A Temporal Visualizer for Social Networks

Example: Trying to Correlate Temporal Communication Patterns of Online Communities with Innovation

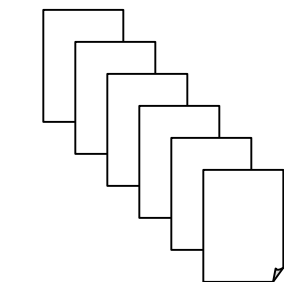Peter A. Gloor, MIT & Dartmouth
Yan Zhao, Dartmouth
Rob Laubacher, MIT
Scott Dynes, Dartmouth
Gregor Schrott, University of Frankfurt

Center for Coordination Science

MITSloan

TUCK SCHOOL OF BUSINESS AT DARTMOUTH
GLASSMEYER/MCNAMEE
CENTER FOR DIGITAL STRATEGIES

Communicate. Coll

Our tools employ a flexible & scalable systems architecture

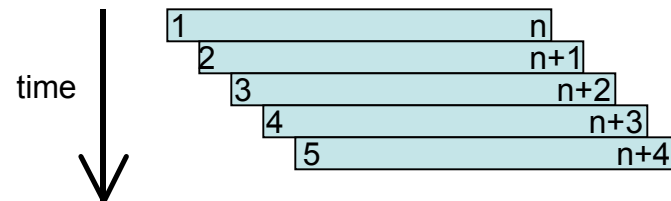e-Mail archives:
• mailing lists
• flat files
• .pst
• .mbx

parsing

From:
To:
Title:
Timestamp:
Contents...
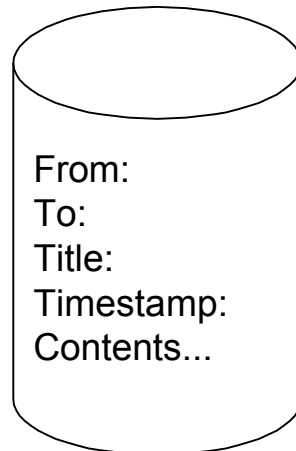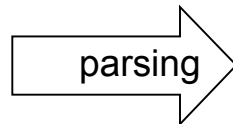
database (SQL, grid , p2p)
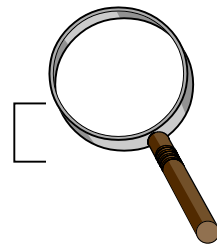
Structural
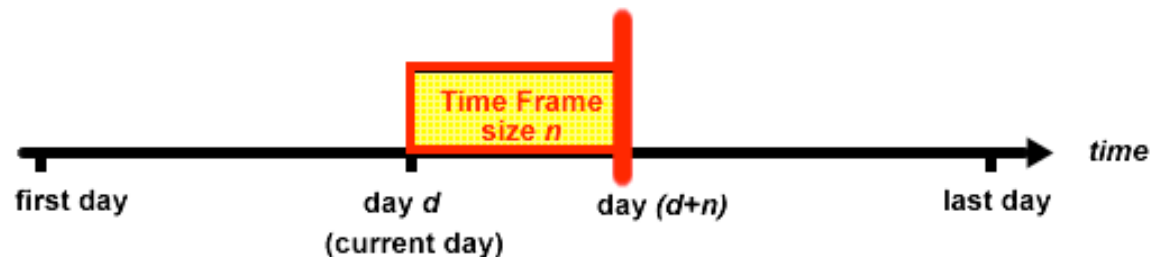queries
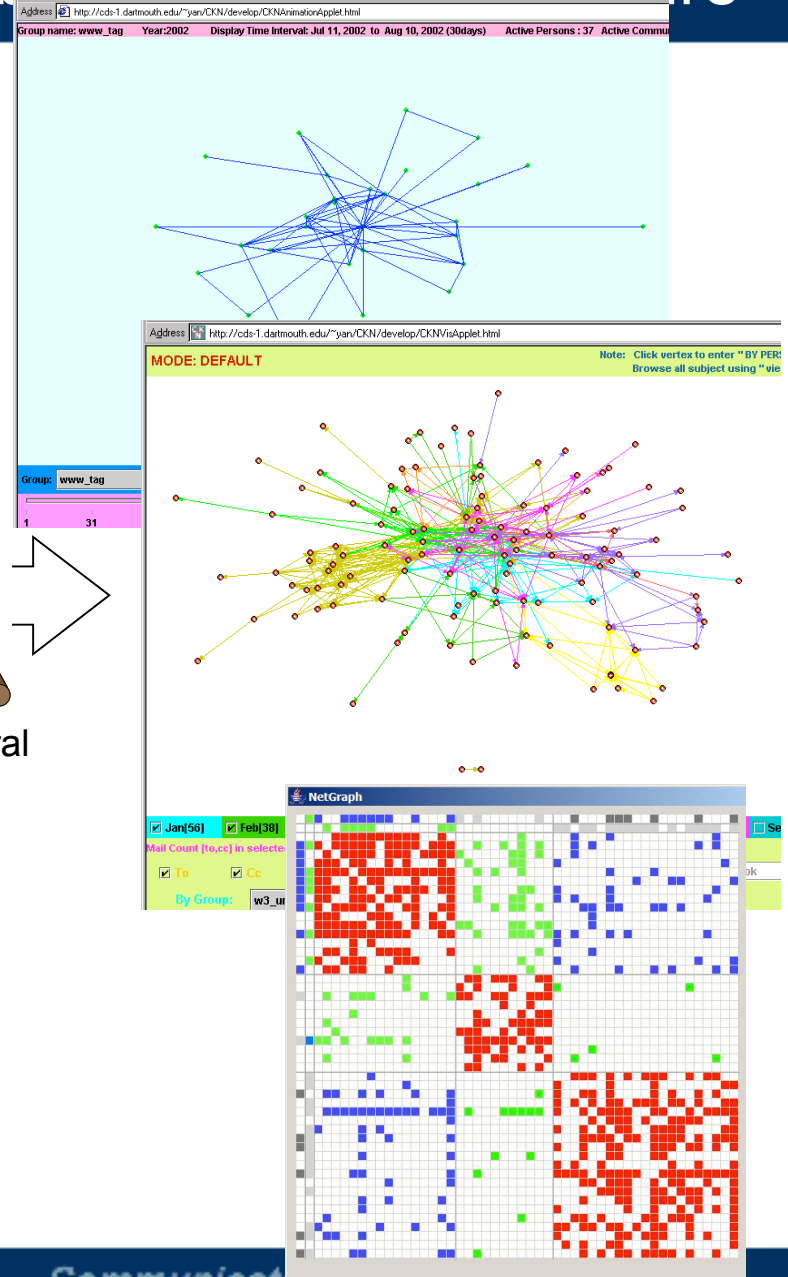
Temporal Visualization by a Sliding Time Frame
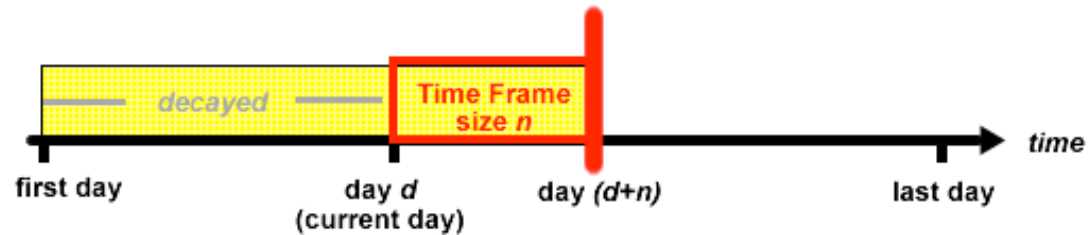
Demo

