Network Lab Assignment - 1

Rahul Kumawat B180635CS

ping - To determine if a server is responding to requests, you can use
 Online Ping. You provide an IP address or a domain name, and you can see if the host is responding or not.

```
rahul@rahul-VivoBook-15-ASUS-Laptop-X507UF:~$ ping www.amazon.in
PING e15322.a.akamaiedge.net (23.54.89.89) 56(84) bytes of data.
64 bytes from a23-54-89-89.deploy.static.akamaitechnologies.com (23.54.89.89): icmp_seq=1 ttl=57 time=3
3.1 ms
64 bytes from a23-54-89-89.deploy.static.akamaitechnologies.com (23.54.89.89): icmp_seq=2 ttl=57 time=2
6.1 ms
64 bytes from a23-54-89-89.deploy.static.akamaitechnologies.com (23.54.89.89): icmp_seq=3 ttl=57 time=3
1.4 ms
64 bytes from a23-54-89-89.deploy.static.akamaitechnologies.com (23.54.89.89): icmp_seq=4 ttl=57 time=2
5.5 ms
64 bytes from a23-54-89-89.deploy.static.akamaitechnologies.com (23.54.89.89): icmp_seq=5 ttl=57 time=3
1.6 ms
64 bytes from a23-54-89-89.deploy.static.akamaitechnologies.com (23.54.89.89): icmp_seq=6 ttl=57 time=3
2.6 ms
60 c
60 c
61 ms
61 ms
62 c
63 ms
64 ms
64 ms
65 ms
66 ms
66 ms
67 c
67 ms
67 ms
68 ms
69 ms
69 ms
60 ms
```

 tracert/traceroute - it is a network tool used to show the route taken by packets across two points.

 ip/ifconfig/ipconfig - It is an IP network configuration tool. This system tray application gives easy access to changing; saving and loading IP address information

```
rahul@rahul-VivoBook-15-ASUS-Laptop-X507UF:~$ ifconfig -a
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 156502 bytes 28106782 (28.1 MB)
       RX errors 0 dropped 0 overruns 0 frame 0
       TX packets 156502 bytes 28106782 (28.1 MB)
       TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
wlp2s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu  1500
       inet 192.168.0.105 netmask 255.255.255.0 broadcast 192.168.0.255
       inet6 fe80::8782:9fd0:d2e4:93ec prefixlen 64 scopeid 0x20<link>
       ether 38:ba:f8:9f:e7:c8 txqueuelen 1000 (Ethernet)
       RX packets 746205 bytes 933977586 (933.9 MB)
       RX errors 0 dropped 0 overruns 0 frame 0
       TX packets 465349 bytes 84203734 (84.2 MB)
       TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

 dig- Dig (Domain Information Gopher) is a DNS lookup utility used for probing DNS servers and troubleshooting problems associated with DNS servers.

```
rahul@rahul-VivoBook-15-ASUS-Laptop-X507UF:-$ dig amazon.in
; <<>> DiG 9.16.1-Ubuntu <<>> amazon.in
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 29837
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 0, ADDITIONAL: 1
;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;amazon.in.
                               IN
                                       A
;; ANSWER SECTION:
                             IN A
IN A
IN A
                      54
amazon.in.
                                              52.95.120.67
                      54
                                              52.95.116.115
amazon.in.
                      54
amazon.in.
                                              54.239.33.92
;; Query time: 24 msec
```

 nslookup - nslookup (from name server lookup) is used for handling DNS (Domain Name System) lookups and displays crucial information such as MX records, and the IP address associated with a domain name.

```
rahul@rahul-VivoBook-15-ASUS-Laptop-X507UF:~$ nslookup amazon.in
Server: 127.0.0.53
Address: 127.0.0.53#53

Non-authoritative answer:
Name: amazon.in
Address: 54.239.33.92
Name: amazon.in
Address: 52.95.120.67
Name: amazon.in
Address: 52.95.116.115
```

host - it is a simple tool used to perform DNS lookups in Linux. It is usually
used to resolve a hostname into an IP address or vice-versa.

