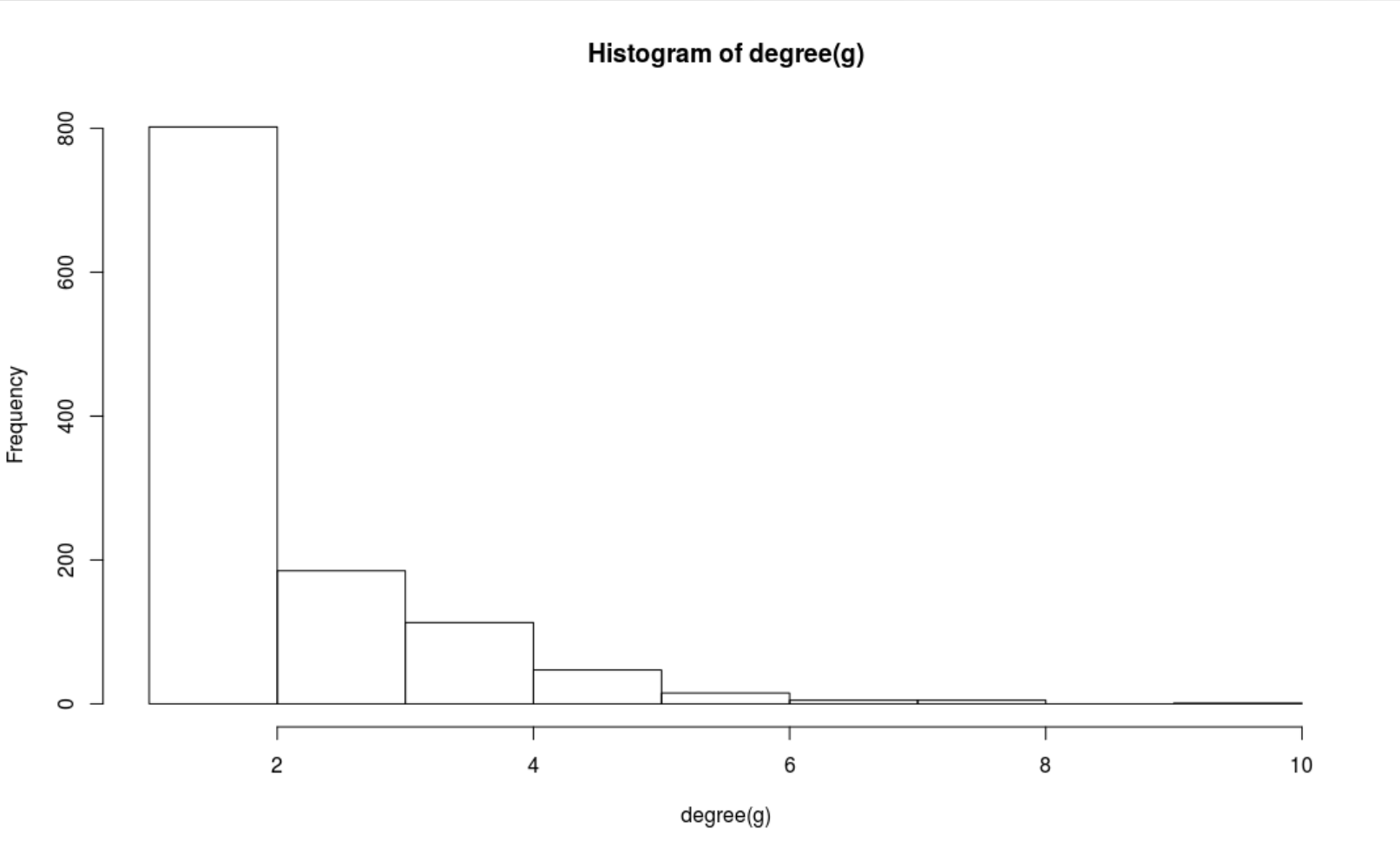
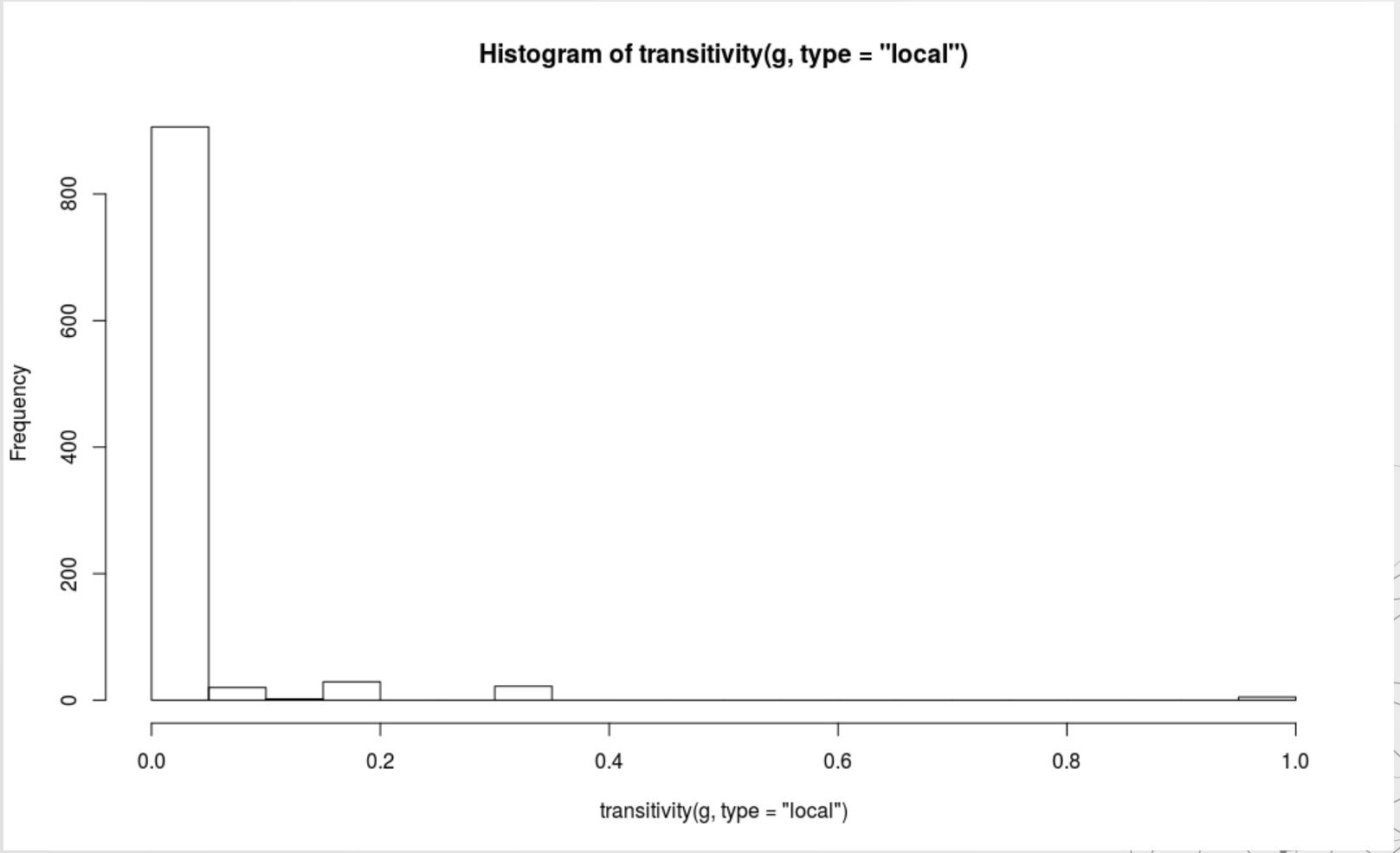
R