Method of Analysis

- Watch movies
- Come up with hypothesis
- Verify/reject hypothesis

3 Streams of previous work

- Core/periphery structures (Borgatti, Everet, 1999)

- Work group structure & performance (Cummings, Cross, 2003)

- Temporal analysis of network structure (Holme, Edling, Lijeros, 2003)

Data Set

- One year mail archive of 200 people emerging global consulting practice
- Ego network of practice leader (his mailbox)
- Ego network of practice coordinator (his mailbox)
- Assumption: corresponds to organizational memory of practice
- 15 communities (messages grouped by practice coordinator and leader)
  - Development of 8 service offerings
  - Sales and marketing efforts
  - Weekly brownbag
  - Webinar organization (Web seminar)
  - Web Site development
  - Software vendor collaboration
- Performance measurement: quality of community output (popularity for service offerings, judgment of practice leader for admin communities)

Advantages/Disadvantages of Data Set

+ Researcher has deep knowledge

+ Organizational memory of practice

+ Measurable output

– Researcher might be biased

– Incomplete data (ego network)

# Hypothesis: Innovation Dissemination by evolving types of Collaborative Knowledge Networks

COIN
Collaborative Innovation Network

CLN
Collaborative Learning Network

CIN
Collaborative Interest Network
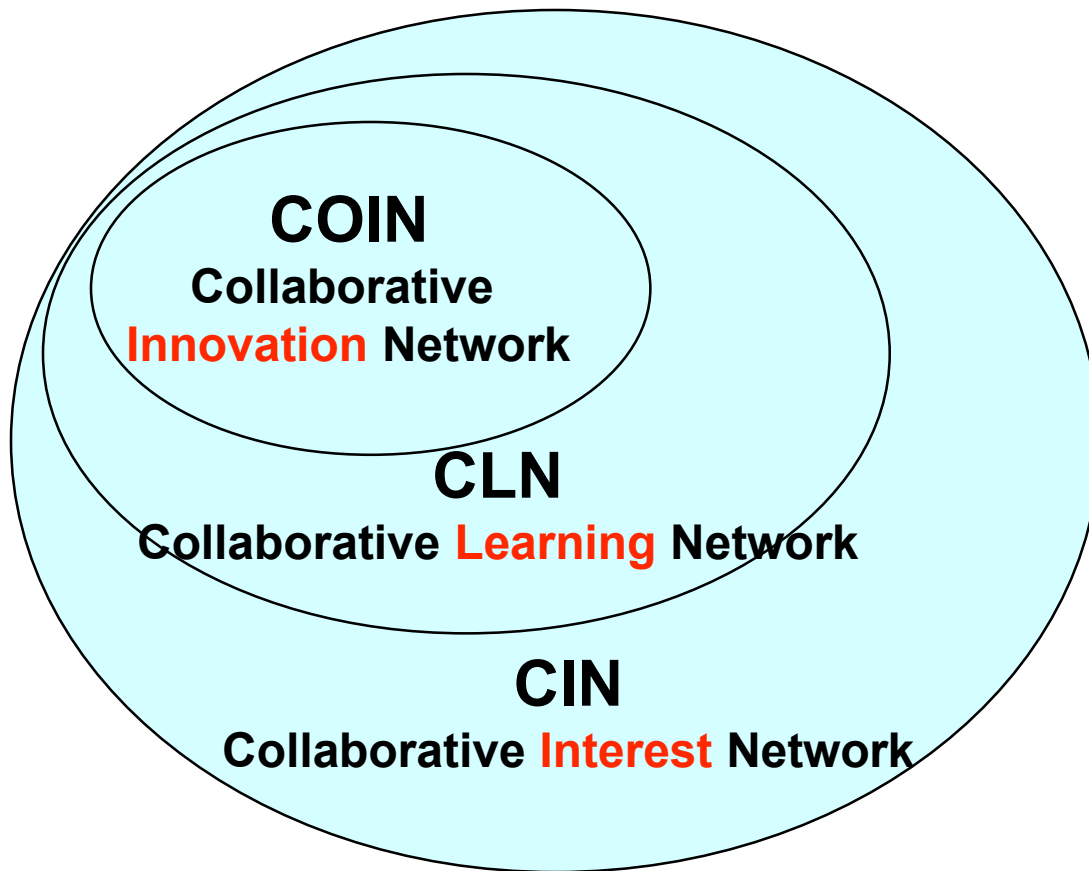
Example:

Linux Creators

+

Linux Sysadmin

+

Linux Users

In SNA terms

	COIN	CLN/CIN
core/ periphery	large core small periphery	small core large periphery
density	high	low
betweeness centrality	low	high
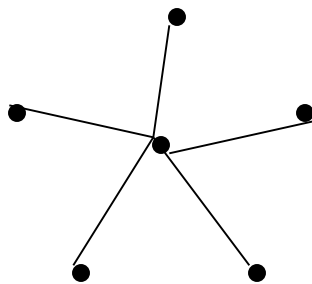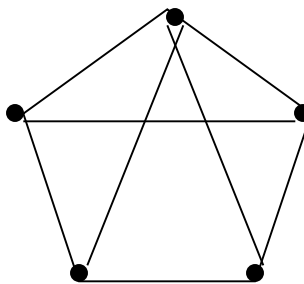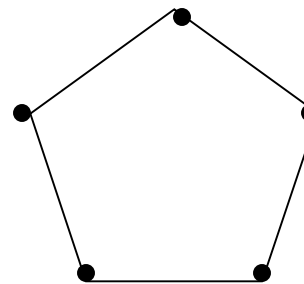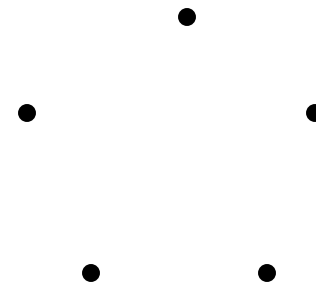
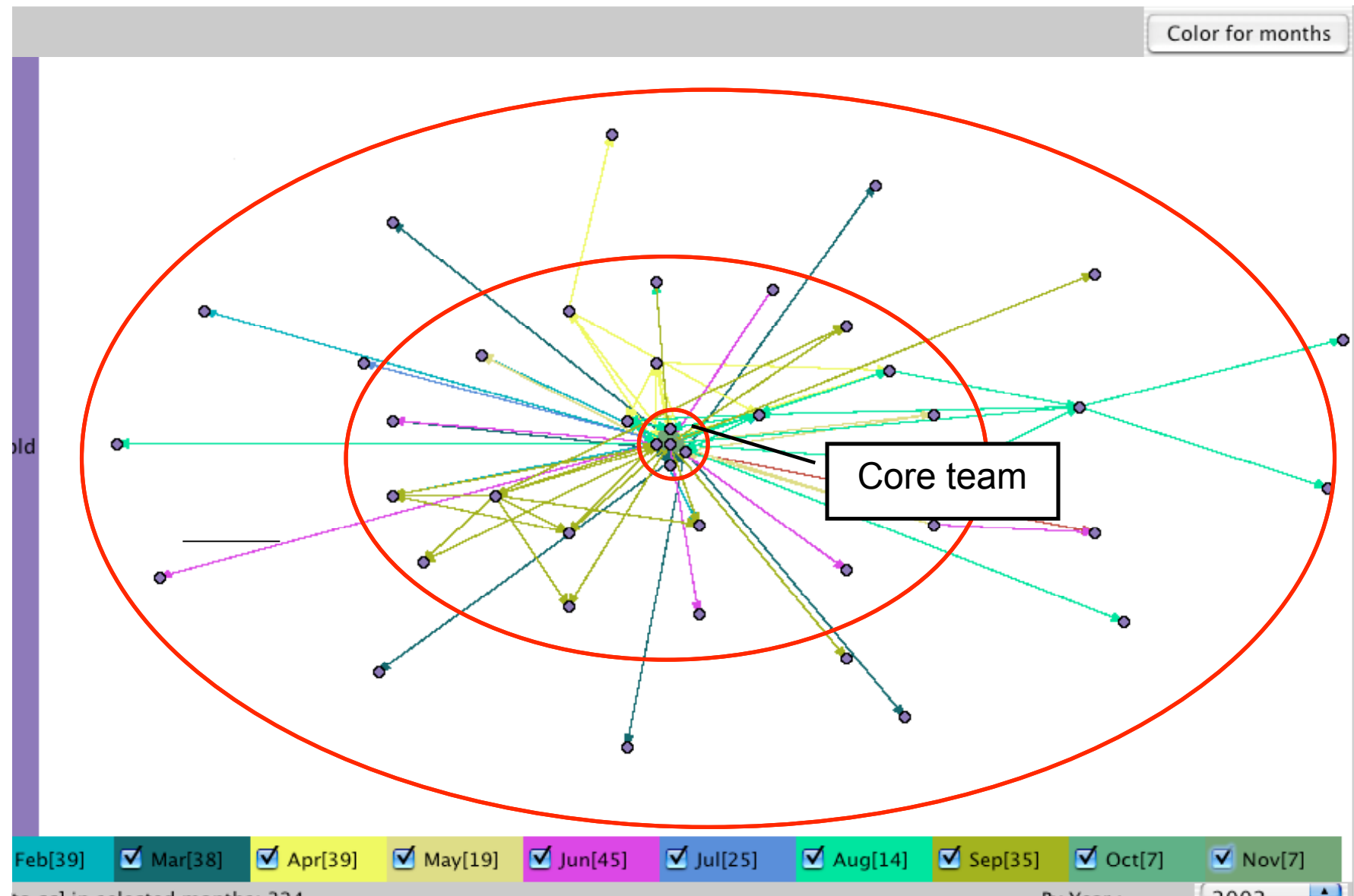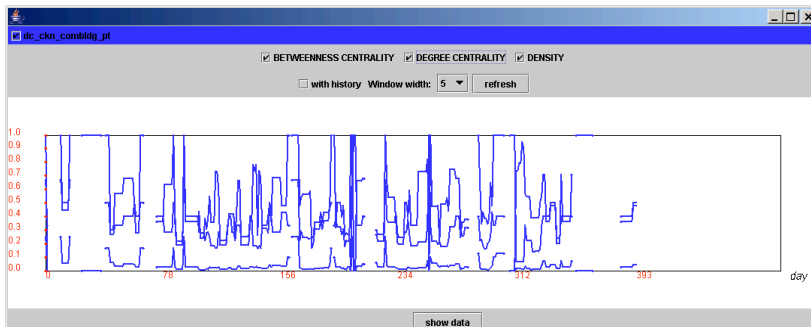GBC=1   GBC=0   GBC=0   GBC=0

