Social Network Analysis

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Tutorial
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Gephi Tutorial Quick Start

Welcome to this introduction tutorial. It will guide you to the basic steps of network visualization and manipulation in Gephi.

Gephi version 0.7alpha2 was used to do this tutorial.

Get Gephi

https://gephi.org/tutorials/gephi-tutorial-quick_start.pdf

Download

Gephi is an open-source and multiplatform software distributed under the dual license CDDL 1.0 and GNU General Public License v3.

Official Releases

Release Notes | System Requirements | Installation instructions

Gephi 0.10.1 is the latest stable release.

Download Gephi for Windows

Version 0.10.1

If you have an older Gephi on your computer, you should uninstall it first, see the installation instructions.

All downloads:

Download Gephi 0.10.1 for Mac OS (Intel)
Download Gephi 0.10.1 for Mac OS (Silicon)
Download Gephi 0.10.1 for Windows
Download Gephi 0.10.1 for Linux
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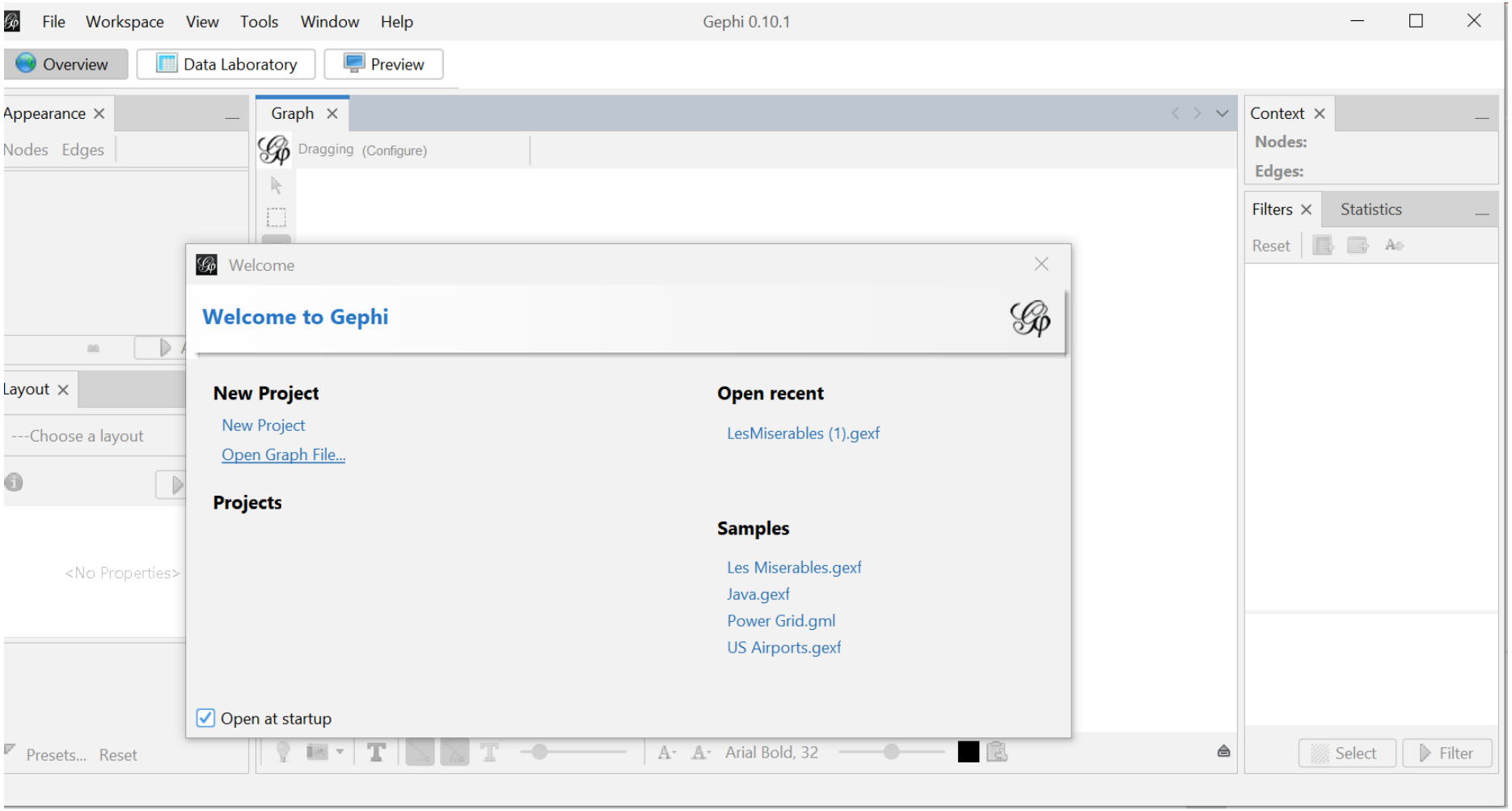
Ways to get help

2) Get Personal Help
3) Other Gephi Support

https://gephi.org/users/download/

Open file

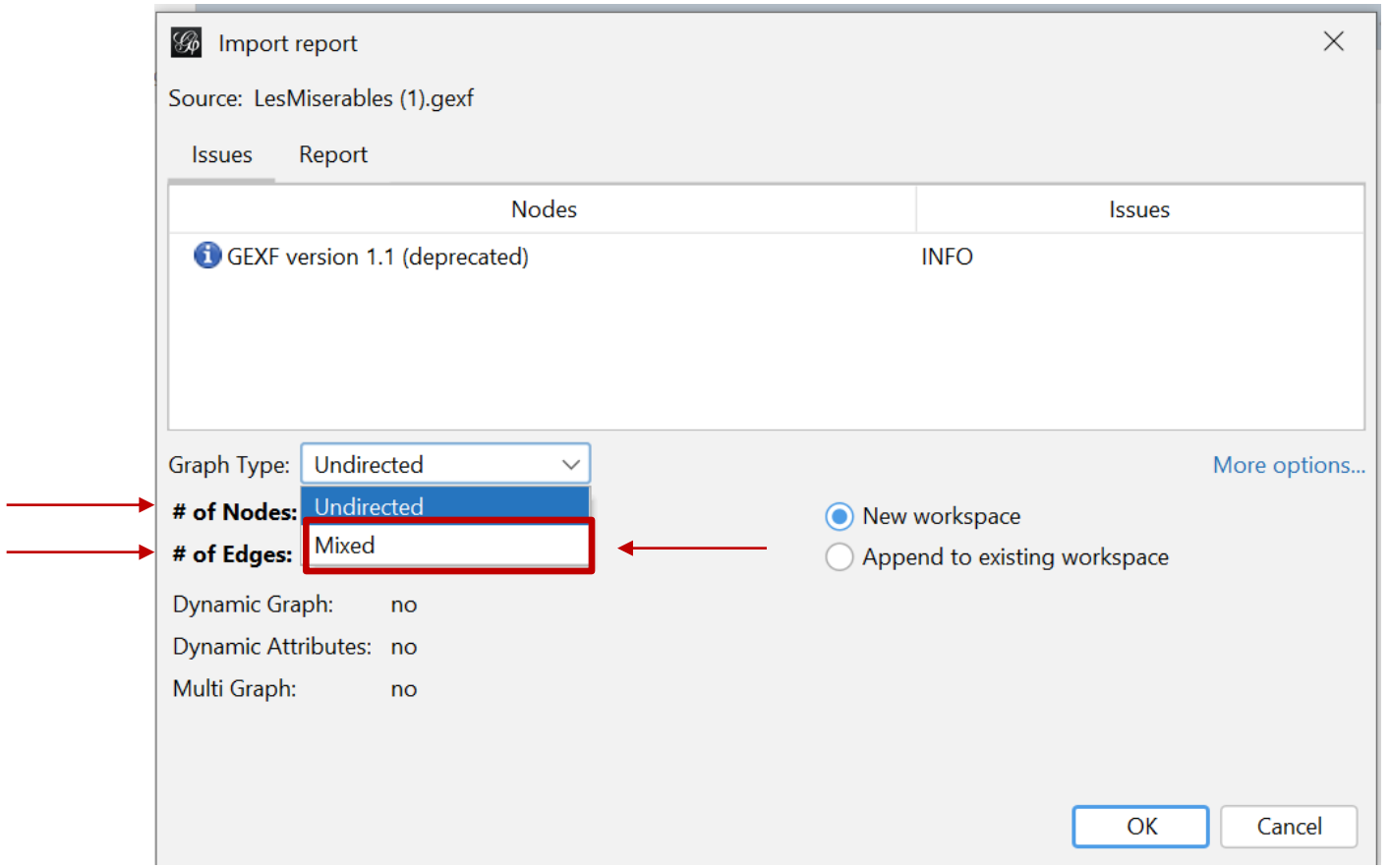
- In the menubar, go to File Menu and Open



