



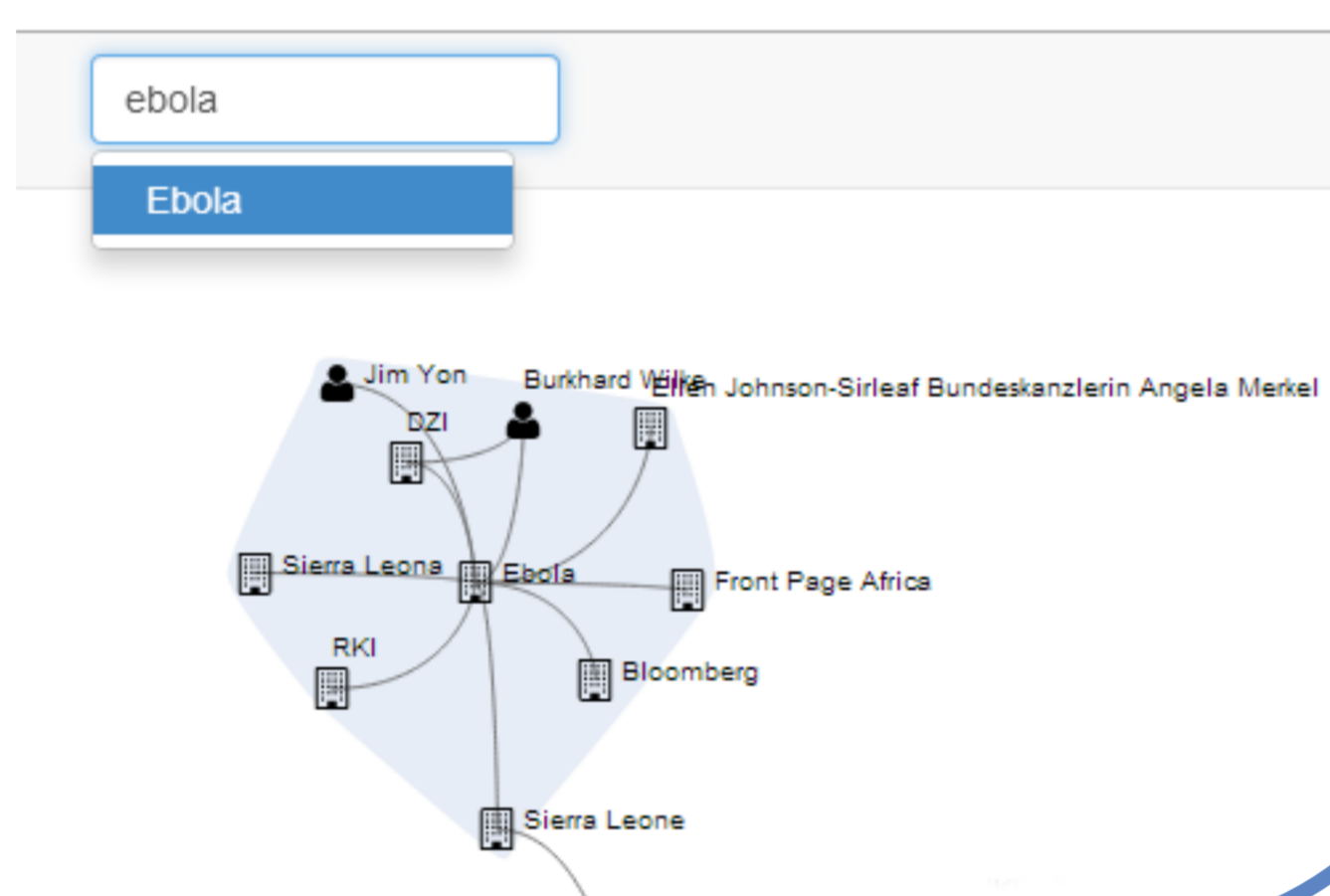
Network of the Day: Interactive Visualization of Time-Dependent Entity Relation Networks from Online Sources

