Tutorial: Using Gephi for Analyzing ADB's Global Input-Output Table

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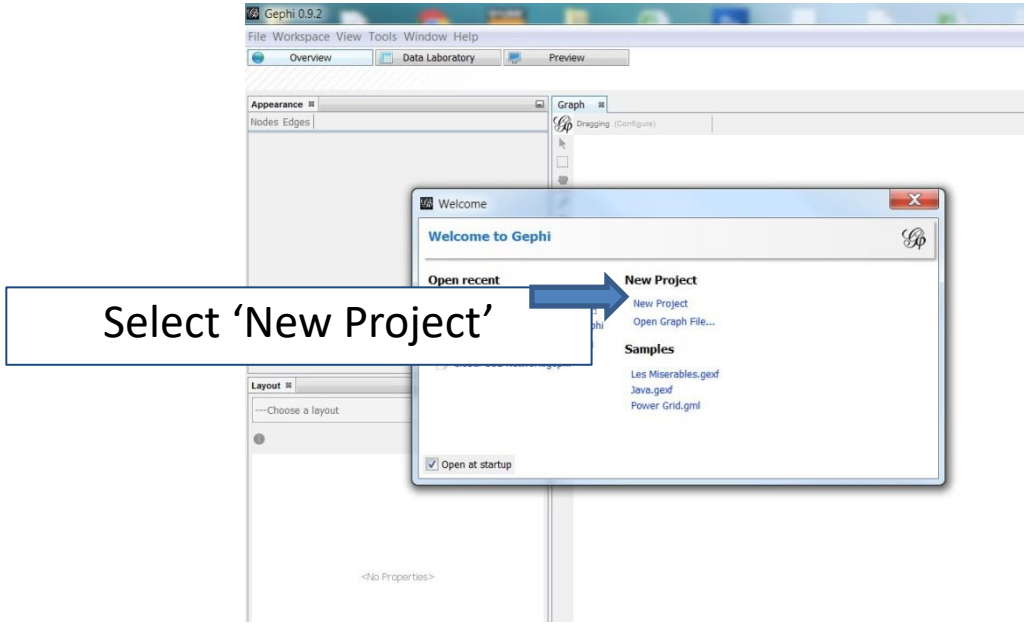
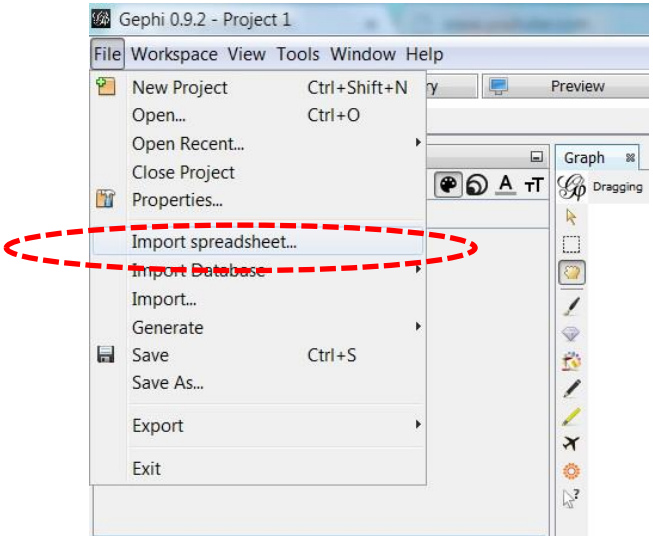
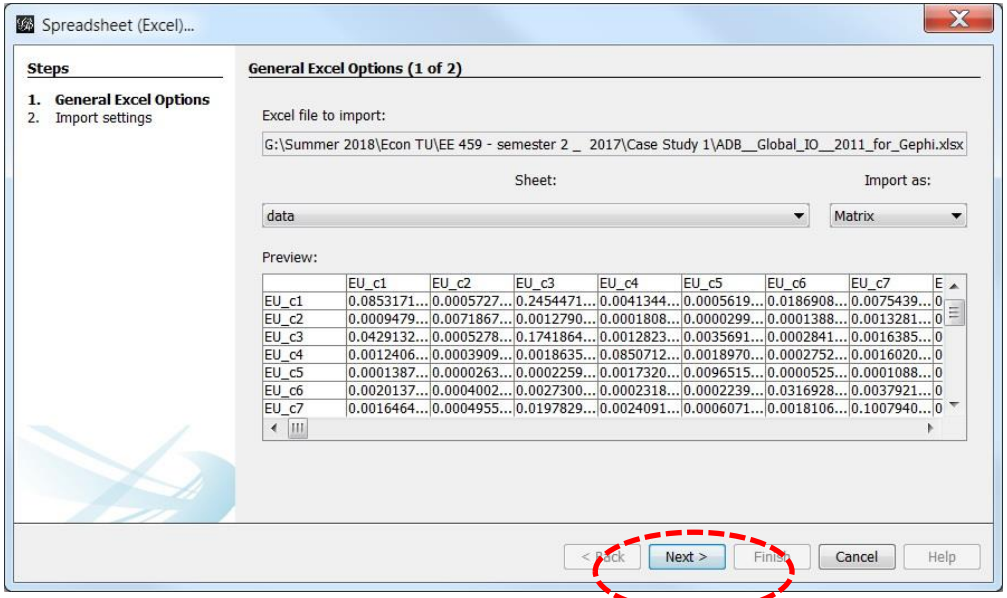
Step 1: Import the Excel data (which is ADB's global IO table of 2011) by selecting 'New Project'.



