HTTP and REST Services

HTTP, Request Headers, RESTful Web Services

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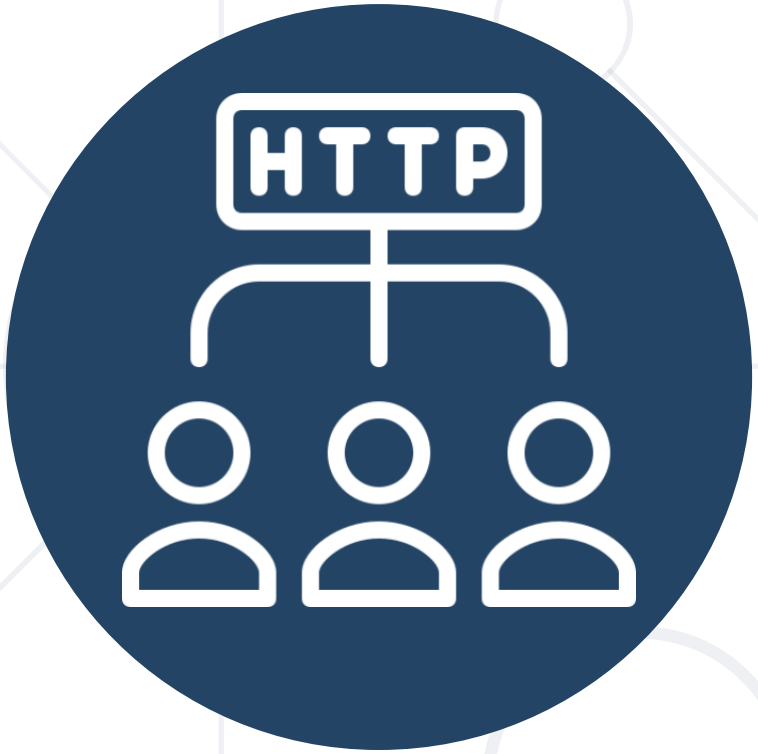
#js-front-end

