The Dynamics of an Organization in Crisis:
Enron, a case study

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5 August 2006
SCTPLS 2006
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Center for Computational Analysis of Social and Organizational Systems

http://www.casos.cs.cmu.edu/

Introduction to CASOS Lab

- Center for Computational Analysis of Social and Organizational Systems (CASOS)
- Carnegie Mellon University, Pittsburgh, PA, USA
- School of Computer Science
- Director: Kathleen Carley, Ph.D.
- 30 staff and PhD students
- brings together:
  - computer science,
  - dynamic network analysis, and the
  - empirical study of complex socio-technical systems
- Computational & social network techniques combined
  - to develop a better understanding of the fundamental principles of organizing, coordinating, managing and destabilizing systems of intelligent adaptive agents (human and artificial) engaged in real tasks at the team, organizational or social level.
- Overt & Covert Organizations

Synopsis

- Explore dynamics of a social network in a business organization
- Applying Dynamic Network Analysis techniques
- Investigate Enron sample
- Focus on dynamics around high-impact people-related events

Agenda

- Background
- Methodology
- Findings (preliminary)
  - Graph-level
  - Key actors
  - Conversational topics
- Recap

Introduction

- Enron email corpus provides opportunity to investigate some of the dialogue empirically

- Report the chatter in the particular case of Enron

- Organization crisis and leadership change are common events, so will highlight them

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Methodology

- Enron email corpus
  - 250,000 internal emails
  - 20,000 email addresses
- Construct 165 weekly network snapshots of address-to-address communications
- Exploratory analysis:
  - graph-level
  - key actors
  - conversation content

Notable personnel events

- Dec. 20, 2000 — Skilling named as CEO
- Aug. 14 2001 — Skilling resigns
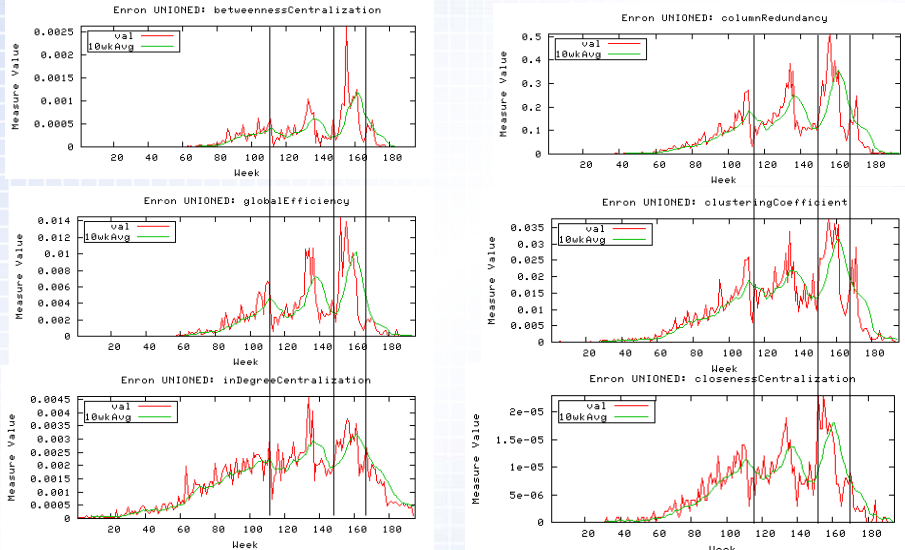- Dec 2-3 2001 — Bankruptcy filed & massive layoff

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Graph-level?

Q: What is happening with the structure of the network around the time of the three personnel-type events?

1. Look at 30 graph-level network measures over the 165 weekly snapshots

Graph-level?

Key Events (left to right): New CEO named; CEO resigns; Bankruptcy filed & massive layoff

Graph-level

- Many measures following same pattern:
  - Peak at CEO announce
  - Trough at CEO resign
  - Trough bankruptcy
- Peak Interpretation
  - The group is more integrated
  - All individuals more likely to get more mail
  - More learning from overall system
- Trough
  - More fragmentation
  - Specialized groups form
  - More learning from local group

Graph-level - summary

- Enron became <u>more integrated and tightly coupled</u> around *positive* events.

