
# Shri G.S Institute of Technology & Science

## Computer Networks

## Assignment 3 – INDEX

Networking Commands

1) ping google.com | head -> The ping google.com command sends ICMP echo requests to Google's server to check network connectivity and measure response time. It helps diagnose internet connection issues and network latency.

```
with root in ~ …
➜ ping google.com | head
PING google.com (142.250.192.46) 56(84) bytes of data.
64 bytes from bom12s15-in-f14.1e100.net (142.250.192.46): icmp_seq=1 ttl=52 time=81.9 ms
64 bytes from bom12s15-in-f14.1e100.net (142.250.192.46): icmp_seq=2 ttl=52 time=74.4 ms
64 bytes from bom12s15-in-f14.1e100.net (142.250.192.46): icmp_seq=3 ttl=52 time=101 ms
64 bytes from bom12s15-in-f14.1e100.net (142.250.192.46): icmp_seq=4 ttl=52 time=72.0 ms
64 bytes from bom12s15-in-f14.1e100.net (142.250.192.46): icmp_seq=5 ttl=52 time=91.1 ms
64 bytes from bom12s15-in-f14.1e100.net (142.250.192.46): icmp_seq=6 ttl=52 time=87.7 ms
64 bytes from bom12s15-in-f14.1e100.net (142.250.192.46): icmp_seq=7 ttl=52 time=75.8 ms
64 bytes from bom12s15-in-f14.1e100.net (142.250.192.46): icmp_seq=8 ttl=52 time=61.8 ms
64 bytes from bom12s15-in-f14.1e100.net (142.250.192.46): icmp_seq=9 ttl=52 time=86.7 ms
```

2) ip address -> The ip address command (or ip addr) displays information about the system's network interfaces, including assigned IP addresses. It is used to check and configure network settings.

```
with root in ~ …
➜ ip address
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 1400 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:7a:e2:78 brd ff:ff:ff:ff:ff:ff
    inet 172.25.225.191/20 brd 172.25.239.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe7a:e278/64 scope link
       valid_lft forever preferred_lft forever
```

3) traceroute google.com | head -> The traceroute google.com command shows the path packets take to reach Google's server, listing all intermediate hops. It helps diagnose network routing issues and latency at different points.

```
with root in ~ …
➜ traceroute google.com | head
traceroute to google.com (142.250.70.46), 30 hops max, 60 byte packets
 1  Pookie.mshome.net (172.25.224.1)  0.383 ms  0.359 ms  0.346 ms
 2  192.168.197.188 (192.168.197.188)  12.371 ms  12.358 ms *
 3  * * *
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  * * *
 9  * * *
```

4) mtr google.com -> The mtr command (My Traceroute) combines ping and traceroute, providing real-time network diagnostics. It continuously tracks packet loss and latency across each hop to the destination.

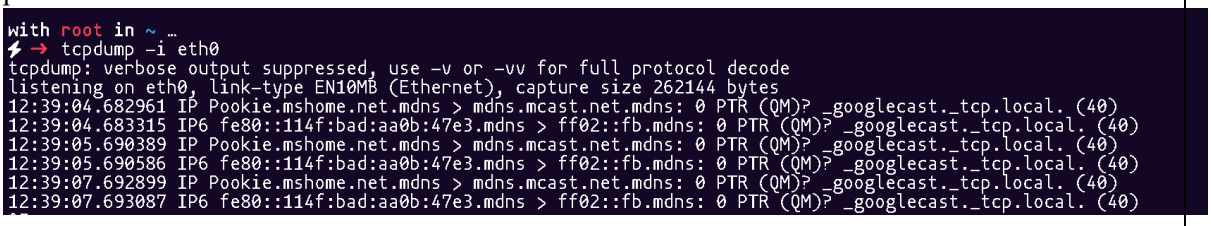
```
                                My traceroute  [v0.93]
Pookie (172.25.225.191)                                  2025-03-05T12:27:43+0530
Keys:  Help   Display mode   Restart statistics   Order of fields   quit
                                                 Packets               Pings
 Host                                          Loss%   Snt   Last   Avg  Best  Wrst StDev
 1. Pookie.mshome.net                           0.0%    42    0.7   0.6   0.3   0.9   0.2
 2. 192.168.197.188                             0.0%    42    7.4   9.8   4.7  41.2   7.2
 3. 192.0.0.1                                   0.0%    42    5.9  10.3   5.6  22.2   3.8
 4. (waiting for reply)
```

5) ufw status -> The ufw (Uncomplicated Firewall) command is a user-friendly interface for managing firewall rules in Linux. It allows users to enable, disable, and configure firewall settings easily.


6) curl -I google.com -> The curl command is used to transfer data from or to a server using various protocols like HTTP, HTTPS, and FTP. It is commonly used for API requests, downloading files, and testing network connections.


