Joel Sivanish

Professor Thurston

Lab 8

12/2/2025

MAC Addresses Traversed:

1) U1 to R1 – MAC Source: 00:00:27:d2:7f:f4 MAC Destination: ff:ff:ff:ff:ff:ff
   - The MAC 00:00:27:d2:7f:f4 belongs to U1's outgoing interface (enp0s3).
   - Traceroute begins by ARP-resolving the gateway; therefore the first frames are broadcast or directed toward R1.
   - How we know: From U1's ip a output, interface enp0s3 uses MAC 00:00:27:d2:7f:f4. Since U1 sends the first hop to its gateway (R1), the source MAC must be U1's, and the destination MAC must be the gateway's interface.
2) R1 to U2 – MAC Source: 00:00:27:44:93:e9 MAC Destination: 00:00:27:f0:88:3b
   - The MAC 00:00:27:44:93:e9 belongs to R1's interface on the 192.168.57.0/24 network (enp0s8).
   - The MAC 00:00:27:f0:88:3b belongs to U2's interface (enp0s8).
   - How we know: R1's ip a shows enp0s8 using MAC 00:00:27:44:93:e9, and U2's ip a shows its enp0s8 using MAC 00:00:27:f0:88:3b. All forwarded packets destined for U2 must exit R1 on the enp0s8 network, using R1's MAC as the source and U2's MAC as the destination.

How to Make IP Forwarding Persistent:

- To make forwarding persistent, the following must be added to the system configuration file.
- 1. Edit sysctl.conf - sudo nano /etc/sysctl.conf
- 2. Uncomment this line: net.ipv4.ip_forward=1 (Remove #)
- 3. Apply the settings - sudo sysctl -p
- This ensures that R1 always functions as a router after reboot.