HTTP and REST Services

HTTP, Request Headers, RESTful Web Services

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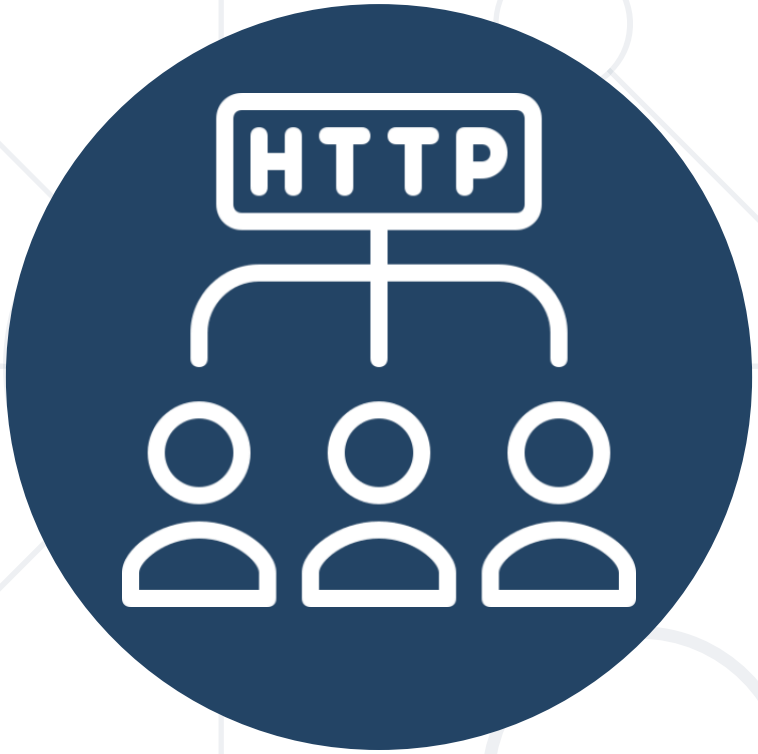
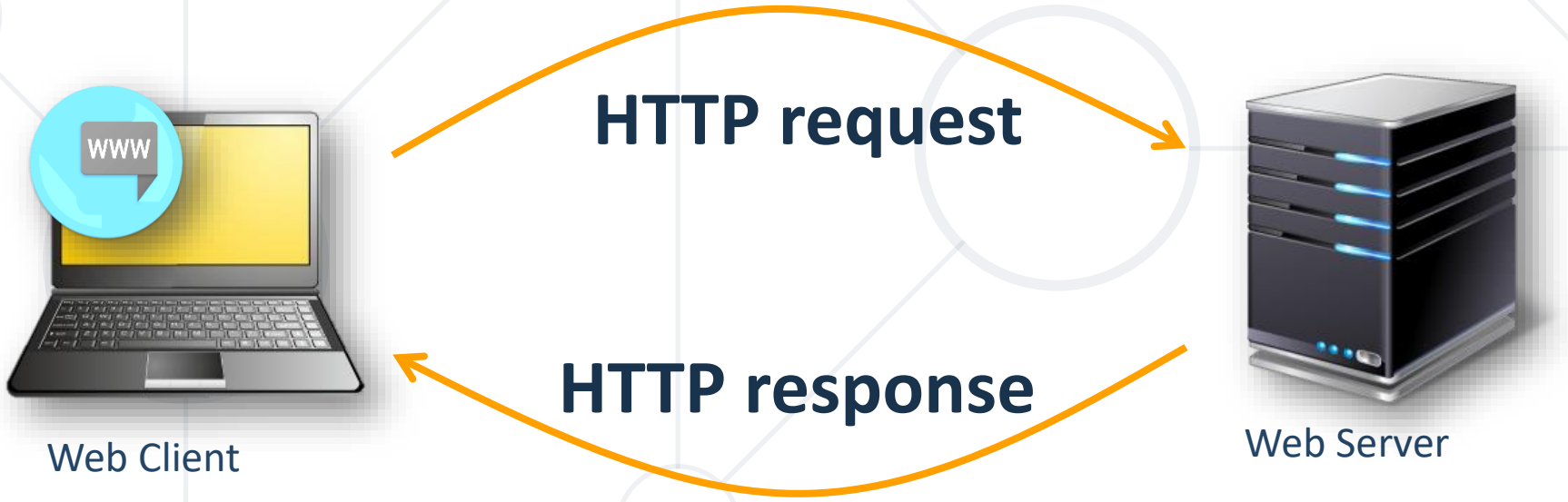


