

ASSIGNMENT
ON
NETWORKING & SYSTEM
ADMINISTRATION LAB

SUBMITTED TO,

RINI MISS

SUBMITTED BY,

RADHIKA C

ROLL NO - 13

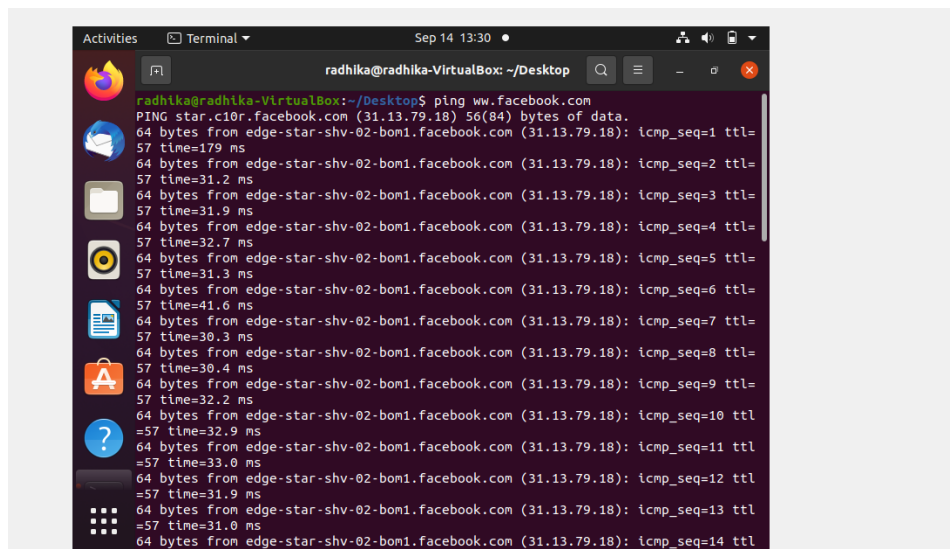
RMCA-B S2

Q1. Ping, route, traceroute, nslookup, IpConfig, NetStat

LINUX

1. Ping

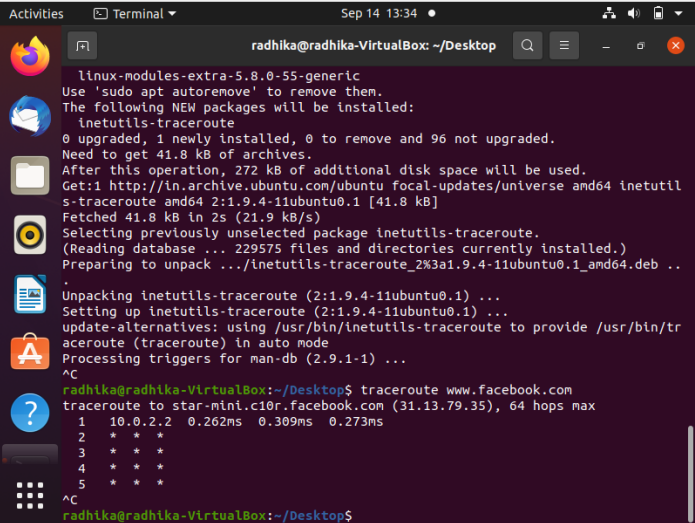
ping is the primary TCP/IP command used to troubleshoot connectivity, reachability, and name resolution. Used without parameters, this command displays Help content.

A screenshot of a Linux terminal window titled 'radhika@radhika-VirtualBox: ~/Desktop'. The terminal shows the command 'ping ww.facebook.com' being executed. The output displays the results of 14 ping attempts, each showing 64 bytes of data from 'edge-star-shv-02-bon1.facebook.com' (31.13.79.18) with varying response times and TTL values. The terminal window includes standard Linux desktop icons on the left and a top bar with system information like 'Sep 14 13:30'.

2. Traceroute

Traceroute is a network diagnostic tool used to track in real-time the pathway taken by a packet on an IP network from source to destination, reporting the IP addresses of all the routers it pinged in between. Traceroute also records the time taken for each hop the packet makes during its route to the destination.