Import file

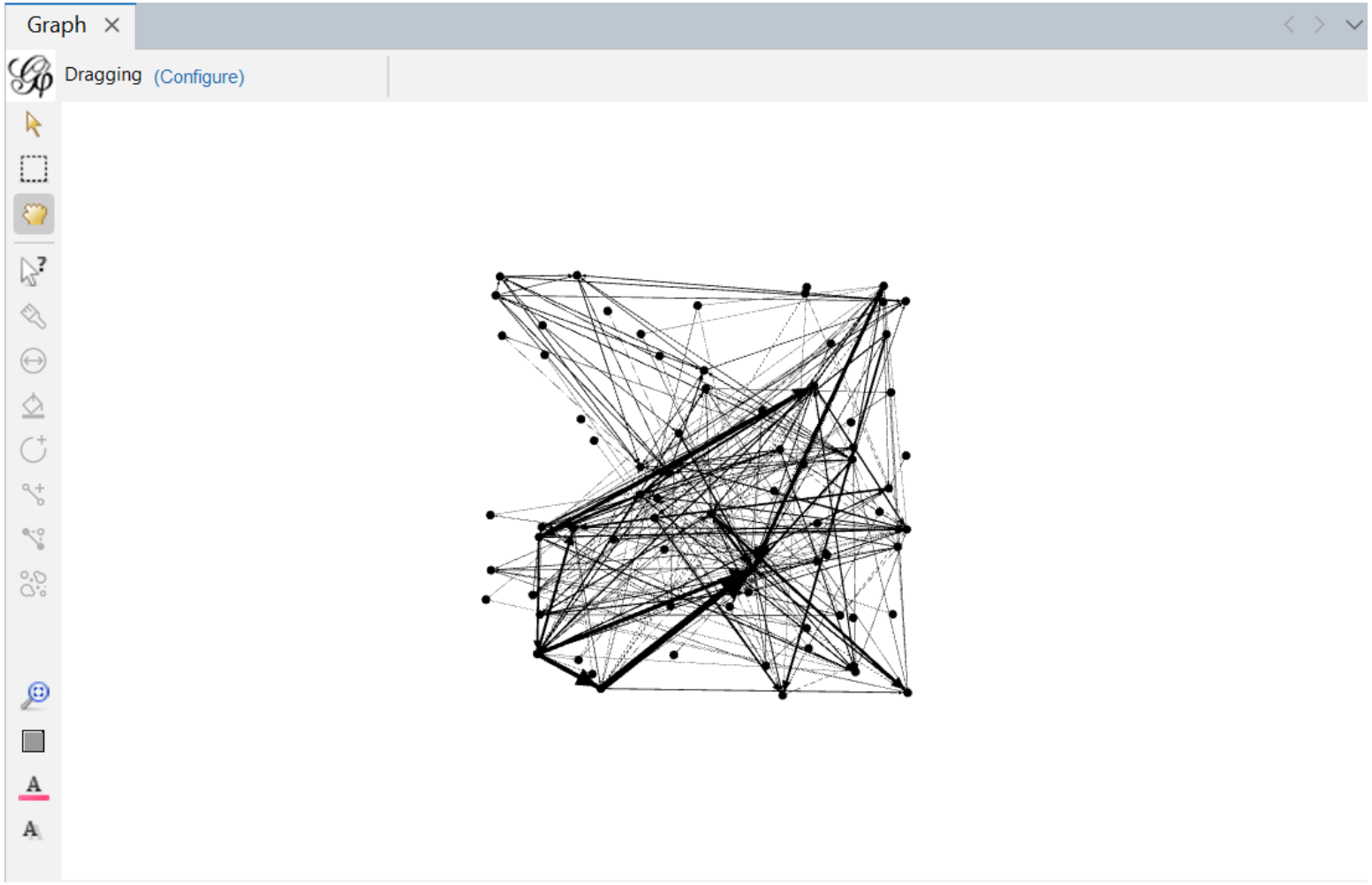
- When your filed is opened, the report sum up data found and issues.
  - ↘Number of nodes Number of edges
  - ↘Type of graph

- Click on OK to validate and see the graph



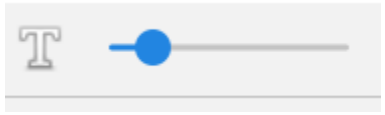
Visualization

- You should now see this graph
  - ↘ Nodes position is random at first, so you may see a slighty different representation



