



Quantify Influence on Twitter

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Outline

- Quantify Influence on Twitter
 - Reason
 - Approaches
- Social Influence Applications
- Developing App with Twitter API
 - Key Features
 - User profile Crawling

Why Quantify Influence

- Understand Human behavior
 - Identify the important nodes
 - Community detection
- Marketing campaign
 - Information diffusion/propagation
 - Product adoption
 - Personal recommendation

The Approaches

- Quantify Influence on
 - User, tweets, topics...
- Common Measurements
 - In-degree, out-degree, rt count
 - Centrality
- Other Algorithm
 - K-shell
 - PangRank (and its variations)

Twitter Influence Applications

TweetStats
In ur Tweets, Graphin' Your Stats!

[Home](#) [Trends](#) [Donate](#)

Tweets per Day

Day	Tweets
Mon	521
Tue	633
Wed	669
Thu	489
Fri	459
Sat	332
Sun	406

Graph your Twitter Stats including
Tweets per hour
Tweets per month
Tweet timeline
Reply statistics
In use by nearly 1,000,000 Twitter-folk!

Enter your Twitter username

Graph My Tweets!

Looking for simple
Social Media Monitoring?

Brought to you by @dacort!

Refresh your stats - stats get updated when you come back after 8 hours and enter your username.

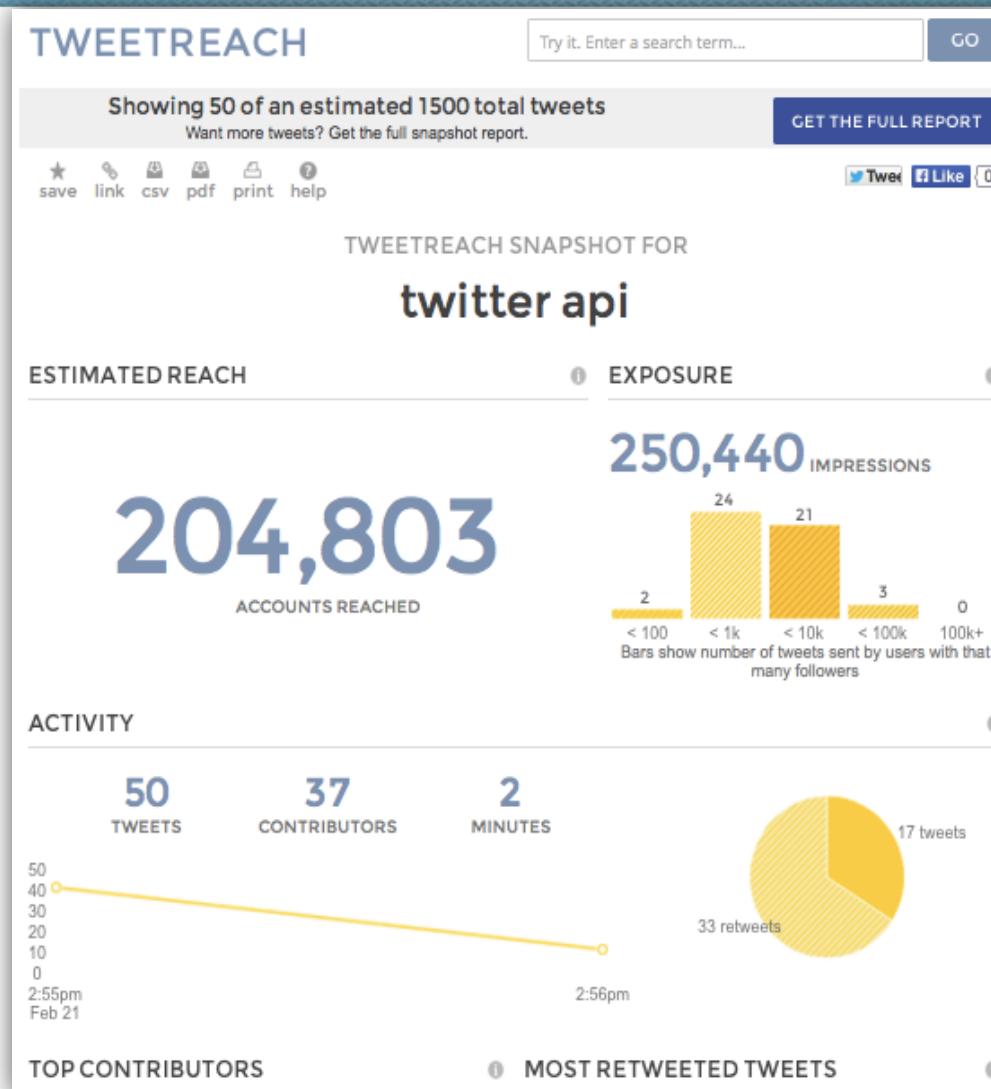
Interested in more detailed analytics?
Contact dacort at tweetstats.com

[BOOKMARK](#) ...

