HTTP and REST Services

HTTP, Request Headers, RESTful Web Services

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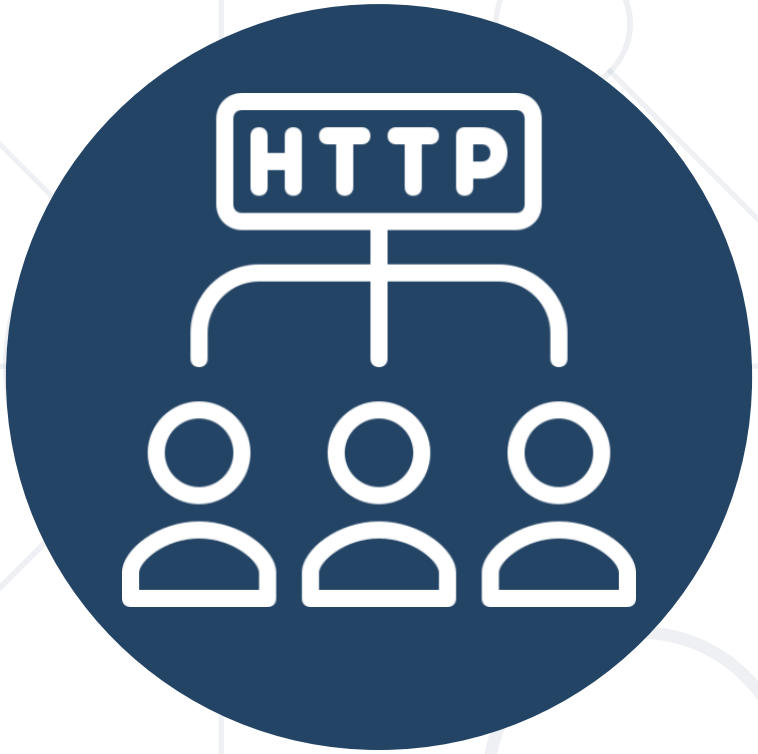
#js-advanced

