CSCI 3308
Software Dev
Methodologies and Tools

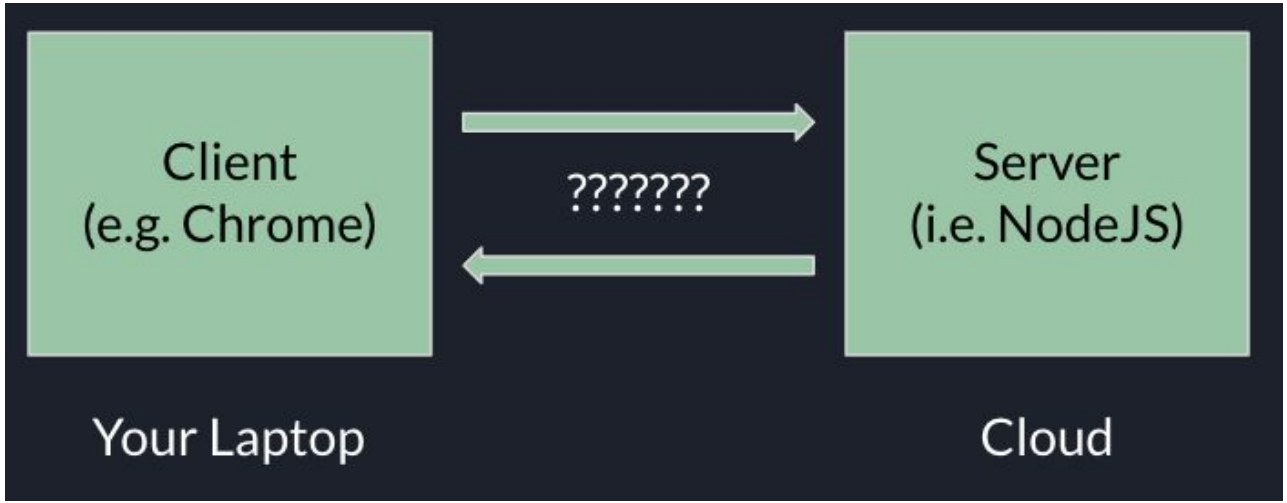
Lab 6: Feb 19, 2025

!! Announcements !!

- Team Formations - Finalization
- Sit with your teams

Web Architecture

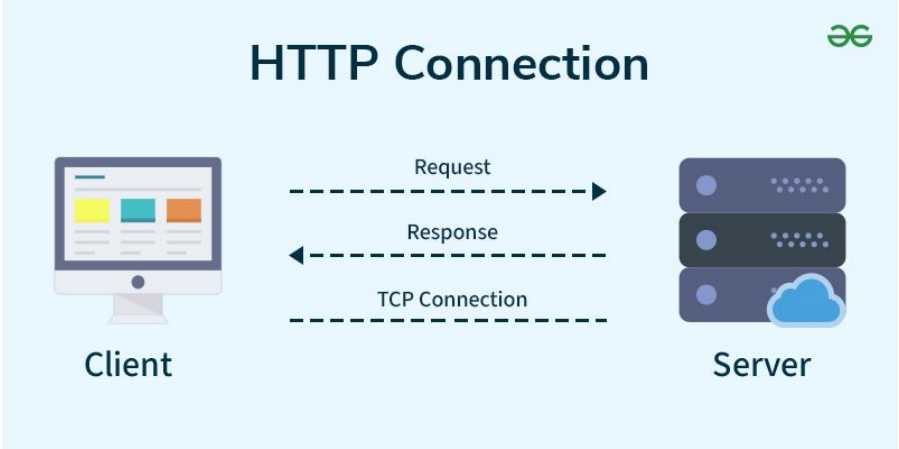
How can we exchange data between our front end and our server?



