CS 640 Introduction to Computer Networks

Lab 3 Overview
Due: Thursday November 11, 2021

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Lab 3 Overview

For this lab, you will modify your virtual router to:

1. Generate Internet Control Messaging Protocol (ICMP) messages when error conditions occur.
2. Populate the ARP cache by generating and consuming Address Resolution Protocol (ARP) messages.
3. Build a routing table using distance vector routing. With these changes, your virtual router will no longer depend on a static ARP cache or static route table, and it will be pingable and traceable.

Learning Outcomes

After completing this lab, you should be able to:

- Write code that constructs and deconstructs packets containing multiple layers of protocols
- Explain how the Address Resolution Protocol (ARP) and distance vector (DV) routing work

Rubric: Submission

Late policy:

- Upto 24 hours late — lose 10% of points
- Upto 48 hours late — lose 30% of points
- Upto 72 hours late — lose 60% of points
- Beyond 72 hours — lose 100% of points

Description	Points	Explanation
Format correct	1	Files submitted as specified in the lab description.
Documentation in code	2	Useful comments throughout code.
Code compiles	2	Code compiles with no help from TA.

Rubric: Part 2 ICMP

Description	Points	Test commands
Time to live Exceeded	3	ping ran with count and time set
Destination net unreachable	3	ping ran with count set to unreachable net
Destination host unreachable	3	ping ran with count set to unreachable host
Destination host reachable	2	ping ran with no packet loss
Destination port unreachable	3	nc ran with connection refused output
Echo reply implemented	3	Checked manually by TA
Same subnet is reachable	2	ping ran in same subnet with 0% loss
Other subnet is reachable	2	ping ran in different subnet with 0% loss
All valid IPs in linear topology are reachable	3	traceroute shows all IPs

Rubric: Part 3 ARP

Description	Points	Test commands
Generates ARP replies	3	tcpdump output shows replies
Generates ARP requests	3	tcpdump output shows requests
Receives ARP replies	3	tcpdump output shows replies
Packets dropped from queue after 3 requests + 1 second	2	Checked manually by TA
ARP request unsuccessful when pinging a non-exsistent IP address	2	tcpdump output does not show requests that should not be there.
Discovers and probes hosts on a computer network	2	arping output shows search

Rubric: Part 4 RIP

Description	Points	Test commands
Entries populated when router is started	2	tcpdump output shows RIP messages
RIP packets created as UDP with destination port 520	2	Checked manually by TA along with tcpdump with output showing UDP
RIP request sent to all router interfaces	3	tcpdump showing IP and mac addresses
Route table entries are updated overtime.	3	tcpdump and ping commands
Works on pair, triangle, and linear topologies	6	2 points for each topology.

Contact

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