Computer Networks
Homework 1

Jaxson Billings

1/29/23

Problem 1

Instance 1 Ping to 2 External

```
jaxsonbillings@instance-1:~$ ping 104.154.206.54
PING 104.154.206.54 (104.154.206.54) 56(84) bytes of data.
64 bytes from 104.154.206.54: icmp_seq=1 ttl=61 time=1.60 ms
64 bytes from 104.154.206.54: icmp_seq=2 ttl=61 time=0.506 ms
64 bytes from 104.154.206.54: icmp_seq=3 ttl=61 time=0.499 ms
64 bytes from 104.154.206.54: icmp_seq=4 ttl=61 time=0.430 ms
64 bytes from 104.154.206.54: icmp_seq=5 ttl=61 time=0.436 ms
64 bytes from 104.154.206.54: icmp_seq=6 ttl=61 time=0.506 ms
64 bytes from 104.154.206.54: icmp_seq=7 ttl=61 time=0.485 ms
64 bytes from 104.154.206.54: icmp_seq=8 ttl=61 time=0.567 ms
64 bytes from 104.154.206.54: icmp_seq=9 ttl=61 time=0.441 ms
64 bytes from 104.154.206.54: icmp_seq=10 ttl=61 time=0.498 ms
64 bytes from 104.154.206.54: icmp_seq=11 ttl=61 time=0.572 ms
64 bytes from 104.154.206.54: icmp_seq=12 ttl=61 time=0.497 ms
^C
--- 104.154.206.54 ping statistics ---
12 packets transmitted, 12 received, 0% packet loss, time 11241ms
rtt min/avg/max/mdev = 0.430/0.586/1.600/0.309 ms
jaxsonbillings@instance-1:~$
```

Instance 1 Ping to 2 Internal

```
jaxsonbillings@instance-1:~$ ping 10.128.0.3
PING 10.128.0.3 (10.128.0.3) 56(84) bytes of data.
64 bytes from 10.128.0.3: icmp_seq=1 ttl=64 time=1.29 ms
64 bytes from 10.128.0.3: icmp_seq=2 ttl=64 time=0.199 ms
64 bytes from 10.128.0.3: icmp_seq=3 ttl=64 time=0.187 ms
64 bytes from 10.128.0.3: icmp_seq=4 ttl=64 time=0.261 ms
64 bytes from 10.128.0.3: icmp_seq=5 ttl=64 time=0.226 ms
64 bytes from 10.128.0.3: icmp_seq=6 ttl=64 time=0.213 ms
64 bytes from 10.128.0.3: icmp_seq=7 ttl=64 time=0.207 ms
64 bytes from 10.128.0.3: icmp_seq=8 ttl=64 time=0.207 ms
64 bytes from 10.128.0.3: icmp_seq=9 ttl=64 time=0.240 ms
64 bytes from 10.128.0.3: icmp_seq=10 ttl=64 time=0.202 ms
64 bytes from 10.128.0.3: icmp_seq=11 ttl=64 time=0.220 ms
64 bytes from 10.128.0.3: icmp_seq=12 ttl=64 time=0.248 ms
^C
--- 10.128.0.3 ping statistics ---
12 packets transmitted, 12 received, 0% packet loss, time 11231ms
rtt min/avg/max/mdev = 0.187/0.308/1.296/0.299 ms
jaxsonbillings@instance-1:~$
```

Instance 2 ping to 1 External

```
jaxsonbillings@instance-2:~$ ping 34.173.32.250
PING 34.173.32.250 (34.173.32.250) 56(84) bytes of data.
64 bytes from 34.173.32.250: icmp_seq=1 ttl=61 time=1.82 ms
64 bytes from 34.173.32.250: icmp_seq=2 ttl=61 time=0.518 ms
64 bytes from 34.173.32.250: icmp_seq=3 ttl=61 time=0.584 ms
64 bytes from 34.173.32.250: icmp_seq=4 ttl=61 time=0.510 ms
64 bytes from 34.173.32.250: icmp_seq=5 ttl=61 time=0.508 ms
64 bytes from 34.173.32.250: icmp_seq=6 ttl=61 time=0.549 ms
64 bytes from 34.173.32.250: icmp_seq=7 ttl=61 time=0.551 ms
64 bytes from 34.173.32.250: icmp_seq=8 ttl=61 time=0.625 ms
64 bytes from 34.173.32.250: icmp_seq=9 ttl=61 time=0.518 ms
64 bytes from 34.173.32.250: icmp_seq=10 ttl=61 time=0.533 ms
64 bytes from 34.173.32.250: icmp_seq=11 ttl=61 time=0.523 ms
64 bytes from 34.173.32.250: icmp_seq=12 ttl=61 time=0.520 ms
^C
--- 34.173.32.250 ping statistics ---
12 packets transmitted, 12 received, 0% packet loss, time 11239ms
rtt min/avg/max/mdev = 0.508/0.647/1.827/0.357 ms
jaxsonbillings@instance-2:~$
```