HTTP Overview

Hypertext Transfer Protocol

HTTP Basics

- HTTP (**H**yper **T**ext **T**ransfer **P**rotocol)
  - Text-based client-server protocol for the Internet
  - For transferring Web resources (HTML files, images, styles, etc.)
  - Request-response based



HTTP Request Methods

- **HTTP** defines **methods** to indicate the desired action to be performed on the identified resource

Method	Description
GET	Retrieve / load a resource
POST	Create / store a resource
PUT	Update a resource
DELETE	Delete (remove) a resource
PATCH	Update resource partially
HEAD	Retrieve the resource's headers
OPTIONS	Returns the HTTP methods that the server supports for the specified URL

HTTP GET Request – Example

```
GET /users/testnakov/repos HTTP/1.1
Host: api.github.com
Accept: */*
Accept-Language: en
Accept-Encoding: gzip, deflate
User-Agent: Mozilla/5.0 (Windows NT 10.0; WOW64) AppleWebKit/
537.36 (KHTML, like Gecko) Chrome/54.0.2840.71 Safari/537.36
Connection: Keep-Alive
Cache-Control: no-cache
<CRLF>
```

HTTP request line

HTTP headers

The request body is empty

HTTP POST Request – Example

```
POST /repos/testnakov/test-nakov-repo/issues HTTP/1.1
Host: api.github.com
Accept: */*
Accept-Language: en
Accept-Encoding: gzip, deflate
User-Agent: Mozilla/4.0 (compatible;MSIE 6.0; Windows NT 5.0)
Connection: Keep-Alive
Cache-Control: no-cache
<CRLF>
{"title":"Found a bug",
 "body":"I'm having a problem with this.",
 "labels":["bug","minor"]}
<CRLF>
```

HTTP request line

HTTP headers

The request body holds the submitted data

HTTP Response – Example

```
HTTP/1.1 200 OK
Date: Fri, 11 Nov 2016 16:09:18 GMT+2
Server: Apache/2.2.14 (Linux)
Accept-Ranges: bytes
Content-Length: 84
Content-Type: text/html
<CRLF>
<html>
  <head><title>Test</title></head>
  <body>Test HTML page.</body>
</html>
```

HTTP response status line

HTTP response headers

HTTP response body

HTTP Response Status Codes

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Status Code	Action	Description
200	OK	Successfully retrieved resource
201	Created	A new resource was created
204	No Content	Request has nothing to return
301 / 302	Moved	Moved to another location (redirect)
400	Bad Request	Invalid request / syntax error
401 / 403	Unauthorized	Authentication failed / Access denied
404	Not Found	Invalid resource
409	Conflict	Conflict was detected, e.g. duplicated email
500 / 503	Server Error	Internal server error / Service unavailable

Content-Type and Disposition

- The **Content-Type** / **Content-Disposition** headers specify how the HTTP request / response body should be processed

JSON-encoded data

```
Content-Type: application/json
```

UTF-8 encoded HTML page. Will be shown in the browser

```
Content-Type: text/html; charset=utf-8
```

This will download a PDF file named Financial-Report-April-2016.pdf

```
Content-Type: application/pdf
Content-Disposition: attachment;
filename="Financial-Report-April-2016.pdf"
```

