APIs

Paul Bradshaw

What is an API (for)?

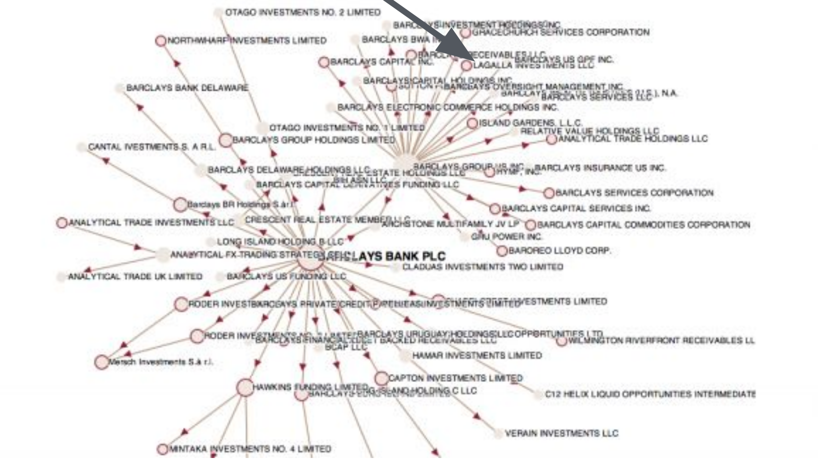
- **Interface** between your machine and a database
- Especially useful for getting the **latest** data
- And for getting **contextual** data

For example…

- The police API will give you the latest crime data for a particular force/location
- The postcodes.io API will give you the constituency etc for a given postcode
- TheyWorkForYou's API will give you the MP/party representing that postcode

opencorporates

“For this keyword, give me a list of companies & their directors”


OTAGO INVESTMENTS NO. 2 LIMITED
GRACECHURCH SERVICES CORPORATION
NORTHWHARF INVESTMENTS LIMITED
BARCLAYS BWA
BARCLAYS CAPITAL INC.
RECEIVABLES LLC
BARCLAYS US GPF INC.
LAGALLA INVESTMENTS LLC
BARCLAYS BANK DELAWARE
BARCLAYS CAPITAL HOLDINGS INC
BARCLAYS OVERSIGHT MANAGEMENT INC.
BARCLAYS SERVICES LLC
BARCLAYS ELECTRONIC COMMERCE HOLDINGS INC.
OTAGO INVESTMENTS NO. 1 LIMITED
ISLAND GARDENS, L.L.C.
RELATIVE VALUE HOLDINGS LLC
BARCLAYS GROUP HOLDINGS LIMITED
ANALYTICAL TRADE HOLDINGS LLC
CANTAL IVESTMENTS S. A R.L.
BARCLAYS DELAWARE HOLDINGS LLC
BARCLAYS GROUP US INC.
HYMF, INC.
BARCLAYS INSURANCE US INC.
BARCLAYS CAPITAL DERIVATIVES FUNDING LLC
BARCLAYS SERVICES CORPORATION
Barclays BR Holdings S.à r.l.
BARCLAYS CAPITAL SERVICES INC.
ANALYTICAL TRADE INVESTMENTS LLC
CRESCENT REAL ESTATE MEMBER LLC
ARCHSTONE MULTIFAMILY JV LP
BARCLAYS CAPITAL COMMODITIES CORPORATION
GRJ POWER INC.
LONG ISLAND HOLDING B LLC
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ANALYTICAL FX-TRADING STRATEGY
BARCLAYS BANK PLC
CLADUAS INVESTMENTS TWO LIMITED
ANALYTICAL TRADE UK LIMITED
BARCLAYS US FUNDING LLC
RODER INVEST
BARCLAYS PRIVATE CREDIT
INVESTMENTS LIMITED
RODER INVESTMENTS
BARCLAYS URUGUAY HOLDINGS LLC
OPPORTUNITIES LTD
BARCLAYS FINANCIAL
WILMINGTON RIVERFRONT RECEIVABLES LL
BCAP LLC
HAMAR INVESTMENTS LIMITED
Mersch Investments S.à r.l.
CAPTON INVESTMENTS LIMITED
HAWKINS FUNDING LIMITED
ISLAND HOLDING C LLC
C12 HELIX LIQUID OPPORTUNITIES INTERMEDIATE
VERAIN INVESTMENTS LLC
MINTAKA INVESTMENTS NO. 4 LIMITED

https://api.opencorporates.com/

Report / 23 Oct 2015

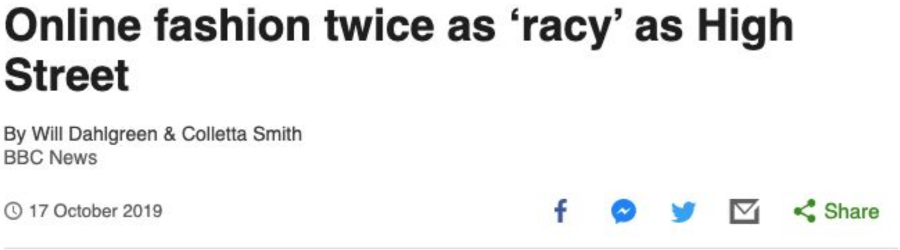
JADE: MYANMAR'S "BIG STATE SECRET"

The biggest natural resources heist in modern history?

Reconciliation with OpenCorporates API

Transliteration always introduces some ambiguity and there are often numerous ways to convert a specific company name from one script to another. Fortunately, OpenCorporates has a service that lets users find company names in the database that are near but not exact matches. This all happens via an 'endpoint' through which users can load the data they want to reconcile into OpenRefine. OpenCorporates will then return a likely set of matches against the company names you have imported. In the case of this investigation, many of the companies returned multiple matches. The mining, gems and trading arms of companies were often separated into different legal entities under the same name. Take for example, Max Burma Company: there is a general limited company, a gems and jewellery arm as well as a construction company.

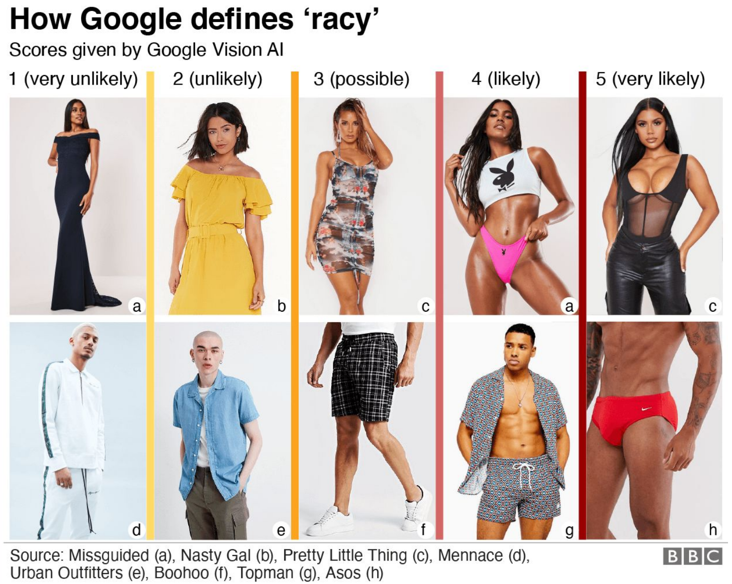
Made using the Open Corporates API (source)



Online fashion twice as ‘racy’ as High Street

By Will Dahlgreen & Colletta Smith
BBC News

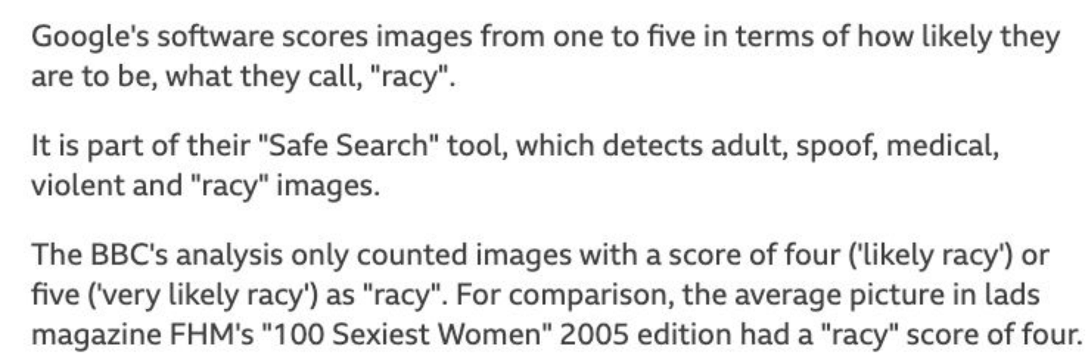
17 October 2019



How Google defines ‘racy’

Scores given by Google Vision AI

Source: Missguided (a), Nasty Gal (b), Pretty Little Thing (c), Mennace (d), Urban Outfitters (e), Boohoo (f), Topman (g), Asos (h)