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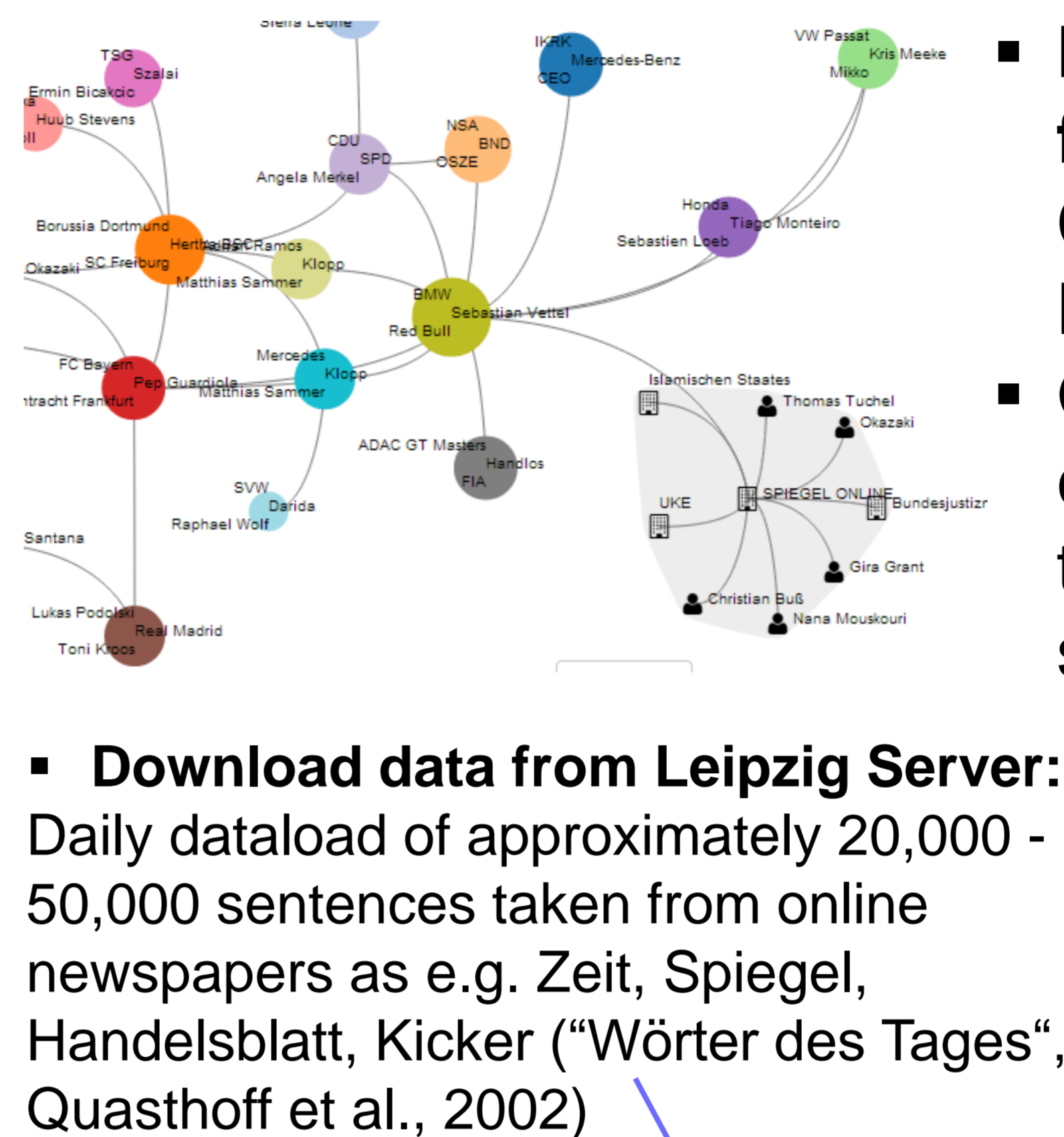
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Tool description

- Interactive visualization of time-dependent relationships of public agents (persons and organizations) extracted from German online news
- Transparent and intuitive tool for the exploration of current events
- Cooperative tagging of relationships
- The target group of this tool are journalists, but also laymen such as students, voters and politically interested citizens
- Typeahead search mask allows users to find entities in the current network and center the respective cluster