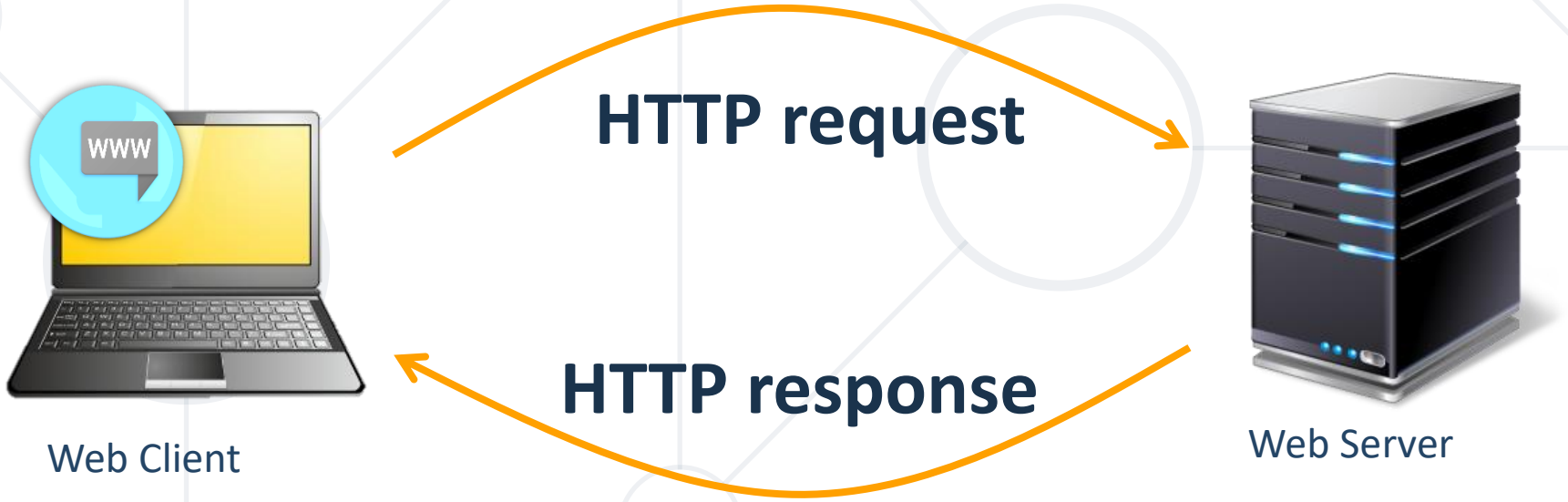


HTTP Overview

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
```

```
Content-Type: application/pdf

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