Visualization options

- Locate the “Edge Thickness” slider on the bottom

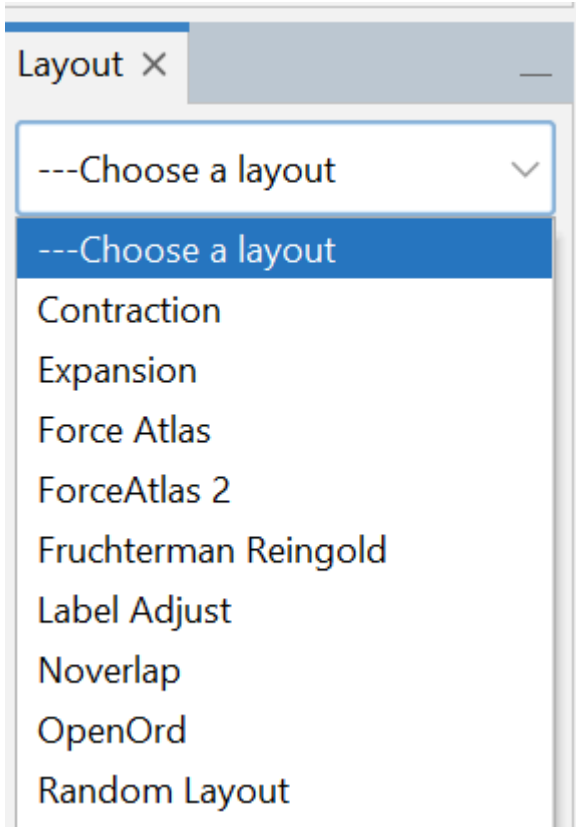


- If you loose your graph, reset the position

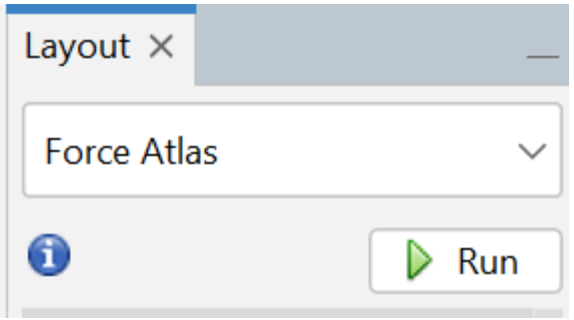
Layout the graph

Layout algorithms sets the graph shape, it is the most essential action.

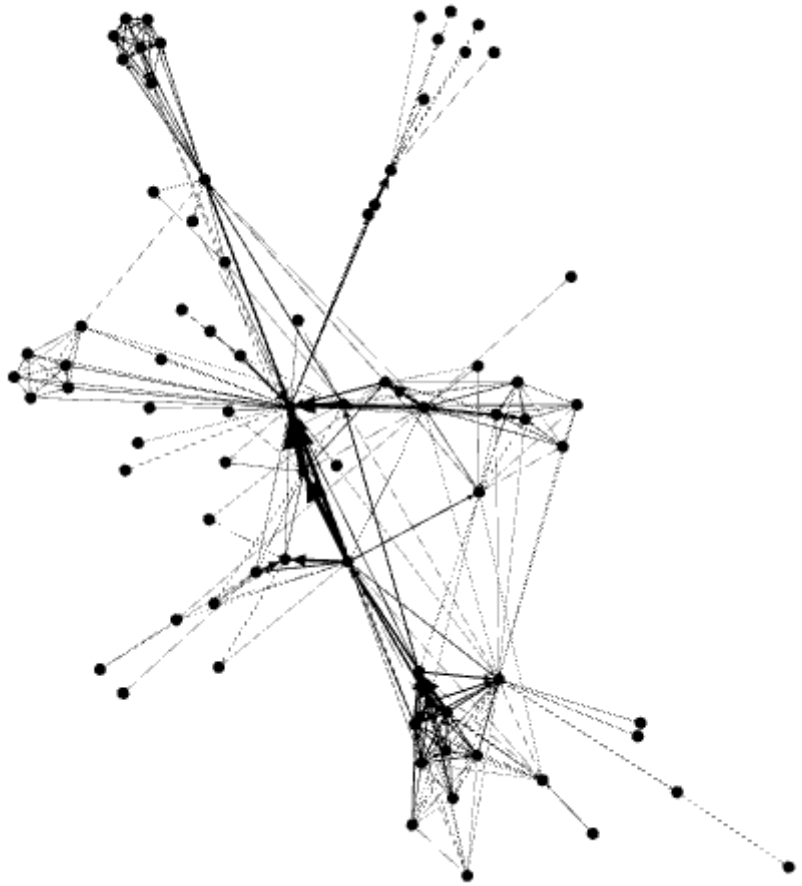
- Locate the Layout module, on the left panel.



- Choose “Force Atlas”
  - ↘ Set the “Repulsion strengh” at 10 000 to expand the graph.
- Click on run to launch the algorithm

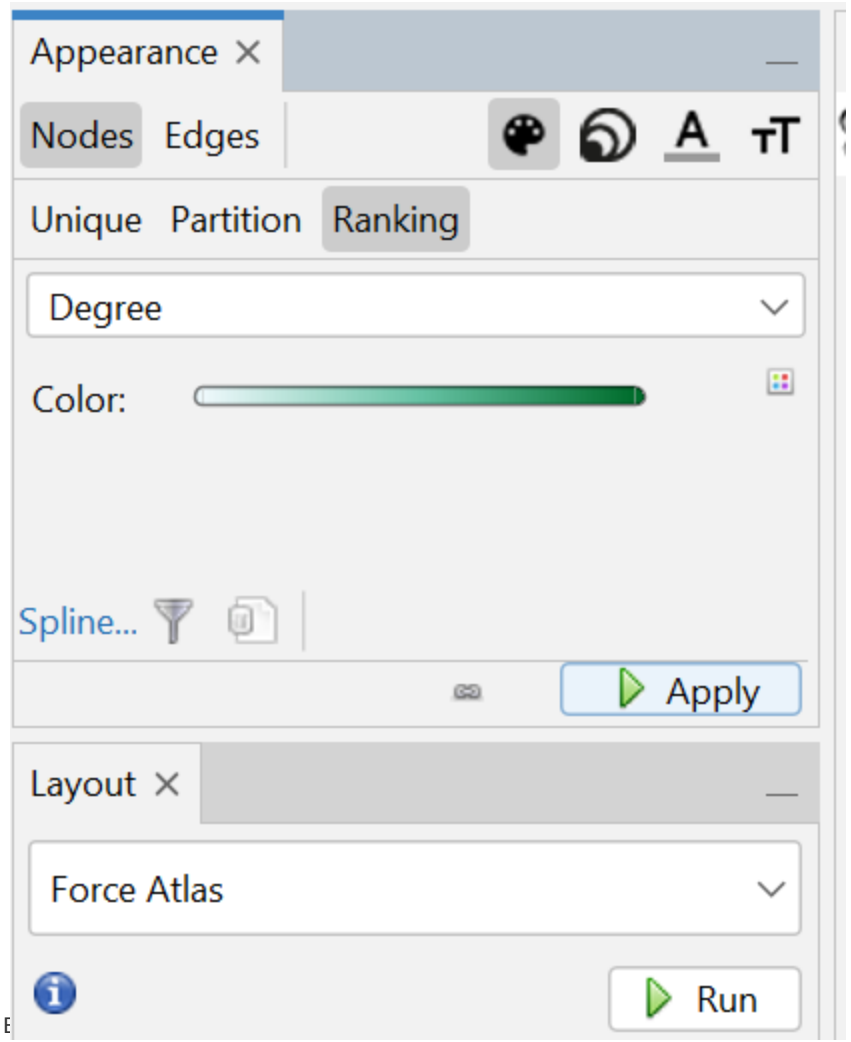


You should now see a layouted graph



Ranking (color)

Ranking module lets you configure node's color and size.