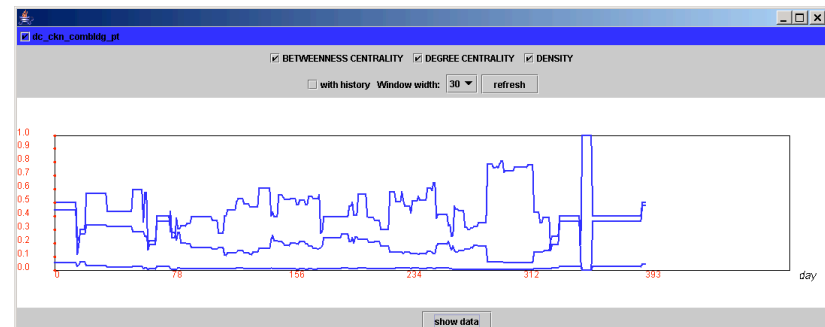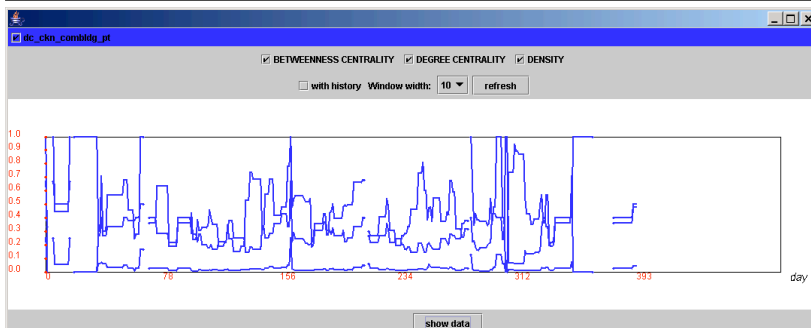# Application: virtual global consulting practice