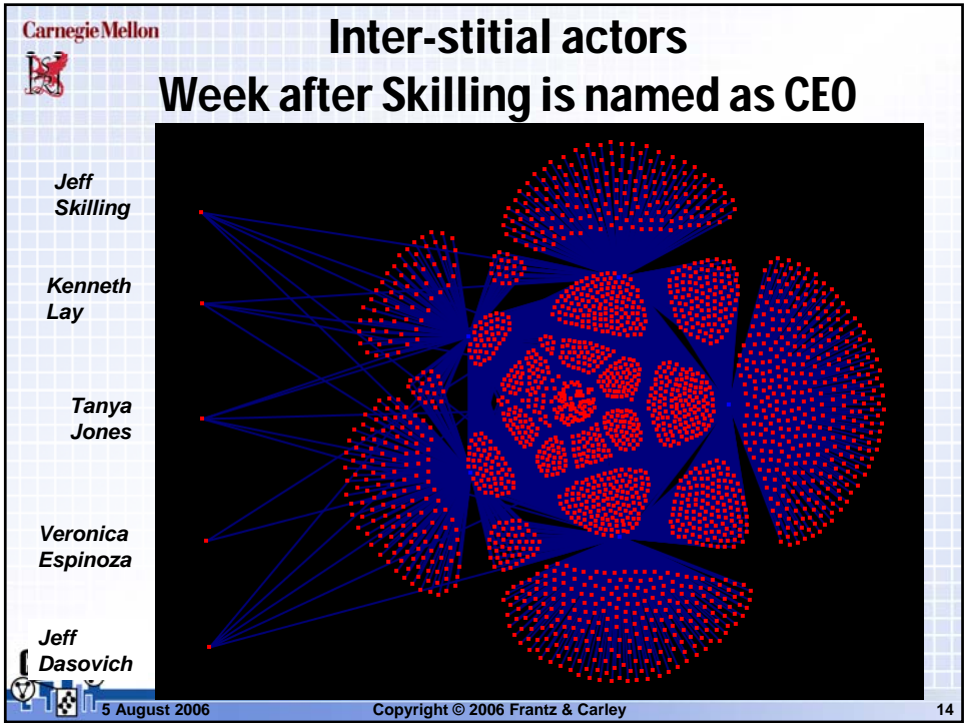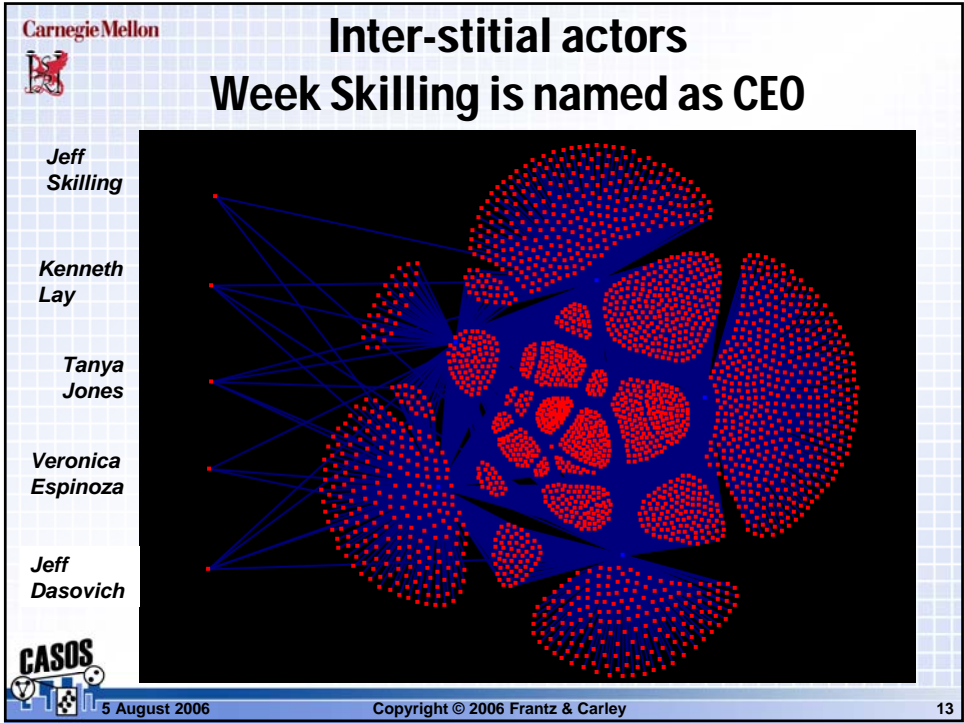- Enron became <u>more fragmented and loosely tied</u> around *negative* events.

