address	Country	Region	City
87.245.248.213	United Kingdom	England	Poplar
ISP	**Organization**	**Latitude**	**Longitude**
RETN Limited	ReTN external interconnections in Helsinki (retn.net)	51.5111	-0.0157

Geolocation data from DB-IP (Product: Full, 2020-9-1)

IP Address	Country	Region	City
87.245.248.213	Finland	Uusimaa	Helsinki
ISP	**Organization**	**Latitude**	**Longitude**
RETN.net backbone	Not Available	60.1733	24.941

7. Try the ping command on several of these same IP addresses. Did it work? Why do you think this is the case?



Lab Exercise 5.2: Test a LAN's Speed and Throughput

What You Need

A Computer running a Windows OS (Preferably 10).
A LAN Speed Test (Lite) v1.3.1and Tamosoft Throughput Test.

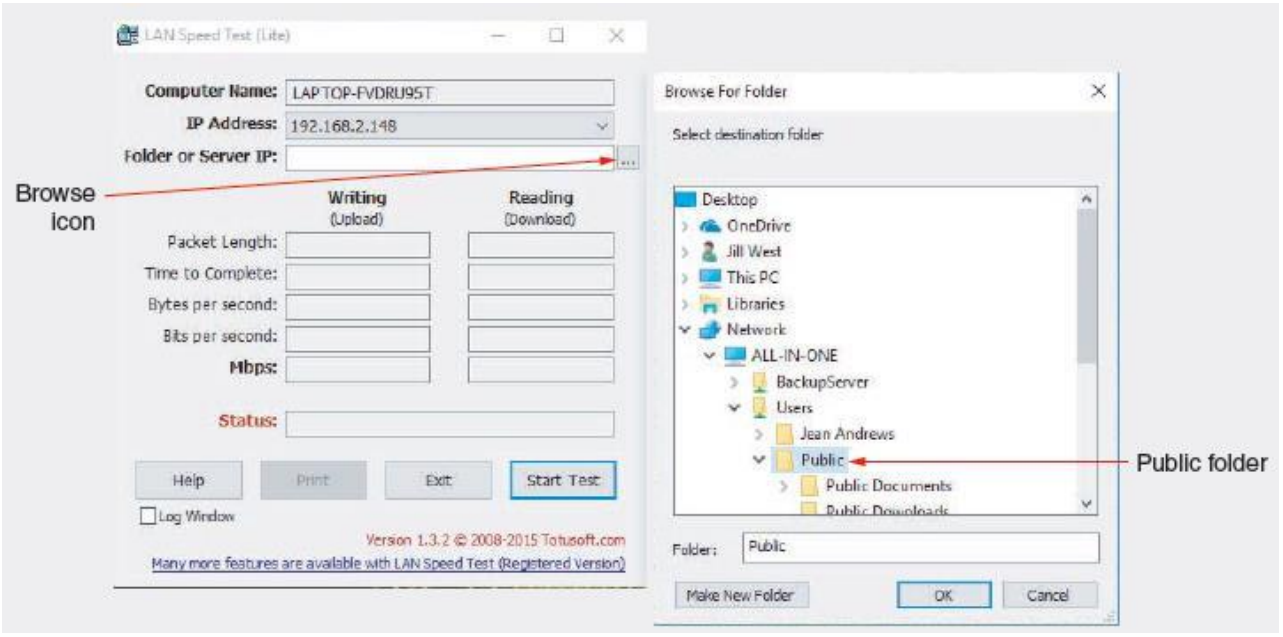
Description/Instruction

Your task is to follow the instructions and attach/paste images of what you did to satisfy the steps.

