Updated Gephi Quick Start Turotial for 0.9

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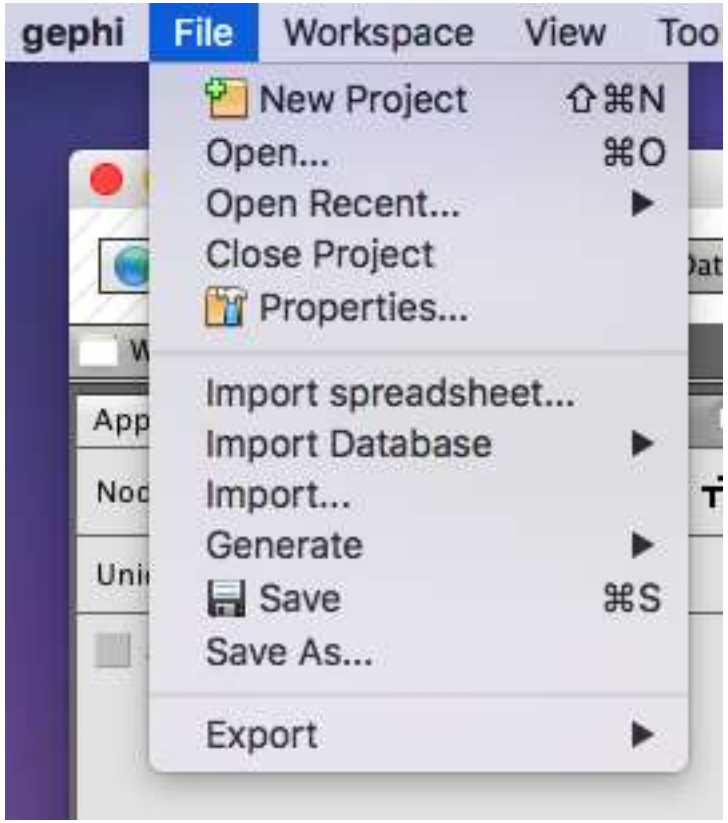
A quick note

- The original Gephi Quick Start Tutorial can be found at https://gephi.org/users/quick-start/
- Things have moved or changed since it was made, so this tutorial uses their examples and slides but adds updates so you can find these features in version 0.9
- I tried to use their originals as much as possible to preserve consistency. All credit for those slides goes to the Gephi creators.

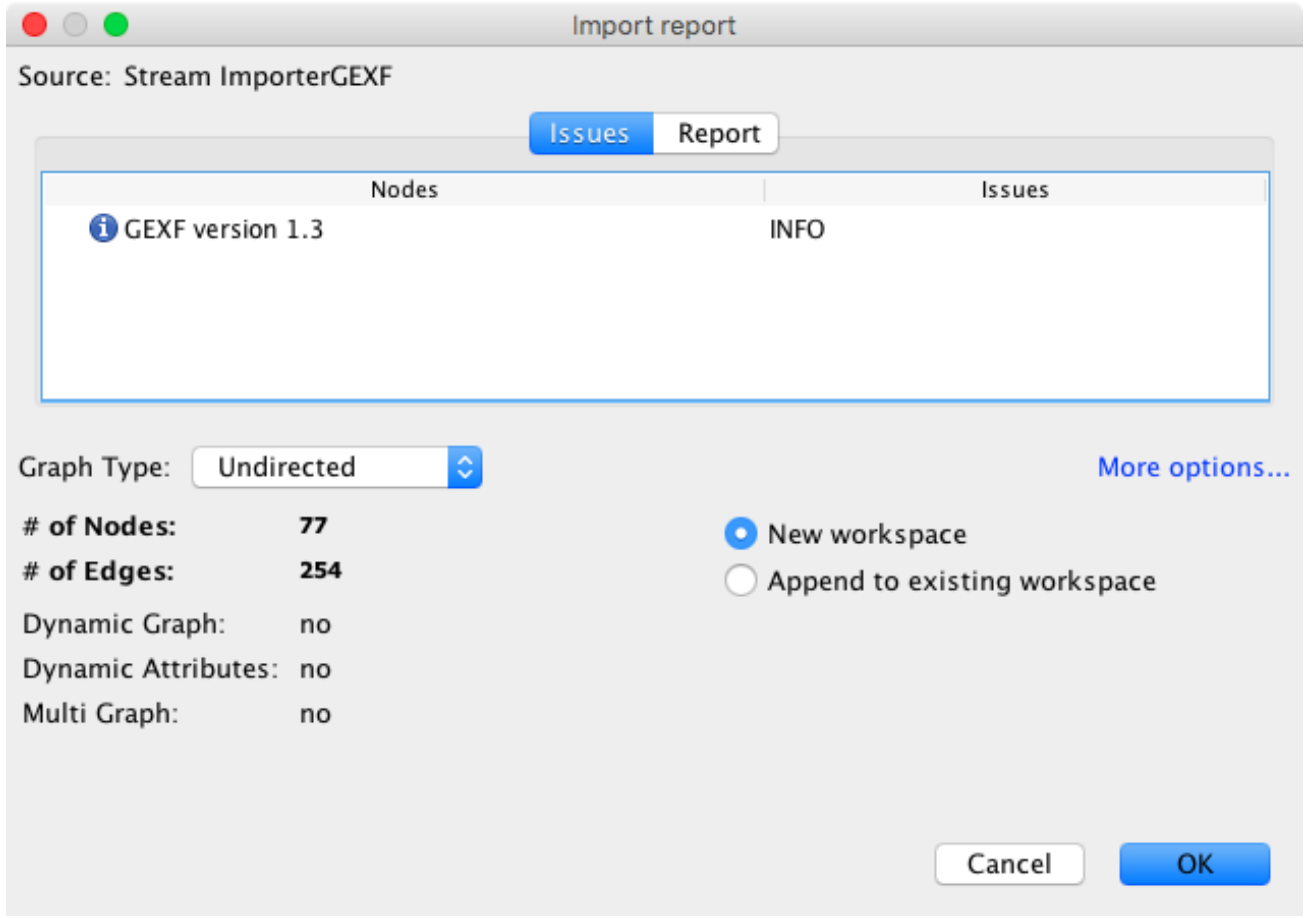
Download the Les Mis file from

https://github.com/gephi/gephi/wiki/Datasets

Then, in Gephi, go to File->open. Select the Les Mis file and click ok.

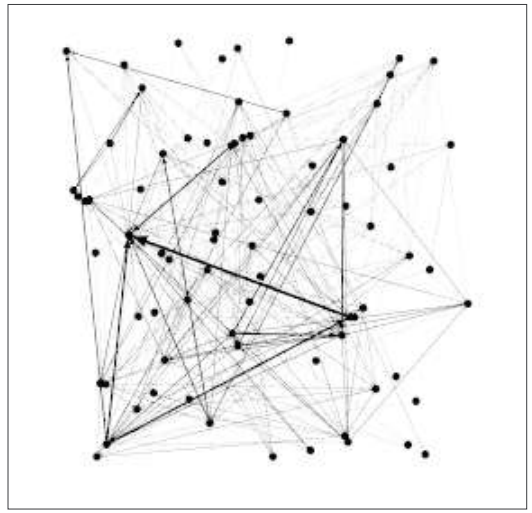


This report window shows up every time you open a new graph. You see the graph type and can see there are 77 nodes and 254 edges. You can change the Graph Type in this window by using the pull down menu. Click Ok to start working with the graph.



You should now see a graph

We imported "Les Miserables" dataset[1]. Coappearance weighted network of characters in the novel "Les Miserables" from Victor Hugo.



Nodes position is random at first, so you may see a slightly different representation.

[1] D. E. Knuth, The Stanford GraphBase: A Platform for Combinatorial Computing, Addison-Wesley, Reading, MA (1993).

Graph Visualization

- Use your mouse to move and scale the visualization
  - Zoom: Mouse Wheel
  - Pan: Right Mouse Drag

Zoom

- Locate the “Edge Thickness” slider on the bottom

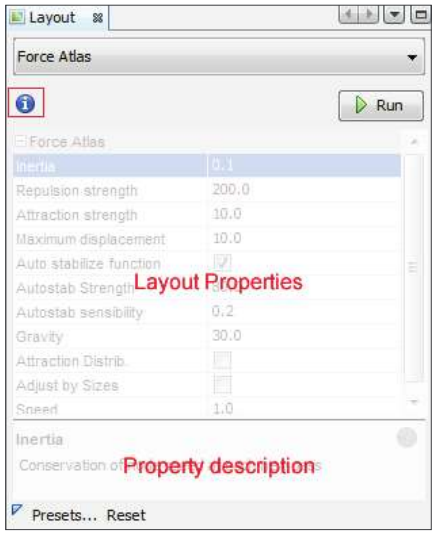
Drag

- 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”

You can see the layout properties below, leave default values.