Software and Architecture



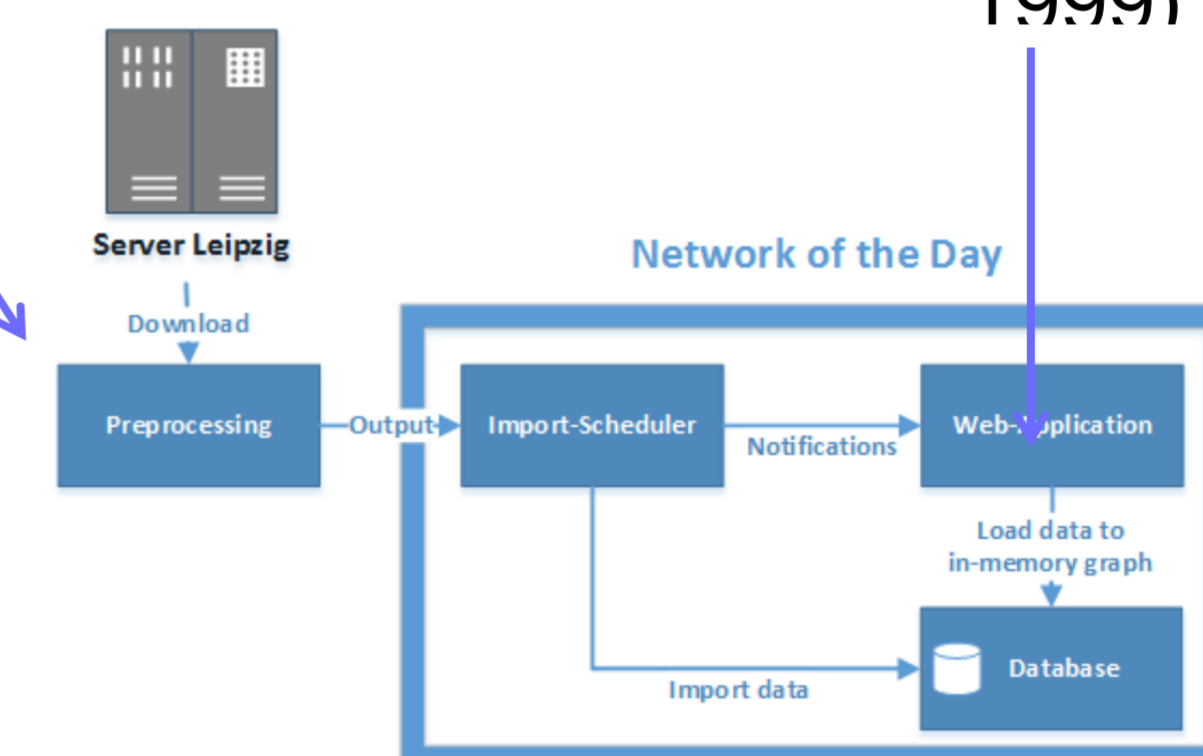
- Modern web & visualization frameworks:** JQuery, CoffeeScript, D3.js, Highcharts, Marionette.js
- Graph Layout:** Force Layout converges to local optimum thus no jitter and much more stable network

- Download data from Leipzig Server:** Daily dataload of approximately 20,000 - 50,000 sentences taken from online newspapers as e.g. Zeit, Spiegel, Handelsblatt, Kicker ("Wörter des Tages", Quasthoff et al., 2002)

- NE Extraction:** Stanford Named Entity Parser (Faruqui and Padò, 2010; Finkel et al., 2005)