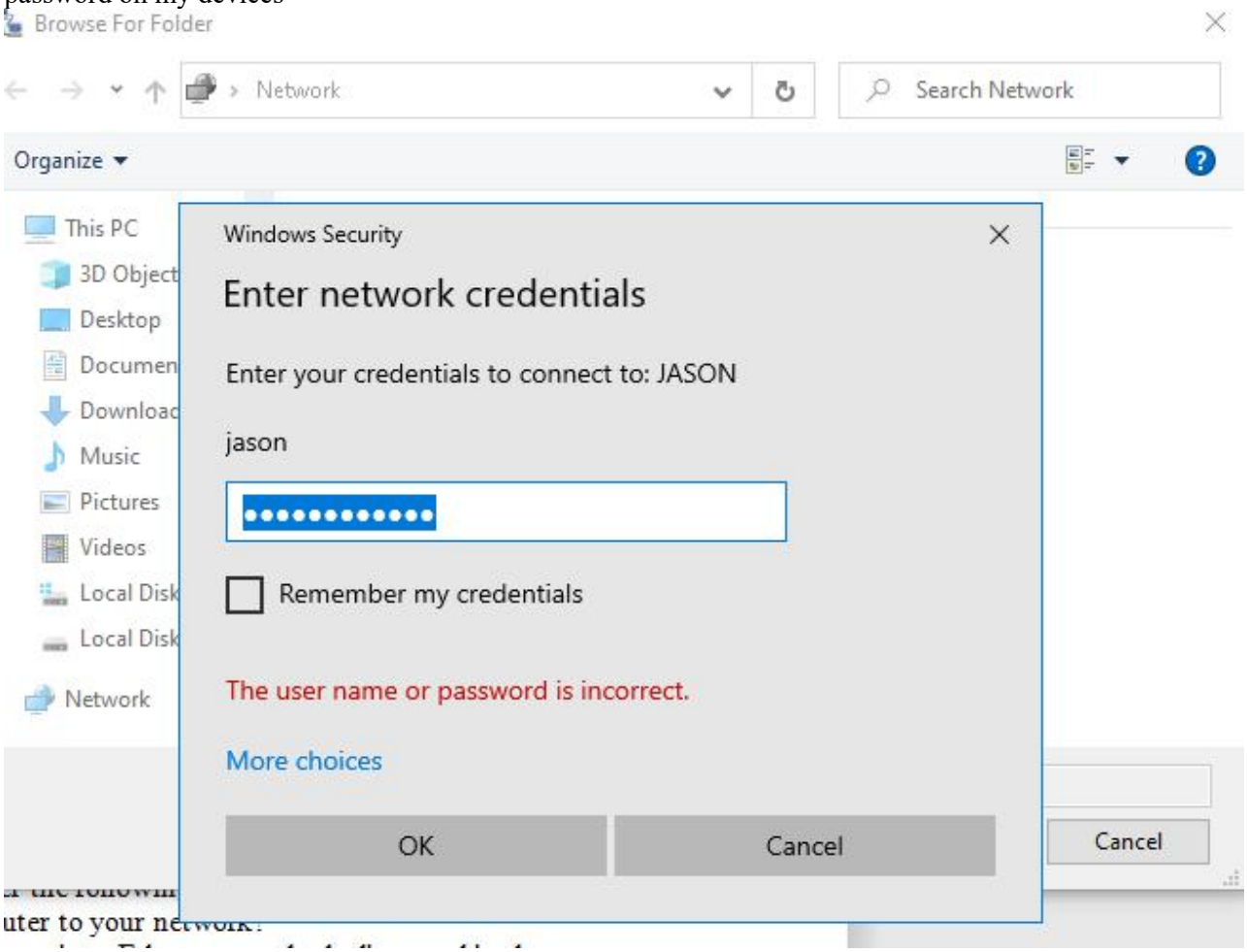
Tasks

A variety of software and web-based tools are available to help you establish baseline measurements— and later, detect fluctuations and problems—in the efficiency of your network and Internet connections. This project walks you through two different tests you can perform on your school's lab network or at home on your own LAN. You'll need two computers with either Windows 10 or macOS installed and connected to the same network.
TotuSoft's LAN Speed Test is a simple, free program that only needs access to a shared folder on the local area network in order to test throughput speeds on the network. The Public Users folder on another workstation meets this requirement.
To test a wired network connection, make sure both your computer and the target computer have a wired connection to the network (rather than a Wi-Fi connection), and then complete the following steps:

1. Go to totusoft.com, download the latest version of LAN Speed Test (Lite), and run the downloaded .exe file. The app will automatically detect your own computer's IP address.
2. Find a shared folder on another workstation or a server on your network, as shown in Figure below. Select the folder as the target, accept the default settings, and start the test



This is the output of my LAB Speed tester, its looks like asking for credential even though I don have any password on my devices

