UNIVERSITY OF PADOVA
DEPARTMENT OF INFORMATION ENGINEERING

Biomedical Wearable Technologies
for Healthcare and Wellbeing

Networking

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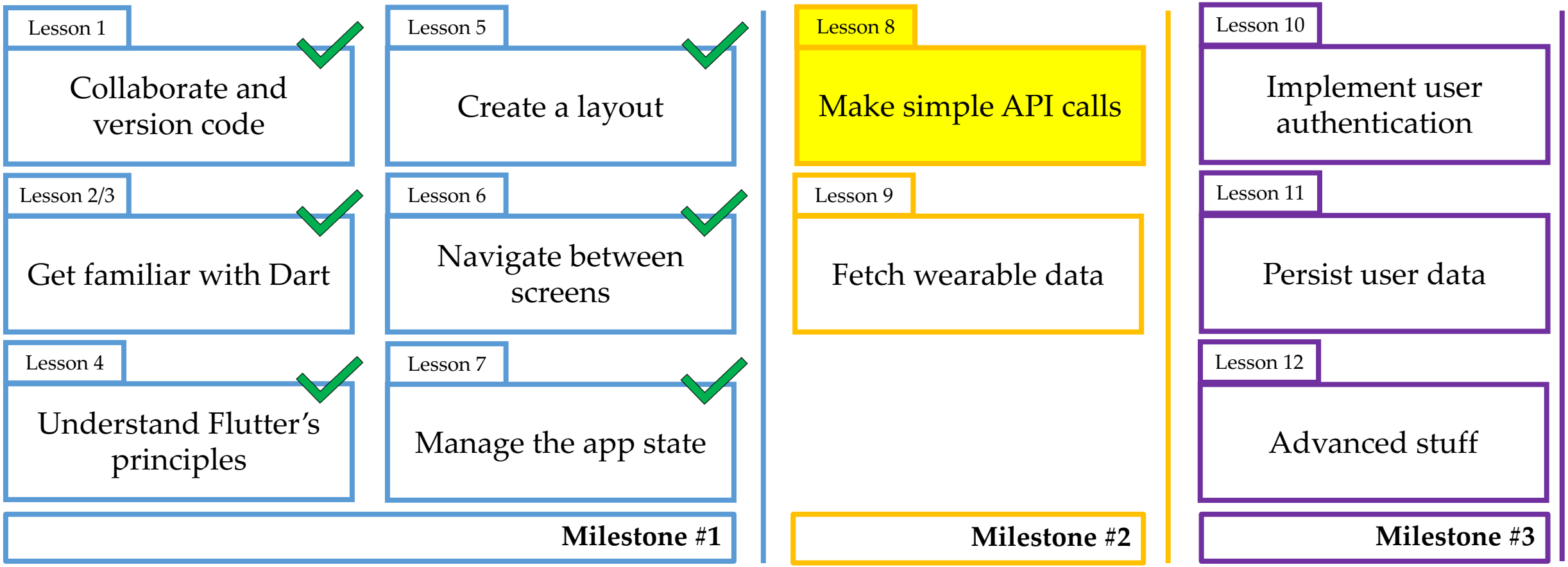
INFORMATION
ENGINEERING
UNIVERSITY OF PADOVA