Key actors?

Q: What is happening with key actors in the network?

1. Fuzzy grouping of population

2. Identify key actors

3. Characterize key actors

Inter-stitial actors
Week Skilling is named as CEO

Inter-stitial actors
Week after Skilling is named as CEO

Key actors – most central

Email address	Average Rank(n=5)
tana.jones@enron.com	2
jeff.dasovich@enron.com	4.4
sara.shackleton@enron.com	5.4
sally.beck@enron.com	8
louise.kitchen@enron.com	8.2
veronica.espinoza@enron.com	8.4
mark.taylor@enron.com	8.6
richard.shapiro@enron.com	8.6
ginger.dernehl@enron.com	9.4
cheryl.johnson@enron.com	10
elizabeth.sager@enron.com	10
john.lavorato@enron.com	10.2

--These individuals send and receive vast quantities of mail compared to the average employee.

--More importantly they often serve as conduits moving information from one group to another.

Average ranking (out of 20,000 actors; across 5 centrality measures: Betweennness, in degree, out degree, closeness, eigenvector:

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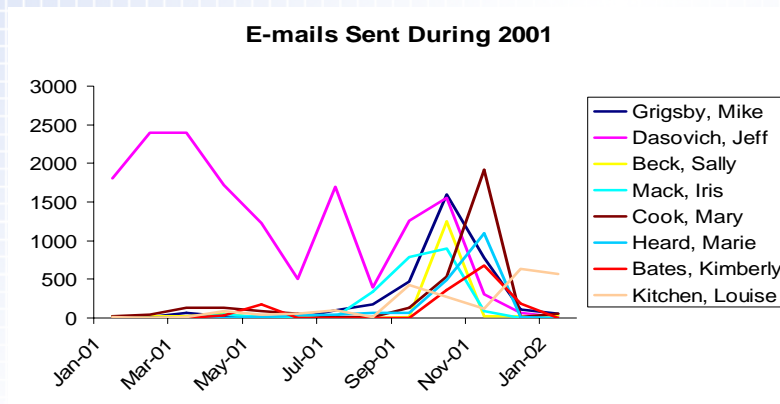# Key actors - political

Person	Average Ranking	Role
Kenneth Lay	222	CEO
Jeff Skilling	398	CEO
Richard Causey	475	CFO
Andrew Fastow	1,733	CFO
Vincent Kaminski	42	Risk Mgmt
Sherron Watkins	3,669	whistleblower

Average ranking (out of 20,000 actors; across 5 centrality measures: Betweennness, in degree, out degree, closeness, eigenvector:
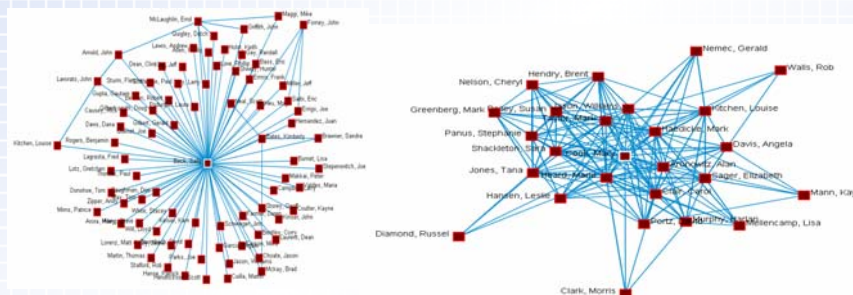
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Key actors- communication hubs