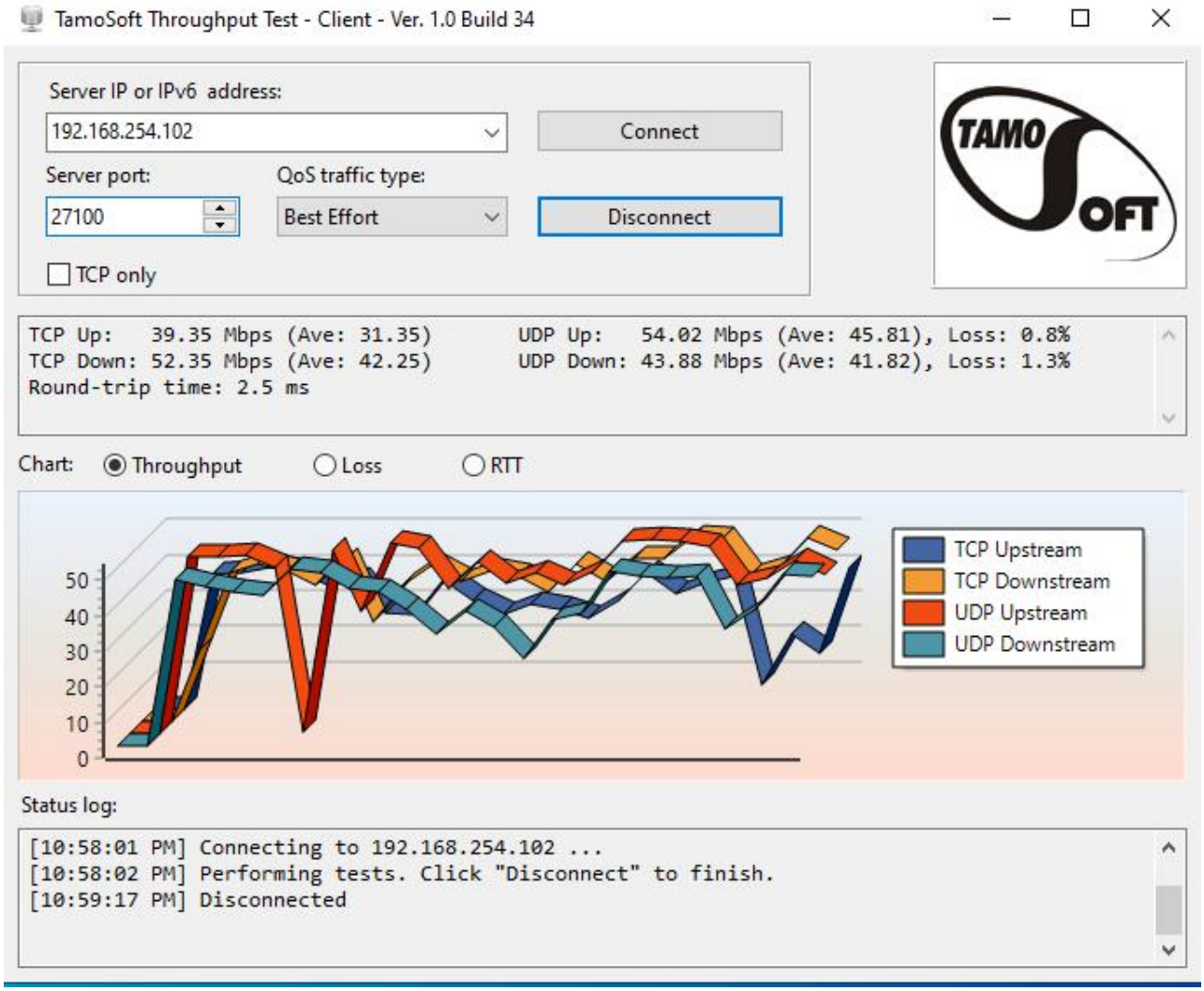


3. Accept the default settings for the test, including file size and the option to delete the file after the test is finished. Click Ok.
4. When the test has finished running, answer the following questions:
a. What network media connects your computer to your network?
b. How do your test results compare with the various Ethernet standards discussed in the chapter?
c. If your test results differ from the standards you were expecting, how do you explain these results?
TamoSoft, another security and network monitoring software company, offers a free Throughput Test that works on both wired and wireless LAN connections. Complete the following steps:
5. Go to tamos.com and look for the Throughput Test in the Download Area. Download and install it on two computers on the same LAN, accepting default settings in the setup wizard.
NOTE: If Run Server and Run Client are not visible at the top of the Start menu, scroll down and click to expand TamoSoft Throughput Test. Then click Run Server or Run Client, respectively.
6. One computer will act as the client and one as the server.
a. On the server computer, click Start and, in the Start menu, click Run Server. If necessary, click Yes in the UAC dialog box.
b. On the client computer, click Start and, in the Start menu, click Run Client. If necessary, click Yes in the UAC dialog box.
7. On the computer acting as the server, note its IP address, which is reported automatically in the TamoSoft Throughput Test window. Accept all the default settings. Nothing more is needed on this end of the connection because the server only needs to listen for the client.

