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Apply a layout to visualize each network clearly.

### 1. ForceAtlas 2

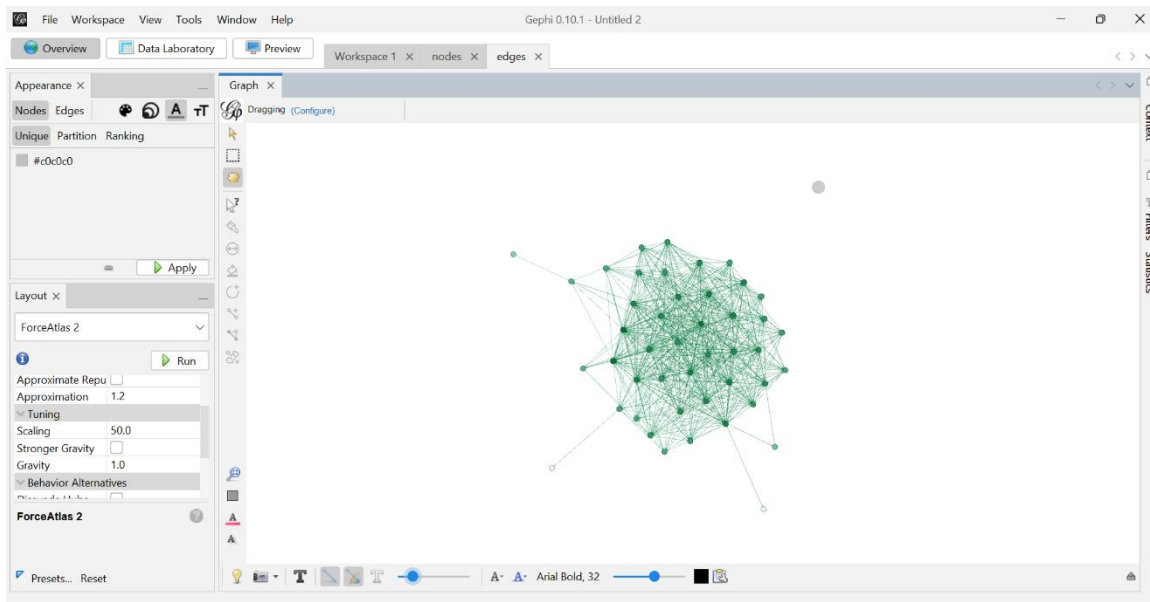
ForceAtlas2 is a graph layout algorithm commonly used in Gephi. It positions nodes in a way that makes the structure of the network easy to understand.

How it works

- Nodes repel each other like charged particles.
- Edges attract nodes like springs pulling connected nodes together.

What you should observe

- Dense clusters = strong community structure
- Central nodes = important/highly connected accounts
- Outer nodes = less influential or isolated accounts



### 2. Modularity class Appearance

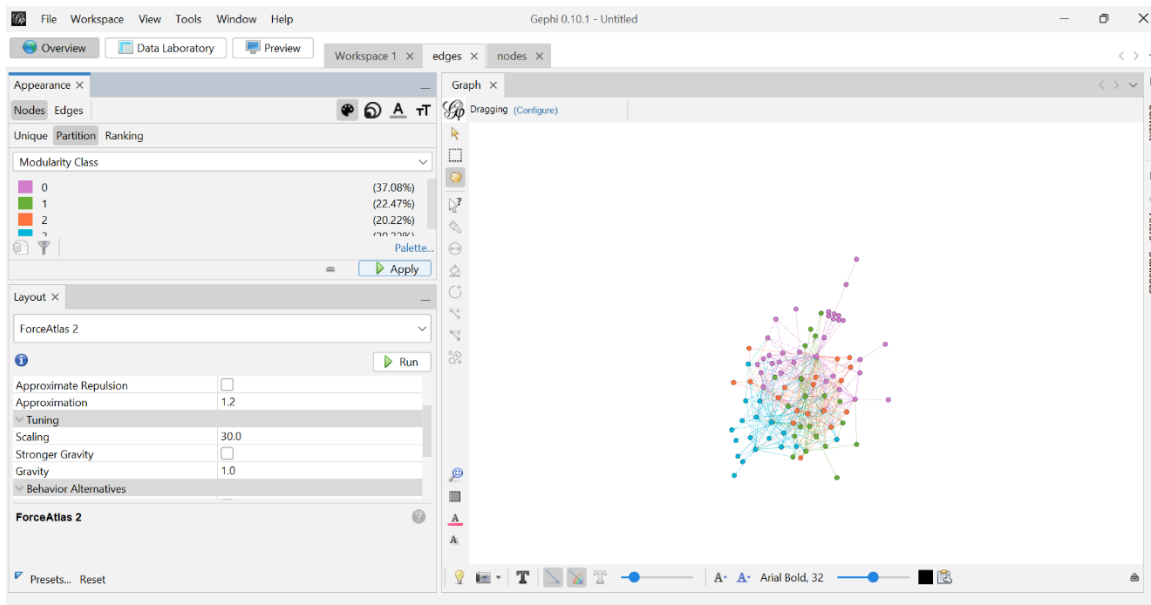
Modularity class is a community detection technique that groups nodes based on how densely connected they are to each other.