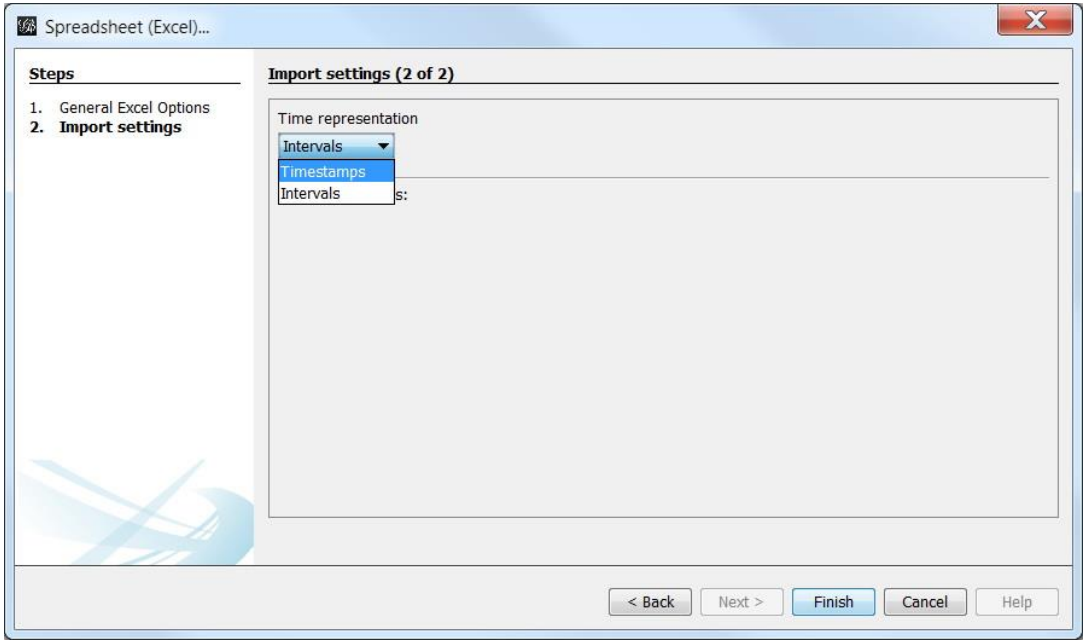
Step 2: On the top menu, select 'File → Import spreadsheet'. Then identify the location of the spreadsheet of ADB's global IO table.



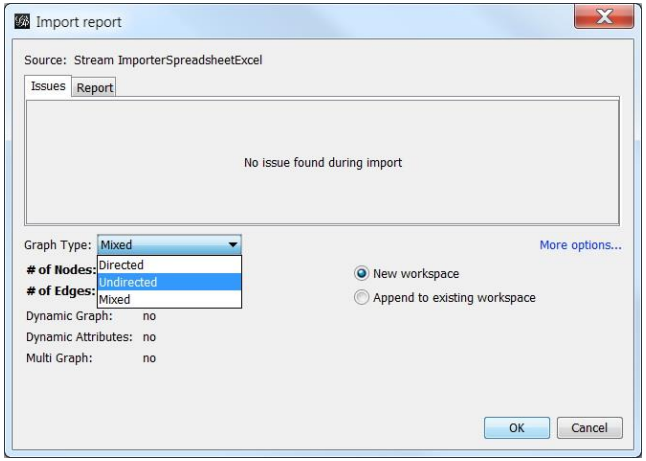
Step 3: The spreadsheet import window will be displayed. Select 'Next'.



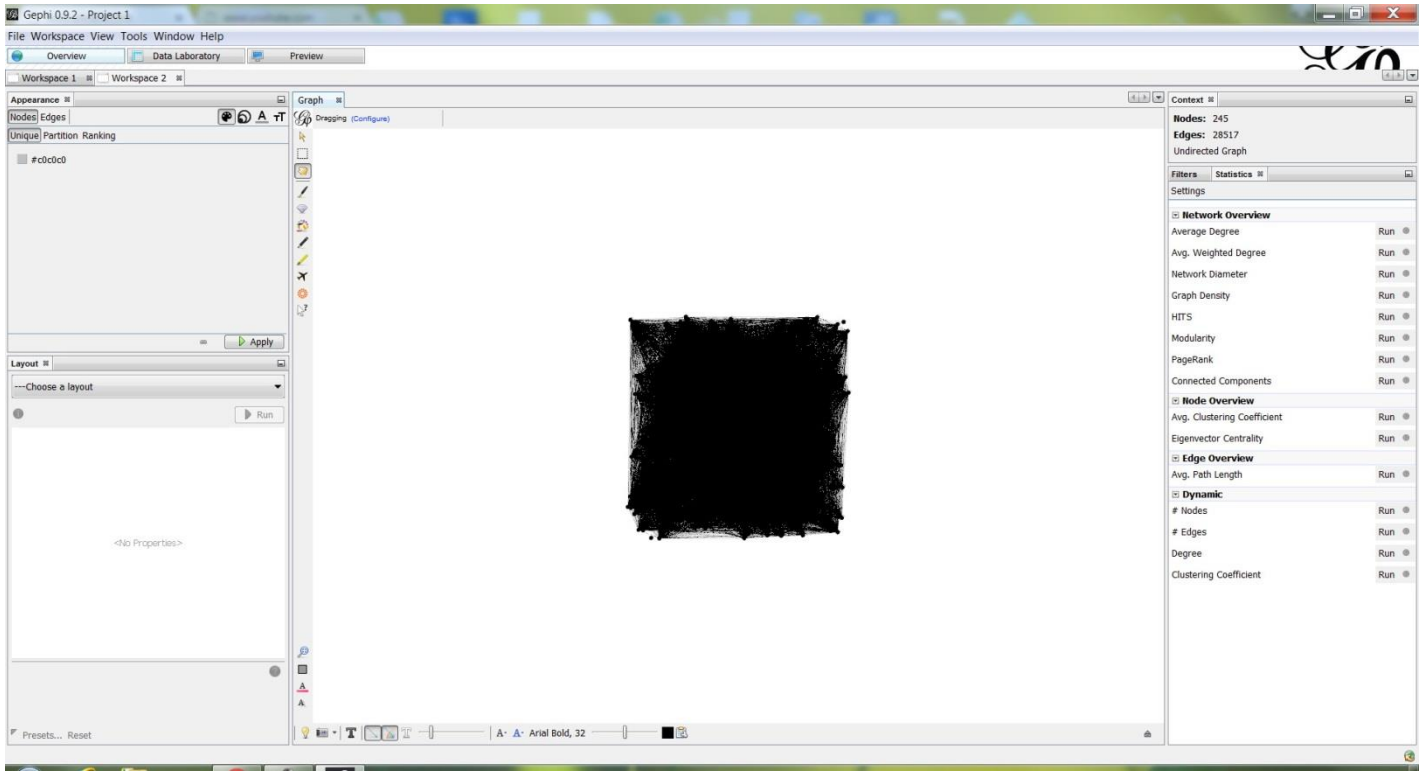
Step 4: Select the time representation as 'Timestamps' because this is just the single year data.



