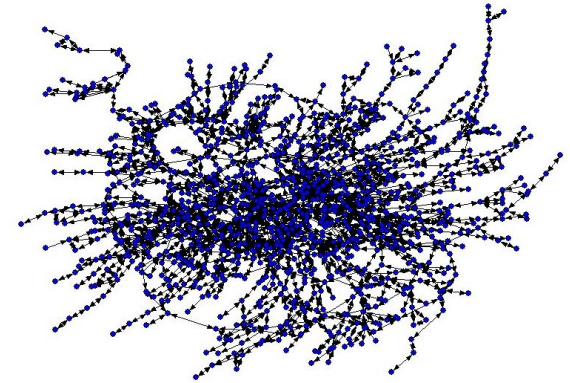




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Connecting the dots

The Use of Visualizations in Historical Network Research

Matthias Bixler, m.bixler@ikmz.uzh.ch

http://historicalnetworkresearch.org/

The screenshot shows the homepage of the Historical Network Research website. The browser address bar displays 'historicalnetworkresearch.org'. The website header includes navigation links: ABOUT, NEW: HNR JOURNAL, RESOURCES, HNR EVENTS, EVENT CALENDAR, HNR NEWSLETTERS, and NODEGOAT FORUM. A search bar is located on the right side of the header.

The main content area features three large promotional tiles:

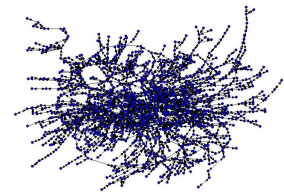
- CFP: 12. WORKSHOP HISTORISCHE NETZWERKFORSCHUNG 20-21.4.2018 IN BREMEN**: Accompanied by an image of a large Gothic cathedral.
- HNR CONFERENCES**: Accompanied by an image of a colorful network graph.
- NEXT HNR CONFERENCE TO TAKE PLACE 10-13 SEPTEMBER 2018 IN BRNO, CZECH REPUBLIC**: Accompanied by an image of a city square at night.

Below these tiles are three smaller tiles:

- INAUGURAL ISSUE OF THE JOURNAL OF HISTORICAL NETWORK RESEARCH OUT NOW**: Accompanied by an image of a network graph.
- TOOLS, BLOGS & TUTORIALS**: Accompanied by an image of various wooden tools.
- BIBLIOGRAPHY**: Accompanied by an image of a bookshelf filled with books.

The left sidebar contains a newsletter sign-up form with the text 'HNR NEWSLETTER' and 'Your E-mail Address', followed by a 'SUBSCRIBE' button. Below this, it says 'Or follow @HNR_org for the Newsletter and Bibliography updates'. Further down, under 'SEE ALSO', it lists 'Réseaux et Histoire', 'Connected Past', 'Topographies of Entanglements', and social media icons for Facebook, Google+, Twitter, LinkedIn, and a plus sign.

At the bottom of the page, there are two sections: 'WELCOME' and 'UPCOMING EVENTS'.



THE 12TH WORKSHOP IN BREMEN ON COMMUNICATION

Call for Papers 12. HNR-Workshop „Historische Netzwerkforschung“ „Kommunikation in Netzwerken – Netzwerke der Kommunikation. Thematische, methodische und theoretische Perspektiven historischer Netzwerkanalyse zwischen Geschichts- und Kommunikationswissenschaft

20- 21. April 2018 Zentrum für Medien-, Kommunikations- und Informationsforschung Universität Bremen

Organisation: Dr. Erik Koenen (Universität Bremen) & Matthias Bixler (Universität Zürich)

Deadline for abstract
submissions: 31.01.2018

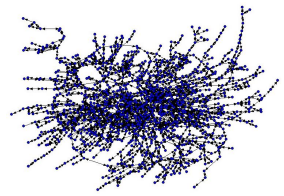
Workshop I: Einführung in die
Visualisierung und Analyse von
Netzwerkdaten für Historiker
(Matthias Bixler & Martin Stark)

Workshop II: Einführung in
Nodegoat
(<https://www.nodegoat.net>)

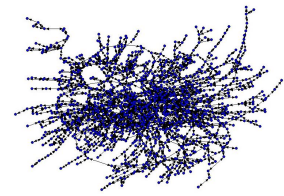


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What is Historical Network Research?



What is Historical Network Research (HNR)?

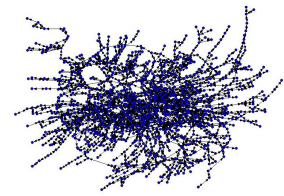
Historical Sociology – History – Digital Humanities

Historical Network Research tries to adapt theories and methods from social network analysis (SNA) and make them fruitful for historical research.

Explanans: network structure

Explanandum: agency

- mostly descriptive structural measures and visualizations
- derive relational data from sources and describe a historical network for the first time



What is a (social) network?

Ein Netzwerk ist «definiert als eine abgegrenzte Menge von Knoten oder Elementen und der Menge der zwischen ihnen verlaufenden sogenannten Kanten.»

(Jansen 2006, S. 58)

«A social network consists of a finite set or sets of actors and the relation or relations defined on them.»

Wasserman & Faust (1994, S. 20)

$$\mathcal{I} = \langle S, \mathcal{G}_d, \mathbf{X}, \mathbf{A} \rangle$$

Wasserman & Faust (1994, S. 91)