E-mails Sent During 2001

Legend:
- Grigsby, Mike
- Dasovich, Jeff
- Beck, Sally
- Mack, Iris
- Cook, Mary
- Heard, Marie
- Bates, Kimberly
- Kitchen, Louise

* The average number of e-mails sent between September and December is 22 per employee, while these employees send thousands of messages

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Two Types of High Communicative Actors

Sally Beck (COO)

Iris Mack (Trading)

Kimberly Bates (Admin Assist Trading)

Dasovich (Gvt Relations)
Cook (Legal)
Heard (Legal)
Grigsby (Trader)
Kitchen (*Pres Enron online*)

Key actors - summary

- inter-stitial actors fall into two categories:
  - Broadcasters
  - Politicos
- Politicos are graph-central, but not top-ranked

Chatter content?

Q: What is the content of the chatter around the time of the three personnel-type events?

1. Extract most frequent words – email subject line

2. Construct a work-word visualization

Content – across network

RANK	200048	200049	200050	200132	200133	200134	200148	200149	200150
1	enron	enron	gas	meeting	meeting	enron	enron	enron	enron
2	meeting	meeting	request	enron	enron	manageme	meeting	contact	meeting
3	gas	agreement	enron	update	update	meeting	november	information	employees
4	agreement	report	meeting	gas	gas	california	gas	shop	power
5	report	gas	power	report	update	trv	body	gas
6	energy	energy	agreement	power	announcer	committee	request	update	data
7	power	legal	california	energy	organizatio	power	update	home	updated
8	request	letter	report	market	report	gas	informatior	list	daily
9	conference	power	letter	california	project	agreement	agreement	gas	qandas
10	november	deal	access	agreement	agreement	master	power	meeting	report
11	credit	holiday	news	review	call	report	important	energy	ena
12	deal	christmas	alert	issues	energy	risk	issues	power	energy
13	proposal	services	conference	teesside	dialing	request	today	request	hello
14	update	memo	plan	aug.	conference	energy	plan	daily	request
15	trading	revised	energy	deal	market	draft	daily	letter	call
16	letter	request	ferc	he	california	formation	energy	members	got
17	master	draft	succession	letter	final	campaign	contact	attention	contract
18	list	conference	call	master	services	policy	report	closure	match.com
19	draft	departmen	update	pricing	united	company	expense	info	list
20	interview	board	market	group	issues	closeout	antitrust	board	schedule