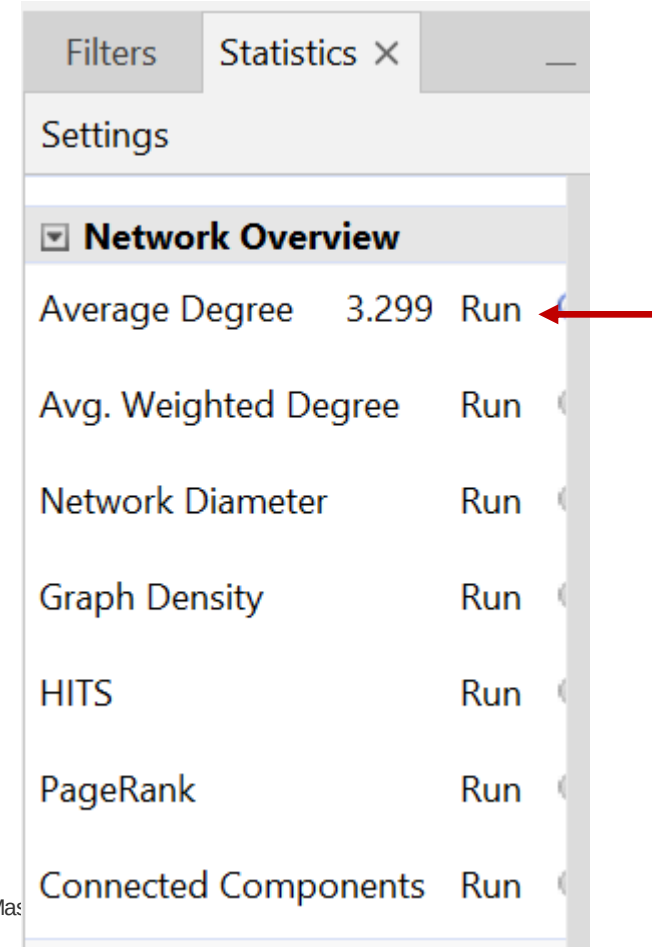


- Locate Ranking module, in the top left.
  - ↘ Choose "Degree" as a rank parameter
- Change colors as you prefer
- Click on apply to launch the algorithm

Ranking result table

You can see rank values by enabling the result table. Valjean has 36 links and is the most connected node in the network..

- Locate the Statistics module, on the right panel.
- Run Average Degree
- Who is in the node with the largest degree centrality? You should check the Data Table tab



Graph | Data Table

Nodes | Edges | Configuration | Add node | Add edge | Search/Replace | Import Spreadsheet | Export table | More actions

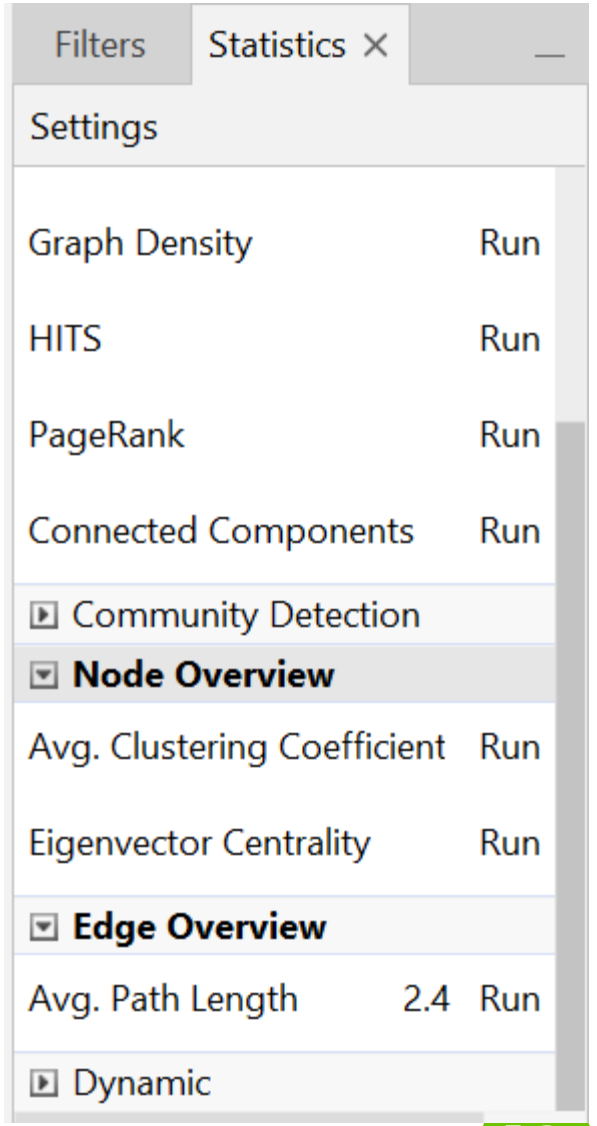
Id	Label	Interval	In-Degree	Out-Degree	Degree
42.0	Anzelma		0	3	3
69.0	Babet		3	7	10
63.0	Bahorel		4	8	12
29.0	Bamatabois		5	3	8
56.0	BaronessT		0	2	2
19.0	Blacheville		4	3	7
64.0	Bossuet		3	10	13
40.0	Boulatruelle		0	1	1
36.0	Brevet		2	4	6
75.0	Brujon		0	7	7
35.0	Champmathieu		3	3	6
6.0	Champtercier		0	1	1

Metrics

We will calculate the average path length for the network. It computes the path length for all possible pairs of nodes and give information about how nodes are close from each other.

In the report you get some centrality metrics as closeness, betwenness…

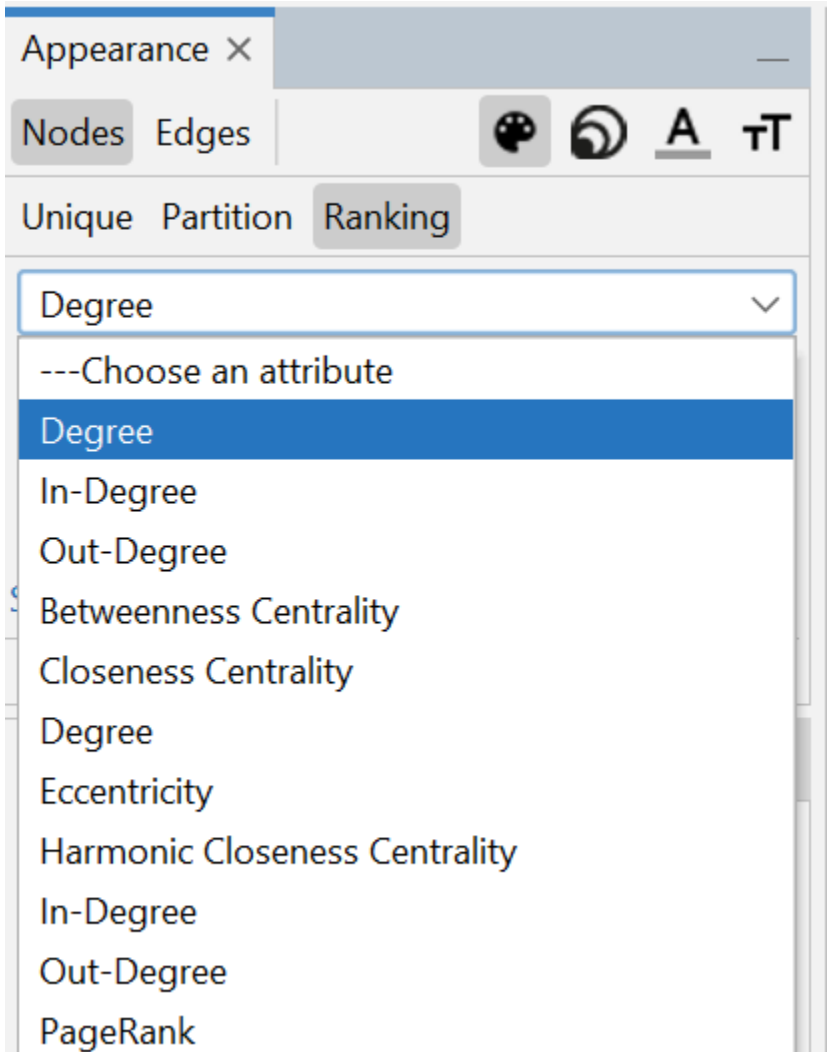
You can check other metrics as centrality ones, density…



