

NATIONAL INSTITUTE OF TECHNOLOGY SILCHAR

Cachar, Assam

B.Tech. VIth Sem

Subject Code: CS-321

Subject Name: Social Network Analysis Lab

Submitted By:

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Sch. Id. : 1912160

Branch : CSE – B

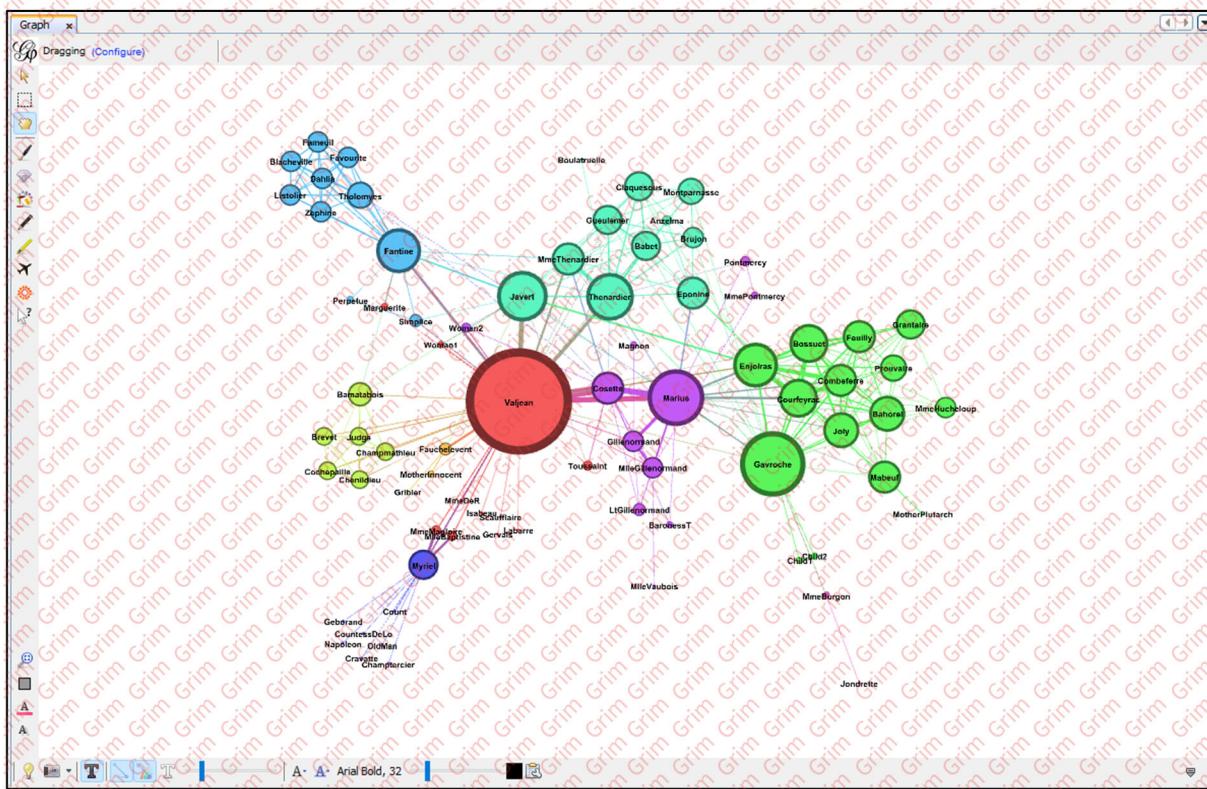
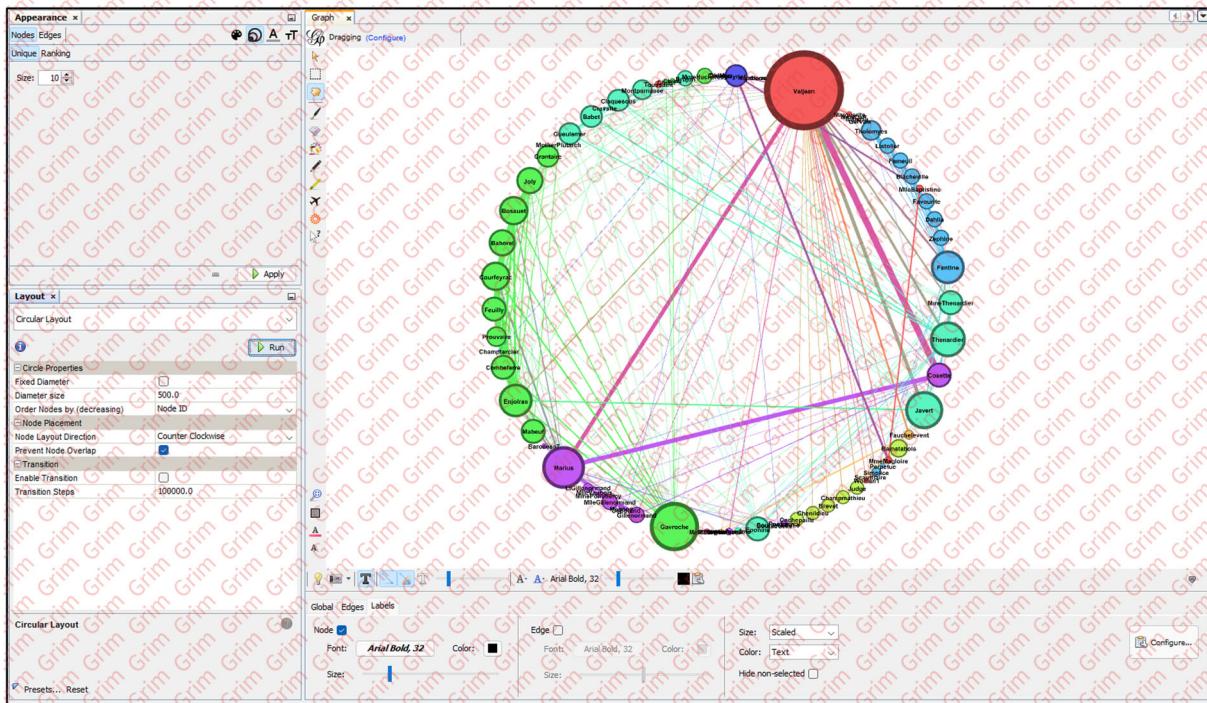
AIM: USE THE GEPHI TOOL TO DO THE FOLLOWING OPERATIONS:

INSTALL PLUGIN WHEREVER REQUIRED AND USE THE FOLLOWING LAYOUTS TO SET THE GRAPH SHAPE AND SUMMARIZE THE SIGNIFICANCE OF EACH LAYOUT.