HTTP Developer Tools

Browser Dev Tools, Postman

Browser Developer Tools

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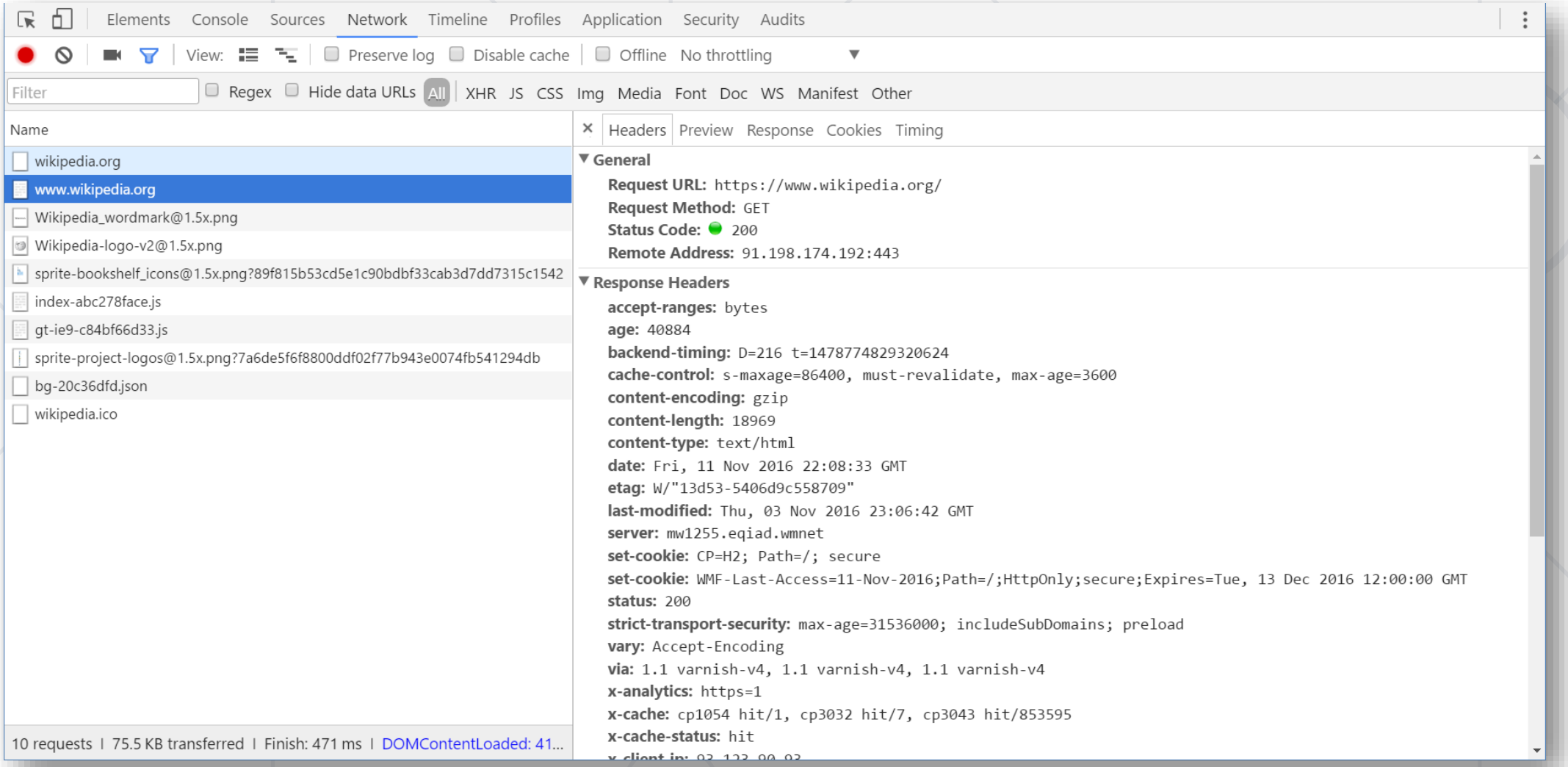
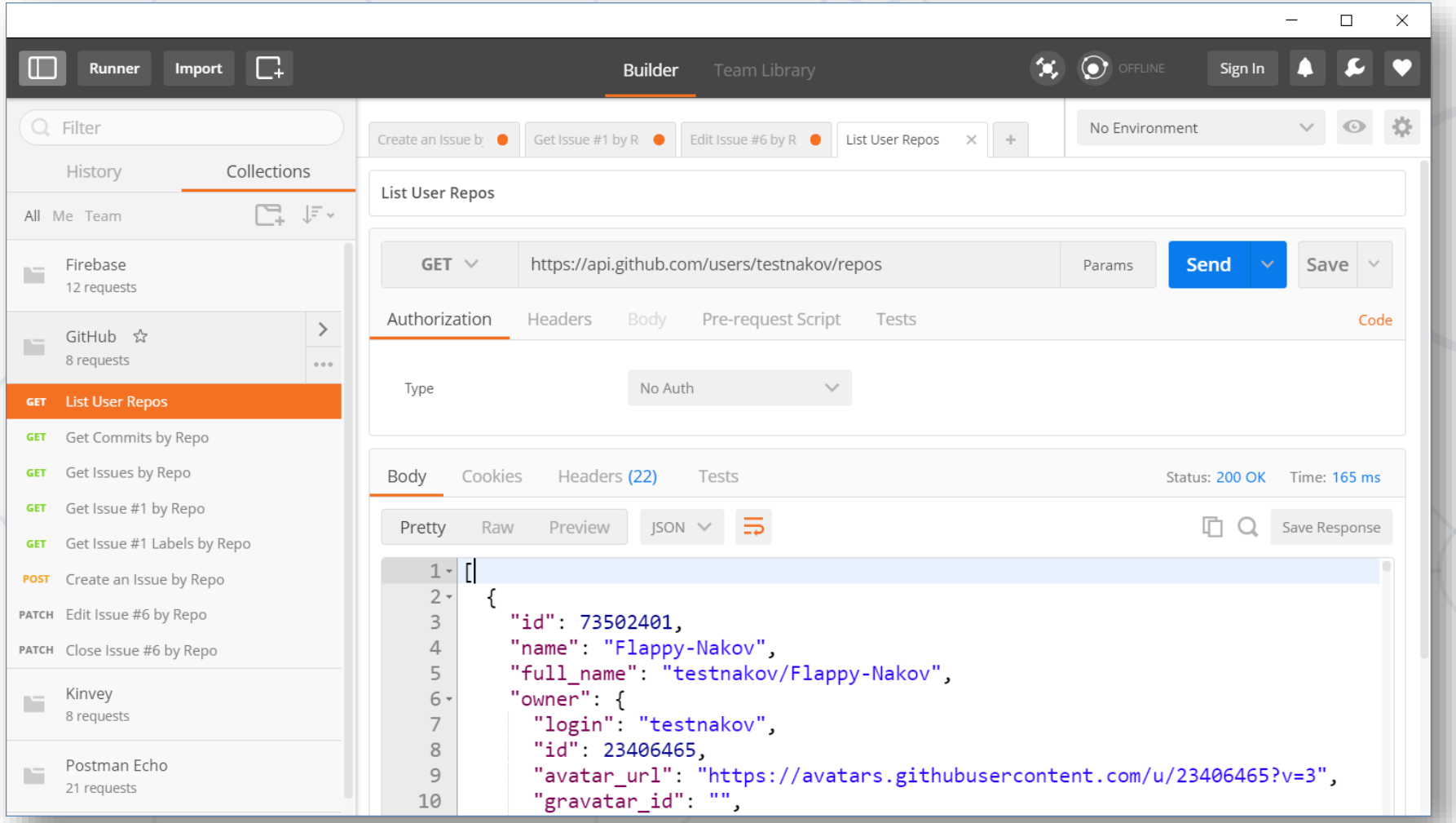


