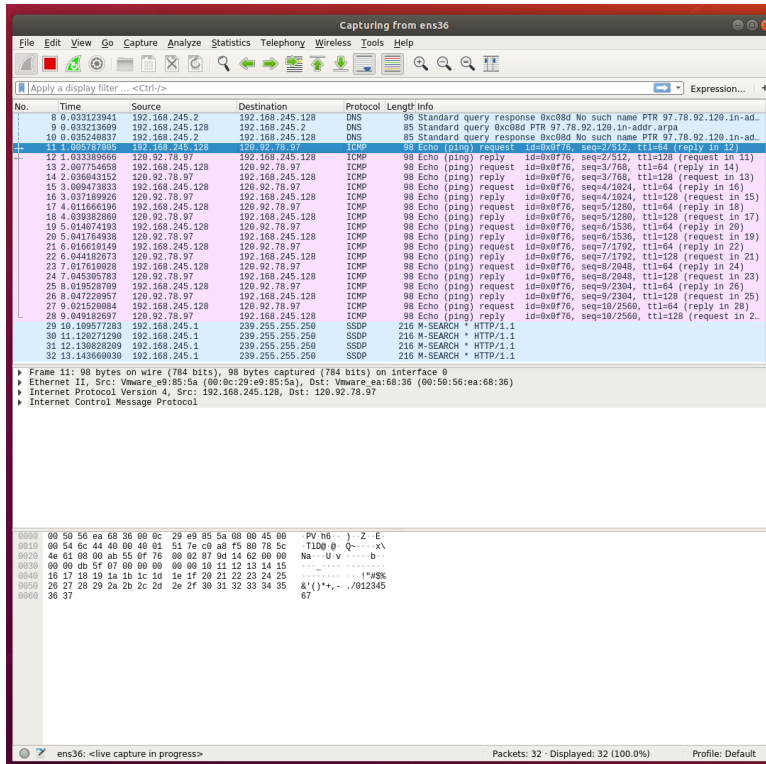


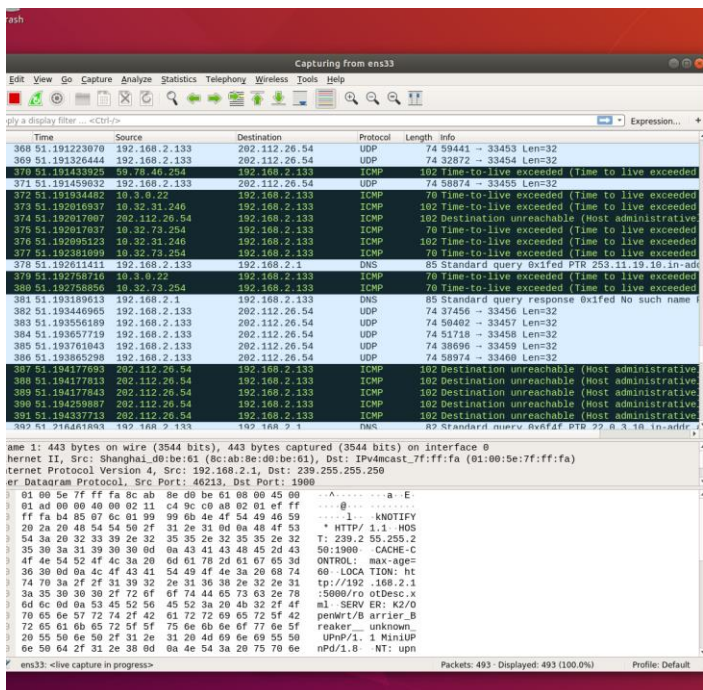
Lab 1: Set Up Environment and Test Basic Software