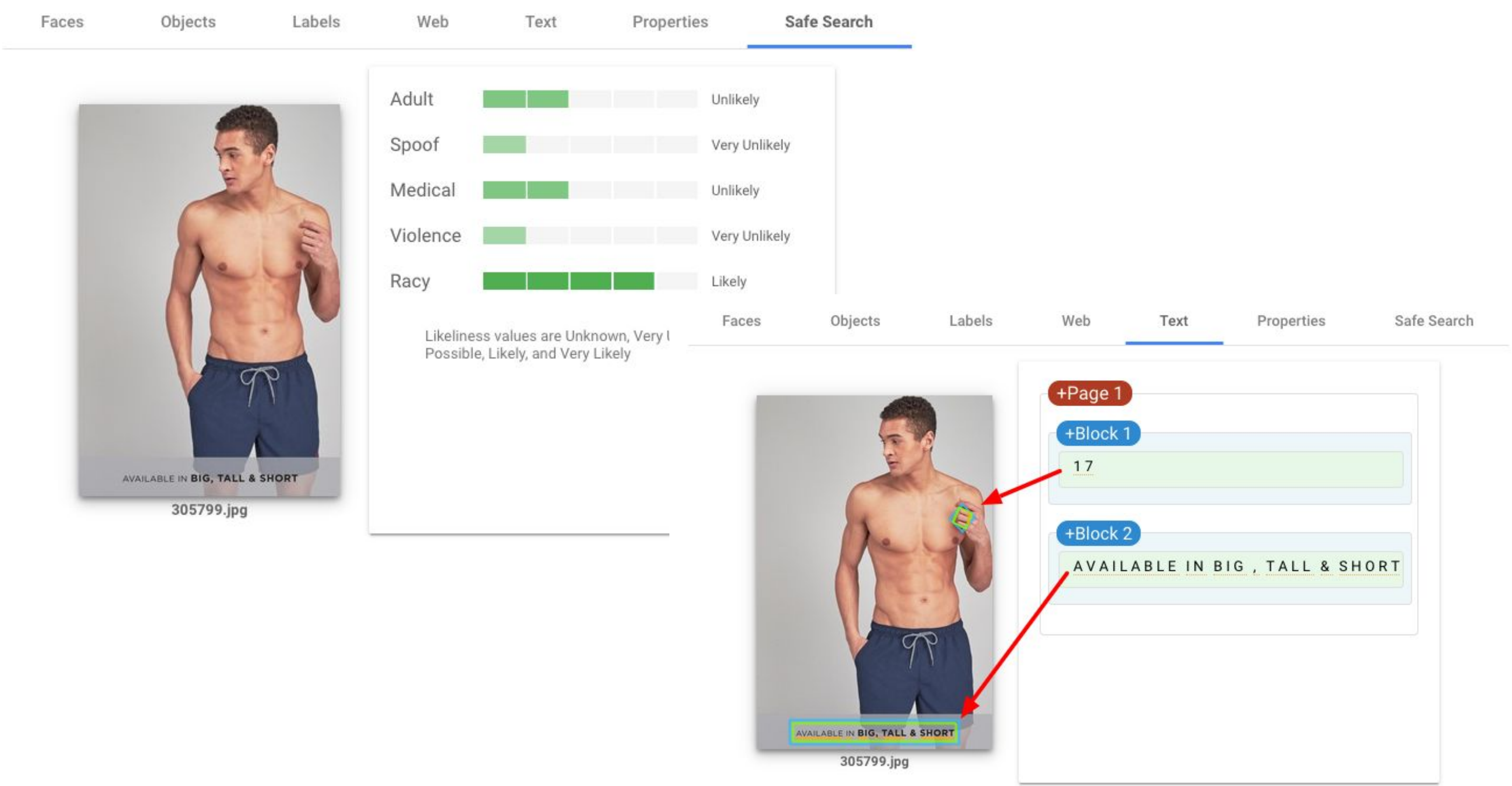


Google's software scores images from one to five in terms of how likely they are to be, what they call, "racy".

It is part of their "Safe Search" tool, which detects adult, spoof, medical, violent and "racy" images.

The BBC's analysis only counted images with a score of four ('likely racy') or five ('very likely racy') as "racy". For comparison, the average picture in lads magazine FHM's "100 Sexiest Women" 2005 edition had a "racy" score of four.

https://www.bbc.co.uk/news/business-49987037



305799.jpg

Adult	Unlikely
Spoof	Very Unlikely
Medical	Unlikely
Violence	Very Unlikely
Racy	Likely