```
rahul@rahul-VivoBook-15-ASUS-Laptop-X507UF:~$ host amazon.in amazon.in has address 52.95.116.115 amazon.in has address 52.95.120.67 amazon.in has address 54.239.33.92 amazon.in mail is handled by 10 amazon-smtp.amazon.com.
```

whois - whois searches for an object in a WHOIS database. WHOIS is a
query and response protocol that is widely used for querying databases
that store the registered users of an Internet resource, such as a domain
name or an IP address block but is also used for a wider range of other
information.

```
rahul@rahul-VivoBook-15-ASUS-Laptop-X507UF:~$ whois google.in
Domain Name: google.in
Registry Domain ID: D21089-IN
Registrar WHOIS Server:
Registrar URL: http://www.markmonitor.com
Updated Date: 2021-01-18T10:38:43Z
Creation Date: 2005-02-14T20:35:14Z
Registry Expiry Date: 2022-02-14T20:35:14Z
Registrar: MarkMonitor Inc.
Registrar IANA ID: 292
Registrar Abuse Contact Email:
Registrar Abuse Contact Phone:
Domain Status: clientDeleteProhibited http://www.icann.org/epp#clientDeleteProhibited
Domain Status: clientTransferProhibited http://www.icann.org/epp#clientTransferProhibited
Domain Status: clientUpdateProhibited http://www.icann.org/epp#clientUpdateProhibited
Registry Registrant ID: REDACTED FOR PRIVACY
Registrant Name: REDACTED FOR PRIVACY
Registrant Organization: Google LLC
Registrant Street: REDACTED FOR PRIVACY
Registrant Street: REDACTED FOR PRIVACY
Registrant Street: REDACTED FOR PRIVACY
Registrant City: REDACTED FOR PRIVACY
Registrant State/Province: CA
Registrant Postal Code: REDACTED FOR PRIVACY
Registrant Country: US
Registrant Phone: REDACTED FOR PRIVACY
Registrant Phone Ext: REDACTED FOR PRIVACY
Registrant Fax: REDACTED FOR PRIVACY
Registrant Fax Ext: REDACTED FOR PRIVACY
Registrant Email: Please contact the Registrar listed above
Registry Admin ID: REDACTED FOR PRIVACY
Admin Name: REDACTED FOR PRIVACY
Admin Organization: REDACTED FOR PRIVACY
Admin Street: REDACTED FOR PRIVACY
Admin Street: REDACTED FOR PRIVACY
Admin Street: REDACTED FOR PRIVACY
Admin City: REDACTED FOR PRIVACY
Admin State/Province: REDACTED FOR PRIVACY
Admin Postal Code: REDACTED FOR PRIVACY
Admin Country: REDACTED FOR PRIVACY
Admin Phone: REDACTED FOR PRIVACY
Admin Phone Ext: REDACTED FOR PRIVACY
Admin Fax: REDACTED FOR PRIVACY
Admin Fax Ext: REDACTED FOR PRIVACY
Admin Email: Please contact the Registrar listed above
Registry Tech ID: REDACTED FOR PRIVACY
Tech Name: REDACTED FOR PRIVACY
Tech Organization: REDACTED FOR PRIVACY
Tech Street: REDACTED FOR PRIVACY
Tech Street: REDACTED FOR PRIVACY
Tech Street: REDACTED FOR PRIVACY
Tech City: REDACTED FOR PRIVACY
Tech State/Province: REDACTED FOR PRIVACY
Tech Postal Code: REDACTED FOR PRIVACY
Tech Country: REDACTED FOR PRIVACY
```

 route - route command in Linux is used when you want to work with the IP/kernel routing table. It is mainly used to set up static routes to specific hosts or networks via an interface. It is used for showing or update the IP/kernel routing table.

```
rahul@rahul-VivoBook-15-ASUS-Laptop-X507UF:~$ route
Kernel IP routing table
                                                 Flags Metric Ref
Destination
                Gateway
                                 Genmask
                                                                      Use Iface
default
                 gateway
                                 0.0.0.0
                                                        600
                                                                        0 wlp2s0
link-local
                0.0.0.0
                                 255.255.0.0
                                                 U
                                                        1000
                                                               0
                                                                        0 wlp2s0
                                 255.255.255.0
                                                                        0 wlp2s0
192.168.0.0
                0.0.0.0
                                                        600
```

• **tcpdump** - Tcpdump is a command line utility that allows you to capture and analyze network traffic going through your system. It is often used to help troubleshoot network issues, as well as a security tool.

