

1/6/2025

PROJECT FILE

TOPIC – Create a user Login System
using AWS Cognito and LAMP Stack



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ABSTRACT

This project focuses on the development of a secure and scalable user login system utilizing AWS Cognito integrated with the LAMP (Linux, Apache, MySQL, PHP) stack. User authentication and management are critical components of modern web applications, requiring robust solutions to ensure both security and usability. AWS Cognito is a powerful service that facilitates user sign-up, sign-in, and access control, offering features such as multi-factor authentication (MFA), social identity federation, and token-based authorization. Integrating AWS Cognito with the LAMP stack, a widely used open-source web development framework, enables the creation of a secure and efficient user authentication system.

The project implementation begins with configuring AWS Cognito to manage user pools and identity pools, which handle user data storage and identity federation respectively. It integrates Cognito's authentication APIs with a web application built on the LAMP stack. The backend, powered by PHP, communicates with AWS Cognito to validate user credentials and manage session tokens. MySQL is used to store supplementary user data and application-specific information, while Apache serves as the web server running on a Linux operating system.

Key functionalities include secure user registration, email and password-based login, password recovery, and session management. Security measures such as HTTPS, encryption of sensitive data, and Cognito's built-in capabilities like account lockout on suspicious activity are implemented to ensure robust protection against common vulnerabilities.

This system is designed with scalability in mind, leveraging AWS Cognito's serverless architecture to handle a growing number of users without additional overhead. It demonstrates a cost-effective approach to building secure, reliable, and maintainable user authentication systems suitable for web applications across diverse domains.

By integrating AWS Cognito with the LAMP stack, this project exemplifies a practical solution for modern authentication challenges, combining cloud-based services with traditional web development practices.

OBJECTIVE

The objective of this project was to design and implement a secure, scalable, and user-friendly login system using AWS Cognito and the LAMP (Linux, Apache, MySQL, PHP) stack. The system was developed to enhance authentication, streamline user management, and ensure a robust security framework. Key objectives achieved through this project include:

Integration of AWS Cognito for Authentication and Authorization

AWS Cognito was seamlessly integrated to enable a highly secure user authentication mechanism. This allowed for the management of user pools, multifactor authentication (MFA), and token-based identity verification, ensuring compliance with industry security standards.

Development of a Scalable and Modular Architecture

The project utilized the LAMP stack to build a modular architecture capable of handling dynamic user interactions efficiently. PHP was employed for server-side scripting, Apache for web server functionality, MySQL for robust database management, and Linux for hosting the application. This architecture ensures scalability and flexibility to accommodate future enhancements.

Implementation of Role-Based Access Control (RBAC)

A role-based access control system was implemented to restrict access to specific features based on user roles. This ensures that users interact with the system within their defined privileges, enhancing security and operational efficiency.

Responsive and User-Friendly Interface

The system features a responsive and intuitive interface designed for seamless user registration, login, and profile management. The interface was rigorously tested for cross-browser compatibility and mobile responsiveness to ensure an optimal user experience.

This project demonstrates proficiency in integrating AWS Cognito with the LAMP stack to create a secure, reliable, and scalable user login system. The solution aligns with modern security practices and provides a foundation for further enhancements and integrations.

INTRODUCTION

In the dynamic landscape of modern web applications, user authentication and secure login systems are critical components that ensure data integrity, user privacy, and seamless access control. This project, *Create a User Login System using AWS Cognito and LAMP Stack*, explores an innovative approach to building a robust and scalable authentication framework by leveraging Amazon Web Services (AWS) Cognito alongside the tried-and-tested LAMP stack architecture.

The LAMP stack—comprising Linux, Apache, MySQL, and PHP—has long been a cornerstone of web development due to its simplicity, flexibility, and cost-effectiveness. It provides the backbone for server-side scripting, database management, and web hosting. AWS Cognito complements this stack by offering a scalable and secure authentication service that handles user sign-up, sign-in, and access control. By combining these two technologies, the project delivers a powerful system that prioritizes security, performance, and scalability.

The primary objective of this project is to design and implement a user login system that meets industry standards for authentication while maintaining user-friendly functionality. Key features include multi-factor authentication (MFA), password recovery, and role-based access control (RBAC), ensuring users have a seamless and secure experience. The integration of AWS Cognito introduces advanced features like OAuth 2.0 support, token-based authentication, and social identity federation, enabling the system to cater to a diverse range of applications.

This project will serve as a comprehensive guide to integrating AWS Cognito with the LAMP stack, covering essential aspects such as configuring the AWS

Cognito User Pool, establishing secure connections with the MySQL database, and creating an intuitive front-end interface for user interactions. By leveraging these technologies, the system will achieve enhanced security, scalability, and maintainability, making it suitable for deployment in both small-scale and enterprise-level applications.

The outcome of this project will be a production-ready login system that demonstrates the synergy between AWS cloud services and traditional server-side technologies. It is a testament to the potential of hybrid solutions in addressing modern web development challenges. Through this initiative, developers and organizations can gain insights into building secure, reliable, and scalable authentication systems, paving the way for innovation in user access management.

METHODOLOGIES

The Methodologies, Design Elements, Tools, and Languages Used for making this project are mentioned below:

1. **Agile Development Approach**: Iterative and incremental development for seamless implementation and testing.
2. **User-Centric Design**: Focused on creating an intuitive and secure user experience for login and authentication.
3. **MVC (Model-View-Controller) Architecture**: Ensured clear separation of concerns for efficient development and maintenance.
4. **Security-First Design**: Incorporated industry-standard security practices, including encryption and secure token management.
5. **Cloud-Native Development**: Leveraged AWS services for scalability, reliability, and high availability.

Design Elements

1. **Responsive Web Design**: Ensured seamless functionality across devices and screen sizes.
2. **Intuitive UI/UX**: Designed forms and feedback messages for better usability and user interaction.
3. **Robust Error Handling**: Implemented meaningful error messages and logs for improved troubleshooting.
4. **Secure Authentication Flow**: Employed multi-factor authentication (MFA) and secure session management.
5. **Scalable Architecture**: Designed the system to handle growing user demands efficiently.

