


# Social network project

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# The data

- messages from Jobs channel ODS community in  **slack**
- vacancies from Jan 2021 - Jul 2021
- consider user latest vacancy
- examine reactions from users with vacancies from Jun 2020

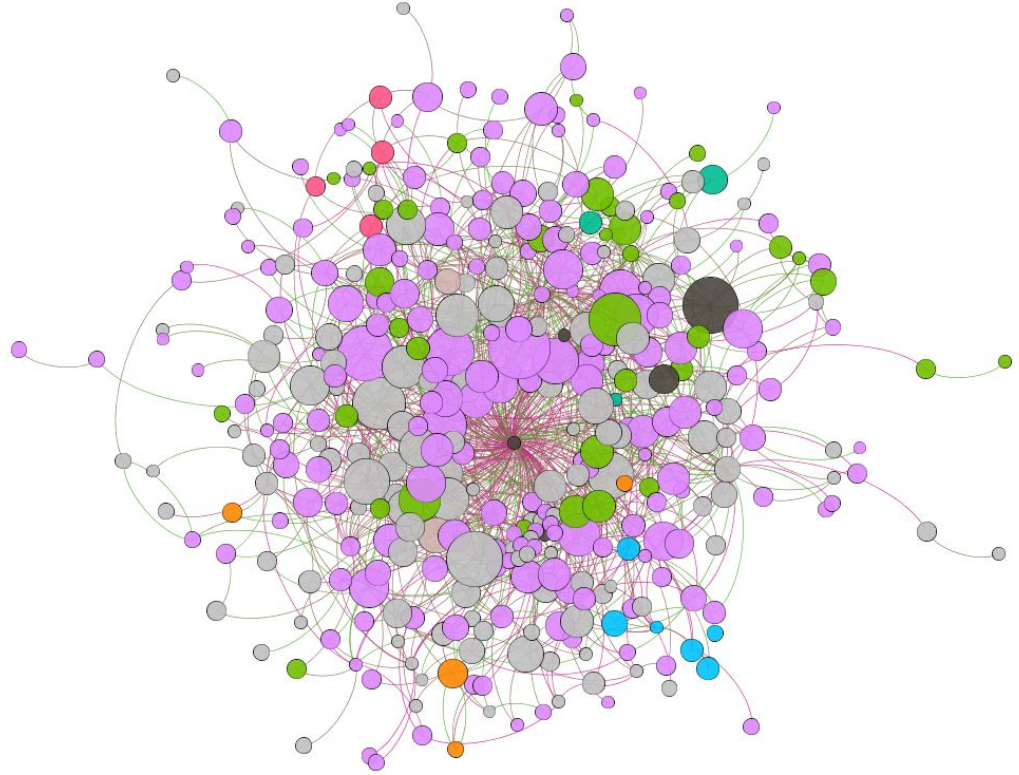
# The graph

- nodes - users
- nodes attributes - users company
- edges - reactions on vacancy (with direction)
- edges attributes - tone of reaction (negative, neutral, positive)



# Visualisation

- node color - company
- edge color - reaction tone
- edge size - in degree

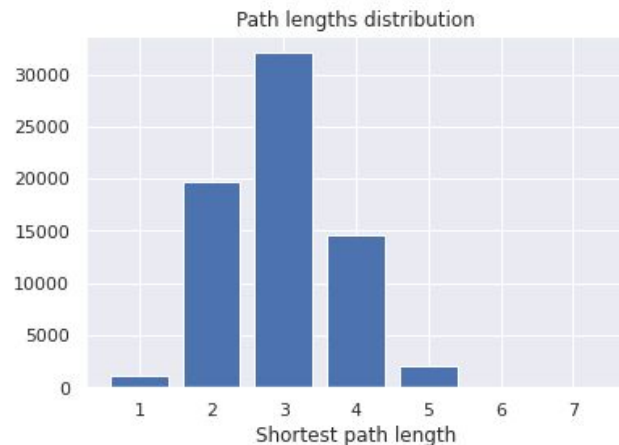
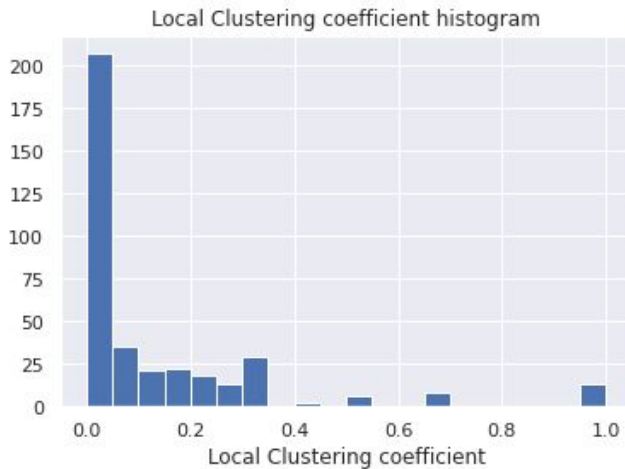


