Linux Project: Network Diagnostic Report

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1. **Create a Network Diagnostic Report File**

   ```
   touch network_diagnostic_report.txt
   ```

   The `ls` command will show the file if it exists

   ```
   echo "--- Network Configuration ---" >>
   ~/network_diagnostic_report.txt
   ```

2. **Check Network Configuration**

   ```
   ip a >> network_diagnostic_report.txt
   ```

   Confirm the content of file using `cat` command

   ```
   cat network_diagnostic_report.txt
   ```

```
--- Network Configuration ---
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
    inet 10.255.255.254/32 brd 10.255.255.254 scope global lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:f4:a3:78 brd ff:ff:ff:ff:ff:ff
    inet 172.26.251.191/20 brd 172.26.255.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fef4:a378/64 scope link
       valid_lft forever preferred_lft forever
```

3. **Verify Routing Table**

   ```
   echo "--- Routing Table ---" >> network_diagnostic_report.txt
   ```

   ```
   ip route >> network_diagnostic_report.txt
   ```

```
--- Routing Table ---
default via 172.26.240.1 dev eth0 proto kernel
172.26.240.0/20 dev eth0 proto kernel scope link src 172.26.251.191
```

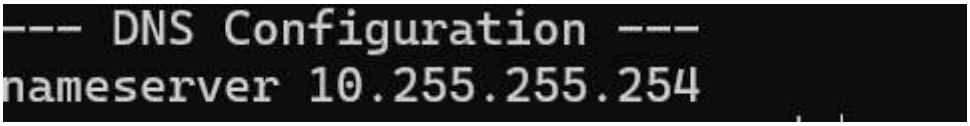
4. **Check DNS Configuration**

   ```
   echo "--- DNS Configuration ---" >>
   network_diagnostic_report.txt
   ```

```
cat /etc/resolv.conf | tail -1 >>
network_diagnostic_report.txt
```

- /etc/resolv.conf file contains DNS (Domain Name System) configuration

The Project is done on windows using **WSL**(Windows Subsystem for Linux) so there was some extra information hence `tail -1`

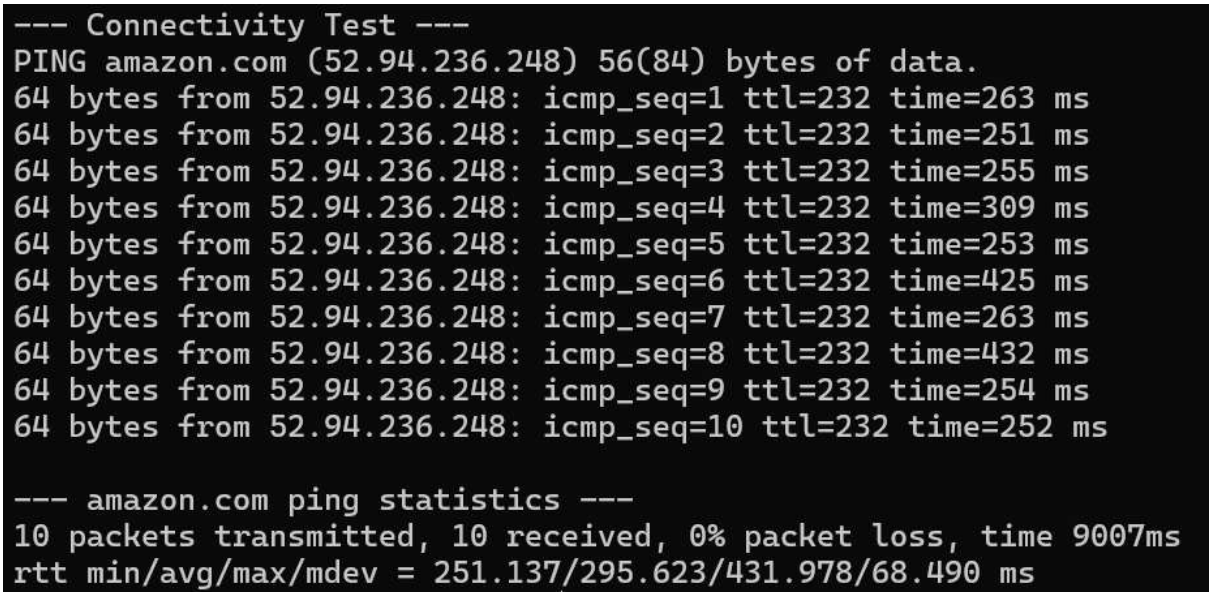


5. **Test Internet Connectivity**

```
echo "--- Connectivity Test ---" >>
network_diagnostic_report.txt

ping -c 10 amazon.com >> network_diagnostic_report.txt
```

- Sends 10 test packets to amazon.com



6. **Examine Open Ports and Services**

```
echo "--- Open Ports ---" >> network_diagnostic_report.txt

netstat -tuln | head -20 >> network_diagnostic_report.txt
```

- **netstat** - Network statistics tool
- **-t** - Show TCP connections
- **-u** - Show UDP connections
- **-l** - Show only listening sockets (services waiting for connections)
- **-n** - Show numerical addresses (don't resolve names - faster)

```
--- Open Ports ---
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 10.255.255.254:53       0.0.0.0:*               LISTEN
tcp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN
tcp        0      0 127.0.0.54:53           0.0.0.0:*               LISTEN
udp        0      0 127.0.0.54:53           0.0.0.0:*
udp        0      0 127.0.0.53:53           0.0.0.0:*
udp        0      0 10.255.255.254:53       0.0.0.0:*
udp        0      0 127.0.0.1:323           0.0.0.0:*
udp6       0      0 ::1:323                 :::*
```

7. **Examine Open Ports and Services**

```
echo "--- DNS Resolution ---" >> network_diagnostic_report.txt

nslookup amazon.com >> network_diagnostic_report.txt
```

```
--- DNS Resolution ---
Server:         10.255.255.254
Address:        10.255.255.254#53

Non-authoritative answer:
Name:   amazon.com
Address: 205.251.242.103
Name:   amazon.com
Address: 52.94.236.248
Name:   amazon.com
Address: 54.239.28.85
```

8. **Check Network Socket Statistics**

```
echo "--- Network Statistics ---"
>>network_diagnostic_report.txt

ss -s >> network_diagnostic_report.txt
```

```
--- Network Statistics ---
Total: 209
TCP:   3 (estab 0, closed 0, orphaned 0, timewait 0)

Transport Total     IP        IPv6
RAW       0         0         0
UDP       5         4         1
TCP       3         3         0
INET      8         7         1
FRAG      0         0         0
```

9. **Review Final Report**

   `cat ~/network_diagnostic_report.txt`

   The Final Report is attached with this file.

Challenge & Resolution

Challenge: `netstat` command not found

Cause: Not installed by default

Solution: Install netstat using `sudo apt install net-tools`, re-ran the `netstat` test, and confirmed success

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Challenge: `nslookup` command not found

Cause: Not installed by default

Solution: Install nslookup using `sudo apt install dnsutils`, re-ran the `nslookup` test, and confirmed success