Tools and Technologies

1. **Languages**:

- PHP (Backend development)
- HTML, CSS, and JavaScript (Frontend development)
- SQL (Database queries)

2. **Tools:**

- phpMyAdmin (Database management)
- Postman (API testing and validation)

3. **Frameworks:**

- Bootstrap (Frontend design framework)

4. **Version Control:**

- Git and GitHub (Code versioning and collaboration)

AWS Services

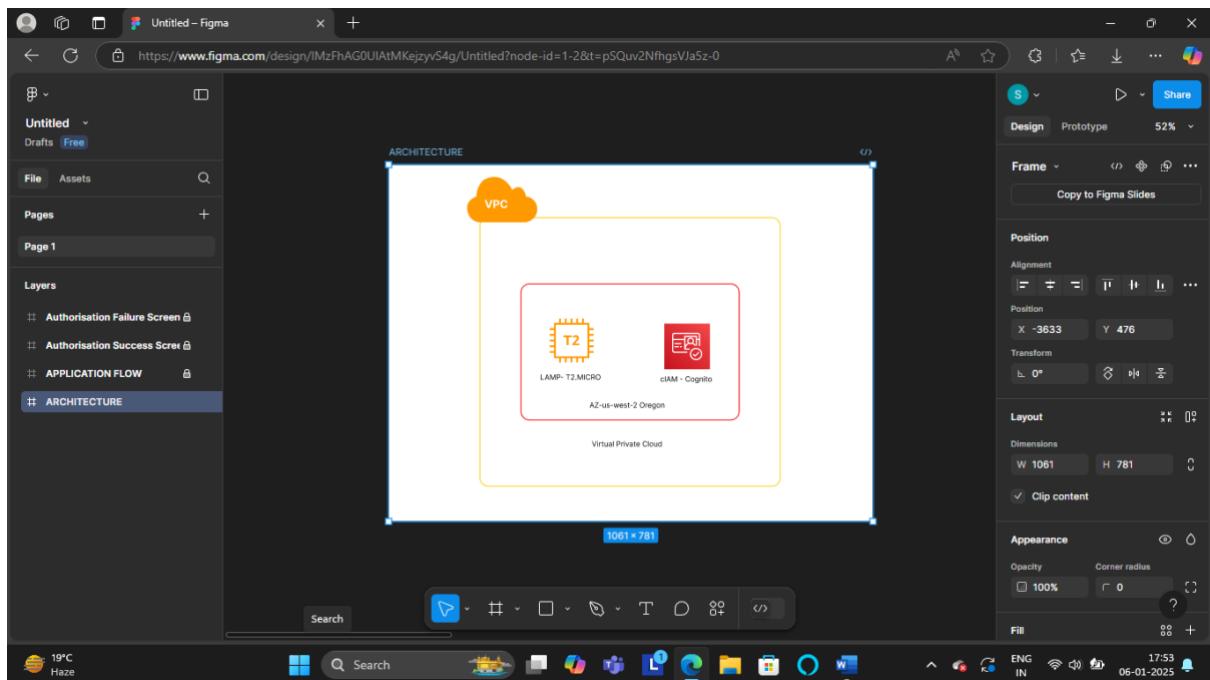
1. **AWS Cognito:** Managed user authentication, authorization, and user pools.
2. **AWS IAM (Identity and Access Management):** Controlled access to AWS resources securely.
3. **AWS EC2:** Hosted the web application and managed server instances.
4. **AWS RDS (Relational Database Service):** Hosted and managed the MySQL database.
5. **AWS CloudWatch:** Monitored application logs and performance metrics.

LAMP Stack Components

1. **Linux:** Operating system for hosting the server environment.
2. **Apache:** Web server to handle HTTP requests.
3. **MySQL:** Database for storing user credentials and login data.
4. **PHP:** Backend scripting language for server-side logic.

UNDERSTANDING THE AWS CLOUD

ARMATURE



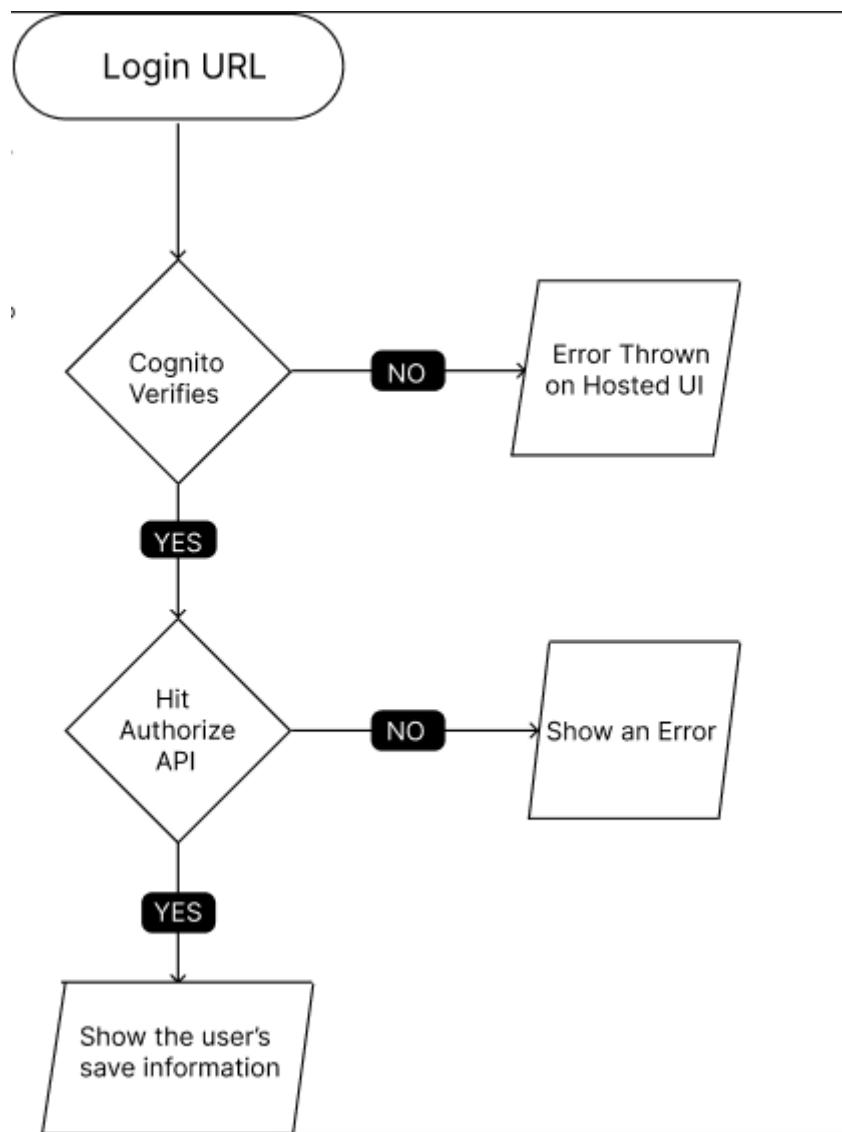
This architecture represents a basic cloud setup for a web application. It allows for a secure environment for the application's server and user management. Users can access the application through the public internet, but their logins and access are controlled by Cognito. The application runs on the LAMP server, which is hosted on an EC2 instance within the VPC.