Core team

Group Betweeness Centrality for service offering development no history, time window 5-50 days
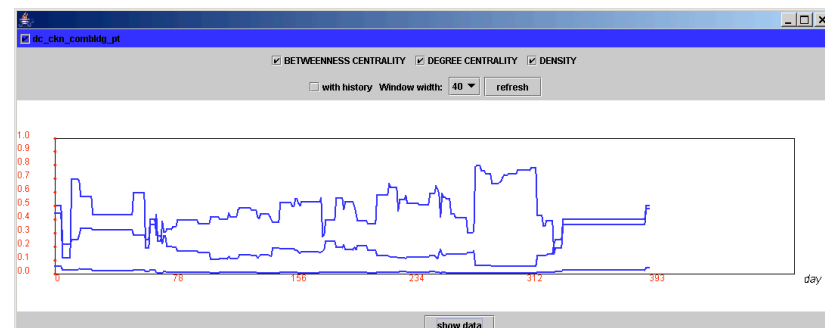
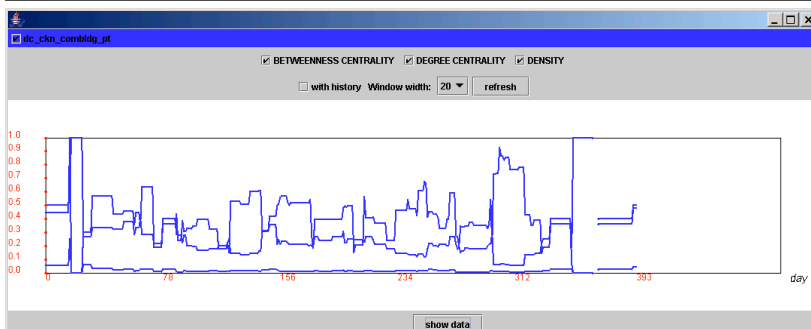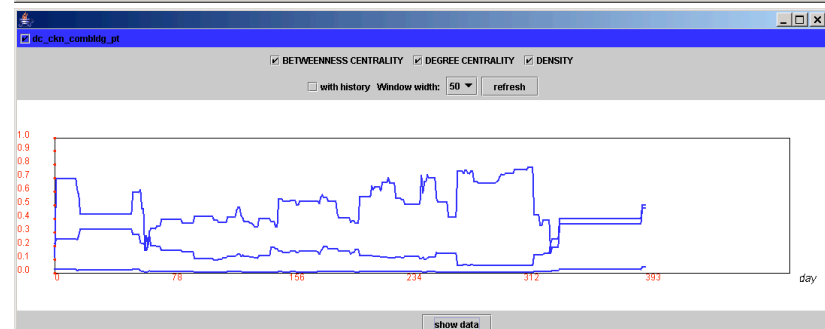