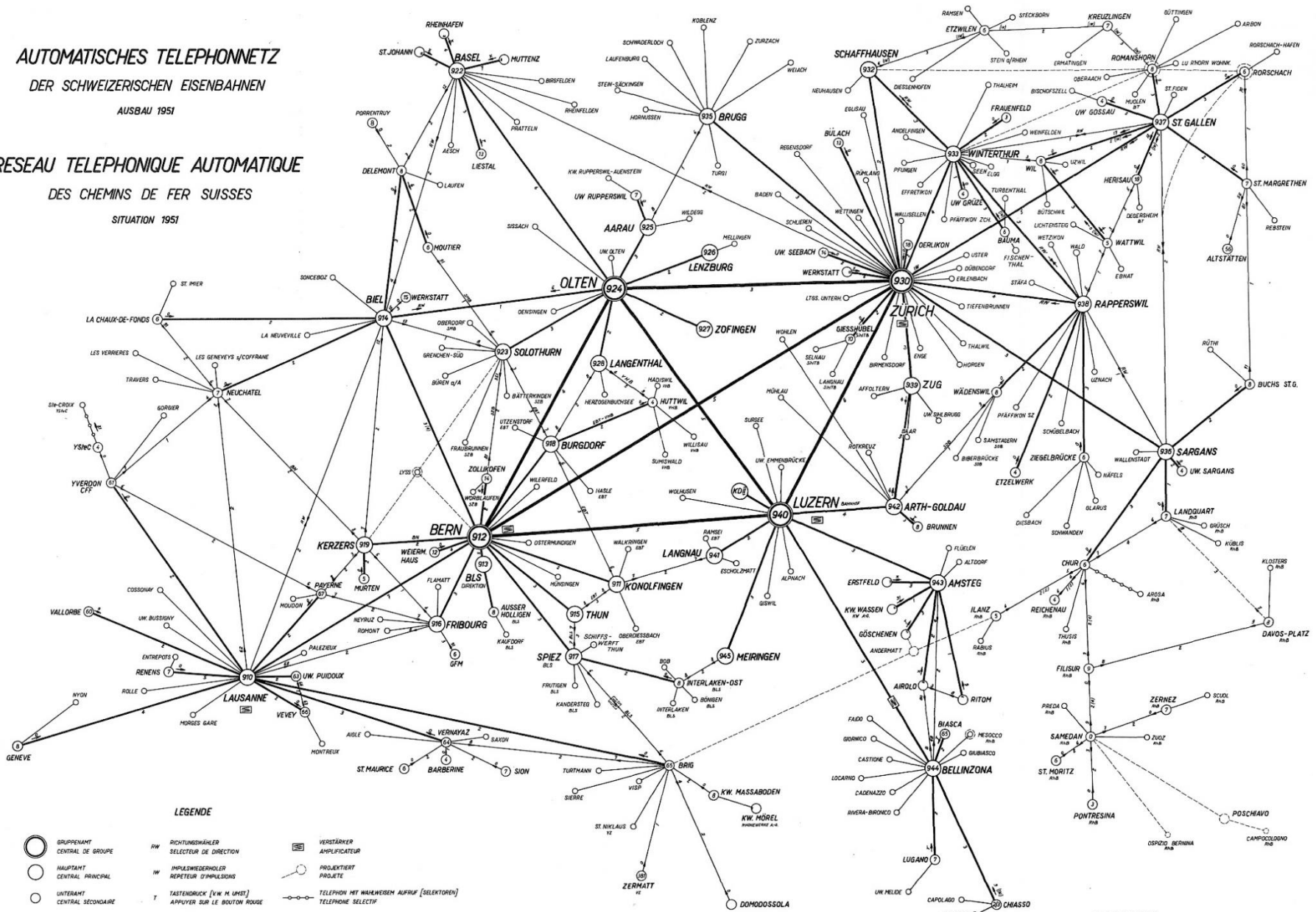


AUTOMATISCHES TELEPHONNETZ
DER SCHWEIZERISCHEN EISENBAHNEN

AUSBAU 1951

RESEAU TELEPHONIQUE AUTOMATIQUE
DES CHEMINS DE FER SUISSES

SITUATION 1951

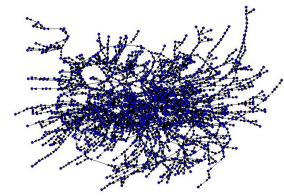


LEGENDE

- | | | |
|-----------------------------------|--|--|
| GRUPPENAMT
CENTRAL DE GROUPE | RICHTUNGSWÄHLER
SELECTEUR DE DIRECTION | VERSTÄRKER
AMPLIFICATEUR |
| HAUPTAMT
CENTRAL PRINCIPAL | IMPLIKWIEDERHOLER
REPETEUR D'IMPULSIONS | PROJEKTIERTE
PROJETE |
| UNTERAMT
CENTRAL SECONDAIRE | TASTENDRÜCK [V.M. H. UNTER]
APPUIER SUR LE BOUTON ROUGE | TELEPHON MIT WAKKREDEM AUFHUF [SELEKTOR]
TELEPHONE SELECTIF |
| GRUPPENSTELLE
CENTRAL TERMINAL | VORWÄHLER MIT UNSTERBUNG
1 ^{re} SELECTEUR A COMUTATION | |

SBP 60. BAUABTEILUNG
SEKTION NIEDERSpannung & FERNLEITUNGEN
BERN, DEN 12. SEPTEMBER 1950
Z.Nr. 1238

S.B.B. N° 4521 H. 52. 200



Research designs in SNA

- **Egocentric network**

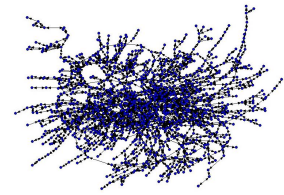
One focal actor and his relationships

- **One-mode network**

One type of actors that are linked with each other

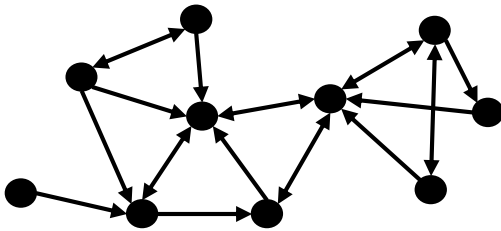
- **Two-Mode Netzwerke**

Two distinct types of actors, where actors are only linked with actors of the other type

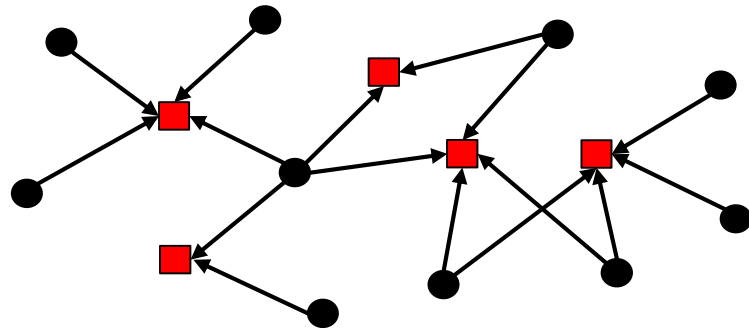


Types of networks

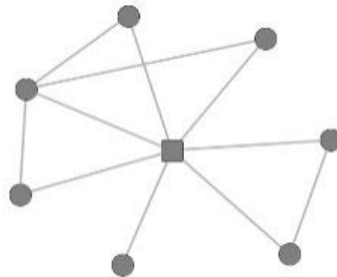
One-mode network

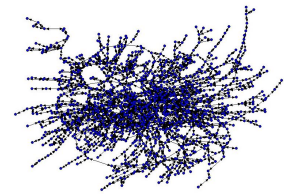


Two-Mode network



Egocentric network





Duality of «social networks»

“Networks are **phenomenological realities** as well as **measurement constructs**.

White (1992, S. 65)



Real-life social networks and network data are *not identical!*

Reality

dynamic

multiplex

multi-mode

Data

static

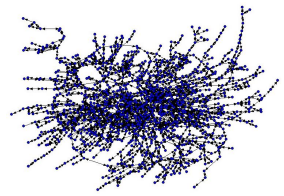
uniplex

one-mode

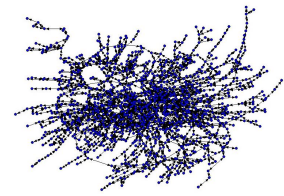


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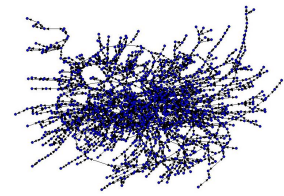


Network graphs – when, why and how?