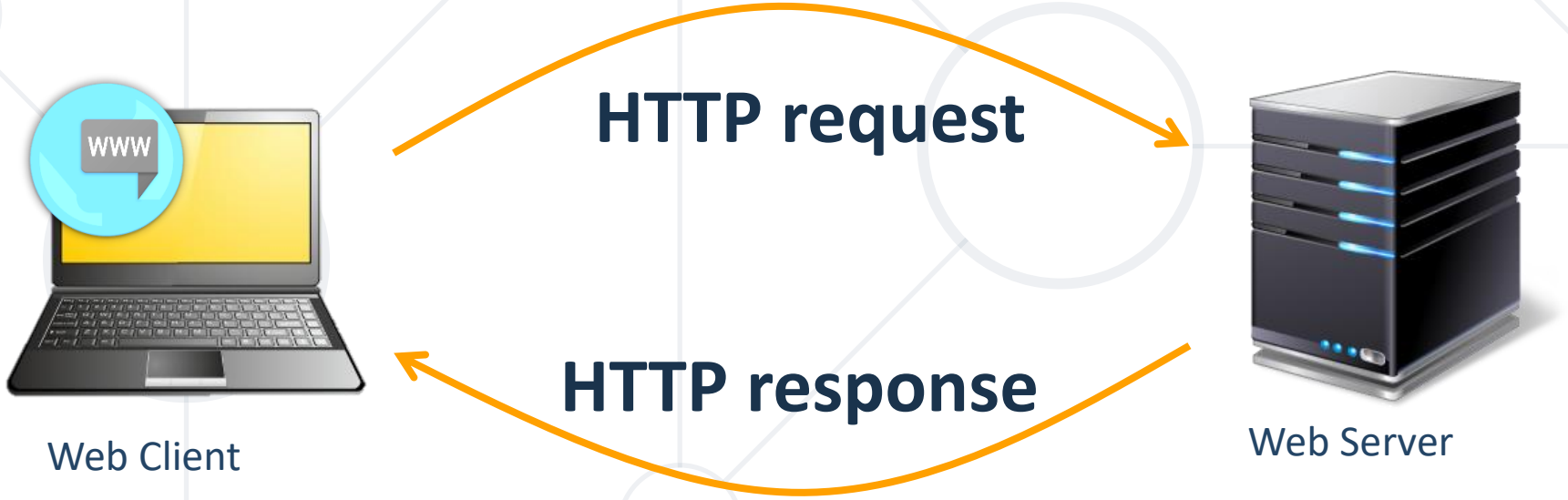


HTTP Overview

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

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

HTTP Developer Tools

Browser Dev Tools, Postman

Browser Developer Tools

Elements Console Sources Network Timeline Profiles Application Security Audits

View: Preserve log Disable cache Offline No throttling

Filter Regex Hide data URLs All XHR JS CSS Img Media Font Doc WS Manifest Other

Name
wikipedia.org
www.wikipedia.org
Wikipedia_wordmark@1.5x.png
Wikipedia-logo-v2@1.5x.png
sprite-bookshelf_icons@1.5x.png?89f815b53cd5e1c90bdbf33cab3d7dd7315c1542
index-abc278face.js
gt-ie9-c84bf66d33.js
sprite-project-logos@1.5x.png?7a6de5f6f8800ddf02f77b943e0074fb541294db
bg-20c36dfd.json
wikipedia.ico

10 requests | 75.5 KB transferred | Finish: 471 ms | DOMContentLoaded: 41...

