

# Lab 1: Set Up Environment and Test Basic Softwares

## Questions

1. What protocol does "ping" and "traceroute" use? (10 points)

**Requirements:**

- a) Ping and traceroute a website or a certain IP address and then use Wireshark to figure out the protocol they use.
- b) Apart from the answers, please provide screenshots of the interface of Wireshark in your report.

2. What is the IP address of [www.baidu.com](http://www.baidu.com) ? (5 points)

**Requirements:**

- a) You are required to use the ping command in this question.
- b) Apart from the answers, please provide screenshots of the Ubuntu terminal in your report.

3. Use nslookup to perform a DNS Lookup. (5 points)

**Requirements:**

- a) Perform a DNS lookup for the domain "[www.sjtu.edu.cn](http://www.sjtu.edu.cn)".
- b) Please provide screenshots of the Ubuntu terminal in your report.

4. What is the average round trip time (RTT) from your VM to [www.sjtu.edu.cn](http://www.sjtu.edu.cn) and [mit.edu](http://mit.edu). Analyze the reason for the difference of their RTTs. (15 points)

**Requirements:**

- a) You are required to use the command ping to send 10 packets and get the average RTT.
- b) Analyze the reason for the difference of their RTTs
- c) Please provide screenshots of the Ubuntu terminal in your report.

5. Use netstat to monitor net connections before and after opening a webpage. (15 points)

**Requirements:**

- a) Run netstat -t to display active TCP connections before opening a webpage in your browser.
- b) Open a webpage (e.g., [www.baidu.com](http://www.baidu.com)) in the browser of your VM and then run netstat -t again to observe the new TCP connections.
- c) Compare the output before and after opening the webpage, and identify the connections related to the website.
- d) Please provide screenshots of the Ubuntu terminal in your report.

6. What is the TCP bandwidth between your two VMs? (10 points)

**Requirements:**

- a) Open another VM and use iperf3 to test the TCP bandwidth between the two VMs.

- b) Apart from the answers, please provide screenshots of the Ubuntu terminal in your report.
7. Select a VM as your host machine, and another VM as your server machine, then use ssh on your host to connect to the server. (10 points)
- Requirements:**
- a) Please provide screenshots of the Ubuntu terminal in your report.
8. Use scp to copy a file from your host to the server. (15 points)
- Requirements:**
- a) Create a file named as “lab1.txt” in your host machine, and copy it to the “/home/test” directory of the server machine.
  - b) Please provide screenshots of the Ubuntu terminal in your report.
9. Use ifconfig to set your Network Interface Card (NIC). (15 points)
- Requirements:**
- a) Display all the NICs which are currently available.
  - b) Change the IP address of the NIC enp0s8 on your VM as 192.168.56.103, and the subnet mask as 255.255.255.0.
  - c) Apart from the answers, please provide screenshots of the Ubuntu terminal in your report.