- Click on Run to launch the algorithm

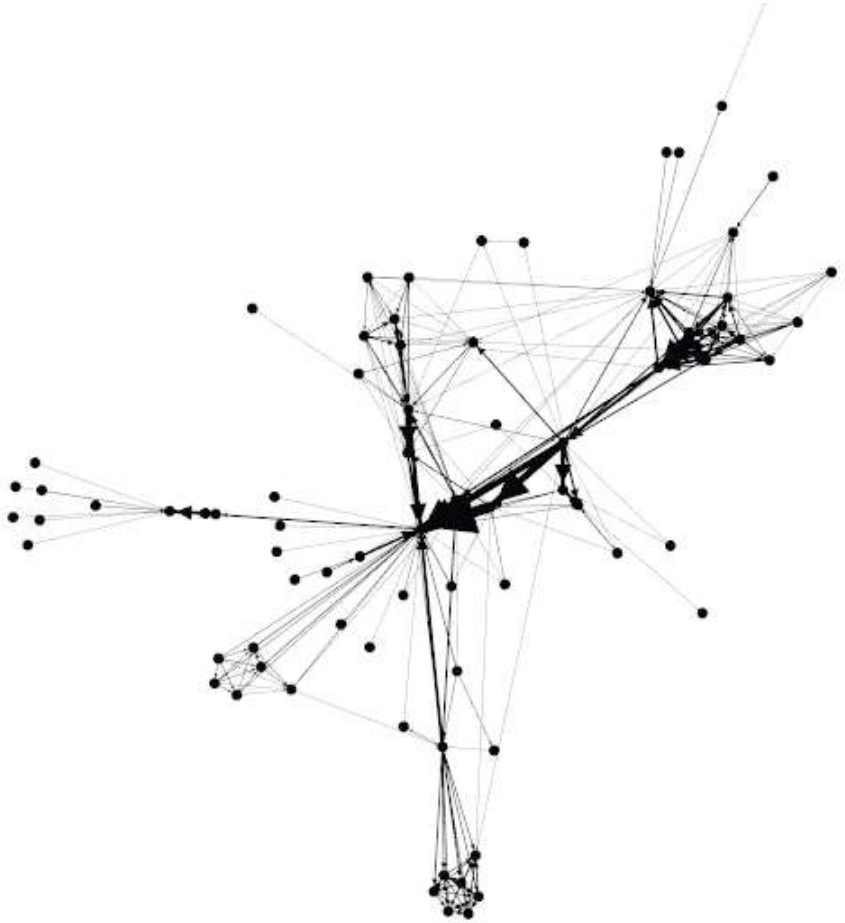
Layout algorithms

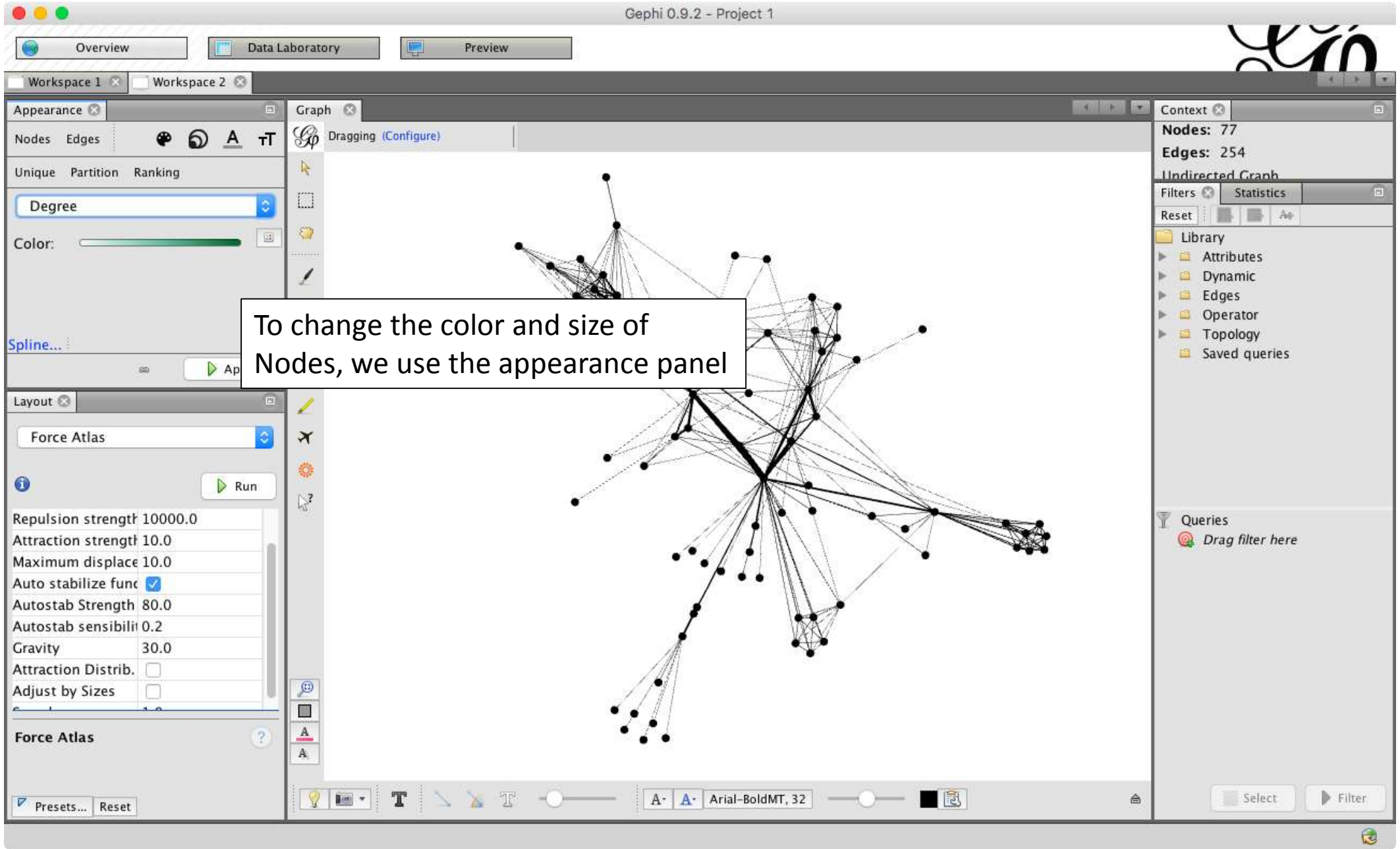
Graphs are usually layouted with “Force-based” algorithms. Their principle is easy, linked nodes attract each other and non-linked nodes are pushed apart.

Tutorial
Quick Start

* Introduction
* Import fil
* Visualization
* Layout
* Ranking (color)
* Metrics
* Ranking (size)
* Layout again
* Show labels
* Community-detection
* Partition
* Filter
* Preview
* Export
* Save
* Conclusion

You should now see a layouted graph




Gephi 0.9.2 - Project 1
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Drag filter here
Layout
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Repulsion strengt 10000.0
Attraction strengt 10.0
Maximum displace 10.0
Auto stabilize func
Autostab Strength 80.0
Autostab sensibili 0.2
Gravity 30.0
Attraction Distrib.
Adjust by Sizes
Force Atlas
Presets...
Reset
Arial-BoldMT, 32
Select
Filter

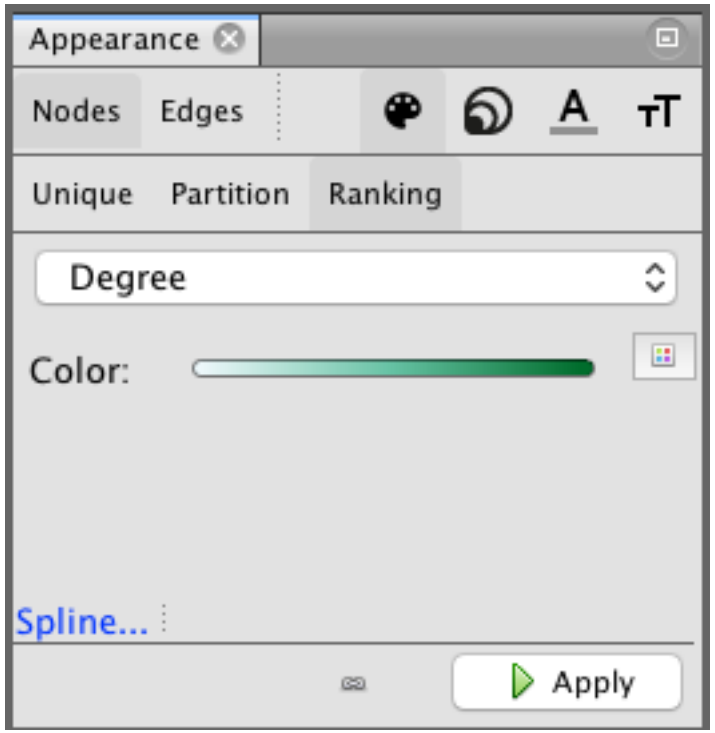
At the top, pick if you want to adjust a node or edge.

To the right, the first shape adjusts the color (it's supposed to look like an artist's palette). The circles next to that will change size.

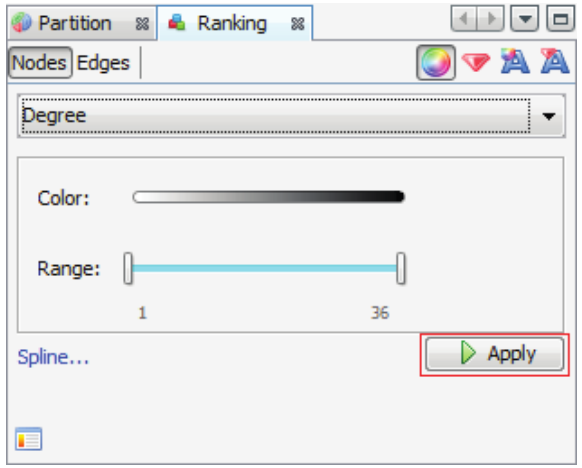
Click on Nodes and then the color icon.

There are three options – Unique (pick a single color), Partition (something we'll look at in a bit), and Ranking. Ranking is used when you have a numeric scale. Click Ranking.

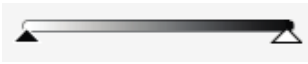
From the pulldown, choose Degree. This will let you choose a color range.



Let's configure colors



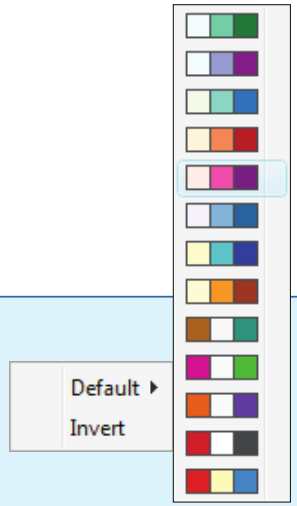
- Move your mouse over the gradient component.