Content – politicos

RANK	200048	200049	200050	200132	200133	200134	200148	200149	200150
1	enron	enrononline	charitygift	trip	report	manageme	memos	update	dpr
2	november	executive	thank	associate	meeting	risk	meeting	dpr	update
3	enrononline	request	executive	dinnerr	organizatio	committee	violation	meeting	meeting
4	executive	saturday	enrononline	end	executive	executive	committee	committee	committee
5	committee	interviewer	committee	full-time	statistics	program	draft	manageme	manageme
6	policy	summary	summary	orientation	united	changes	finalviolatio	post	status
7	summary	meeting	list	ene	updated	market	release	reduction	issuance
8	corporate	credit	update	goldman	best	policy	final	contacts	board
9	meeting	watch	meeting	holdings	call	under	preliminary	headcount	monday
10	group	report	today	jeff	committee	meetings	concentrati	hr	today
11	survey	thank	plan	meeting	communica	update	daily	contact	agenda
12	houston	enron	succession	sachs	drafts	cash	erv	enron	boardroom
13	details	program	report	share	enrononline	daily	manageme	board	elections
14	line	manageme	manageme	wednesday	latest	flow	personal	body	officer
15	pulse	presentatio	commodity	california	materials	updated	thank	confirming	power
16	results	gary	exchange	enron	phone	business	boardroom	information	gas
17	top	hamel	trading	eprm	trip	california	bottom	locations	letter
18	first	set	act	expense	update	improved!	code	non	request
19	interview	slide	azurix	fe	wishes	moved	deep	power	trading
20	report	canadian	congress	santa	agreement	report	dial-in	shop	wind
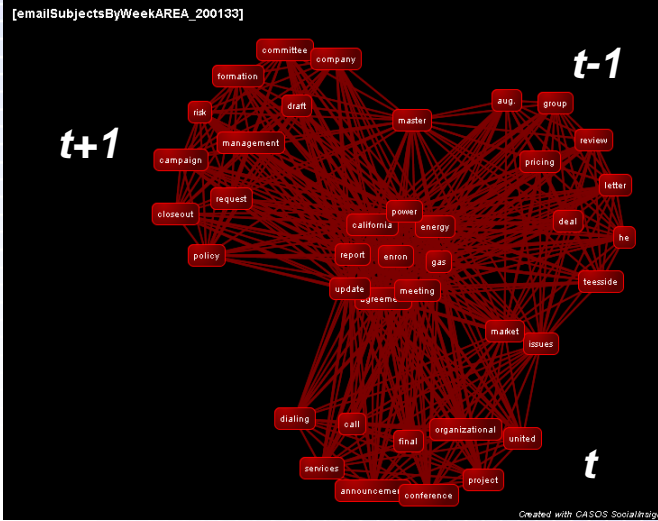
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Content – Skilling resign CEO

Content – Skilling resign CEO

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Content – bankruptcy / layoff

[emailSubjectsByWeekAREA_200149]

