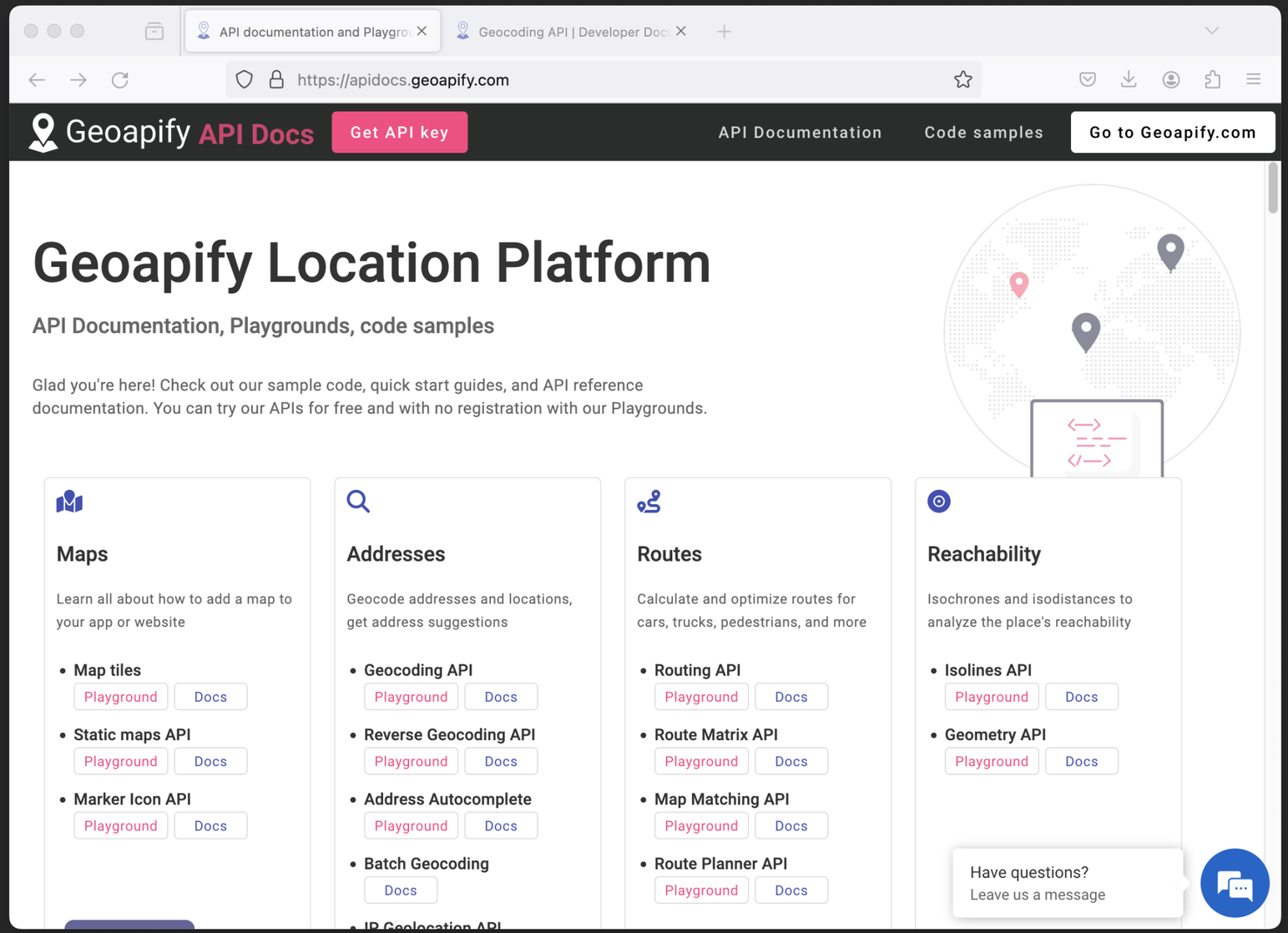
APIs

http://en.wikipedia.org/wiki/Web_services

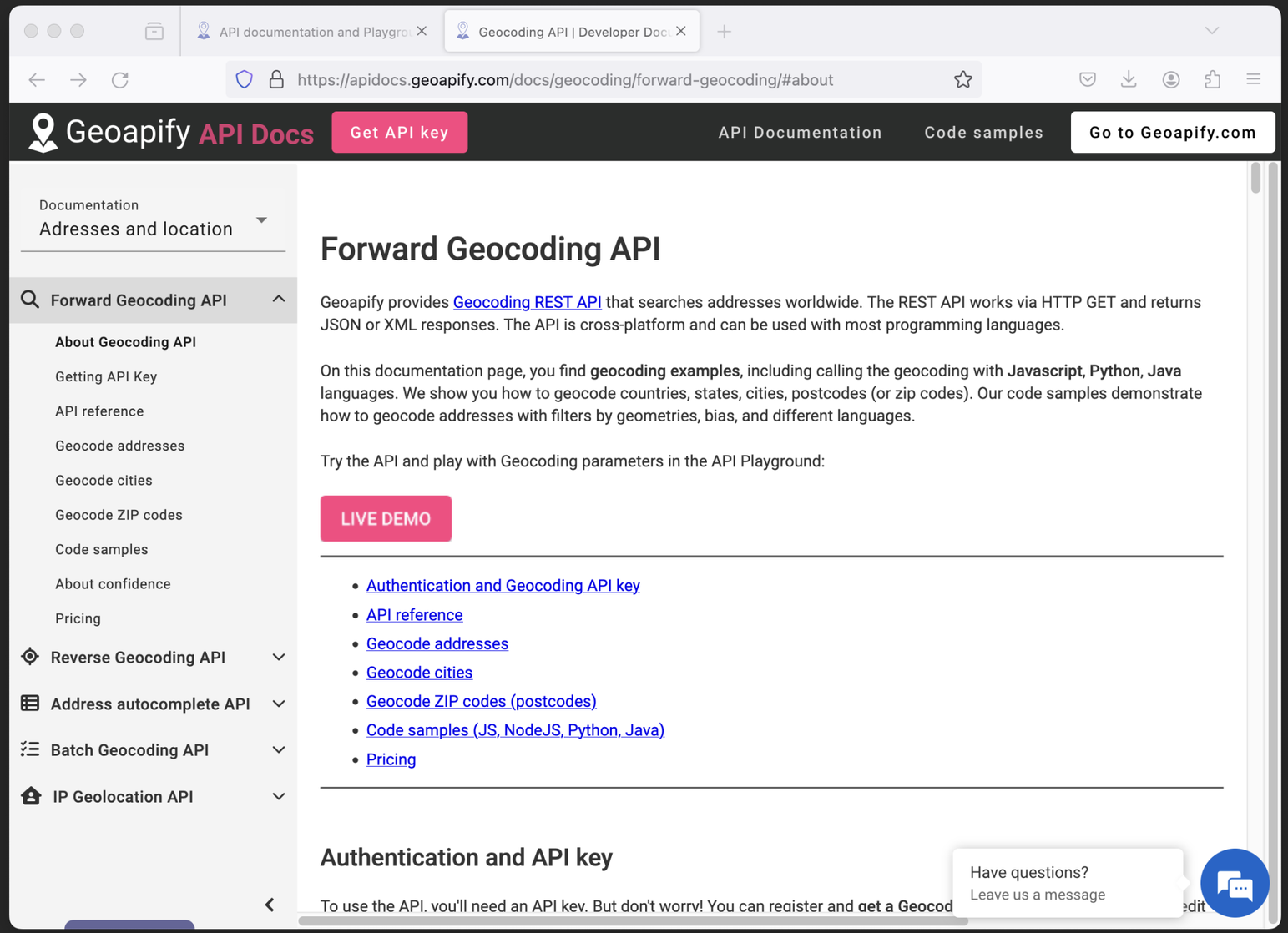
There Are Many APIs

- There are organizations that put up public APIs and sell access to those APIs
- We will explore a geocoding API based on the OpenStreetMap data
- You need an account to access this API
- There is a free level of requests
- You pay above that rate of usage

