Server-Side!

The Coding Bootcamp

A Moment of Caution

Focus!

Node + Express Servers and Routing are two of the

MOST IMPORTANT CONCEPTS

in the **ENTIRE** program.

Seriously… Try to learn this now.

Forewarning: This is the ***HARD*** Stuff

- These next units are some of the hardest to grasp.
- **But are also some of the most important.**
- This is where you go from humble HTML, CSS hackers to full-stack, employable engineers.
- Bring your A-Game!!!

Don’t let this be you!

How to Succeed Through the Full-Stack Apocalypse

1. **Form a Study Group Now**
   Get in the habit of explaining in-class exercises to one another. Work together on homework assignments.

2. **Take notes!**
   Jot down concepts or key ideas that come out of activities. This class isn't a lecture, but it may help you keep things straight!

3. **Ask "Conceptual" Questions**
   Don't let big picture ideas gloss over you. Be courageous and ask questions in class. (Don't worry -- if your question isn't relevant, we'll let you know. But if it is, you owe it to yourself to understand!)

4. **Come to Office Hours**
   As things get trickier, we'll be available to review any concepts during office hours. Come to these. Ask questions! We want to help.

Lastly, be confident !!!

There is zero reason to get despondent at this point. If you've made it this far, you've proven that you have what it takes to succeed. **Keep going!**

Remember Our Mantra…

When it comes to web development…

Remember Our Mantra…

*I know **nothing.***

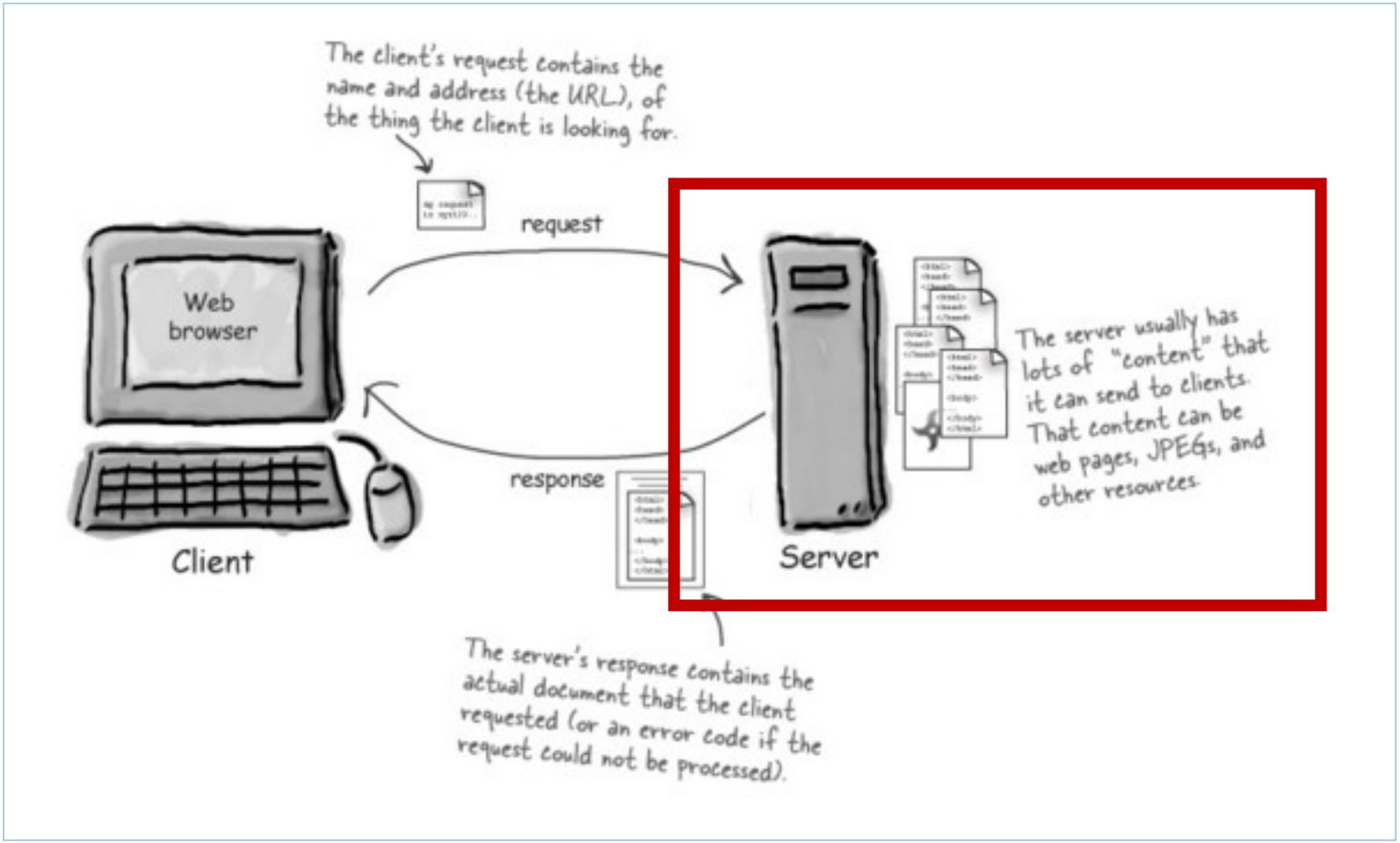
So Let’s Begin…

Remind me again…

What is a **server**?

- In modern **web applications** there is a constant back-and-forth communication between the visuals displayed on the user's browser (**frontend)** and the data and logic stored on the server (**backend).**

Server Definition



Server:

The Machine and Code that handles requests and respond to them.

Remind me again…

What are examples of **server-side** functions?

- In modern **web applications** there is a constant back-and-forth communication between the visuals displayed on the user's browser (**frontend)** and the data and logic stored on the server (**backend).**

Server-Side Code in Action!

- Visiting a URL and then being given an HTML page.
- Visiting an API end-point that parse URL parameters to provide selective JSONs.
- Clicking an invoice that provides a PDF report.
- Image processing software that takes an image applies a filter, then saves the new version.
- Google providing “results” relevant to your searches on other sites.

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Remind me again…

What is a **client**?

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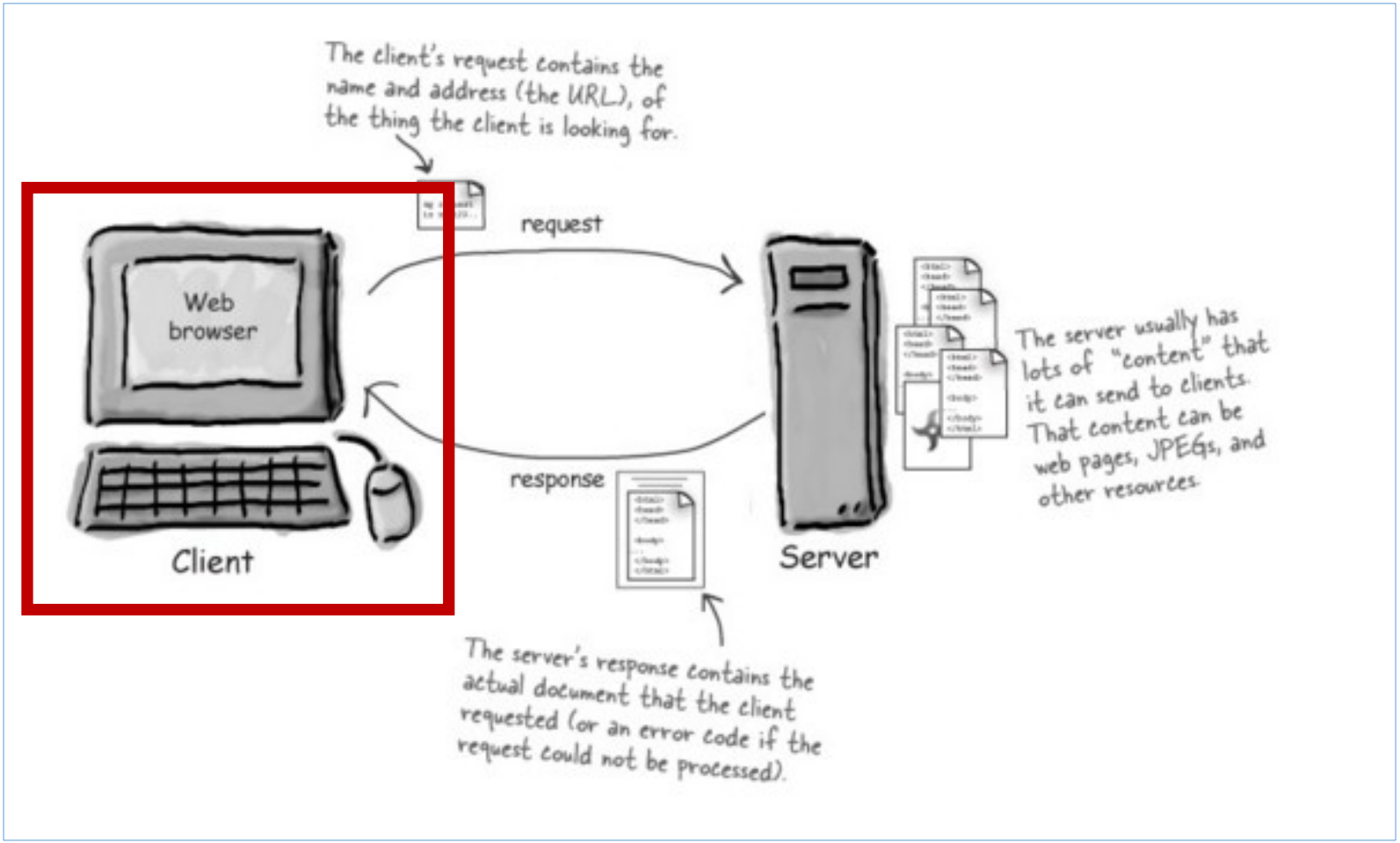
Client Definition



