



UNIVERSITÀ
degli STUDI
di CATANIA

DIPARTIMENTO DI
MATEMATICA E INFORMATICA

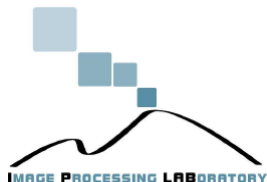
Social Media Data Analysis 2023/2024

Social Media API

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<https://iplab.dmi.unict.it/fpv/>



Getting the Data

Social Media API



API

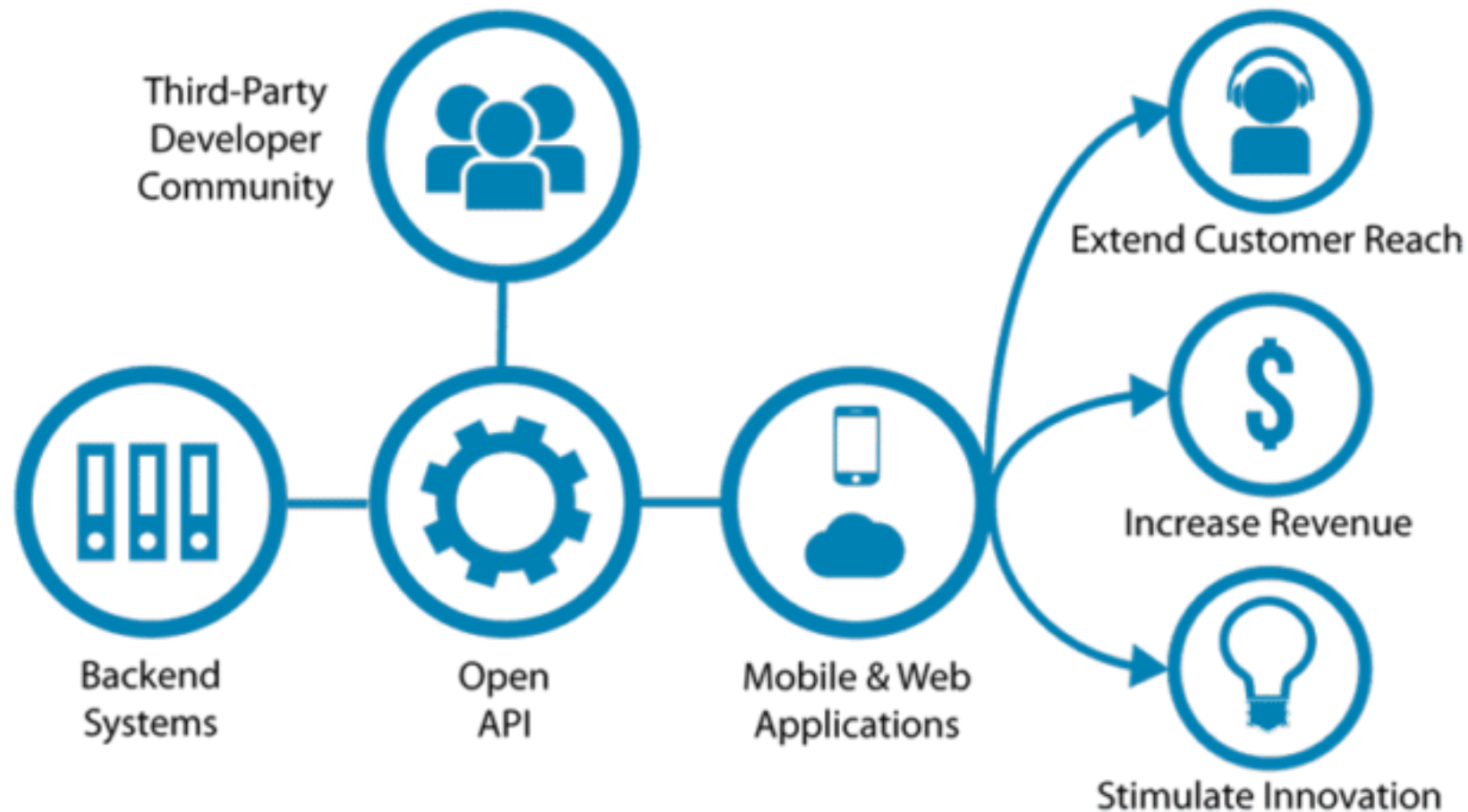
API stands for Application Programming Interface:

- A- Application
- P- Programming
- I- Interface



Types of APIs

Open APIs: are publicly available interfaces. These are also sometimes called **public APIs** or a **free social media API**.



- API Key
- OAuth

Types of APIs

Partner APIs: are only available to approved business partners.

 | selling partner api

 developers program

 Partner API

 Skyscanner Partners

Types of APIs

Internal APIs: They provide access to backend data for developers who either work for the company or have been contracted by the company. These are not accessible to outside developers.

