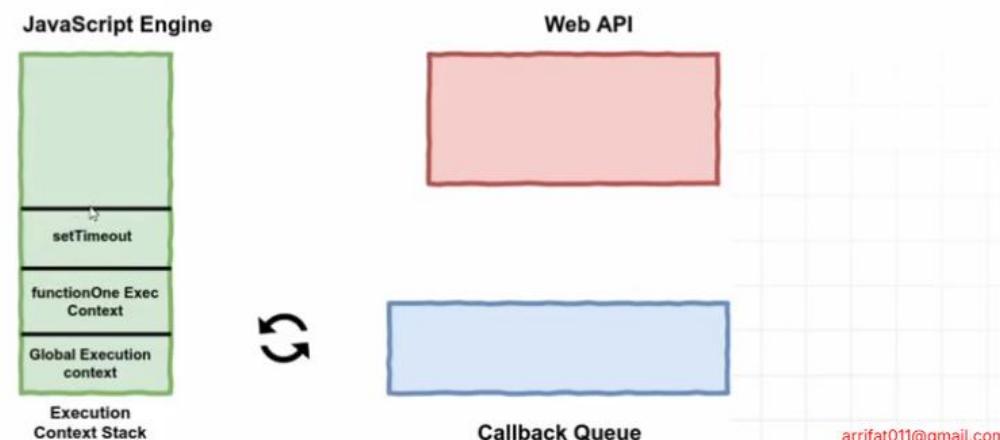


Node JS Runtime environment



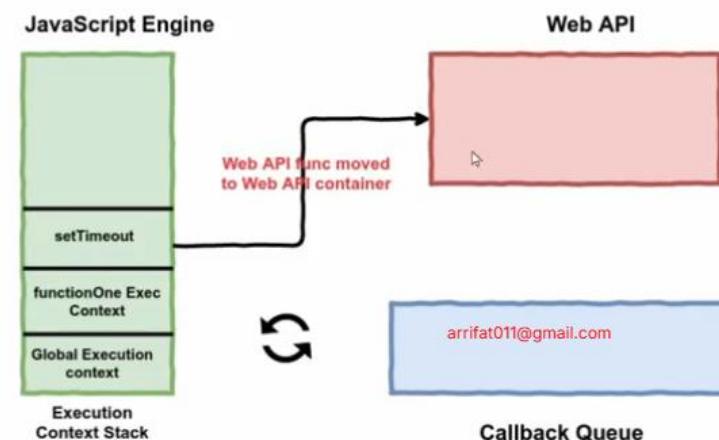
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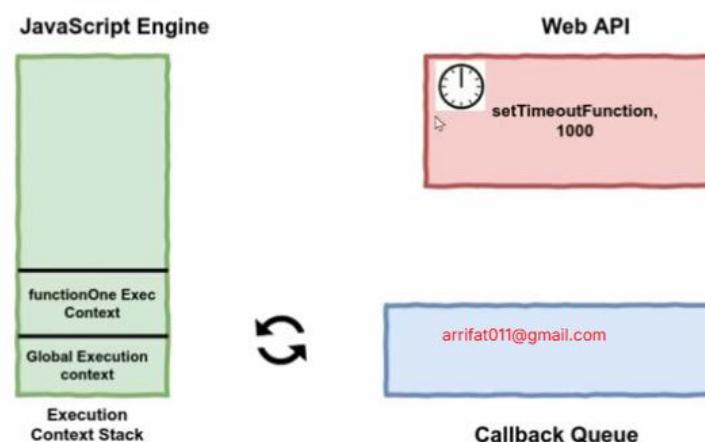
Node JS Runtime environment



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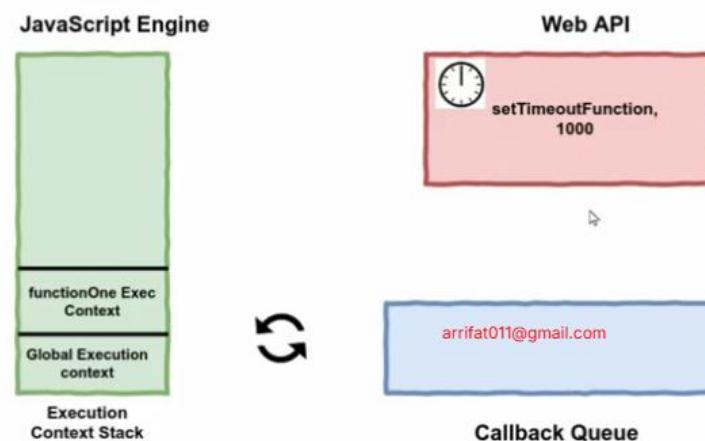
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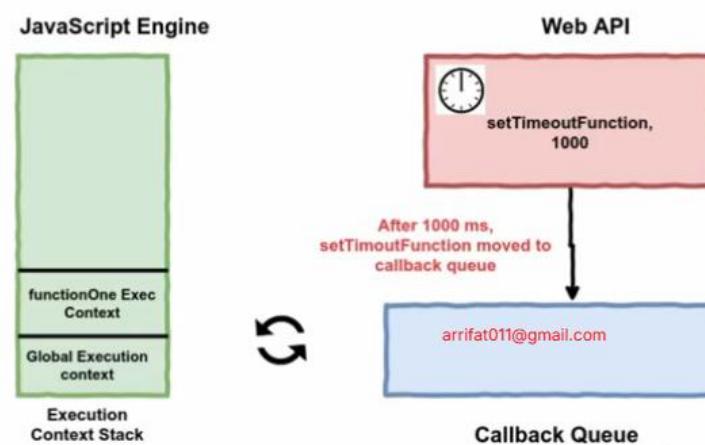
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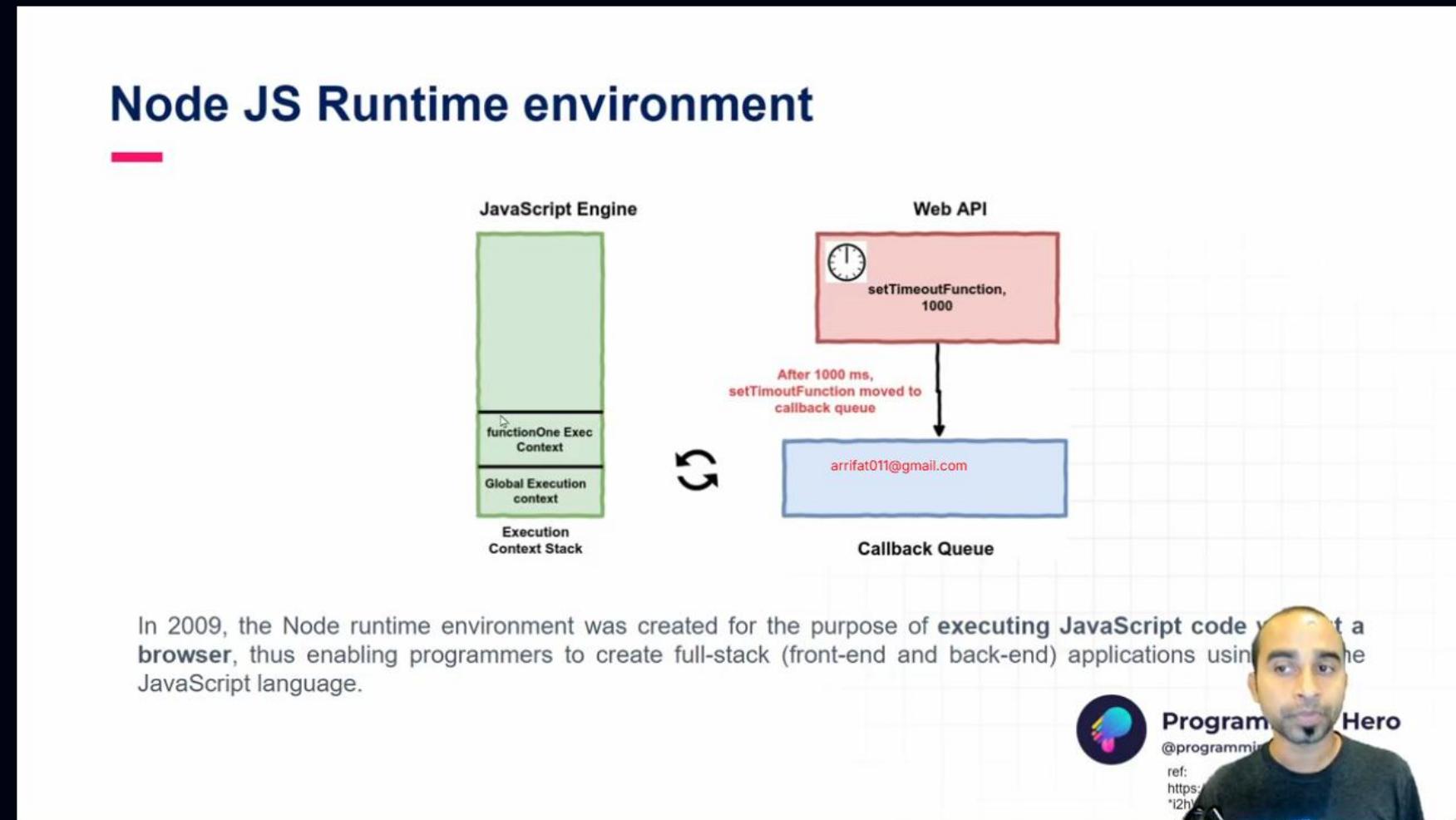


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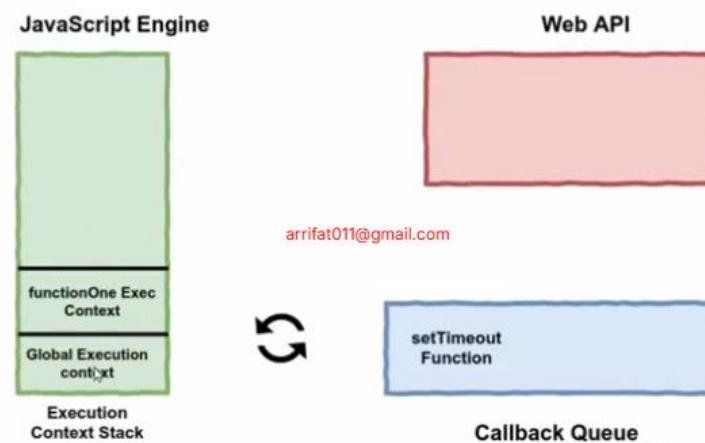




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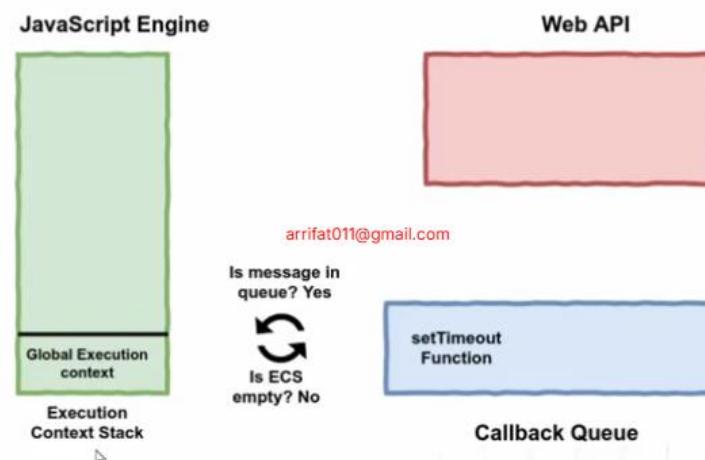
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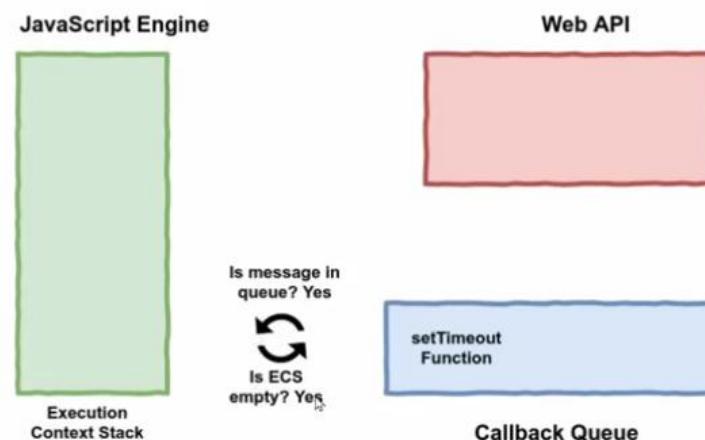
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Node JS Runtime environment

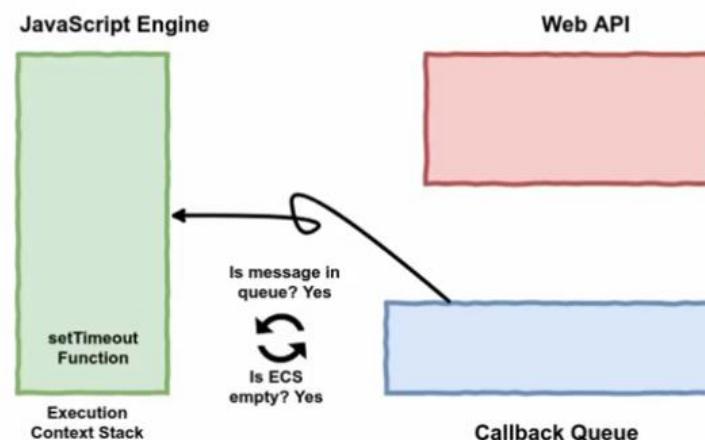


In 2009, the Node runtime environment was created for the purpose of **executing JavaScript code outside a browser**, thus enabling programmers to create full-stack (front-end and back-end) applications using the JavaScript language.

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Node JS Runtime environment



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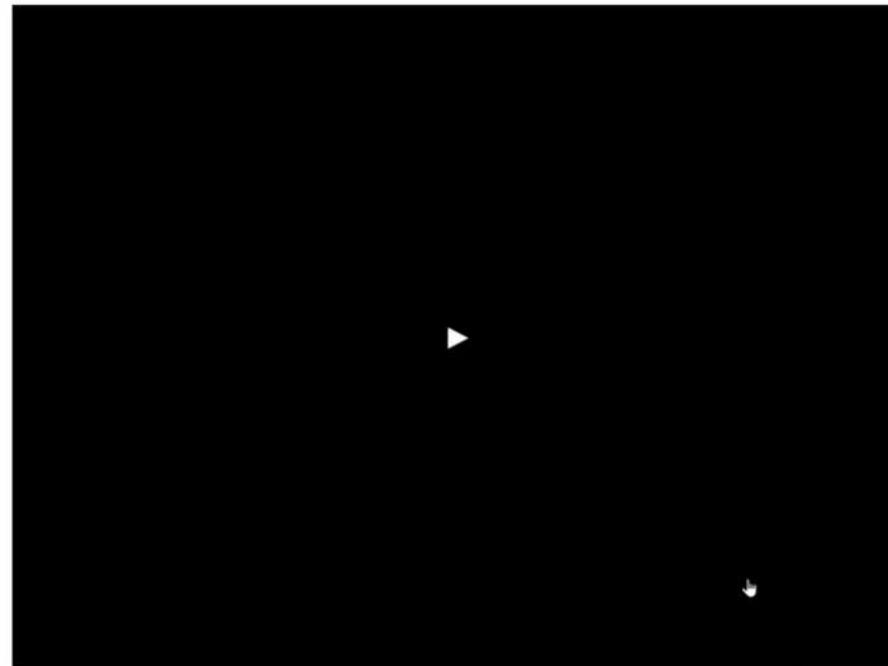


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CASE - 1



Single thread, Multi thread

Single threaded



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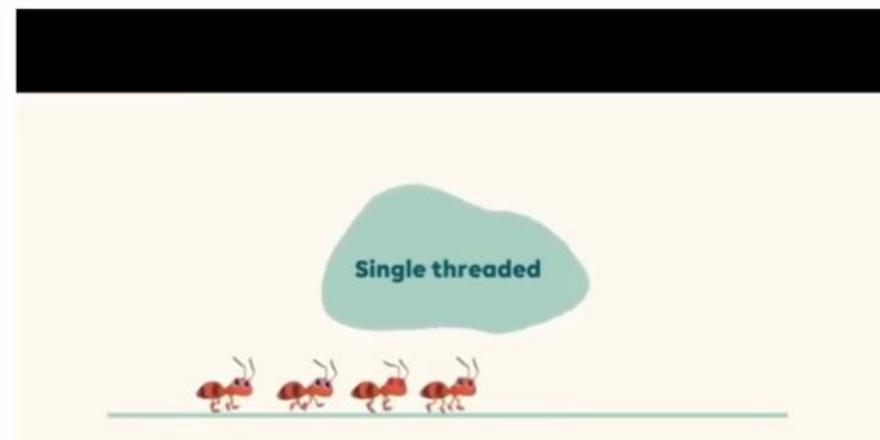
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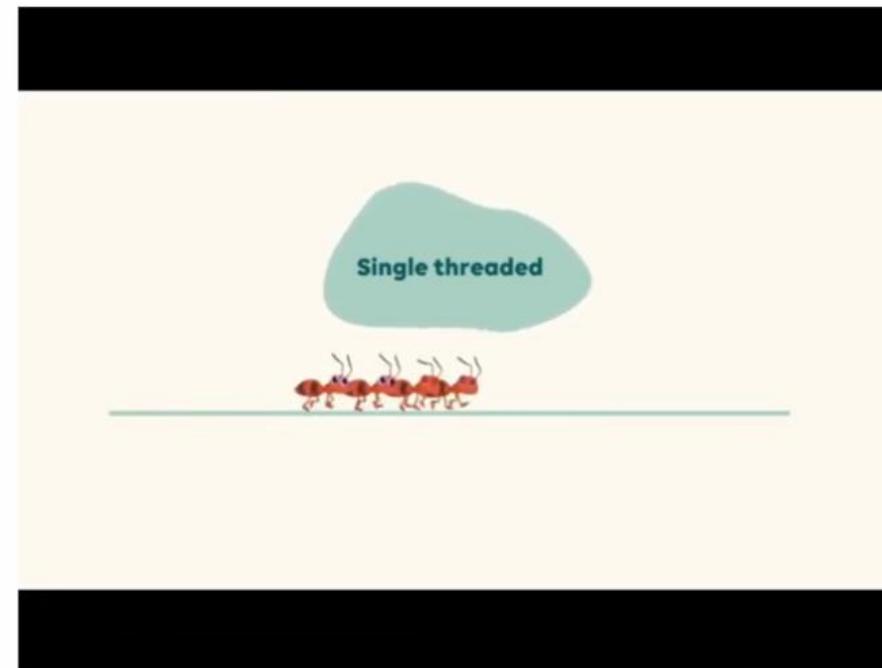
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Single thread, Multi thread



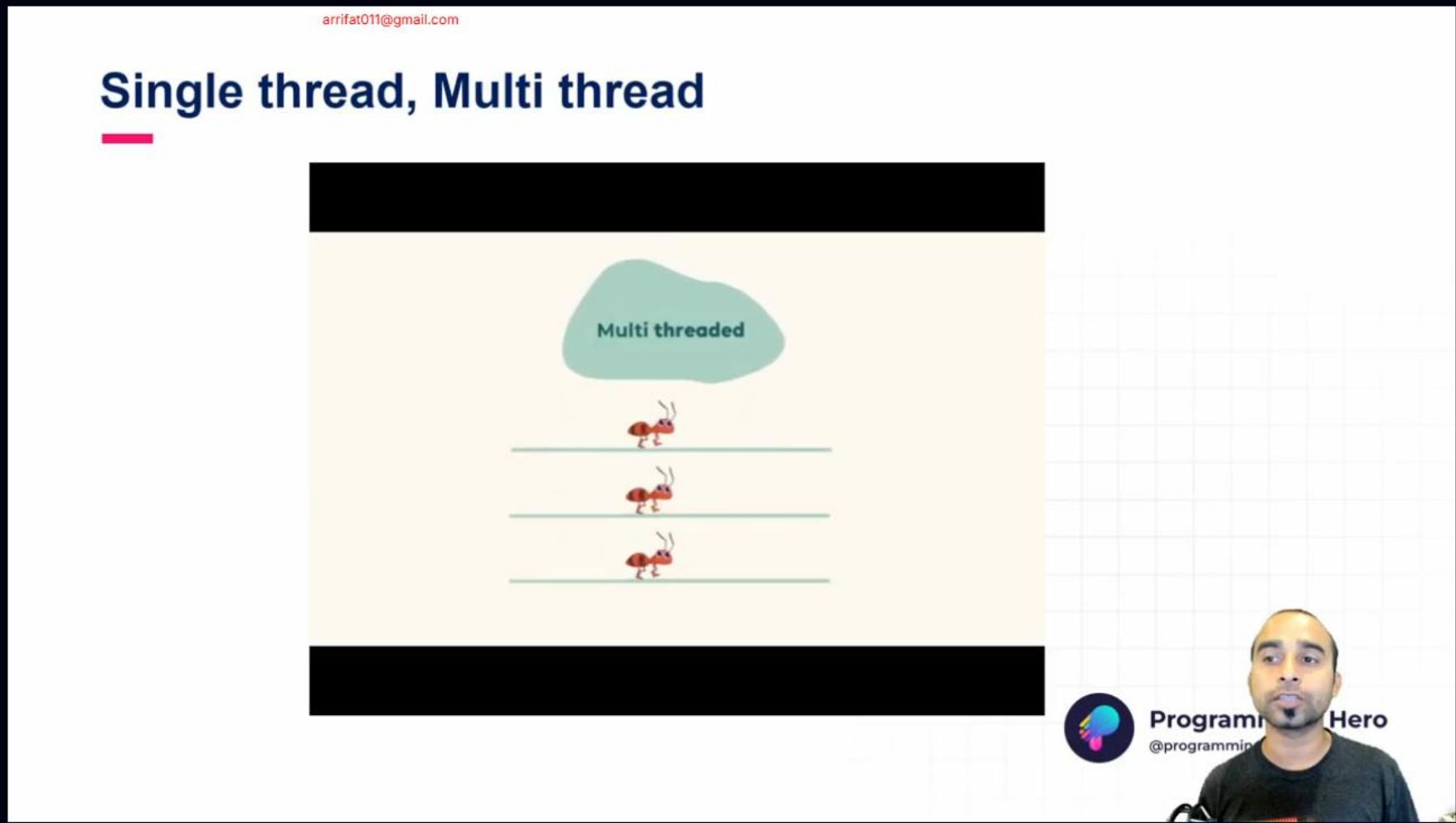
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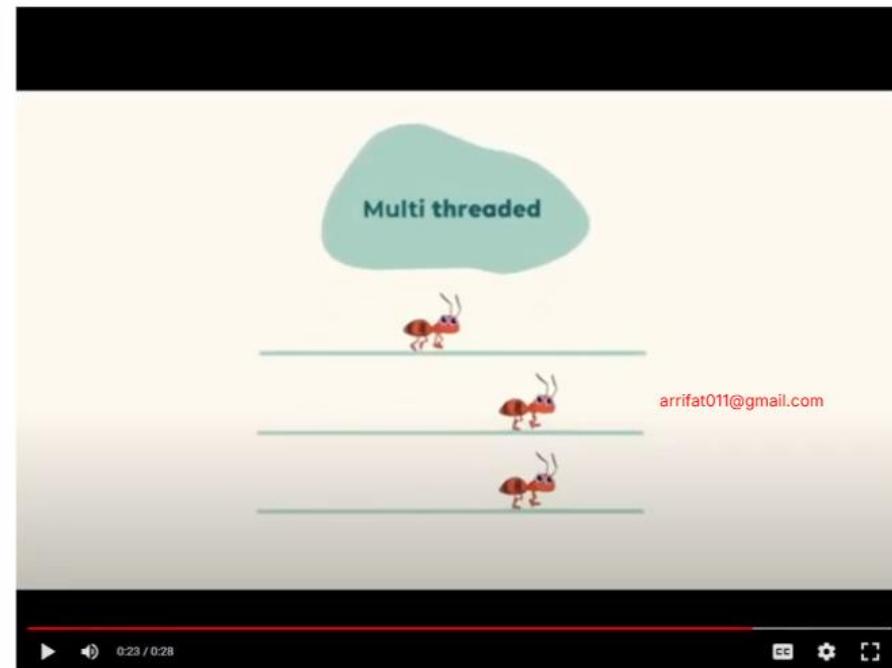
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Single thread, Multi thread



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Single thread, Multi thread



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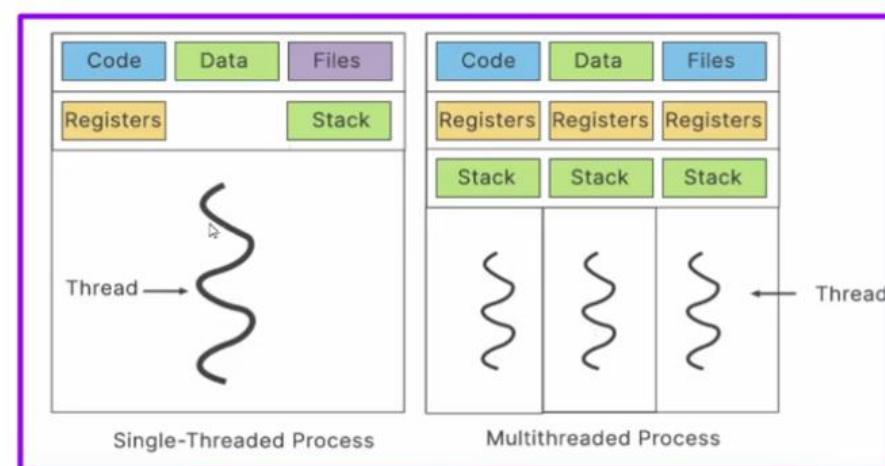
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What is thread? Single thread, Multi thread

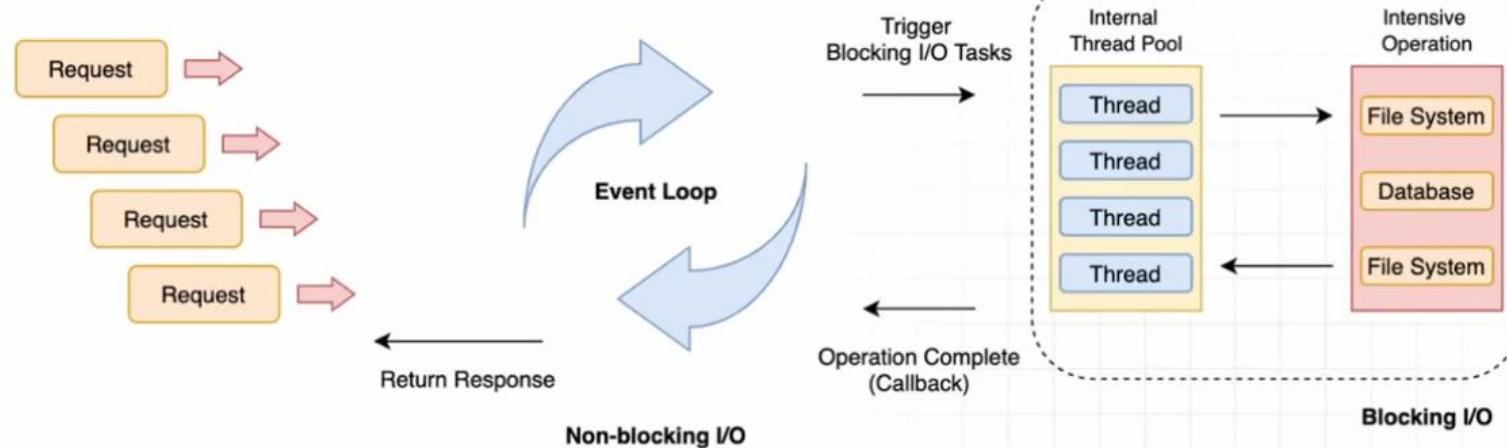
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- ★ A basic unit of CPU utilization.
 - ★ A thread is a **path of execution** within a process/ task.