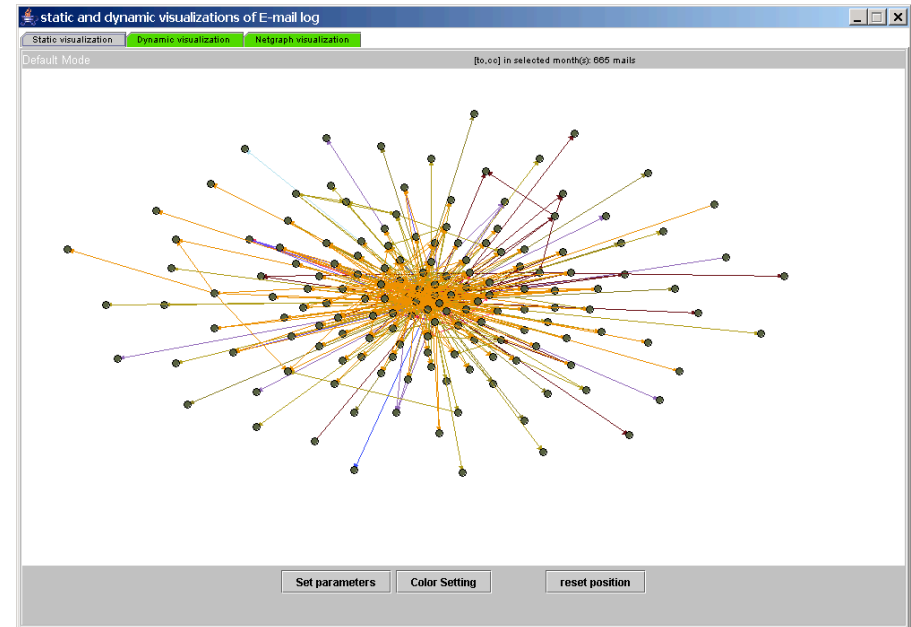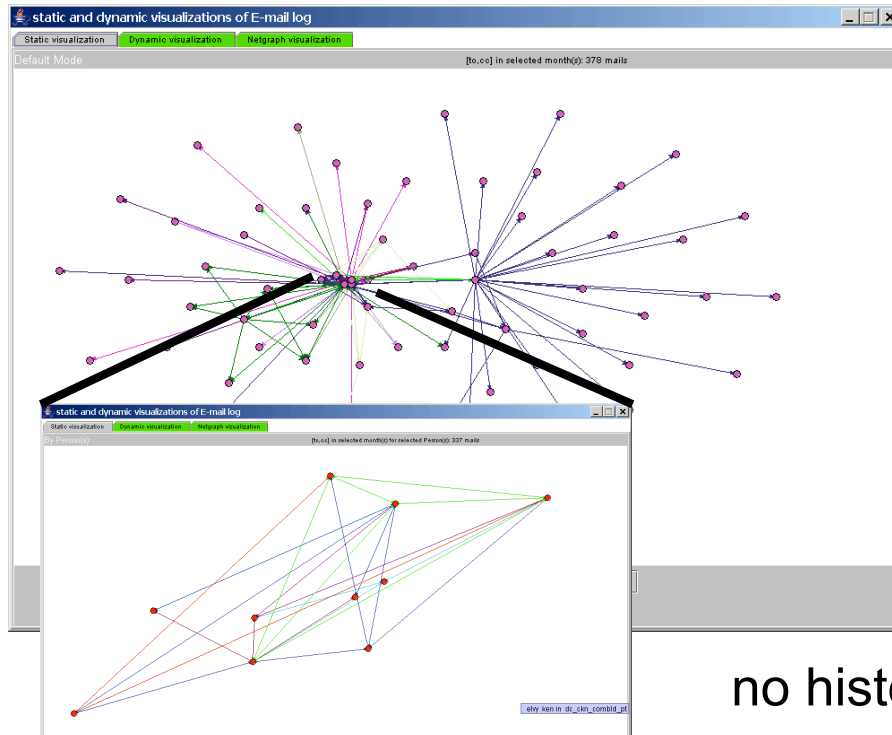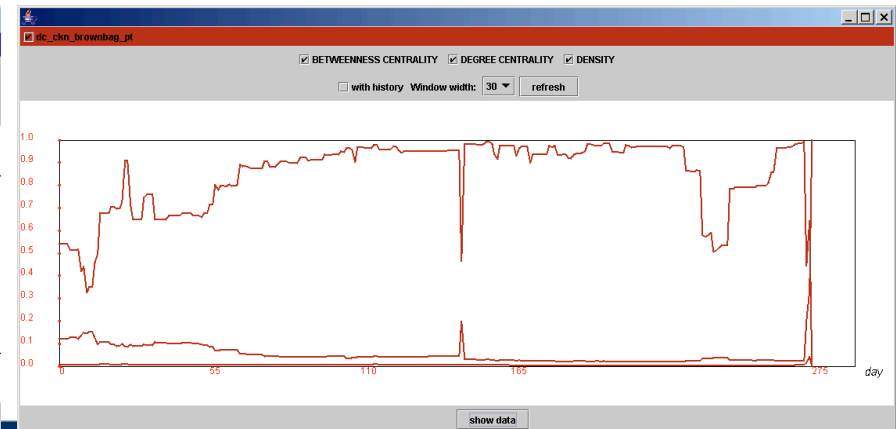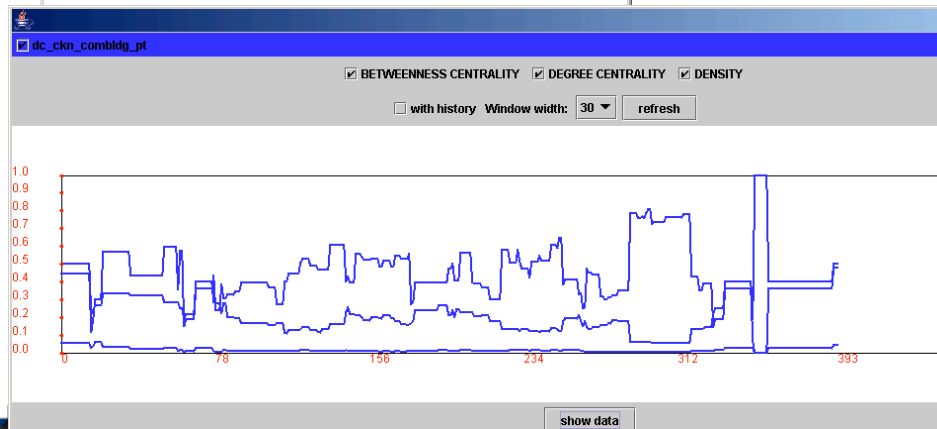# Community Building Service Offering
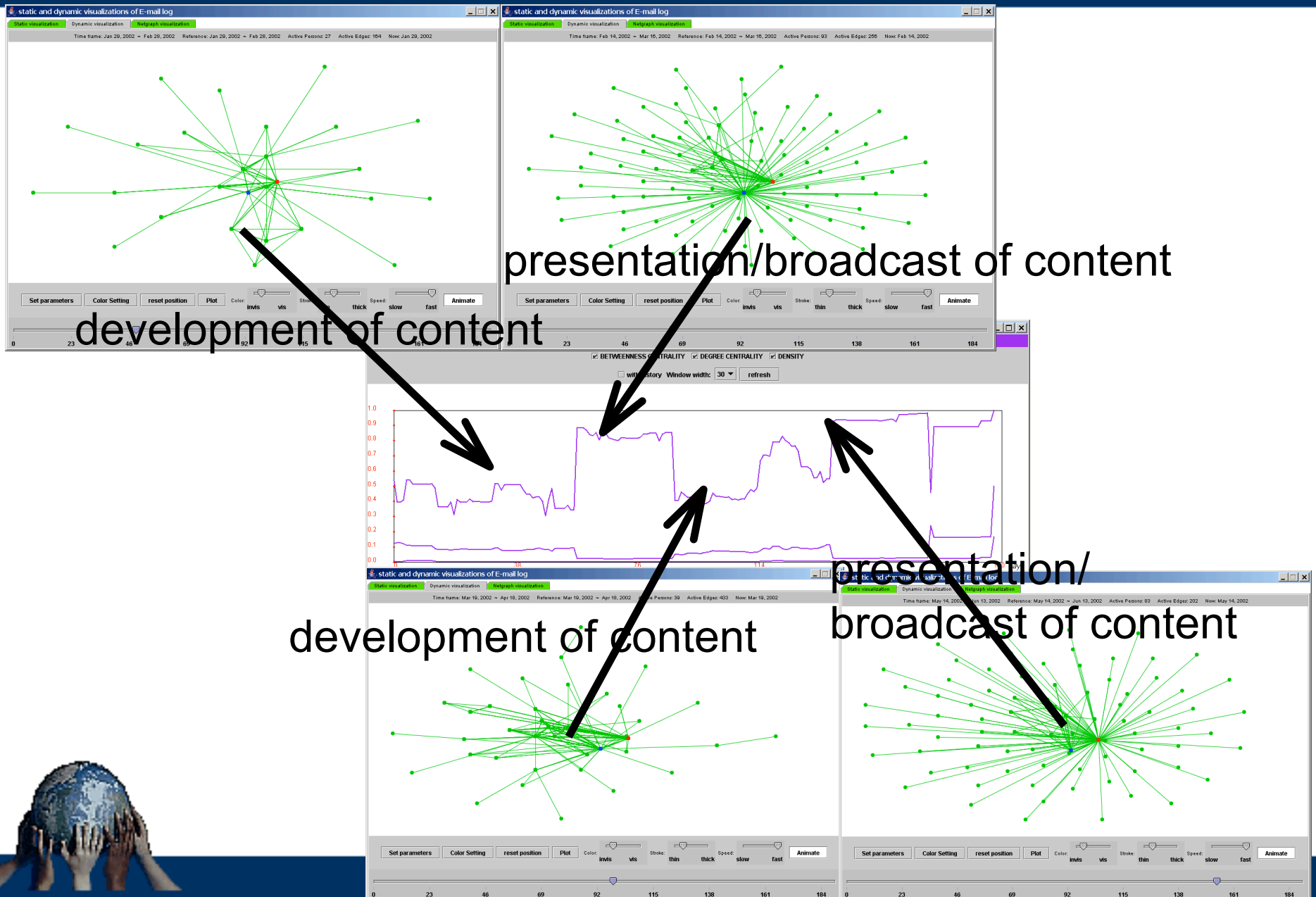(381 mails, 65 individuals)