Components:

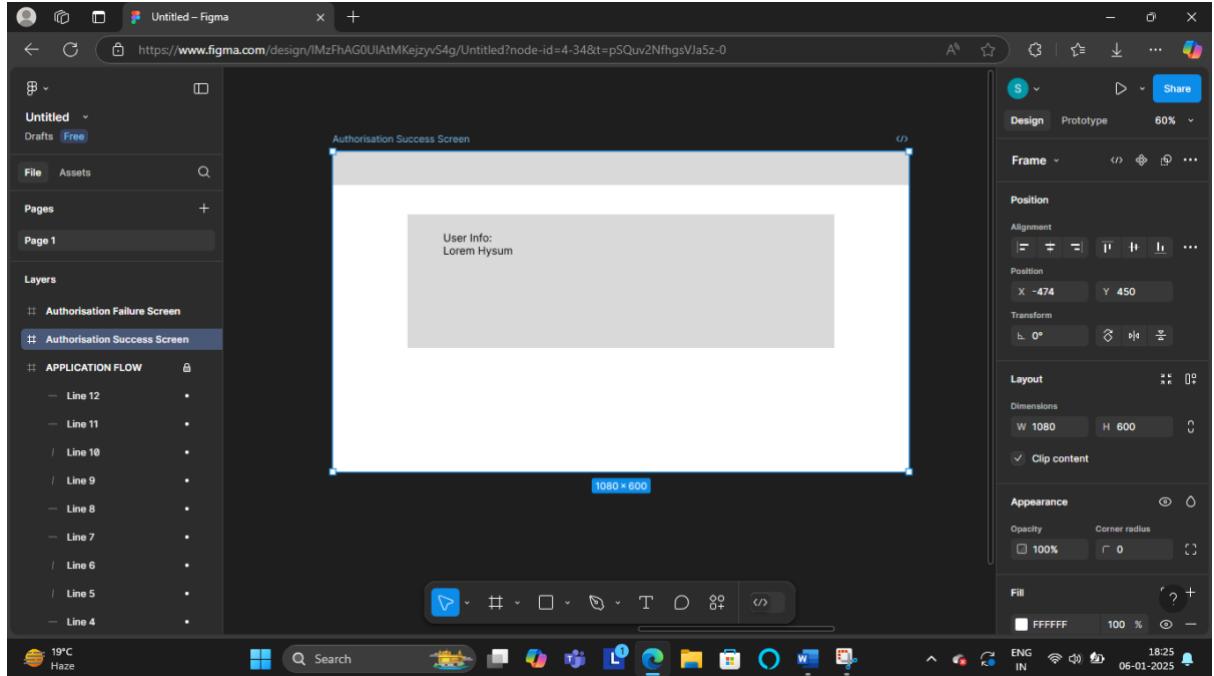
- **VPC (Virtual Private Cloud):** It is a virtual network that is isolated from the public internet. It acts as the foundation for the architecture.

- **T2 (T2 Micro)**: An instance of AWS EC2 (Elastic Compute Cloud) in the t2.micro instance type. It is likely used to run a LAMP stack (Linux, Apache, MySQL, PHP), which powers the web application.
- **CIAM (Cognito)**: AWS Cognito is used for user authentication and authorization. It provides a user pool that stores user information and manages logins and access to resources.

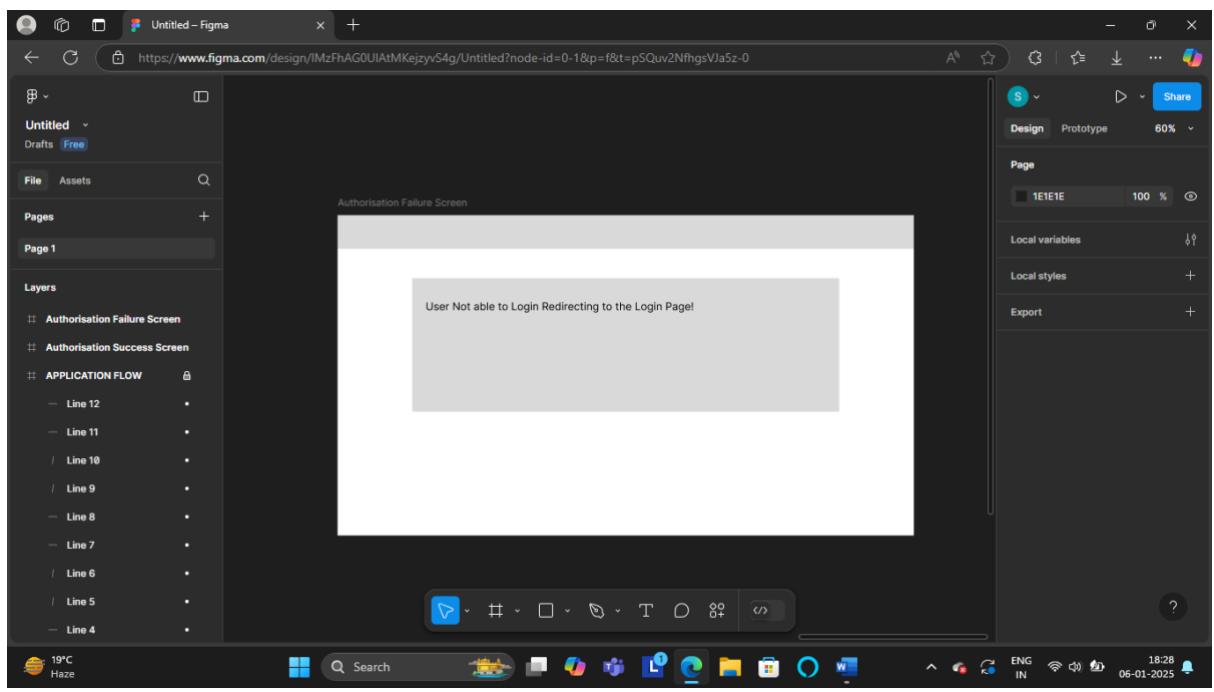
THE APPLICATION FLOW



AUTHORISATION SUCCESS SCREEN



AUTHORISATION FAILURE SCREEN



CODE

The screenshot shows the AWS EC2 Instances page. On the left, a sidebar navigation includes: AMI Catalog, Elastic Block Store (Volumes, Snapshots, Lifecycle Manager), Network & Security (Security Groups, Elastic IPs, Placement Groups, Key Pairs, Network Interfaces), Load Balancing (Load Balancers, Target Groups, Trust Stores New), and Auto Scaling (Auto Scaling Groups). The main content area displays a table titled "Instances (1/1) info". The table has one row for "LAMPServer" with Instance ID "i-0a137017a7f06e040", which is "Running" (t2.micro), has 2/2 checks passed, and is in "us-west-2a". Below the table, a detailed view for "i-0a137017a7f06e040 (LAMPServer)" is shown with tabs for Details, Status and alarms, Monitoring, Security, Networking, Storage, and Tags. Under "Details", there are sections for Instance ID (i-0a137017a7f06e040), IPv6 address (empty), Public IPv4 address (54.189.145.207), Instance state (Running), Private IPv4 addresses (172.31.26.57), and Public IPv4 DNS (empty).

