LAB 3

Using basic Linux and Networking commands

Objectives:

- To understand the basic Networking commands

Apparatus:

Linux or Windows OS, terminal

Using Ifconfig

Ifconfig is used to configure the kernel-resident network interfaces. It is used at boot time to set up interfaces as necessary. After that, it is usually only needed when debugging or when system tuning is needed.

Example:

```
basanta@machine:~ $ ifconfig
br-2649fce8e0af: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 172.18.0.1  netmask 255.255.0.0  broadcast 172.18.255.255
        ether 02:42:e1:06:05:97  txqueuelen 0  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

br-9f7526635f7a: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 172.19.0.1  netmask 255.255.0.0  broadcast 172.19.255.255
        ether 02:42:da:ef:3c:46  txqueuelen 0  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

docker0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 172.17.0.1  netmask 255.255.0.0  broadcast 172.17.255.255
        ether 02:42:90:5f:9b:de  txqueuelen 0  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

enp2s0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        ether 10:62:e5:58:6e:01  txqueuelen 1000  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        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 2192  bytes 252051 (252.0 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 2192  bytes 252051 (252.0 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

wlp3s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.1.71  netmask 255.255.255.0  broadcast 192.168.1.255
        inet6 fe80::ebf:eb6f:24f9:f100  prefixlen 64  scopeid 0x20<link>
        inet6 2400:1a00:b020:441b:627f:947:126c:9251  prefixlen 64  scopeid 0x0<global>
        inet6 2400:1a00:b020:441b:d68f:8c24:b3e5:9547  prefixlen 64  scopeid 0x0<global>
        ether 90:32:4b:55:31:cb  txqueuelen 1000  (Ethernet)
        RX packets 474123  bytes 587649830 (587.6 MB)
        RX errors 0  dropped 181  overruns 0  frame 0
        TX packets 95920  bytes 25123049 (25.1 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Using ping

Ping is used to get an echo response from the host or gateway.

Example:

```
basanta@machine:~ ϕ ping google.com
PING google.com(bom12s14-in-x0e.1e100.net (2404:6800:4009:827::200e)) 56 data bytes
64 bytes from bom12s14-in-x0e.1e100.net (2404:6800:4009:827::200e): icmp_seq=1 ttl=113 time=92.0 ms
64 bytes from bom12s14-in-x0e.1e100.net (2404:6800:4009:827::200e): icmp_seq=2 ttl=113 time=114 ms
64 bytes from bom12s14-in-x0e.1e100.net (2404:6800:4009:827::200e): icmp_seq=3 ttl=113 time=55.3 ms
64 bytes from bom12s14-in-x0e.1e100.net (2404:6800:4009:827::200e): icmp_seq=4 ttl=113 time=57.5 ms
64 bytes from bom12s14-in-x0e.1e100.net (2404:6800:4009:827::200e): icmp_seq=5 ttl=113 time=79.1 ms
64 bytes from bom12s14-in-x0e.1e100.net (2404:6800:4009:827::200e): icmp_seq=6 ttl=113 time=101 ms
64 bytes from bom12s14-in-x0e.1e100.net (2404:6800:4009:827::200e): icmp_seq=7 ttl=113 time=123 ms
64 bytes from bom12s14-in-x0e.1e100.net (2404:6800:4009:827::200e): icmp_seq=8 ttl=113 time=146 ms
64 bytes from bom12s14-in-x0e.1e100.net (2404:6800:4009:827::200e): icmp_seq=9 ttl=113 time=56.2 ms
64 bytes from bom12s14-in-x0e.1e100.net (2404:6800:4009:827::200e): icmp_seq=10 ttl=113 time=57.6 ms
^C
--- google.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9015ms
rtt min/avg/max/mdev = 55.331/88.183/145.773/30.746 ms
```

Using hostname

Shows the system hostname.

Example:

```
basanta@machine:~ ϕ hostname
machine
basanta@machine:~ ϕ
```

Using nslookup

nslookup is a program to query Internet domain name servers. nslookup has two modes: interactive and non-interactive. Interactive mode allows the user to query name servers for information about various hosts and domains or to print a list of

hosts in a domain. Non-interactive mode prints just the name and requested information for a host or domain.

```
basanta@machine:~ ϕ nslookup
> www.google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   www.google.com
Address: 142.250.67.196
Name:   www.google.com
Address: 2404:6800:4009:813::2004
>
```

```
basanta@machine:~ ϕ nslookup
> set type=ns
> google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
google.com      nameserver = ns2.google.com.
google.com      nameserver = ns1.google.com.
google.com      nameserver = ns4.google.com.
google.com      nameserver = ns3.google.com.

Authoritative answers can be found from:
ns2.google.com  internet address = 216.239.34.10
ns2.google.com  has AAAA address 2001:4860:4802:34::a
ns1.google.com  internet address = 216.239.32.10
ns1.google.com  has AAAA address 2001:4860:4802:32::a
ns4.google.com  internet address = 216.239.38.10
ns4.google.com  has AAAA address 2001:4860:4802:38::a
ns3.google.com  internet address = 216.239.36.10
ns3.google.com  has AAAA address 2001:4860:4802:36::a
```

Using route

Route manipulates the kernel's IP routing tables. Its primary use is to set up static routes to specific hosts or networks via an interface after it has been configured with the ifconfig(8) program.

When the add or del options are used, route modifies the routing tables. Without these options, route displays the current contents of the routing tables.

```
basanta@machine:~ $ route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         192.168.1.254   0.0.0.0         UG    600    0        0 wlp3s0
169.254.0.0     0.0.0.0         255.255.0.0     U     1000   0        0 wlp3s0
172.17.0.0      0.0.0.0         255.255.0.0     U     0      0        0 docker0
172.18.0.0      0.0.0.0         255.255.0.0     U     0      0        0 br-2649fce8e0af
172.19.0.0      0.0.0.0         255.255.0.0     U     0      0        0 br-9f7526635f7a
192.168.1.0     0.0.0.0         255.255.255.0   U     600    0        0 wlp3s0
basanta@machine:~ $ route -v
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         _gateway        0.0.0.0         UG    600    0        0 wlp3s0
link-local      0.0.0.0         255.255.0.0     U     1000   0        0 wlp3s0
172.17.0.0      0.0.0.0         255.255.0.0     U     0      0        0 docker0
172.18.0.0      0.0.0.0         255.255.0.0     U     0      0        0 br-2649fce8e0af
172.19.0.0      0.0.0.0         255.255.0.0     U     0      0        0 br-9f7526635f7a
192.168.1.0     0.0.0.0         255.255.255.0   U     600    0        0 wlp3s0
```