# Network summary

- 374 nodes, 1099 edges
- 4 radius, 9 diameter
- Global Clustering coefficient: 0.05
- Average local Clustering coefficient: 0.13
- Average path length: 2.96

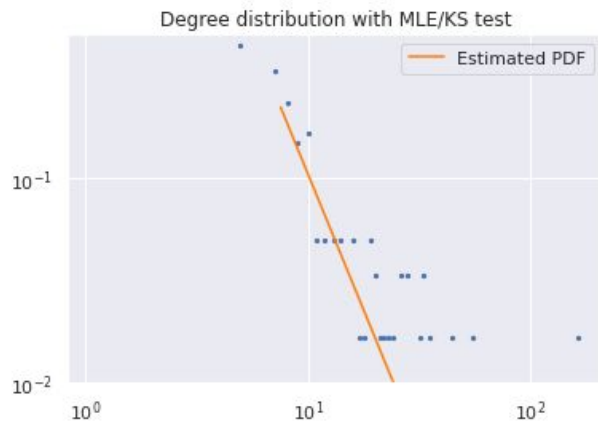
The network is similar to random graph

Most of the nodes have zero clustering coefficient - it means they have no triangles (in some parts the graph is close to star graph)



# Degree distribution

The degree distribution of the network is similar to Power law

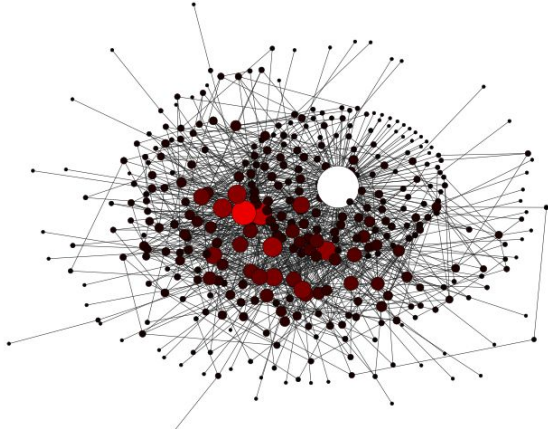


# The closest random graph model

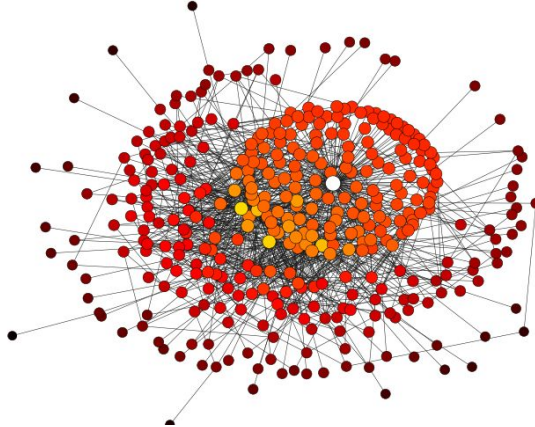
The network is similar to Barabasi Albert Graph (and our network is scale-free)

