GATE and Social Media: Gathering Social Media Data

Leon Derczynski
Kalina Bontcheva

Social media sites

Twitter, LinkedIn, Facebook

Twitter has varied uptake per country:

- Low in China (often censored, local competitor – Weibo)
- Low in Denmark, Germany (Facebook is preferred)
- Medium in UK, though often complementary to Facebook
- High in USA

Networks have common themes:

- Individuals as nodes in a common graph
- Relations between people
- Sharing and privacy restrictions
- No curation of content
- Multimedia posting and re-posting

Other features: topics, closed groups, moderation, liking, media, groups, person discovery ..

Disclaimer: I Am Not A Legal Professional; caveat emptor!

1. Twitter

Opened in 2006 as a short message blogging service

Allows ‘subscription’ to interesting accounts

Anyone can post, most messages are public

Messages are <140 characters

Posts can come from PC, mobile, SMS, iPad etc

Specialised markup: #hashtags and @mentions

Has grown extremely popular

- 100 million active users; over 230 million tweets a day http://www.guardian.co.uk/technology/pda/2011/sep/08/twitter-active-users

Example Uses

Public relations

Barack Obama
We just made history. All of this happened because you gave your time, talent and passion. All of this happened because of you. Thanks

Celebrity worship

Kidrauhl ♡
“One day you will forget me. You have a husband and be a mother. But I will never forget you, My Beliebers.” - Justin Bieber ♥

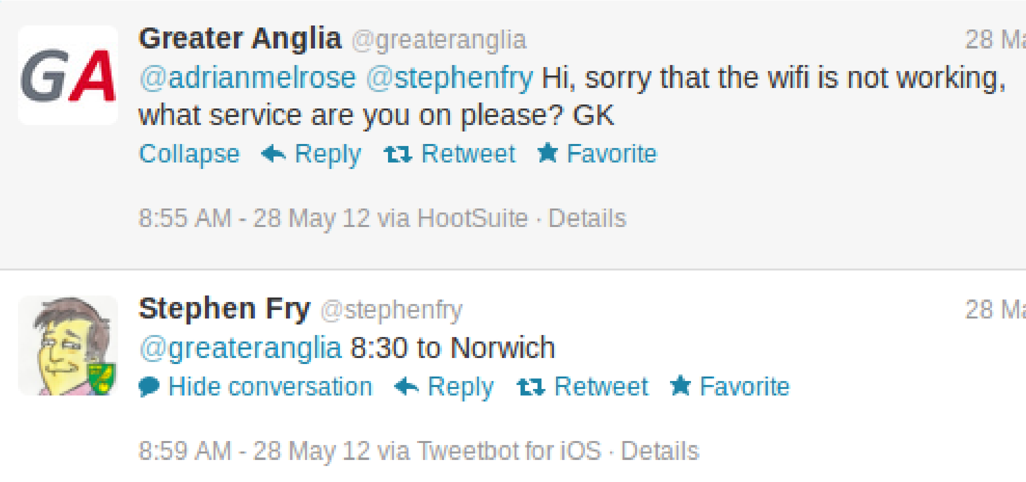
Broadcasting & Activism

Ars Technica
SOPA opponents unveil "Digital Bill of Rights" http://arstechnica.com/tech-policy/20 ... by @nathanmattise

Social uses

「ジャム」 **Jam Gregory**
@RyanBibby: lots of people have been talking about it - need to make sure I watch it! Love @ninaconti, got a signed DVD at #EdFringe :D

Conversations/Customer Support



Greater Anglia @greateranglia 28 Ma

@adrianmelrose @stephenfry Hi, sorry that the wifi is not working, what service are you on please? GK

