Application Programming Interface (API)

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What is an API?

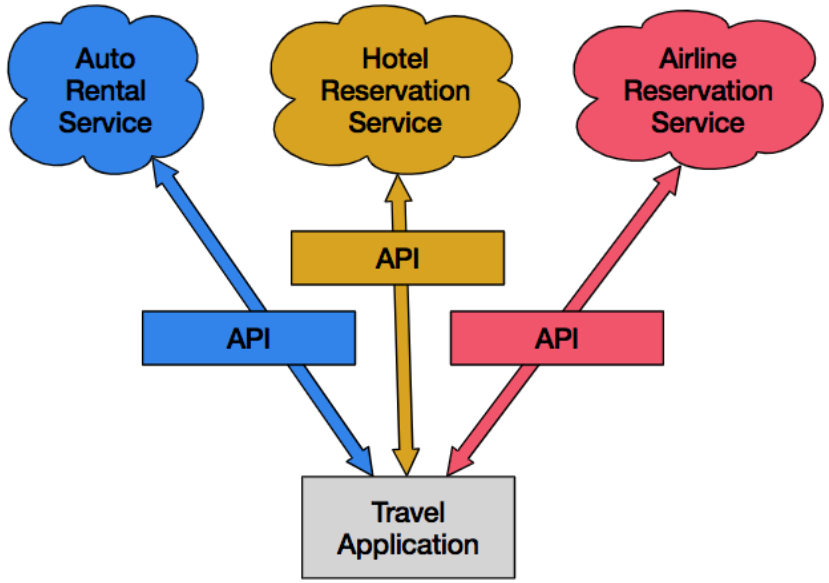
- Software that provides programs access to data on a remote server
  - Clients request data
  - Servers give a reply with the data
    - Typically in JSON
  - Like a waiter at a restaurant

client

server

Service Oriented Architecture (SOA)

- Application that uses the services of other applications
- If web-based then this is a web service