Donate

Made with love and lots of help by
[Damon Cortesi](#) aka (@dacort)

Twitter Influence Applications



Twitter Influence Applications



Simply Measured

Social Analytics

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Free Tools

Resources

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Free Social Media Analytics Tools

Try one of our free reports to analyze your brand across Twitter, Facebook, Google+ and more.



Free Twitter Follower Analysis

Learn about your Twitter followers, from interests to influence.



Free Twitter Customer Service Analysis

Measure your key customer service metrics on Twitter.

Twitter API: Numbers

- 1M applications
- 750K active developers
- 15B API requests per day

Twitter API: Key Features

- OAuth
 - Open standard for authentication
- Three APIs
 - REST, Search and Streaming
- Main Objects
 - Timeline, Status and User
- Rate Limits

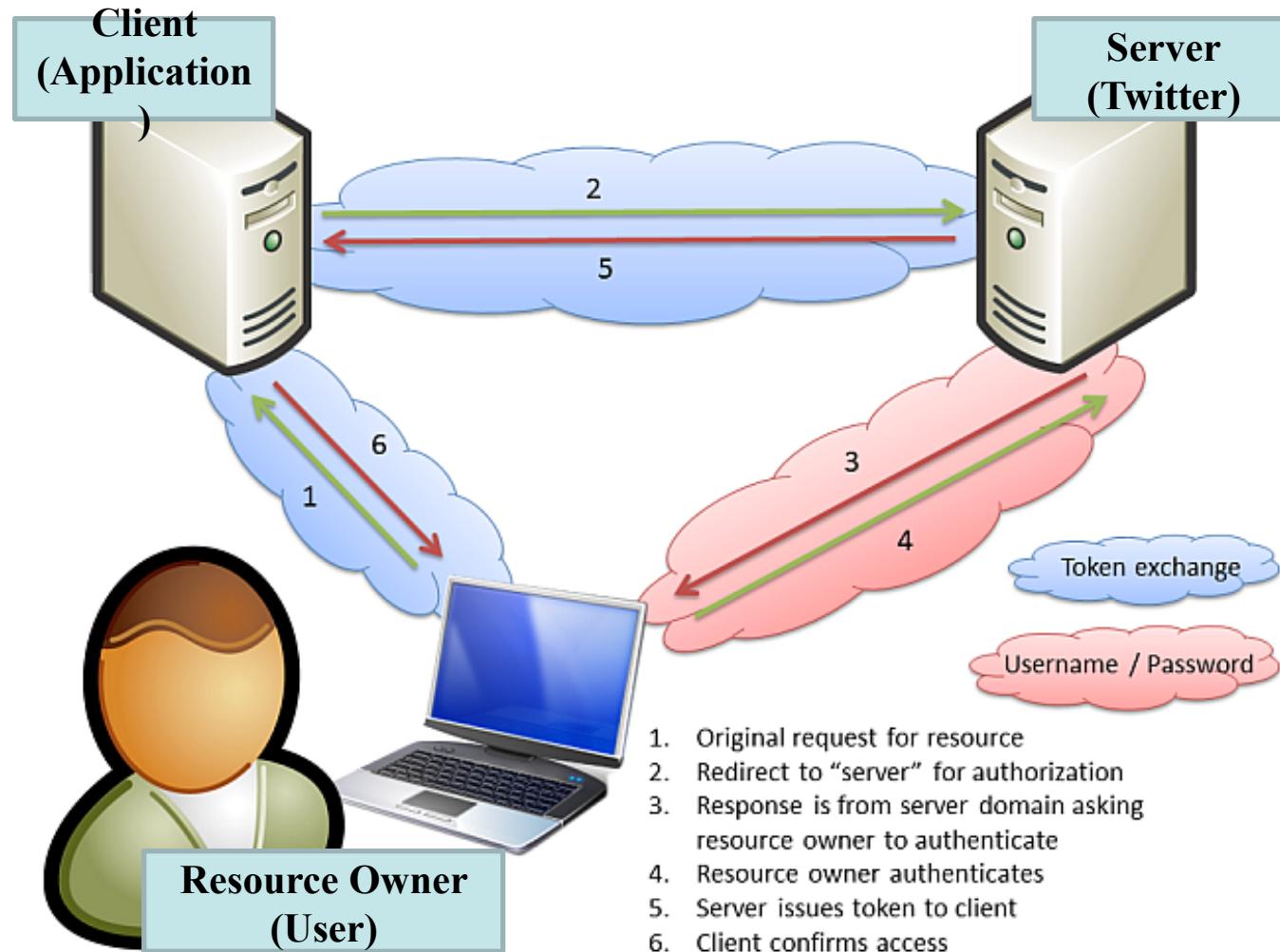
OAuth



- What is OAuth

- a method for clients (application) to access server resources (Twitter info.) on behalf of a resource owner (Twitter User)
- a process for resource owner to authorize third-party access to their server resources without sharing their credentials, using user-agent redirections.

