Programs

Note: There are multiple variance of the same file in different team members directory. Every team member proactively collaborated for the development of these programs.

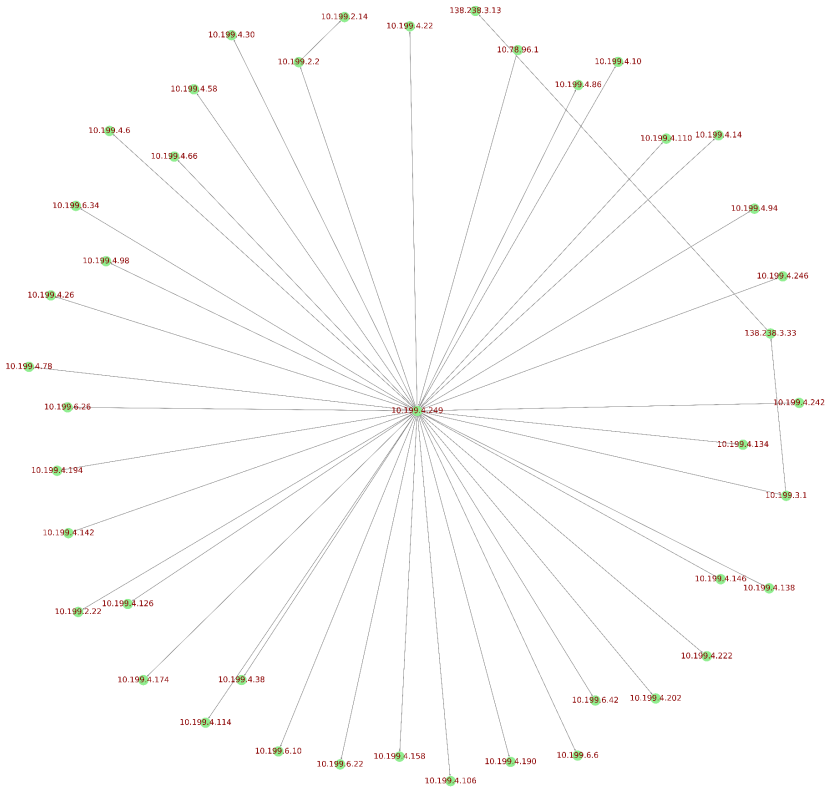
1. Python program to find the traceroute and the subnet: Oct 3, 2023
    a. Made improvements by all of the team members throughout the project and made their own variance to find the trace routes
2. Started data collection from different locations of Howard University Oct 12, 2023
    a. Sanjay Subedi
        i. Primary data collector from iLab
    b. Ujjwal Adhikari
        i. Primary data collector from Chem Building and Stokes Library
    c. Manish Niure
        i. Primary data collector from ilab, ugl and mackey building
    d. Prem Oli
        i. Primary data collector from CEA, biology building and in front of iLab.
    e. Pradeep Lamichhane
        i. Primary data collector from CEA, Social Building, Chem Building(10.116) and UGL(10.199)
3. Started playing with the data to form some analysis and how to create the topology based on the data Oct 16, 2023
    a. Researched about the different possibility of reading the files and available libraries to create the topology
    b. Developed a python program that would parse the given traceroute file of data and create topology graph using networkx library. Oct 18, 2023
    c. As there were more traceroute files with many routers the current program seemed not to work (or the topology graph seemed messy). So, we developed a new code that processes traceroute data, filters active IP addresses belonging to specific subnets, and organizes them into routes, and saves the routes into a "routes.txt" file for further analysis. Oct 23, 2023
        i. We then used the routes.txt to form a topology graph which showed the more clean and easy to figure out which topology structure it followed.

Topology Fragments:

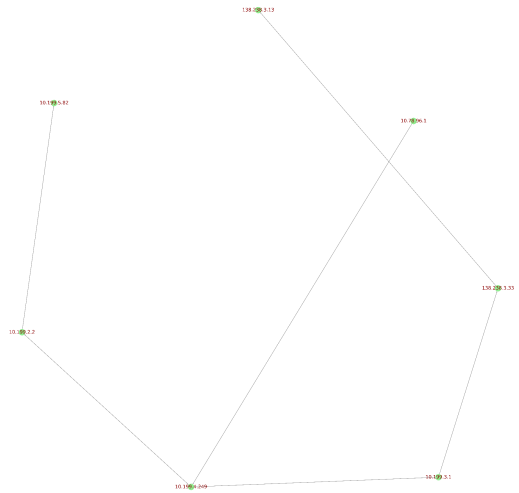
1. iLab Topology Fragment (Sanjaya Subedi - @02988775)
   Screenshot of program output:

```
1186732    1 hops away: 10.78.96.1
1186733     2 hops away: 10.199.4.249
1186734     3 hops away: 10.199.3.1
1186735     No reply, Time out at 4 hops away.
1186736    For traceroute: 10.199.255.253
1186737    1 hops away: 10.78.96.1
1186738     2 hops away: 10.199.4.249
1186739     No reply, Time out at 3 hops away.
1186740    For traceroute: 10.199.255.254
1186741    1 hops away: 10.78.96.1
1186742     2 hops away: 10.199.4.249
1186743     3 hops away: 10.199.3.1
1186744     No reply, Time out at 4 hops away.
1186745    For traceroute: 10.199.255.255
1186746    1 hops away: 10.78.96.1
1186747     2 hops away: 10.199.4.249
1186748     3 hops away: 10.199.3.1
1186749     4 hops away: 66.44.94.195
1186750     5 hops away: 138.238.3.33
1186751     6 hops away: 138.238.3.13
1186752     No reply, Time out at 7 hops away.
1186753
```

