

DEVOPS INTERNSHIP – TASK 3

Networking Basics for DevOps

Tools Used

- **Primary:** Linux CLI (Ubuntu / WSL)
 - **Alternatives:** Windows CMD, PowerShell
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Objective

The objective of this task is to understand basic networking concepts used in DevOps, including IP addressing, connectivity testing, port inspection, DNS resolution, network path tracing, and simulating network failures using command-line tools.

System Details

- **Operating System:** Ubuntu (WSL) / Linux
 - **Shell:** Bash
 - **Network Interface:** Ethernet / Wi-Fi
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Task Activities & Observations

1. IP Addressing & Network Interfaces

Command Used:

`ip a`

(Alternative)

`Ifconfig`

```
Need to get 204 kB of archives.  
After this operation, 811 kB of additional disk space will be used.  
Get:1 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 net-tools amd64 2.10-0.1ubuntu4.4 [204 kB]  
Fetched 204 kB in 2s (131 kB/s)  
Selecting previously unselected package net-tools.  
(Reading database ... 40754 files and directories currently installed.)  
Preparing to unpack .../net-tools_2.10-0.1ubuntu4.4_amd64.deb ...  
Unpacking net-tools (2.10-0.1ubuntu4.4) ...  
Setting up net-tools (2.10-0.1ubuntu4.4) ...  
Processing triggers for man-db (2.12.0-4build2) ...  
romioontrack@Shashi:~$ ifconfig  
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1492  
    inet 172.22.76.241 netmask 255.255.240.0 broadcast 172.22.79.255  
    inet6 fe80::215:5dff:fea5:ddaf prefixlen 64 scopeid 0x20<link>  
    ether 00:15:5d:a5:dd:af txqueuelen 1000 (Ethernet)  
    RX packets 289 bytes 246289 (246.2 KB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 132 bytes 10729 (10.7 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 22 bytes 2734 (2.7 KB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 22 bytes 2734 (2.7 KB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
romioontrack@Shashi:~$
```

Observation:

- Displayed all network interfaces such as eth0, lo, and wlan0.
- Identified IPv4 address, subnet mask, and MAC address.

2. Connectivity Testing (Ping)

Command Used:

ping 8.8.8.8

```
romioontrack@Shashi:~$ ping 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=117 time=54.9 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=117 time=47.5 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=117 time=81.6 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=117 time=70.4 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=117 time=53.1 ms
64 bytes from 8.8.8.8: icmp_seq=7 ttl=117 time=49.0 ms
64 bytes from 8.8.8.8: icmp_seq=8 ttl=117 time=49.4 ms
64 bytes from 8.8.8.8: icmp_seq=9 ttl=117 time=56.1 ms
64 bytes from 8.8.8.8: icmp_seq=10 ttl=117 time=52.5 ms
64 bytes from 8.8.8.8: icmp_seq=11 ttl=117 time=52.7 ms
64 bytes from 8.8.8.8: icmp_seq=12 ttl=117 time=52.0 ms
64 bytes from 8.8.8.8: icmp_seq=13 ttl=117 time=48.8 ms
64 bytes from 8.8.8.8: icmp_seq=14 ttl=117 time=49.8 ms
64 bytes from 8.8.8.8: icmp_seq=15 ttl=117 time=47.4 ms
64 bytes from 8.8.8.8: icmp_seq=16 ttl=117 time=51.2 ms
64 bytes from 8.8.8.8: icmp_seq=17 ttl=117 time=49.0 ms
64 bytes from 8.8.8.8: icmp_seq=18 ttl=117 time=49.7 ms
64 bytes from 8.8.8.8: icmp_seq=19 ttl=117 time=51.7 ms
64 bytes from 8.8.8.8: icmp_seq=20 ttl=117 time=50.9 ms
64 bytes from 8.8.8.8: icmp_seq=21 ttl=117 time=50.8 ms
64 bytes from 8.8.8.8: icmp_seq=22 ttl=117 time=51.1 ms
64 bytes from 8.8.8.8: icmp_seq=23 ttl=117 time=54.7 ms
64 bytes from 8.8.8.8: icmp_seq=24 ttl=117 time=48.3 ms
```

Observation:

- Successful replies confirmed internet connectivity.
- Measured packet loss and response time (latency).

