

Task 3: Networking Basics for DevOps

Objective

To understand basic networking concepts and analyze network configuration using Linux commands.

Tools Used

- Linux CLI

Experiments and Observations

Checking IP Address

The `ip a` command displays network interfaces and assigned IP addresses.

```
rutuja@ubuntu-virtualbox:~$ mkdir task-3-networking-basics
rutuja@ubuntu-virtualbox:~$ cd task-3-networking-basics
rutuja@ubuntu-virtualbox:~/task-3-networking-basics$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:f7:78:b5 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
        valid_lft 85720sec preferred_lft 85720sec
    inet6 fd17:625c:f037:2:6a2:4647:4a8c:83aa/64 scope global temporary dynamic
        valid_lft 86291sec preferred_lft 14291sec
    inet6 fd17:625c:f037:2:a00:27ff:fef7:78b5/64 scope global dynamic mngtmpaddr
        valid_lft 86291sec preferred_lft 14291sec
    inet6 fe80::a00:27ff:fe7:78b5/64 scope link
        valid_lft forever preferred_lft forever
```

Network Connectivity Test

Ping was used to test connectivity to Google DNS (8.8.8.8).

```
rutuja@ubuntu-virtualbox:~/task-3-networking-basics$ ping -c 4 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=255 time=241 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=255 time=149 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=255 time=170 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=255 time=191 ms

--- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3009ms
rtt min/avg/max/mdev = 148.941/187.581/240.800/34.063 ms
rutiua@ubuntu-virtualbox:~/task-3-networking-basics$
```

Open Ports and Services

The `ss` command was used to inspect open ports and services.

```
rutuja@ubuntu-virtualbox:~/task-3-networking-basics$ ss -tuIn
Netid      State      Recv-Q      Send-Q      Local Address:Port          Peer Address:Port      Process
udp        UNCONN     0           0           0.0.0.0:5353            0.0.0.0:*
udp        UNCONN     0           0           0.0.0.0:38278           0.0.0.0:*
udp        UNCONN     0           0           127.0.0.54:53            0.0.0.0:*
udp        UNCONN     0           0           127.0.0.53%lo:53          0.0.0.0:*
udp        UNCONN     0           0           [::]:5353               [::]:*
udp        UNCONN     0           0           [::]:48461              [::]:*
tcp        LISTEN    4096        0           127.0.0.1:631             0.0.0.0:*
tcp        LISTEN    4096        0           127.0.0.53%lo:53          0.0.0.0:*
tcp        LISTEN    511         0           0.0.0.0:80               0.0.0.0:*
tcp        LISTEN    4096        0           127.0.0.54:53            0.0.0.0:*
tcp        LISTEN    511         0           [::]:80                 [::]:*
tcp        LISTEN    4096        0           [::]:631                [::]:*
rutiua@ubuntu-virtualbox:~/task-3-networking-basics$
```

DNS Resolution

DNS resolution was tested using nslookup/dig.

```
rutuja@ubuntu-virtualbox:~/task-3-networking-basics$ nslookup google.com
Server:      127.0.0.53
Address:      127.0.0.53#53

Non-authoritative answer:
Name:    google.com
Address: 142.251.43.14
Name:    google.com
Address: 2404:6800:4009:826::200e

rutiua@ubuntu-virtualbox:~/task-3-networking-basics$
```

Network Path Tracing

Traceroute was used to identify the network path to a destination.

```
rutuja@ubuntu-virtualbox:~/task-3-networking-basics$ traceroute google.com
Command 'traceroute' not found, but can be installed with:
sudo apt install inetutils-traceroute # version 2:2.4-3ubuntu1, or
sudo apt install traceroute          # version 1:2.1.5-1
rutiua@ubuntu-virtualbox:~/task-3-networking-basics$
```

Simulating Network Failure

Network failure can be simulated by disabling a network interface using the `ip link set <interface> down` command.