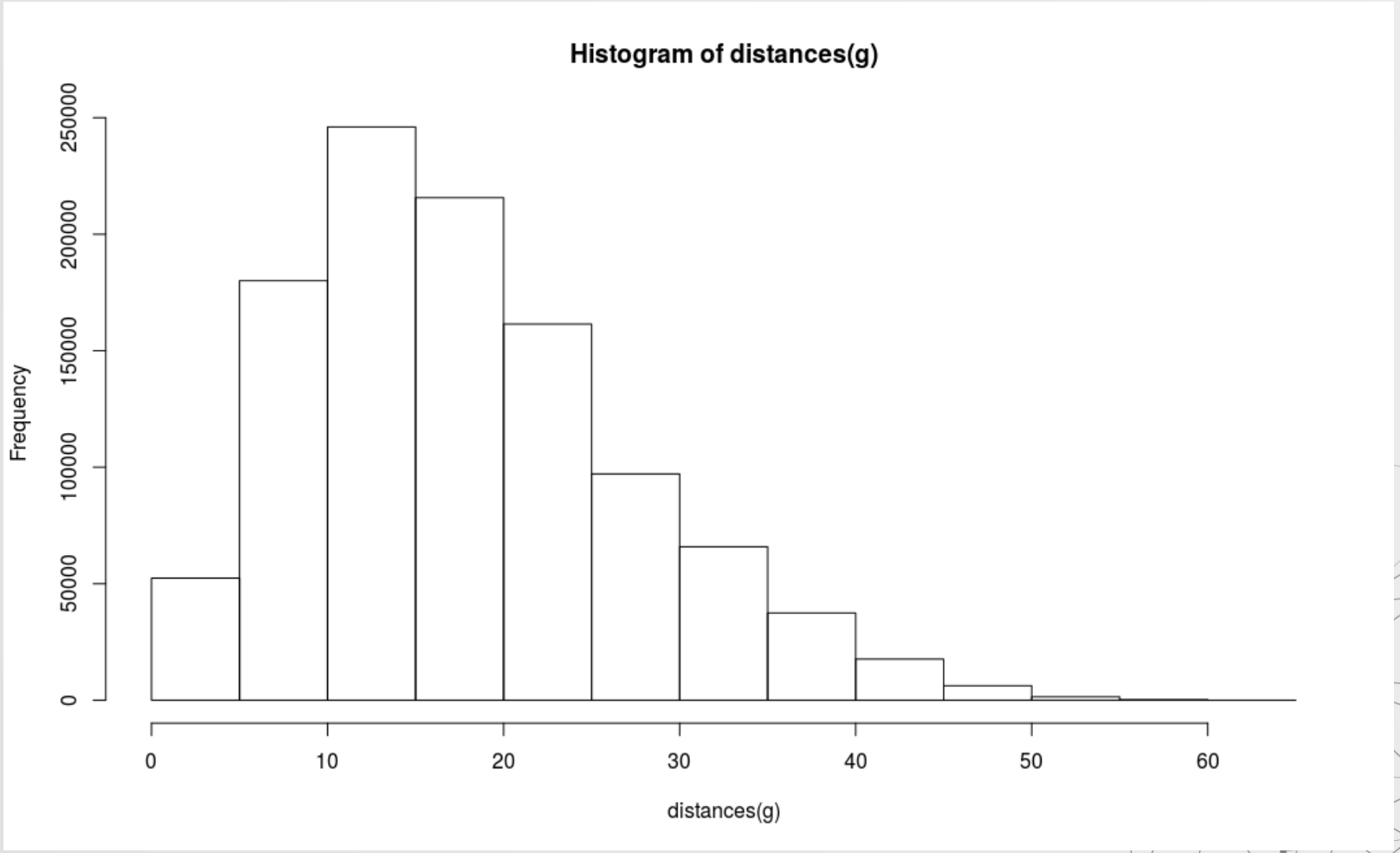
Network analysis with R and igraph

EuroRoad

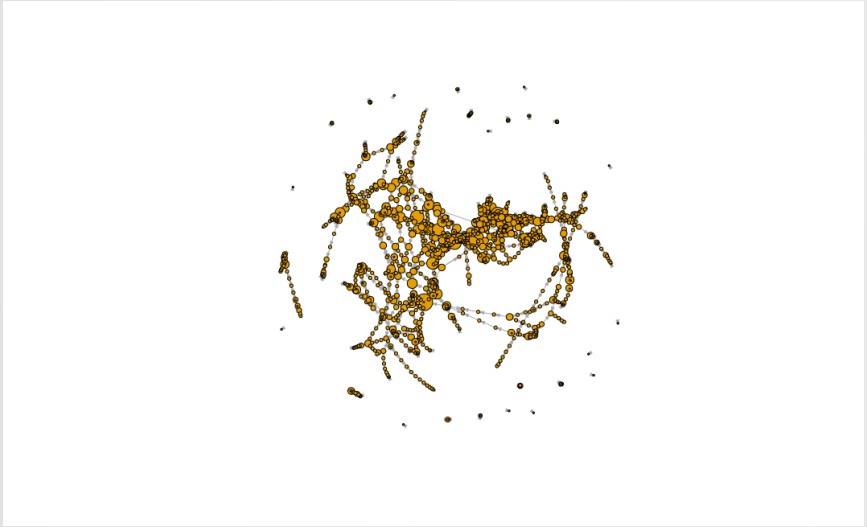
	Value	Time in seconds
Degree	Avg 2.414322, max 10	0.0013
Betweenness	Avg 116.1535	0.007
Number of connected components	26	0.006
Clustering coefficient	0.03391028	0.052
pagerank	0.0008525149	0.006
shorthest paths	8.782487	0.217
diameter	41 (largest component)	0.007