	GCC size	Edges	Radius	Diameter	Global CC	Average local CC	Average path length	KS test
<b>Current</b>	374	1099	4	7	0.045161	0.130321	2.958653	1.000000
<b>ER</b>	372	1093	4	6	0.011416	0.010854	3.537750	0.647059
<b>BA</b>	374	744	4	6	0.023757	0.066421	3.557555	0.796791
<b>WS</b>	374	748	6	9	0.110482	0.126853	4.950467	0.711230

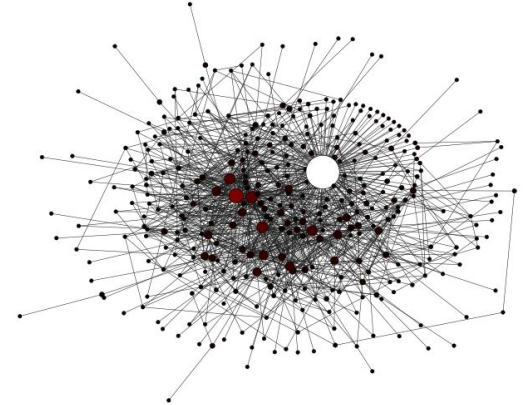
# Centralities



Degree centrality



Closeness centrality



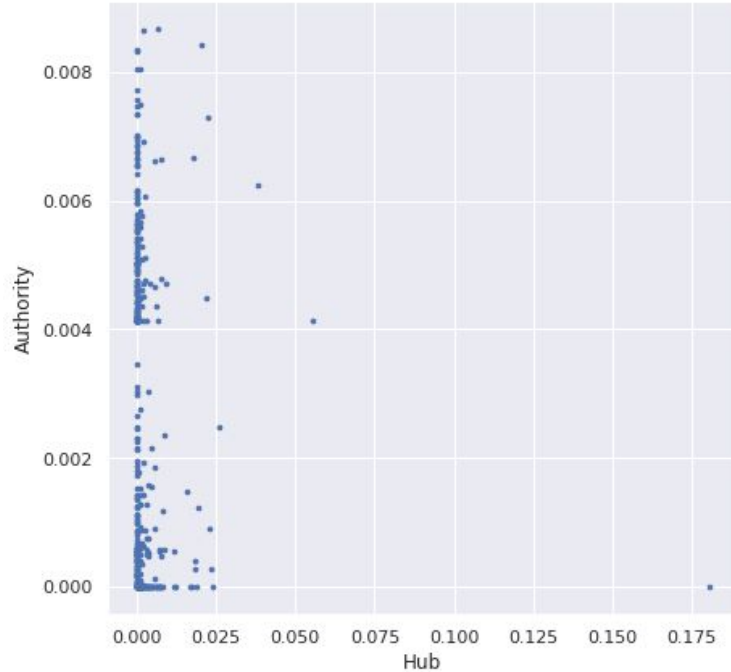
Betweenness centrality

Sergey Zakharov is in the top for all centralities as he puts a lot of reactions

The top also contains users with a large number of received / delivered reactions