Instance 2 ping to 1 Internal

```
jaxsonbillings@instance-2:~$ ping 10.128.0.2
PING 10.128.0.2 (10.128.0.2) 56(84) bytes of data.
64 bytes from 10.128.0.2: icmp_seq=1 ttl=64 time=1.32 ms
64 bytes from 10.128.0.2: icmp_seq=2 ttl=64 time=0.229 ms
64 bytes from 10.128.0.2: icmp_seq=3 ttl=64 time=0.250 ms
64 bytes from 10.128.0.2: icmp_seq=4 ttl=64 time=0.203 ms
64 bytes from 10.128.0.2: icmp_seq=5 ttl=64 time=0.178 ms
64 bytes from 10.128.0.2: icmp_seq=6 ttl=64 time=0.232 ms
64 bytes from 10.128.0.2: icmp_seq=7 ttl=64 time=0.189 ms
64 bytes from 10.128.0.2: icmp_seq=8 ttl=64 time=0.260 ms
64 bytes from 10.128.0.2: icmp_seq=9 ttl=64 time=0.188 ms
64 bytes from 10.128.0.2: icmp_seq=10 ttl=64 time=0.213 ms
64 bytes from 10.128.0.2: icmp_seq=11 ttl=64 time=0.180 ms
64 bytes from 10.128.0.2: icmp_seq=12 ttl=64 time=0.210 ms
^C
--- 10.128.0.2 ping statistics ---
12 packets transmitted, 12 received, 0% packet loss, time 11219ms
rtt min/avg/max/mdev = 0.178/0.304/1.322/0.308 ms
jaxsonbillings@instance-2:~$
```

Problem 2

When we ping we get five crucial parts of information back from the system, from which you can see by the screenshots of the outputs above. Here is what they mean.

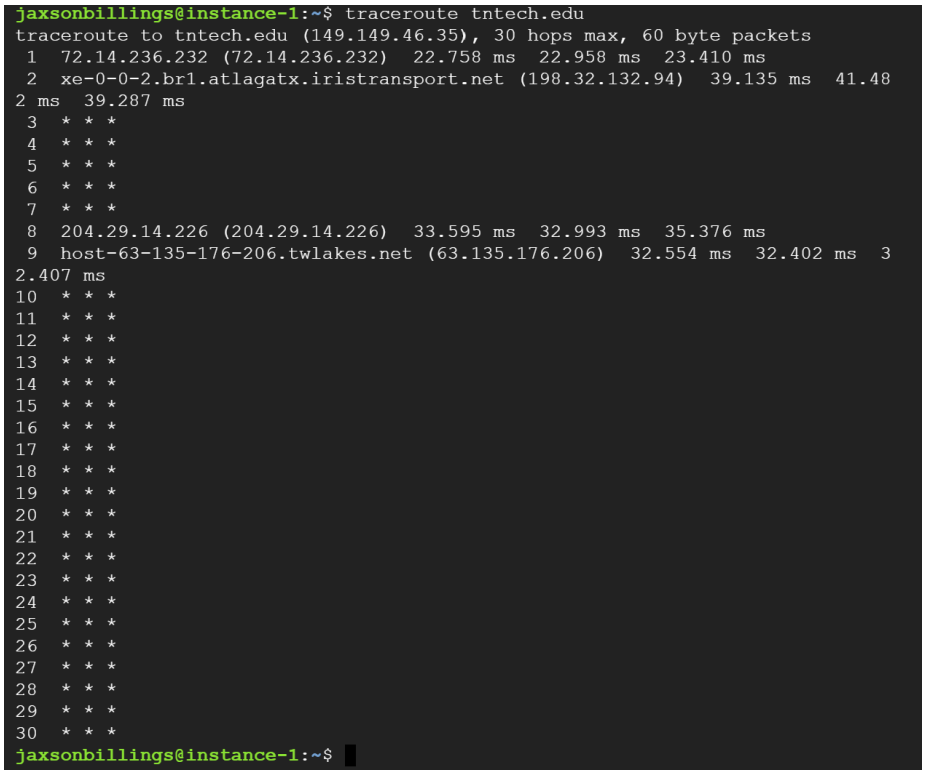
Field	Definition
Bytes	It will show the received bytes in size, usually set at 32 or 64 by default
Reply	This will show you the IP address by which it is pinging and receiving data from and about
icmp_seq	This shows you the current cycle that the system is on and how many times it has pinged
TTL	This is Time-to-Live and represents the maximum IP routers that packets can be sent before they are discarded
Time	The round-trip time in milliseconds from when the ping was sent to when the reply was received