### Key idea

- Nodes that have many internal connections form a community.
- Modularity assigns each node a class number representing its community.

### Modularity (Q) Value

- Q ranges from 0 to 1
- Higher Q = stronger community structure
- $Q > 0.3$  is usually considered good

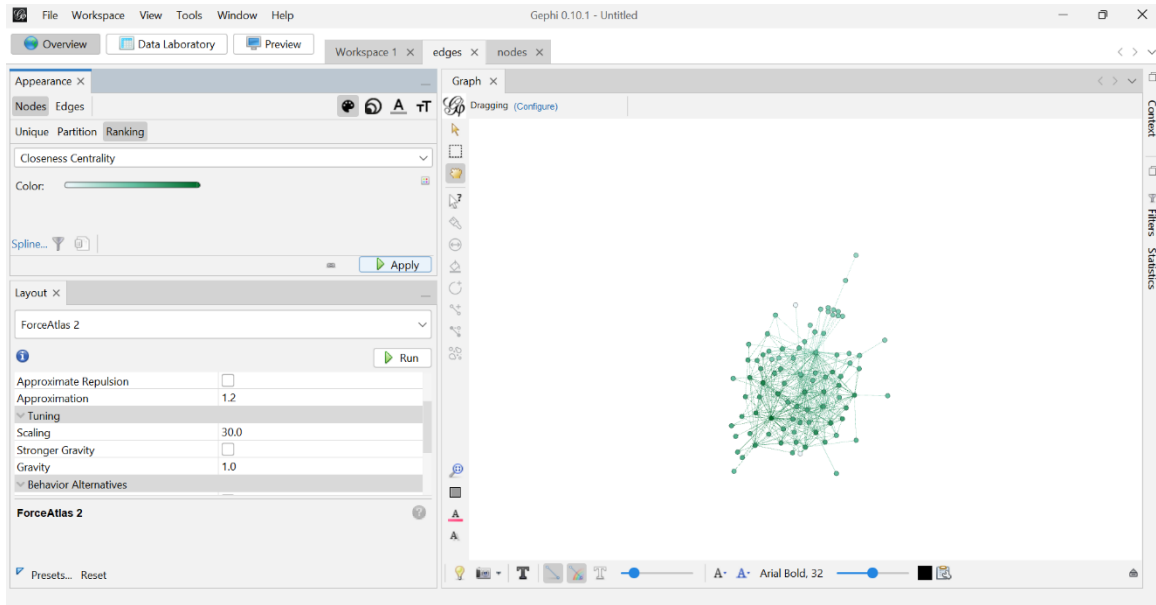


### 3. closeness centrality

Closeness centrality measures how close a node is to all other nodes in the network.

### Interpretation

- High closeness = the node can reach all others very quickly
- Low closeness = the node is far from many nodes