OAuth Mechanism



1. Original request for resource
2. Redirect to “server” for authorization
3. Response is from server domain asking resource owner to authenticate
4. Resource owner authenticates
5. Server issues token to client
6. Client confirms access

Twitter API (REST API)

- REST API
 - Basic tweet functionality
 - Post tweet
 - Follow others,
 - Modify account settings, etc
 - All functions on the timeline
 - View tweets
 - Retweet etc

Twitter API (Search API)

- Search API
 - Discover trends
 - Real-time search index
 - By keywords
 - By user
 - By location

Twitter API (Streaming API)

- Streaming API
 - HTTP long-poll connection
 - Tweets in real-time
 - Sample of public tweets
 - Filter real-time tweets on
 - Keywords
 - Users etc.

Rate Limits

- **Per User Basis**
- **Time Window: 15 minute intervals**
 - REST API: 15 or 180 calls per window
 - Search API: will be rate limited at 180 queries per window
 - Streaming API: streaming cap (about 1% of the public stream)

Three Main Object

- Timeline
 - Orderings of tweets/**Status**
- Status
 - The tweet (text, author/**User**, location ...)
- User
 - Twitter user profile

Three Main Object (JSON)

DEPRECATED

```
{"id":>12296272736,  
"text":>  
"An early look at Annotations:  
http://groups.google.com/group/twitter-api-announce/browse_thread/thread/fa5da2608865453",  
"created_at":>"Fri Apr 16 17:55:46 +0000 2010",  
"in_reply_to_user_id":>nil,  
"in_reply_to_screen_name":>nil,  
"in_reply_to_status_id":>nil  
"favorited":>false,  
"truncated":>false,  
"user":>  
"id":>6253282,  
"screen_name":>"twitterapi",  
"name":>"Twitter API",  
"description":>  
"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.",  
"url":>"http://apiwiki.twitter.com",  
"location":>"San Francisco, CA",  
"profile_background_color":>"cldfee",  
"profile_background_image_url":>  
"http://a3.twimg.com/profile_background_images/59931895/twitterapi-background-new.png",  
"profile_background_tile":>false,  
"profile_image_url":>"http://a3.twimg.com/profile_images/689684365/api_normal.png",  
"profile_link_color":>"0000ff",  
"profile_sidebar_border_color":>"87bc44",  
"profile_text_color":>"000000",  
"profile_use_background_image":>true}
```

The tweet's unique ID. These IDs are roughly sorted & developers should treat them as opaque (<http://bit.ly/dCkppc>).

Text of the tweet.
Consecutive duplicate tweets are rejected. 140 character max (<http://bit.ly/4ud3he>).

The author's user ID.

The author of the tweet. This embedded object can get out of sync.

The ID of an existing tweet that this tweet is in reply to. Won't be set unless the author of the referenced tweet is mentioned.

The screen name & user ID of replied to tweet author.

The author's user name.

The author's screen name.

The author's biography.