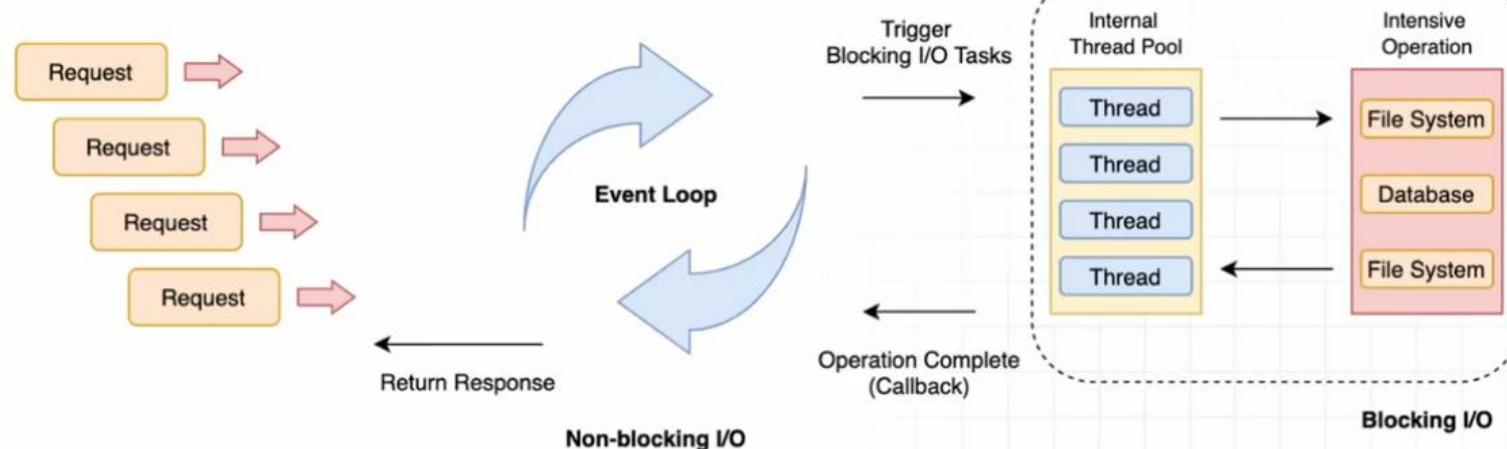
Non-blocking I/O event loop

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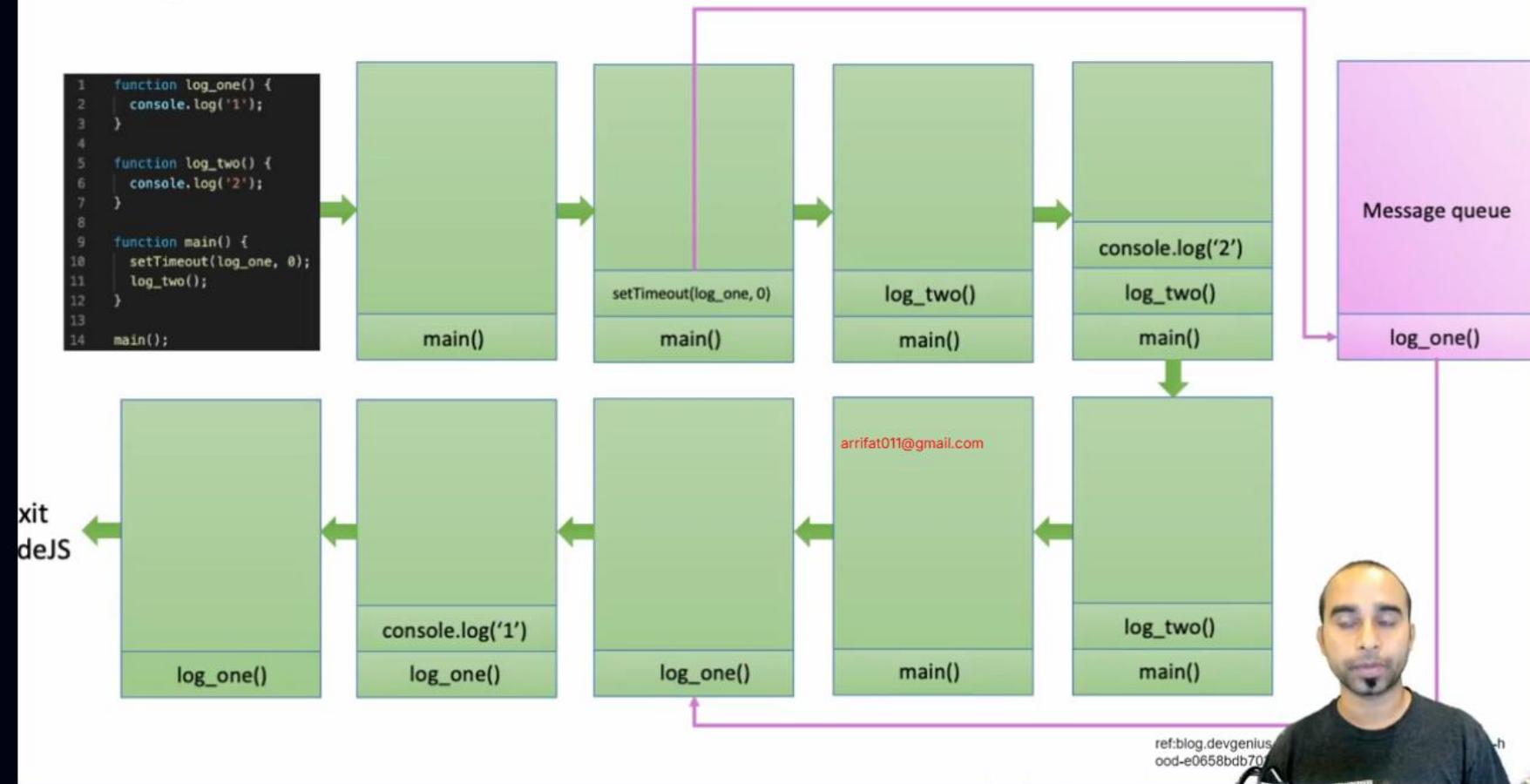
Non-blocking I/O event loop

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Asynchronous NodeJS

```
1 function log_one() {  
2     console.log('1');  
3 }  
4  
5 function log_two() {  
6     console.log('2');  
7 }  
8  
9 function main() {  
10    setTimeout(log_one, 0);  
11    log_two();  
12 }  
13  
14 main();
```



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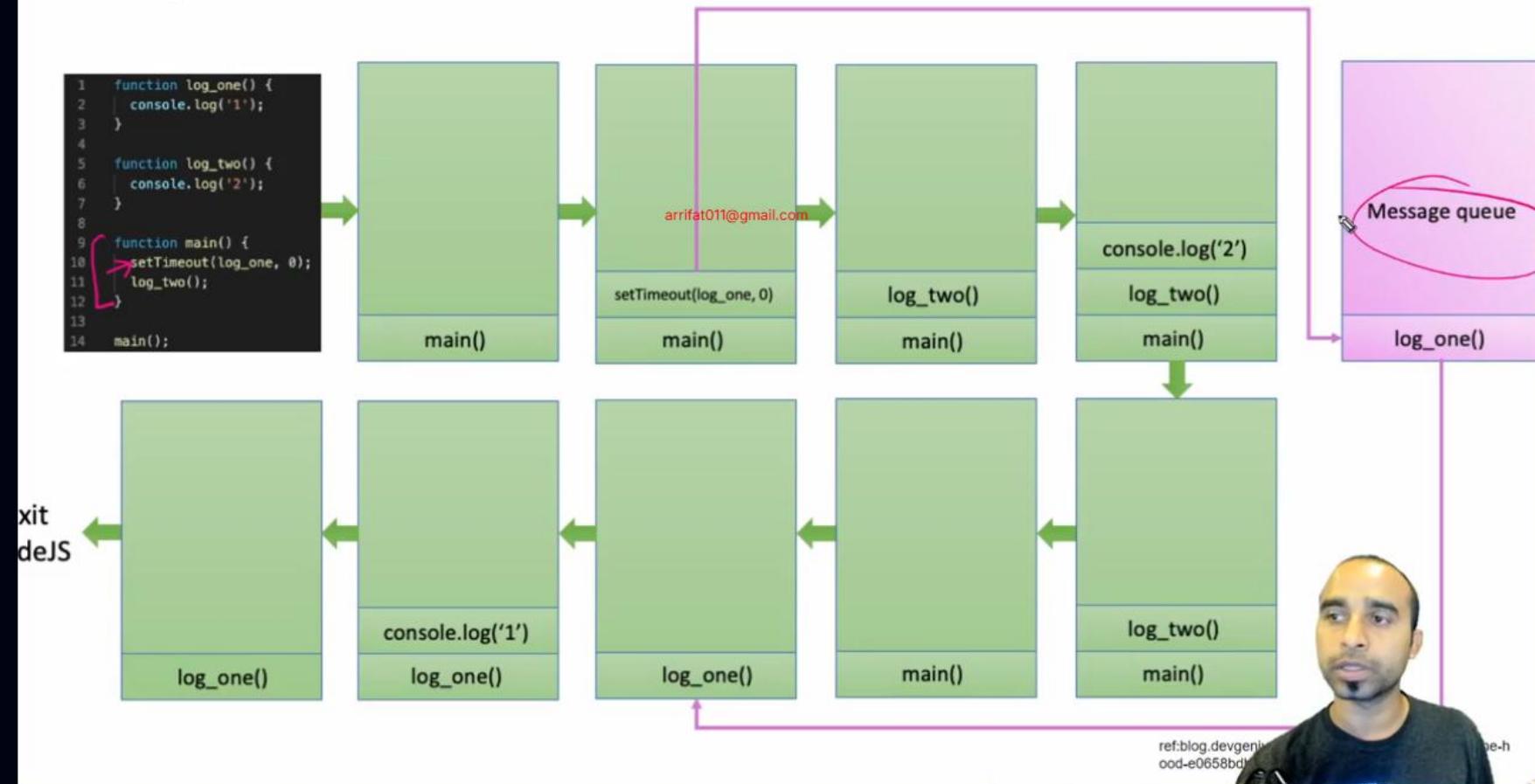


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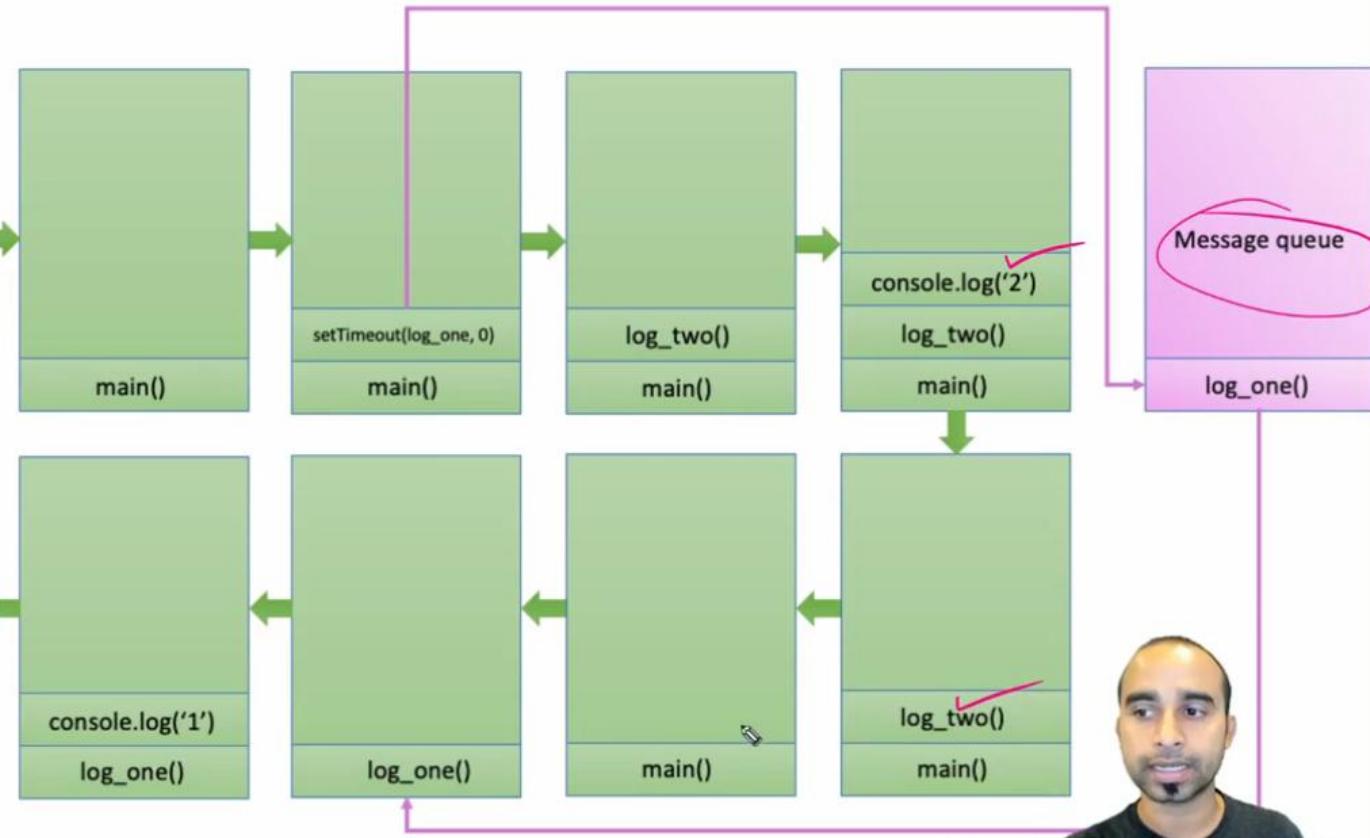
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Asynchronous NodeJS

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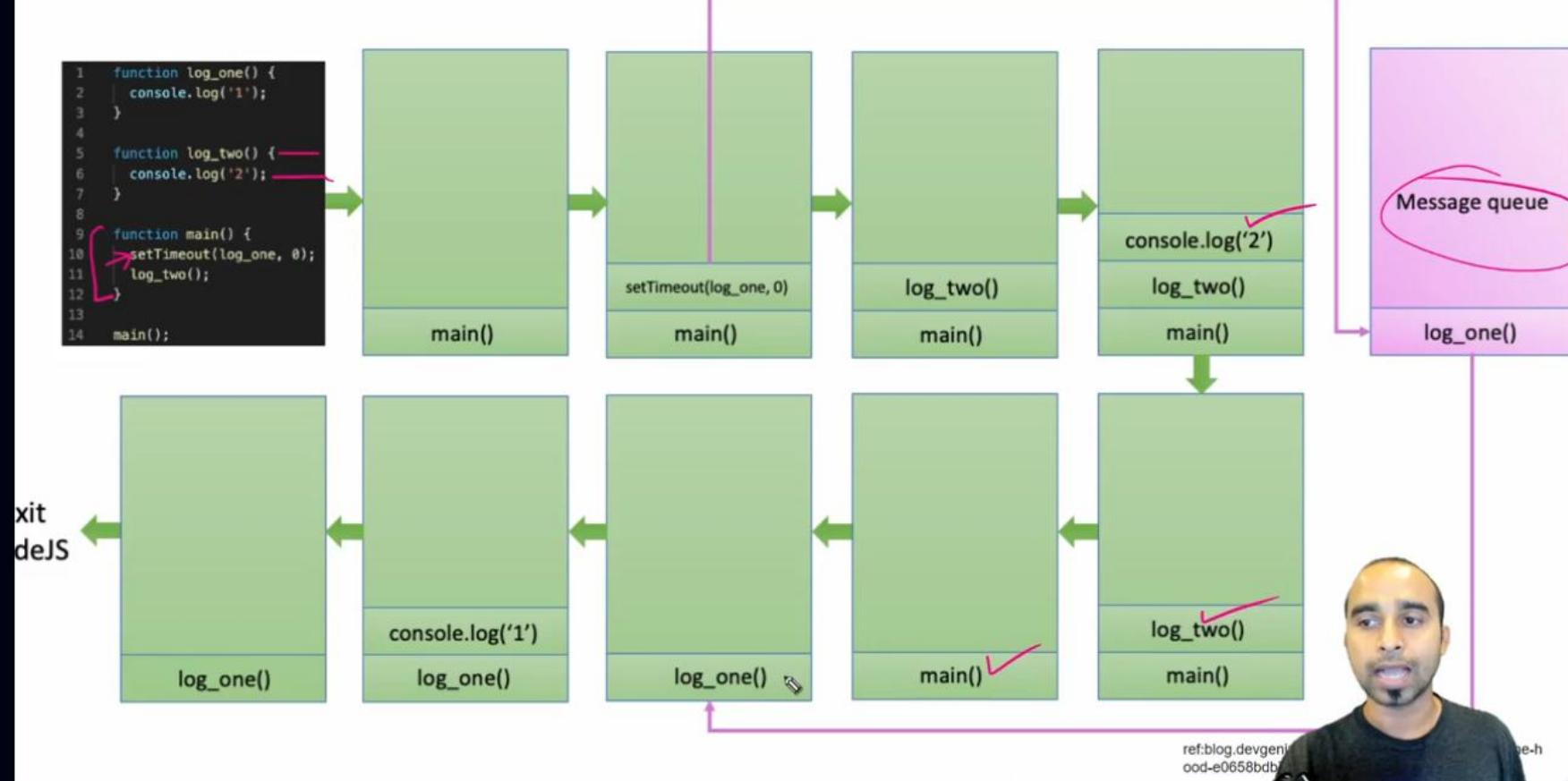


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Asynchronous NodeJS

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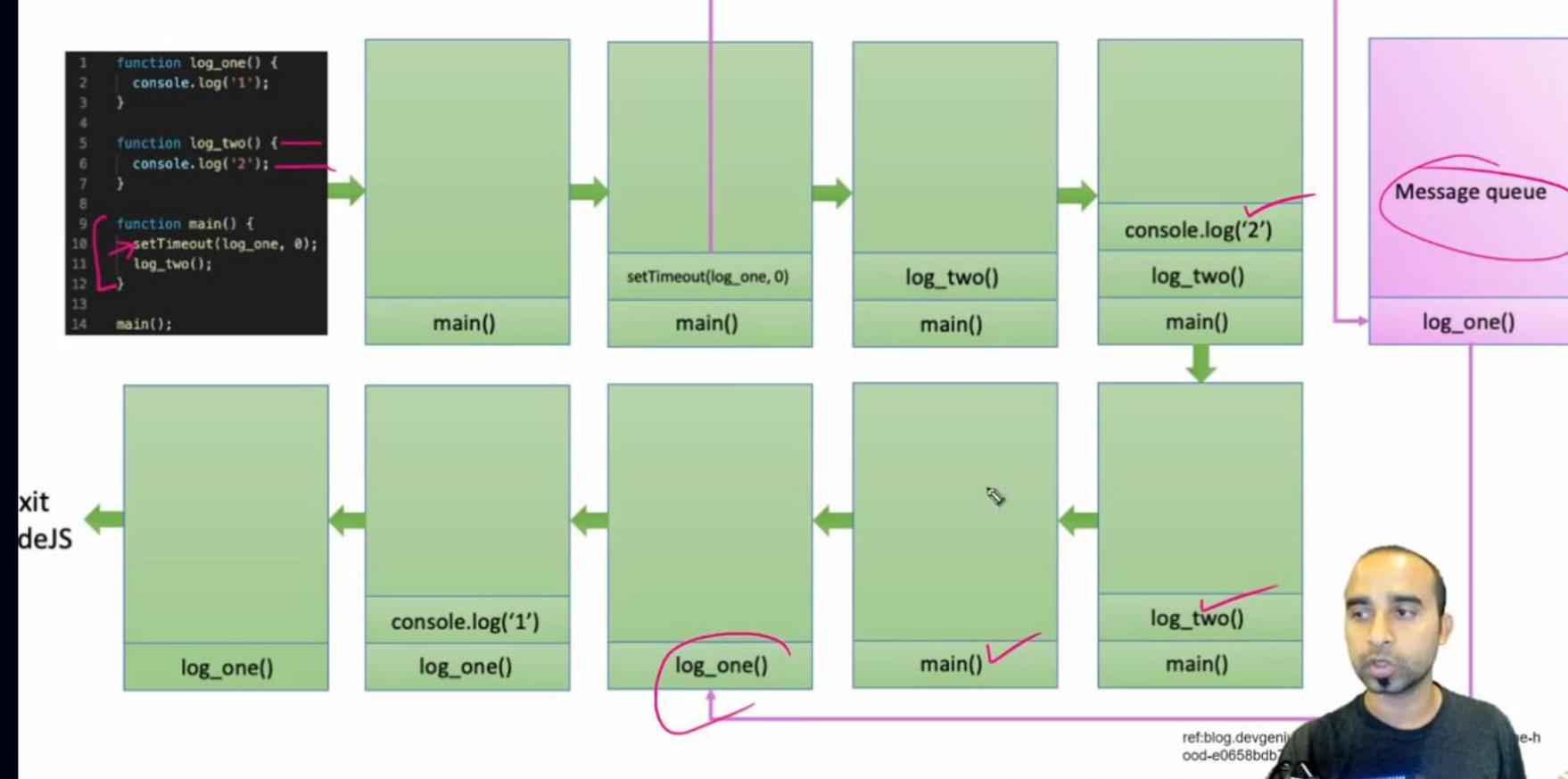
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Asynchronous NodeJS



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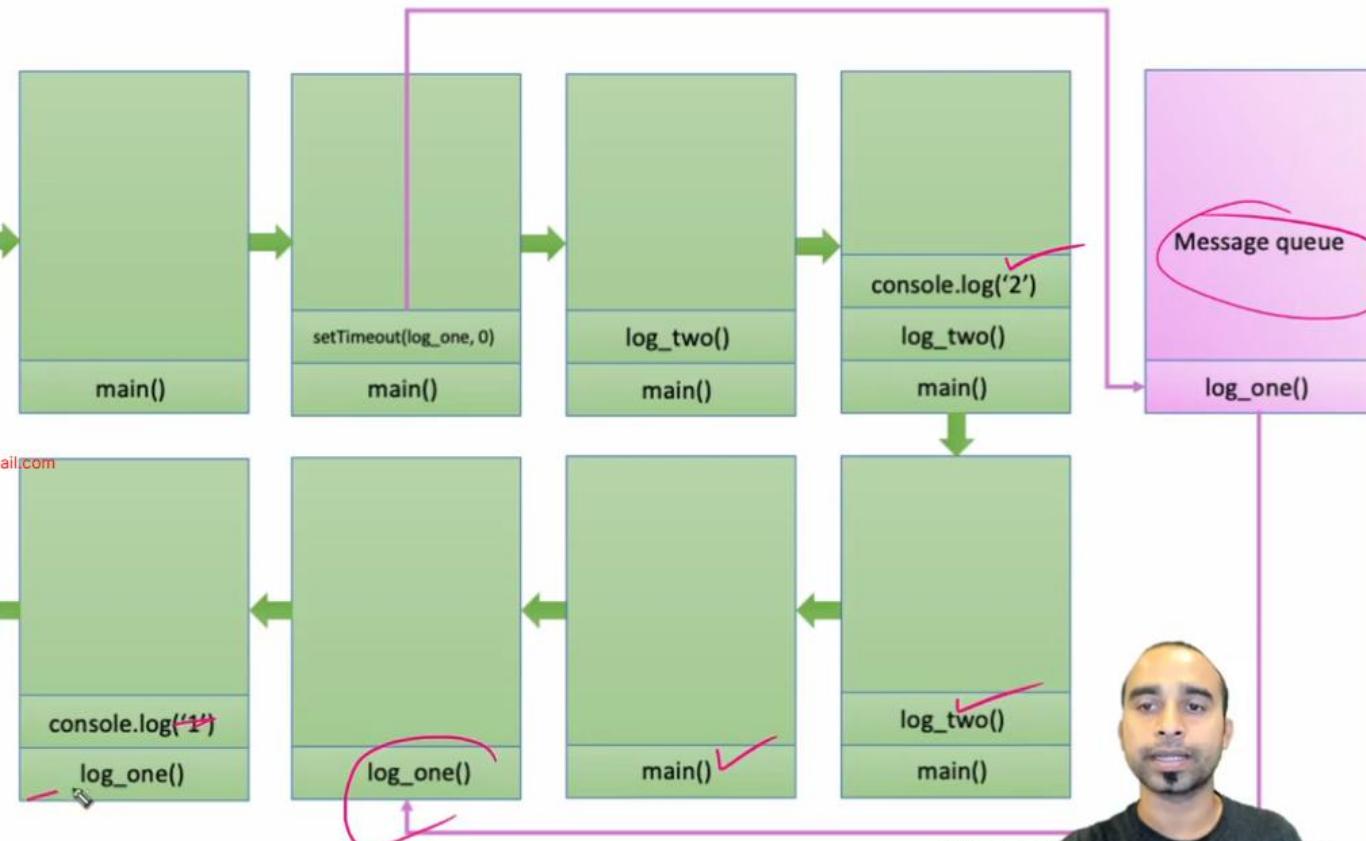