Brownbag
(665 mails, 96 individuals)

no history   30 days

Webinar, 152 individuals, 606 messages

presentation/broadcast of content

development of content

development of content
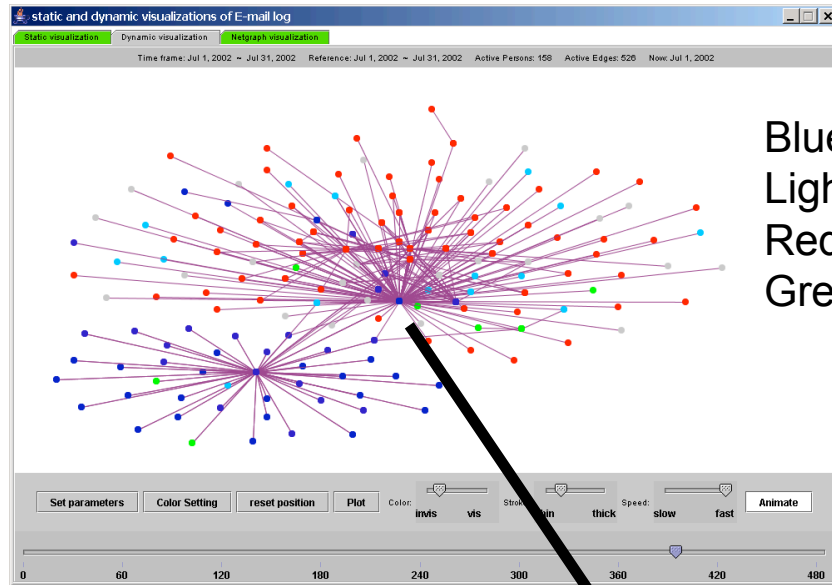
presentation/
broadcast of content

