

Aether

Real-time Recovery and
Visualization of Deleted Tweets

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Media Arts & Technology

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“I don't think I've ever felt so awkward
in my life. I WANT TO CRY ”



Deleted by @DanielleAndert in San Francisco after 2 days

Approach

Melding art & technology

Provoke thought and discussion

Make system to be re-used in future projects

Permanence

Once you publish something on the internet,
you can't truly *take it back*

You can *delete* your post, but
you never know who already has **your data**

Observation

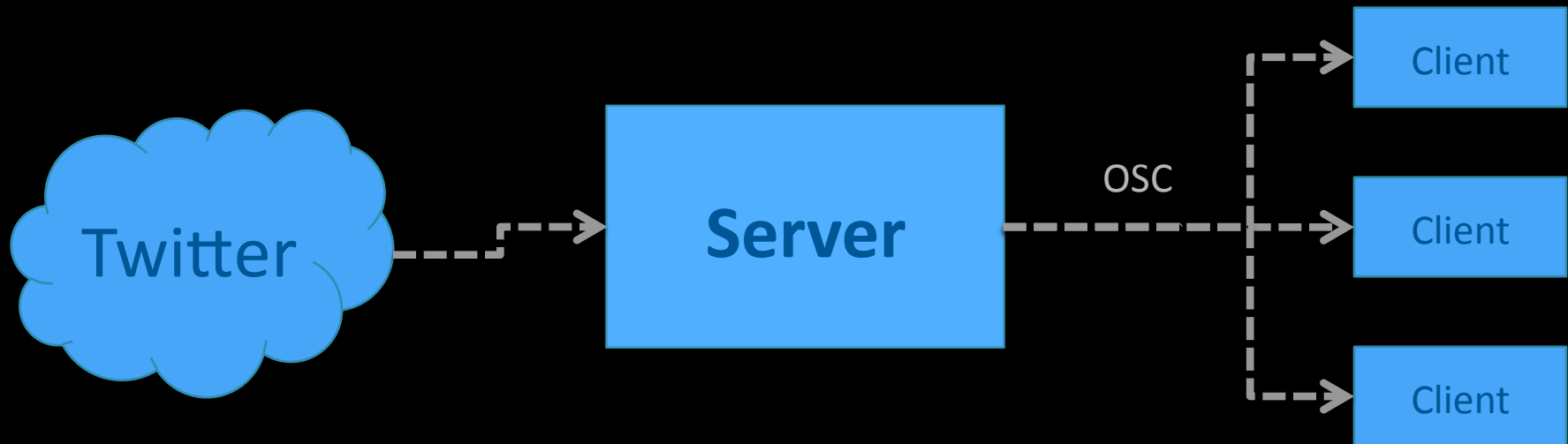
The act of deletion adds a **new dimension** to the data, inviting interpretation

No one really knows who is **watching**

Not a lot of research done on **erasing online identity**

Aether

Client-server software for real-time recovery and visualization of deleted tweets



Twitter

Twitter

Microblogging since 2006

“What are you doing, *right now?*”

Send short status updates (<140 char)

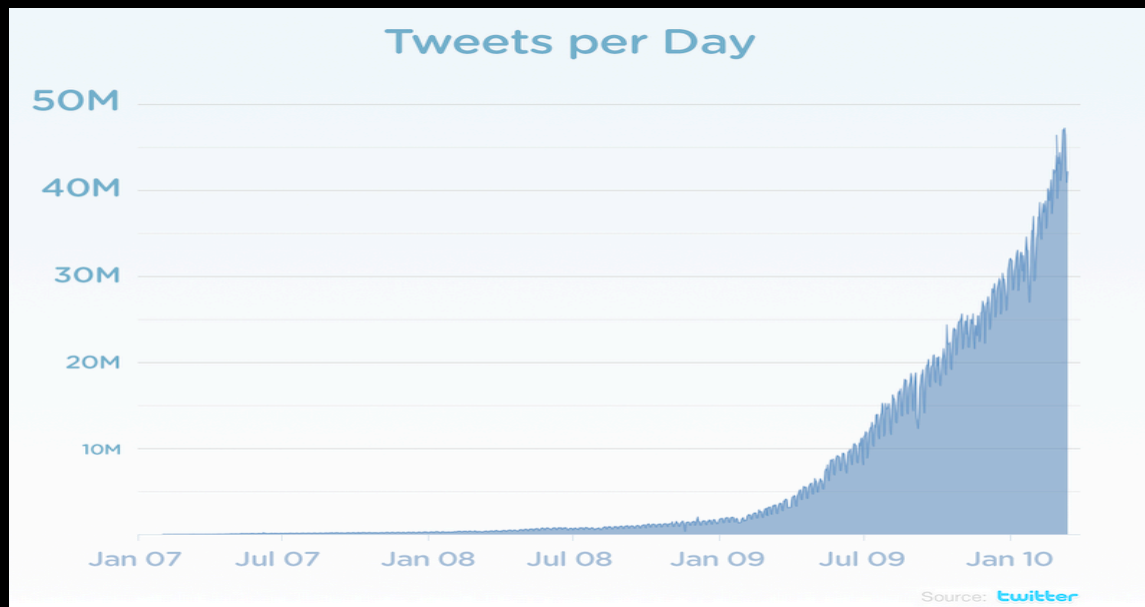
Follow interesting people, hope they follow back