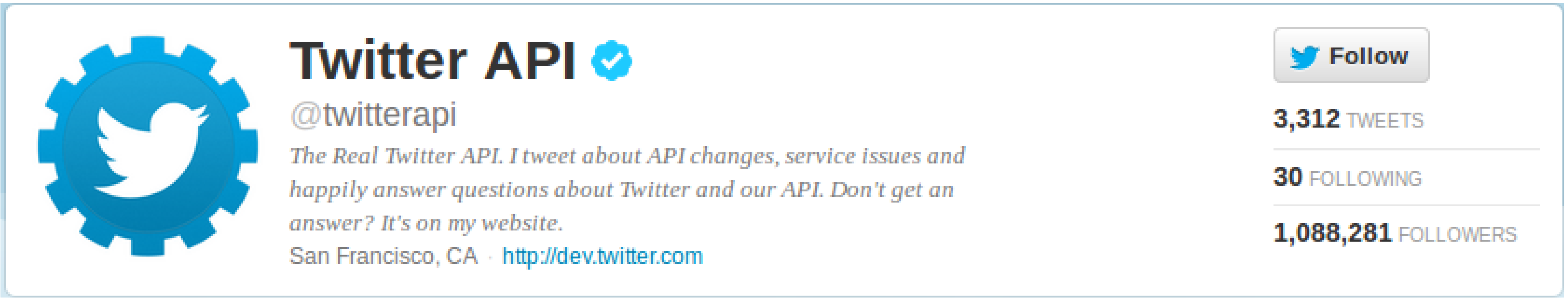
8:55 AM - 28 May 12 via HootSuite · Details

Stephen Fry @stephenfry 28 Ma

@greateranglia 8:30 to Norwich

8:59 AM - 28 May 12 via Tweetbot for iOS · Details

Twitter User Profiles



Twitter API

@twitterapi

The Real Twitter API. I tweet about API changes, service issues and happily answer questions about Twitter and our API. Don't get an answer? It's on my website.

San Francisco, CA · http://dev.twitter.com

3,312 TWEETS

30 FOLLOWING

1,088,281 FOLLOWERS

- Picture
- Name
- Location
- Website
- Bio (160 characters)

What is Twitter? (2)

Interest-graph social media

Following/follower relationship is typically not bi-directional

- 77.6% of user connections are not reciprocated (Kwak 2010)

A large graph in which mutual follower/following relationships comprise the edges

Twitterers can 'retweet' one another, so information propagates via the graph quickly

- RTs typically contain links to interesting content

Users can be organised in lists, which introduces groupings

Example Tweet metadata in JSON

```
{    "contributors":null,
     "text":"Automotive RDFa (a horribly researched SEO article on RDFa/Microformats):
     http://ow.ly/5JSoS #somanyerrorsitsfunny“,
     "geo":null,
     "retweeted":false,
     "in_reply_to_screen_name":null,
     "truncated":false,  "entities":{"urls":[{"expanded_url":null,"indices":
     [74,92],"url":"http://ow.ly/5JSoS"}],                              "hashtags":
     [{"text":"somanyerrorsitsfunny","indices":[93,114]}],
     "user_mentions":[]},
     "in_reply_to_status_id_str":null,
     "id":94029193863639040,
     "source":"<a href=\"http://www.hootsuite.com\" rel=\"nofollow\">HootSuite<\/a>“,
     "in_reply_to_user_id_str":null,
     "favorited":false,
     "in_reply_to_status_id":null,
     "retweet_count":0,
     "created_at":"Thu Jul 21 13:01:21 +0000 2011",
```

Example Tweet metadata in JSON (2)

```
 "in_reply_to_user_id":null,
"id_str":"94029193863639040“,
"place":{"id":"c799e2d3a79f810e",
          "bounding_box":{"type":"Polygon",
          "coordinates":[[[6.6266397,35.4928765],
                          [18.5203619,35.4928765],
                          [18.5203619,47.0924248],
                          [6.6266397,47.0924248]]]},
         "place_type":"country",  ←      Type of place, e.g. city
         "name":"Italia",
         "attributes":{},
         "country_code":"IT“,
         "url":"http:/…/1/geo/id/c799e2d3a79f810e.json",
         "full_name":"Italia",
         "country":"Italia"←          Country containing the place of origin

   },
```