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Asynchronous NodeJS

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14 main();
```



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Asynchronous NodeJS

Further to the **message queue**, the **job queue** was put in place since ES6/ES2015 which is **used by Promises and async/await**. Unlike the message queue, when a promise resolves before the current function execution ends, the callback logic will be executed right after the current function call. This means **callbacks put on the job queue will execute as soon as possible and not deferred till after the call stack is empty**.

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Event-driven architecture/ application



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An event-driven application is a program that is written to respond to actions generated by the user or the system.



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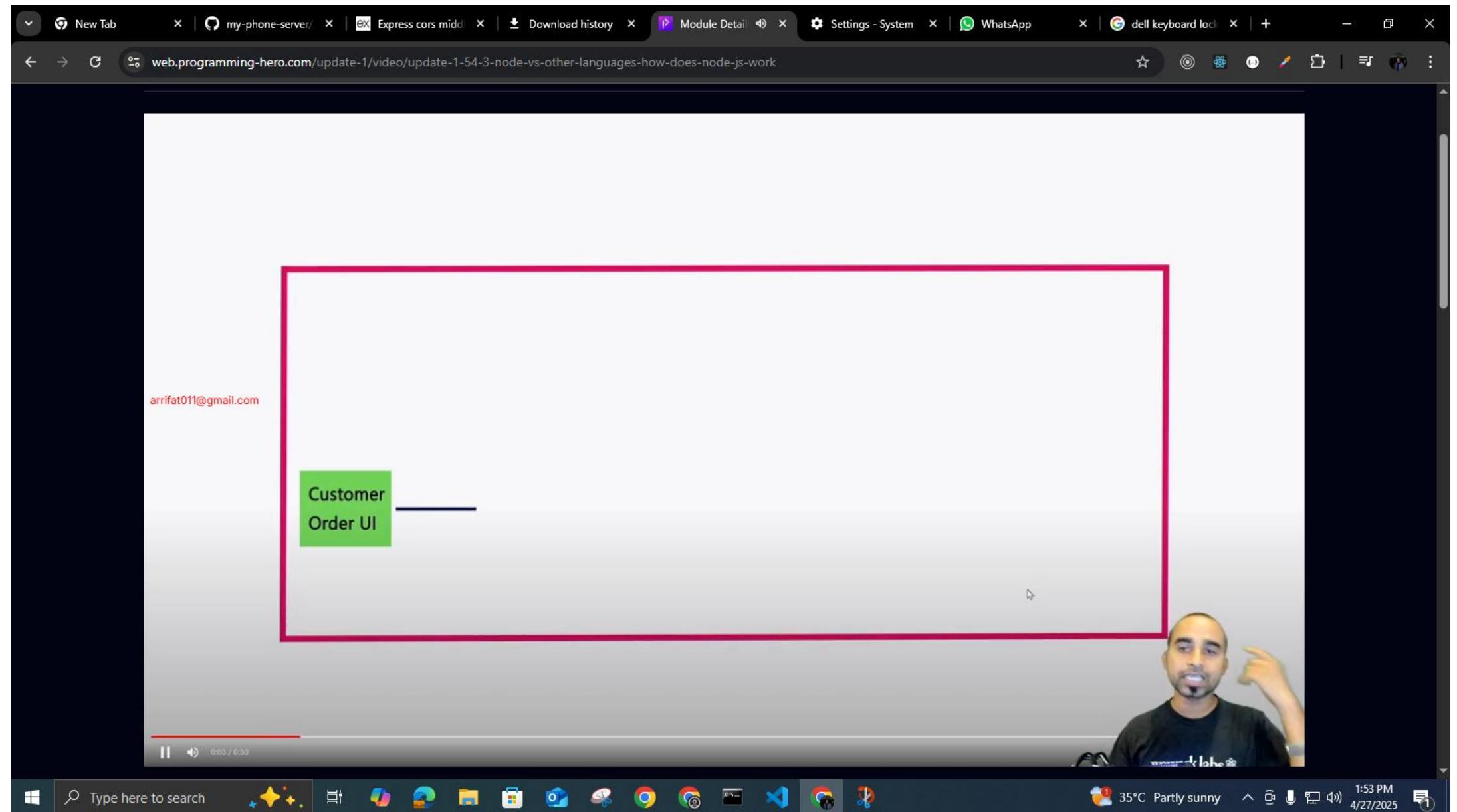
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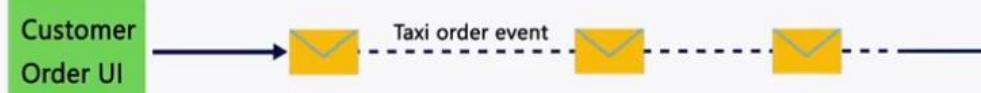
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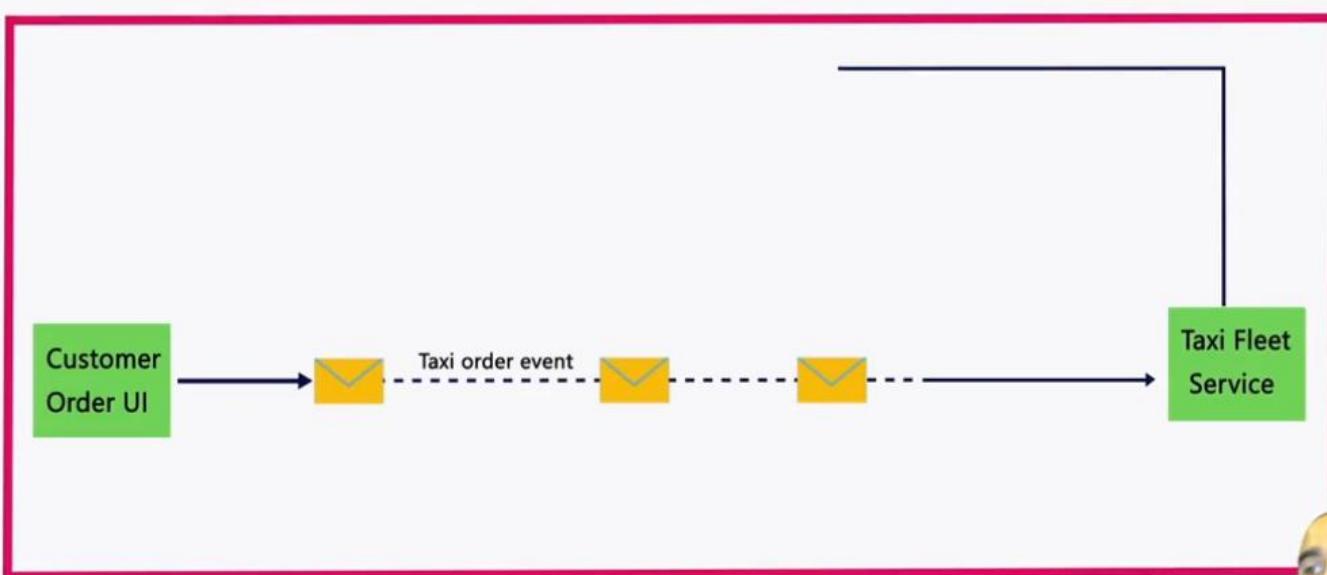
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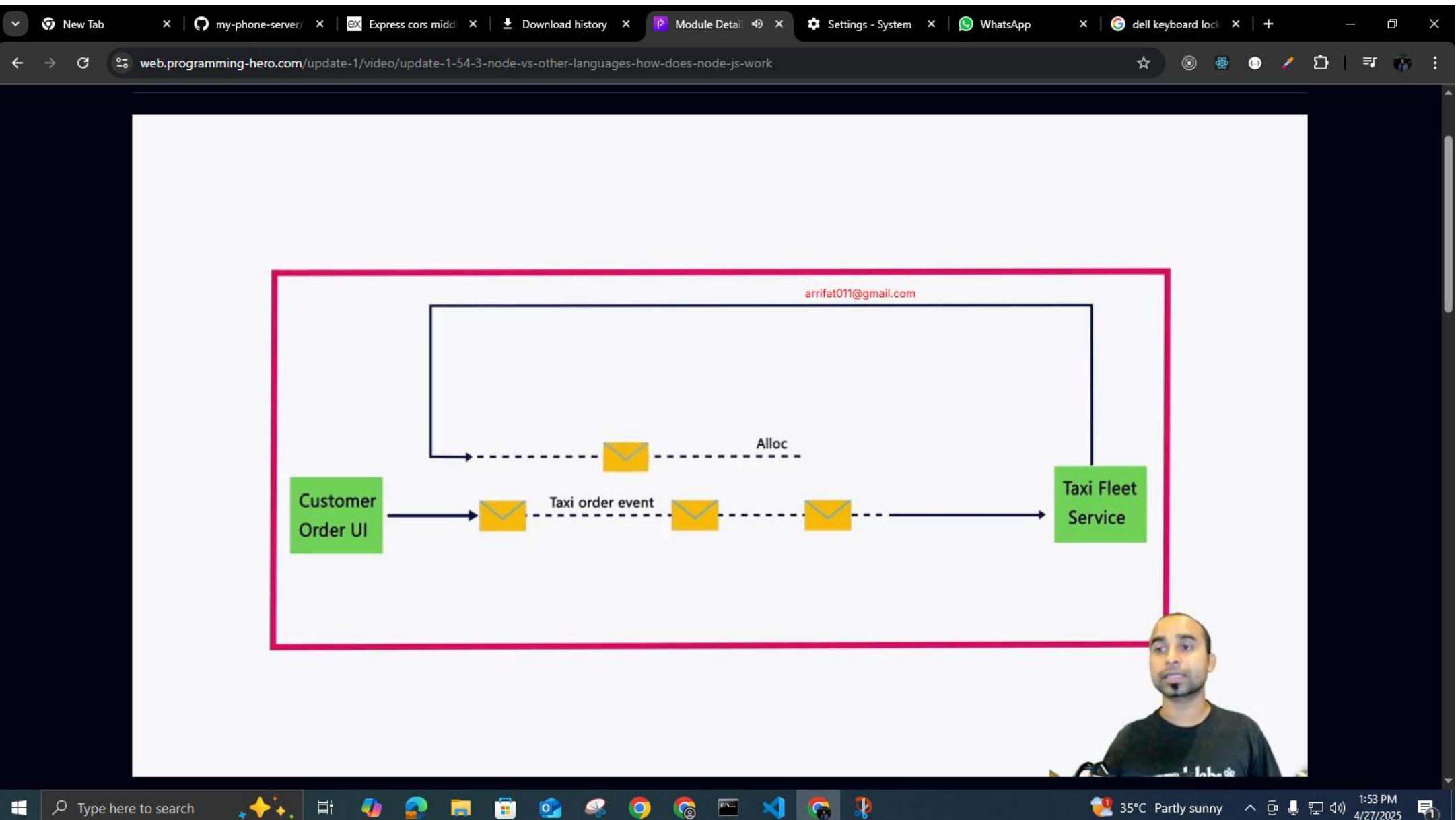


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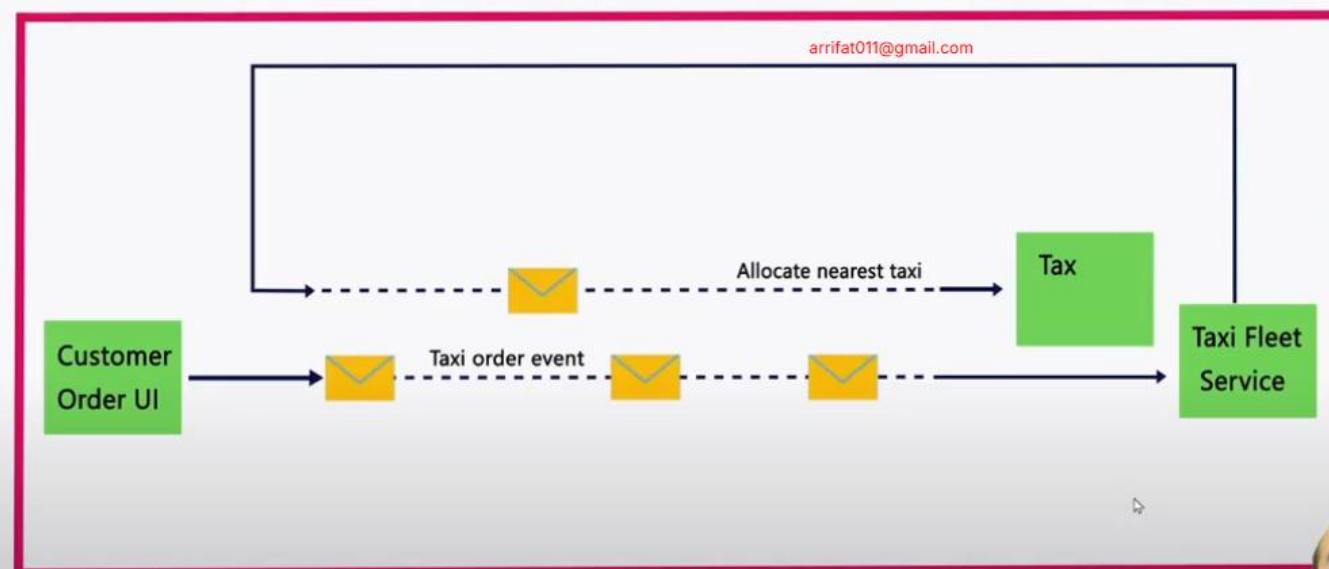


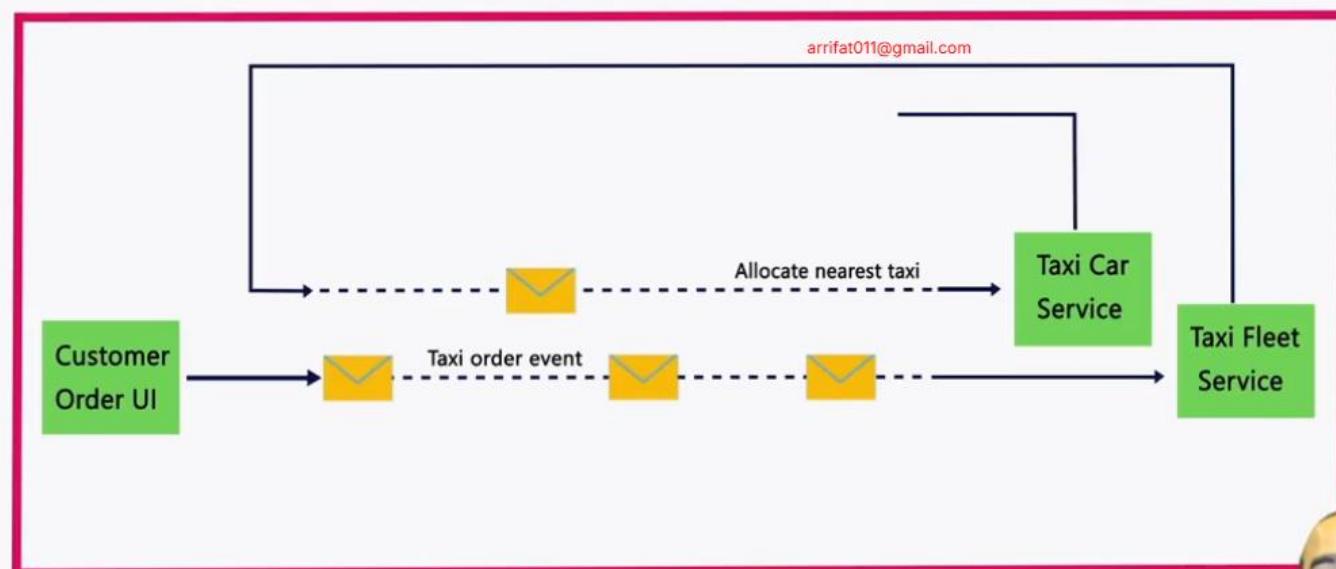
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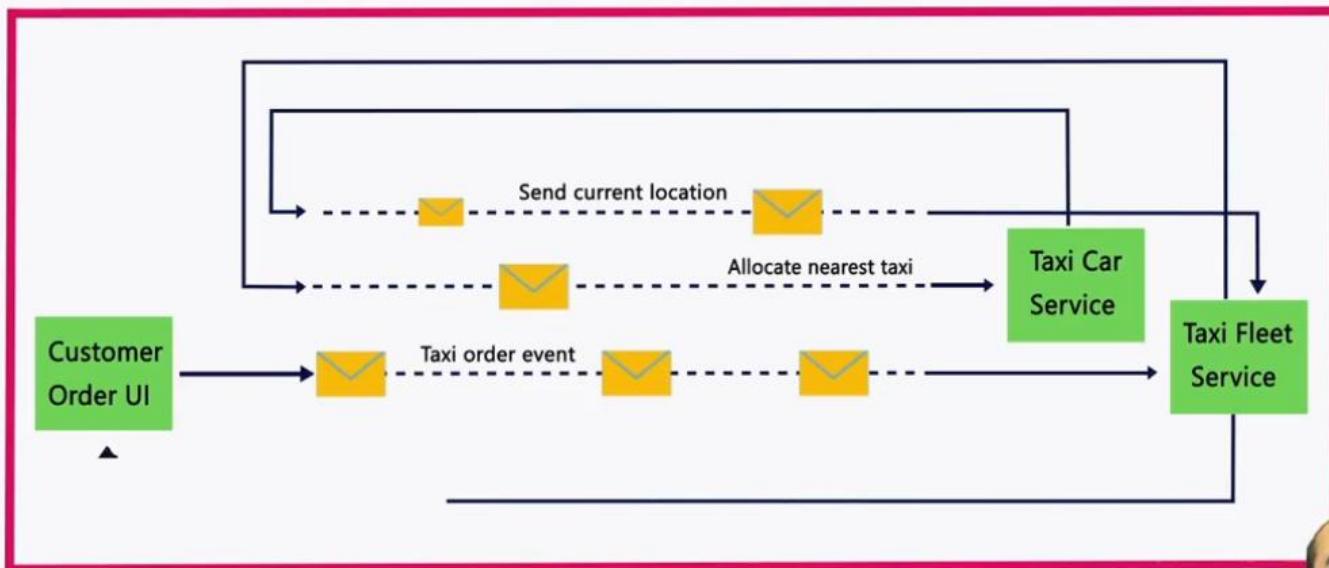


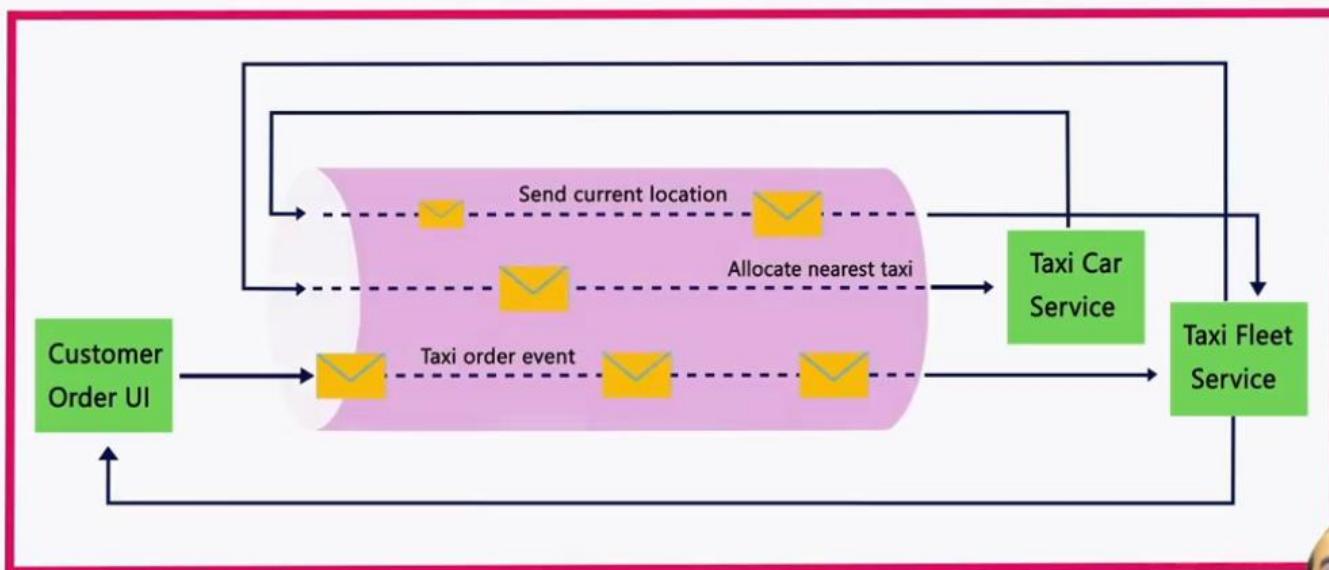
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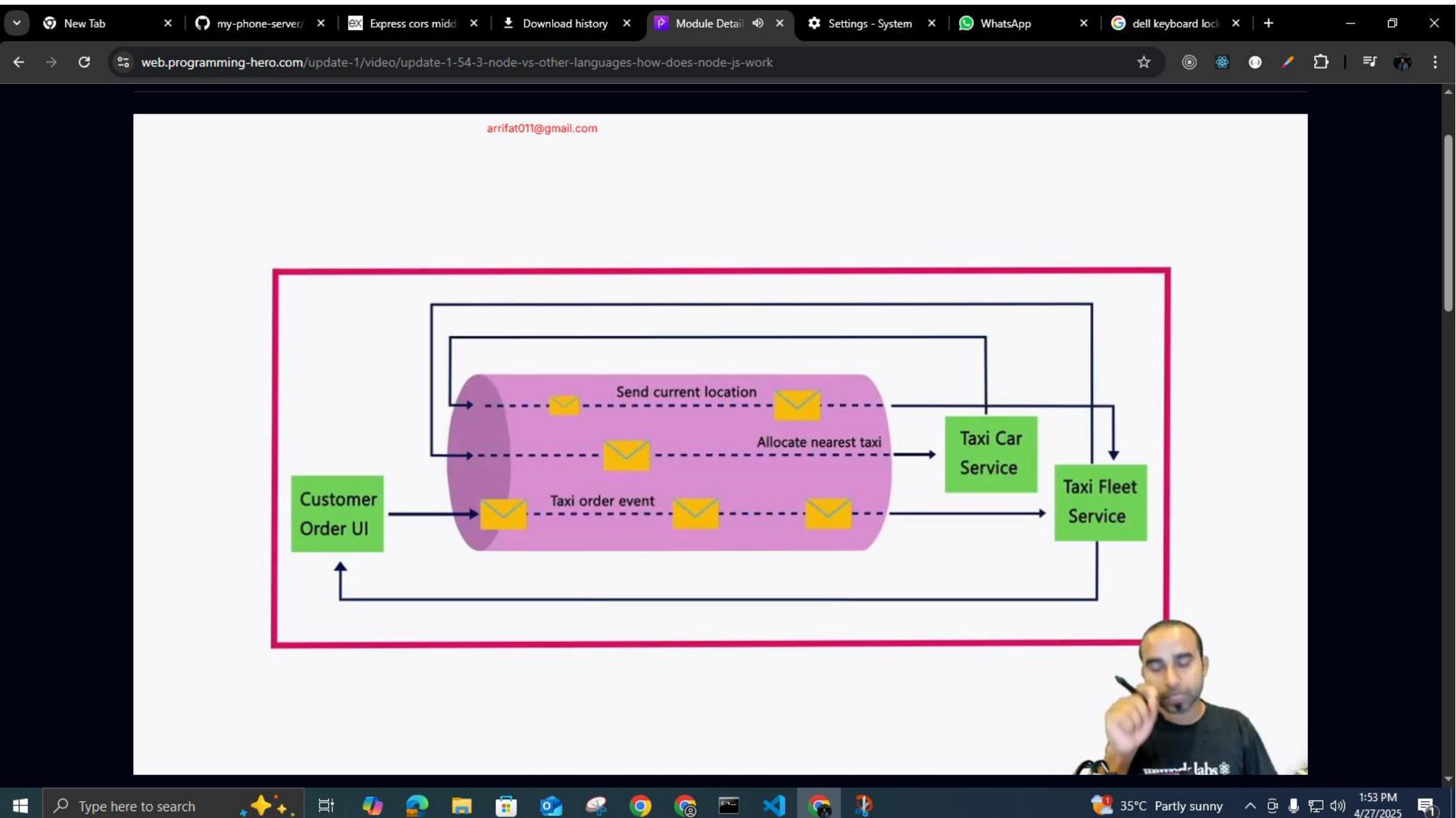






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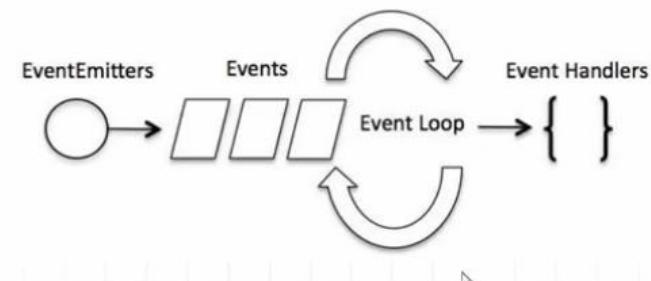
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Event-driven in Node JS

The basic components:

- A **callback function** (called an event handler) is called when an event is triggered.
- An **event loop** that listens for event triggers and calls the corresponding event handler for that event.
- A function that listens for the triggering of an event is said to be an '**Observer**'. It gets triggered when an event occurs.
- Most of the in-built modules of Node.js inherit from the **EventEmitter** class. The **EventEmitter** is a Node module that allows objects to communicate with one another. The core of Node's asynchronous event-driven architecture is **EventEmitter**.



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javascriptFile.js



Global



V8 ENGINE

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Client



Server



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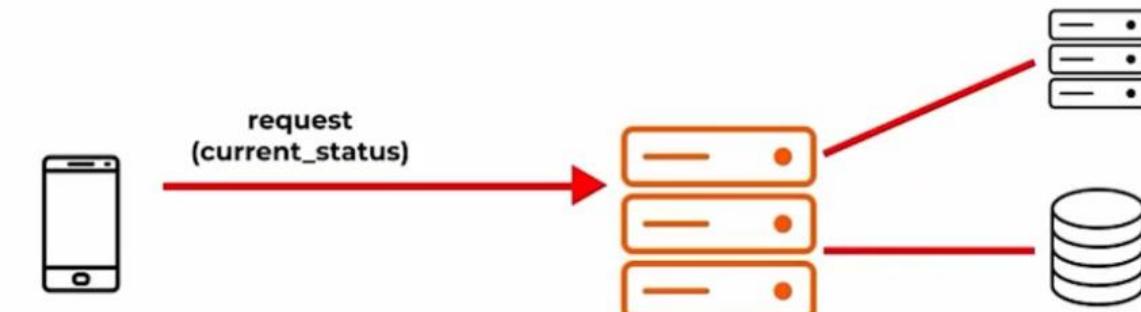


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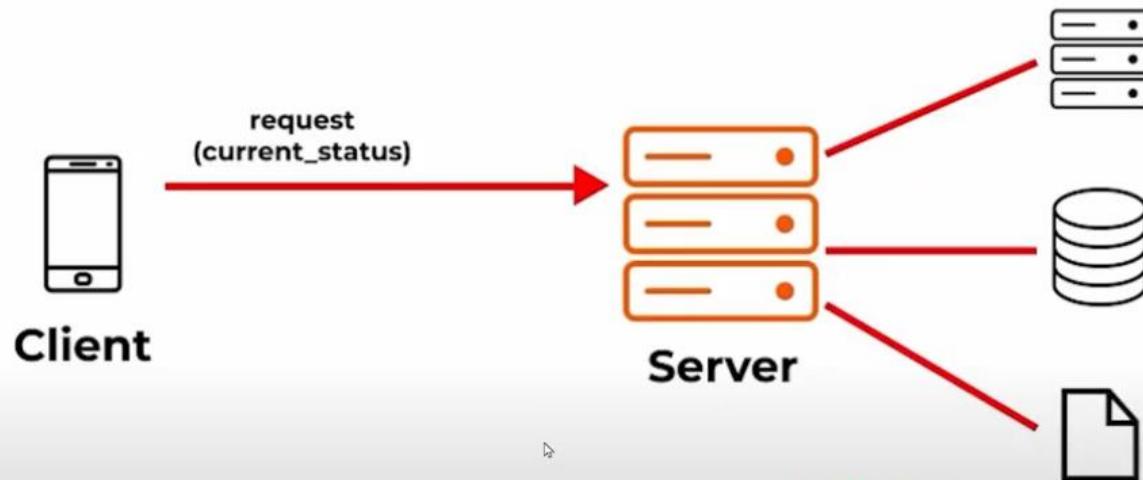


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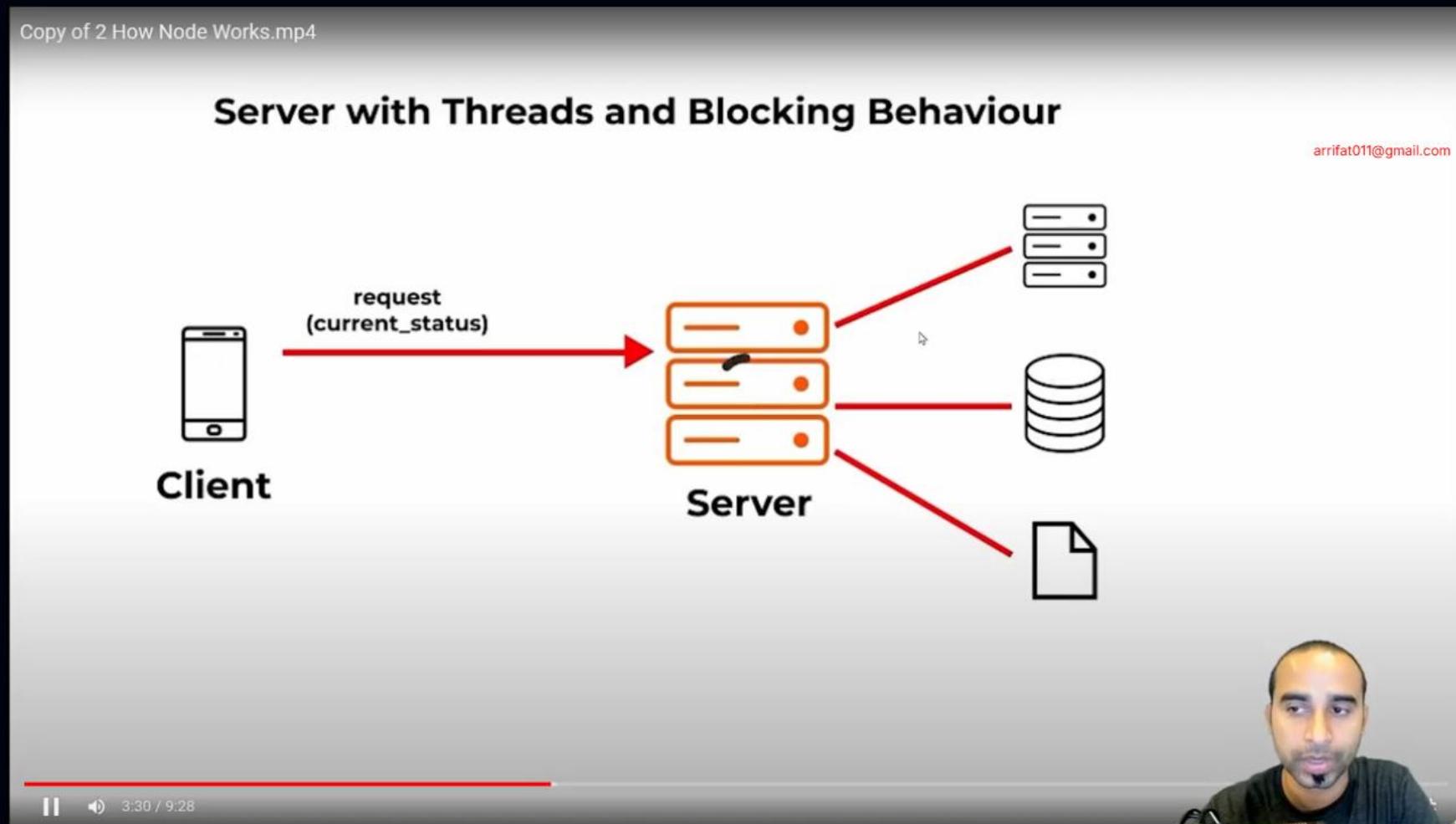


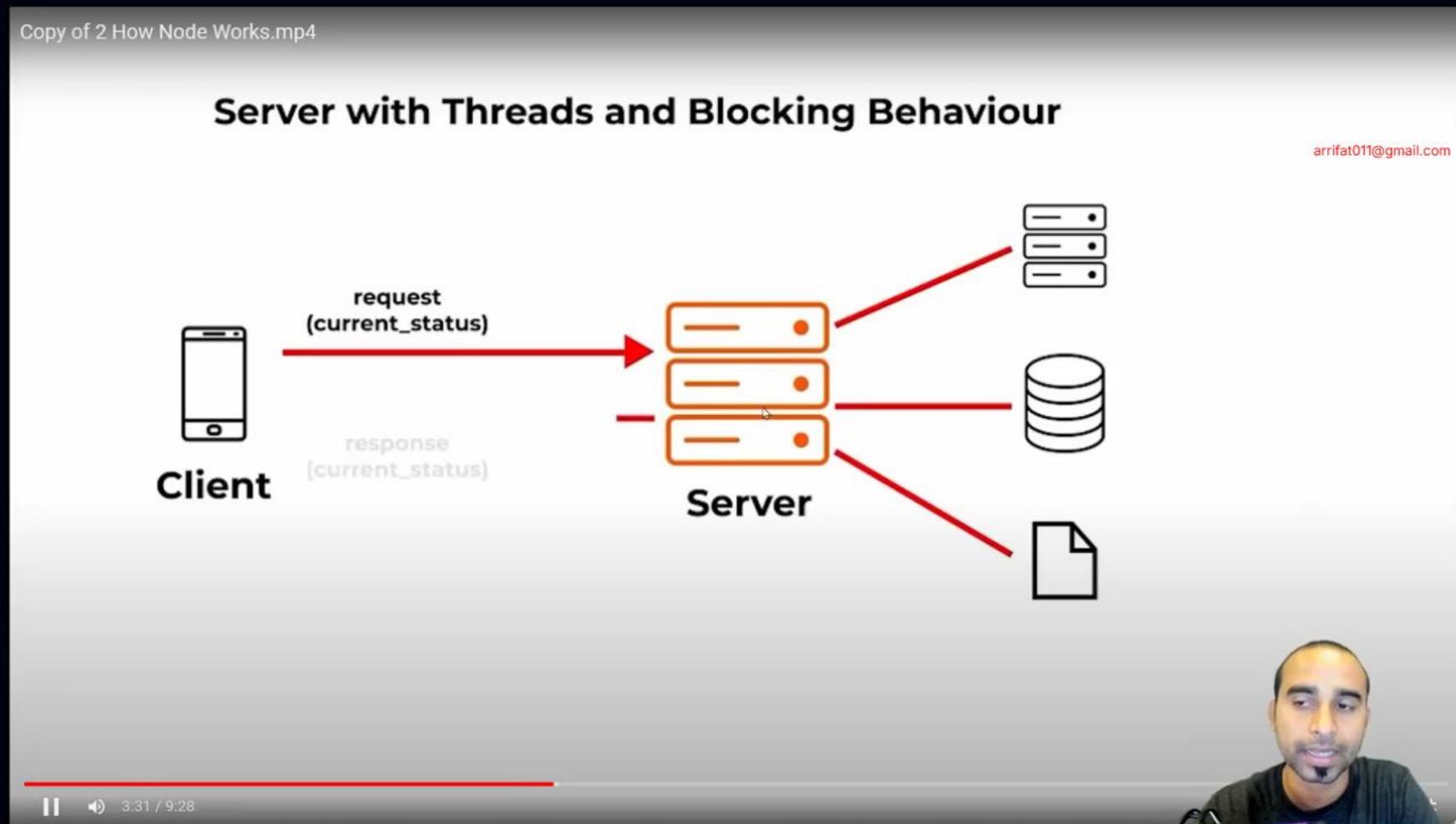
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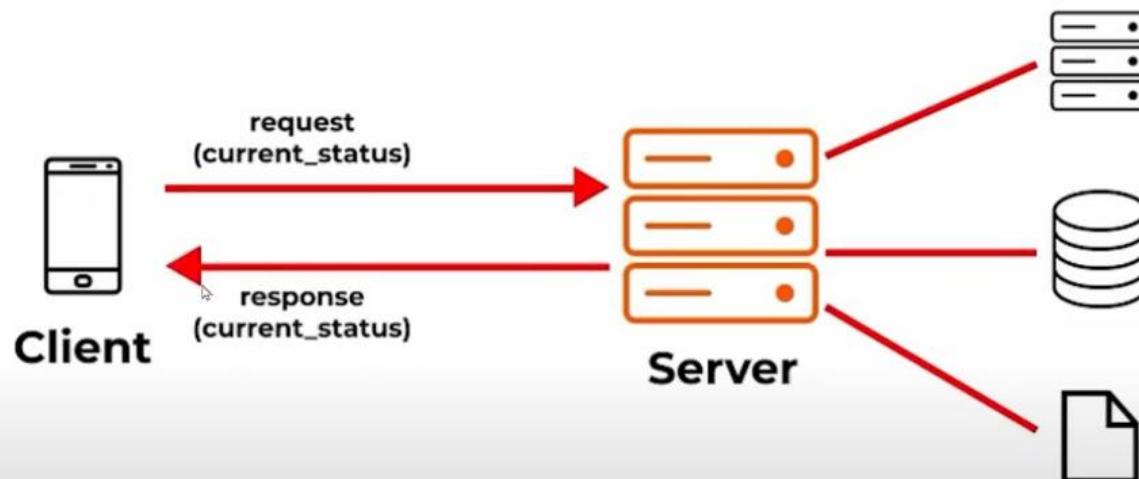




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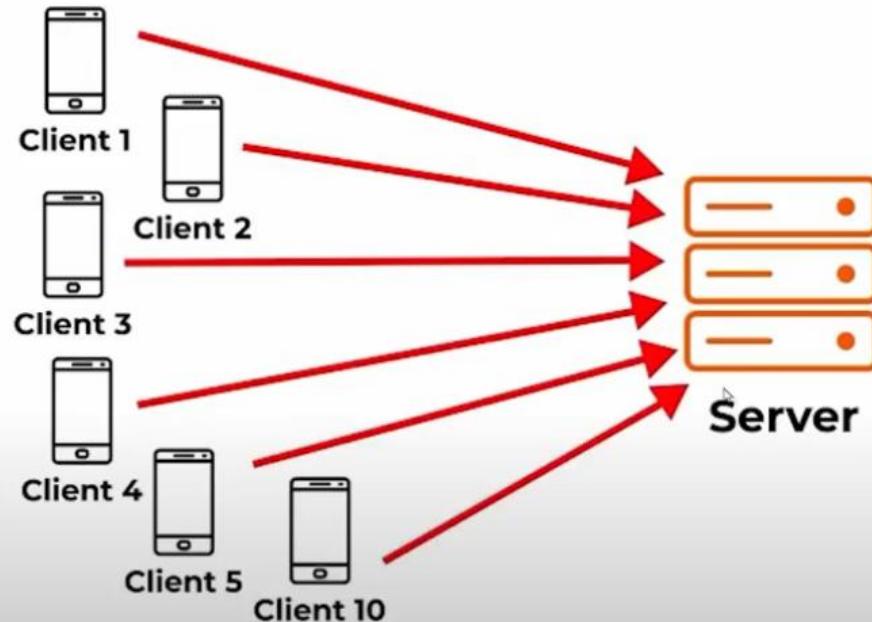
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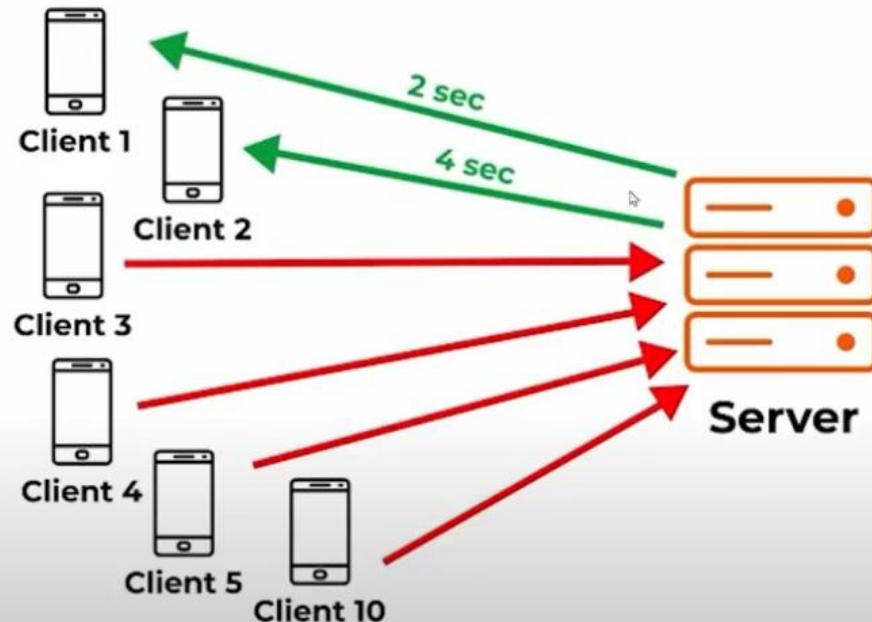


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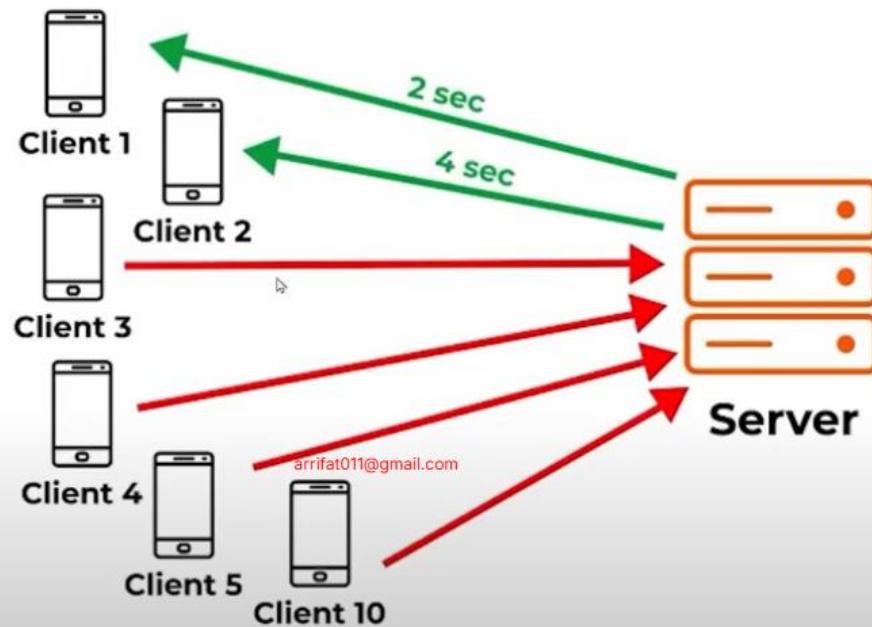
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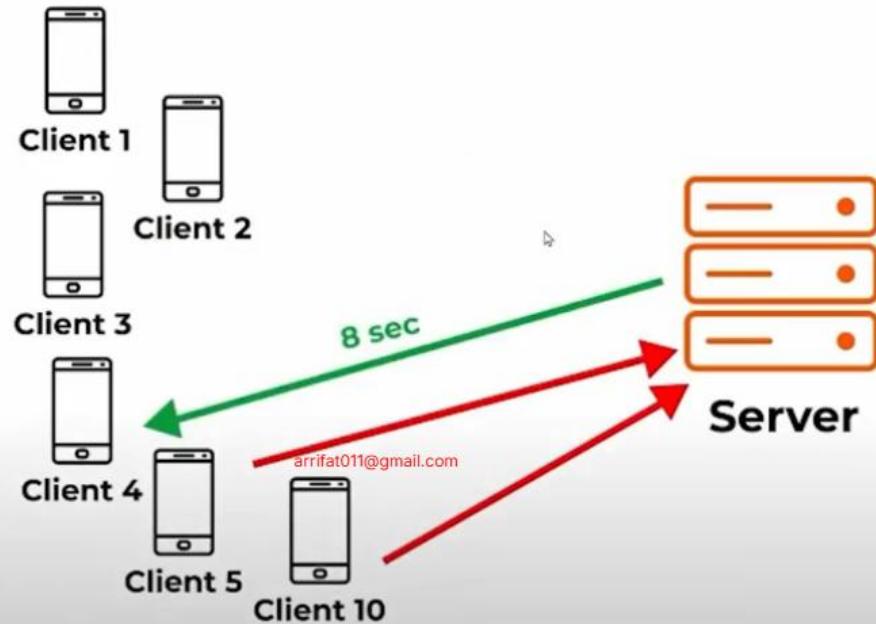
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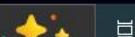
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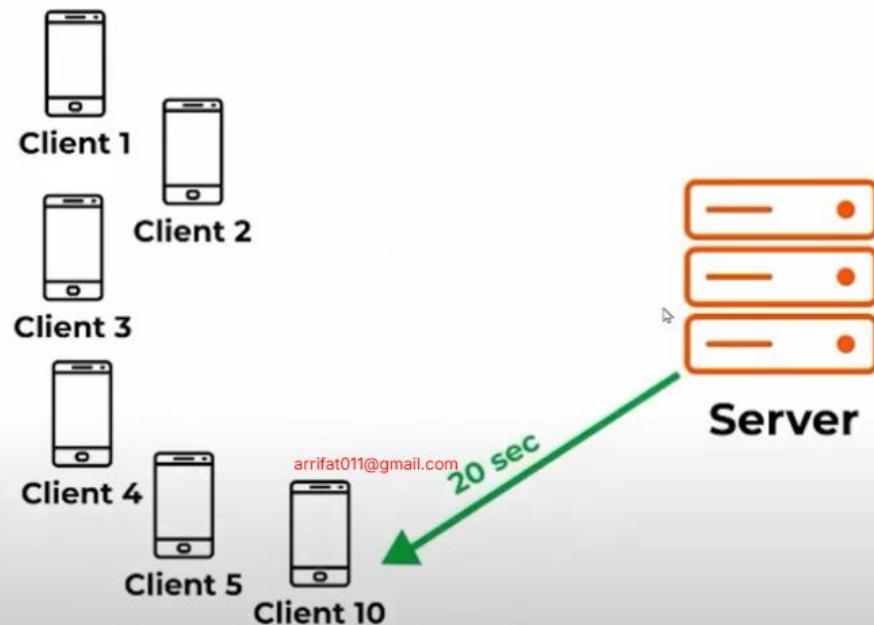
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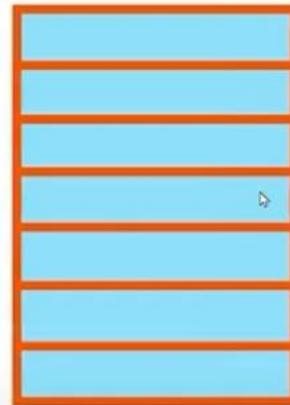


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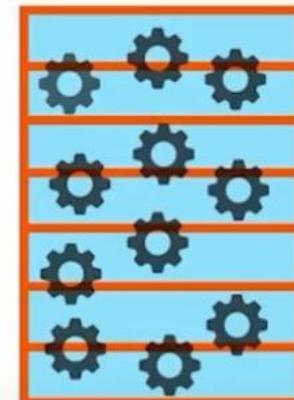
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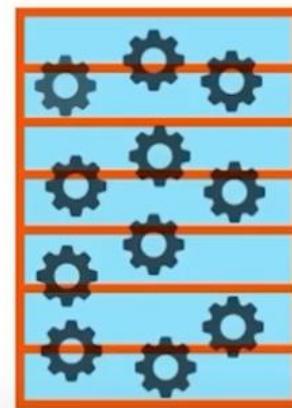
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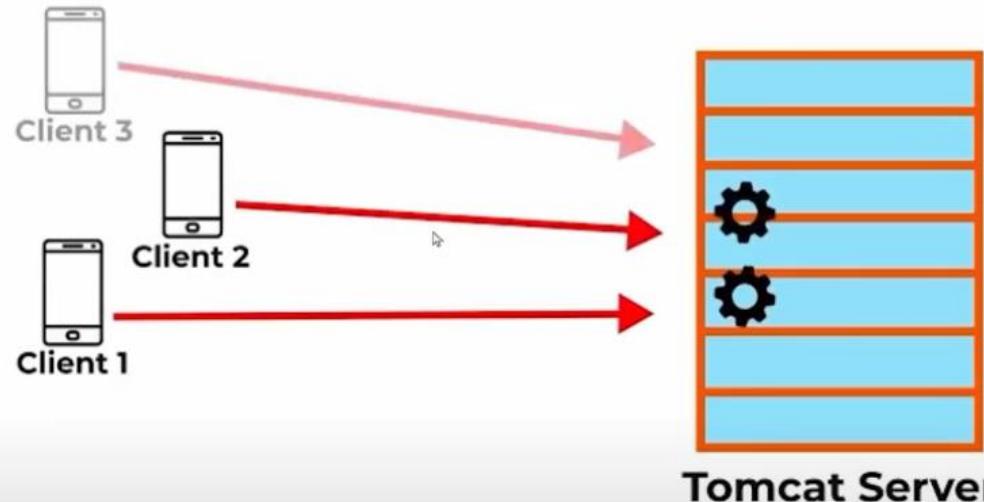


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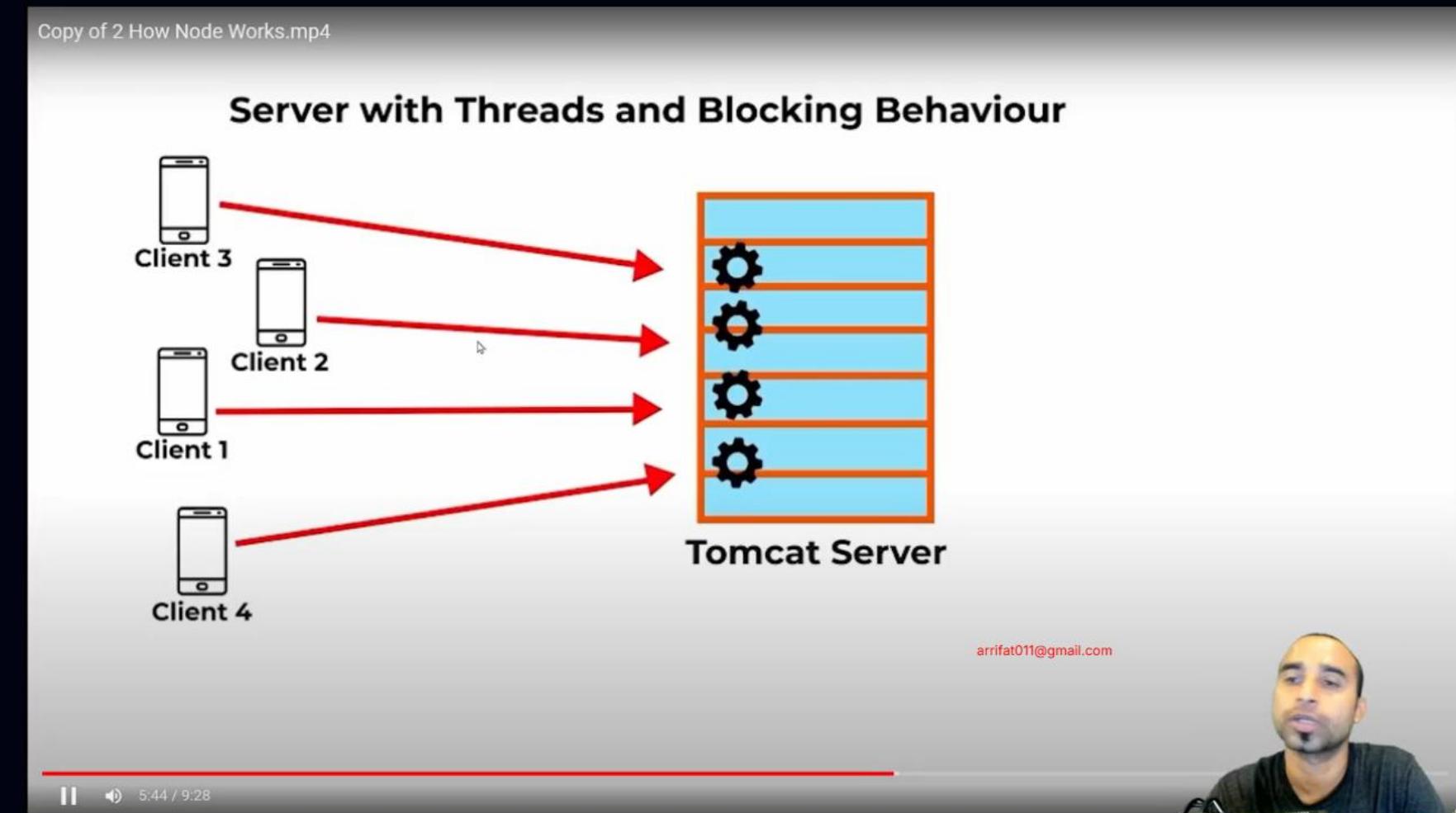


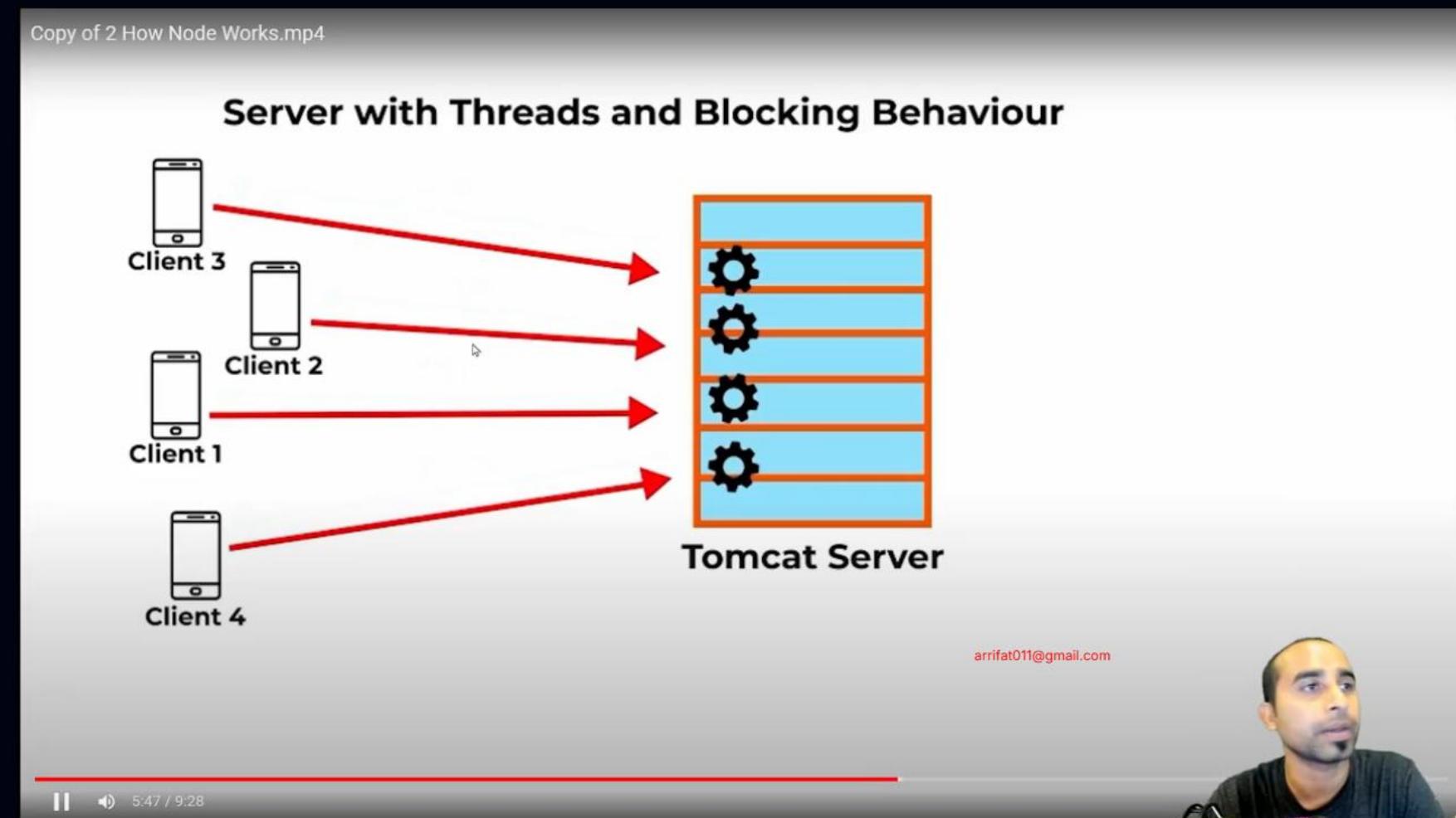
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Server with Threads and Blocking Behaviour

The diagram illustrates the interaction between four clients (Client 1, Client 2, Client 3, Client 4) and a Tomcat Server. The server is represented as a vertical stack of four blue rectangular boxes, each containing a black gear icon, representing four available threads. Red arrows point from each client to the server, and green arrows point from the server back to each client. Each interaction is labeled "2 sec", indicating a two-second delay for each request-response cycle.

Client 3

Client 2

Client 1 arrifat011@gmail.com

Client 4

Tomcat Server

2 sec

2 sec

2 sec

2 sec

arrifat011@gmail.com

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Copy of 2 How Node Works.mp4



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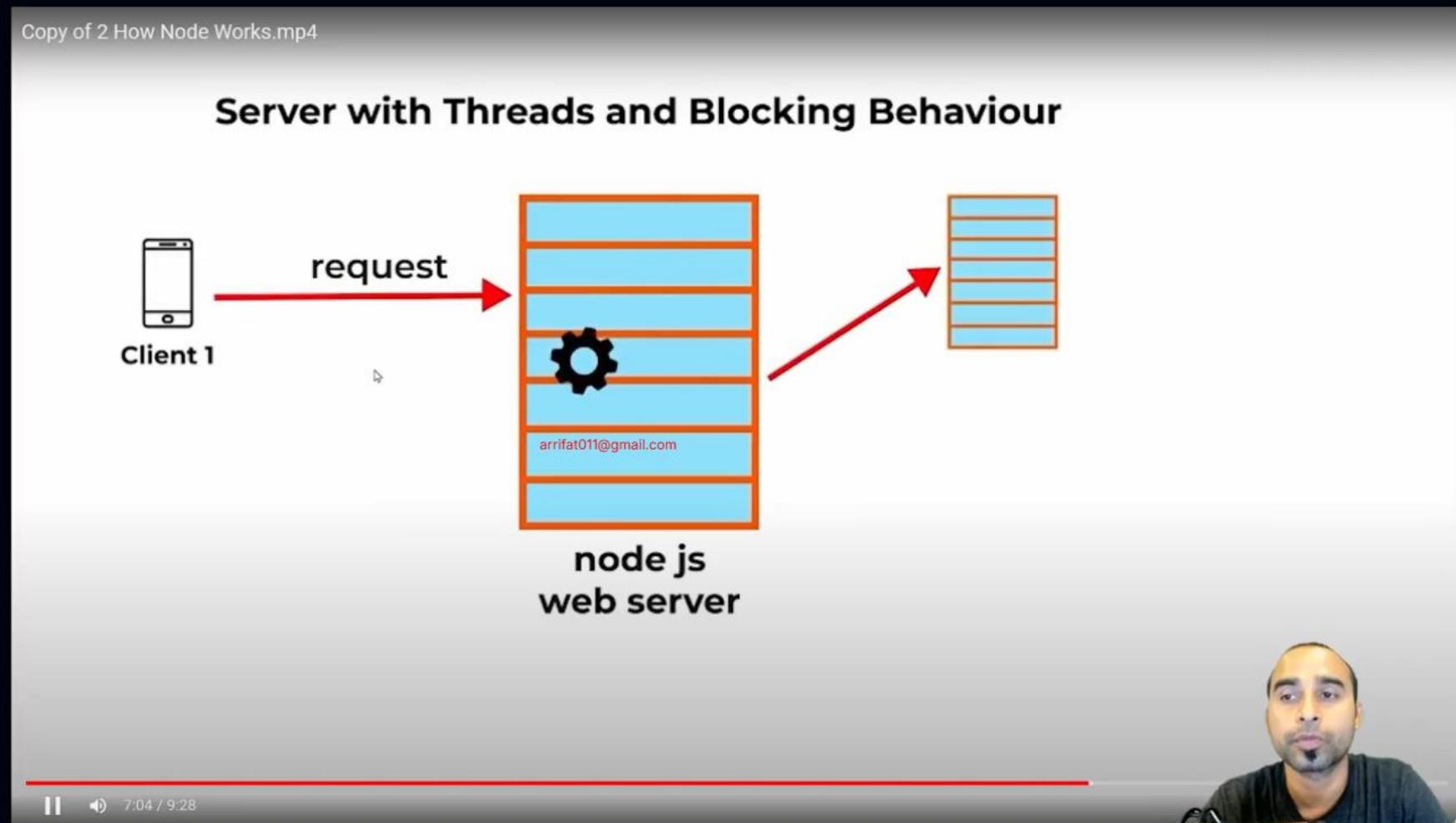


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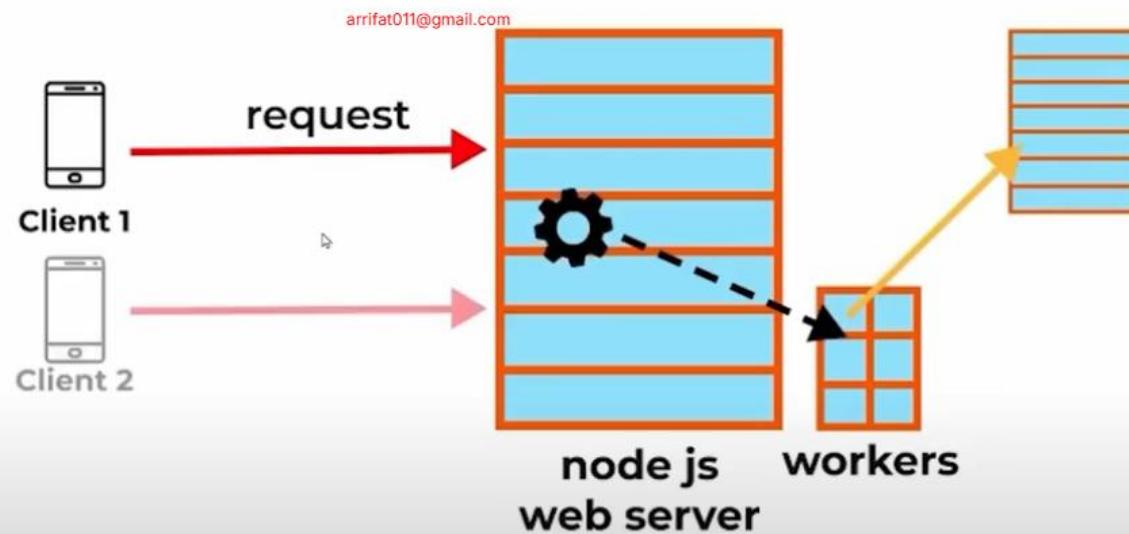
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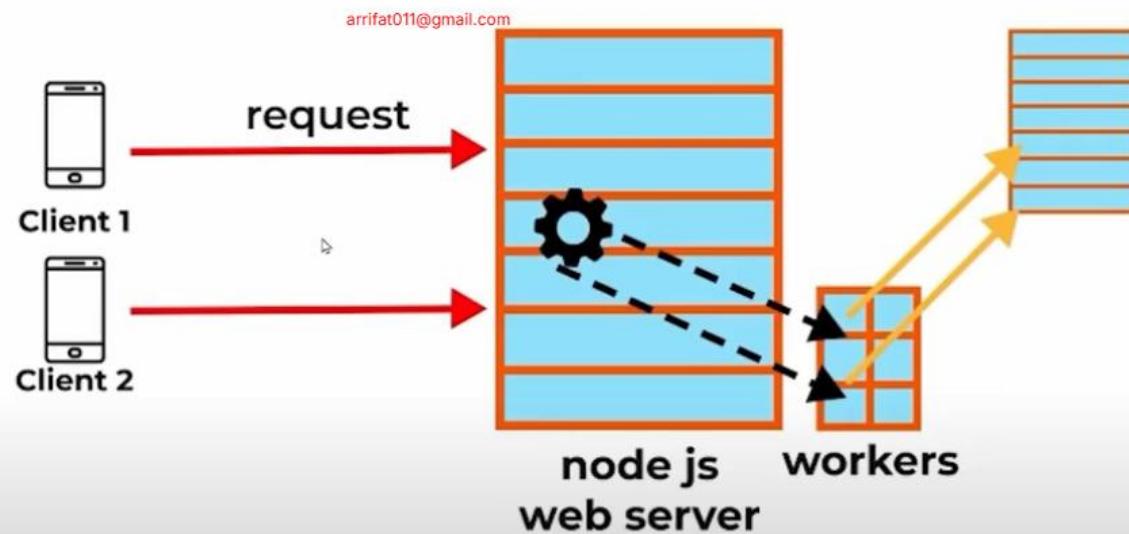
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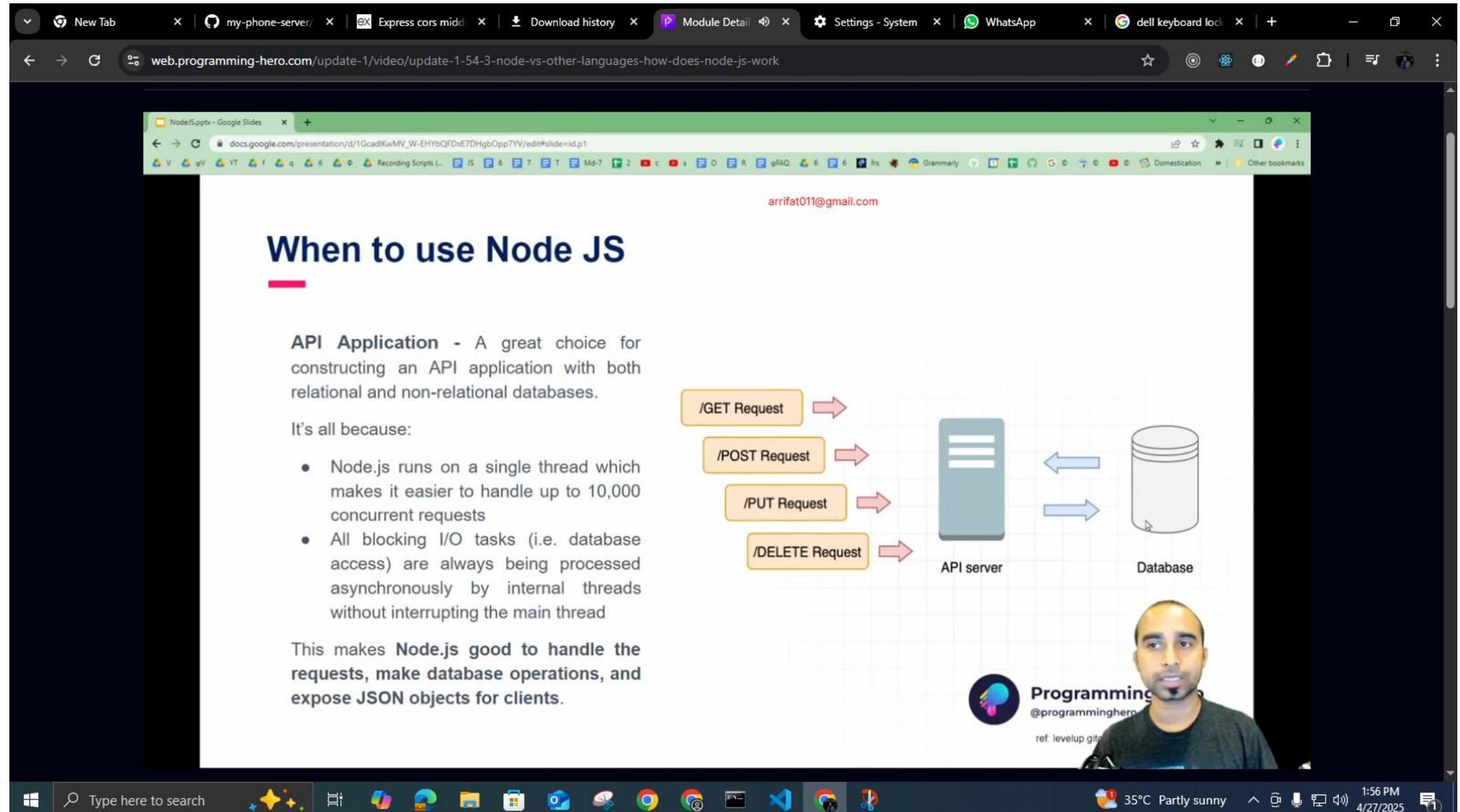
Server with Threads and Blocking Behaviour



Copy of 2 How Node Works.mp4

Server with Threads and Blocking Behaviour





When to use Node JS

Real time Applications

Good at building real-time applications like

- messaging,
- notifications delivery,
- live streaming and
- collaboration tools.

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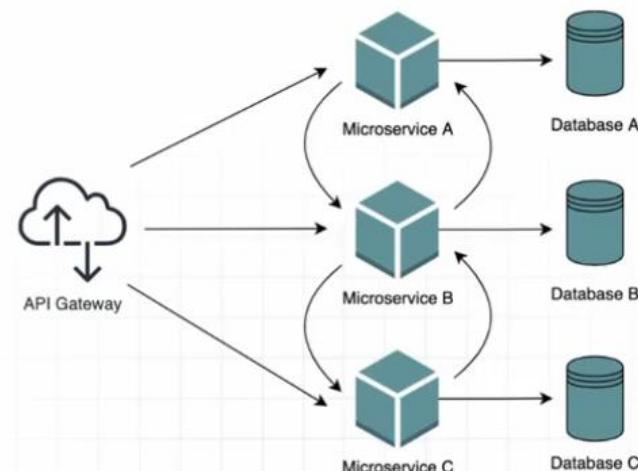
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When to use Node JS

Microservices

Node can also be used to build microservices — an architectural approach based on building an application as a collection of small services. Each microservice has its own data model and manages its own data.



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Node/S.pptx - Google Slides | docs.google.com/presentation/d/1GcadIKwMV_W-EHYbQFDxE7DHgbOpp7Y/edit#slide=id.g1

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When to use Node JS (at a glance)

- 1 Real-time applications
- 2 Collaborative tools
- 3 IoT solutions
- 4 Data streaming applications
- 5 Apps relying on scalability

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When not to use Node JS

- CPU intensive tasks/ heavy computational applications
- Backend with relational databases



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Companies using Node JS



Real-time applications.

Node.js is able to maintain tough traffic with no loss in performance. This makes the environment a perfect choice for real-time messaging and chatting apps.

Collaborative drawing and editing tools (Google Docs, Figma, Sketch);

Live-chat apps (LiveChat, Smartsupp)
arifat011@gmail.com



Online gaming apps.

As Node.js delivers a real-time and dynamic experience, online games are one of its leading use-cases (Ancient Beast, PaintVar, Voxel Shooting, Anagrammatix)



E-commerce transaction software.

Huge traffics of e-commerce platforms demand a proven technology to satisfy all users' requests (PayPal).



Video-Conferencing apps.

Node.js will work here with specific hardware or VoIP (Zoom, Google Hangouts, Skype).



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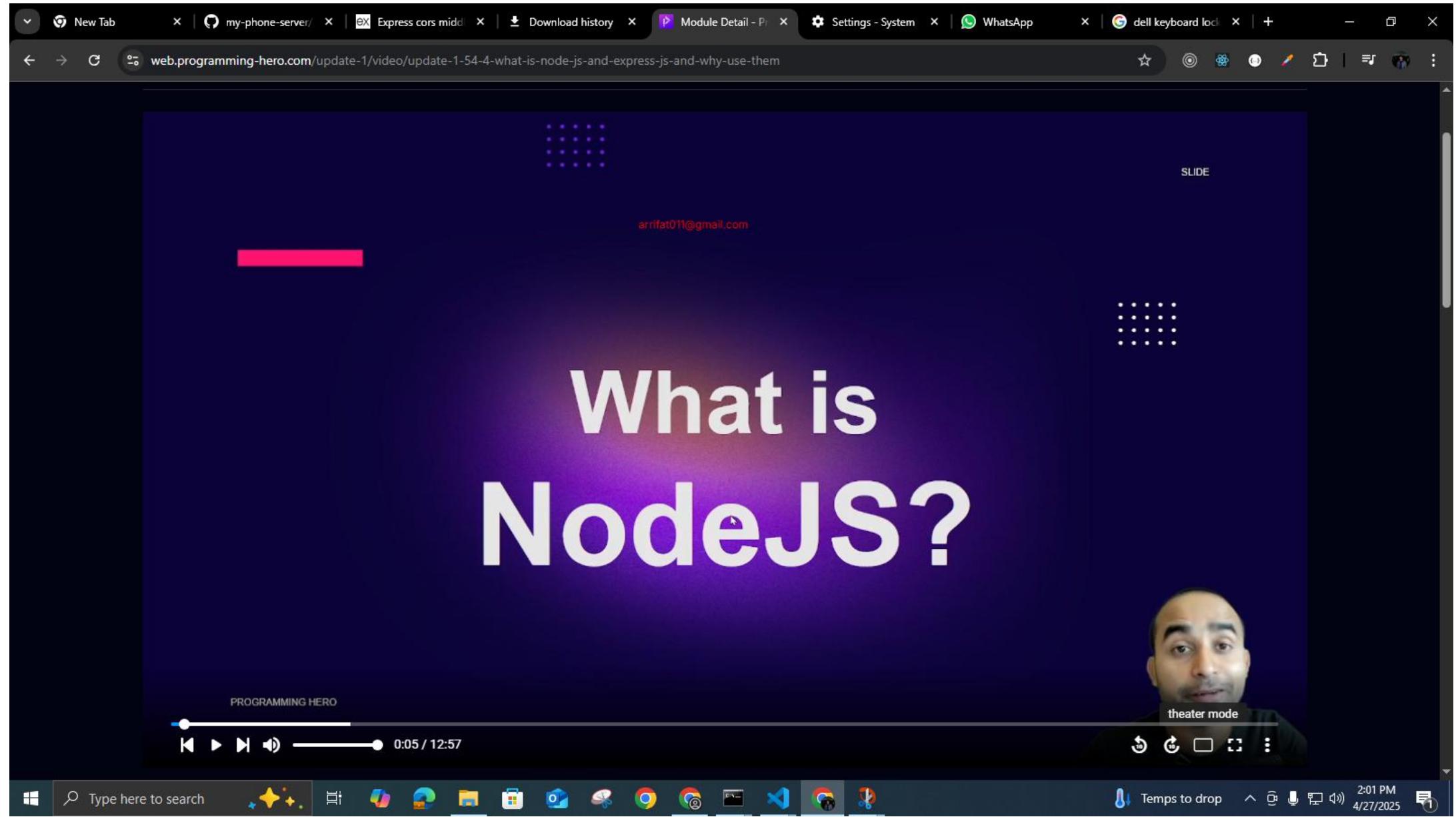
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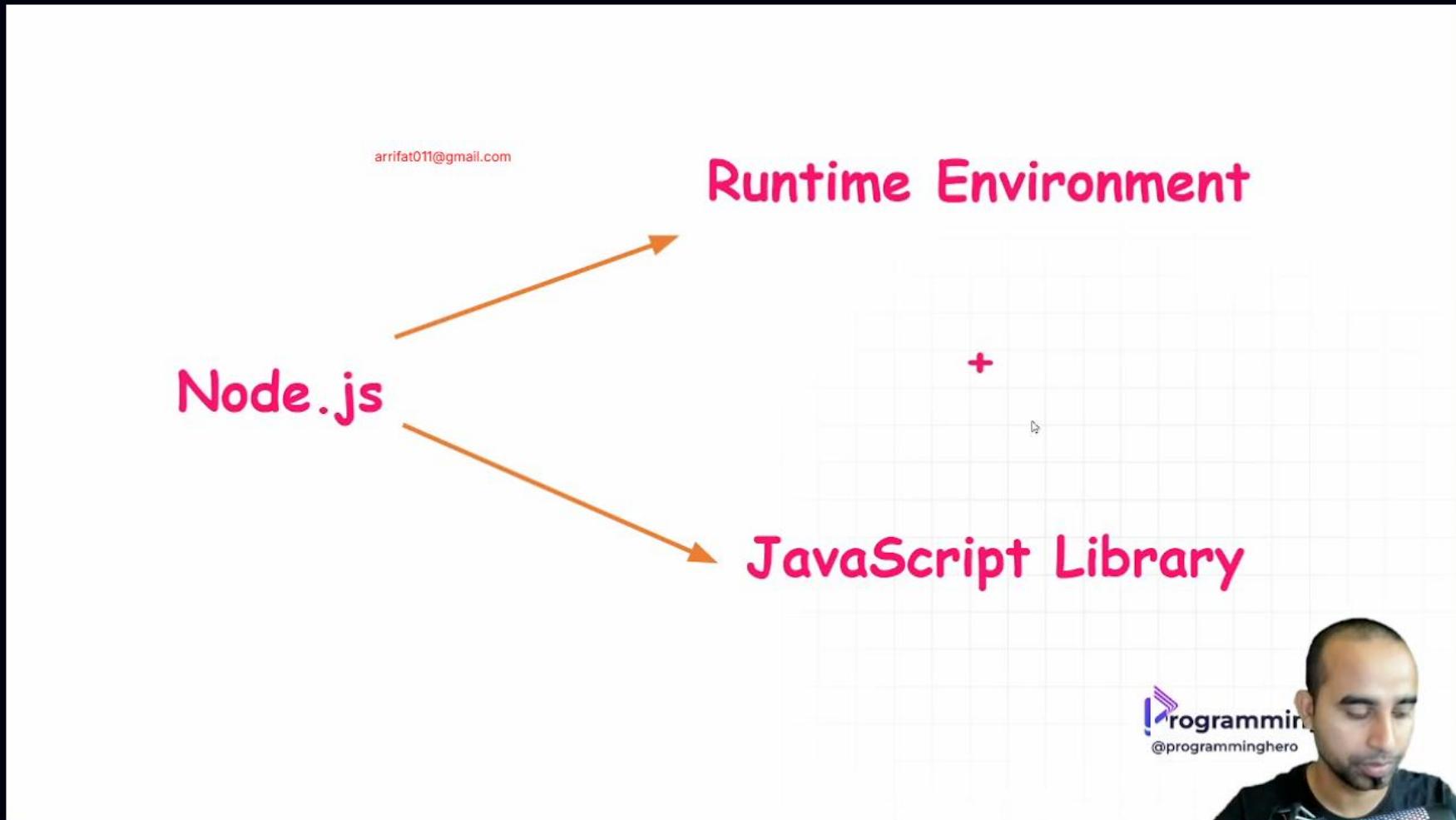
SLIDE

What is NodeJS?

PROGRAMMING HERO

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Runtime Environment

Node.js

JavaScript Library



Node JS

- Free
- Uses JavaScript on the server
- An open source server environment
- Runs on various platforms (Windows, Linux, Unix, Mac OS X, etc.)

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A screenshot of a Google search results page. The search query "what is nodejs?" is entered in the search bar. The top result is a link to the Node.js website, titled "About | Node.js". The snippet describes Node.js as an asynchronous event-driven JavaScript runtime designed for building scalable network applications. Below this, another result from TutorialsPoint is shown, titled "Node.js - Introduction", which also describes Node.js as a platform built on Chrome's JavaScript runtime for easily building fast and scalable network applications. The Node.js result has a large orange rectangular box drawn around it, and three red arrows point from the left and bottom towards this box. In the bottom right corner of the screen, there is a video overlay of a man speaking, with the "programminghero" logo and handle visible.

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what is nodejs?

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Node.js
https://nodejs.org › about

About | Node.js

As an **asynchronous event-driven JavaScript runtime**, Node.js is designed to build scalable network applications. In the following "hello world" example, ...
Project Governance · Blocking vs Non-Blocking Calls · Limba română

Tutorialspoint
https://www.tutorialspoint.com › nodejs › nodejs_intro... ·

Node.js - Introduction

js is a platform built on Chrome's JavaScript runtime for easily building fast and scalable network applications. Node.js uses an event-driven, non-blocking I/O ...

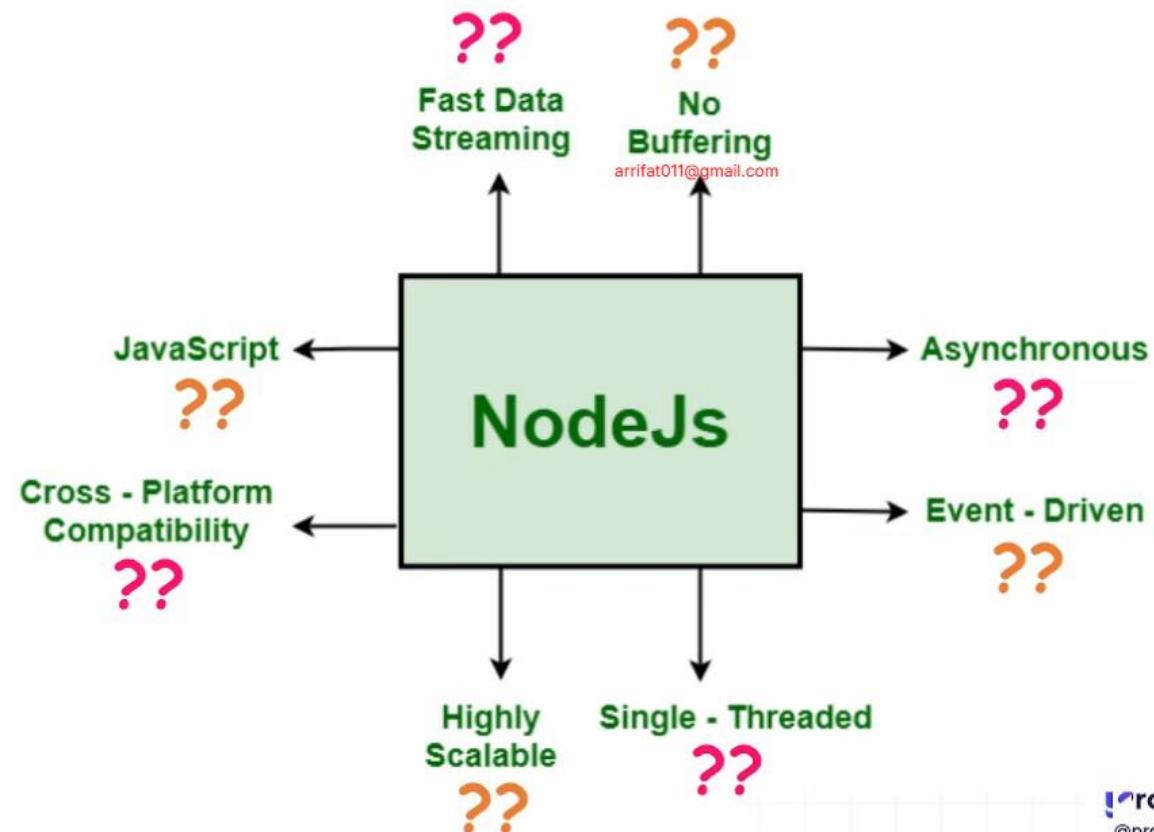
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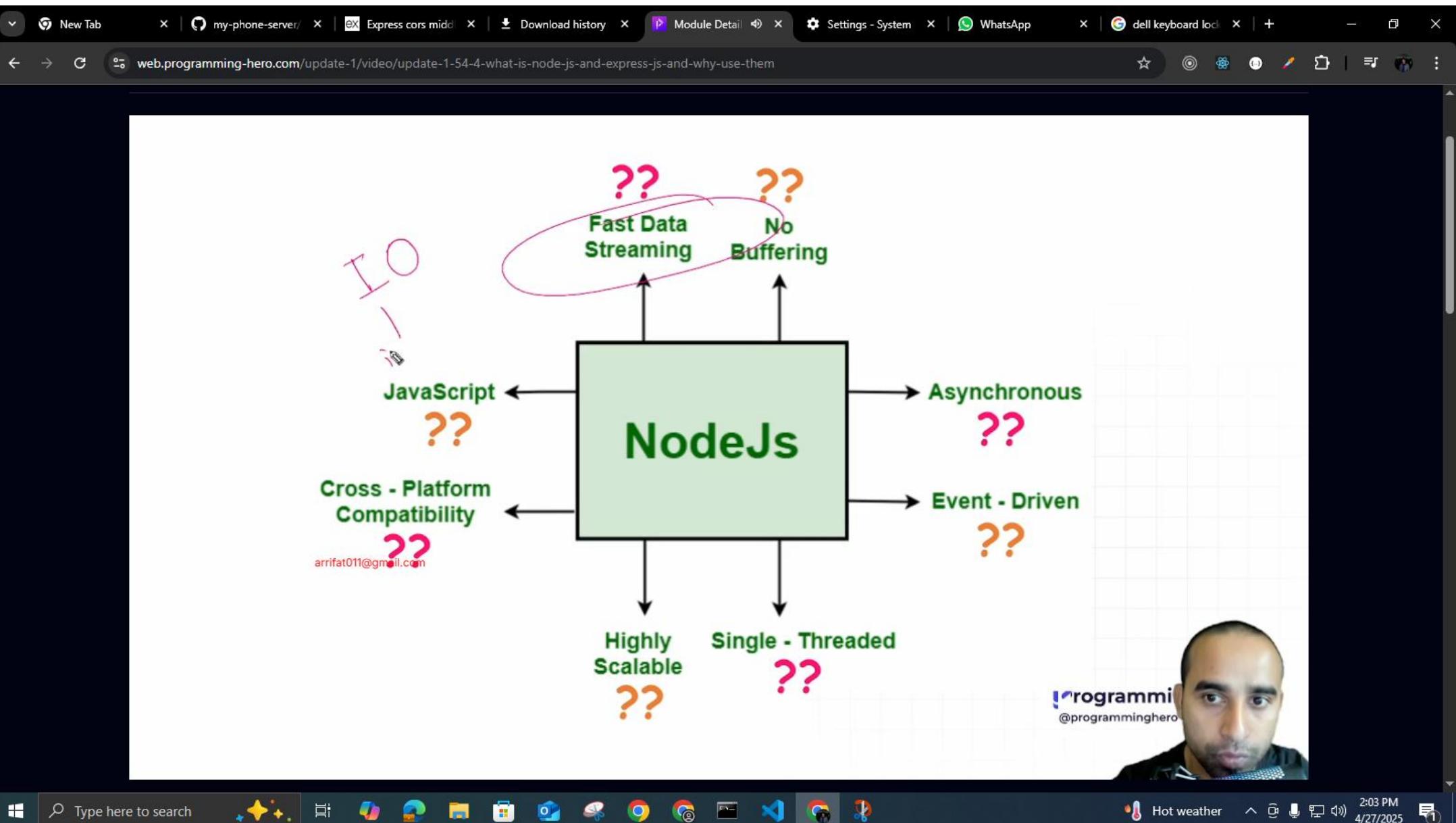
A screenshot of a Windows desktop showing a Google search results page for the query "what is nodejs?". The search bar at the top contains the text "what is nodejs?". Below the search bar, the first result is from the Node.js website, titled "About | Node.js". It describes Node.js as an asynchronous event-driven JavaScript runtime designed for building scalable network applications. The second result is from TutorialsPoint, titled "Node.js - Introduction", which also describes Node.js as a platform built on Chrome's JavaScript runtime for easily building fast and scalable network applications. A large orange rectangular box highlights the first two search results. Three red arrows point from the left towards this highlighted area: one arrow points to the search bar, another points to the first result, and a third points to the second result. The bottom right corner of the screen features a video feed of a person with a watermark for "Programminghero". The taskbar at the bottom includes icons for the Start button, search, file explorer, and various application icons like Microsoft Edge, Google Chrome, and VS Code.

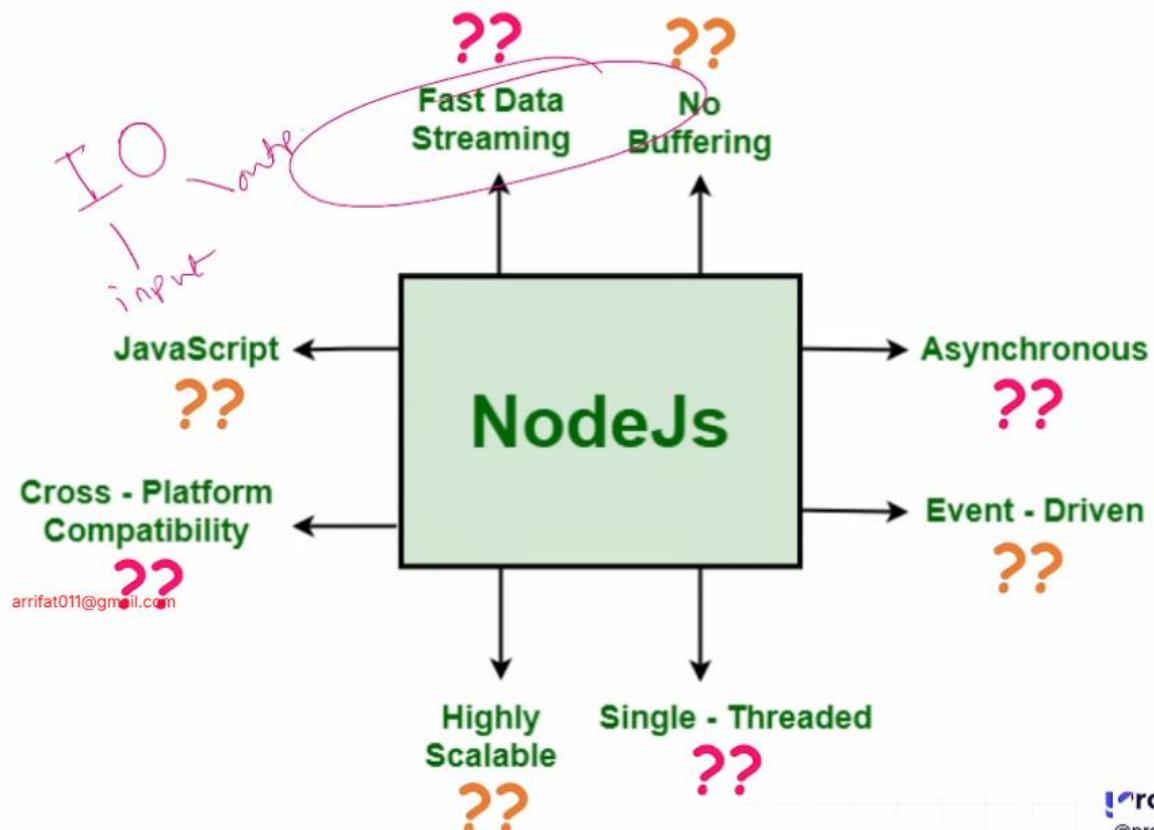
