



MSc. Computer Science (ESS)  
Module: Enterprise Web Development

*Overview*

Website: <https://tutors.dev/topic/enterpwebdev-2026-setu-deise/topic00>

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# Objective

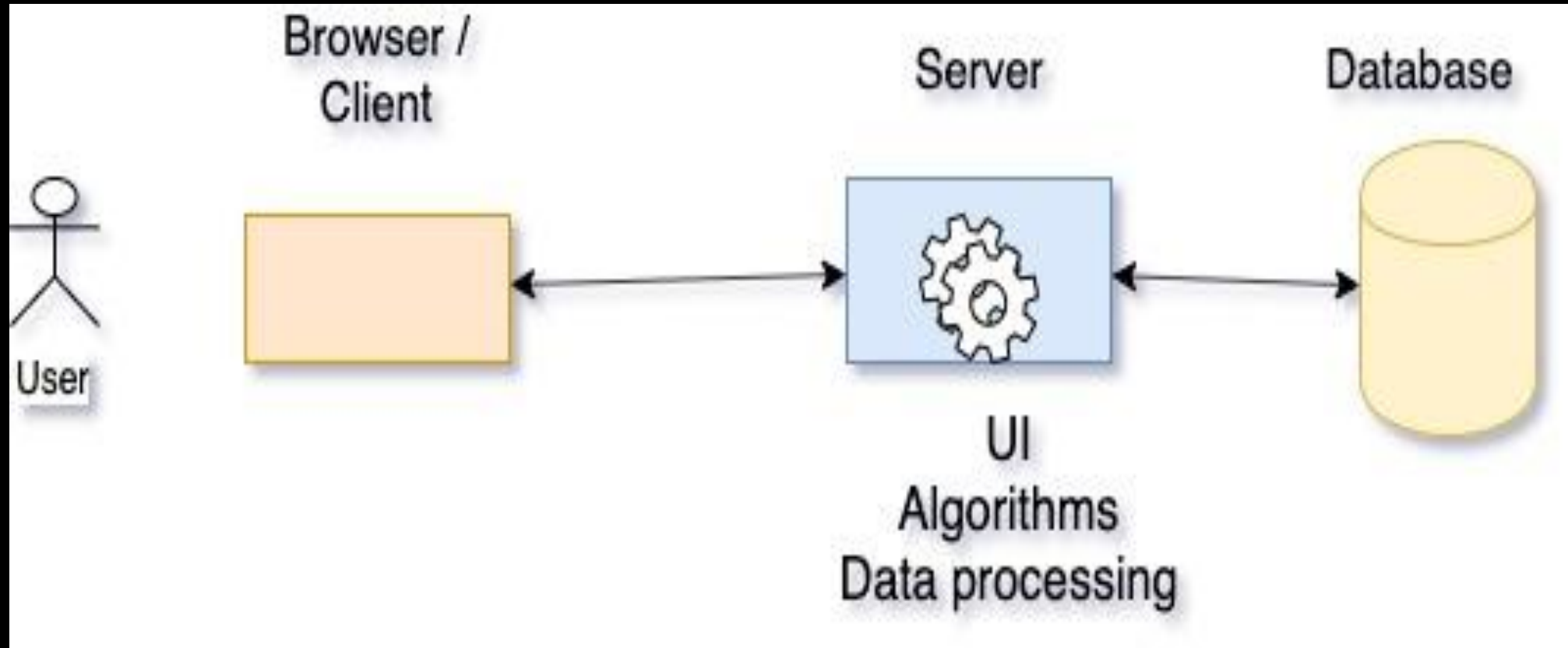
## TL;DR

Design and implement client-side rendering web apps and deploy them on a serverless platform using automated provisioning of the required cloud resources.

