Visualization and analysis of social media networks: an overview and use cases

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2) ...and what is social network analysis?
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4) How can we gather the data?
5) What kind of visualization tools can we use?
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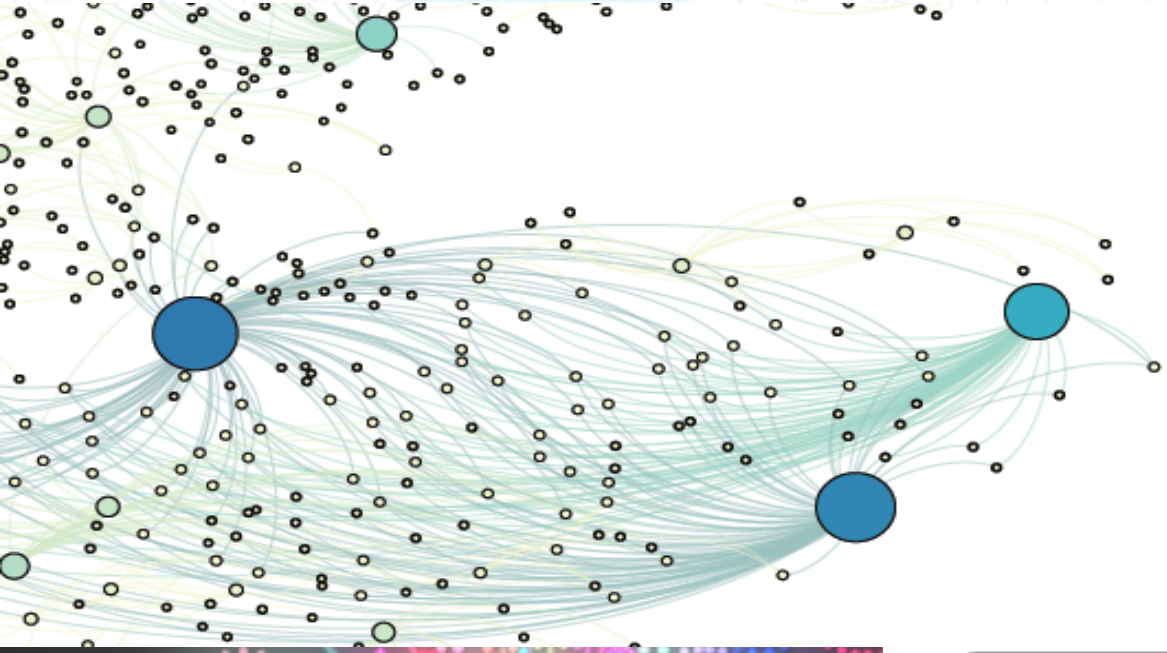
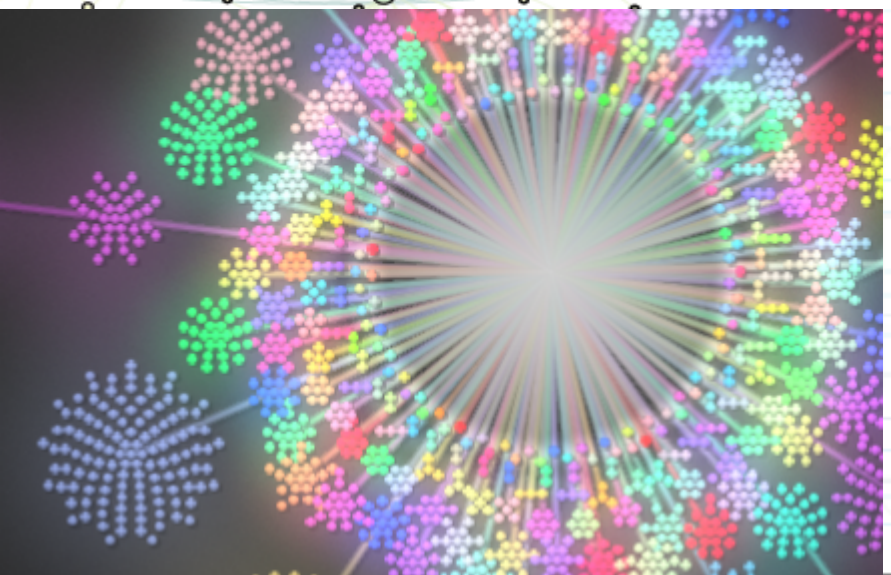
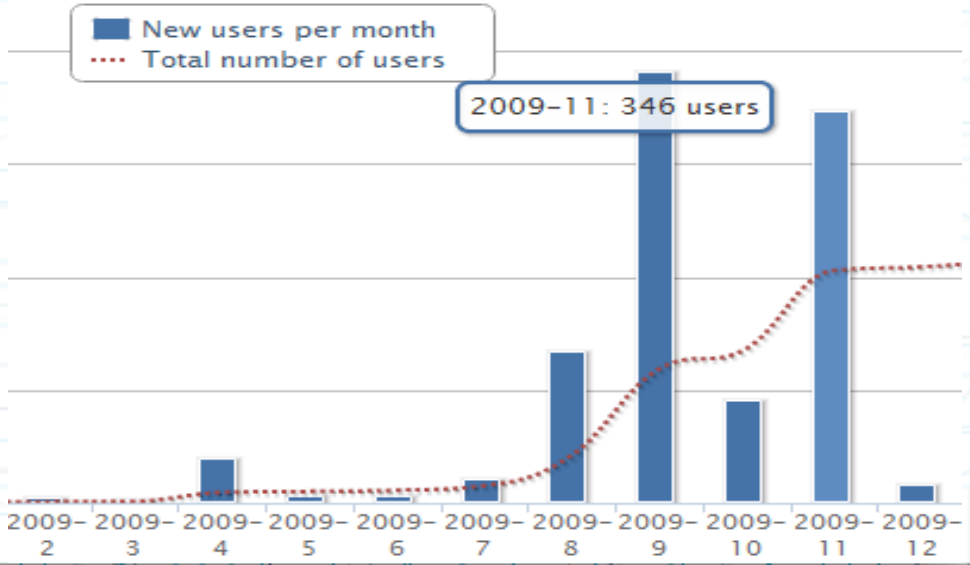
(Information) visualization