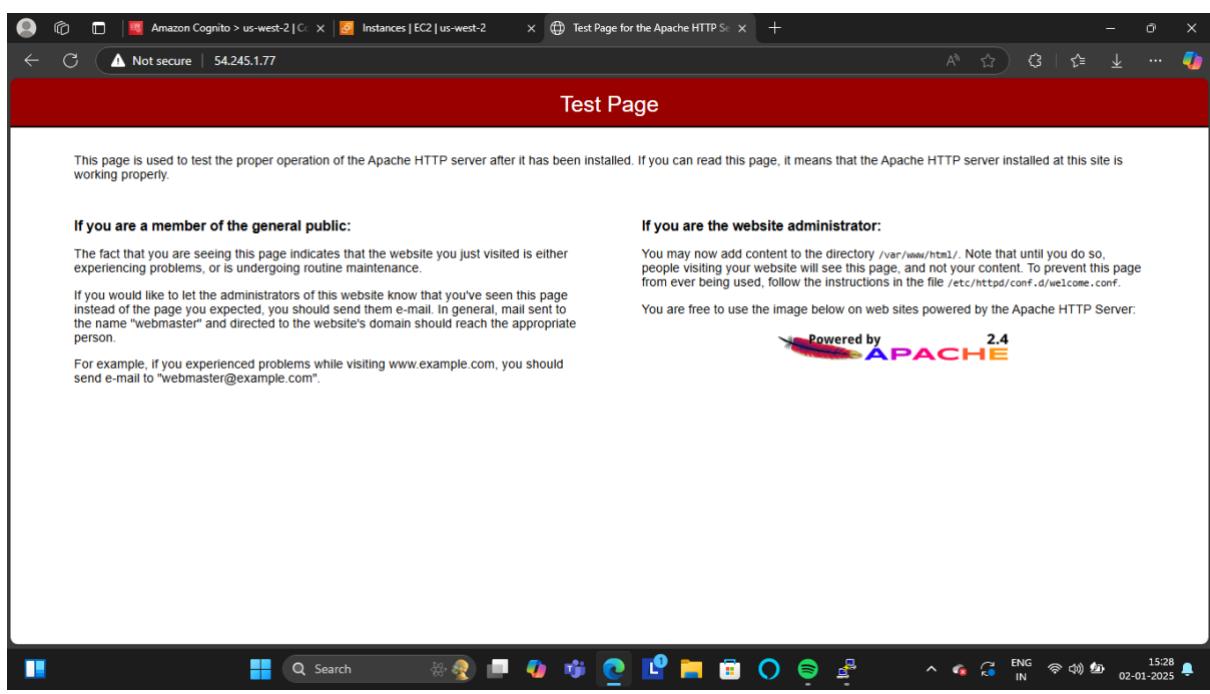
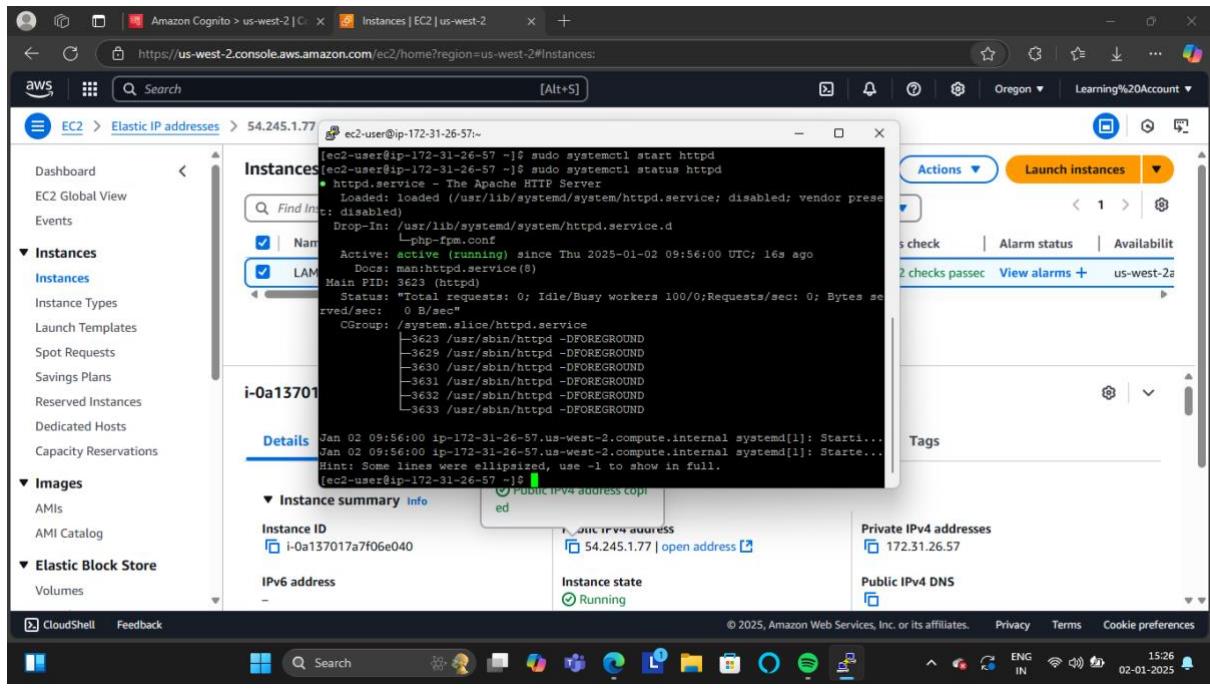
The screenshot shows the AWS EC2 Elastic IP addresses page. The sidebar navigation includes: Dashboard, EC2 Global View, Events, Instances (Instances, Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Capacity Reservations), Images (AMIs, AMI Catalog), and Elastic Block Store (Volumes). The main content area shows a summary for the IP address 54.245.1.77, which is associated with the instance i-0a137017a7f06e040. The summary table includes fields: Allocated IPv4 address (54.245.1.77), Association ID (eipassoc-0724f71358656b697), Network interface ID (eni-0d4e16d200371b24f), Address pool (Amazon), Type (Public IP), Scope (VPC), Network interface owner account ID (120569638613), Network border group (us-west-2), Allocation ID (eipalloc-0ec003c20ac5cb236), Associated instance ID (i-0a137017a7f06e040), Public DNS (ec2-54-245-1-77.us-west-2.compute.amazonaws.com), Reverse DNS record (empty), Private IP address (172.31.26.57), and NAT Gateway ID (empty). A green success message at the top states: "Elastic IP address associated successfully. Elastic IP address 54.245.1.77 has been associated with instance i-0a137017a7f06e040".