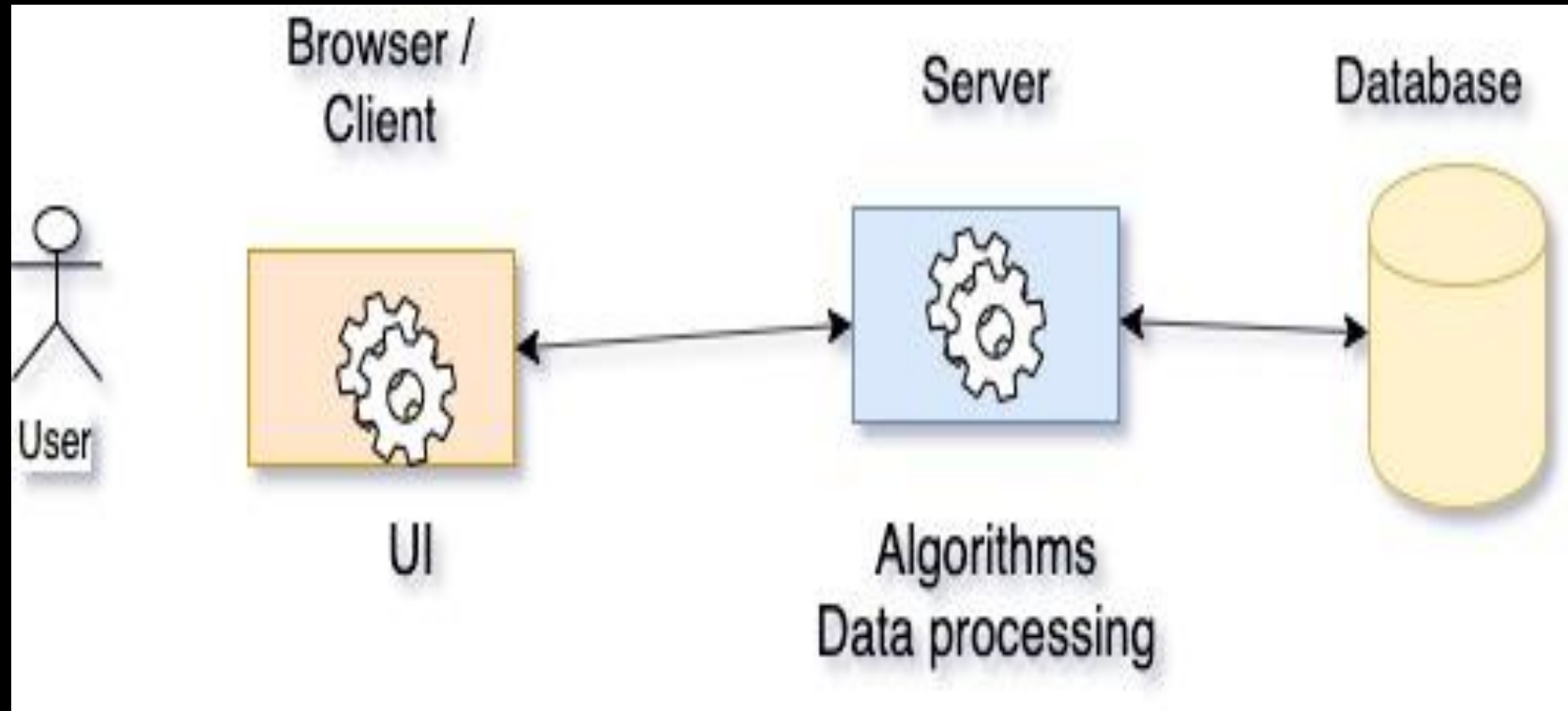
# Agenda

- Context.
- This module's focus.
- Software installation requirements.

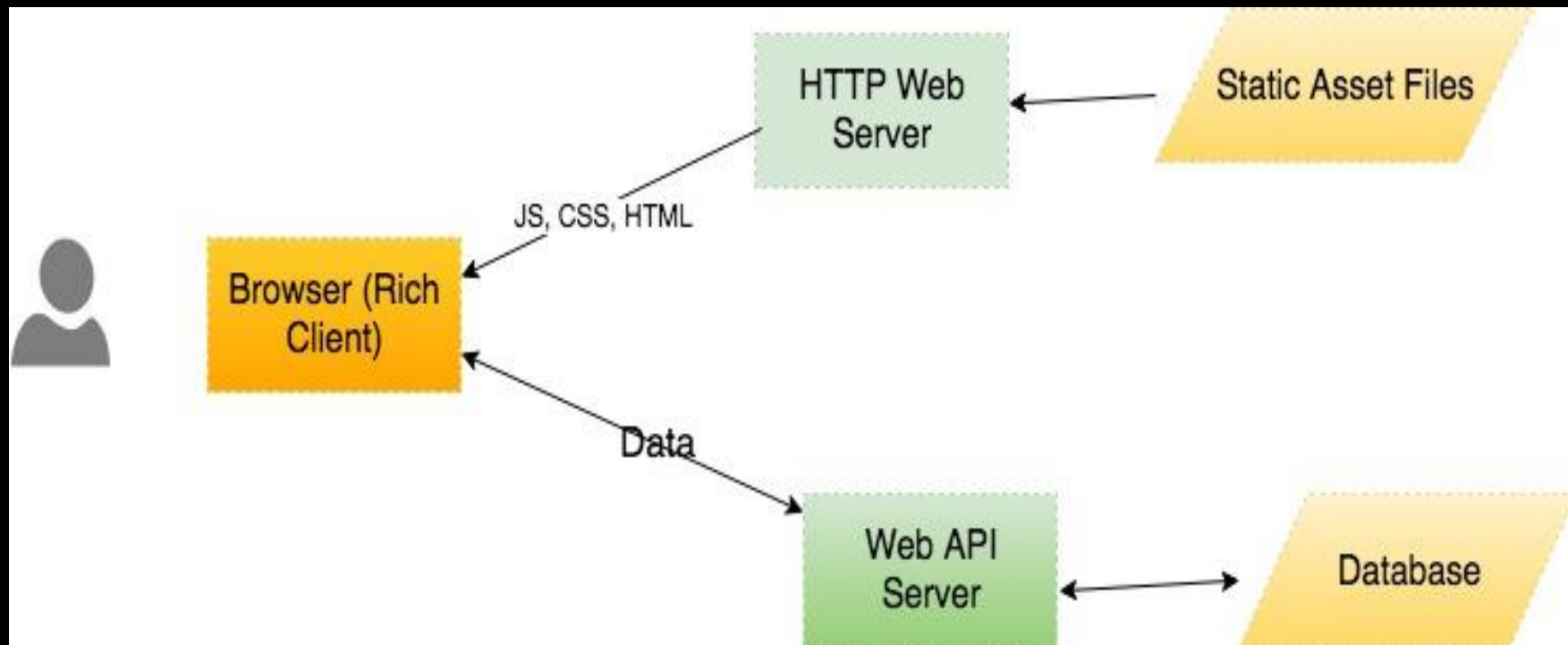
# Web Apps Architecture – Server-Side Rendering (SSR)