Ranking (size)

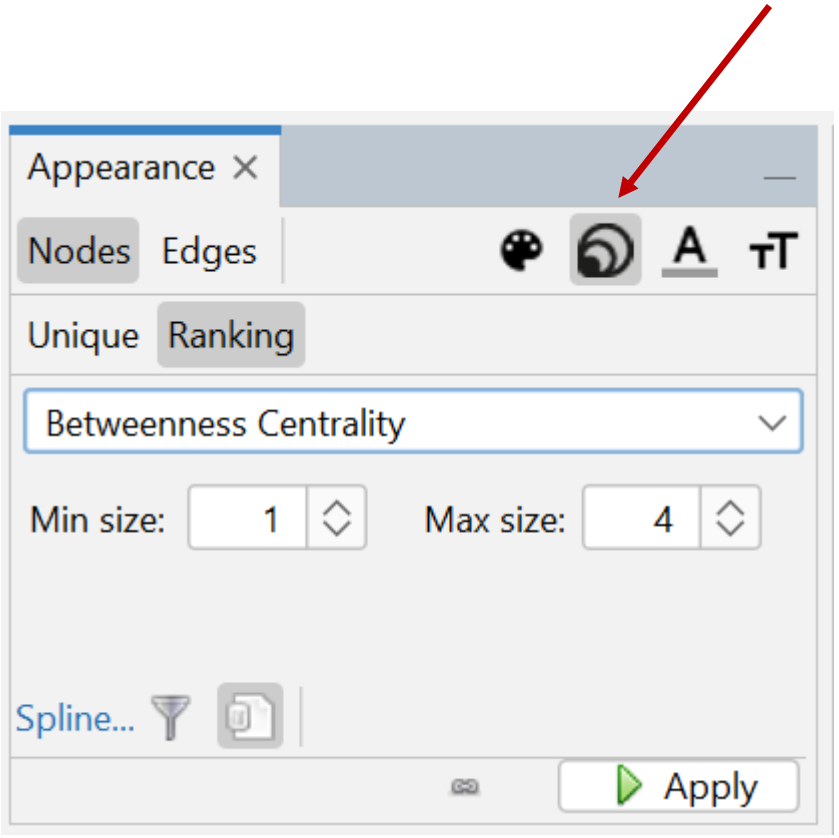
Metrics generates general reports but also results for each node. Thus three new values have been created by the “Average Path Length” algorithm we ran.

- Betweeness Centrality
- Closeness Centrality
- Eccentricity.



Ranking (size)

The node's size will be set now. Colors remain the "Degree" indicator
Locate the Layout module, on the left panel.

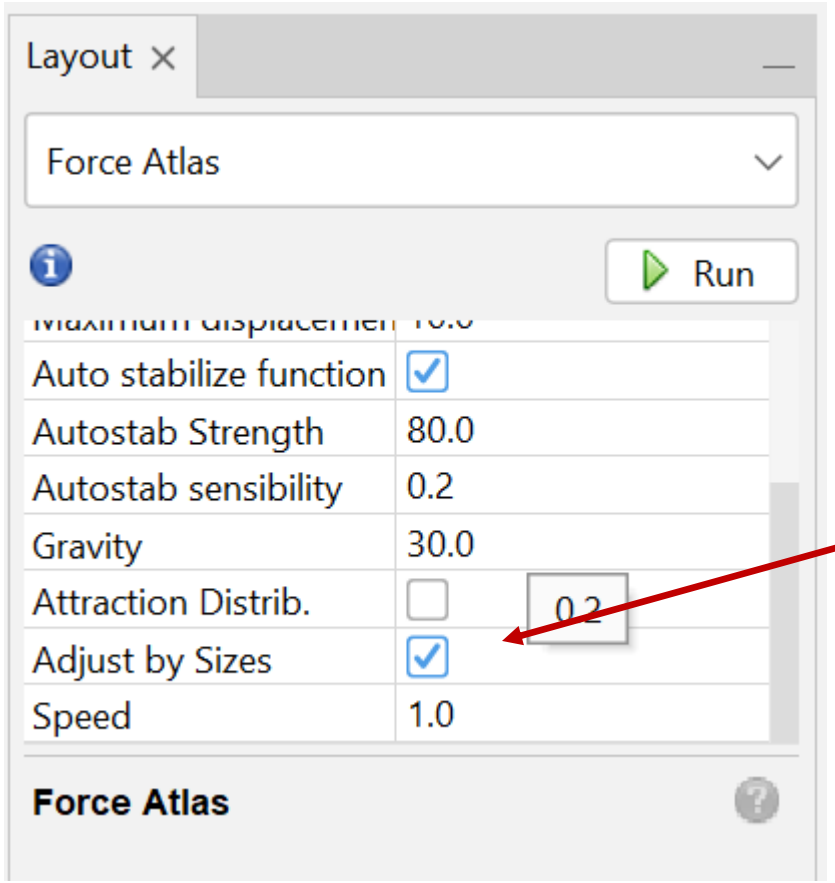


- Select the circls icon in the toolbar for size.
- Change min and max sizes until you find those that work better

You should see a colored and sized graph

Layout again

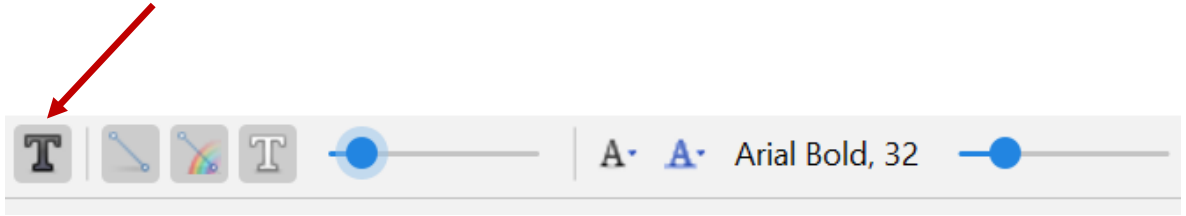
The layout is not completely satisfying, as big nodes can overlap smaller. The “Force Atlas” algorithm has an option to take node size in account when layouting.



- Check the “Adjust by Sizes” option and run again the algorithm for short moment.
- You can see nodes are not overlapping anymore.