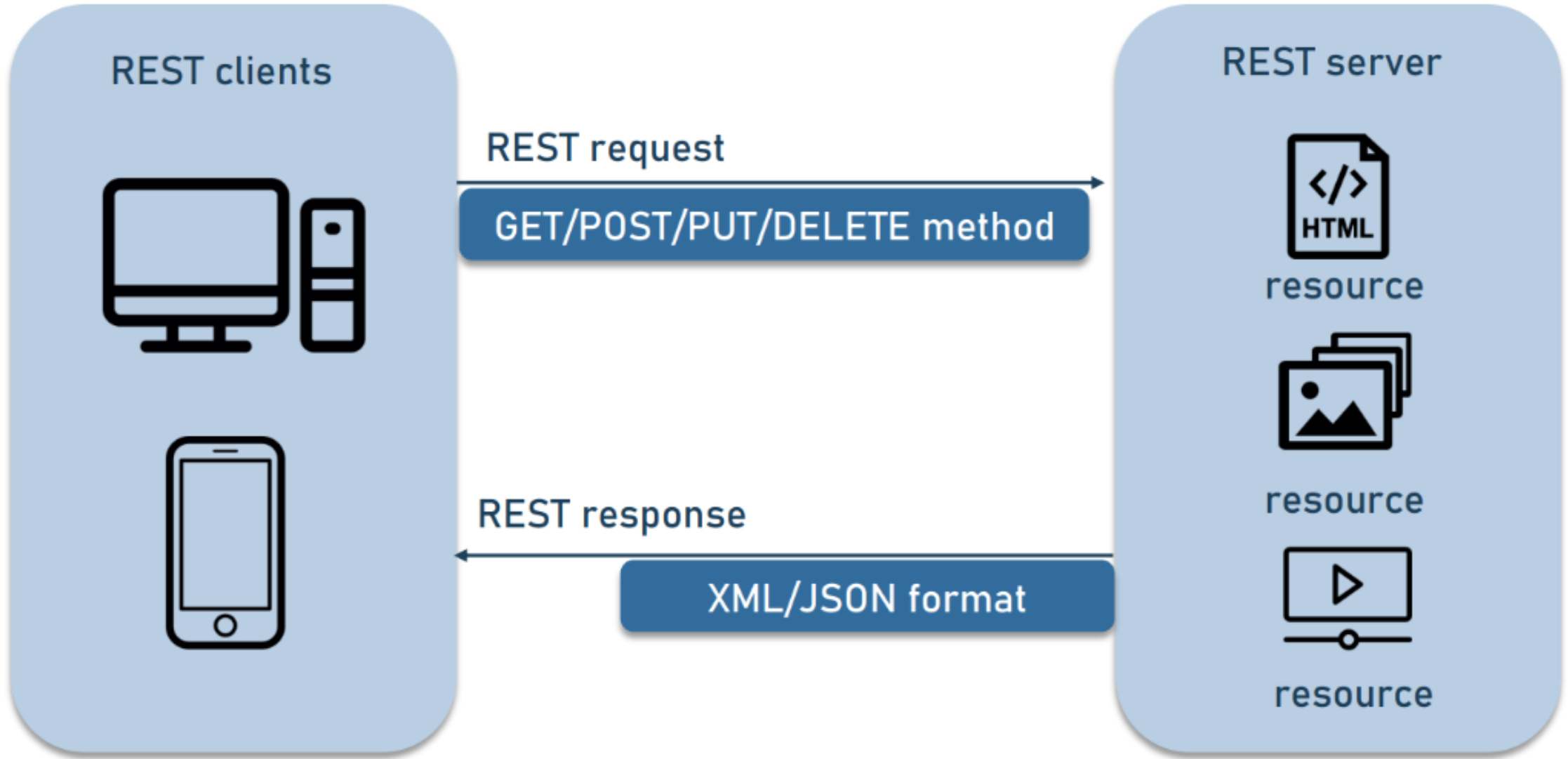
Ordering food at a fast-food restaurant



Types of APIs

	Public API	Partner API	Internal API
Availability	Anyone can use it	Restricted to selected users	Restricted users within an organization
Subscription	Limits the number of requests for free users sometimes	Requests limits may vary depending on the subscription plan	No subscription plan
Authentication	May require an OAuth or an API key	May require an access token	May not require any authentication tokens
Use Case	Business-to-Consumer	Business-to-Consumer & Business-to-Business	Business-to-Employee, Application-to-Application, Business-to-Business, Business-to-Consumer

REST API



REST API

```
POST /api/2.2/sites/9a8b7c6d-5e4f-3a2b-1c0d-9e8f7a6b5c4d/users HTTP/1.1
HOST: my-server
X-Tableau-Auth: 12ab34cd56ef78ab90cd12ef34ab56cd
Content-Type: application/json

{
  "user": {
    "name": "NewUser1",
    "siteRole": "Publisher"
  }
}
```

HTTP method

Endpoint

Headers

Body

The word ***stateless*** indicates that an API doesn't store any information related to the previous sessions, treating each request independently. All data on the current client's state is contained in the request body.

Exchange Format: JSON

```
{  
  "name": "Mario",  
  "surname": "Rossi",  
  "active": true,  
  "favoriteNumber": 42,  
  "birthday": {  
    "day": 1,  
    "month": 1,  
    "year": 2000  
  },  
  "languages": [ "it", "en" ]  
}
```

Example of REST call

```
[
  {
    "postId": 1,
    "id": 5,
    "name": "vero eaque aliquid doloribus et culpa",
    "email": "Hayden@althea.biz",
    "body": "harum non quasi et ratione\ntempore iure ex voluptates in  
ratione\nharum architecto fugit inventore cupiditate\nvoluptates magni quo et"
  }
]
```

<https://jsonplaceholder.typicode.com/comments?id=5>

protocol

server

resource

params

Example of REST Call - Python

```
import json
from urllib.request import urlopen as uRequest
page = uRequest('https://jsonplaceholder.typicode.com/comments?id=5')
content = json.load(page) #Python dictionary
print('Name:',content[0]['name'])
print('Body:',content[0]['body'])
```

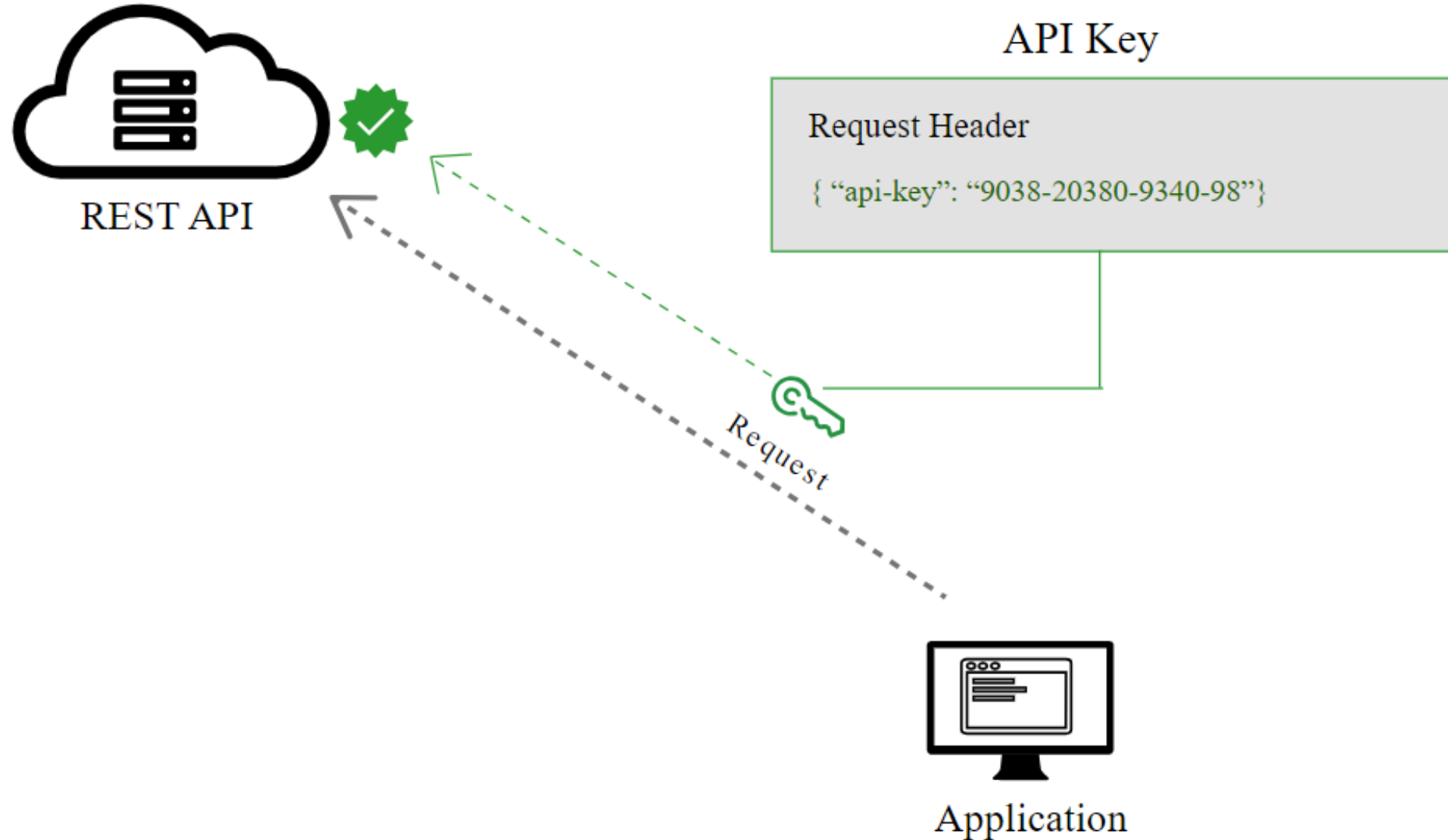
Name: vero eaque aliquid doloribus et culpa
Body: harum non quasi et ratione
tempore iure ex voluptates in ratione
harum architecto fugit inventore cupiditate
voluptates magni quo et