孙济宸 520030910016

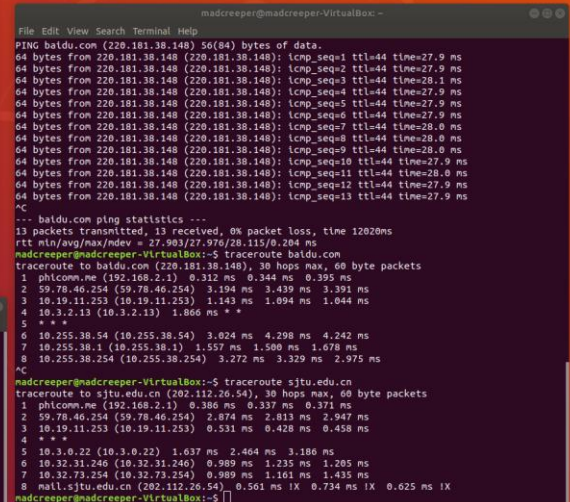
1. Ping: ICMP protocol



Traceroute: UDP & ICMP protocol



2. IP address of baidu.com: 220.181.38.148

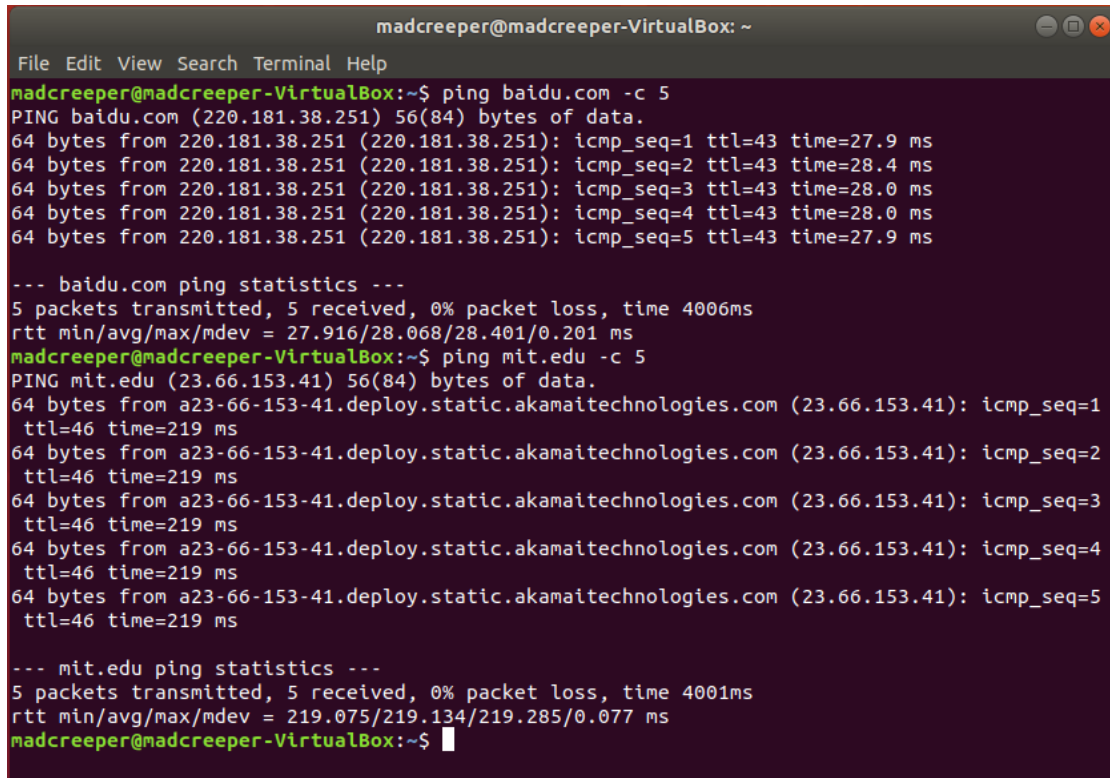


```

madcrawler@madcrawler-VirtualBox:~$ ping baidu.com
PING baidu.com (220.181.38.148) 56(84) bytes of data.
64 bytes from 220.181.38.148 (220.181.38.148): icmp_seq=1 ttl=44 time=28.0 ms
64 bytes from 220.181.38.148 (220.181.38.148): icmp_seq=2 ttl=44 time=27.9 ms
64 bytes from 220.181.38.148 (220.181.38.148): icmp_seq=3 ttl=44 time=28.1 ms
64 bytes from 220.181.38.148 (220.181.38.148): icmp_seq=4 ttl=44 time=27.9 ms
^C
--- baidu.com ping statistics ---