# Hits

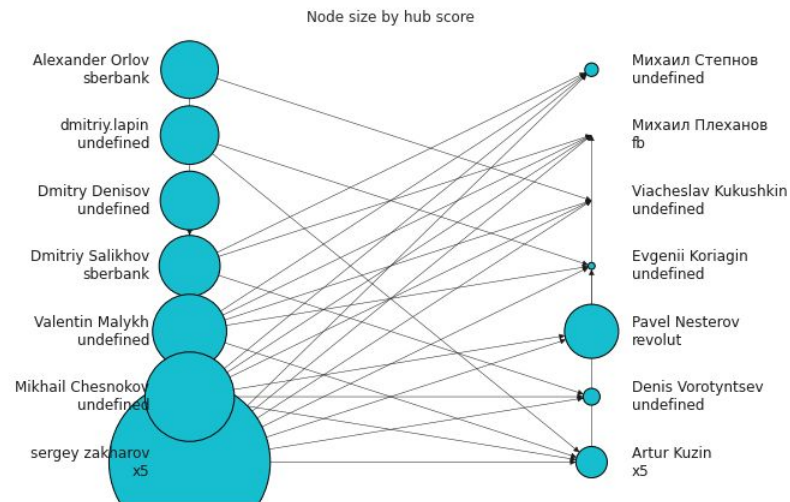
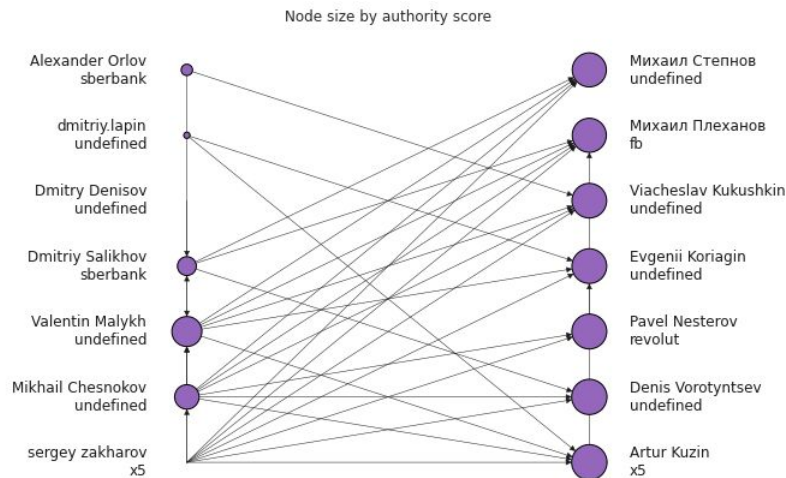


There are few users in the graph with a large number of reactions received, but there are many users delivering reactions

# Hits

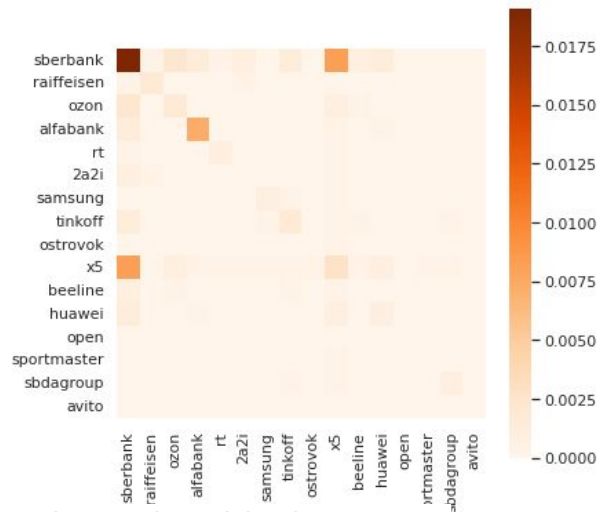
Sergey Zakharov is an outstanding hub

Pavel Nesterov is both a good hub and authority (also he is in centralities top)