Authentication

- **API Keys**
- **Basic Auth**
- **HMAC**
- **OAuth**

Authentication

- **API Keys**



Authentication

- **Basic Auth**

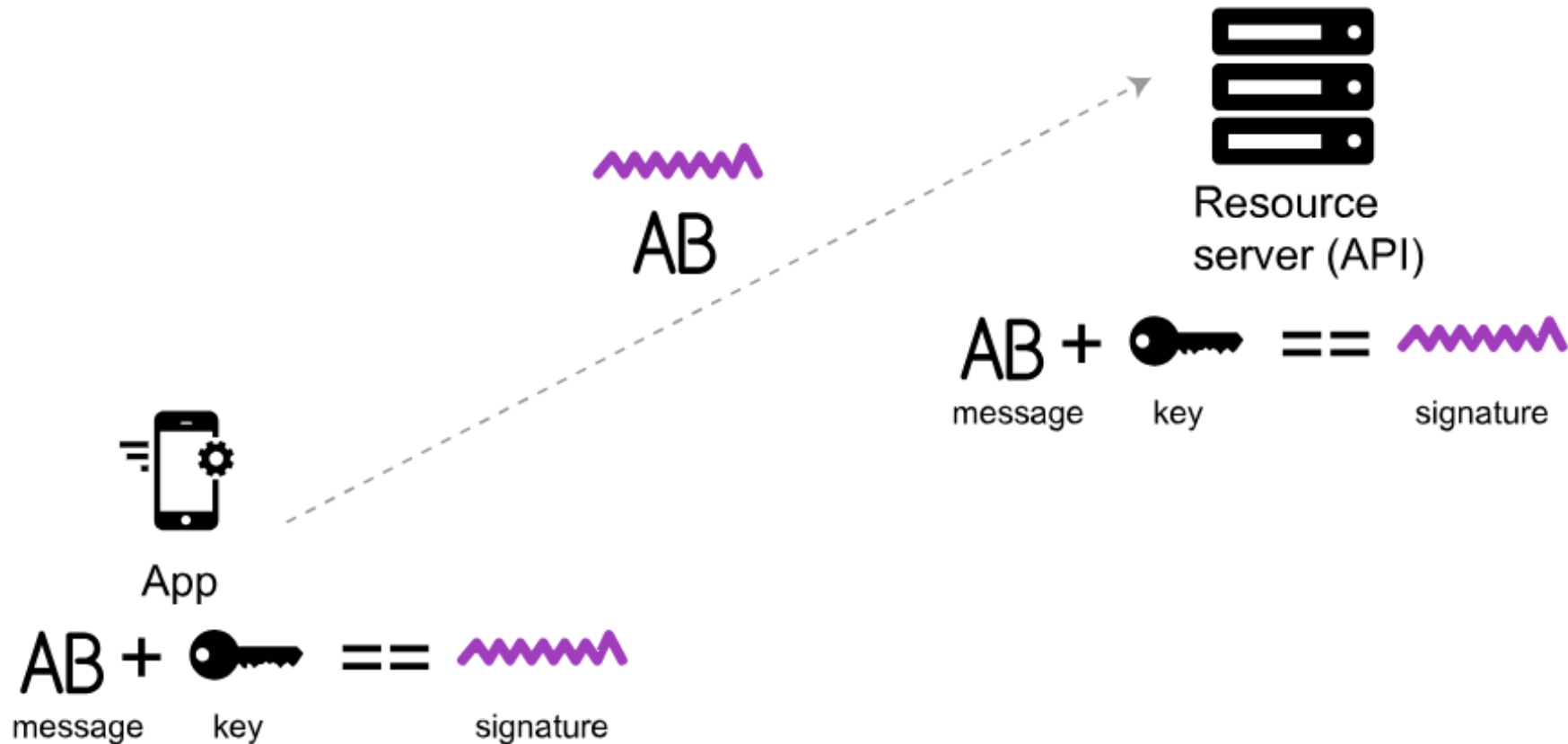
```
username:password
```

```
Authorization: Basic bG9sOnNlY3VyZQ==
```