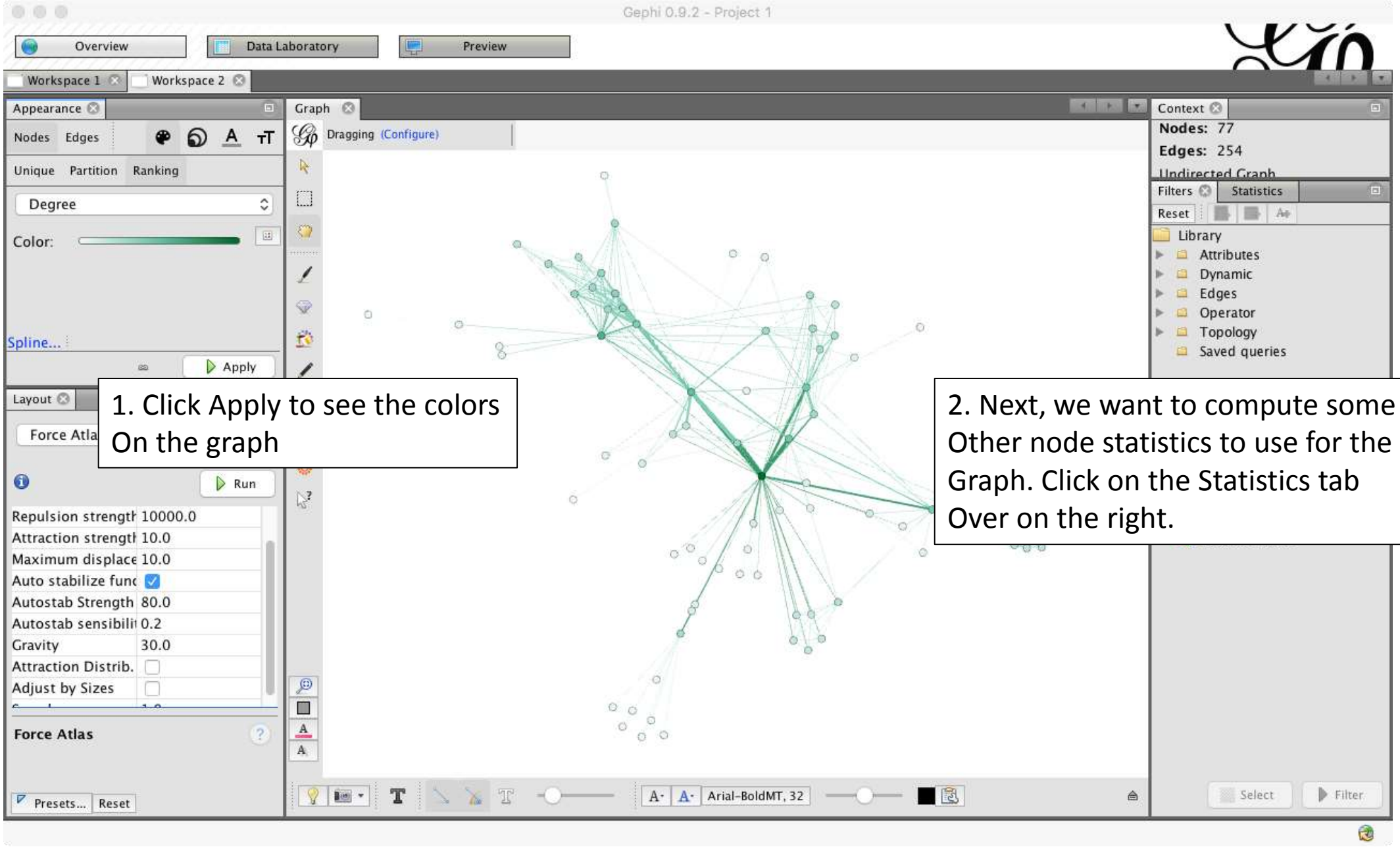


- Double-click on triangles to configure the color

Palette

Use palette by right-clicking on the panel.

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Spline...
Apply
Layout
Force Atla
Run
Repulsion strengt 10000.0
Attraction strengt 10.0
Maximum displace 10.0
Auto stabilize func
Autostab Strength 80.0
Autostab sensibili 0.2
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Undirected Graph
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Reset
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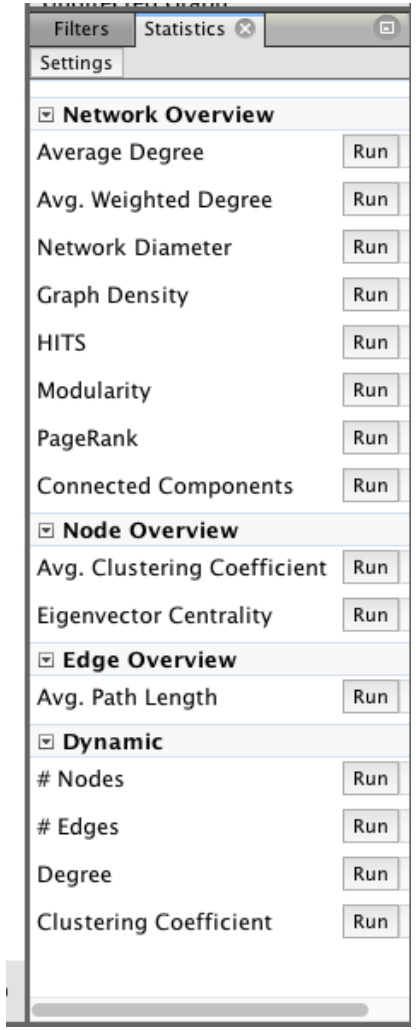
Edges
Operator
Topology
Saved queries
Select
Filter
1. Click Apply to see the colors
On the graph
2. Next, we want to compute some
Other node statistics to use for the
Graph. Click on the Statistics tab
Over on the right.

Statistics

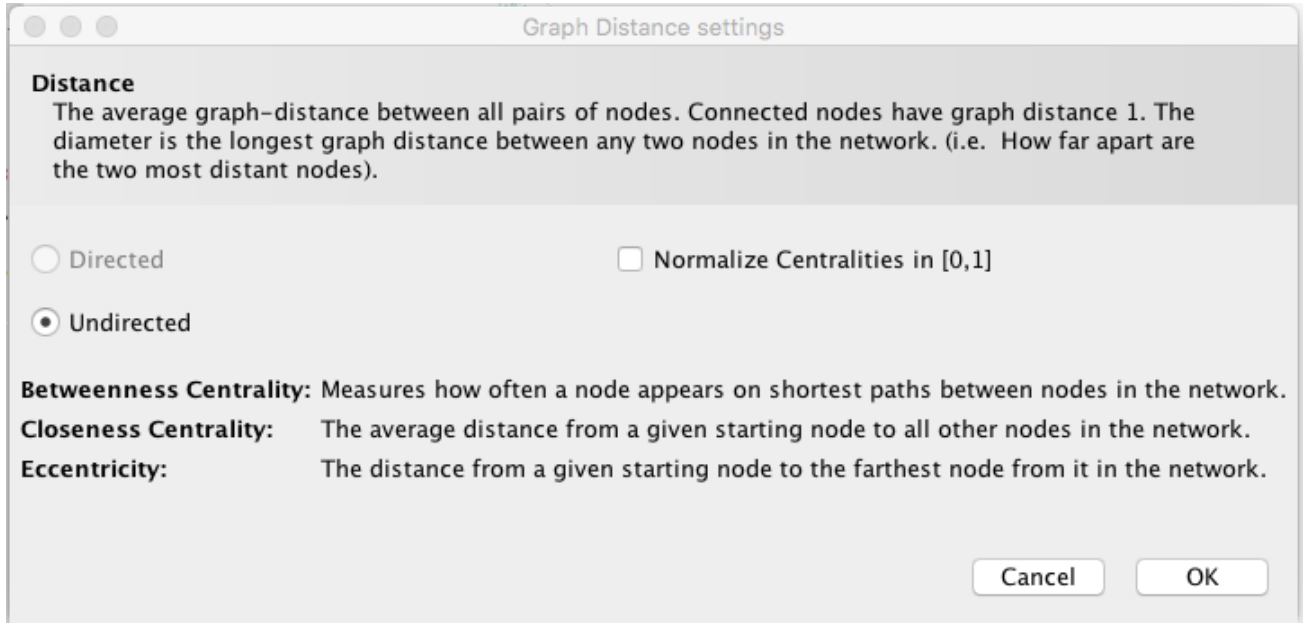
There are lots of statistics you can calculate and they are in this tab.

For this exercise, we want to calculate betweenness. You can do that by running the Network Diameter statistic.

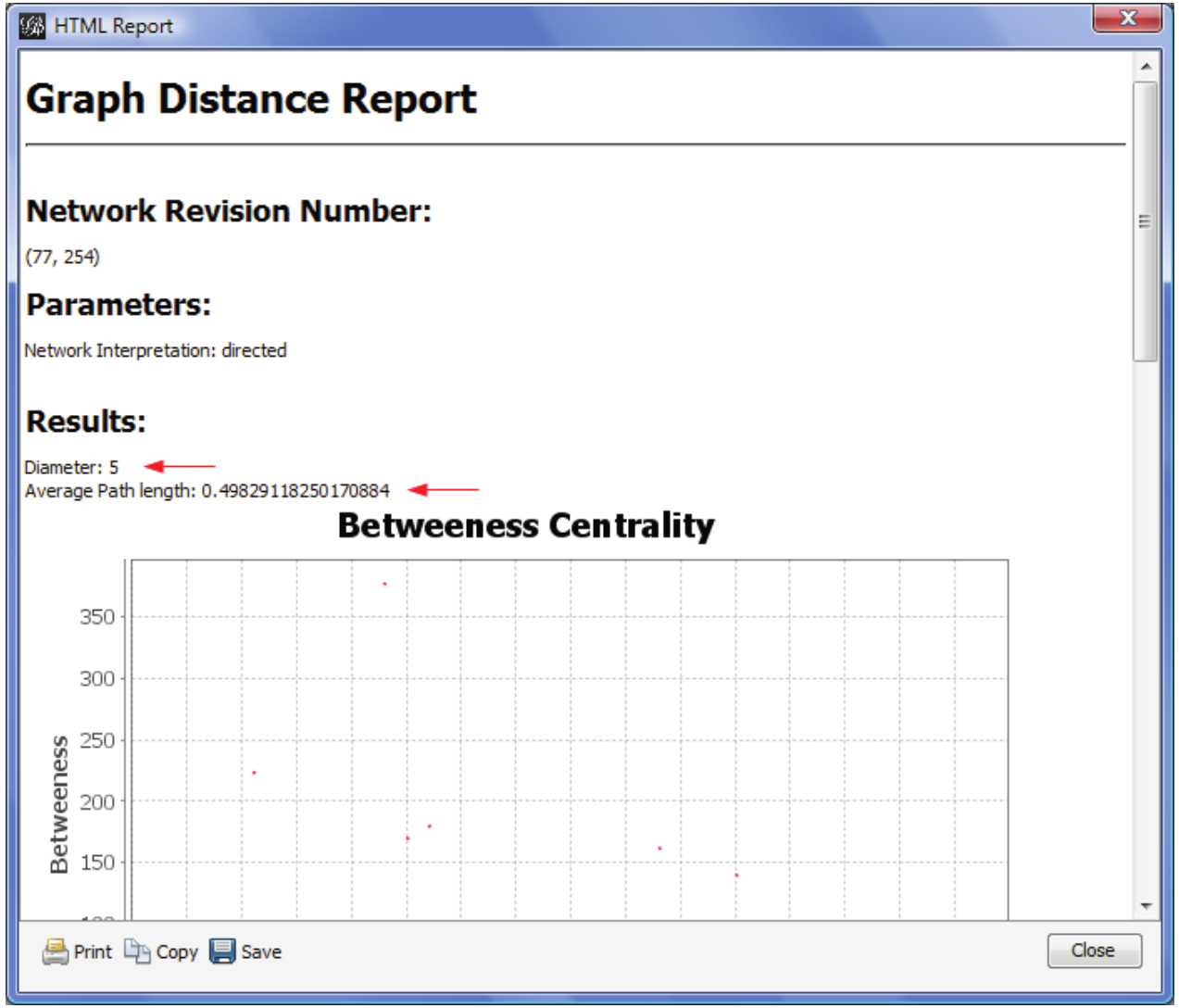
Click Run by Network Diameter.