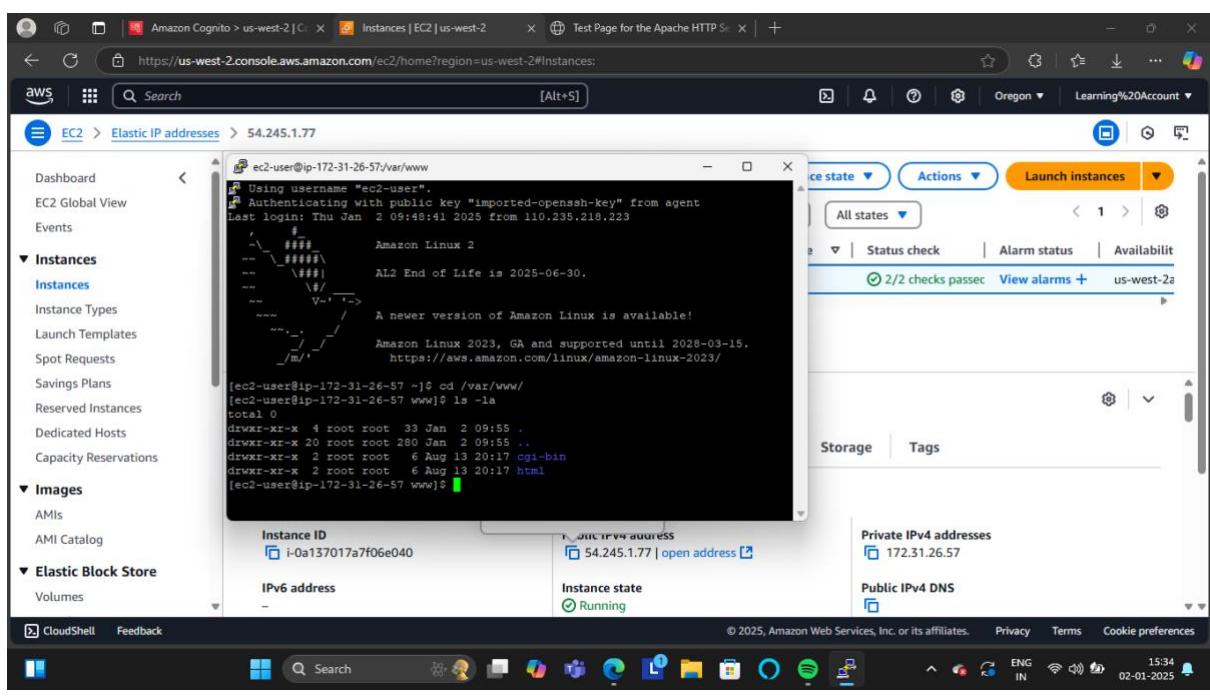
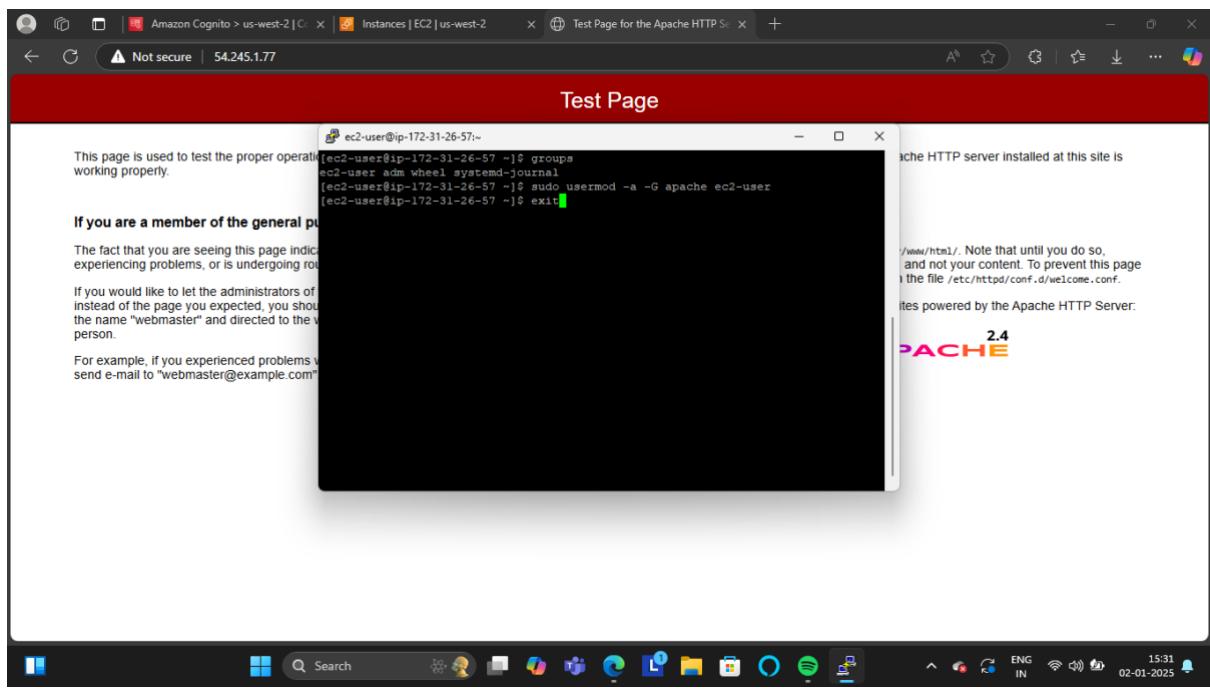
The screenshot shows a terminal window titled "ec2-user@ip-172-31-26-57:~". The terminal displays a series of package names followed by their status and stability levels (available, stable, or enabled). The output includes:

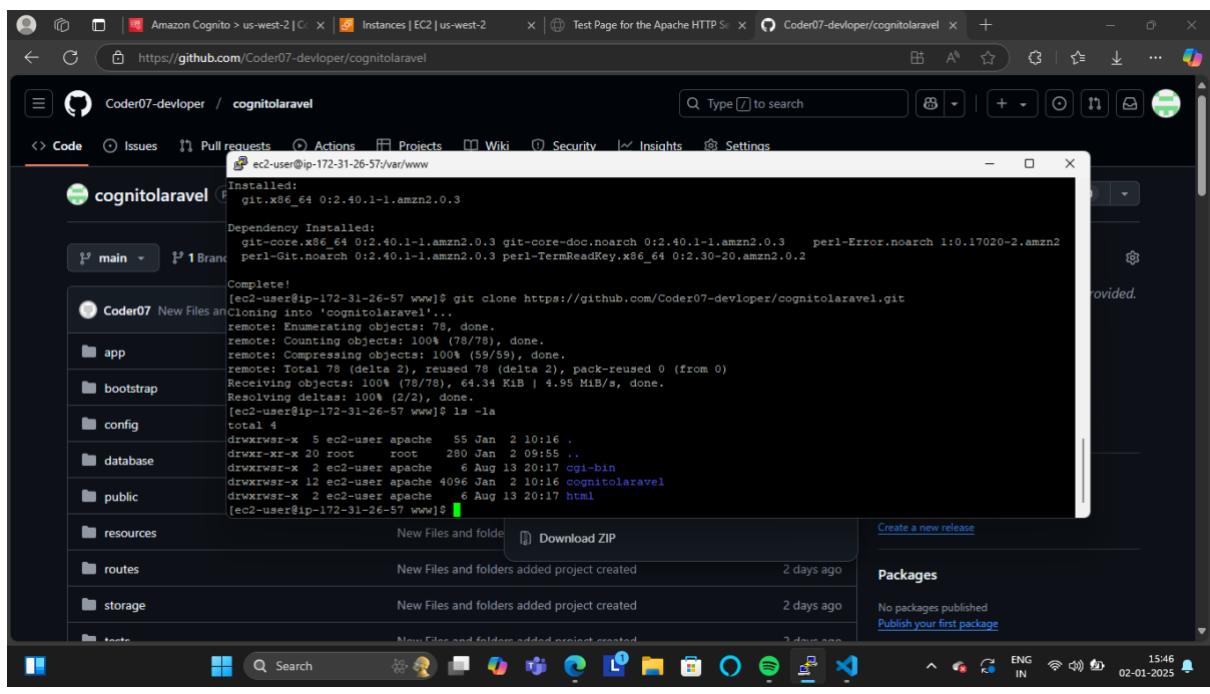
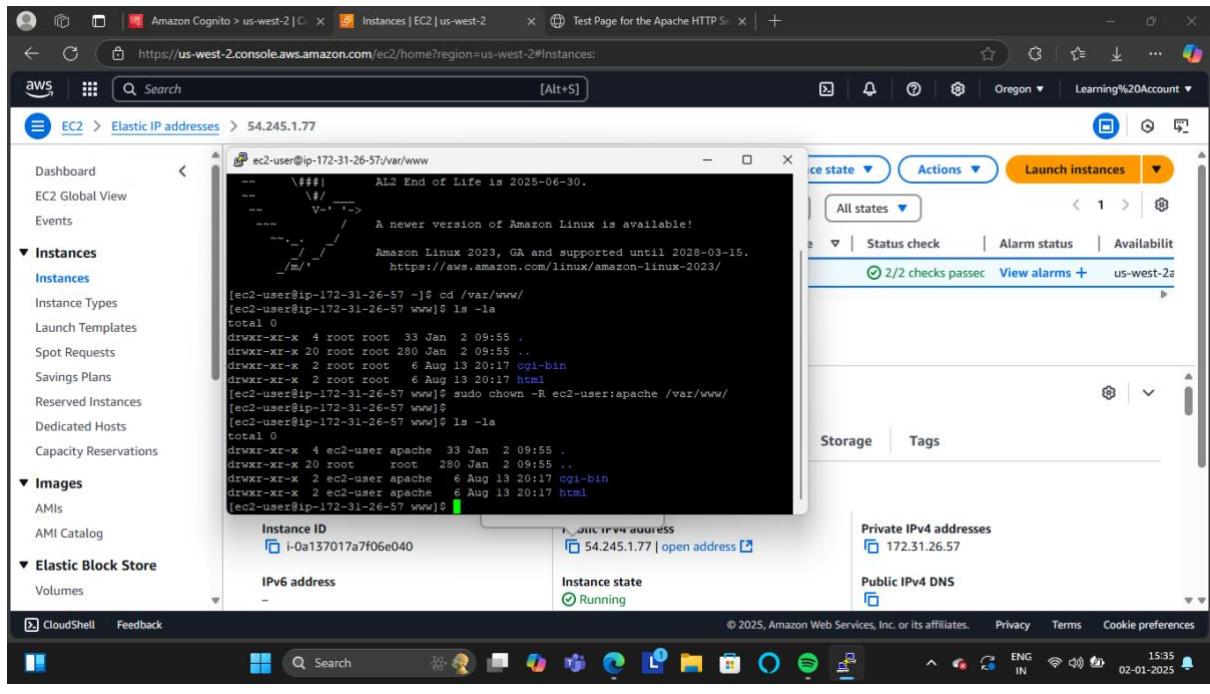
```
50 selinux-ng available [ =stable ]
52 tomcat9 available [ =stable ]
53 unbound1.13 available [ =stable ]
54 fmaradb10.5 available [ =stable ]
55 kernel-p.10=latest enabled [ =stable ]
56 redis6 available [ =stable ]
59 tpostgresql13 available [ =stable ]
60 mock2 available [ =stable ]
61 dnsmasq2.85 available [ =stable ]
62 kernel-5.15 available [ =stable ]
63 tpostgresql14 available [ =stable ]
64 firefox available [ =stable ]
65 lustre available [ =stable ]
67 awscli available [ =stable ]
68 tphp8.2=latest enabled [ =stable ]
69 dnsmasq available [ =stable ]
70 unbound1.17 available [ =stable ]
72 collectd-python3 available [ =stable ]
t Note on end-of-support. Use 'info' subcommand.
[ec2-user@ip-172-31-26-57 ~]$ php -v
PHP 8.2.23 (cli) (built: Sep 16 2024 21:00:00) (NTS)
Copyright (c) The PHP Group
Zend Engine v4.2.23, Copyright (c) Zend Technologies
[ec2-user@ip-172-31-26-57 ~]$
```

The screenshot shows a terminal window titled "ec2-user@ip-172-31-26-57:~". The terminal displays a series of package names followed by their status and stability levels (available, stable, or enabled). The output includes:

```
50 selinux-ng available [ =stable ]
52 tomcat9 available [ =stable ]
53 unbound1.13 available [ =stable ]
54 fmaradb10.5 available [ =stable ]
55 kernel-p.10=latest enabled [ =stable ]
56 redis6 available [ =stable ]
59 tpostgresql13 available [ =stable ]
60 mock2 available [ =stable ]
61 dnsmasq2.85 available [ =stable ]
62 kernel-5.15 available [ =stable ]
63 tpostgresql14 available [ =stable ]
64 firefox available [ =stable ]
65 lustre available [ =stable ]
67 awscli available [ =stable ]
68 tphp8.2=latest enabled [ =stable ]
69 dnsmasq available [ =stable ]
70 unbound1.17 available [ =stable ]
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[ec2-user@ip-172-31-26-57 ~]$
```