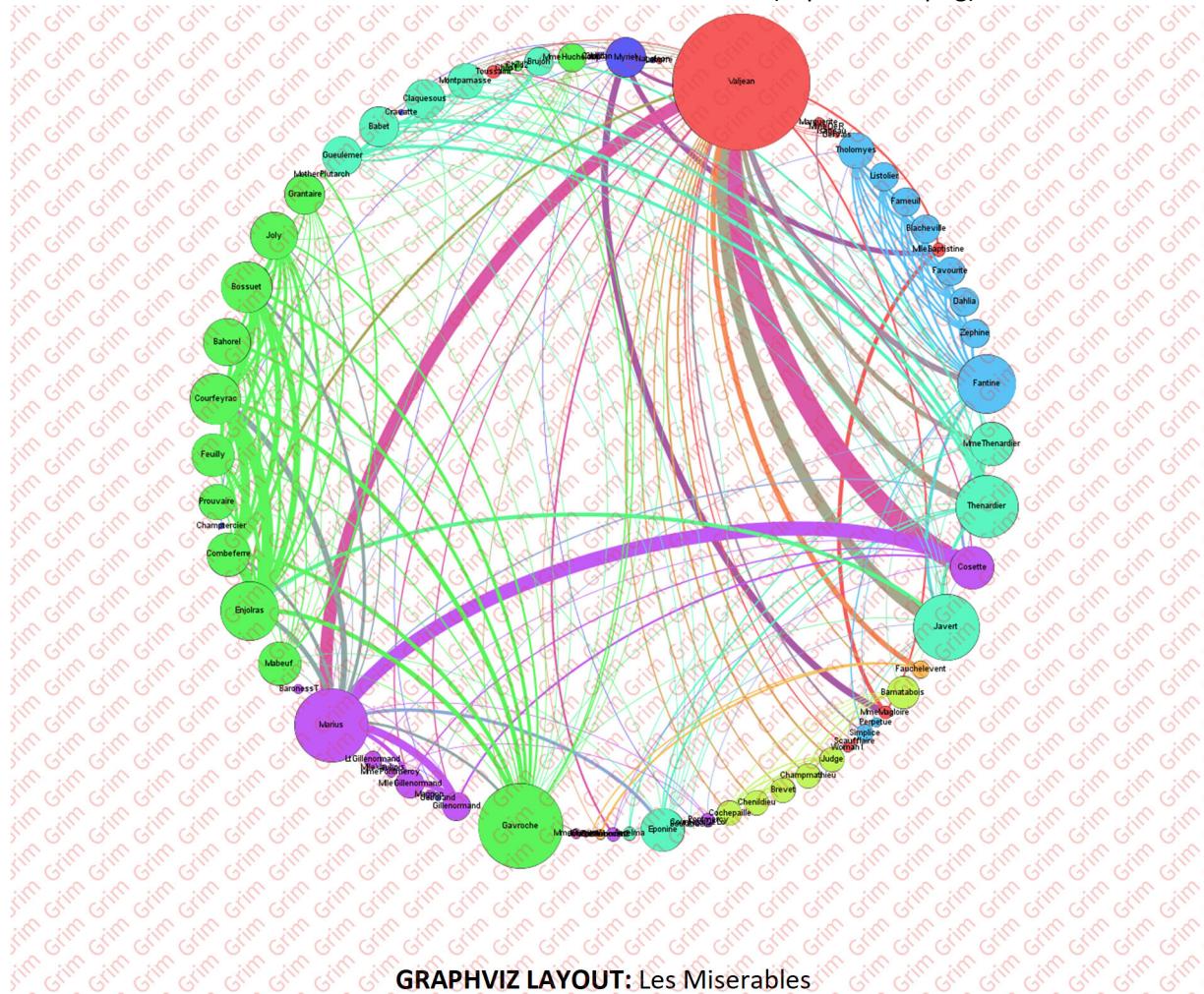
- **LAYOUT:** CIRCULAR LAYOUT, GRAPHVIZ.
- **COMPUTE THE FOLLOWING USING STATISTICS AND METRICS FRAMEWORK OF THE GEPHI TOOL:** AVERAGE DEGREE, GRAPH DENSITY, MODULARITY, CLUSTERING COEFFICIENT, PAGERANK, DBSCAN, GIRVAN-NEWMAN ALGORITHM, LEIDEN ALGORITHM, AVERAGE CLUSTERING COEFFICIENT, EIGENVECTOR CENTRALITY AND AVERAGE PATH LENGTH.
- SHOW THE USAGE (IMPORTING AND EXPORTING) OF THE GRAPH FORMATS SUCH AS GEXF, CSV, GML AND GRAPHML.

SAMPLE GRAPH FILES USED IN THIS PROJECT:

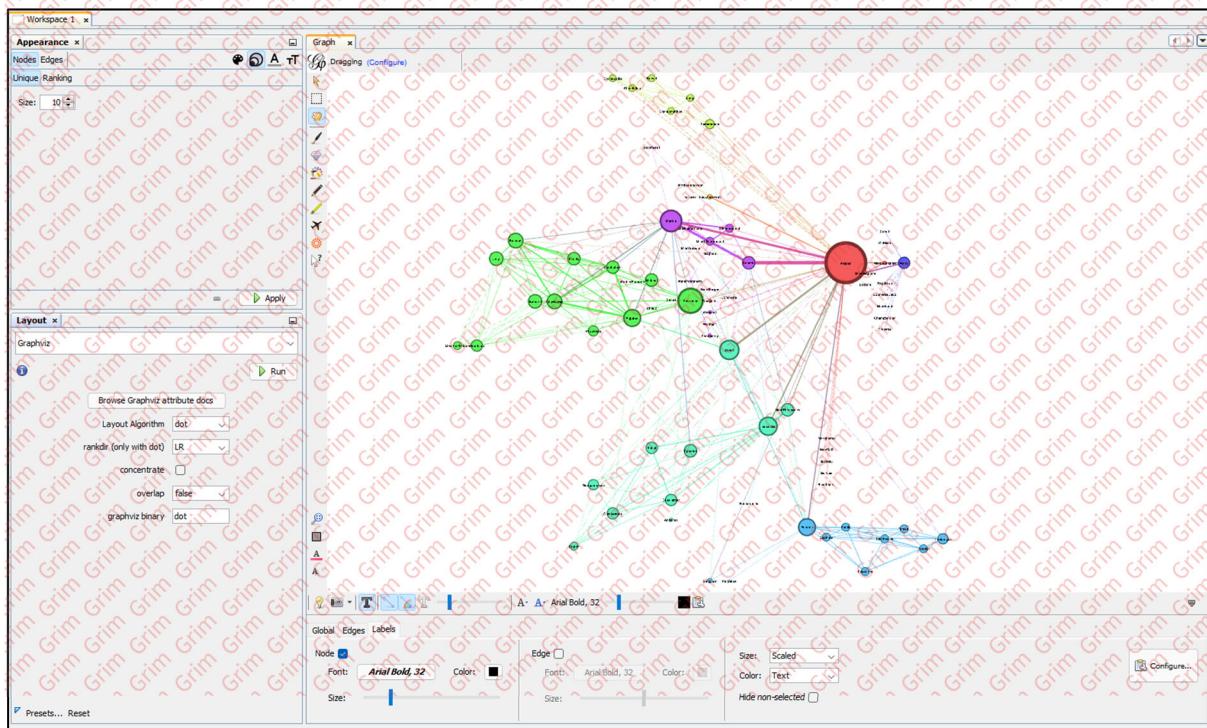
1. Les Miserables.gexf
2. Power Grid.gml
3. Airlines.graphml
4. Zachary's Karate Club.csv

GRAPH FILE NAME: "Les Miserables.gexf"**CIRCULAR LAYOUT: Les Miserables**

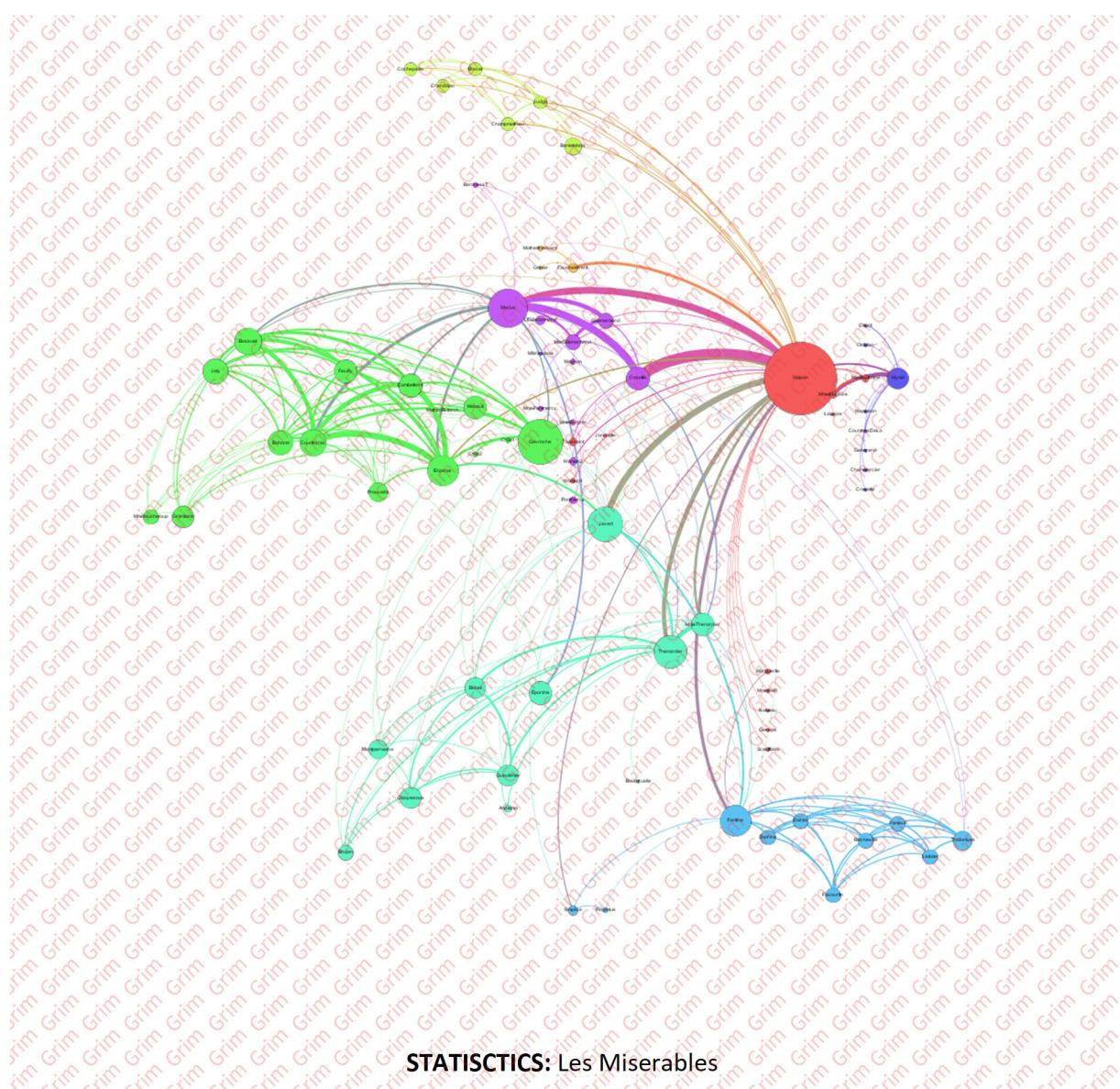
PREVIEW: CIRCULAR LAYOUT: Les Miserables (Exported as png)