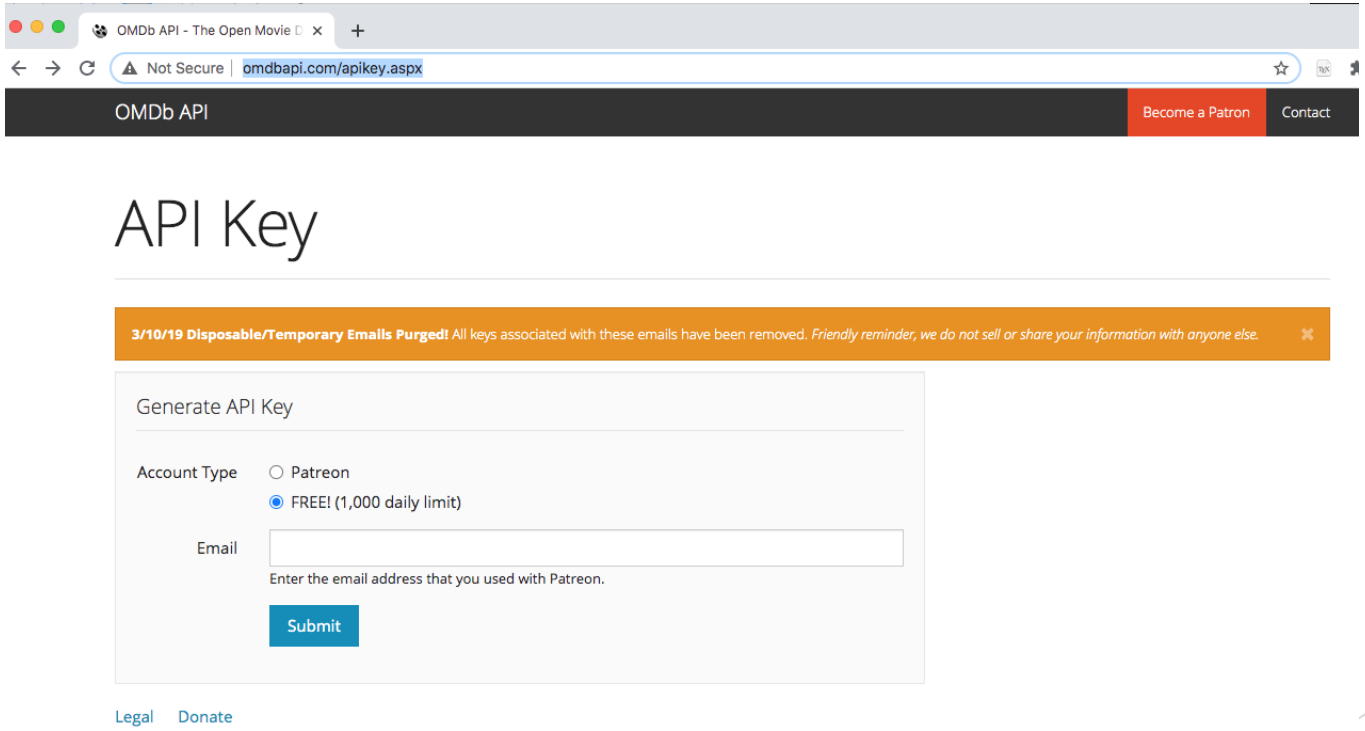
Security and API usage

- Servers may require a key
  - Want to know who is using the service and how much
  - May require billing information
    - Google Maps used to be open - Now requires an account
- Servers may require OAuth 2.0
  - Authorization framework to allow 3rd party applications to access a web service
  - https://oauth.net/

OMDB API

- Requires a key
  - Apply for one at http://www.omdbapi.com/apikey.aspx

Add to your API requests as apikey="your key"



