CS359 Computer Networks Lab
Lab Exercise

Indian Institute of Technology, Patna
March 28, 2022

Objective

To see how DHCP (Dynamic Host Configuration Protocol) works. DHCP is an essential glue protocol that is used to configure your computer with an IP address, as well as other information.

Requirements

Wireshark: This lab uses the Wireshark software tool to capture and examine a packet trace. A packet trace is a record of traffic at a location on the network, as if a snapshot was taken of all the bits that passed across a particular wire. The packet trace records a timestamp for each packet, along with the bits that make up the packet, from the lower-layer headers to the higher-layer contents.

ipconfig (windows) / ***ifconfig*** (mac) / ***dhclient*** (linux): This lab uses a command-line utility to cause the computer to renew its IP address lease using DHCP.

Problem Statement

You are required to capture your own network traffic (.pcap file) and then inspect the network traffic/trace on your network using Wireshark.

1. Answer the following questions based on your examination of the DHCP fields for both the DHCP Request and DHCP Ack

    a. How long is the Transaction ID field? Say whether it is likely that concurrent DHCP operations done by different computers will happen to pick the same Transaction ID.
    b. What is the name of the field that carries the IP address that is being assigned to the client? You will find this field filled in on the DHCP Ack, as that message is completing the assignment.
    c. The first DHCP option is DHCP Message Type. What option value stands for this type? DHCP Requests will typically have a Client Identifier option. Look at the value of this option. How does it identify the client? Take a guess.
    d. DHCP Acks will typically have a Server Identifier option. Look at the value of this option. How does it identify the server? Take a guess.
    e. What option value stands for the Requested IP Address option? And for the IP Address Lease Time option?
    f. How does the recipient of a DHCP message know that it has reached the last option?

2. Answer the following questions by selecting a DHCP Request packet and looking at its UDP details in the middle Wireshark panel.

a. What port number does the DHCP client use, and what port number does the DHCP server use?
b. What source IP address is put on the Request message? It is a special value meaning “this host on this network” used for initialization.
c. What destination IP address is put on the Request message? It is also a reserved value designed to reach the DHCP server wherever it is on the local network.
d. What source Ethernet address is put on the Request message, and what destination Ethernet address is put on the Request message? One of these addresses is a reserved address.
e. How does a computer work out whether a DHCP message it receives is intended as a reply to its DHCP Request message, and not a reply to another computer? Hint: If you are not sure then go over the fields you inspected previously.

Submission Instructions and Deadline

You are required to provide the screenshots in support of your answer for each question in a PDF file and submit the .pdf file along with the .pcap file on or before **April 4, 2022 (11:59 PM)**. The name of the PDF file is your rollno.pdf and the name of the .pcap file is rollno.pcap. (For example, if your roll no is 2011CS26, then the files should be named as 2011CS26.pdf and 2011CS26.pcap)