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

Browser Developer Tools

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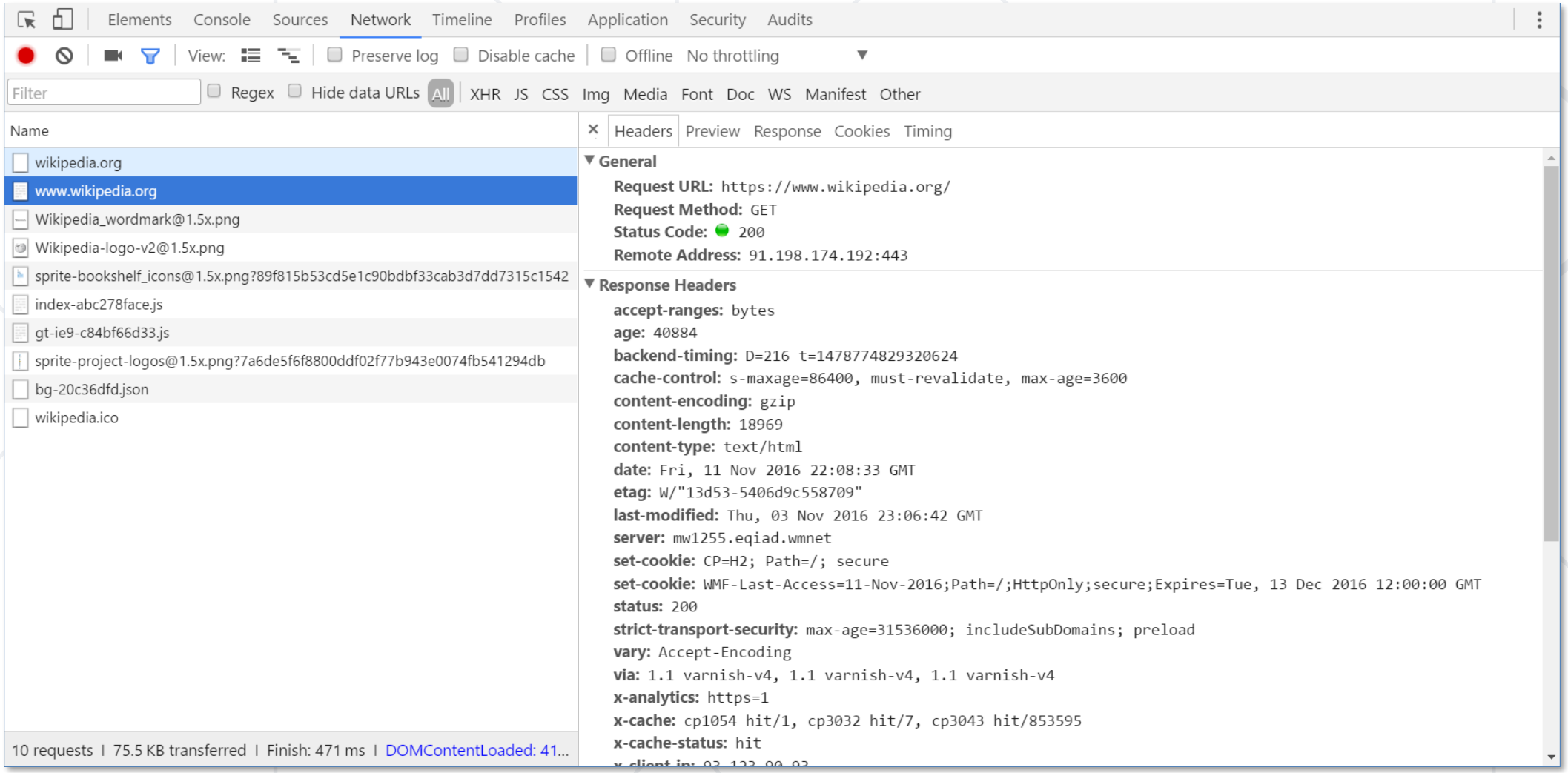
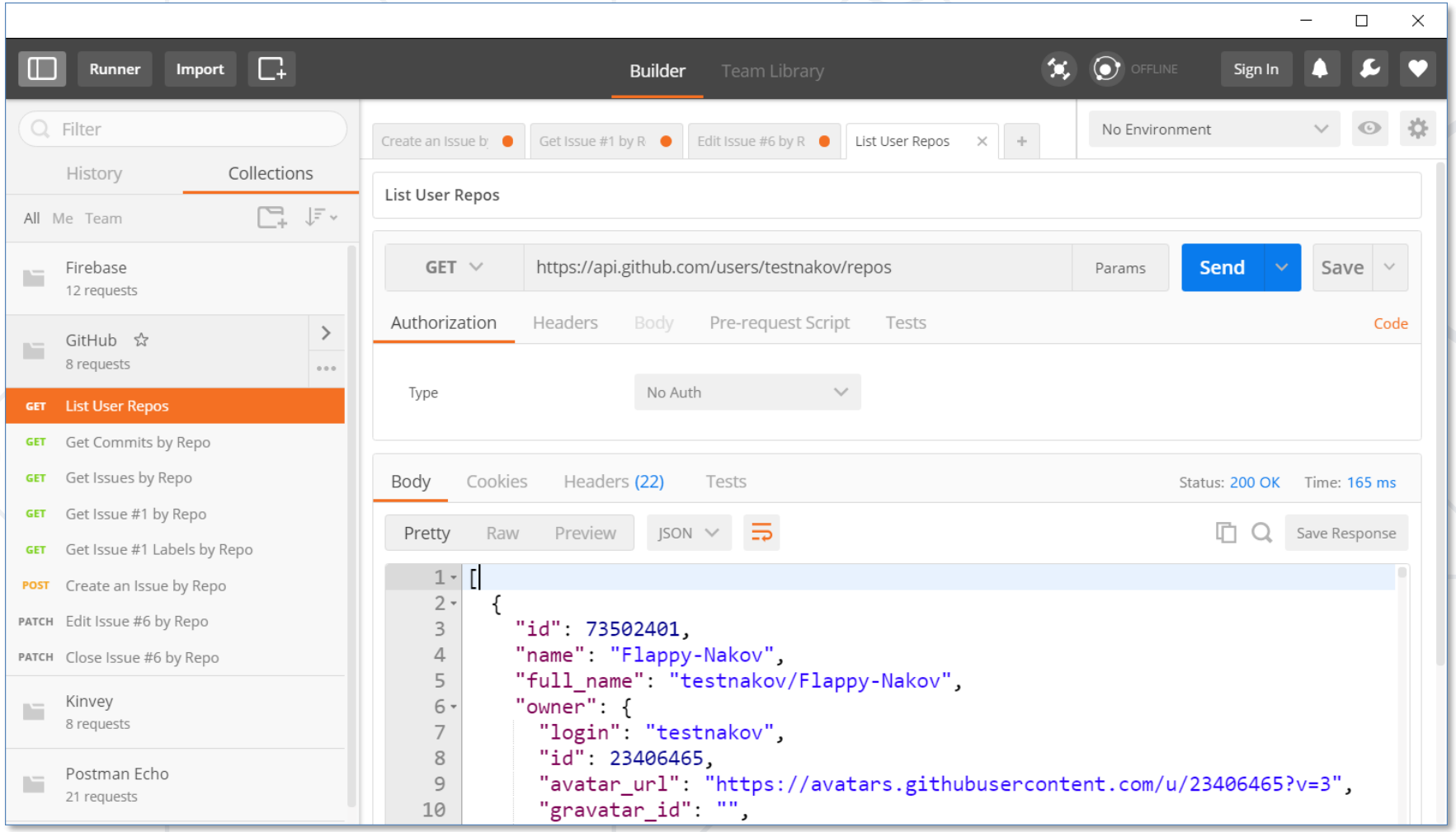