This will give you a window with some settings. Click OK here.



Metric result

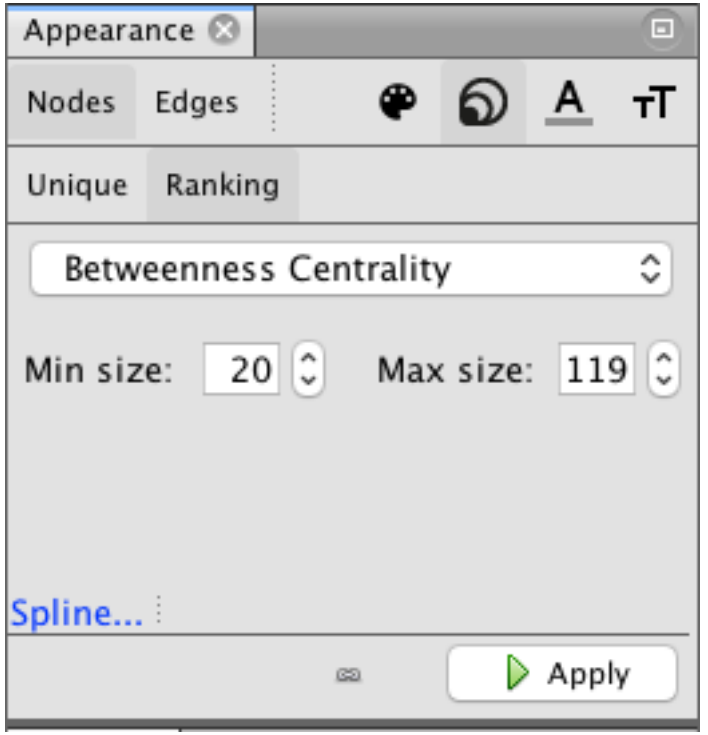


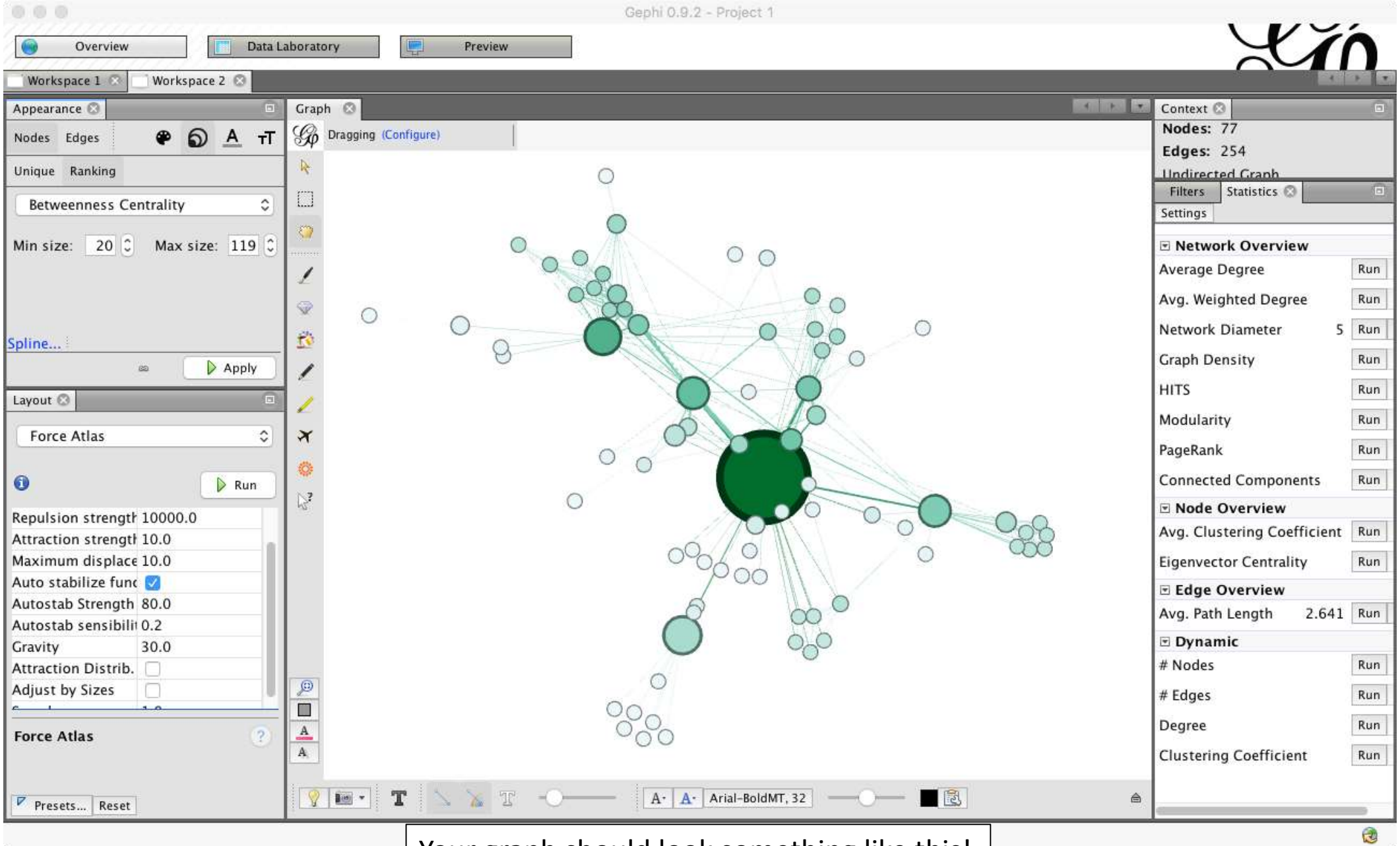
When finshed, the metric displays its result in a report

Now, we will use the new stats in the visualization.

Go back to the appearance tab. Click Nodes and then the size icon. Then click Ranking.

From the pull down menu, select betweenness centrality. Nodes with lower betweenness will be set close to the Min Size you pick and high betweenness will be close to the Max size. These values often work well for me. Enter them and click Apply.



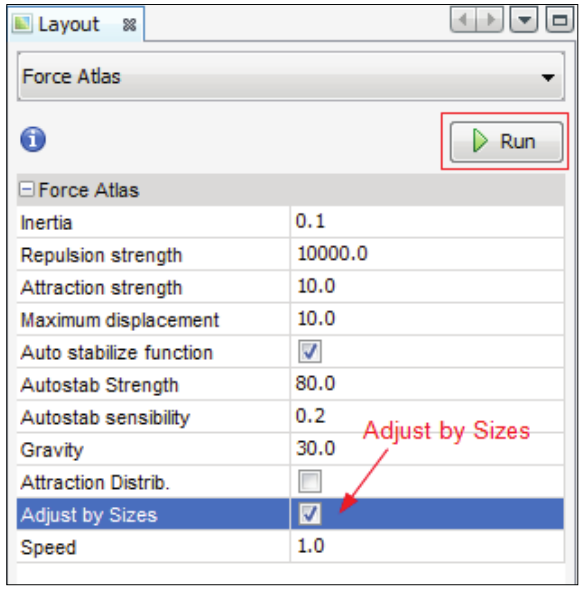


Your graph should look something like this!

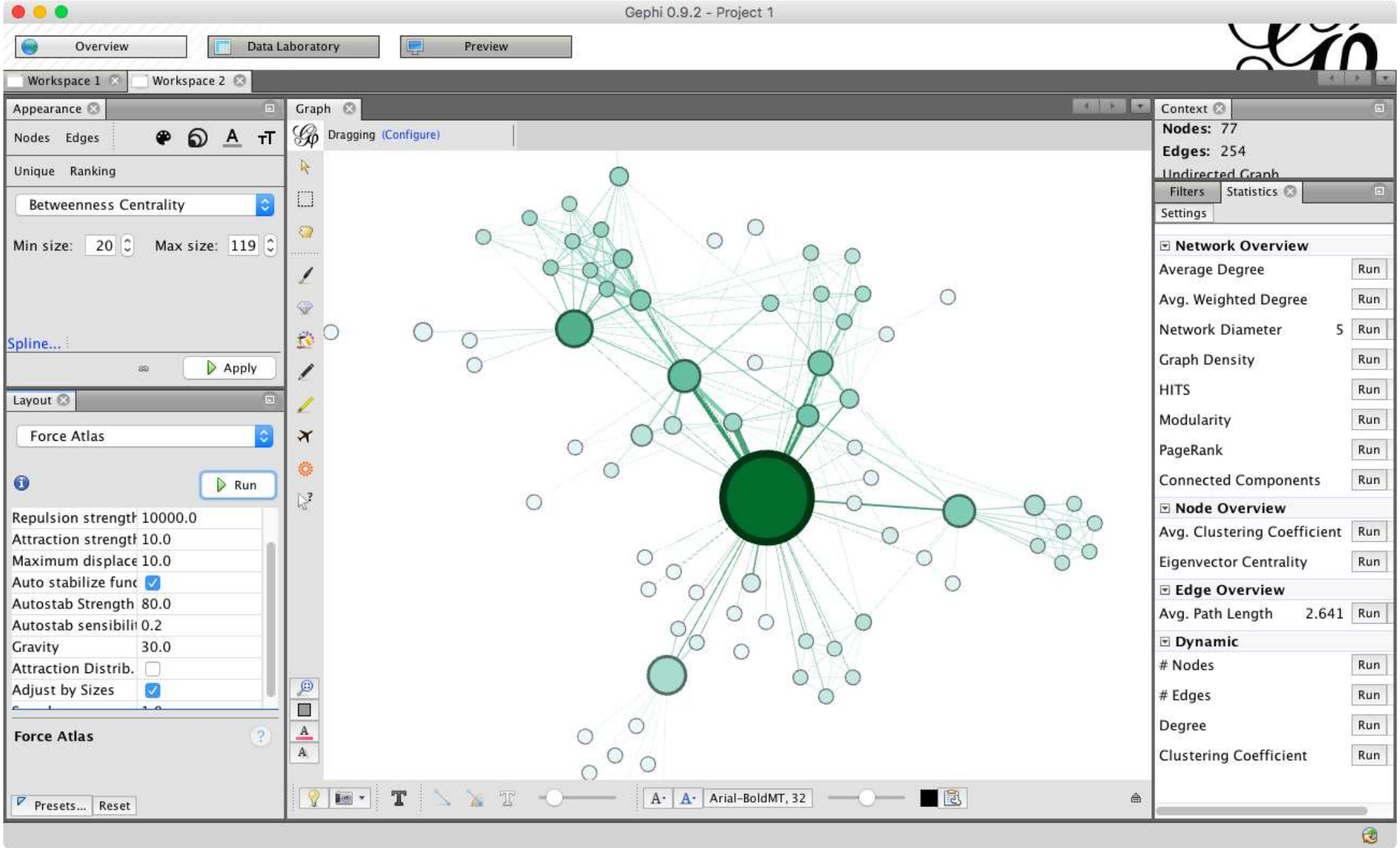
Layout again

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.