Likeliness values are Unknown, Very U
Possible, Likely, and Very Likely

305799.jpg

+Page 1

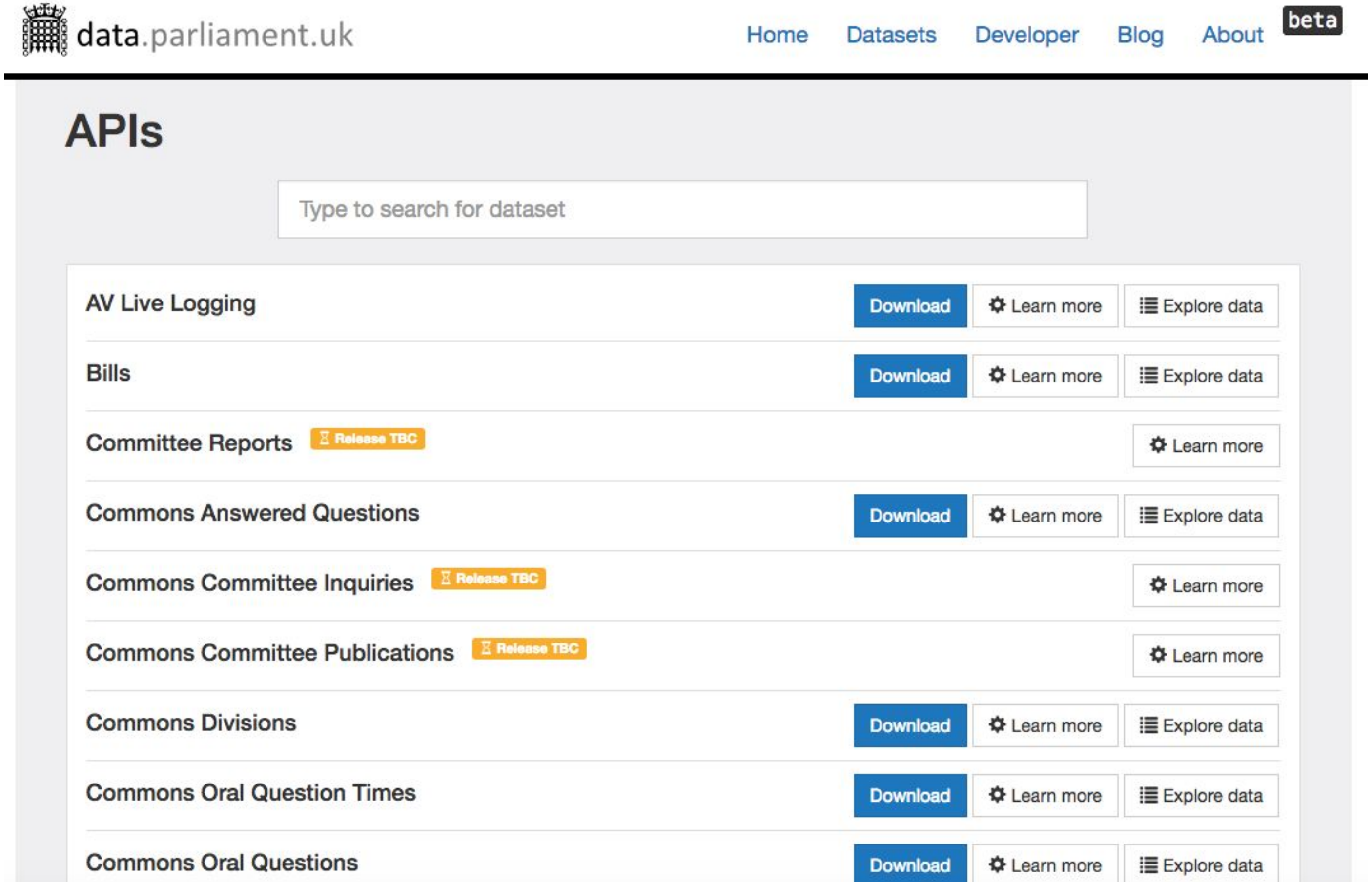
+Block 1

17

+Block 2

AVAILABLE IN BIG , TALL & SHORT

https://cloud.google.com/vision/



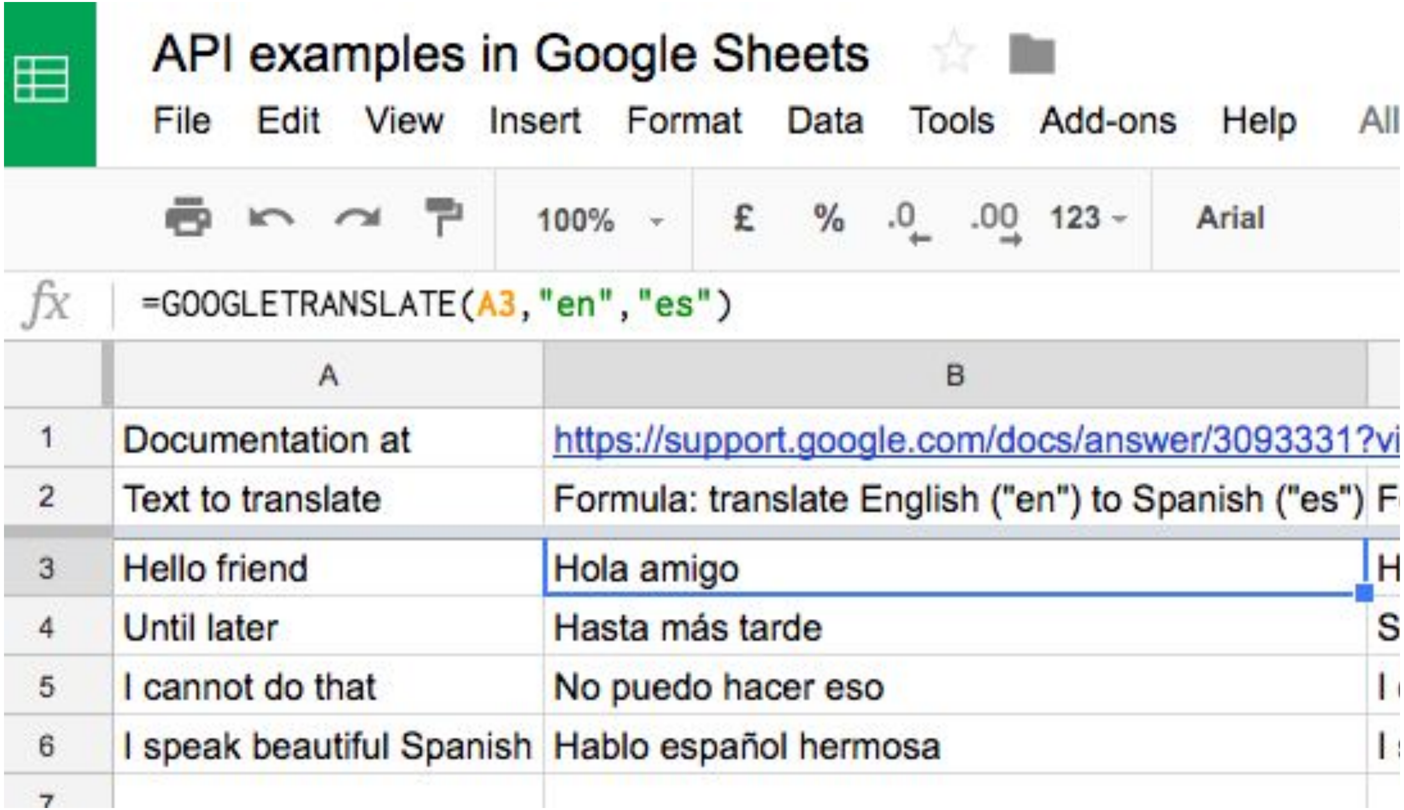
APIs

Type to search for dataset

AV Live Logging		Download	⚙ Learn more	☰ Explore data
Bills		Download	⚙ Learn more	☰ Explore data
Committee Reports	⌛ Release TBC		⚙ Learn more	
Commons Answered Questions		Download	⚙ Learn more	☰ Explore data
Commons Committee Inquiries	⌛ Release TBC		⚙ Learn more	
Commons Committee Publications	⌛ Release TBC		⚙ Learn more	
Commons Divisions		Download	⚙ Learn more	☰ Explore data
Commons Oral Question Times		Download	⚙ Learn more	☰ Explore data
Commons Oral Questions		Download	⚙ Learn more	☰ Explore data

http://explore.data.parliament.uk/

Use Google APIs in Sheets

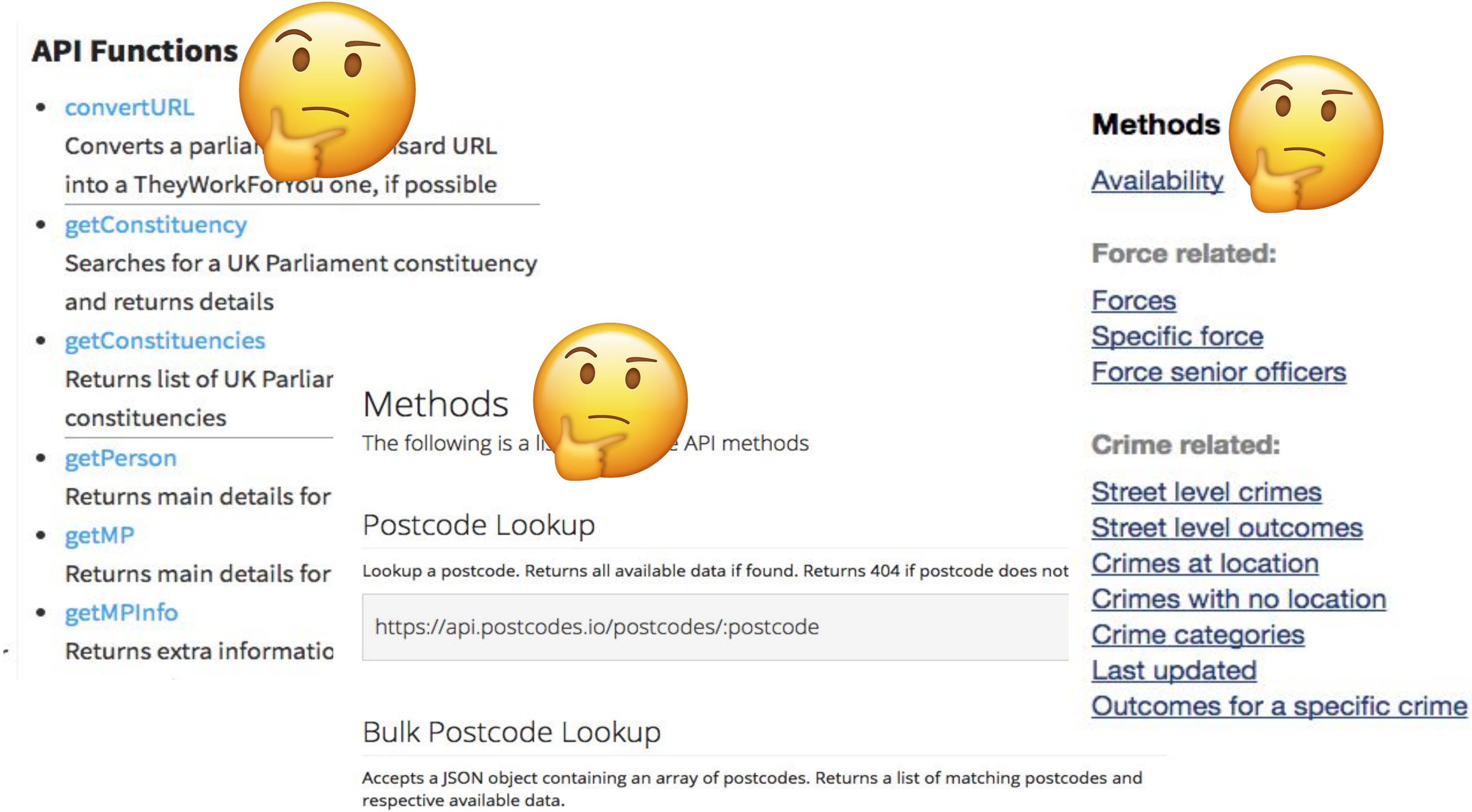


=GOOGLETRANSLATE(A3,"en","es")

	A	B	
1	Documentation at	https://support.google.com/docs/answer/3093331?vi	
2	Text to translate	Formula: translate English ("en") to Spanish ("es")	F
3	Hello friend	Hola amigo	H
4	Until later	Hasta más tarde	S
5	I cannot do that	No puedo hacer eso	I
6	I speak beautiful Spanish	Hablo español hermosa	I
7			

Look at an example

- Go to data.police.uk and click on the API tab
- This is the ‘documentation’ for the API, telling you how to get data out of it — but it’s full of jargon…



API Functions

- convertURL
  Converts a parlia sard URL into a TheyWorkForYou one, if possible
- getConstituency
  Searches for a UK Parliament constituency and returns details
- getConstituencies
  Returns list of UK Parliar constituencies
- getPerson
  Returns main details for
- getMP
  Returns main details for
- getMPInfo
  Returns extra informatio

Methods

The following is a li e API methods

Postcode Lookup

Lookup a postcode. Returns all available data if found. Returns 404 if postcode does not

```
https://api.postcodes.io/postcodes/:postcode
```

Bulk Postcode Lookup

Accepts a JSON object containing an array of postcodes. Returns a list of matching postcodes and respective available data.