```
Tabul@rahul-VivoBook-15-ASUS-Laptop-X507UF:-$ sudo tcpdump
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on wlp250, link-type ENIONB (Ethernet), capture size 262144 bytes
19:03:15.540255 IP rahul-VivoBook-15-ASUS-Laptop-X507UF.60258 > del03s07-in-f14.1e100.net.https: Flags [.], ack 3310886342, win 501, opt
ions [nop,nop,TS val 2383483966 ecr 1198103401], length 0
19:03:15.540330 IP rahul-VivoBook-15-ASUS-Laptop-X507UF.55876 > 104.16.190.66.https: Flags [.], ack 2241836611, win 501, length 0
19:03:15.540330 IP rahul-VivoBook-15-ASUS-Laptop-X507UF.39836 > 199.232.21.253.https: Flags [.], ack 3221748464, win 501, options [nop,nop,TS val 1685516434 ecr 1901522116], length 0
19:03:15.540357 IP rahul-VivoBook-15-ASUS-Laptop-X507UF.33834 > server-13-35-130-225.del54-r.cloudfront.net.https: Flags [.], ack 199019
6725, win 501, options [nop,nop,TS val 2327780463 ecr 54320669], length 0
19:03:15.5403378 IP rahul-VivoBook-15-ASUS-Laptop-X507UF.57593 > _gateway.domain: 49486+ [1au] PTR? 46.221.58.216.in-addr.arpa. (55)
19:03:15.559857 IP rahul-VivoBook-15-ASUS-Laptop-X507UF.60274 > 104.22.2.144.https: Flags [.], ack 3917102294, win 501, length 0
19:03:15.559857 IP rahul-VivoBook-15-ASUS-Laptop-X507UF.60274 > 104.22.2.144.https: Flags [.], ack 3917102294, win 501, length 0
19:03:15.599048 IP _gateway.domain > rahul-VivoBook-15-ASUS-Laptop-X507UF.57593 > _gateway.domain: 10671+ [1au] PTR? 105.0.168.192.in-addr.arpa. (55)
19:03:15.599048 IP _gateway.domain > rahul-VivoBook-15-ASUS-Laptop-X507UF.57593: 49486 2/0/1 PTR del03s07-in-f14.1e100.net., PTR kul01s1
0-in-f46.1e100.net. (124)
19:03:15.5990718 IP rahul-VivoBook-15-ASUS-Laptop-X507UF.45245 > _gateway.domain: 10671+ [1au] PTR? 105.0.168.192.in-addr.arpa. (55)
19:03:15.6044614 IP del03s07-in-f14.1e100.net.https > rahul-VivoBook-15-ASUS-Laptop-X507UF.39836: Flags [.], ack 1, win 269, options [nop,nop,TS val 1198148483 ecr 2383392566], length 0
19:03:15.604850 IP Pserver-13-35-130-225.del54-r.cloudfront.net.https > rahul-VivoBook-15-ASUS
```

 netstat/ss - netstat (network statistics) is a command line tool for monitoring network connections both incoming and outgoing as well as viewing routing tables, interface statistics etc.