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



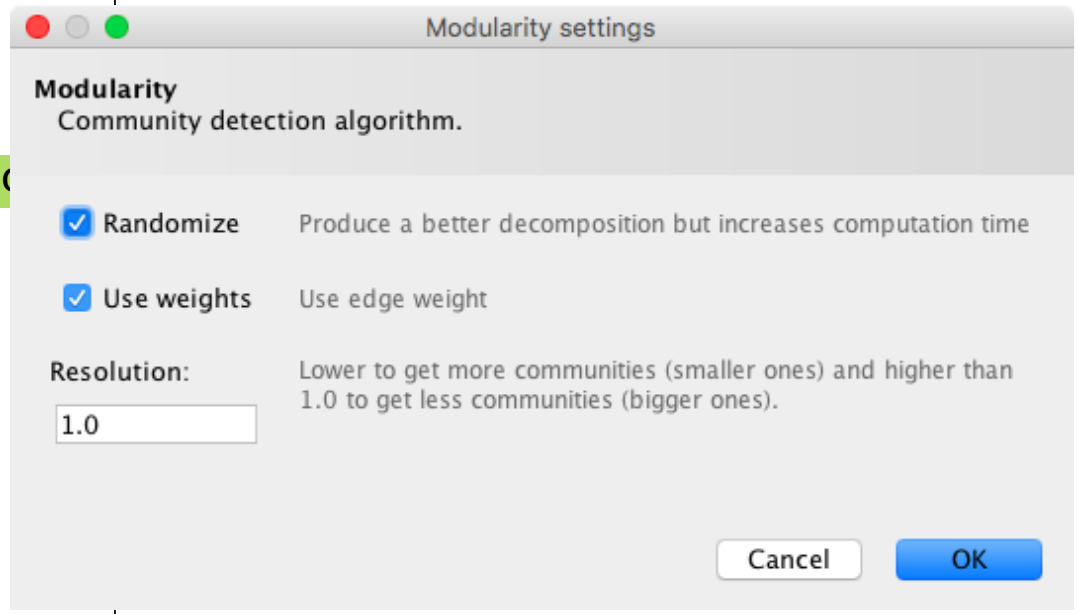
Now it looks a bit more like this

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[1], available from the Σ Statistics panel.

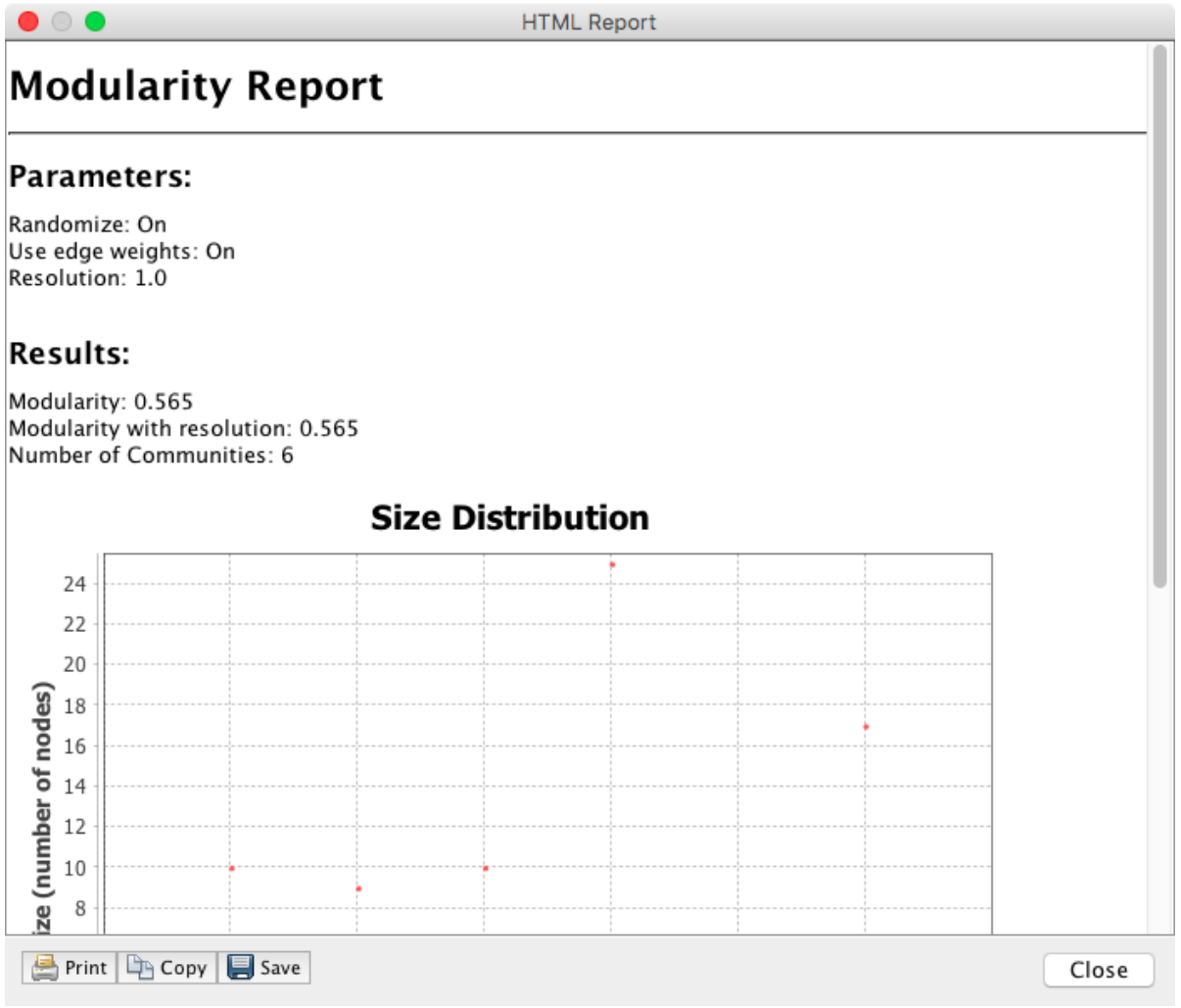
Click on Run near the "Modularity" line



- Select "Randomize" on the panel.
- Click on OK to launch the detection.

[1] Blondel V, Guillaume J, Lambiotte R, Mech E (2008) Fast unfolding of communities in large networks. J Stat Mech: Theory Exp 2008:P10008. (http://fincommunities.googlepages.com)

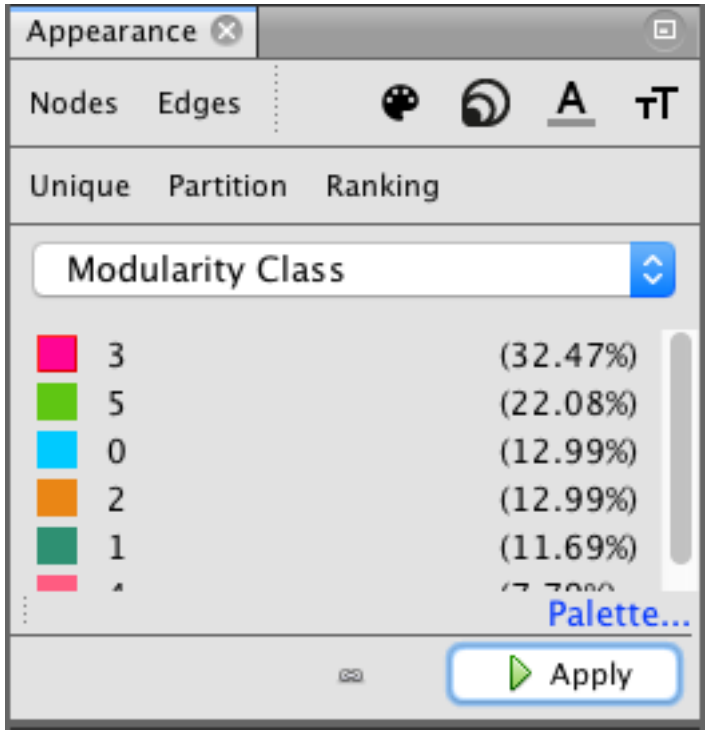
This will generate a report. Click Close to dismiss that. Now, our community information is available for changing the graph appearance.