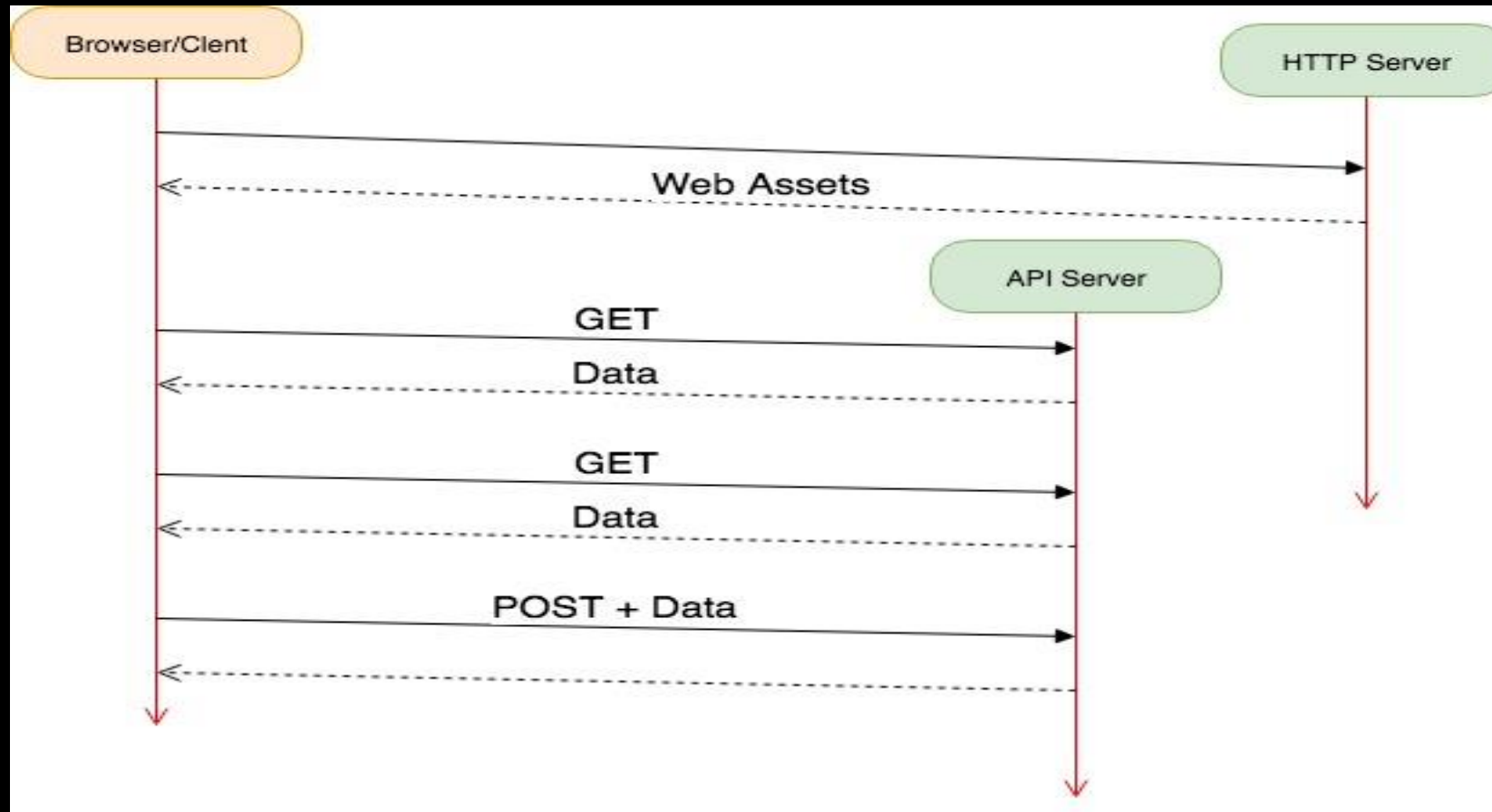
# Web Apps Architecture – Client-Side Rendering (CSR)



## Client-Side Rendering – Deployment (Traditional)



# CSR Web Apps – HTTP Communications flow



# CSR Web Apps – Evolution.

- Early Examples: Gmail (2004), YouTube (1st generation)
  - Disadvantage:
    - Poor developer experience (DX) – code bloat; Poor maintainability; Browser inconsistencies.
    - Lacked addressability (Key principle of the web).
- JQuery – A cross-platform JavaScript library to simplify the client-side scripting of HTML pages. (2006)
  - Adv.: Better developer productivity; reduced code bloat.
  - Disadvantages: Lacked Addressability; Unmaintainable code (spaghetti code).
- Single Page App (SPA) frameworks. (2010 ish)
  - Supports addressability; Improved DX; Improved maintainability.