3. Open Ports & Services

Command Used:

ss -tln

```
romioontrack@Shashi:~$ ss -tln
Netid      State      Recv-Q     Send-Q      Local Address:Port      Peer Address:Port      Process
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            10.255.255.254:53      0.0.0.0:*
udp        UNCONN     0           0            127.0.0.1:323         0.0.0.0:*
udp        UNCONN     0           0            [*:*]:323             [*:*]
tcp        LISTEN     0          4096         127.0.0.54:53           0.0.0.0:*
tcp        LISTEN     0          4096         127.0.0.53%lo:53       0.0.0.0:*
tcp        LISTEN     0          1024        10.255.255.254:53      0.0.0.0:*
```

Observation:

- Listed listening TCP/UDP ports.
- Identified services running on specific ports (e.g., SSH on port 22).

4. DNS Resolution

Commands Used:

nslookup google.com

```
romioontrack@Shashi:~$ nslookup google.com 8.8.8.8
Server:                8.8.8.8
Address:                8.8.8.8#53

Non-authoritative answer:
Name:   google.com
Address: 142.251.221.110
Name:   google.com
Address: 2404:6800:4007:817::200e
```

dig google.com

```
romioontrack@Shashi:~$ dig google.com

; <<>> DiG 9.18.39-0ubuntu0.24.04.2-Ubuntu <<>> google.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 62710
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;google.com.                IN      A

;; ANSWER SECTION:
google.com.                197     IN      A      142.250.206.14

;; Query time: 30 msec
;; SERVER: 10.255.255.254#53(10.255.255.254) (UDP)
;; WHEN: Mon Jan 19 23:52:31 UTC 2026
;; MSG SIZE rcvd: 55
```

Observation:

- Converted domain names into IP addresses.
- Verified DNS server response and query time.

5. Network Path Tracing

Command Used:

tracert google.com

```
romioontrack@Shashi:~$ tracert google.com
tracert to google.com (142.250.206.14), 30 hops max, 60 byte packets
 1 Shashi.mshome.net (172.22.64.1)  0.483 ms  0.460 ms  0.449 ms
 2 192.168.1.1 (192.168.1.1)  8.636 ms  8.592 ms  8.520 ms
 3 10.240.12.100 (10.240.12.100)  17.969 ms  17.958 ms  17.911 ms
 4 * * *
 5 128.185.73.117 (128.185.73.117)  17.852 ms  17.487 ms  17.452 ms
 6 116.119.161.149 (116.119.161.149)  62.358 ms * *
 7 * * *
 8 * * *
 9 pmaaa-ax-in-f14.1e100.net (142.250.206.14)  137.526 ms 142.250.235.106 (142.250.235.106)  137.623 ms 216.239.59.170 (216.239.59.170)  137.729 ms
```

Observation:

- Displayed the route taken by packets across multiple network hops.
 - Helped identify latency at each hop.
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6. Simulating Network Failure

Command Used:

sudo ip link set eth0 down

```
romioontrack@Shashi:~$ sudo ip link set eth0 down
```

(To enable back)

sudo ip link set eth0 up

```
romioontrack@Shashi:~$ sudo ip link set eth0 up
```

Observation:

- Network connectivity was lost when the interface was disabled.
 - Restored connectivity after enabling the interface.
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Key Learnings

- Understood how IP addressing works in Linux systems.
 - Learned to troubleshoot connectivity issues using ping and traceroute.
 - Gained experience inspecting running services and open ports.
 - Learned DNS resolution and its importance in networking.
 - Practiced simulating and recovering from network failures.
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Deliverables

- Network analysis report
- Command outputs with observations

- Understanding of basic networking tools
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Final Outcome

After completing this task, the intern understands how systems communicate over networks, how to troubleshoot connectivity issues, and how networking concepts are applied in DevOps environments.

Conclusion

This task provided hands-on experience with essential networking commands used in DevOps. These skills are critical for diagnosing network issues, managing servers, and ensuring reliable application deployments.

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Role: DevOps Intern

Task: Networking Basics for DevOps