```

3. baidu.com: avg = 28ms
 mit.edu: avg = 219ms
 causes: physical distance, more jumps, firewall,, etc.



```

madcrawler@madcrawler-VirtualBox: ~
File Edit View Search Terminal Help
madcrawler@madcrawler-VirtualBox:~$ ping baidu.com -c 5
PING baidu.com (220.181.38.251) 56(84) bytes of data.
64 bytes from 220.181.38.251 (220.181.38.251): icmp_seq=1 ttl=43 time=27.9 ms
64 bytes from 220.181.38.251 (220.181.38.251): icmp_seq=2 ttl=43 time=28.4 ms
64 bytes from 220.181.38.251 (220.181.38.251): icmp_seq=3 ttl=43 time=28.0 ms
64 bytes from 220.181.38.251 (220.181.38.251): icmp_seq=4 ttl=43 time=28.0 ms
64 bytes from 220.181.38.251 (220.181.38.251): icmp_seq=5 ttl=43 time=27.9 ms

--- baidu.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4006ms
rtt min/avg/max/mdev = 27.916/28.068/28.401/0.201 ms
madcrawler@madcrawler-VirtualBox:~$ ping mit.edu -c 5
PING mit.edu (23.66.153.41) 56(84) bytes of data.
64 bytes from a23-66-153-41.deploy.static.akamaitechnologies.com (23.66.153.41): icmp_seq=1
ttl=46 time=219 ms
64 bytes from a23-66-153-41.deploy.static.akamaitechnologies.com (23.66.153.41): icmp_seq=2
ttl=46 time=219 ms
64 bytes from a23-66-153-41.deploy.static.akamaitechnologies.com (23.66.153.41): icmp_seq=3
ttl=46 time=219 ms
64 bytes from a23-66-153-41.deploy.static.akamaitechnologies.com (23.66.153.41): icmp_seq=4
ttl=46 time=219 ms
64 bytes from a23-66-153-41.deploy.static.akamaitechnologies.com (23.66.153.41): icmp_seq=5
ttl=46 time=219 ms

--- mit.edu ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4001ms
rtt min/avg/max/mdev = 219.075/219.134/219.285/0.077 ms
madcrawler@madcrawler-VirtualBox:~$

```

4. TCP bandwidth between 2 VMs:
 The bandwidth is 3.07 Gbits/sec
 Client:

```

iperf Done.
madcreeper@madcreeper-VirtualBox:~$ iperf3 -c 192.168.74.131
Connecting to host 192.168.74.131, port 5201
[ 4] local 192.168.74.130 port 36406 connected to 192.168.74.131 port 5201
[ ID] Interval           Transfer     Bandwidth       Retr   Cwnd
[ 4]  0.00-1.00   sec      263 MBytes  2.20 Gbits/sec    145   1.60 MBytes
[ 4]  1.00-2.00   sec      339 MBytes  2.84 Gbits/sec     0   1.74 MBytes
[ 4]  2.00-3.00   sec      329 MBytes  2.76 Gbits/sec    13   1.32 MBytes
[ 4]  3.00-4.00   sec      375 MBytes  3.15 Gbits/sec     0   1.51 MBytes
[ 4]  4.00-5.00   sec      384 MBytes  3.22 Gbits/sec     0   1.68 MBytes
[ 4]  5.00-6.00   sec      405 MBytes  3.39 Gbits/sec     0   1.85 MBytes
[ 4]  6.00-7.00   sec      400 MBytes  3.36 Gbits/sec     4   1.50 MBytes
[ 4]  7.00-8.00   sec      396 MBytes  3.32 Gbits/sec     0   1.68 MBytes
[ 4]  8.00-9.00   sec      407 MBytes  3.41 Gbits/sec     0   1.85 MBytes
[ 4]  9.00-10.00  sec      371 MBytes  3.11 Gbits/sec    17   1.48 MBytes
-----
[ ID] Interval           Transfer     Bandwidth       Retr
[ 4]  0.00-10.00  sec    3.58 GBytes  3.08 Gbits/sec    179
[ 4]  0.00-10.00  sec    3.58 GBytes  3.07 Gbits/sec
-----
iperf Done.
madcreeper@madcreeper-VirtualBox:~$