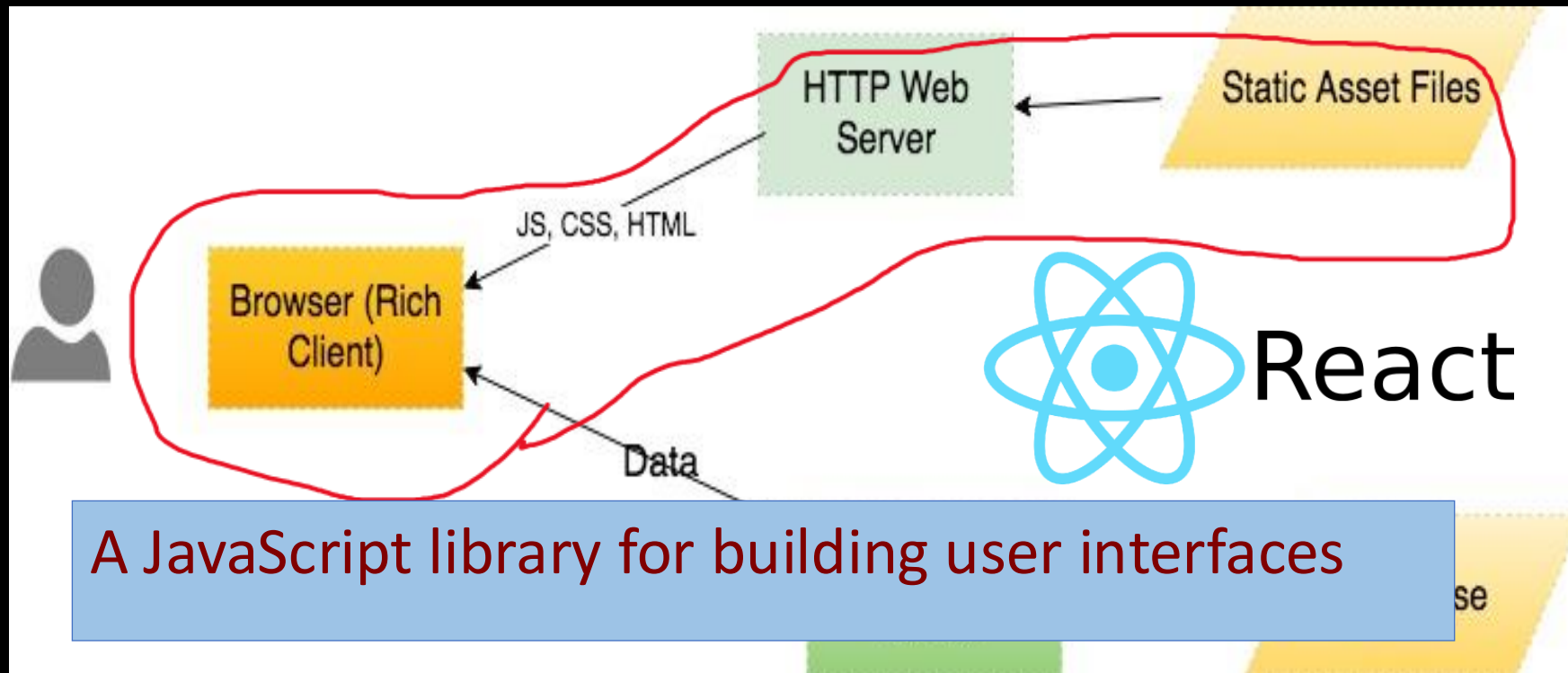
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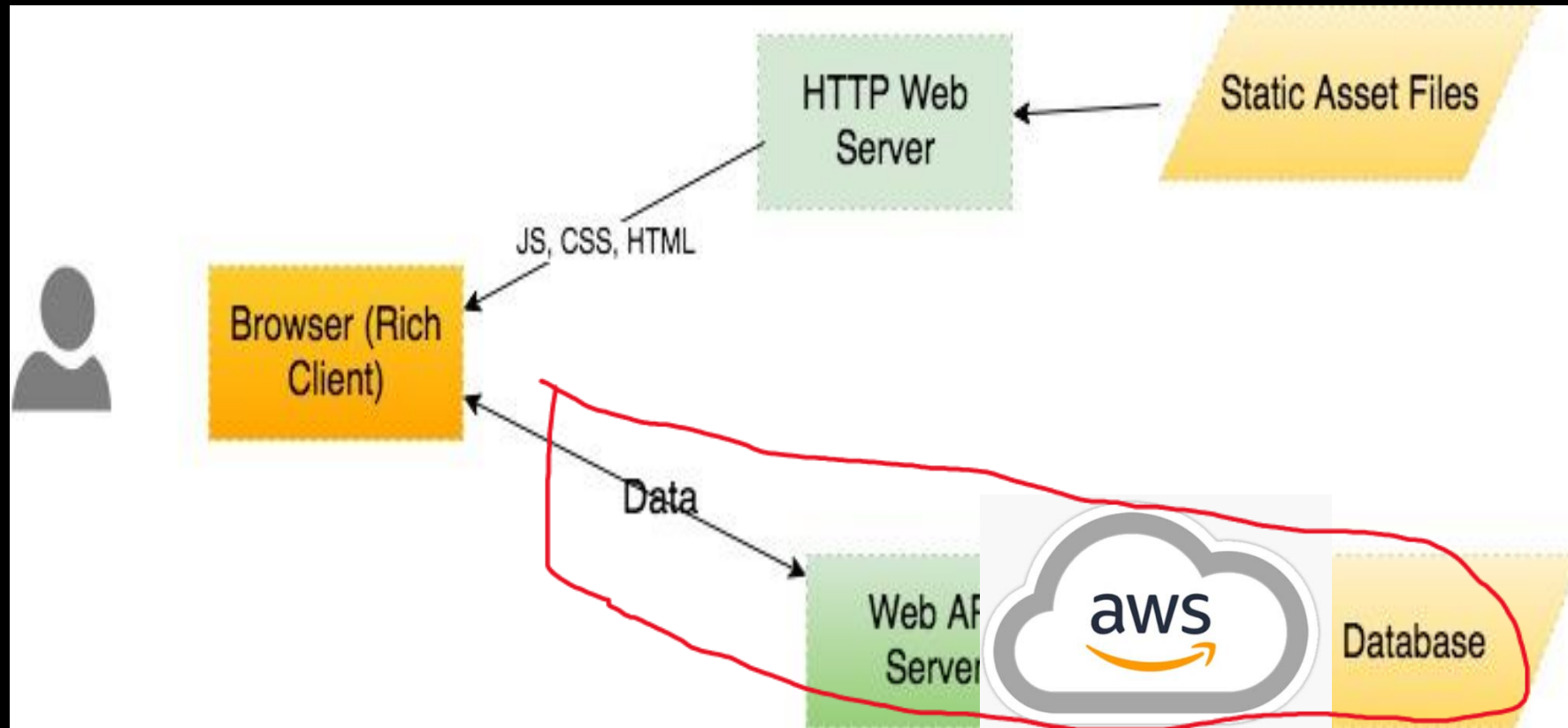
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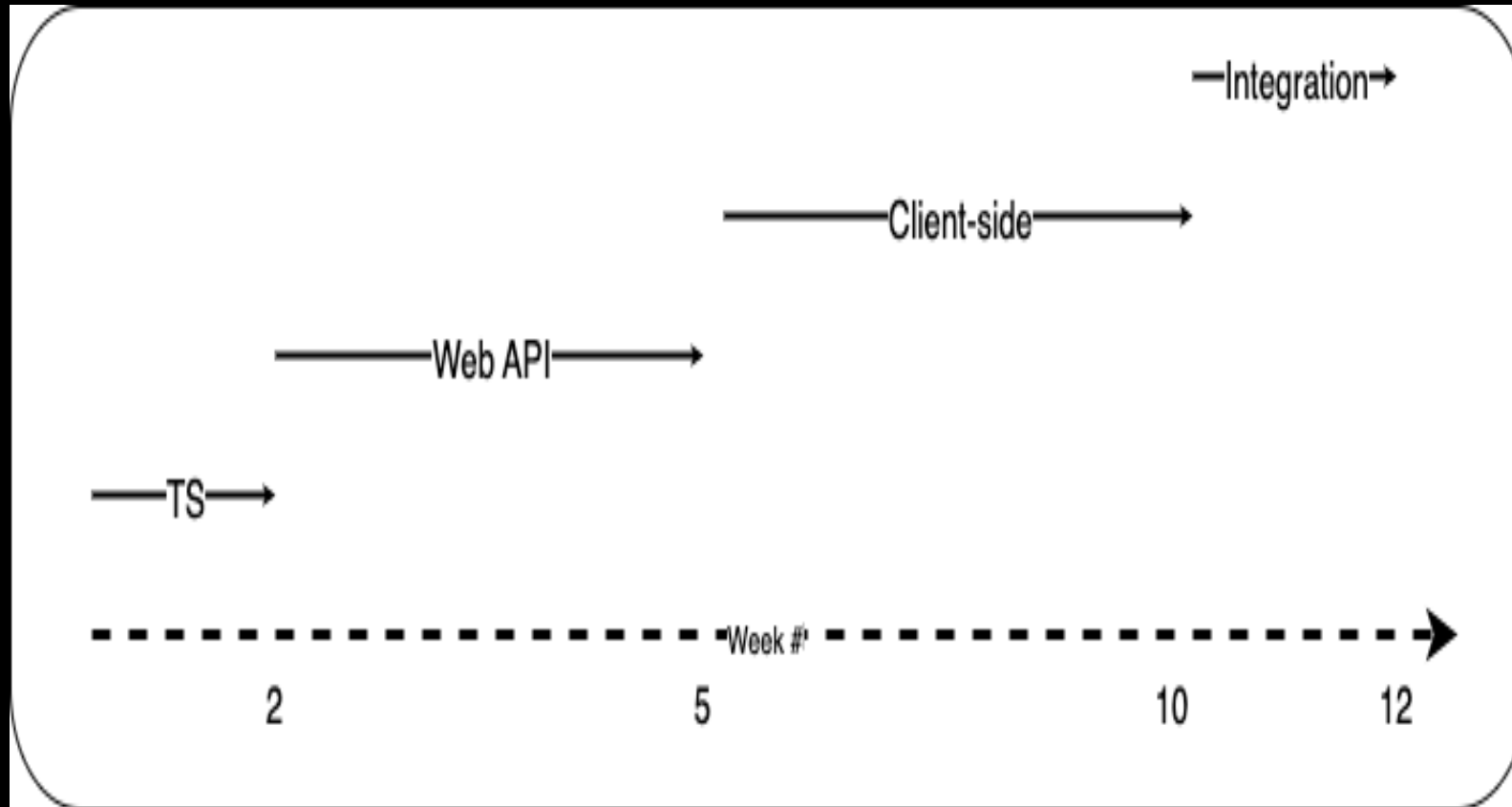
# Our Technology stack - Client.