A screenshot of a Windows desktop showing a Google search results page for the query "what is nodejs?". The search bar at the top contains the text "what is nodejs?". Below the search bar, there are two search results:

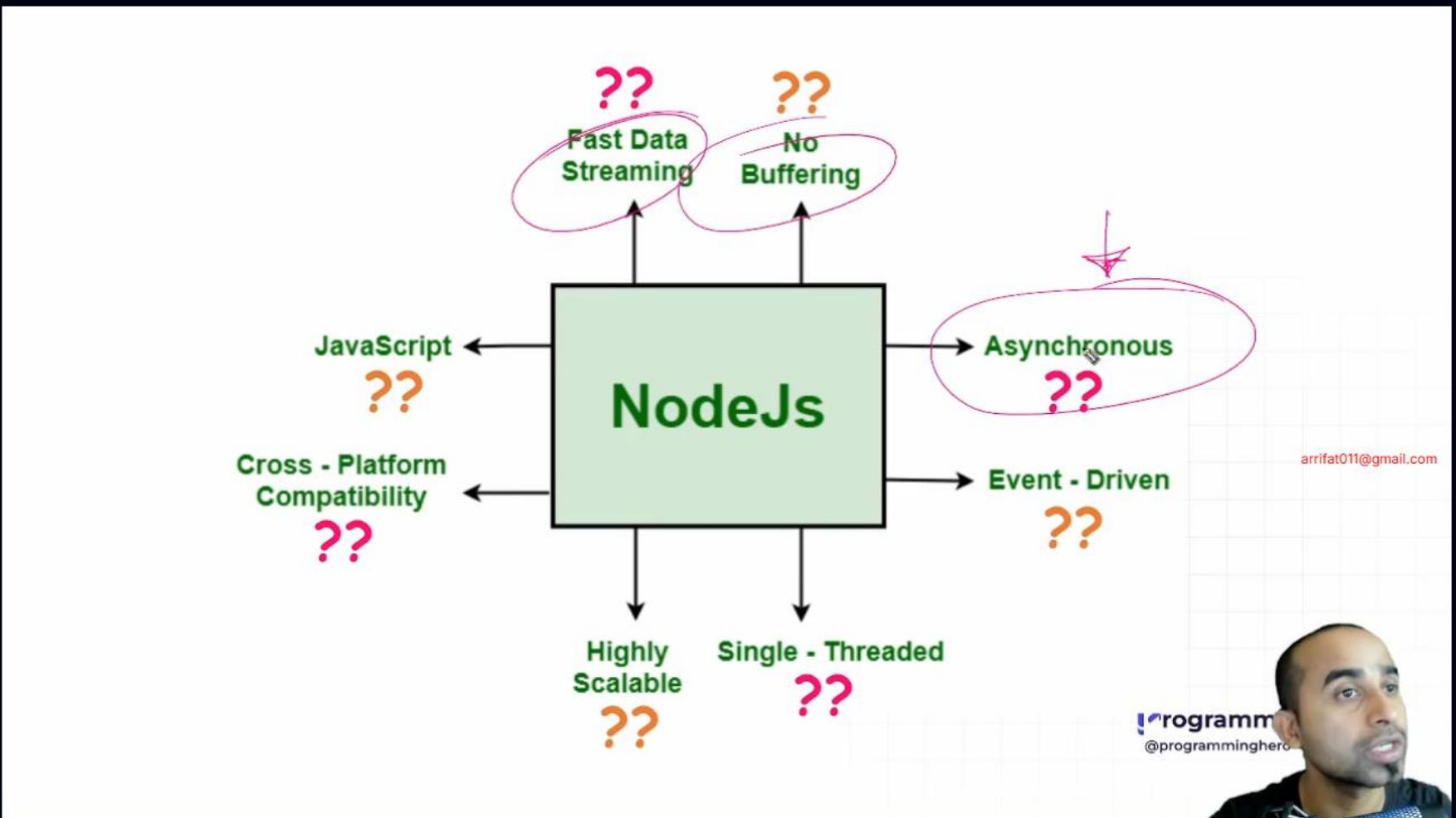
- Node.js**
https://nodejs.org › about · [About | Node.js](#)
As an asynchronous event-driven JavaScript runtime, Node.js is designed to build scalable network applications. In the following "hello world" example, ...
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- Tutorialspoint**
https://www.tutorialspoint.com › nodejs › nodejs_intro... · [Node.js - Introduction](#)
js is a platform built on Chrome's JavaScript runtime for easily building fast and scalable network applications. Node.js uses an event-driven, non-blocking I/O ...

The entire search results area is highlighted with a thick orange border. Three red arrows point from the left edge of the screen towards the top-left corner of the search results box, indicating the search term. A fourth red arrow points from the bottom-right corner of the search results box towards the right edge of the screen, indicating the URL. In the bottom right corner of the desktop, there is a small video feed of a person's face.

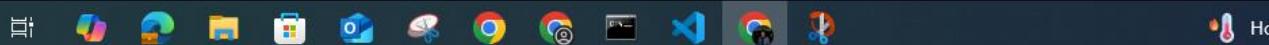




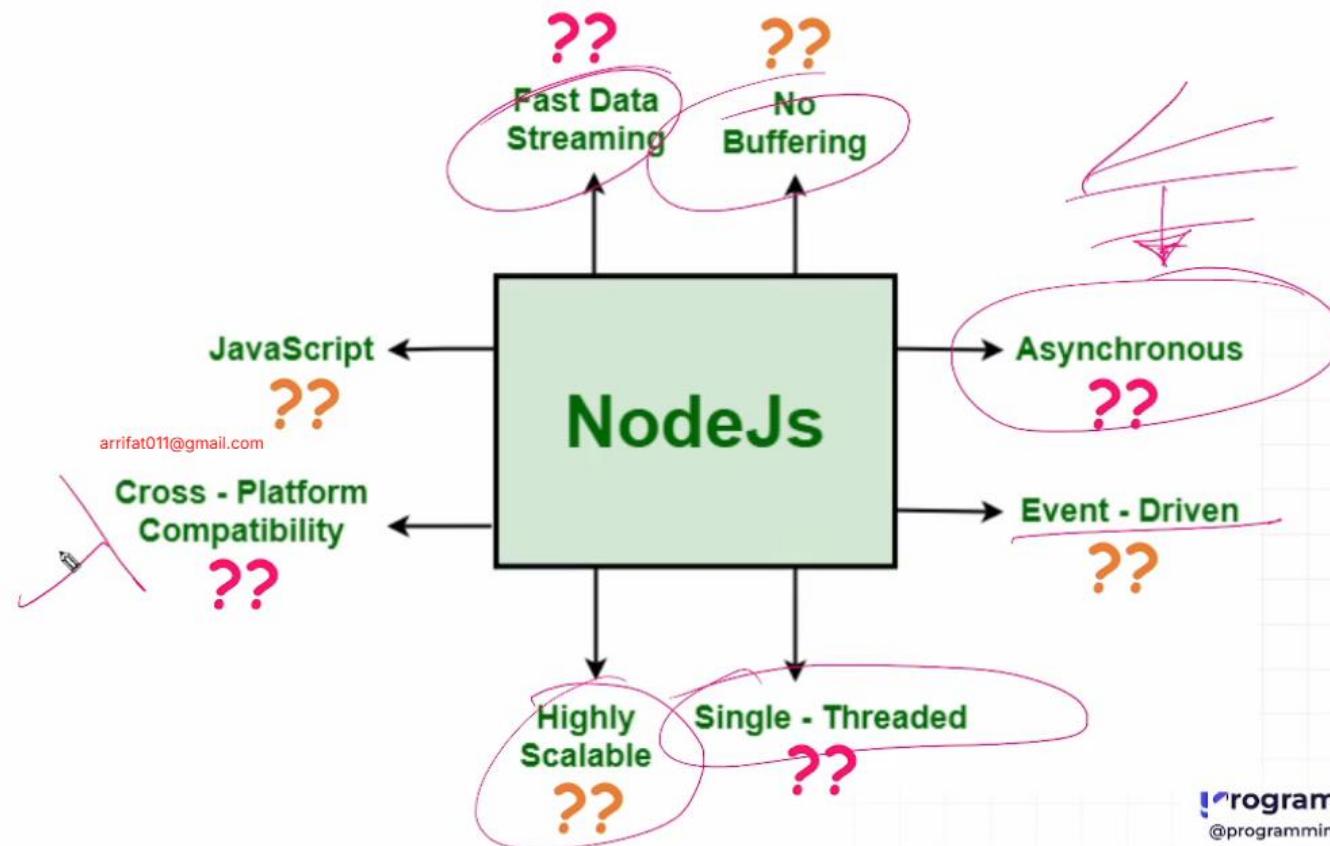




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Features

- Very Fast
- No Buffering
- Asynchronous and Event Driven
- Single Threaded but Highly Scalable

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ref:
tutorialspoint.com/nod...



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Who uses?

- eBay
- General Electric
- GoDaddy
- Microsoft
- PayPal
- Uber
- Wikipins
- Yahoo!

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WELL!!
It's also using NodeJS



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Where to use?

- I/O bound Applications
- Data Streaming Applications
- Data Intensive Real-time Applications (DIRT)
- JSON APIs based Applications
- Single Page Applications



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Where to use?

- I/O bound Applications
- Data Streaming Applications
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- JSON APIs based Applications
- Single Page Applications



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Windows Start button

Icons for File Explorer, Edge, Microsoft Store, OneDrive, Mail, Photos, and other system icons.

Hot weather icon, 2:04 PM, 4/27/2025, and a notification icon.

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NodeJS এর এতো alternatives থাকলে আমরা NodeJS ই কেন শিখবো?

Why???

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The screenshot shows a Google search results page. The search query is "which backend language is best with front end react in web development?". The top result is from KnowledgeHut, dated Jan 30, 2023, stating: "We recommend using Express Js with NodeJS as they have proven to be the best and most appropriate backend framework for React." A red arrow points to the author's email, arrifat011@gmail.com, located to the left of the snippet. Another red arrow points to the snippet itself. The KnowledgeHut logo and URL are also visible.

Google

which backend language is best with front end react in web development?

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About 3,220,000 results (0.53 seconds)

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We recommend using Express Js with NodeJS as they have proven to be the best and most appropriate backend framework for React.

Jan 30, 2023

KnowledgeHut
https://www.knowledgehut.com > ... > Web Development

Best Backend for React in 2023 - KnowledgeHut

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web.programming-hero.com/update-1/video/update-1-54-4-what-is-node-js-and-express-js-and-why-use-them

The screenshot shows a Google search results page. The search query is "which backend language is best with front end react in web development?". The top result is a snippet from KnowledgeHut, dated Jan 30, 2023, which recommends using Express Js with NodeJS as the best backend framework for React. A red arrow points to this snippet. Another red arrow points to the orange border of the entire search results area.

Google

which backend language is best with front end react in web development? X

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We recommend using **Express Js with NodeJS** as they have proven to be the best and most appropriate backend framework for React.

Jan 30, 2023

KnowledgeHut
https://www.knowledgehut.com > ... > Web Development

Best Backend for React in 2023 - KnowledgeHut

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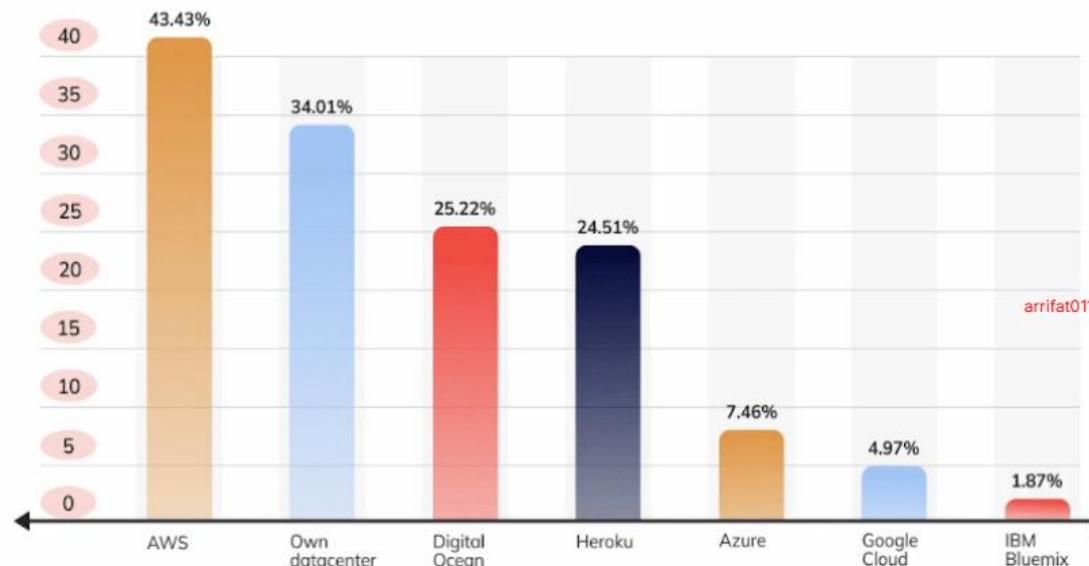
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Windows Start button

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Where can you run NodeJS apps?



ref:
tutorialspoint.com/nodejs



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Employers need vs Our learning

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A bar chart titled 'Employers need vs Our learning' comparing the percentage of employers needing specific technologies versus what students know. The Y-axis represents the percentage from 0% to 40%. The X-axis lists ten technologies: Node.js, AngularJS, React, Spring, .NETCore, Django, ExpressJS, Vue.js, Ruby on Rails, and React Native. For each technology, there are two bars: a light blue bar for 'Employers Need' and a dark blue bar for 'Students Know'. The chart shows that employers most frequently need Node.js and AngularJS, while students are more likely to know Node.js and AngularJS.

Technology	Employers Need (%)	Students Know (%)
Node.js	35	15
AngularJS	35	12
React	30	7
Spring	20	3
.NETCore	12	4
Django	12	9
ExpressJS	10	7
Vue.js	8	1
Ruby on Rails	8	3
React Native	7	2

● Employers Need ● Students Know

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তাই বলে কি NodeJS সব ধরনের website এর জন্যই best?

No



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web.programming-hero.com/update-1/video/update-1-54-4-what-is-node-js-and-express-js-and-why-use-them

NodeJs vs Python : Website categories

A bar chart titled "NodeJs vs Python : Website categories" showing the count of websites for each technology across nine categories. The Y-axis represents the count from 0 to 9000. The X-axis categories are Computer & Technology, Entertainment, Finance, Vehicles, Business & Services, Heavy Industries, Law & Govt., Health, and F & B. Node.js is represented by blue bars and Python by purple bars. A watermark for "Programming Tutorials Point" is visible in the bottom right corner.

Category	Node.js	Python
Computer & Technology	~7300	~5200
Entertainment	~2700	~2300
Finance	~2600	~1200
Vehicles	~2600	~1100
Business & Services	~2200	~2000
Heavy Industries	~500	~1400
Law & Govt.	~1600	~1700
Health	~1400	~1600
F & B	~1700	~2200

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Node.js

Python

Programming Tutorials Point

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tutorialspoint.com

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Thank you!

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Press Esc to exit full screen

SLIDE

What is express & why should you learn express js?

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What is ExpressJS?

- Express is a node js web application framework that provides broad features for building web and mobile applications.
- It is used to build a single page, multipage, and hybrid web application.
- It's a layer built on the top of the Node js that helps manage servers and routes.

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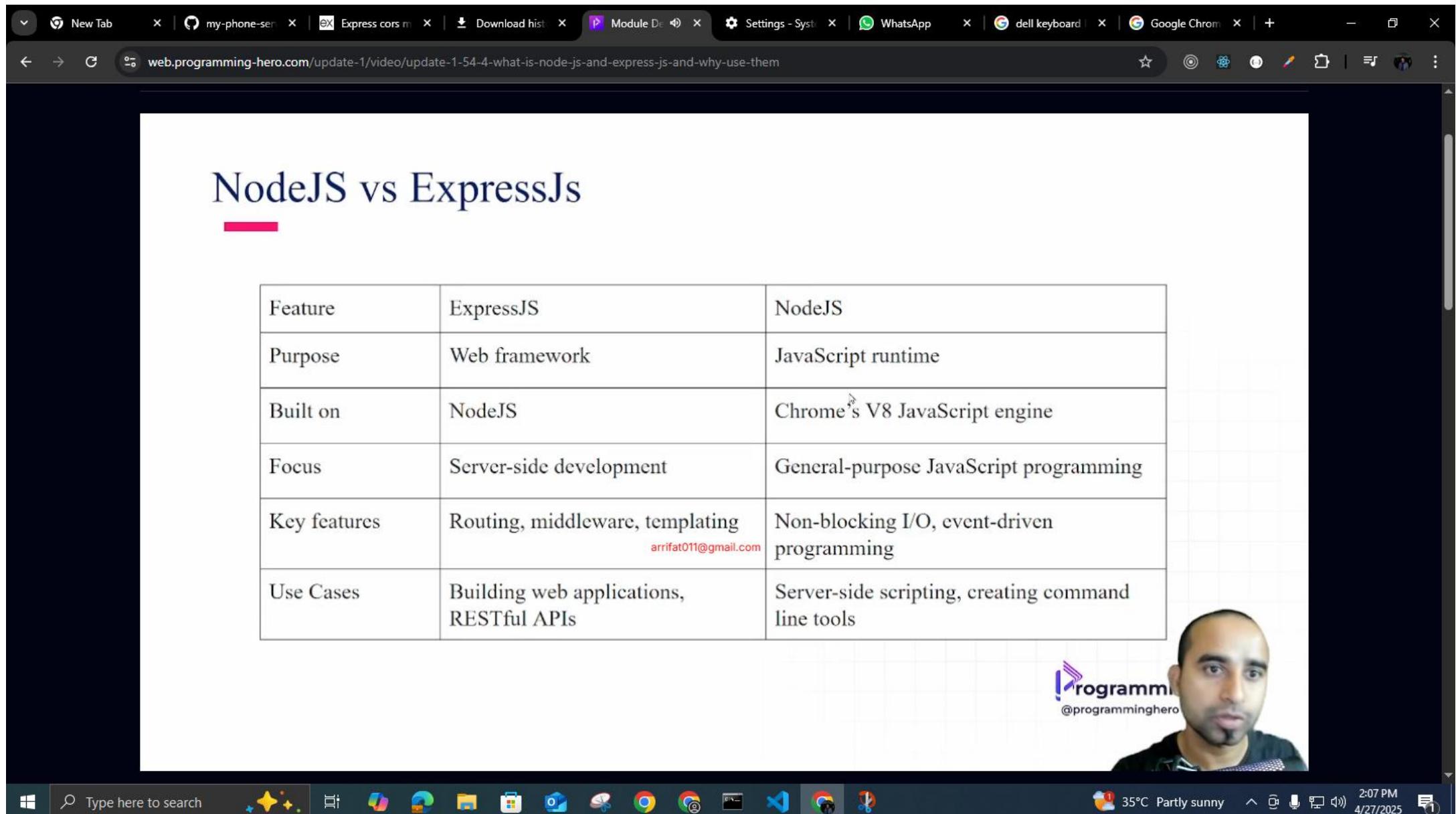


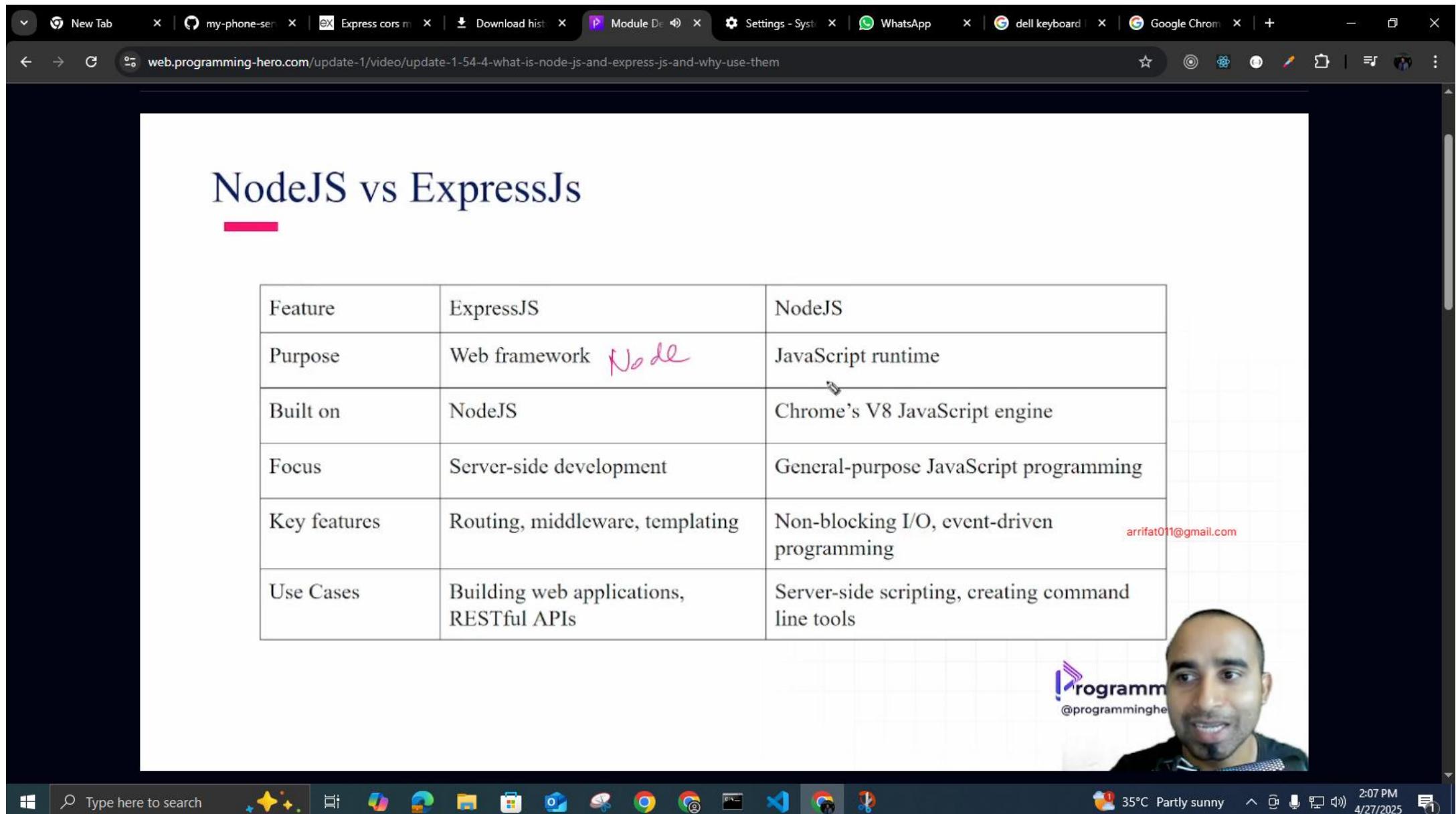
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NodeJS vs ExpressJS

E+
Node
JS
V8

Feature	ExpressJS <small>arrifat011@gmail.com</small>	NodeJS
Purpose	Web framework <u>Node</u>	<u>JavaScript runtime</u>
Built on	NodeJS	Chrome's V8 JavaScript engine
Focus	Server-side development	General-purpose JavaScript programming
Key features	Routing, middleware, templating	Non-blocking I/O, event-driven programming
Use Cases	Building web applications, RESTful APIs	Server-side scripting, creating command line tools



NodeJS vs ExpressJS

E + JS
Node
JS
V8

Feature	ExpressJS arrifat011@gmail.com	NodeJS
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NodeJS vs ExpressJS

E + JS
Node
JS
V8

Feature	ExpressJS	NodeJS
Purpose	Web framework <u>Node</u>	<u>JavaScript runtime</u>
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NodeJS vs ExpressJS

~~Express~~
Node
JS
V8

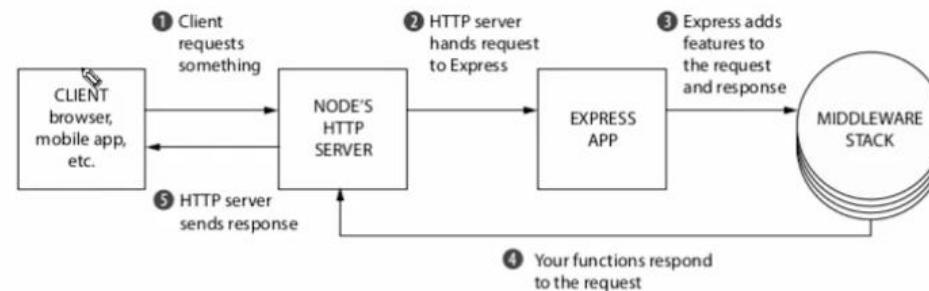
Feature	ExpressJS	NodeJS
Purpose	Web framework Node	<u>JavaScript runtime</u>
Built on	NodeJS	<u>Chrome's V8 JavaScript engine</u>
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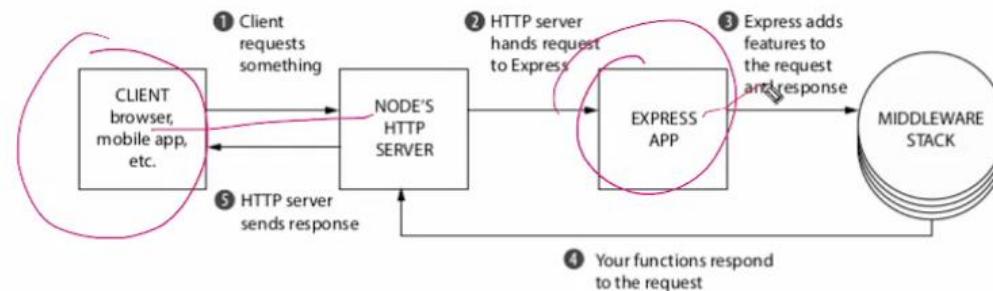
Node.js APIs can get complex and writing how to handle a single request can end up being over 50 lines of code. Express makes it easier to write Node.js web applications.





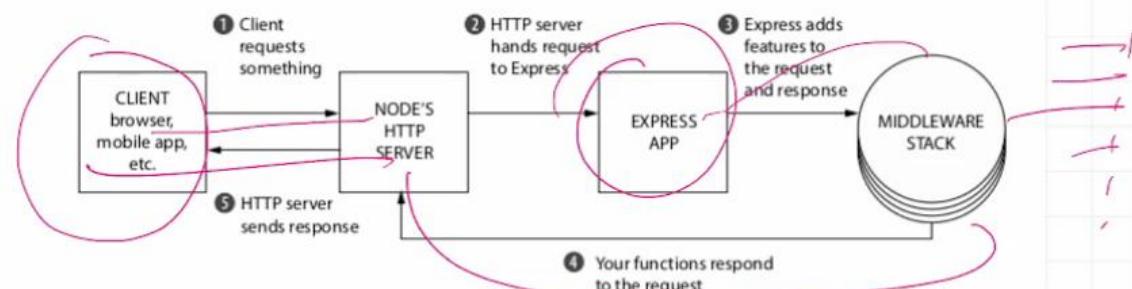
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Node.js APIs can get complex and writing how to handle a single request can end up being over 50 lines of code. Express makes it easier to write Node.js web applications.



What is ExpressJS?

Node.js APIs can get complex and writing how to handle a single request can end up being over 50 lines of code. Express makes it easier to write Node.js web applications.



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What is ExpressJS Middleware?

- Middleware in Express are functions that come into play **after the server receives the request and before the response is sent to the client.**
- They are arranged in a chain and are called in sequence.

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What is ExpressJS Middleware?

We can use middleware functions for different types of processing tasks required for fulfilling the request like

- database querying,
- making API calls,
- preparing the response, etc,
- and finally calling the next middleware function in the chain.

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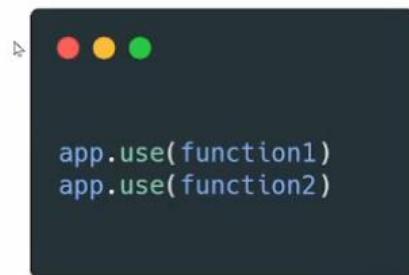


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What is ExpressJS Middleware?

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- We call `app.use()` to add a middleware function to our Express application.
- Under the hood, when we call `app.use()`, the Express framework adds our middleware function to its internal middleware stack.
- Express executes middleware in the order they are added, so if we make the calls in this order:



```
app.use(function1)
app.use(function2)
```

Express will first execute `function1` and then `function2`.



What is ExpressJS Middleware?

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```
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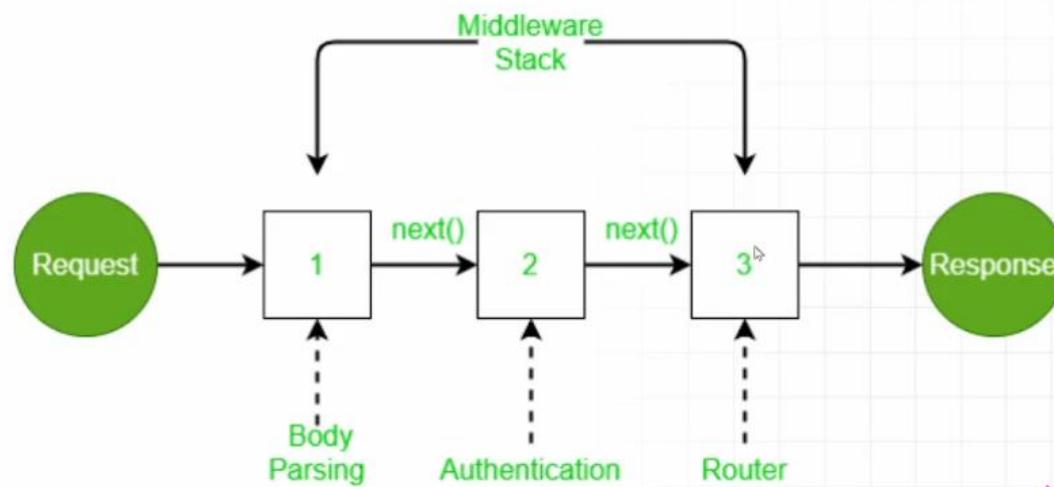
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Express will first execute `function1` and then `function2`.



What is ExpressJS Middleware?

The **next()** function in the express is responsible for calling the next middleware function if there is one.



What is ExpressJS Middleware?

Some middleware functions do not require the next function to be called, because they are specifically designed to handle the request and response on their own.

