CSSE 490 -- Network Security

Rose-Hulman Institute of Technology

Lab 08: Introduction to Networking - ICMP and Traceroute

Learning Objectives

At the end of this lab, you should be able to:

- Identify the data link and network layer protocols.
- Capture traffic on a network using ‘tcpdump‘ and/or ‘scapy‘ and/or ‘libpcap‘.
- Examine network packets captured on the wire.
- Craft and send network packets to achieve a certain objective.

Name: _____

Question	Points	Score
Question 1	10	
Question 2	5	
Question 3	10	
Question 4	15	
Question 5	10	
Question 6	15	
Question 7	5	
Question 8	5	
Question 9	0	
Total:	75	

1 Exploring ICMP

The questions below refer to section 1 of the lab documentation, specifically to the *Exploring ICMP* section.

1.1 The `ping`

Question 1. (10 points) Based on your observations, draw a simple structure of an ICMP packet, stacking together the different headers that must be present in the packet so that communication can happen successfully.

1.2 Deciphering an ICMP Packet

After running your experiments, examine your packet captures and answer the following questions on the lab sheet:

Question 2. (5 points) Describe the setup of your experiment and the commands you used to launch it.

Question 3. (10 points) Examine the `ICMP` packet headers, based on your observations, how can `hostA` match `Echo (ping) reply` packets received from `hostB` to corresponding `Echo (ping) request` packets?

2 Traceroute

The questions below refer to section 2 of the lab documentation, specifically to the *Traceroute* section.

Question 4. (15 points) Describe an experiment in which you can capture packets to examine `traceroute` traffic and reverse engineer its operation.

Question 5. (10 points) Based on the outcomes of your experiment, describe how `traceoute` determines the hops on the path between `hostA` and `1.1.1.1`

Question 6. (15 points) Implement `traceroute` using your chosen programming language. Please submit your script on the separate box on Gradescope.

3 Wrap Up

Question 7. (5 points) In your own words, please write a quick summary of what you have learned in this lab.

Question 8. (5 points) How much time did it take you to complete this lab?

Question 9. Do you have any feedback about this lab? (If you'd like to leave an anonymous feedback, feel free to detach this page and slide it under my door).