API for OMDB

- http://www.omdbapi.com/

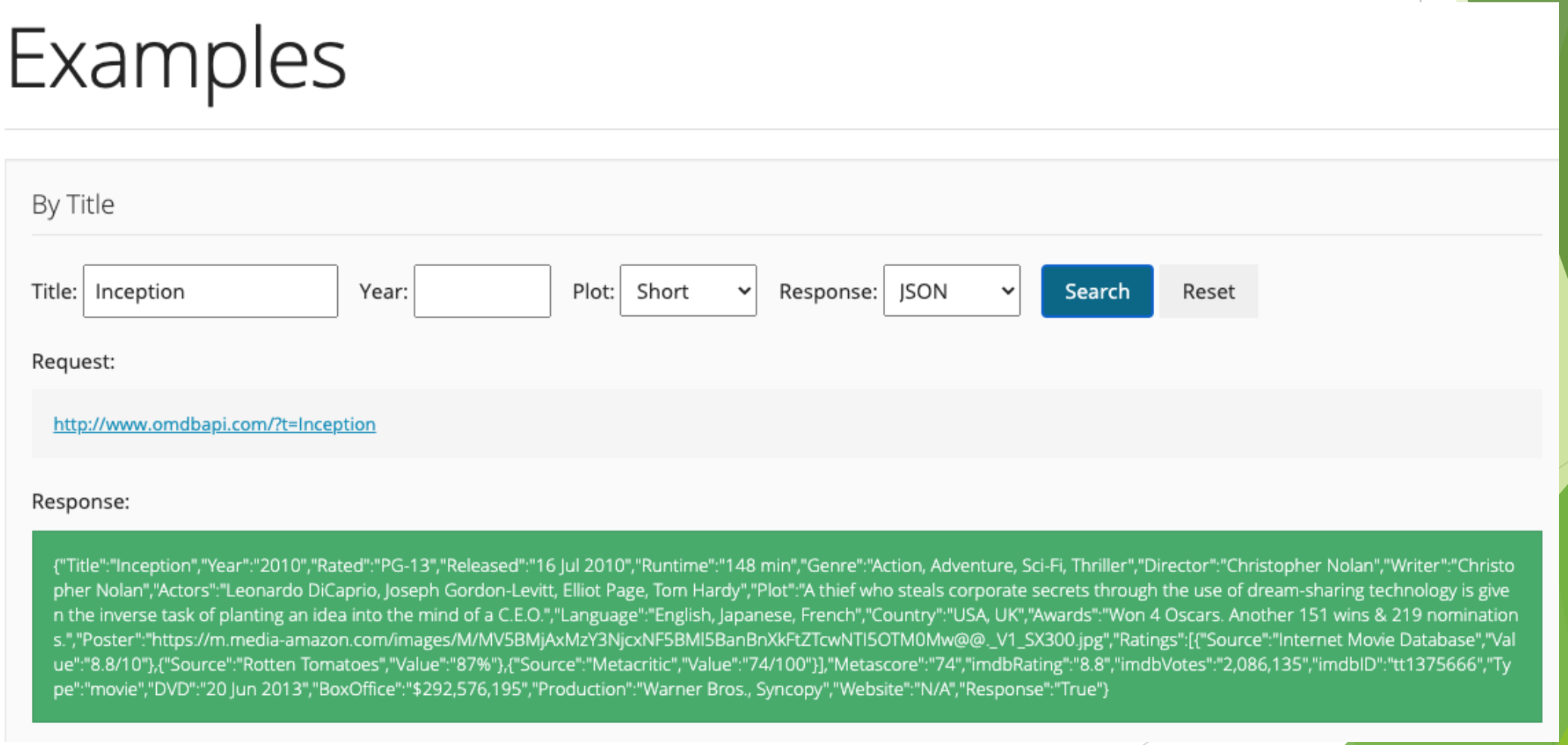
By ID or Title

Parameter	Required	Valid Options	Default Value	Description
i	Optional*		<empty>	A valid IMDb ID (e.g. tt1285016)
t	Optional*		<empty>	Movie title to search for.
type	No	movie, series, episode	<empty>	Type of result to return.
y	No		<empty>	Year of release.
plot	No	short, full	short	Return short or full plot.
r	No	json, xml	json	The data type to return.
callback	No		<empty>	JSONP callback name.
v	No		1	API version (reserved for future use).