Methods

Availability

Force related:

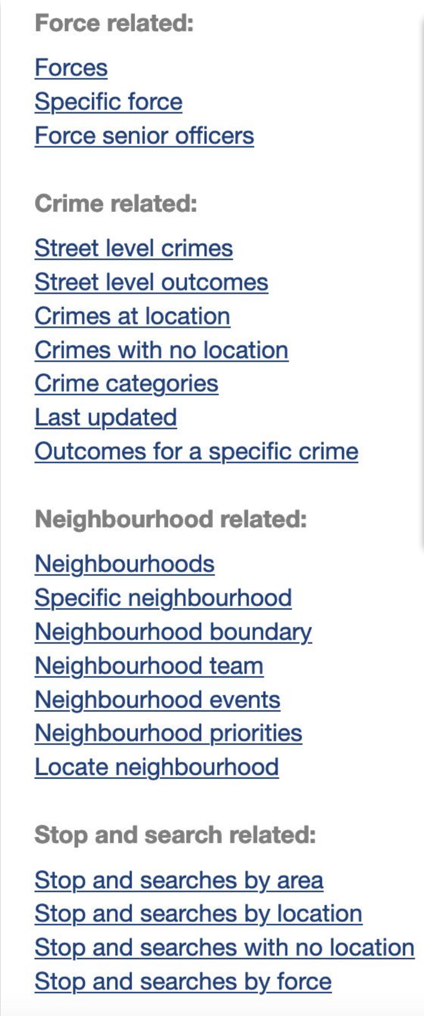
Forces
Specific force
Force senior officers

Crime related:

Street level crimes
Street level outcomes
Crimes at location
Crimes with no location
Crime categories
Last updated
Outcomes for a specific crime

Methods, functions and parameters

- **Methods/functions** - words to get different types of information (e.g. ‘getMPname’)
- **Parameters/arguments** - words that specify what you want data on (e.g. date range, lat/long, etc)



Force related:

- Forces
- Specific force
- Force senior officers

Crime related:

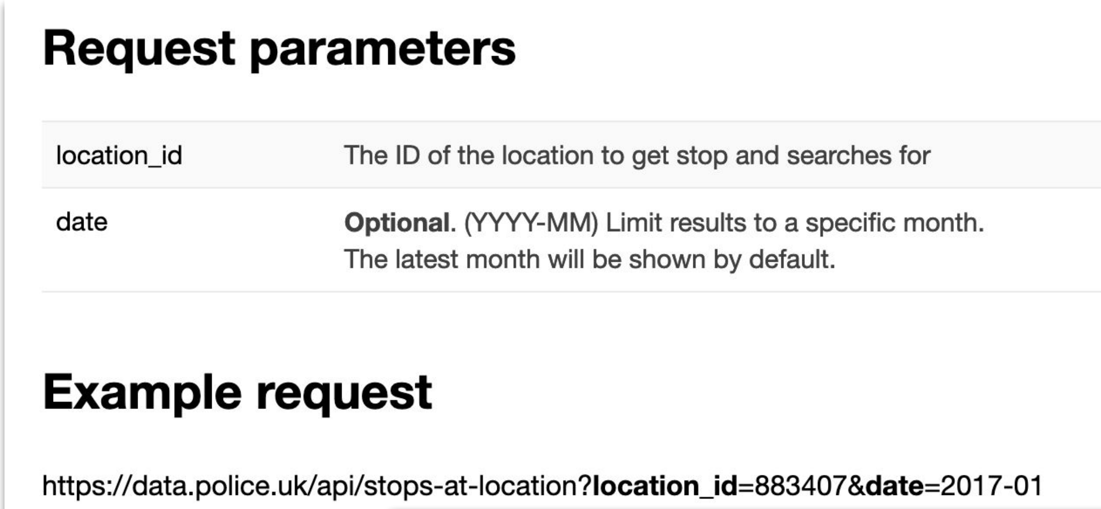
- Street level crimes
- Street level outcomes
- Crimes at location
- Crimes with no location
- Crime categories
- Last updated
- Outcomes for a specific crime

Neighbourhood related:

- Neighbourhoods
- Specific neighbourhood
- Neighbourhood boundary
- Neighbourhood team
- Neighbourhood events
- Neighbourhood priorities
- Locate neighbourhood

Stop and search related:

- Stop and searches by area
- Stop and searches by location
- Stop and searches with no location
- Stop and searches by force

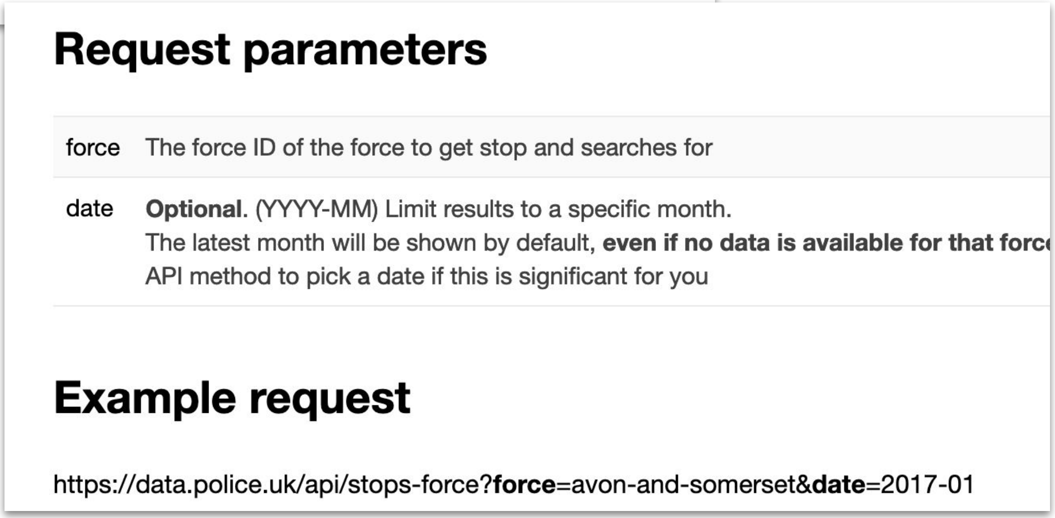


Request parameters

location_id	The ID of the location to get stop and searches for
date	**Optional**. (YYYY-MM) Limit results to a specific month. The latest month will be shown by default.

Example request

https://data.police.uk/api/stops-at-location?**location_id**=883407&**date**=2017-01

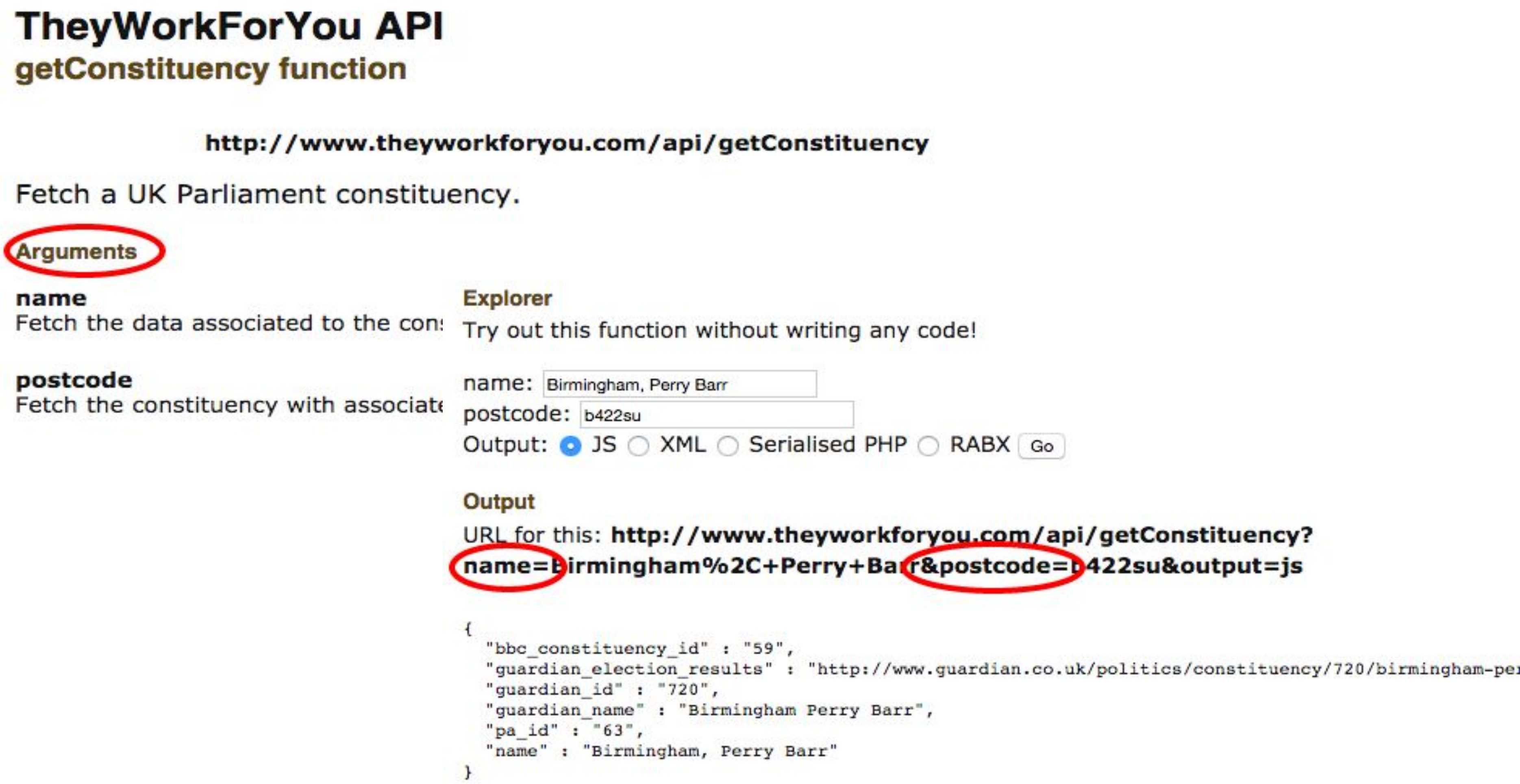


Request parameters

force	The force ID of the force to get stop and searches for
date	**Optional**. (YYYY-MM) Limit results to a specific month. The latest month will be shown by default, **even if no data is available for that forc** API method to pick a date if this is significant for you

