

LAB01 Test-bed setting[STEP 1-5]

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[STEP 1] Virtual Machine status check

1 Which VM OS type will you use for your exercise?

	Real host	VM OS			
	Windows	Ubuntu	Centos	Kali	Windows
VMware					
VirtualBox	X	X			

* [Mainly we will use Ubuntu](#)

2 Check your Virtual Machine name Ubuntu [\$ uname -a]

```
student@student-VirtualBox: ~
File Edit View Search Terminal Help
student@student-VirtualBox:~$ uname -a
Linux student-VirtualBox 5.4.0-72-generic #80~18.04.1-Ubuntu SMP Mon Apr 12 23:26:25 UTC 2021 x86_64 x86_64 x86_64 GNU/Linux
student@student-VirtualBox:~$
```

3 Check your guest OS name Ubuntu: GNU/Linux [\$ uname -o]

```
student@student-VirtualBox:~$ uname -o
GNU/Linux
student@student-VirtualBox:~$
```

4 What kind of linux for Virtual Machine? Ubuntu [\$ uname -r]

```
student@student-VirtualBox:~$ uname -r
5.4.0-72-generic
student@student-VirtualBox:~$
```

[STEP 2] Define the addresses of test-bed table (snap shot)

Role	SENDER	TARGET
	Tester	Victim
IP address	Student's real IP Student's VM IP (Kali, Ubuntu, Centos each)	<ul style="list-style-type: none"> real system :CTU,CICT U RL, IP student's VM IP (Kali, Ubuntu, Centos each) loopback address neighbor PC IP in class
HW	Class terminal	Class terminal
NW device	Hub, router, GW	
OS	Real host(window) VM(Kali,Ubuntu,Centos)	Real host(window) VM(Kali,Ubuntu,Centos)
SW		

1 Check host IP[Window]

CMD ipconfig/all

```
C:\Users\student>ipconfig/all

Windows IP Configuration

Host Name . . . . . : P212M34
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No

Wireless LAN adapter Local Area Connection* 3:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
Description . . . . . : Microsoft Wi-Fi Direct Virtual Adapter
Physical Address. . . . . : 2C-6E-85-28-4D-27
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes

Wireless LAN adapter Wi-Fi:

Media State . . . . . : Media disconnected
```

2 Check VM IP [Linux]

\$ Sudo apt install net-tools

```
student@student-VirtualBox:~$ sudo apt install net-tools
[sudo] password for student:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer
required:
  efibootmgr libegl1-mesa libfwup1 libllvm9 libwayland-egl1-mesa
  python3-click python3-colorama
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  net-tools
0 upgraded, 1 newly installed, 0 to remove and 209 not upgraded.
Need to get 194 kB of archives.
After this operation, 803 kB of additional disk space will be used.
Get:1 http://vn.archive.ubuntu.com/ubuntu bionic/main amd64 net-tools
amd64 1.60+git20161116.90da8a0-1ubuntu1 [194 kB]
Fetched 194 kB in 0s (2,485 kB/s)
Selecting previously unselected package net-tools.
(Reading database ... 169332 files and directories currently installed
.)
Preparing to unpack .../net-tools_1.60+git20161116.90da8a0-1ubuntu1_am
d64.deb ...
Unpacking net-tools (1.60+git20161116.90da8a0-1ubuntu1) ...
Setting up net-tools (1.60+git20161116.90da8a0-1ubuntu1) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
student@student-VirtualBox:~$
```

\$ ifconfig

```

student@student-VirtualBox:~$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
    inet6 fe80::d768:69e2:d465:ca9e prefixlen 64 scopeid 0x20<li
nk>
    ether 08:00:27:2c:99:aa txqueuelen 1000 (Ethernet)
    RX packets 813 bytes 466652 (466.6 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 764 bytes 95792 (95.7 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 254 bytes 23302 (23.3 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 254 bytes 23302 (23.3 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

student@student-VirtualBox:~$

```

- Ubuntu
 - Centos
 - Kali
- 3 Define target IP [Windows:CMD nslookup URL]
- CTU IP

```

C:\Users\student>nslookup ctu.edu.vn
Server: CTUAD2.ctu.edu.vn
Address: 172.18.27.2

Name: ctu.edu.vn
Addresses: 10.16.36.54
          172.18.27.6
          172.18.45.2
          172.18.45.6
          172.18.27.2

```

- CICT IP

```
Server: CTUAD2.ctu.edu.vn
Address: 172.18.27.2

Name: cit.ctu.edu.vn
Address: 10.16.63.194
```

- loopback address [Windows]

```
C:\Users\student>nslookup loopback.site
Server: CTUAD2.ctu.edu.vn
Address: 172.18.27.2

Non-authoritative answer:
Name: loopback.site
Address: 127.0.0.1
```

