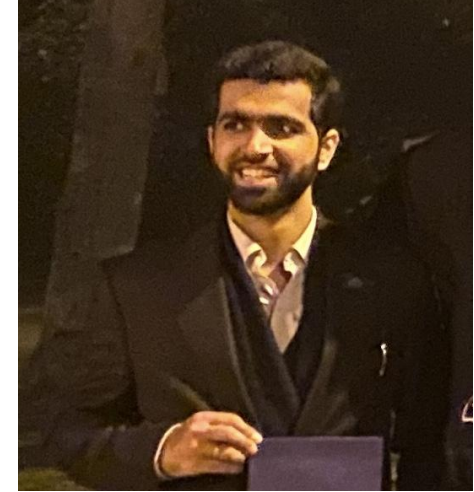


Paginated APIs x Python

PyOhio 2022

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- Software Engineer at Arbisoft
- Speaker, Open edX Conference 2022
- Led a development team of Open Data Pakistan
- Google CodeU APAC Singapore Participant
- Top Rated Freelancer on Upwork Inc.
- [Inter]national Hackathons Winner
- [ex] President, IEEE CS LUMS
- **I love Python!**



Agenda

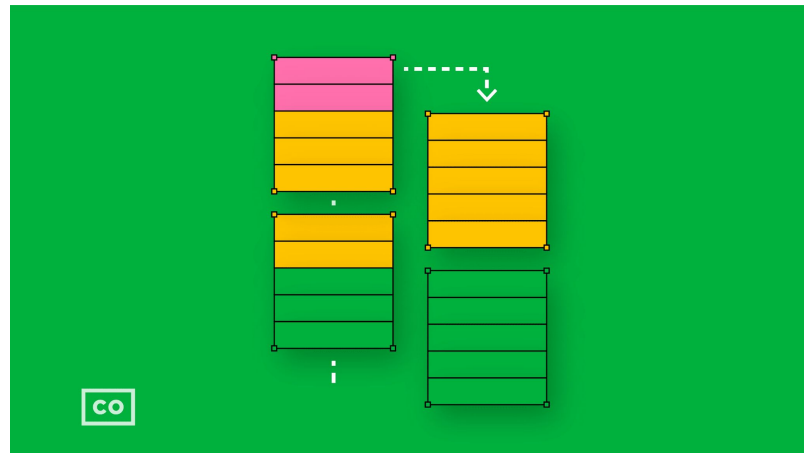
What we will cover:

- APIs
- Pagination
- Types/Methods
- Examples

What we will not cover:

- Authentication
- Rate Limitation
- Detailed Error Handling

Image [\[ref\]](#)



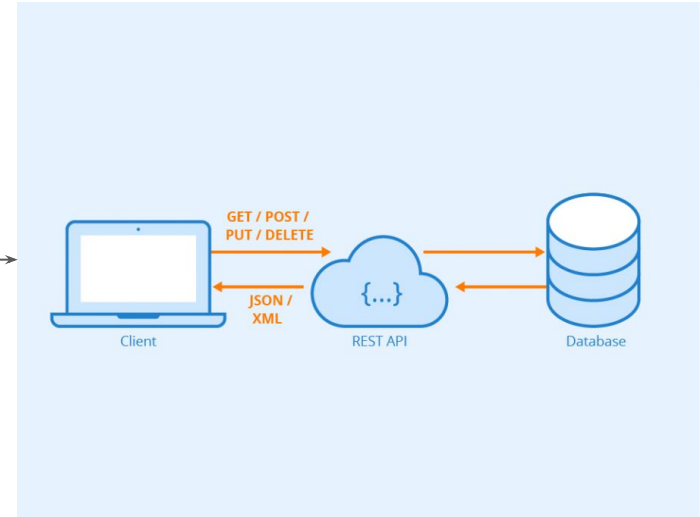
Application Programming Interface (API)

Definition [\[ref\]](#):

APIs are mechanisms that enable two software components to communicate with each other using a set of definitions and protocols.

