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Introduction to the Web

By Ethan Richards

mines acm

HTTP & HTTPS

HTTP (HyperText Transfer Protocol) is the basis of the web

- It defines **methods** (next slide)
- It defines **Requests** and **Responses**
- *..and more!*

In a nutshell, HTTPS is secure HTTP (TLS encryption)

For more: https://developer.mozilla.org/en-US/docs/Web/HTTP/Overview

HTTP Request Methods

GET - Retrieves data

POST - Sends data to the server

PUT - Creates/replaces a resource

DELETE - Deletes something

HTTP Request Methods follow the **CRUD Operations**: **C**reate (POST), **R**ead (GET), **U**pdate (PUT), **D**elete (DELETE)

For more: https://developer.mozilla.org/en-US/docs/Web/HTTP/Methods

Application Programming Interface (API)

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An API is a tool for developers to safely interact with a program, made by the developers of the original program. It’s an “outward-facing part” of an app.

See this StackOverflow post for differences between libraries, frameworks, and APIs.

REST Principles

REST stands for **RE**presentational **S**tate **T**ransfer is a software architecture that makes things easy to send on the web.

REST architectures are **stateless** and have separate **clients** and **servers**.

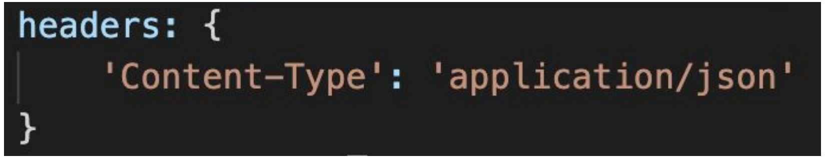
- *Clients send requests, servers send responses!*
- The frontend and backend may be “decoupled” to be “truly RESTful”

You’ll hear “**RESTful APIs**” and similar terms often. It’s nothing to be afraid of!

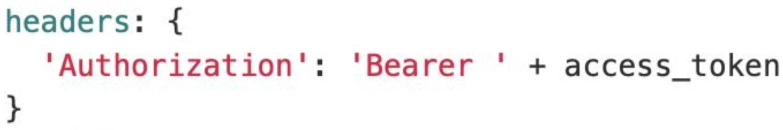
HTTP Headers & Bodies

Headers

Headers to a request indicate what type of data is to be expected and other useful information.



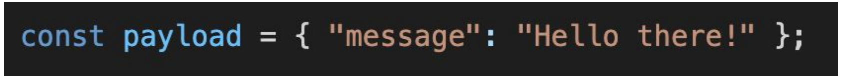
```
headers: {
    'Content-Type': 'application/json'
}
```



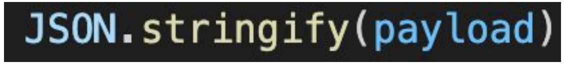
```
headers: {
  'Authorization': 'Bearer ' + access_token
}
```

Content Bodies

HTTP requests can have content bodies, too. This is typically done in JSON format. Sometimes this is called a "payload."



```
const payload = { "message": "Hello there!" };
```



```
JSON.stringify(payload)
```

Read more: HTTP Headers, Request Bodies, JSON.stringify()

HTTP Response Codes

200 - OK!

400 - Bad Request

401 - Unauthorized

403 - Forbidden

404 - Not Found

405 - Method Not Allowed

418 - I'm a teapot

500 - Internal Server Error

504 - Gateway Timeout

Mozilla classifies HTTP response codes in five different number ranges:

Informational (100-199)

Successful (200-299)

Redirection (300-399)

Client error (400-499)

Server error (500-599)

Read more: https://developer.mozilla.org/en-US/docs/Web/HTTP/Status

Programming time!

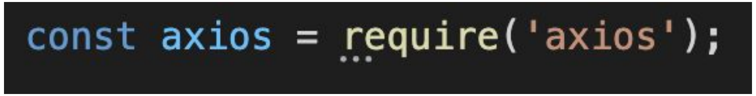
Open up your editor of choice - my examples will use JavaScript or Python.