Example request

https://data.police.uk/api/stops-force?**force**=avon-and-somerset&**date**=2017-01



TheyWorkForYou API

getConstituency function

http://www.theyworkforyou.com/api/getConstituency

Fetch a UK Parliament constituency.

Arguments

name
Fetch the data associated to the con

postcode
Fetch the constituency with associate

Explorer

Try out this function without writing any code!

name: Birmingham, Perry Barr

postcode: b422su

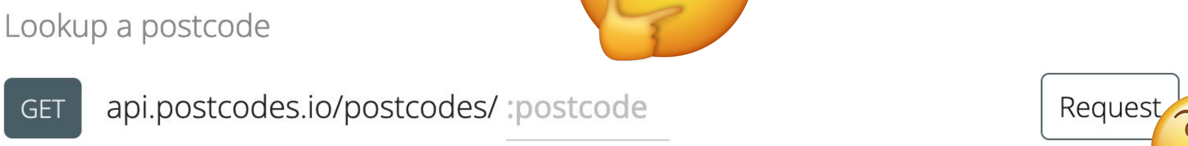
Output: ● JS ○ XML ○ Serialised PHP ○ RABX Go

Output

URL for this: **http://www.theyworkforyou.com/api/getConstituency?name=Birmingham%2C+Perry+Barr&postcode=b422su&output=js**

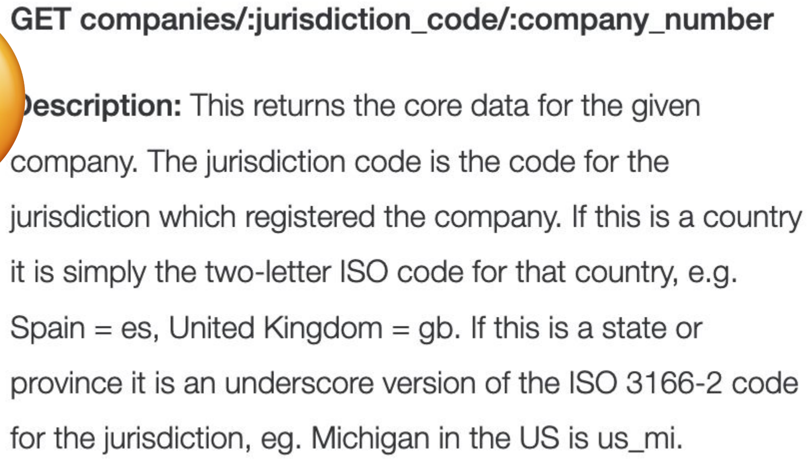
```
{
  "bbc_constituency_id" : "59",
  "guardian_election_results" : "http://www.guardian.co.uk/politics/constituency/720/birmingham-per
  "guardian_id" : "720",
  "guardian_name" : "Birmingham Perry Barr",
  "pa_id" : "63",
  "name" : "Birmingham, Perry Barr"
}
```

API Endpoint & Methods



Lookup a postcode

api.postcodes.io/postcodes/ :postcode

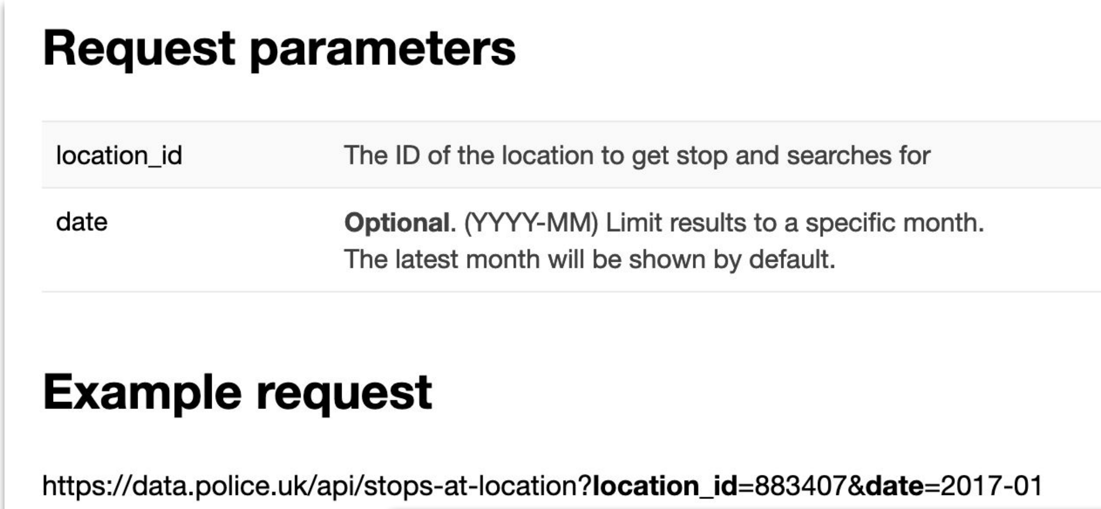


GET companies/:jurisdiction_code/:company_number

Description: This returns the core data for the given company. The jurisdiction code is the code for the jurisdiction which registered the company. If this is a country it is simply the two-letter ISO code for that country, e.g. Spain = es, United Kingdom = gb. If this is a state or province it is an underscore version of the ISO 3166-2 code for the jurisdiction, eg. Michigan in the US is us_mi.

Queries and endpoints

- **A query/request/GET** - Your question - normally formulated as a URL
- **A response** - the data you get (at that URL)
- **Endpoint** - Another word for the URL

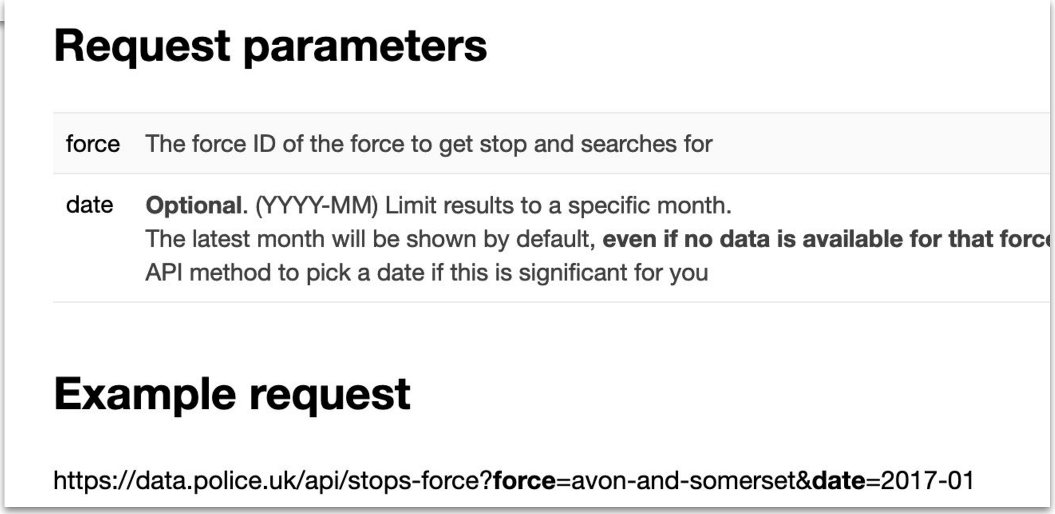


Request parameters

location_id	The ID of the location to get stop and searches for
date	**Optional**. (YYYY-MM) Limit results to a specific month. The latest month will be shown by default.