Client:

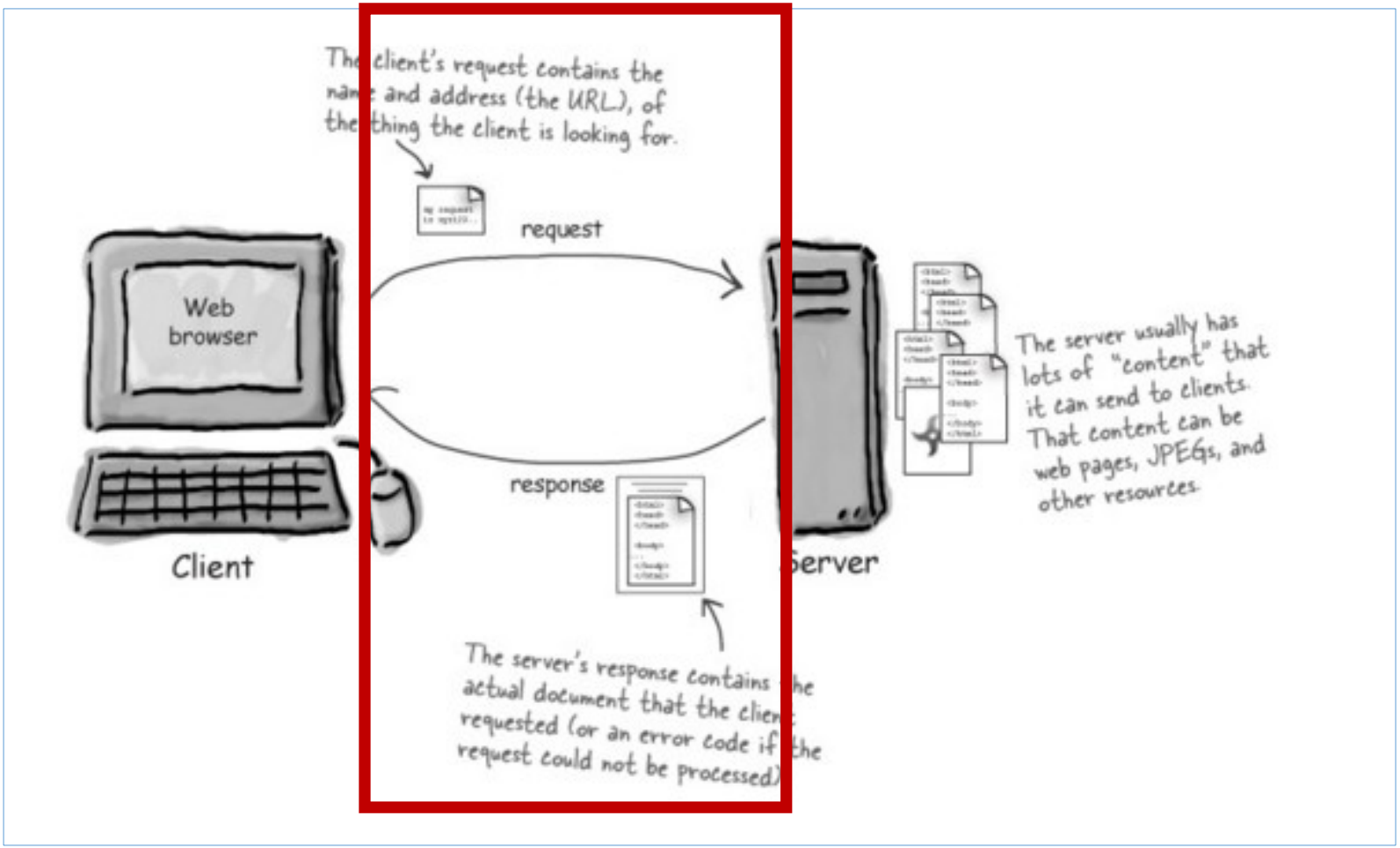
The users' personal machines that make "requests" of the server.

Bonus Question:

How do the client and server **communicate** with one another?

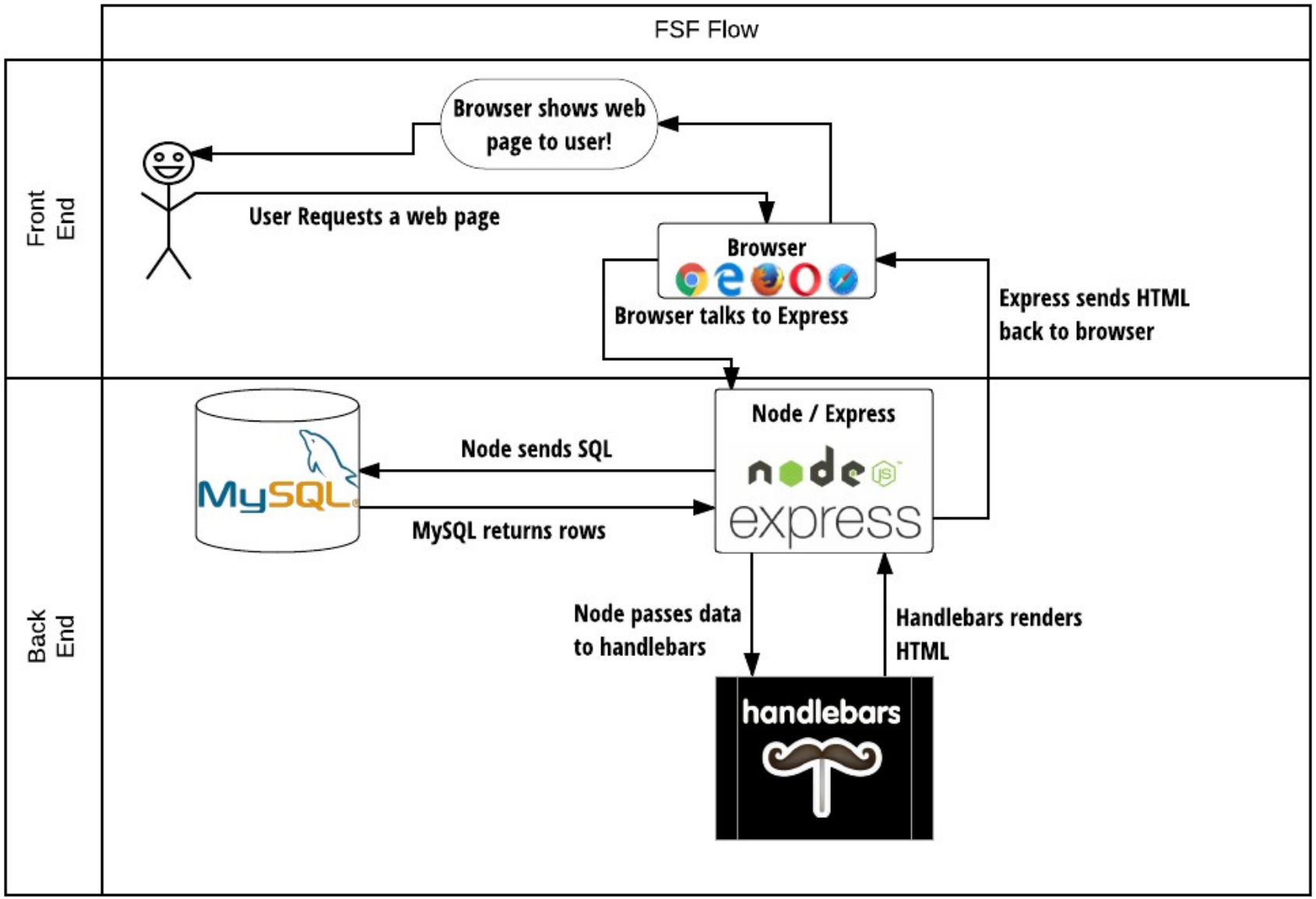
- In modern **web applications** there is a constant back-and-forth communication between the visuals displayed on the user's browser (**frontend)** and the data and logic stored on the server (**backend).**