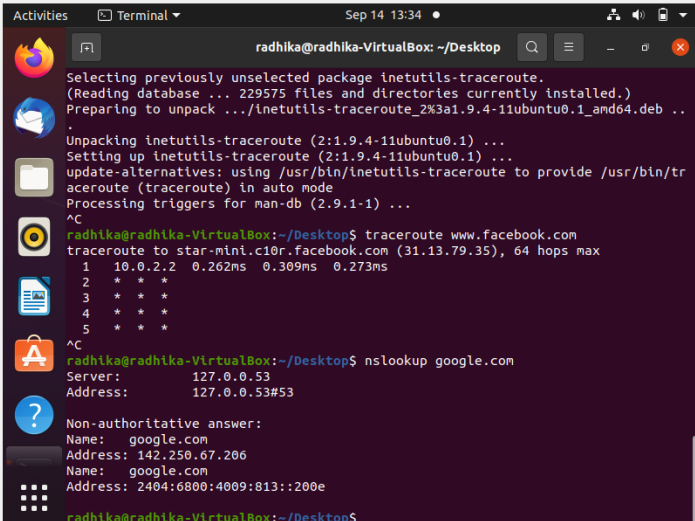
The difference between **tracert(windows)** and **traceroute(linux)** is that: **tracert(windows)** will only use ICMP echo requests. **traceroute(linux)** [and somewhat dependent on linux distro] default to UDP echo requests.



```
linux-modules-extra-5.8.0-55-generic
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  inetutils-traceroute
0 upgraded, 1 newly installed, 0 to remove and 96 not upgraded.
Need to get 41.8 kB of archives.
After this operation, 272 kB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 inetutils-traceroute amd64 2:1.9.4-11ubuntu0.1 [41.8 kB]
Fetched 41.8 kB in 2s (21.9 kB/s)
Selecting previously unselected package inetutils-traceroute.
(Reading database ... 229575 files and directories currently installed.)
Preparing to unpack .../inetutils-traceroute_2%3a1.9.4-11ubuntu0.1_amd64.deb ...
Unpacking inetutils-traceroute (2:1.9.4-11ubuntu0.1) ...
Setting up inetutils-traceroute (2:1.9.4-11ubuntu0.1) ...
update-alternatives: using /usr/bin/inetutils-traceroute to provide /usr/bin/traceroute (traceroute) in auto mode
Processing triggers for man-db (2.9.1-1) ...
^C
radhika@radhika-VirtualBox:~/Desktop$ traceroute www.facebook.com
traceroute to star-mini.c10r.facebook.com (31.13.79.35), 64 hops max
 1  10.0.2.2  0.262ms  0.309ms  0.273ms
 2  * * *
 3  * * *
 4  * * *
 5  * * *
```

3. Nslookup

Nslookup (stands for “Name Server Lookup”) is a **useful command for getting information from DNS server**. It is a network administration tool for querying the Domain Name System (DNS) to obtain domain name or IP address mapping or any other specific DNS record.



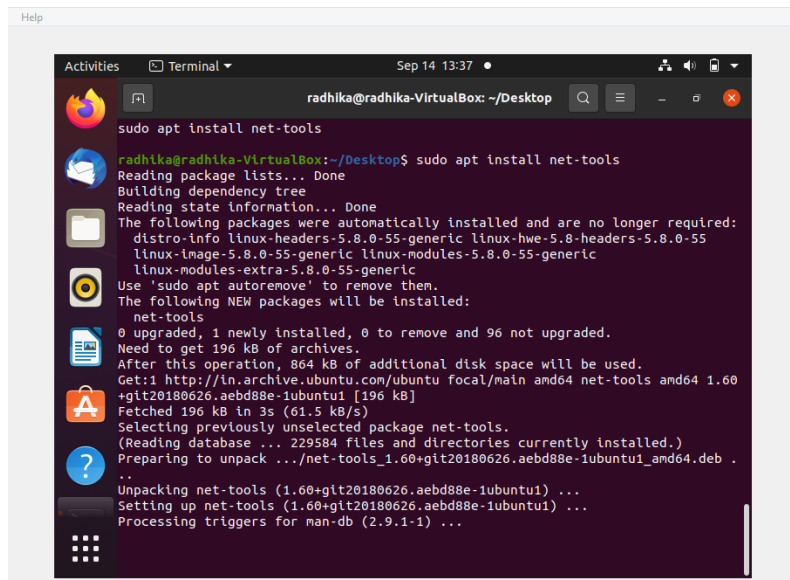
```
radhika@radhika-VirtualBox:~/Desktop$ traceroute www.facebook.com
traceroute to star-mini.c10r.facebook.com (31.13.79.35), 64 hops max
 1  10.0.2.2  0.262ms  0.309ms  0.273ms
 2  * * *
 3  * * *
 4  * * *
 5  * * *
```

```
radhika@radhika-VirtualBox:~/Desktop$ nslookup google.com
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.67.206
Name:   google.com
Address: 2404:6800:4009:813::200e
```

