

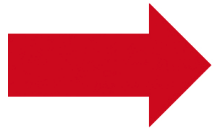


# **Bulk Collection & Online Social Networks: A zoo of metadata-producing systems**

**NATIONAL SECURITY, SURVEILLANCE  
TECHNOLOGY AND THE LAW**  
**Georgetown Law/Federal Judicial Center**

**Joseph Lorenzo Hall, PhD**

*June 2, 2015*



## Outline

- **Bulk collection streams**
- **Online social networks**
- **Relevant social network analysis methods**

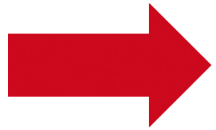


KEEPING THE INTERNET  
OPEN • INNOVATIVE • FREE



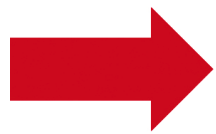
## Bulk Collection Streams

- **USA PATRIOT Act, Section 215**
  - Telephone metadata 2001-present (FISC auth. Since 2006)
  - International money transfer metadata (CIA)
  - Credit-cards? Web searches? (<http://on.wsj.com/1RGdYRs>)
- **FISA pen/trap statute (50 U.S.C. §1842)**
  - Email and Internet Address metadata (2001-2011)
  - ...email: email addresses, Internet address email sent from
  - ...internet address: the “Internet Protocol” (IP) addresses involved in online interactions (web, email, chat, etc.)
  - **cdt.org** = ‘54.85.18.136’



## Bulk Collection Streams

- **FISA Am. Act, Section 702 (one end foreign)**
  - **Email and Internet Address metadata**
  - **Billions of cellphone metadata records/day**
- **Third-party metadata**
  - **“...bank codes, insurance information, Facebook profiles, passenger manifests, voter registration rolls and GPS location information, as well as property records and unspecified tax data...” (<http://nyti.ms/1kFSsyi>)**



# Zoo of Social Networks: Facebook

Facebook

https://www.facebook.com

Search Facebook

Joseph Home

Update Status Add Photos/Video Create Photo Album

What's on your mind?

Friends except Acquainta... Post

added 3 new photos.

1 min ·

I met the Chicken Lady at a rest stop today and she gave me an egg with a message in it.

Ex Flamma Clan Pa... 1

Family

New Groups

Create Group

Close Friends 1

Family

Takoma Park, Mar...

Center for Democr...

Jersey City, New J...

La Cueva High Sch...

Northern Arizona U...

University of Califo...

Princeton University

New York University

UC Berkeley

researchers 20+

3 event invites

's birthday is today

TRENDING

#CaitlynJenner: Olympian Formerly Known as Bruce Jenner Says 'Call Me Caitlyn' on Vanity Fair Cover

Atlantic Slave Trade: Artifacts Coming to US From Slave Ship Discovered Off Coast of South Africa

York County, Pennsylvania: Police Say They Have Found Teen Missing Since Sunday Night

See More

SUGGESTED PAGES

See All

The Takoma Foundation

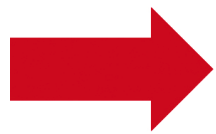
Company · 605 likes

Like Page

PEOPLE YOU MAY KNOW

See All





# Zoo of Social Networks: Twitter

The screenshot displays the Twitter homepage in a web browser. The browser's address bar shows the URL <https://twitter.com>. The Twitter interface features a top navigation bar with links for Home, Notifications, and Messages. The main content area shows a tweet from Breaking News (@BreakingNews) about a ship sinking, and a retweet by Michael M Clements (@mikegenki3) about a toddler car sharing app. The left sidebar shows the profile of Joseph Lorenzo Hall (@JoeBeOne) and a 'Who to follow' section with users like Bromium, OhNoSheTwitnt, and Adam Liptak.

**Joseph Lorenzo Hall** @JoeBeOne  
TWEETS 29.2K FOLLOWING 1,019 FOLLOWERS 2,666

**Who to follow** · Refresh · View all

- Bromium** @bromium  
Followed by Caspar Bowden ...  
Follow Promoted
- OhNoSheTwitnt** @OhNoSh...  
Follow
- Adam Liptak** @adamliptak  
Followed by Mike Godwin a...  
Follow

**Find people you know**  
Import your contacts from Gmail  
Connect other address books

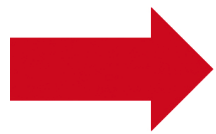
**What's happening?**

View 1 new Tweet

**Breaking News** @BreakingNews · 16s  
Fewer than a dozen rescued so far after ship carrying about 450 people sank on China's Yangtze River - @nytimes [nyti.ms/1QlaMlp](https://nyti.ms/1QlaMlp)  
View summary