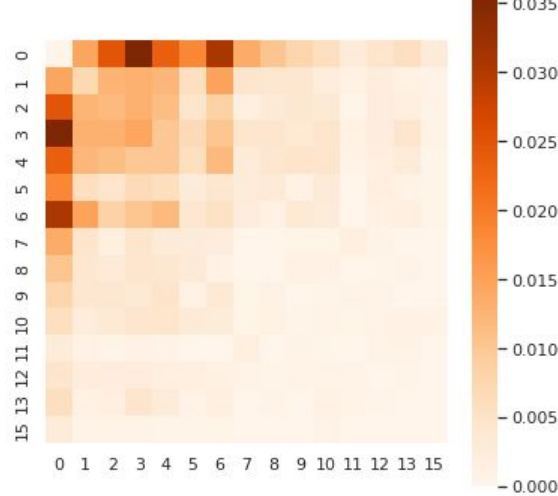


# Assortative mixing

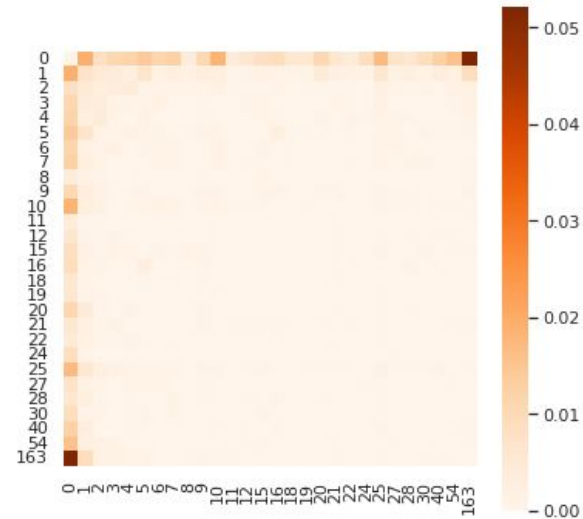
- Assortativity by company 0.0365
- Assortativity by in node degree -0.0630
- Assortativity by out node degree -0.1210