Authentication

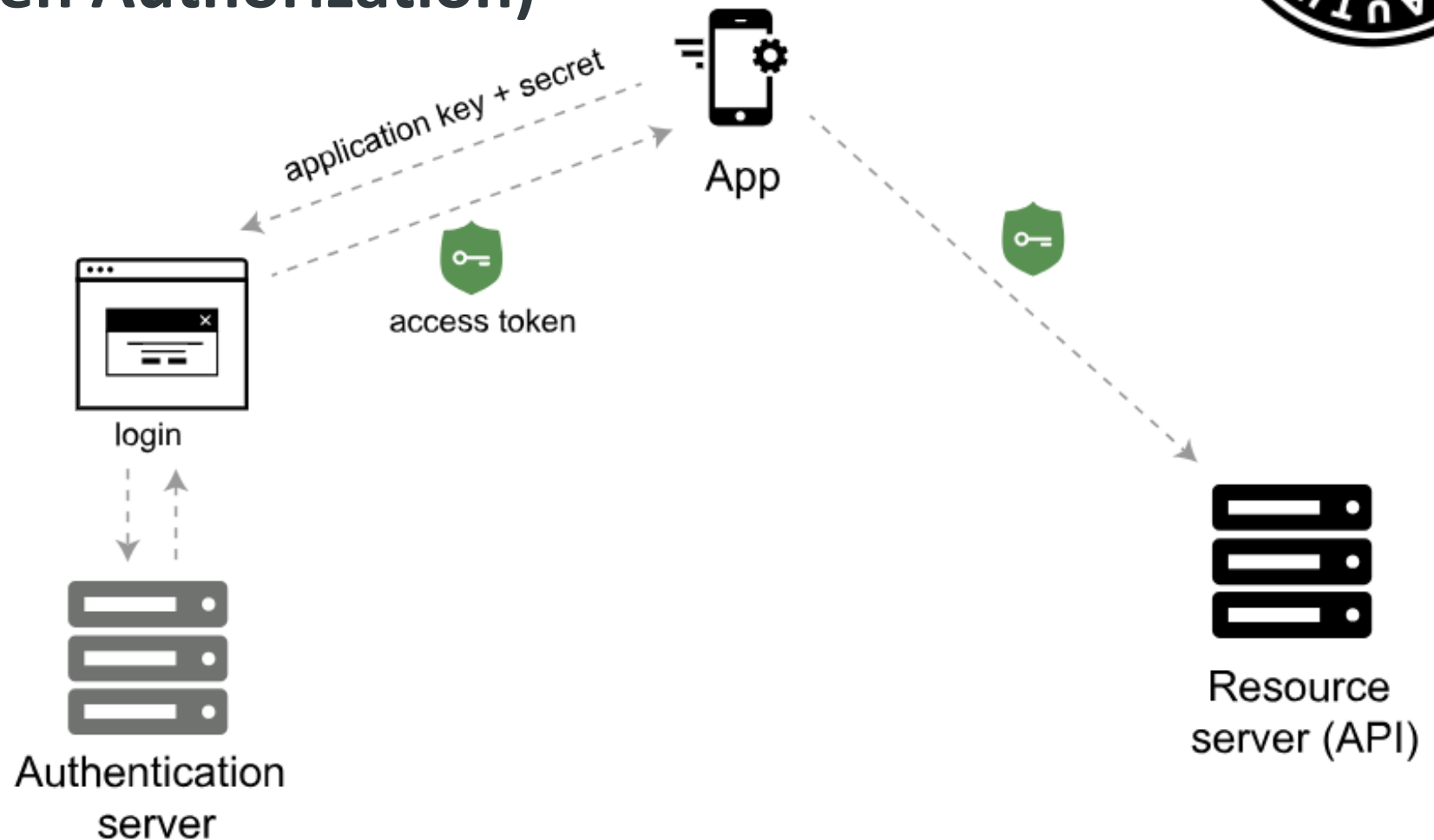


- HMAC (Hash-based message authorization code)



Authentication

- **OAuth (Open Authorization)**



OAuth


Step 1
Find Friends

Step 2
Profile Information

Step 3
Profile Picture

Are your friends already on Facebook?


Many of your friends may already be here. Searching your email account is the fastest way to find your friends on Facebook.


 Gmail

Your Email:


Email Password:

Find Friends


 Facebook will not store your password.

 Yahoo!

Find Friends

 Windows Live Hotmail

Find Friends

 Other Email Service

Find Friends

Before OAuth, Facebook requesting to login using Gmail's credentials

OAuth


OAuth is an authorization framework.

It allows third-party applications to access user data from a trusted website (like Gmail) without giving user's credentials to third party applications.

All the authorization requests from third parties are handled by the OAuth server.


OAuth


login.nvgs.nvidia.com/v1/login?key=eyJhbGciOiJIUzI1NiJ9.eyJzZSI6IlBGB0ciLCJpZCI6bnVsbCwidG9rZW5JZCI6IjI3MDMyMDA1NjM1OTk3NzM4

 NVIDIA

LOG IN

Email address



Password 

☐ I'm not a robot  reCAPTCHA
Privacy - Terms

☒ Stay logged in ☐ Automatic login

[LOG IN](#)

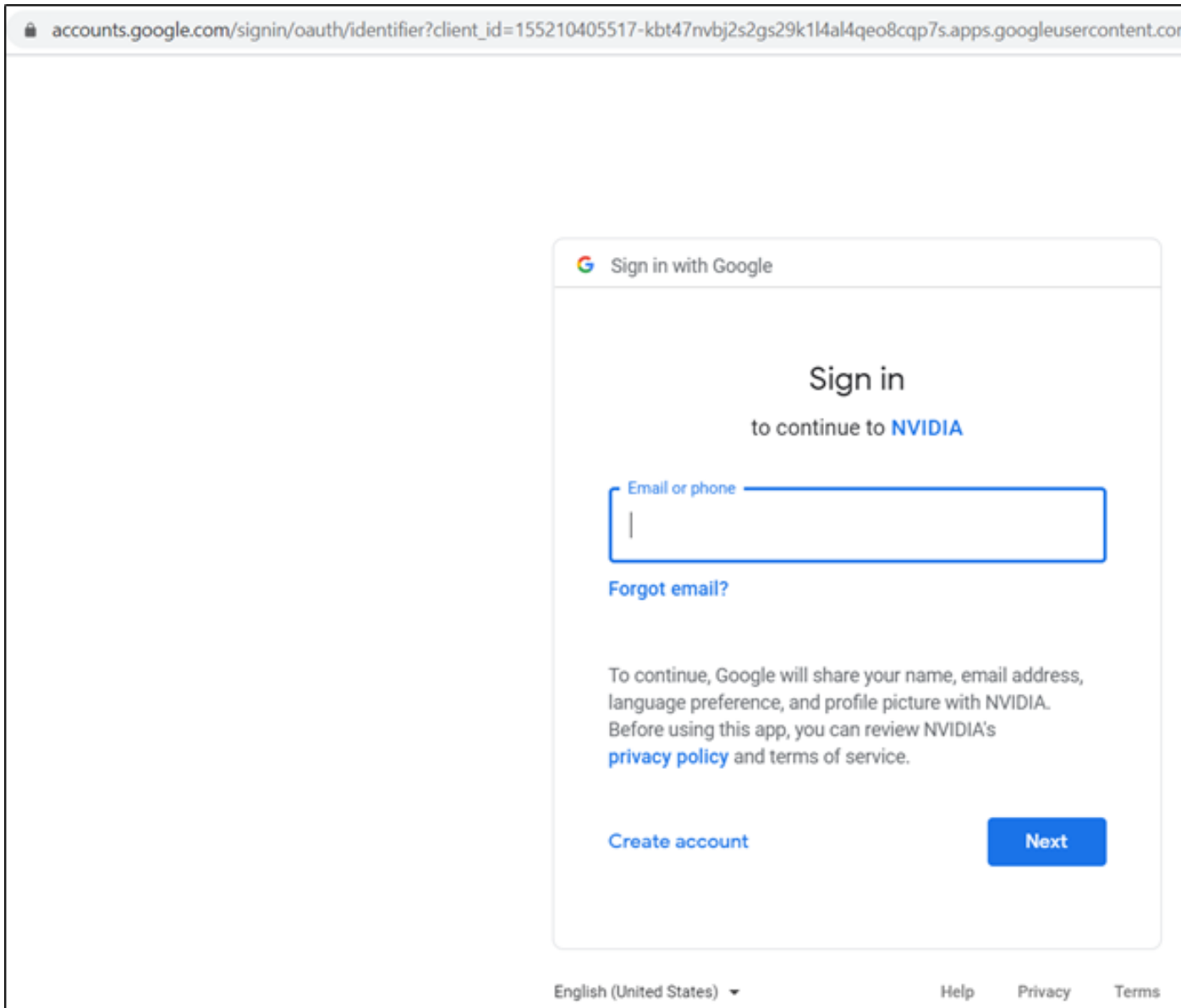
Don't have an account? [Create account](#)

