

Computer Networks Lab

Lab Assignment 1

July 31, 2018

Submission Deadline: 10:55 AM, Wednesday 7 August, 2018

Lab Objectives: In this assignment, you will explore the various tools that an end user can use to discover how a machine is connected to the network and how the network looks like beyond the first hop.

Important guidelines:

Submit a soft copy of the report on all these experiments. Link to upload the report will be intimated before the submission deadline.

Report should not contain more than 5-6 pages. No need to describe how the tools work. Copy cases will be strictly punished by giving 'F' grades.

1. *Select five hosts of your choice in the Internet (mention the list in your report) and experiment with pinging each host 20 times at three different hours of the day. Check if there exist cases which shows packet loss greater than 0% and provide reasoning. Find out average RTT for each host and explain whether measured RTTs are strongly or weakly correlated with the geographical distance of the hosts? Pick one of the above used hosts and repeat the experiment with different packet sizes from 64-bytes to 2048-bytes. Plot the average RTT and explain how change in packet size and time of the day impacts RTT.*

Use online tool <http://www.spfld.com/ping.htm> for this experiment.

2. *Capture the output of ifconfig with necessary options, and identify and explain as much of what is printed as you can. NOTE: You should be able to understand almost all of it.*
3. *What is netstat and what is it used for? What parameters for netstat should you use to show all the TCP connections established? Include a printout of this list for your machine. Be sure to explain what all fields are. What does netstat -r show? What are each of the fields in this output? netstat can be used to display network interface status. What option of netstat does this? By using netstat, figure out the number of interfaces on your machine. In the output you will find an interface named lo0 as a*

loopback interface. Can you say anything about this interface and its function?

4. *Perform traceroute experiment (with same hosts used in Q1) at three different hours of the day to determine the routes used.*

Use any one of the online tools: <http://network-tools.com>, <http://ping.eu> and <http://www.cogentco.com/en/network/looking-glass> for this experiment.

- (a) List out the hop counts for each host in each time slot. Determine the common hops between two routes if they exist.*
 - (b) Check and explain the reason if route to same host changes at different times of the day.*
 - (c) Inspect the cases when traceroute does not find complete paths to some hosts and provide reasoning.*
 - (d) Is it possible to find the route to certain hosts which fail to respond with ping experiment? Give reasoning.*
5. *How do you show the full ARP table for your machine? Capture a printout of what it is. Explain each column of what is printed. If you try and use the arp command to add or delete an entry to the ARP table what happens? Why do you suppose this is the case? You still have the ability to modify the ARP table, just not directly. How can you affect (either add, delete, or change) entries in the ARP table? Use this mechanism to add at least two new hosts to the ARP table and include a printout. How long do entries stay cached in the ARP table? Describe a trial-and-error method to discover the timeout value. What will happen if two IP addresses map to the same Ethernet address? Be specific on how all hosts on the subnet operate.*