Postman

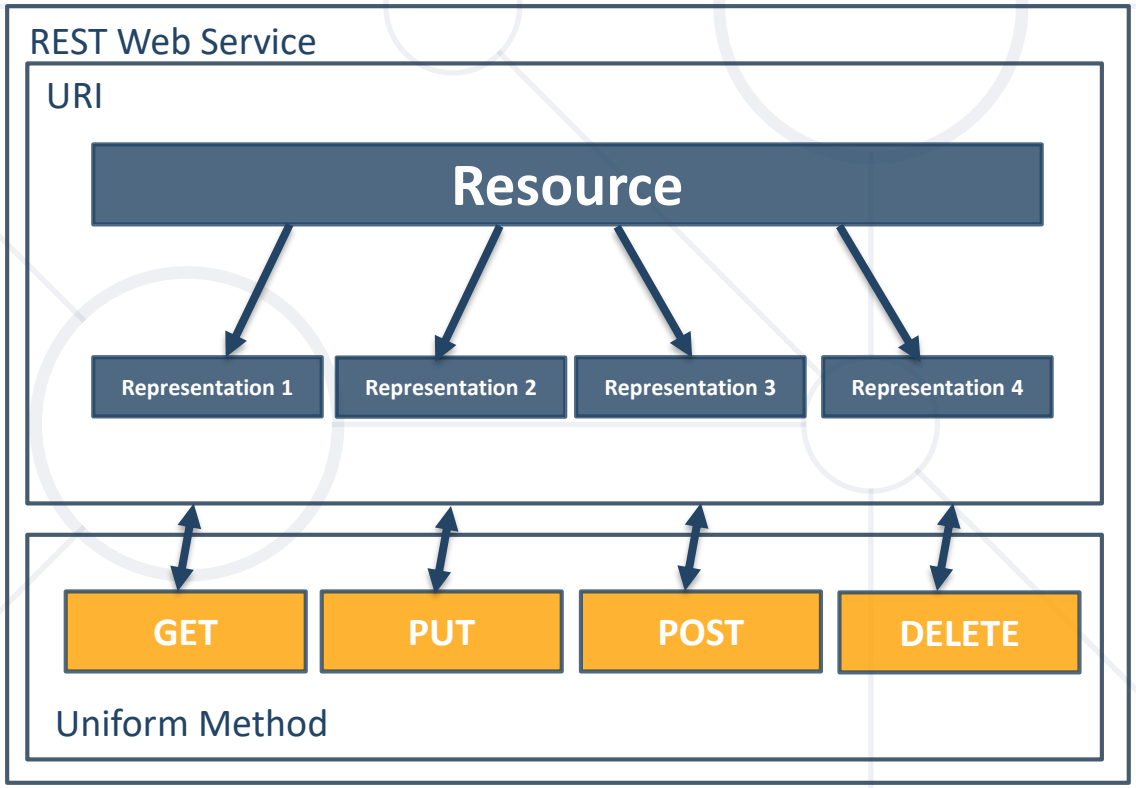


Read more about Postman REST Client

REST and RESTful Services

REST and RESTful Services

- **Re**presentational **S**tate **T**ransfer (**REST**)
  - Architecture for **client-server communication** over HTTP
  - Resources have **URI** (address)
  - Can be **created**/**retrieved**/**modified**/**deleted**/etc.
- RESTful API/RESTful Service
  - Provides access to **server-side resources** via **HTTP** and **REST**



REST Architectural Constraints

- REST defines **6 architectural constraints** which make any web service a true RESTful API
  - Client-server architecture
  - Statelessness
  - Cacheable
  - Layered system
  - Code on demand (optional)
  - Uniform interface

Read more about REST Architectural Constraints

REST and RESTful Services – Example

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- Create a new post

POST	http://some-service.org/api/posts

- Get all posts / specific post

GET	http://some-service.org/api/posts

GET	http://some-service.org/api/posts/17

- Delete existing post

DELETE	http://some-service.org/api/posts/17

- Replace / modify existing post

PUT/PATCH	http://some-service.org/api/posts/17

Accessing GitHub Through HTTP

GitHub REST API

GitHub API

- List user's all public repositories:

GET	https://api.github.com/users/testnakov/repos

- Get all commits from a public repository:

GET	https://api.github.com/repos/testnakov/softuniada-2016/commits

- Get all issues/issue #1 from a public repository

GET	/repos/testnakov/test-nakov-repo/issues

GET	/repos/testnakov/test-nakov-repo/issues/1

Github: Labels Issue

- Get the first issue from the "**test-nakov-repo**" repository
- Send a **GET** request to:
  - https://api.github.com/repos/testnakov/test-nakov-repo/issues/:id
  - Where **:id** is the current issue

GitHub API

- Get all labels for certain issue from a public repository:

GET	https://api.github.com/repos/testnakov/test-nakov-repo/issues/1/labels

- Create a new issue to certain repository (with authentication)

POST	https://api.github.com/repos/testnakov/test-nakov-repo/issues

Headers	Authorization: Basic base64(user:pass)