network density	0.001030001	0.006
closeness	7.37621204528284e-07	0.011

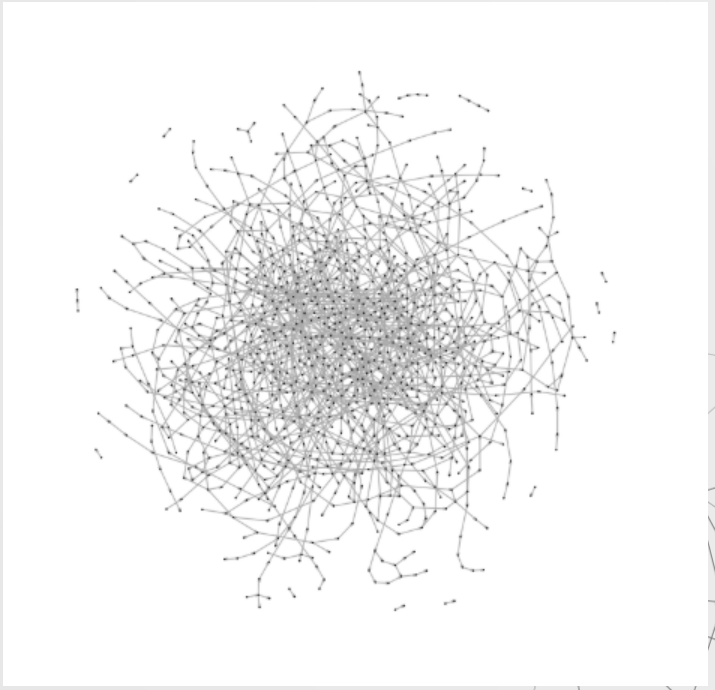

Histogram of degree(g)
Frequency
0
200
400
600
800
2
4
6
8
10
degree(g)


Histogram of transitivity(g, type = "local")
Frequency
0
200
400
600
800
0.0
0.2
0.4
0.6
0.8
1.0
transitivity(g, type = "local")


Histogram of distances(g)
Frequency
0
50000
100000
150000
200000
250000
0
10
20
30
40
50
60
distances(g)