Headers Preview Response Cookies Timing

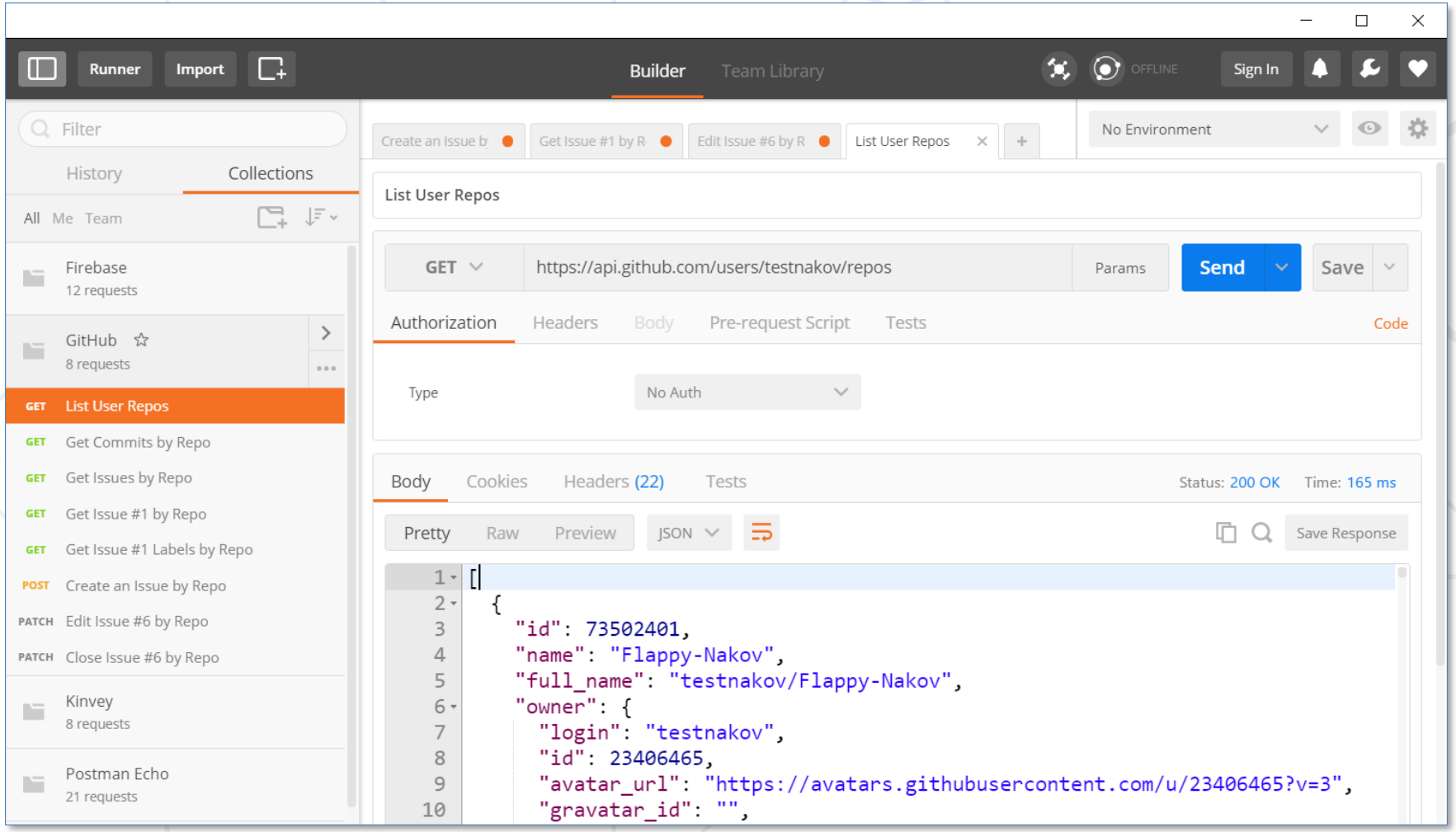
General

Request URL: https://www.wikipedia.org/
Request Method: GET
Status Code: 200
Remote Address: 91.198.174.192:443

Response Headers

accept-ranges: bytes
age: 40884
backend-timing: D=216 t=1478774829320624
cache-control: s-maxage=86400, must-revalidate, max-age=3600
content-encoding: gzip
content-length: 18969
content-type: text/html
date: Fri, 11 Nov 2016 22:08:33 GMT
etag: W/"13d53-5406d9c558709"
last-modified: Thu, 03 Nov 2016 23:06:42 GMT
server: mw1255.eqiad.wmnet
set-cookie: CP=H2; Path=/; secure
set-cookie: WMF-Last-Access=11-Nov-2016;Path=/;HttpOnly;secure;Expires=Tue, 13 Dec 2016 12:00:00 GMT
status: 200
strict-transport-security: max-age=31536000; includeSubDomains; preload
vary: Accept-Encoding
via: 1.1 varnish-v4, 1.1 varnish-v4, 1.1 varnish-v4
x-analytics: https=1
x-cache: cp1054 hit/1, cp3032 hit/7, cp3043 hit/853595
x-cache-status: hit
x-client-ip: 93.123.90.93