# Our Technology stack - Server.



# Outline schedule



# Agenda

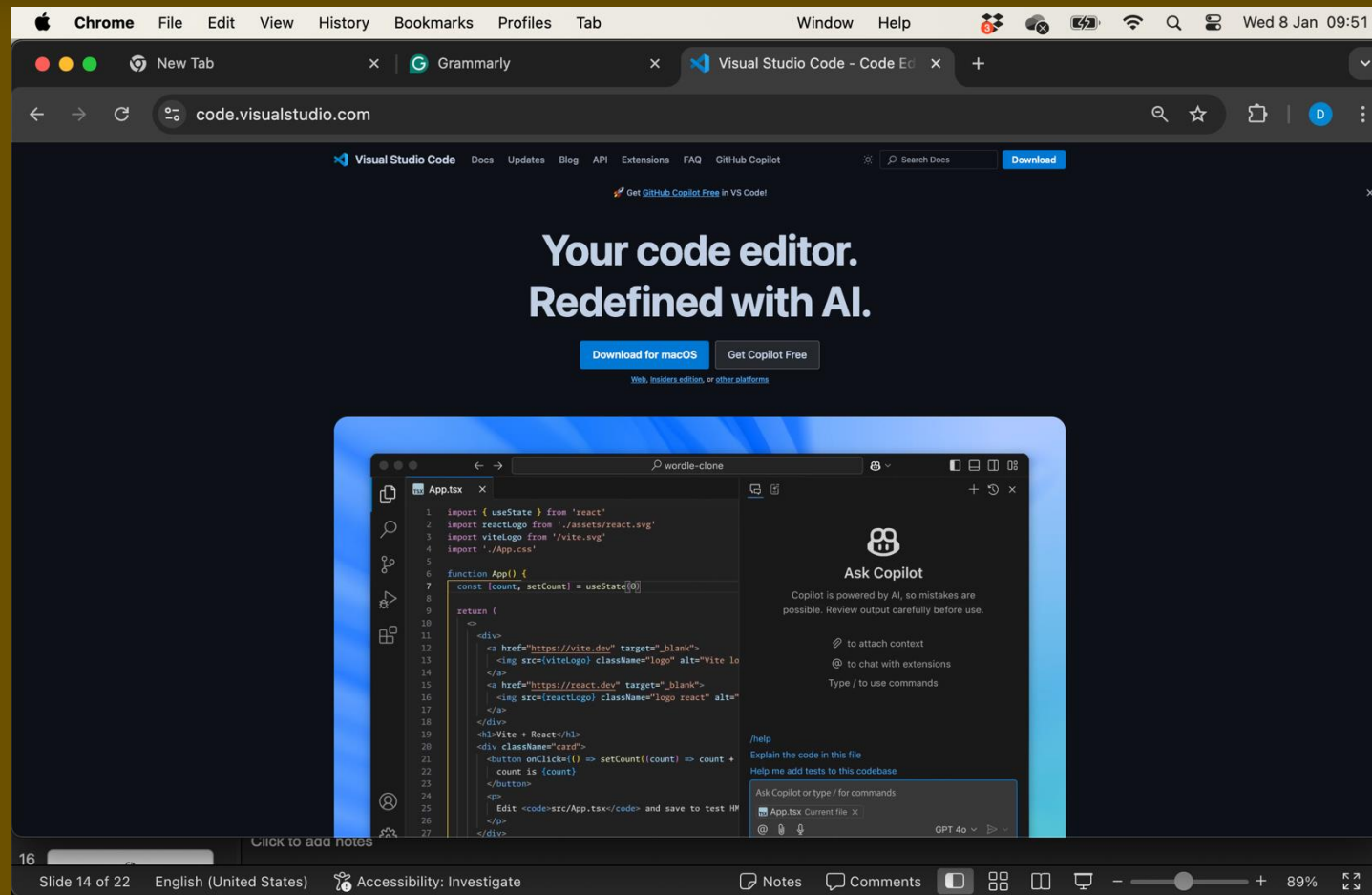
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# Text Editor – VS Code