```

Server:

```

File Edit View Search Terminal Help
Server listening on 5201
-----
Accepted connection from 192.168.74.130, port 36404
[ 5] local 192.168.74.131 port 5201 connected to 192.168.74.130 port 36406
[ ID] Interval           Transfer     Bandwidth
[ 5]  0.00-1.00   sec      256 MBytes  2.15 Gbits/sec
[ 5]  1.00-2.00   sec      339 MBytes  2.84 Gbits/sec
[ 5]  2.00-3.00   sec      328 MBytes  2.75 Gbits/sec
[ 5]  3.00-4.00   sec      375 MBytes  3.14 Gbits/sec
[ 5]  4.00-5.00   sec      384 MBytes  3.22 Gbits/sec
[ 5]  5.00-6.00   sec      404 MBytes  3.39 Gbits/sec
[ 5]  6.00-7.00   sec      401 MBytes  3.36 Gbits/sec
[ 5]  7.00-8.00   sec      396 MBytes  3.32 Gbits/sec
[ 5]  8.00-9.00   sec      407 MBytes  3.42 Gbits/sec
[ 5]  9.00-10.00  sec      372 MBytes  3.12 Gbits/sec
[ 5] 10.00-10.01  sec      2.82 MBytes  2.42 Gbits/sec
-----
[ ID] Interval           Transfer     Bandwidth
[ 5]  0.00-10.01  sec      0.00 Bytes  0.00 bits/sec
[ 5]  0.00-10.01  sec    3.58 GBytes  3.07 Gbits/sec
-----
Server listening on 5201
-----

```

5. SSH login

```

apt-get done.
madcreeper@madcreeper-VirtualBox:~$ ssh madcreeper@192.168.74.131
The authenticity of host '192.168.74.131 (192.168.74.131)' can't be established.
ECDSA key fingerprint is SHA256:pNPOX70F5xG0283p65r9eRJoymH8qEazMBMdbLT589g.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.74.131' (ECDSA) to the list of known hosts.
madcreeper@192.168.74.131's password:
Welcome to Ubuntu 18.04.6 LTS (GNU/Linux 5.4.0-84-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

110 updates can be applied immediately.
89 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

New release '20.04.3 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

Your Hardware Enablement Stack (HWE) is supported until April 2023.

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

madcreeper@madcreeper-VirtualBox:~$ ^C
madcreeper@madcreeper-VirtualBox:~$ exit
logout
Connection to 192.168.74.131 closed.

```

6. SCP file copy

Server: first use chmod, or copy shows 'Permission Denied'

```

madcreeper@madcreeper-VirtualBox:/$ sudo chmod 777 /home/test
madcreeper@madcreeper-VirtualBox:/$

```

Host:

```

madcreeper@madcreeper-VirtualBox:~/Desktop$ sudo scp lab1.txt madcreeper@192.168.74.131:/home/test
[sudo] password for madcreeper:
The authenticity of host '192.168.74.131 (192.168.74.131)' can't be established.
ECDSA key fingerprint is SHA256:pNPOX70F5xG0283p65r9eRJoymH8qEazMBMdbLT589g.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.74.131' (ECDSA) to the list of known hosts.
madcreeper@192.168.74.131's password:
scp: /home/test/lab1.txt: Permission denied
madcreeper@madcreeper-VirtualBox:~/Desktop$ sudo scp lab1.txt madcreeper@192.168.74.131:/home/test
madcreeper@192.168.74.131's password:
scp: /home/test/lab1.txt: Permission denied
madcreeper@madcreeper-VirtualBox:~/Desktop$ ^C
madcreeper@madcreeper-VirtualBox:~/Desktop$ sudo scp lab1.txt madcreeper@192.168.74.131:/tmp
madcreeper@192.168.74.131's password:
lab1.txt                                100%   0    0.0KB/s   00:00
madcreeper@madcreeper-VirtualBox:~/Desktop$ sudo scp lab1.txt madcreeper@192.168.74.131:/home
madcreeper@192.168.74.131's password:
lab1.txt                                100%   0    0.0KB/s   00:00
madcreeper@madcreeper-VirtualBox:~/Desktop$ sudo scp lab1.txt madcreeper@192.168.74.131:/home/test
madcreeper@192.168.74.131's password:
lab1.txt                                100%   0    0.0KB/s   00:00
madcreeper@madcreeper-VirtualBox:~/Desktop$

```

Server (After copy):

```

madcreeper@madcreeper-VirtualBox:/$ sudo chmod 777 /home/test
madcreeper@madcreeper-VirtualBox:/$ cd /home/test
madcreeper@madcreeper-VirtualBox:/home/test$ ls
lab1.txt
madcreeper@madcreeper-VirtualBox:/home/test$

```