



Computer Network 1

Lab 2

Network tools in Windows and Linux

Student Name: Le Huy Hoang.....

Student No.: 1652212.....

I. Objectives

- Know how to configure TCP/IP in Microsoft Windows and Linux operating systems.
- Know common networking tools.

II. Contents

1. Configuration of TCP/IP in Microsoft Windows

1. Configuration parameters of TCP/IP

- Use ipconfig to look for TCP/IP configuration details
- There are commonly two Adapters (Network Interface Card and PPP)
- Note down configuration of Network Interface Card:

IP Address: 192.168.0.163.....Subnet Mask: 255.255.255.0.....

Default Gateway: 192.168.0.1.....DNS Server: 192.168.0.1 (tenda access point).....

2. Configure TCP/IP: automatic IP or manual

- Start -> Settings -> Control Panel -> Network Connections -> Local Area Connection -> Properties -> Internet Protocol (TCP/IP) -> Properties

2. Configuration of TCP/IP in Linux

- Look into the network configuration file
/etc/sysconfig/networking/devices/ifcfg-eth0. Information in file /etc/sysconfig/networking/devices/ifcfg-eth0 is used to configure TCP/IP parameters for the first NIC.
- If there is any change about TCP/IP configuration, change the configuration parameters in /etc/sysconfig/ifcfg-ethx, the, use the following command to restart network service:

```
# service network restart
```

3. Learn basic network commands

1. *ipconfig* (*ifconfig* in Linux/UNIX)

- System administrator uses this command to examine TCP/IP configuration parameters and also to configure parameters for network interfaces:
- Detail basic syntax of *ipconfig/ifconfig*:

```
$ ifconfig -h
Usage:
ifconfig [-a] [-v] [-s] <interface> [[<AF>] <address>]
[add <address>[/<prefixlen>]]
[del <address>[/<prefixlen>]]
[[-]broadcast [<address>]] [[-]pointopoint [<address>]]
[netmask <address>] [dstaddr <address>] [tunnel <address>]
[outfill <NN>] [keepalive <NN>]
[hw <HW> <address>] [mtu <NN>]
[[-]trailers] [[-]arp] [[-]allmulti]
[multicast] [[-]promisc]
[mem_start <NN>] [io_addr <NN>] [irq <NN>] [media <type>]
[txqueuelen <NN>]
[[-]dynamic]
[up|down] ...

<HW>=Hardware Type.
List of possible hardware types:
loop (Local Loopback) slip (Serial Line IP) cslip (VJ Serial Line IP)
slip6 (6-bit Serial Line IP) cslip6 (VJ 6-bit Serial Line IP) adaptive (Adaptive Serial Line IP)
ash (Ash) ether (Ethernet) ax25 (AMPR AX.25)
netrom (AMPR NET/ROM) rose (AMPR ROSE) tunnel (IPIP Tunnel)
ppp (Point-to-Point Protocol) hdlc ((Cisco)-HDLC) lapb (LAPB)
arcnet (ARCnet) dlii (Frame Relay DLCI) frad (Frame Relay Access Device)
```

2. *netstat*

- This command is used to examine information about network connections of the computer and TCP/IP protocols.
- Provide the result when run the command “**netstat -a**”

```
$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 localhost:ipps          0.0.0.0:*               LISTEN
tcp        0      0 tommy.local:36234       server-13-35-12-5:https ESTABLISHED
tcp        0      0 tommy.local:60148       sc-in-f97.1e100.n:https ESTABLISHED
tcp        0      0 tommy.local:37992       static.vnpt.vn:https    ESTABLISHED
tcp        0      0 tommy.local:58136       ec2-52-33-134-128:https ESTABLISHED
tcp        0      0 tommy.local:53842       static.vnpt.vn:https    ESTABLISHED
tcp        0      0 tommy.local:43576       edge-star-shv-02-:https ESTABLISHED
tcp        0      0 tommy.local:52746       server-13-35-8-12:https ESTABLISHED
tcp        0      0 tommy.local:43914       static.vnpt.vn:www-http TIME_WAIT
tcp        0      0 tommy.local:43614       edge-star-shv-02-:https ESTABLISHED
tcp        0      0 tommy.local:34116       sc-in-f138.1e100.:https ESTABLISHED
tcp        0      0 tommy.local:43832       static.vnpt.vn:www-http TIME_WAIT
tcp        0      0 tommy.local:51786       172.217.194.95:https    ESTABLISHED
tcp        0      0 tommy.local:43830       static.vnpt.vn:www-http TIME_WAIT
tcp        0      0 tommy.local:45528       edge-star-shv-02-:https ESTABLISHED
tcp        0      0 tommy.local:39310       74.125.24.138:https     TIME_WAIT
tcp        0      0 tommy.local:43944       static.vnpt.vn:www-http TIME_WAIT
tcp        0      0 tommy.local:37998       static.vnpt.vn:https     ESTABLISHED
tcp        0      0 tommy.local:41064       ec2-34-251-59-153:https ESTABLISHED
tcp        0      0 tommy.local:38076       static.vnpt.vn:https     ESTABLISHED
tcp        0      0 tommy.local:46012       151.101.1.2:https       ESTABLISHED
```

3. **tracert** (traceroute in Linux/UNIX)

