

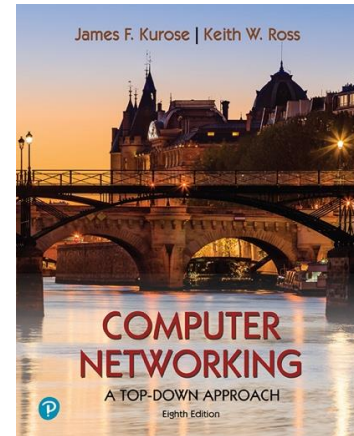
Wireshark Lab:

UDP v8.1

Supplement to *Computer Networking: A Top-Down Approach*, 8th ed., J.F. Kurose and K.W. Ross

“Tell me and I forget. Show me and I remember. Involve me and I understand.” Chinese proverb

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In this lab, we'll take a quick look at the UDP transport protocol. As we saw in Chapter 3 of the text¹, UDP is a streamlined, no-frills protocol. You may want to re-read section 3.3 in the text before doing this lab. Because UDP is simple and sweet, we'll be able to cover it pretty quickly in this lab.

The Assignment

Start capturing packets in Wireshark and then do something that will cause your host to send and receive several UDP packets. It's also likely that just by doing nothing (except capturing packets via Wireshark) that some UDP packets sent by others will appear in your trace. In particular, the Domain Name System (DNS) protocol (see section 2.4 in the text; and the DNS Wireshark Lab) **typically sends DNS query and response messages inside of UDP**, so it's likely that you'll find some DNS messages (and therefore UDP packets) in your trace.

Specifically you can try out the `nslookup` command, which invokes the underlying DNS protocol, which in turn will send UDP segments from/to the host issuing the `nslookup`. `nslookup` is available in most Microsoft, Apple IOS, and Linux operating systems. To run `nslookup` you just type the `nslookup` command on the command line in a DOS window, Mac IOS terminal window, or Linux shell. Figure 1 is a screenshot of running `nslookup` on the Linux command line on the `newworld.cs.umass.edu` host located in the CS Department at the University of Massachusetts (UMass) campus, to display the IP address of `www.nyu.edu`.

¹ References to figures and sections are for the 8th edition of our text, *Computer Networks, A Top-down Approach*, 8th ed., J.F. Kurose and K.W. Ross, Addison-Wesley/Pearson, 2020. Our website for this book is http://gaia.cs.umass.edu/kurose_ross You'll find lots of interesting open material there.

```

[newworld.cs.umass.edu> nslookup www.nyu.edu
Server:      128.119.240.1
Address:     128.119.240.1#53

Non-authoritative answer:
www.nyu.edu canonical name = WEB.GSLB.nyu.edu.
Name:   WEB.GSLB.nyu.edu
Address: 216.165.47.12
Name:   WEB.GSLB.nyu.edu
Address: 2607:f600:1002:6113::100

```

Figure 1: the basic `nslookup` command

After starting packet capture on Wireshark, run `nslookup` for a hostname that you haven't visited for a while. Then stop packet capture, set your Wireshark packet filter so that Wireshark only displays the UDP segments sent and received at your host. Pick the first UDP segment and expand the UDP fields in the details window.

Answer the following questions:

1.
 - a. Select the first UDP segment in your trace. What is the packet number² of this segment in the trace file?
 - b. What type of application-layer payload or protocol message is being carried in this UDP segment?
 - c. Look at the details of this packet in Wireshark. How many fields there are in the UDP header?
 - d. What are the names of these fields?
2. By consulting the displayed information in Wireshark's packet content field for this packet, what is the length (in bytes) of each of the UDP header fields?
3. What is the maximum number of bytes that can be included in a UDP payload? (Hint: the answer to this question can be determined by your answer to 2. above)
4. What is the protocol number for UDP? Give your answer in decimal notation. To answer this question, you'll need to look into the Protocol field of the IP datagram containing this UDP segment.
5. Examine the pair of UDP packets in which your host sends the first UDP packet and the second UDP packet is a reply to this first UDP packet. (Hint: for a second packet to be sent in response to a first packet, the sender of the first packet should be the destination of the second packet).
 - a. What is the packet number³ of the first of these two UDP segments in the trace file?
 - b. What is the packet number⁴ of the second of these two UDP segments in the trace file? Describe the relationship between the port numbers in the two packets.

² Remember that this "packet number" is assigned by Wireshark for listing purposes only; it is NOT a packet number contained in any real packet header.

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