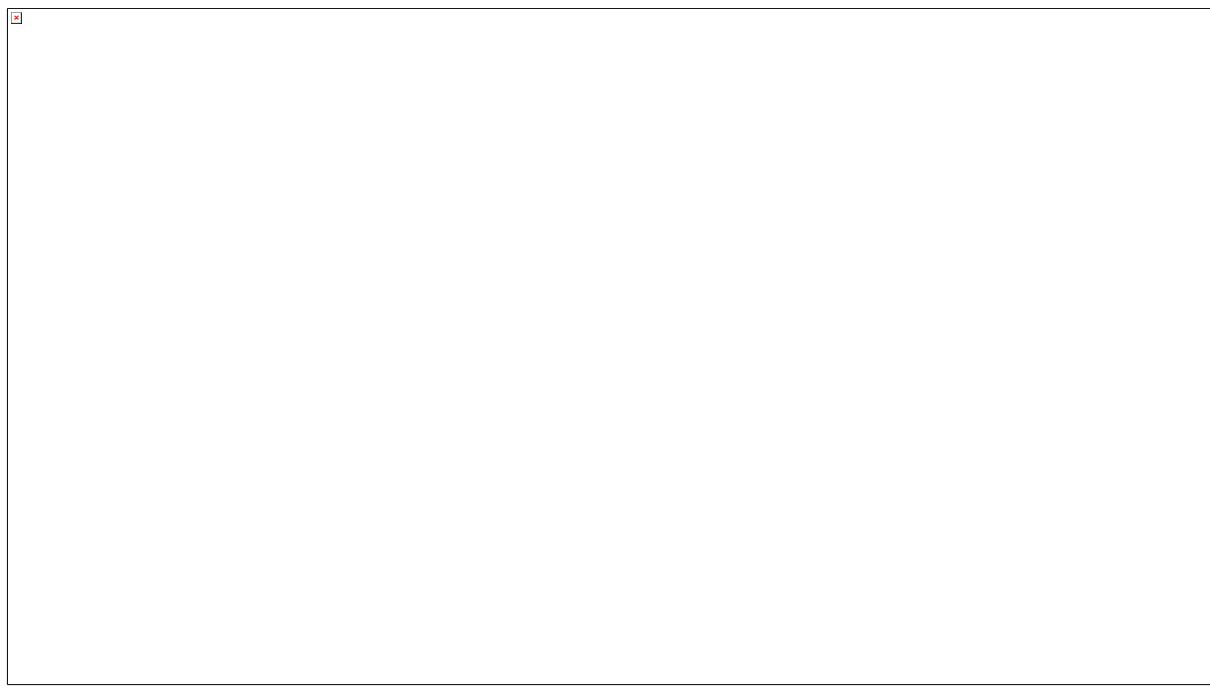






The screenshot shows a GitHub repository page for 'cognitolaravel'. The terminal window displays the following Apache logs:

```
[ec2-user@ip-172-31-26-57 www]# ls -la
total 0
drwxrwsr-x 4 ec2-user apache 33 Jan 2 10:17 .
drwxr-xr-x 20 root  root  280 Jan 2 09:55 ..
drwxrwsr-x 2 ec2-user apache 6 Aug 13 20:17 cgi-bin
drwxrwsr-x 2 ec2-user apache 6 Aug 13 20:17 html
[ec2-user@ip-172-31-26-57 www]# cd html/
[ec2-user@ip-172-31-26-57 html]# ls
[ec2-user@ip-172-31-26-57 html]# clear
```



The screenshot shows a GitHub repository page for 'Coder07-developer/cognitolaravel'. The terminal window displays the following command and output:

```
[ec2-user@ip-172-31-26-57 cognitolaravel]$ cd -  
[ec2-user@ip-172-31-26-57 html]$ sudo curl -sS https://getcomposer.org/installer | sudo php  
All settings correct for using Composer  
Downloading...  
Composer (version 2.8.4) successfully installed to: /var/www/html/composer.phar  
Use it: php composer.phar
```

The file listing shows the directory structure:

- app
- bootstrap
- config
- database
- public
- resources
- routes
- storage
- tests

Below the file listing, there are two sections: 'New Files and folders added project created' and 'New Files and folders added project created'.

On the right side of the terminal window, there is a sidebar with 'Create a new release' and 'Packages' sections.

At the bottom of the screen, a taskbar is visible with various icons.