- Visualization is any technique for creating images, diagrams, or animations to communicate a message. (Wikipedia)
- Visualizations purpose is to represent existing and available data in a more human-readable form.
- Information visualization tries to give insight of the data that is being visualized.
- Visualization can be static or dynamic.

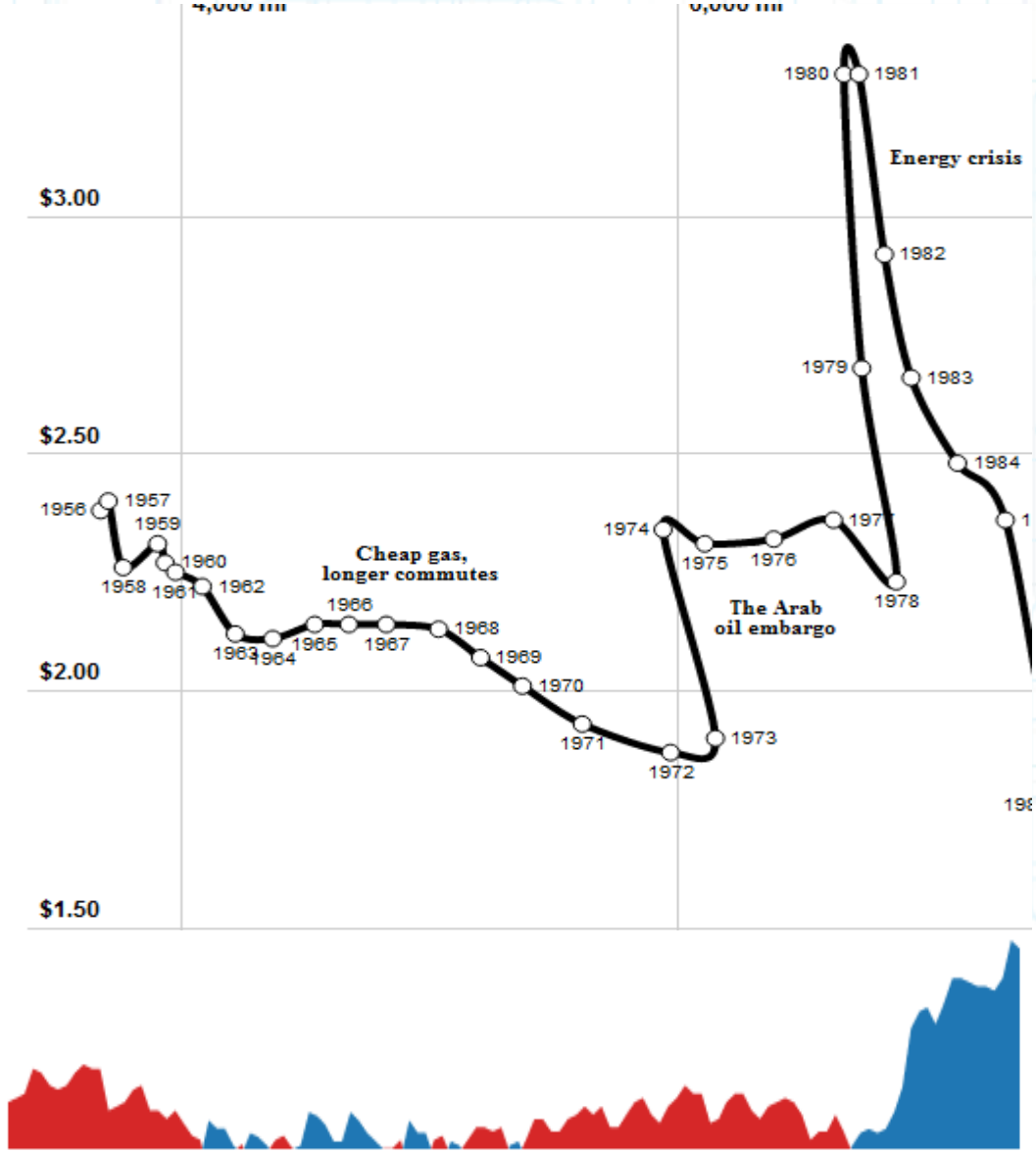
Visualizations

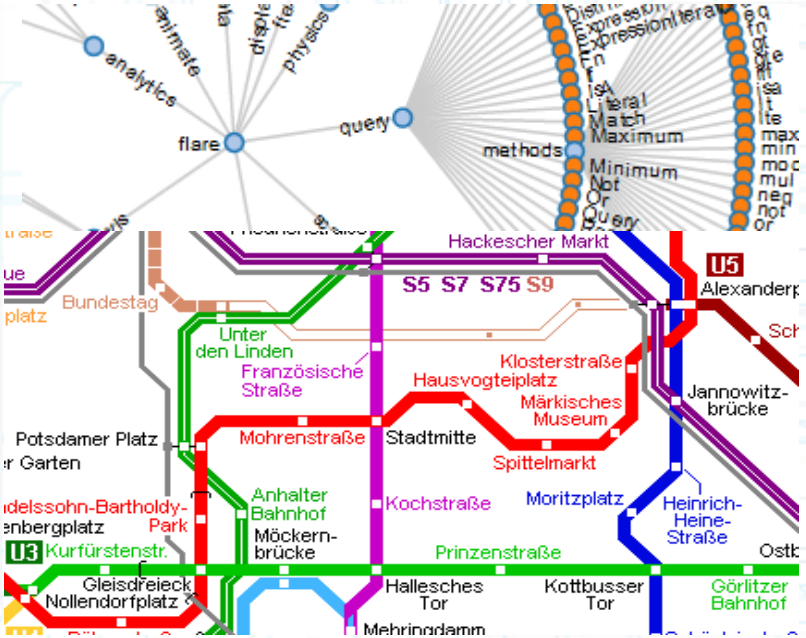






Visualizations

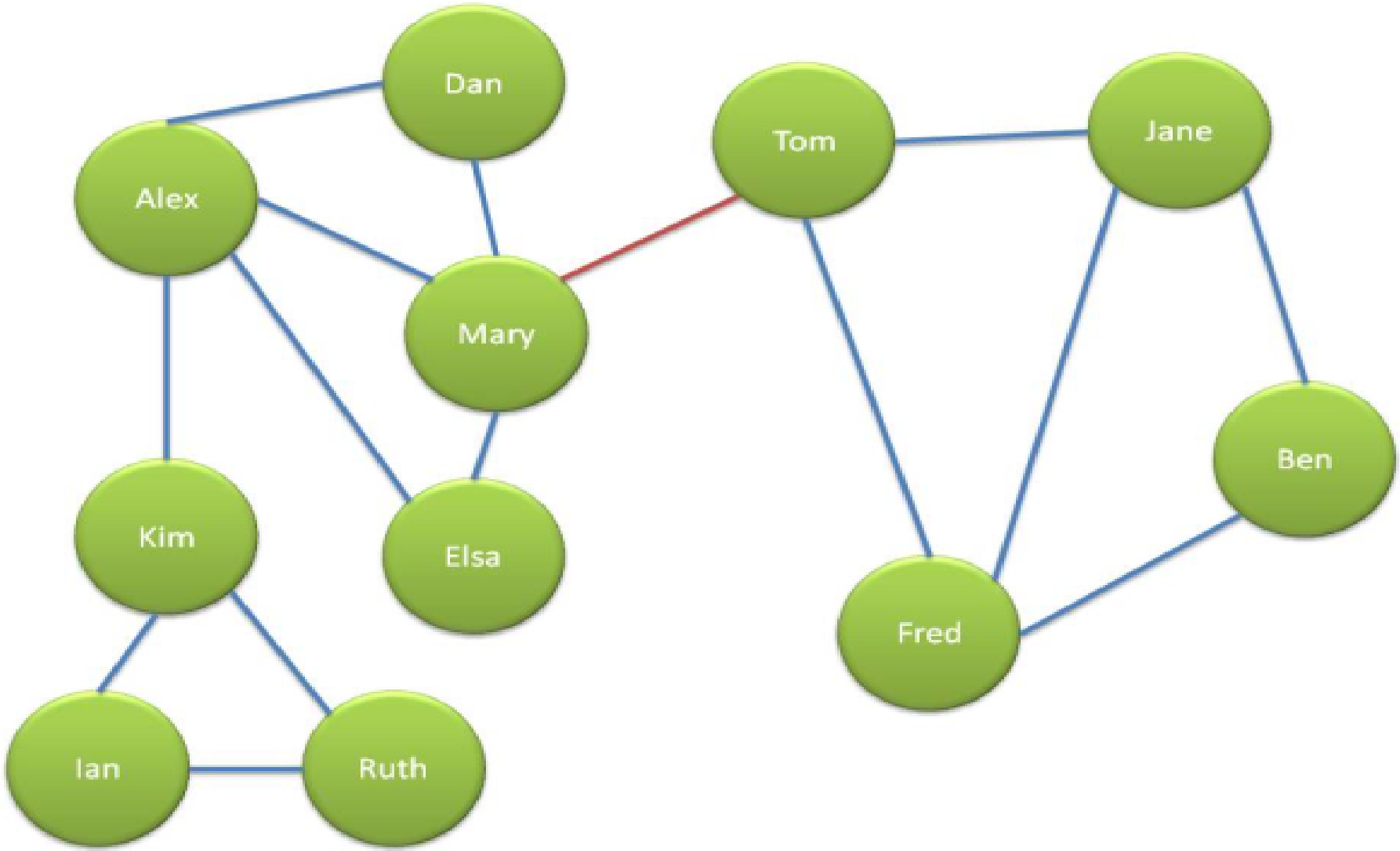




Social Network Analysis

- Social network analysis (SNA) views social relationships in terms of network theory consisting of nodes and edges.
- Nodes are the individual actors within the networks, and edges are the relationships between the actors.
- In its simplest form, a social network is a map of specified edges, such as friendship, between the nodes being studied. (Wikipedia)

Social Network Analysis



Transmission

- Well at least a short summary.
- Now we know what I mean by visualization.
- ...and we know the definition of SNA.