- neighbor PC IP in class [Windows] => your classmate IP

```
C:\Users\student>arp -a

Interface: 172.30.115.44 --- 0x3
    Internet Address      Physical Address      Type
    172.30.115.1          3c-41-0e-87-d3-5a    dynamic
    172.30.115.9          84-7b-eb-21-fb-f2    dynamic
    172.30.115.31         84-7b-eb-21-fc-03    dynamic
    172.30.115.36         84-7b-eb-13-78-e7    dynamic
    172.30.115.68         40-16-3b-1a-bf-a0    dynamic
    172.30.115.255        ff-ff-ff-ff-ff-ff    static
    224.0.0.22            01-00-5e-00-00-16    static
    224.0.0.251          01-00-5e-00-00-fb    static
    224.0.0.252          01-00-5e-00-00-fc    static
    239.255.255.250      01-00-5e-7f-ff-fa    static

Interface: 192.168.56.1 --- 0x7
    Internet Address      Physical Address      Type
    192.168.56.255        ff-ff-ff-ff-ff-ff    static
    224.0.0.22            01-00-5e-00-00-16    static
    224.0.0.251          01-00-5e-00-00-fb    static
    224.0.0.252          01-00-5e-00-00-fc    static
    239.255.255.250      01-00-5e-7f-ff-fa    static
    255.255.255.255        ff-ff-ff-ff-ff-ff    static
```

[STEP3] Check packet exchanging status between sender and target command prompt (snap shot)

- 1 Ping from Host[Windows] to Virtual Machine [Linux] OS

```
C:\Users\student>ping 192.168.56.1

Pinging 192.168.56.1 with 32 bytes of data:
Reply from 192.168.56.1: bytes=32 time<1ms TTL=128
Reply from 192.168.56.1: bytes=32 time<1ms TTL=128
Reply from 192.168.56.1: bytes=32 time<1ms TTL=128
Reply from 192.168.56.1: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.56.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

2 Check TTL value with Ping

-TTL Value: 64

3 Ping from Virtual Machine OS [Linux] to Host [Windows]

```
student@student-VirtualBox:~$ ping 192.168.56.1
PING 192.168.56.1 (192.168.56.1) 56(84) bytes of data.
64 bytes from 192.168.56.1: icmp_seq=1 ttl=127 time=0.931 ms
64 bytes from 192.168.56.1: icmp_seq=2 ttl=127 time=0.861 ms
64 bytes from 192.168.56.1: icmp_seq=3 ttl=127 time=0.894 ms
64 bytes from 192.168.56.1: icmp_seq=4 ttl=127 time=0.699 ms
64 bytes from 192.168.56.1: icmp_seq=5 ttl=127 time=0.472 ms
64 bytes from 192.168.56.1: icmp_seq=6 ttl=127 time=0.448 ms
64 bytes from 192.168.56.1: icmp_seq=7 ttl=127 time=0.925 ms
64 bytes from 192.168.56.1: icmp_seq=8 ttl=127 time=0.696 ms
64 bytes from 192.168.56.1: icmp_seq=9 ttl=127 time=0.583 ms
64 bytes from 192.168.56.1: icmp_seq=10 ttl=127 time=0.910 ms
64 bytes from 192.168.56.1: icmp_seq=11 ttl=127 time=0.741 ms
^C
--- 192.168.56.1 ping statistics ---
11 packets transmitted, 11 received, 0% packet loss, time 10688ms
rtt min/avg/max/mdev = 0.448/0.741/0.931/0.174 ms
student@student-VirtualBox:~$
```

4 Check TTL value with Ping

-TTL Value: 128

5 Ping from Host[Windows] to loopback[Windows] of terminal

```
C:\Users\student>ping 127.0.0.1

Pinging 127.0.0.1 with 32 bytes of data:
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128

Ping statistics for 127.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\student>
```

6 Explain the meaning of TTL (time to live) in Ping reply

[STEP 4] Check routing route status between sender and target (snap shot)

- 1 **Tracert** from Host[Windows] to [Linux] and check how many nodes were connected for packet transmission with **Tracert**?

Windows:CMD tecert

```
Tracing route to P212M34 [192.168.56.1]
over a maximum of 30 hops:

  1    <1 ms    <1 ms    <1 ms    P212M34 [192.168.56.1]

Trace complete.
C:\Users\student>
```

- 2 **Traceroute** from Virtual OS [Linux] to Host [Windows] and check how many nodes were connected for packet transmission with **Traceroute**?

```
student@student-VirtualBox:~$ sudo apt install traceroute 192.168.56.1
[sudo] password for student:
Sorry, try again.
[sudo] password for student:
Reading package lists... Done
Building dependency tree
Reading state information... Done
E: Unable to locate package 192.168.56.1
E: Couldn't find any package by glob '192.168.56.1'
E: Couldn't find any package by regex '192.168.56.1'
student@student-VirtualBox:~$
```

- 3 Tracert from Host [Windows] to loopback of terminal [Windows:CMD]

Windows:CMD tecert to loopback

```
C:\Users\student>tracert 127.0.0.1

Tracing route to P212M34 [127.0.0.1]
over a maximum of 30 hops:

  1    <1 ms    <1 ms    <1 ms    P212M34 [127.0.0.1]

Trace complete.
C:\Users\student>
```

It's 14 nodes.