JavaScript

npm init

npm install axios

touch index.js

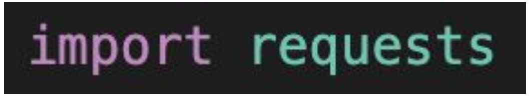


```
const axios = require('axios');
```

Python

pip install requests

touch app.py



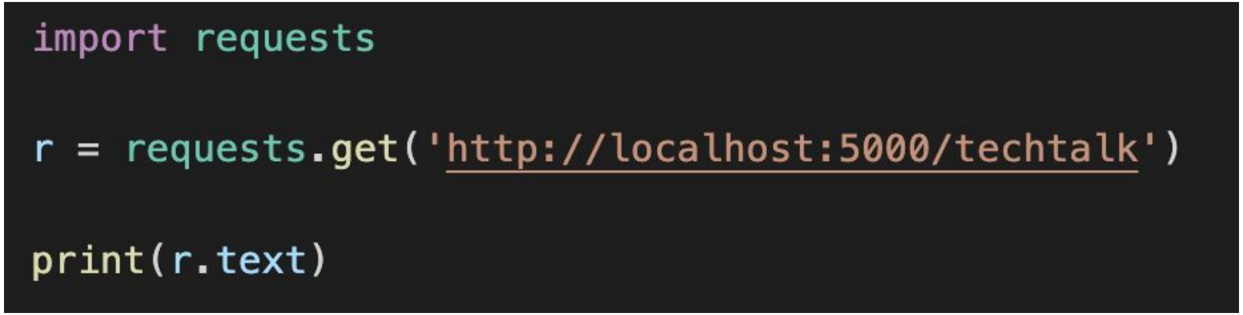
```
import requests
```

https://localhost:8000/techtalk

I have a message for you - come GET it from me!

This is called an **endpoint**! Servers host endpoints for data to be accessed that way.

Python GET

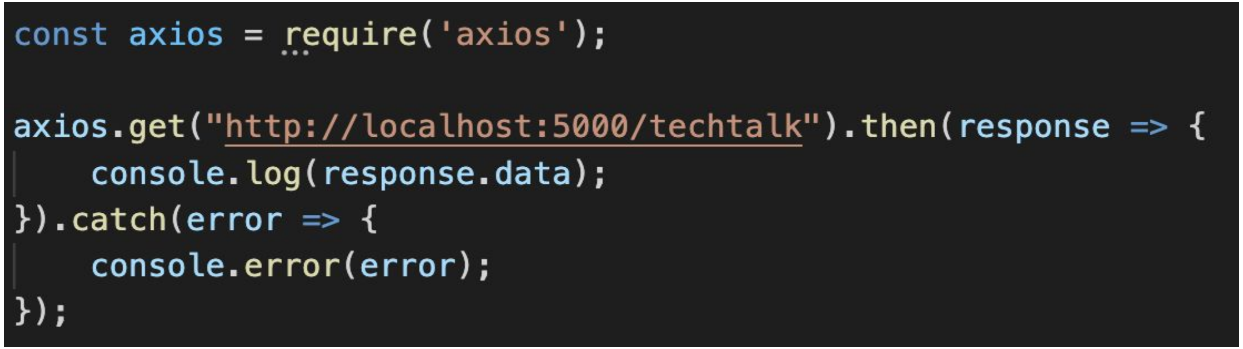


```python
import requests

r = requests.get('http://localhost:5000/techtalk')

print(r.text)
```