4. netstat -l

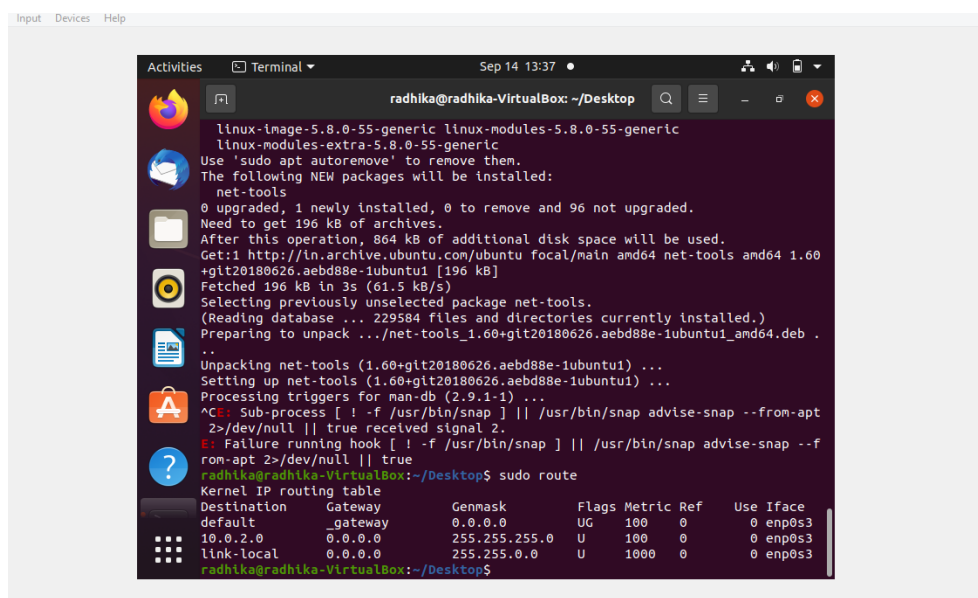
The netstat command symbolically **displays the contents of various network-related data structures for active connections**. The Interval parameter, which is specified in seconds, continuously displays information regarding packet traffic on the configured network interfaces.



```
radhika@radhika-VirtualBox: ~/Desktop
sudo apt install net-tools
radhika@radhika-VirtualBox:~/Desktop$ sudo apt install net-tools
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
distro-info linux-headers-5.8.0-55-generic linux-hwe-5.8-headers-5.8.0-55
linux-image-5.8.0-55-generic linux-modules-5.8.0-55-generic
linux-modules-extra-5.8.0-55-generic
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
net-tools
0 upgraded, 1 newly installed, 0 to remove and 96 not upgraded.
Need to get 196 kB of archives.
After this operation, 864 kB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 net-tools 1.60
+git20180626.aebd88e-1ubuntu1 [196 kB]
Fetched 196 kB in 3s (61.5 kB/s)
Selecting previously unselected package net-tools.
(Reading database ... 229584 files and directories currently installed.)
Preparing to unpack .../net-tools_1.60+git20180626.aebd88e-1ubuntu1_amd64.deb ...
Unpacking net-tools (1.60+git20180626.aebd88e-1ubuntu1) ...
Setting up net-tools (1.60+git20180626.aebd88e-1ubuntu1) ...
Processing triggers for man-db (2.9.1-1) ...
```