GRAPHVIZ LAYOUT: Les Miserables



PREVIEW: GRAPHVIZ LAYOUT: Les Miserables (Exported as png)



STATISTICS: Les Miserables

Average Degree: 6.597

Graph Density (Undirected): 0.087

Modularity: 0.557

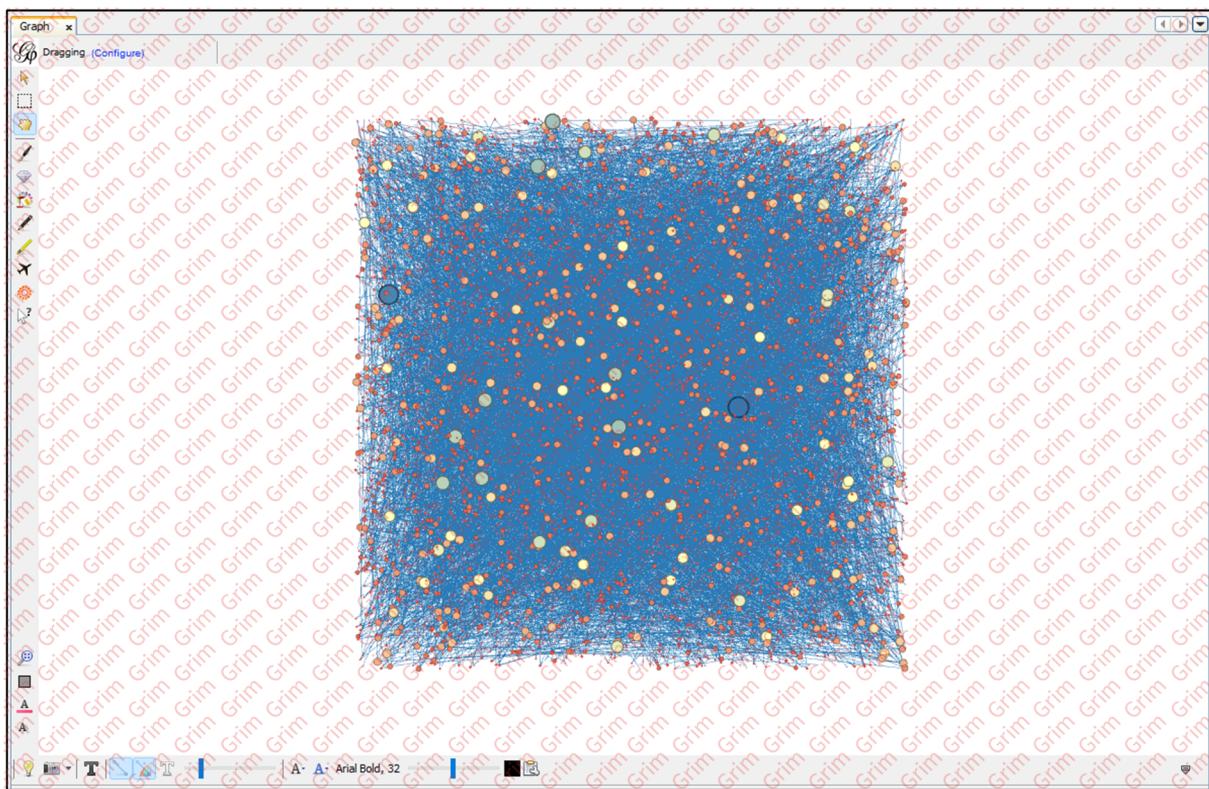
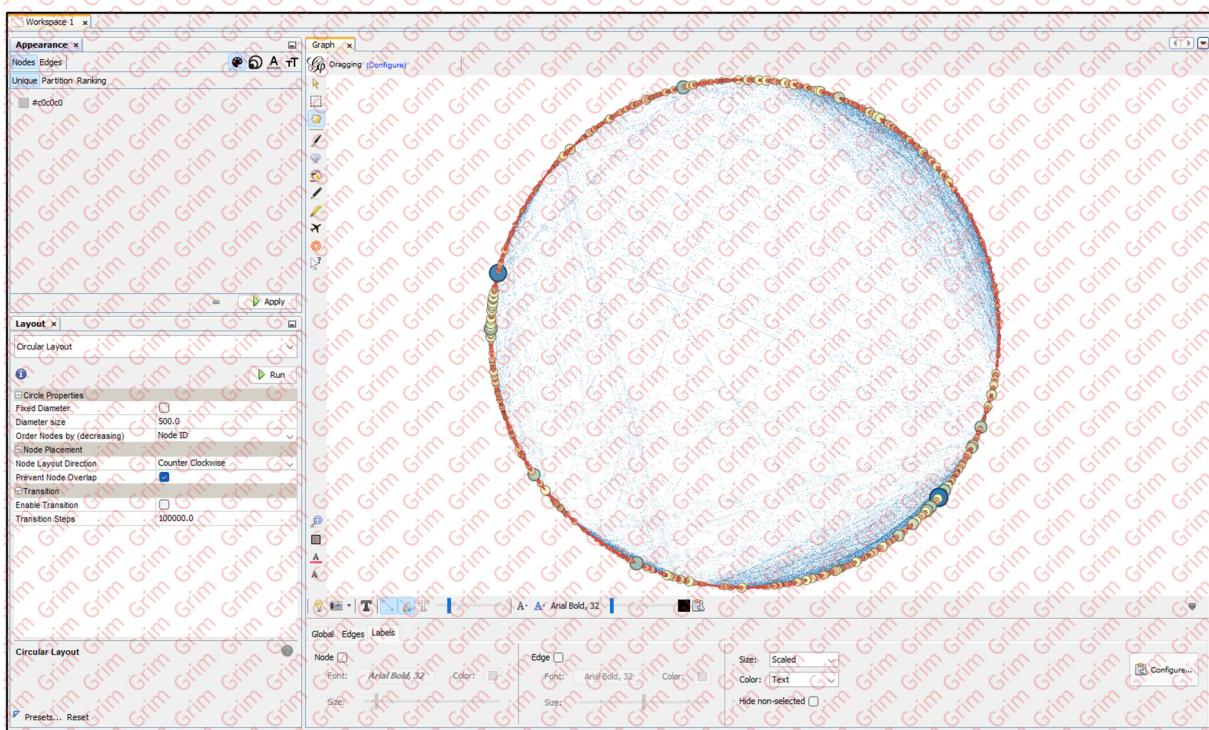
Clustering Coefficient (Triangle Method): 0.499