- Next we are looking on where does the data come from?

Data sources

- (In Internet) data can be found in all kind of systems.
  - Wikis, blogs, social media services, forums, databanks, logs, bonus card systems, bus route schedules, etc.
- In social media the data is created by the users.
  - Users interact within the system and the system used records user actions in some way (i.e. database).

Social Media Data Sources

Gathering data

- How can we gather the data from the system.
- There are two distinct ways to automatically gather data.
    1) Crawling from the frontend
    2) Saving in the backend

Gathering data

- There are two distinct ways to automatically gather data.
    1) Crawling from the frontend
    2) **Saving in the backend**
- It is crusial that all user actions are saved within the system.
    - These include page views, page edits, logins, content contributions, etc.
    - Some things are given but others must be considered while creating the system.

Gathering data to database

- Mostly the data is saved into a database.
  - MySQL, PostgreSQL, MongoDB, FS, etc.

	Field	Type	Collation	Attributes	Null	Default	Extra
☐	nid	int(10)		UNSIGNED	No		auto_increment
☐	vid	int(10)		UNSIGNED	No	0	
☐	type	varchar(32)	utf8_general_ci		No		
☐	language	varchar(12)	utf8_general_ci		No		
☐	title	varchar(255)	utf8_general_ci		No		
☐	uid	int(11)			No	0	
☐	status	int(11)			No	1	
☐	created	int(11)			No	0	
☐	changed	int(11)			No	0	
☐	comment	int(11)			No	0	
☐	promote	int(11)			No	0	
☐	moderate	int(11)			No	0	
☐	sticky	int(11)			No	0	
☐	tnid	int(10)		UNSIGNED	No	0	
☐	translate	int(11)			No	0	

Intermission

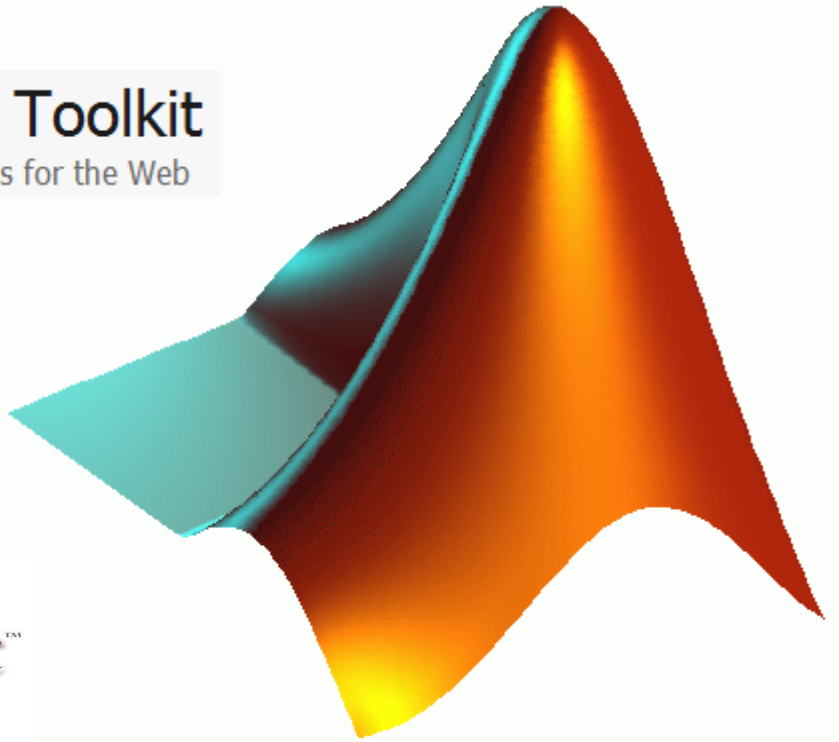
- Now we have the data collected, but it is located in some database in some raw format.
- This raw data gives very little insight on whats going on in the system.
- There are various tools available for visualizing data.
  - Commercial, free, open-source, etc.