```
app.use(cors());
```

the cors() middleware function is used to enable Cross-Origin Resource Sharing (CORS) for an Express application, and it sets the appropriate headers in the response to allow cross-origin requests.

```
app.use(express.json());
```

the express.json() middleware function is used to parse incoming JSON requests.



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Why ExpressJS?

Providing a robust set of features for building web app's:

- Configuration
 - Middleware
 - Session
 - Routing
 - View & Templates
 - Security



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The reason behind creating an express framework for nodejs is
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**Fast, asynchronous, unopinionated,
minimalist**



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Create server without ExpressJS

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

const server = http.createServer((req, res) => {
  res.writeHead(200, {'Content-Type': 'text/plain'});
  res.write('Hello, world!');
  res.end();
});

server.listen(3000, () => {
  console.log('Server is running on port 3000');
});
```



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Create server with ExpressJS

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

const app = express();

app.get('/', (req, res) => {
    res.send('Hello, world!');
});

app.listen(3000, () => {
    console.log('Server is running on port 3000');
});
```

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Routing without ExpressJS

```
const http = require('http');
const hostname = 'localhost';
const port = 3000;

const server = http.createServer((req, res) => {
  // Parse the request URL to get the path
  const path = req.url;

  // Route the request based on the path
  if (path === '/') {
    res.statusCode = 200;
    res.setHeader('Content-Type', 'text/plain');
    res.end('Hello, world!');
  } else if (path === '/about') {
    res.statusCode = 200;
    res.setHeader('Content-Type', 'text/plain');
    res.end('This is the about page');
  } else {
    res.statusCode = 404;
    res.setHeader('Content-Type', 'text/plain');
    res.end('Page not found');
  }
});

server.listen(port, hostname, () => {
  console.log(`Server running at http://${hostname}:${port}/`);
});
```

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Routing with ExpressJS

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

const app = express();

app.get('/', (req, res) => {
    res.send('Hello, world!');
});

app.get('/about', (req, res) => {
    res.send('This is the about page');
});

app.use((req, res) => {
    res.status(404).send('Page not found');
});

app.listen(3000, () => {
    console.log('Server is running on port 3000');
});
```



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Is ExpressJS better than other frameworks?

In recent years, ExpressJS has become the de facto choice for building web applications as it is fast, flexible, and minimal.

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Is ExpressJS good for larger applications?

ExpressJS has a simple and intuitive API that makes it easy to learn and use, even for beginner web developers. ExpressJS is designed to be scalable and efficient, making it suitable for building large and complex web applications.

ref: [Intellipaat](#) arrifat011@gmail.com



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In 2023

arrifat011@gmail.com

The Most Demanding Backend Web Frameworks?

Framework	Logo
Django	django
Laravel	laravel
Express.JS	express
Nest.JS	nestjs
Ruby On Rails	rails
Spring Boot	spring
Flask	flask

ref: [GrafferID](#)

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Companies using ExpressJS



EXOVE



See more: [expressjs](#)

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DATABASE, DBMS, MONGODB, MONGODB VS MYSQL

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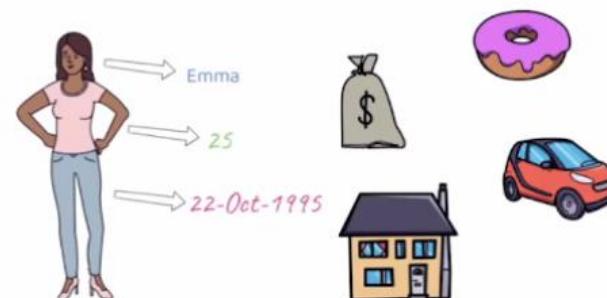
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What is data?