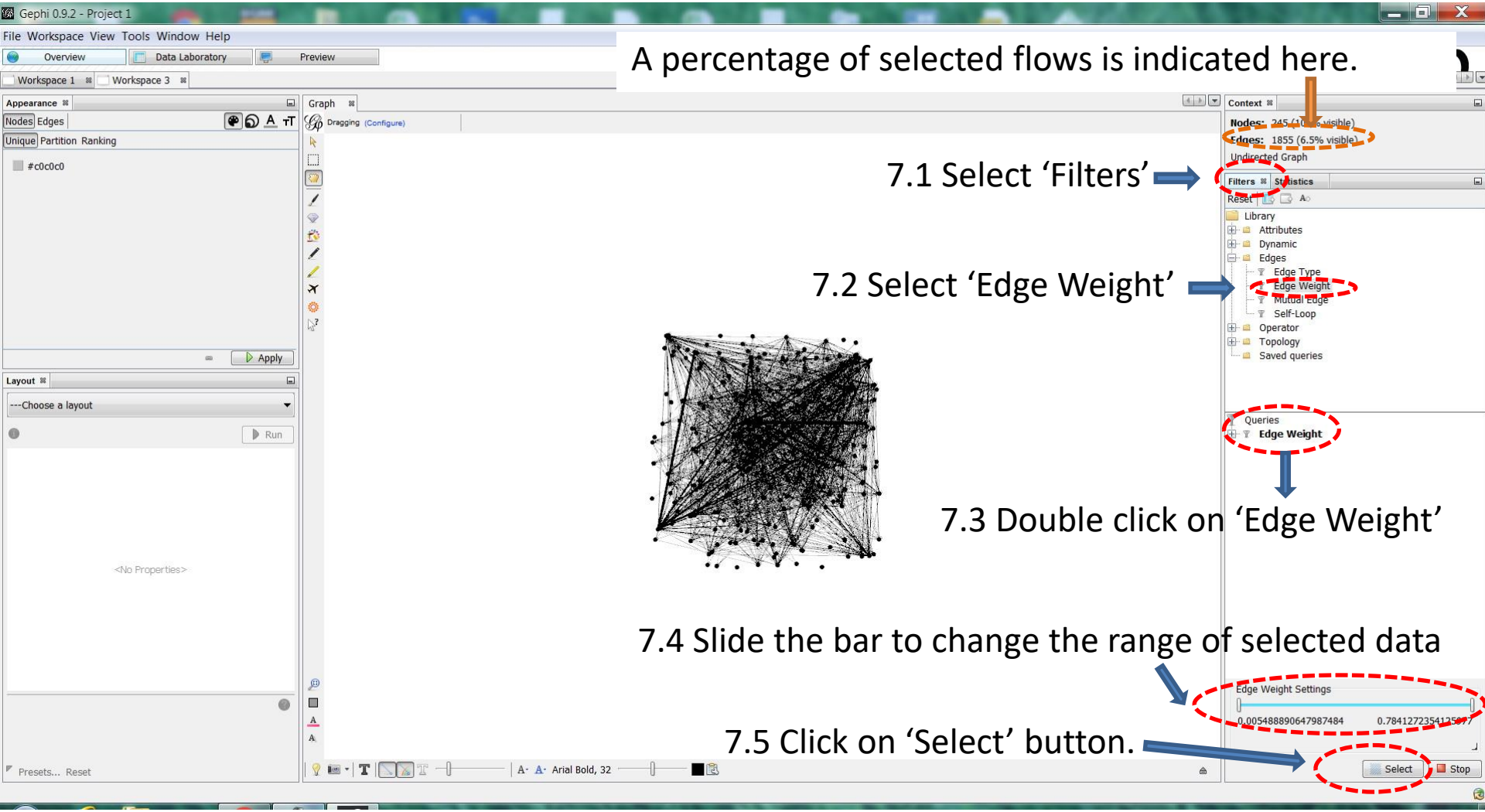
Step 5: Select the graph type as 'Undirected'. Then select 'OK'. (Note: the 'Undirected' indicated that the direction of flows in the table is ignored. To identifying both the direction and the magnitude of flows, please select 'Directed'.)



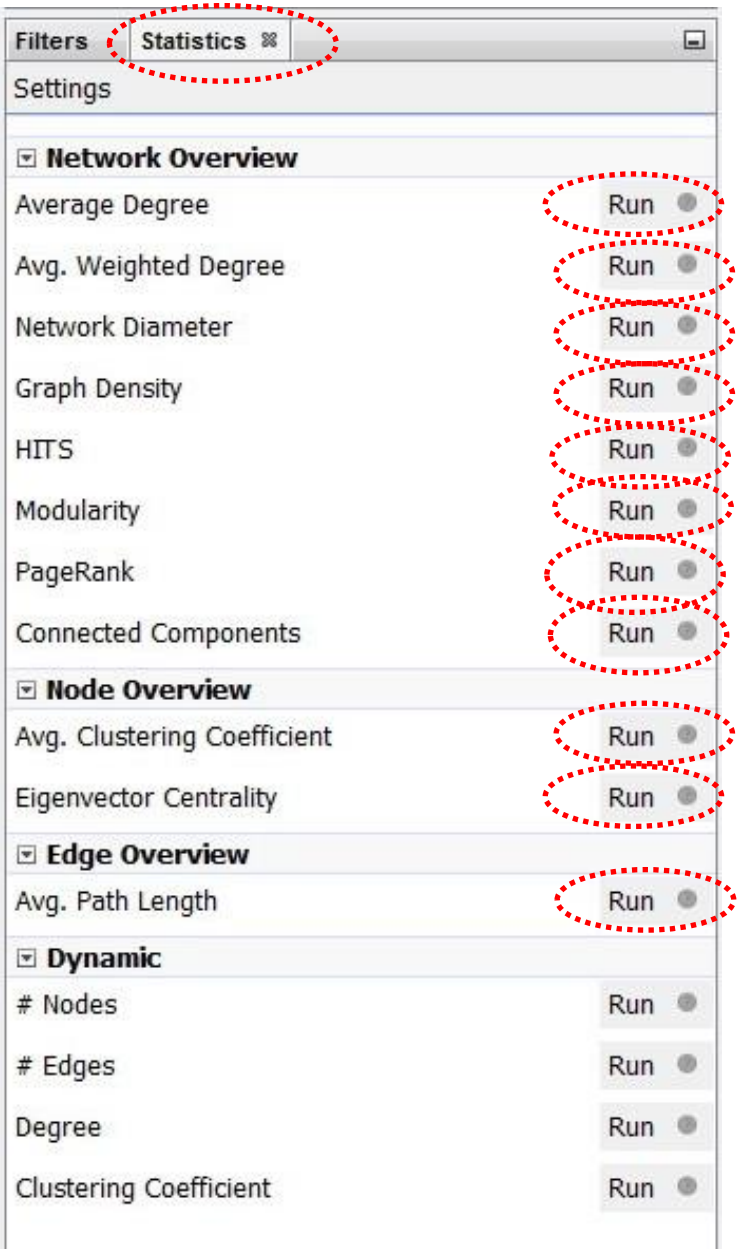
Step 6: The main window of Gephi will then display the network graph of imported data.