Visualization tools

d3.js

Gephi

JavaScript InfoVis Toolkit
Create Interactive Data Visualizations for the Web



Highcharts
Interactive JavaScript charts for your web pages

vizster

Google

Visualization tools

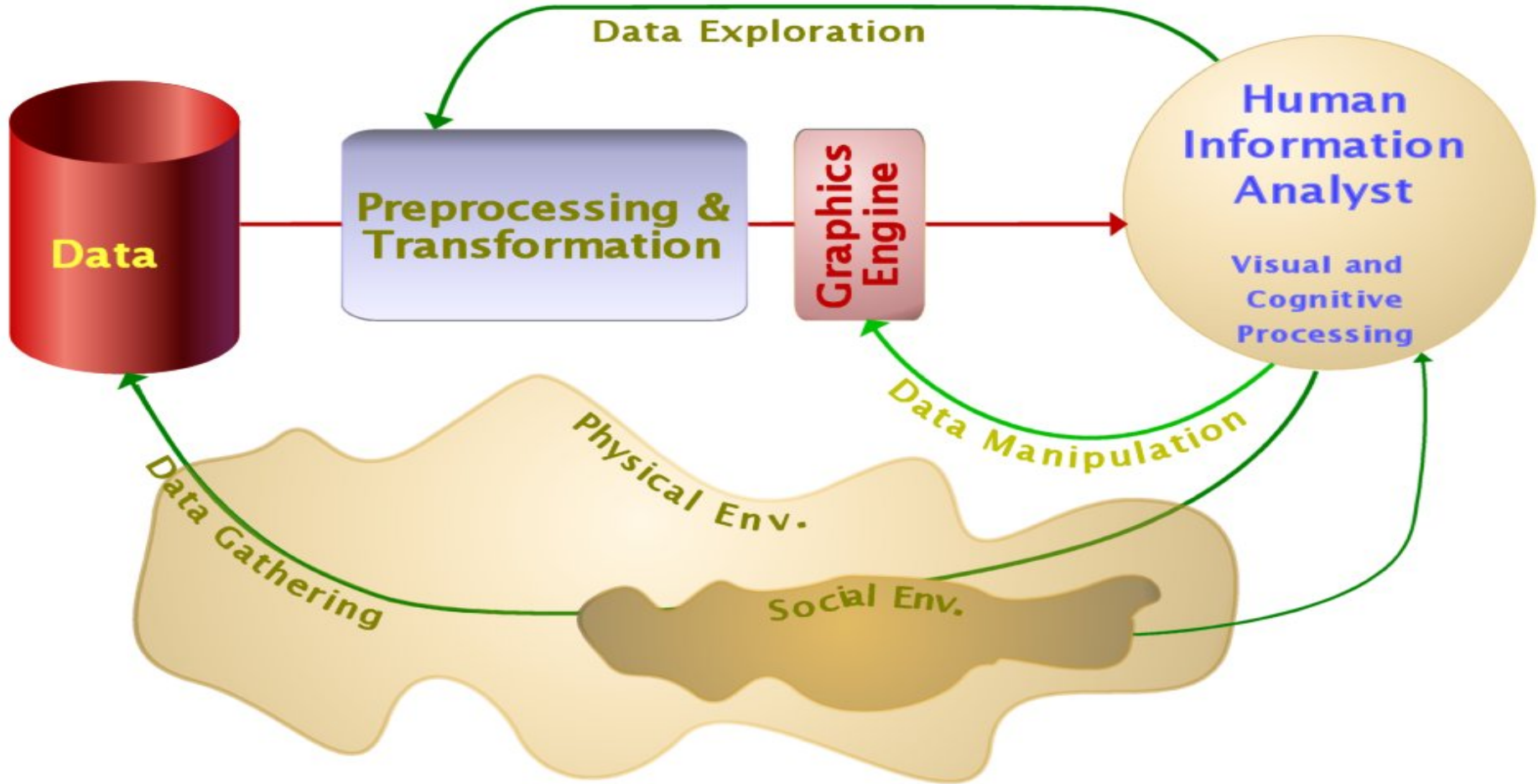
- Gathered data must be often converted to the format that is used in the desired visualization tool.
- Data formats include:
  - CSV (Excelsheets)
  - JSON
  - XML (i.e. .gexf)
  - Tailored arrays

A short overview of file formats

- Script for converting data to desired file format.
- .gexf – file format example.
- .csv – file format example.
- .gource custom file format example.

To summarize what we have gone through

- We are talking about information visualization process (Ware, 2004)



Intermission

- It's crusial to understand how information visualization (infovis) differs from scientific information visualization (scivis).
- There is a need for both ad its wrong to assume that only scivis is meaningfull and infovis has no value.