Run Statistics for the following metrics on graph

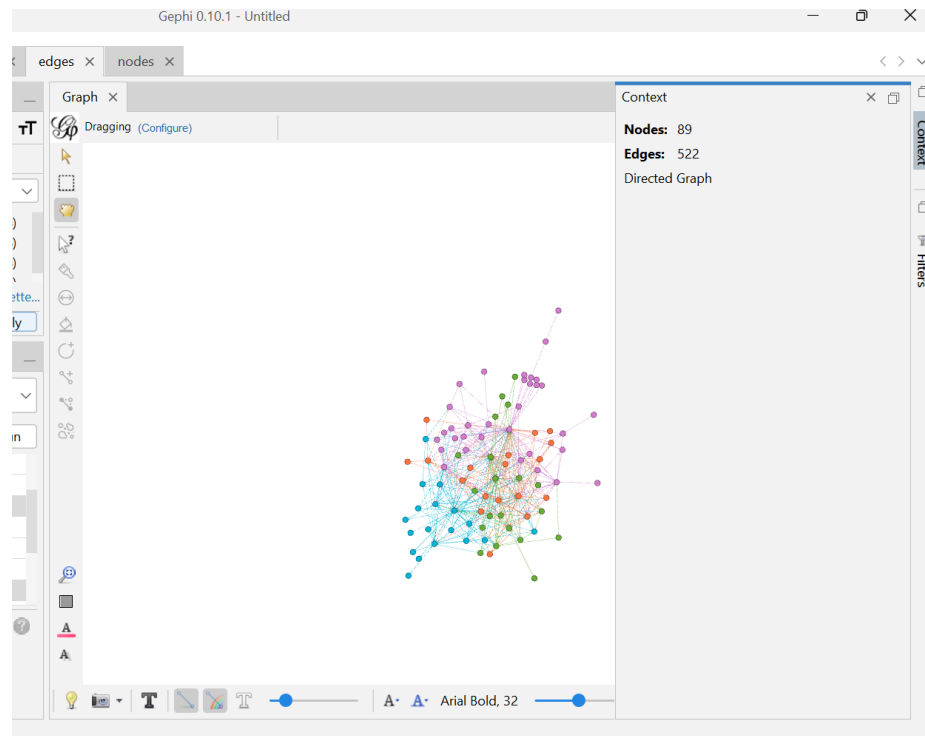
1.Number of nodes and edges

Represent Twitter users.

Edges

Represent interactions such as:

- Retweets
- Mentions
- Replies
- Follows



2. Average degree / Graph density / Average clustering coefficient / Modularity (Q) and number of communities / Connected components

Average degree = average number of connections per node.

#### Interpretation

- High average degree → highly interactive community
- Low average degree → sparse, disconnected network

Graph density tells you how many edges exist compared to how many *could* exist.

#### Meaning

- High density → many nodes are interconnected
- Low density → network is sparse

Clustering coefficient measures how likely a node's neighbors are to also be connected to each other.

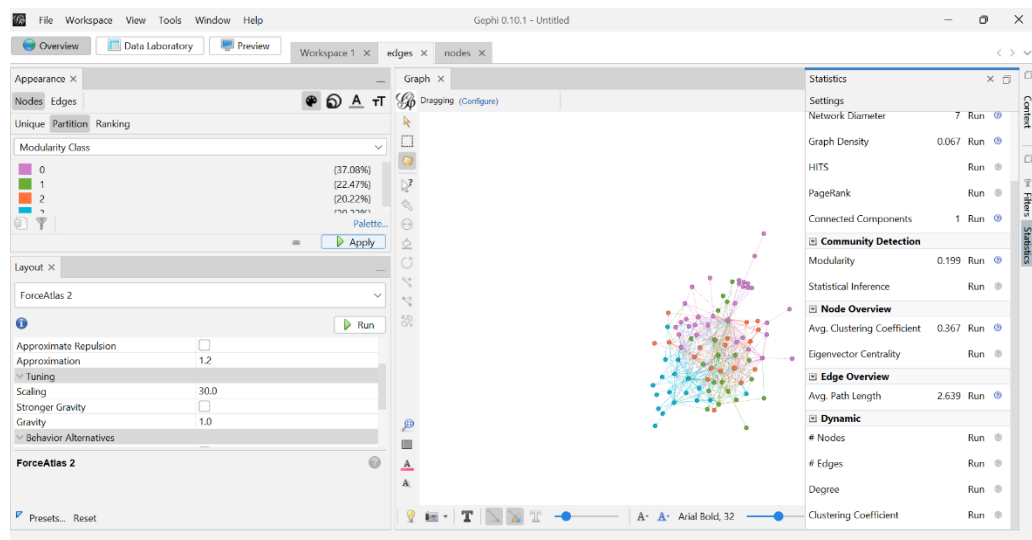
#### Interpretation

- High coefficient → tightly-knit clusters (echo chambers)
- Low coefficient → loosely connected nodes