HTTP Definition



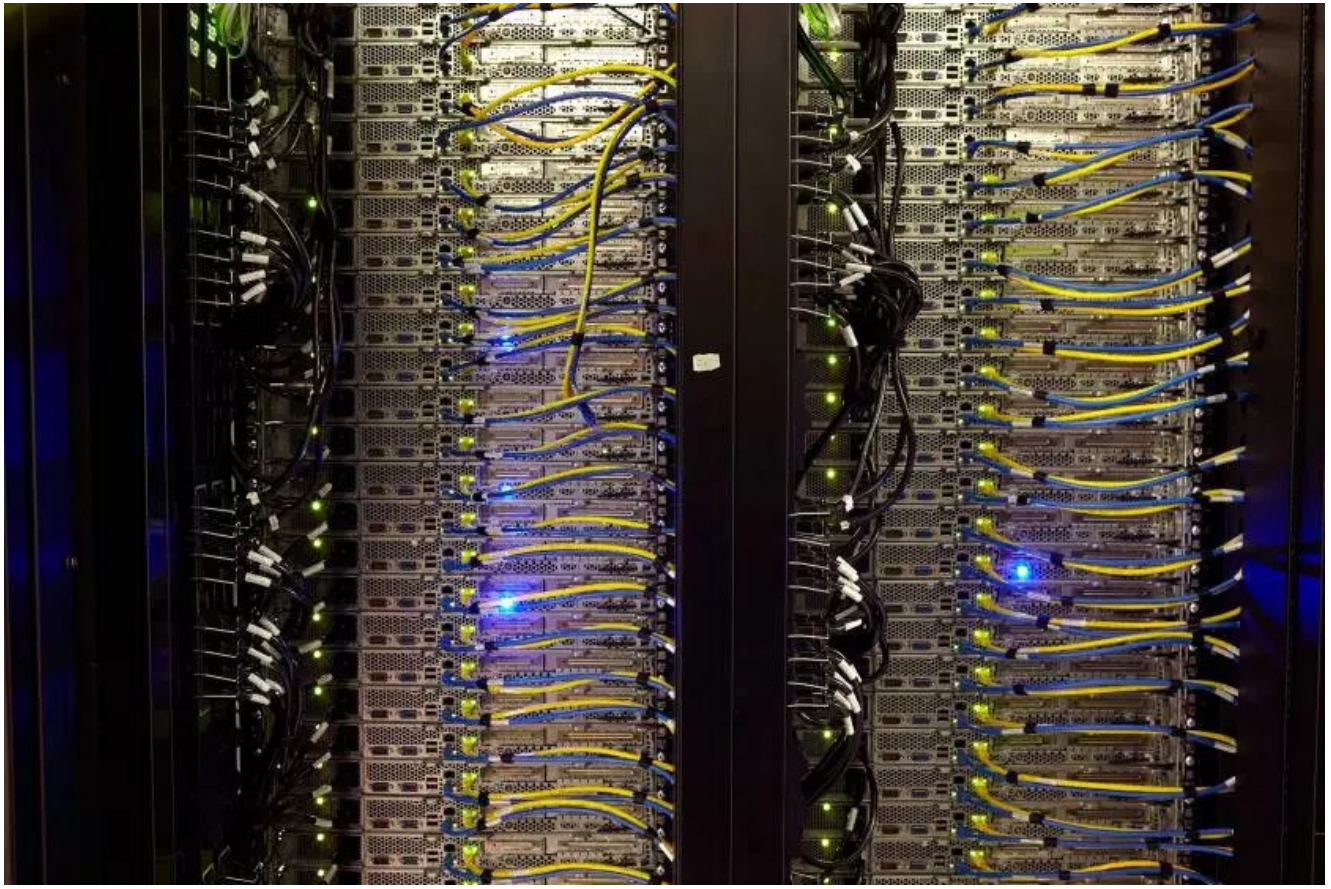
Clients and Servers communicate back and forth using a series of understood communications defined by **HTTP / HTTPs**.

Full-Stack


FSF Flow
Front End
Back End
Browser shows web page to user!
User Requests a web page
Browser
Browser talks to Express
Express sends HTML back to browser
MySQL
Node sends SQL
MySQL returns rows
Node / Express
node
express
Node passes data to handlebars
Handlebars renders HTML
handlebars

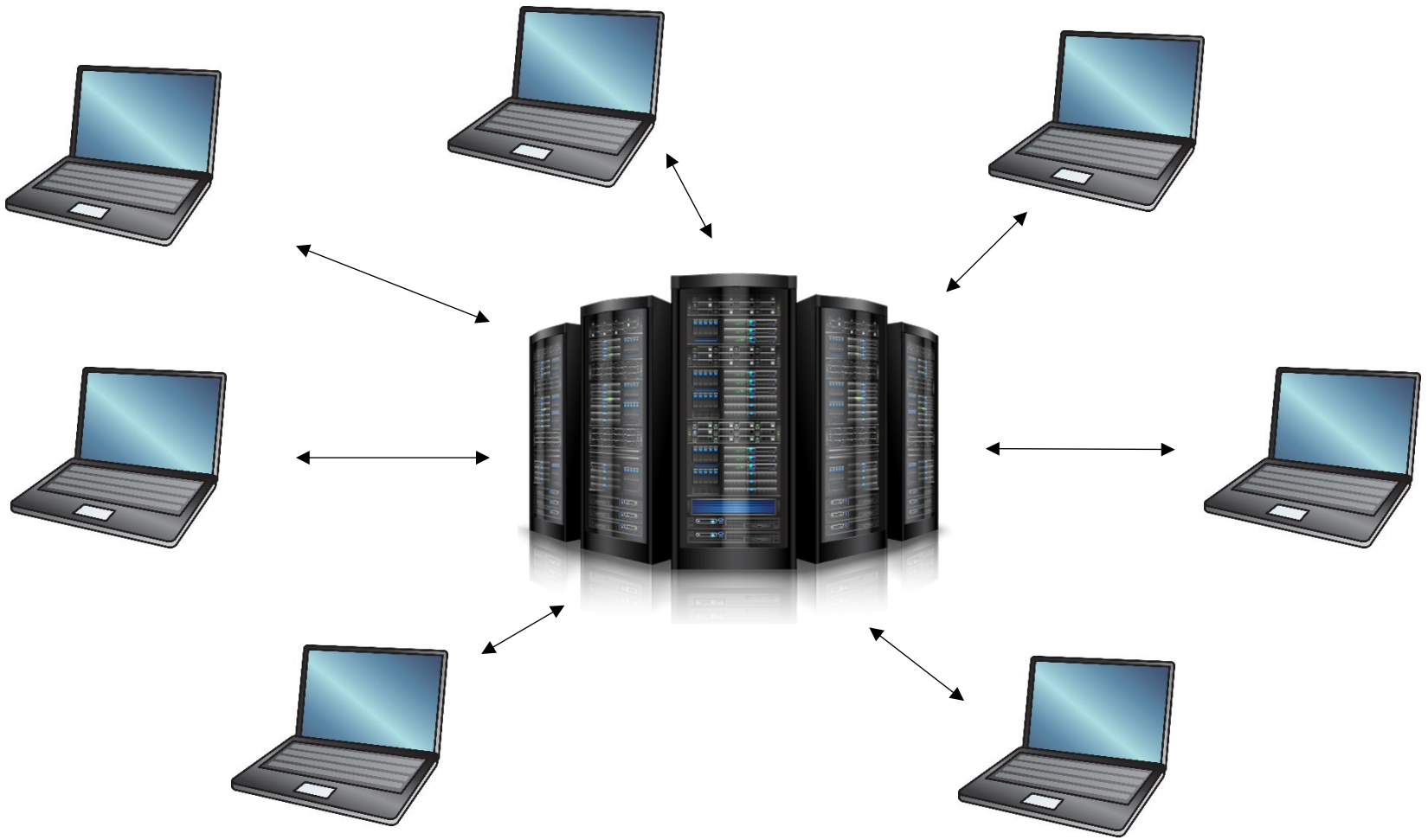
Digging Deep into Server

Visualizing Servers



Server Hardware look like large, ruggedized versions of desktop computers.

Visualizing Servers



These machines (and their respective code) handle all of the requests coming in from browsers accessing a website.

Visualizing Servers

Where does the server **live**?

- constant back-and-forth
  layed on the user's browser (**frontend)** and the data and logic stored on the server (**backend).**

Where Do Servers Live?

- Servers live in dedicated hardware intended to handle ALL the requests and responses of many clients.

- Servers can live most often live on cloud platforms like AWS, Heroku, Google Cloud, etc.

Google Cloud Platform

Where Do Servers Live?

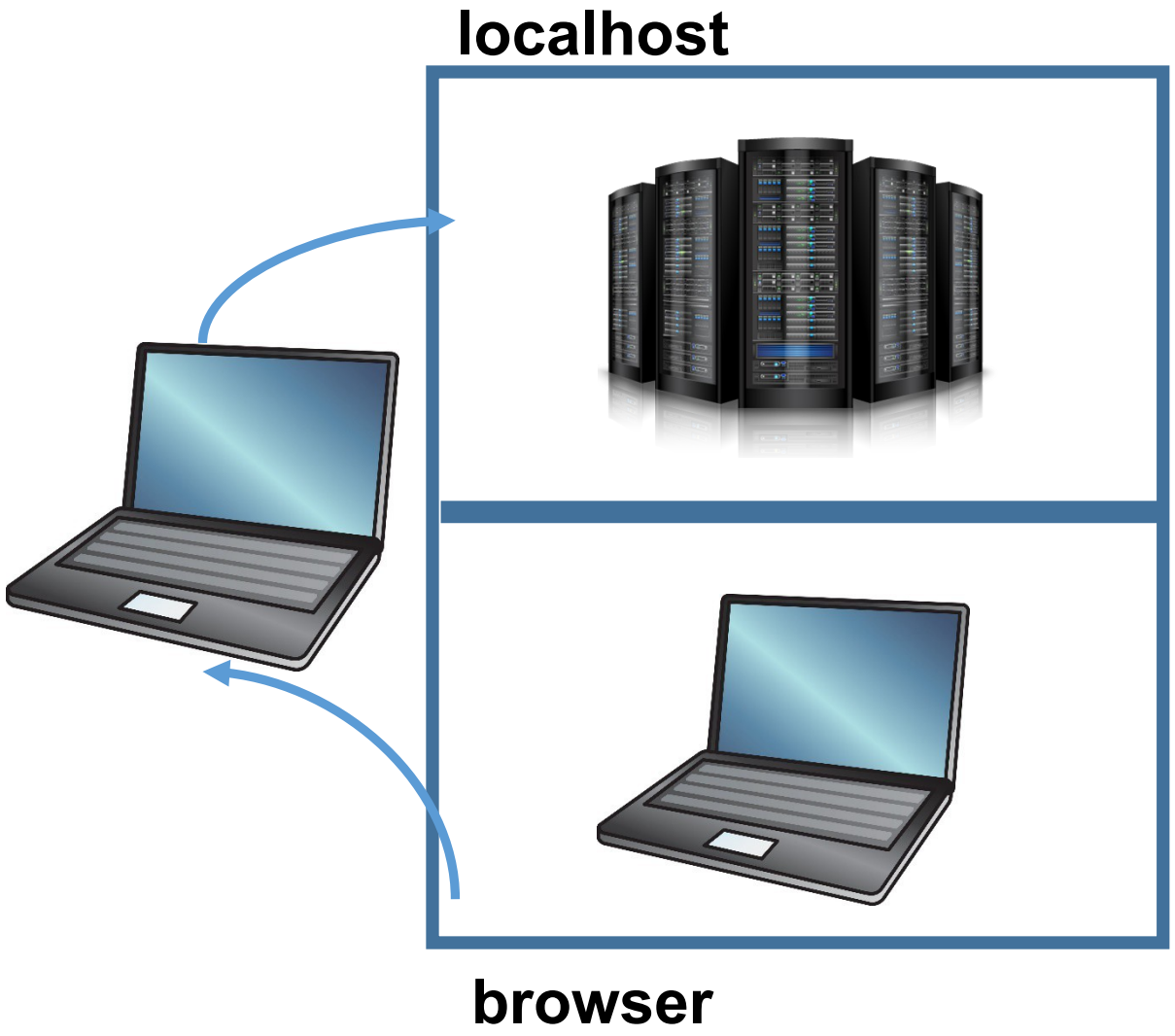
Where Do Servers Live?