Beautiful to see someone so unabashedly herself. #caitlyn [vnty.fr/1FPyauO](https://vnty.fr/1FPyauO)  
View summary

Navroop Mitter retweeted  
**Michael M Clements** @mikegenki3 · 10m  
#Todly, a toddler car sharing app, valued at \$12 billion, got off to rough start:



# Zoo of Social Networks: LinkedIn

The screenshot shows a web browser window with the LinkedIn profile of Joseph Lorenzo Hall. The browser's address bar displays the URL [https://www.linkedin.com/profile/view?id=542354&trk=nav\\_responsive\\_tab\\_profile](https://www.linkedin.com/profile/view?id=542354&trk=nav_responsive_tab_profile). The LinkedIn header includes the logo, a search bar, and navigation links for Home, Profile, Connections, Jobs, and Interests. A banner at the top of the profile section reads: "Avg Offer for Devs: 120k - Want to move out of your industry? Work with a new stack? Try Hired today! | [Read More »](#)".

**Joseph Lorenzo Hall**  
Chief Technologist at Center for Democracy & Technology  
Washington, District Of Columbia | Research

**Current** Center for Democracy & Technology, California Voter Foundation, Verified Voting Foundation  
**Previous** Center for Democracy & Technology, Verified Voting Foundation, New York University  
**Education** University of California, Berkeley

[View profile as](#) **317** connections

<https://www.linkedin.com/in/josephhall> [Contact Info](#)

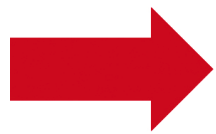
**Add a section to your profile** – be discovered for your next career step.

**Skills**  
Members with skills on their profile

**Language**  
This can help you find a new job, get

**Profile Strength**  
All-Star





## Zoo of Social Networks: Fitbit (health)

The screenshot shows the Fitbit Premium website. The browser address bar displays <https://www.fitbit.com/premium/about>. The navigation bar includes the Fitbit logo, links for Products, Experiences, Fun, and Help, and buttons for Setup, Log in, and Store. The main banner features the text "Fitbit Premium is your 24/7 digital:" followed by a list of services: Personal Trainer, Nutritionist, and Sleep Consultant. A pink button indicates "BUY NOW \$49.99" with a link to "or try Premium for free". The background of the banner shows a woman in a light blue shirt looking at her arm, with a bar chart overlay. Below the banner, the "Premium Features" section is divided into two rows. The first row is titled "Get More Active or Lose Weight with Fitbit Trainer" and includes a "Lightly Active" badge and a description of the 12-week fitness plan. The second row is titled "See In-Depth Analysis of YOUR Data" and includes a "Protein 15%" badge and a description of the personal reports.

Fitbit Premium Membership

<https://www.fitbit.com/premium/about>

Apps | Instapaper | encggoog | keyserv | misc | CDT | chrome | censor ID | w3c | Other Bookmarks

fitbit. Products ▾ Experiences ▾ Fun ▾ Help ▾ Setup Log in Store

**Fitbit Premium**  
is your 24/7 digital:

- Personal Trainer
- Nutritionist
- Sleep Consultant

**BUY NOW \$49.99**  
[or try Premium for free](#)

**Premium Features**

**Lightly Active**

**Get More Active or Lose Weight with Fitbit Trainer**  
Looking to increase your daily activity level? Reach your movement goals more quickly and see results faster with Fitbit Trainer!

**How it works:** Fitbit Trainer reviews your current activity level and creates a personalized 12 week fitness plan that pushes you to gradually increase your movement.

**See In-Depth Analysis of YOUR Data**  
Are you working towards goals for better health, or looking for trends in your lifestyle? Access your personal reports to quickly identify changes for a healthier you. Reports provide in-depth analysis of your historical trends for sleep, food and







## **Zoo of Social Networks: Others**


- **Photos/Videos: Flickr, Tumblr, Instagram, Snapchat, Vine, ... (built-in to many others)**
- **Messaging: Snapchat, WhatsApp, Kik, ...**
- **Locative: Foursquare, (built-in to many others)**
- **Dating: Match.com, e-Harmony, ...**
- **Health/fitness: PatientsLikeMe, Fitbit, ...**
- **Video Gaming: so so many... e.g., Clash Of Clans**


Global

Klan

 Ex Flamma






 Du


Ass. leder

ill take a screen shot now

 Du


Ass. leder

anyway...