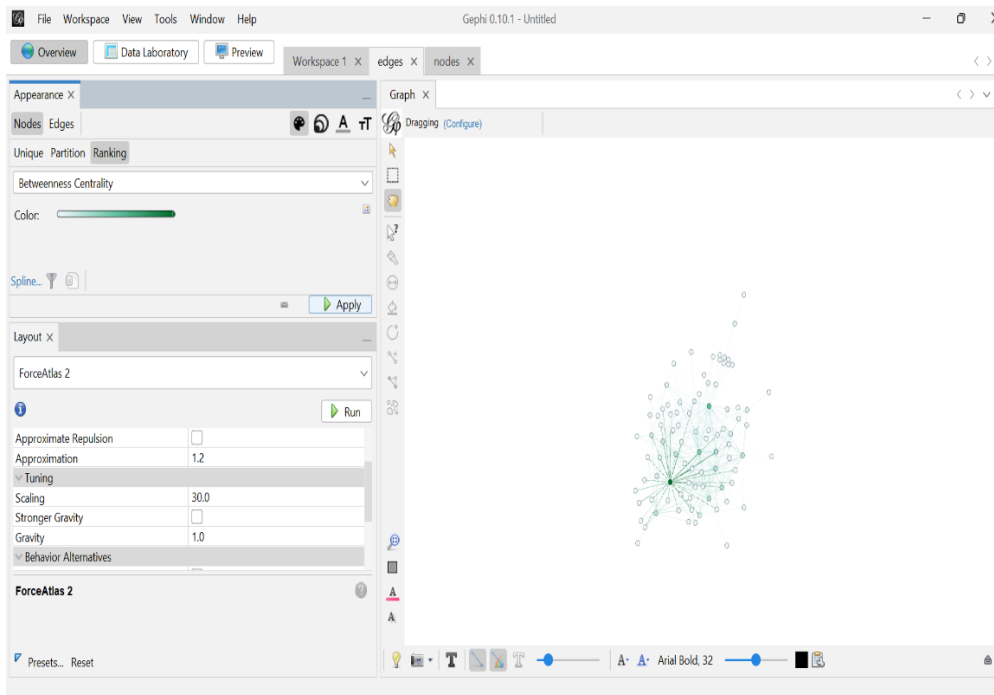
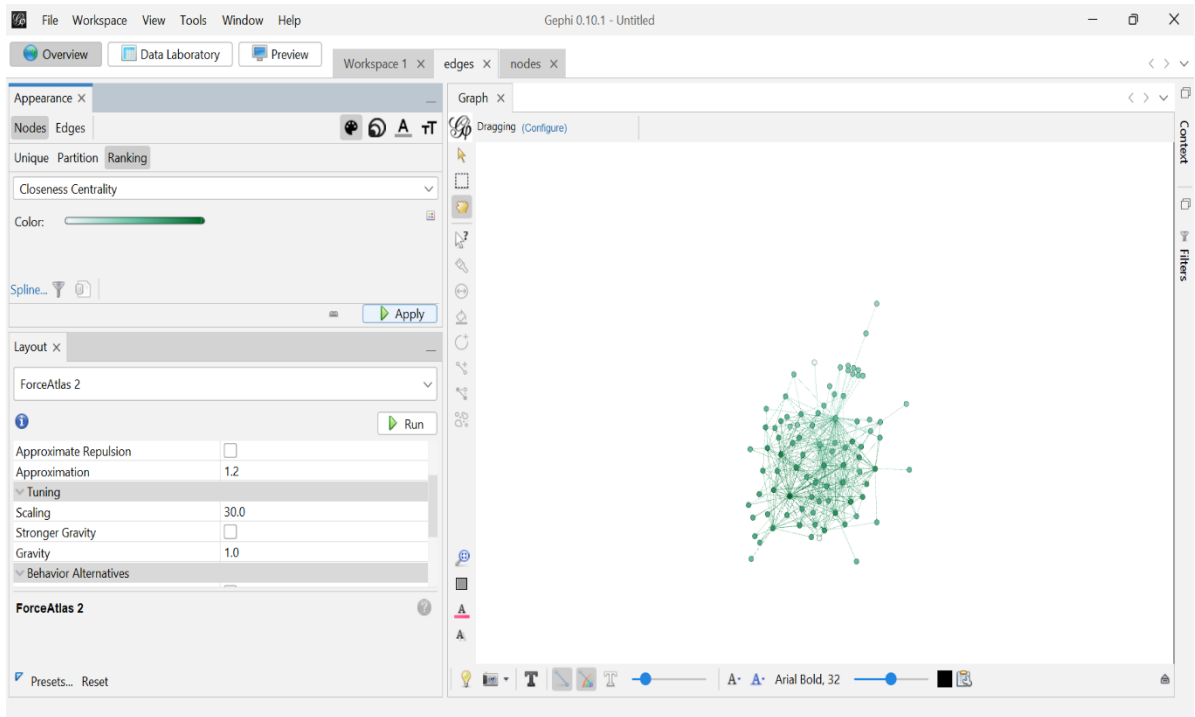
Connected component is a subgraph where all nodes can reach each other.

### Meaning

- 1 connected component = everyone is connected somehow
- Many components = isolated subgraphs



### 3. Betweenness and closeness centrality



Fake follower/several node

Betweenness centrality measures how often a node lies on the shortest path between other nodes.