Assortative mixing by company



Assortative mixing by in node degree

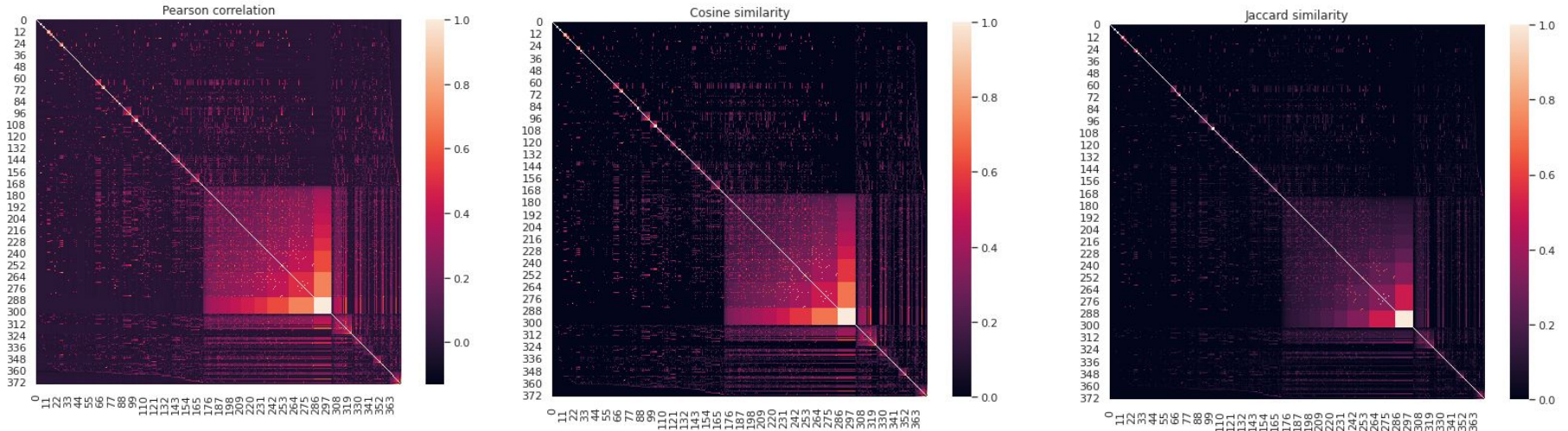


Assortative mixing by out node degree

# Node structural equivalence

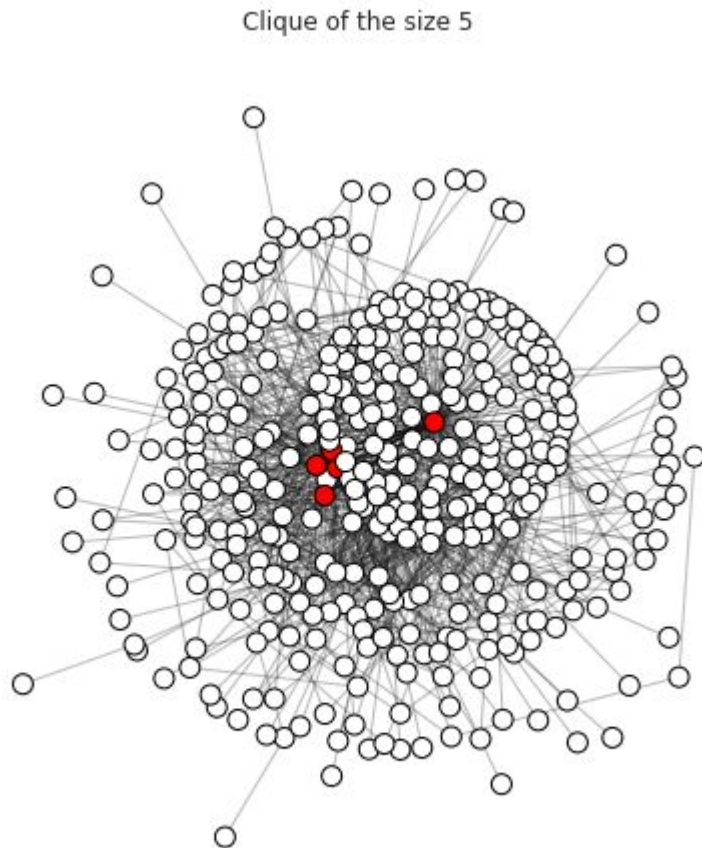
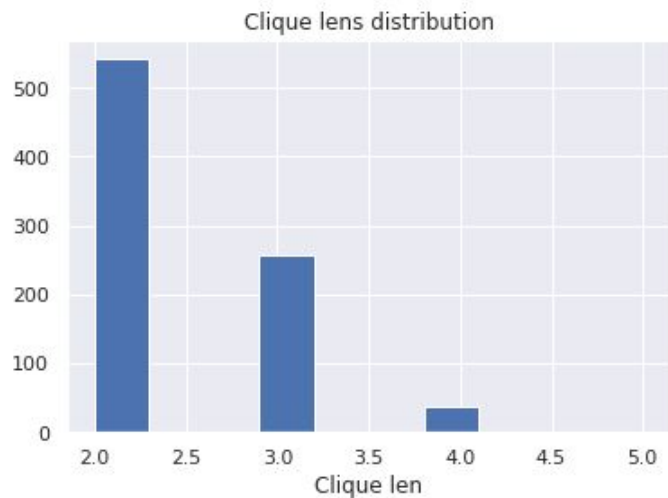
One large group of similar nodes can be distinguished in the graph, but the remaining nodes are practically not similar to each other

The network does not have pronounced clusters



# Cliques

- Clique number 837
- One clique with max size 5  
(contains top centralities nodes)

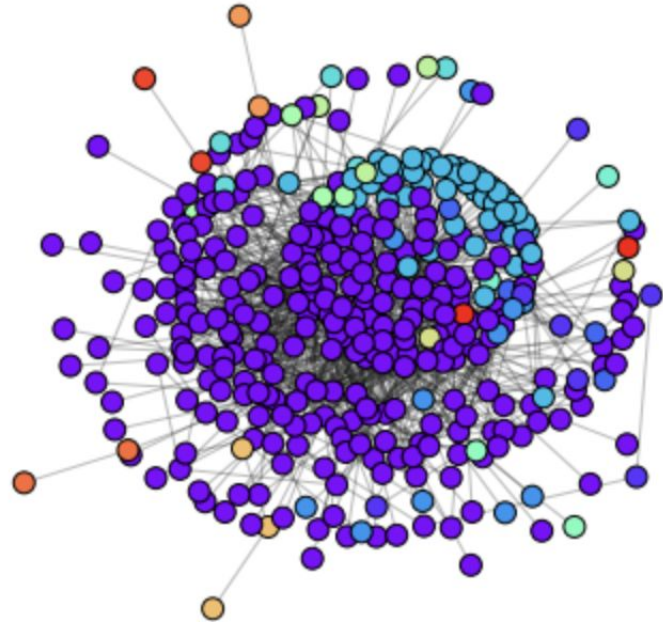


# Community detection

There is hard to detect the communities within the graph

This means that there are no clearly defined communities in the graph that share reactions only to each other

Edge betweenness (16 communities)  
modularity 0.1441, silhouette -0.1734, ground truth score 0.0572



Thank you for your attention!