JavaScript GET



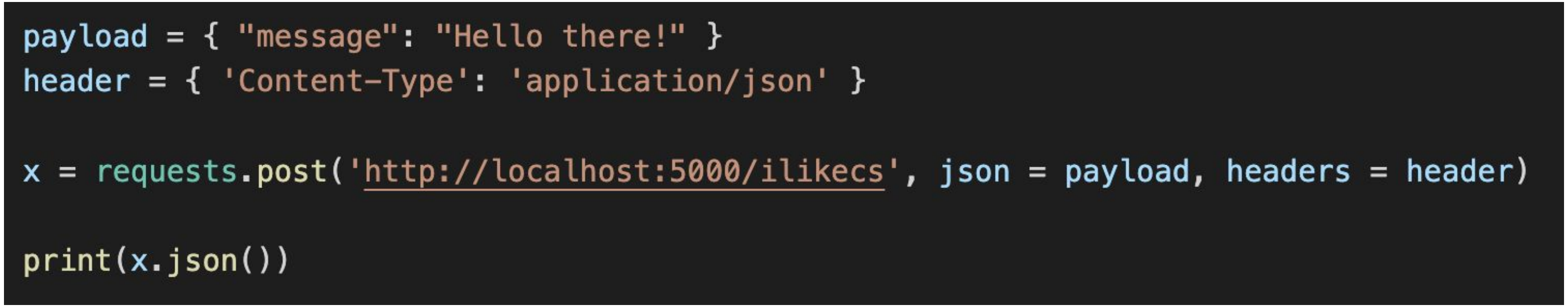
```javascript
const axios = require('axios');

axios.get("http://localhost:5000/techtalk").then(response => {
    console.log(response.data);
}).catch(error => {
    console.error(error);
});
```

https://localhost:8000/ilikecs

Send me a message via HTTP!

Python POST

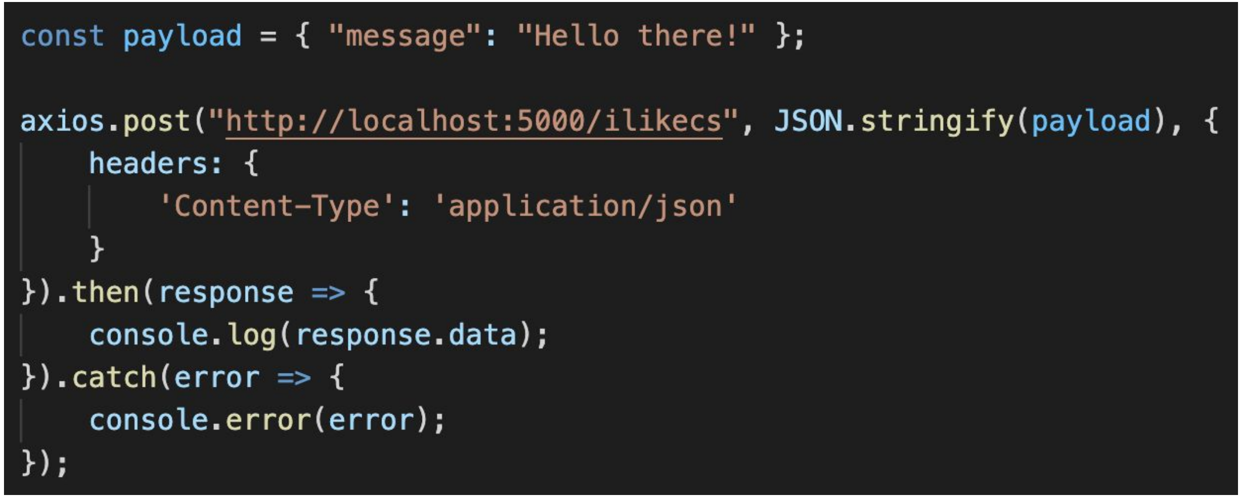


```python
payload = { "message": "Hello there!" }
header = { 'Content-Type': 'application/json' }

x = requests.post('http://localhost:5000/ilikecs', json = payload, headers = header)

print(x.json())
```