 Log in with Facebook  Log in with Google

[Show more ▼](#)

[Need help logging in?](#)

OAuth

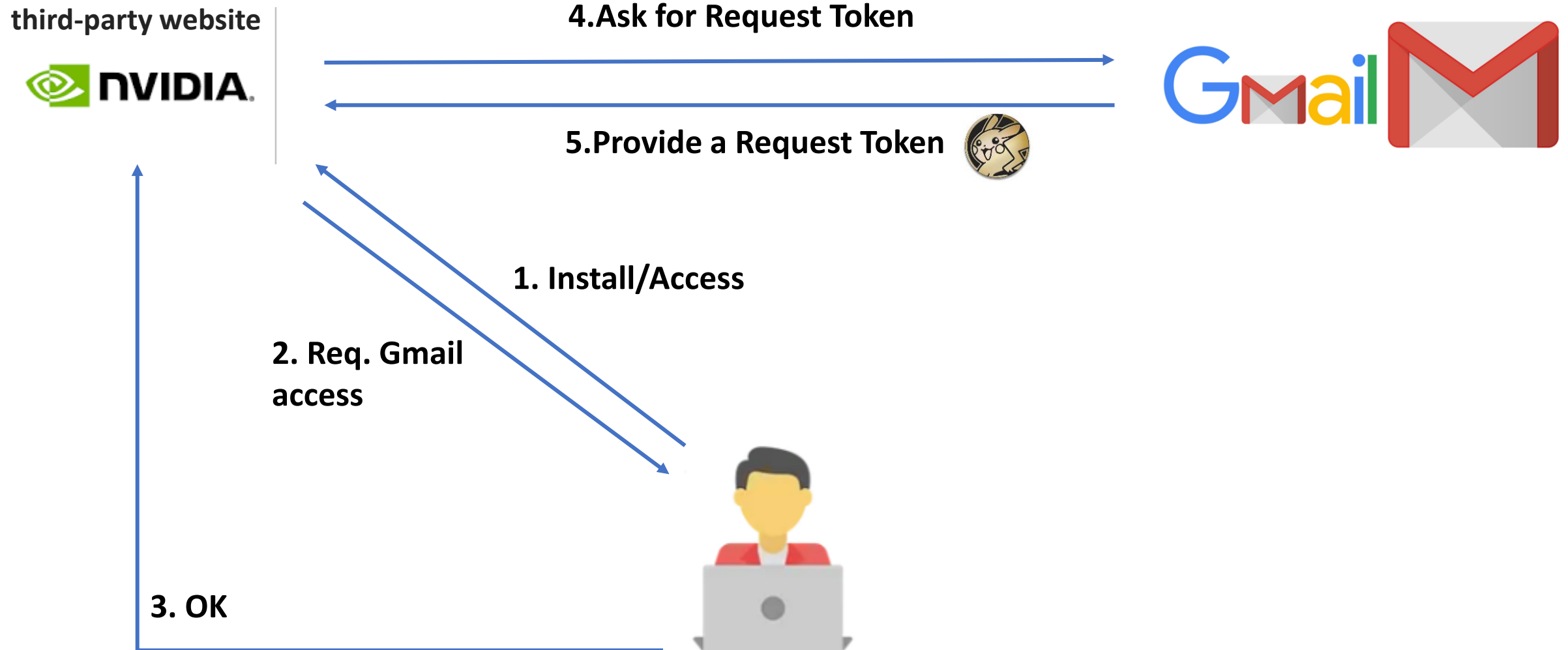


The screenshot shows a web browser window with the URL `accounts.google.com/signin/oauth/identifier?client_id=155210405517-kbt47nrbj2s2gs29k1l4al4qeo8cqp7s.apps.googleusercontent.com`. The page features a "Sign in with Google" header. Below it, the text "Sign in to continue to NVIDIA" is displayed. A text input field labeled "Email or phone" is present, with a "Forgot email?" link below it. A paragraph of text states: "To continue, Google will share your name, email address, language preference, and profile picture with NVIDIA. Before using this app, you can review NVIDIA's [privacy policy](#) and terms of service." At the bottom, there is a "Create account" link and a blue "Next" button. The footer includes "English (United States)" with a dropdown arrow, and links for "Help", "Privacy", and "Terms".