https://www.geoapify.com/



https://www.geoapify.com/


API documentation and Playgro
Geocoding API | Developer Doc
https://apidocs.geoapify.com/docs/geocoding/forward-geocoding/#about
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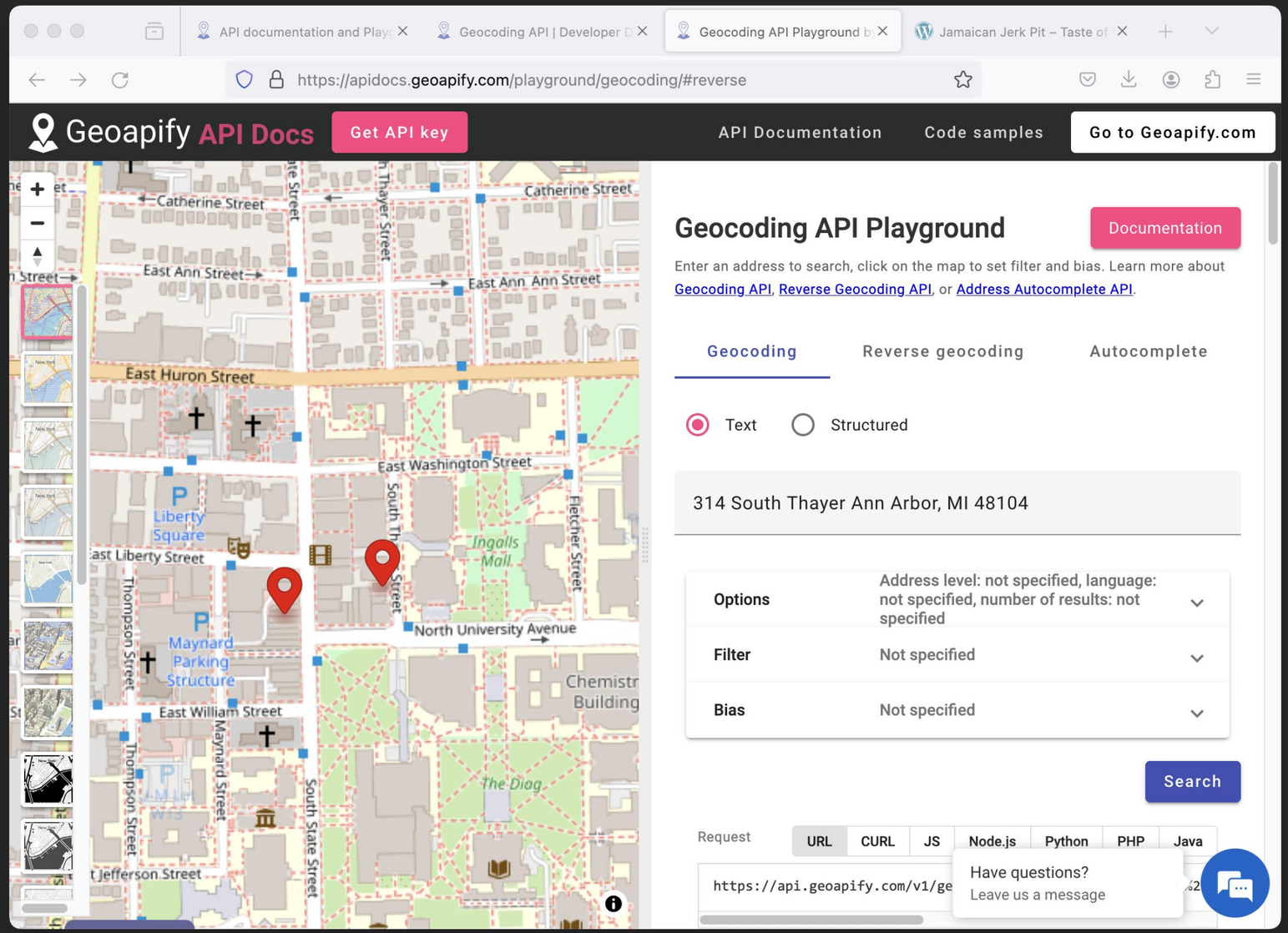
Address autocomplete API
Batch Geocoding API
IP Geolocation API
Forward Geocoding API
Geoapify provides Geocoding REST API that searches addresses worldwide. The REST API works via HTTP GET and returns JSON or XML responses. The API is cross-platform and can be used with most programming languages.
On this documentation page, you find geocoding examples, including calling the geocoding with Javascript, Python, Java languages. We show you how to geocode countries, states, cities, postcodes (or zip codes). Our code samples demonstrate how to geocode addresses with filters by geometries, bias, and different languages.
Try the API and play with Geocoding parameters in the API Playground:
LIVE DEMO
Authentication and Geocoding API key
API reference
Geocode addresses
Geocode cities
Geocode ZIP codes (postcodes)
Code samples (JS, NodeJS, Python, Java)
Pricing
Authentication and API key
Have questions?
Leave us a message