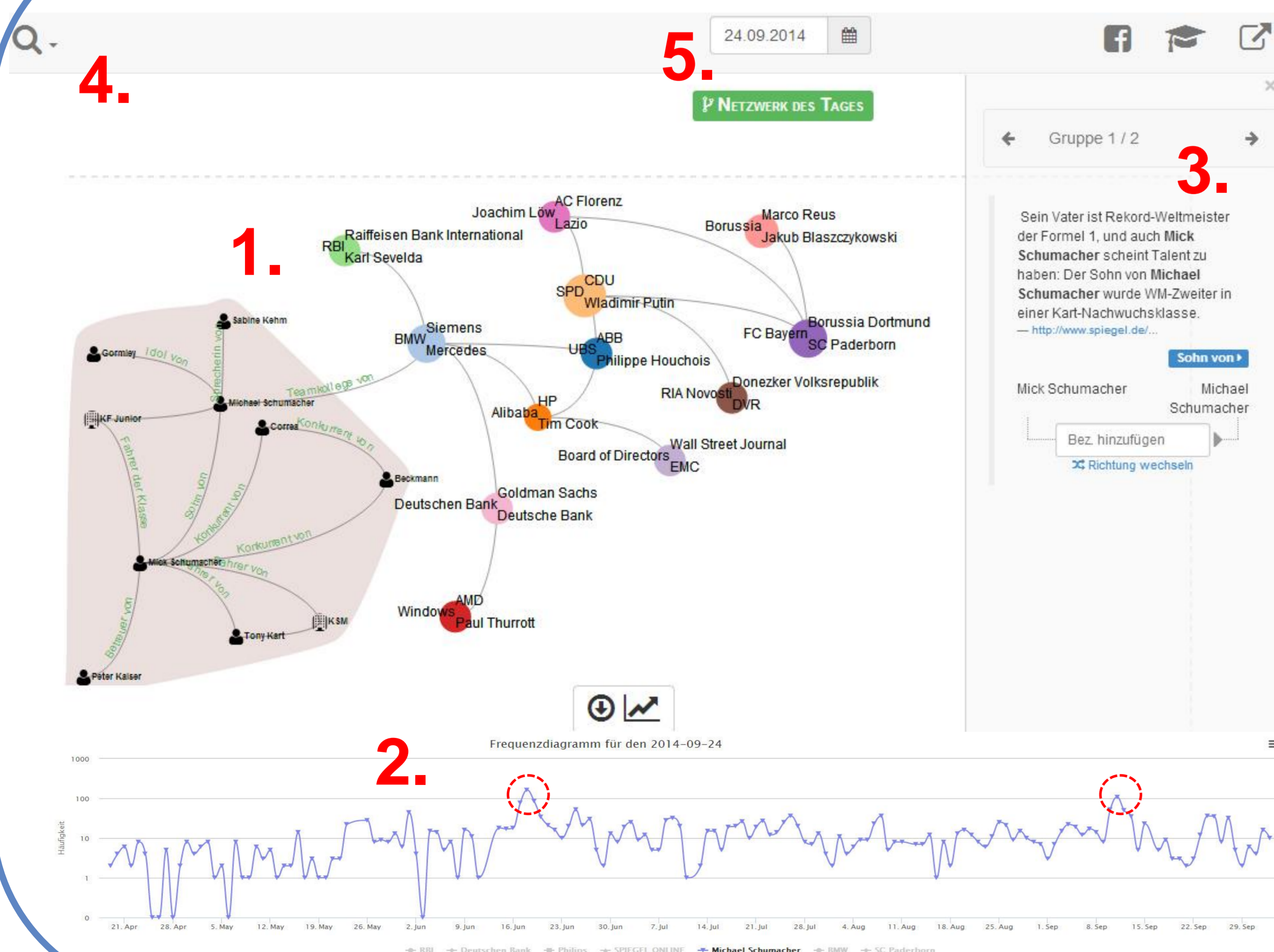
- Create daily graph:** Using Markov Chain Clustering to find communities Using PageRank to select displayed entities (Page et al., 1999)

- Graph representation:** Jung framework for in-memory graph representation¹



¹ <http://jung.sourceforge.net>

Daily Network Visualization



1. Interactive time-dependent network:

- Clusters: Organized by topic
- Nodes: Named-Entities (persons and organizations)
- Edges: Relations between Named-Entities

2. Frequency-Chart:

- Shows terms that were popular on the respective day
- Trend of terms can be observed over time
- Shorter timespans can be selected
- Two peaks reflect changes in Schumacher's condition

3. Cooperative social tagging:

- Source sentences linked to original online articles
- Users may add a tag which labels the relationship

4. Entity Search:

- Search mask allows users to search for entities
- Match will open the respective cluster

5. Datepicker:

- Select date of interest

Future Work

- Incorporation of Twitter data
- Direct comparison of entities such as persons, organizations and events, appearing in both Twitter and online newspaper articles
- Networks representing time-spans
- Automatic relationship tagging

References

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Lawrence Page, Sergey Brin, Rajeev Motwani, and Terry Winograd. 1999. The Pagerank Citation Ranking: Bringing order to the web. Technical Report 1999-66, Stanford InfoLab, November. Previous number = SIDL-WP-1999-0120.

Uwe Quasthoff, Matthias Richter, and Christian Wolff. 2002. "Wörter des Tages"-Tagesaktuelle wissensbasierte Analyse und Visualisierung von Zeitungen und Newsdiensten. In *ISI*, pages 369–372.

Acknowledgments

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¹ <http://www.hochschulwettbewerb2014.de>