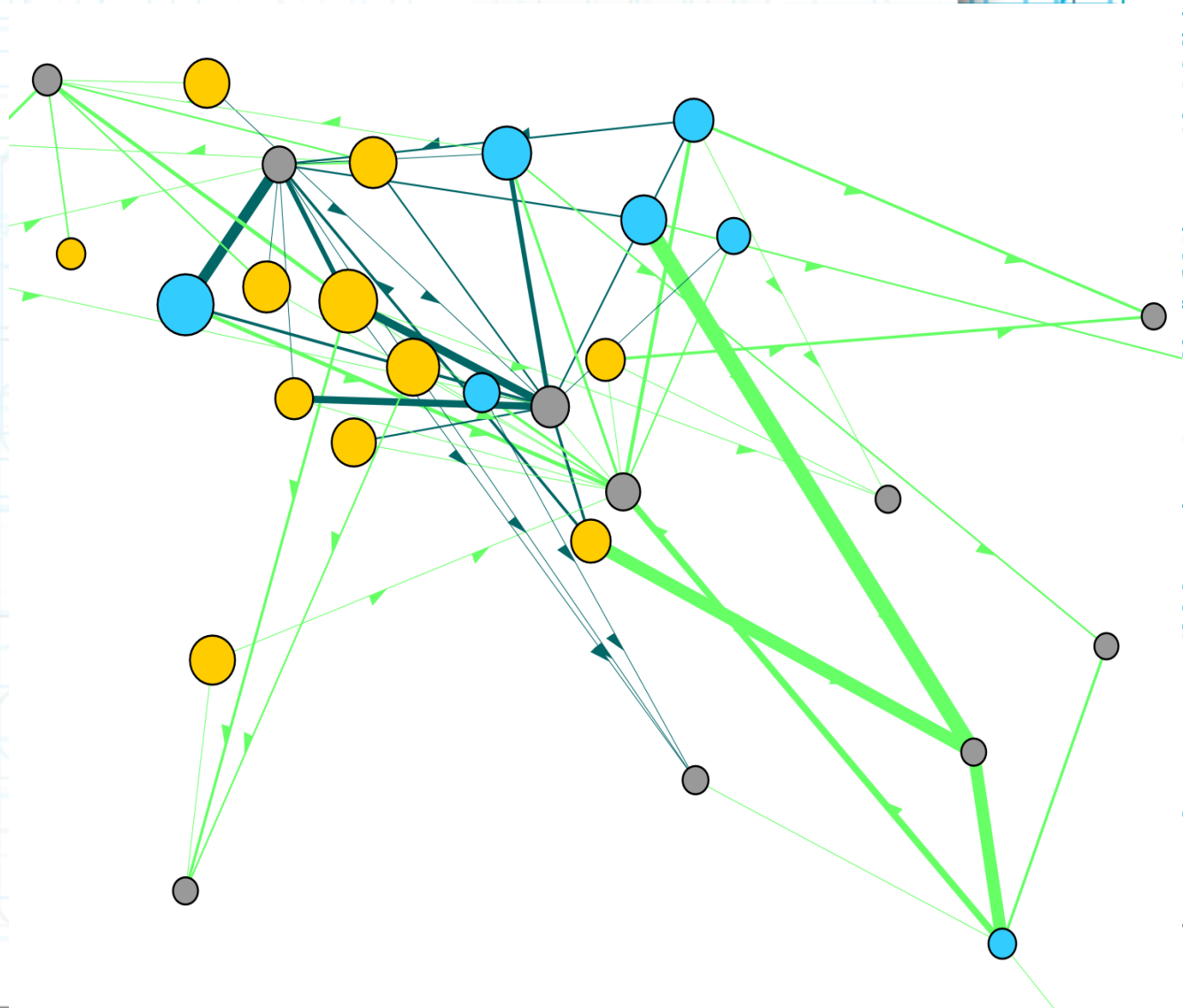
- Ok! Time to see some use cases.

Use cases

- Courses:
  - Developing an Online Publication 2011
  - Programming Hypermedia 2011
  - Usefulness of Web-Based Services 2011
- Data journalism and open data:
  - Tampere Data Journalism Day 29.9.2011
  - Varsova Open Government Data Camp 2011