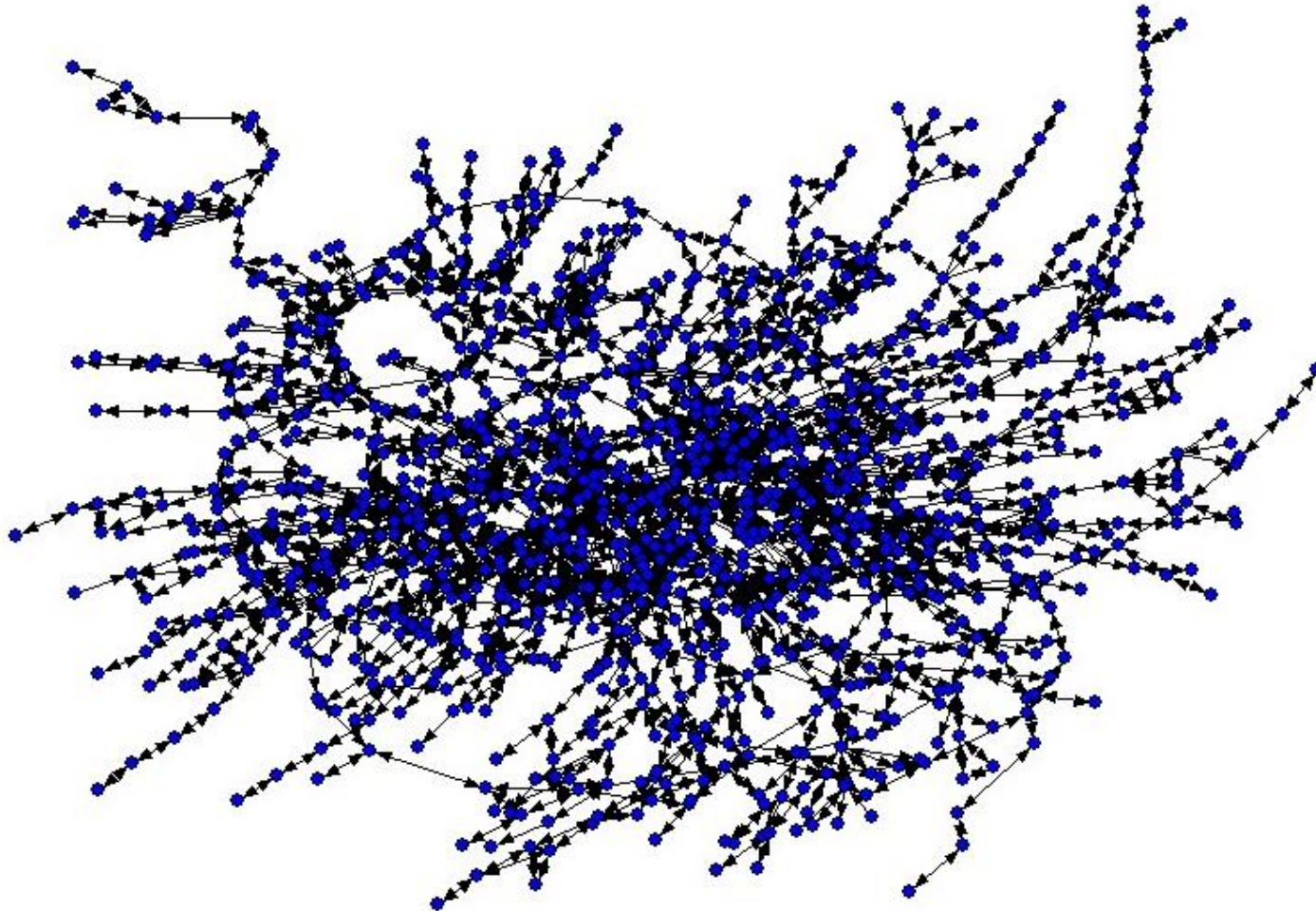


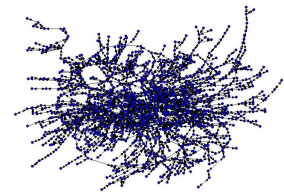
Network graphs – when and why?

- Network graphs are amounts of visually ordered data.
 - Various layouts that provide specific types of information.
 - Frequent purposes of network graphs:
 - Giving insight to the researcher
 - Presenting results to an audience
 - Showing off
- Often very ugly
- Often very pretty
- Often very unuseful



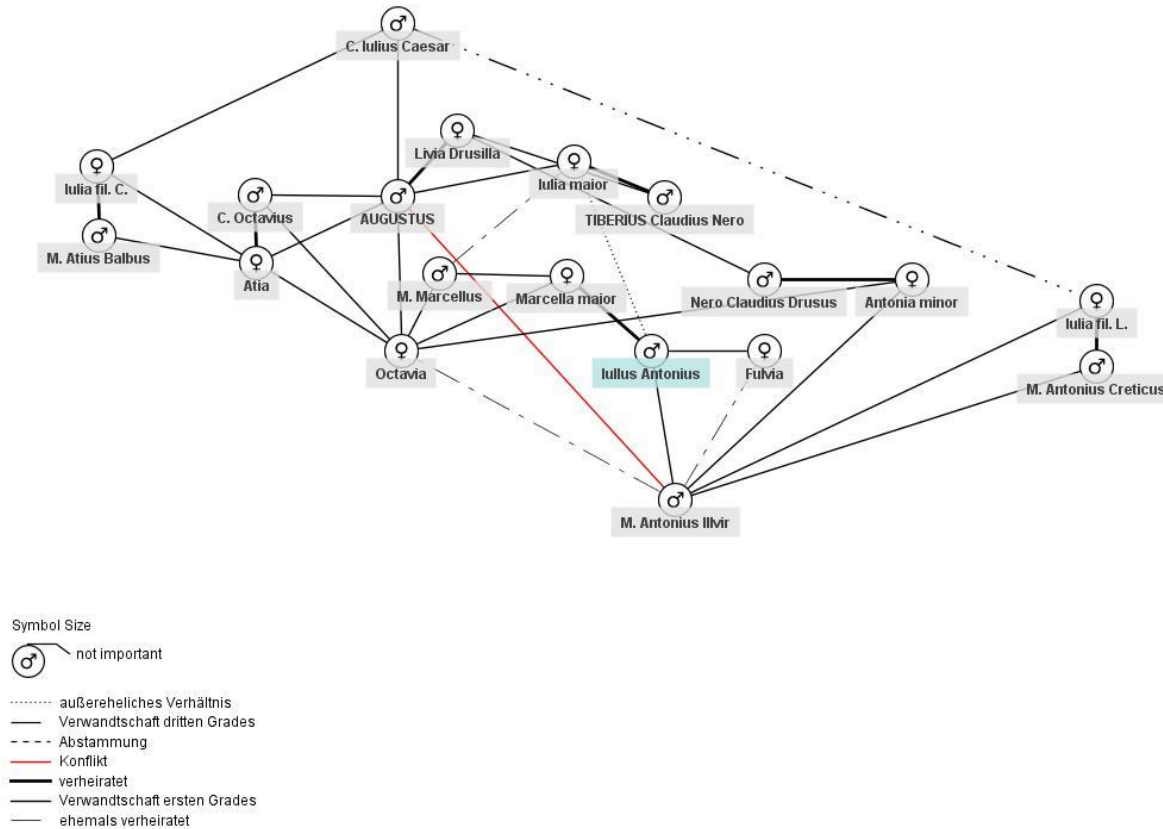
Test visualization – roman senator network

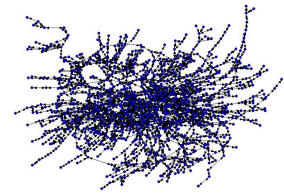




Julio-Claudian family network in 2 BC (work in progress)

