

Task 3: Basic Networking Commands

1 ping — Test Network Connectivity

```
Administrator: C:\WINDOWS\system32\cmd.exe
Microsoft Windows [Version 10.0.26100.6899]
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C:\Windows\System32>ping /?

Usage: ping [-t] [-a] [-n count] [-l size] [-f] [-i TTL] [-v TOS]
          [-r count] [-s count] [[-j host-list] | [-k host-list]]
          [-w timeout] [-R] [-S srcaddr] [-c compartment] [-p]
          [-4] [-6] target_name

Options:
  -t          Ping the specified host until stopped.
              To see statistics and continue - type Control-Break;
              To stop - type Control-C.
  -a          Resolve addresses to hostnames.
  -n count    Number of echo requests to send.
  -l size     Send buffer size.
  -f          Set Don't Fragment flag in packet (IPv4-only).
  -i TTL      Time To Live.
  -v TOS      Type Of Service (IPv4-only. This setting has been deprecated
              and has no effect on the type of service field in the IP
              Header).
  -r count    Record route for count hops (IPv4-only).
  -s count    Timestamp for count hops (IPv4-only).
  -j host-list Loose source route along host-list (IPv4-only).
  -k host-list Strict source route along host-list (IPv4-only).
  -w timeout  Timeout in milliseconds to wait for each reply.
  -R          Use routing header to test reverse route also (IPv6-only).
              Per RFC 5095 the use of this routing header has been
              deprecated. Some systems may drop echo requests if
```


```
Administrator: C:\WINDOWS\system32\cmd.exe

C:\Windows\System32>ping 127.0.0.1

Pinging 127.0.0.1 with 32 bytes of data:
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128
Reply from 127.0.0.1: bytes=32 time<1ms TTL=128

Ping statistics for 127.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Detail	Description
Purpose	Checks if a host is reachable on a network
Protocol Used	ICMP
Example Command	<code>ping google.com</code>

 It shows packet loss, latency, and whether target is alive or not.

2 traceroute / tracert — Trace Route Packets Travel

```

Administrator: C:\WINDOWS\system32\cmd.exe
C:\Windows\System32>
C:\Windows\System32>
C:\Windows\System32>tracert 8.8.8.8

Tracing route to dns.google [8.8.8.8]
over a maximum of 30 hops:

  1    9 ms    2 ms    2 ms  172.29.57.212
  2     *      *      *     Request timed out.
  3   131 ms   98 ms   99 ms  192.168.203.1
  4   192 ms   50 ms   45 ms  192.168.203.2
  5   134 ms   98 ms   96 ms  123.63.86.122
  6    76 ms  101 ms   98 ms  182.19.106.113
  7   107 ms   97 ms   99 ms  72.14.205.216
  8   174 ms   99 ms  203 ms  142.251.49.177
  9    86 ms  142 ms   99 ms  142.250.227.73
 10   199 ms   99 ms   98 ms  dns.google [8.8.8.8]


Trace complete.

```

OS **Command**

Windows **tracert google.com**

Linux / macOS **traceroute google.com**

 Shows router hops & path taken by packets to reach destination.

3 netstat — Show Network Connections & Ports


```
Administrator: C:\WINDOWS\system32\cmd.exe
C:\Windows\System32>netstat -ano

Active Connections

Proto Local Address           Foreign Address         State       PID
TCP   0.0.0.0:135             0.0.0.0:0               LISTENING   1644
TCP   0.0.0.0:445             0.0.0.0:0               LISTENING   4
TCP   0.0.0.0:1521            0.0.0.0:0               LISTENING   6660
TCP   0.0.0.0:2179            0.0.0.0:0               LISTENING   3364
TCP   0.0.0.0:3306            0.0.0.0:0               LISTENING   7232
TCP   0.0.0.0:5040            0.0.0.0:0               LISTENING   10932
TCP   0.0.0.0:5500            0.0.0.0:0               LISTENING   6660
TCP   0.0.0.0:7070            0.0.0.0:0               LISTENING   5964
TCP   0.0.0.0:9999            0.0.0.0:0               LISTENING   6744
TCP   0.0.0.0:33060           0.0.0.0:0               LISTENING   7232
TCP   0.0.0.0:49667           0.0.0.0:0               LISTENING   1316
TCP   0.0.0.0:49668           0.0.0.0:0               LISTENING   1148
TCP   0.0.0.0:49669           0.0.0.0:0               LISTENING   2120
TCP   0.0.0.0:49670           0.0.0.0:0               LISTENING   3580
TCP   0.0.0.0:49671           0.0.0.0:0               LISTENING   5884
TCP   0.0.0.0:49688           0.0.0.0:0               LISTENING   7780
TCP   0.0.0.0:49696           0.0.0.0:0               LISTENING   1268
TCP   10.0.0.13:139           0.0.0.0:0               LISTENING   4
TCP   10.0.0.13:2030          0.0.0.0:0               LISTENING   6700
TCP   127.0.0.1:49675         127.0.0.1:49675         ESTABLISHED 7232
TCP   127.0.0.1:49676         127.0.0.1:49675         ESTABLISHED 7232
TCP   127.0.0.1:49677         127.0.0.1:49678         ESTABLISHED 7232
TCP   127.0.0.1:49678         127.0.0.1:49677         ESTABLISHED 7232
TCP   127.0.0.1:49693         0.0.0.0:0               LISTENING   7780
TCP   127.0.0.1:49694         0.0.0.0:0               LISTENING   7780
```

Detail	Description
Purpose	Lists active connections, listening ports & routing table
Useful Options	netstat -a (all), -n (numeric), -tulnp (Linux services)

ipconfig / ifconfig — Interface Configuration

 Administrator: C:\Windows\system32\cmd.exe

```
Microsoft Windows [Version 10.0.14393]
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C:\Users\Administrator>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet 2:

    Connection-specific DNS Suffix  . : 
    IPv6 Address. . . . . : 2001::1
    Link-local IPv6 Address . . . . . : fe80::5810:74f2:1545:e105%3
    IPv4 Address. . . . . : 192.168.20.1
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 

Tunnel adapter isatap.{A93807F0-65BF-47D1-8782-44D114DE82D8}:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :
```

OS	Command	Purpose
Windows	ipconfig	Shows IP, subnet mask, gateway
Linux	ifconfig	Displays network interface details