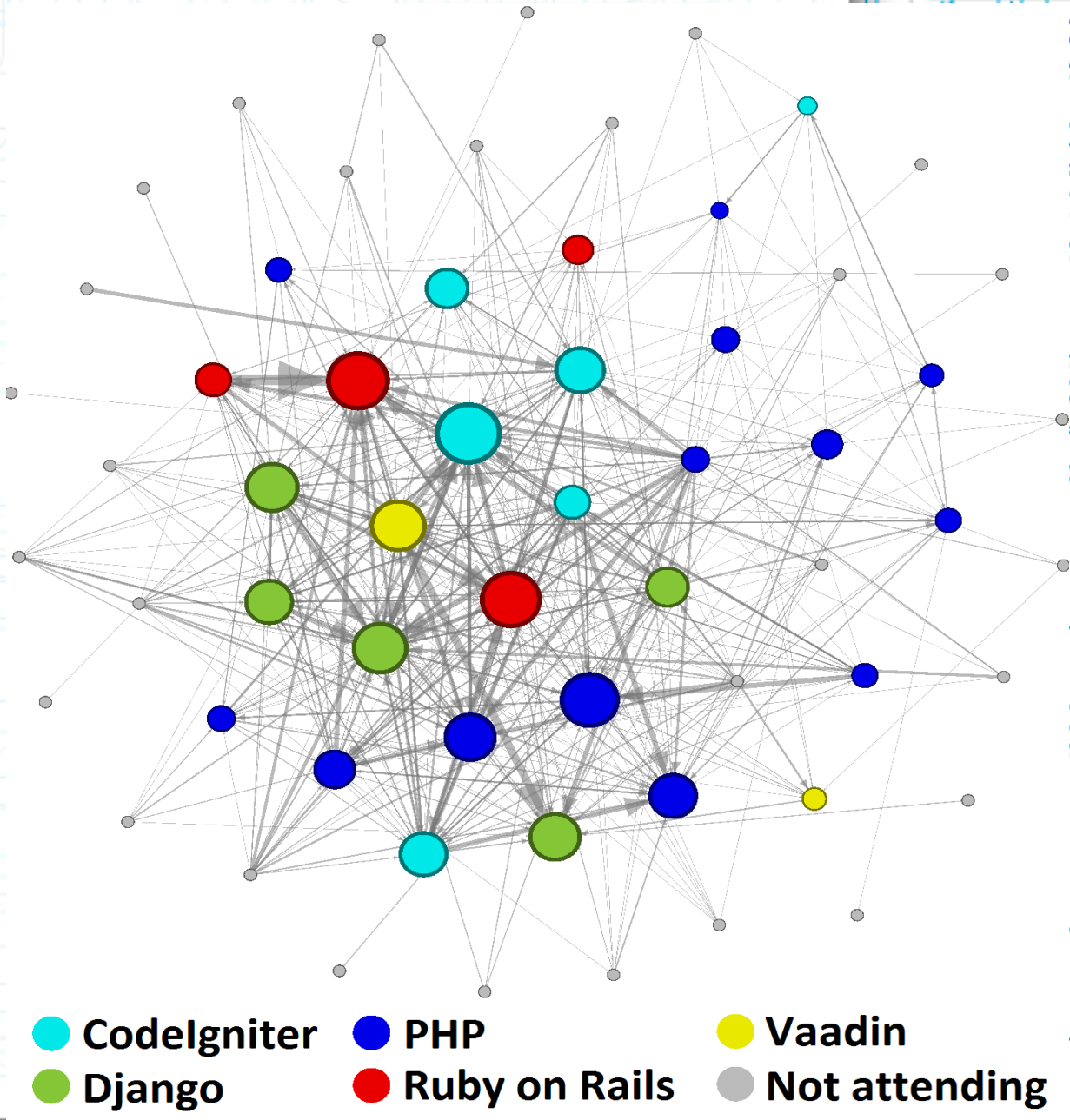
Developing an Online Publication

- Academic tribes.
- Yellow nodes are UTA students and cyan are TUT students. Grey nodes are wiki pages and edges represents edits.



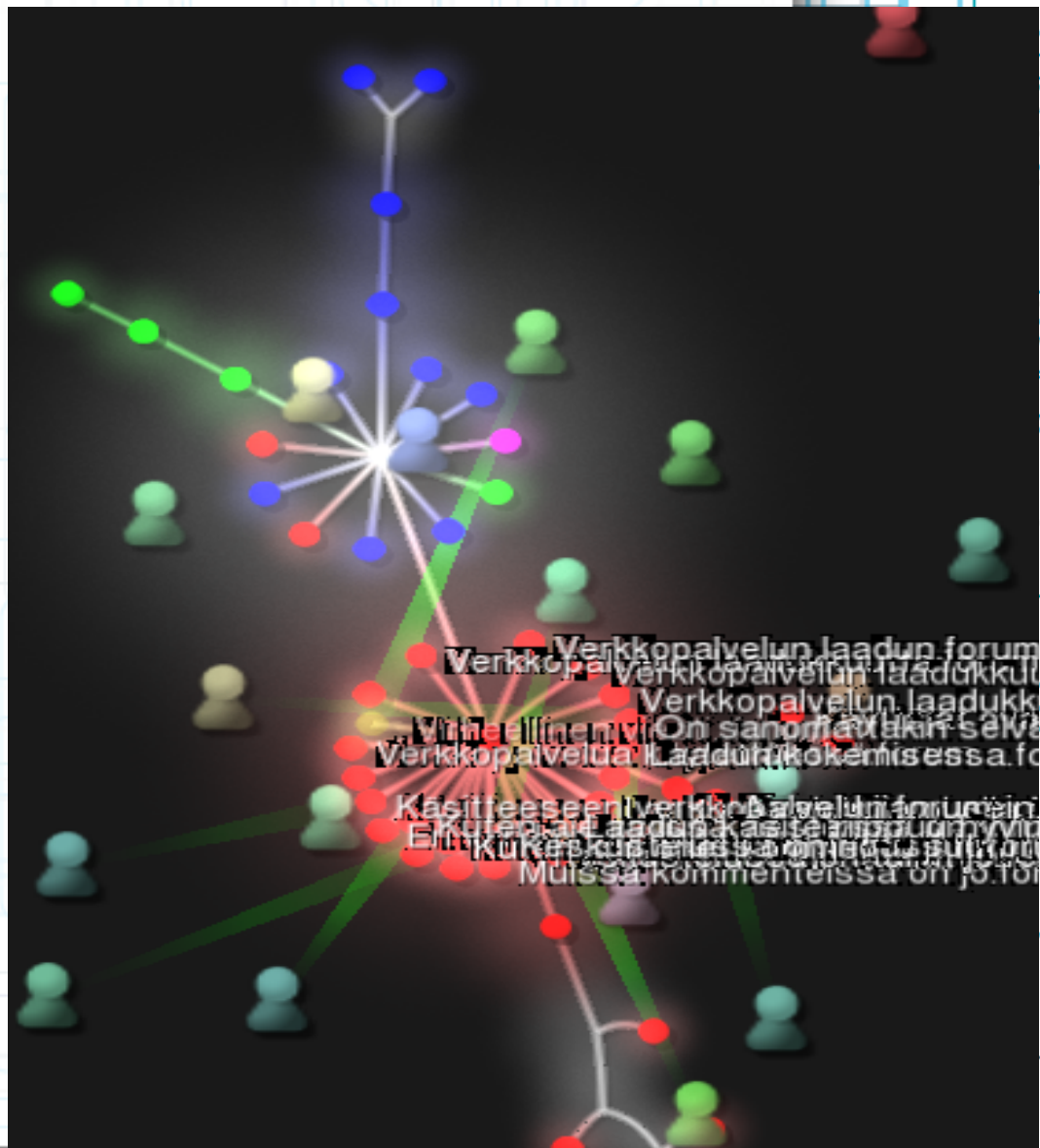
Programming Hypermedia

- Peer-learning.
- Nodes represent users reporting their work done in various different technologies and edges represent read counts.