The author's URL

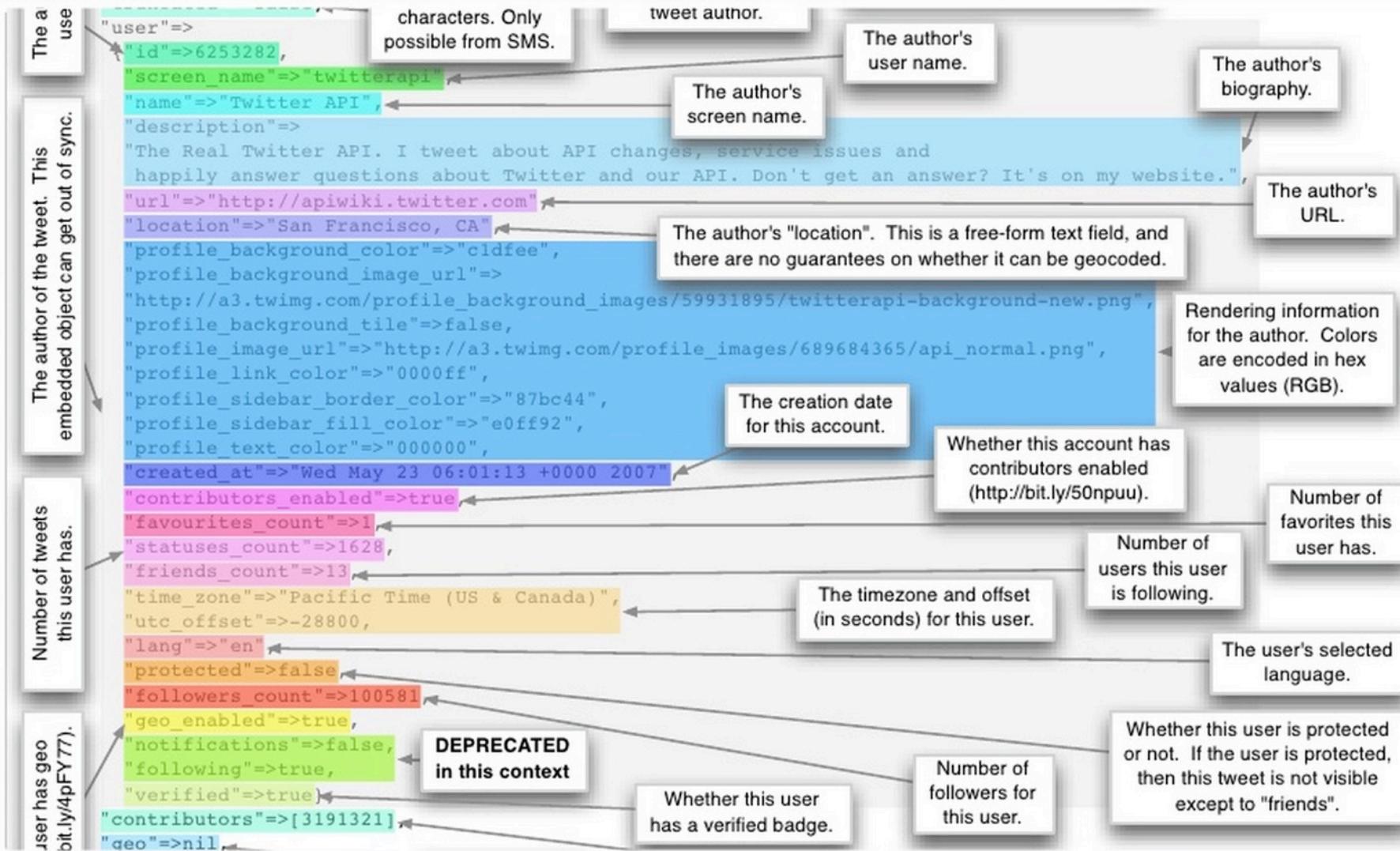
The author's "location". This is a free-form text field, and there are no guarantees on whether it can be geocoded.

The creation date

Rendering information for the author. Colors are encoded in hex values (RGB).



Three Main Object (JSON)



A case study for user profile crawling by using JAVA

DEVELOPING WITH TWITTER API

Required tools

- A Twitter developer ID
- Java
 - <https://www.java.com/en/download/>
- Eclipse (Optional): IDE for Java
 - <https://www.eclipse.org/downloads/>
- Twitter4j: Java library for Twitter API
 - <http://twitter4j.org/en/index.html#download>

Establish Twitter Account



Have an account? [Sign in](#) ▾

Join Twitter today.

Full name
 Enter your first and last name.

Email address

Create a password

Choose your username

Keep me signed-in on this computer.

By clicking the button, you agree to the terms below.
These Terms of Service ("Terms") govern your access to and use of the services, including our various websites, SMS, APIs, email

[Printable versions:](#) [Terms of Service](#) · [Privacy Policy](#) · [Cookie Use](#)

Create my account

Note: Others will be able to find you by name, username or email. Your email will not be shown publicly. You can change your privacy settings at any time.

Create Twitter App

- <https://apps.twitter.com>



Create Twitter App

Create an application

Application details

Name *

Your application name. This is used to attribute the source of a tweet and in user-facing authorization screens. 32 characters max.

Description *

Your application description, which will be shown in user-facing authorization screens. Between 10 and 200 characters max.

Website *

Your application's publicly accessible home page, where users can go to download, make use of, or find out more information about your application. This fully-qualified URL is used in the source attribution for tweets created by your application and will be shown in user-facing authorization screens.

(If you don't have a URL yet, just put a placeholder here but remember to change it later.)

Callback URL

Where should we return after successfully authenticating? OAuth 1.0a applications should explicitly specify their oauth_callback URL on the request token step, regardless of the value given here. To restrict your application from using callbacks, leave this field blank.

Create Twitter App

Create an application

Application details

Name *

Your application name. This is used to attribute the source of a tweet and in user-facing authorization screens. 32 characters max.

Description *

Your application description, which will be shown in user-facing authorization screens. Between 10 and 200 characters max.