SOLUTION = HTTP Request

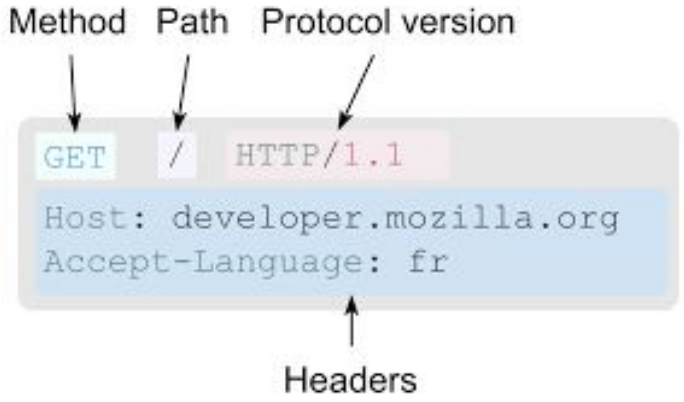
What is HTTP?

- HTTP (Hypertext Transfer Protocol) is the foundation of communication on the web.
- It is a protocol used for transmitting data between a client (like a web browser) and a server.
- HTTP is commonly used for accessing web pages, transferring files, and interacting with web APIs.



What Does an HTTP Request Contain?

- **Request Method:** Specifies the action to be performed (GET, POST, etc.).
- **Request URL:** The web address **(URL)** of the resource the client is requesting.
- **HTTP Headers:** Metadata like content type, authentication, user-agent, etc.
- **Body (optional):** Data sent with requests, typically with POST or PUT requests.



http://{hostname}:{hostport}/{resource_path}

http://localhost:3000/get_user

HTTP Methods

There are many types of HTTP request methods (GET, POST, PUT, DELETE, etc.), which are used to specify the type of action that is taken on the resource

1. GET - Retrieve a resource (get a webpage or DB entry)
2. POST - Submit an entry to the resource (new row in a table)
3. PUT - Replace an entry in the resource (edit a row in the table)
4. DELETE - Remove an entry in the resource (delete a row in the table)

It's up to you to ensure that your server obeys these rules -- there's nothing stopping you from writing to your DB when accepting a GET request

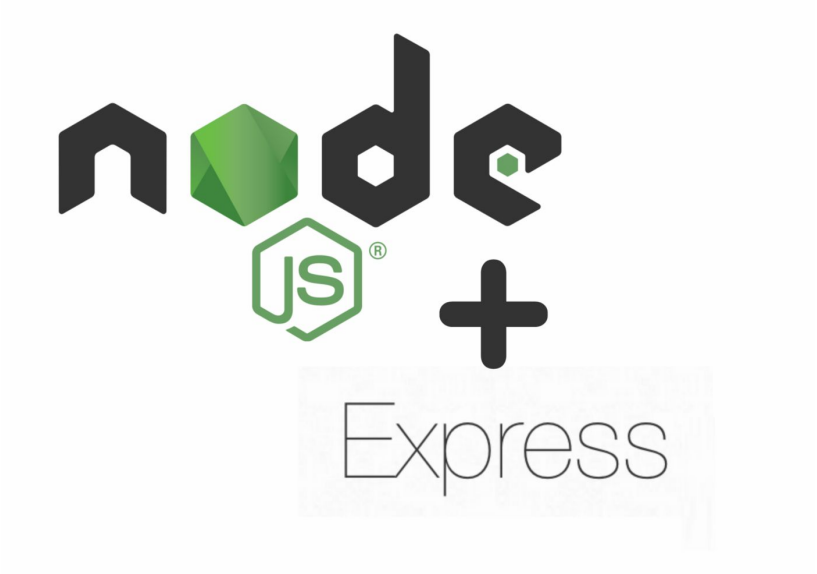
Backend Server

Node JS

- It allows developers to run JavaScript code on the server-side, outside the browser.
- Node.js is designed for building scalable, high-performance applications, especially suitable for operations like web servers and APIs.

Express

- Express.js is a minimal and flexible Node.js web application framework.
- It provides a robust set of features for building web and mobile applications.
- It allows developers to build APIs and serve web content quickly and efficiently.
- Commonly used with databases like SQL, MongoDB etc. to create full-stack applications.



