Homework #4

Due Time: 2019/4/28 (Sun.) 22:00
Contact TAs: `vegetable@csie.ntu.edu.tw`

Submission

- Put all answers **in one single PDF file** named **[studentID].pdf**, in the same order as the problem sheet. Do not repeat problem descriptions, just organize them by problem number in a tidy manner.

- Submit on NTU COOL (https://cool.ntu.edu.tw).

Instructions and Announcements

- Discussions with others are encouraged. However, you should write down your solutions **in your own words**. In addition, for **each and every** problem you have to specify the references (the URL of the web page you consulted or the people you discussed with) on the first page of your solution to that problem.

- Problems below will be related to the materials taught in the class and may be far beyond that. Try to search for additional information on the Internet and give a reasonable answer.

- Some problems below may not have standard solutions. We will give you the points if your answer is followed by reasonable explanations.

- **NO LATE SUBMISSION OR PLAGIARISM IS ALLOWED.**

Network Administration

Before you start

- You should complete all given tasks via *pfSense* web GUI without using `Diagnostics->Command Prompt`.

- Write down what you did step by step (e.g. "In `Firewall->Rules`, add a rule which ... for VLAN 5") and provide explanation for what you did for each task.

- Some hints are given at the end of in-class lab slides.

- Download ISOs for this homework here: http://linux1.csie.ntu.edu.tw:9000/

pfSense

Set up and configure a *pfSense* server with 2 VLANs: 5 and 99 such that the following requirements are met:

1. (5%) `192.168.5.0/24` and `192.168.99.0/24` are allocated to VLAN 5 and 99, respectively.

   - *pfSense* provides a DHCP server in each VLAN.
   - *pfSense* acts as a gateway for each VLAN.
   - The DHCP lease should include two DNS server IPs: `8.8.8.8` and `8.8.4.4`.

2. (10%) Turn on the SSH management interface of *pfSense*. In addition, make sure that **only** hosts in VLAN 99 can access the management interfaces of *pfSense* (both SSH and web interface).

3. (5%) Hosts in VLAN 99 can **only** access the following hosts:

   - `linux1.csie.org`
   - *pfSense*
   - Hosts in VLAN 5.

4. (10%) Hosts in VLAN 5 **cannot** connect to machines in VLAN 99, but the opposite direction is allowed.

5. (10%) All UDP traffic in VLAN 5 should be blocked automatically during `2019/11/23 14:00 ~ 2019/11/23 17:00` and `2019/11/24 14:00 ~ 2019/11/24 17:00`.

6. (5%) Other than the rules specified previously, communication in VLAN 5 should **not** be restricted.

7. (5%) IP addresses should **not** be modified in connections between VLAN 5 and VLAN 99.

System Administration

Lucky you! There is none in this homework.