Step 7: Since the initial network graph includes all flows (i.e. all transactions on the global IO table), we can filter these data by selecting the option in the right-hand -side box. Specifically, select Filters → Edges → Edge Weight. Then, double click on 'Edge Weight' and change the range of selected data by scrolling the Edge Weight Settings bar. The percentage of selected data will be shown on the top-right box as % of visible Edges.

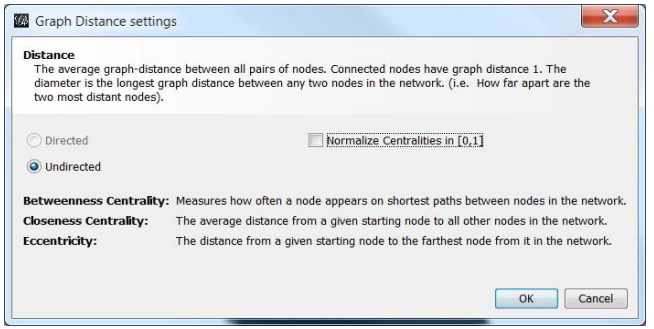


Step 8: Now we will calculate all indicators indicating the characteristics of this network. In the right-hand-side box, select 'Statistics'. Then, click on the 'Run' button to activate the related computation of single-year data.

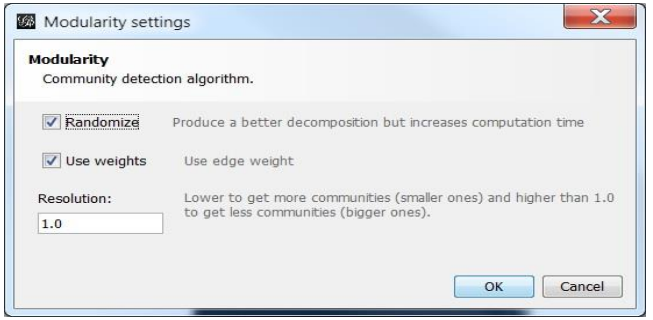


The computations of some indicators will display the new windows asking for specifying options or parameters of that particular computation. For each case, please use the default value and selection as shown below.

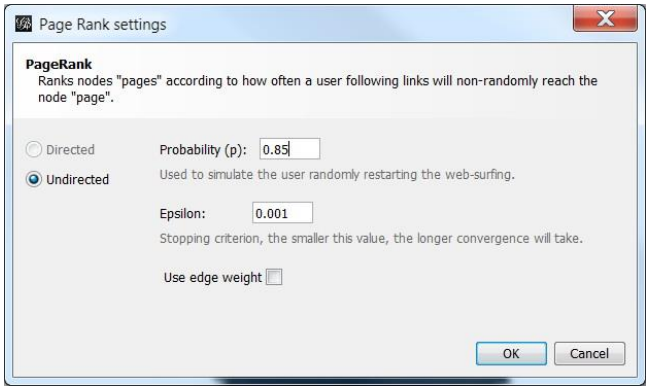
Options for computing 'Network Diameter'.



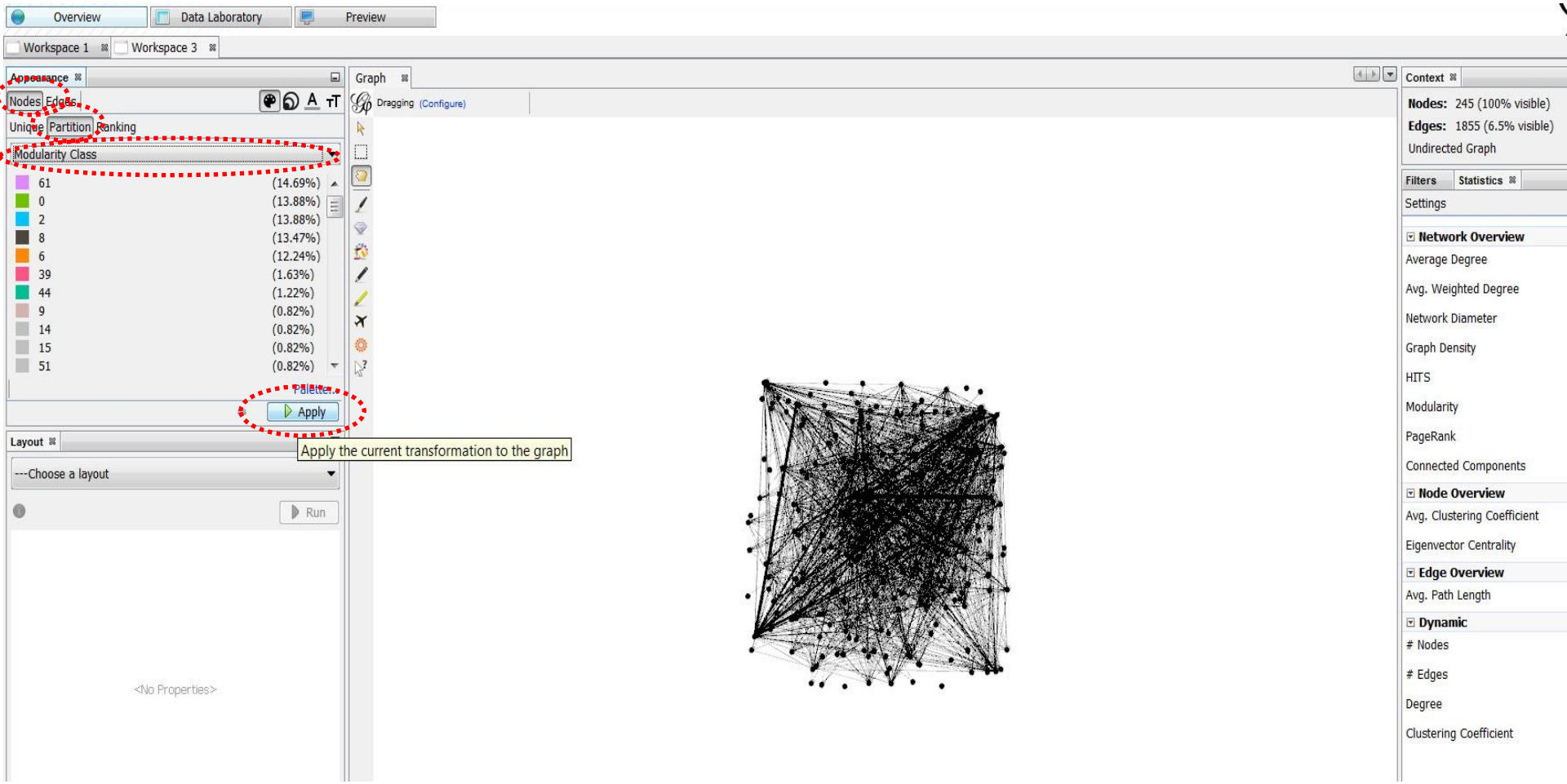
Options for computing 'Modularity'.