More: https://courses.ischool.berkeley.edu/i202/f11/sites/default/files/map-of-a-tweet.pdf

Example Tweet metadata in JSON (3)

```
"user":{"location":"Blacksburg, VA",
        …,
        "statuses_count":2404,
        "lang":"en",
        "id":20446311,
         …,
        "description":“Text from the user profile (max 160 chars)", …,
        "name":“User Name", …,
        "created_at":"Mon Feb 09 16:33:16 +0000 2009",
        "followers_count":1239,
        "geo_enabled":false, …,
        "url":“The author’s URL (optional)",
        "utc_offset":-21600,
        "time_zone":"Central Time (US & Canada)", ..,
        "friends_count":160, …,
        "screen_name":“twitter-user-name", …,
        "listed_count":189, …

}, …
```

Embedded user information can become out-of-sync, if the user changes it later

More: https://courses.ischool.berkeley.edu/i202/f11/sites/default/files/map-of-a-tweet.pdf

How to get tweets?

The REST API allows access timelines, tweeting, following, etc.

- REST/JSON based
- Requires registration, and developer / app keys
- Contains access to what was previously the Search API
- Core entities: tweets, users, entities, places
- Heavily rate-limited

The Streaming API streams tweets in real time

- Various strengths available, from 1% to 100% sample (~$1M p.a.)
- May be filtered by language, location, user view, hashtag, search term

See https://dev.twitter.com/docs

2. LinkedIn

Opened in 2003 as a professional networking portal

Focus is on a CV-like profile

Allows connection to your contacts

Allows subscription and posting to forum-like groups

Event-focused rather than message focused

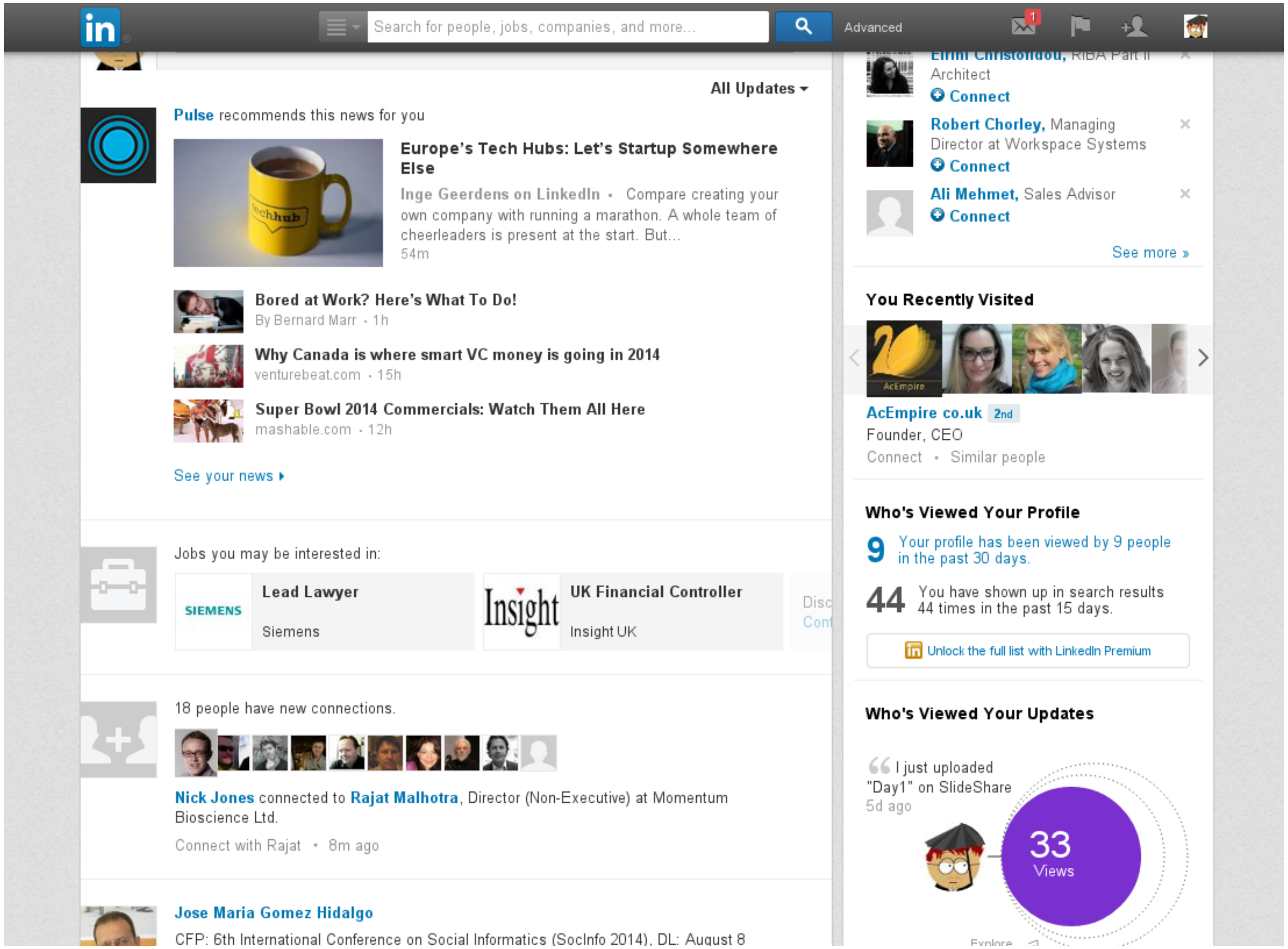
Posts can come from PC, mobile, SMS, iPad etc