Website *

<http://www.<abcdefg>.com>

Your application's publicly accessible home page, where users can go to download, make use of, or find out more information about your application. This fully-qualified URL is used in the source attribution for tweets created by your application and will be shown in user-facing authorization screens.

(If you don't have a URL yet, just put a placeholder here but remember to change it later.)

Callback URL

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Twitter App Keys

Your application has been created. Please take a moment to review and adjust your application's settings.

twit for dmsn

[Test OAuth](#)

[Details](#) [Settings](#) [API Keys](#) [Permissions](#)



an app for show to the dmsn

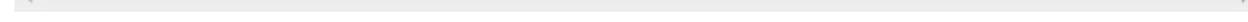
<http://tweet-dmsn.com/>

Organization

Information about the organization or company associated with your application. This information is optional.

Organization

Organization website



Application settings

Your application's API keys are used to [authenticate](#) requests to the Twitter Platform.

Access level

Twitter App Keys

Details Settings API Keys Permissions

Application settings

Keep the "API secret" a secret. This key should never be human-readable in your application.

API key

[REDACTED]

API secret

[REDACTED]

Twitter App Access Tokens

Your access token

You haven't authorized this application for your own account yet.

By creating your access token here, you will have everything you need to make API calls right away. The access token generated will be assigned your application's current permission level.



Twitter App Access Tokens

Your access token

This access token can be used to make API requests on your own account's behalf. Do not share your access token secret with anyone.

Access token

[REDACTED]

Access token secret

[REDACTED]

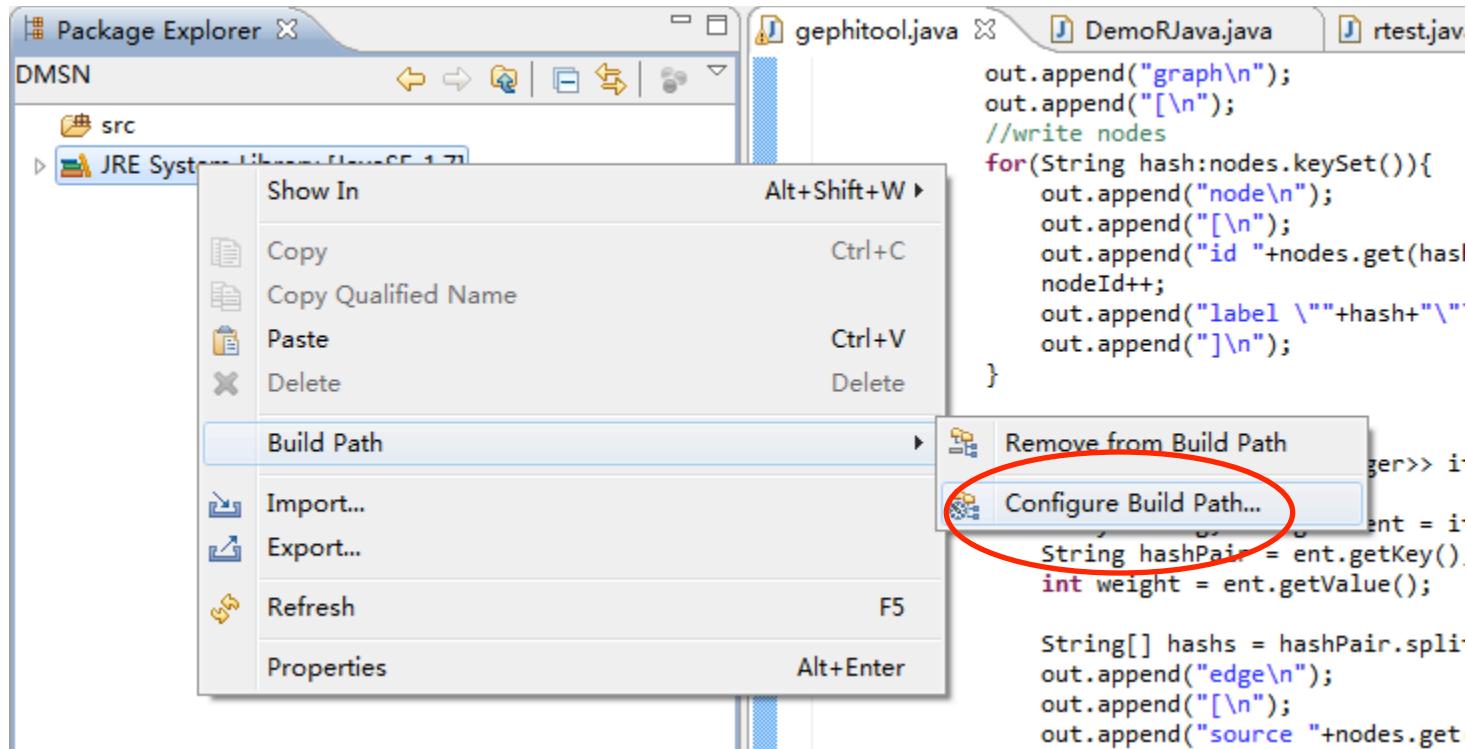
Twitter API credentials

- Get your API credentials ready
 - API key
 - API secret
 - Access token
 - Access token secret