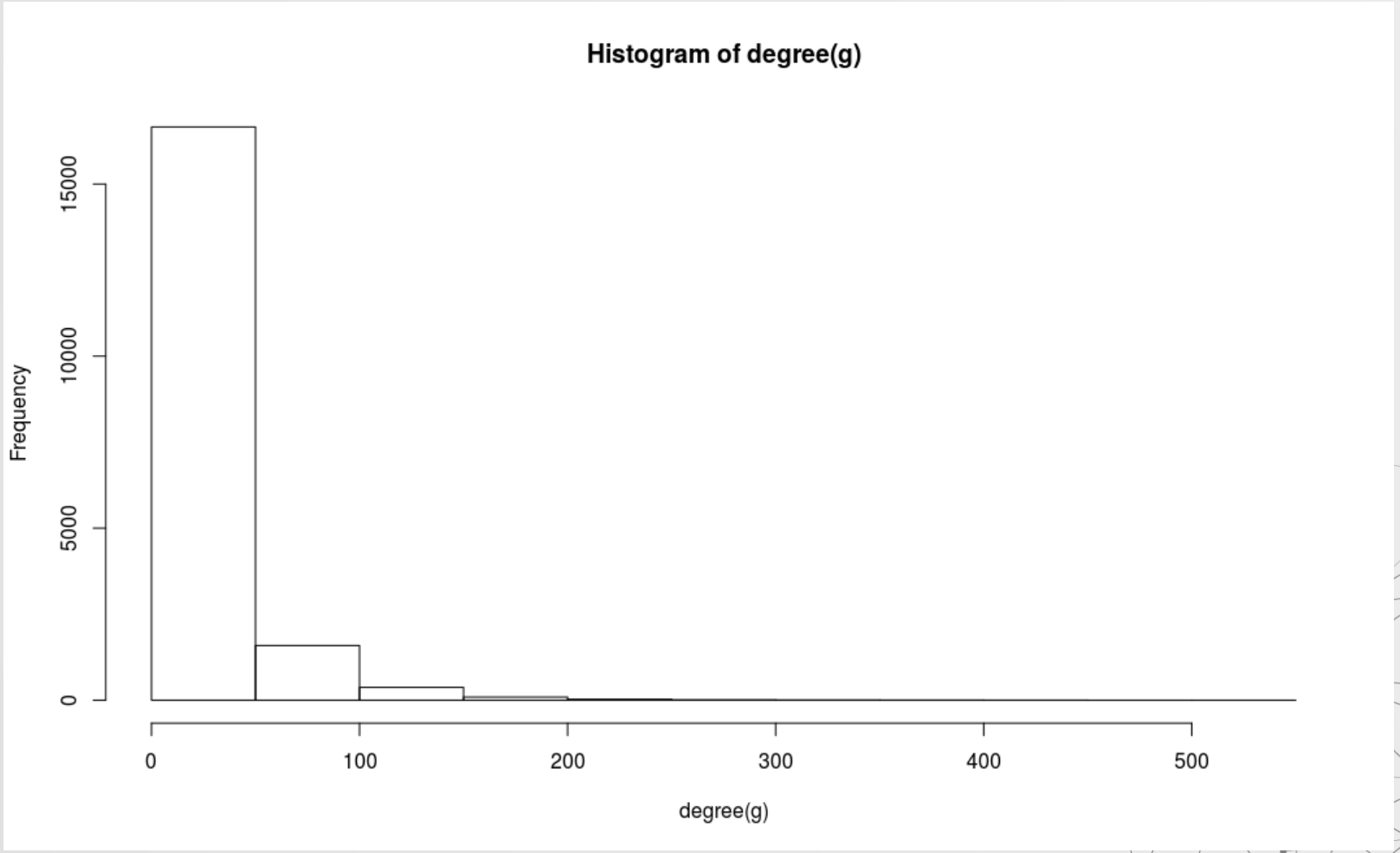
Visualization

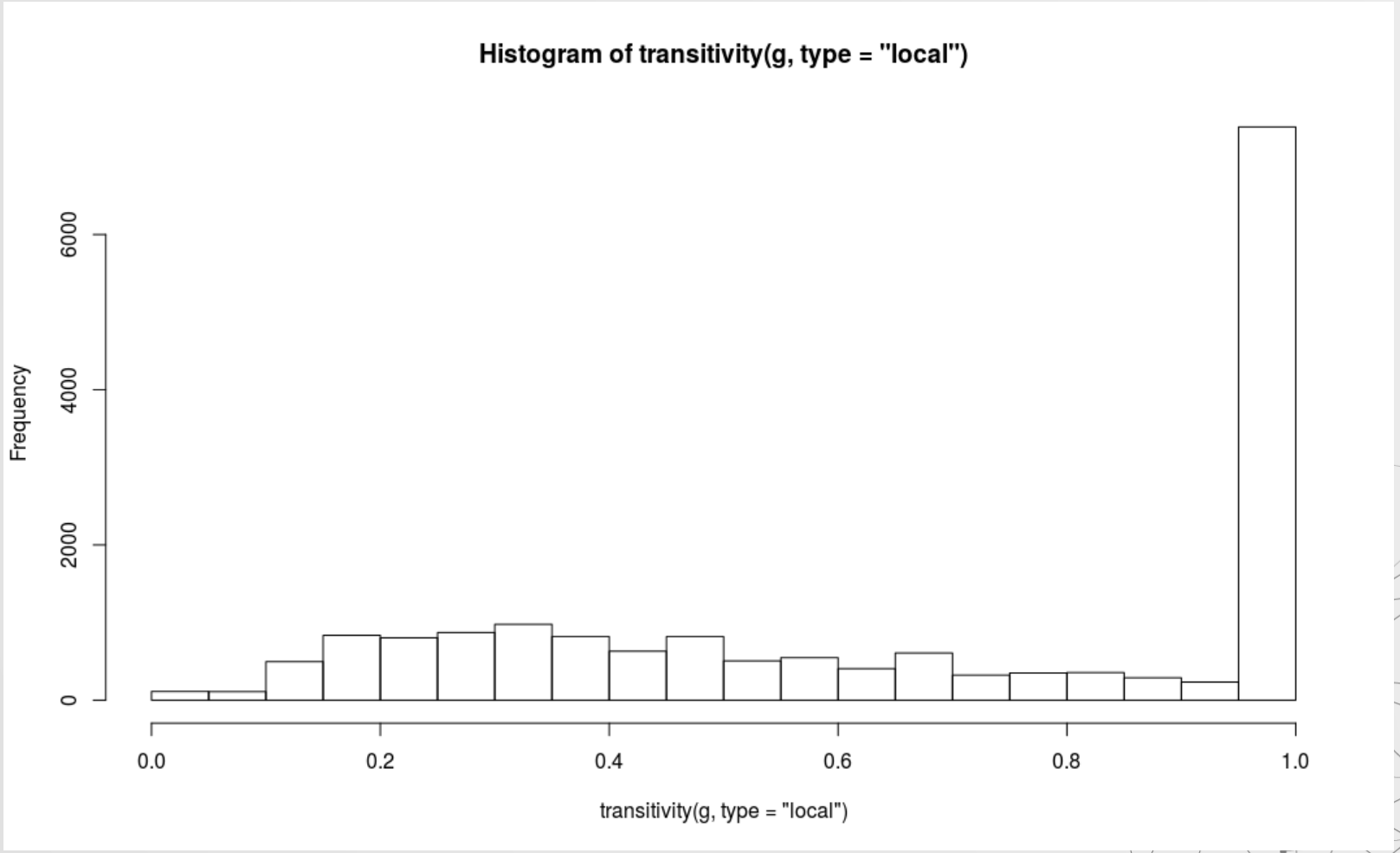


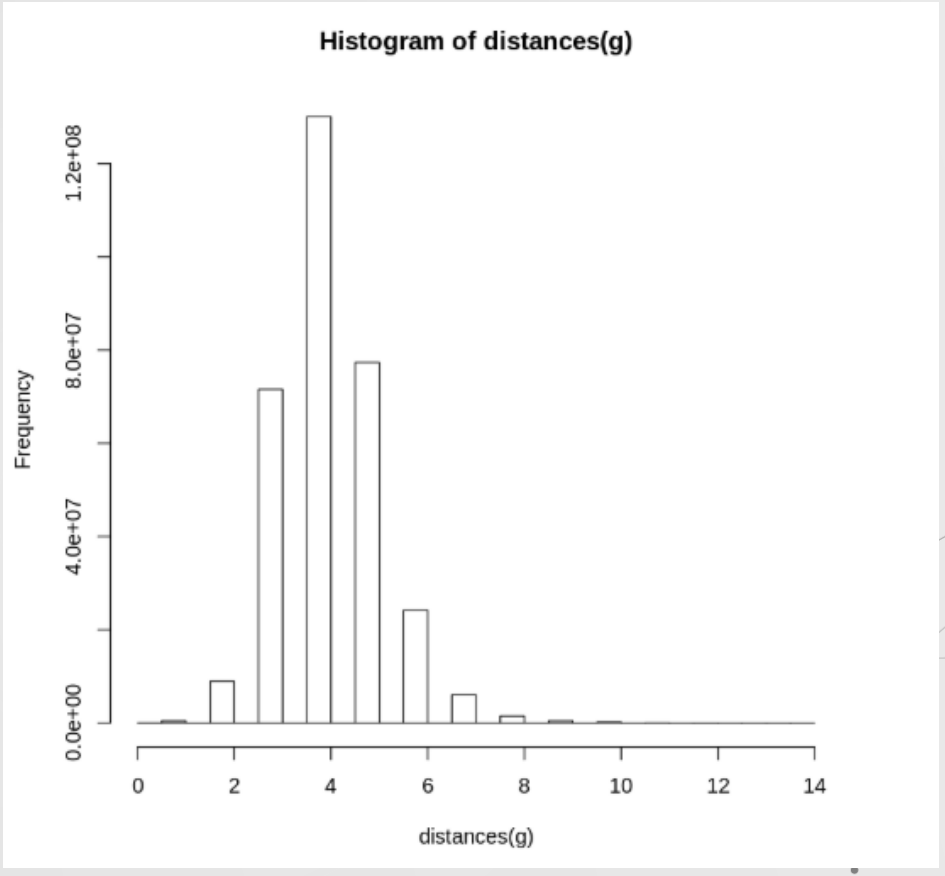


Ca-AstroPh

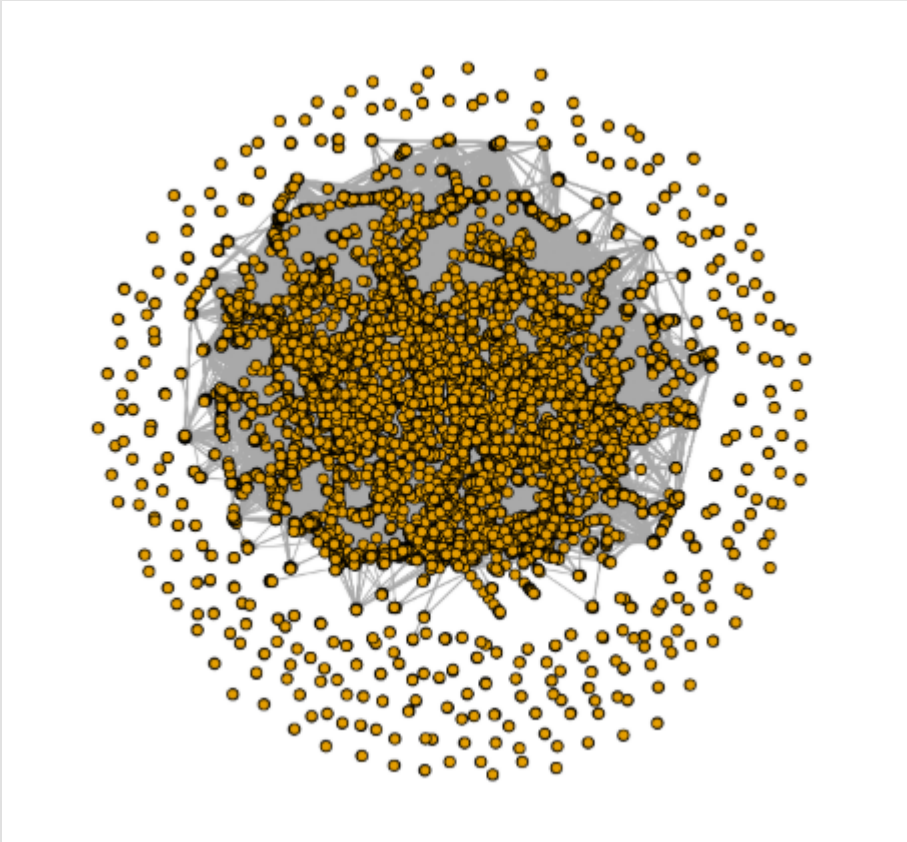
	Value	Time in seconds