t

t-1

t+1
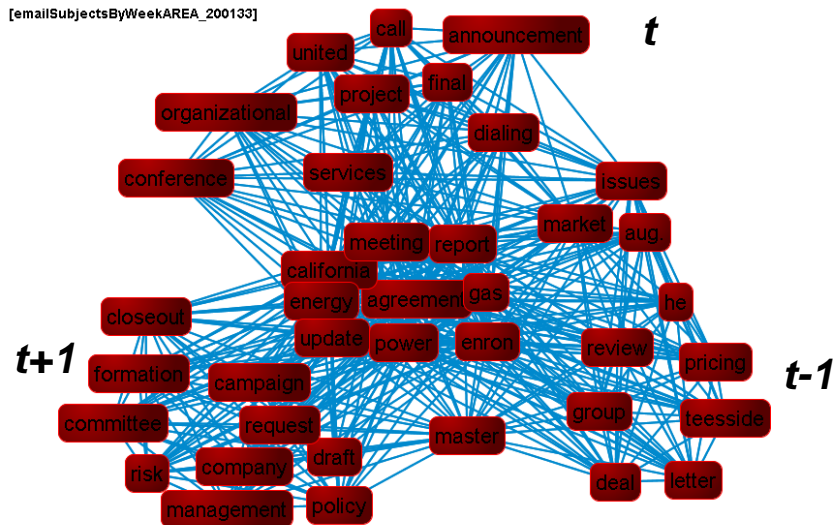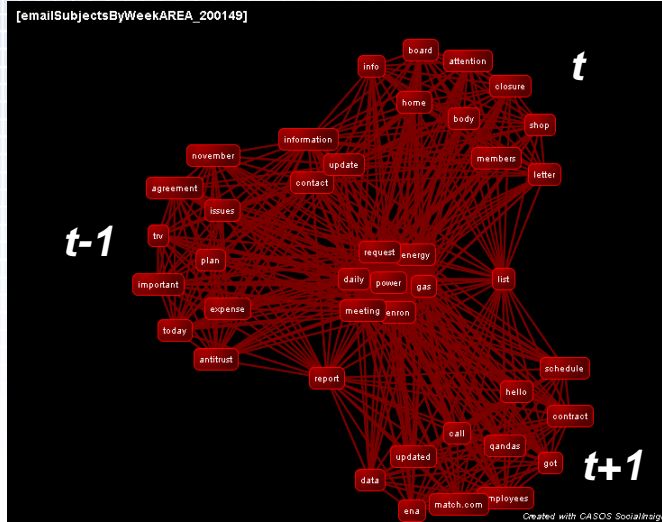
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Content – bankruptcy / layoff
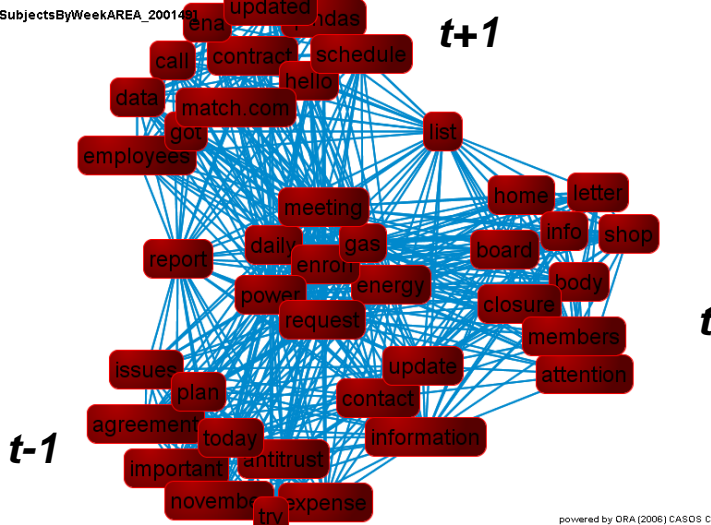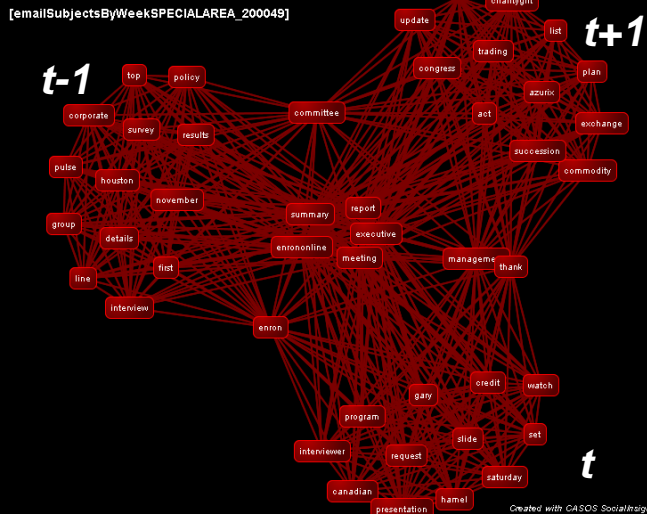
[emailSubjectsByWeekAREA_200149]

t+1

t

t-1

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Politicos – Skilling named CEO