Example request

https://data.police.uk/api/stops-at-location?**location_id**=883407&**date**=2017-01



Request parameters

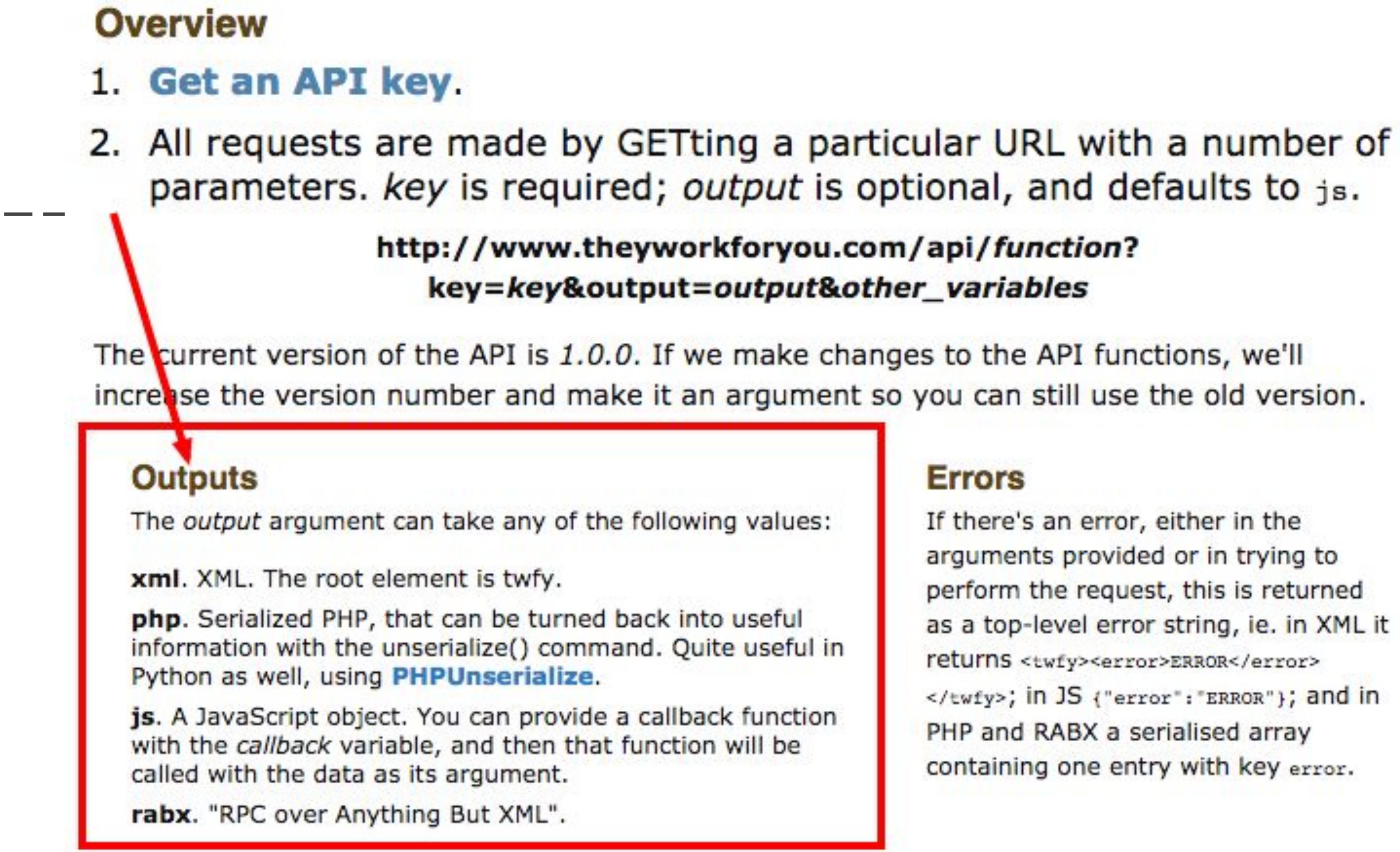
force	The force ID of the force to get stop and searches for
date	**Optional**. (YYYY-MM) Limit results to a specific month. The latest month will be shown by default, **even if no data is available for that forc** API method to pick a date if this is significant for you

Example request

https://data.police.uk/api/stops-force?**force**=avon-and-somerset&**date**=2017-01

Authentication and keys

- Some APIs require a ‘key’
- This is just a password - apply for it on the site
- Use it by including in your ‘request’ URL



Overview

1. Get an API key.
2. All requests are made by GETting a particular URL with a number of parameters. *key* is required; *output* is optional, and defaults to `js`.

http://www.theyworkforyou.com/api/*function*?key=*key*&output=*output*&*other_variables*

The current version of the API is *1.0.0*. If we make changes to the API functions, we'll increase the version number and make it an argument so you can still use the old version.

Outputs

The *output* argument can take any of the following values:

xml. XML. The root element is twfy.

php. Serialized PHP, that can be turned back into useful information with the unserialize() command. Quite useful in Python as well, using **PHPUnserialize**.

js. A JavaScript object. You can provide a callback function with the *callback* variable, and then that function will be called with the data as its argument.

rabx. "RPC over Anything But XML".

Errors

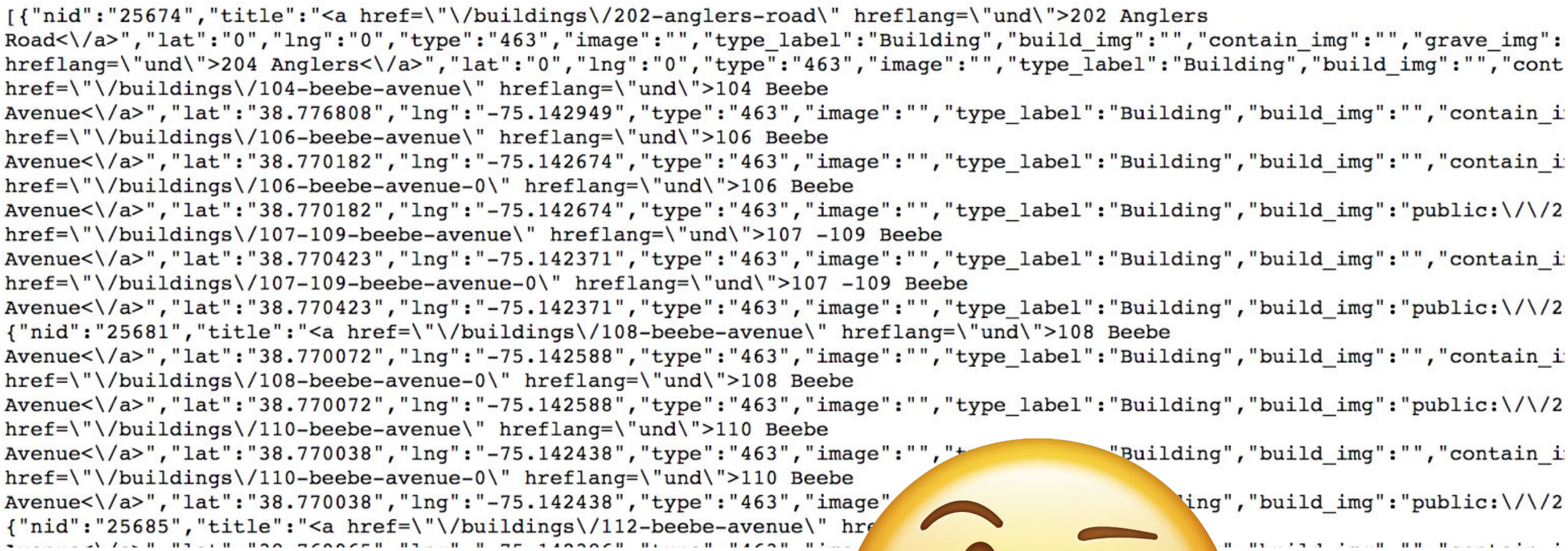
If there's an error, either in the arguments provided or in trying to perform the request, this is returned as a top-level error string, ie. in XML it returns `<twfy><error>ERROR</error></twfy>`; in JS `{"error":"ERROR"}`; and in PHP and RABX a serialised array containing one entry with key `error`.