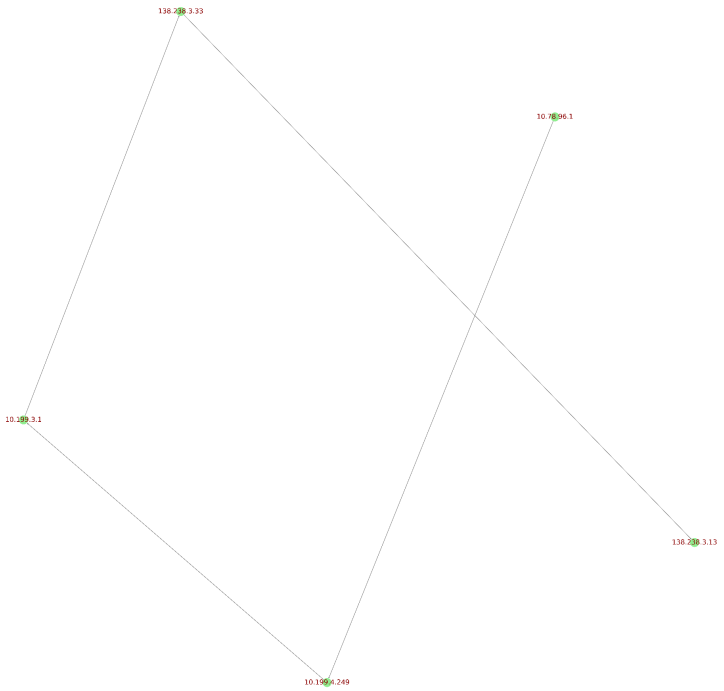
a. 10.199 subnet



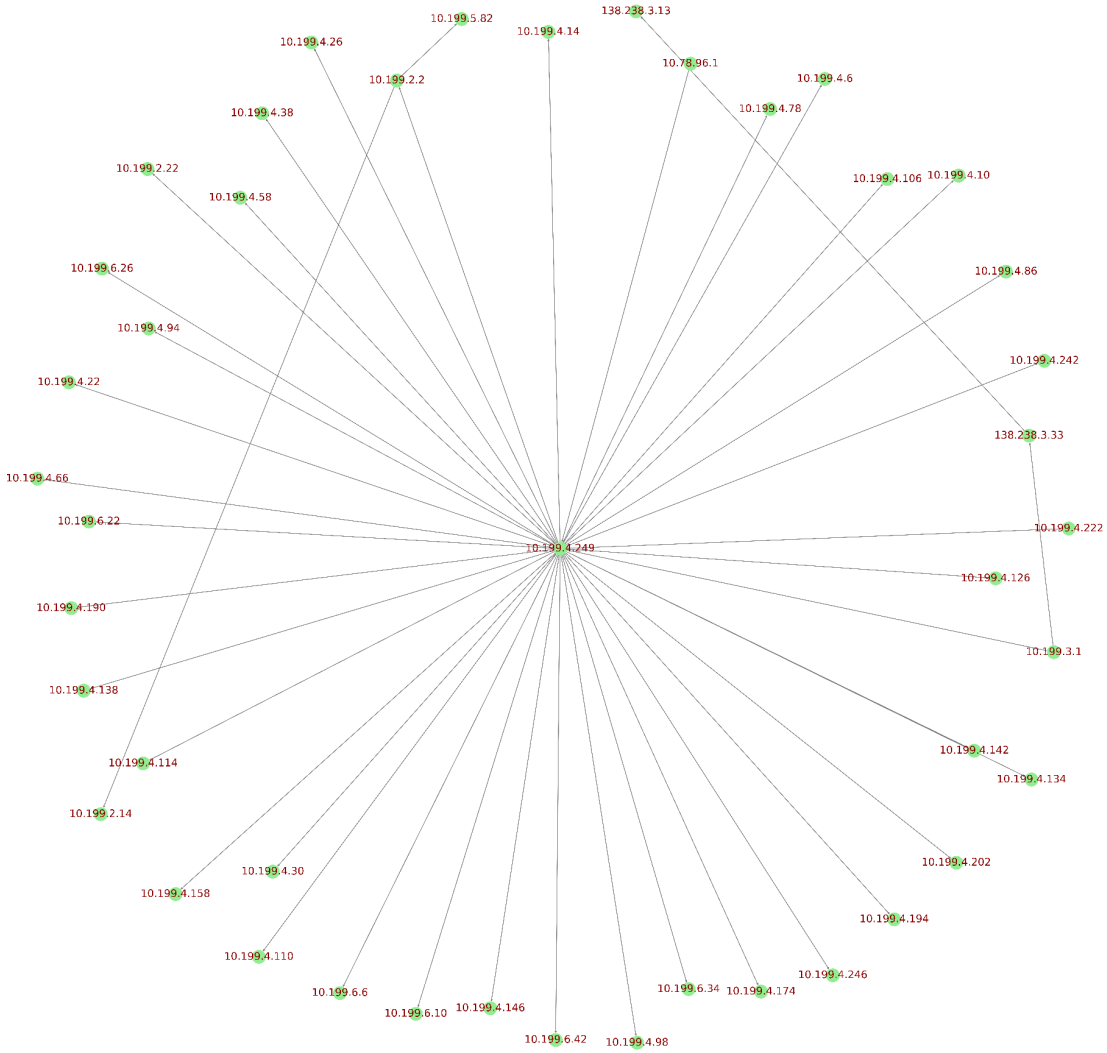
b. 10.26 subnet



c. 10.78 subnet

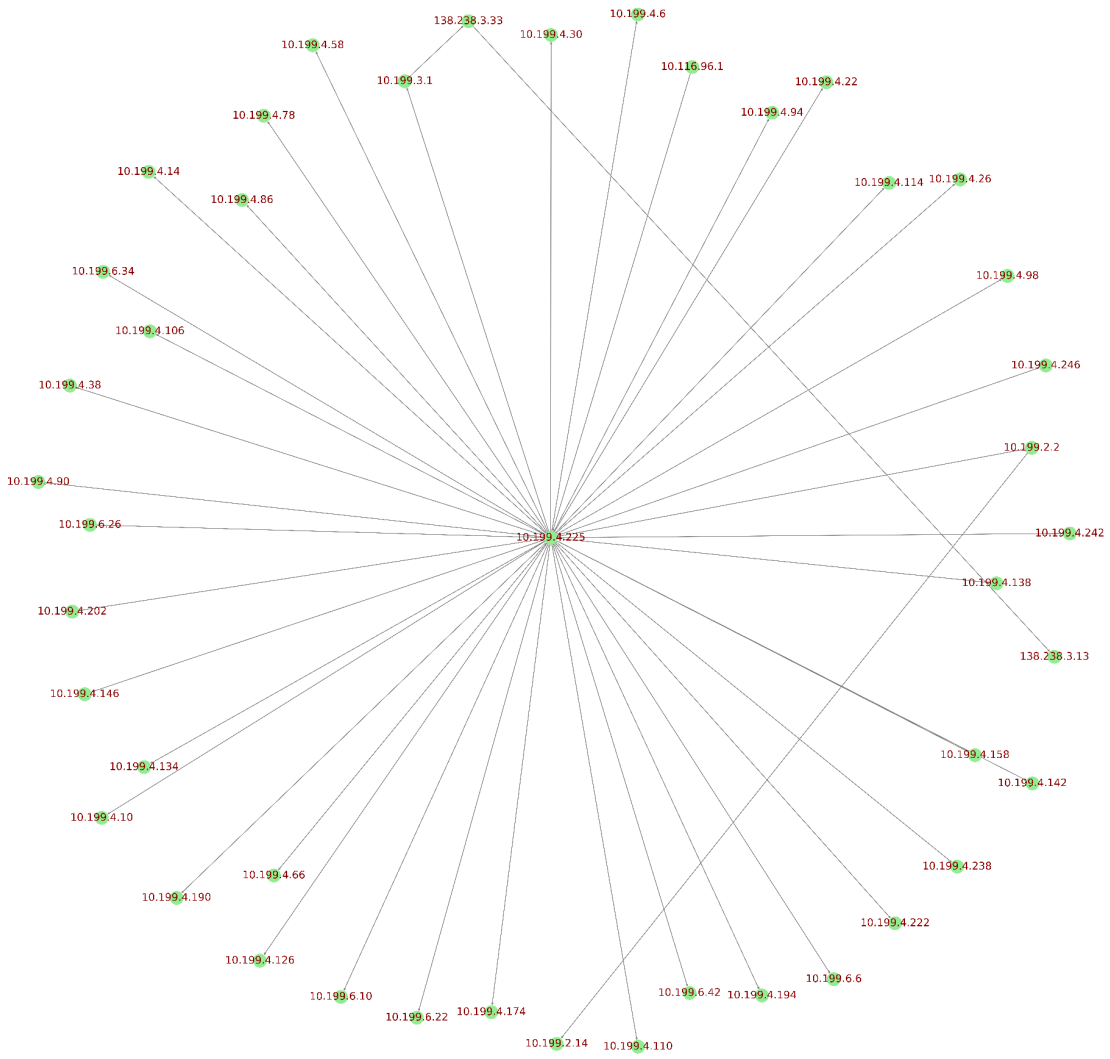


Below is the diagram of the final fragment of ilab combining all of these subnets:

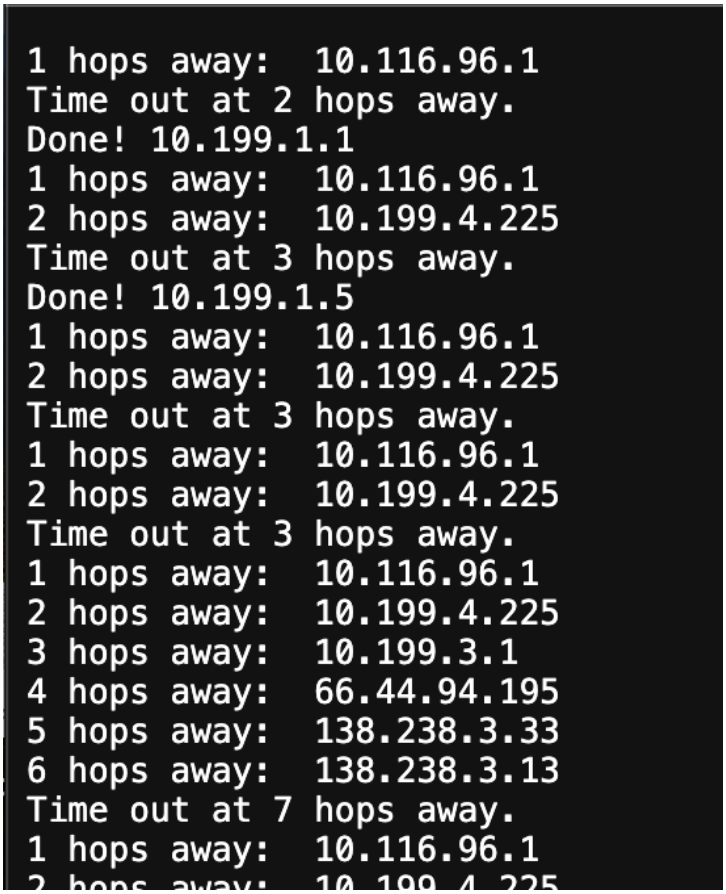


2. Chemistry Building Topology Fragment (10.199)

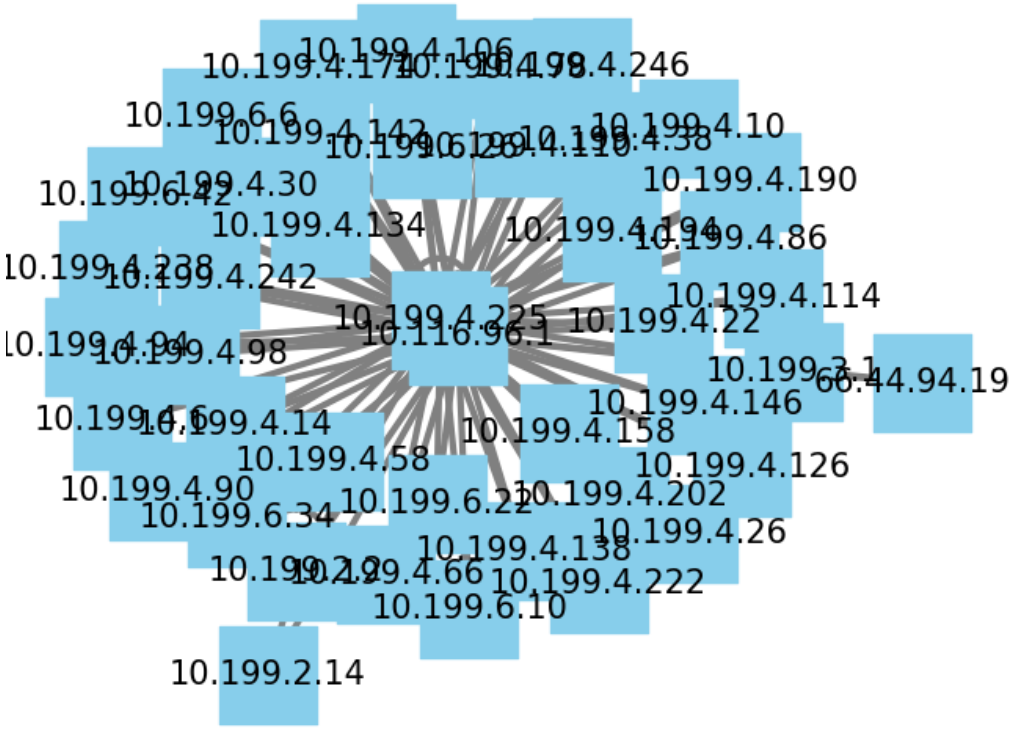
- Discovered by Ujjwal Adhikari (@02962931). Below is the diagram of the fragment: (Oct 24, 2023)

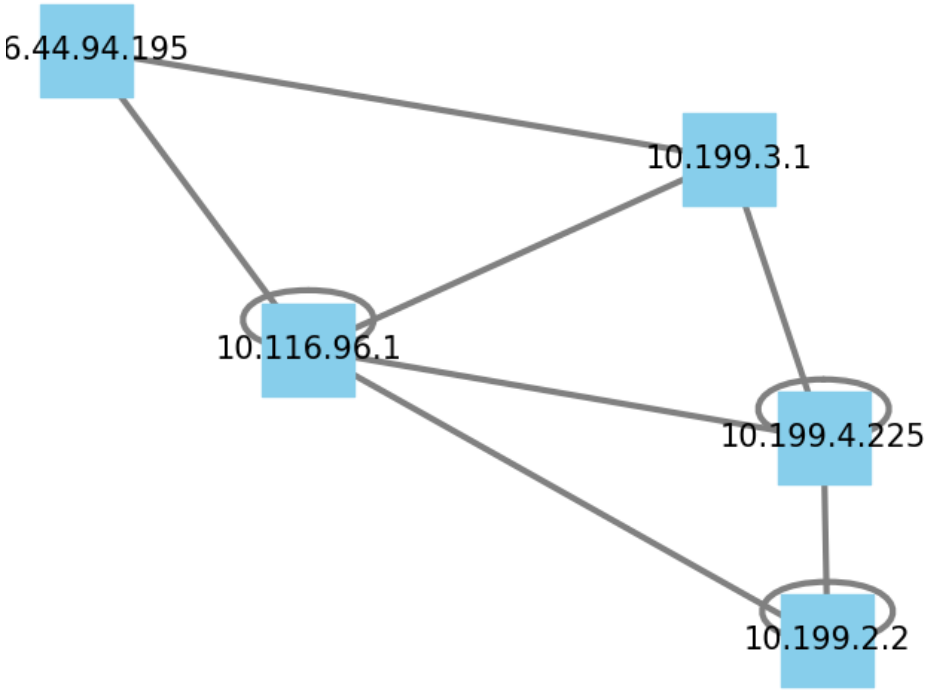


- Program output (Oct 13, 2023)