5. route

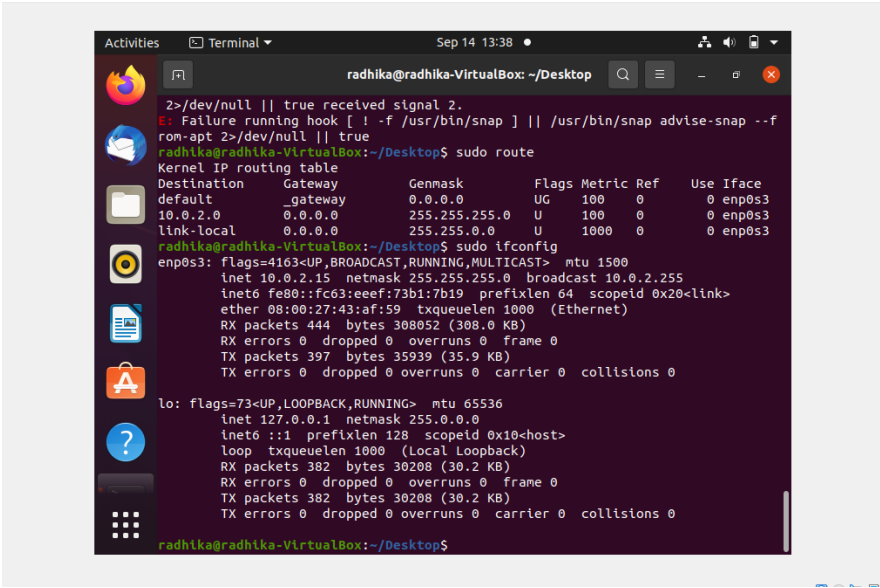
The route command allows **you to make manual entries into the network routing tables**. The route command distinguishes between routes to hosts and routes to networks by interpreting the network address of the Destination variable, which can be specified either by symbolic name or numeric address.



```
radhika@radhika-VirtualBox:~/Desktop$ sudo route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
default _gateway 0.0.0.0 UG 100 0 0 enp0s3
10.0.2.0 0.0.0.0 255.255.255.0 U 100 0 0 enp0s3
link-local 0.0.0.0 255.255.0.0 U 1000 0 0 enp0s3
```

6.ipconfig

- ipconfig (standing for "Internet Protocol configuration") is a console application program of some computer operating systems that displays all current TCP/IP network configuration values and refreshes Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) settings.
- Ifconfig(interface configuration) command is used to configure the kernel-resident network interfaces. It is used at the boot time to set up the interfaces as necessary. After that, it is usually used when needed during debugging or when you need system tuning. Also, this command is used to assign the IP address and netmask to an interface or to enable or disable a given interface.
- The ifconfig command is supported by Unix-based operating systems. Functionality: The ipconfig command **displays all the currently connected network interfaces whether they are active or not**. On the other hand, the ifconfig command displays only the enabled network interfaces that are connected to the system.



```
radhika@radhika-VirtualBox: ~/Desktop
2>/dev/null || true received signal 2.
Failure running hook [ 1 -f /usr/bin/snap ] || /usr/bin/snap advise-snap --f
rom-apt 2>/dev/null || true
radhika@radhika-VirtualBox:~/Desktop$ sudo route
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
default _gateway 0.0.0.0 UG 100 0 0 enp0s3
10.0.2.0 0.0.0.0 255.255.255.0 U 100 0 0 enp0s3
link-local 0.0.0.0 255.255.0.0 U 1000 0 0 enp0s3
radhika@radhika-VirtualBox:~/Desktop$ sudo ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
inet6 fe80::fc63:eeef:73b1:7b19 prefixlen 64 scopeid 0x20<link>
ether 08:00:27:43:af:59 txqueuelen 1000 (Ethernet)
RX packets 444 bytes 308052 (308.0 KB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 397 bytes 35939 (35.9 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 382 bytes 30208 (30.2 KB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 382 bytes 30208 (30.2 KB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

radhika@radhika-VirtualBox:~/Desktop$
```

WINDOWS

1. ping

```
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Users\hp>ping www.facebook.com

Pinging star-mini.c10r.facebook.com [157.240.16.35] with 32 bytes of data:
Reply from 157.240.16.35: bytes=32 time=35ms TTL=56
Reply from 157.240.16.35: bytes=32 time=34ms TTL=56
Reply from 157.240.16.35: bytes=32 time=35ms TTL=56
Reply from 157.240.16.35: bytes=32 time=35ms TTL=56

Ping statistics for 157.240.16.35:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 34ms, Maximum = 35ms, Average = 34ms

C:\Users\hp>
```