- Data can be anything and everything. Any information or fact can be considered as data.
- Your name, age, date of birth or any other information such as your house address, bank balance, vehicle you drive or even the food you eat can be considered as data.

What is Data?

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What is a database?

- Database can be considered as a container filled with data which is electronically stored in a computer system.
- Data in any form can be stored into the database. It is a collection of records. Purpose of storing data in a database is so that it ^{arrifat011@gmail.com} can be easily accessed, modified, protected and analyzed.
- **Types of database:** Distributed databases, Object-oriented databases, Centralized database, Open-source databases, Cloud databases, NoSQL Databases and many more.



Windows taskbar icons include: Search bar, Start button, File Explorer, Microsoft Edge, Google Chrome, Visual Studio Code, and others. System tray icons show weather (35°C Partly sunny), battery, and date (4/27/2025).

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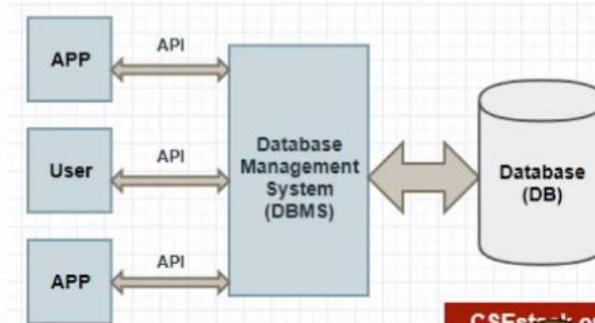
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What is Database management System (DBMS)?

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- **Database** is just a container which stores data whereas **Database Management System or DBMS** is a software which is used to manage your database.
- You need DBMS to interact with database, to store, modify, retrieve and protect data.
- DBMS is also required to create, modify and delete databases.
- Users can use DBMS to enter commands in specific language to interact with Database.
- Example of a DBMS is MySQL, PostgreSQL, MongoDB, Neo4j, Cassandra etc.



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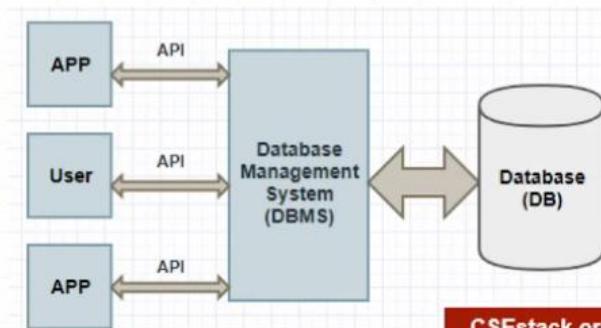


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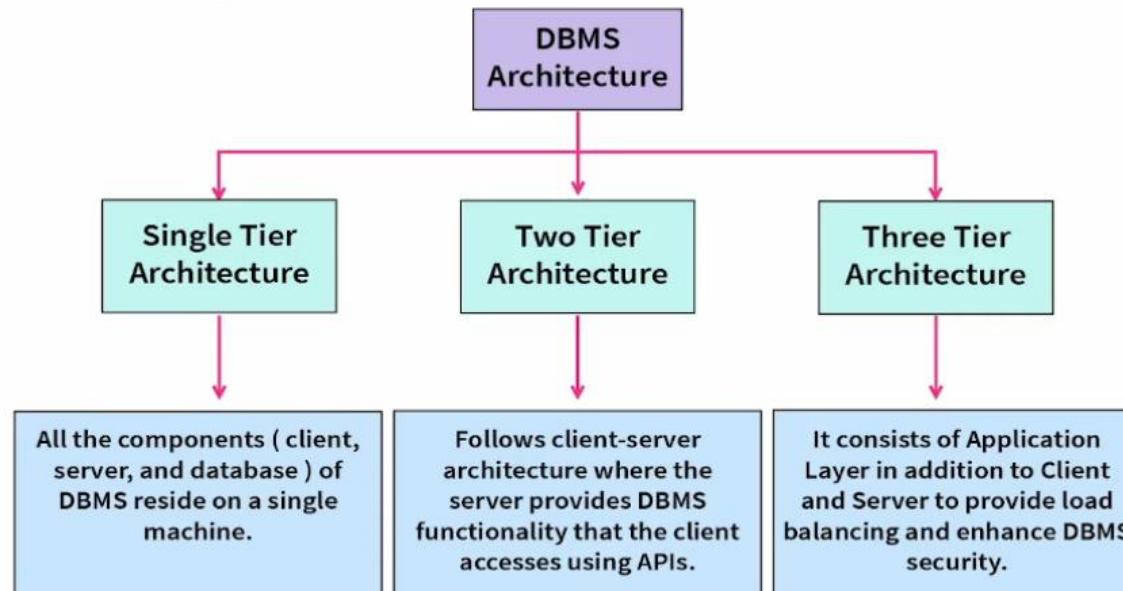


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DBMS Architecture Types

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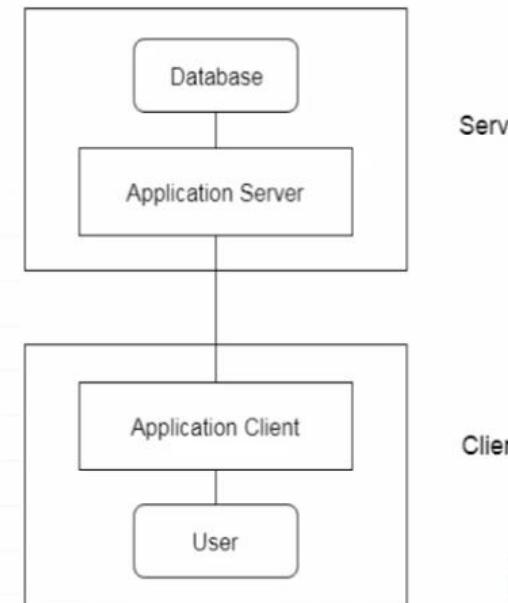


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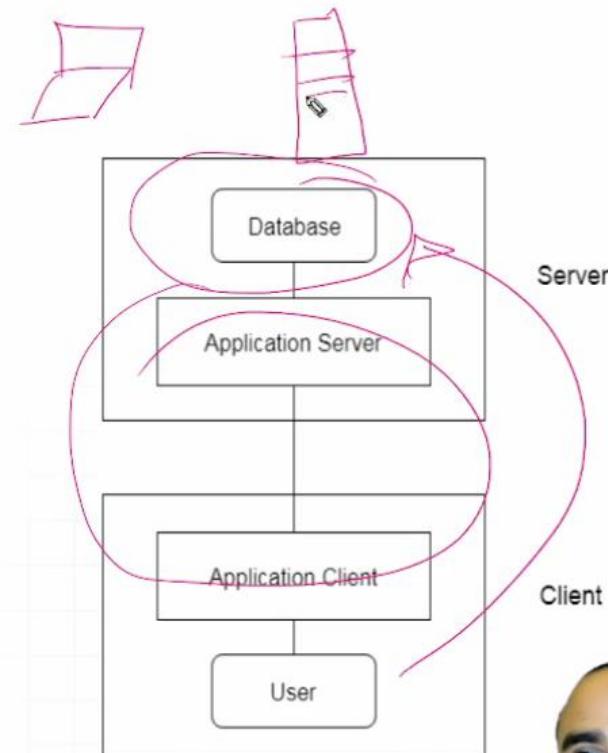
3-Tier Architecture

- The 3-Tier architecture contains another layer between the client and server. In this architecture, client can't directly communicate with the server.
- The application on the client-end interacts with an application server which further communicates with the database system.
- End user has no idea about the existence of the database beyond the application server.
- The 3-Tier architecture is used in case of large web application.



3-Tier Architecture

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SQL

VS

NoSQL

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SQL Database

- SQL(Structured Query language) is the standard language for dealing with Relational Databases.
- SQL database or relational database is a collection of highly structured tables
- each row reflects a data entity, and every column defines a specific information field.
- Relational databases are built using the structured query language (SQL) to create, store, update, and retrieve data.
- Therefore, SQL is the underlying programming language for all relational database management systems (RDBMS) such as MySQL, Oracle, and Sybase, among others.



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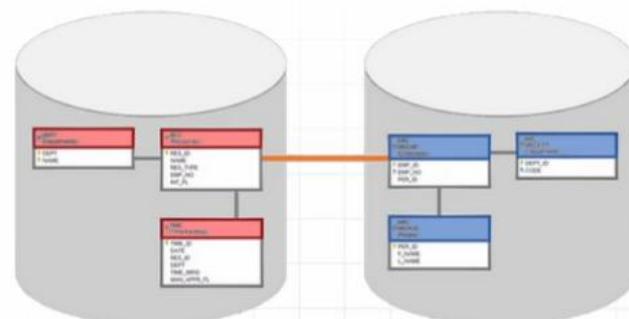
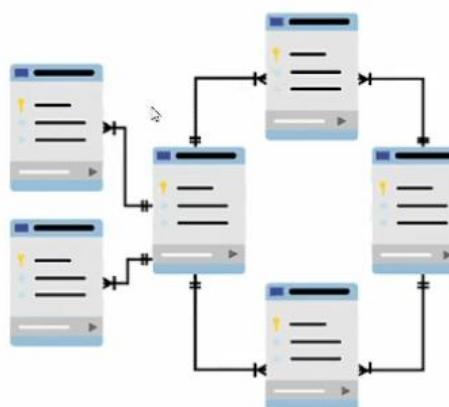


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SQL Database



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NoSQL Database

- NoSQL databases are non-tabular databases and store data differently than relational tables
- It avoids joins, and is easy to scale.
- The major purpose of using a NoSQL database is for distributed data stores with humongous data storage needs.



Types of NoSQL Database

- **Document databases** store data in documents similar to JSON (JavaScript Object Notation) objects. Each document contains pairs of fields and values. The values can typically be a variety of types, including things like strings, numbers, booleans, arrays, or objects.
- **Key-value databases** are a simpler type of database where each item contains keys and values.
- **Wide-column stores** store data in tables, rows, and dynamic columns.
- **Graph databases** store data in nodes and edges. Nodes typically store information about people, places, and things, while edges store information about the relationships between the nodes.



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When should NoSQL be used?

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When deciding which database to use, decision-makers typically find one or more of the following factors lead them to selecting a NoSQL database:

- Fast-paced Agile development
- Storage of structured and semi-structured data
- Huge volumes of data
- Requirements for scale-out architecture
- Modern application paradigms like microservices and real-time streaming

To more visit this link: <https://www.mongodb.com/nosql-explained/when-to-use-nosql>



SQL Vs NoSQL

SQL	NoSQL
SQL databases are primarily called RDBMS or Relational Databases <small>arrifat011@gmail.com</small>	NoSQL databases are primarily called as Non-relational or distributed database
Structured query language (SQL)	No declarative query language
SQL databases are table based databases	NoSQL databases can be document based, key-value pairs, graph databases
SQL databases have a predefined schema	NoSQL databases use dynamic schema for unstructured data.
Oracle, Postgres, MySQL, and MS-SQL	MongoDB, Redis, Neo4j, Cassandra, Hbase



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SQL Vs NoSQL

SQL	NoSQL
SQL databases are primarily called RDBMS or Relational Databases	NoSQL databases are primarily called as Non-relational or distributed database
<u>Structured query language (SQL)</u>	<u>No declarative query language</u>
<u>SQL databases are table based databases</u>	NoSQL databases can be document based, key-value pairs, <u>graph databases</u>
<u>SQL databases have a predefined schema</u>	NoSQL databases use <u>dynamic schema</u> for unstructured data.
<u>Oracle, Postgres, MySQL, and MS-SQL</u>	MongoDB, Redis, Neo4j, Cassandra, Hbase

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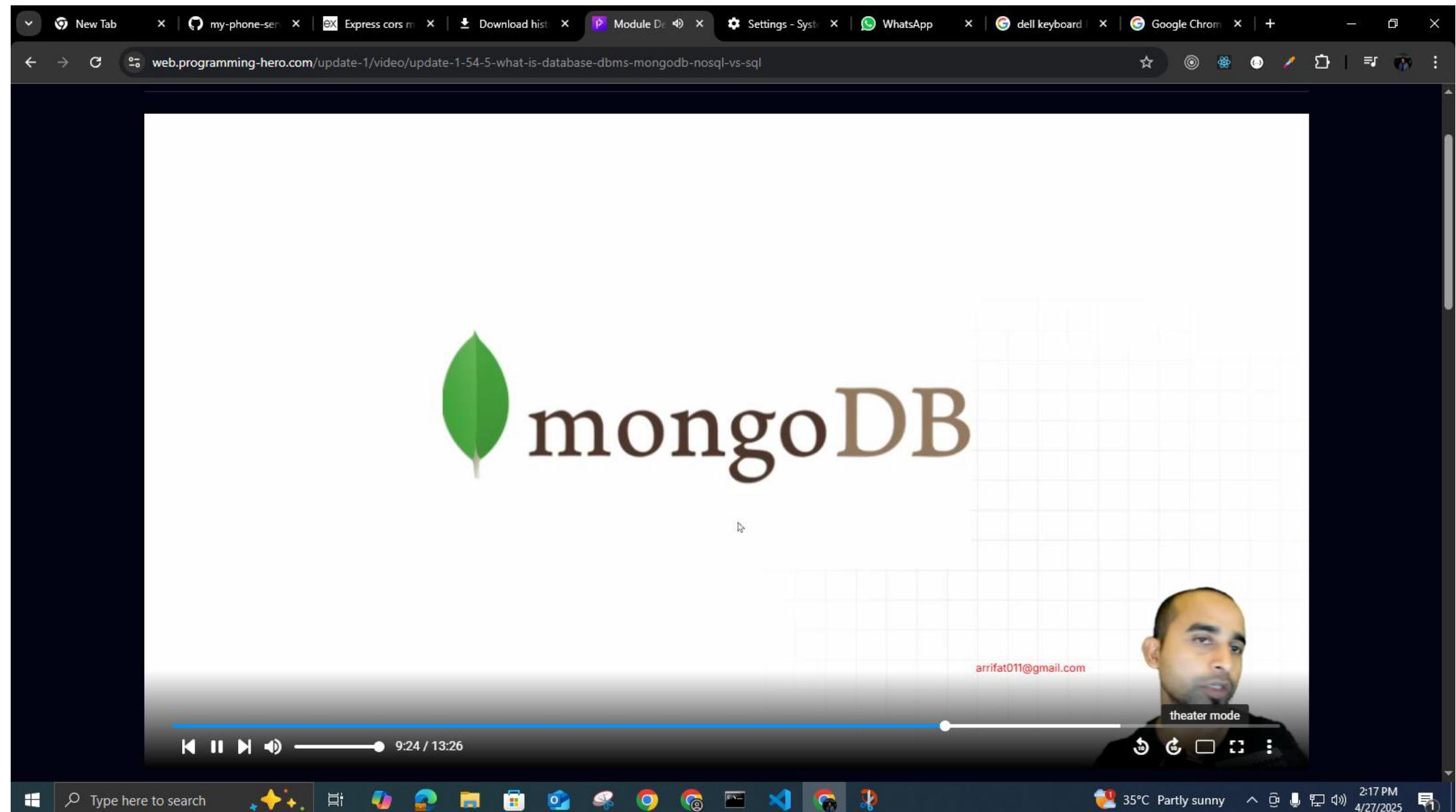
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MongoDB

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- MongoDB is an open-source, cross-platform, distributed document database.
- MongoDB is developed by MongoDB Inc. and categorized as a NoSQL database.
- MongoDB is not a Relational Database Management System (RDBMS).
- It is opposite to SQL based databases where it does not normalize data under schemas and tables where every table has a fixed structure.
- It stores data in the collections as JSON based documents and does not enforce schemas. It does not have tables, rows, and columns as other SQL (RDBMS) databases.



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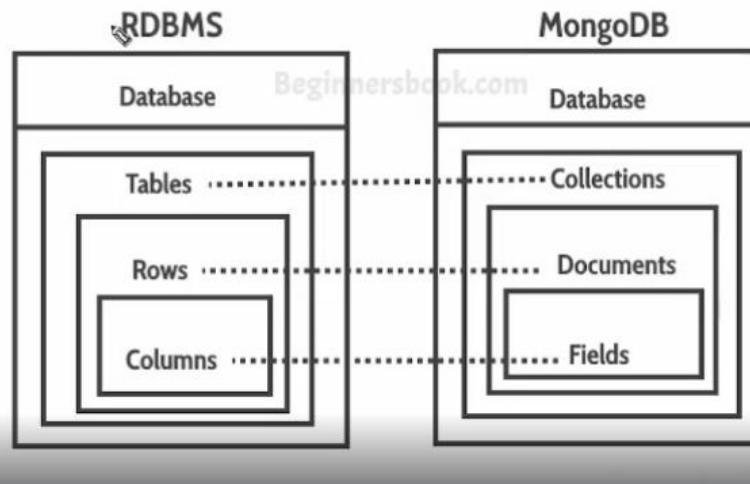


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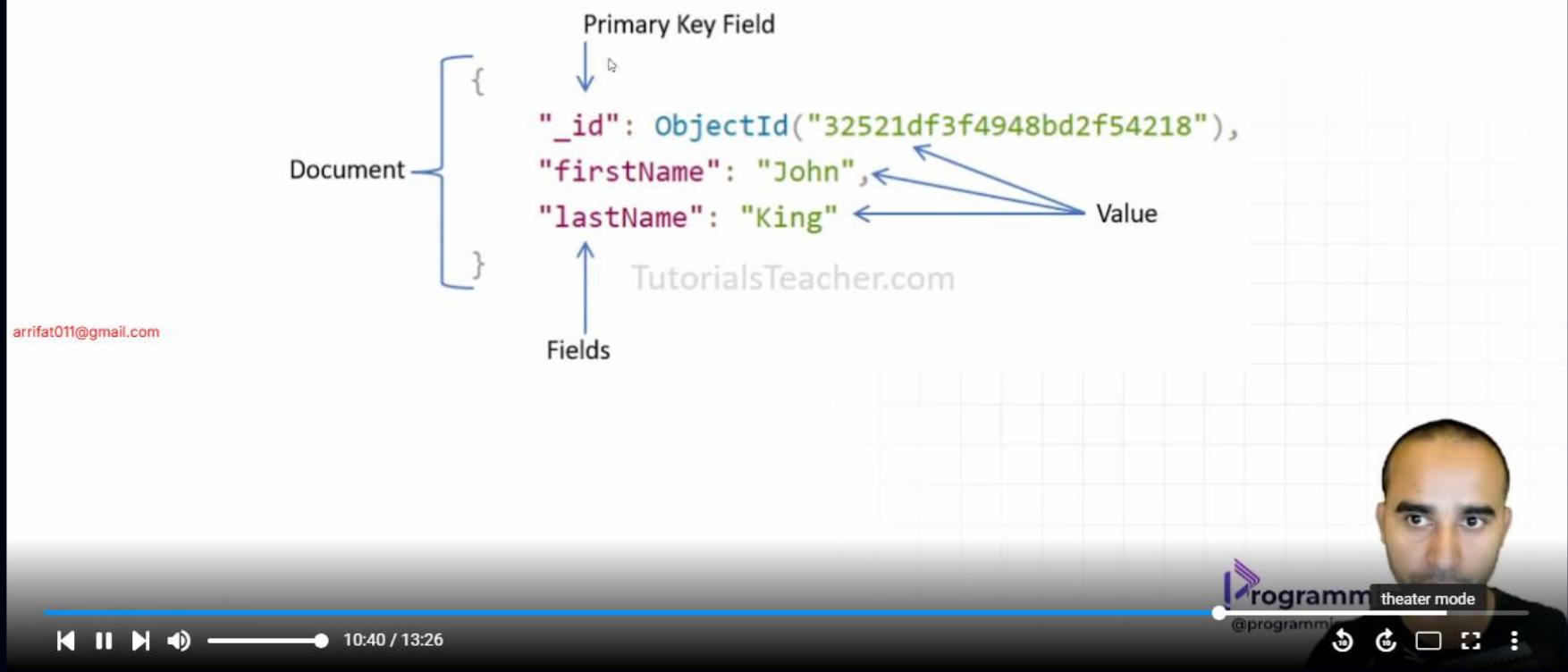


MongoDB

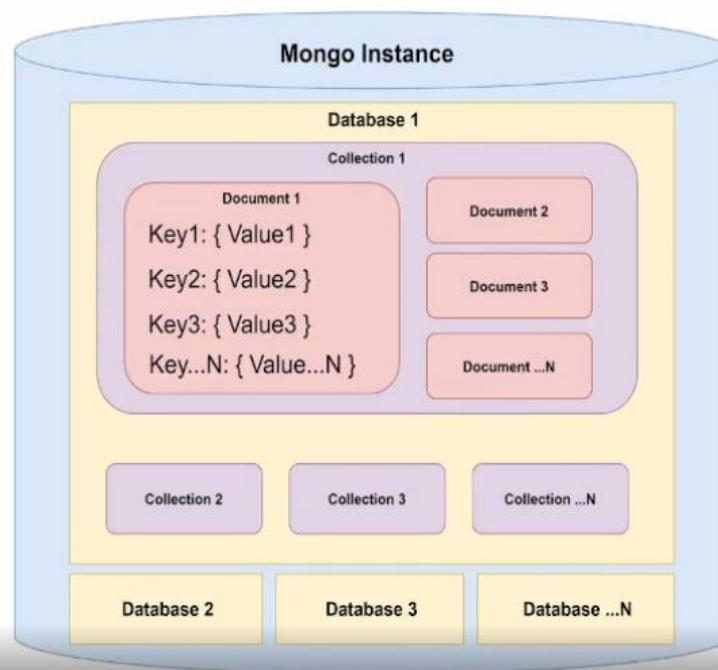
In the RDBMS database, a table can have multiple rows and columns. Similarly in MongoDB, a collection can have multiple documents which are equivalent to the rows. Each document has multiple "fields" which are equivalent to the columns. Documents in a single collection can have different fields.



MongoDB



A visual look at the structure of MongoDB databases, collections, and documents.



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Advantages of MongoDB

- MongoDB stores data as JSON based document that does not enforce the schema. It allows us to store hierarchical data in a document. This makes it easy to store and retrieve data in an efficient manner.
- It is easy to scale up or down as per the requirement since it is a document based database. MongoDB also allows us to split data across multiple servers.
- MongoDB provides rich features like indexing, aggregation, file store, etc.
- MongoDB performs fast with huge data.
- MongoDB provides drivers to store and fetch data from different applications developed in different technologies such as C#, Java, Python, Node.js, etc.
- MongoDB provides tools to manage MongoDB databases.

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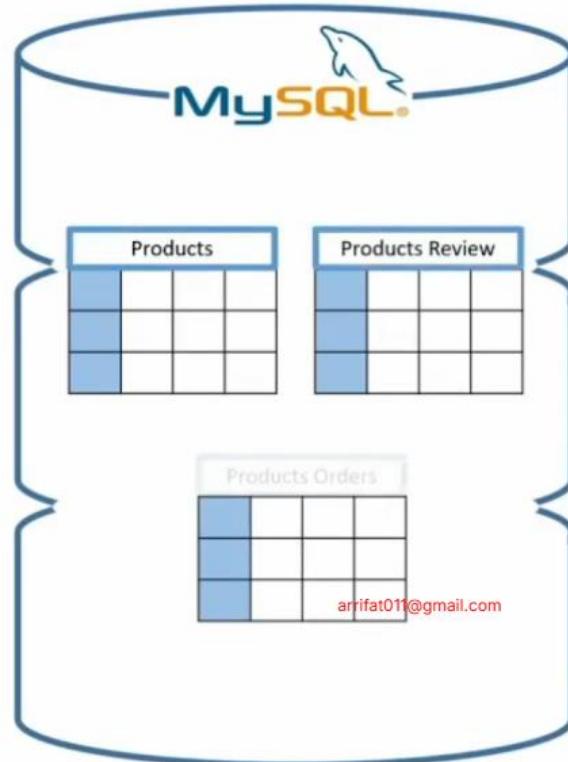
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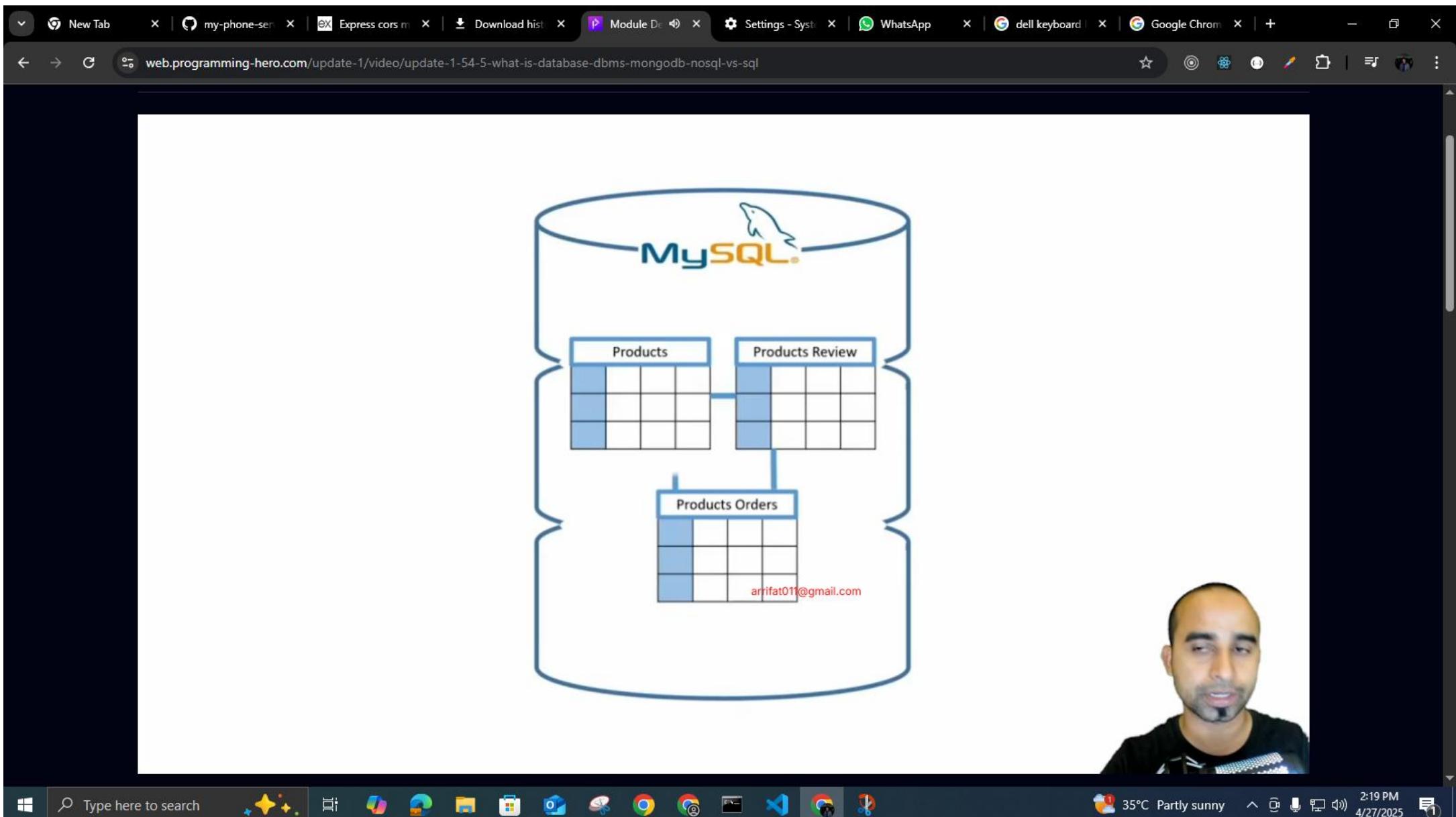


