Homework #4

Due Time: 2017/4/30 (Sun.) 22:00
Contact TAs: `vegetable@csie.ntu.edu.tw`

Submission

- Compress all your files into a file named **HW4_[studentID].zip** (e.g. `HW4_bxx902xxx.zip`), which contains one folder named **[studentID]_SA**.
- **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.
- You will get 5 points if you follow the assignment format specified above. Failure to follow any of the above requirements will result in deductions from your assignment mark.

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 IS ALLOWED.**

System Administration

Note that:

- You should write down what you do step by step, and explain what you are doing to get full credit.
- Please write down your answers in order, and seperate them well.
- The process is as important as the result. Therefore, if you do things in some incorrect or nasty ways, you will not get full credit.
- You do not need to paste a screenshot of each step.
- The environment should be CentOS.
- Do not use the command `service`.

1. (20%)

Install a VM host as you did in class. However, there are some additional requirements.

1. Has hardware virtualization support. Explain how you verfy it.
2. Allow non-root user to create a VM without sudo.
3. But only a certain user.
4. Also show that how to use `virsh` to connect to the VM host without root permission.
5. Follow the principle of least privilege.

Though there is more than one way to achieve the above requirements, please adopt the way that does not need to install more packages than the way done in class.

2. (25%)

Create a VM completely without GUI. The VM should satisfy the following requirements:

1. Its virtual disk is based on LVM of VM host.
2. Has a graphical console as the VM you created in class. That is, you can see the "screen" of it with virt-manager.
3. It should be installed from an ISO file.
4. It should be installed with "kickstart".
5. It is connected to the network either through NAT, macvtap or bridge. You should do it explicitly rather than use default value implicitly.
6. Its graphical console should be password protected.

You have to explain each argument of used commands. Note that you do not need to paste your kickstart script content, but you should tell me how you get the kickstart script.

Hint: A kickstart script can be found at `/root/anaconda-ks.cfg` after a manual installation.

3. (10%)

Explain what is the interface that `virsh console` simulates (4%). Also, explain how to do the thing like `virsh console` on a physical machine (4%). Find pictures of the interface or the special tool you need to use (2%).

(Remember to follow the license of the picture you found.)

4. (15%)

Do something so

- you can see the GRUB menu with the command `virsh console` during boot.
- you can login to your VM with the command `virsh console` automatically after the vm boots.

5. (15%)

Given a VM host as you created in class, do something so that you can connect your VM to the network with Linux bridge without GUI tool. Please write down what additional things you do and how to connect to the network through bridge.

6. (10%)

Find out virsh commands to (no explaination required):

1. List VMs on a VM host.
2. Remove a VM.
3. List interfaces of a VM.
4. Delete an interface of a VM.
5. "Edit" config of a VM directlly.

7. (10% bonus)

There are ways for a virtual network to connect to the physical network. Please explain and compare how following methods work.

- NAT
- macvtap
- routed mode
- Linux bridge

Also, which method(s) should be adopted if you want your VM to connect to a VLAN trunk?

Please provide reliable references to justify your arguments. Also, if you do not want to fully understand those things, do not waste your and TAs' time. This problem will be graded strictly.