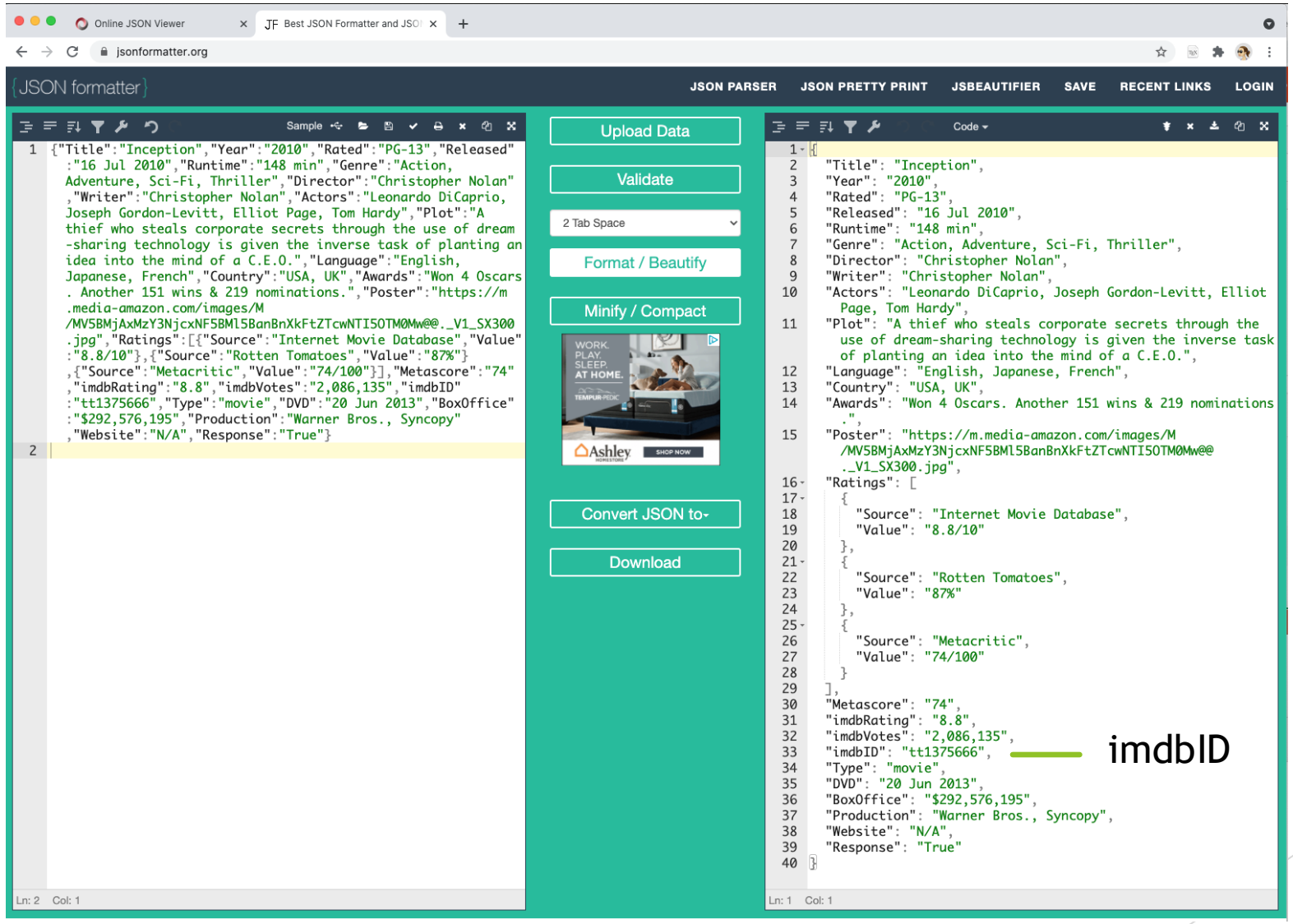
By Search

Parameter	Required	Valid options	Default Value	Description
s	Yes		<empty>	Movie title to search for.
type	No	movie, series, episode	<empty>	Type of result to return.
y	No		<empty>	Year of release.
r	No	json, xml	json	The data type to return.
page New!	No	1-100	1	Page number to return.
callback	No		<empty>	JSONP callback name.
v	No		1	API version (reserved for future use).

Example with OMDB - http://www.omdbapi.com/



Viewing the JSON - https://jsonformatter.org/



Using a separate file with key/Oauth

- It is best to not turn in your api keys with your final project
- Create a separate python file that defines the keys/Oauth information and name it *my_info.py*
  - omdb_key = "xxxxx"
- import the file
  - import my_info
- Use filename.value to access each value
  - my_info.omdb_key

How to Use an API key

- You can just add “?apikey=key” to the end of the url as a string. Separate other parameters with ‘&’

```
response = requests.get("http://www.omdbapi.com/?apikey=" +
my_key.omdb_key + "&t=" + title)
```

- You can create a dictionary and with a key of apikey and the key as the value and pass that to requests.get

```
r_dict = {}
r_dict["apikey"] = my_key.omdb_key
r_dict["t"] = title
response = requests.get("http://www.omdbapi.com/", params = r_dict)
```

Sample Code – api-test.py

```
import requests
import my_info

# get the title for the movie
title = input("Enter a title for a movie: ")

# put the parameters for the request in a dictionary
r_dict = {}
r_dict["apikey"] = my_info.omdb_key
r_dict["t"] = title

# get the response from the endpoint
#response = requests.get("http://www.omdbapi.com/?apikey=" + my_key.omdb_key + "&t=" + title)
response = requests.get("http://www.omdbapi.com/", params = r_dict)
print(response.status_code)
print(response.content)
```