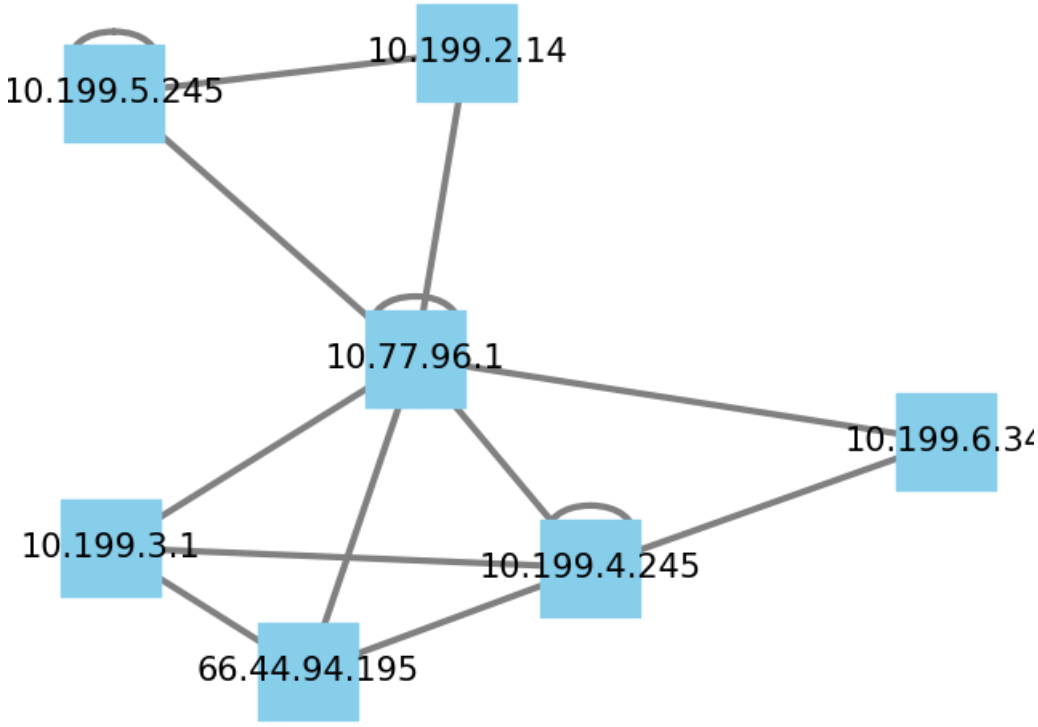


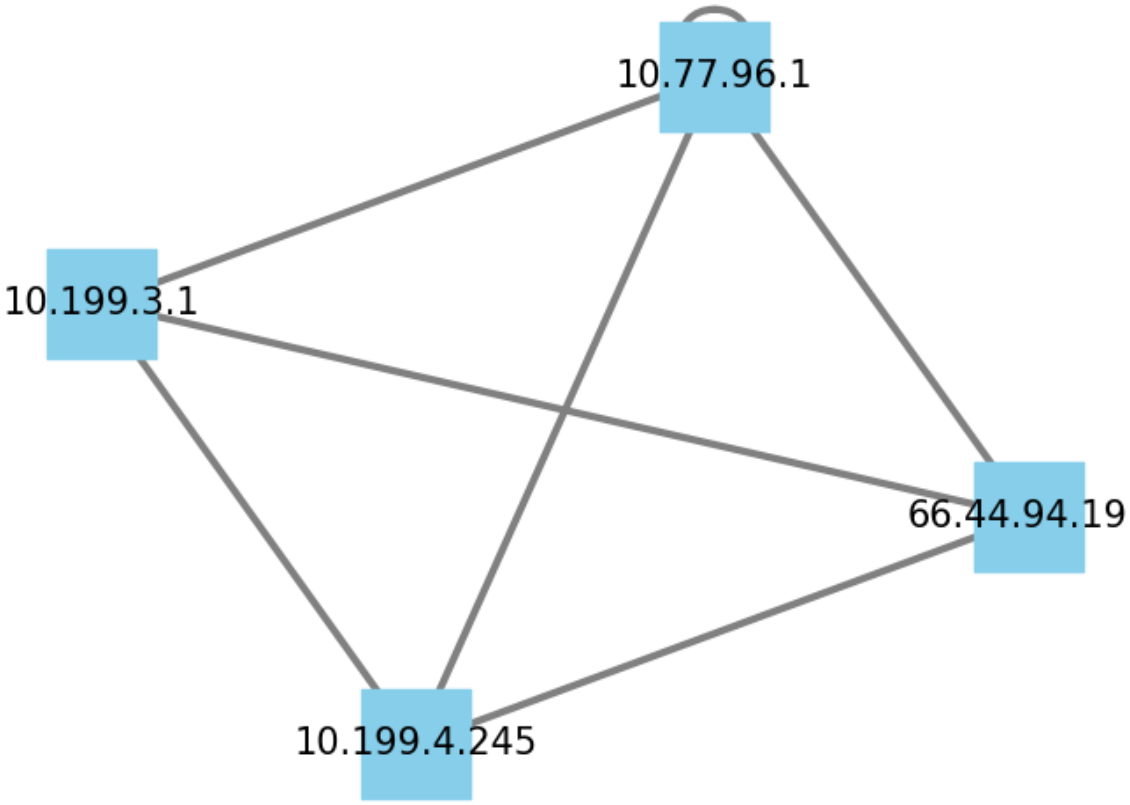
- Initial topology formed (Oct 19, 2023)





3. Stokes Library:
    a. Discovered by Ujjwal Adhikari (@02962931). Below is the diagram of the fragment: (Oct 19, 2023) (10.199, 10.77)





- Program output (Oct 14, 2023)

```
For ip address 10.77.1.1
Destination reached, Time out at 1 hops away.

For ip address 10.77.1.5
No reply, Time out at 1 hops away.
No reply, Time out at 2 hops away.
No reply, Time out at 3 hops away.
No reply, Time out at 4 hops away.
No reply, Time out at 5 hops away.
No reply, Time out at 6 hops away.
No reply, Time out at 7 hops away.
No reply, Time out at 8 hops away.
No reply, Time out at 9 hops away.
No reply, Time out at 10 hops away.
No reply, Time out at 11 hops away.
No reply, Time out at 12 hops away.
No reply, Time out at 13 hops away.
No reply, Time out at 14 hops away.
No reply, Time out at 15 hops away.
No reply, Time out at 16 hops away.
No reply, Time out at 17 hops away.
```

4. Topology Fragments

   Discovered by Pradeep Lamichhane (@02967686). Below is the diagram of the program outputs:

   Screenshot of program output(Ugl - 199 subnet) → October 16

```
1 hops away: 10.41.96.1
Destination 10.199.1.1 reached in 2 hops. Source: 10.199.1.1
===============
1 hops away: 10.41.96.1
2 hops away: 10.199.4.229
Destination 10.199.1.2 reached in 3 hops. Source: 10.199.1.2
===============
1 hops away: 10.41.96.1
2 hops away: 10.199.4.229
3 hops away: 10.199.2.2
4 hops away: 10.199.2.14
Destination 10.199.1.3 reached in 5 hops. Source: 10.199.1.3
===============
1 hops away: 10.41.96.1
2 hops away: 10.199.4.229
3 hops away: 10.199.2.2
Destination 10.199.1.4 reached in 4 hops. Source: 10.199.1.4
```

Screenshot of program output(Chem-116 subnet) → October 20

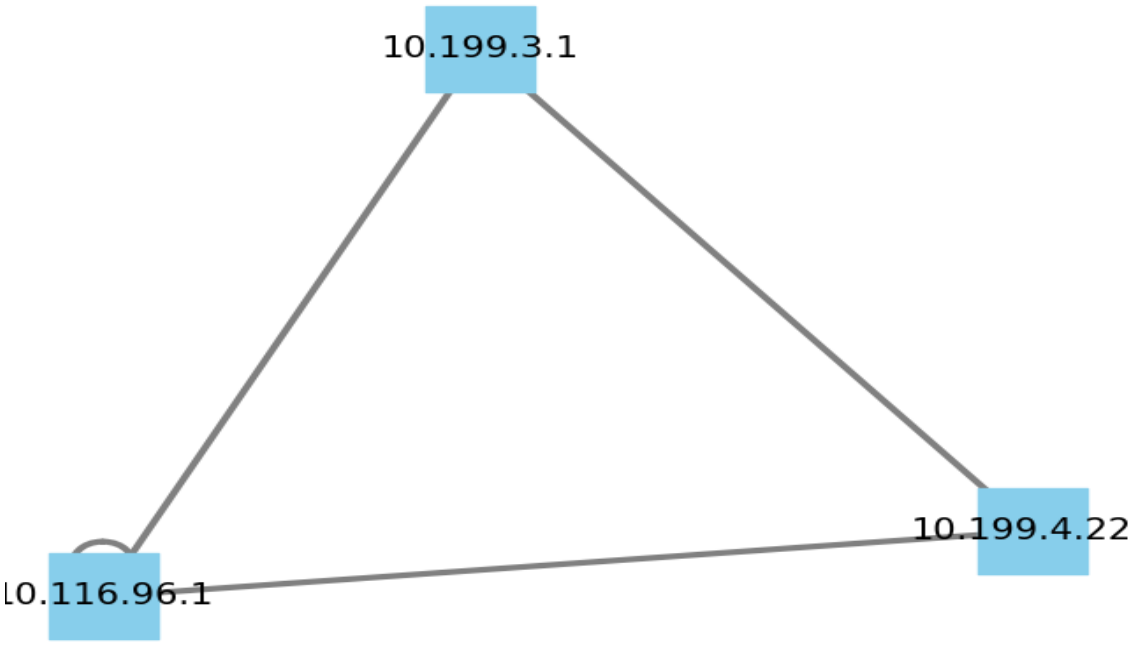
```
1 hops away: 10.116.96.1
Time out at 2 hops away for 10.116.1.21.
===============
1 hops away: 10.116.96.1
2 hops away: 10.199.4.225
3 hops away: 10.199.3.1
4 hops away: 66.44.94.195
5 hops away: 138.238.3.33
6 hops away: 138.238.3.13
Time out at 7 hops away for 10.116.20.1.
===============
1 hops away: 10.116.96.1
Time out at 2 hops away for 10.116.1.22.
===============
1 hops away: 10.116.96.1
2 hops away: 10.199.4.225
3 hops away: 10.199.3.1
4 hops away: 66.44.94.195
5 hops away: 138.238.3.33
6 hops away: 138.238.3.13
Time out at 7 hops away for 10.116.20.2.
===============
1 hops away: 10.116.96.1
2 hops away: 10.199.4.225
3 hops away: 10.199.3.1
4 hops away: 66.44.94.195
5 hops away: 138.238.3.33
6 hops away: 138.238.3.13
Destination 10.116.20.3 reached in 7 hops. Source: 208.58.82.153
===============
```