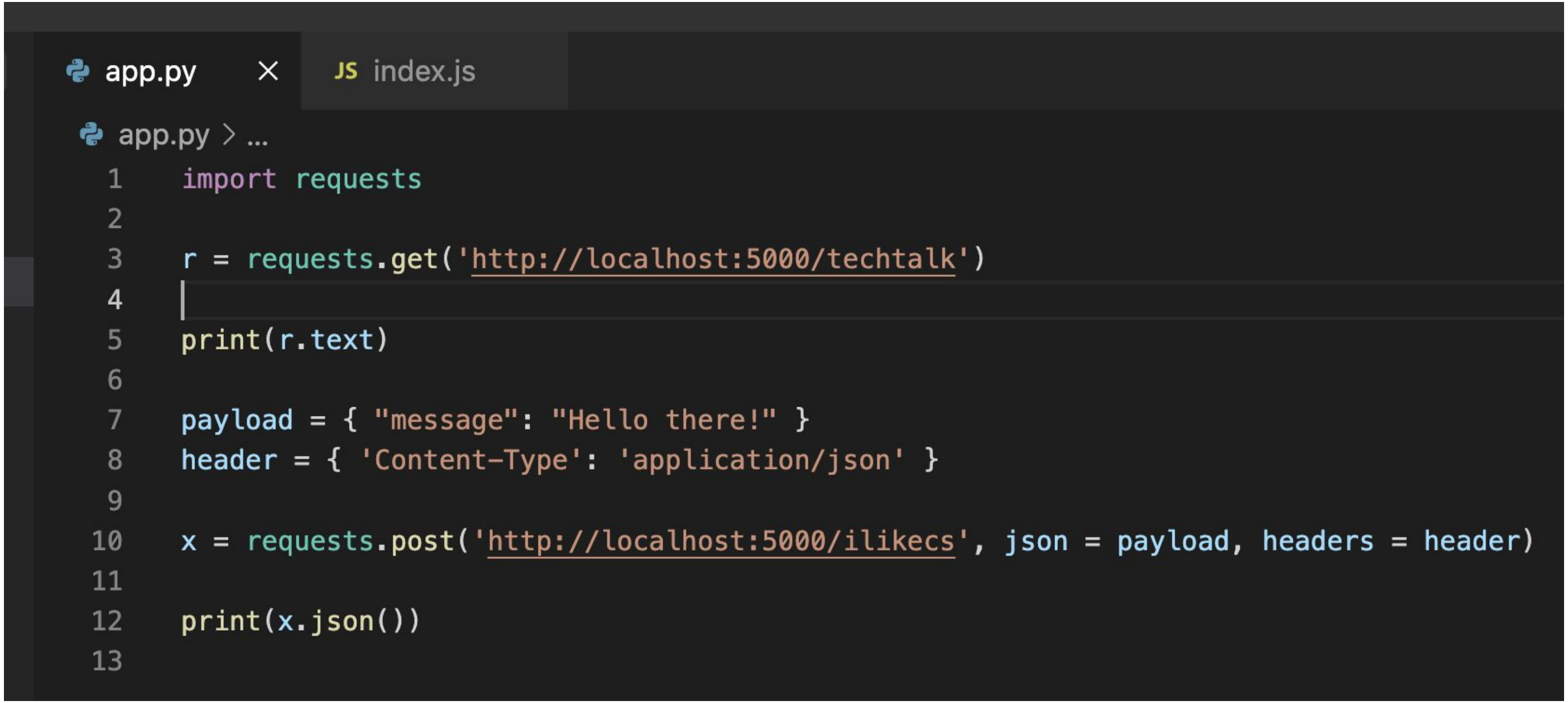
JavaScript POST



```javascript
const payload = { "message": "Hello there!" };

axios.post("http://localhost:5000/ilikecs", JSON.stringify(payload), {
    headers: {
        'Content-Type': 'application/json'
    }
}).then(response => {
    console.log(response.data);
}).catch(error => {
    console.error(error);
});
```