Outline

- **Recap**
- The network flow
- RESTful API in practice
- Case study

- Exercise
- Homework
- Resources

Recap



Do something with your fantasy

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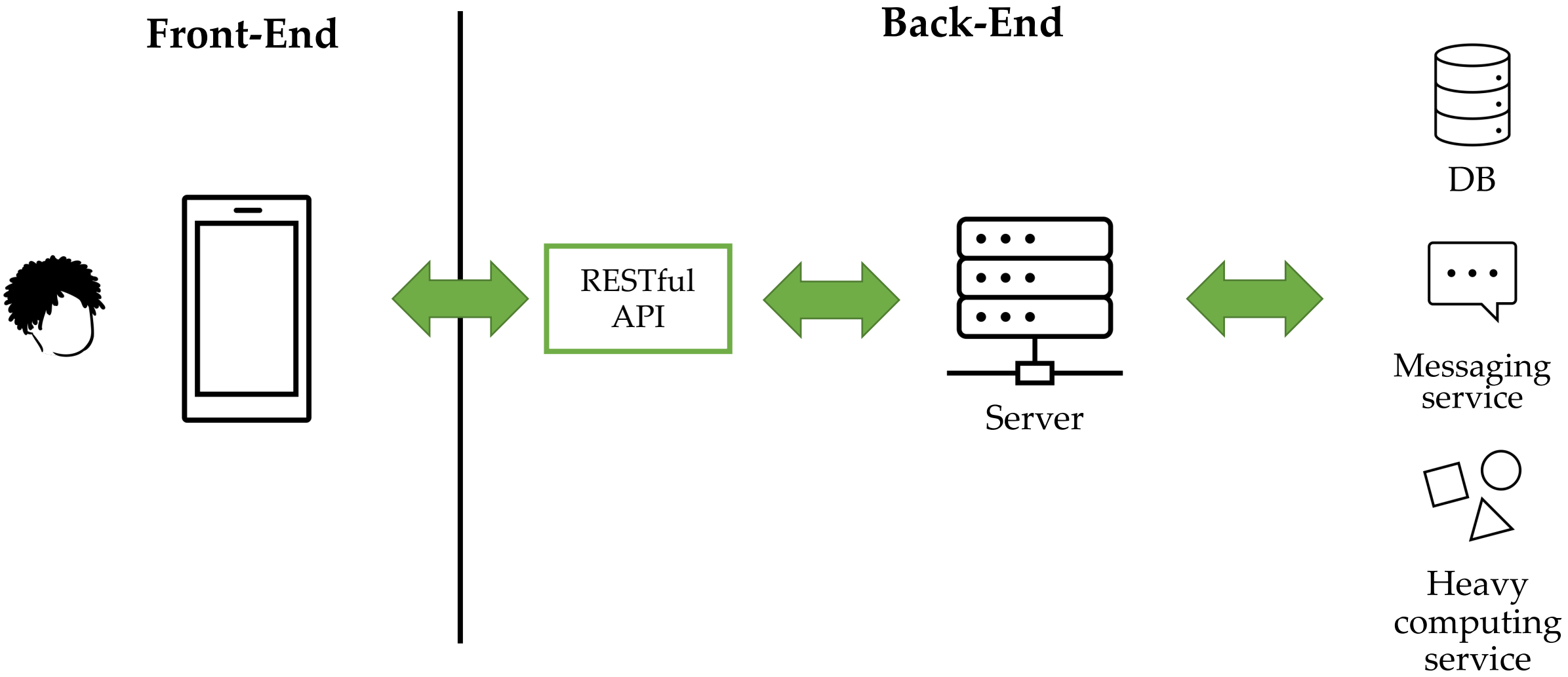
The network flow



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RESTful API in practice

- From the practical point of view, RESTful API can be used via http following three steps:
  - Step 1: Send an http request to the RESTful API
  - Step 2: Await for the response
  - Step 3: Process the response (usually in a JSON format)

- The http request has the following structure:

<METHOD> <HTTP or HTTPS>://<DOMAIN>/<ENDPOINT>?<PARAMETERS>

+

<BODY> and <HEADERS>

- <METHOD> and <ENDPOINT> defines the so-called **route, e.g.:**

  GET /heartrate/today/

  DELETE /user/1

RESTful API in practice

- Beside its content a response contains an **HTTP status code**, i.e., a special number that tells to the frond-end if the request is successful or, otherwise, why it is not successful. Here's the most common:

  - 200: OK
  - 401: UNAUTHORIZED
  - 403: FORBIDDEN
  - 404: NOT FOUND
  - 500: INTERNAL SERVER ERROR

- Normally, the front-end developer has to manage these codes based on the API specifics