Screenshot of program output(10.29 subnet) → October 23

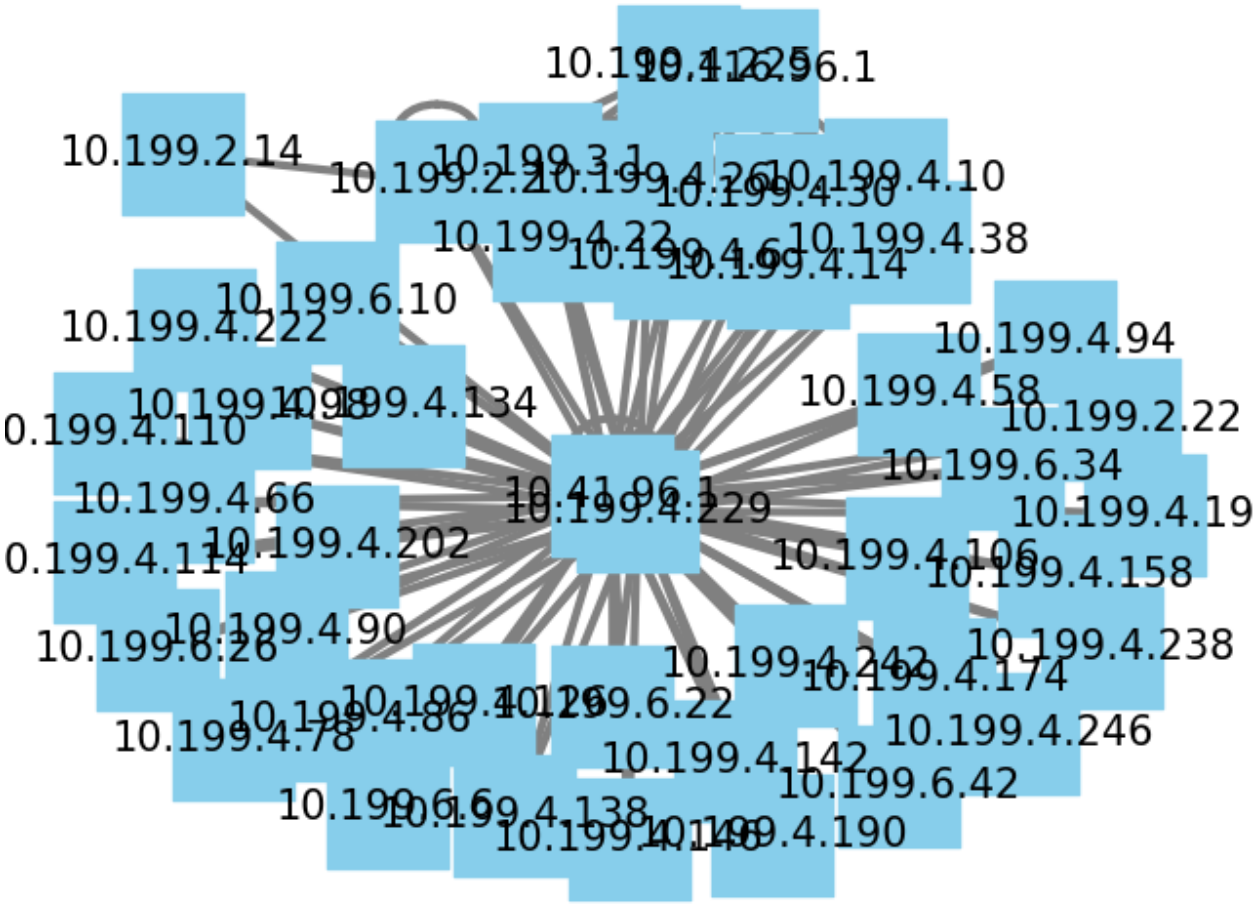
```
Trace Route: 10.29.0.0
1 hops away: 10.29.96.1
2 hops away: 10.199.4.5
Timeout at 3 hops away for 10.29.0.0
------------------------------------------------
Trace Route: 10.29.0.1
1 hops away: 10.29.96.1
2 hops away: 10.199.4.5
Timeout at 3 hops away for 10.29.0.1
------------------------------------------------
Trace Route: 10.29.0.2
1 hops away: 10.29.96.1
2 hops away: 10.199.4.5
3 hops away: 10.199.3.1
4 hops away: 66.44.94.195
5 hops away: 138.238.3.33
6 hops away: 138.238.3.13
Timeout at 7 hops away for 10.29.0.2
------------------------------------------------
Trace Route: 10.29.0.3
1 hops away: 10.29.96.1
2 hops away: 10.199.4.5
Timeout at 3 hops away for 10.29.0.3
------------------------------------------------
```

Discovered by Pradeep Lamichhane (@02967686). Below is the diagram of the topology fragments:

Initial topology fragments: Initial → October 16 to October 20
-Chem building (subnet 10.199)

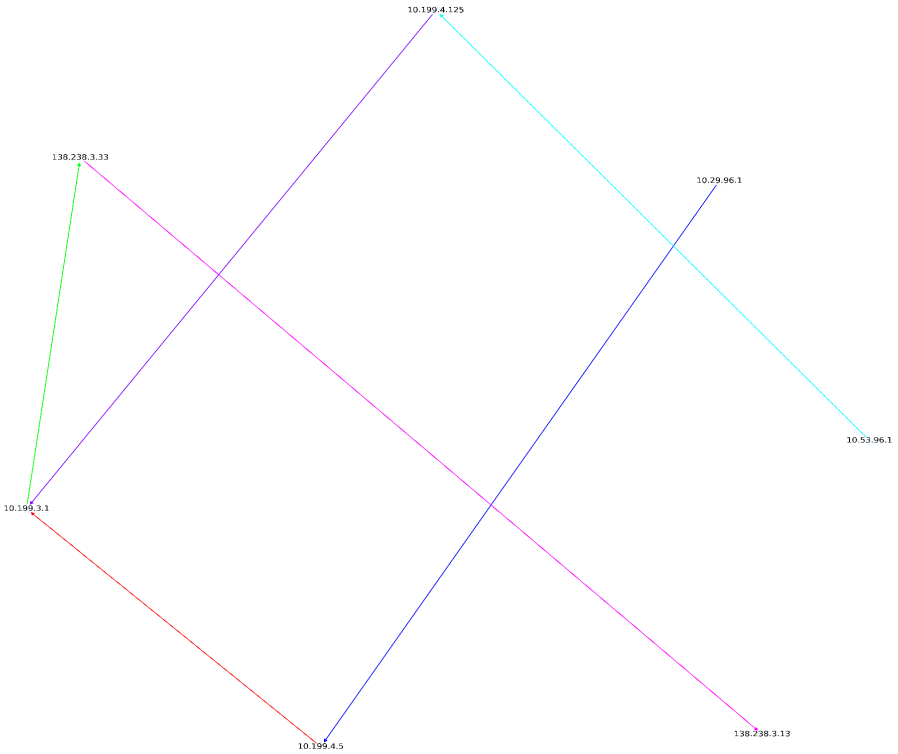


UGL building(subnet 10.199)