Degree	Avg 21.10159	0.007
Betweenness	Avg 13047.849	7.699
Number of connected components	289	0.015
Clustering coefficient	0.318002528143559	0.081
pagerank	5.32736668264877e-05	0.019
shorthest paths	4.93853583560696	67.105
diameter	22	3.529
network density	0.0005621	0.006
closeness	5.13647237711114e-09	4.096

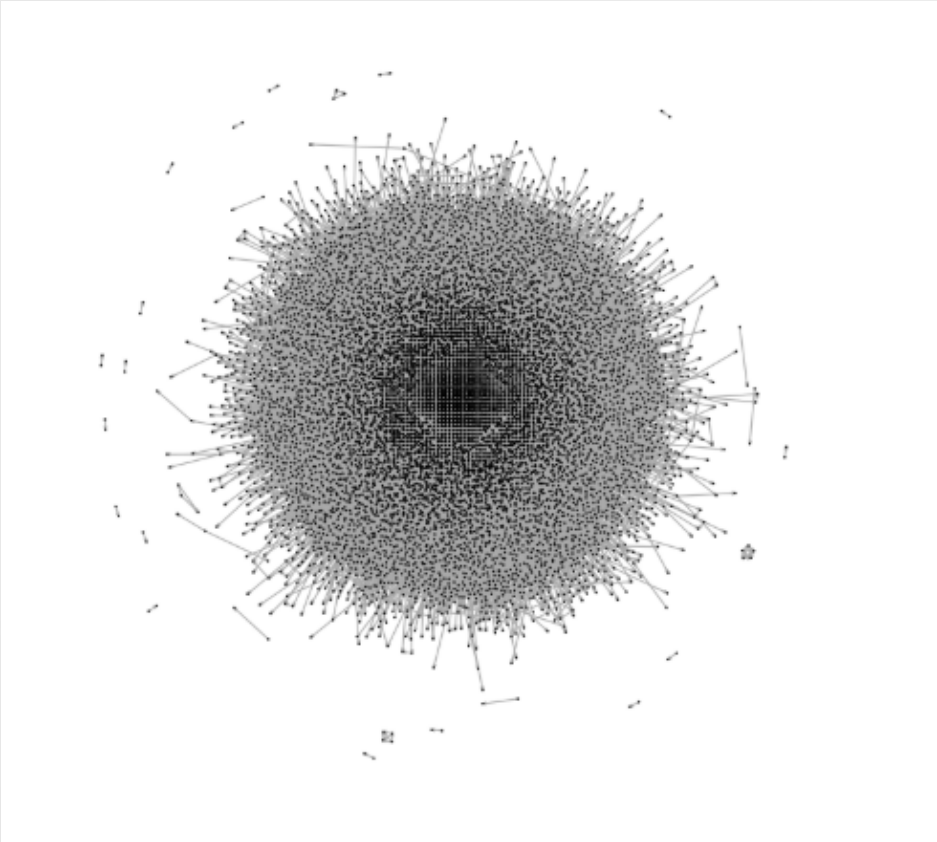

Histogram of degree(g)
Frequency
0
5000
10000
15000
0
100
200
300
400
500
degree(g)