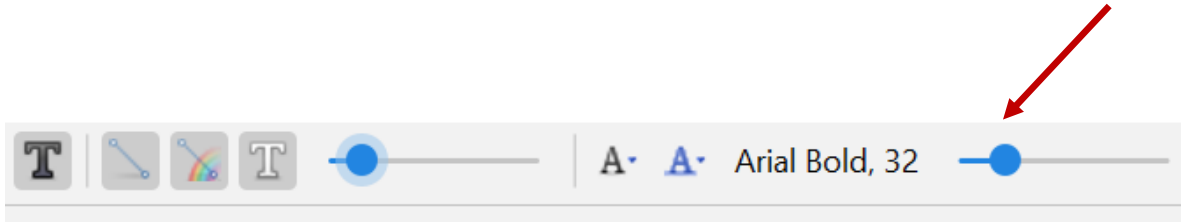
Show labels

Let's explore the network more in details now that colors and size indicates central nodes.



- Display node labels

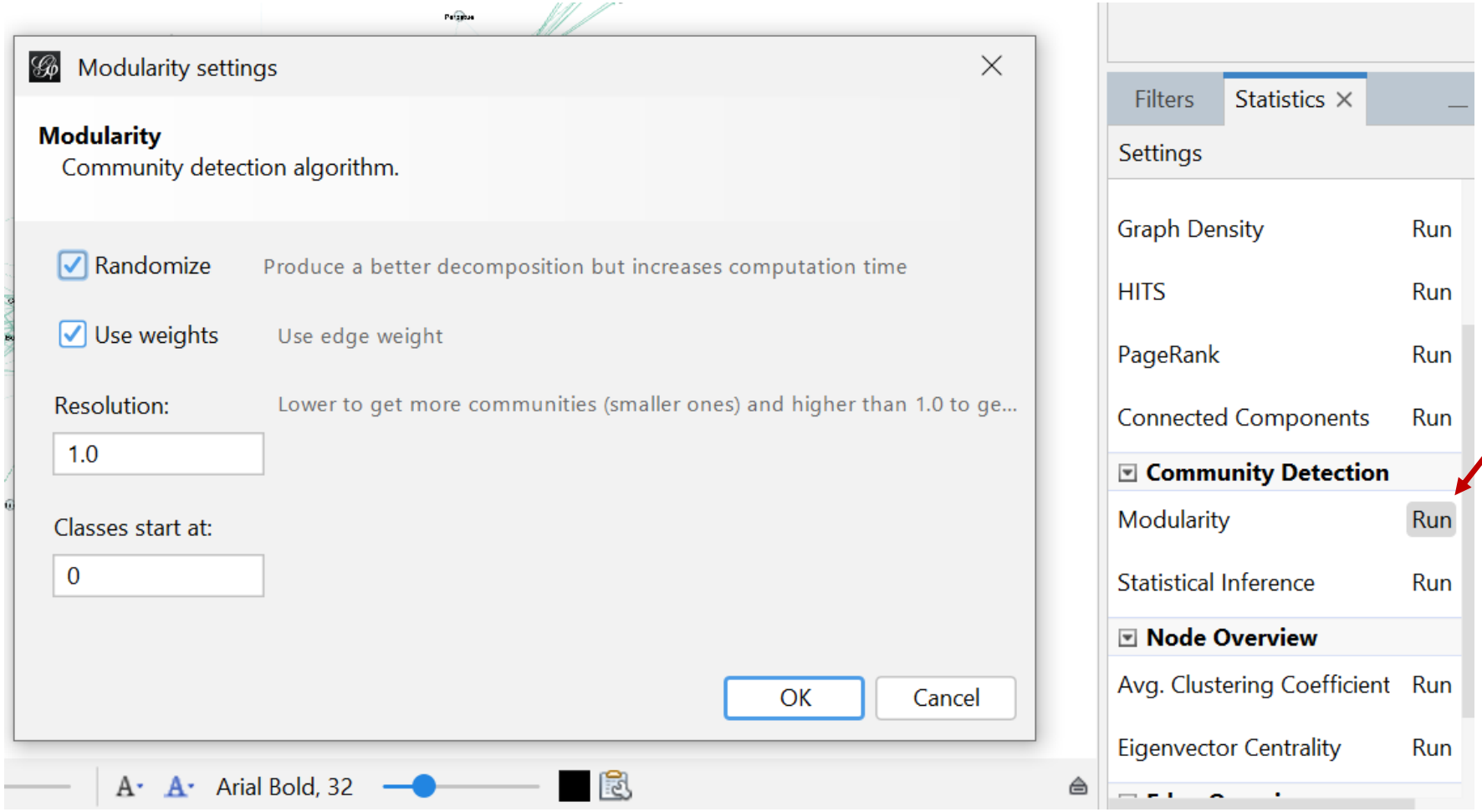
- Set label size proportional to node size



- Set label size with the scale slider

Community detection

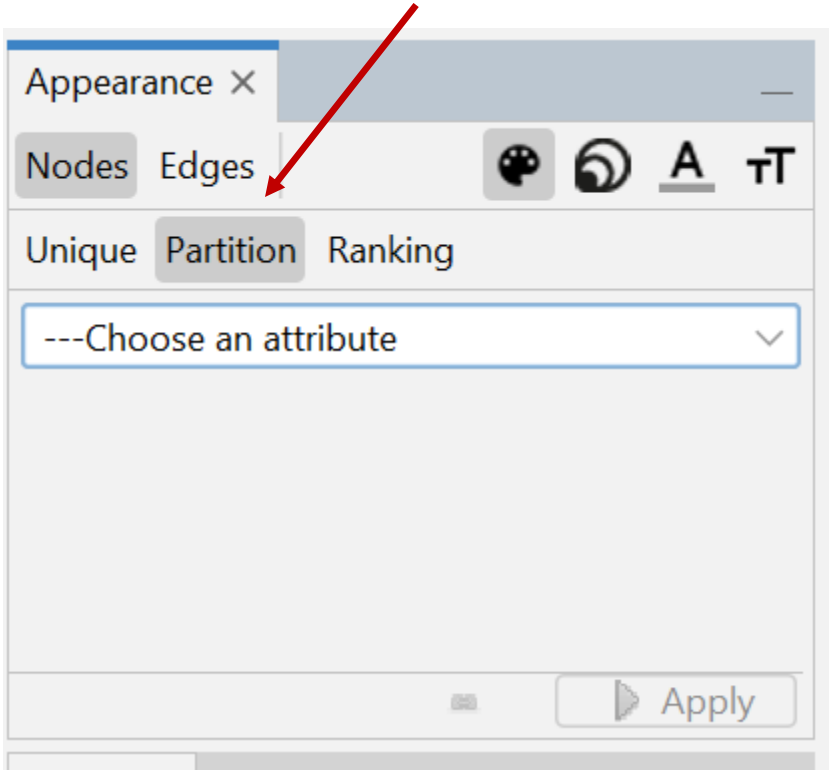
The ability to detect and study communities is central in network analysis. We would like to colorize clusters in our example. Gephi implements the Louvain method, available from the Statistics panel.