Visualizing Servers

Servers During Development

Important Note:

- During development our personal computers will be able to simulate both.
- We will create a “local server”
- And then use our browser to interact with it.



Building a “Server”

Creating a Server

- For our purposes, “creating a server” equates to writing the code that handles what the server will ***do***.

- It’s important to note that even though you pay for server-side hardware, you still need to create the code that goes inside.

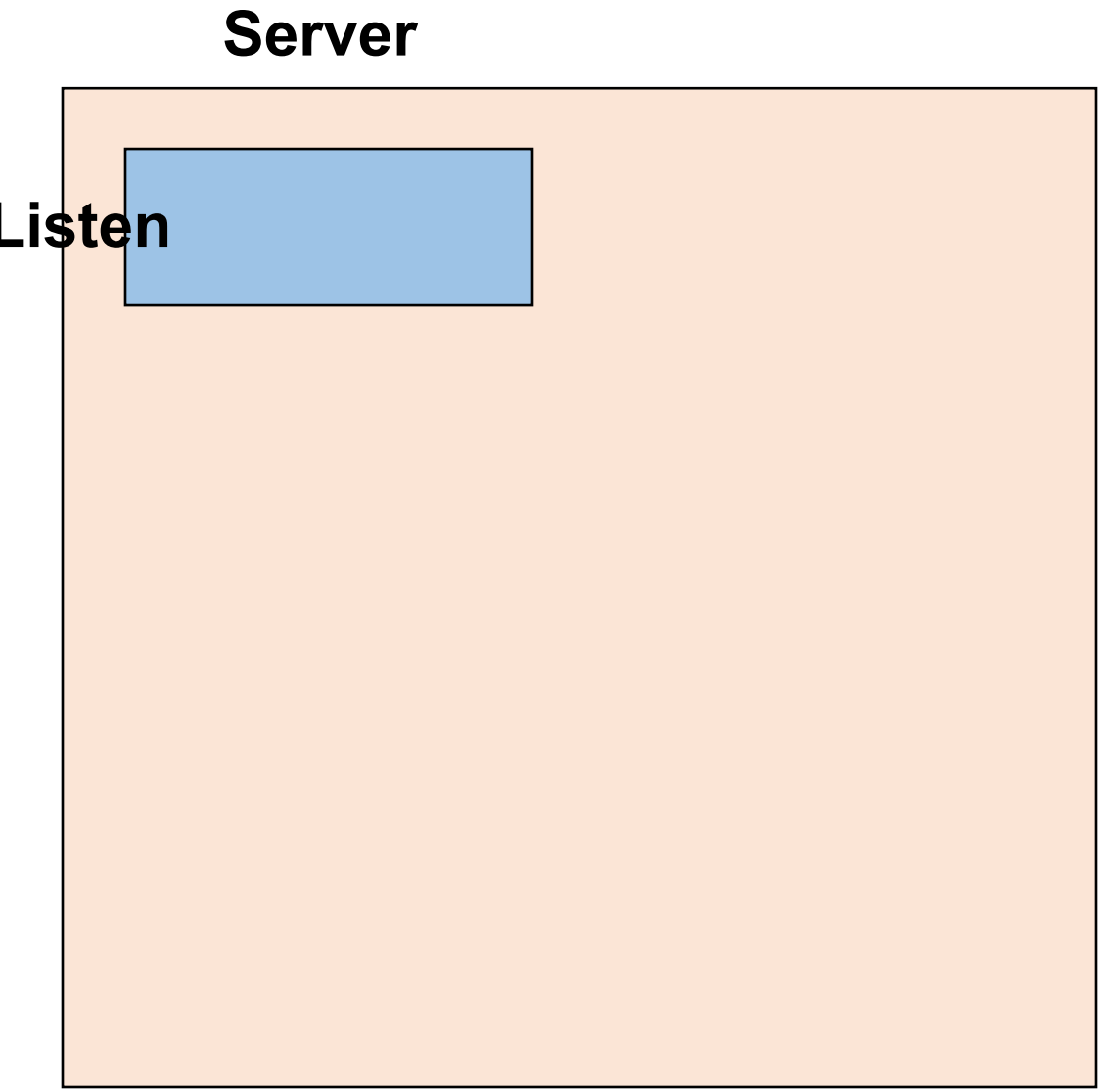
- **This code you create handles things like:**
  - Connections to the database
  - Handling client-side URL requests
  - Performing server-side processes
  - Authenticating user requests
  - Logging client requests

A Big Box

- Throughout this week… imagine your server to be a big, empty box.

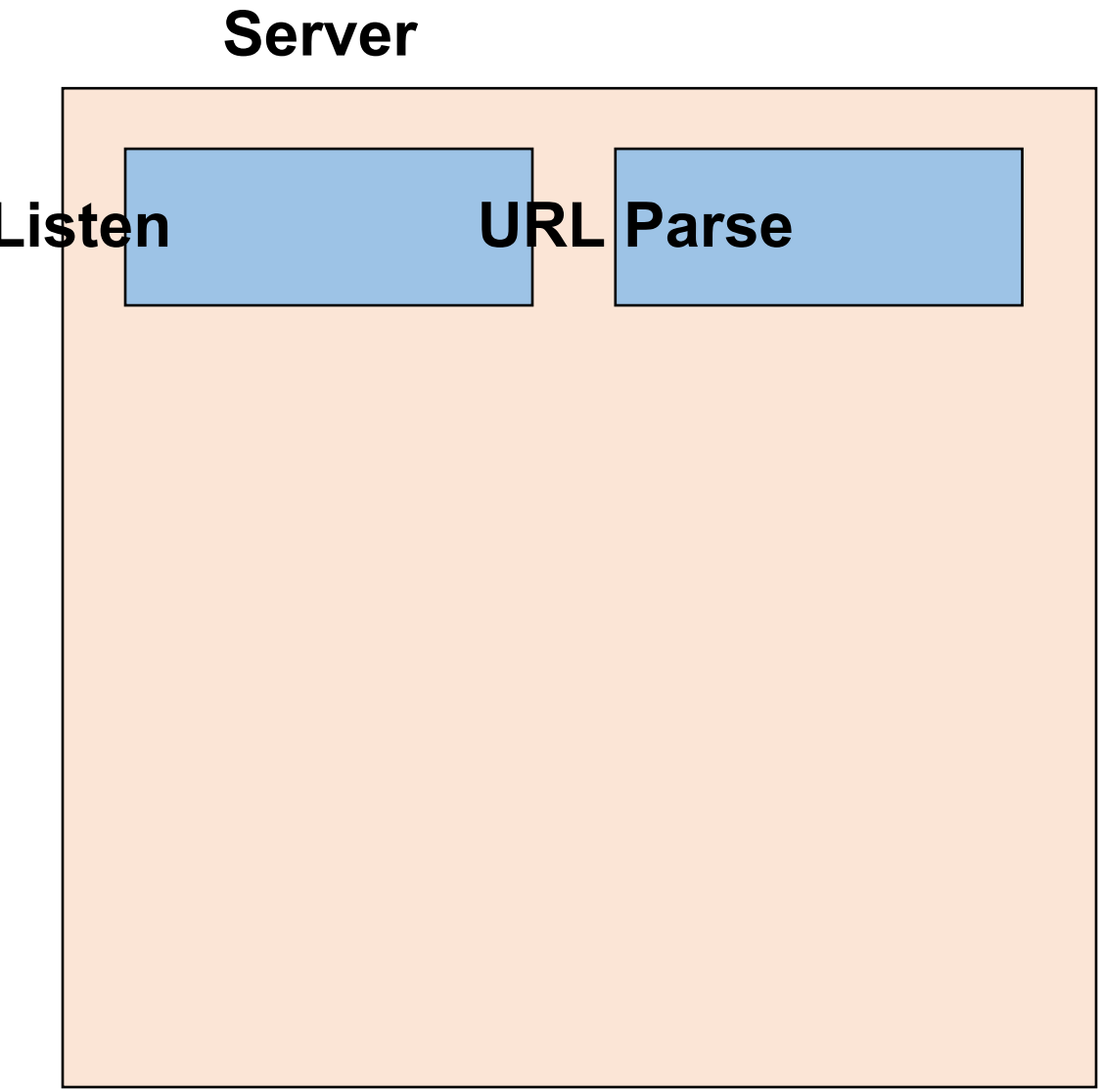
- We will be adding code snippets and modules to give our big, empty box the powers to ***do*** stuff in response to all the requests that come in.