```
rahul@rahul-VivoBook-15-ASUS-Laptop-X507UF:~$ netstat -l
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address
                                               Foreign Address
                                                                         State
tcp
                   0 localhost:ipp
           0
                                               0.0.0.0:*
                                                                         LISTEN
tcp
           0
                   0 localhost:domain
                                               0.0.0.0:*
                                                                         LISTEN
tcp6
            0
                   0 ip6-localhost:ipp
                                                [::]:*
                                                                          LISTEN
                                                [::]:*
tcp6
            0
                   0 [::]:27121
                                                                         LISTEN
           0
                   0 localhost:domain
                                               0.0.0.0:*
udp
           0
                                               0.0.0.0:*
                   0 0.0.0.0:32830
abu
udp
           0
                   0 0.0.0.0:631
                                               0.0.0.0:*
udp
            0
                   0 224.0.0.251:mdns
                                               0.0.0.0:*
udp
            0
                     0.0.0.0:mdns
                                               0.0.0.0:*
                                               [::]:*
[::]:*
udp6
            0
                   0 [::]:57276
udp6
           0
                   0 [::]:mdns
                                                [::]:*
                                                                         7
гамб
           0
                   0 [::]:ipv6-icmp
Active UNIX domain sockets (only servers)
Proto RefCnt Flags
                                       State
                                                      I-Node
                                                                Path
                           Type
                           STREAM
                                                                @/tmp/dbus-06vB01sw
unix
                                       LISTENING
                                                      37990
unix
                ACC
                           SEQPACKET
                                       LISTENING
                                                      2784
                                                                /run/udev/control
                           STREAM
                                       LISTENING
                                                      44850
                                                                @/tmp/.ICE-unix/1747
unix
                ACC
      2
                ACC
                                                      44851
unix
                           STREAM
                                       LISTENING
                                                                /tmp/.ICE-unix/1747
                                                                /run/user/1000/systemd/private
unix
      2
                ACC
                           STREAM
                                       LISTENING
                                                      43153
unix
      2
                ACC
                           STREAM
                                       LISTENING
                                                      45160
                                                                @/tmp/dbus-7JrWbJV2
                                                                /run/user/1000/bus
unix
                ACC
                           STREAM
                                       LISTENING
                                                      43158
      2
                ACC
                           STREAM
                                       LISTENING
                                                      43159
                                                                /run/user/1000/gnupg/S.dirmngr
unix
                ACC
                                                                /run/user/1000/gnupg/S.gpg-agent.browser
unix
                           STREAM
                                       LISTENING
                                                      43160
                                                      411559
                                                                /tmp/.com.google.Chrome.SnlgZk/SingletonSocket
unix
      2
                ACC
                           STREAM
                                       LISTENING
unix
      2
                ACC
                           STREAM
                                       LISTENING
                                                      43161
                                                                /run/user/1000/gnupg/S.gpg-agent.extra
                ACC
                           STREAM
                                       LISTENING
                                                      43162
                                                                /run/user/1000/gnupg/S.gpg-agent.ssh
unix
                                                                /run/user/1000/gnupg/S.gpg-agent
unix
                ACC
                           STREAM
                                       LISTENING
                                                      43163
                                                                /run/user/1000/pk-debconf-socket
/run/user/1000/pulse/native
                ACC
                           STREAM
                                       LISTENING
                                                      43164
unix
unix
                ACC
                           STREAM
                                       LISTENING
                                                      43165
unix
                ACC
                           STREAM
                                       LISTENING
                                                      43166
                                                                /run/user/1000/snapd-session-agent.socket
unix
      2
                ACC
                           STREAM
                                       LISTENING
                                                      127073
                                                                /tmp/.dqbqjK/s
unix
                ACC
                           STREAM
                                       LISTENING
                                                      48377
                                                                /tmp/ssh-arKX5g0kRpyp/agent.1629
                                                                @/home/rahul/.cache/ibus/dbus-CA7ob5fI
unix
                ACC
                           STREAM
                                       LISTENING
                                                      42866
                ACC
                                                                @/tmp/.X11-unix/X0
unix
                           STREAM
                                       LISTENING
                                                      45317
```