8. On the computer acting as the client, enter the server's IP address, then click Connect.
The figure below shows the server and client consoles side by side

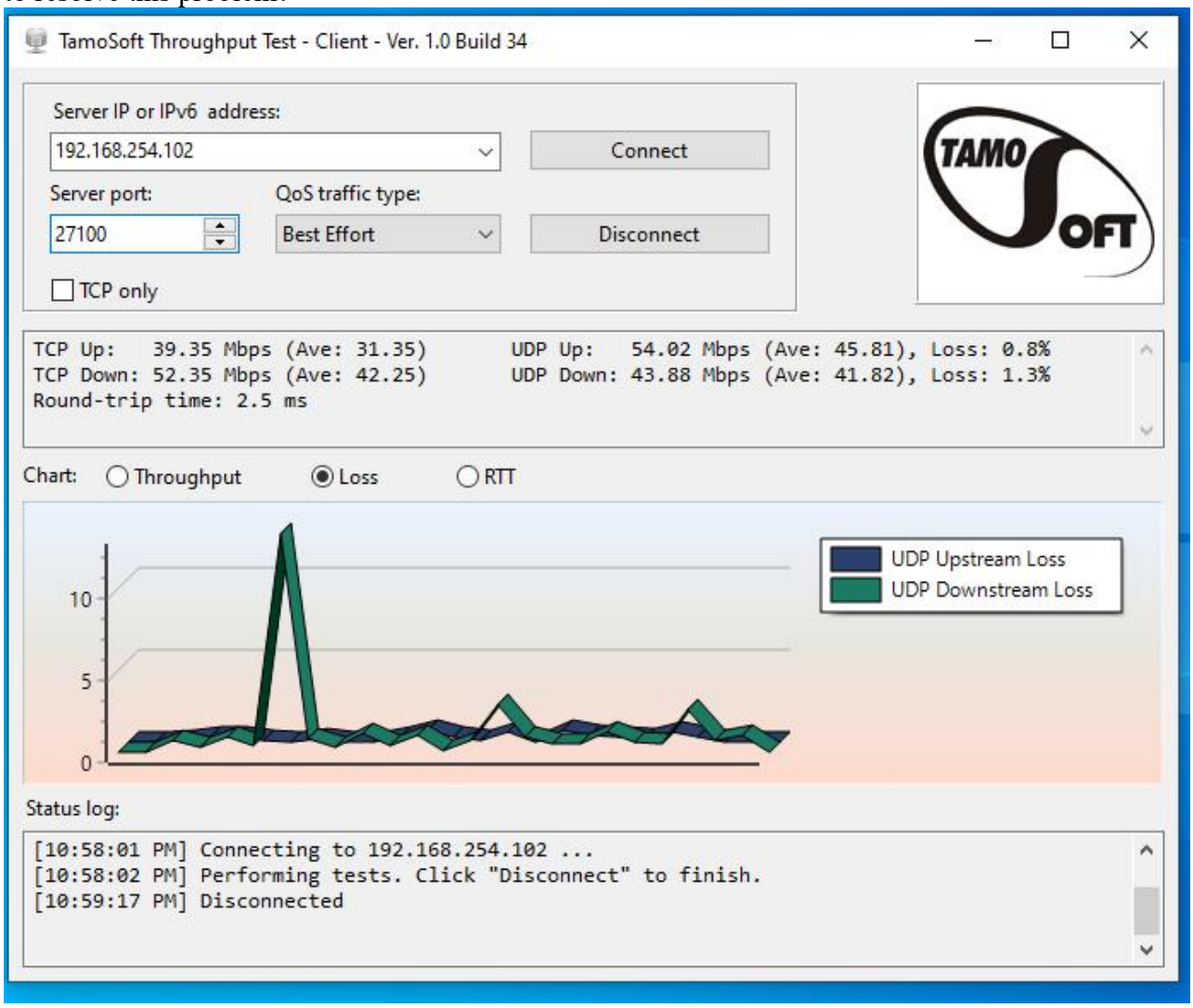
Server (a) and client (b) consoles for Throughput Test, with results showing on the client side

9. In the Chart pane, TCP and UDP throughput are monitored. Upstream refers to traffic moving from the client computer to the server computer. Downstream refers to traffic moving from the server computer to the client computer. Other charts include Loss and RTT. Let the test run for a while, then click Disconnect. Examine the results, and answer the following questions.