## High betweenness

- Acts as a bridge between communities
- Influential in spreading information

## Low betweenness

- Not a connector
- More isolated or irrelevant

Closeness Centrality is the same metric mentioned earlier but now inside statistical analysis—you must run it and collect numbers.

| y/Replace  Import Spreadsheet  Export table  More actions <span>Filter:</span> |                     |                             |                   |              |           |
|--|---------------------|-----------------------------|-------------------|--------------|-----------|
| ccentricity  | Closeness Centra... | Harmonic Closeness Centr... | Betweenness Ce... | Component... | Strongly- |
| 0  | 0.270463            | 0.294079                    | 0.0               | 0            | 4         |
| 0  | 0.270463            | 0.294079                    | 0.0               | 0            | 5         |
| 0  | 0.35023             | 0.369518                    | 0.0               | 0            | 7         |
| 0  | 0.215084            | 0.232591                    | 0.0               | 0            | 9         |
| 0  | 0.270463            | 0.294079                    | 0.0               | 0            | 10        |
| 0  | 0.270463            | 0.294079                    | 0.0               | 0            | 11        |
| 0  | 0.270463            | 0.294079                    | 0.0               | 0            | 12        |
| 0  | 0.270463            | 0.294079                    | 0.0               | 0            | 13        |
| 0  | 0.270463            | 0.294079                    | 0.0               | 0            | 14        |
| 0  | 0.0                 | 0.0                         | 0.0               | 0            | 1         |
| 0  | 0.279412            | 0.310088                    | 0.0               | 0            | 3         |
| 0  | 0.270758            | 0.294667                    | 0.0               | 0            | 2         |
| 0  | 0.25                | 0.266222                    | 0.0               | 0            | 2         |
| 0  | 0.398936            | 0.426667                    | 0.0               | 0            | 2         |
| 0  | 0.340909            | 0.367778                    | 0.0               | 0            | 2         |
| 0  | 0.323404            | 0.356798                    | 0.0               | 0            | 15        |
| 0  | 0.342466            | 0.366                       | 0.0               | 0            | 2         |
| 0  | 0.353774            | 0.38                        | 0.0               | 0            | 2         |
| 0  | 0.271739            | 0.295333                    | 0.0               | 0            | 2         |
| 0  | 0.407609            | 0.44                        | 0.0               | 0            | 2         |
| 0  | 0.340909            | 0.377111                    | 0.0               | 0            | 2         |
| 0  | 0.416667            | 0.446667                    | 0.0               | 0            | 2         |

to n

Fill column with a value

Duplicate column

Create a boolean column from regex match

Create column with list of regex matching groups

| File Workspace View Tools Window Help Gephi 0.10.1 - Untitled   |  |   |   |   |     |          |          |          |  |  |
|---|--|---|---|---|-----|----------|----------|----------|--|--|
| Overview Data Laboratory Preview Workspace 1 x edges x nodes x  |  |   |   |   |     |          |          |          |  |  |
| Data Table x Statistics x   |  |   |   |   |     |          |          |          |  |  |
| Nodes Edges Configuration Add node Add edge Search/Replace Import Spreadsheet Export table More actions                         |  |   |   |   |     |          |          |          |  |  |
| Id Label Interval In-Degree Out-Degree Degree Eccentricity Closeness Centra... Harmonic Closeness Centr... Betweenness Centr... |  |   |   |   |     |          |          |          |  |  |
| 775105844   |  | 0 | 1 | 1 | 6.0 | 0.270463 | 0.294079 | 0.0      |  |  |
| 60686997  |  | 0 | 1 | 1 | 6.0 | 0.270463 | 0.294079 | 0.0      |  |  |
| 24275089  |  | 0 | 1 | 1 | 4.0 | 0.35023  | 0.369518 | 0.0      |  |  |
| 40292048  |  | 0 | 1 | 1 | 7.0 | 0.215084 | 0.232591 | 0.0      |  |  |
| 233353448   |  | 0 | 1 | 1 | 6.0 | 0.270463 | 0.294079 | 0.0      |  |  |
| 156087129   |  | 0 | 1 | 1 | 6.0 | 0.270463 | 0.294079 | 0.0      |  |  |
| 57466012  |  | 0 | 1 | 1 | 6.0 | 0.270463 | 0.294079 | 0.0      |  |  |
| 836611287   |  | 0 | 1 | 1 | 6.0 | 0.270463 | 0.294079 | 0.0      |  |  |
| 284688875   |  | 0 | 1 | 1 | 6.0 | 0.270463 | 0.294079 | 0.0      |  |  |
| 25212306  |  | 1 | 0 | 1 | 0.0 | 0.0      | 0.0      | 0.0      |  |  |
| 300280518   |  | 0 | 2 | 2 | 6.0 | 0.279412 | 0.310088 | 0.0      |  |  |
| 289208771   |  | 1 | 1 | 2 | 6.0 | 0.270758 | 0.294667 | 0.0      |  |  |
| 350186797   |  | 1 | 1 | 2 | 6.0 | 0.25     | 0.266222 | 0.0      |  |  |
| 300607291   |  | 1 | 1 | 2 | 4.0 | 0.398936 | 0.426667 | 0.0      |  |  |
| 216073902   |  | 1 | 1 | 2 | 6.0 | 0.270463 | 0.294079 | 0.0      |  |  |
| 335587733   |  | 1 | 1 | 2 | 4.0 | 0.340909 | 0.367778 | 0.0      |  |  |
| 23565355  |  | 0 | 2 | 2 | 5.0 | 0.323404 | 0.356798 | 0.0      |  |  |
| 298810362   |  | 1 | 1 | 2 | 5.0 | 0.342466 | 0.366    | 0.0      |  |  |
| 155069004   |  | 1 | 2 | 3 | 4.0 | 0.353774 | 0.38     | 0.0      |  |  |
| 43747835  |  | 2 | 1 | 3 | 5.0 | 0.342466 | 0.367556 | 1.019444 |  |  |
| 532614472   |  | 3 | 1 | 4 | 6.0 | 0.271739 | 0.295333 | 0.0      |  |  |
| 538433981   |  | 2 | 2 | 4 | 4.0 | 0.371287 | 0.4      | 3.675408 |  |  |