- This command is used to trace a route to a computer in the network. It is usually used to investigate network connections when problems happen.
- Provide the result when run: “**tracert www.google.com**”

```
$ tracert www.google.com
tracert to www.google.com (172.217.194.147), 30 hops max, 60 byte packets
 1  _gateway (192.168.0.1)  1.379 ms  1.683 ms  4.001 ms
 2  192.168.1.1 (192.168.1.1)  4.586 ms  4.963 ms  4.954 ms
 3  125.235.249.190.adsl.viettel.vn (125.235.249.190)  5.780 ms  6.069 ms  6.921 ms
 4  125.235.249.213.adsl.viettel.vn (125.235.249.213)  6.599 ms  7.148 ms  7.266 ms
 5  localhost (27.68.237.129)  28.515 ms localhost (27.68.237.185)  32.212 ms 32.413 ms
 6  localhost (27.68.250.170)  26.453 ms 22.151 ms localhost (27.68.250.230)  21.919 ms
 7  108.170.240.241 (108.170.240.241)  22.644 ms 74.125.242.35 (74.125.242.35)  22.230 ms *
 8  209.85.242.200 (209.85.242.200)  25.465 ms 25.534 ms 72.14.234.176 (72.14.234.176)  22.849 ms
 9  209.85.253.230 (209.85.253.230)  24.415 ms 108.170.240.241 (108.170.240.241)  23.766 ms 108.170.240.164 (
108.170.240.164)  24.678 ms
10  108.170.231.23 (108.170.231.23)  26.121 ms 209.85.246.55 (209.85.246.55)  25.810 ms 209.85.246.17 (209.85
.246.17)  27.131 ms
11  * 108.170.230.73 (108.170.230.73)  29.830 ms 74.125.253.62 (74.125.253.62)  26.249 ms
12  72.14.238.89 (72.14.238.89)  23.053 ms 74.125.37.235 (74.125.37.235)  23.206 ms 209.85.246.19 (209.85.246.19)  24.369 ms
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * 172.217.194.147 (172.217.194.147)  52.503 ms
```

4. **route**

- Route command is used to examine, add or remove a route in routing table of a computer.
- Provide the result when run “**route PRINT**”

```
$ route PRINT
Usage: route [-nNvee] [-FC] [<AF>]          List kernel routing tables
       route [-v] [-FC] {add|del|flush} ...  Modify routing table for AF.

       route {-h|--help} [<AF>]             Detailed usage syntax for specified AF.
       route {-V|--version}                 Display version/author and exit.

       -v, --verbose                        be verbose
       -n, --numeric                        don't resolve names
       -e, --extend                         display other/more information
       -F, --fib                           display Forwarding Information Base (default)
       -C, --cache                         display routing cache instead of FIB

<AF>=Use -4, -6, '-A <af>' or '--<af>'; default: inet
List of possible address families (which support routing):
  inet (DARPA Internet) inet6 (IPv6) ax25 (AMPR AX.25)
  netrom (AMPR NET/ROM) ipx (Novell IPX) ddp (Appletalk DDP)
  x25 (CCITT X.25)
```

5. **ping**

- Ping command is used to check if a host in the network is reachable:
- Provide the result when run “**ping www.cse.hcmut.edu.vn**”



```
$ ping www.cse.hcmut.edu.vn
PING server.cse.hcmut.edu.vn (221.133.13.113) 56(84) bytes of data.
^C
--- server.cse.hcmut.edu.vn ping statistics ---
72 packets transmitted, 0 received, 100% packet loss, time 1025ms
```

6. *nslookup*

- nslookup command is used to interact with Domain Name Systems.
- Use nslookup to get IP address of www.vnn.vn (nslookup www.vnn.vn):
- Get IP address of Mail eXchange domain hotmail.com (nslookup -type=MX hotmail.com)

```
$ nslookup -type=MX outlook.com
Server:          192.168.0.1
Address:         192.168.0.1#53

Non-authoritative answer:
outlook.com      mail exchanger = 5 outlook-com.olc.protection.outlook.com.

Authoritative answers can be found from:

~ 12:02:05
$ nslookup -type=MX gmail.com
Server:          192.168.0.1
Address:         192.168.0.1#53













Non-authoritative answer:
gmail.com        mail exchanger = 30 alt3.gmail-smtp-in.l.google.com.
gmail.com        mail exchanger = 5 gmail-smtp-in.l.google.com.
gmail.com        mail exchanger = 20 alt2.gmail-smtp-in.l.google.com.
gmail.com        mail exchanger = 10 alt1.gmail-smtp-in.l.google.com.
gmail.com        mail exchanger = 40 alt4.gmail-smtp-in.l.google.com.

Authoritative answers can be found from:
```

7. **SSH** (Secure Shell) Client

- SSH client is used for login securely to a remote server.
- Use Google to search for common SSH client on available on the web.



| BEST SSH CLIENTS FOR LINUX | | PRICE | LAST UPDATED | < > | |
|----------------------------|---|----------------------------------|--------------|--------------|--|
| 92 |  | OpenSSH | FREE | Mar 4, 2019 | |
| -- |  | MobaXterm | \$70 | Feb 11, 2019 | |
| -- |  | PuTTY | FREE | Dec 29, 2018 | |
| -- |  | SecureCRT® for Linux | \$99.00 | Feb 11, 2019 | |
| -- |  | Shell NGN - Web Based SSH Client | FREE | Dec 22, 2018 | |
| -- |  | kitty | FREE | Feb 26, 2019 | |
| -- |  | PAC Manager | FREE | Jan 21, 2019 | |
| -- |  | Tectia SSH Client | \$149 | Jan 12, 2019 | |
| -- |  | FireSSH | FREE | Jan 5, 2019 | |
| -- |  | Butterfly | FREE | Apr 26, 2018 | |
| -- |  | lsh | FREE | Dec 10, 2017 | |
| -- |  | Chromium hterm (Secure Shell) | FREE | Dec 10, 2017 | |