Postman

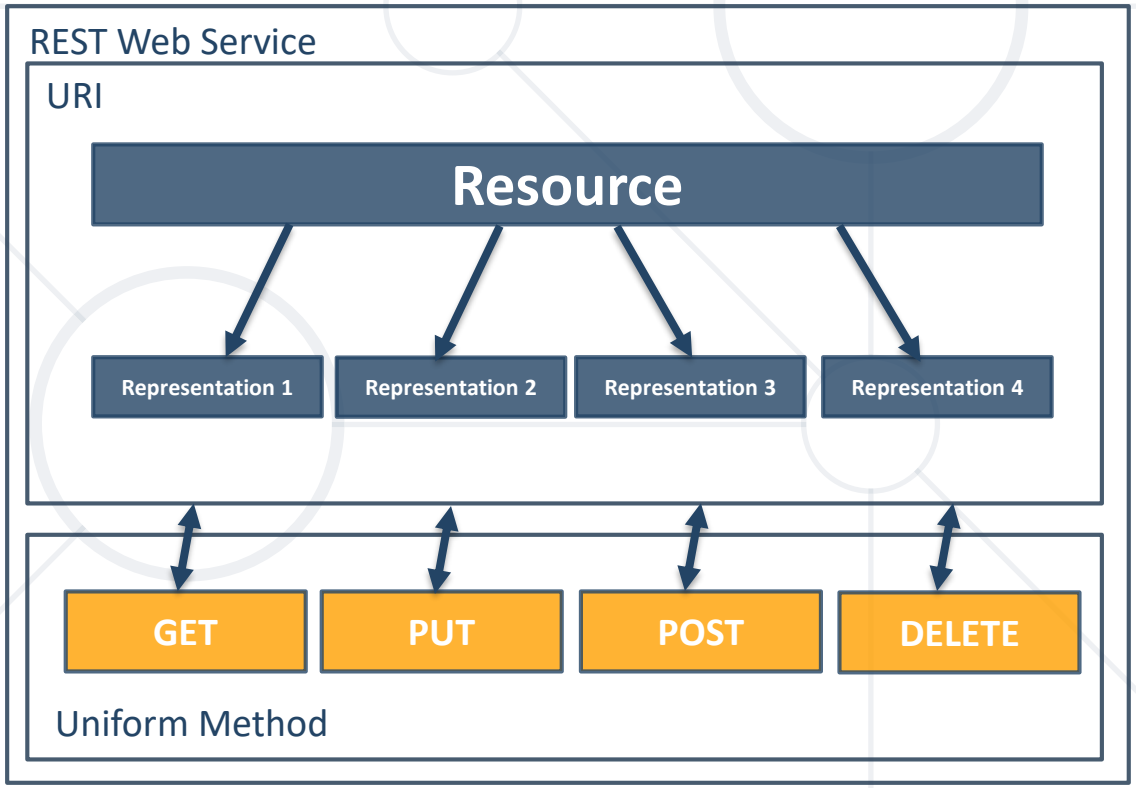


Read more about Postman REST Client

REST and RESTful Services

REST and RESTful Services

- Representational State Transfer (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 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 (2)

- 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

Node Package Manager (NPM)

NPM: Package Management for JavaScript Projects

- **Node Package Manager (NPM)** is a package manager for JavaScript and Node.js projects
- Simplifies installing, managing, and sharing libraries and tools in web development
- Bundled with Node.js, it offers a command-line interface for various tasks
- Facilitates integrating third-party packages to reuse existing code and speed up development
- Helps manage project dependencies, ensuring required packages are available
- Allows defining and running scripts through the project's package.json file

package.json

- **package.json** is a metadata file used in Node.js projects to provide information about the project, its dependencies, and various configurations
- It includes details such as the project's name, version, description, author, license, and more, making it a central place to document essential project information
- integral to the Node.js and NPM ecosystems. When you share your project, including the **package.json** file lets others quickly understand and recreate your project's environment. It also makes it easy for others to install the correct dependencies with a single command (**npm install**)