Leiden Algorithm: 0.964

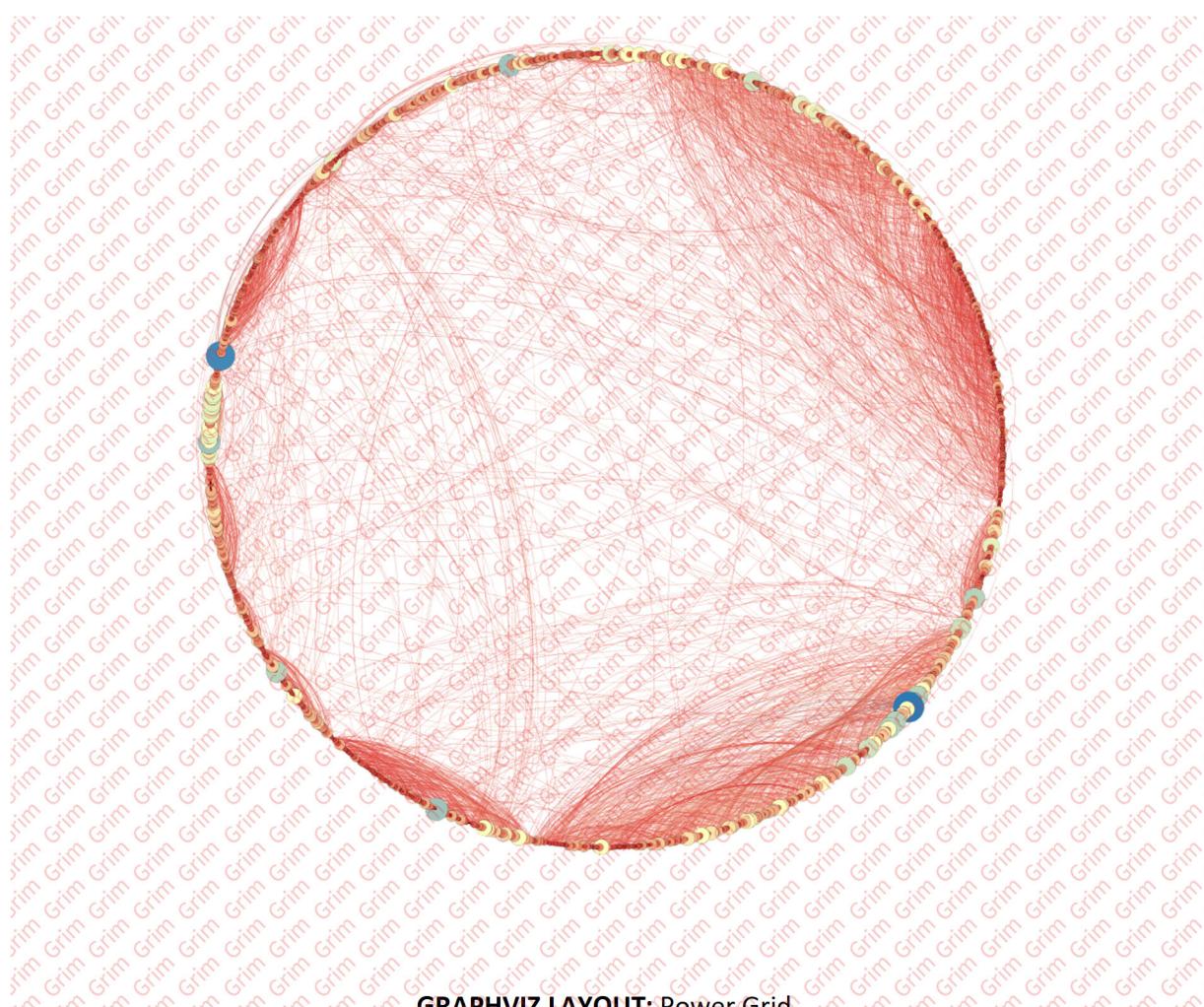
Average Clustering Coefficient: 0.736

Average Path Length: 2.641

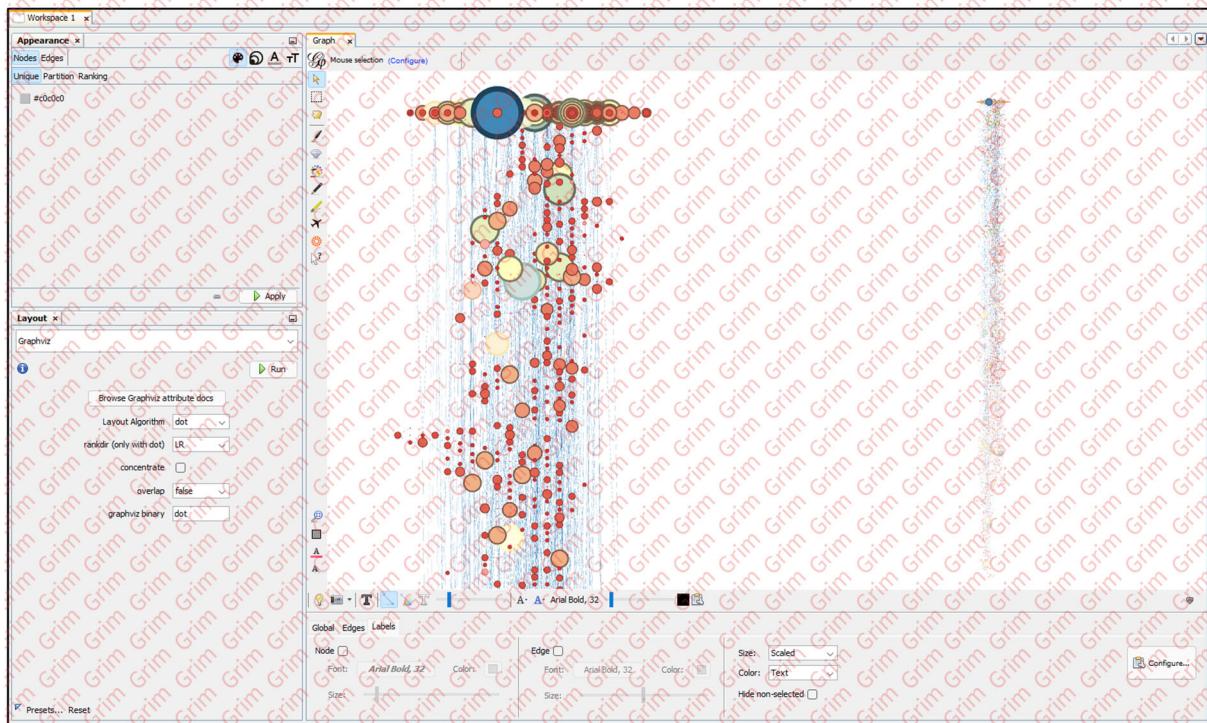
Filters		Statistics			
		x			
Settings					
<input checked="" type="checkbox"/> Network Overview					
Average Degree	6.597	Run	(i)		
Avg. Weighted Degree	21.299	Run	(i)		
Network Diameter	5	Run	(i)		
Graph Density	0.087	Run	(i)		
HITS		Run	(i)		
Modularity	0.566	Run	(i)		
Clustering Coefficient		Run	(i)		
PageRank		Run	(i)		
Connected Components	1	Run	(i)		
DBSCAN		Run	(i)		
Girvan-Newman Clustering		Run	(i)		
Leiden algorithm	0.964	Run	(i)		
<input checked="" type="checkbox"/> Node Overview					
Avg. Clustering Coefficient	0.736	Run	(i)		
Eigenvector Centrality		Run	(i)		
<input checked="" type="checkbox"/> Edge Overview					
Avg. Path Length	2.641	Run	(i)		
Dynamic		Run	(i)		