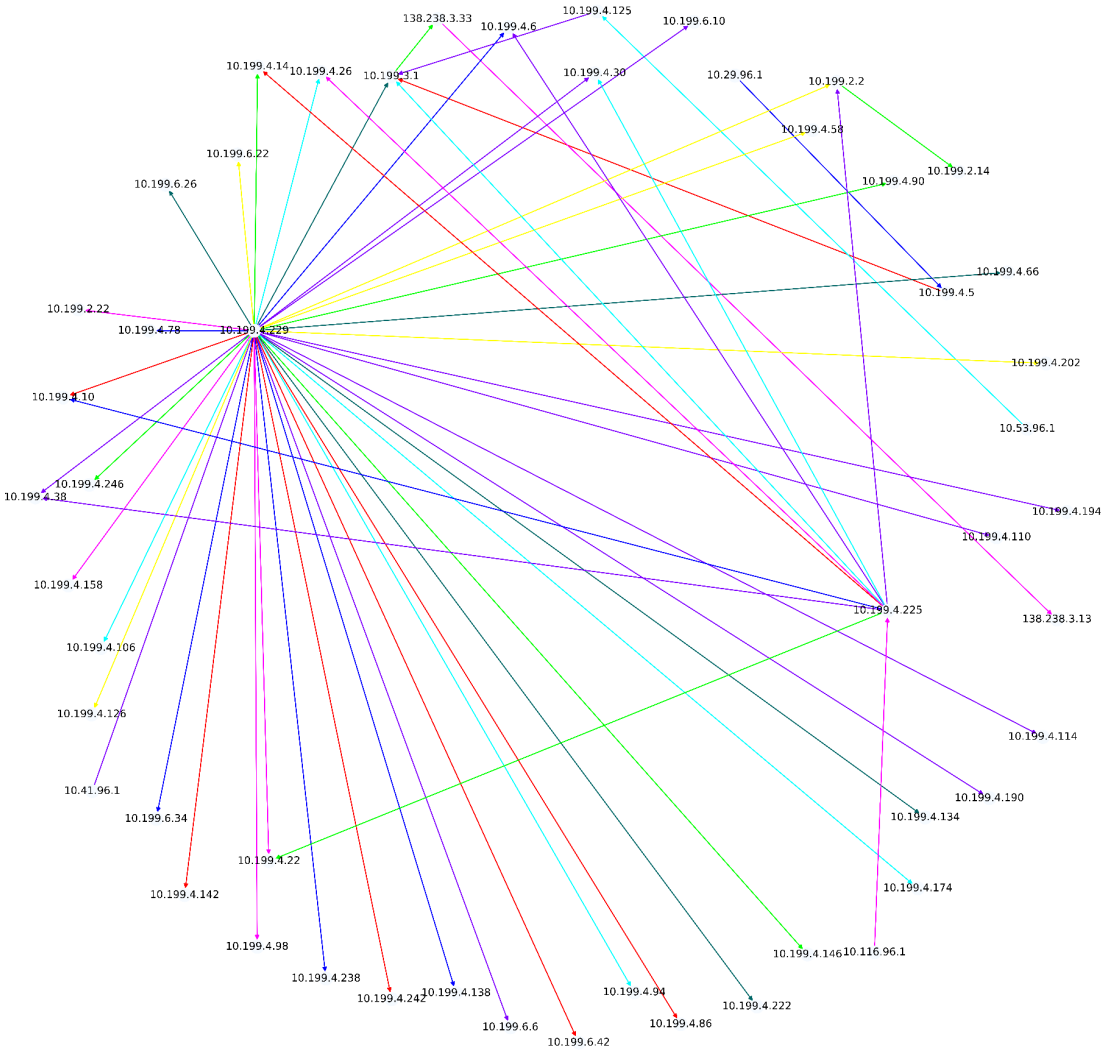


Final topology fragments: Finalized→ October 23 to October 25

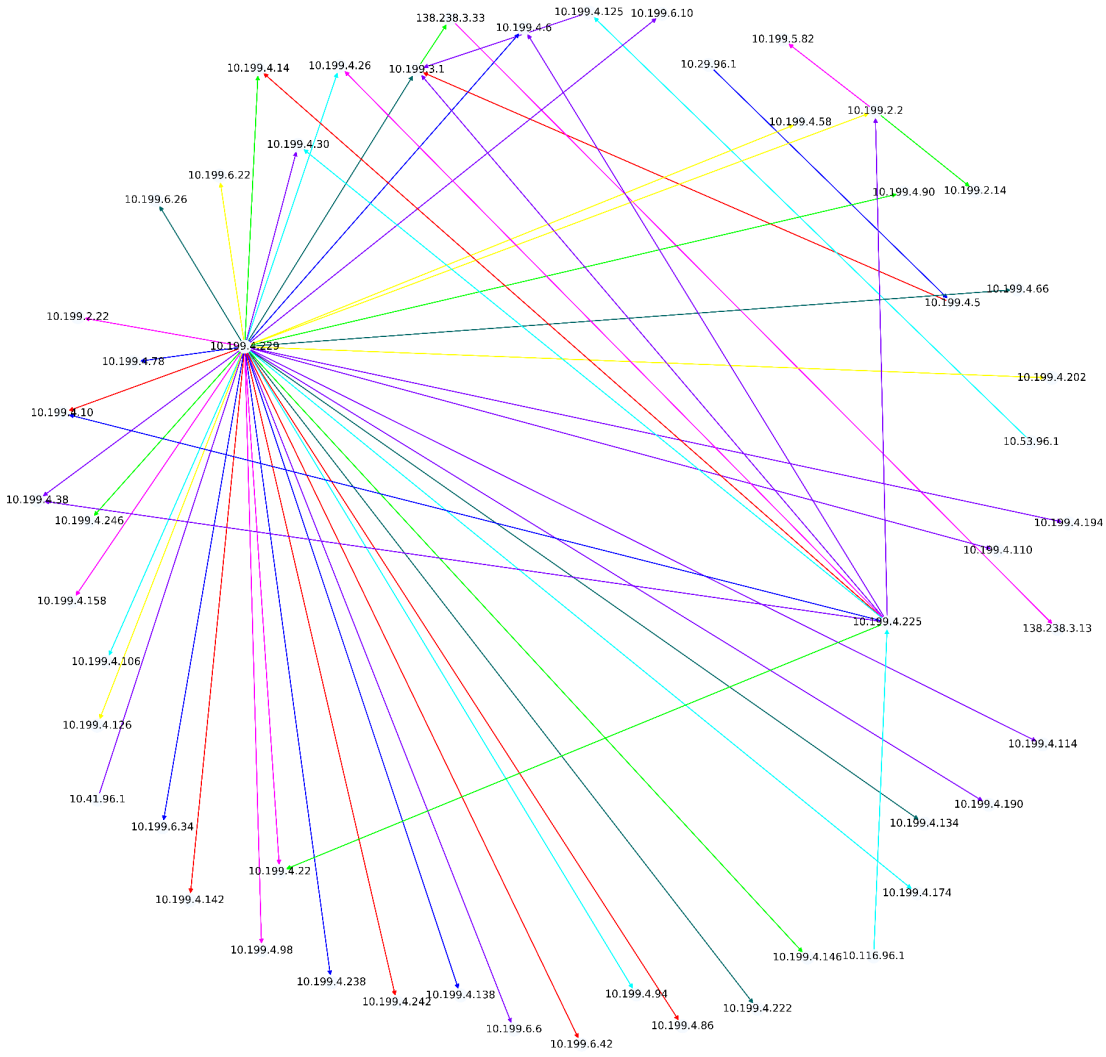
a. 10.53 and 10.29 subnet(combined data from front of CEA building and Social building)



b. 10.53 and 10.29 and 10.199 subnets(Combined data from Social building, CEA and UGL-subnet 199)



c. 10.53 and 10.29 and 10.199 and 10.26 subnets(Combined from CEA, Social Building, UGL-10.199 and Chemistry building-10.26)

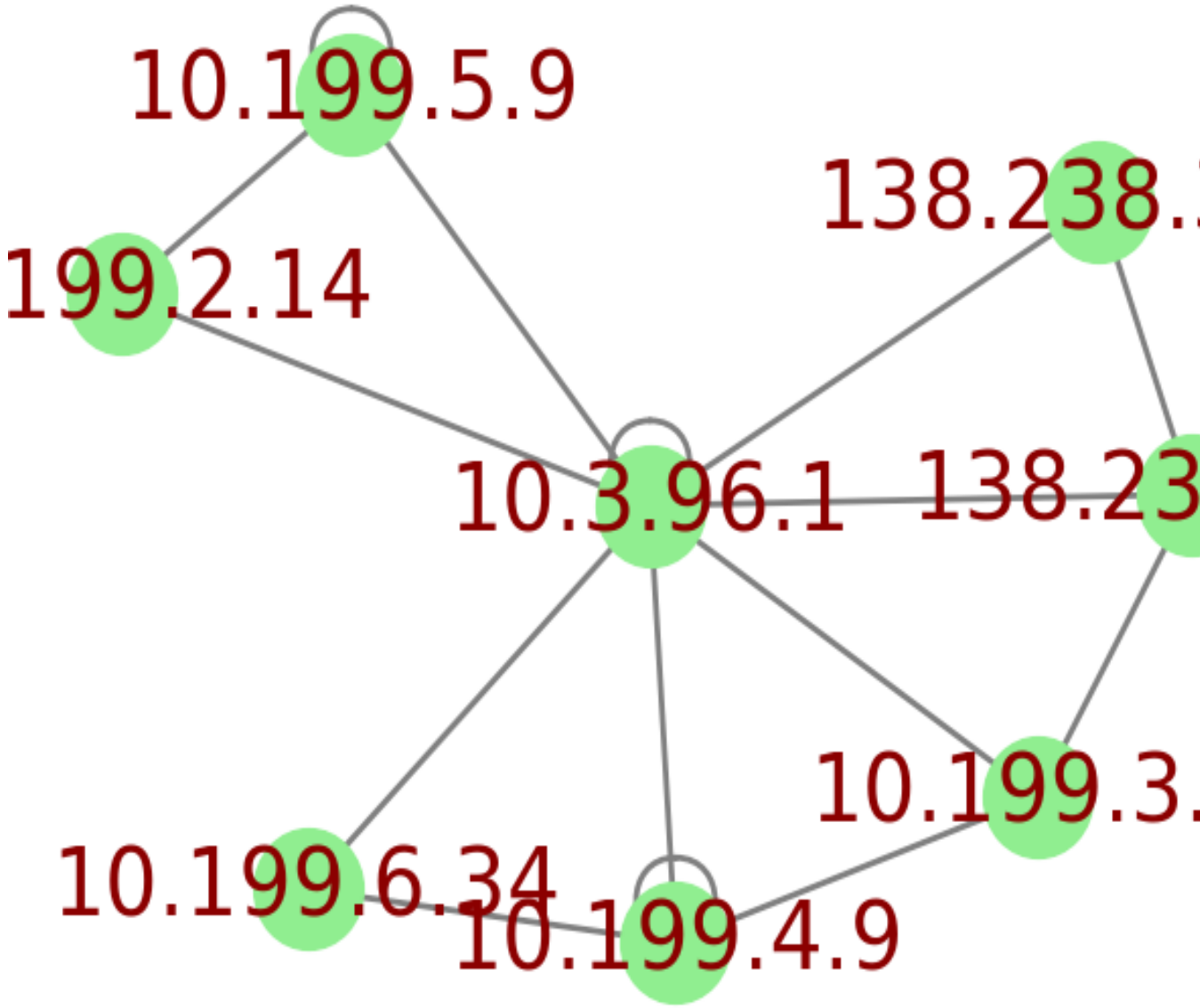

138.238.3.33
10.199.4.125
10.199.6.10
10.199.4.6
10.199.5.82
10.199.4.14
10.199.4.26
10.199.3.1
10.29.96.1
10.199.2.2
10.199.4.58
10.199.4.30
10.199.6.22
10.199.4.90
10.199.2.14
10.199.6.26
10.199.4.66
10.199.4.5
10.199.2.22
10.199.4.229
10.199.4.78
10.199.4.202
10.199.4.10
10.53.96.1
10.199.4.38
10.199.4.194
10.199.4.246
10.199.4.110
10.199.4.158
10.199.4.225
138.238.3.13
10.199.4.106
10.199.4.126
10.199.4.114
10.41.96.1
10.199.4.190
10.199.6.34
10.199.4.134
10.199.4.22
10.199.4.174
10.199.4.142
10.199.4.98
10.199.4.146
10.116.96.1
10.199.4.238
10.199.4.242
10.199.4.138
10.199.4.94
10.199.4.222
10.199.6.6
10.199.4.86
10.199.6.42

5. **Mackey and Ugl Building Topology (Manish Niure@02969739)**
   Topology Fragment Of Mackey Building

Some Portion Of Output :