260 million registered users

2. LinkedIn

Feed-based output; information on new relations

Focus on building networks: contact suggestions, contact history, people interested in you



All Updates

Pulse recommends this news for you

Europe's Tech Hubs: Let's Startup Somewhere Else
Inge Geerdens on LinkedIn • Compare creating your own company with running a marathon. A whole team of cheerleaders is present at the start. But...
54m

Bored at Work? Here's What To Do!
By Bernard Marr • 1h

Why Canada is where smart VC money is going in 2014
venturebeat.com • 15h

Super Bowl 2014 Commercials: Watch Them All Here
mashable.com • 12h

See your news ▸

Jobs you may be interested in:

SIEMENS	Lead Lawyer Siemens	Insight	UK Financial Controller Insight UK

Disc
Conf

18 people have new connections.

Nick Jones connected to **Rajat Malhotra**, Director (Non-Executive) at Momentum Bioscience Ltd.
Connect with Rajat • 8m ago

Jose Maria Gomez Hidalgo
CFP: 6th International Conference on Social Informatics (SocInfo 2014), DL: August 8

Eirini Christodoulou, RIBA Part II Architect
Connect

Robert Chorley, Managing Director at Workspace Systems
Connect

Ali Mehmet, Sales Advisor
Connect

See more »

You Recently Visited

AcEmpire co.uk 2nd
Founder, CEO
Connect • Similar people

Who's Viewed Your Profile

9 Your profile has been viewed by 9 people in the past 30 days.

44 You have shown up in search results 44 times in the past 15 days.

Unlock the full list with LinkedIn Premium

Who's Viewed Your Updates

I just uploaded "Day1" on SlideShare
5d ago

33 Views

Explore

2. LinkedIn

Data is available via API

No storage of data permitted: “**No LinkedIn data can be stored**”

- Except member ID
- User data can be stored only given explicit permission from that user
- Rationale: “LinkedIn users own their data. They need to have control over it. They might want to change it, change the visibility rules, or even delete it.”