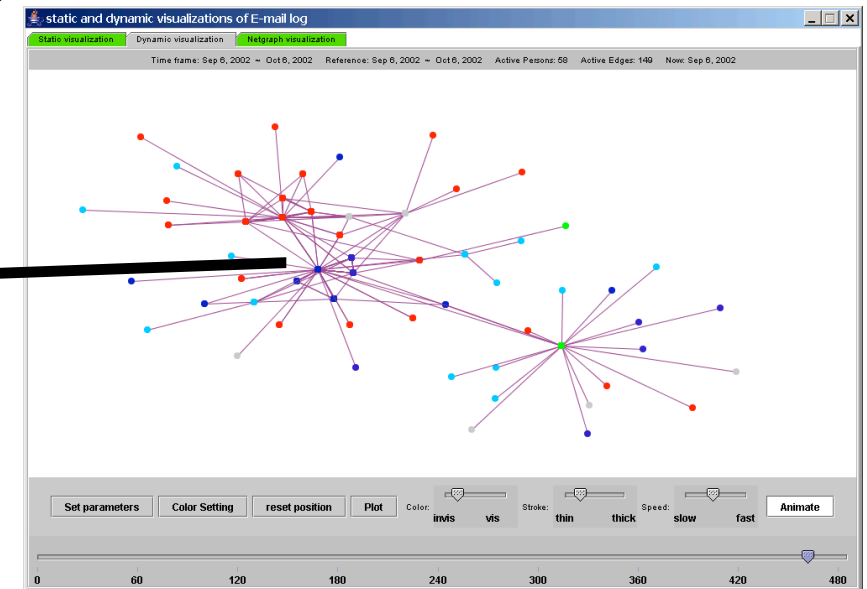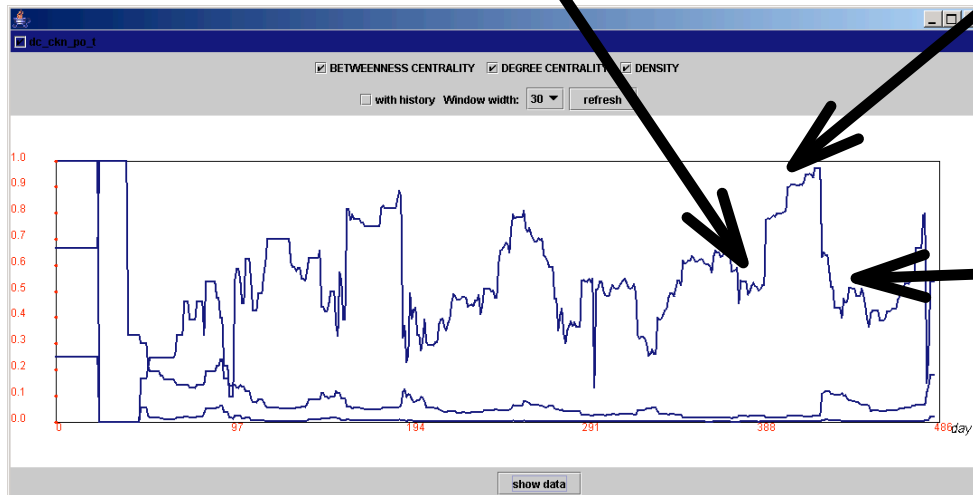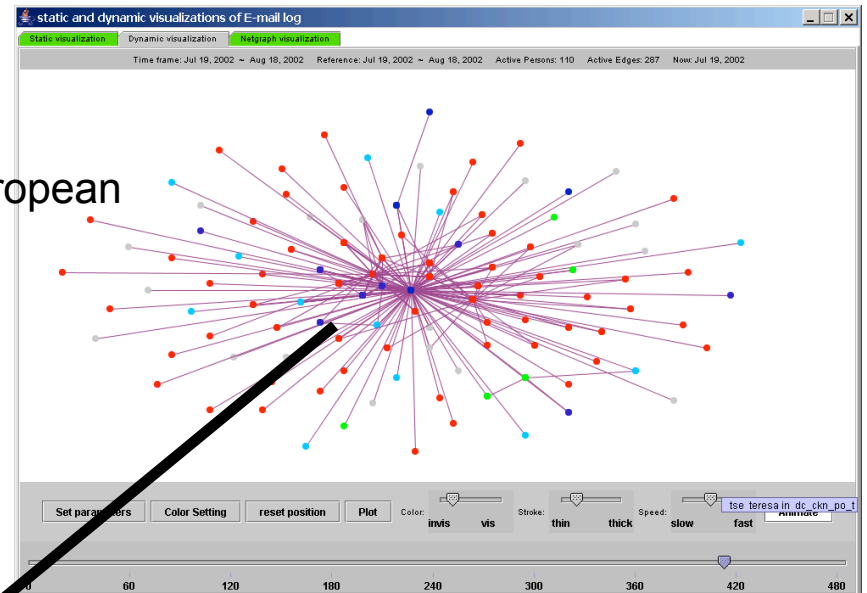6 innovation communities 130 individuals, 736 messages

But: Admin has same pattern

Blue: Swiss
Light blue: European
Red: US
Green: UK

Conclusions

- New way for temporal analysis of social networks:
  - Measuring a sliding time window
  - Movies of evolving networks with/without history
  - Evolving properties of social networks (group betweeness centrality)
- Temporal analysis conveys new insights
- Fast way to find periods of low/high centrality
- Identify periods of high productivity and information dissemination
- Need other contextual cues to obtain full understanding

More info

- CKN Web site: www.ickn.org
- Download CKN tool
  http://www.ickn.org/ickndemo/

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