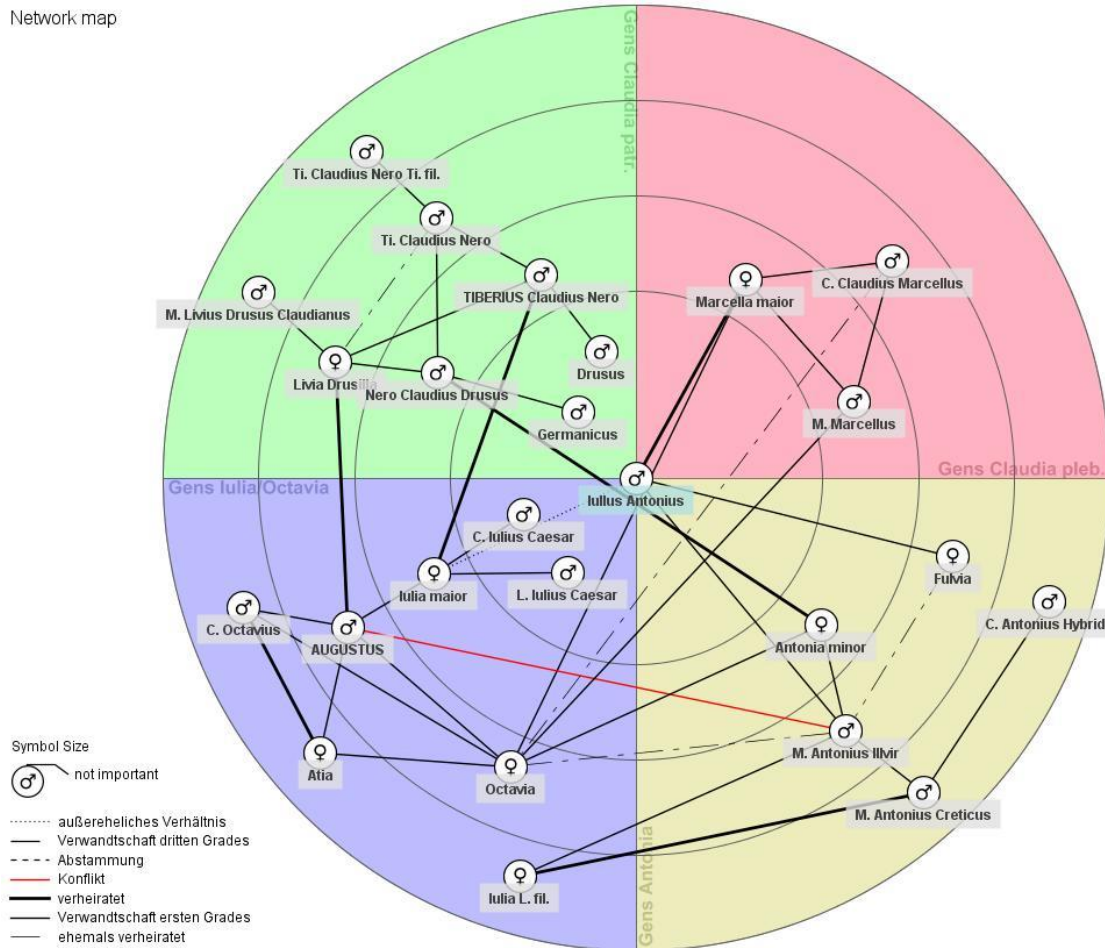
Network map



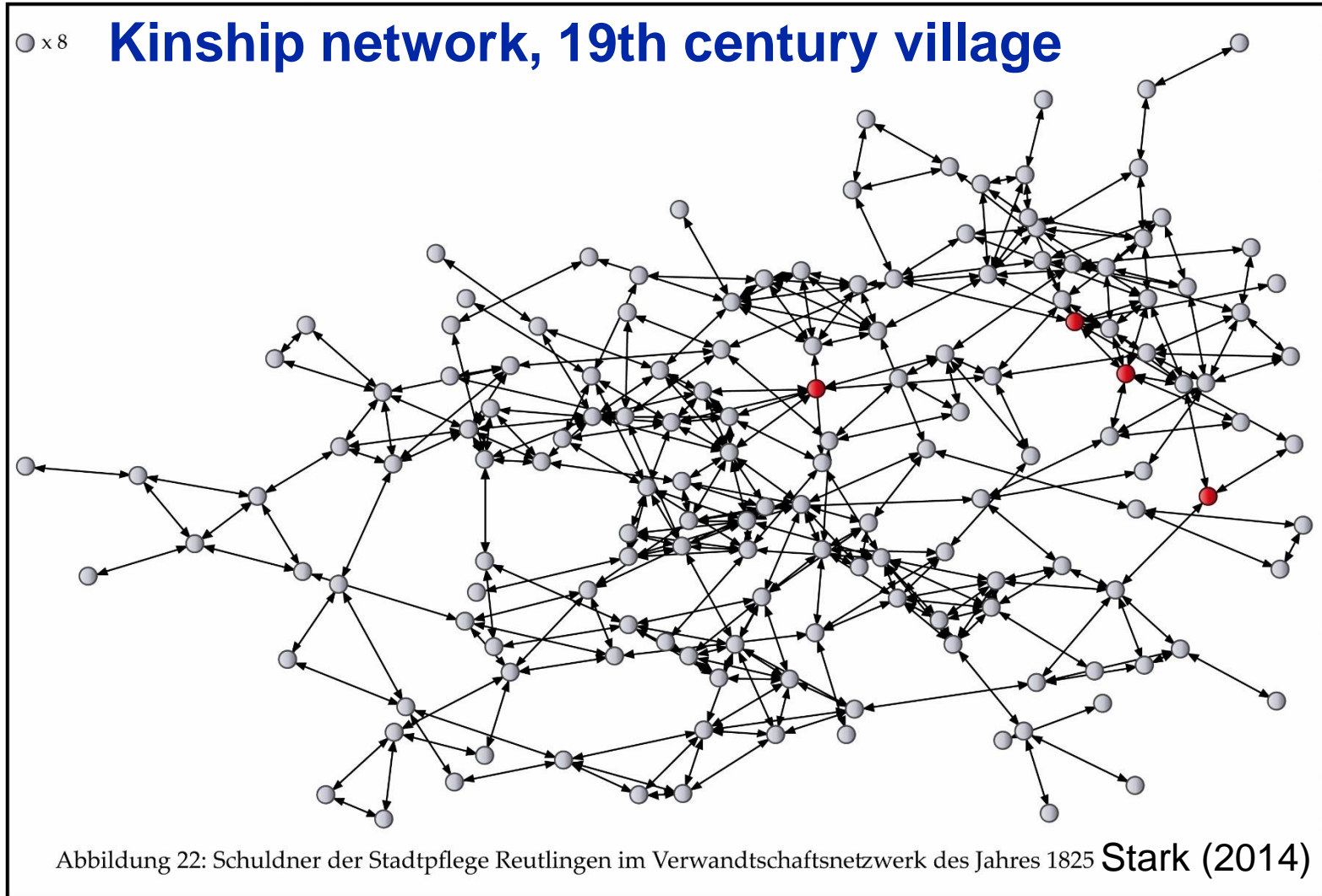
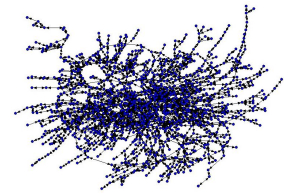


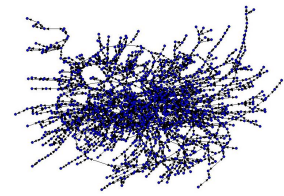
Julio-Claudians ordered by gens (published)