Full Python Code



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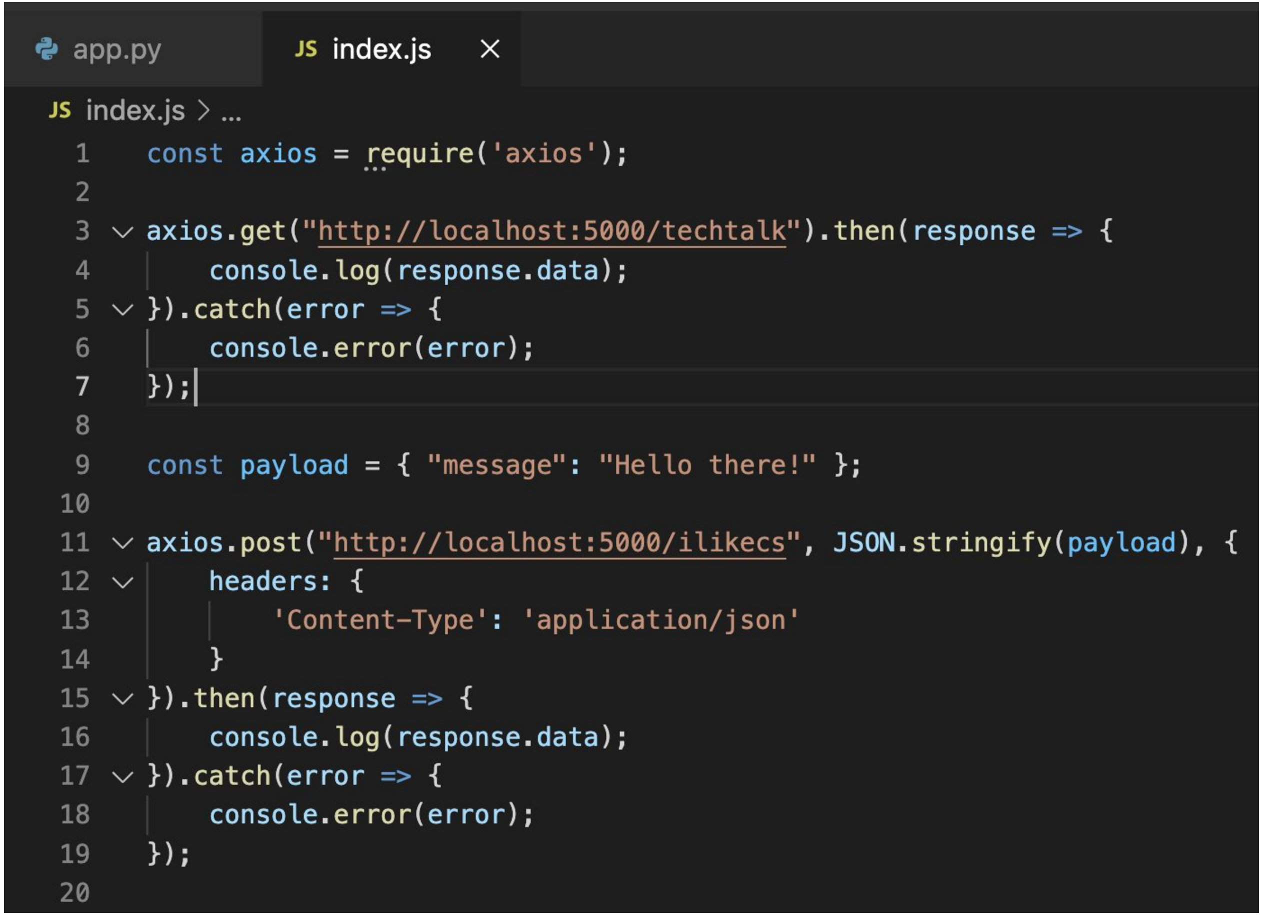

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