Date : Oct 19 , 2023
Mackey Building

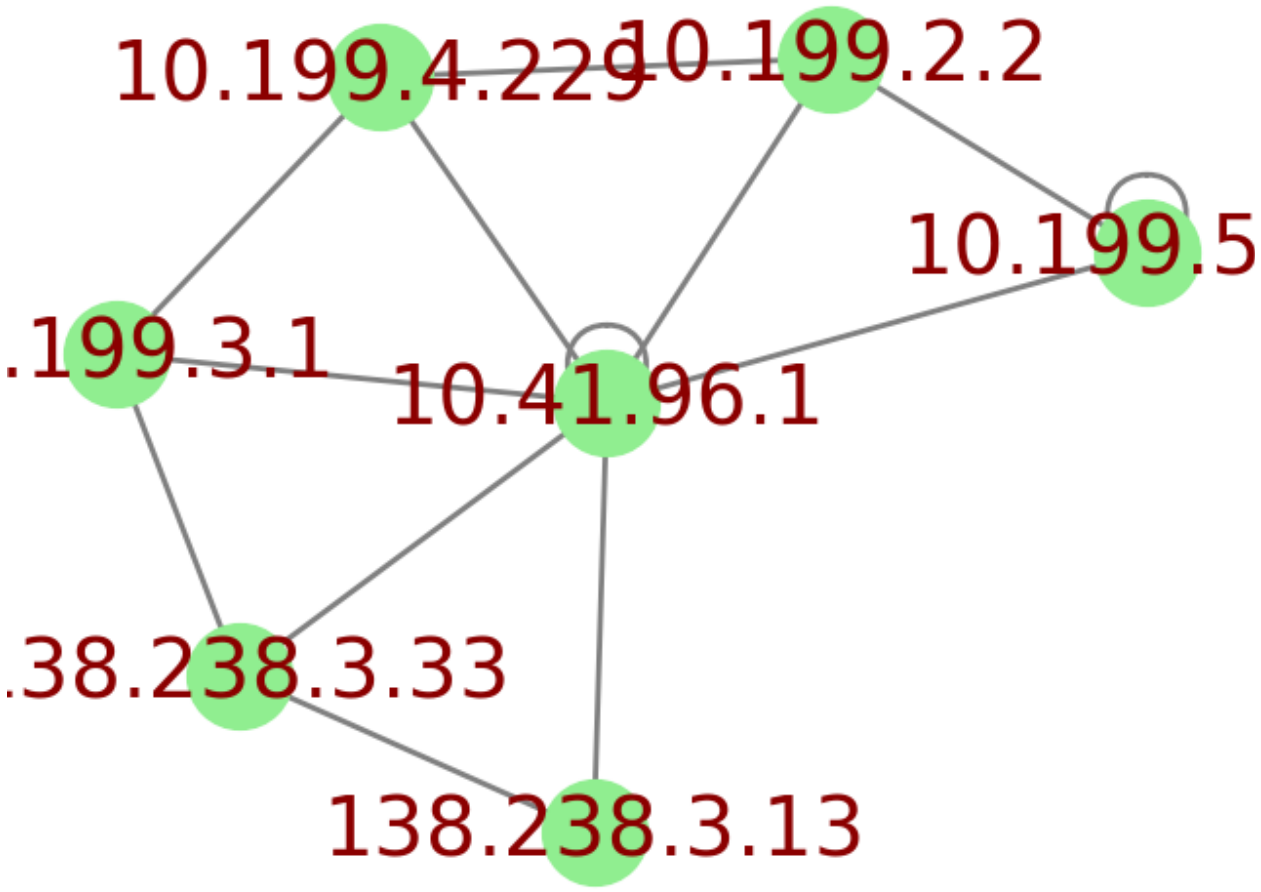
```
1 hops away: 10.3.96.1
2 hops away: 10.199.4.9
3 hops away: 10.199.3.1
4 hops away: 66.44.94.195
5 hops away: 138.238.3.33
6 hops away: 138.238.3.13
Time out at 7 hops away for 10.199.1.13.
===============
1 hops away: 10.3.96.1
2 hops away: 10.199.4.9
3 hops away: 10.199.3.1
4 hops away: 66.44.94.195
5 hops away: 138.238.3.33
6 hops away: 138.238.3.13
Time out at 7 hops away for 10.199.1.17.
===============
1 hops away: 10.3.96.1
2 hops away: 10.199.4.9
3 hops away: 10.199.3.1
4 hops away: 66.44.94.195
5 hops away: 138.238.3.33
6 hops away: 138.238.3.13
Time out at 7 hops away for 10.199.1.21.
```

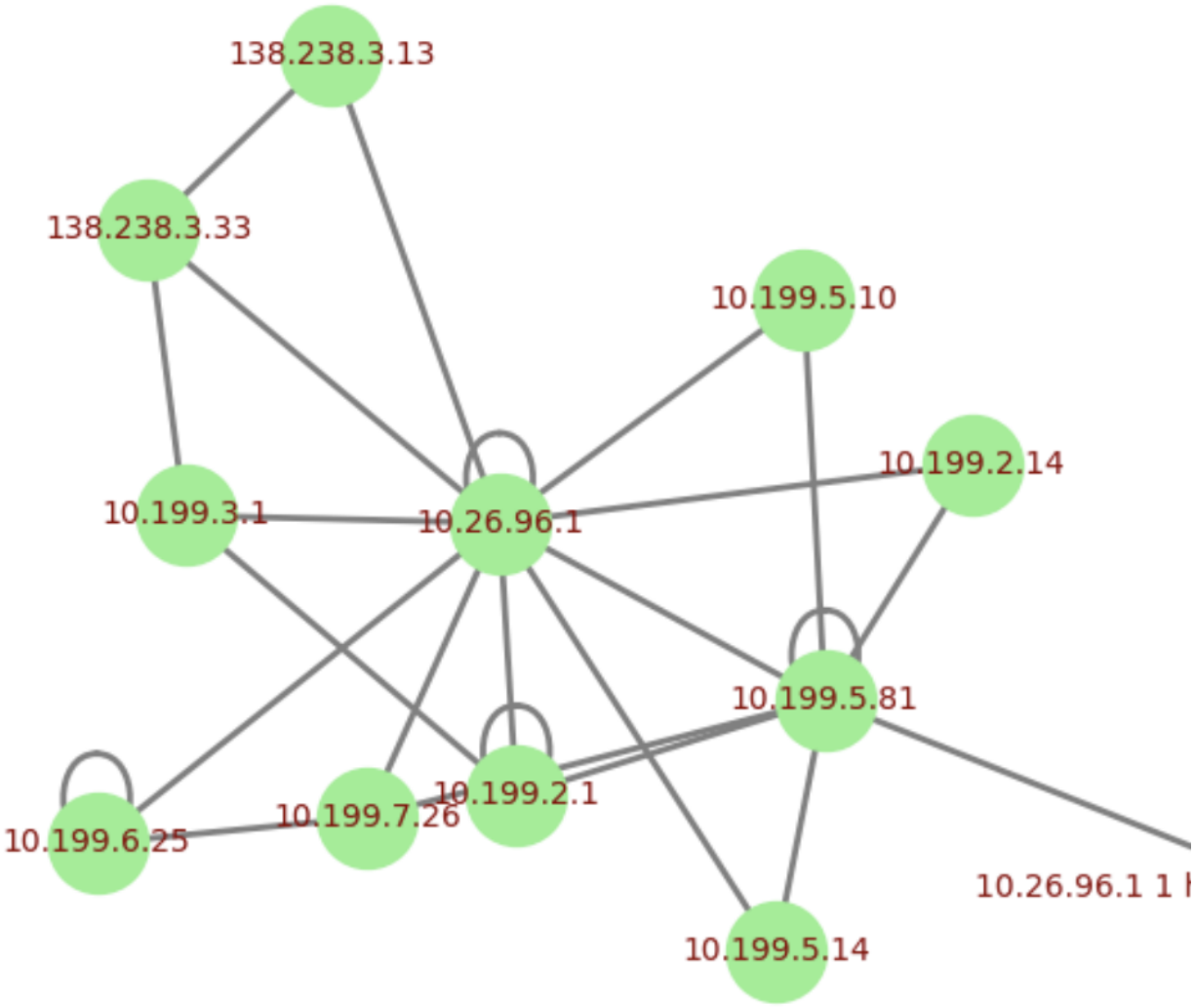

10.199.5.9
138.238.
199.2.14
10.3.96.1
138.23
10.199.3.
10.199.6.34
10.199.4.9

6.

Ugl with subnet 26
Date : Oct 16, 2023

```
1 hops away: 10.41.96.1
2 hops away: 10.199.4.229
3 hops away: 10.199.3.1
4 hops away: 66.44.94.195
5 hops away: 138.238.3.33
6 hops away: 138.238.3.13
Time out at 7 hops away for 10.26.22.80.
===============
1 hops away: 10.41.96.1
2 hops away: 10.199.4.229
3 hops away: 10.199.3.1
4 hops away: 66.44.94.195
5 hops away: 138.238.3.33
6 hops away: 138.238.3.13
Time out at 7 hops away for 10.26.22.81.
```





LKD Building topology

Prem (@02992540)