Add column

Merge columns

Delete column

Clear column

Copy data to other column

Fill column with a value

Duplicate column

Create a boolean column from regex match

Create column with list of regex matching groups

# 5G\_Conspiracy\_Graphs

Gephi 0.10.1 - Untitled

Overview Data Laboratory Preview Workspace 1 nodes

Data Table Statistics

Nodes Edges Configuration Add node Add edge Search/Replace Import Spreadsheet Export table More actions Filter: Id

| Id        | Label | Interval | time   | friends | followers | In-Degree | Out-Degree | Degree | Clustering Coef... | Compone... | Strongly-Conne... | Modularity ... | Eccentric... | Closeness Cen... | Harmonic Closeness C... | Betweenness Ce... |
|-----------|-------|----------|--------|---------|-----------|-----------|------------|--------|--------------------|------------|-------------------|----------------|--------------|------------------|-------------------------|-------------------|
| 28012764  |       |          | 465593 | 11      | 10        | 0         | 0          | 0      | 0.0                | 0          | 0                 | 0              | 0.0          | 0.0              | 0.0                     | 0.0               |
| 21534606  |       |          | 504634 | 13      | 12        | 3         | 3          | 6      | 0.333333           | 1          | 2                 | 9              | 2.0          | 0.551724         | 0.59375                 | 124.0             |
| 131511... |       |          | 343047 | 9       | 9         | 0         | 0          | 0      | 0.0                | 2          | 3                 | 1              | 0.0          | 0.0              | 0.0                     | 0.0               |
| 187558... |       |          | 398793 | 11      | 9         | 0         | 0          | 0      | 0.0                | 3          | 4                 | 2              | 0.0          | 0.0              | 0.0                     | 0.0               |
| 166625... |       |          | 340531 | 10      | 6         | 0         | 0          | 0      | 0.0                | 4          | 5                 | 3              | 0.0          | 0.0              | 0.0                     | 0.0               |
| 812531... |       |          | 340556 | 7       | 7         | 0         | 0          | 0      | 0.0                | 5          | 6                 | 4              | 0.0          | 0.0              | 0.0                     | 0.0               |
| 836610... |       |          | 803413 | 6       | 6         | 0         | 0          | 0      | 0.0                | 6          | 7                 | 5              | 0.0          | 0.0              | 0.0                     | 0.0               |
| 778874... |       |          | 340006 | 7       | 6         | 0         | 0          | 0      | 0.0                | 7          | 8                 | 6              | 0.0          | 0.0              | 0.0                     | 0.0               |
| 187977... |       |          | 407804 | 11      | 11        | 0         | 0          | 0      | 0.0                | 8          | 9                 | 7              | 0.0          | 0.0              | 0.0                     | 0.0               |
| 48054709  |       |          | 332376 | 10      | 7         | 0         | 0          | 0      | 0.0                | 9          | 10                | 8              | 0.0          | 0.0              | 0.0                     | 0.0               |
| 677413... |       |          | 352151 | 11      | 11        | 1         | 1          | 2      | 0.0                | 1          | 2                 | 9              | 4.0          | 0.313725         | 0.369792                | 0.0               |
| 834579... |       |          | 499427 | 11      | 12        | 0         | 0          | 0      | 0.0                | 10         | 11                | 10             | 0.0          | 0.0              | 0.0                     | 0.0               |
| 227750... |       |          | 347727 | 10      | 7         | 0         | 0          | 0      | 0.0                | 11         | 12                | 11             | 0.0          | 0.0              | 0.0                     | 0.0               |
| 117959... |       |          | 412106 | 11      | 11        | 1         | 1          | 2      | 0.0                | 12         | 13                | 18             | 1.0          | 1.0              | 1.0                     | 0.0               |
| 638095... |       |          | 341213 | 7       | 2         | 0         | 0          | 0      | 0.0                | 13         | 14                | 12             | 0.0          | 0.0              | 0.0                     | 0.0               |
| 138604... |       |          | 468687 | 10      | 11        | 0         | 0          | 0      | 0.0                | 14         | 15                | 13             | 0.0          | 0.0              | 0.0                     | 0.0               |
| 14423930  |       |          | 338872 | 13      | 13        | 0         | 0          | 0      | 0.0                | 15         | 16                | 14             | 0.0          | 0.0              | 0.0                     | 0.0               |
| 217179... |       |          | 587393 | 13      | 13        | 1         | 1          | 2      | 0.0                | 16         | 17                | 15             | 1.0          | 1.0              | 1.0                     | 0.0               |
| 9116942   |       |          | 348771 | 12      | 10        | 1         | 1          | 2      | 0.0                | 1          | 2                 | 9              | 4.0          | 0.313725         | 0.369792                | 0.0               |
| 8219413   |       |          | 359157 | 9       | 10        | 1         | 0          | 1      | 0.0                | 17         | 18                | 16             | 0.0          | 0.0              | 0.0                     | 0.0               |
| 13876735  |       |          | 399246 | 10      | 9         | 4         | 4          | 8      | 0.6                | 1          | 2                 | 55             | 4.0          | 0.432432         | 0.552083                | 3.352381          |
| 57656228  |       |          | 435596 | 11      | 9         | 0         | 0          | 0      | 0.0                | 18         | 19                | 17             | 0.0          | 0.0              | 0.0                     | 0.0               |