Package.json– Example

```
{
  "name": "test",
  "version": "1.0.0",
  "description": "",
  "main": "app.js",
  "scripts": {
    "start": "http-server -a localhost -p 3000 -P http://localhost:3000? -c-1"
  },
  "author": "",
  "license": "ISC",
  "devDependencies": {
    "http-server": "0.12.3"
  }
}
```

Install Packages From The package.json

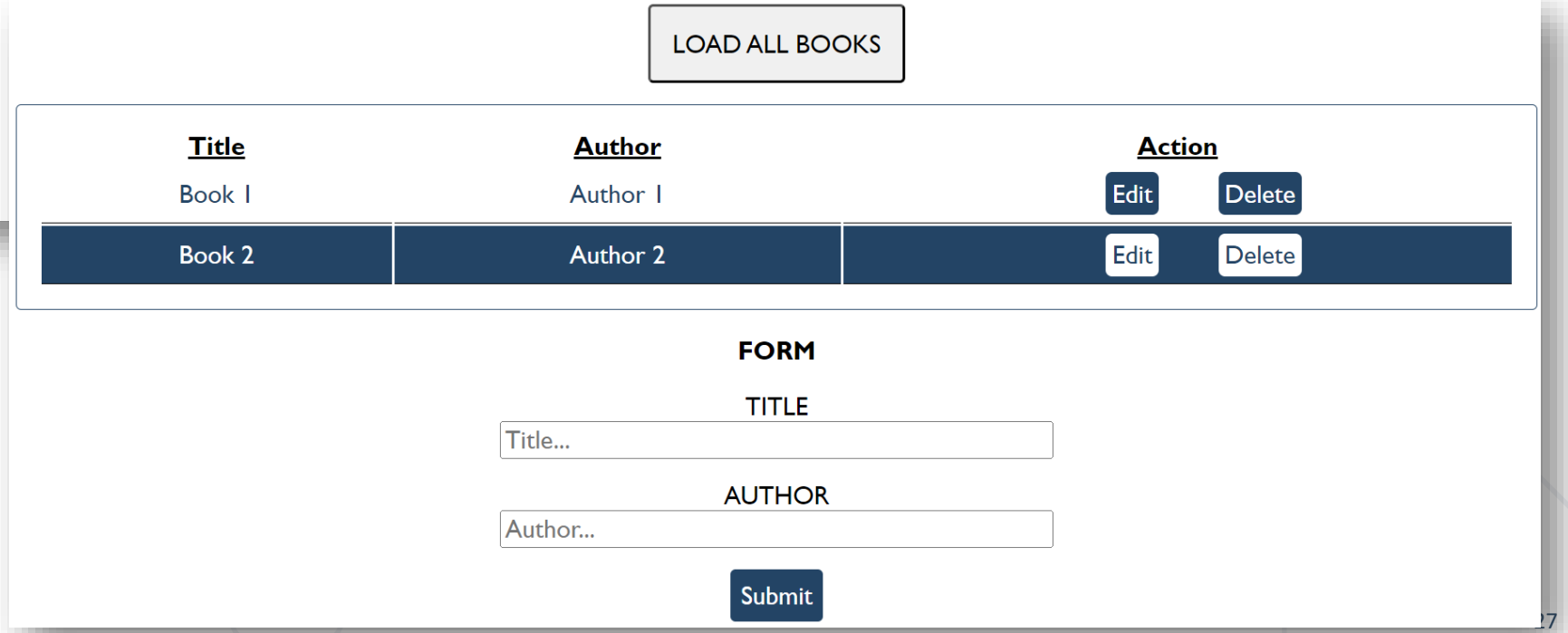
- **Navigate to Project**: Open your command-line interface and navigate to your project's directory
- Run the following command to install the project's dependencies listed in the **package.json**

```
npm install
```