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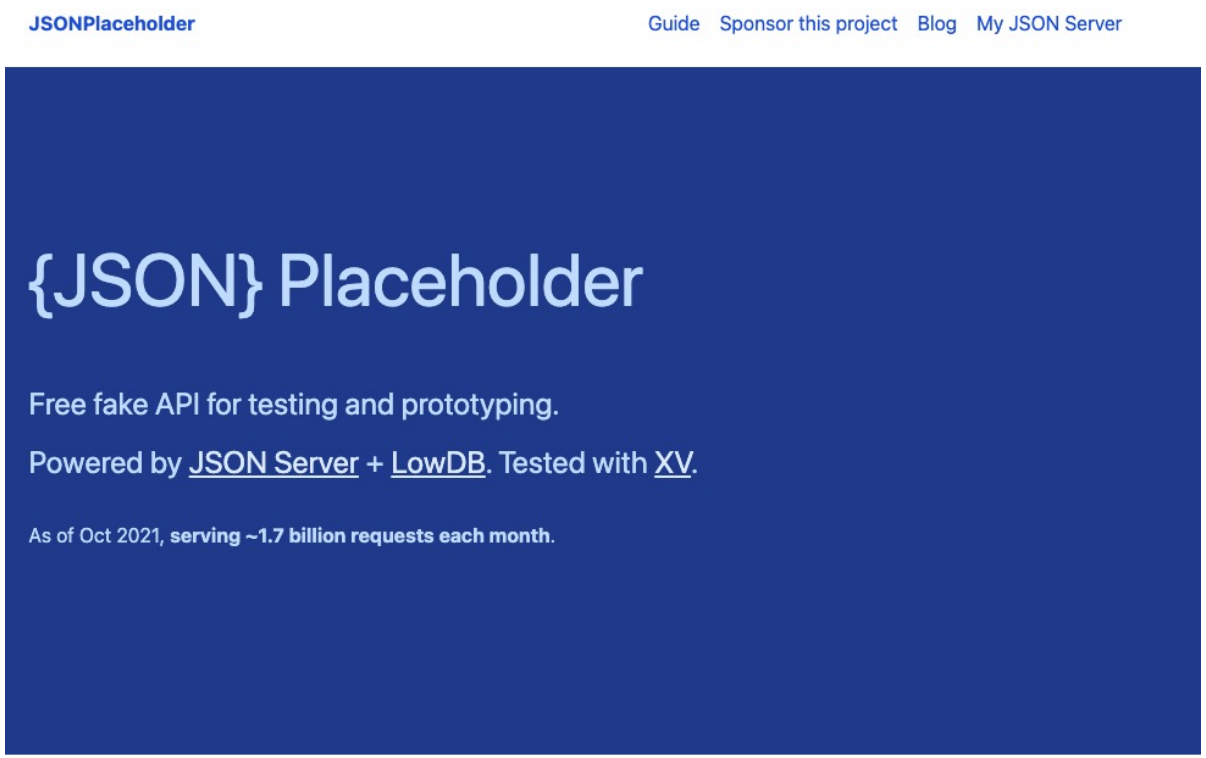
{JSON} Placeholder

- To learn how to do request to an API and process its result we will use {JSON}Placeholder



{JSON} Placeholder

- {JSON}Placeholder exposes the following resources and routes we can play with

Resources

JSONPlaceholder comes with a set of 6 common resources:

/posts	100 posts
/comments	500 comments
/albums	100 albums
/photos	5000 photos
/todos	200 todos
/users	10 users

Note: resources have relations. For example: posts have many comments, albums have many photos, ... see guide for the full list.

Routes

All HTTP methods are supported. You can use http or https for your requests.

GET	/posts
GET	/posts/1
GET	/posts/1/comments
GET	/comments?postId=1
POST	/posts
PUT	/posts/1
PATCH	/posts/1
DELETE	/posts/1

Note: see guide for usage examples.