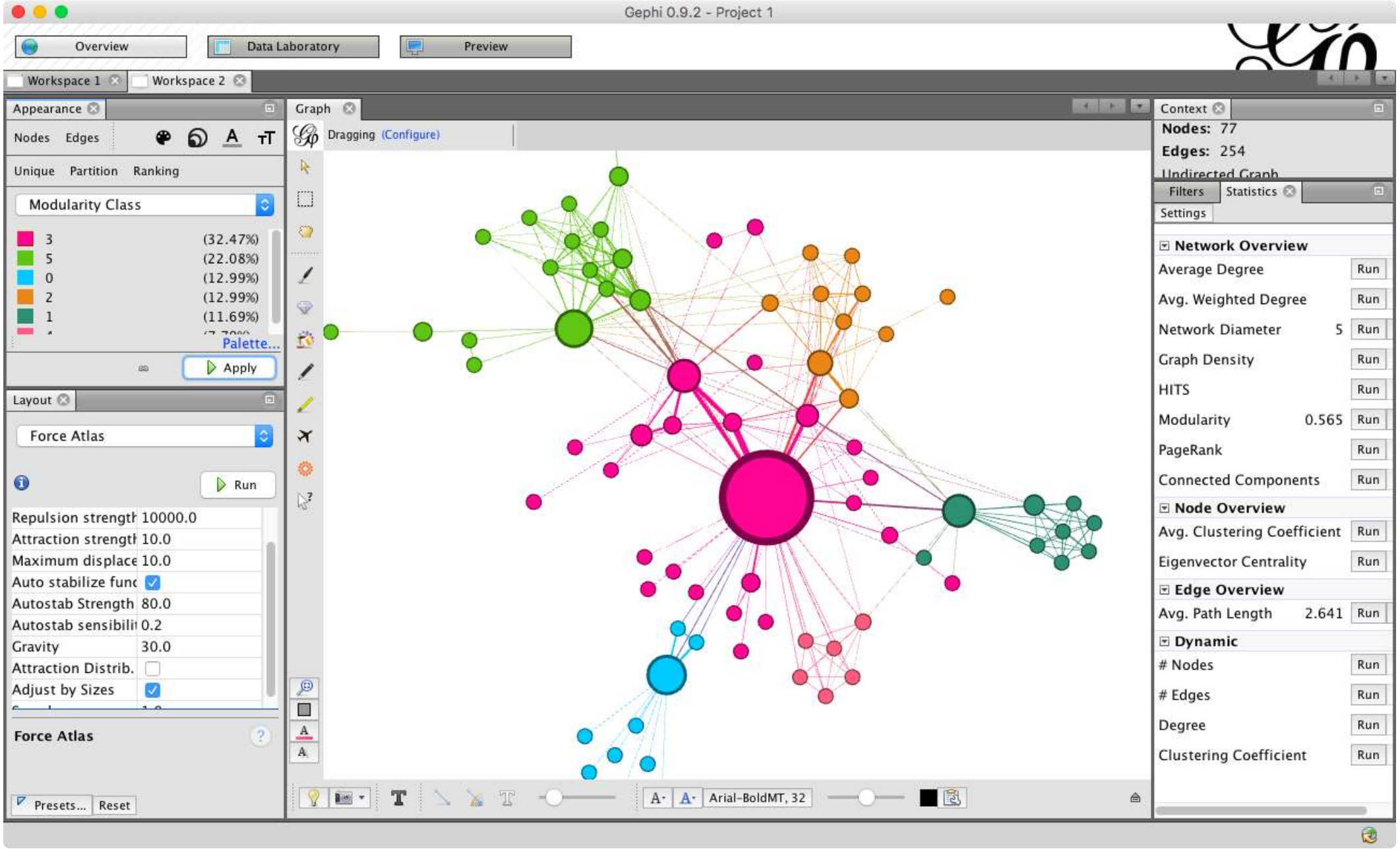


Go back to the appearance window. Click Nodes and the color icon. Then, click Partition. You use this when setting color based on a category.

In the pull down, select Modularity class. It will show you the numbered groups. The color next to that is the color that group will appear in the graph. To change the color, click and hold on the color swatch. A palette will appear. Drag to the color you want and then un-click to select it.

To color the graph, click Apply.

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5 (22.08%)
0 (12.99%)
2 (12.99%)
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Palette...
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Graph Density Run
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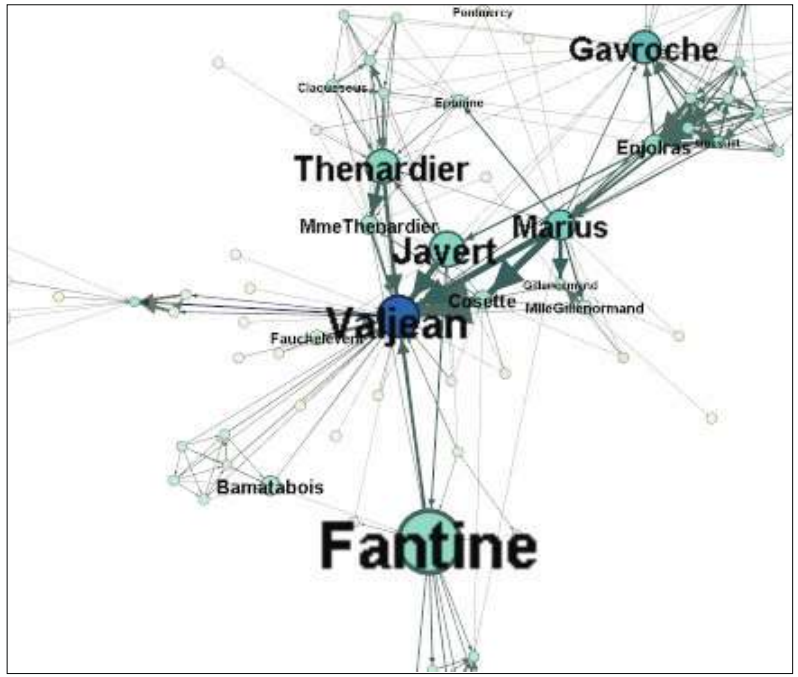
PageRank Run
Connected Components Run
Node Overview
Avg. Clustering Coefficient Run
Eigenvector Centrality Run
Edge Overview
Avg. Path Length 2.641 Run
Dynamic
Nodes Run
Edges Run
Degree Run
Clustering Coefficient Run

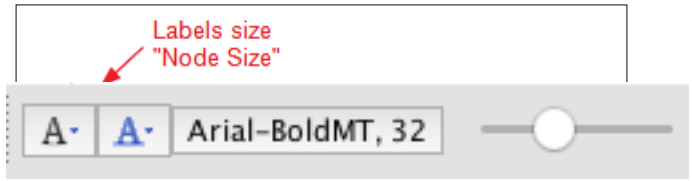
Show labels

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

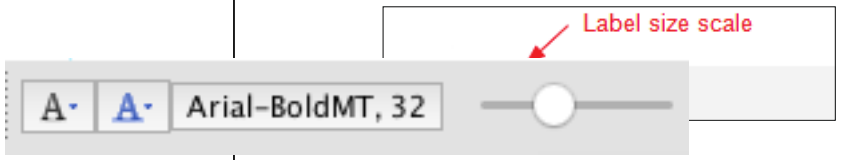


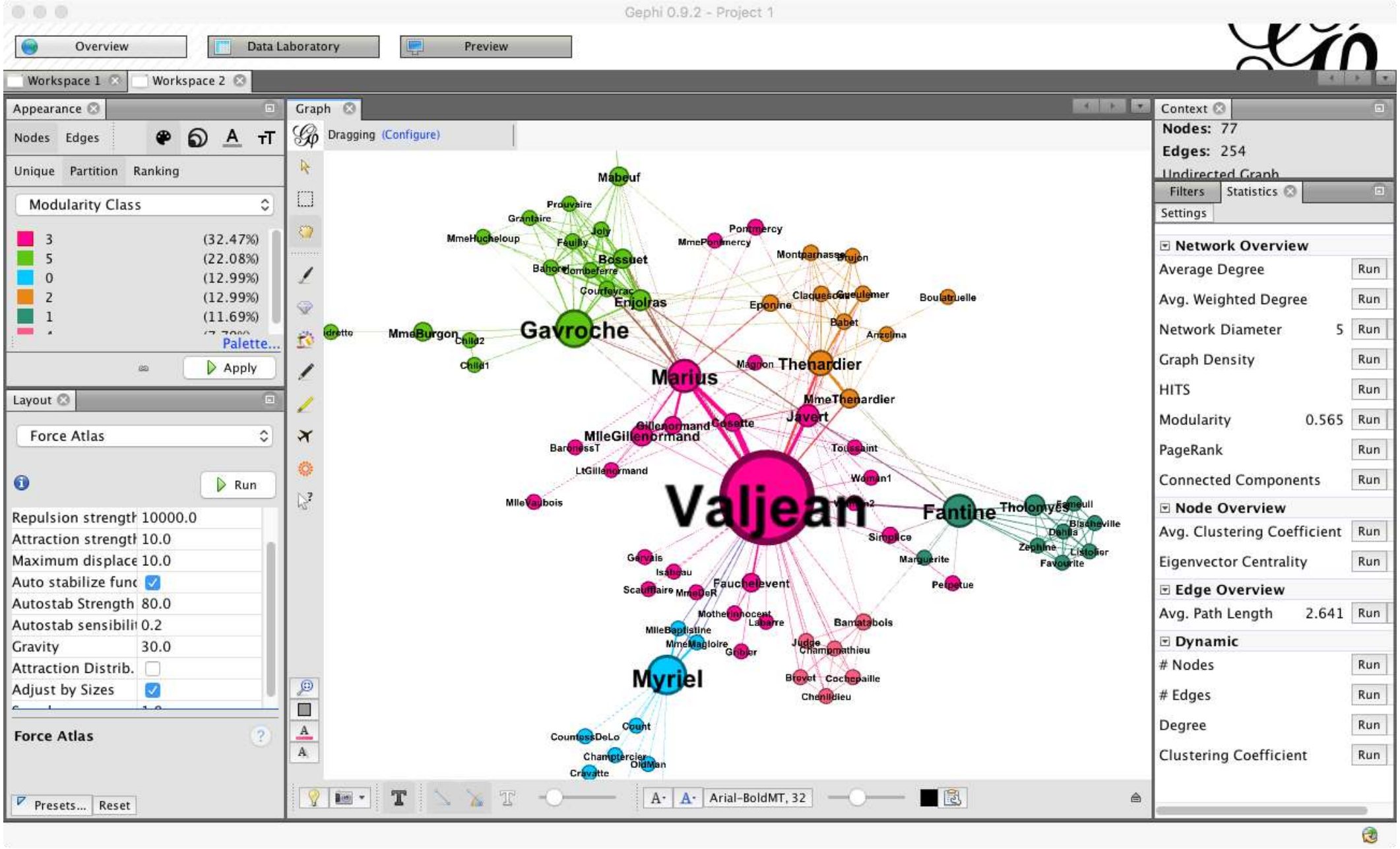
- Display node labels

- Set label size proportional to node size



- Set label size with the scale slider

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Grantaire
Joly
Feuilly
MmeHucheloup
Bossuet
Bahorel
Combeferre
Courfeyrac
Enjolras
Gavroche
MmeBurgon
Child2
Child1
Pontmercy
MmePontmercy
Montparnasse
Brujon
Claquesous
Gueulemer
Boulatruelle
Eponine
Babet
Anzelma
Magnon
Thenardier
Marius
MmeThenardier
Javert
Cosette
Gillenormand
MlleGillenormand
BaronessT
LtGillenormand
MlleVaubois
Toussaint
Woman1
Valjean
Fantine
Tholomyes
Listolier
Fameuil
Blacheville
Dahlia
Zephine
Favourite
Simplice
Marguerite
Perpetue
Gervais
Isabeau
Scaufflaire
MmeDeR
Fauchelevent
Mother Innocent
Labarre
MlleBaptistine
MmeMagloire
Gribier
Bamatabois
Judge
Champmathieu
Brevet
Cochepaille
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Myriel
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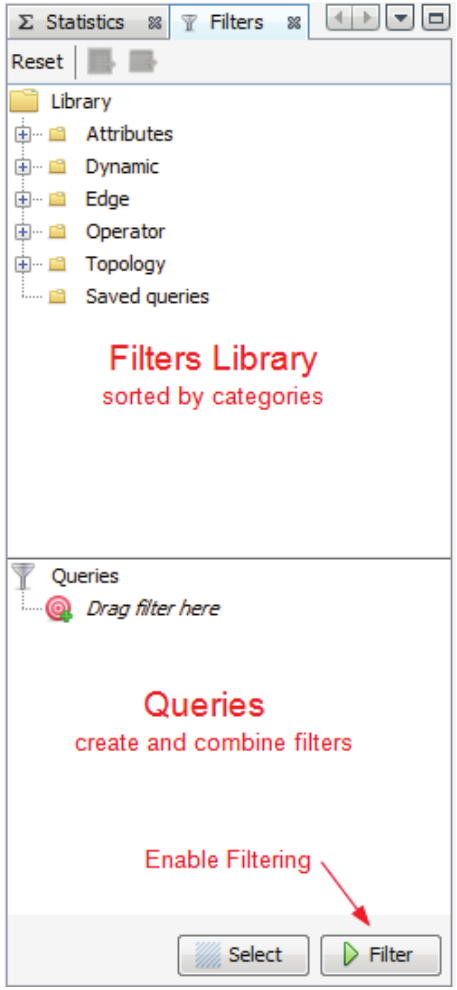
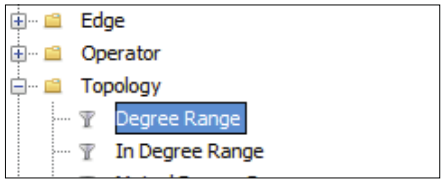
Degree Run
Clustering Coefficient Run