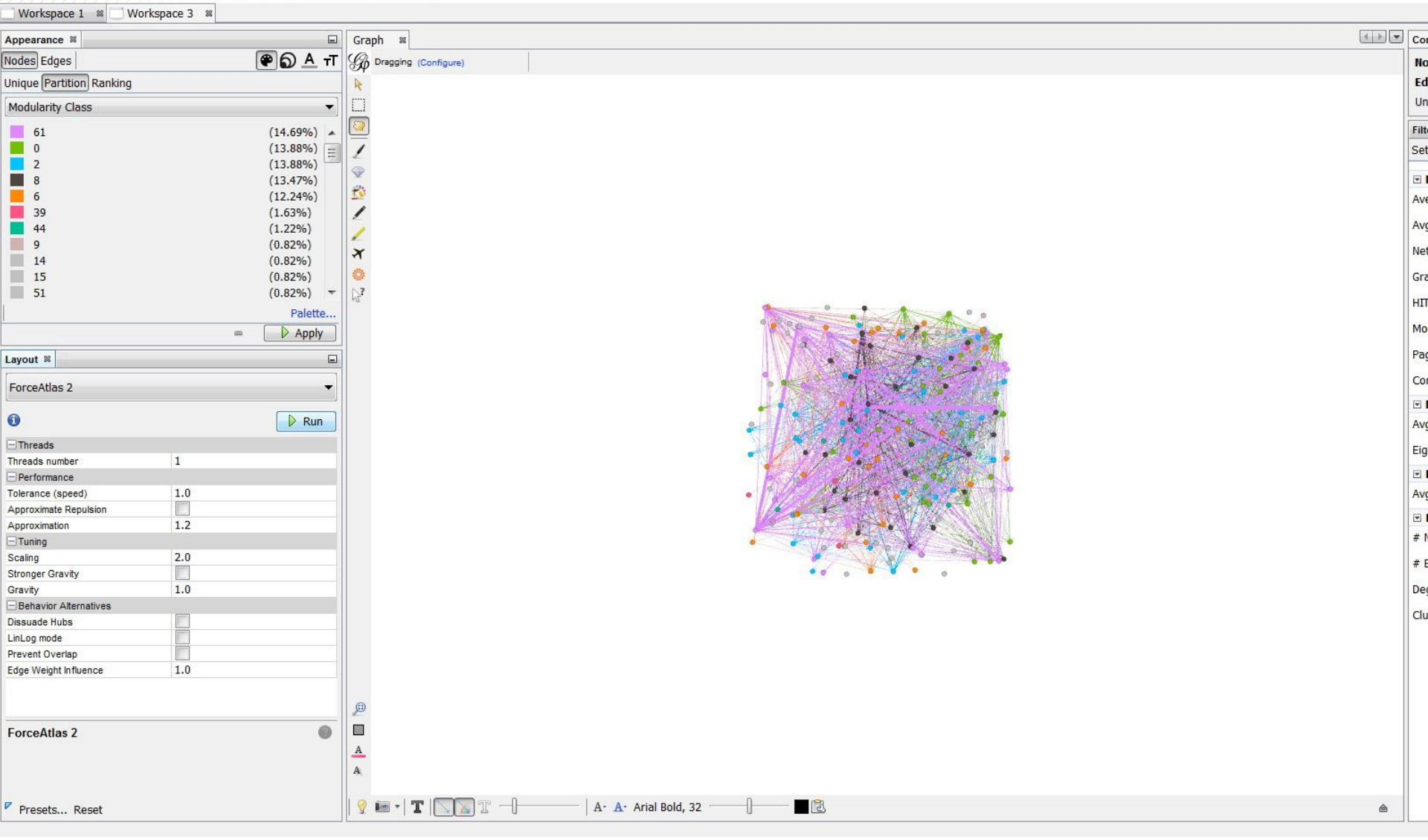
Options for computing 'PageRank'.



Step 9: We will classify each node into groups based on the result obtained from 'Modularity' previously computed. On the top-left window of Appearances. Select 'Node' and 'Partition'. In the drop-down menu, select 'Modularity Class'. This process will color each node based on the distribution of affiliation shown in the Appearances box. Then select 'Apply' button.