Cross-referencing data is not permitted (via e.g. other networks)

- Creates problems for storing and communicating graph information
- Analysis must be live, but processing is not instantaneous – so no snapshots

API access is query driven: entities, items in streams

- Entities: people, stream, groups, mail, companies, job positions
- API is rate limited at application, user and developer level
- Limits quite high: e.g. 100k user profile queries per application per day

3. Facebook

Opened in 2004 as a university student directory

Communication is based on personal pages, to which messages are posted

Allows connection to your contacts

Allows subscription and posting to forum-like groups

Message focused, with comments and voting systems (unidirectional)

Posts can come from PC, mobile, SMS, iPad etc

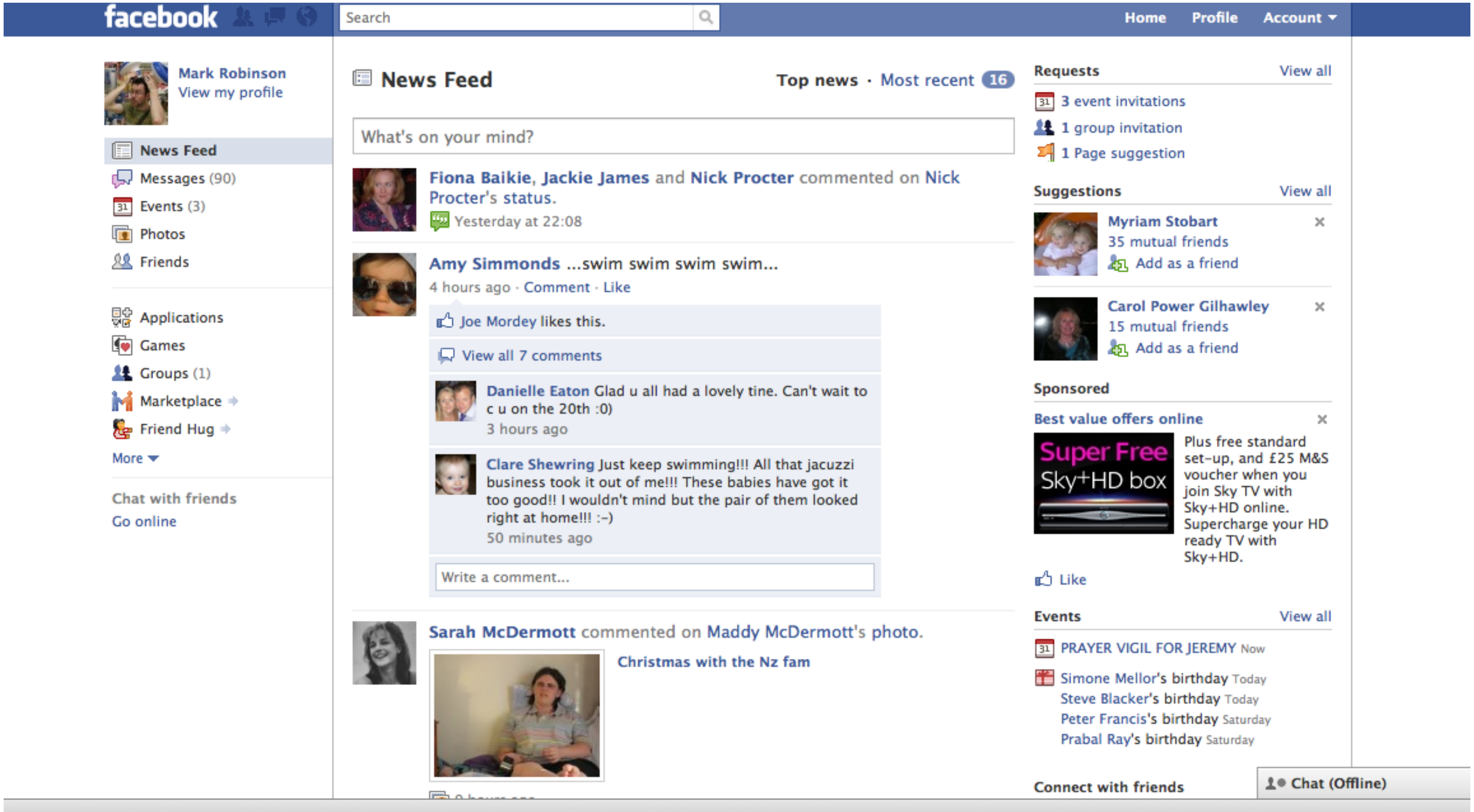
1 200 million registered users

Extensive privacy options for users

3. Facebook

News items, with comments and likes

Access network connections, events and private messaging



facebook

Search

Home Profile Account

Mark Robinson
View my profile

News Feed
Messages (90)
Events (3)
Photos
Friends

Applications
Games
Groups (1)
Marketplace
Friend Hug
More

Chat with friends
Go online

News Feed

Top news · Most recent 16

What's on your mind?