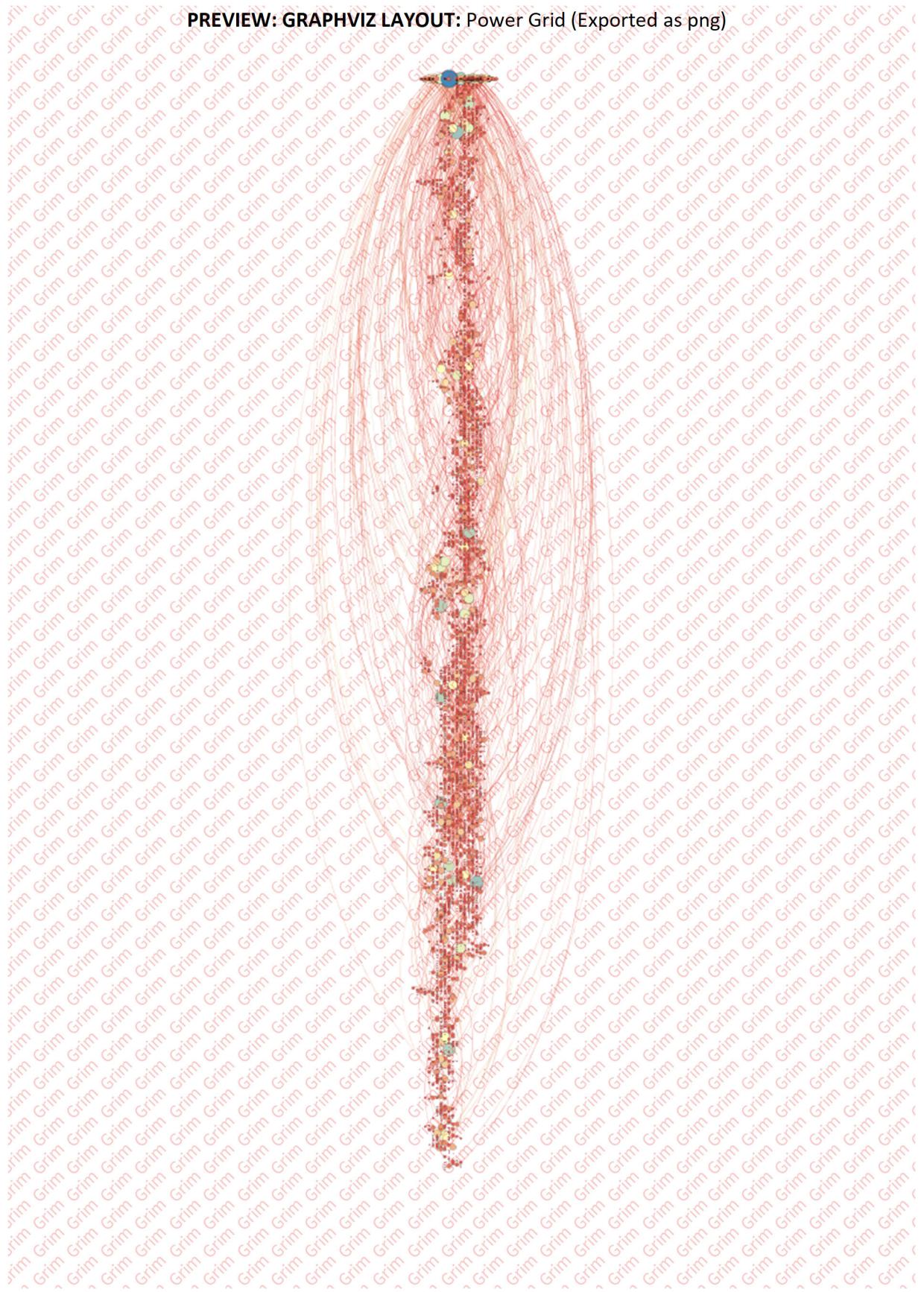
GRAPH FILE NAME: "Power Grid.gml"**CIRCULAR LAYOUT: Power Grid**

PREVIEW: CIRCULAR LAYOUT: Power Grid (Exported as png)



GRAPHVIZ LAYOUT: Power Grid





STASTICS: Power Grid

PageRank Report

Parameters:
Epsilon = 0.001
Probability = 0.85

Results:

PageRank Distribution

DBSCAN result

Execution time: 30.01.735
Clusters: 68
Clustered nodes: 200
Noises: 471

Eigenvalue Centrality Report

Parameters:
Network Interpretation: undirected
Number of iterations: 100
Sum change: 0.6473580145499714

Results:

Eigenvalue Centrality Distribution

Context

Nodes: 4941
Edges: 6594
Undirected Graph

Filters Statistics

Network Overview

- Average Degree: 2.669 Run ⓘ
- Avg. Weighted Degree: 2.669 Run ⓘ
- Network Diameter: 46 Run ⓘ
- Graph Density: 0.001 Run ⓘ
- HITS: Run ⓘ
- Modularity: Run ⓘ
- Clustering Coefficient: Run ⓘ
- PageRank: Run ⓘ
- Connected Components: 1 Run ⓘ
- DBSCAN: Run ⓘ
- Girvan-Newman Clustering: Run ⓘ
- Leiden algorithm: 0.794 Run ⓘ

Node Overview

- Avg. Clustering Coefficient: 0.107 Run ⓘ
- Eigenvector Centrality: Run ⓘ

Edge Overview

- Avg. Path Length: 18.989 Run ⓘ

Girvan-Newman Report

Parameters:

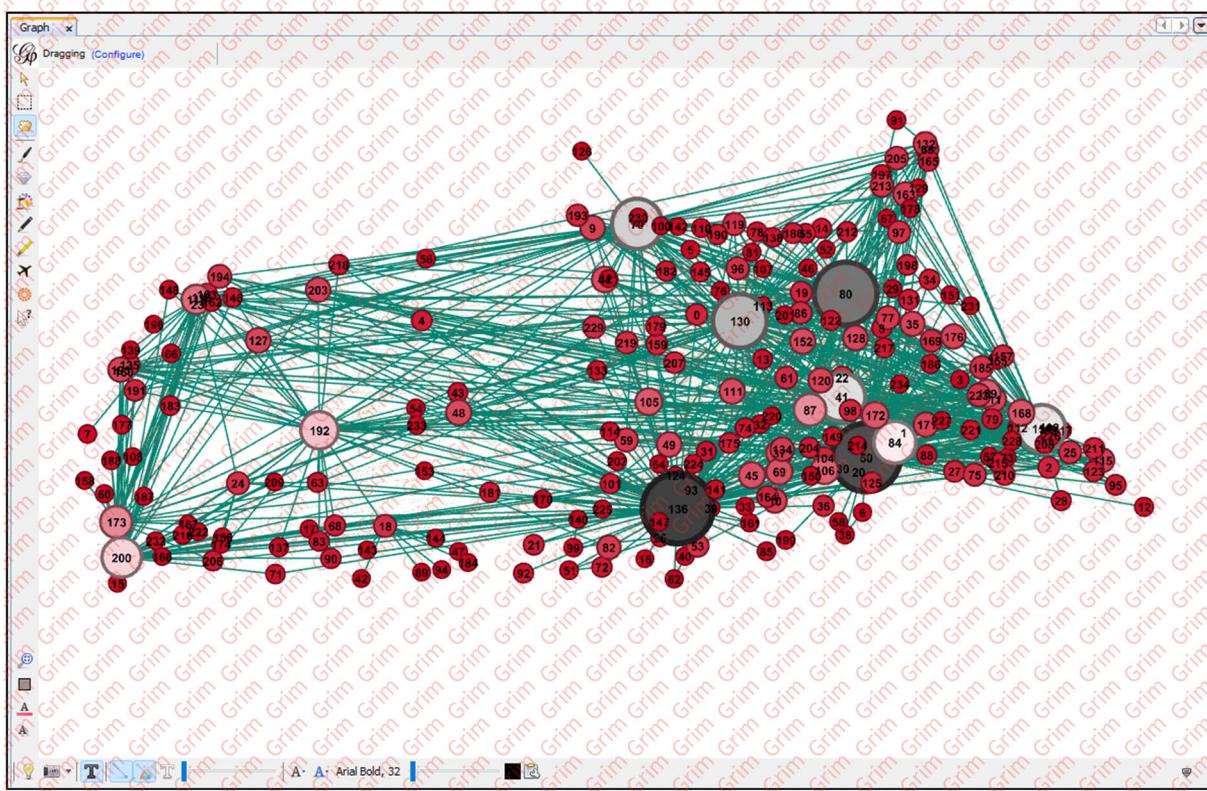
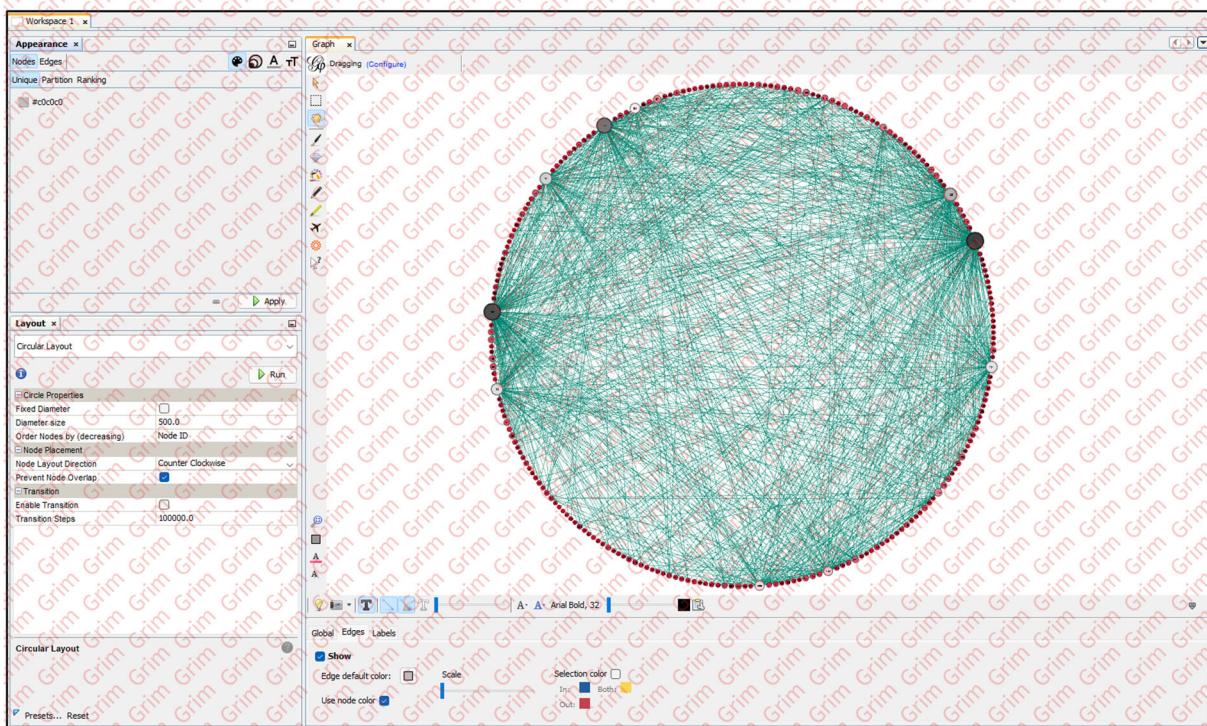
- Respect edge type for shortest path betweenness: yes
- Respect parallel edges for shortest path betweenness: no
- Respect edge type for modularity computation: no
- Respect parallel edges for modularity computation: no