7) wget google.com -> The wget command is used to download files from the web using HTTP, HTTPS, and FTP protocols. It supports background downloading, resuming interrupted downloads, and mirroring websites.


8) tcpdump -i eth0 -> The tcpdump command is a packet analyzer that captures and displays network traffic in real-time. It helps diagnose network issues by filtering and analyzing packets based on various criteria.




9) hostname -> The hostname command displays or sets the system's hostname. It is useful for identifying the machine on a network or changing its network name.

```
with root in ~ took 2m 37.6s …
⚡ → hostname
Pookie
```

10) resolvectl status -> The resolvectl command is used to query and manage DNS resolution settings on Linux systems using systemd-resolved. It helps check domain resolution, set DNS servers, and troubleshoot network issues.

```
with root in ~ …
⚡ → resolvectl status
Global
       LLMNR setting: no
MulticastDNS setting: no
  DNSOverTLS setting: no
      DNSSEC setting: no
    DNSSEC supported: no
  Current DNS Server: 10.255.255.254
         DNS Servers: 10.255.255.254
          DNSSEC NTA: 10.in-addr.arpa
                      16.172.in-addr.arpa
                      168.192.in-addr.arpa
                      17.172.in-addr.arpa
                      18.172.in-addr.arpa
                      19.172.in-addr.arpa
                      20.172.in-addr.arpa
                      21.172.in-addr.arpa
                      22.172.in-addr.arpa
                      23.172.in-addr.arpa
                      24.172.in-addr.arpa
                      25.172.in-addr.arpa
                      26.172.in-addr.arpa
                      27.172.in-addr.arpa
                      28.172.in-addr.arpa
                      29.172.in-addr.arpa
                      30.172.in-addr.arpa
                      31.172.in-addr.arpa
```

11) dig google.com -> The dig (Domain Information Groper) command is used to query DNS servers for domain-related information, such as IP addresses and mail servers. It helps troubleshoot DNS resolution issues and analyze domain records.

```
with root in ~ …
⚡ → dig google.com

; <<>> DiG 9.18.30-0ubuntu0.20.04.2-Ubuntu <<>> google.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 40409
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1280
;; QUESTION SECTION:
;google.com.                    IN      A

;; ANSWER SECTION:
google.com.             71      IN      A       142.250.192.46

;; Query time: 79 msec
;; SERVER: 10.255.255.254#53(10.255.255.254) (UDP)
;; WHEN: Wed Mar 05 12:45:46 IST 2025
;; MSG SIZE  rcvd: 55
```

12) nsloopup google.com -> The nslookup command queries DNS servers to obtain domain name or IP address information. It is useful for diagnosing DNS resolution issues and verifying domain records.

```
with root in ~ …
⚡ ➜ nslookup google.com
Server:         10.255.255.254
Address:        10.255.255.254#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.192.46
Name:   google.com
Address: 2404:6800:4002:816::200e
```

13) ip route show -> The ip route command displays or manipulates the system's routing table, showing how network traffic is directed. It helps configure and troubleshoot network routes.

```
with root in ~ …
⚡ ➜ ip route show
default via 172.25.224.1 dev eth0 proto kernel
172.25.224.0/20 dev eth0 proto kernel scope link src 172.25.225.191
```

14) ethtool eth0 -> The ethtool command is used to display and modify network interface settings on Linux. It helps check link status, speed, duplex mode, and configure advanced network features.

```
with root in ~ …
⚡ ➜ ethtool eth0
Settings for eth0:
        Supported ports: [ ]
        Supported link modes:   Not reported
        Supported pause frame use: No
        Supports auto-negotiation: No
        Supported FEC modes: Not reported
        Advertised link modes:  Not reported
        Advertised pause frame use: No
        Advertised auto-negotiation: No
        Advertised FEC modes: Not reported
        Speed: 10000Mb/s
        Duplex: Full
        Port: Other
        PHYAD: 0
        Transceiver: internal
        Auto-negotiation: off
        Current message level: 0x000000f7 (247)
                               drv probe link ifdown ifup rx_err tx_err
        Link detected: yes
```

15) nload -> The nload command is a real-time network bandwidth monitoring tool that displays incoming and outgoing traffic. It helps analyze network usage with a graphical representation of data transfer rates.

```
Device eth0 [172.25.225.191] (1/2):
================================================================================
Incoming:

                                                  Curr: 0.00 Bit/s
                                                  Avg: 0.00 Bit/s
                                                  Min: 0.00 Bit/s
                                                  Max: 0.00 Bit/s
                                                  Ttl: 728.76 kByte
Outgoing:

                                                  Curr: 0.00 Bit/s
                                                  Avg: 0.00 Bit/s
                                                  Min: 0.00 Bit/s
                                                  Max: 0.00 Bit/s
                                                  Ttl: 239.38 kByte
```