```
rahul@rahul-VivoBook-15-ASUS-Laptop-X507UF:~$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address
                                             Foreign Address
                                                                      State
           0
                  0 localhost:ipp
tcp
                                             0.0.0.0:*
                                                                      LISTEN
           0
                                             0.0.0.0:*
tcp
                  0
                    localhost:domain
                                                                      LISTEN
                     rahul-VivoBook-15:36882 ip21.67-202-110.s:https ESTABLISHED
tcp
           0
                  0
           0
                     rahul-VivoBook-15:49792 194.23.211.130.bc:https ESTABLISHED
tcp
                  0
           0
                     rahul-VivoBook-15:53506 server-13-224-21-:https ESTABLISHED
tcp
           0
                  0
                    rahul-VivoBook-15:34246 152.199.43.37:https
                                                                      ESTABLISHED
tcp
           0
                  0
                    rahul-VivoBook-15:33894 del03s16-in-f10.1:https ESTABLISHED
tcp
           0
                    rahul-VivoBook-15:50340 151.101.153.44:https
tcp
                  0
                                                                      ESTABLISHED
           0
                     rahul-VivoBook-15:44916 del03s17-in-f14.1:https ESTABLISHED
tcp
           0
                    rahul-VivoBook-15:54058 del03s14-in-f2.1e:https ESTABLISHED
tcp
                    rahul-VivoBook-15:54918 server-13-224-21-:https ESTABLISHED
           0
tcp
           0
                    rahul-VivoBook-15:43624 69.173.159.50:https
tcp
                                                                      ESTABLISHED
tcp
           0
                     rahul-VivoBook-15:52902 del03s15-in-f10.1:https ESTABLISHED
tcp
           0
                  0
                    rahul-VivoBook-15:43632 104.26.1.139:https
                                                                      ESTABLISHED
tcp
           0
                  0
                    rahul-VivoBook-15:38476 a23-50-246-69.dep:https ESTABLISHED
tcp
           0
                  0
                    rahul-VivoBook-15:41188 104.26.3.70:https
                                                                      ESTABLISHED
tcp
           0
                    rahul-VivoBook-15:41544 a104-91-246-107.d:https ESTABLISHED
tcp
           0
                    rahul-VivoBook-15:36468 del03s13-in-f14.1:https ESTABLISHED
tcp
           0
                    rahul-VivoBook-15:55018 del11s05-in-f1.1e:https ESTABLISHED
           0
                    rahul-VivoBook-15:36608 aeab55d76dd13c9bb:https ESTABLISHED
tcp
                  0
                     rahul-VivoBook-15:37864 a23-54-86-102.dep:https ESTABLISHED
tcp
           0
                  0
tcp
           0
                     rahul-VivoBook-15:52756 a23-8-179-11.depl:https ESTABLISHED
tcp
           0
                    rahul-VivoBook-15:36354 del03s16-in-f3.1e:https ESTABLISHED
                  0
           0
                    rahul-VivoBook-15:57808 server-13-35-191-:https ESTABLISHED
tcp
                  0
           0
                    rahul-VivoBook-15:59376 server-13-35-217-:https ESTABLISHED
tcp
           0
                    rahul-VivoBook-15:59946 server-13-35-131-:https ESTABLISHED
tcp
                     rahul-VivoBook-15:50728 104.26.2.23:https
```

• **dstat** - dstat is a powerful, flexible and versatile tool for generating Linux system resource statistics, that is a replacement for all the tools mentioned above. It comes with extra features, counters and it is highly extensible, users with Python knowledge can build their own plugins.

rahul@rahul-VivoBook-15-ASUS-Laptop-X507UF:~\$ dstat You did not select any stats, using -cdngy by default.												
total-cpu-usagedsk/totalnet/totalpagingsystem												
								send				CSW
17	4	77			126	233k		0	1908	28568	1642	
3		96				136		870B				
3		97										
3		96									708	1677
3		97										
5		91				276						
3		96										
3		96										
4		96										
3		93				556					778	
3		92				212						
- 3		97										
4		95										
4		96					6974B					
3		96										
6		87				42/1	11					
3		96					7279B					
3		96										
3		97										
3		96										
4		94				124						
.3		96										
3		97										
.3		96										
3		96										
.3		96				40						
3		96										1463
3		96										
3		96										
.3		96									776	
.3		94				64			0			

 ifstat - ifstat neatly prints out network interface statistics. The utility keeps records of the previous data displayed in history files and by default only shows difference between the last and the current call. Location of the history files defaults to /tmp/.

ι	0	wlp	2s0	
KB/s in	KB/s out	KB/s in	KB/s out	
0.00	0.00	0.00	0.00	
0.00	0.00	0.00	0.00	
0.00	0.00	0.00	0.00	
0.00	0.00	0.00	0.00	
0.00	0.00	0.00	0.00	
0.35	0.35	10.39	23.69	
0.00	0.00	0.91	0.61	
0.00	0.00	0.00	0.18	
0.00	0.00	0.00	0.00	
0.00	0.00	0.00	0.00	
0.00	0.00	0.04	0.25	
0.00	0.00	0.00	0.00	
0.00	0.00	0.00	0.00	
0.00	0.00	0.06	0.09	
0.00	0.00	0.22	0.83	
0.00	0.00	8.95	129.12	
0.00	0.00	0.10	0.00	
0.00	0.00	0.06	0.09	
0.19	0.19	5.87	22.43	
0.00	0.00	0.40	0.17	
0.00	0.00	0.00	0.00	
0.00	0.00	0.06	0.08	

 wget - Wget command is a Linux command line utility that helps us to download the files from the web. We can download the files from web servers using HTTP, HTTPS and FTP protocols.