Caching Response Data

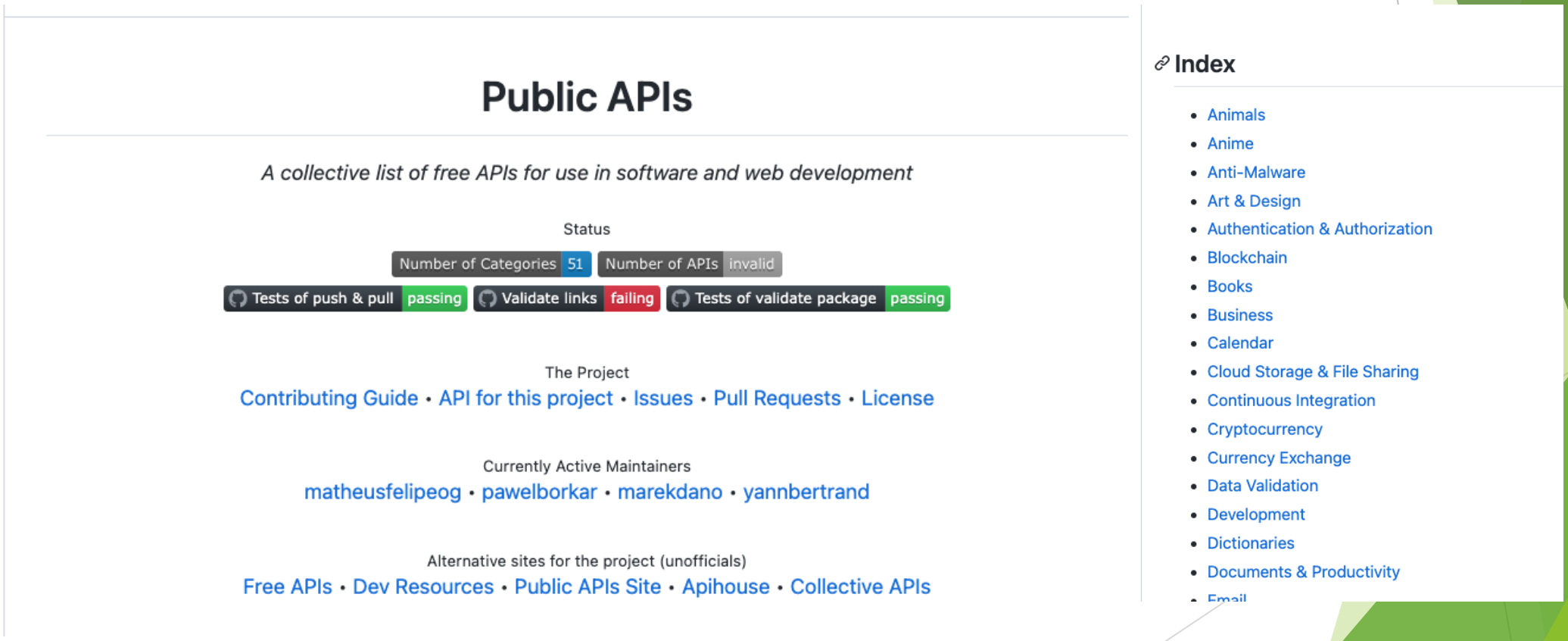
- Often you will need lots of data from a server
- Servers may limit the number of requests
  - Before a new request, check if you already have that data (look it up in a dictionary)
    - If so, return it
    - If not – do the request and save (cache) the results in a dictionary
      - Can also save to a file using JSON

Pros and Cons to Caching

- Pros
  - Reduces the load on the server
  - Makes your program run faster
  - Makes it easier to debug when you know the data format
- Cons
  - The data may change online

Free APIs

- https://github.com/public-apis/public-apis



Public APIs

A collective list of free APIs for use in software and web development

Status

Number of Categories 51 | Number of APIs invalid

Tests of push & pull passing | Validate links failing | Tests of validate package passing

The Project

Contributing Guide • API for this project • Issues • Pull Requests • License

Currently Active Maintainers

matheusfelipeog • pawelborkar • marekdano • yannbertrand

Alternative sites for the project (unofficials)

Free APIs • Dev Resources • Public APIs Site • Apihouse • Collective APIs

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Cat Facts

- Free API
  - Endpoints URLS for the resources
  - APIs often have more than one
- Models describe the data

https://alexwohlbruck.github.io/cat-facts/docs/

API Documentation

Base URL for all endpoints `https://cat-fact.herokuapp.com`

The response time will likely be a few seconds long on the first request, because this app is running on a free Heroku dyno. Subsequent requests will behave as normal.

Endpoints

`/facts` Retrieve and query facts

`/users` * Get user data

* Requires authentication. As of now, this can only be achieved by logging in manually on the website.