API documentation and Play
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https://apidocs.geoapify.com/playground/geocoding/#reverse
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Catherine Street
East Ann Street
East Huron Street
East Washington Street
East Liberty Street
North University Avenue
East William Street
Jefferson Street
Liberty Square
Maynard Parking Structure
Ingalls Mall
The Diag
Chemistry Building
Thompson Street
Maynard Street
South State Street
Fletcher Street
Geocoding API Playground
Documentation
Enter an address to search, click on the map to set filter and bias. Learn more about Geocoding API, Reverse Geocoding API, or Address Autocomplete API.
Geocoding
Reverse geocoding
Autocomplete
Text
Structured
314 South Thayer Ann Arbor, MI 48104
Options
Address level: not specified, language: not specified, number of results: not specified
Filter
Not specified
Bias
Not specified
Search
Request
URL
CURL
JS
Node.js
Python
PHP
Java
https://api.geoapify.com/v1/ge
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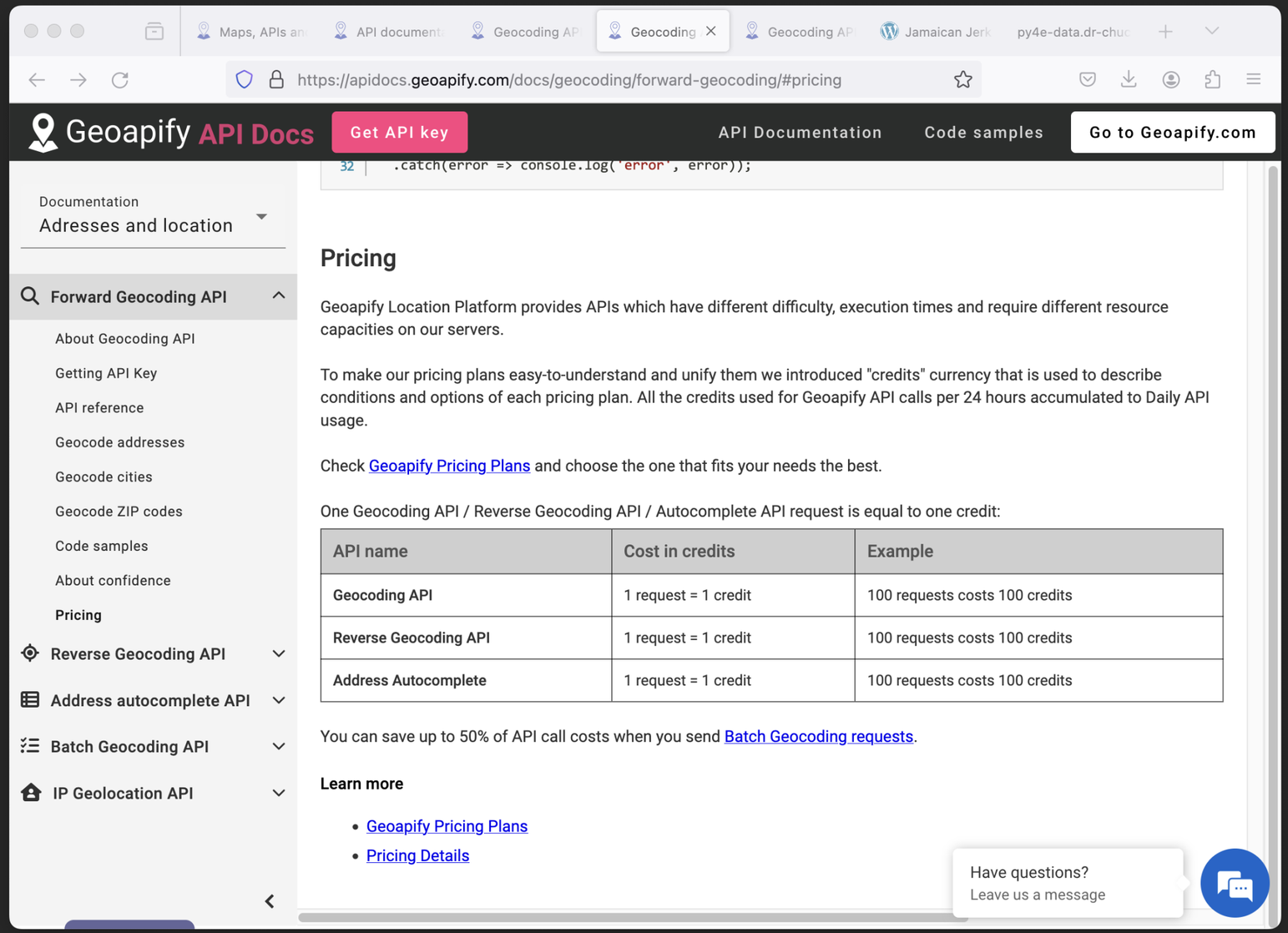
https://apidocs.geoapify.com/docs/geocoding/forward-geocoding/#pricing