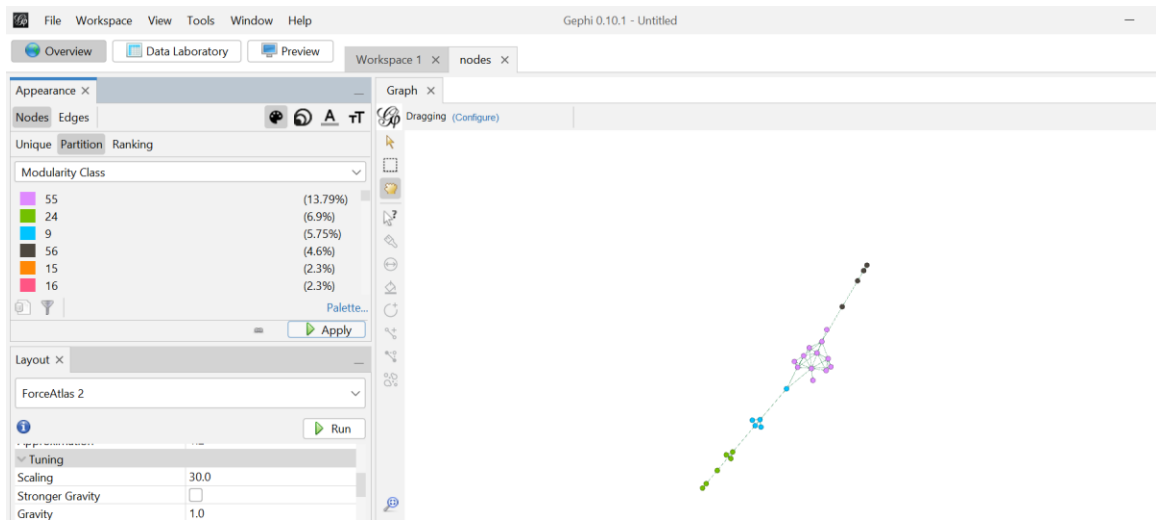
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|-----------|-------|----------|--------|---------|-----------|-----------|------------|--------|--------------------|------------|-------------------|----------------|--------------|------------------|-------------------------|-------------------|
| 28012764  |       |          | 465593 | 11      | 10        | 0         | 0          | 0      | 0.0                | 0          | 0                 | 0              | 0.0          | 0.0              | 0.0                     | 0.0               |
| 21534606  |       |          | 504634 | 13      | 12        | 3         | 3          | 6      | 0.333333           | 1          | 2                 | 9              | 2.0          | 0.551724         | 0.59375                 | 124.0             |
| 131511... |       |          | 343047 | 9       | 9         | 0         | 0          | 0      | 0.0                | 2          | 3                 | 1              | 0.0          | 0.0              | 0.0                     | 0.0               |
| 187558... |       |          | 398793 | 11      | 9         | 0         | 0          | 0      | 0.0                | 3          | 4                 | 2              | 0.0          | 0.0              | 0.0                     | 0.0               |
| 166625... |       |          | 340531 | 10      | 6         | 0         | 0          | 0      | 0.0                | 4          | 5                 | 3              | 0.0          | 0.0              | 0.0                     | 0.0               |
| 812531... |       |          | 340556 | 7       | 7         | 0         | 0          | 0      | 0.0                | 5          | 6                 | 4              | 0.0          | 0.0              | 0.0                     | 0.0               |
| 836610... |       |          | 803413 | 6       | 6         | 0         | 0          | 0      | 0.0                | 6          | 7                 | 5              | 0.0          | 0.0              | 0.0                     | 0.0               |
| 778874... |       |          | 340006 | 7       | 6         | 0         | 0          | 0      | 0.0                | 7          | 8                 | 6              | 0.0          | 0.0              | 0.0                     | 0.0               |
| 187977... |       |          | 407804 | 11      | 11        | 0         | 0          | 0      | 0.0                | 8          | 9                 | 7              | 0.0          | 0.0              | 0.0                     | 0.0               |
| 48054709  |       |          | 332376 | 10      | 7         | 0         | 0          | 0      | 0.0                | 9          | 10                | 8              | 0.0          | 0.0              | 0.0                     | 0.0               |
| 677413... |       |          | 352151 | 11      | 11        | 1         | 1          | 2      | 0.0                | 1          | 2                 | 9              | 4.0          | 0.313725         | 0.369792                | 0.0               |
| 834579... |       |          | 499427 | 11      | 12        | 0         | 0          | 0      | 0.0                | 10         | 11                | 10             | 0.0          | 0.0              | 0.0                     | 0.0               |
| 227750... |       |          | 347727 | 10      | 7         | 0         | 0          | 0      | 0.0                | 11         | 12                | 11             | 0.0          | 0.0              | 0.0                     | 0.0               |