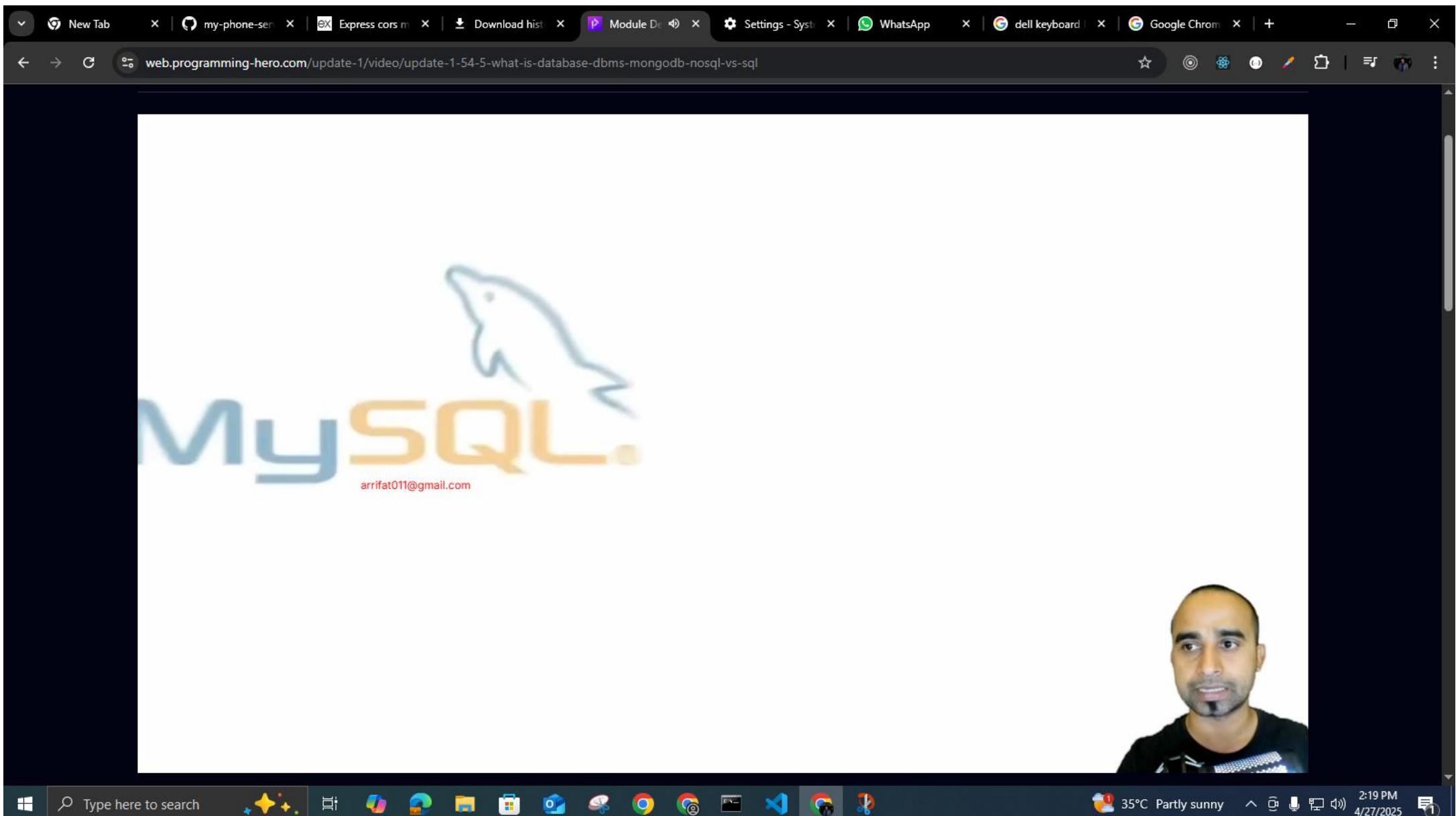
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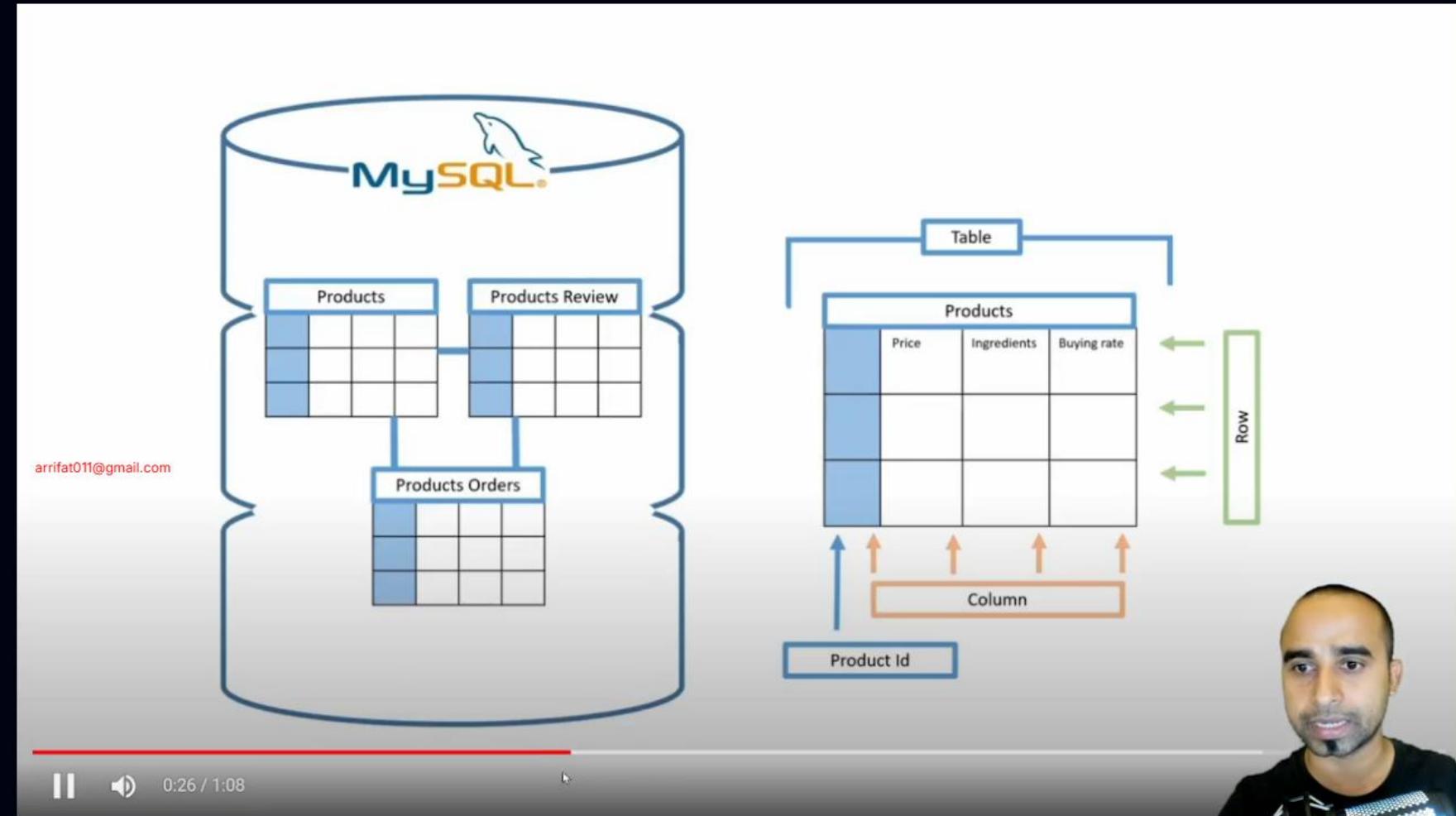


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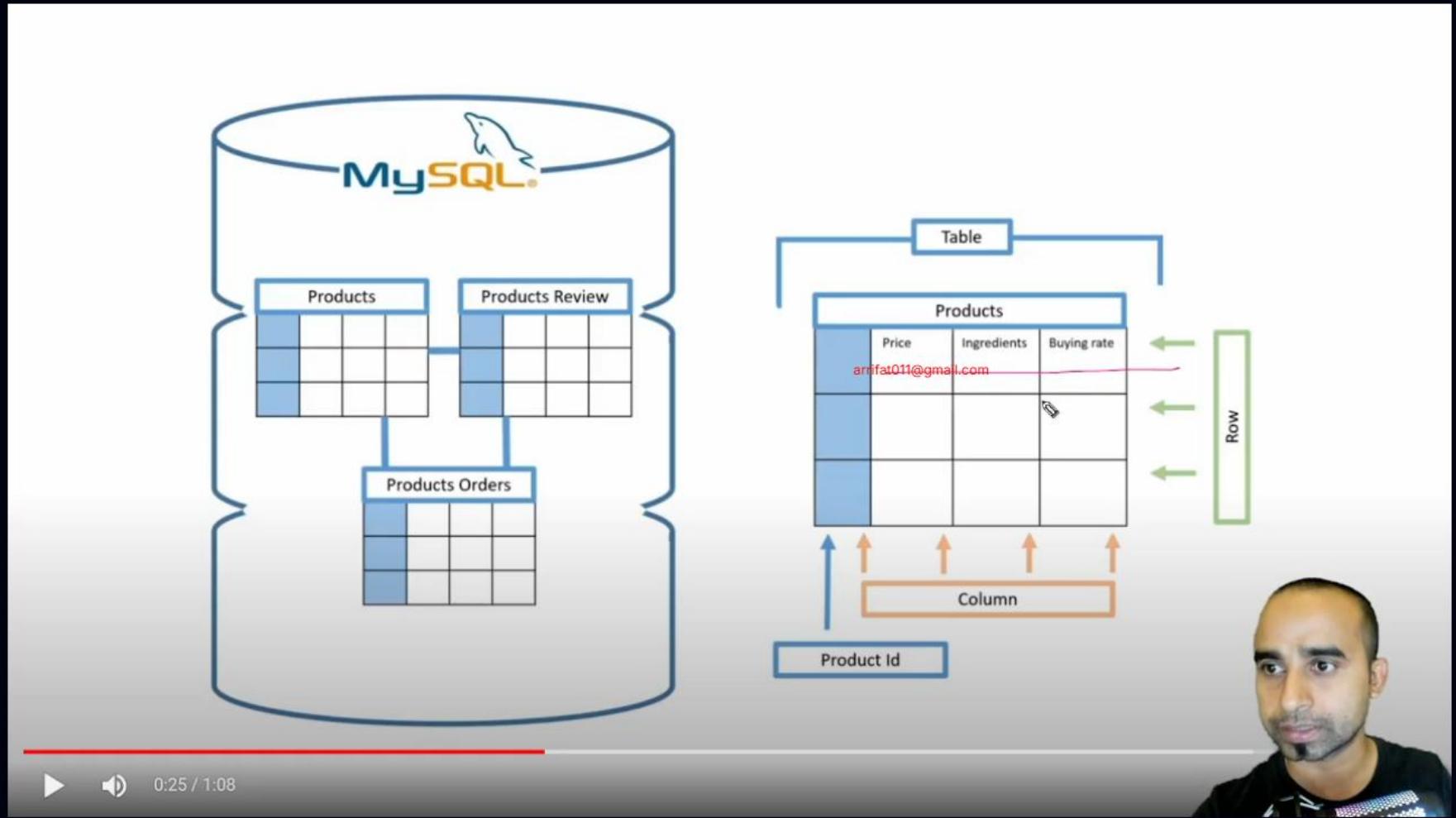
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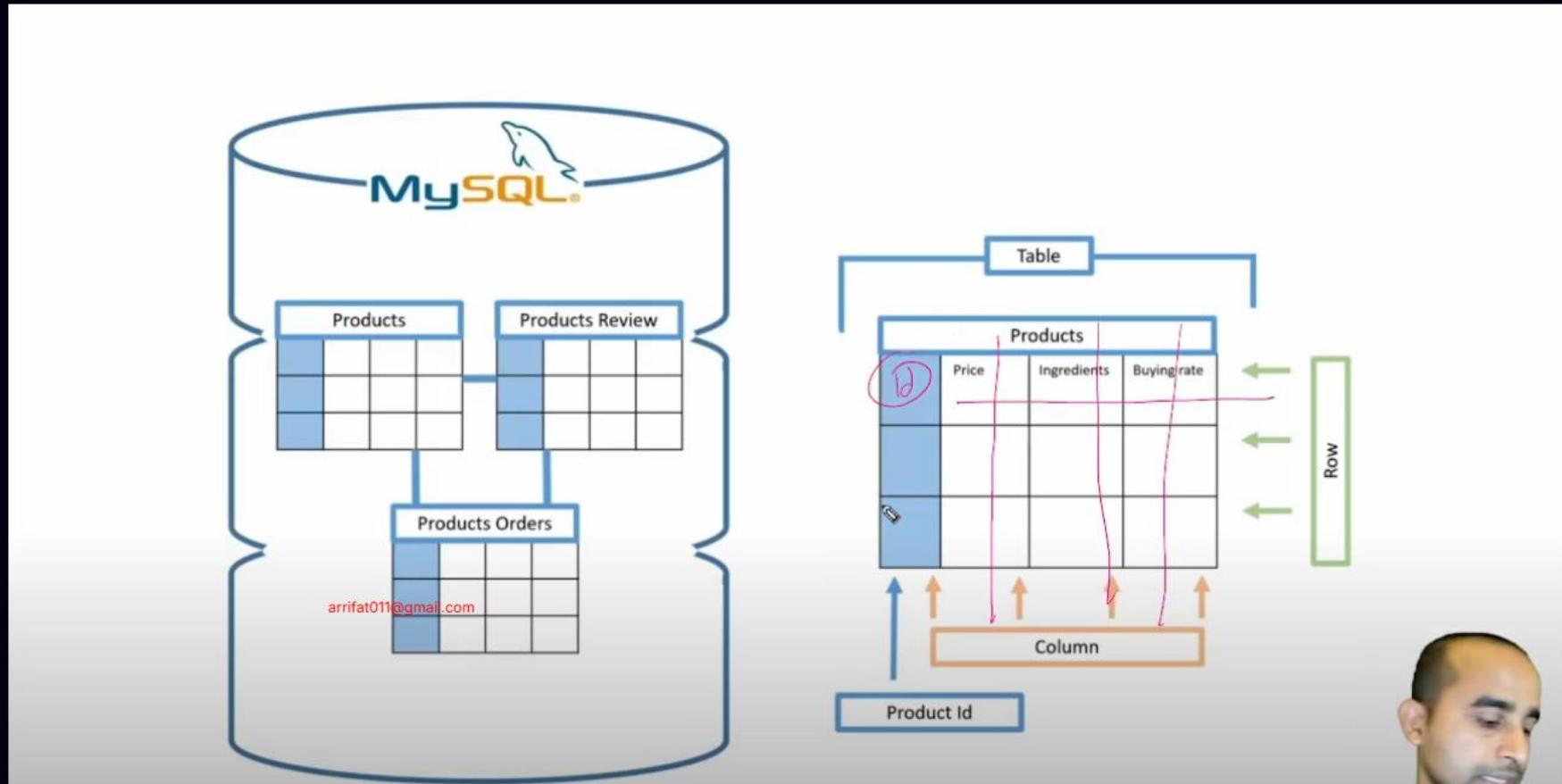


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The diagram illustrates a MongoDB database structure. It features a large green cylinder with the word "mongoDB" and its logo at the top. Inside the cylinder, there is a smaller, light-colored rectangular box with a thin black border. The word "Products" is written above this inner box. The entire diagram is set against a white background.

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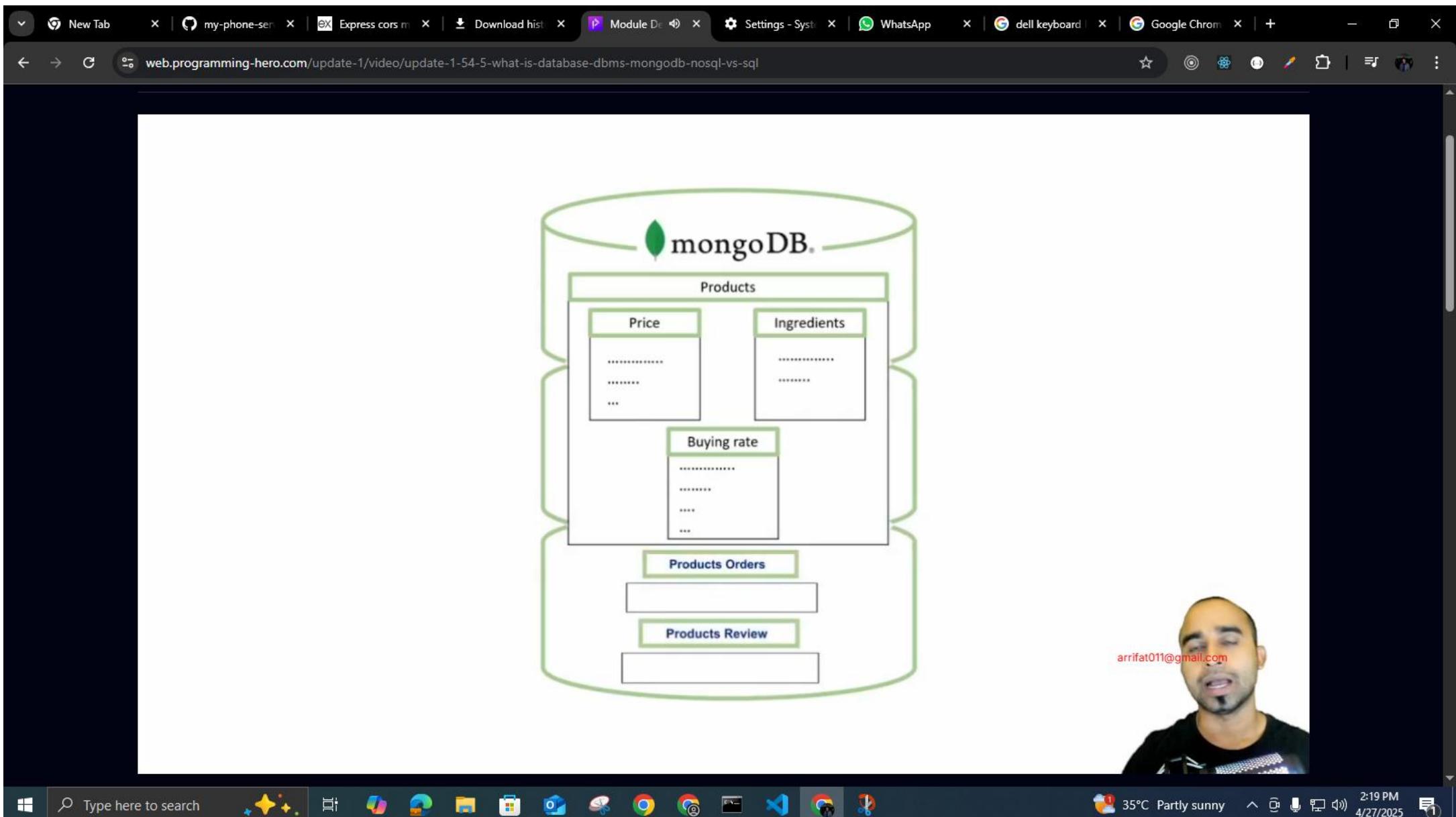
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The diagram illustrates a MongoDB database structure. A large green cylinder represents the database, with the word "mongoDB" written on it. Inside the cylinder, there is a single document labeled "Products". This document contains three fields: "Price", "Ingredients", and "Buying rate". Each field is represented by a small rectangular box.

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The diagram illustrates the difference between MongoDB and SQL databases. On the left, a large green cylinder represents a MongoDB database, labeled "mongoDB". Inside the cylinder, there is a "Products" document structure. This structure contains fields for "Price" (with three dots), "Ingredients" (with three dots), and "Buying rate" (with three dots). Below this document are two other documents: "Products Orders" and "Products Review". On the right, outside the cylinder, is a separate "Products" document structure. This structure contains fields for "Price", "Ingredients", and "Buying rate", each represented by a rectangular box with three dots.

mongoDB

Products

Price

Ingredients

Buying rate

Products Orders

Products Review

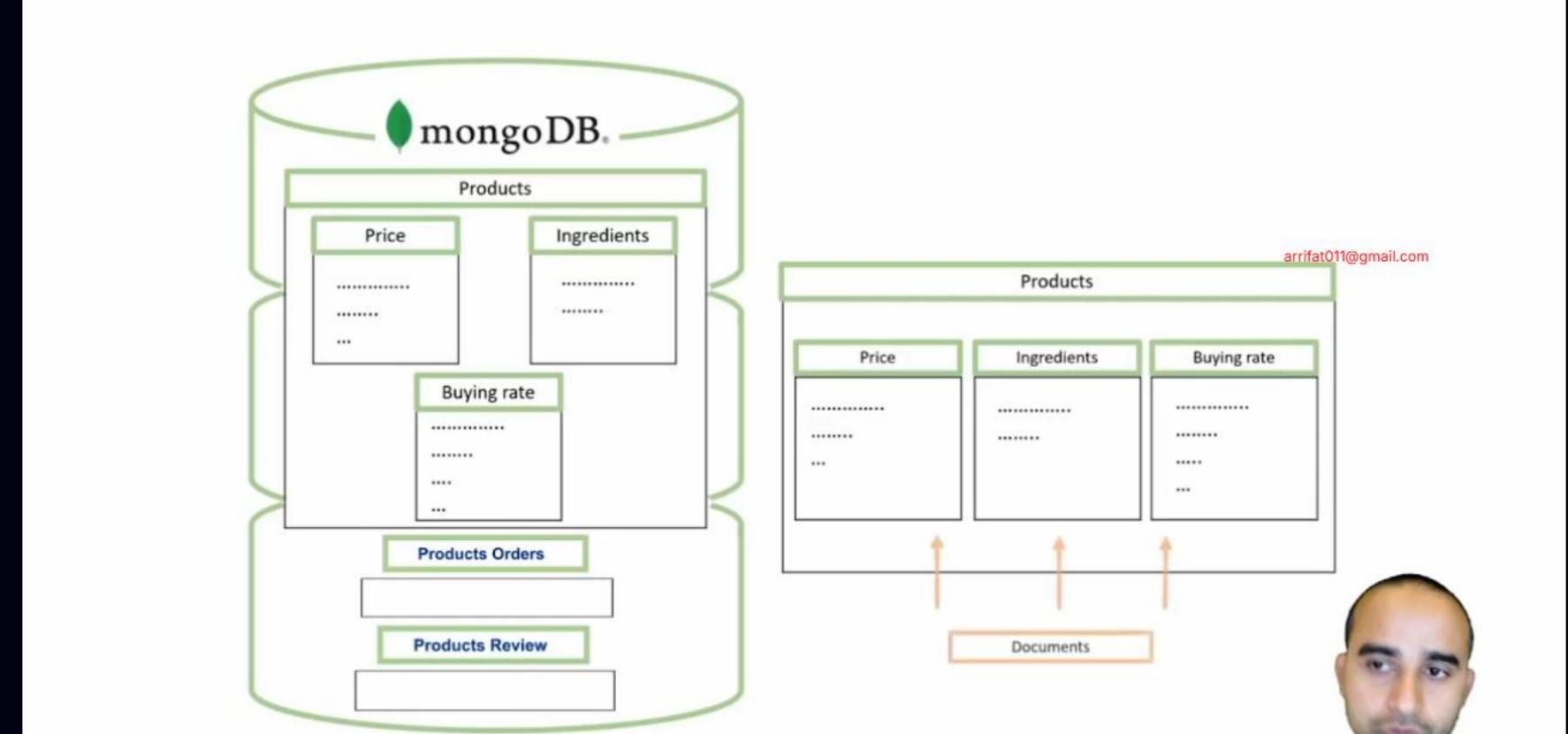
Products

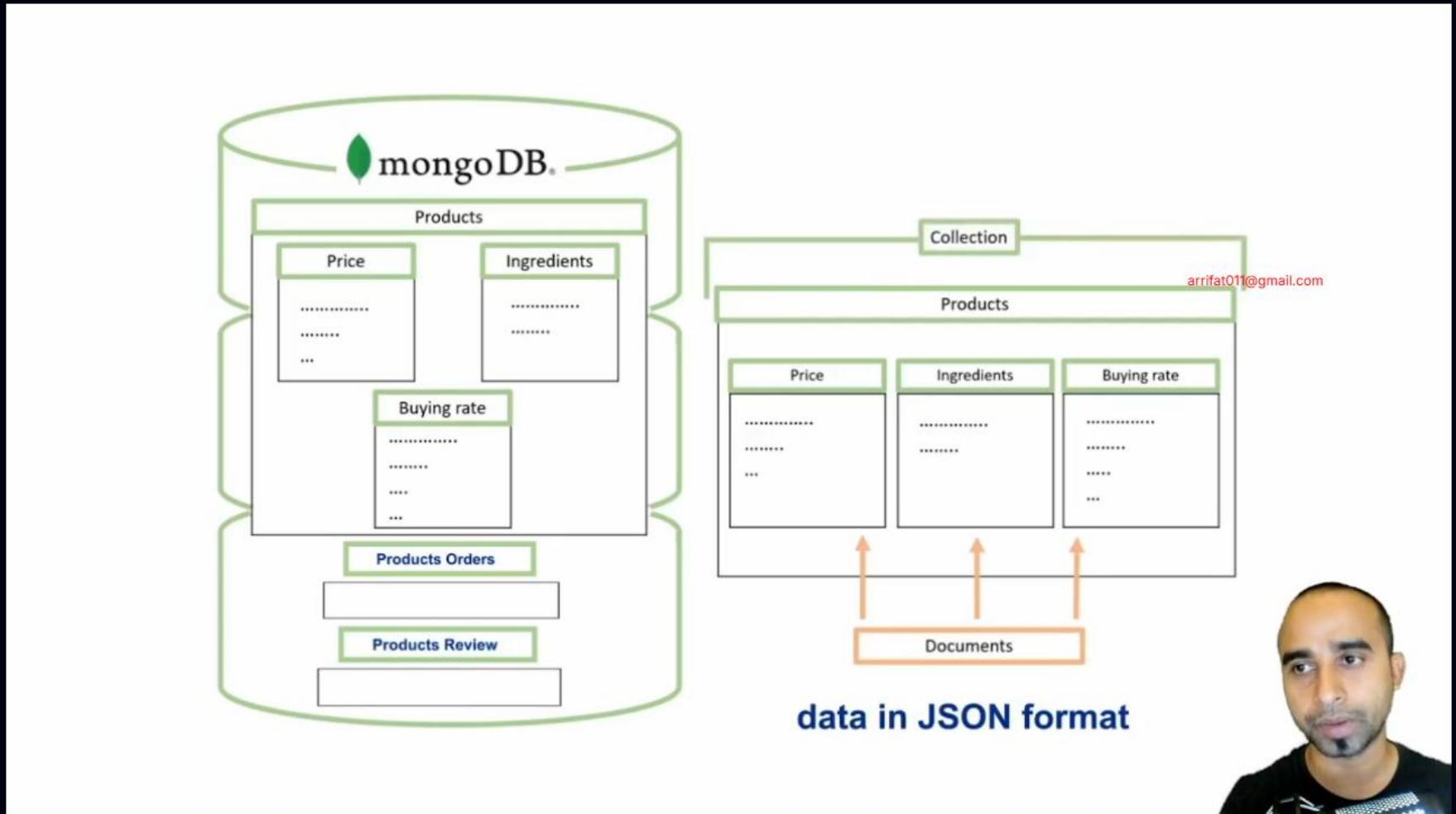
Price

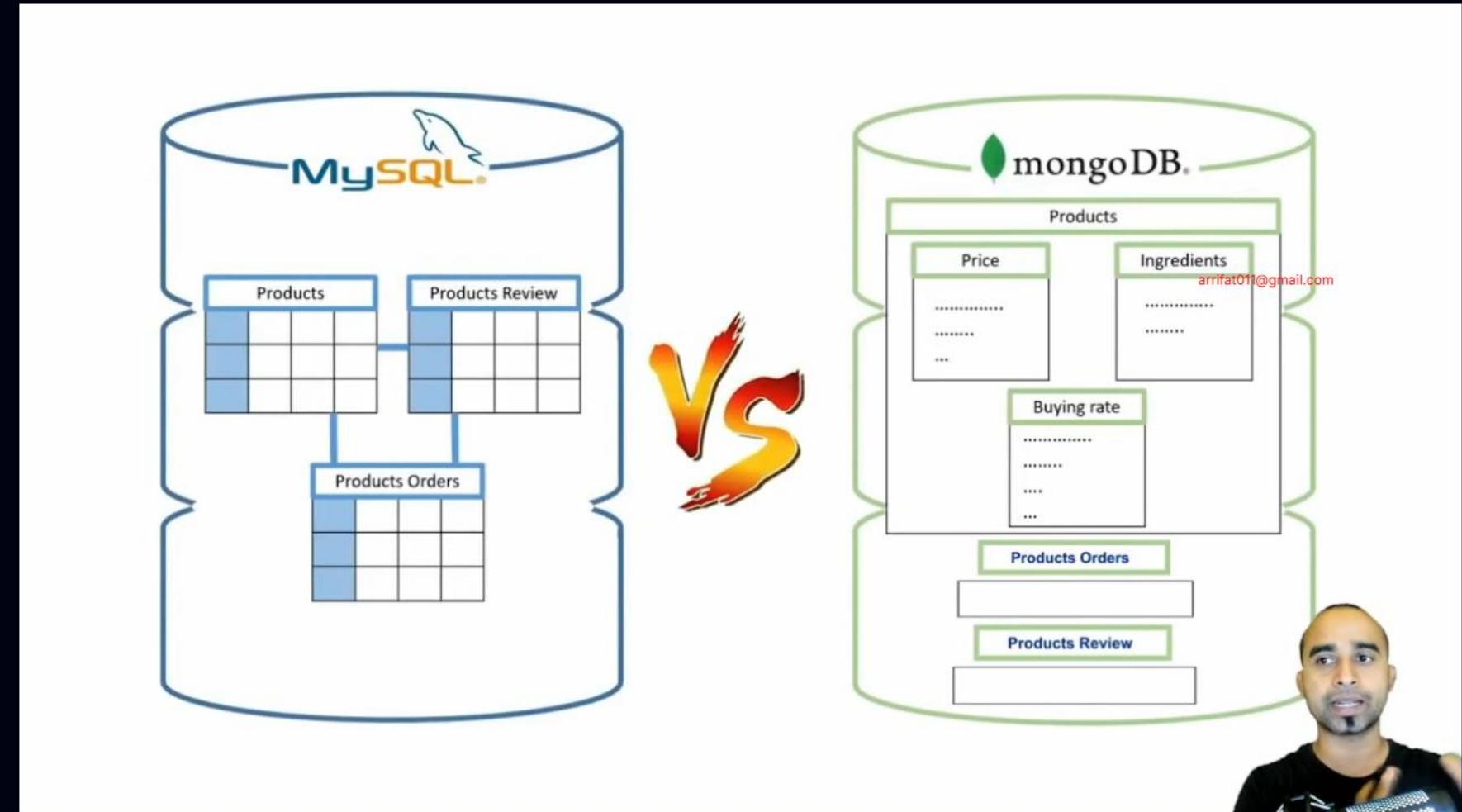
Ingredients

Buying rate









Thank you!

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