Fiona Baikie, Jackie James and Nick Procter commented on Nick Procter's status.
Yesterday at 22:08

Amy Simmonds ...swim swim swim swim...
4 hours ago · Comment · Like

Joe Mordey likes this.

View all 7 comments

Danielle Eaton Glad u all had a lovely tine. Can't wait to c u on the 20th :0)
3 hours ago

Clare Shewring Just keep swimming!!! All that jacuzzi business took it out of me!!! These babies have got it too good!! I wouldn't mind but the pair of them looked right at home!!! :-)
50 minutes ago

Write a comment...

Sarah McDermott commented on Maddy McDermott's photo.

Christmas with the Nz fam

Requests View all

3 event invitations
1 group invitation
1 Page suggestion

Suggestions View all

Myriam Stobart
35 mutual friends
Add as a friend

Carol Power Gilhawley
15 mutual friends
Add as a friend

Sponsored

Best value offers online

Super Free Sky+HD box

Plus free standard set-up, and £25 M&S voucher when you join Sky TV with Sky+HD online. Supercharge your HD ready TV with Sky+HD.

Like

Events View all

PRAYER VIGIL FOR JEREMY Now
Simone Mellor's birthday Today
Steve Blacker's birthday Today
Peter Francis's birthday Saturday
Prabal Ray's birthday Saturday

Connect with friends

Chat (Offline)

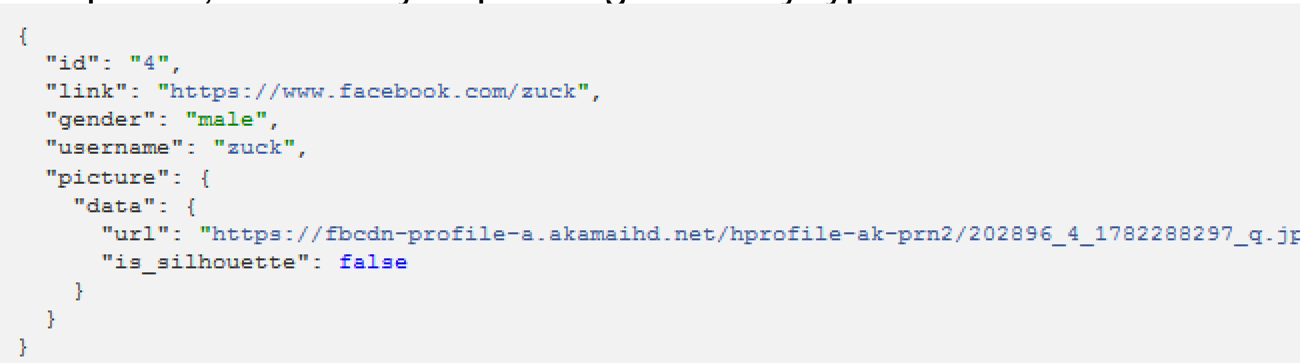
3. Facebook

Main APIs for facebook data access: Graph, Public Feed (also others for web hosting, ads)

