

Homework #4

Due Time: 2016/4/20 (Wed.) 17:00
Contact TAs: vegetable@csie.ntu.edu.tw

Submission

- Compress all your files into a file named **HW4_[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 and the script(s) you wrote in *Network Administration Part*.
- **Folder [studentID]_SA** should contain a pdf file of all your answers 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 DHCP

1.1 (10%)

Write down the command that you can use to renew the IP your computer get from DHCP server. It would be better if the command doesn't restart the connection.

1.2 (15%)

Try the command you found while you are connecting to a new network with DHCP. If you always get the same IP after running that command what may be the reason for this result?

2 DNS

2.1 (15%)

Why should DNS be distributed? Please name three disadvantages if a single server handles all domain name translation services.

2.2 (15%)

dig.sh is a bash script that can do type A DNS query and print out the response using hexdump. Try the command `./dig.sh www.csie.ntu.edu.tw` on CSIE workstation and point out where the IP of www.csie.ntu.edu.tw is in the response.

2.3 (15%)

While doing query in the above problem, you may also see "csman", "csman2", "ntuns" in the response. There are only part of the domain name of the name servers because of compression. Please write down how to decompress and get the full domain name of the name servers and what may happen if DNS server doesn't compress large responses.(hint: DNS uses UDP by default)

2.4 (15%)

dig.sh uses the CSIE DNS server 140.112.30.21, which only allows queries from NTU network and makes dig.sh not working outside NTU network. What kind of attack are we trying to avoid with this setting?

2.5 (15%)

Fix dig.sh so that it can pick one name server from system setting and send queries to that name server. Please name the new script "dig_new.sh".

2.6 (Bonus 10%)

Enhance the script `dig.sh` so that it can make type MX query by `./dig.sh csie.ntu.edu.tw MX` while keeping the original type A query ability. Please name the new script `dig_bonus.sh`. (hint: 3.2.2 in <https://www.ietf.org/rfc/rfc1035.txt>)

System Administration

Find the correct command to solve these problems.

Please write down the command you used. For those problems marked with (*), also paste the outputs.

1. Configure `eth0` interface as listed below.
 - ip: 192.168.217.1
 - netmask: 255.255.255.0
 - gateway: 192.168.217.254
2. (*) Find the network path that is being used to reach `www.google.com` from `linux1`.
3. (*) Get the http header of `www.csie.ntu.edu.tw`.
4. (*) Query for the MX record of `csie.ntu.edu.tw` with the command `dig`.
5. Show the processes related with port 80.