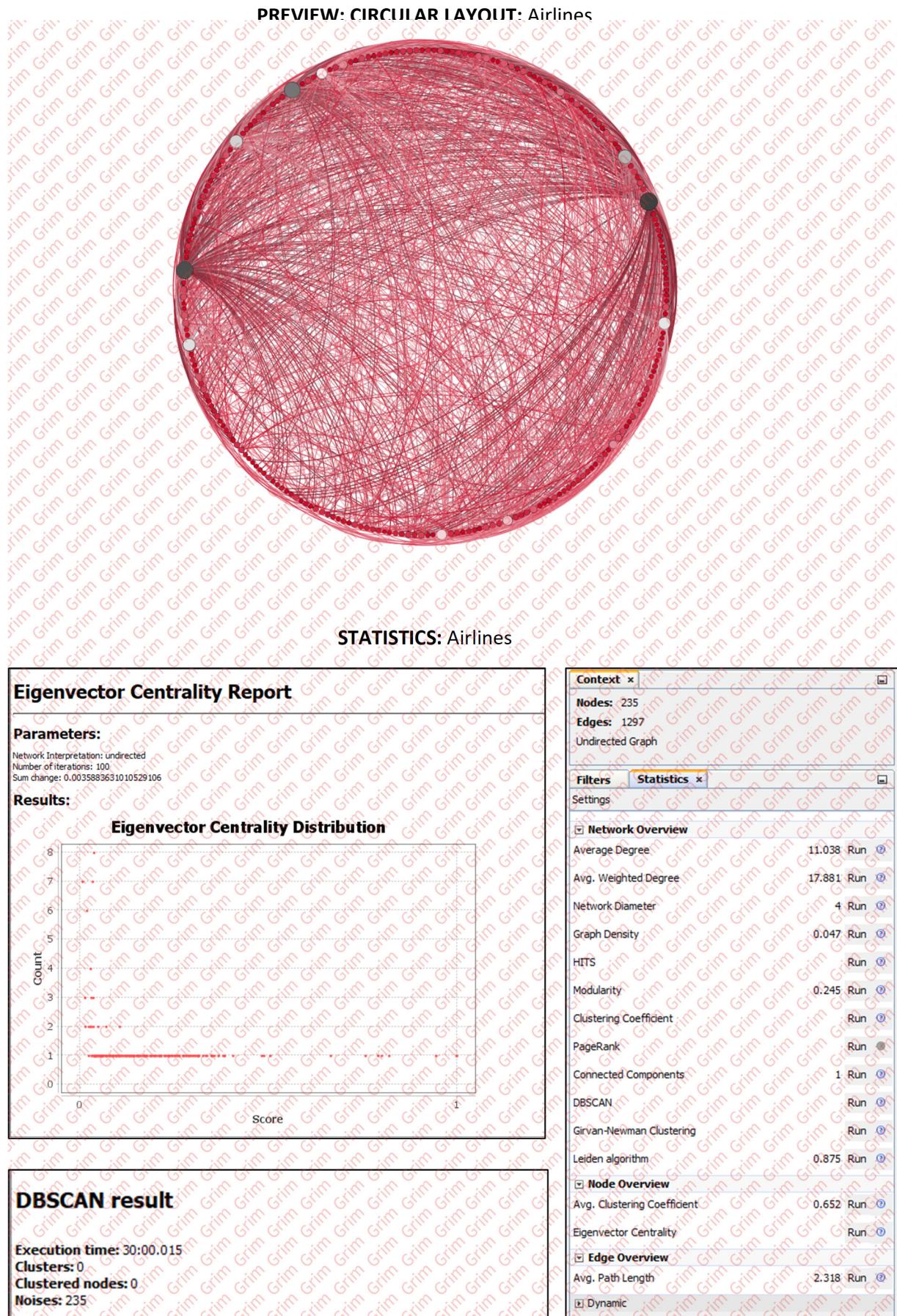
Processed Graph Data

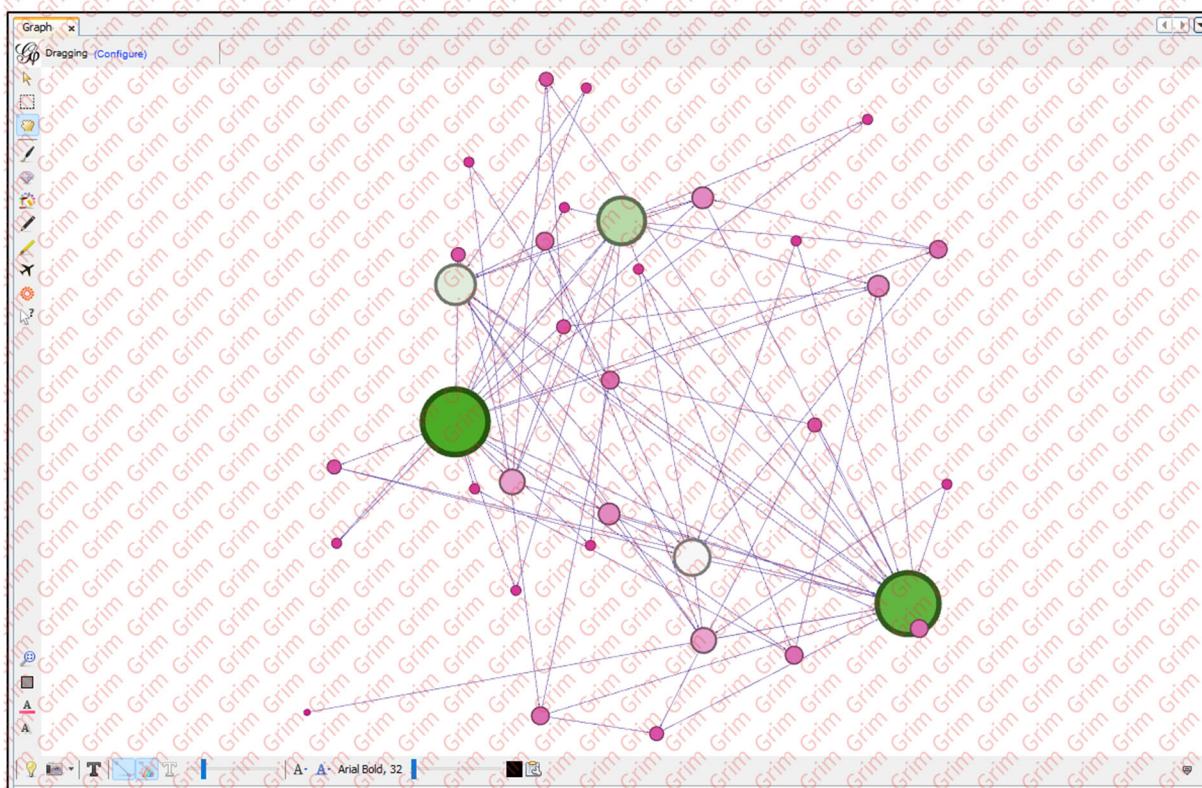
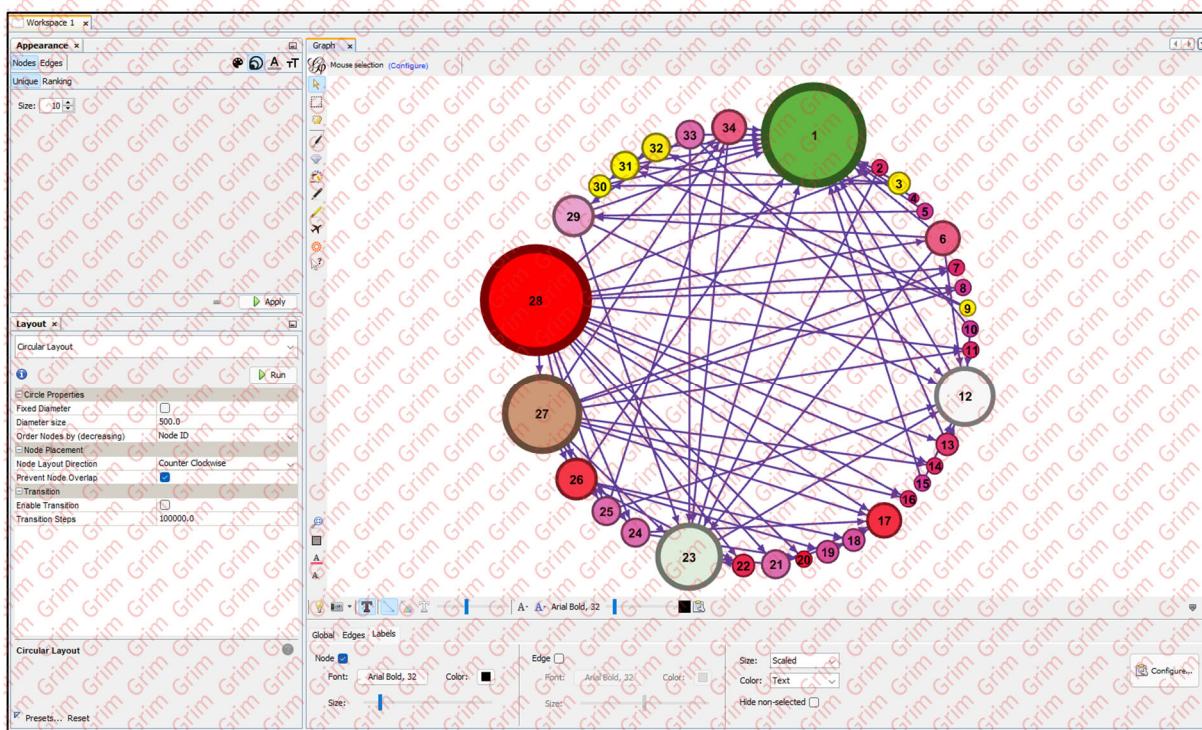
Nodes: 4941