(Not a heavyweight IDE, thankfully)



# Node.js

(A JavaScript runtime platform)

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New Tab x Grammarly x Node.js — Run JavaScript Everywhere x +

nodejs.org/en

nodejs Learn About Download Blog Docs Contribute Certification Start typing... K

## Run JavaScript Everywhere

Node.js® is a free, open-source, cross-platform JavaScript runtime environment that lets developers create servers, web apps, command line tools and scripts.

**Download Node.js (LTS)**

Downloads Node.js v22.13.0<sup>1</sup> with long-term support. Node.js can also be installed via [package managers](#).

Want new features sooner? Get **Node.js v23.6.0<sup>1</sup>** instead.

**Create an HTTP Server** Write Tests Read and Hash a File S

```
1 // server.mjs
2 import { createServer } from 'node:http';
3
4 const server = createServer((req, res) => {
5   res.writeHead(200, { 'Content-Type': 'text/'
6   res.end('Hello World!\n');
7 });
8
9 // starts a simple http server locally on port
10 server.listen(3000, '127.0.0.1', () => {
11   console.log('Listening on 127.0.0.1:3000');
12 });
13
14 // run with `node server.mjs`
```

JavaScript Copy to clipboard

Learn more what Node.js is able to offer with our [Learning materials](#).

Slide 16 of 16 English (United States) Accessibility: Investigate Notes Comments 71%

# Source Control - Git

The screenshot shows the Git website (https://git-scm.com) in a Chrome browser window. The browser's address bar shows the URL and a search bar. The website header features the Git logo and the tagline "--distributed-even-if-your-workflow-isnt". A search bar is located in the top right corner. The main content area describes Git as a free and open source distributed version control system, highlighting its speed, efficiency, ease of learning, and tiny footprint. It also mentions that Git outclasses other SCM tools like Subversion, CVS, Perforce, and ClearCase. A diagram on the right illustrates a distributed version control system with multiple repositories connected by a network. Below the main text, there are links to "Learn Git in your browser for free with Try Git.", "About", "Documentation", and "Latest source Release 2.15.1". The footer contains links to "GUI clients and binary releases for all major platforms." and "Get involved! Bug reporting, mailing list, chat, development and more."

Chrome File Edit View History Bookmarks People Window Help

Secure | https://git-scm.com

**git** --distributed-even-if-your-workflow-isnt

Search entire site...

Git is a **free and open source** distributed version control system designed to handle everything from small to very large projects with speed and efficiency.

Git is **easy to learn** and has a **tiny footprint with lightning fast performance**. It outclasses SCM tools like Subversion, CVS, Perforce, and ClearCase with features like **cheap local branching**, convenient **staging areas**, and **multiple workflows**.

**Learn Git in your browser for free with Try Git.**

**About**  
The advantages of Git compared to other source control systems

**Documentation**  
Command reference pages, Pro Git book content, videos and more

**Latest source Release 2.15.1**

Line 33, Column 76

GUI clients and binary releases for all major platforms.