{JSON} Placeholder – Post resource

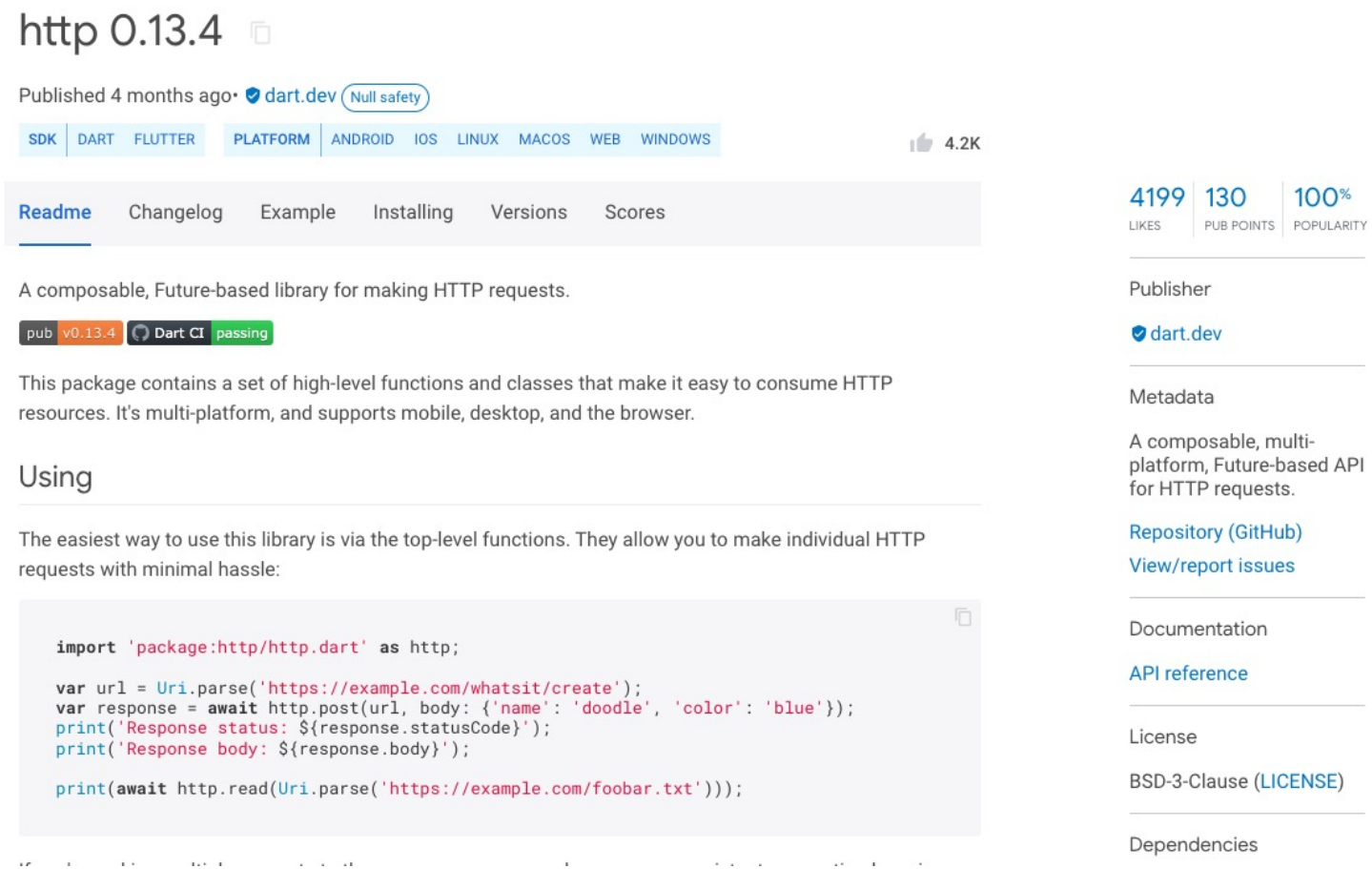
- Let's zoom in the **post** resource:
  - https://jsonplaceholder.typicode.com/posts (this is equivalent to the GET request) will result to:


```
[
  {
    "userId": 1,
    "id": 1,
    "title": "sunt aut facere repellat provident occaecati excepturi optio reprehenderit",
    "body": "quia et suscipit\nsuscipit recusandae consequuntur expedita et cum\nreprehenderit molestiae ut ut quas totam\nnostrum rerum est autem sunt rem eveniet architecto"
  },
  {
    "userId": 1,
    "id": 2,
    "title": "qui est esse",
    "body": "est rerum tempore vitae\nsequi sint nihil reprehenderit dolor beatae ea dolores neque\nfugiat blanditiis voluptate porro vel nihil molestiae ut reiciendis\nqui aperiam non debitis possimus qui neque nisi nulla"
  },
  {
    "userId": 1,
    "id": 3,
    "title": "ea molestias quasi exercitationem repellat qui ipsa sit aut",
    "body": "et iusto sed quo iure\nvoluptatem occaecati omnis eligendi aut ad\nvoluptatem doloribus vel accusantium quis pariatur\nmolestiae porro eius odio et labore et velit aut"
  },
  {
    "userId": 1,
    "id": 4,
    "title": "eum et est occaecati",
    "body": "ullam et saepe reiciendis voluptatem adipisci\nsit amet autem assumenda provident rerum culpa\nquis hic commodi nesciunt rem tenetur doloremque ipsam iure\nquis sunt voluptatem rerum illo velit"
  },
  {
    "userId": 1,
    "id": 5,
```