Filter

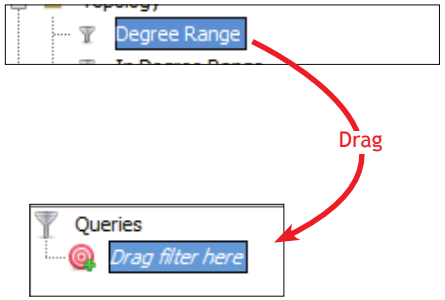
The last manipulation step is filtering. You create filters that can hide nodes and egdes on the network. We will create a filter to remove leaves, i.e. nodes with a single edge.



- Locate the Filters module on the right panel.
- Select “Degree Range” in the “Topology” category.



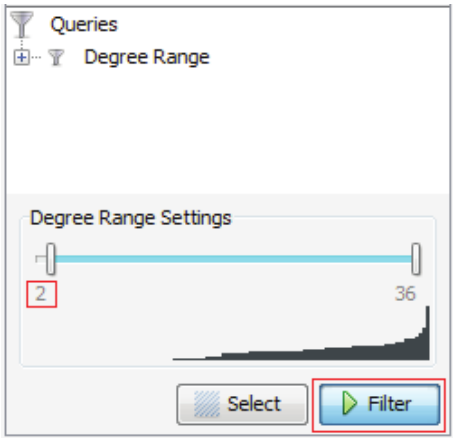
- Drag it to the Queries, drop it to “Drag filter here”.



Filter

- Click on “Degree Range” to activate the filer . The parameters panel appears.

It shows a range slider and the chart that represents the data, the degree distribution here.

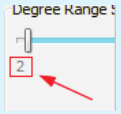


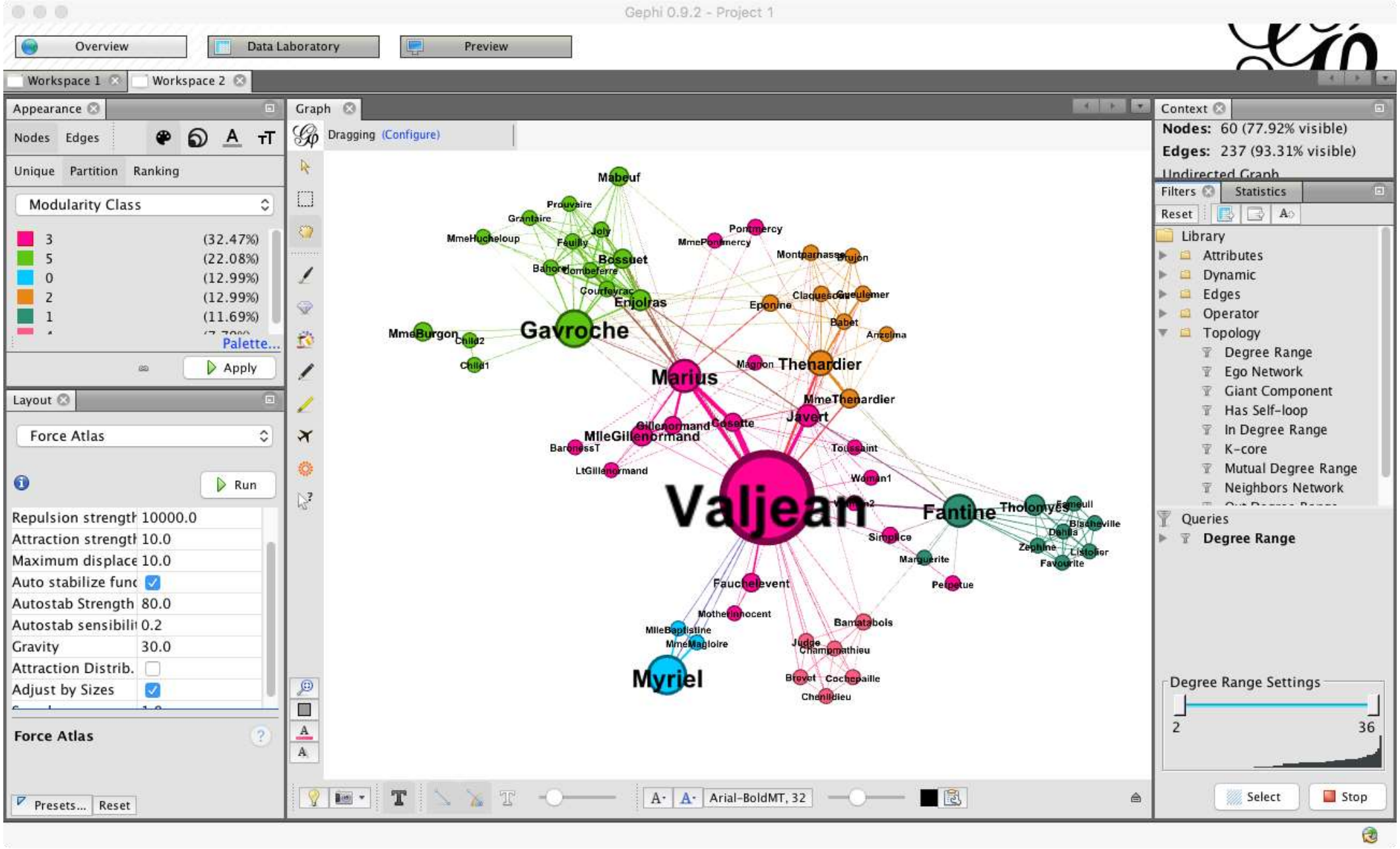
- Move the slider to sets its lower bound to 2.
t
- Enable filer ing by pus hi ng the Filter but ton.

Nodes with a degree inferior to 2 are now hidden.

Tip

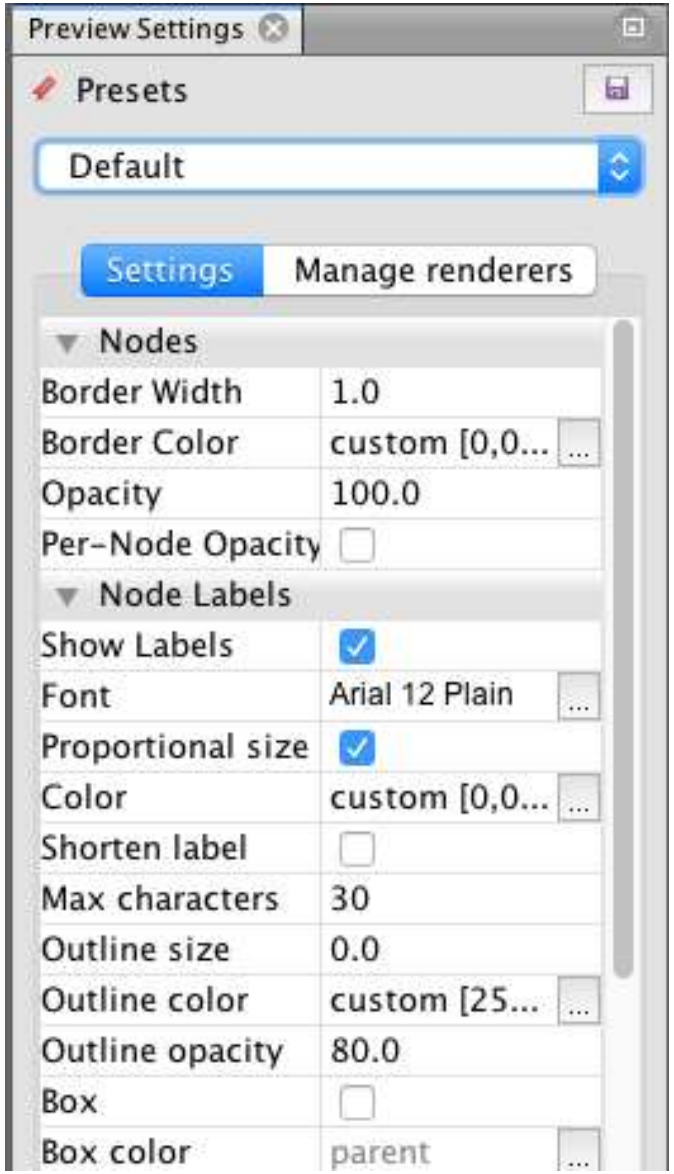
You can edit bounds manually by double-clickng on values.