REST and JSON-based

- GET graph.facebook.com /{node-id}
- GET graph.facebook.com /{node-id}/{edge-name}
- Also POST, DELETE

Example response; fields vary depending on entity type



```
{
  "id": "4",
  "link": "https://www.facebook.com/zuck",
  "gender": "male",
  "username": "zuck",
  "picture": {
    "data": {
      "url": "https://fbcdn-profile-a.akamaihd.net/hprofile-ak-prn2/202896_4_1782288297_q.jp
      "is_silhouette": false
    }
  }
}
```

Many different entity types (messages, links, photos, events, posts, payments, videos..)

Optional FQL access – Facebook Query Language

One extra API: Keyword Insights

- Access to demographic information given keywords, locations

Storing social media data

What would help us do our science?

- NLP and network analysis tools often data-driven, preferring “as much data as possible”
- Not only do the messages change over time – meta-information also
- A minimum: something that helps others reproduce your work
- Abstract annotations over the raw data != the raw data

What native data can we safely store?

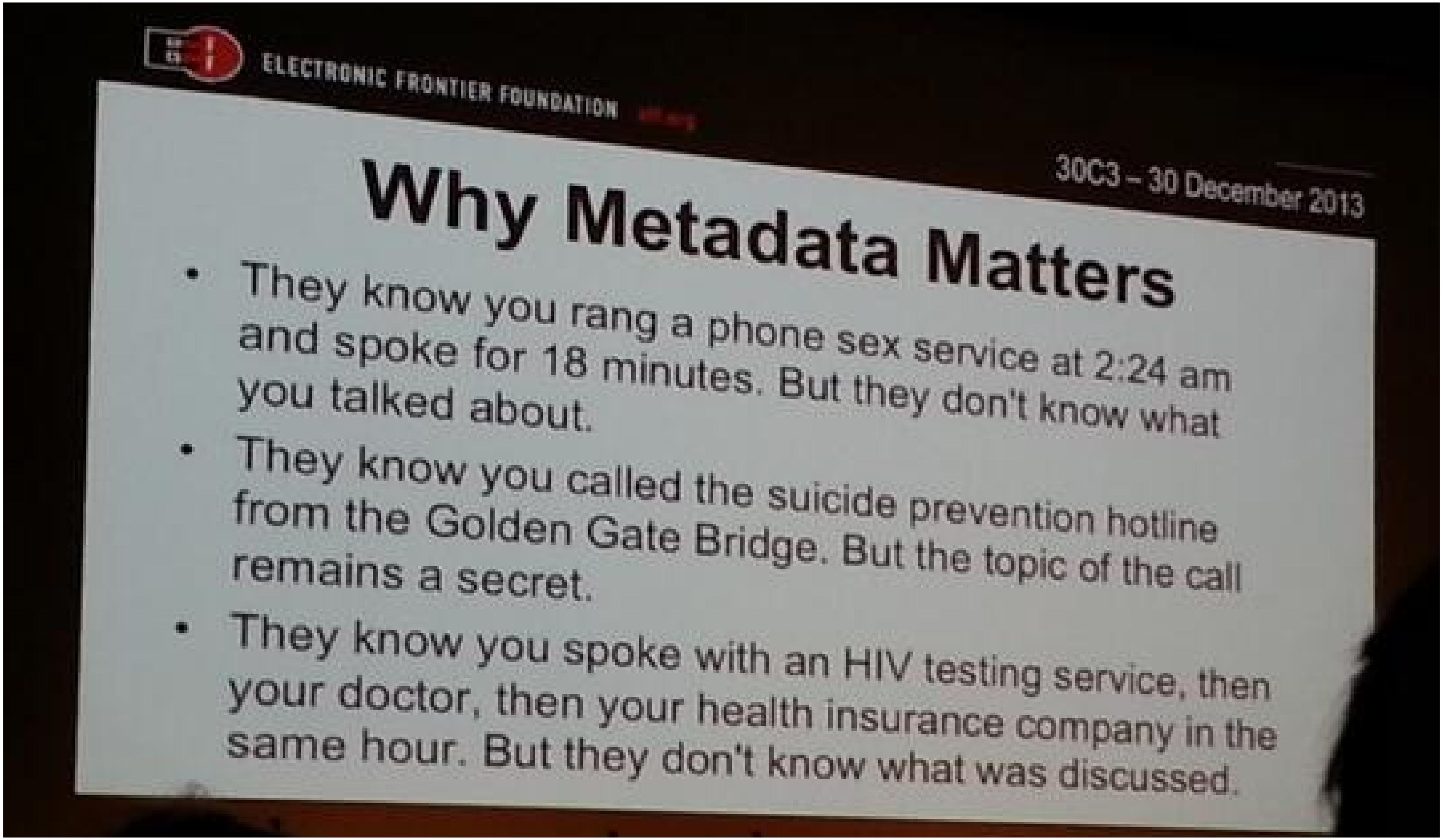
- LinkedIn: Object IDs only
- Twitter: IDs and the freshest seen API call result
- Facebook: Anything that the user has given us access to

