

EE673 – Lab

Host connectivity: Configuration and Testing

Objective:

- Network Configuration and testing on linux system

After you have booted your system and logged in as guest, open a terminal window.

NOTE:

1. The commands to be typed in the terminal window are in this font
2. Your reference document for the testbed ip and topology diagram are on brihaspati

ifconfig – understand ifconfig and configure a network interface

% ifconfig / netstat -ie (shows output similar to)

```
eth0   Link encap:Ethernet HWaddr 70:71:bc:9a:78:05
inet addr:172.26.82.77 Bcast:172.26.83.255 Mask:255.255.252.0
inet6 addr: 2001:e30:1401:1:7271:bcff:fe9a:7805/64 Scope:Global
inet6 addr: fe80::7271:bcff:fe9a:7805/64 Scope:Link
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:17072 errors:0 dropped:171 overruns:0 frame:0
TX packets:4450 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:1000
RX bytes:4790614 (4.7 MB) TX bytes:1551500 (1.5 MB)
Interrupt:20 Memory:fb100000-fb120000
```

Link encap: Link encapsulation
eth0: Interface Ethernet 0
Hwaddr: Hardware (MAC) Address
inet addr: Internet Address (IPv4)
Bcast: Broadcast Address
Mask: mask

```
lo     Link encap:Local Loopback
inet addr:127.0.0.1 Mask:255.0.0.0
inet6 addr: ::1/128 Scope:Host
UP LOOPBACK RUNNING MTU:16436 Metric:1
RX packets:28 errors:0 dropped:0 overruns:0 frame:0
TX packets:28 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:1680 (1.6 KB) TX bytes:1680 (1.6 KB)
```

Will also show unconfigured
eth1,eth2,eth3,eth4,eth5

lo: Loopback interface

netstat - Print network connections, routing tables, interface statistics, masquerade connections, and multicast memberships

% netstat -r / netstat -rn (shows ouput similar to)
Kernel IP routing table

Destination	Gateway	Genmask	Flags	MSS Window	irtt	Iface
172.26.80.0	*	255.255.252.0	U	0 0	0	eth0
link-local	*	255.255.0.0	U	0 0	0	eth0
default	172.26.83.254	0.0.0.0	UG	0 0	0	eth0

Destination: Destination network / host	Gateway: router address
Genmask: netmask for destination net	MSS: Default TCP maximum segment size
window: TCP Window size	irtt: initial round trip time
Iface: Interface to which packets for this routewill be sent	Link-local: address block 169.254.0.0/16
Default: If destination address is not on this network (172.26.80.0)/ link-local, use default gateway	

Flags :

Possible flags include

U (route is **up**)

H (target is a **host**)

G (use **gateway**)

R (**reinstate** route for dynamic routing)

D (**dynamically** installed by daemon or redirect)

M (**modified** from routing daemon or redirect)

A (installed by **addrconf**)

C (**cache** entry)

! (**reject** route)

ping: send ICMP ECHO_REQUEST to network hosts

`% ping <default gateway>` (If default gateway is reachable, shows output similar to)

```
PING 172.26.83.254 (172.26.83.254) 56(84) bytes of data.  
64 bytes from 172.26.83.254: icmp_req=1 ttl=255 time=1.32 ms  
64 bytes from 172.26.83.254: icmp_req=2 ttl=255 time=1.19 ms  
64 bytes from 172.26.83.254: icmp_req=3 ttl=255 time=0.554 ms  
64 bytes from 172.26.83.254: icmp_req=4 ttl=255 time=2.07 ms
```

arp: address resolution display and control

`% arp -an` (shows all the IP and hardware addresses the interface has learnt through some broadcast)

Traceroute: Print the route packets trace to network host

```
% traceroute 172.26.83.251  
% traceroute 172.26.82.159  
% traceroute 172.31.1.1  
% traceroute www.iitk.ac.in
```

host: Name resolution

Use any of the commands learnt in lab-1 to see contents of /etc/resolv.conf.

```
% host -v FQDN
```

e.g. www.iitk.ac.in

understand the output of above command and contents of resolv.conf

route: show / manipulate the IP routing table

```
% route -n
```

Logging into the testbed:

```
% ssh root@<ipaddress> eth0 on testbed>
```

You would log into the testbed.

```
% screen
```

Press Ctrl+a+c to get a new window on the testbed. You can switch between the windows using ctrl+a <screen no>

These commands are to be run on the testbed.

Your reference documents are Testbed-ip.pdf and topology-1.pdf uploaded on Brihaspati.

Objective: Create a network with point to point links using appropriate ip addr and subnet

```
% ifconfig -a
```

Note the output.

See, which interfaces have been assigned IP, and which do not have an IP.

Use the above document to assign ip address to eth1, eth2 for the node you are logged into

Note- If you change ip for eth0, you will loose connectivity to the testbed.

```
% ifconfig <interface x> <ip>/<mask>
```

Objective: Check the routing table

```
% route -n
```

```
% arp -an
```

Objective:

Check that neighbors are reachable by ping < ip addr of neighbor >

```
% ping <ip>
```

Objective: setup routing

Set up static routing in forward and reverse directions

Enable intermediate nodes to act as router by setting ip_forward

(Path name is /proc/sys/net/ipv4/ip_forward)

```
% route add -net <network address> netmask <netmask> gw <gateway  
address>
```

Check the routing table. And connectivity

Objective: To bring an ethernet interface up/down

```
% ifconfig <ethx> down
```

Check the interface status

bring the interface up and see the interface status

Please note:

Understand the topology diagram, connectivity and the routing in the testbed. You will need to use this for the third experiment.