Inside the Box: Connections



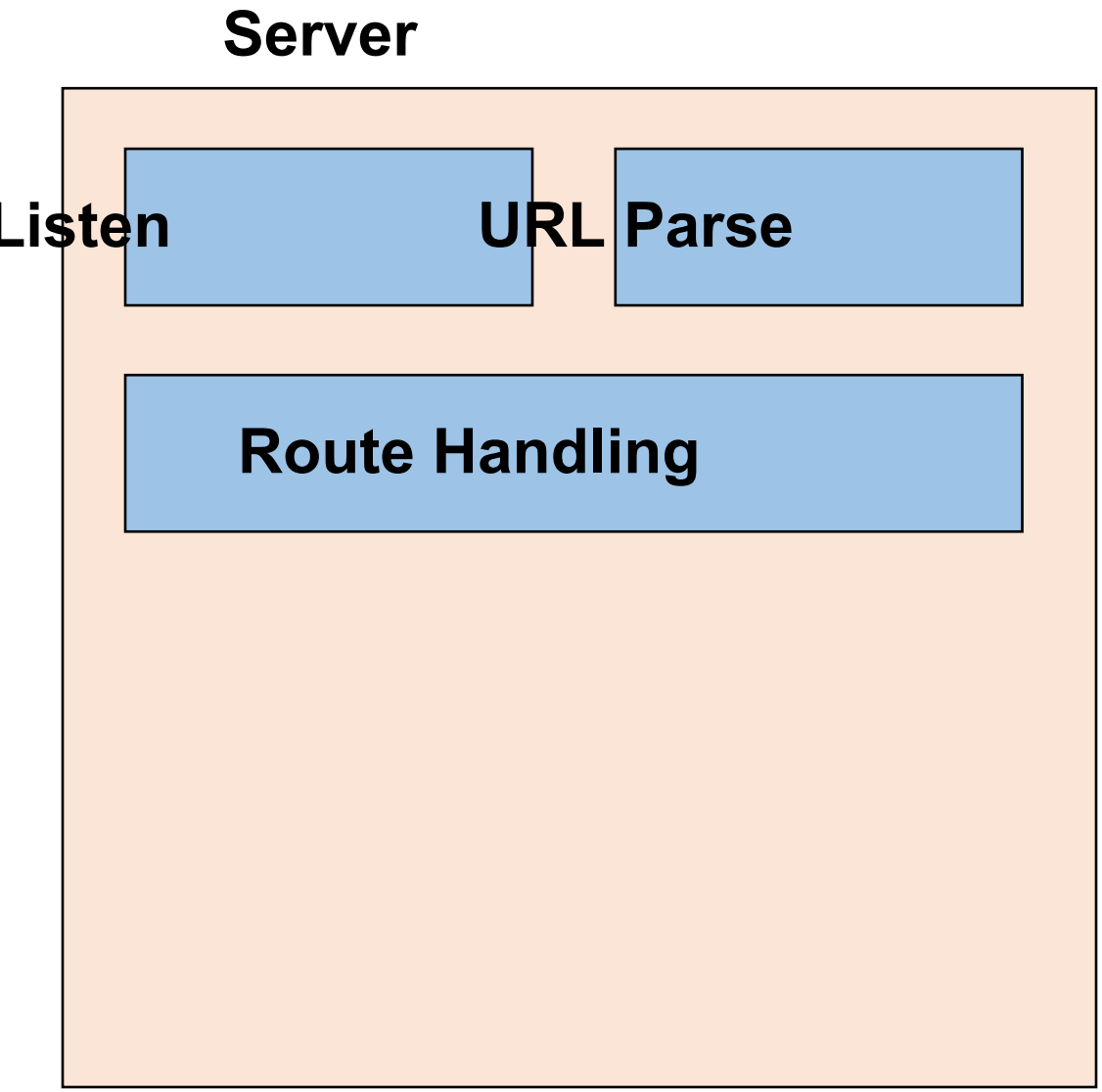
- We'll add listener such that the server can "begin" listening for requests.

Inside the Box: Parsing



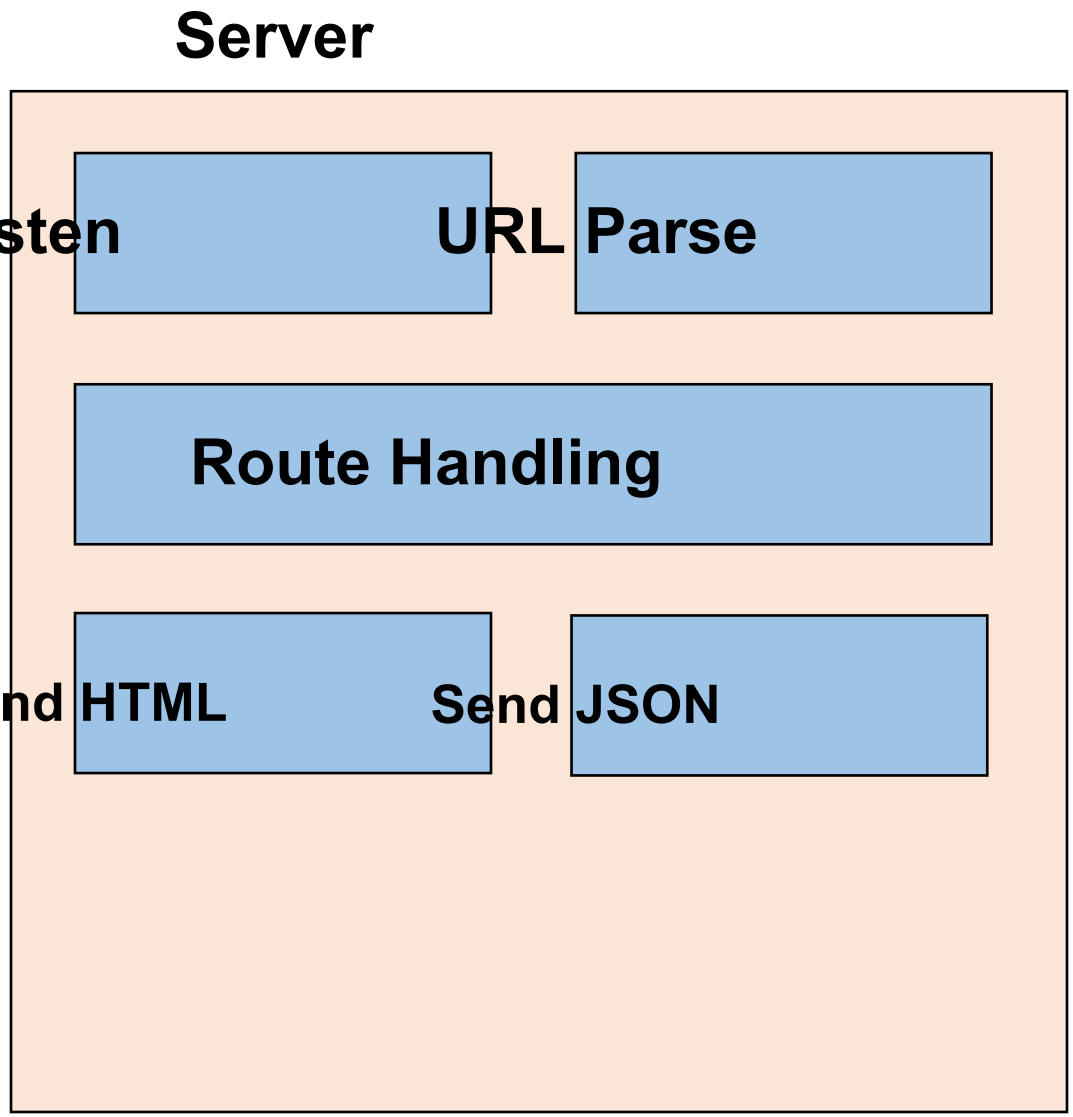
- We'll give our server the ability to "parse" URLs that the user requests.

Inside the Box: Routing



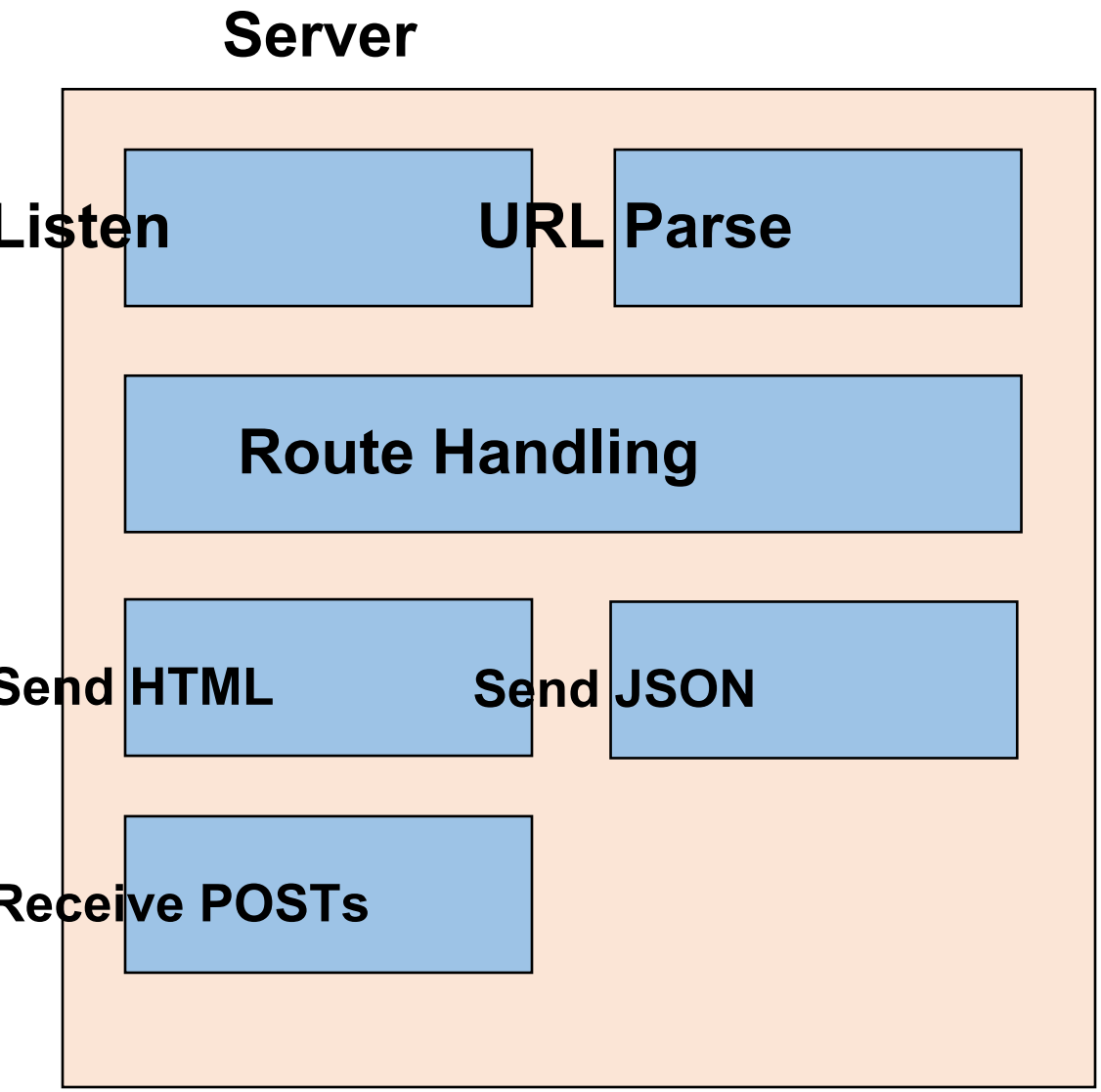
- Then based on the URL's keywords, our server will be able to **route** (or direct the flow of logic to initiate other processes)