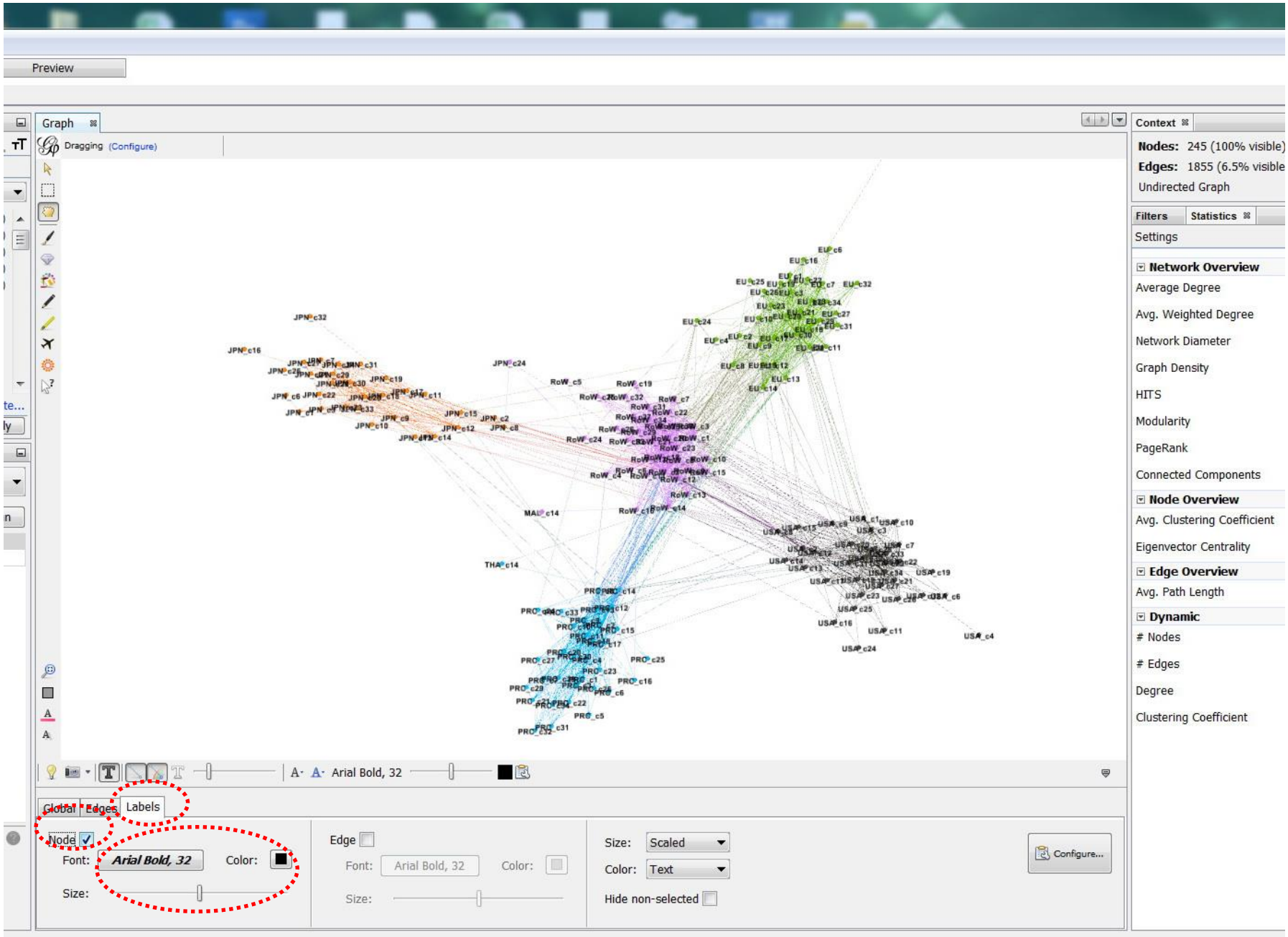


Step 10: The colored graph of network is still incomprehensive. Gephi allows an user to format the layout of network graph with many computational techniques, listed in the drop-down menu of 'Layout' window. In this study, we will use ForeceAtlas2 as the layout-formatting method, arranging most significant nodes in the core of the network.