Network map

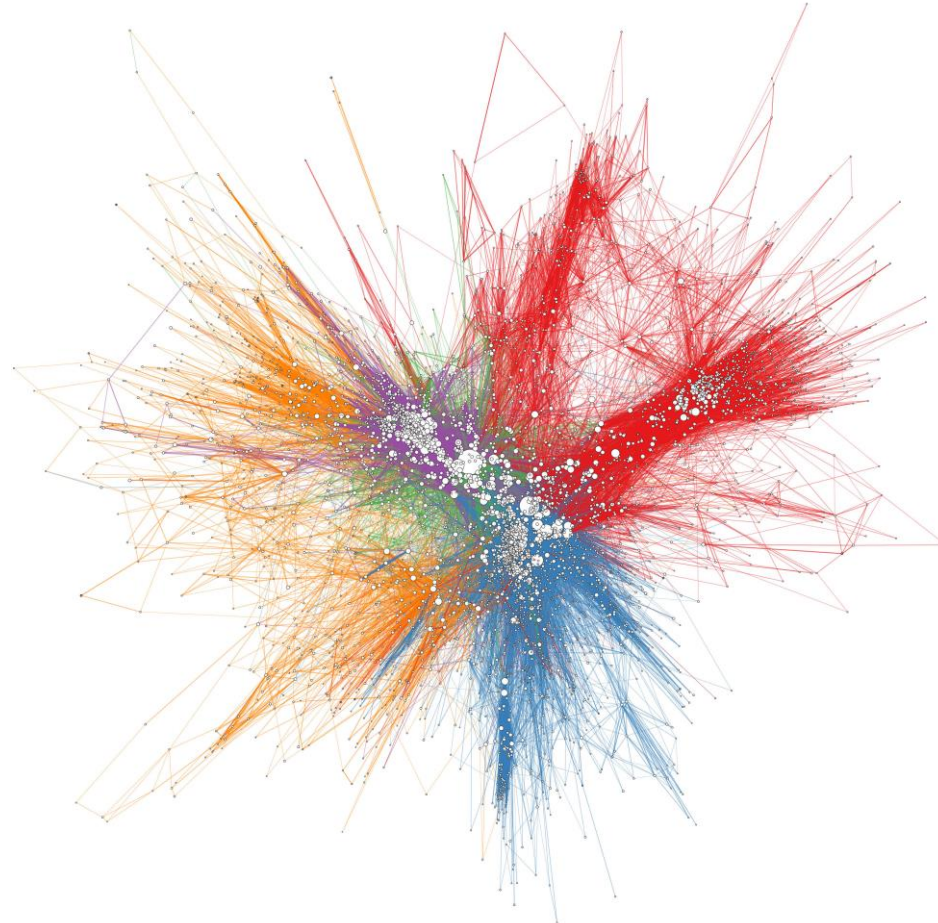


Düring et al. (2011)

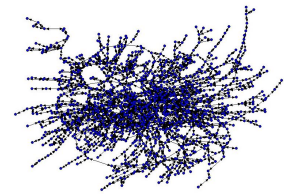




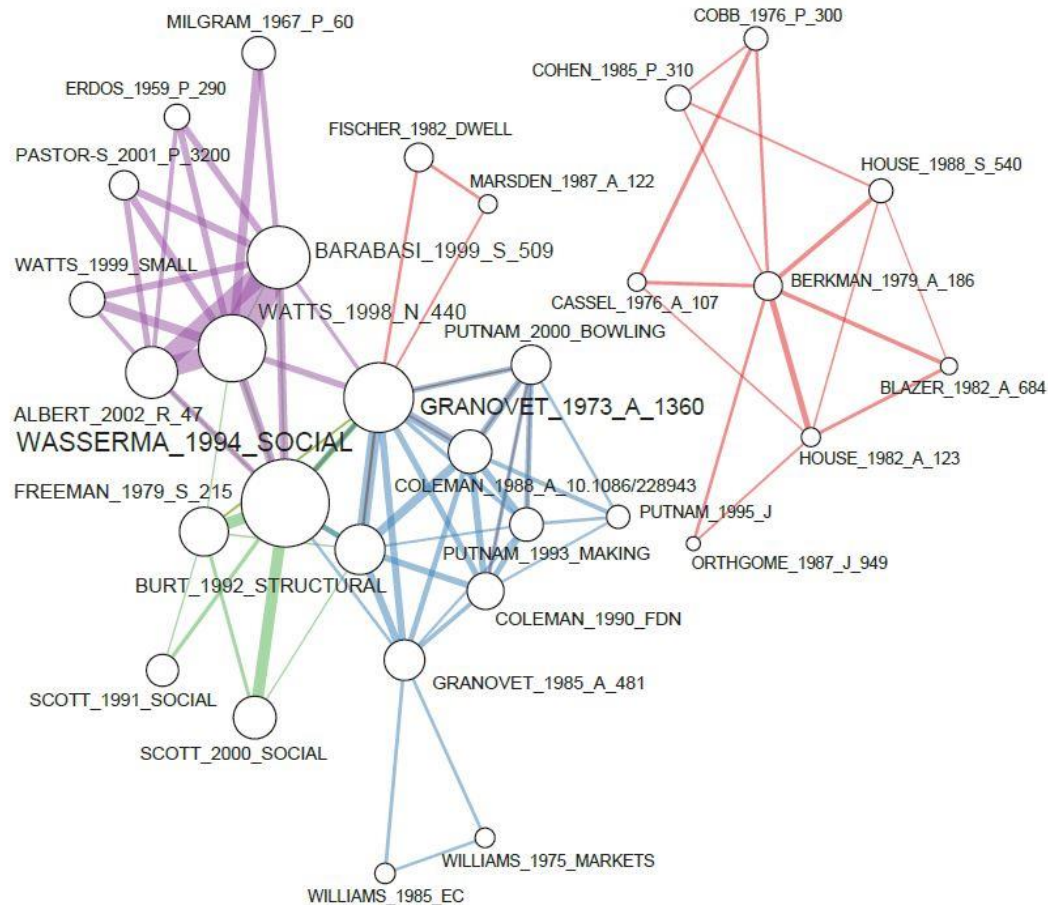
Citation network in the field of SNA



Lietz (2016: 138)



Micro-level citation network in the field of SNA

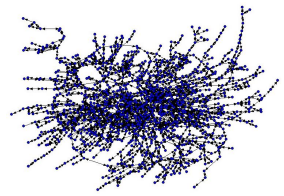


Lietz (2016: 138)

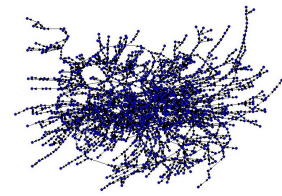


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Mapping historical networks in time and space



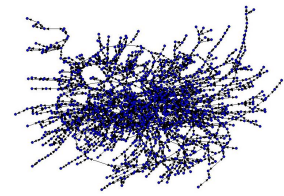
Mapping historical networks in time and space