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.catch(error => console.log('error', error));
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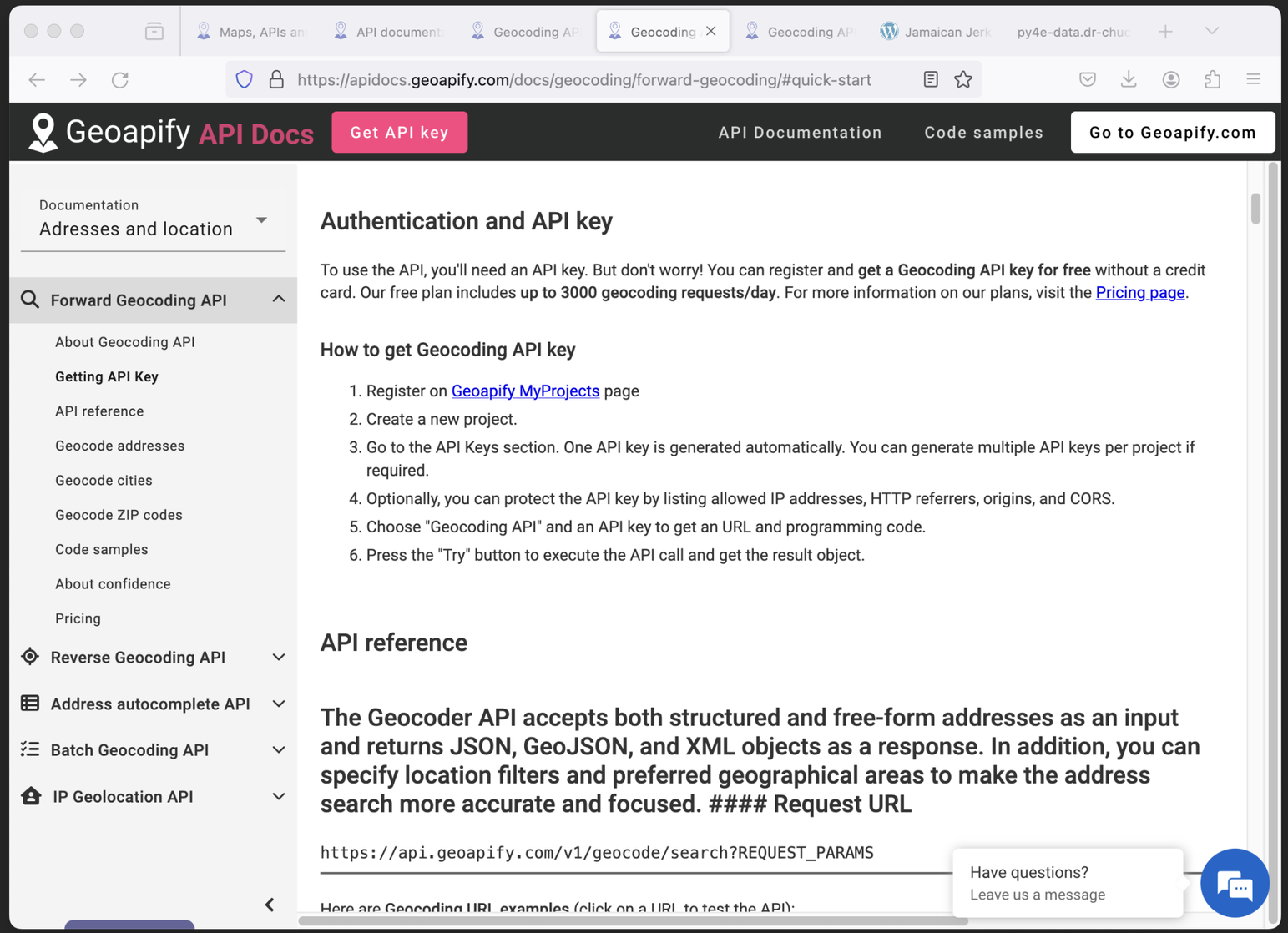
Pricing
Geoapify Location Platform provides APIs which have different difficulty, execution times and require different resource capacities on our servers.
To make our pricing plans easy-to-understand and unify them we introduced "credits" currency that is used to describe conditions and options of each pricing plan. All the credits used for Geoapify API calls per 24 hours accumulated to Daily API usage.
Check Geoapify Pricing Plans and choose the one that fits your needs the best.
One Geocoding API / Reverse Geocoding API / Autocomplete API request is equal to one credit:
API name
Cost in credits
Example
Geocoding API
1 request = 1 credit
100 requests costs 100 credits
Reverse Geocoding API
1 request = 1 credit
100 requests costs 100 credits
Address Autocomplete
1 request = 1 credit
100 requests costs 100 credits
You can save up to 50% of API call costs when you send Batch Geocoding requests.
Learn more
Geoapify Pricing Plans
Pricing Details
Have questions?
Leave us a message