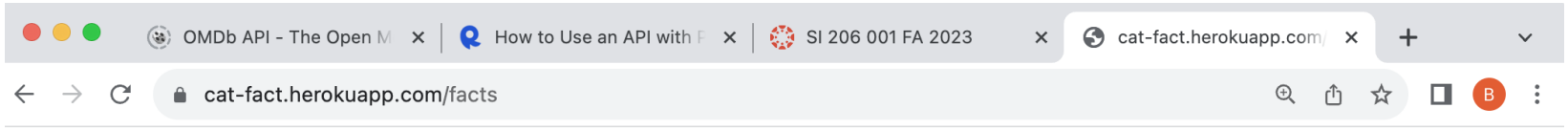
Models

`Fact` An animal fact

`User` A user of the Cat Facts site

Try it in a Browser

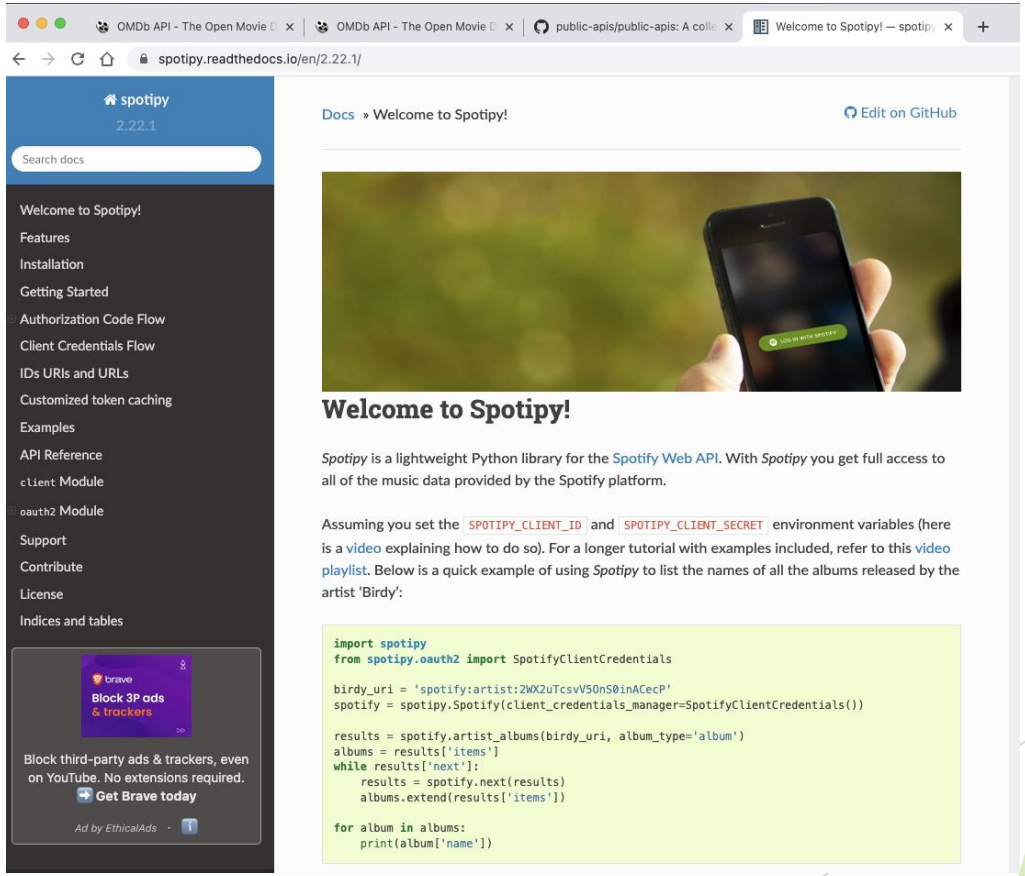
- https://cat-fact.herokuapp.com/facts



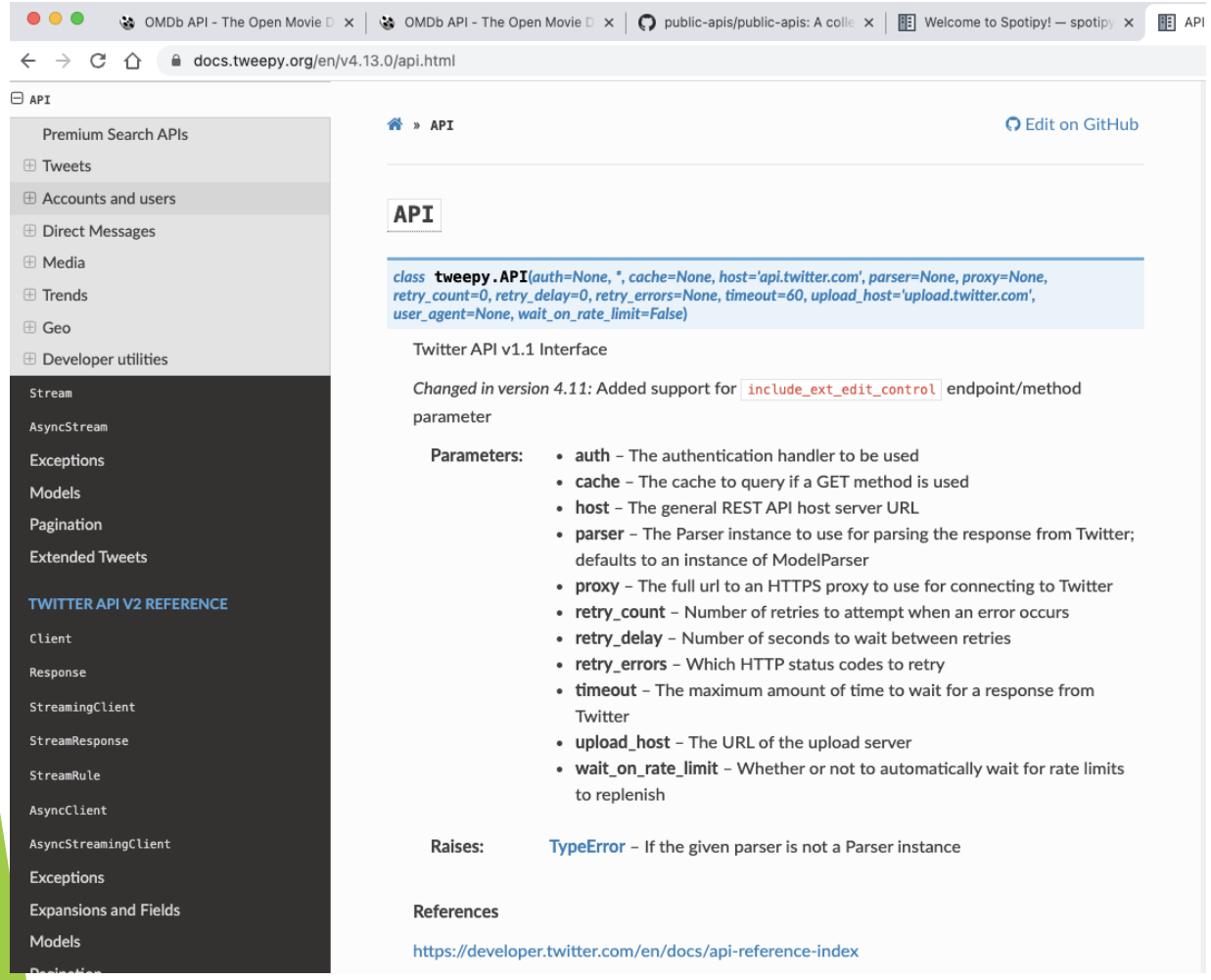

```
[{"status":
{"verified":true,"sentCount":1},"_id":"58e00b5f0
aac31001185ed24","user":"58e007480aac31001185ece
f","text":"When asked if her husband had any
hobbies, Mary Todd Lincoln is said to have
replied
\"cats.\"","__v":0,"source":"user","updatedAt":"
2020-08-
23T20:20:01.611Z","type":"cat","createdAt":"2018
```

There are Python Libraries that Make it Easier to get Data From APIs

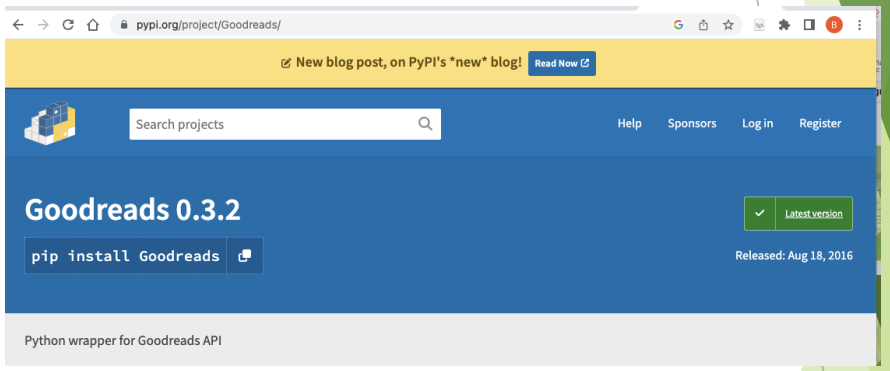
- Don’t use the Spotify API – use Spotipy
  - https://spotipy.readthedocs.io/en/2.22.1/
- Have to install the library



Other Libraries – Tweepy and Goodreads



Goodreads



How to Use an API
https://blog.hubspot.com/website/api-documentation

- Read the documentation
  - Every API is unique
- Check the Authorization
  - APIs will often require some type of authorization
    - apiKey - identifies you – request one
    - Oauth – more secure and complex
- Rate limits
  - How many requests can you send in a time period?
- Terms of Service – What is allowed?
- Look for Examples
- Look at the status codes and error messages

May have to Pay for Some Types of Access