2. route

```
C:\Users\hp>route www.facebook.com

Manipulates network routing tables.

ROUTE [-f] [-p] [-4|-6] command [destination]
        [MASK netmask] [gateway] [METRIC metric] [IF interface]

-f          Clears the routing tables of all gateway entries. If this is
            used in conjunction with one of the commands, the tables are
            cleared prior to running the command.

-p          When used with the ADD command, makes a route persistent across
            boots of the system. By default, routes are not preserved
            when the system is restarted. Ignored for all other commands,
            which always affect the appropriate persistent routes.

-4          Force using IPv4.

-6          Force using IPv6.
```

3. tracert

```
C:\Users\hp>tracert www.facebook.com

Tracing route to star-mini.c10r.facebook.com [157.240.15.35]
over a maximum of 30 hops:

  1      1 ms      1 ms      1 ms      192.168.18.1
  2      3 ms      3 ms      3 ms      100.65.128.1
  3      3 ms      5 ms      3 ms      192.168.20.5
  4      4 ms      4 ms      4 ms      182.73.157.189
  5     47 ms     50 ms     53 ms      182.79.135.16
  6     50 ms     50 ms     51 ms      ae20.pr02.sin6.tfbnw.net [103.4.96.218]
  7     48 ms     47 ms     48 ms      po104.psw04.sin6.tfbnw.net [129.134.55.137]
  8     49 ms     48 ms     48 ms      157.240.37.67
  9     51 ms     50 ms     51 ms      edge-star-mini-shv-03-sin6.facebook.com [157.240.15.35]

Trace complete.
```

4.netstat

```
C:\Users\hp>netstat -a
Active Connections

Proto Local Address           Foreign Address         State
TCP   0.0.0.0:135              user:0                  LISTENING
TCP   0.0.0.0:445              user:0                  LISTENING
TCP   0.0.0.0:1025             user:0                  LISTENING
TCP   0.0.0.0:1026             user:0                  LISTENING
TCP   0.0.0.0:1027             user:0                  LISTENING
TCP   0.0.0.0:1028             user:0                  LISTENING
TCP   0.0.0.0:1029             user:0                  LISTENING
TCP   0.0.0.0:1030             user:0                  LISTENING
TCP   0.0.0.0:5357             user:0                  LISTENING
TCP   0.0.0.0:8336             user:0                  LISTENING
TCP   0.0.0.0:61406            user:0                  LISTENING
TCP   127.0.0.1:5354            user:0                  LISTENING
TCP   127.0.0.1:8335            user:0                  LISTENING
TCP   127.0.0.1:21896           user:0                  LISTENING
TCP   127.0.0.1:22303           user:23783              ESTABLISHED
TCP   127.0.0.1:23783           user:22303              ESTABLISHED
TCP   127.0.0.1:27017           user:0                  LISTENING
TCP   127.0.0.1:39378           user:0                  LISTENING
```

5.ipconfig

```
C:\Users\hp>ipconfig

Windows IP Configuration

Wireless LAN adapter Local Area Connection* 3:

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

Ethernet adapter Bluetooth Network Connection:

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

Ethernet adapter Ethernet:

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

Wireless LAN adapter Wi-Fi:

    Connection-specific DNS Suffix  . :
```

6. nslookup

```
C:\Users\hp>nslookup google.com
Server:      UnKnown
Address:     192.168.18.1

Non-authoritative answer:
Name:        google.com
Addresses:   2404:6800:4009:82a::200e
             172.217.163.206
```


Q2. Identify and perform 5 more network commands

1. hostname

A very simple command that displays the host name of your machine. This is much quicker than going to the control panel>system route.

```
C:\Users\hp>hostname  
user
```

2. getmac

Another very simple command that shows the MAC address of your network interfaces.

```
C:\Users\hp>getmac  


| Physical Address  | Transport Name                                    |
|-------------------|---------------------------------------------------|
| C4-46-19-19-B1-8C | \Device\NPF{00402401-3451-4D82-BA4B-1C9AB9164B7E} |
| C8-0A-A9-B5-5E-D5 | Media disconnected                                |
| 70-F3-95-31-F1-53 | Media disconnected                                |
| 0A-00-27-00-00-1B | \Device\NPF{A32AE3A3-7E1B-471E-8044-A5284B9570F4} |