Twitter

75 million registered accounts

15 million “active” in a month

50 million tweets per day in 2010



Twitter API

REST API: retrieving specific information

Search API: find tweets by keyword and location

Streaming API: real-time continuous TCP stream

Aether uses Streaming API & REST API

Twitter API

Data in XML, JSON or RSS Atom formats

Tweets come with User data inside

REST API is rate-limited

Stream API is downsampled

The Tweet (JSON)

```
{
  "id": 13094530000,
  "text": "Ok back not getting too bad. Hopefully I'll
          get some sleep.",

  "created_at": "Thu Apr 29 22:53:35 +0000 2010",
  "source": "<a href=\"http://ubertwitter.com
            \">UberTwitter</a>",

  "coordinates": {
    "type": "Point",
    "coordinates": [
      34.05,
      -118.25 ]
    }
}
```

The User (JSON)

```
"user": {  
  "screen_name": "fifinoir",  
  "name": "fiona",  
  "id": 17502304,  
  
  "followers_count": 63,  
  "friends_count": 127,  
  "statuses_count": 7038,  
  
  "lang": "en",  
  "created_at": "Thu Nov 20 02:36:19 +0000 2008",  
  "time_zone": "Edinburgh",  
  "utc_offset": 0,  
  
  "geo_enabled": true,  
  "location": "Anywhere you are!!",  
}
```

Using Twitter API

Twambulance: Real-world impacts of a Tweet

1) Continuously watch the SB County fire dispatch feed
`@sbcFireDispatch`

2) Look for tweets about Isla Vista:

`971 Embarcadero Del Mar *** Isla Vista *** Medical Emergency`

3) Turn on microphone at the window
and record the ambulance sounds



Deleted Tweets

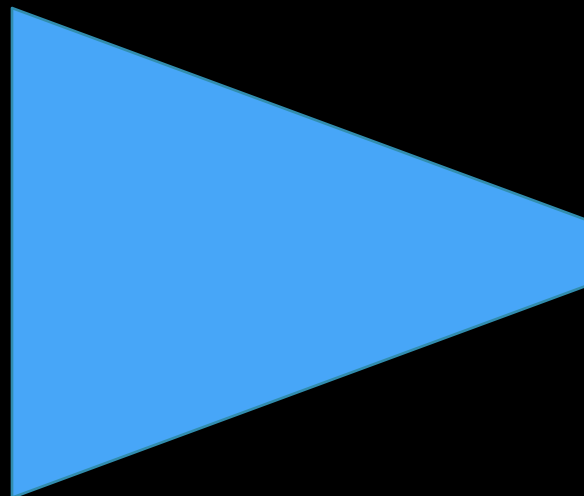
Recovering Deleted Tweets

Save all tweets from streaming API

Twitter sends deleted status ID

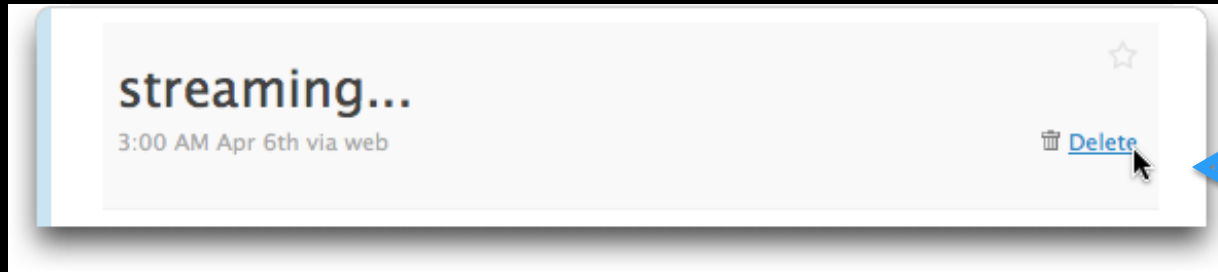
Check archive for each id

Saved 22,297



234 recovered

Recovering Deleted Tweets



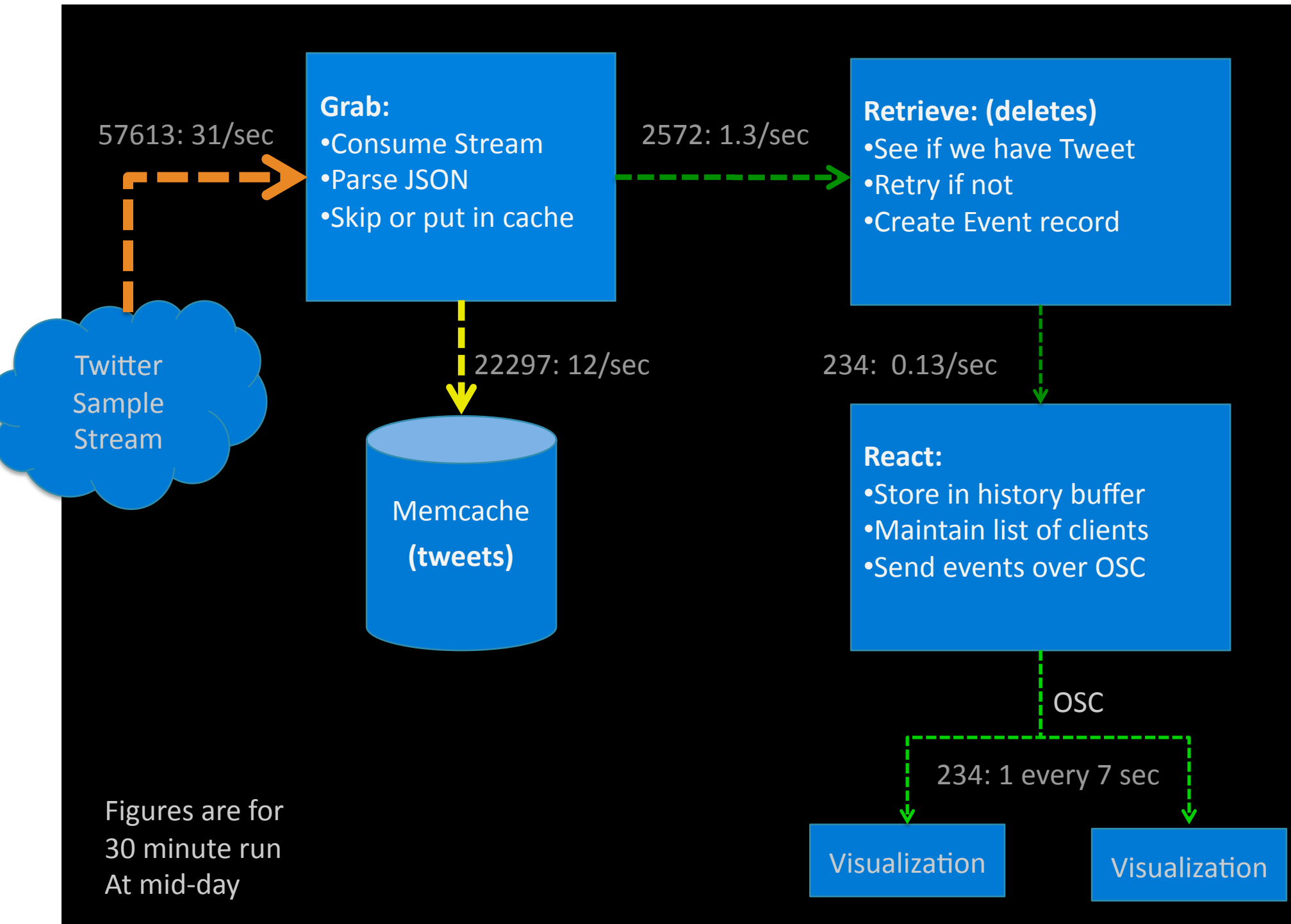
```
{:delete=>{:status=>{:user_id=>69114405, :id=>8408482002}}}
```

```
--Found! @M2pics out for 326s:
```

```
I'm so doing this tomorrow morning RT @mashable HOW TO:  
Spring Clean Your Twitter Account http://bit.ly/aWc7jz  
#social-media #twitter
```

```
This user has deleted 1/1 we have seen
```

```
---
```



Visualization

Visualizing Deleted Tweets

Present metrics to help viewers ponder
“Why do people delete their tweets?”

Two approaches:

User-centric: Who deletes their tweets?

Content-centric: What was deleted?

Things to look at

Server data rates:

Dynamic graph of estimated server throughput

Compare tweets per second and
deletes per second

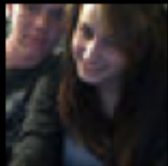


Things to look at

User details:

Who is this person?

What do they say about themselves?