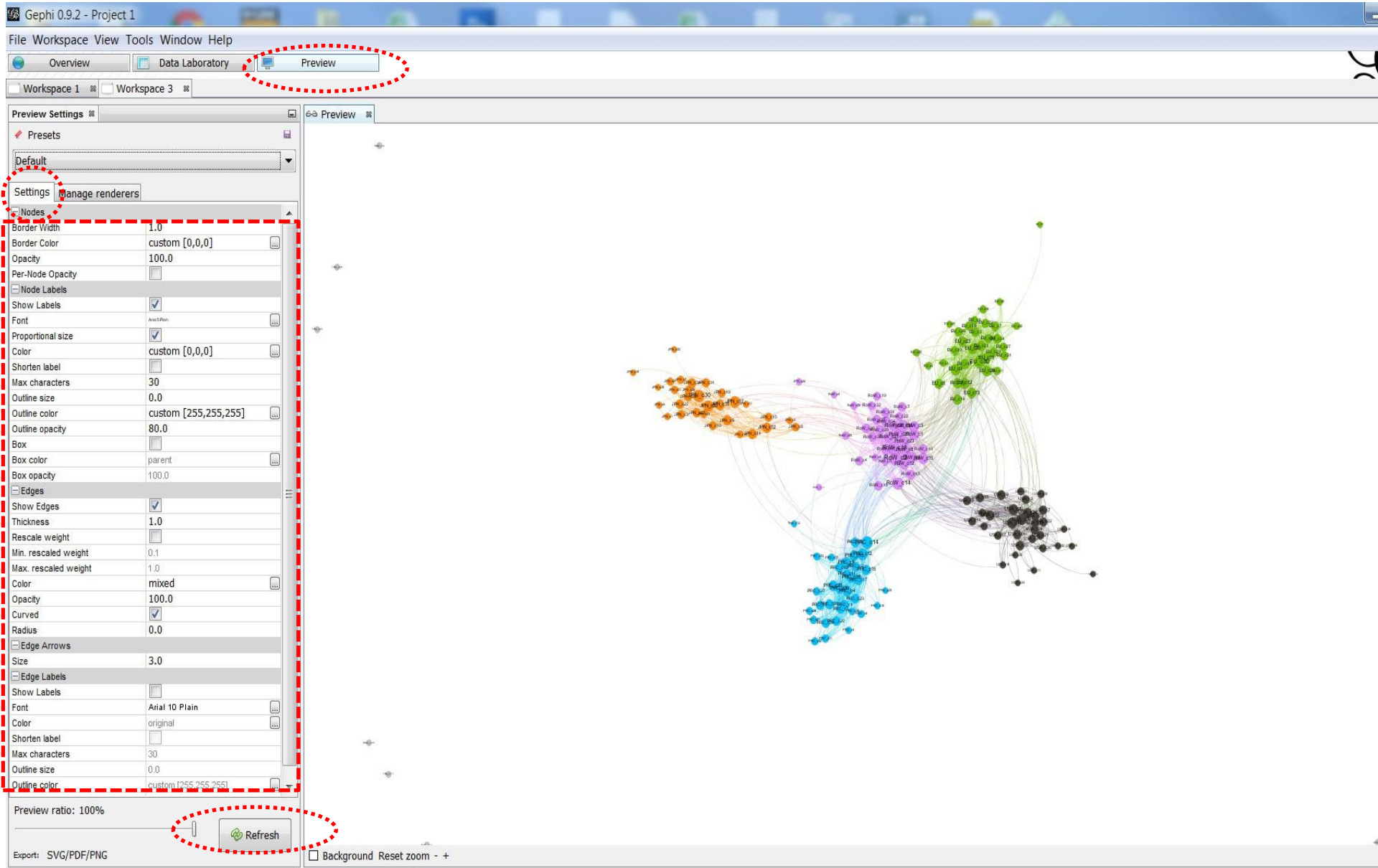


Step 11: ForeceAtlas2 method has revealed that the core of global trade is composed of 5 groups of nodes. To add the labels and other details of this network graph, select the small arrow icon located in the bottom-right of the main window.

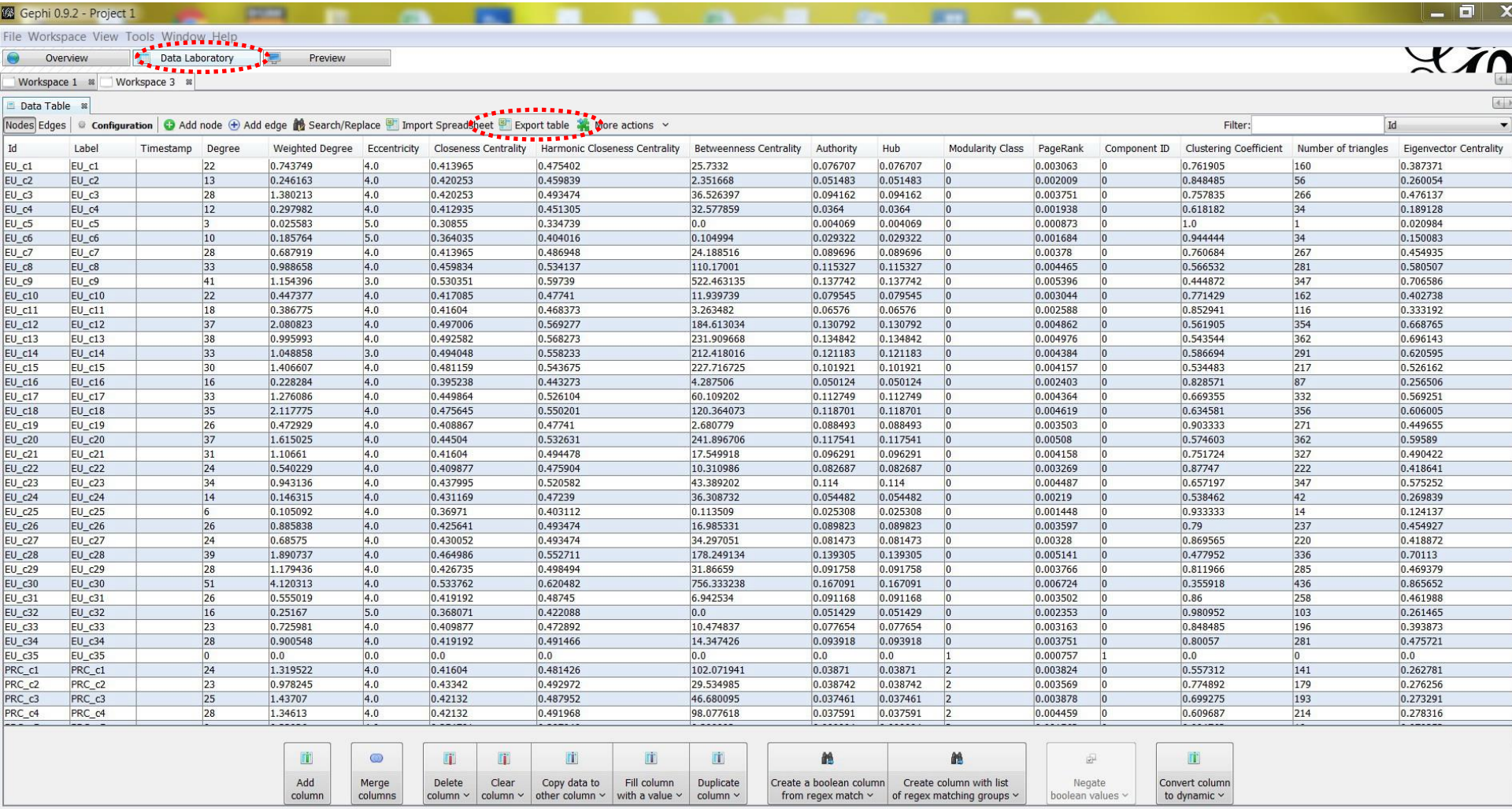
Step 12: The label of each node can be displayed by selecting ‘Labels’ and then check the box of ‘Node’. The specification of font and color can also be adjusted.



Step 13: The visualization of network graph can be modified in order to create the professional-look output. Please select the 'Preview' tab. All graphical properties of the network graph can be refined by selecting options listed on the left-hand-side box. After the adjustment, please click on the Refresh button for displaying the updated graph.



Step 14: Clicking on 'Data Laboratory' tab will display outcomes obtained from all computations of network indicators. These indicators can be sorted and filtered. Also these data can be exported by clicking on 'Export table' button.