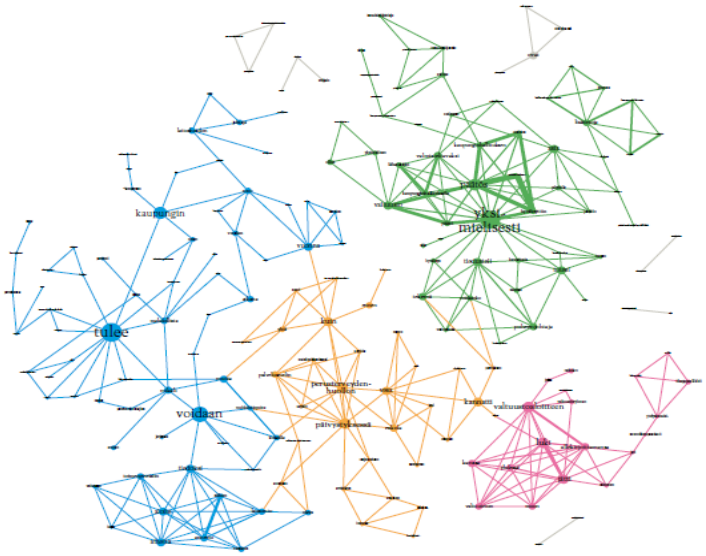
Usefulness of Web-Based Services

- Bursts and deadline culture. (Barabasi, 2010)
- The motivation to accomplish things increases towards the deadline.
- Also very little voluntary contribution were seen.



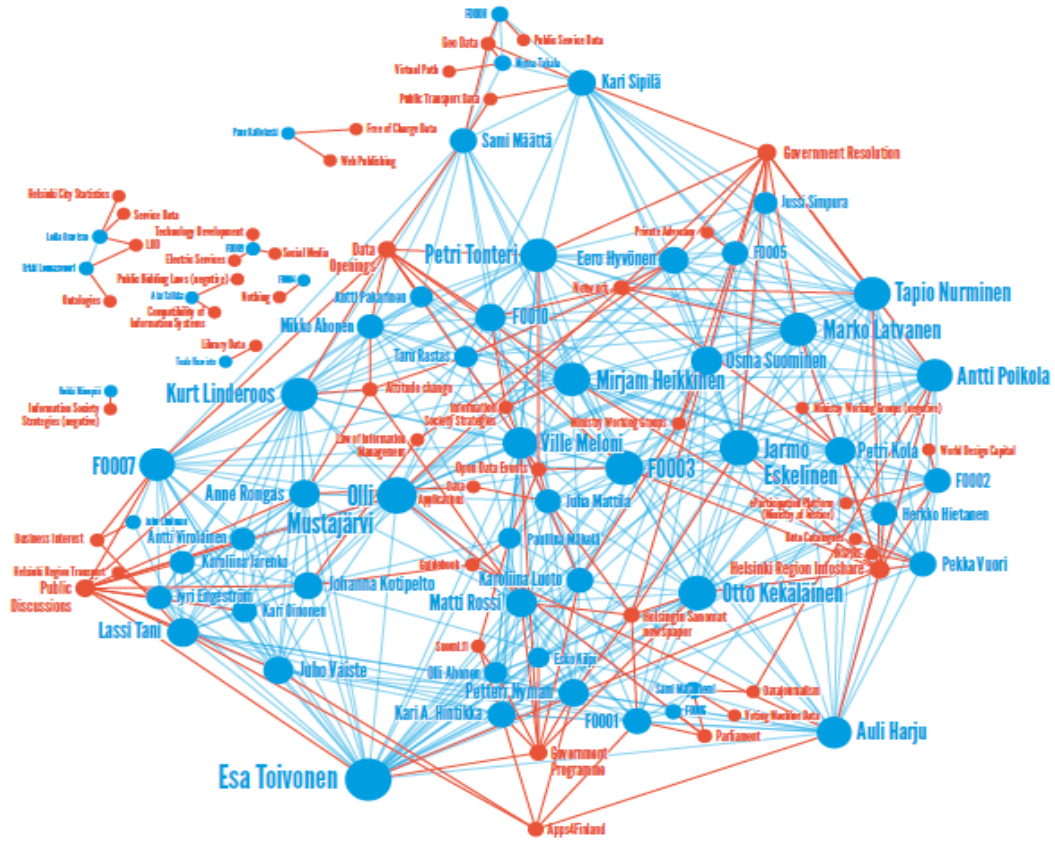
Tampere Data Journalism Day

- Collaboration workshop with journalists, graphic designers and engineers.
- Tampere city government decision-making data.
- All was done in one day.



Varsova Open Government Data Camp

- Finnish open-source actors and factors.
- Web survey: ”Mention 3 things in the area of Finnish open-source”



Conclusions and Next Steps

- Visualizations can reveal things that would otherwise remain hidden.
- Visualizations can be informatic and/or impressive.

- In the future visualizations should be more user-controlled (dynamic) and user-oriented.
- Ideally anyone should be able to be an amateur social network analysist.

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- Antti Poikola from Otavan Opisto.

Thanks for your interest

Feel free to contact me!

- https://twitter.com/teelmo
- http://fi.linkedin.com/in/teelmo

Further readings

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Further readings

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  - Programming of Hypermedia: Course Implementation in Social Media
- Web sites
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  - http://code.google.com/p/gource/
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  - http://hlab.ee.tut.fi/piiri/groups/verkkojulkaisun-kehittaminen