Body	{"title":"Found a bug", "body": "I'm having a problem with this."}

Github: Create Issue

- Create an issue when you send a "**POST**" request
- Use your Github account **credentials** to submit the issue

Popular Providers

Back-end as a Service

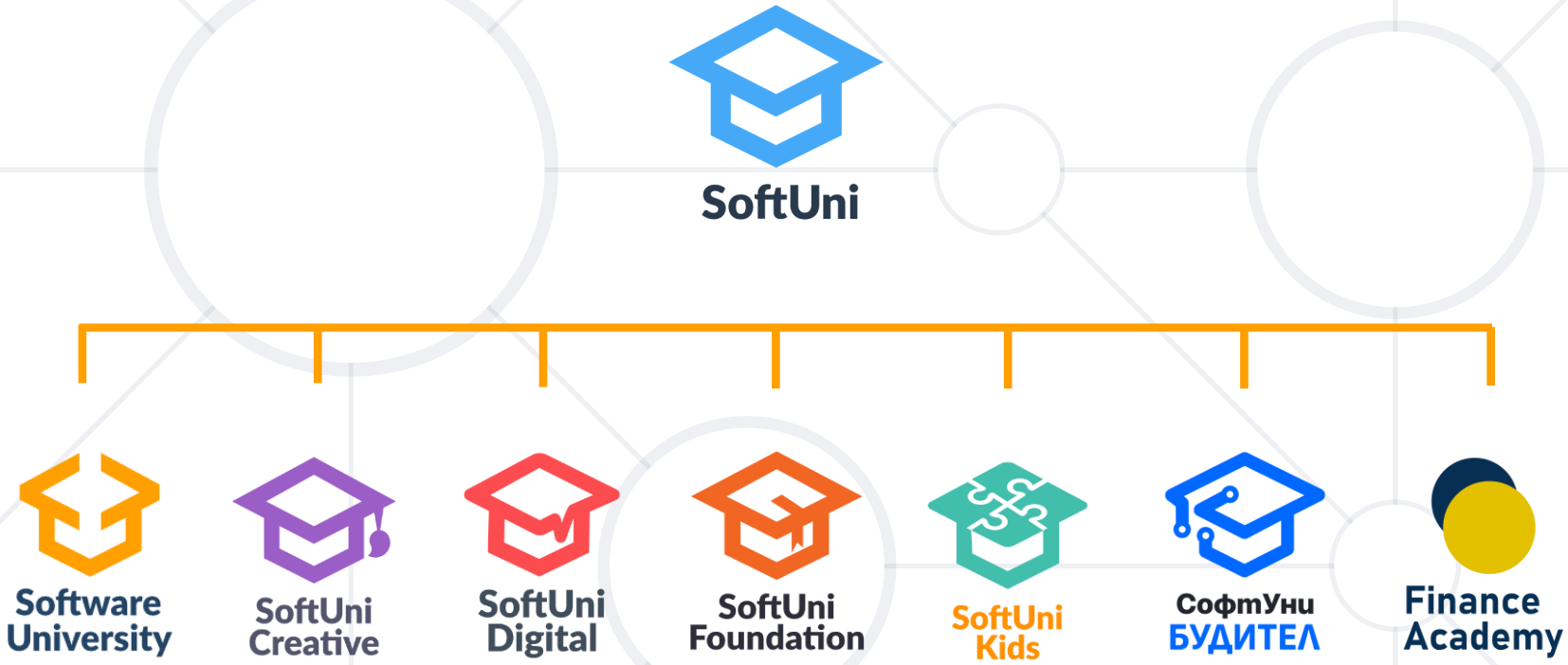
Back-end as a Service

- Web applications require a **back-end** to **store** information
  - User profiles, settings, content, etc.
- **Creating** a back-end can be very **time consuming**
- **Ready to use** back-end services are available (free trial):
  - **Firebase**
  - **Backendless**
  - **Back4App**
  - And more

Summary

- HTTP is text-based request-response protocol
- REST uses GET, POST, PUT, PATCH, DELETE
- RESTful services address resources by URL
  - Provide CRUD operations over HTTP
- Many BaaS providers have free trials

Questions?



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