| 117959... |       |          | 412106 | 11      | 11        | 1         | 1          | 2      | 0.0                | 12         | 13                | 18             | 1.0          | 1.0              | 1.0                     | 0.0               |
| 638095... |       |          | 341213 | 7       | 2         | 0         | 0          | 0      | 0.0                | 13         | 14                | 12             | 0.0          | 0.0              | 0.0                     | 0.0               |
| 138604... |       |          | 468687 | 10      | 11        | 0         | 0          | 0      | 0.0                | 14         | 15                | 13             | 0.0          | 0.0              | 0.0                     | 0.0               |
| 14423930  |       |          | 338872 | 13      | 13        | 0         | 0          | 0      | 0.0                | 15         | 16                | 14             | 0.0          | 0.0              | 0.0                     | 0.0               |
| 217179... |       |          | 587393 | 13      | 13        | 1         | 1          | 2      | 0.0                | 16         | 17                | 15             | 1.0          | 1.0              | 1.0                     | 0.0               |
| 9116942   |       |          | 348771 | 12      | 10        | 1         | 1          | 2      | 0.0                | 1          | 2                 | 9              | 4.0          | 0.313725         | 0.369792                | 0.0               |
| 8219413   |       |          | 359157 | 9       | 10        | 1         | 0          | 1      | 0.0                | 17         | 18                | 16             | 0.0          | 0.0              | 0.0                     | 0.0               |
| 13876735  |       |          | 399246 | 10      | 9         | 4         | 4          | 8      | 0.6                | 1          | 2                 | 55             | 4.0          | 0.432432         | 0.552083                | 3.352381          |
| 57656228  |       |          | 435596 | 11      | 9         | 0         | 0          | 0      | 0.0                | 18         | 19                | 17             | 0.0          | 0.0              | 0.0                     | 0.0               |





## 1. 5G Conspiracy Graph (Misinformation Network)

- The network depends on a few key influencer accounts.
- Most users are not connected to each other (low clustering).
- The graph is highly modular with many small groups.
- Betweenness is very high for a small number of nodes → they control information flow.
- Overall structure is centralized and coordinated.

## 2. Non-Conspiracy Graph (Normal Network)

- Users interact more naturally with each other.
- Higher clustering → real conversations and circles of users.
- Degree is more evenly distributed (no single dominant influencers).
- Betweenness is spread across many nodes.
- Structure is more connected, organic, and balanced.

## 3. Comparison

| Metric                 | 5G (Misinformation)    | Normal              |
|------------------------|------------------------|---------------------|
| Connectivity           | Low                    | High                |
| Clustering             | Low                    | High                |
| Influence distribution | Few nodes dominate     | Distributed         |
| Structure              | Centralized            | Networked           |
| Communities            | Many fragmented groups | Natural communities |

## 4. Conclusion

Misinformation networks are centralized, fragmented, and controlled by a few accounts, while normal networks are healthy, well-connected, and organically formed.