Project for Twitter Crawling

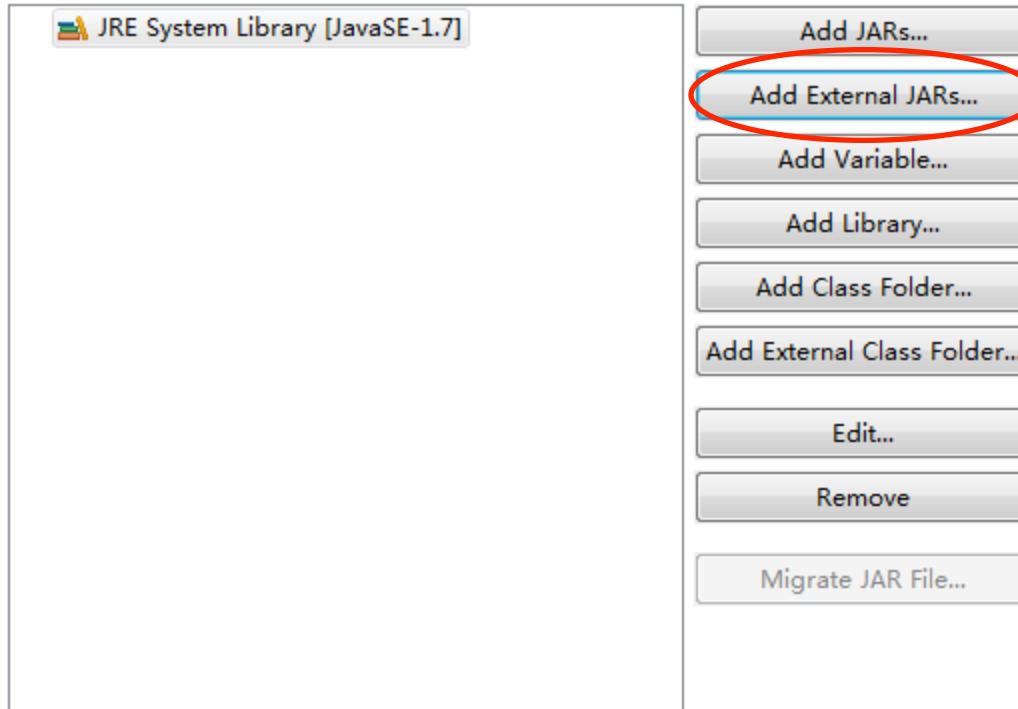
- Install Java & Eclipse
- Create a new project
- Twitter4j library:
 - Current version 4.0.2
 - all jar files under directory /lib

