

Homework #2

Due Time: 2018/3/25 (Sun.) 22:00

Contact TAs: vegetable@csie.ntu.edu.tw

Submission

- Compress all your files into a file named **HW2_[studentID].zip** (e.g. HW2_bxx902xxx.zip), which contains two folders named **[studentID]_NA** and **[studentID]_SA** respectively.
- **Folder [studentID]_NA** should contain a pdf file named **na.pdf** of all your answers in *Network Administration Part*.
- **Folder [studentID]_SA** should contain a pdf file named **sa.pdf** of all your answers in *System Administration Part*.
- Submit your zip file to Ceiba.

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

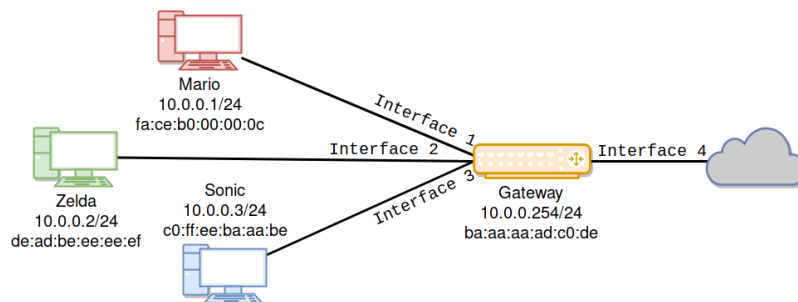
1. Flamestrike (15%)

Please answer each question in less than 7 sentences. Be concise!

- Explain what is a broadcast storm.
- Suppose you are the network administrator, and, unfortunately, you found a broadcast storm in the network. Please solve this problem as quick as possible.
- In fact, in the CSIE network, Spanning Tree Protocol (STP) is utilized. Explain how STP prevents loops.

2. MAC Pro (20%)

Initially, the arp tables of Mario, Zelda and Sonic are empty. The mac address table of Gateway is empty as well.



- Mario wants to send 1 ICMP ping to Zelda. Please list all the packets in transmitted between Mario and Zelda in order. Each packet should contain the protocol name, src/dst IP and MAC addresses.
e.g. ICMP, 10.1.2.3 -> 10.2.3.4, 01:23:45:67:89:0a -> 12:34:56:78:90:ab
- Suppose Zelda received the Mario's request successfully, and sent ICMP reply back to Mario. Please list the current mac address table of the Gateway.
- Mario wants to ping a WAN IP address, 140.112.30.28. Please list all the packets that Mario will send in order. Each packet should contain the protocol name, src/dst IP and MAC addresses.
- Sonic found Mario enjoys surfing on the PTT BBS every night. What's more, Mario always uses telnet to connect to PTT. Please list each step in your strategy to help Sonic to steal Mario's PTT password. (Hint: ARP is useful)

3. Let's IPv6 (15%)

Currently, CSIE network doesn't support IPv6. However, we can still play some IPv6 in the LAN environment. Watch this video first: <https://www.youtube.com/watch?v=A3LFt7CHpgs> , and answer the questions.

- In IPv6, IPv4 ARP is replaced by NDP. In NDP, what kind of protocol in layer 3 is used?
- What is the multicast address of all the routers on LAN?

- (c) I've created a TCP server listening on IPv6 address of oasis2.csie.ntu.edu.tw on port 9453. Try to use `ncat/nc` to connect it (from oasis2 itself, or other CSIE workstations). What does the server say?

System Administration

1 Playing With LVM

1.1 Storage For NASA Course (15%)

Hsinmu arranged a new machine for the upcoming NASA course. Students may need to upload their homeworks, TAs would need to put their in-class lab materials, and also, all the lectures would be placed here, too.

There are two 300G disks `/dev/sdb`, `/dev/sdc`. Please satisfy all the following requirements.

- create 1 volume group **storage-vg** with these two disks
- create 1 logic volume of size 150G named **student** with ext4 filesystem
- create 1 logic volume of size 350G named **ta** with ext4 filesystem
- create another logic volume with rest of the size named **hsinmu** and also ext4 filesystem

1.2 Need More Space (20%)

After Hsinmu's first class, he decided to video take all of his lecture given in the following course, and he found out that there is not enough space for him to use. However, there's only a 100G disk left, so Hsinmu planned to borrow 150G from **ta**.

Please help Hsinmu extend logic volume **hsinmu** with the entire new 100G disk `/dev/sdd`, and also 150G borrowed from **ta**. Assume the two partitions are already unmount.

2 PTT Alert (15%)

On October 30th, 2017, PTT crashed unexpectedly. Please gather as much information as possible and take a closer look at the whole event. Describe how the disaster happened, and provide a better solution.

Note: Please use your own words and write as much detail as possible to get full credit.