Geographical space

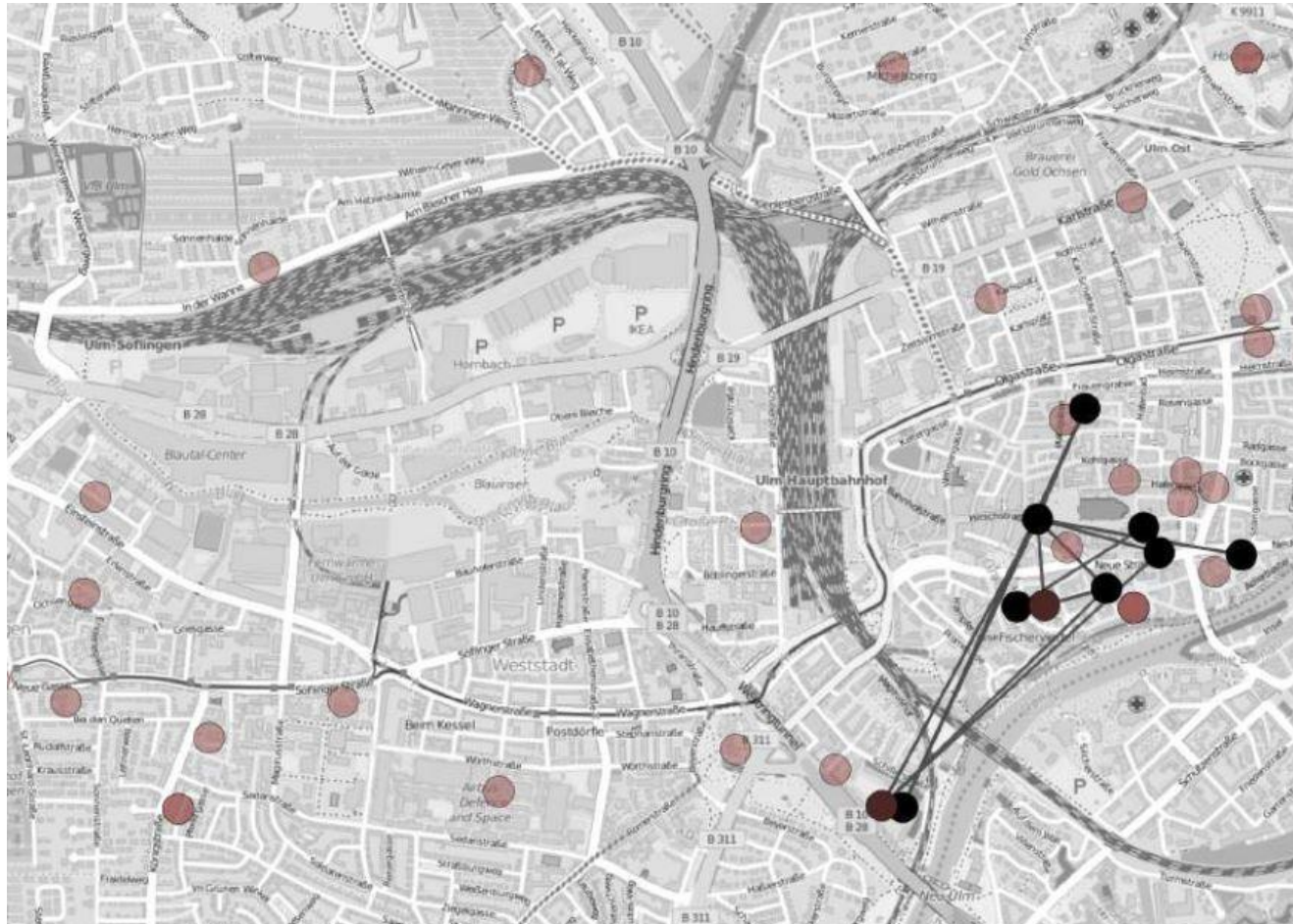
- Network topology vs. geographical topology
- Put a map in the background
- Map GIS data
- Combinations of network and geographical topology

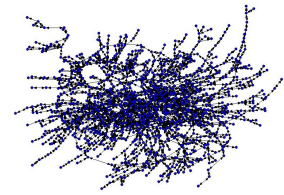
The problem of longitudinal data

- Cross-sectional networks from longitudinal data
- Time slices
 - Cross-sections
 - periods

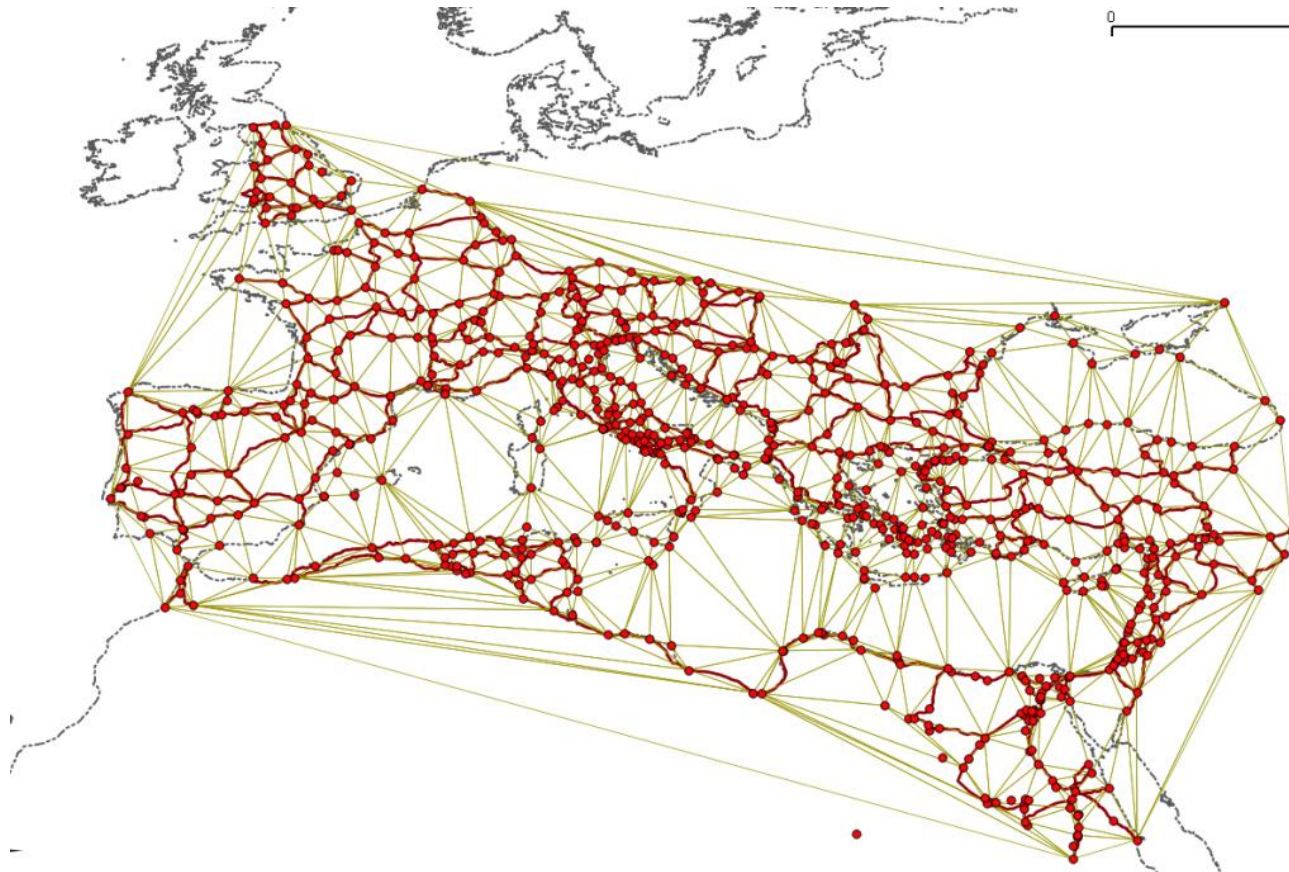


Networks in geographical space (GIS data)