Node JS

NodeJS uses JavaScript to instantiate a web server. Typically, we have a index.js script that specifies what types of HTTP Requests it will accept. For example, we can specify that we will accept GET requests for the resource “/resource/path”:

```
app.get('/resource/path', function(req, res) {
     // handle your request here!
     // req is the request object
     // res is the response object that you manipulate
});
```

NodeJS

Similarly, we can specify that we will accept POST requests, this time for a login request:

```
app.post('/login', function(req, res) {
     // get properties from the body
     var username = req.body.username;
     var password = req.body.password;
     // TODO: check with the DB for username/password match
});
```

Database Queries in NodeJS

How can we insert data from our database?

The first thing you'll need is a connection to the PostgreSQL server:

index.js

```
var pgp = require('pg-promise')(); // require the postgres package
const dbConfig = {
      host: 'db',
      port: 5432,
      database: 'football_db',
      user: 'postgres',
      password: 'pwd'
};
var db = pgp(dbConfig); // create a connection to the db server
```

Database Queries in NodeJS

Once we have a connection to our database, we can issue queries:

index.js

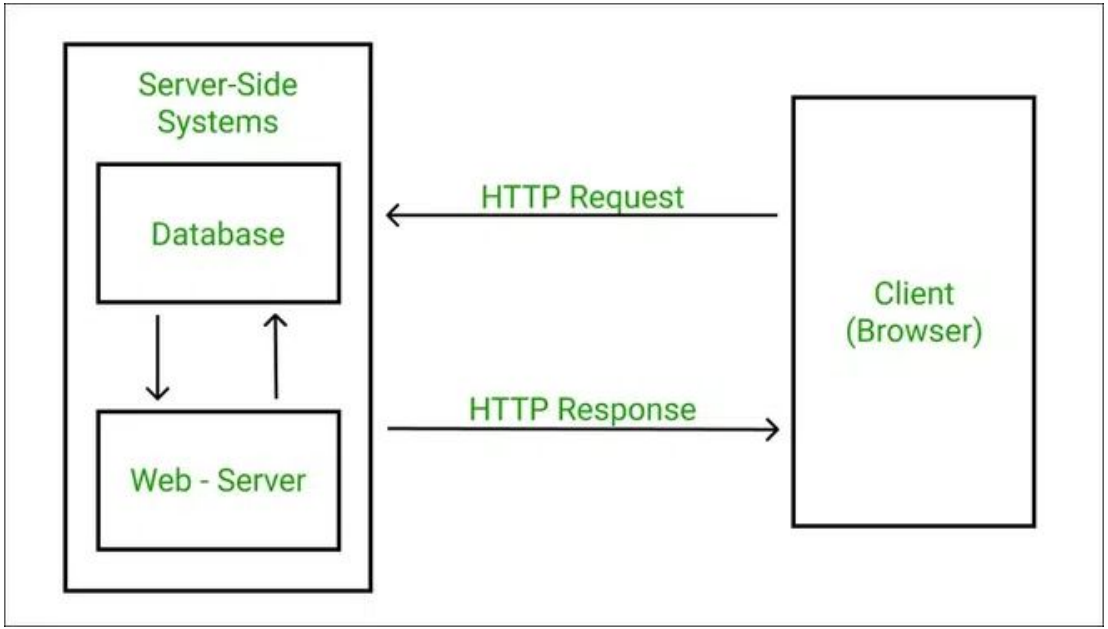
```
app.get('/userinfo', function(req, res) {
     var query = SELECT * from my_table WHERE username = '${req.query.username}';
     db.any(query)
     .then(function (rows) {
          // render your page with
          // data inserted from rows
     }).catch(function (err) {
          // handle an error,
          // maybe by rendering a
          // slightly different page?
     });
```

How do we test the API's we wrote ??

Postman

- Postman is a popular API development and testing tool used by developers to interact with APIs.
- It provides a user-friendly interface to easily create, send, and analyze HTTP requests.
- Postman supports multiple HTTP methods like GET, POST, PUT, DELETE, and PATCH.

Lets link everything we know about


Server-Side
Systems
Database
Web - Server
HTTP Request
HTTP Response
Client
(Browser)

!! Lab Time !!