Types:

- SOAP
- RPC
- Websocket
- ...
- **REST [\[ref\]](#)**



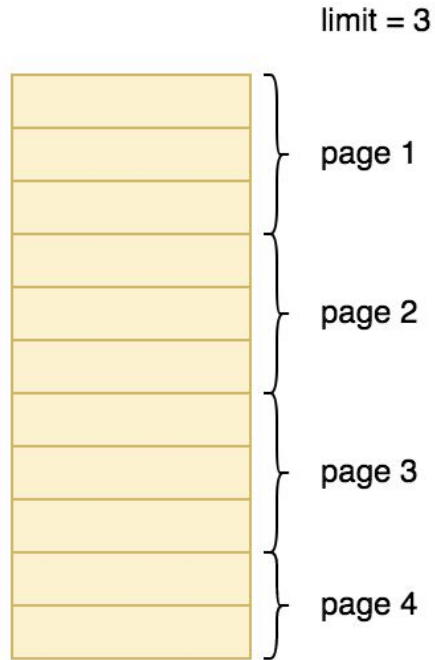
Paginated APIs [[ref](#)]

- When we use a GET API request to request information from a server via API endpoint, there could be thousands of entries in the returned JSON file.
- Pagination turns big archives of data into smaller, more digestible pieces.

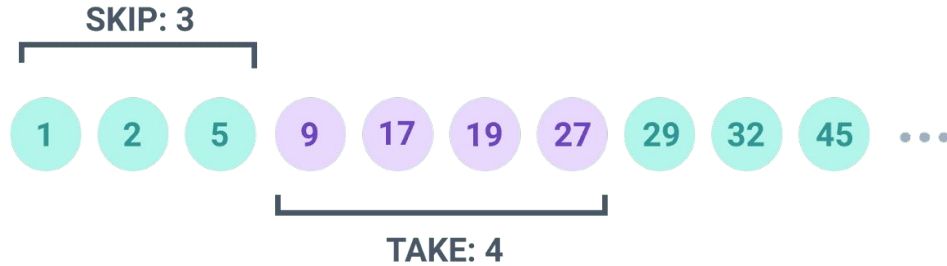
Pagination Methods

- Offset
- Page
- Cursor
- Url
- Keyset
- Seek
- ...

Page-based Pagination



Offset-based Pagination [[ref](#)]



Link-based Pagination

```
{
  "total_count" : 1,
  "_links" : {
    "self" : {
      "href" : "https://api.artsy.net/api/artists"
    },
    "next" : {
      "href" : "https://api.artsy.net/api/artists?cursor=..."
    }
  },
  "_embedded" : {
    "artists" : [
      {
        "id" : "...",
        ...
      }
    ]
  }
}
```

Artsy API [[ref](#)]

```
{
  "count": 87,
  "next": "http://swapi.co/api/people/?page=2",
  "previous": null,
  "results": [
    {
      "name": "Luke Skywalker",
      "height": "172",
      "mass": "77",
      "hair_color": "blond",
      "skin_color": "fair",
      "eye_color": "blue",
      "birth_year": "19BBY",
      "gender": "male",
      "homeworld": "http://swapi.co/api/planets/1/",
      "films": [
        "http://swapi.co/api/films/6/",
        "http://swapi.co/api/films/3/",

```

The Star Wars API [[ref](#)]

Cursor-based Pagination [[ref](#)]

```
{
  "data": [
    ... Endpoint data is here
  ],
  "paging": {
    "cursors": {
      "after": "MTAxNTExOTQ1MjAwNzI5NDE=",
      "before": "NDMyNzQyODI3OTQw"
    },
    "previous": "https://graph.facebook.com/{your-user-id}/albums?limit=25&before=NDMyNzQyODI3OTQw",
    "next": "https://graph.facebook.com/{your-user-id}/albums?limit=25&after=MTAxNTExOTQ1MjAwNzI5NDE="
  }
}
```

Image: Facebook Graph API

Comparison

```
examples > page.py > ...
You, 1 minute ago | 1 author (You)
"""
2 Paginated API: An page-based strategy
3 """
4
5 import requests
6
7 results = []
8 max_pages = 3
9 page = 0
10 total = 1 # init
11
12 while page < total:
13     url = "https://api.instantwebtools.net/v1/passenger"
14     params = {
15         'page': page, # offset value, default to 0
16         'size': 100 # assuming constant page size
17     }
18
19     r = requests.get(url, params=params)
20
21     if r.ok:
22         r = r.json()
23         total = r['totalPages'] # constant value set
24         results.extend(r['data'])
25
26     else:
27         print(r.status_code)
28         break
29
30 print(f"Status: fetched page no {page} of {total} pages")
31
32 # early stop to get only max required results
33 if page >= max_pages:
34     print("Stopping at max pages to fetch")
35     break
36
37 # increment to get next page
38 page = page + 1
39
40 # verify number of products
41 assert page == min(total, max_pages)
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That's all Folks!

<https://github.com/azanbinzahid/paginated-apis-pyohio-2022/>