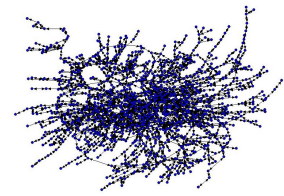




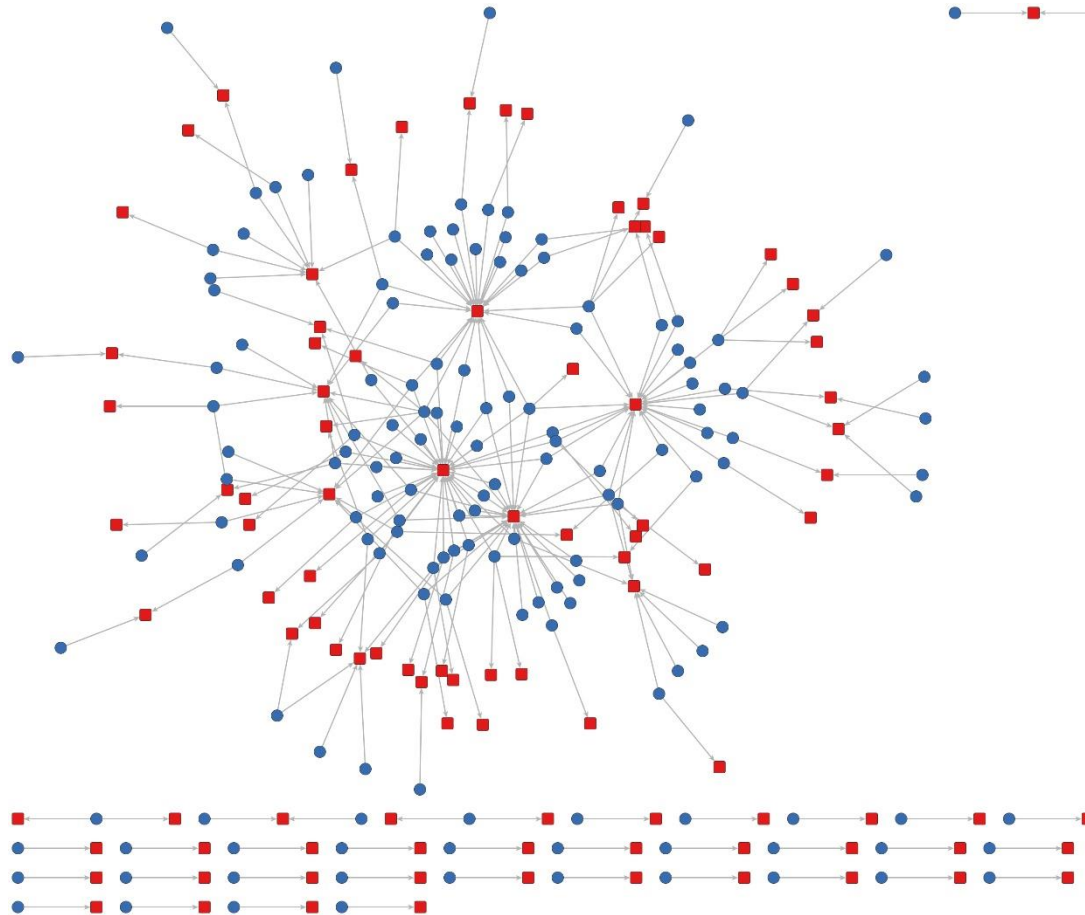
Combination of GIS and network topology

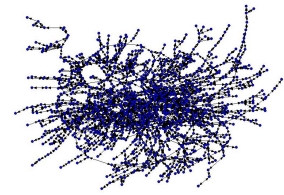


Meeks (2012)

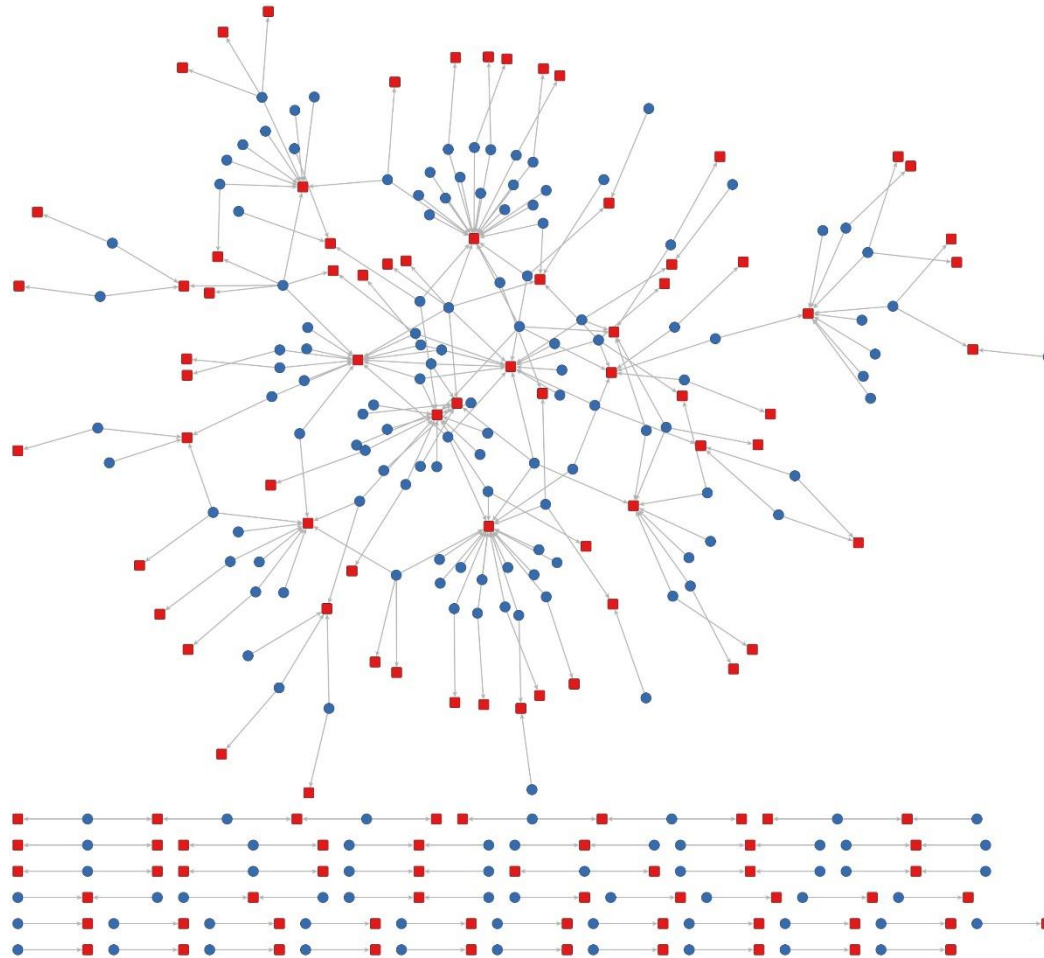


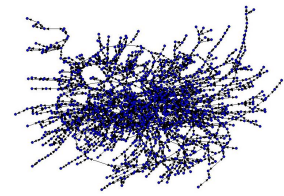
Evolution of Ohmenhausen credit market (1830)