Partition

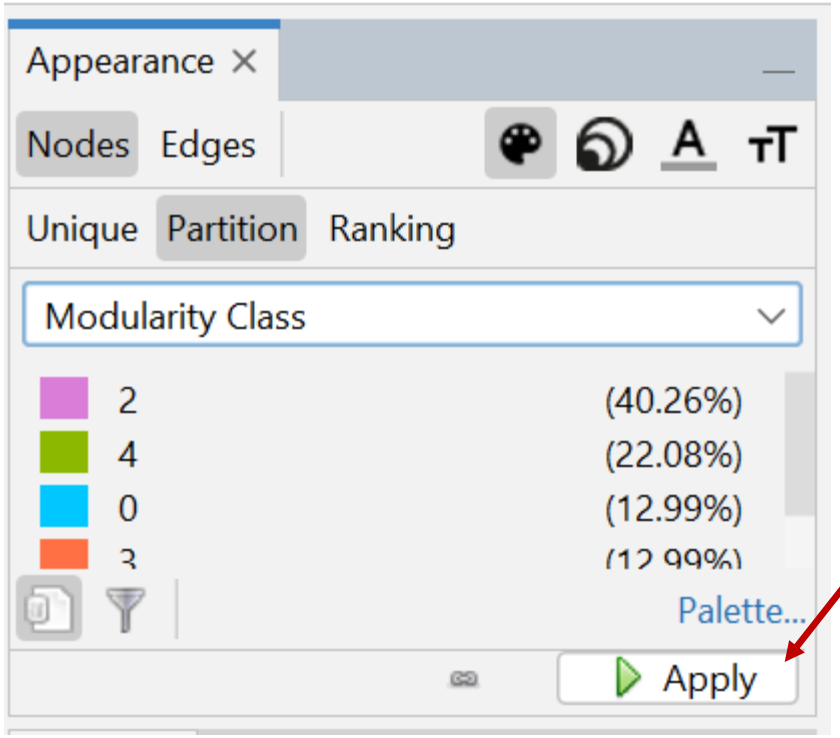
The community detection algorithm created a “Modularity Class” value for each node.

The partition module can use this new data to colorize communities.



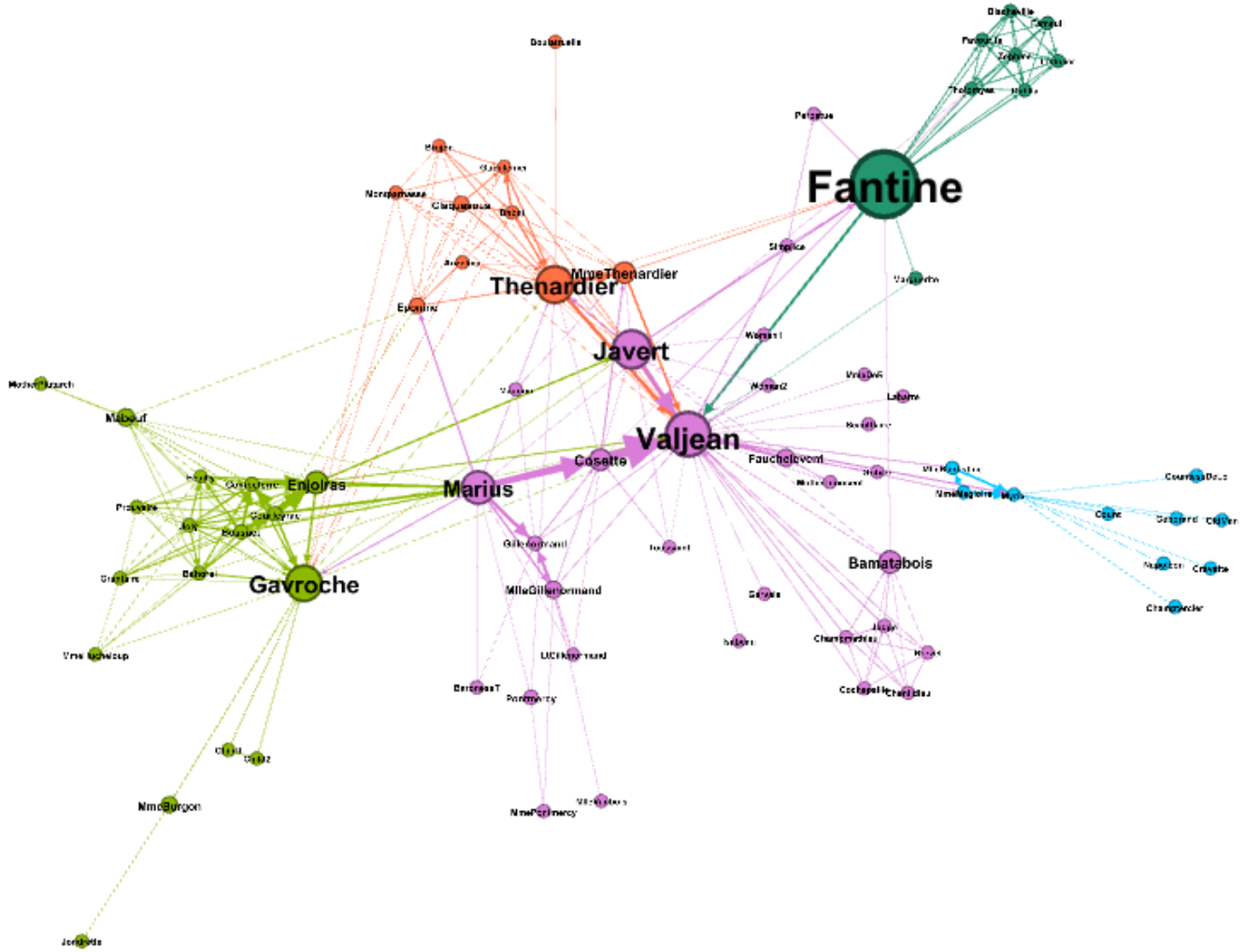
- Select the circles icon in the toolbar for size.
- Change min and max sizes until you find those that work better

Partition



- Select “Modularity Class” in the partition list.
- You can see that 9 communities were found, could be different for you.
- A random color has been set for each community identifier.
- Change it as you prefer