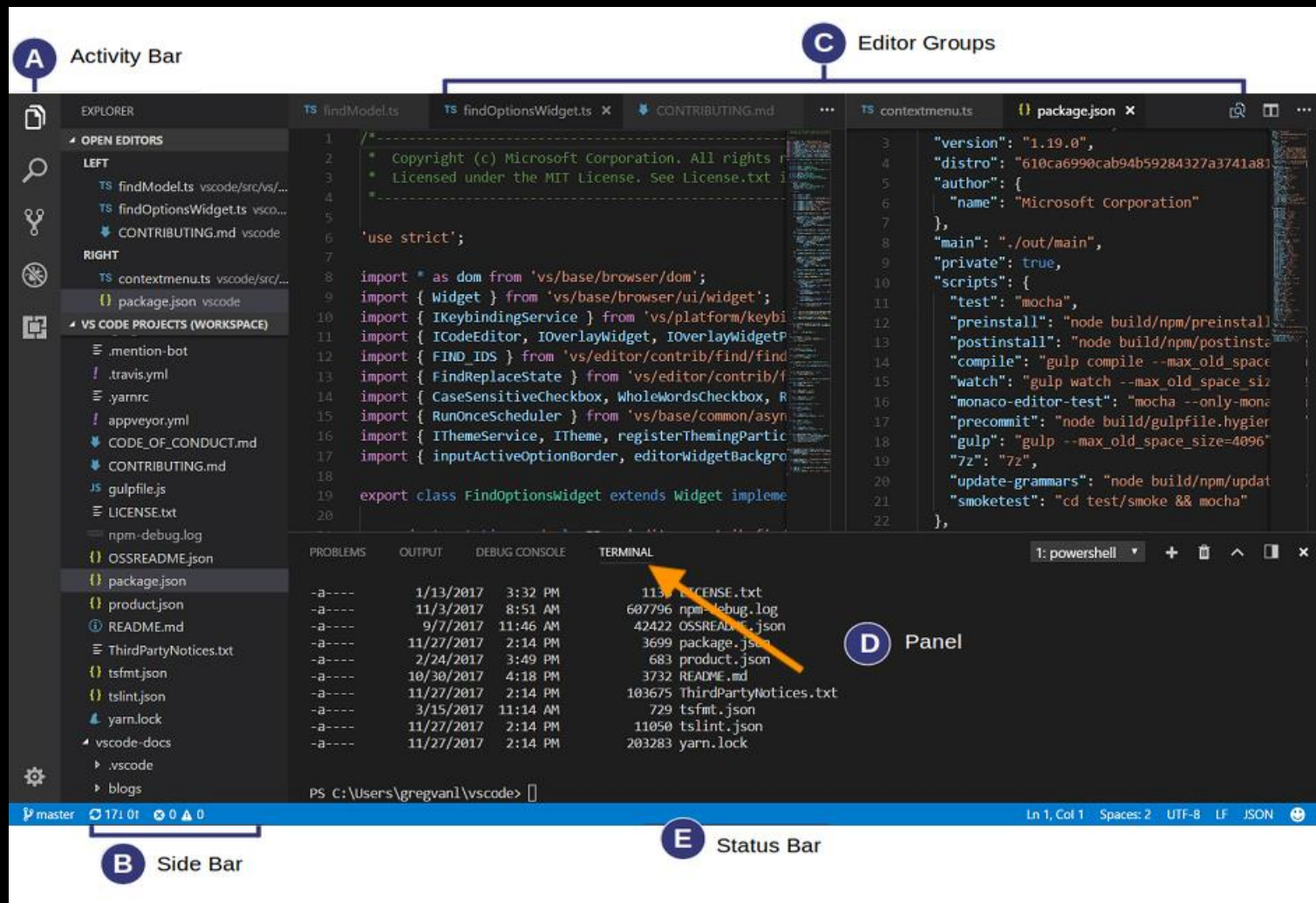
Get involved! Bug reporting, mailing list, chat, development and more

35 misspelled words Spaces: 4 Markdown



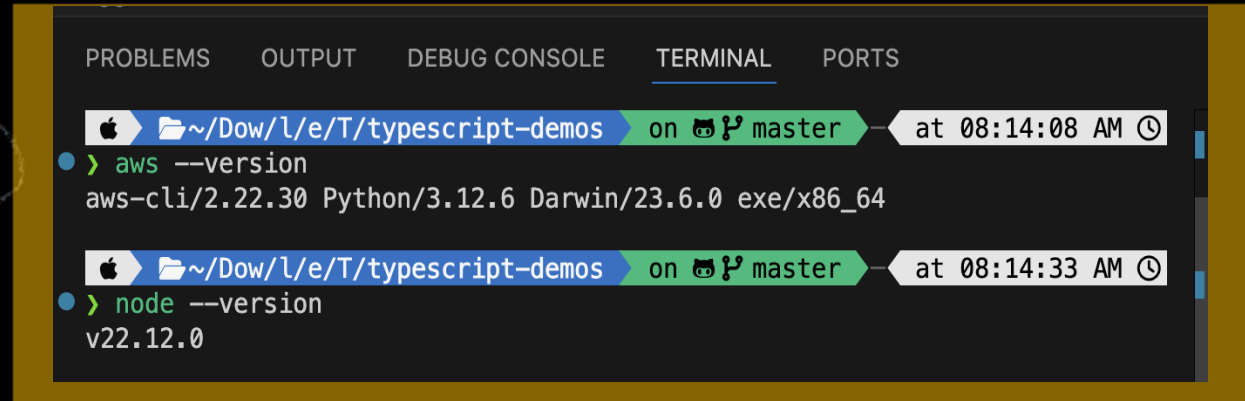
# Terminal/Shell

( Use VS Code's integrated terminal )



# Prerequisites.

- An AWS account.
  - (Paid tier)
- The AWS CLI installed
- Familiarity with AWS Management Console