```

192.168.1.1
static.vnpt.vn [123.29.12.155]
static.vnpt.vn [113.171.45.125]
static.vnpt.vn [113.171.44.97]
static.vnpt.vn [113.171.45.177]
static.vnpt.vn [113.171.37.229]
72.14.213.88
108.170.241.33
108.170.241.48
216.239.62.165
142.251.68.133
108.170.225.101
216.239.35.167
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
sa-in-f100.1e100.net [74.125.200.100]

```

[STEP 5] Advanced Ping test [Linux]:

- 1 Send 5 packets to facebook.com, from Windows

ping -c 5 facebook.com.

```

C:\Users\student>ping -c 5 www.facebook.com
Access denied. Option -c requires administrative privileges.

C:\Users\student>ping /n 5 www.facebook.com

Pinging star-mini.c10r.facebook.com [157.240.211.35] with 32 bytes of data:
Reply from 157.240.211.35: bytes=32 time=29ms TTL=55
Reply from 157.240.211.35: bytes=32 time=28ms TTL=55
Reply from 157.240.211.35: bytes=32 time=29ms TTL=55
Reply from 157.240.211.35: bytes=32 time=29ms TTL=55
Request timed out.

Ping statistics for 157.240.211.35:
    Packets: Sent = 5, Received = 4, Lost = 1 (20% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 28ms, Maximum = 29ms, Average = 28ms

C:\Users\student>

```

- 2 ping Facebook for 10 seconds from Ubuntu and then display the results

ping -w 10 facebook.com.


```

student@student-VirtualBox:~$ ping -w 10 www.facebook.com
PING star-mini.c10r.facebook.com (157.240.211.35) 56(84) bytes of data.
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=1 ttl=54 time=42.4 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=2 ttl=54 time=42.2 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=3 ttl=54 time=42.3 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=4 ttl=54 time=39.0 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=5 ttl=54 time=41.0 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=6 ttl=54 time=41.9 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=7 ttl=54 time=36.4 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=8 ttl=54 time=41.5 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=9 ttl=54 time=32.1 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=10 ttl=54 time=38.8 ms

--- star-mini.c10r.facebook.com ping statistics ---

```

[Change the interval between packets]

- 3 To increase the wait to 3 seconds between packets in your ping to Facebook, you'd use from Ubuntu

ping -i 3 facebook.com.

```

64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=2 ttl=54 time=42.2 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=3 ttl=54 time=42.3 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=4 ttl=54 time=39.0 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=5 ttl=54 time=41.0 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=6 ttl=54 time=41.9 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=7 ttl=54 time=36.4 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=8 ttl=54 time=41.5 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=9 ttl=54 time=32.1 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq
=10 ttl=54 time=38.8 ms

--- star-mini.c10r.facebook.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9017ms
rtt min/avg/max/mdev = 32.100/39.796/42.415/3.172 ms

```

- 4 To decrease the wait to half of one second, from Ubuntu

ping -i 0.5 facebook.com.

```
student@student-VirtualBox:~$ ping -i 0.5 www.facebook.com
PING star-mini.c10r.facebook.com (157.240.211.35) 56(84) bytes of data.
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq=1 ttl=54 time=30.0 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq=2 ttl=54 time=29.7 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq=3 ttl=54 time=38.8 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq=4 ttl=54 time=29.6 ms
64 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq=5 ttl=54 time=29.6 ms
^C
--- star-mini.c10r.facebook.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 2008ms
rtt min/avg/max/mdev = 29.664/31.588/38.800/3.608 ms
student@student-VirtualBox:~$
```

[Change the size of your packets].

- 5 By default, ping packets are 56 bytes, To send 1000 bytes instead of the default, you'd use

ping -s 1000 facebook.com. from Ubuntu

```
student@student-VirtualBox:~$ ping -s 1000 www.facebook.com
PING star-mini.c10r.facebook.com (157.240.211.35) 1000(1028) bytes of data.
1008 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq=1 ttl=54 time=31.9 ms
1008 bytes from edge-star-mini-shv-02-hkg4.facebook.com (157.240.211.35): icmp_seq=2 ttl=54 time=30.4 ms
^C
--- star-mini.c10r.facebook.com ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1002ms
rtt min/avg/max/mdev = 30.451/31.179/31.908/0.749 ms
student@student-VirtualBox:~$
```

<https://www.wikihow.com/Ping-in-Linux#/Image:Ping-in-Linux-Step-2-Version-3.jpg>

<https://monovm.com/post/33/how-to-ping-in-centos>

<https://m.wikihow.com/Ping-in-Linux>