Inside the Box: Sending Files



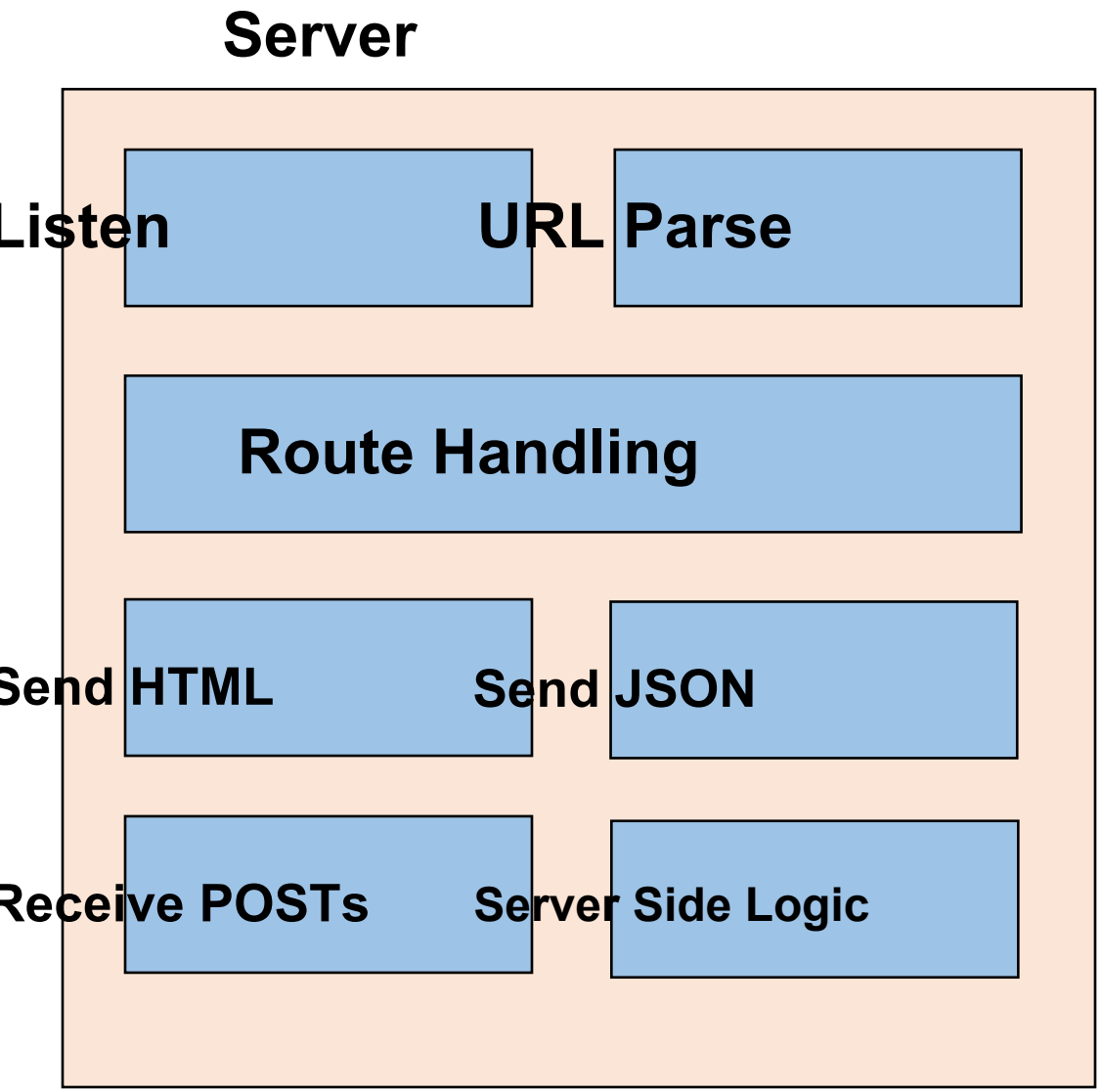
- This subsequent process may be to send an HTML file to be rendered or to send a JSON file to be rendered…

Inside the Box: Receiving Posts



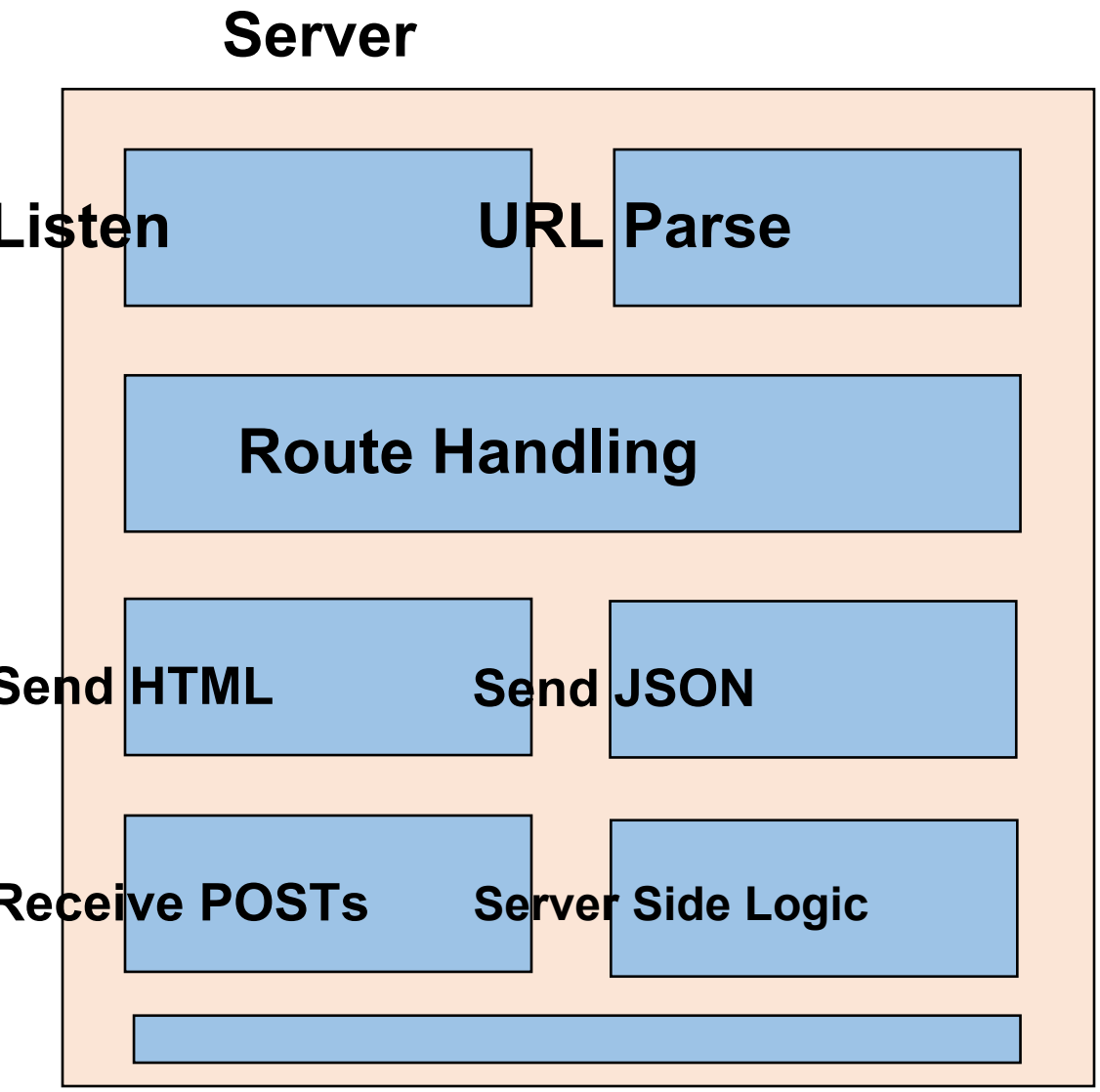
- We may also have a new module to handle receiving user's POST requests (i.e. the data they send the server)

Inside the Box: Performing Logic



- We may also have complex server-side logic that we want to initiate in response to user's visiting a route endpoint or sending us data.

Inside the Box: And More!



- But it doesn't stop there!
- We may add in functionality for authentication, logging requests, connecting to databases, and so much more.
- But always remember… we're **coding out these functionalities into our box!**

Questions?

Let’s Get Coding!