Problem 3

Traceroute was installed

Problem 4

Instance 1 Traceroute



Instance 2 Traceroute

```
jaxsonbillings@instance-2:~$ traceroute tntech.edu
traceroute to tntech.edu (149.149.46.35), 30 hops max, 60 byte packets
 1  72.14.236.232 (72.14.236.232)  23.251 ms  23.701 ms  23.678 ms
 2  xe-0-0-2.br1.atlagatx.iristransport.net (198.32.132.94)  25.476 ms  26.03
3 ms  23.236 ms
 3  * * *
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  204.29.14.226 (204.29.14.226)  35.547 ms  35.451 ms  33.996 ms
 9  host-63-135-176-206.twlakes.net (63.135.176.206)  33.631 ms  33.099 ms ho
st-63-135-176-194.twlakes.net (63.135.176.194)  35.840 ms
10  * * *
11  * * *
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
jaxsonbillings@instance-2:~$
```

Problem 5

Here we have an output that shows our Hop number, RTT and finally our IP Address. This is what each of these mean.

Field	Definition
Hop Number	This is the number of hop that the system is currently on when along the route
RTT Columns	This is the round trip times for your packet to reach the point directed to and back. This can vary in column numbers.
Domain/IP column	This contains the IP address of the router

Problem 6

ifconfig Instance 1

```
jaxsonbillings@instance-1:~$ ifconfig
ens4: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1460
        inet 10.128.0.2  netmask 255.255.255.255  broadcast 0.0.0.0
        inet6 fe80::4001:aff:fe80:2  prefixlen 64  scopeid 0x20<link>
        ether 42:01:0a:80:00:02  txqueuelen 1000  (Ethernet)
        RX packets 3930  bytes 27688673 (27.6 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 3370  bytes 372548 (372.5 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 200  bytes 20346 (20.3 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 200  bytes 20346 (20.3 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

jaxsonbillings@instance-1:~$
```

ifconfig Instance 2

```
jaxsonbillings@instance-2:~$ ifconfig
ens4: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1460
        inet 10.128.0.3  netmask 255.255.255.255  broadcast 0.0.0.0
        inet6 fe80::4001:aff:fe80:3  prefixlen 64  scopeid 0x20<link>
        ether 42:01:0a:80:00:03  txqueuelen 1000  (Ethernet)
        RX packets 4234  bytes 27733653 (27.7 MB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 3890  bytes 606457 (606.4 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 218  bytes 23167 (23.1 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 218  bytes 23167 (23.1 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

jaxsonbillings@instance-2:~$
```

Problem 7

The following information is below:

IP Address: 10.128.0.2

Ethernet Address: 42:01:0a:80:00:02 txqueuelen 1000

Netmask: 255.255.255.255

MTU: 1460

Problem 8

Instance 1 IP Route

```
jaxsonbillings@instance-1:~$ ip route show
default via 10.128.0.1 dev ens4 proto dhcp src 10.128.0.2 metric 100
10.128.0.1 dev ens4 proto dhcp scope link src 10.128.0.2 metric 100
jaxsonbillings@instance-1:~$
```

Instance 2 IP Route

```
jaxsonbillings@instance-2:~$ ip route show
default via 10.128.0.1 dev ens4 proto dhcp src 10.128.0.3 metric 100
10.128.0.1 dev ens4 proto dhcp scope link src 10.128.0.3 metric 100
jaxsonbillings@instance-2:~$
```

Problem 9

The first line says the default route for packets is through a virtual machine and is using the ip addresses of 10.182.0.2 and 10.182.0.3 depending on the instance.