- So, we have a list of posts, each identified via an id, the id of the user who posted it, a title, and a body.

http package

- To be able to make calls we will use the http package. This provides a simple web client to be used to make http calls.



http 0.13.4

Published 4 months ago• dart.dev Null safety

SDK DART FLUTTER PLATFORM ANDROID IOS LINUX MACOS WEB WINDOWS 4.2K

Readme Changelog Example Installing Versions Scores

A composable, Future-based library for making HTTP requests.

pub v0.13.4 Dart CI passing

This package contains a set of high-level functions and classes that make it easy to consume HTTP resources. It's multi-platform, and supports mobile, desktop, and the browser.

Using

The easiest way to use this library is via the top-level functions. They allow you to make individual HTTP requests with minimal hassle:

```
import 'package:http/http.dart' as http;

var url = Uri.parse('https://example.com/whatsit/create');
var response = await http.post(url, body: {'name': 'doodle', 'color': 'blue'});
print('Response status: ${response.statusCode}');
print('Response body: ${response.body}');

print(await http.read(Uri.parse('https://example.com/foobar.txt')));
```

4199 LIKES | 130 PUB POINTS | 100% POPULARITY

Publisher

dart.dev

Metadata

A composable, multi-platform, Future-based API for HTTP requests.

Repository (GitHub)

View/report issues

Documentation

API reference

License

BSD-3-Clause (LICENSE)

Dependencies

Android-specific action

- To be able to access to internet functionalities in Android you are required to provide a specific permission:

- To do so, in the android>app>src>main folder open the AndroidManifest.xml file, and add the following after the <manifest …> tag:

<uses-permission android:name="android.permission.INTERNET" />

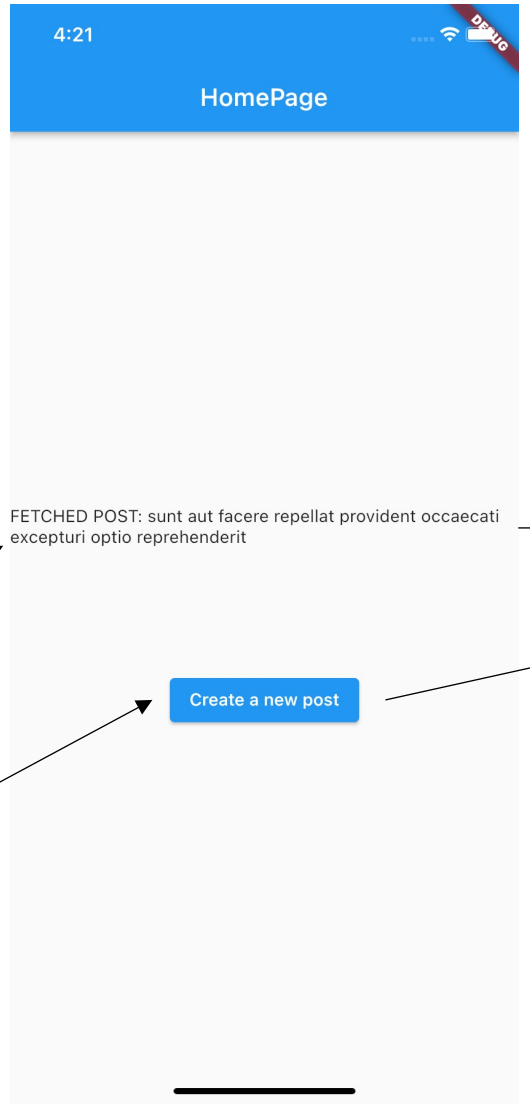
- No need to do this in iOS.