Call/rate limits

- APIs often involve making multiple ‘calls’ for data, e.g. hundreds of postcodes
- May be a limit on rate (per second) and number (per day)

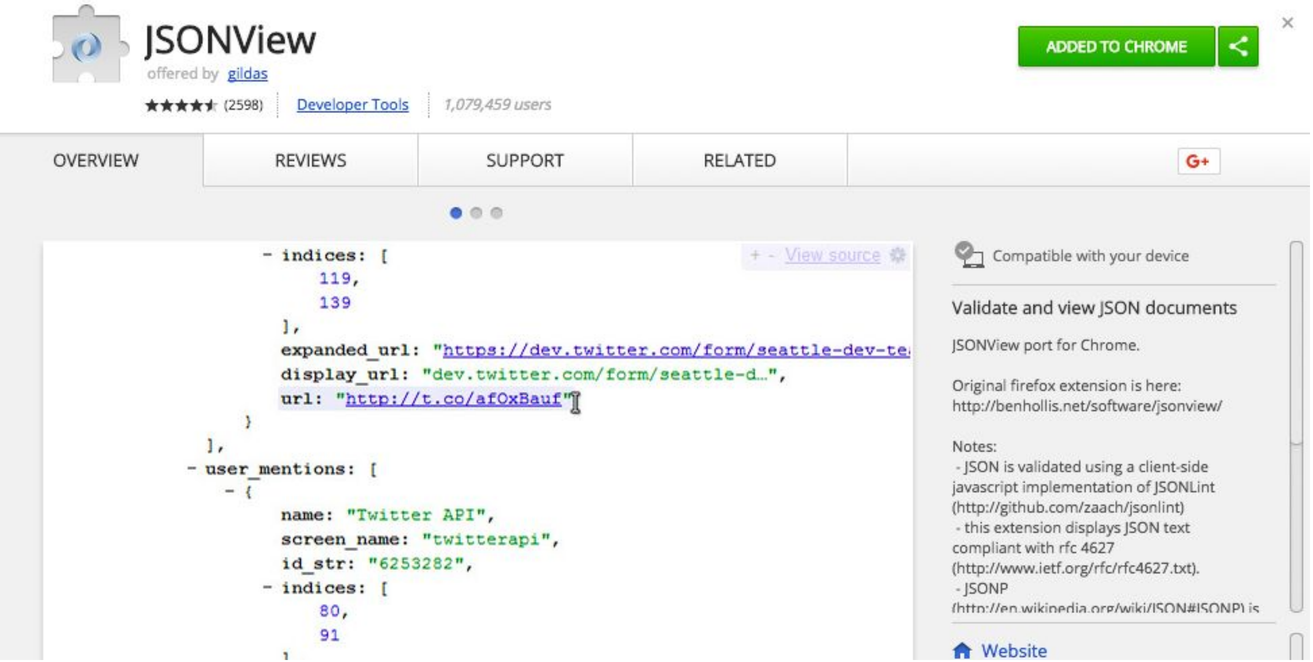
Looking at a response

- Try an example URL given *(tip: change the year on police URLs - it’s now too long ago)*
- E.g. https://data.police.uk/api/forces
- Or https://data.police.uk/api/forces/leicestershire



```
[{"nid":"25674","title":"<a href=\"\/buildings\/202-anglers-road\" hreflang=\"und\">202 Anglers
Road<\/a>","lat":"0","lng":"0","type":"463","image":"","type_label":"Building","build_img":"","contain_img":"","grave_img":
hreflang=\"und\">204 Anglers<\/a>","lat":"0","lng":"0","type":"463","image":"","type_label":"Building","build_img":"","cont
href=\"\/buildings\/104-beebe-avenue\" hreflang=\"und\">104 Beebe
Avenue<\/a>","lat":"38.776808","lng":"-75.142949","type":"463","image":"","type_label":"Building","build_img":"","contain_i
href=\"\/buildings\/106-beebe-avenue\" hreflang=\"und\">106 Beebe
Avenue<\/a>","lat":"38.770182","lng":"-75.142674","type":"463","image":"","type_label":"Building","build_img":"","contain_i
href=\"\/buildings\/106-beebe-avenue-0\" hreflang=\"und\">106 Beebe
Avenue<\/a>","lat":"38.770182","lng":"-75.142674","type":"463","image":"","type_label":"Building","build_img":"public:\/\/2
href=\"\/buildings\/107-109-beebe-avenue\" hreflang=\"und\">107 -109 Beebe
Avenue<\/a>","lat":"38.770423","lng":"-75.142371","type":"463","image":"","type_label":"Building","build_img":"","contain_i
href=\"\/buildings\/107-109-beebe-avenue-0\" hreflang=\"und\">107 -109 Beebe
Avenue<\/a>","lat":"38.770423","lng":"-75.142371","type":"463","image":"","type_label":"Building","build_img":"public:\/\/2
{"nid":"25681","title":"<a href=\"\/buildings\/108-beebe-avenue\" hreflang=\"und\">108 Beebe
Avenue<\/a>","lat":"38.770072","lng":"-75.142588","type":"463","image":"","type_label":"Building","build_img":"","contain_i
href=\"\/buildings\/108-beebe-avenue-0\" hreflang=\"und\">108 Beebe
Avenue<\/a>","lat":"38.770072","lng":"-75.142588","type":"463","image":"","type_label":"Building","build_img":"public:\/\/2
href=\"\/buildings\/110-beebe-avenue\" hreflang=\"und\">110 Beebe
Avenue<\/a>","lat":"38.770038","lng":"-75.142438","type":"463","image":"","t          "Building","build_img":"","contain_i
href=\"\/buildings\/110-beebe-avenue-0\" hreflang=\"und\">110 Beebe
Avenue<\/a>","lat":"38.770038","lng":"-75.142438","type":"463","image"                        ing","build_img":"public:\/\/2
{"nid":"25685","title":"<a href=\"\/buildings\/112-beebe-avenue\" hre
```

Install JSONView extension



```
      - indices: [
            119,
            139
        ],
        expanded_url: "https://dev.twitter.com/form/seattle-dev-te
        display_url: "dev.twitter.com/form/seattle-d…",
        url: "http://t.co/afOxBauf"
    }
  ],
- user_mentions: [
   - {
        name: "Twitter API",
        screen_name: "twitterapi",
        id_str: "6253282",
      - indices: [
            80,
            91
        ]
```

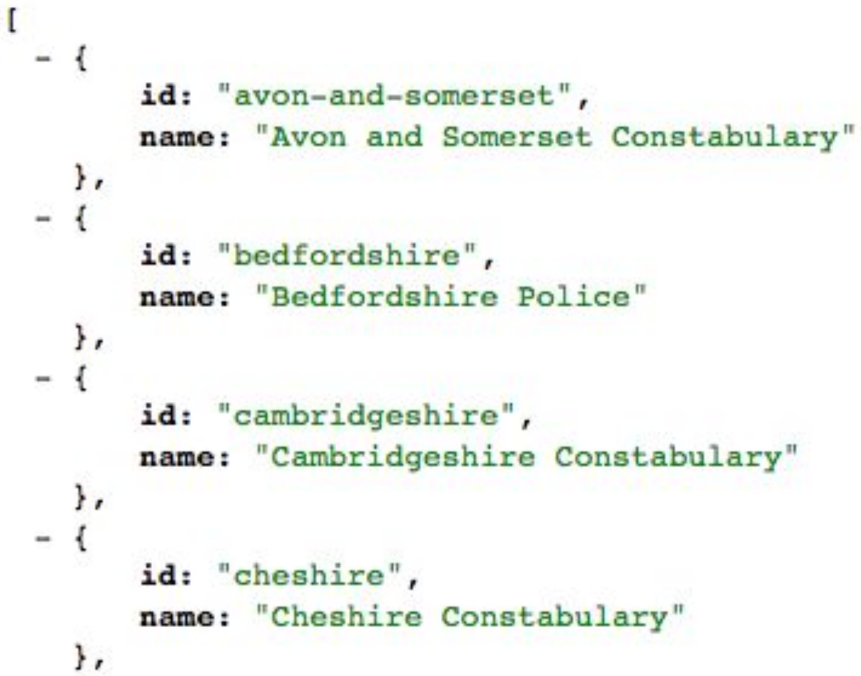
Validate and view JSON documents

JSONView port for Chrome.