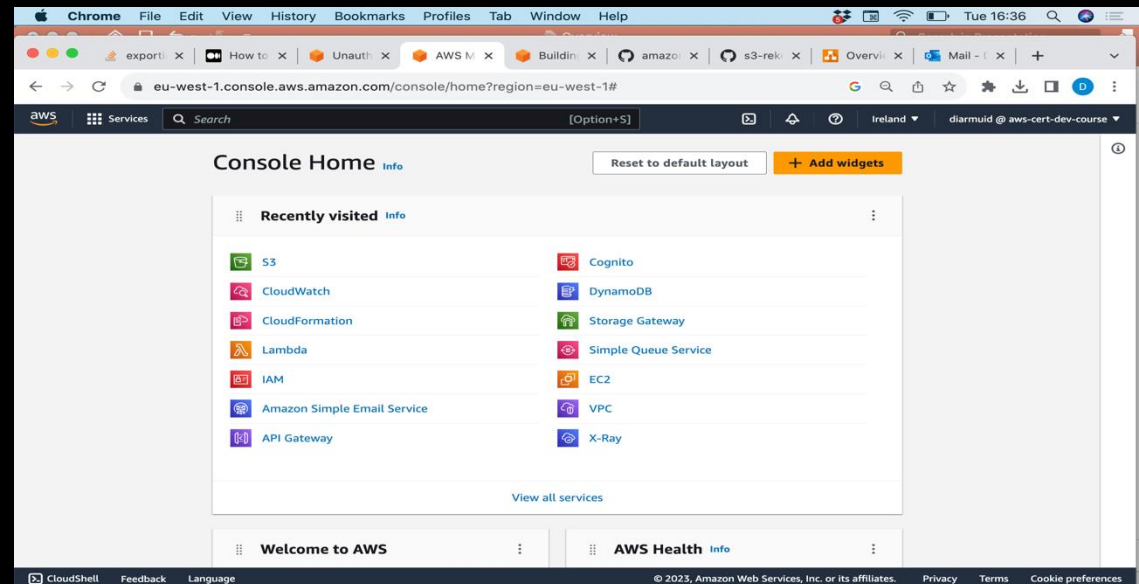


A terminal window with tabs for PROBLEMS, OUTPUT, DEBUG CONSOLE, TERMINAL, and PORTS. The TERMINAL tab is active. It shows two command prompts. The first prompt is in a directory ~/Dow/l/e/T/typescript-demos on a master branch, showing the output of 'aws --version' as 'aws-cli/2.22.30 Python/3.12.6 Darwin/23.6.0 exe/x86\_64'. The second prompt is in the same directory, showing the output of 'node --version' as 'v22.12.0'.

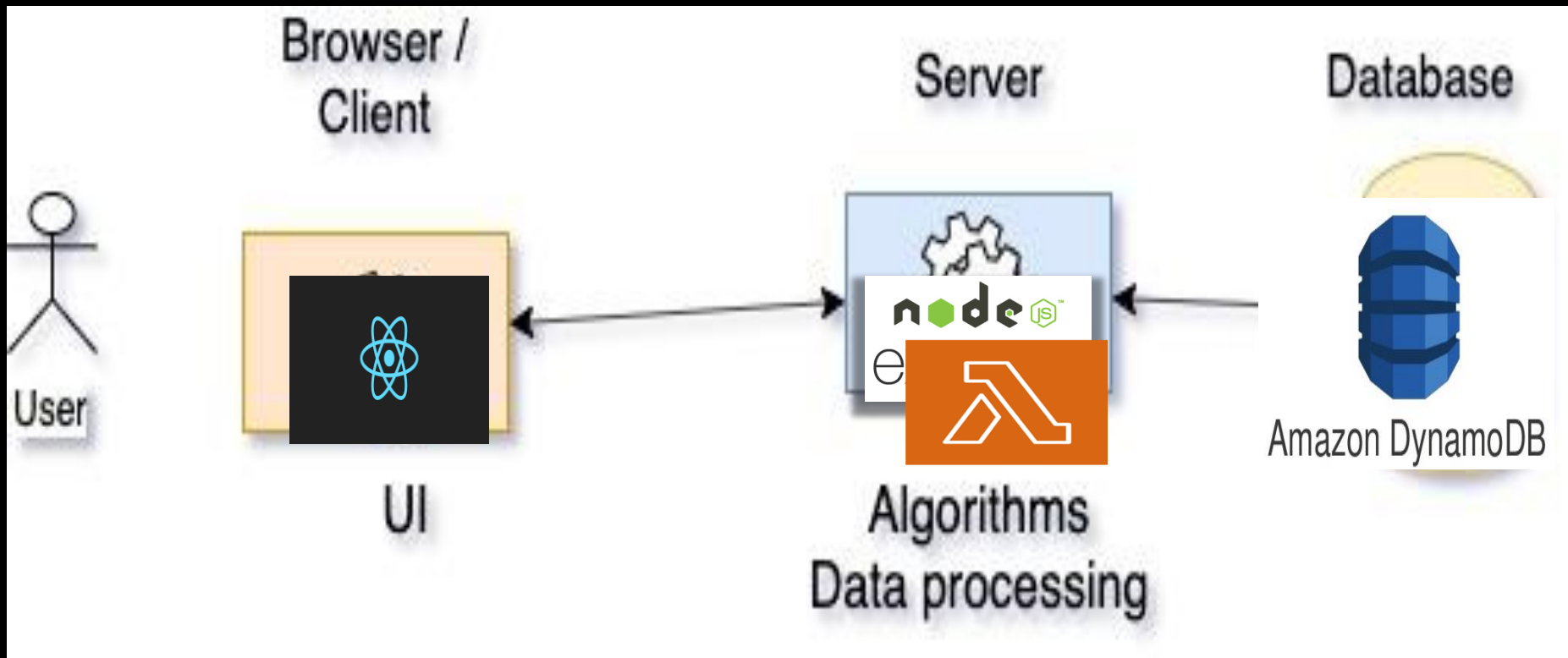
```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

~/Dow/l/e/T/typescript-demos on master at 08:14:08 AM
> aws --version
aws-cli/2.22.30 Python/3.12.6 Darwin/23.6.0 exe/x86_64

~/Dow/l/e/T/typescript-demos on master at 08:14:33 AM
> node --version
v22.12.0
```



# (Serverless) Full-Stack Web Development



# Summary

- Two models of web apps:
  - Server Side Rendering (SSR)
  - Client Side Rendering (CSR)
- CSR model evolution:
  - Unmaintainable JS codebase to SPA framework-based.
  - No addressability to full addressable.
- Server-side evolution:
  - From SSR web applications to Web APIs.
- NoSQL databases.