Express Yourself…

Early Concerns…

Comment #1 - Concern

“This is all so confusing…”

Comment #1 - Response

And it will be for your employer as well.

Comment #2 - Concern

“I feel like I’m just copying and pasting”

Comment #2 - Response

- **Backend code libraries mean YOU have to code less.**
- Often you are just copying “best-practices” over and over again.

Express

Remind me again…

What is **Express?**

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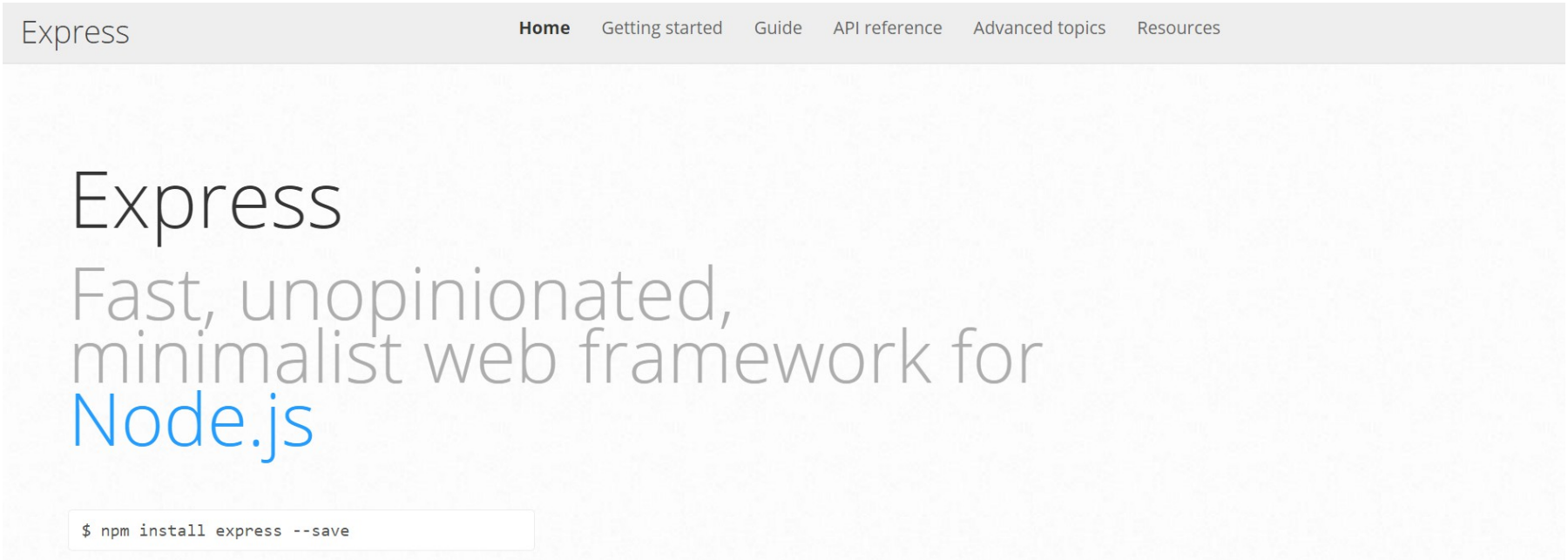
Express.JS



Web framework for node to make creating code for **server** much simpler

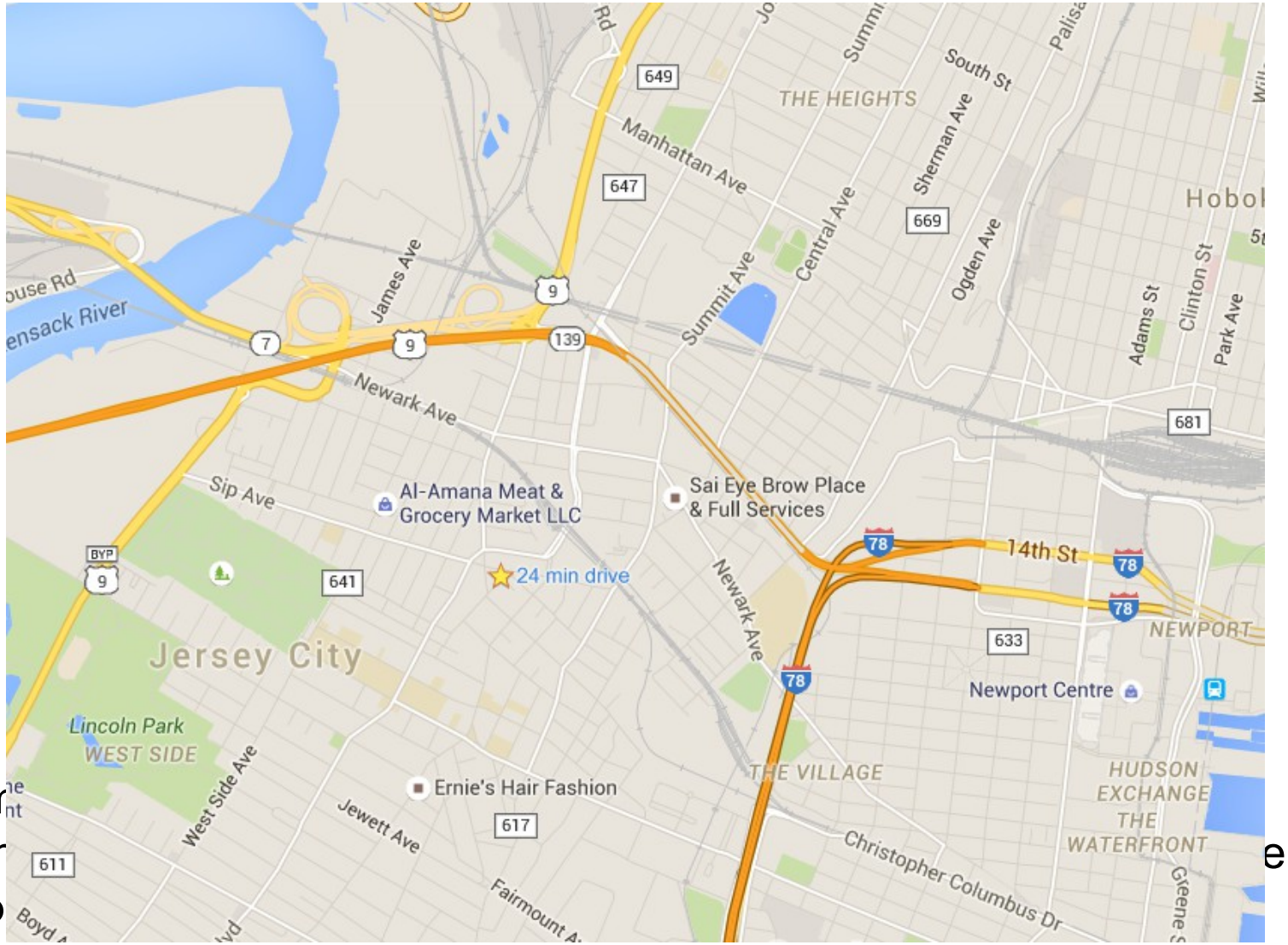
- In modern **web applications** there is a constant back-and-forth communication between the visuals displayed on the user's browser (**frontend)** and the data and logic stored on the server (**backend).**

Remind me again…

What is a **route?**

- In modern **web applications** there is a constant back-and-forth communication between the visuals displayed on the user's browser (**frontend)** and the data and logic stored on the server (**backend).**