```

3. arp

This is used for showing the **address resolution cache**. This command must be used with a command line switch **arp -a** is the most common.

```
C:\Users\hp>arp -a  


| Interface: 192.168.18.71 --- 0x3 | Internet Address | Physical Address  | Type    |
|----------------------------------|------------------|-------------------|---------|
|                                  | 192.168.18.1     | fc-1b-d1-8e-89-53 | dynamic |
|                                  | 192.168.18.255   | ff-ff-ff-ff-ff-ff | static  |
|                                  | 224.0.0.22       | 01-00-5e-00-00-16 | static  |
|                                  | 224.0.0.251      | 01-00-5e-00-00-fb | static  |
|                                  | 224.0.0.252      | 01-00-5e-00-00-fc | static  |
|                                  | 239.255.255.250  | 01-00-5e-7f-ff-fa | static  |
|                                  | 255.255.255.255  | ff-ff-ff-ff-ff-ff | static  |


| Interface: 192.168.56.1 --- 0x1b | Internet Address | Physical Address  | Type   |
|----------------------------------|------------------|-------------------|--------|
|                                  | 192.168.56.255   | ff-ff-ff-ff-ff-ff | static |
|                                  | 224.0.0.22       | 01-00-5e-00-00-16 | static |
|                                  | 224.0.0.251      | 01-00-5e-00-00-fb | static |
|                                  | 224.0.0.252      | 01-00-5e-00-00-fc | static |
|                                  | 239.255.255.250  | 01-00-5e-7f-ff-fa | static |
|                                  | 255.255.255.255  | ff-ff-ff-ff-ff-ff | static |


```


4. nbtstat

The nbtstat command is a **diagnostic tool for NetBIOS over TCP/IP**. Its primary design is to help troubleshoot NetBIOS name resolution problems. The command is included in several versions of Microsoft Windows. ... When a network is functioning normally, NetBIOS over TCP/IP (NetBT) resolves NetBIOS names to IP addresses.

```
C:\Users\hp>nbtstat -r

NetBIOS Names Resolution and Registration Statistics
-----

Resolved By Broadcast          = 0
Resolved By Name Server        = 0

Registered By Broadcast        = 18
Registered By Name Server      = 0
```

5.path ping

The pathping command which provides a combination of the best aspects of Tracert and Ping. This command takes 300 seconds to gather statistics and then returns reports on latency and packet loss statistics at intermediate hops between the source and the target in more detail than those reports provided by Ping or Tracert commands.

```
C:\Users\hp>pathping www.facebook.com

Tracing route to star-mini.c10r.facebook.com [157.240.16.35]
over a maximum of 30 hops:
 0  user [192.168.18.71]
 1  192.168.18.1
 2  100.65.128.1
 3  192.168.20.5
 4  172.16.1.9
 5  10.1.1.254
 6  103.27.170.158
 7  po104.psv01.bon1.tfbnw.net [157.240.53.65]
 8  157.240.38.85
 9  edge-star-mini-shv-01-bon1.facebook.com [157.240.16.35]

Computing statistics for 225 seconds...
Hop  RTT      Source to Here   This Node/Link   Address
 0      Source to Here   Lost/Sent = Pct   Lost/Sent = Pct   Address
 0      0/ 100 = 0%      0/ 100 = 0%      0/ 100 = 0%      user [192.168.18.71]
 1      1ms      0/ 100 = 0%      0/ 100 = 0%      0/ 100 = 0%      192.168.18.1
 2      5ms      0/ 100 = 0%      0/ 100 = 0%      0/ 100 = 0%      100.65.128.1
 3      5ms      0/ 100 = 0%      0/ 100 = 0%      0/ 100 = 0%      192.168.20.5
 4      4ms      0/ 100 = 0%      0/ 100 = 0%      0/ 100 = 0%      172.16.1.9
 5      27ms     0/ 100 = 0%      0/ 100 = 0%      0/ 100 = 0%      10.1.1.254
 6      ---     100/ 100 =100%   99/ 100 = 99%     1/ 100 = 1%      103.27.170.158
 7      ---     100/ 100 =100%   99/ 100 = 99%     0/ 100 = 0%      po104.psv01.bon1.tfbnw.net [157.24
0.53.65]
 8      ---     100/ 100 =100%   99/ 100 = 99%     0/ 100 = 0%      157.240.38.85
 9      35ms     1/ 100 = 1%      0/ 100 = 0%      0/ 100 = 0%      edge-star-mini-shv-01-bon1.faceboo
k.com [157.240.16.35]

Trace complete.
```