

# Web APIs

CSSE6400

Brae Webb

April 18, 2022

## Goals

- Review existing networking knowledge.

## Goals

- Review existing networking knowledge.
- Understand *URLs*.

## Goals

- Review existing networking knowledge.
- Understand *URLs*.
- Understand *HTTP* protocol and methods.

## Goals

- Review existing networking knowledge.
- Understand *URLs*.
- Understand *HTTP* protocol and methods.
- Understand *RESTful* APIs.

## Goals

- Review existing networking knowledge.
- Understand *URLs*.
- Understand *HTTP* protocol and methods.
- Understand *RESTful* APIs.
- *Build* a basic RESTful API.

# OSI Model



# OSI Model





# OSI Model



TCP/UDP

Low-level with *minimal abstraction*.

TCP/UDP

*Impractical* for building web APIs.

# OSI Model



# OSI Model



HTTP/HTTPS (CSSE6400)

# The anatomy of URLs

*Hostname*

http://example.com/hello-world

*Protocol*

*Path*

Hostname

Port

http://example.com:80/hello-world

Protocol

Path





HTTP

A *request-response* abstraction for networking.

## HTTP Request

**URL** An endpoint to send request to.

**Method** Described later.

**Headers** Specify type of data, e.g. JSON, HTML, etc.

**Body** Optional extra data to include.

## HTTP Response

**Status Code** A number between 100 and 599 giving details about the response.

**Headers** Specify type of response data, e.g. JSON, HTML, etc.

**Body** Content of the response.

## Status Codes

**200s** Indicate the request was *successful*,  
200 is most common.

**300s** *Redirects* the client to another location.

**400s** Indicates that the *request was wrong*

e.g. 404 meaning that the request was for something that doesn't exist.

**500s** Indicates that the *server had a problem*  
fulfilling the request.

Types of HTTP communication

# HTTP Methods

## HTTP Methods

GET *Query* for information.

## HTTP Methods

GET *Query* for information.

POST *Create* resource.



## HTTP Methods

GET *Query* for information.

POST *Create* resource.

PUT *Update* resource.

## HTTP Methods

GET *Query* for information.

POST *Create* resource.

PUT *Update* resource.

DELETE *Delete* resource.

# Examples

```
» cat app.py
```

```
1  from flask import Flask
3  app = Flask(__name__)
5  @app.route("/")
6  def hello_world():
7      return "Hello, World!"
9  if __name__ == "__main__":
10     app.run(port=6400)
```

# Result



```
» cat app.js
```

```
1  const express = require('express')
2  const app = express()
3  const port = 6400

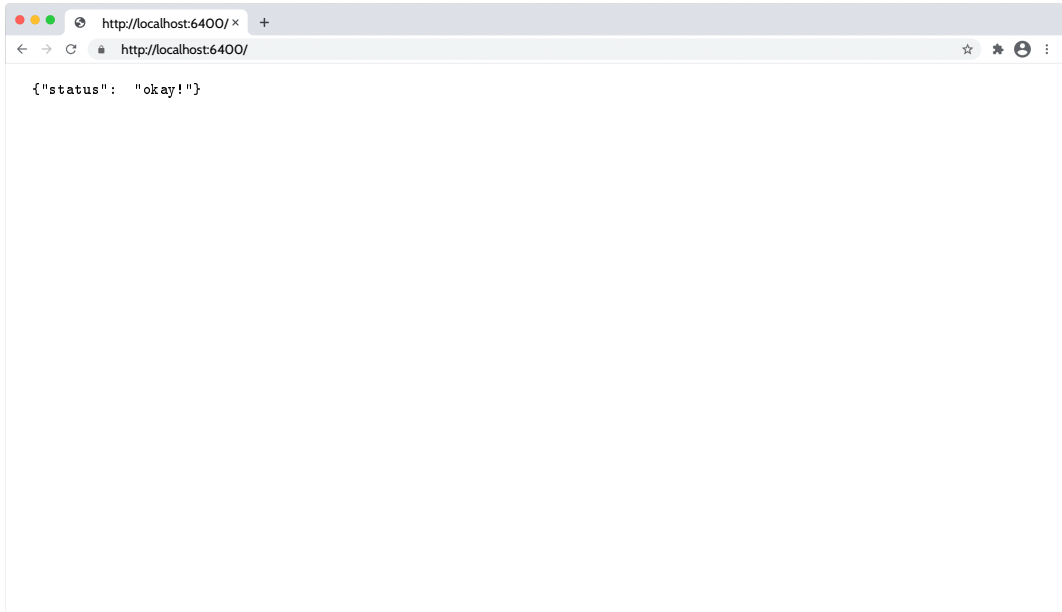
5  app.get('/', (req, res) => {
6    res.send('Hello, World!')
7  })

9  app.listen(port, () => {
10    console.log(`Example app listening on port ${port}`)
11  })
```

```
» cat app.py
```

```
1  from flask import Flask
3  app = Flask(__name__)
5  @app.route("/health")
6  def hello_world():
7      return {"status": "okay!"}
9  if __name__ == "__main__":
10     app.run(port=6400)
```

# Result





```
» cat app.js
```

```
1  const express = require('express')
2  const app = express()
3  const port = 6400

5  app.get('/', (req, res) => {
6      res.send({"status": "okay!"})
7  })

9  app.listen(port, () => {
10     console.log(`Example app listening on port ${port}`)
11 })
```

```
» cat app.py
```

```
1 from flask import Flask
2 from flask import request

4 app = Flask(__name__)

6 @app.route("/echo", methods=["POST"])
7 def hello_world():
8     return request.json.say

10 if __name__ == "__main__":
11     app.run(port=6400)
```

```
1 >>> curl -X POST \  
2 -H "Accept: application/json" \  
3 -H "Content-Type: application/json" \  
4 "http://localhost:6400" \  
5 -d '{  
6     "say" : "Hello, World",  
7 }'  
8 Hello, World
```

```
» cat app.js
```

```
1  const express = require('express')
2  const app = express()
3  const port = 6400

5  app.post('/', express.json(), (req, res) => {
6      res.send(req.body.say)
7  })

9  app.listen(port, () => {
10     console.log(`Example app listening on port ${port}`)
11 })
```