Politicos – Skilling named CEO

Politicos – Skilling resign CEO

Politicos – Skilling resign CEO

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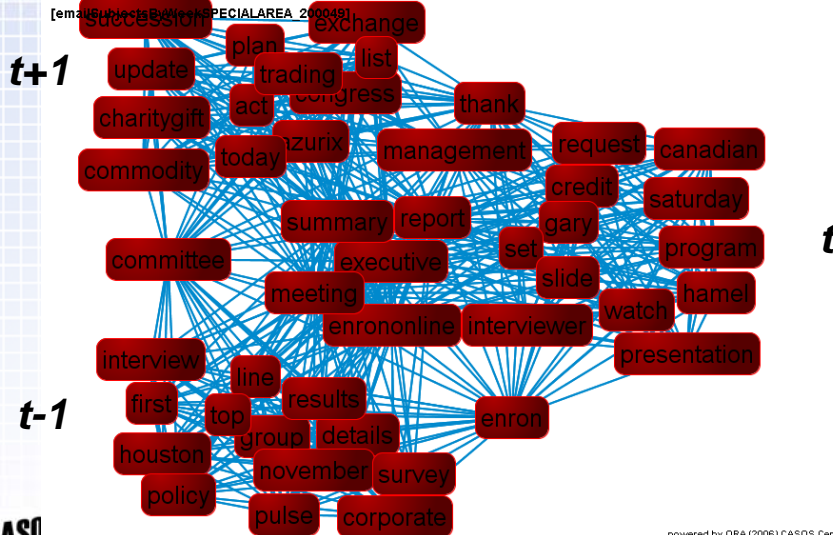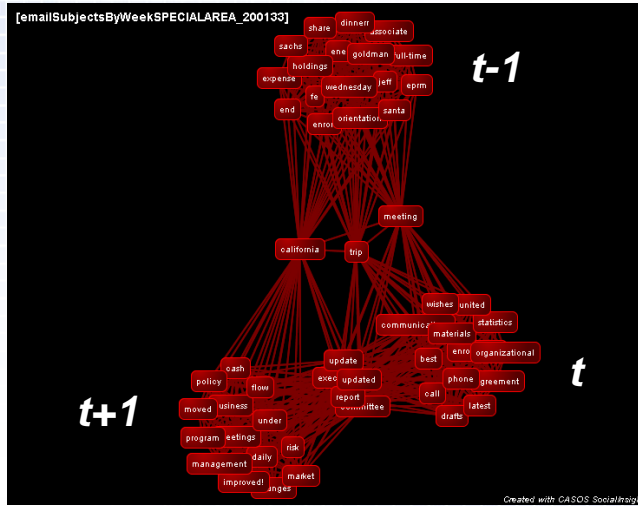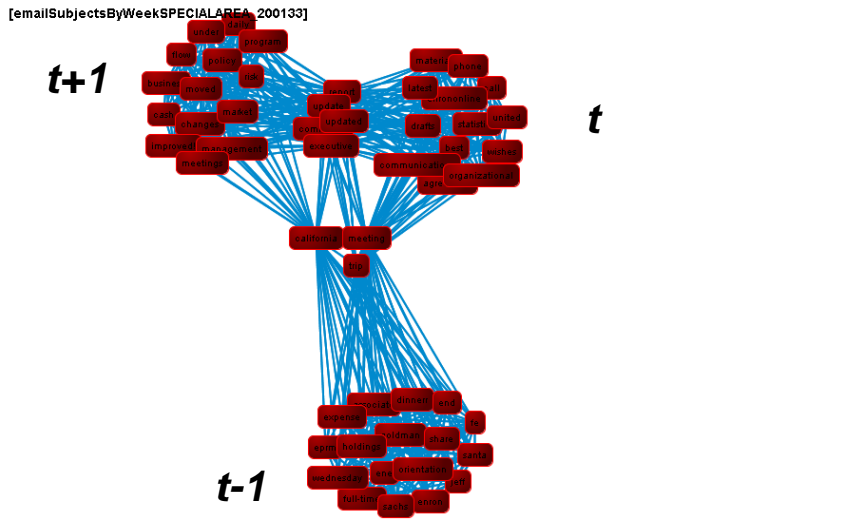
Topics - summary

- dramatic shift from t-1 to t+1 conversations
- politicos concerned with different issues than rest of company
- recurrent concern with California

Recap

- **Overall network** during personnel-type events:
  - Enron became more integrated and tightly coupled around *positive* events.
  - Enron became more fragmented and loosely tied around *negative* events.
- **Key actors** during personnel-type events:
  - inter-stitial actors fall into two categories:
    - Broadcasters
    - Politicos
  - Politicos are graph-central, but not top-ranked
- **Chatter** during personnel-type events:
  - dramatic shift from t-1 to t+1conversations
  - politicos concerned with different issues than rest of company
  - recurrent concern with California

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