 Du


Ass. leder

im going to argue that coc is just as much a social network as Facebook, twitter, just different

 Cyberjip


Ass. leder

oooohh interesting indeed

 Disperse64


Ass. leder

that sounds awesome

 Du


Ass. leder

is a sort of community

 Du

Ass. leder

say hi, i want them to see ex Flamma

 Du

Ass. leder

hey y'all... im going to give a talk tomorrow in DC to many US Federal Judges...

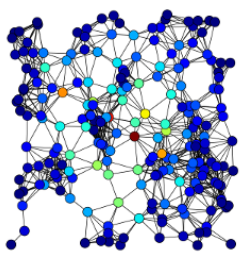




# Relevant Social Network Analysis Techniques

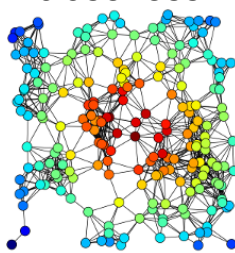
## ■ Centrality measures

betweenness



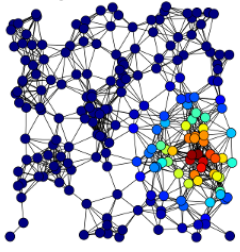
A

closeness



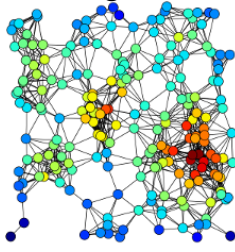
B

eigenvector



C

degree



D

- Measure a given node's relative importance
- “degree centrality” – higher for most connected nodes
- “betweenness centrality” – higher for nodes that connect “cliques” in a network
- “closeness centrality” – higher for nodes on average closest to other nodes
- “eigenvector centrality” – higher for nodes with higher “influence”

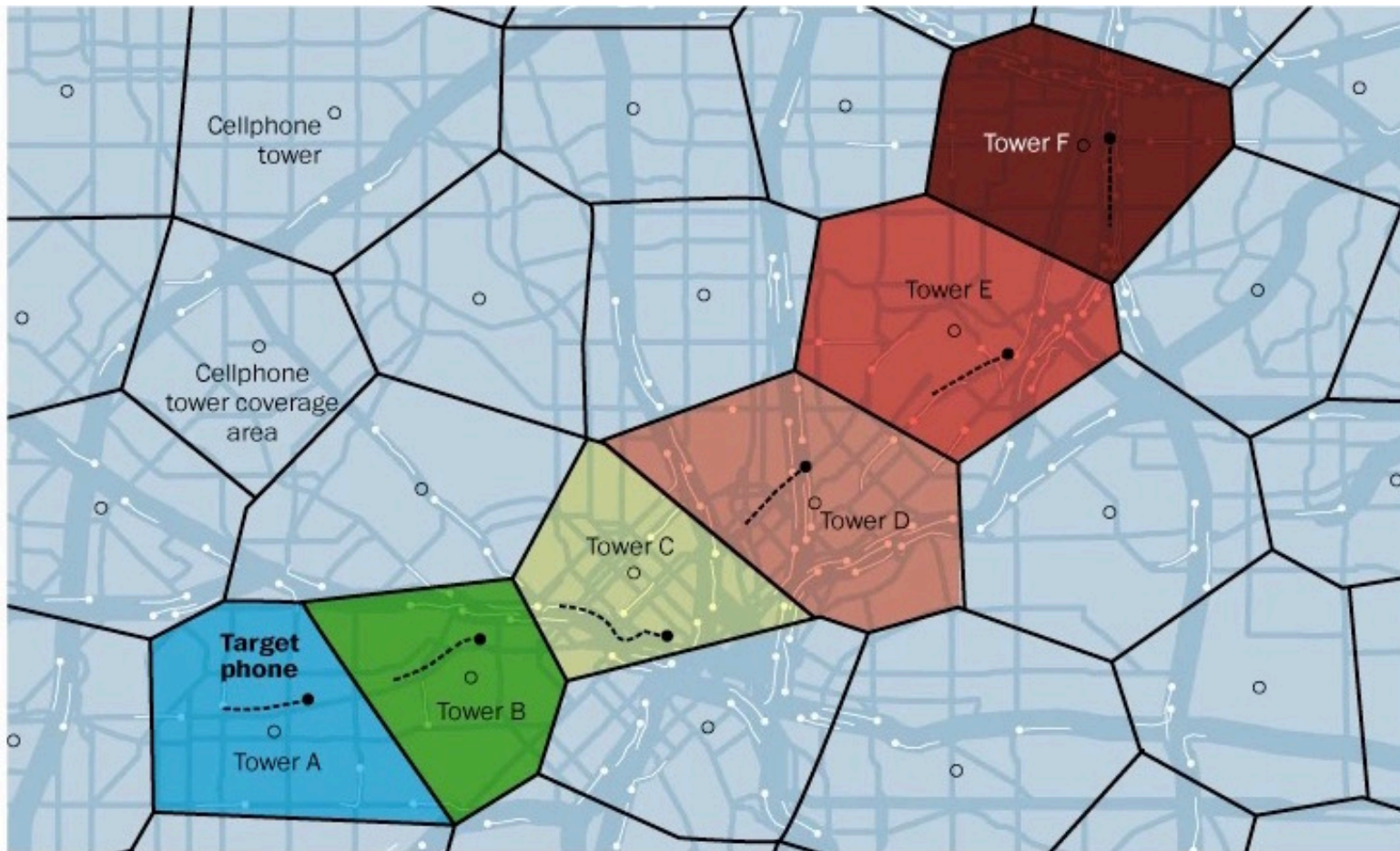
- Contact-chaining: a social network centered on person of interest based on phone patterns