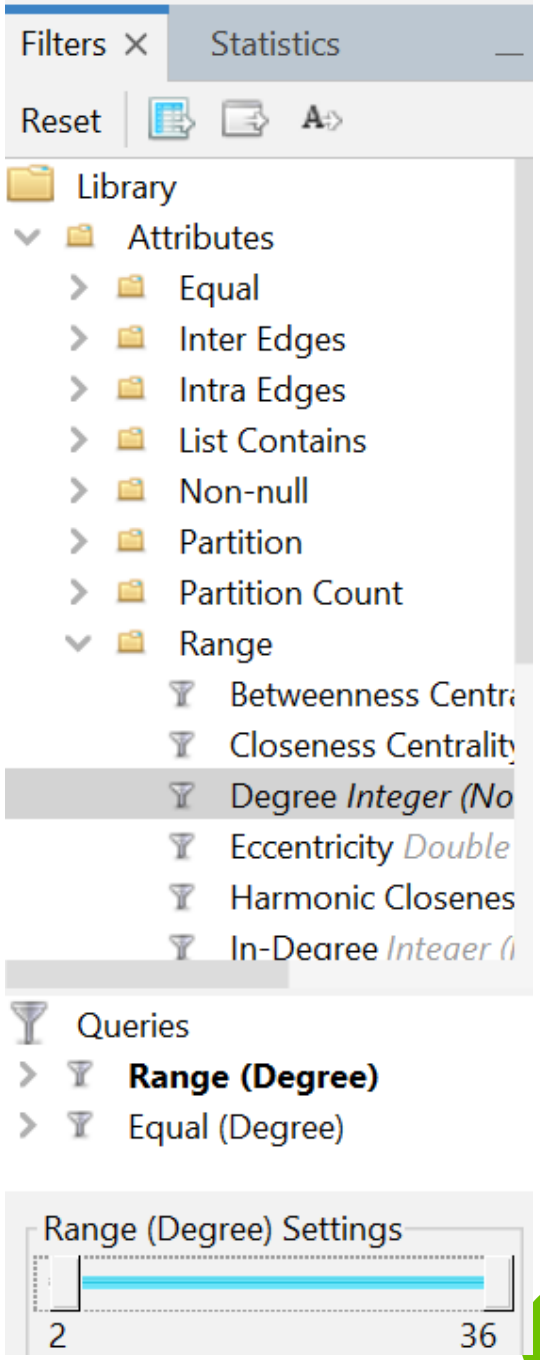
What the network looks like now



Filter

The last manipulation step is filtering. You create filters that can hide nodes and egdes on the network. We will create a filter to remove leaves, i.e. nodes with a single edge.

- Select “Degree Range” in the “Attributes” category.
- • Click on “Degree Range” to activate the filter
- It shows a range slider and the chart that represents the data, the degree distribution here.
- Move the slider to sets its lower bound to 2.
- Nodes with a degree inferior to 2 are now hidden.



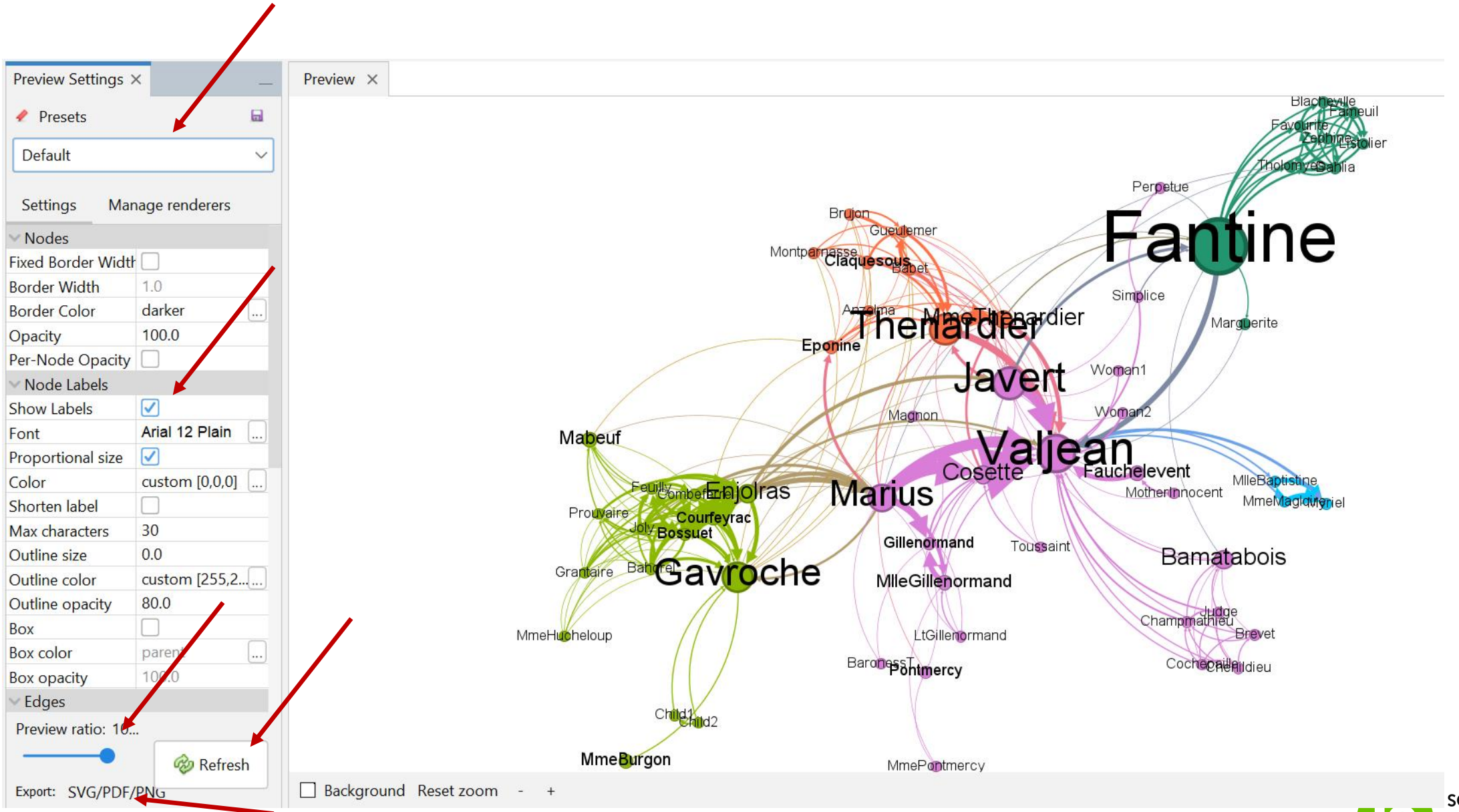
Preview

Before exporting your graph as a SVG or PDF file, go to the Preview

- Select the “Preview” tab in the banner

- Click on Refresh to see the preview
- If the graph is big, reduce the “Preview ratio” slider to 50% or 25% to display a partial graph.
- In the Node properties, find “Show Labels” and enable the option.
- Preview Settings supports Presets, click on the presets list and try different configurations.
- Export it as SVG

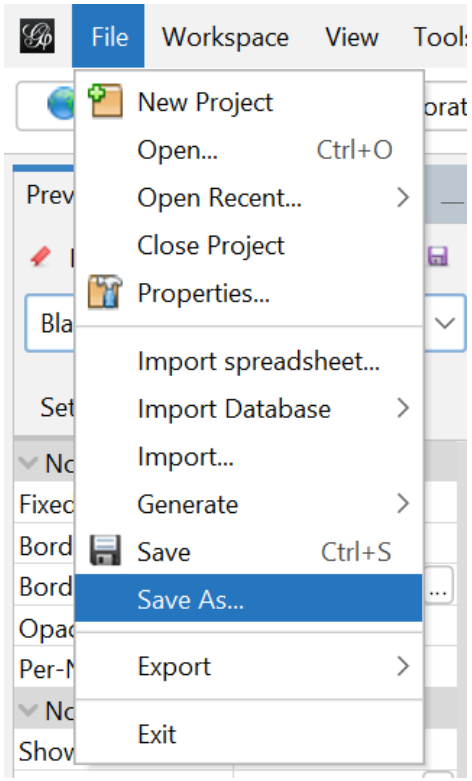
Filter



Export as SVG

Save your project

Saving your project encapsulates all data and results in a single session file.



Conclusion

In this tutorial you learned the basic process to open, visualize, manipulate and render a network file with Gephi.