Maps, APIs and
API documentat
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Jamaican Jerk
py4e-data.dr-chuc
https://apidocs.geoapify.com/docs/geocoding/forward-geocoding/#quick-start
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Authentication and API key
To use the API, you'll need an API key. But don't worry! You can register and get a Geocoding API key for free without a credit card. Our free plan includes up to 3000 geocoding requests/day. For more information on our plans, visit the Pricing page.
How to get Geocoding API key
1. Register on Geoapify MyProjects page
2. Create a new project.
3. Go to the API Keys section. One API key is generated automatically. You can generate multiple API keys per project if required.
4. Optionally, you can protect the API key by listing allowed IP addresses, HTTP referrers, origins, and CORS.
5. Choose "Geocoding API" and an API key to get an URL and programming code.
6. Press the "Try" button to execute the API call and get the result object.
API reference
The Geocoder API accepts both structured and free-form addresses as an input and returns JSON, GeoJSON, and XML objects as a response. In addition, you can specify location filters and preferred geographical areas to make the address search more accurate and focused. #### Request URL
https://api.geoapify.com/v1/geocode/search?REQUEST_PARAMS
Here are Geocoding URL examples (click on a URL to test the API):
Have questions?
Leave us a message

An API Proxy

- To avoid making you get an account, I have a well-hidden web server that acts as a proxy for the Geoapify data
- This proxy does not require a password – but it does have rate limits and is heavily cached using an edge-caching service for performance

http://py4e-data.dr-chuck.net/opengeo?q=Ann+Arbor%2C+MI


```
{
  "type": "FeatureCollection",
  "features": [
    {
      "type": "Feature",
      "properties": {
        "datasource": {
          "sourcename": "openstreetmap",
          "attribution": "© OpenStreetMap contributors",
          "license": "Open Database License",
          "url": "https://www.openstreetmap.org/copyright"
        },
        "country": "United States",
        "country_code": "us",
        "state": "Michigan",
        "county": "Washtenaw County",
        "city": "Ann Arbor",
        "lon": -83.7312291,
        "lat": 42.2681569,
        "state_code": "MI",
        "result_type": "city",
        "formatted": "Ann Arbor, MI, United States of America",
```


Note, for this course, we operate through a proxy of the geoapi data to avoid rate limitation and authentication.

opengeo.py

```
import urllib.request, urllib.parse
import http, json, ssl

serviceurl = 'https://py4e-data.dr-chuck.net/opengeo?'

while True:
    address = input('Enter location: ')
    if len(address) < 1: break

    address = address.strip()
    parms = dict()
    parms['q'] = address

    url = serviceurl + urllib.parse.urlencode(parms)

    print('Retrieving', url)
    uh = urllib.request.urlopen(url, context=ctx)
    data = uh.read().decode()
    print('Retrieved', len(data), 'characters', data[:20].replace('\n', ' '))

    js = json.loads(data)

    lat = js['features'][0]['properties']['lat']
    lon = js['features'][0]['properties']['lon']
    print('lat', lat, 'lon', lon)
    location = js['features'][0]['properties']['formatted']
    print(location)
```

```
Enter location: Ann Arbor, MI
Retrieving https://py4e-data.
    dr-chuck.net/opengeo?q=Ann+Arbor%2C+MI
Retrieved 1319 characters {"type":"FeatureColl
lat 42.2681569 lon -83.7312291
Ann Arbor, MI, United States of America
```

opengeo.py

Summary

- Service Oriented Architecture - allows an application to be broken into parts and distributed across a network
- An Application Program Interface (API) is a contract for interaction
- Web Services provide infrastructure for applications cooperating (an API) over a network - SOAP and REST are two styles of web services
- XML and JSON are serialization formats

Acknowledgements / Contributions

Initial Development: Charles Severance, University of Michigan School of Information

… Insert new Contributors here

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