Postman

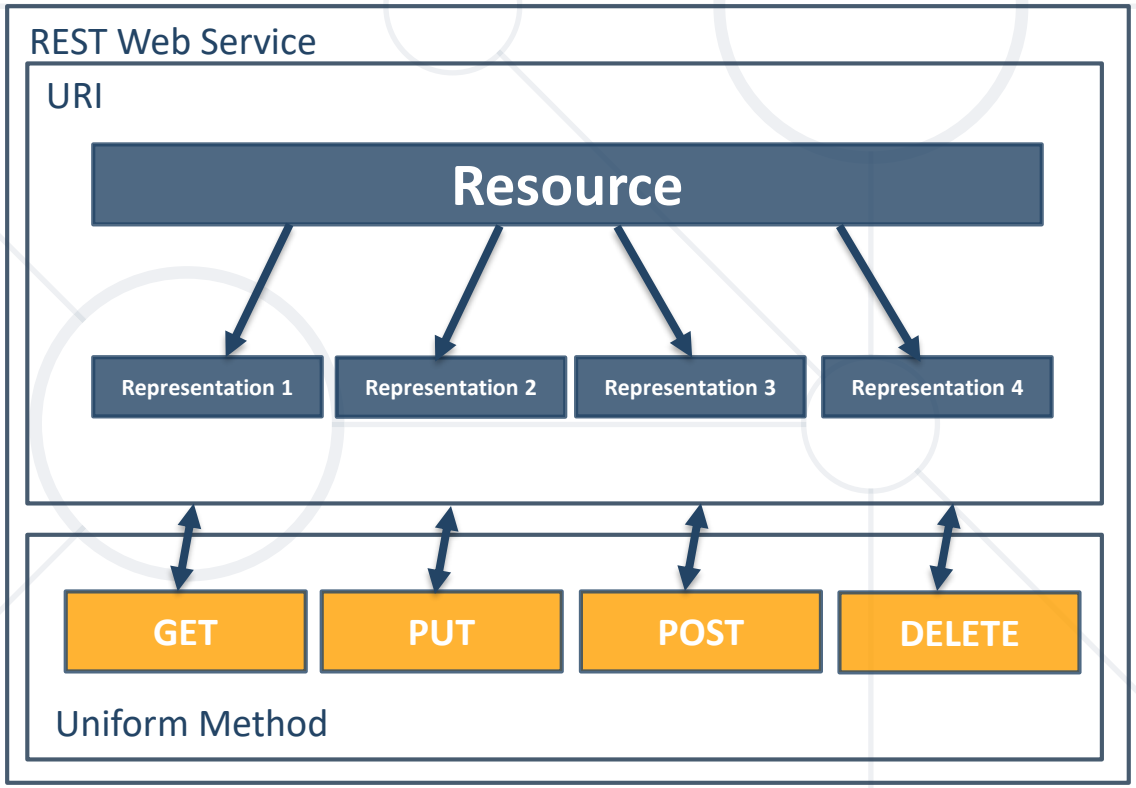


Read more about Postman REST Client

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

- 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

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

Live Demonstration

Firebase Application

Live Demonstration

Backendless Application