Routes = Maps



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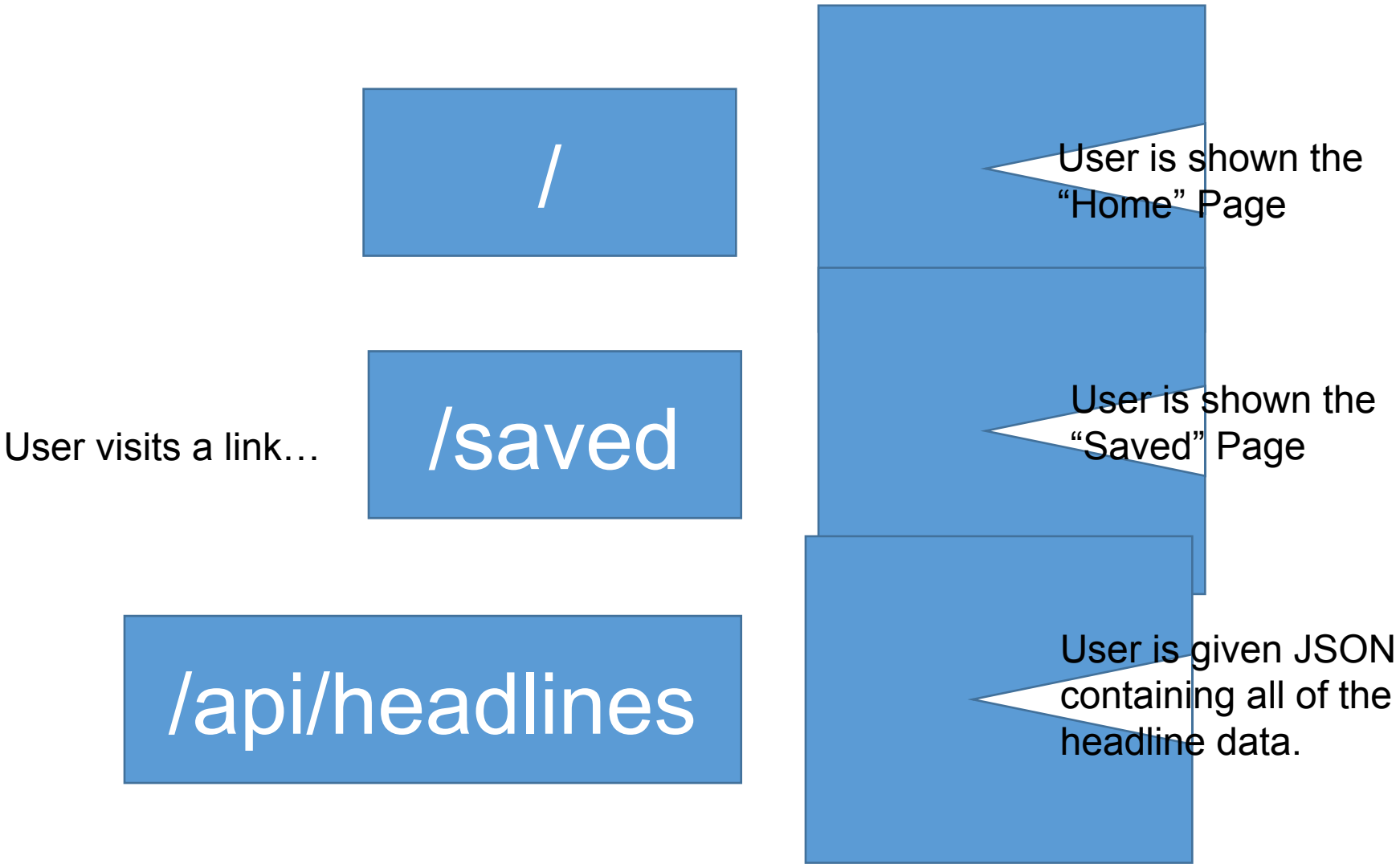
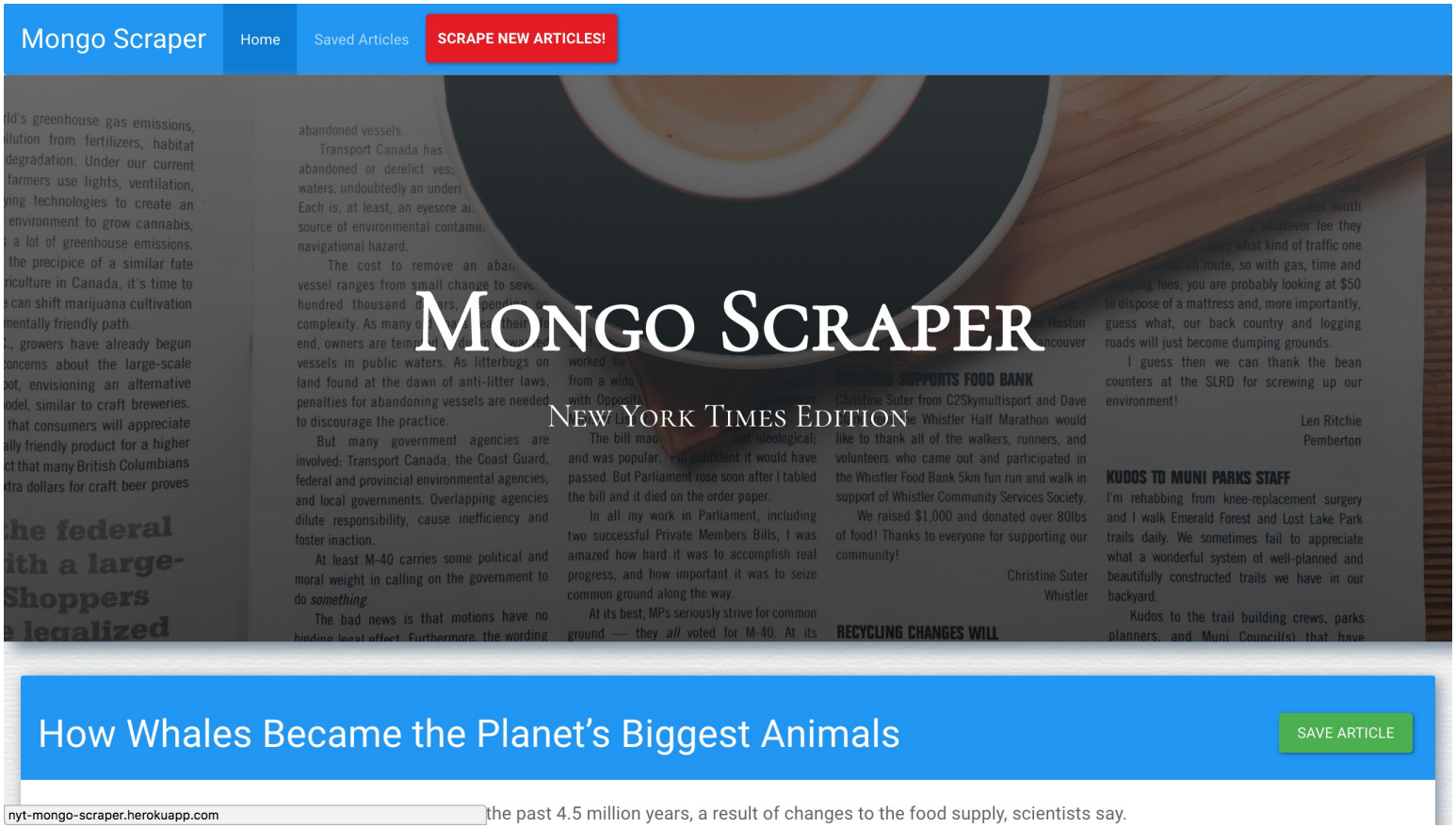
Routes = Maps


/
/saved
/api/headlines
User visits a link…
User is shown the "Home" Page
User is shown the "Saved" Page
User is given JSON containing all of the headline data.

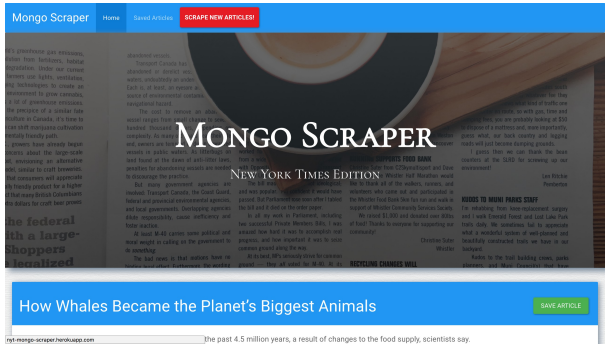
Quick Example



http://nyt-mongo-scraper.herokuapp.com/

Client-Server Communication (GET)

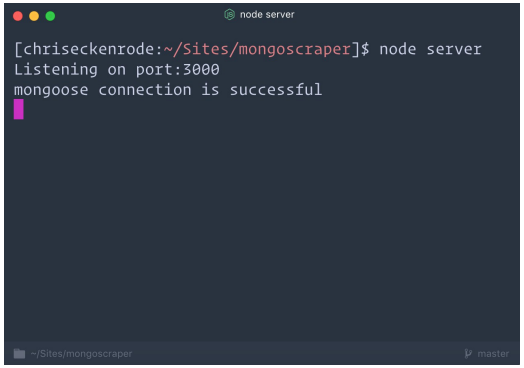
Client Browser



1) User visits "/" route

(GET Request)

Node Server



Client-Server Communication (GET)

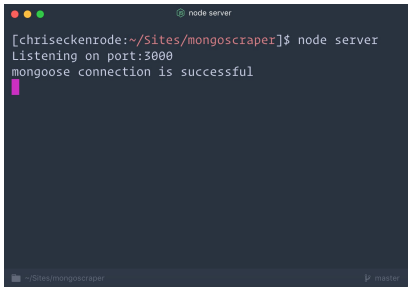
Client Browser

1) User visits /saved

(GET Request)

3) Server responds by providing HTML with saved articles

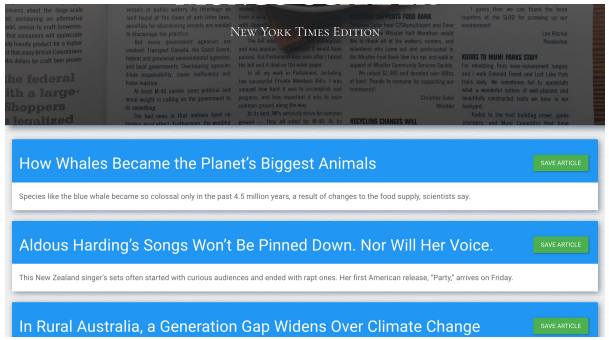
Node Server



2) Request triggers the code in the Server route. The server then finds the relevant HTML content and data

Client-Server Communication (POST)

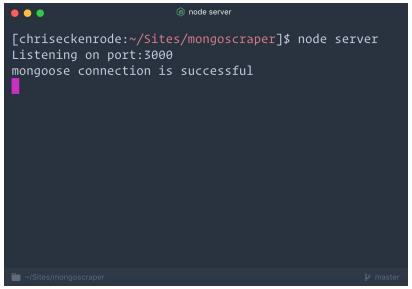
Client Browser



1) User saves an article using ”api/headlines”

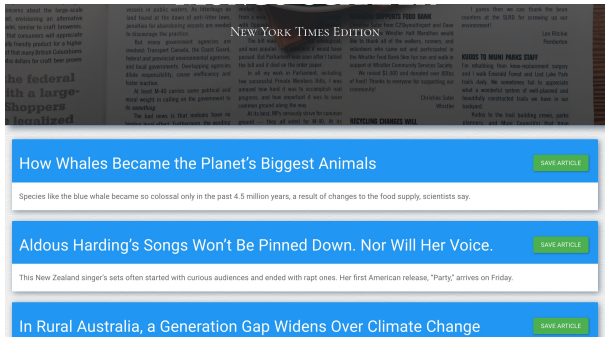
(POST Request)

Node Server



Client-Server Communication (POST)

Client Browser



1) User saves an article using ”api/headlines”

(POST Request)

3) “Saved” articles are loaded on the saved page.

Node Server

2) Request triggers the code in the Server route. The server then sets the article as “saved” in the database.

Activity Time!