Edges: 6594
Processing time: 26.179 sec

Communities

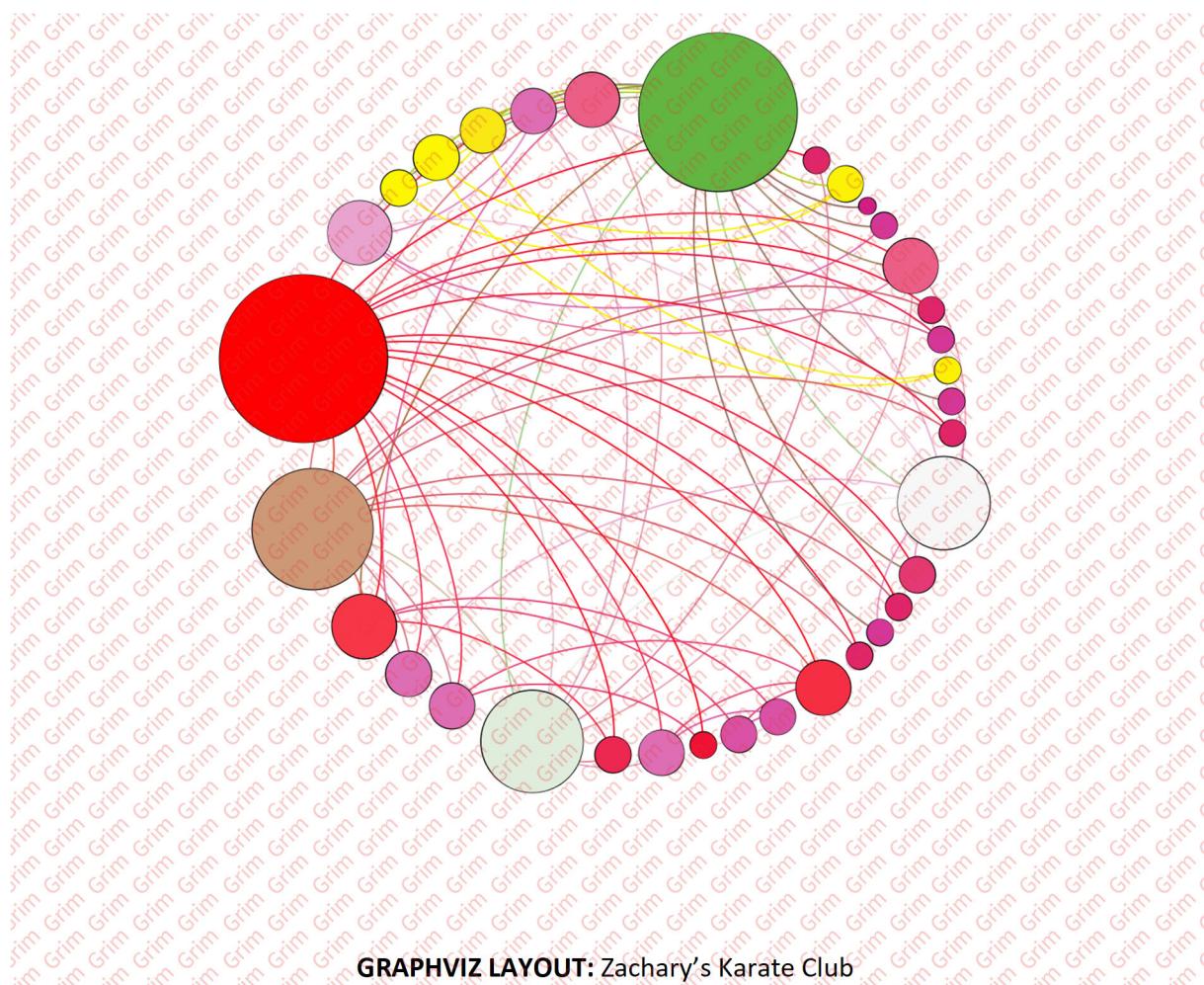
Number of communities: 1
Maximum found modularity: 0.0

