

EECS 563
Project 1
Internet Tools

Provide your results in the form of a technical report using the provided format.

See: [Technical Report Format](#)

Also see this paper for advice on writing technical reports.

See: [Paper on writing technical reports](#)

Do not pad your reports, all figures and tables must be discussed in the text.

The Internet can be viewed as a large real-time distributed system that is owned by different companies, governments, government agencies, and/or enterprises. The Internet covers the globe, i.e., it has wide geographic coverage and connects billions of devices at a wide range of data rates. Identifying performance issues for such a system is problematic. Common Internet diagnostic tools include traceroute (tracert), ping, and speed measurements (using <http://www.speedtest.net/>). Also obtaining information about IP addresses is useful in discovering networking issues.

The objective of this project is to obtain an understanding of traceroute (tracert), ping, and speed measurements tools and collect network measurement using these tools as well as locating information IP addresses. In your report describe the purpose of traceroute (tracert), ping, ipconfig, nslookup, and speed measurement tools.

1. Use <http://www.speedtest.net/>) to measure the "speed" of Internet connections:

- a) Measure the upload and download speeds from your home. In your report identify ISP service you are using, e.g., cable modem, DSL, or campus dorm. Include the date/time of the measurement. Include a figure of the topology of your home network, e.g., draw a figure of how your computer is connected to the Internet. Record the server for this test.
- b) Measure the upload and download speeds of an EECS computer (or any computer connected to the campus network). In your report include the place and date/time of the measurement.
- c) In your report explain the differences between the results from parts a) & b).
- d) Repeat parts a) & b) at a different time of day (off set by at least 8 hours). In your report discuss any time-of-day dependences?

2. Use traceroute (tracert) to find the path taken by packets:

- a) From your home computer execute a traceroute command and report the results: perform a traceroute to www.google.com and www.canterbury.ac.nz (or from windows command use tracert) and the date/time of the measurement. The tracert command can be executed from the Windows Command prompt.

- b) From an EECS computer (or any computer connected to the campus network) execute a traceroute command and show the results: traceroute to www.google.com and www.canterbury.ac.nz (or from windows command window use tracert) and report the date/time of the measurement.
- c) In your report explain the differences between the results from parts a) & b).
- d) Repeat parts a) & b) at a different time of day (off set by at least 8 hours). Are there any time-of-day dependences? If so why?

3. Use Ping to measure Round Trip Time (RTT).

- a) From your home computer execute ping to measure the round-trip time to www.google.com. Collect 25 RTTs times (ping -n option to collect 25 pings with one command) and report the average RTT and standard deviation and document the date/time of the measurement. The ping command can be executed from the Windows Command prompt. (To force ping to use IPv4 use ping www.google.com -4.)
- b) Repeat part a) with the target of www.canterbury.ac.nz.
- c) In your report explain the differences observed between part a) & b).
- d) Explain why are the RTTs to the same site not the same, that is, why is there a standard deviation?
- e) Repeat parts a) & b) at a different time of day (off set by at least 8 hours). Are there any time-of-day dependences? If so why?

4. Use this tool (or any other tool of your choice) obtain information about hosts and IP addresses <https://www.whatismyip.com/>

- a) Find and report the dotted-decimal address for <http://www.ku.edu>
- b) Find and report information about 129.237.125.27
- c) Find and report the dotted-decimal IP address for the server used for your speed test.

5. Use ipconfig (on Windows ipconfig /all) and nslookup to find and report network information about your host. These commands can be executed from the Windows Command prompt.

- a) Using ifconfig find and report your IP address.
- b) Using ifconfig /all list your DNS servers.
- c) Using ifconfig /all find out when does your Lease Expires.
- d) Using ifconfig /all to find the physical address of your network interface.
- e) Using nslookup what is your default server, compare that ip address to the answer found in part b).

6. In your report comment the usefulness of the tools used above. Discuss how these tools can be used to examine the performance and operation of networks.