Program

trace_at_location.py and trace_prefix.py

Time: Oct 3, 2023

Find script in Script.pdf

all_active_ips.py and topology.py

Time: Oct 18, 2023

Topology fragments

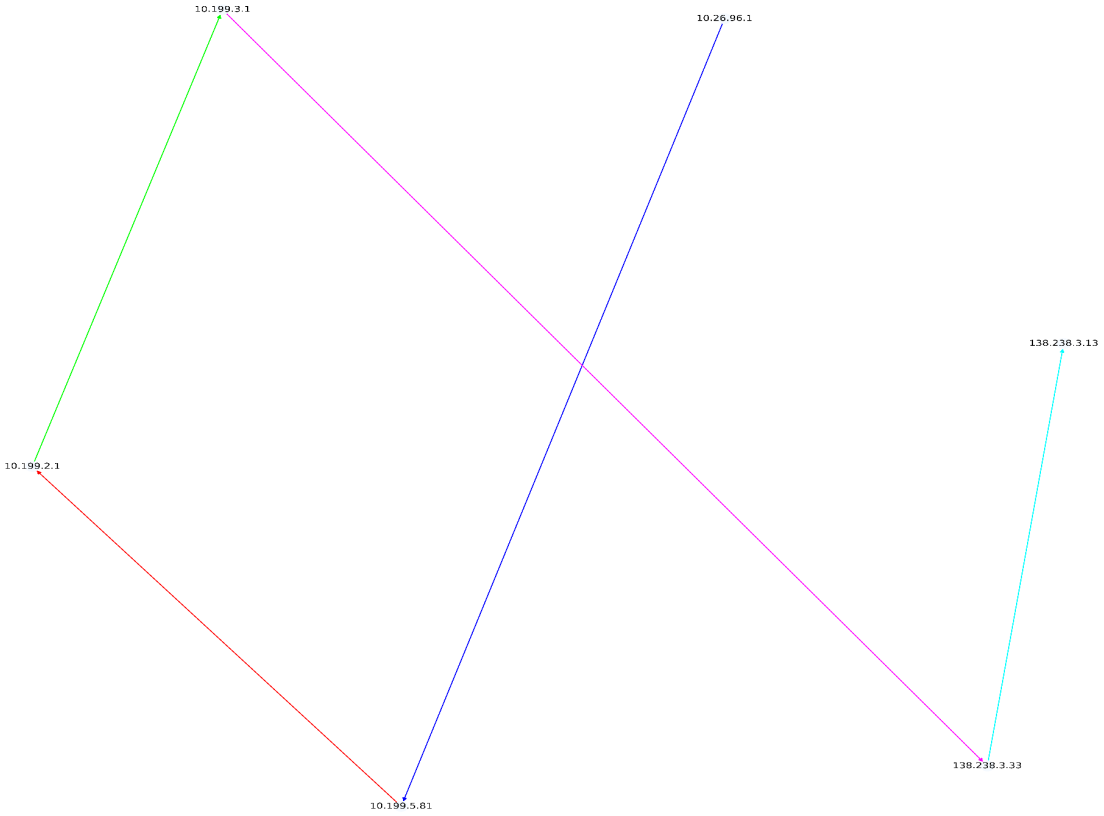
For prefix: 10.26

Time: Oct 9, 2023

Output:

```
Trace Route: 10.26.0.0
1 hops away: 10.26.96.1
2 hops away: 10.199.5.81
3 hops away: 10.199.2.1
Timeout at 4 hops away for 10.26.0.0
------------------------------------------------
Trace Route: 10.26.0.1
1 hops away: 10.26.96.1
2 hops away: 10.199.5.81
3 hops away: 10.199.2.1
4 hops away: 10.199.3.1
5 hops away: 66.44.94.195
6 hops away: 138.238.3.33
7 hops away: 138.238.3.13
Timeout at 8 hops away for 10.26.0.1
------------------------------------------------
Trace Route: 10.26.0.2
1 hops away: 10.26.96.1
2 hops away: 10.199.5.81
3 hops away: 10.199.2.1
4 hops away: 10.199.3.1
5 hops away: 66.44.94.195
6 hops away: 138.238.3.33
7 hops away: 138.238.3.13
Destiation unreachable at 8 hops away for 10.26.0.2
------------------------------------------------
```

Time: Oct 19, 2023



For prefix: 10.127

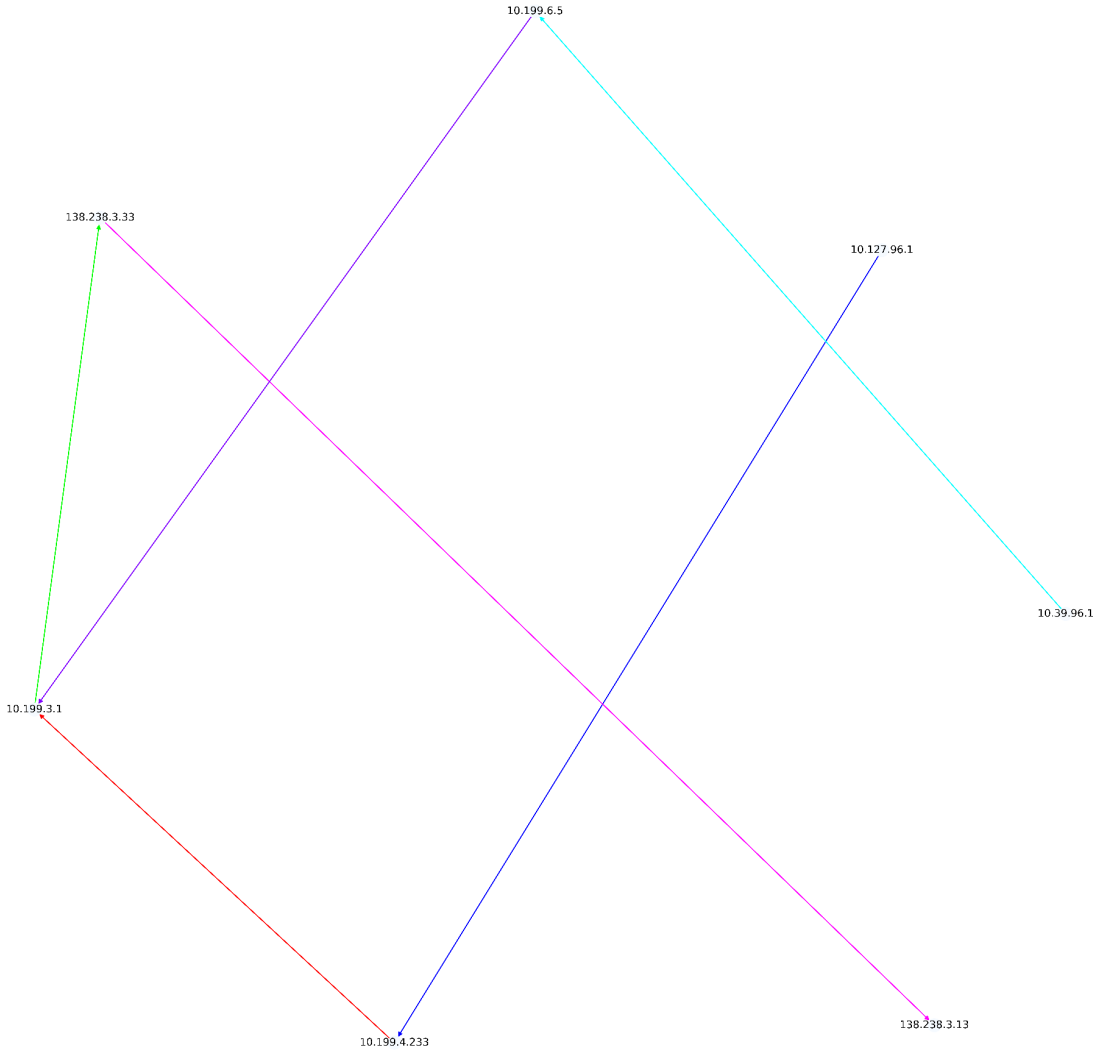
Time: Oct 11, 2023

Output:

```
Trace Route: 10.127.0.0
1 hops away: 10.127.96.1
2 hops away: 10.199.4.233
3 hops away: 10.199.3.1
4 hops away: 66.44.94.195
5 hops away: 138.238.3.33
6 hops away: 138.238.3.13
Timeout at 7 hops away for 10.127.0.0
------------------------------------------------
Trace Route: 10.127.0.1
1 hops away: 10.127.96.1
2 hops away: 10.199.4.233
3 hops away: 10.199.3.1
4 hops away: 66.44.94.195
5 hops away: 138.238.3.33
6 hops away: 138.238.3.13
Timeout at 7 hops away for 10.127.0.1
------------------------------------------------
Trace Route: 10.127.0.2
1 hops away: 10.127.96.1
2 hops away: 10.199.4.233
Timeout at 3 hops away for 10.127.0.2
------------------------------------------------
Trace Route: 10.127.0.3
1 hops away: 10.127.96.1
2 hops away: 10.199.4.233
Timeout at 3 hops away for 10.127.0.3
------------------------------------------------
```

Time: Oct 21, 2023

Output:



For prefix: 138.238

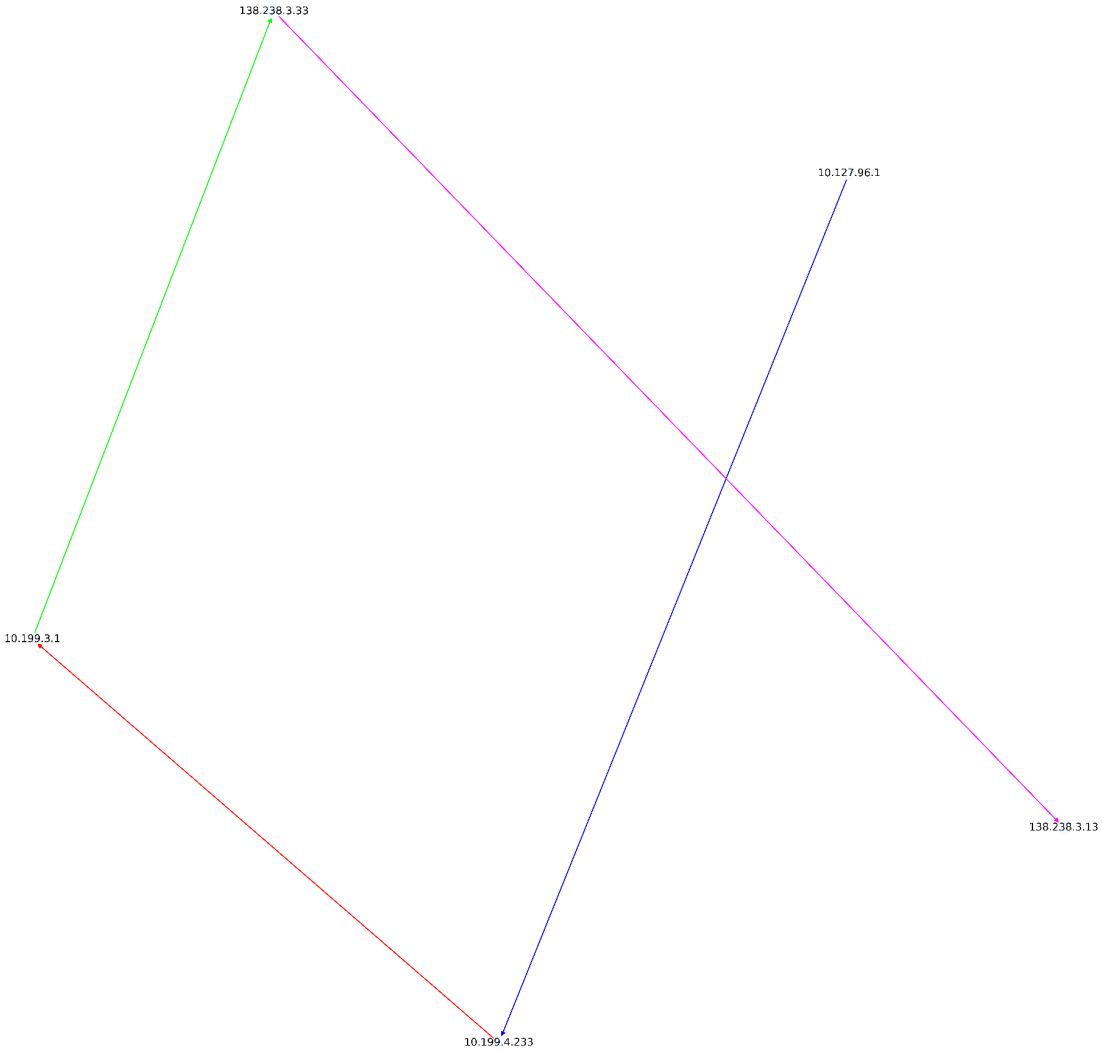
Time: Oct 13, 2023

Output:

```
Trace Route: 138.238.0.0
1 hops away: 10.127.96.1
2 hops away: 10.199.4.233
3 hops away: 10.199.3.1
4 hops away: 66.44.94.195
5 hops away: 138.238.3.33
6 hops away: 138.238.3.13
Timeout at 7 hops away for 138.238.0.0
------------------------------------------
Trace Route: 138.238.0.1
1 hops away: 10.127.96.1
2 hops away: 10.199.4.233
Timeout at 3 hops away for 138.238.0.1
------------------------------------------
Trace Route: 138.238.0.2
1 hops away: 10.127.96.1
2 hops away: 10.199.4.233
3 hops away: 10.199.3.1
4 hops away: 66.44.94.195
5 hops away: 138.238.3.33
6 hops away: 138.238.3.13
Timeout at 7 hops away for 138.238.0.2
------------------------------------------
Trace Route: 138.238.0.3
1 hops away: 10.127.96.1
2 hops away: 10.199.4.233
Timeout at 3 hops away for 138.238.0.3
------------------------------------------
```

