CS-349 Networks Lab

Assignment-1

Instructions:

- **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.**
- **Perform the experiments in a group of maximum two students. Submit a soft copy of the report on all these experiments. The file name should be same as the roll no.s of your group members separated by an underscore. Example, 130101001_130101002.doc, 130101001_130101002.docx or 130101001_130101002.pdf. Link to upload the report will be intimated before the submission deadline.**
- **Submission deadline: 27th January 2016 11:55 pm. Late submissions will not be accepted in any case.**

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

Q1. 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.

Q2. Capture the output of ifconfig with necessary options, and identify and explain as much of what is printed as you can. Explain the output of route command and its options.

Q3. 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 and explain all the fields. What does netstat -r show and explain all the fields of output? What option of netstat can be used to display network interface status. By using netstat, figure out the number of interfaces on your machine. Show and explain the function of loopback interface.

Q4. 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.

1. List out the hop counts for each host in each time slot. Determine the common hops between two routes if they exist.
2. Check and explain the reason if route to same host changes at different times of the day.
3. Inspect the cases when traceroute does not find complete paths to some hosts and provide reasoning.
4. Is it possible to find the route to certain hosts which fail to respond with ping experiment? Give reasoning.

Q5. How do you show the full ARP table for your machine? Show and explain each column of the ARP table. Check and explain what happens if you try and use the arp command to add or delete an entry to the ARP table? Find out how to 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.