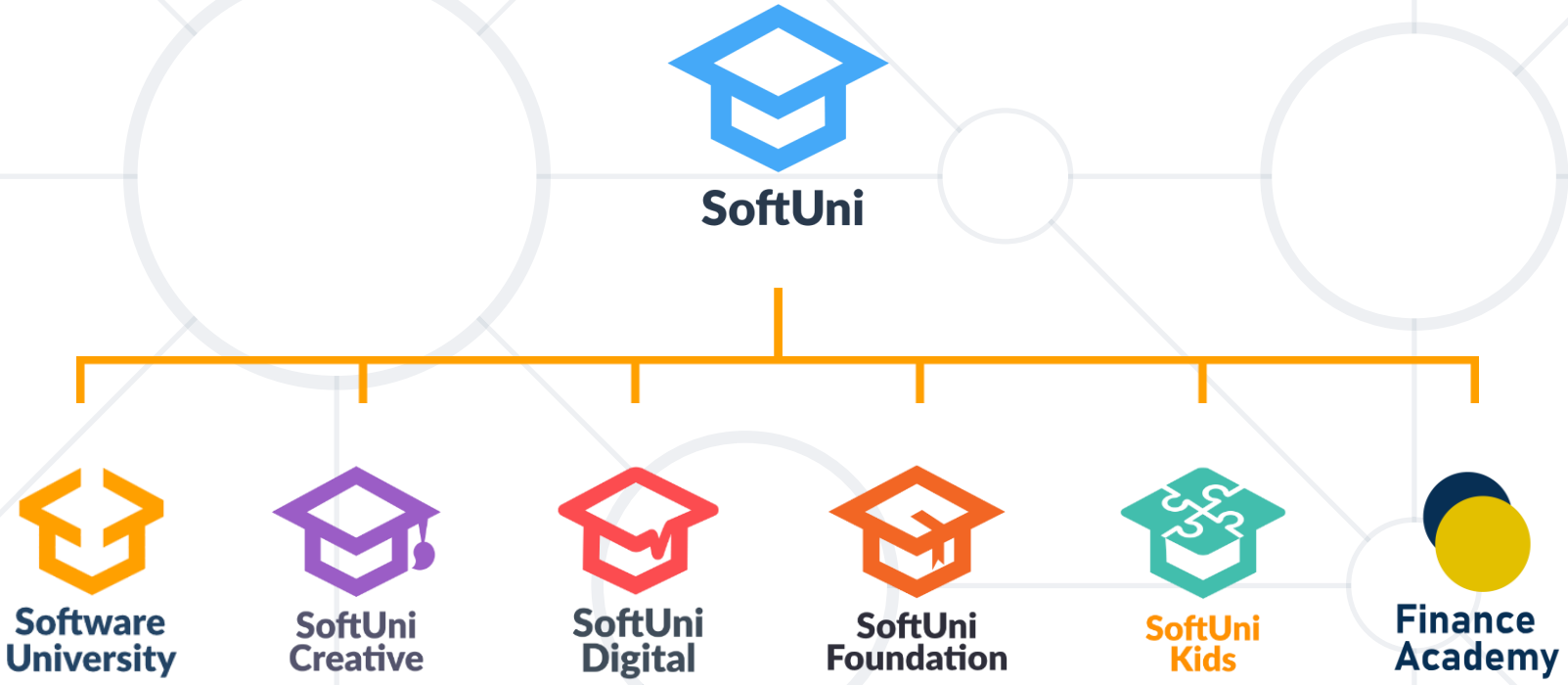
Live Demonstration

Back4App Application

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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Решения за твоето утре

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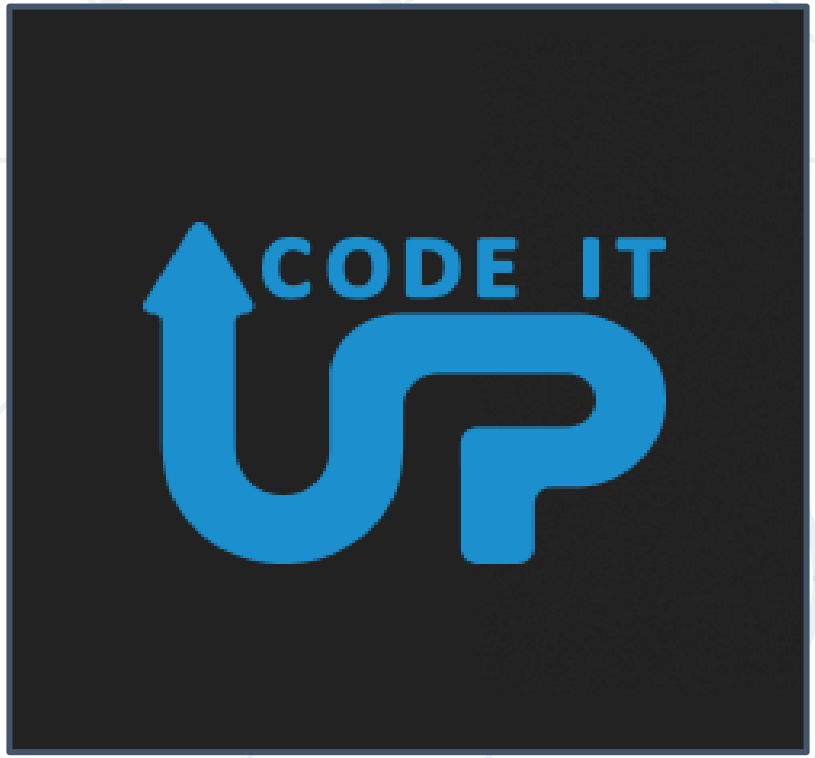

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