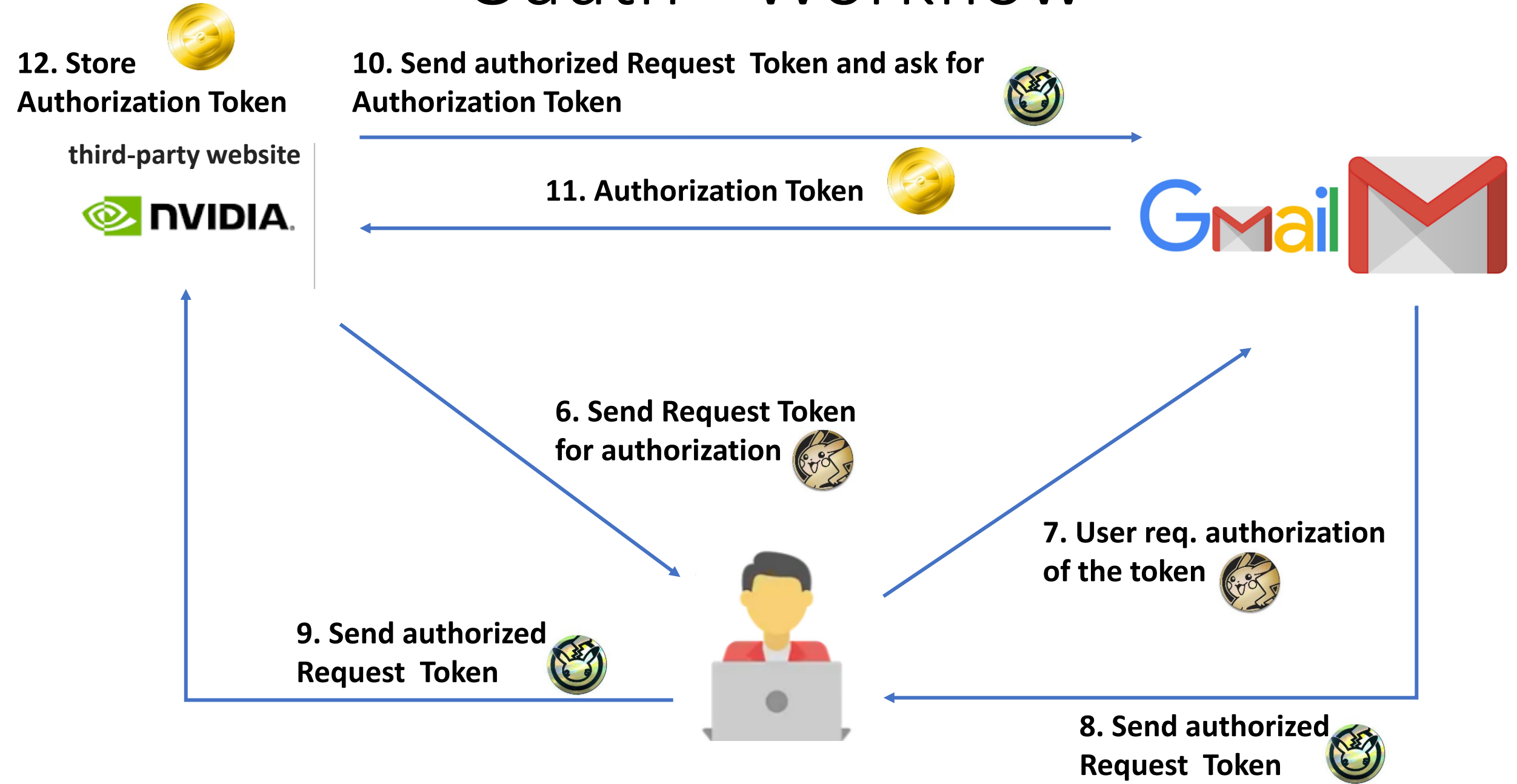
Authentication: To determine whether a user is actually who they claim to be.

Authorization: To determine what a user can or cannot access.

Oauth - Workflow



Oauth - Workflow



Oauth - Benefits

- **Keep user credentials safe.**
- **Easy authorization from one service with another.**
- **It allows security benefits to all the applications in an environment of the main OAuth server.**
- **The surface area for attackers is reduced.**

Example: X (ex Twitter) API

<https://developer.twitter.com/>



Developer Platform

Products ▾

Docs ▾

Use Cases ▾

Community ▾

Support ▾

Developer Portal

Sign in



**Tap into
what's
happening
to build
what's next**

Get immediate access to the X API
and unlock the potential of the X
data



Example: X (ex Twitter) API

<https://developer.twitter.com/>

Free

For write-only use cases and testing the X API

- Rate limited access to v2 posting and media upload endpoints
- 1,500 posts per month - posting limit at the app level
- 1 app ID
- Login with X
- Free

Get started

Basic

For hobbyists or prototypes

- Rate limited access to suite of v2 endpoints
- 3,000 posts per month - posting limit at the user level
- 50,000 posts per month - posting limit at the app level
- 10,000 posts per month - read-limit rate cap
- 2 app IDs

Pro

For startups scaling their business

- Rate-limited access to suite of v2 endpoints, including search and filtered stream
- 1,000,000 posts per month - GET at the app level
- 300,000 posts per month - posting limit at the app level
- 3 app IDs
- Login with X

Enterprise

For businesses and scaled commercial projects

- Commercial-level access that meets your and your customer's specific needs
- Managed services by a dedicated account team
- Complete streams: replay, engagement metrics, backfill, and more features

Example: X (ex Twitter) API

<https://developer.twitter.com/>

×



Accedi a X



Accedi con Google



Accedi con Apple

oppure

Numero, email o nome utente

Avanti

Password dimenticata?

Non hai un account? [Iscriviti](#)

Example: X (ex Twitter) API

<https://developer.twitter.com/>



Developer Portal

Docs ▾

Community ▾

Updates ▾

Support



Pro's v2 includes powerful Filtered Stream endpoint



Write: 300,000 tweets per month

Post up to 300,000 tweets per month



Read: 1 million tweets per month

Retrieve up to 1 million tweets per month



If you need higher levels of access, [click here](#) to contact us and tell us more about your needs.



\$5,000.00 USD/month

Subscribe to Pro

[Sign up for Free Account](#)

Example: X (ex Twitter) API



Developer Portal

Docs ▾

Community ▾

Updates ▾

Support



Developer agreement & policy

Describe all of your use cases of Twitter's data and API:

We need this information for data protection. [Learn more](#)

I am the teacher of the course Social Media Data Analysis at the University of Catania.
I will use the APIs to show to the students how to build their first app and how to manage the Twitter APIs.

- ☒ You understand that you may not resell anything you receive via the Twitter APIs
- ☒ You understand your Developer account may be terminated if you violate the Developer Agreement or any of the Incorporated Developer Terms
- ☒ You accept the Terms & Conditions

By clicking on the box, and by otherwise accessing or using any Licensed Material, you indicate that you have read and agree to this [Developer Agreement](#) and the [Twitter Developer Policy](#)

Twitter API: getting access

The image shows the Twitter Developer Portal dashboard. On the left is a dark sidebar with the Twitter logo and the text "Developer Portal". Below this are navigation links: "Dashboard" (with a house icon), "Projects & Apps" (with a tree icon), "Products" (with a code icon and a "NEW" badge), and "Account" (with a gear icon). The main content area has a top navigation bar with links for "Docs", "Community", "Updates", and "Support", along with a user profile icon. The main heading is "Dashboard". Under the heading is a "Projects" section. It displays "Default project-1705603621335814144". Below this is a "MONTHLY TWEET CAP USAGE" section with a progress bar at 0% and text indicating "0 Tweets pulled of 1.500" and a reset date of "October 23 at 00:00 UTC". At the bottom, a "PROJECT APP" section shows a Twitter profile for "1705603621335814144France" with settings and search icons. On the right side of the dashboard is a "Sample Apps" section featuring a chick icon, the text "Check out our library of sample Apps on Glitch and clone one to get started.", and a "View sample Apps" button.