- NPM will read the **package.json** file and install all the dependencies

Problem: Book Library

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <meta http-equiv="X-UA-Compatible" content="ie=edge">
    <title>Books</title>
    <link rel="stylesheet" href="./styles.css">
</head>
<body>
    <button id="loadBooks">LOAD ALL BOOKS</button>
    <table>
        <thead>
            <tr>
                <th>Title</th>
                <th>Author</th>
                <th>Action</th>
```



Summary

- **HTTP** is text-based request-response protocol
- **RESTful** services address resources by URL
- Provide **CRUD** operations over HTTP
- **RESTful** services address resources by URL
- **NPM** is used for installing, managing, and sharin g libraries and tools

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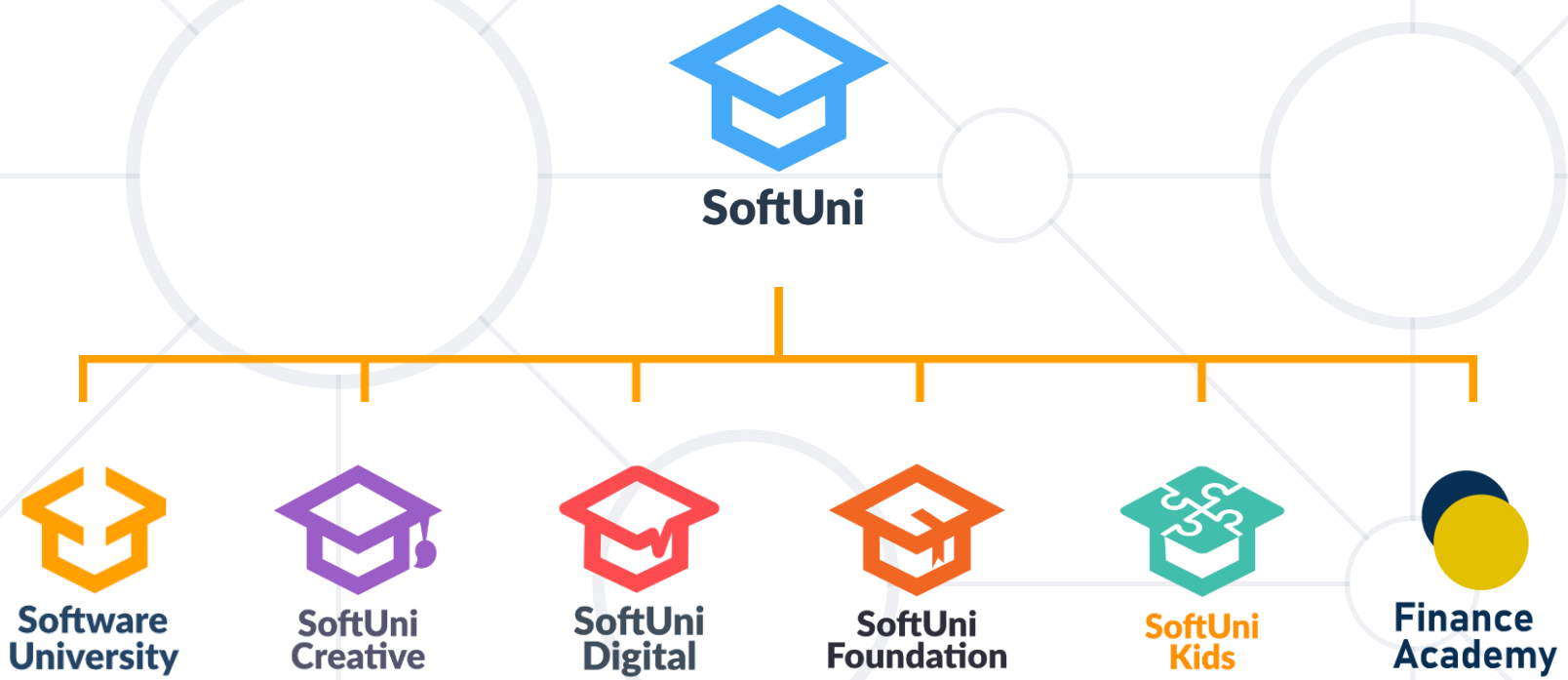

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