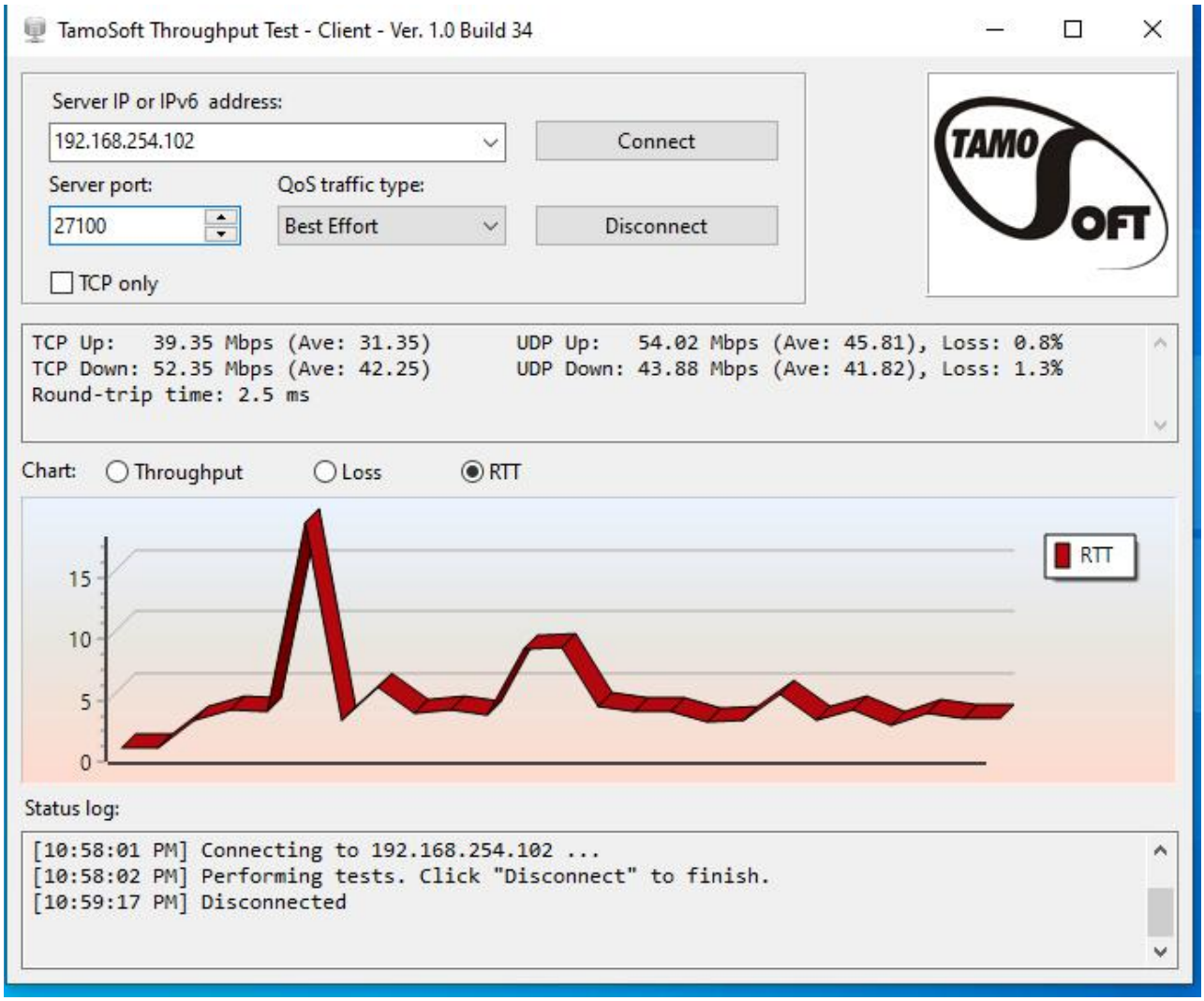


a. On the Throughput chart, what was the highest reading obtained, and what kind of traffic was it? > I think its the red one, the UDP Upstream.

b. On the Loss chart, were there any significant loss results, and what kind of traffic was involved? What theories do you have about why this might be? Where would you look next to resolve this problem?



c. On the RTT (round trip time) chart, were there any spikes? Do you notice any correlation between the timing of the spikes on this chart and the timing of problem indicators on the other two charts?



10. Document both of these software installations in your document submission.

Turning in Your Project

Save this file using the format **LabExer5_[YourName]** and upload to Canvas.