Developer Portal

Dashboard

Projects & Apps

Products **NEW**

Account

Docs ▾ Community ▾ Updates ▾ Support

Dashboard

Projects

Default project-1705603621335814144

MONTHLY TWEET CAP USAGE ⓘ

0%
0 Tweets pulled of 1.500 Resets on October 23 at 00:00 UTC

PROJECT APP

1705603621335814144France

Sample Apps

Check out our library of sample Apps on Glitch and clone one to get started.

View sample Apps

Twitter API: free features

Manage Tweets

Create and delete Tweets on behalf of a user.

[Read the docs](#)

Endpoints	Rate limit ⓘ	Tweet cap ⓘ	Special attributes
POST /2/tweets	50 requests / 24 hours PER APP	no	-
	50 requests / 24 hours PER USER		
DELETE /2/tweets/:id	50 requests / 24 hours PER APP	no	-
	50 requests / 24 hours PER USER		

Twitter API: free features

Users

Users lookup



Retrieve detailed, up-to-date information about a specific user, or users.

[Read the docs](#)

Endpoints

Rate limit ⓘ

Tweet cap ⓘ

Special attributes

GET /2/users/me

25 requests / 24 hours
PER USER

no

-

Twitter API: First request to the APIs



Projects

NO PROJECTS HERE

[+ New Project](#)

Twitter API: First request to the APIs

The screenshot shows the Twitter Developer Portal interface. On the left is a dark sidebar with the Twitter logo and 'Developer Portal' text. It contains navigation links: 'Dashboard', 'Projects & Apps' (with an expand icon), 'Overview' (highlighted), 'Products' (with a 'NEW' badge and a dropdown arrow), and 'Account' (with a dropdown arrow). The main content area has a top navigation bar with links for 'Docs', 'Community', 'Updates', and 'Support', along with a user profile icon. The main heading is 'Overview'. Below this, the 'Free' tier is highlighted. A link for 'Default project-170560362...' is shown with a dropdown arrow, accompanied by labels 'LIMITED V1.1 ACCESS ONLY' and 'V2 ACCESS'. A 'PROJECT APP' card displays a Twitter icon, the app name '1705603621335814144Frances...', and icons for 'App settings' (a gear) and a key. On the right, a 'Why Projects?' section features a tree icon, the title 'Why Projects?', a paragraph explaining that only apps in projects can access v2 endpoints, and a 'Learn more' link.

Developer Portal

Dashboard

Projects & Apps

Overview

Default project-17056036213...

1705603621335814144F...

Products **NEW**

Account

Docs Community Updates Support

Overview

Free

Default project-170560362... >

LIMITED V1.1 ACCESS ONLY

V2 ACCESS

PROJECT APP

App settings

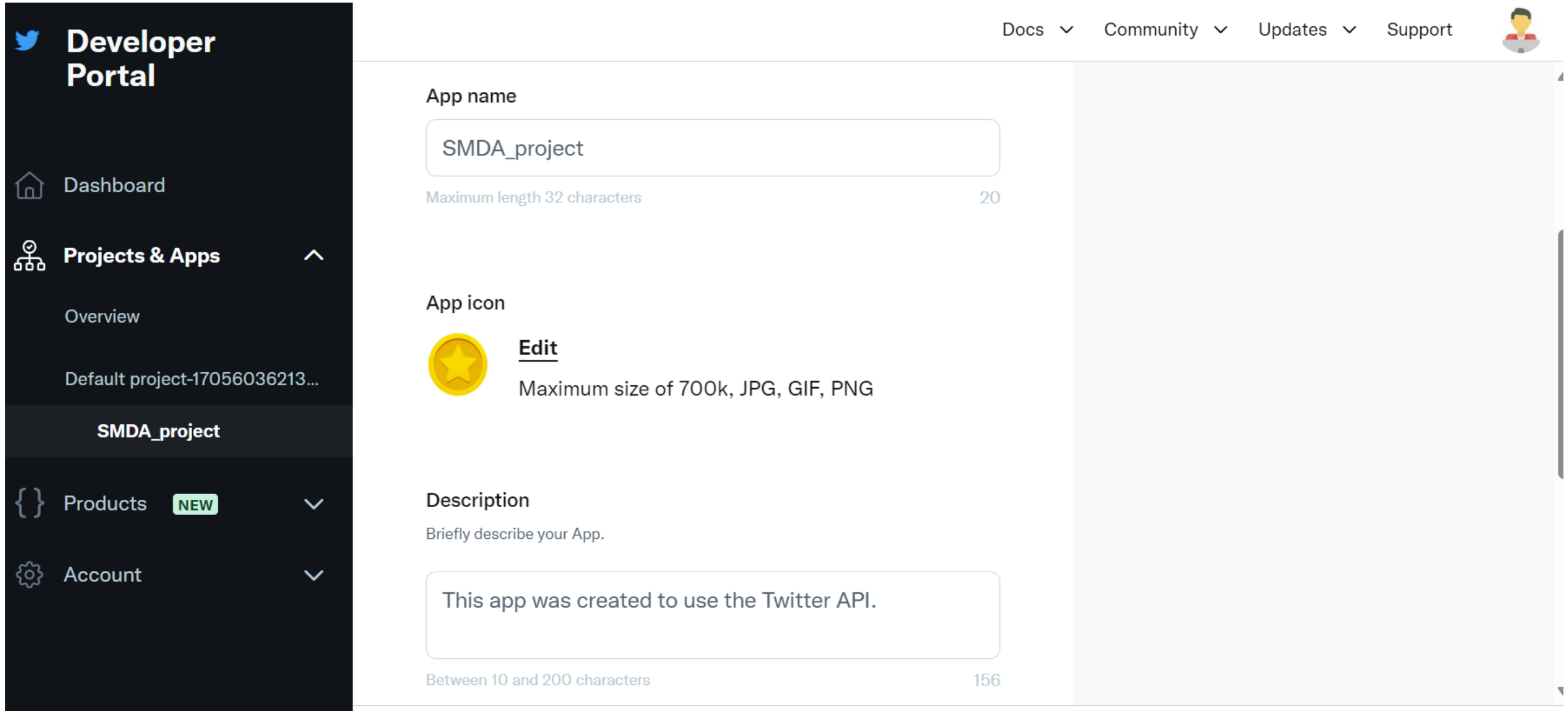
1705603621335814144Frances...