Histogram of transitivity(g, type = "local")
Frequency
0
2000
4000
6000
0.0
0.2
0.4
0.6
0.8
1.0
transitivity(g, type = "local")


Histogram of distances(g)
Frequency
0.0e+00
4.0e+07
8.0e+07
1.2e+08
0
2
4
6
8
10
12
14
distances(g)

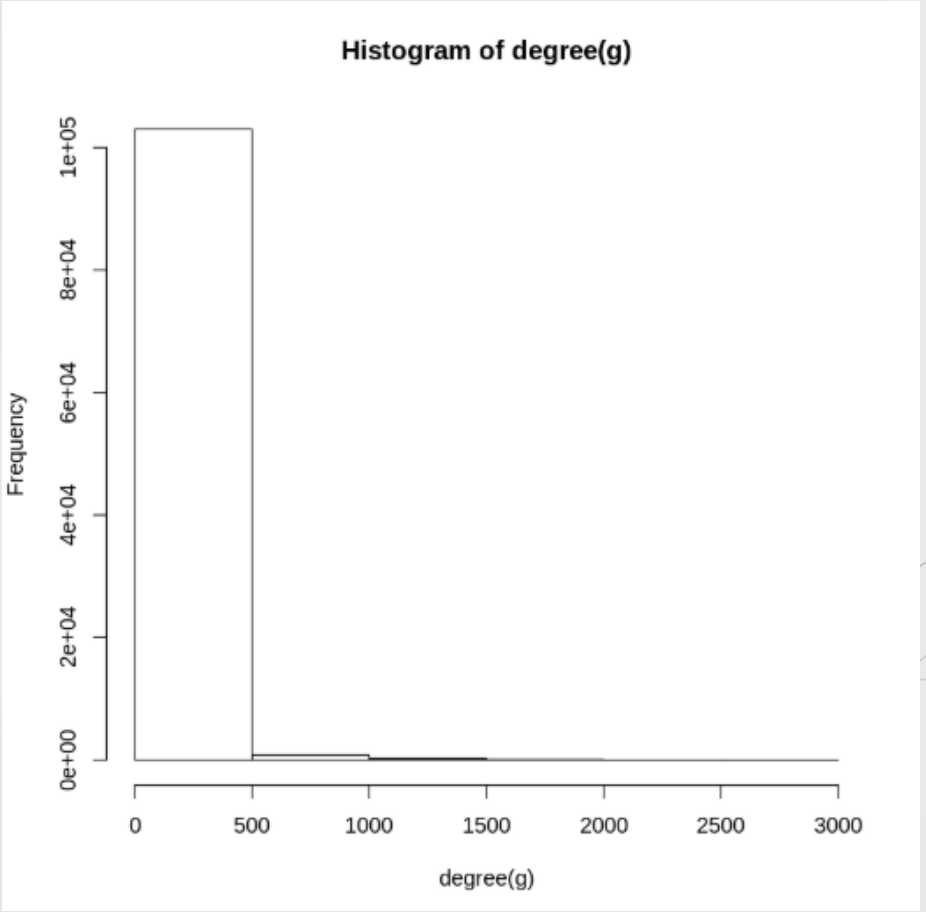
Visualization

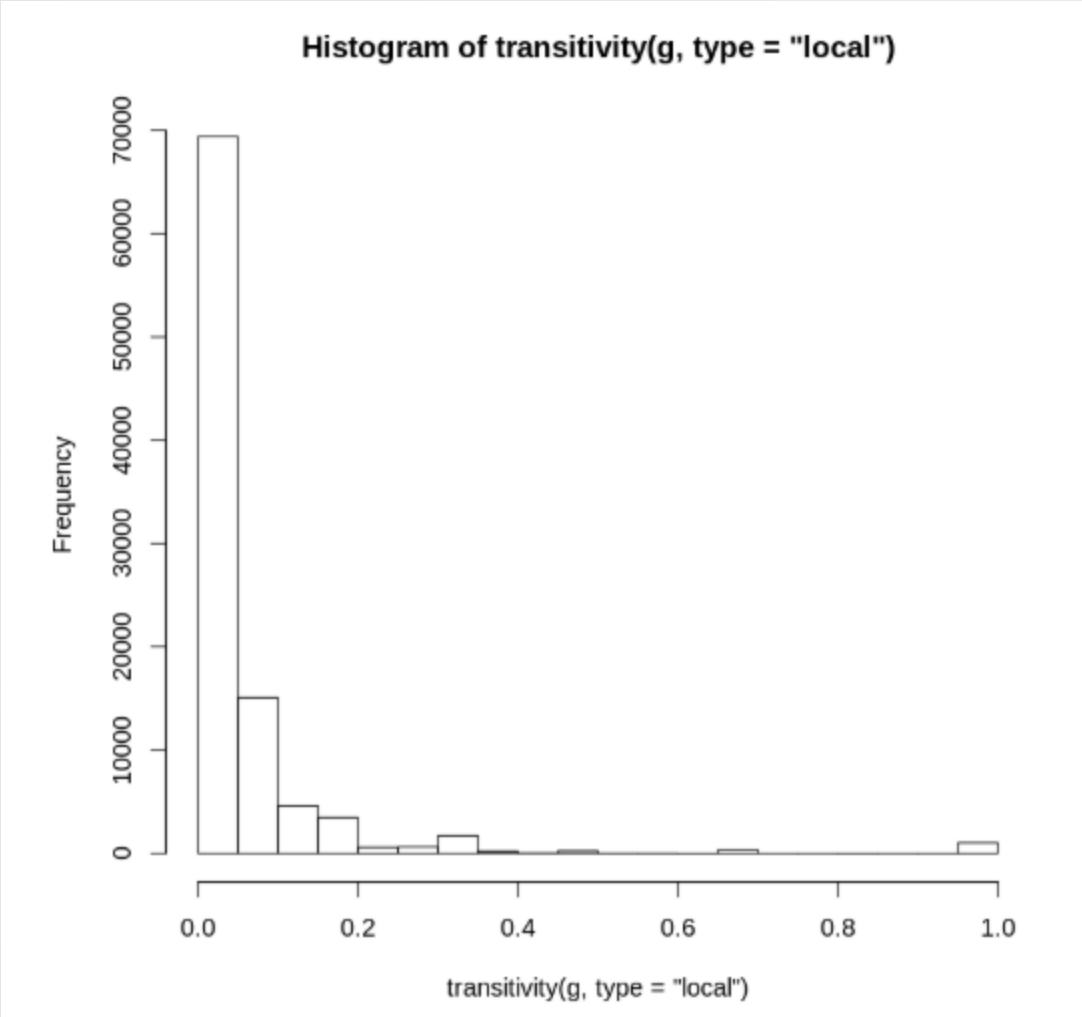




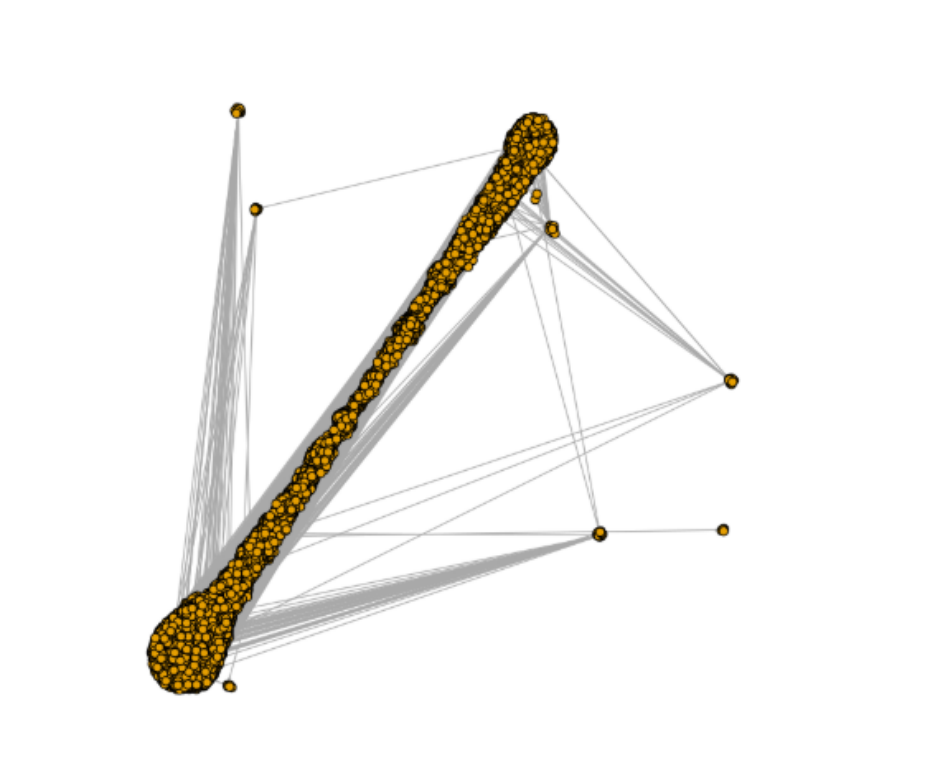
livemocha

	Value	Time in seconds
Degree	42.1333	0.018
Betweenness	61302.053	641.82
Number of connected components	1	0.07
Clustering coefficient	0.0140789	0.808
pagerank	9.60596338206759e-06	0.322
shorthest paths	Avg 4.09296248648373	Crashed ☹
diameter	23	182.396
network density	0.000202367467938907	0.005
closeness	1.83535151121034e-10	200.722


Histogram of degree(g)
Frequency
0e+00
2e+04
4e+04
6e+04
8e+04
1e+05
0
500
1000
1500
2000
2500
3000
degree(g)


Histogram of transitivity(g, type = "local")
Frequency
0
10000
20000
30000
40000
50000
60000
70000
0.0
0.2
0.4
0.6
0.8
1.0
transitivity(g, type = "local")

Visualization



Time comparison

	Euroroad	AstroPh	Livemocha
Degree	0.0013	0.007	0.018
Betweenness	0.007	7.699	641.82
closeness	0.011	4.096	200.722
Number of connected components	0.006	0.015	0.07
Clustering coefficient	0.052	0.081	0.808
pagerank	0.006	0.019	0.322
shorthest paths	0.217	67.105	Crashed ☹
diameter	0.007	3.529	182.396
network density	0.006	0.006	0.005

Advantages and Disadvantages
R+igraph

Pluses:
Good documentation
Very easy to use
Plenty of avaiable layouts

Minuses:
Bad performance with visualization of large networks
RAM demanding
Sometimes confusing syntax