Danielle Russo from **New York, NY, US** pressed delete **48 minutes** ago

"I'm just a young girl livin' in this crazy mixed up world3"

Things to look at

Context:

Other tweets sent around same time

May provide insight into reason for deletion

54m: Interesting: According to @Time, Iceland and Norway have the wo

1h: Interesting: According to @Times Iceland and Norway have the w

2h: @WaikikiBeachwlk @thelotuspond BTW is that Ruth Chris 45 Anni

7m: Decided it was best not to say anything... Going to be a long day.

33m: Awake.

10h: Thanks again for tonight @keifel!

Things to look at

Lifetime:

How long was the tweet publicly available before being recalled?

Hints at how many people may have seen it

Minute



Hour



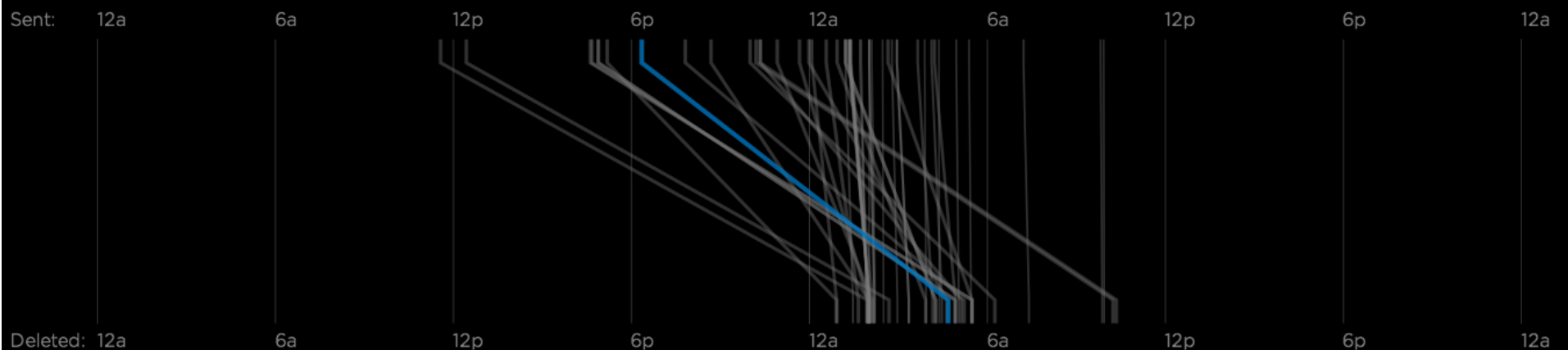
Day



Things to look at

Trajectory:

The path in time taken by the tweet



Things to look at

Recent Tweets

Most recent several tweets for comparison
Stamped with profile picture



[@DonnieWahlberg](#) I agree



THIS SITE GET 100 FREE TWITTER FOLLOWERS! <http://tinyurl.com/2fha2rf> .



[@AtheistRE](#) ...seems to be his bailiwick. Of course the Remnant Faithful daily prays fo



Which do you prefer? Money Can't Buy You Class or Tardy for the Party? <http://bit.ly>



I JUST HAVE FREE 100 TWITTER FOLLOWERS! <http://tinyurl.com/29dnlrp>



Sometimes people dont realize how we feel inside. they just assume & say things

Things to look at

Word frequencies:

Which words are most frequently deleted?

How does this compare to typical tweets?

i₂₂ to₁₇ the₁₅ a₁₄ and₁₂ is₉ love₉ me₉ of₈ it₇ its₇ on₇ be₆ my₆ you₆ for₅ have₅ lol₅ that₅ would₅ all₄ ap.
at₃ bowersox₃ but₃ com₃ dont₃ follow₃ much₃ new₃ now₃ other₃ te₃ thing₃ this₃ up₃ want₃ whole₃ ;
apart₂ audition₂ back₂ blog₂ building₂ call₂ cant₂ de₂ destroying₂ didnt₂ feel₂ final₂ finale₂ girl₂ glee
just₂ like₂ lovefest₂ made₂ need₂ no₂ off₂ oh₂ or₂ photo₂ que₂ retweet₂ see₂ should₂ show₂ shows₂

Results

Results

(Using sample stream – 5% of all tweets)

Skip up to 50% of the data (on purpose)

Save 40,000 tweets per hour

Check 4,600 deletions per hour

Recover 5-7% of deletions

~16% were deleted due to typo

Future Work

Revisit Database:

Store tweets in persistent database to increase lookback time

Need to solve performance issues

HTTP REST or Streaming API:

Allow others to access deleted tweet data

Aether becomes a public filter of the Twitter Stream

@Tweet_Morgue:

Twitter account that collects deleted tweets.

Could also send them back to their owner



@topmodeljasmin
Bronx, NY

“@FlyJeffOnDeck lol did u delete ur tweet about ur hard earned money?”

“@topmodeljasmin Yea I deleted a few... cuz I have a few stalkers who will go on my profile later today!!”



@FLYJEFFONDECK
Empire State, NY



This was later deleted too