Why Projects?

Only Apps in Projects can access v2 Early Access endpoints. They also help you manage and monitor your work.

[Learn more](#)

Twitter API: First request to the APIs



The screenshot displays the Twitter Developer Portal interface. On the left is a dark sidebar with the 'Developer Portal' header and navigation links: 'Dashboard', 'Projects & Apps' (expanded), 'Overview', 'Default project-17056036213...', 'SMDA_project' (selected), 'Products' (marked 'NEW'), and 'Account'. The main content area shows the configuration for the 'SMDA_project' app. At the top right of the main area are links for 'Docs', 'Community', 'Updates', and 'Support', along with a user profile icon. The configuration fields include: 'App name' with the value 'SMDA_project' and a note 'Maximum length 32 characters'; 'App icon' with a yellow star icon, an 'Edit' link, and a note 'Maximum size of 700k, JPG, GIF, PNG'; and 'Description' with the text 'This app was created to use the Twitter API.' and a note 'Between 10 and 200 characters'. A large, empty light blue box is visible on the right side of the configuration area.

Developer Portal

Dashboard

Projects & Apps

Overview

Default project-17056036213...

SMDA_project

Products NEW

Account


Docs Community Updates Support

App name

SMDA_project

Maximum length 32 characters 20

App icon

 [Edit](#)

Maximum size of 700k, JPG, GIF, PNG

Description

Briefly describe your App.

This app was created to use the Twitter API.

Between 10 and 200 characters 156

Twitter API: Keys and Tokens

The screenshot displays the Twitter Developer Portal interface. On the left is a dark sidebar with navigation links: Dashboard, Projects & Apps (expanded to show Overview and a default project), SMDA_project, Products (marked as NEW), and Account. The top right of the page features links for Docs, Community, Updates, and Support, along with a user profile icon. The main content area is divided into two sections: 'Consumer Keys' and 'Authentication Tokens'. The 'Consumer Keys' section contains a card for 'API Key and Secret' with a 'Reveal API Key hint' link and a 'Regenerate' button. The 'Authentication Tokens' section contains two cards: one for 'Bearer Token' with a 'Generate' button, and another for 'Access Token and Secret' (for @Francesco181762) with a 'Generate' button. A 'Helpful docs' sidebar on the right lists links for About Projects, About Apps, About authentication, App permissions, Authentication best practices, and API Key.

Developer Portal

Dashboard

Projects & Apps

Overview

Default project-17056036213...

SMDA_project

Products **NEW**

Account

Docs Community Updates Support

Consumer Keys

API Key and Secret ⓘ

Reveal API Key hint

Regenerate

Authentication Tokens

Bearer Token ⓘ

Generate

Access Token and Secret ⓘ

For @Francesco181762

Generate

Helpful docs

- About Projects
- About Apps
- About authentication
- App permissions
- Authentication best practices
- API Key

Our first HTTP request

The Twitter API is composed of multiple endpoints, each represented by a URL.

Our first HTTP request

Search tweets in the last seven days from the TwitterDev account:

```
curl --request GET 'https://api.twitter.com/2/tweets/search/recent?query=from:twitterdev' --  
header 'Authorization: Bearer $BEARER_TOKEN'
```

Response:

```
{"client_id":"27816447","detail":"When authenticating requests to the Twitter  
API v2 endpoints, you must use keys and tokens from a Twitter developer App  
that is attached to a Project. You can create a project via the developer  
portal.","registration_url":"https://developer.twitter.com/en/docs/projects/o  
verview","title":"Client Forbidden","required_enrollment":"Appropriate Level  
of API Access","reason":"client-not-  
enrolled","type":"https://api.twitter.com/2/problems/client-forbidden"}
```

Twitter RESTful API Example

Show users:

```
curl --request GET --url  
'https://api.twitter.com/1.1/users/show.json?user_id=1705602238746435584'  
--header 'Authorization: Bearer Bearer AAAAAAAAAAAAAAAAAAAAAA.....'
```

Response:

```
{  
  "id":1705602238746435584,"id_str":"1705602238746435584","name":"Francesco",  
  "screen_name":"Francesco181762","location":"","profile_location":null,"description":"","url":null,"entities":{"description":{"urls":[]}},"protected":false,  
  "followers_count":0,"friends_count":1,"listed_count":0,"created_at":"Sat Sep  
23 15:17:24 +0000  
2023","favourites_count":0,"utc_offset":null,"time_zone":null,"geo_enabled":f  
alse,"verified":false,"statuses_count":1,"lang":null,"status":{"created_at":"  
Sun Oct 01 11:02:46 +0000  
2023","id":1708437292526825857,"id_str":"1708437292526825857","text":"Hello  
World!","truncated":false, ... }  
}
```

Python Twitter API

```
import twitter
api = twitter.Api(consumer_key='[REDACTED]',
                  consumer_secret='[REDACTED]',
                  access_token_key='[REDACTED]',
                  access_token_secret='[REDACTED]',
                  tweet_mode='extended')
results = api.GetSearch(
    raw_query="q=%23JokerFilm&count=100")
print(len(results))
results[2]
```

100

Status(ID=1180888987369693186, ScreenName=Erinsdays, Created=Sun Oct 06 16:54:09 +0000 2019, Text="Joaquin Phoenix's performance is pure BRILLIANCE. Psychological exploration of suffering, hinged in an extreme reality. Cinematography, music composition... everything, just WOW. It is exhausting, in the best way possible. Joaquin is just PHENOMENAL. #Joker #JokerMovie #JokerFilm https://t.co/WIS4430gSF")

Some APIs Worth Investigating

- Flickr API.

<https://www.flickr.com/services/api/>;

- Facebook API.

<https://developers.facebook.com>;

- Instagram API.

<https://www.instagram.com/developer/>;

Student Tutorial

- Choose a Social Media Platform;
- Study the **official API**;
- Choose a language-specific API [optional];
- Use the API to automatically download data from the Social Media, e.g., based on some search query;
- Analyze the data, reporting statistics and visualizations;
- Prepare a Jupyter notebook which serves as a tutorial (with working examples) including:
 - How to get access to the API (as seen in this lesson);
 - An example using the RESTful API;
 - A working example of how to use the Python library;
 - The code to download the data;
 - A simple analysis of the downloaded data.

Example of Student Tutorial



Sommario

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- [API Flickr Python](#)
- [Estrazione dati e analisi](#)
- [Conclusione](#)

Credits: **Luigi Seminara**