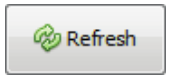



Gephi 0.9.2 - Project 1
Overview
Data Laboratory
Preview
Workspace 1
Workspace 2
Appearance
Nodes
Edges
Unique
Partition
Ranking
Modularity Class
3 (32.47%)
5 (22.08%)
0 (12.99%)
2 (12.99%)
1 (11.69%)
Palette...
Apply
Layout
Force Atlas
Run
Repulsion strength 10000.0
Attraction strength 10.0
Maximum displace 10.0
Auto stabilize func
Autostab Strength 80.0
Autostab sensibili 0.2
Gravity 30.0
Attraction Distrib.
Adjust by Sizes
Force Atlas
Presets...
Reset
Graph
Dragging (Configure)
Mabeuf
Prouvaire
Grantaire
MmeHucheloup
Joly
Feuilly
Bossuet
Bahorel
Combeferre
Courfeyrac
Enjolras
Gavroche
MmeBurgon
Child2
Child1
Pontmercy
MmePontmercy
Montparnasse
Brujon
Eponine
Claquesous
Gueulemer
Babet
Anzelma
Magnon
Thenardier
Marius
MmeThenardier
Javert
Gillenormand
Cosette
MlleGillenormand
BaronessT
LtGillenormand
Toussaint
Woman1
Valjean
Fantine
Tholomyes
Simplice
Marguerite
Fauchelevent
Motherinnocent
MlleBaptistine
MmeMagloire
Bamatabois
Judge
Champmathieu
Brevet
Cochepaille
Chenildieu
Myriel
Arial-BoldMT, 32
Context
Nodes: 60 (77.92% visible)
Edges: 237 (93.31% visible)
Undirected Graph
Filters
Statistics
Reset
Library
Attributes
Dynamic
Edges
Operator
Topology
Degree Range
Ego Network
Giant Component
Has Self-loop
In Degree Range
K-core
Mutual Degree Range
Neighbors Network
Queries
Degree Range
Degree Range Settings
2
36
Select
Stop

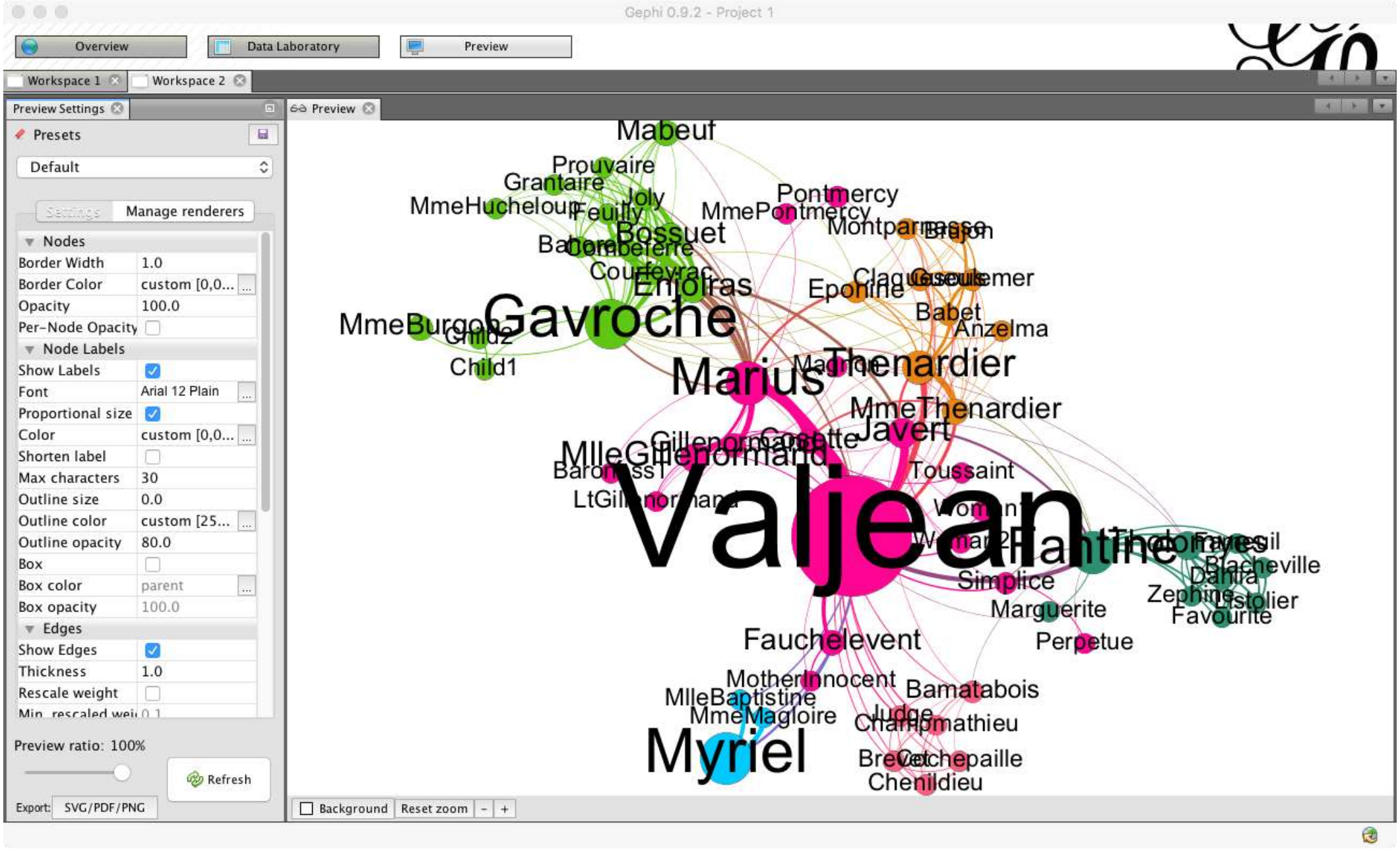
Tutorial
Quick Start

Preview



- In the Node properties, fin "Show Labels" and enable the option.
- Click on 

Preview Settings supports Presets, click on the presets list and try different configrations.


Gephi 0.9.2 - Project 1
Overview
Data Laboratory
Preview
Workspace 1
Workspace 2
Preview Settings
Presets
Default
Settings
Manage renderers
Nodes
Border Width 1.0
Border Color custom [0,0...
Opacity 100.0
Per-Node Opacity
Node Labels
Show Labels
Font Arial 12 Plain
Proportional size
Color custom [0,0...
Shorten label
Max characters 30
Outline size 0.0
Outline color custom [25...
Outline opacity 80.0
Box
Box color parent
Box opacity 100.0
Edges
Show Edges
Thickness 1.0
Rescale weight
Preview ratio: 100%
Refresh
Export: SVG/PDF/PNG
Preview
Mabeuf
Prouvaire
Grantaire
Joly
MmeHucheloup
Feuilly
Bossuet
Pontmercy
MmePontmercy
Montparnasse
Brujon
Babet
Courfeyrac
Enjolras
Gavroche
Eponine
Babet
Anzelma
MmeBurgon
Child2
Child1
Marius
Thenardier
MmeThenardier
Javert
Gillenormand
Cosette
MlleGillenormand
Toussaint
Valjean
Fantine
Simplice
Marguerite
Perpetue
Fauchelevent
MotherInnocent
Bamatabois
MlleBaptistine
MmeMagloire
Judge
Champmathieu
Myriel
Chenildieu
Background
Reset zoom

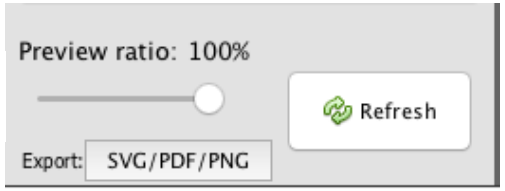
Gephi used to only support SVG but now can do PNG and PDF exports as well

Tutorial
Quick Start

* Introduction
* Import fil
* Visualization
* Layout
* Ranking (color)
* Metrics
* Ranking (size)
* Layout again
* Show labels
* Community-detection
* Partition
* Filter
* Preview
* Export
* Save
* Conclusion

Export as SVG/PNG/PDF

From Preview, click on SVG/PNG/PDF
Near export



SVG Files are vectorial graphics, like PDF. Images scale smoothly to different sizes and can therefore be printed or integrated in high-res presentation.

Transform and manipulate SVG fils in Inkscape or Adobe Illustrator.

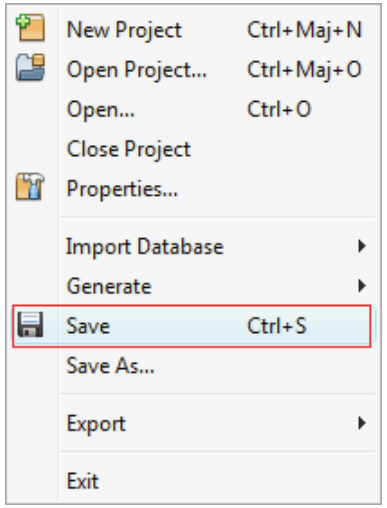
Inkscape

High-resolution screenshots

If you prefer hi-resolution PNG screenshots only, look at the icon in the visualization properties bar, located at the bottom of the visualization.

Save your project

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

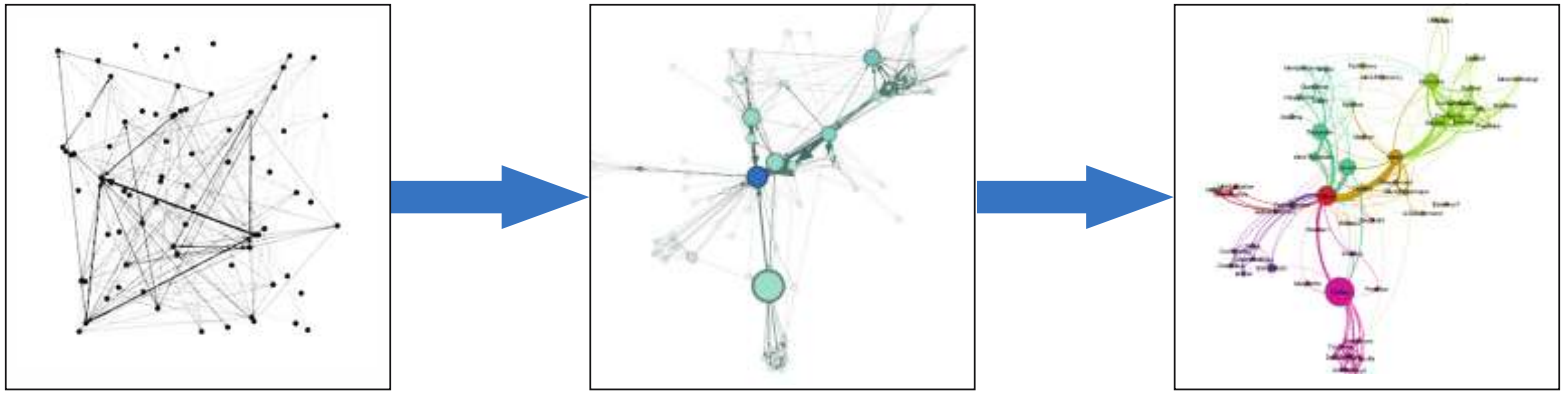


If you missed some steps, you can download the session:

LesMiserables.gephi

Conclusion

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



Go further:

- Gephi Website
- Gephi Wiki
- Gephi forum