CNPro

Computer Networks Programming Practice Homework

Parts of this work are based on the textbook "Conceptual Computer Networks" ©2019 by José María Foces Morán and José María Foces Vivancos

· Submission deadline is 14th May 2019 at 8:30
· In-person validation exam is in Lab B6 on same date as submission (14th May 2019 at 8:30)
· Include your full name and National ID in all source and documentation files
· Reference and cite the sources you have consulted
· Avoid any form of plagiarism
· All programs must be original
· Pack all files into a zip-compressed archive and send it to foces.informatica.unileon@gmail.com with topic "CNPro 2019"
· Organize the response to each question in a separate folder (Question 1, Question 2, etc.). Include all the necessary source files and documentation under their respective folder

1. [1 point] Compose a short summary about RFC 791 (IP). Use the concepts, structures and terms that we studied in chapter no. 1 about Network Architecture.

2. [2.5 points] Compose a short summary about RFC 826 (ARP). Use the concepts, structures and terms that we studied in chapter no. 1 about Network Architecture.

   a. Is this protocol a network or a datalink protocol?

   b. Write a C/libpcap program that sends an ARP request for a MAC address corresponding to an IP address which has not been previously resolved. The program should be capable of receiving the ARP response and print it out on the screen.

   c. After receiving the ARP response, check whether the ARP table has been updated and provide us an explanation.

3. [6 points] Program a 2-port, transparent bridge in Linux as described in the practice lab sessions. You can use the base C program included in CN Lab 4 (simpleBridge.c).

   - Scan the source code for inconsistencies or errors and correct them if any; also, if upon testing the bridge you find some **run-time issue**, you are expected to resolve it.

- The basis C program mentioned above uses two global variables that represent the pcap handles of the network interfaces to be used by the bridge service. Discuss whether this programming style is unavoidable in this context.

- Explain the **functional tests** and the **stress tests** that you have devised to test your program. It's essential that you document the unit and integrated tests you think should be carried out to make sure the bridge behavior is consistent with the simple bridge concept explained in the lab sessions.

- The bridge should result completely transparent to the Linux **IP host** it runs on and should produce no extraneous traffic.

4. [0.5 points] Explain the usefulness of the Netlink Sockets interface as a complement to the bridge service developed above. You may want to start working this question by skimming the man page about netlink ($ man netlink) under Linux.