Case of study - Live

- To demonstrate how to make and process API calls in Flutter, we will build a very simple app called ”network_master” able to

1. Fetch data of a specific post from {JSON}Placeholder
   → **GET method**

2. Create a new post in {JSON}Placeholder
   → **POST method**



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Note: see guide for usage examples.

Full example in lab_08-networking/network_master/

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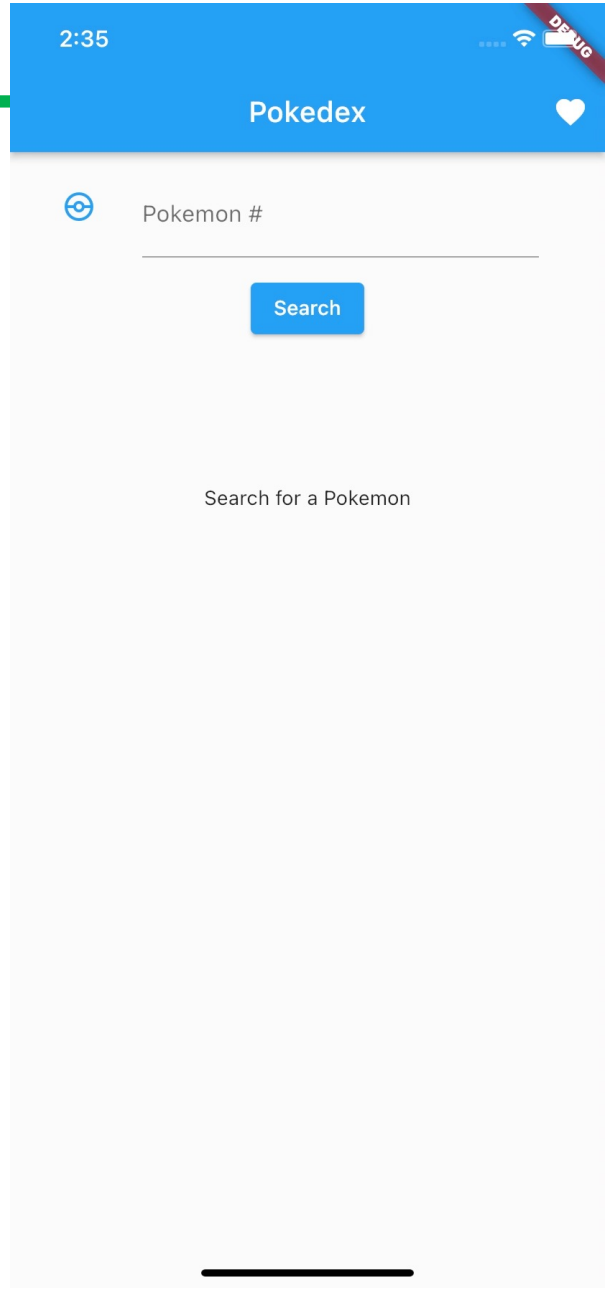
Exercise



- Exercise 08.01
  - Implement a Pokédex using the PokeAPI https://pokeapi.co/ (hint: take a look to the https://pokeapi.co/api/v2/pokemon/ resource)
  - The user can search into the search bar for a Pokémon given its number (be aware that valid numbers go from 1 to 898). Once the button is tapped, if the number is valid, some of the Pokémon details are shown to the user.
  - The user can add that Pokémon to its favorites using a button.
  - Via a button in the AppBar, the user navigates to another screen where all its favorite Pokémon are shown.
  - In the "Favorites Pokémon page" the user can look at the list and delete entries.

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Homework

- Get familiar with the http package

- Take a look to a powerful alternative to the http package: Dio
  - https://pub.dev/packages/dio

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Resources

- HTTP Status Codes
  - https://en.wikipedia.org/wiki/List_of_HTTP_status_codes
- {JSON}placeholder APIs
  - https://jsonplaceholder.typicode.com/
- PokéAPI
  - https://pokeapi.co/
- Fetch data from the internet. Cookbook by the Flutter community
  - https://docs.flutter.dev/cookbook/networking/fetch-data
- Send data to the internet. Cookbook by the Flutter community
  - https://docs.flutter.dev/cookbook/networking/send-data