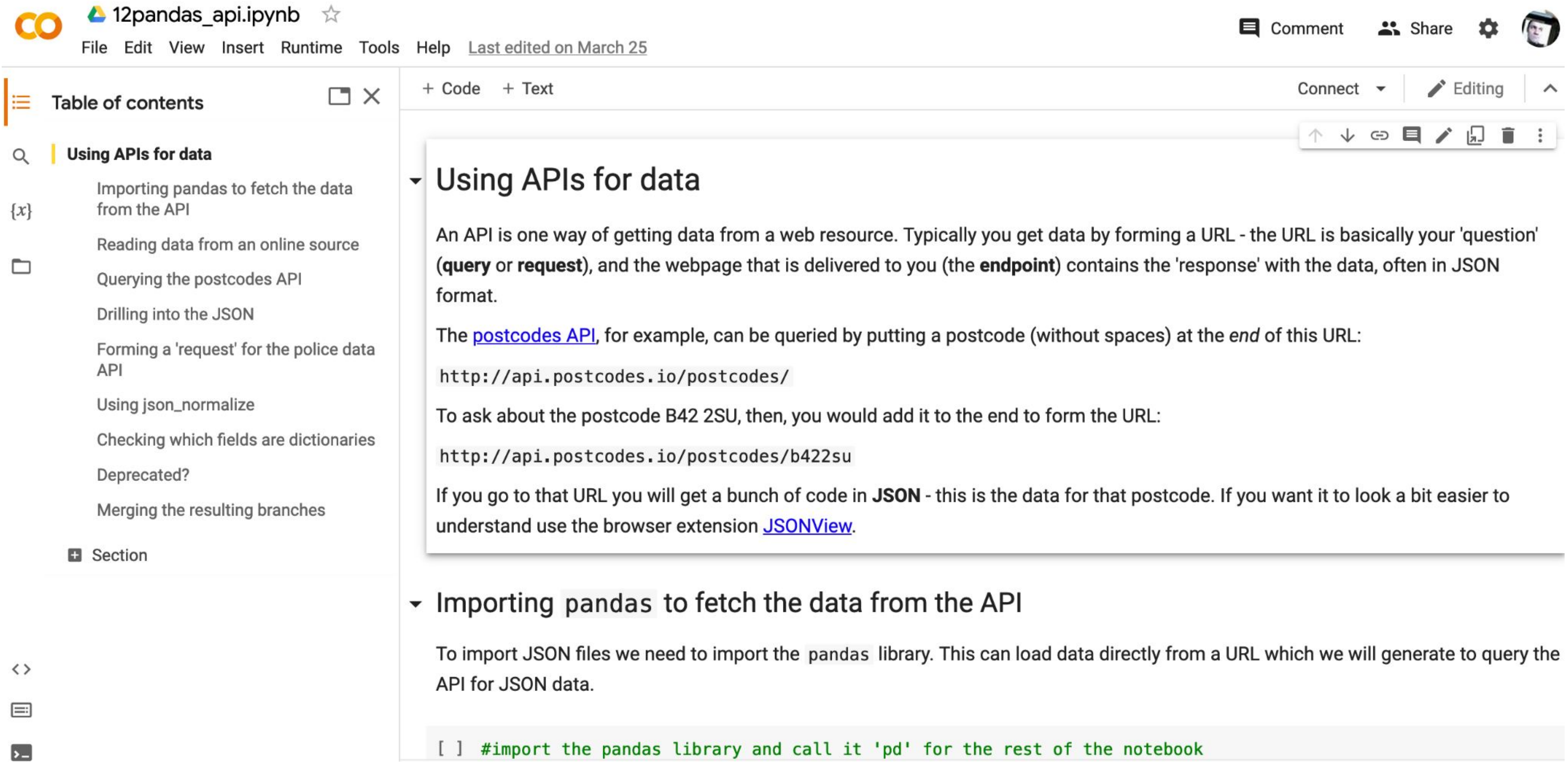
Original firefox extension is here:
http://benhollis.net/software/jsonview/

Notes:
- JSON is validated using a client-side javascript implementation of JSONLint (http://github.com/zaach/jsonlint)
- this extension displays JSON text compliant with rfc 4627 (http://www.ietf.org/rfc/rfc4627.txt).
- JSONP (http://en.wikipedia.org/wiki/JSON#JSONP) is

https://data.police.uk/api/forces



```
[
  - {
        id: "avon-and-somerset",
        name: "Avon and Somerset Constabulary"
    },
  - {
        id: "bedfordshire",
        name: "Bedfordshire Police"
    },
  - {
        id: "cambridgeshire",
        name: "Cambridgeshire Constabulary"
    },
  - {
        id: "cheshire",
        name: "Cheshire Constabulary"
    },
```



CO
12pandas_api.ipynb
File Edit View Insert Runtime Tools Help Last edited on March 25
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Editing

Using APIs for data

An API is one way of getting data from a web resource. Typically you get data by forming a URL - the URL is basically your 'question' (**query** or **request**), and the webpage that is delivered to you (the **endpoint**) contains the 'response' with the data, often in JSON format.

The postcodes API, for example, can be queried by putting a postcode (without spaces) at the *end* of this URL:

`http://api.postcodes.io/postcodes/`

To ask about the postcode B42 2SU, then, you would add it to the end to form the URL:

`http://api.postcodes.io/postcodes/b422su`

If you go to that URL you will get a bunch of code in **JSON** - this is the data for that postcode. If you want it to look a bit easier to understand use the browser extension JSONView.

Importing `pandas` to fetch the data from the API

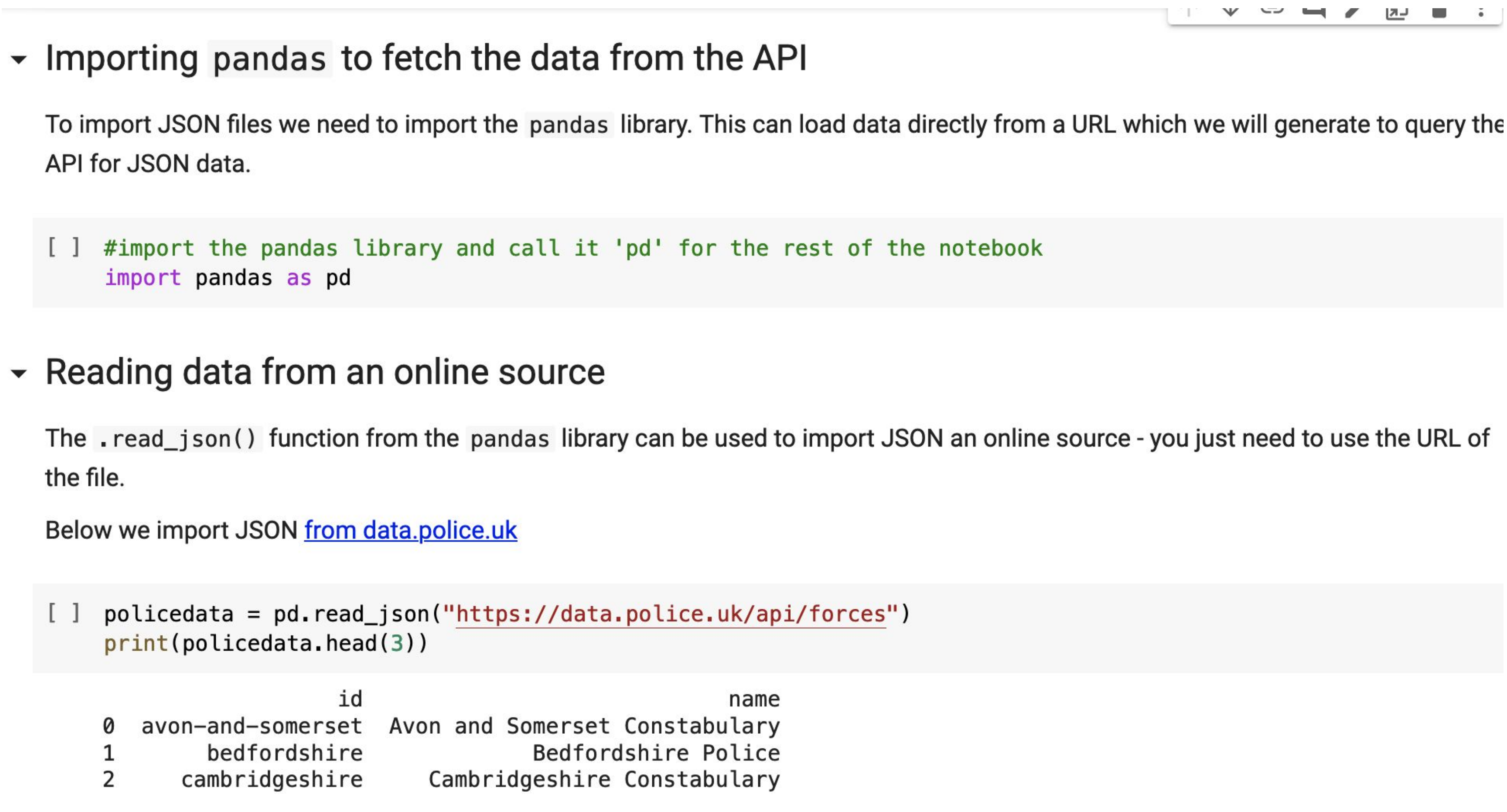
To import JSON files we need to import the `pandas` library. This can load data directly from a URL which we will generate to query the API for JSON data.

```
[ ] #import the pandas library and call it 'pd' for the rest of the notebook
```

https://github.com/paulbradshaw/pythonin12parts/blob/main/part9/12pandas_api.ipynb

Use pandas’s read_json() function

```
mydata = pd.read_json(“URLHERE”)
```



Importing `pandas` to fetch the data from the API

To import JSON files we need to import the `pandas` library. This can load data directly from a URL which we will generate to query the API for JSON data.

```
[ ] #import the pandas library and call it 'pd' for the rest of the notebook
    import pandas as pd
```

Reading data from an online source

The `.read_json()` function from the `pandas` library can be used to import JSON an online source - you just need to use the URL of the file.

Below we import JSON [from data.police.uk](https://data.police.uk)

```
[ ] policedata = pd.read_json("https://data.police.uk/api/forces")
    print(policedata.head(3))
```

```
                   id                           name
0  avon-and-somerset  Avon and Somerset Constabulary
1        bedfordshire              Bedfordshire Police
2      cambridgeshire     Cambridgeshire Constabulary
```

https://github.com/paulbradshaw/pythonin12parts/blob/main/part9/12pandas_api.ipynb

Loop to get data on multiple items

```
for postcode in listofpostcodes:
    apirequest = BASEURL+postcode
    thisdata = pd.read_json(apirequest)
```

Key points

- Use an API to get the latest data or data to complement other info
- Form a ‘request’ in the form of a URL that contains details on what you want data on (and any ‘key’)
- Results often in JSON/XML format - and need looping through