

Homework #2

Due Time: 2016/3/23 (Wed.) 17:00
Contact TAs: vegetable@csie.ntu.edu.tw

Submission

- Compress all your files into a file named **HW2-[studentID]-[version].tar.gz**, which contains two folders named **[studentID]_NA** and **[studentID]_SA** respectively.
- **Folder [studentID]_NA** should contain a pdf file of all your answers in *Network Administration Part*.
- **Folder [studentID]_SA** should contain all script files to do the task in *System Administration Part*.
- Submit your tar file to **sftp://140.112.30.58:7000** with your workstation account and password.

Instructions and Announcements

- Discussions with others are encouraged. However, you should write down your solutions **in your own words**. In addition, for each problem you have to specify the references (the Internet URL you consulted with or the people you discussed with) on the first page of your solution to that problem.
- Problems below would be related to the material taught in the class and might be far beyond that. Try to search for additional information on the Internet and give a reasonable answer.
- Some problem below might not have standard solutions. We would give you the point if your answer is followed by reasonable explanations.
- **NO LATE SUBMISSION IS ALLOWED.**

Network Administration

1 20%

We have studied in class about CSMA/CD, which is the MAC protocol specified in the IEEE 802.3 (Ethernet) standard. However, such protocol is now obsolete with modern Ethernet networks, and is even removed in the new 10 Gigabit Ethernet standard. Briefly explain why CSMA/CD is rarely used in modern applications. Hint: Search for "collision domain", "star network", "bus network", "10 Gigabit Ethernet", "CSMA".

2 20%

Below are questions about CSMA on wireless network:

- a) Briefly introduce the hidden terminal problem and the exposed terminal problem when CSMA is applied on a wireless channel.
- b) Briefly explain how the RTS/CTS mechanism deals with both problems.

3 60%

Install "iperf" on 217 Workstation, measure the bandwidth from your PC to 217 Workstation. Describe how you install iperf on 217 Workstation, the media (Wired Ethernet, Wireless 2.4G/5G, Mobile network) you use, your iperf results, and anything you learn in this process. It's better to provide short report with iperf outputs, pictures or screenshots. Even if you don't accomplish it before deadline, you can still describe how far you go in the report, based on which, partial score will be given.

System Administration

Use `sh` or `bash` to write two scripts named `[your student ID]_SA.1.sh`, `[your student ID]_SA.2.sh` respectively to do the following task.

1 LVM setup

There are two 500GiB disks `/dev/sda`, `/dev/sdb`. Use GNU `parted` and `mkfs` command to partition `/dev/sda`:

- use GPT partition table
- optimally align the partitions
- create first partition with size 200 GiB and FAT32 filesystem
- create second partition with rest of size and labeled as LVM

Use `pvcreate` and `vgcreate` command to create

- 1 volume group named `nasavg` with 2 physical volumes second partition of `/dev/sda` and whole disk `/dev/sdb`

Use `lvcreate` and `mkfs` command to create

- 1 logical volume with size 300 GiB, name `home_student` and ext4 filesystem
- 1 logical volume with rest of size, name `home_ta` and ext4 filesystem

under your volume group.

Please write down the commands you used to `[your student ID]_SA.1.sh`.

2 LVM resize

Suppose that `home_student` is full now and `home_ta` only use 100GiB, so you decided to borrow 100GiB from `home_ta` to `home_student`.

- Assume these two partitions are unmounted now
- Remember to resize filesystem too

Please write down the commands you used to `[your student ID]_SA.2.sh`.