GRAPH FILE NAME: "Airlines.graphml"**CIRCULAR LAYOUT: Airlines**

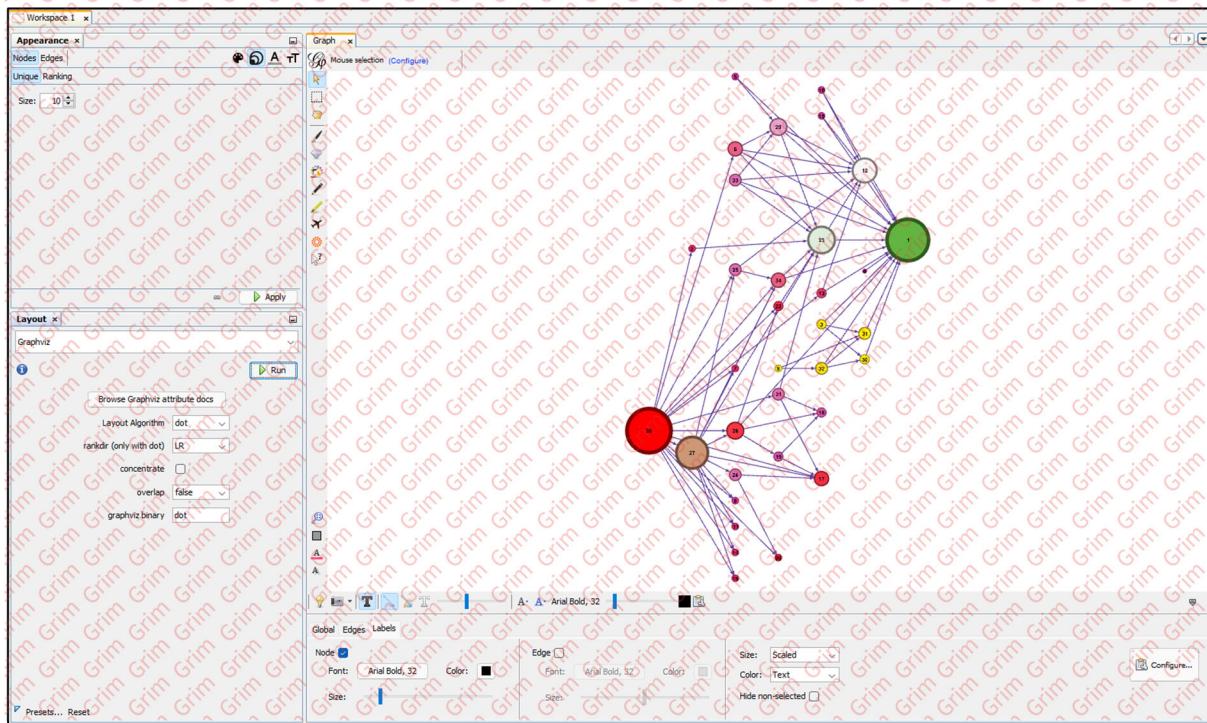


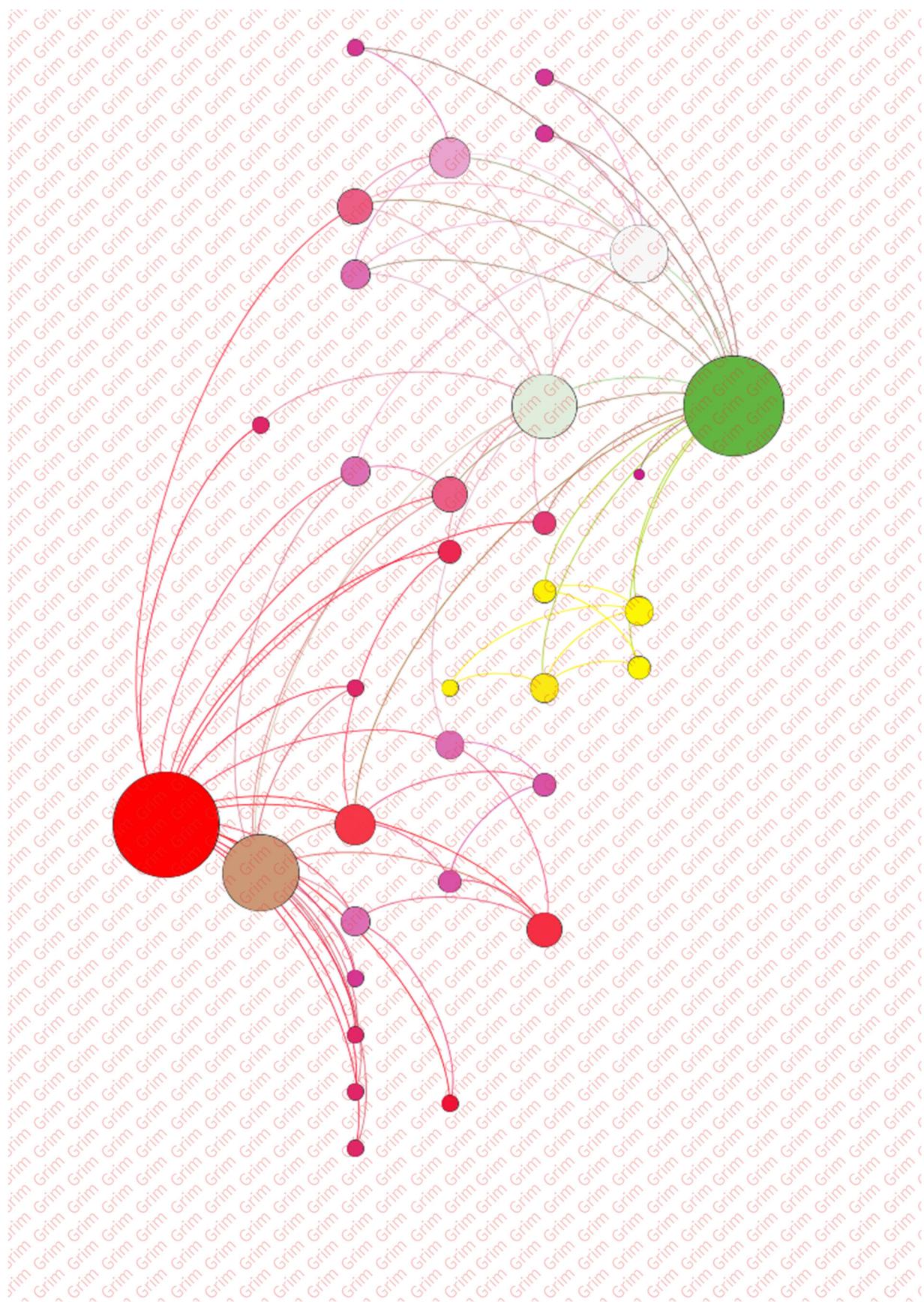
GRAPH FILE NAME: "Zachary's Karate Club.csv"**CIRCULAR LAYOUT: Zachary's Karate Club**

PREVIEW: CIRCULAR LAYOUT: Zachary's Karate Club (Exported as png)



GRAPHVIZ LAYOUT: Zachary's Karate Club



PREVIEW: GRAPHVIZ LAYOUT: Zachary's Karate Club (Exported as png)

STATISTICS: Zachary's Karate Club

Clustering Coefficient (Triangle Method): 0.256

Girvan-Newman Report

Parameters:

Respect edge type for shortest path betweenness: yes
Respect parallel edges for shortest path betweenness: no

Respect edge type for modularity computation: yes
Respect parallel edges for modularity computation: no

Processed Graph Data

Nodes: 34
Edges: 78
Processing time: 0.062 sec.

Communities

Number of communities: 20
Maximum found modularity: 0.1420184

Context x

Nodes: 34
Edges: 78
Directed Graph

Filters	Statistics x
Settings	
<input checked="" type="checkbox"/> Network Overview	Average Degree 2,294 Run ② Avg. Weighted Degree 2,294 Run ② Network Diameter 5 Run ② Graph Density 0.139 Run ② HITS Run ② Modularity 0.42 Run ② Clustering Coefficient Run ② PageRank Run ② Connected Components 1 Run ② DBSCAN Run ② Girvan-Newman Clustering Run ② Leiden algorithm 0.926 Run ② <input checked="" type="checkbox"/> Node Overview Avg. Clustering Coefficient 0.588 Run ② Eigenvector Centrality Run ② <input checked="" type="checkbox"/> Edge Overview Avg. Path Length 2.408 Run ② <input type="checkbox"/> Dynamic

Eigenvector Centrality Report

Parameters:

Network Interpretation: undirected
Number of iterations: 100
Sum change: 9.783386901414531E-4

Results:

Eigenvector Centrality Distribution

PageRank Report

Parameters:

Epsilon = 0.001
Probability = 0.85

Results:

PageRank Distribution

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14th February, 2022