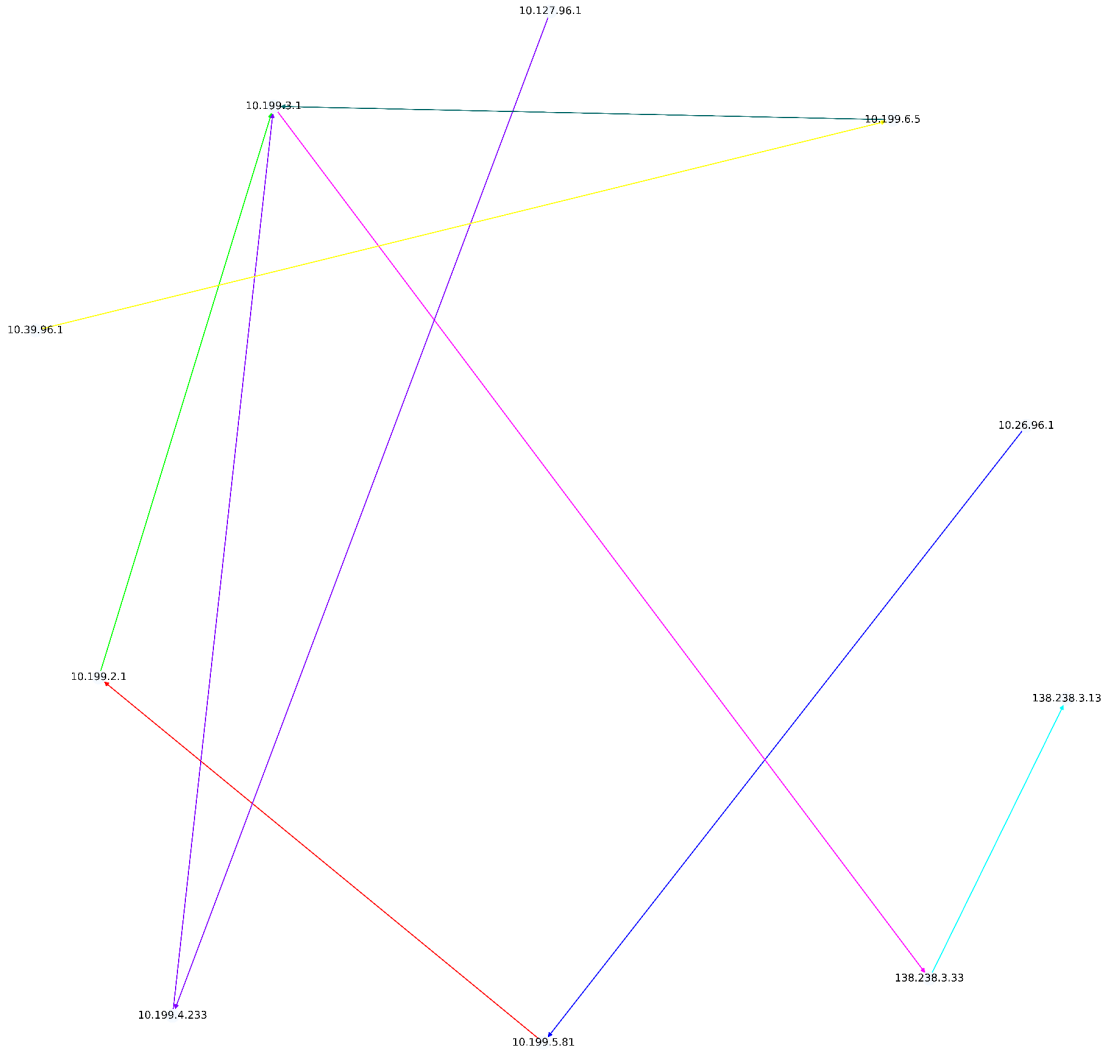
Time: Oct 20, 2023

Output:



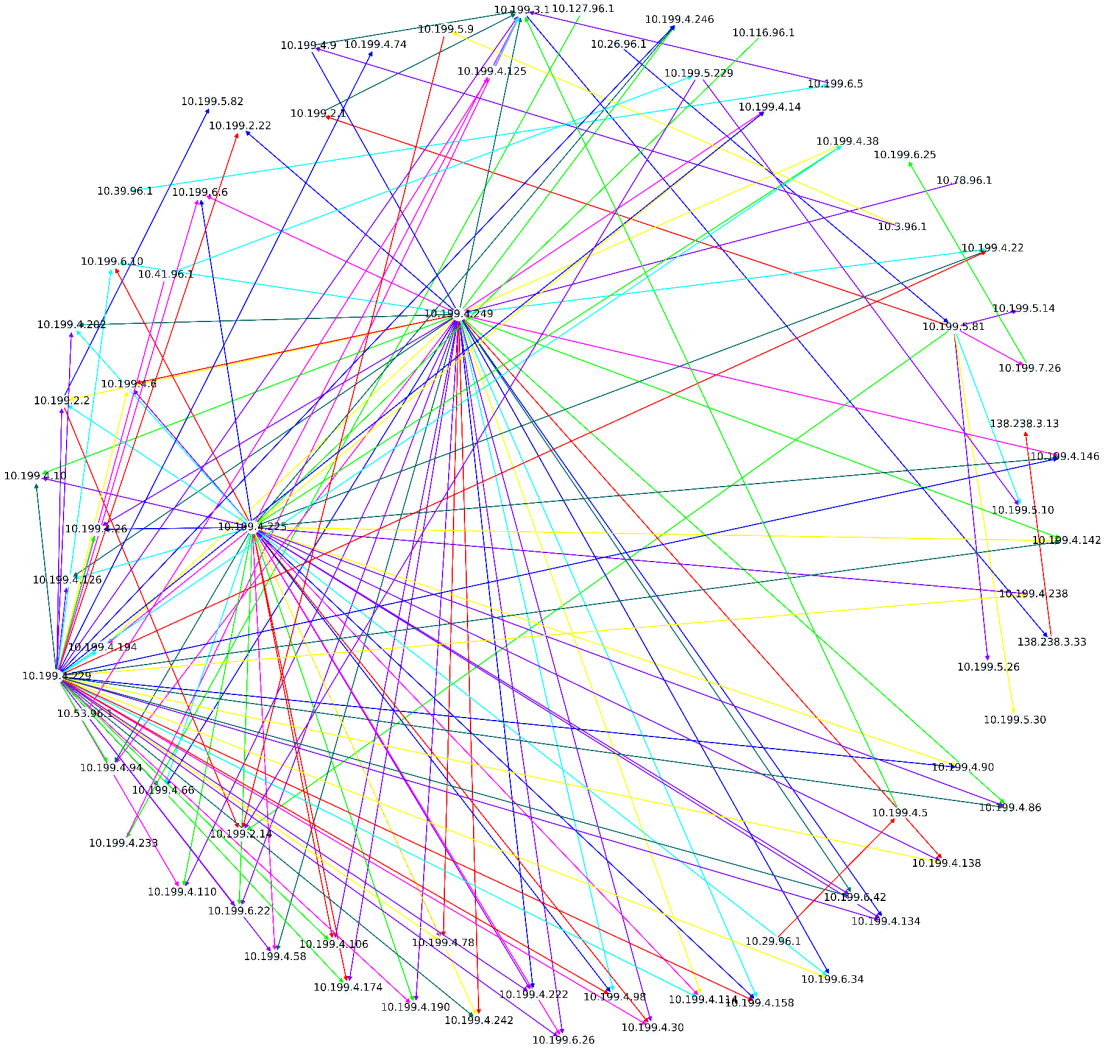
10.26 and 10.127 and 138.238

Time: Oct 20, 2023
Output



Time: Oct 22, 2023

Output:


10.199.3.1
10.127.96.1
10.199.4.246
10.116.96.1
10.199.4.9
10.199.4.74
10.199.5.9
10.26.96.1
10.199.4.125
10.199.5.229
10.199.6.5
10.199.5.82
10.199.2.1
10.199.4.14
10.199.2.22
10.199.4.38
10.199.6.25
10.78.96.1
10.39.96.1
10.199.6.6
10.3.96.1
10.199.4.22
10.199.6.10
10.41.96.1
10.199.5.14
10.199.4.202
10.199.4.249
10.199.5.81
10.199.7.26
10.199.4.6
10.199.2.2
138.238.3.13
10.199.4.146
10.199.2.10
10.199.5.10
10.199.4.26
10.199.4.225
10.199.4.142
10.199.4.126
10.199.4.238
10.199.3.194
138.238.3.33
10.199.5.26
10.199.4.229
10.199.5.30
10.53.96.3
10.199.4.90
10.199.4.94
10.199.4.66
10.199.4.86
10.199.4.5
10.199.2.14
10.199.4.233
10.199.4.138
10.199.4.110
10.199.6.42
10.199.6.22
10.199.4.134
10.199.4.106
10.199.4.78
10.29.96.1
10.199.4.58
10.199.6.34
10.199.4.174
10.199.4.222
10.199.4.98
10.199.4.114
10.199.4.158
10.199.4.190
10.199.4.242
10.199.4.30
10.199.6.26