Ethical considerations

- We all have something to hide (e.g. from identity thieves)
- Important that personal data cannot proliferate once its owner removes / changes it
- How long to retain for? NSA's minimum 15-year seems excessive

- **Metadata just as powerful as text data**
- **Text data weaker without metadata**

Storing social media data



ELECTRONIC FRONTIER FOUNDATION

30C3 – 30 December 2013

Why Metadata Matters

- They know you rang a phone sex service at 2:24 am and spoke for 18 minutes. But they don't know what you talked about.
- They know you called the suicide prevention hotline from the Golden Gate Bridge. But the topic of the call remains a secret.
- They know you spoke with an HIV testing service, then your doctor, then your health insurance company in the same hour. But they don't know what was discussed.

(from Kurt Opshal's slides at the Chaos Communication Congress, photo by Marion Marschalek)

Social media corpora

Distribution concerns

- Social media corpora are difficult to distribute
- E.g. Twitter does not allow you to give other researchers/companies/anyone tweets you have collected and annotated
- Instead, distribute the tweet IDs and stand-off markup for the linguistic gold data
- The recipient re-collects all tweets himself, based on the IDs
- Necessary so user-deleted tweets are not propagated – privacy
- LinkedIn has even more stringent data sharing policy
- Facebook more relaxed, but data recipient must also have express permission from user

Social media corpora

Corpus completeness

- However, in some cases (e.g. misinformation, smear tweets) messages can be deleted
- Makes re-creating the corpus is problematic
- Two classes of deletion:
  - Rapid deletions, usually within first few minutes (e.g. of spam, for editing the text)
  - Slower deletions (Petrovic et al. 2013)

Increased topic and entity drift: broader range of entities (Eisenstein 2013)

- Corpora age rapidly, and become less useful for some purposes (e.g. NEL)

Hands-on: Loading twitter data

Open corpora/plain-tweets.json with a text viewer (such as notepad)

Let's take a more useful view: find an online JSON viewer, and paste one line in. (e.g. “http://jsonviewer.stack.hu”)

Note the hierarchical structure of the data, and embedded user profile

Now, let's load some data into GATE. First, load the Twitter plugin

Create a new GATE corpus called “Raw tweets” and save to DS

Right-click on the corpus and choose “Populate from Twitter JSON files”

See that you can choose which fields to import or ignore

Select the JSON file used earlier, and make sure the “One document per tweet” box is checker, near the top

Import with default fields for now

Examine the different annotations in the document: text, username, date