Twitter4j Library



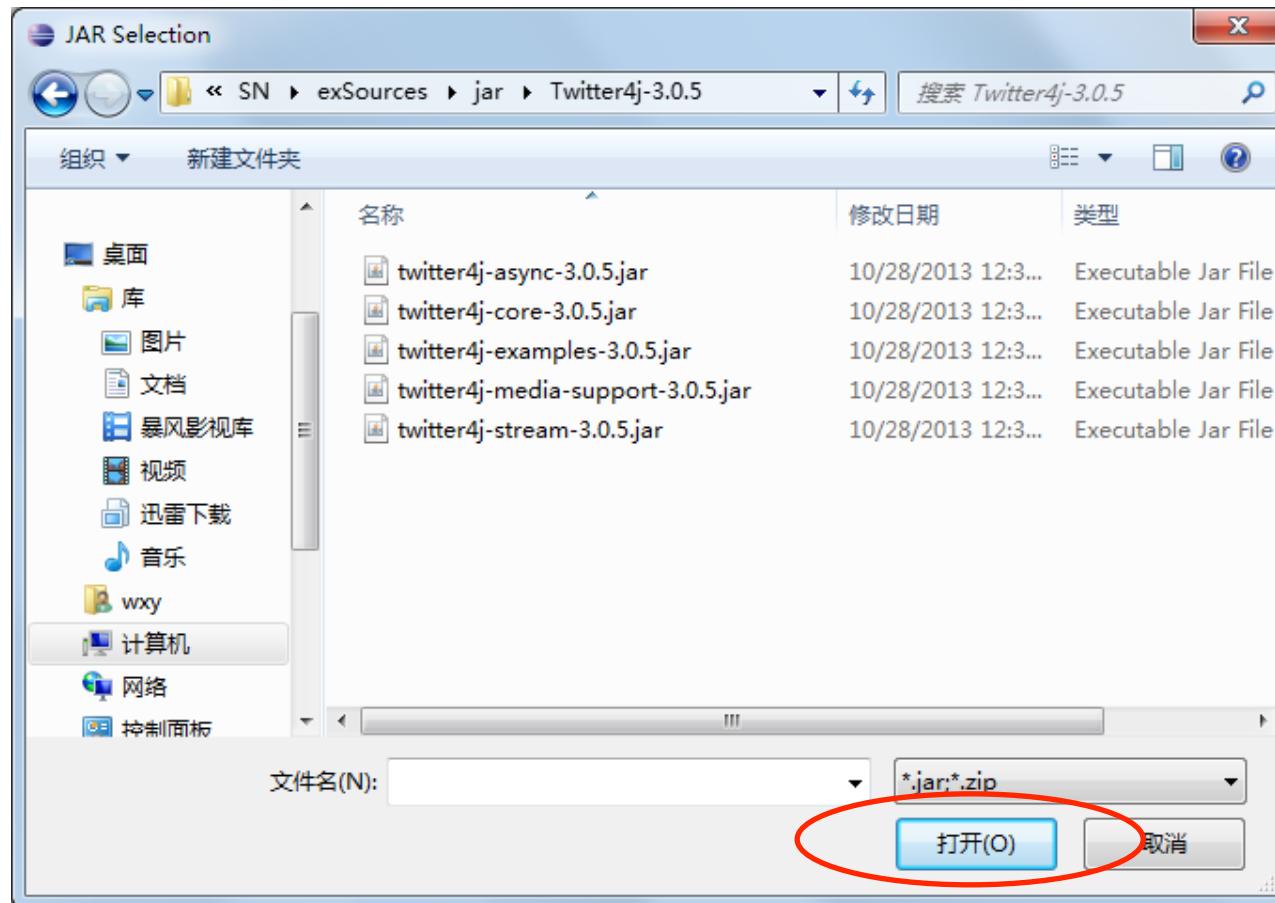
Twitter4j Library

JARs and class folders on the build path:

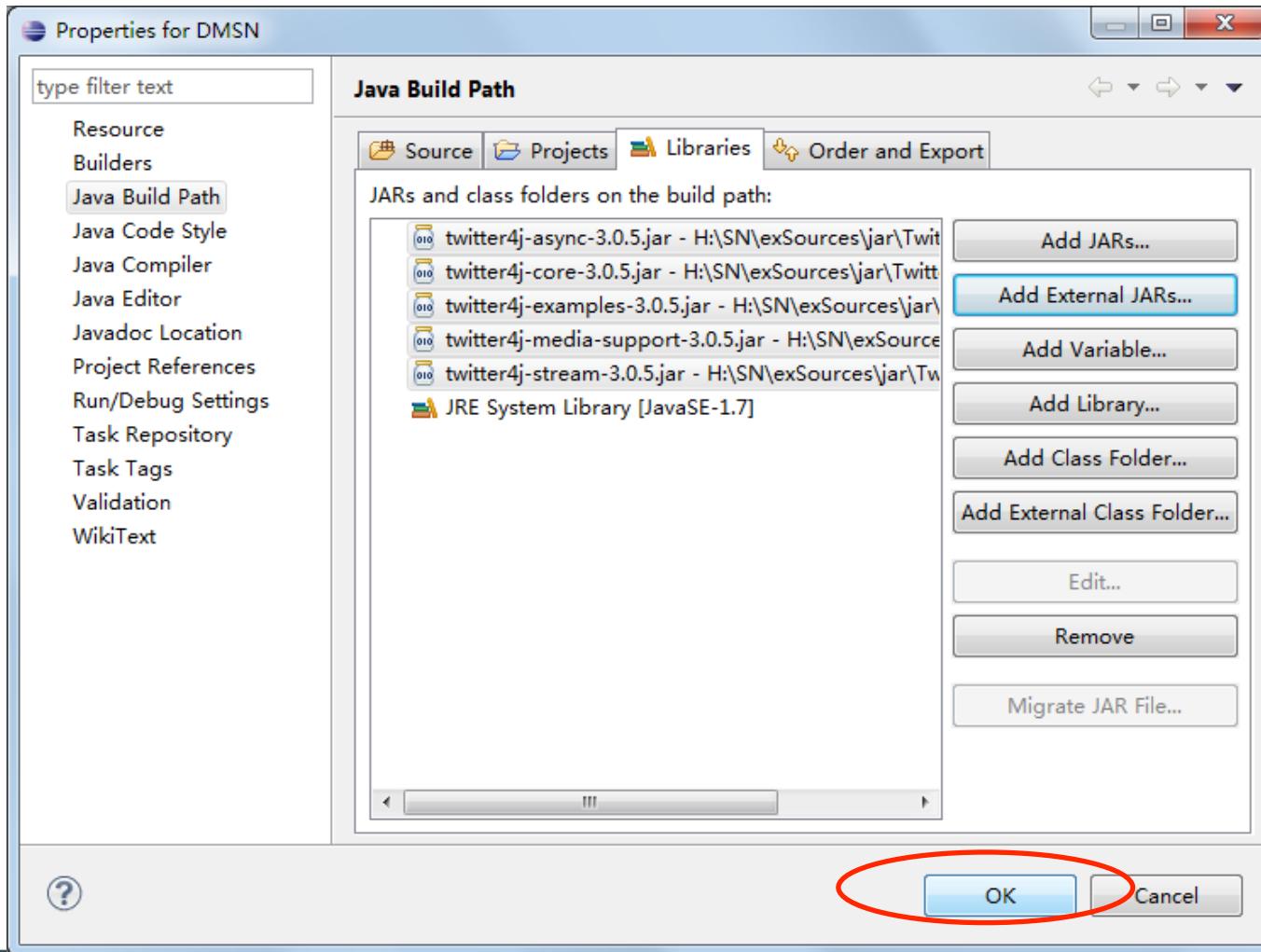


Twitter4j Library

- Twitter4j-4/lib/



Twitter4j Library



Twitter4j OAuth

```
import twitter4j.conf.ConfigurationBuilder;  
private ConfigurationBuilder OAuthBuilder() {  
    ConfigurationBuilder cb = new ConfigurationBuilder();  
    cb.setOAuthConsumerKey("YOUR API KEY");  
    cb.setOAuthConsumerSecret("YOUR API SECRET");  
    cb.setOAuthAccessToken("YOUR ACCESS TOKEN");  
    cb.setOAuthAccessTokenSecret("YOUR ACCESS TOKEN  
SECRET");  
    return cb;  
}
```

Twitter4: connect to Twitter

```
import twitter4j.TwitterFactory;
import twitter4j.conf.ConfigurationBuilder;
public ....{
    ConfigurationBuilder cb = OAuthBuilder();
    Twitter twitter = new
    TwitterFactory(cb.build()).getInstance();
    ...
}
```

Twitter4j: get user profile

```
import twitter4j.User;  
public ....0{  
    ConfigurationBuilder cb = OAuthBuilder();  
    Twitter twitter = new  
TwitterFactory(cb.build()).getInstance();  
    User user = twitter.showUser("USER NAME/USER  
ID")  
    System.out.println(user.getDescrption());  
    System.out.println(user.getCreatedAt());  
    ... ...  
}
```

Twitter4: User Object

- Access to all user's fields
 - getScreenName()
 - getFollowersCount()
 - getFriendsCount()
 - getStatus()
 - getRetweetCount()
 - etc...

Twitter4j: Handle rate limit

- Mining multiple user profile in short time
- Rate limit exception (twitter.showUser)
 - Error code: 88
 - Forbidden period
 - `getRateLimitStatus().getSecondsUntilReset();`
 - Solution: thread sleep

Twitter4j: Handle rate limit

```
import twitter4j.User;  
public ....0{  
    ... ...  
    try{  
        User user = twitter.showUser("USER NAME/  
USER ID")  
        ... ...  
    }catch (TwitterException e){  
        <continued in next page...>  
    }  
}
```

Twitter4j: Handle rate limit

```
catch (TwitterException e){  
    if(e.getErrorCode()==88){  
        System.err.println("Rate Limit exceeded!!!!!!");  
        try{  
            long time = e.getRateLimitStatus().getSecondsUntilReset();  
            .....  
            if(time>0)  
                Thread.sleep(SOME MOMENT – longer then time);  
        }catch(InterruptedException e1){  
            e1.printStackTrace();  
        }  
        continue;  
    }  
}
```

Other language

- Python
 - [tweepy](#)
 - [python-twitter](#)
- C++
 - [twitcurl](#)
- R
 - [twitterR](#)
- and many others...

Storing Data for Analysis

- Data Storing
 - Statistics (e.g. retweet count): csv file
 - Batch of User & Tweet: DBMS, e.g. MySQL
- Data Analysis
 - Data mining: Excel, Matlab, R
 - SNA: igraph, Gephi, NetworkX, etc

Reference

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- [2]. Eytan Bakshy, Jake M. Hofman, Winter A. Mason, and Duncan J. Watts. 2011. Everyone's an influencer: quantifying influence on twitter. In *WSDM '11*. 65-74.
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- [4]. Wikipedia, “Oauth”, <http://en.wikipedia.org/wiki/OAuth>
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