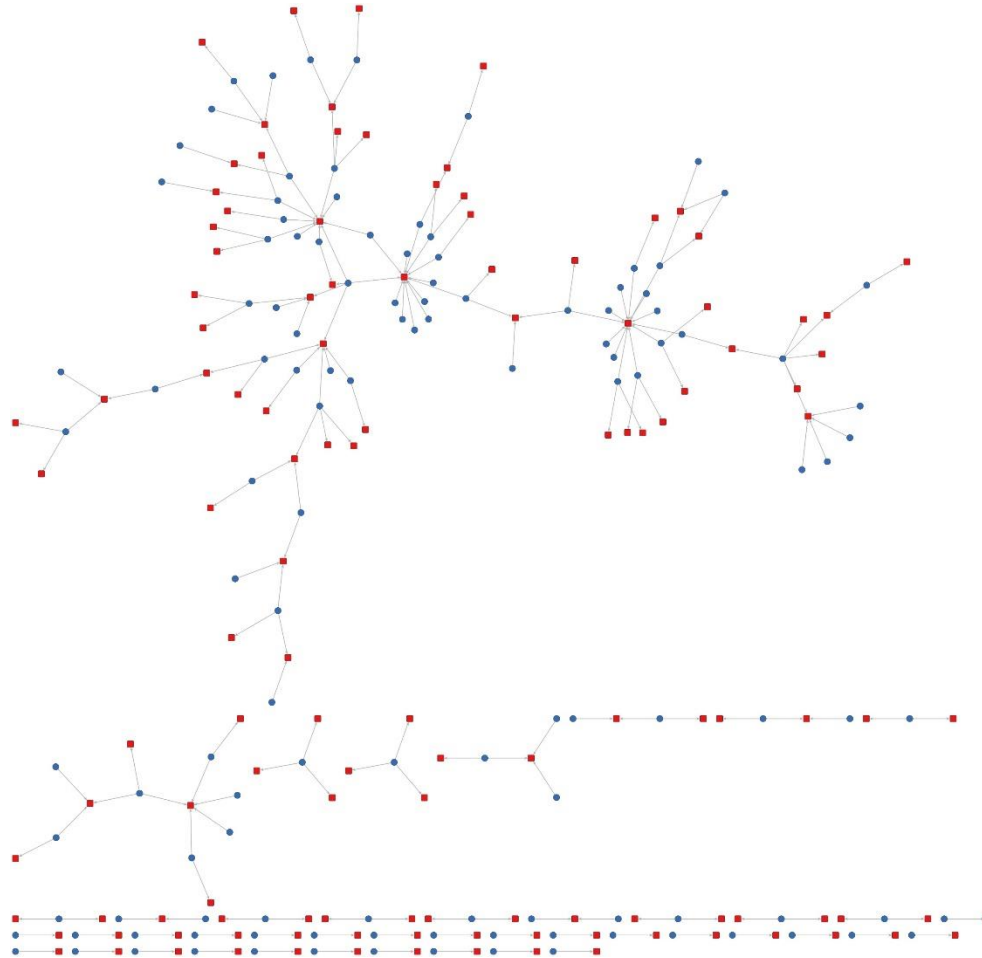


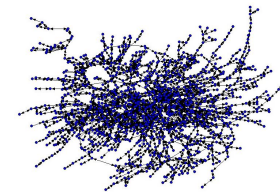
Evolution of Ohmenhausen credit market (1840)



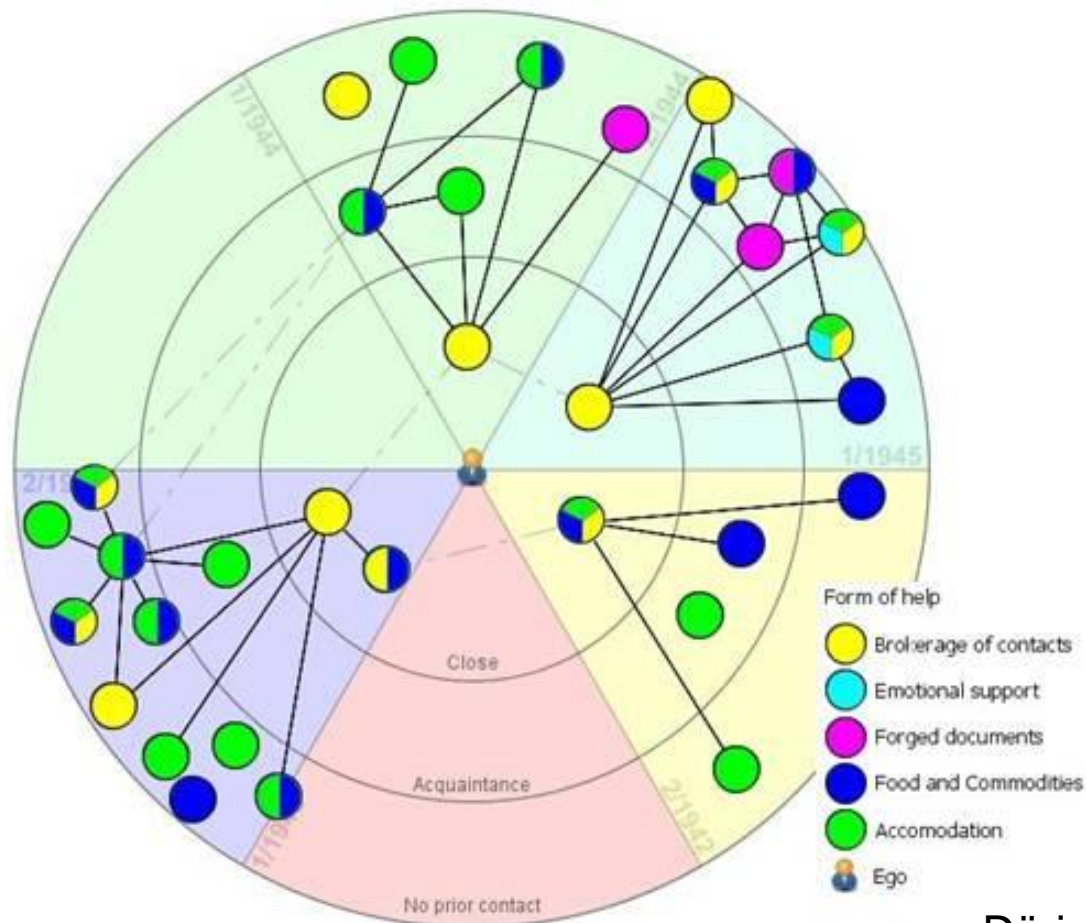


Evolution of Ohmenhausen credit market (1850)





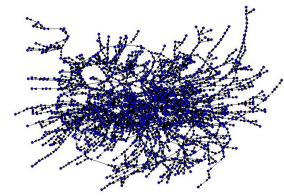
Persecuted Jew, support network



Düring et al. (2011)

Network graphs for librarians?





Books and network data

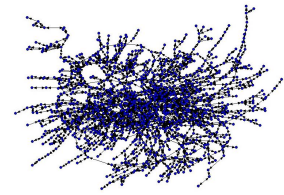
- Books are bundles of ordered information – data!



2 types of data:

- content
 - people, places, events, social ties
 - semantic networks, ideas, concepts
- meta-information
 - authors, places, material, topics, ...

- Give it a try!



Beginner-level software

<http://www.vennmaker.com/>

Open source, designed for collection of egocentric networks in sociology and anthropology.

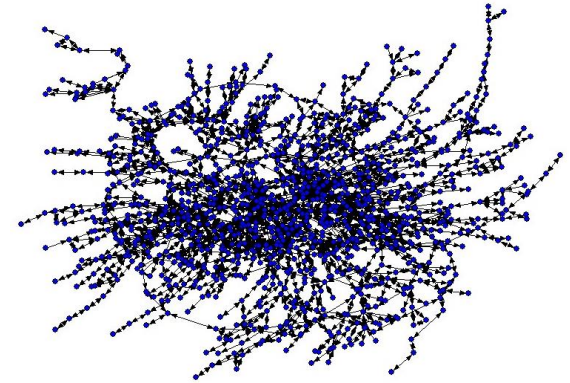
<http://visone.info/>

Free software, powerful tool for analysis and visualization of all kinds of network data.



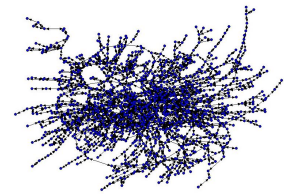
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**Thank you very much for your
attention!**

Matthias Bixler



References

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Lietz, H. (2016). *Scale-Free Identity: The Emergence of Social Network Science* (Dissertation). Universität Duisburg-Essen.

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Wasserman, S., & Faust, K. (1994). *Social Network Analysis: Methods and Applications. Structural Analysis in the Social Sciences: Vol. 8*. Cambridge et al.: Cambridge University Press.