## Relevant Social Network Analysis Techniques

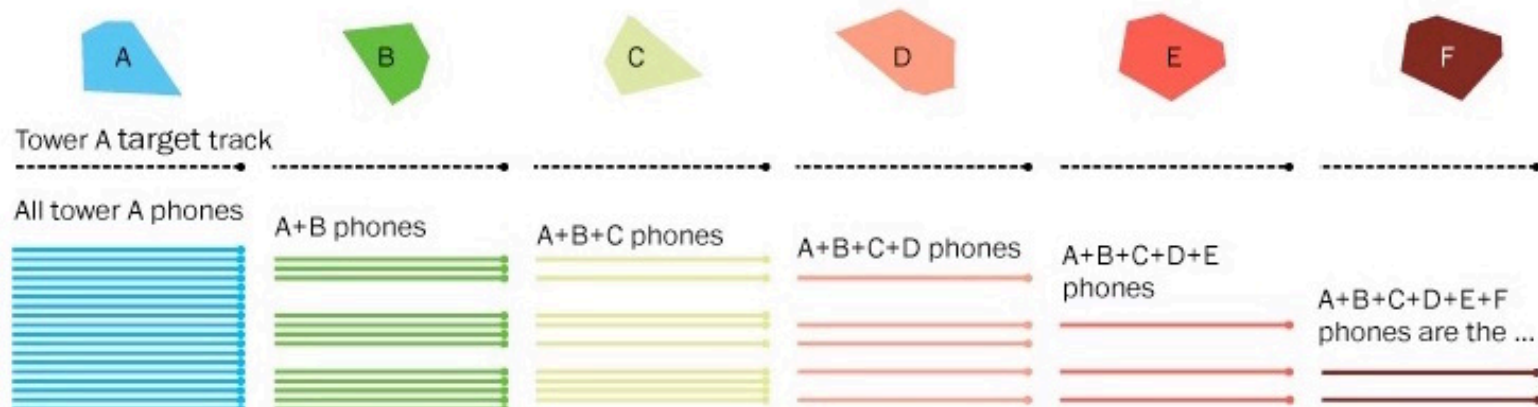
- **Cohort analysis: tracking behavior (in time) of nodes that meet a specific criteria (a “cohort”)**
  - E.g., NSA’s CO-TRAVELER: aims to find “unknown associates who might be traveling with, or meeting up with a known target”
  - Starting with a phone number of a person of interest
  - Associate other phones geographically near this phone
  - As the phone moves, note what other phones follow the same route
  - These are deemed “co-travelers”

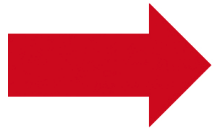




As the target phone moves from tower to tower, fewer and fewer potential co-travelers remain.

<http://wapo.st/18iGVhG>





# Thank you

- [joe@cdt.org](mailto:joe@cdt.org)
- <https://cdt.org/>
- <https://josephhall.org/>
- **Public Encryption Key (PGP):**
  - 3CA2 8D7B 9F6D DBD3 4B10 1607 5F86 6987 40A9 A871