Id	Label	Timestamp	Degree	Weighted Degree	Eccentricity	Closeness Centrality	Harmonic Closeness Centrality	Betweenness Centrality	Authority	Hub	Modularity Class	PageRank	Component ID	Clustering Coefficient	Number of triangles	Eigenvector Centrality
EU_c1	EU_c1		22	0.743749	4.0	0.413965	0.475402	25.7332	0.076707	0.076707	0	0.003063	0	0.761905	160	0.387371
EU_c2	EU_c2		13	0.246163	4.0	0.420253	0.459839	2.351668	0.051483	0.051483	0	0.002009	0	0.848485	56	0.260054
EU_c3	EU_c3		28	1.380213	4.0	0.420253	0.493474	36.526397	0.094162	0.094162	0	0.003751	0	0.757835	266	0.476137
EU_c4	EU_c4		12	0.297982	4.0	0.412935	0.451305	32.577859	0.0364	0.0364	0	0.001938	0	0.618182	34	0.189128
EU_c5	EU_c5		3	0.025583	5.0	0.30855	0.334739	0.0	0.004069	0.004069	0	0.000873	0	1.0	1	0.020984
EU_c6	EU_c6		10	0.185764	5.0	0.364035	0.404016	0.104994	0.029322	0.029322	0	0.001684	0	0.944444	34	0.150083
EU_c7	EU_c7		28	0.687919	4.0	0.413965	0.486948	24.188516	0.089696	0.089696	0	0.00378	0	0.760684	267	0.454935
EU_c8	EU_c8		33	0.988658	4.0	0.459834	0.534137	110.17001	0.115327	0.115327	0	0.004465	0	0.566532	281	0.580507
EU_c9	EU_c9		41	1.154396	3.0	0.530351	0.59739	522.463135	0.137742	0.137742	0	0.005396	0	0.444872	347	0.706586
EU_c10	EU_c10		22	0.447377	4.0	0.417085	0.47741	11.939739	0.079545	0.079545	0	0.003044	0	0.771429	162	0.402738
EU_c11	EU_c11		18	0.386775	4.0	0.41604	0.468373	3.263482	0.06576	0.06576	0	0.002588	0	0.852941	116	0.333192
EU_c12	EU_c12		37	2.080823	4.0	0.497006	0.569277	184.613034	0.130792	0.130792	0	0.004862	0	0.561905	354	0.668765
EU_c13	EU_c13		38	0.995993	4.0	0.492582	0.568273	231.909668	0.134842	0.134842	0	0.004976	0	0.543544	362	0.696143
EU_c14	EU_c14		33	1.048858	3.0	0.494048	0.558233	212.418016	0.121183	0.121183	0	0.004384	0	0.586694	291	0.620595
EU_c15	EU_c15		30	1.406607	4.0	0.481159	0.543675	227.716725	0.101921	0.101921	0	0.004157	0	0.534483	217	0.526162
EU_c16	EU_c16		16	0.228284	4.0	0.395238	0.443273	4.287506	0.050124	0.050124	0	0.002403	0	0.828571	87	0.256506
EU_c17	EU_c17		33	1.276086	4.0	0.449864	0.526104	60.109202	0.112749	0.112749	0	0.004364	0	0.669355	332	0.569251
EU_c18	EU_c18		35	2.117775	4.0	0.475645	0.550201	120.364073	0.118701	0.118701	0	0.004619	0	0.634581	356	0.606005
EU_c19	EU_c19		26	0.472929	4.0	0.408867	0.47741	2.680779	0.088493	0.088493	0	0.003503	0	0.903333	271	0.449655
EU_c20	EU_c20		37	1.615025	4.0	0.44504	0.532631	241.896706	0.117541	0.117541	0	0.00508	0	0.574603	362	0.59589
EU_c21	EU_c21		31	1.10661	4.0	0.41604	0.494478	17.549918	0.096291	0.096291	0	0.004158	0	0.751724	327	0.490422
EU_c22	EU_c22		24	0.540229	4.0	0.409877	0.475904	10.310986	0.082687	0.082687	0	0.003269	0	0.87747	222	0.418641
EU_c23	EU_c23		34	0.943136	4.0	0.437995	0.520582	43.389202	0.114	0.114	0	0.004487	0	0.657197	347	0.575252
EU_c24	EU_c24		14	0.146315	4.0	0.431169	0.47239	36.308732	0.054482	0.054482	0	0.00219	0	0.538462	42	0.269839
EU_c25	EU_c25		6	0.105092	4.0	0.36971	0.403112	0.113509	0.025308	0.025308	0	0.001448	0	0.933333	14	0.124137
EU_c26	EU_c26		26	0.885838	4.0	0.425641	0.493474	16.985331	0.089823	0.089823	0	0.003597	0	0.79	237	0.454927
EU_c27	EU_c27		24	0.68575	4.0	0.430052	0.493474	34.297051	0.081473	0.081473	0	0.00328	0	0.869565	220	0.418872
EU_c28	EU_c28		39	1.890737	4.0	0.464986	0.552711	178.249134	0.139305	0.139305	0	0.005141	0	0.477952	336	0.70113
EU_c29	EU_c29		28	1.179436	4.0	0.426735	0.498494	31.86659	0.091758	0.091758	0	0.003766	0	0.811966	285	0.469379
EU_c30	EU_c30		51	4.120313	4.0	0.533762	0.620482	756.333238	0.167091	0.167091	0	0.006724	0	0.355918	436	0.865652
EU_c31	EU_c31		26	0.555019	4.0	0.419192	0.48745	6.942534	0.091168	0.091168	0	0.003502	0	0.86	258	0.461988
EU_c32	EU_c32		16	0.25167	5.0	0.368071	0.422088	0.0	0.051429	0.051429	0	0.002353	0	0.980952	103	0.261465
EU_c33	EU_c33		23	0.725981	4.0	0.409877	0.472892	10.474837	0.077654	0.077654	0	0.003163	0	0.848485	196	0.393873
EU_c34	EU_c34		28	0.900548	4.0	0.419192	0.491466	14.347426	0.093918	0.093918	0	0.003751	0	0.80057	281	0.475721
EU_c35	EU_c35		0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1	0.000757	1	0.0	0	0.0
PRC_c1	PRC_c1		24	1.319522	4.0	0.41604	0.481426	102.071941	0.03871	0.03871	2	0.003824	0	0.557312	141	0.262781
PRC_c2	PRC_c2		23	0.978245	4.0	0.43342	0.492972	29.534985	0.038742	0.038742	2	0.003569	0	0.774892	179	0.276256
PRC_c3	PRC_c3		25	1.43707	4.0	0.42132	0.487952	46.680095	0.037461	0.037461	2	0.003878	0	0.699275	193	0.273291
PRC_c4	PRC_c4		28	1.34613	4.0	0.42132	0.491968	98.077618	0.037591	0.037591	2	0.004459	0	0.609687	214	0.278316

Note: In this study, we will use PageRank and Eigenvector Centrality as main indices identifying the centrality role of each node to the global trade network.