This screenshot is identical to the one above, showing the same GitHub repository page, terminal session, file listing, and sidebar. The only difference is the timestamp at the bottom right of the screen, which has changed from '02-01-2025 15:52' to '02-01-2025 15:54'.

```
ec2-user@ip-172-31-26-57:~/var/www/html/cognitolaravel
```

```
[ec2-user@ip-172-31-26-57 html]$ cd ~/var/www/html/cognitolaravel/
[ec2-user@ip-172-31-26-57 cognitolaravel]$ clear
[ec2-user@ip-172-31-26-57 cognitolaravel]$ ls
app      composer.json  database  postcss.config.js  resources  tailwind.config.js
artisan  composer.lock  package.json  public        routes     tests
bootstrap config      phpunit.xml  README.md    storage    vite.config.js
[ec2-user@ip-172-31-26-57 cognitolaravel]$ composer install
Installing dependencies from lock file (including require-dev)
Verifying lock file contents can be installed on current platform.
Your lock file does not contain a compatible set of packages. Please run composer update.

Problem 1
- tijsverkoyen/css-to-inline-styles is locked to version v2.3.0 and an update of this package was not requested.
- tijsverkoyen/css-to-inline-styles v2.3.0 requires ext-dom * -> it is missing from your system. Install or enable PHP's dom extension.
Problem 2
- laravel/pint is locked to version v1.18.3 and an update of this package was not requested.
- laravel/pint v1.18.3 requires ext-xml * -> it is missing from your system. Install or enable PHP's xml extension.
Problem 3
- phar-io/manifest is locked to version 2.0.4 and an update of this package was not requested.
- phar-io/manifest 2.0.4 requires ext-dom * -> it is missing from your system. Install or enable PHP's dom extension

Problem 4
- phunit/php-code-coverage is locked to version 11.0.8 and an update of this package was not requested.
- phunit/php-code-coverage 11.0.8 requires ext-dom * -> it is missing from your system. Install or enable PHP's dom extension.
Problem 5
- phunit/phpunit is locked to version 11.5.2 and an update of this package was not requested.
- phunit/phpunit 11.5.2 requires ext-dom * -> it is missing from your system. Install or enable PHP's dom extension

Problem 6
- sebastian/comparator is locked to version 6.2.1 and an update of this package was not requested.
- sebastian/comparator 6.2.1 requires ext-dom * -> it is missing from your system. Install or enable PHP's dom extension.
Problem 7
- theseer/tokenizer is locked to version 1.2.3 and an update of this package was not requested.
- theseer/tokenizer 1.2.3 requires ext-dom * -> it is missing from your system. Install or enable PHP's dom extension.
Problem 8
- laravel/framework is locked to version v11.36.1 and an update of this package was not requested.
- laravel/framework v11.36.1 requires tijsverkoyen/css-to-inline-styles ^2.2.5 -> satisfiable by tijsverkoyen/css-to-inline-styles(v2.3.0).
- tijsverkoyen/css-to-inline-styles v2.3.0 requires ext-dom * -> it is missing from your system. Install or enable PHP's dom extension.
```

```
[ec2-user@ip-172-31-26-57 var/www/html/cognitolaravel] $ composer install
Installing dependencies from lock file (including require-dev)
Verifying lock file contents can be installed on current platform.
Package operations: 110 installs, 0 updates, 0 removals
- Downloading doctrine/inflator (2.0.10)
- Downloading doctrine/lexer (3.0.1)
- Downloading symfony/polyfill ctype (v1.31.0)
- Downloading webmozart/assert (1.11.0)
- Downloading draganmatank/cron-expression (v3.4.0)
- Downloading symfony/dependency-contracts (v3.5.1)
- Downloading psr/container (2.0.2)
- Downloading fakerphp/faker (v1.24.1)
- Downloading symfony/polyfill php83 (v1.31.0)
- Downloading symfony/polyfill mbstring (v1.31.0)
- Downloading symfony/http-foundation (v7.2.0)
- Downloading fruitcake/php-cors (v1.3.0)
- Downloading psr/http-message (2.0)
- Downloading psr/http-client (1.0.3)
- Downloading ralouphie/getallheaders (3.0.3)
- Downloading psr/http-factory (1.1.0)
- Downloading guzzlehttp/psr7 (2.7.0)
- Downloading guzzlehttp/promises (2.0.4)
- Downloading guzzlehttp/guzzle (7.9.2)
- Downloading symfony/polyfill php80 (v1.31.0)
- Downloading guzzlehttp/url-template (v1.0.3)
- Downloading symfony/polyfill intl-normalizer (v1.31.0)
- Downloading symfony/polyfill intl-grapheme (v1.31.0)
- Downloading symfony/string (v7.2.0)
- Downloading symfony/service-contracts (v3.5.1)
- Downloading symfony/console (v7.2.1)
- Downloading nunomaduro/termwind (v2.3.0)
- Downloading voku/portable-ascii (2.0.3)
- Downloading rphoption/rphoption (1.9.3)
- Downloading graham-campbell/result-type (v1.1.3)
- Downloading vlucas/phpdotenv (v5.6.1)
- Downloading symfony/css-selector (v7.2.0)
- Downloading tiljverkoyen/css-to-inline-styles (v2.3.0)
- Downloading symfony/var-dumper (v7.2.0)
- Downloading symfony/polyfill uid (v1.31.0)
- Downloading symfony/uid (v7.2.0)
- Downloading symfony/routing (v7.2.0)
- Downloading symfony/process (v7.2.0)
- Downloading symfony/polyfill intl idn (v1.31.0)
```

```
ec2-user@ip-172-31-26-57:/var/www/html/cognitolaravel
- Installing nunomaduro/collision (v8.5.0): Extracting archive
- Installing sebastian/side-effects-detector (1.0.5): Extracting archive
- Installing sebastian/version (5.0.2): Extracting archive
- Installing sebastian/type (5.1.0): Extracting archive
- Installing sebastian/recursion-context (6.0.2): Extracting archive
- Installing sebastian/object-reflector (4.0.1): Extracting archive
- Installing sebastian/object-enumerator (6.0.1): Extracting archive
- Installing sebastian/global-state (7.0.2): Extracting archive
- Installing sebastian/exporter (6.3.0): Extracting archive
- Installing sebastian/environment (7.2.0): Extracting archive
- Installing sebastian/diff (6.0.2): Extracting archive
- Installing sebastian/comparator (6.2.1): Extracting archive
- Installing sebastian/code-unit (3.0.2): Extracting archive
- Installing sebastian/collector (3.0.2): Extracting archive
- Installing phpunit/php-timer (7.0.1): Extracting archive
- Installing phpunit/php-text-template (4.0.1): Extracting archive
- Installing phpunit/php-invoker (5.0.1): Extracting archive
- Installing phpunit/php-file-iterator (5.1.0): Extracting archive
- Installing theseer/tokenizer (1.2.3): Extracting archive
- Installing sebastian/times-a-f-cycle (3.0.1): Extracting archive
- Installing sebastian/complexity (4.0.1): Extracting archive
- Installing sebastian/code-unit-reverse-lookup (4.0.1): Extracting archive
- Installing phpunit/php-code-coverage (11.0.8): Extracting archive
- Installing phar-io/version (3.2.1): Extracting archive
- Installing phar-io/manifest (2.0.4): Extracting archive
- Installing my-labs/deep-copy (1.12.1): Extracting archive
- Installing phpunit/phpunit (11.5.2): Extracting archive
Generating optimized autoload files
> Illuminate\Foundation\ComposerScripts::postAutoLoadDump
> @php artisan package:discover --ansi
[INFO] Discovering packages.

laravel/pail ..... DONE
laravel/sail ..... DONE
laravel/tinker ..... DONE
nesbot/carbon ..... DONE
nunomaduro/collision ..... DONE
nunomaduro/termwind ..... DONE

81 packages are using are looking for funding
Use the 'composer fund' command to find out more!
[ec2-user@ip-172-31-26-57 cognitolaravel]$
```

```
ec2-user@ip-172-31-26-57:/var/www/html/cognitolaravel
[ec2-user@ip-172-31-26-57 cognitolaravel]$ ls -la
total 356
drwxrwxr-x 13 ec2-user apache 4096 Jan 2 10:32 .
drwxrwxr-x 3 ec2-user apache 44 Jan 2 10:25 ..
drwxrwxr-x 5 ec2-user apache 49 Jan 2 10:19 app
-rw-rw-r-- 1 ec2-user apache 350 Jan 2 10:19 artisan
drwxrwxr-x 3 ec2-user apache 55 Jan 2 10:19 bootstrap
-rw-rw-r-- 1 ec2-user apache 2306 Jan 2 10:19 composer.json
-rw-rw-r-- 1 ec2-user apache 297216 Jan 2 10:19 composer.lock
drwxrwxr-x 2 ec2-user apache 188 Jan 2 10:19 config
drwxrwxr-x 5 ec2-user apache 74 Jan 2 10:19 database
-rw-rw-r-- 1 ec2-user apache 258 Jan 2 10:19 editorconfig
-rw-rw-r-- 1 ec2-user apache 1150 Jan 2 10:32 .env
-rw-rw-r-- 1 ec2-user apache 1099 Jan 2 10:19 .env.example
drwxrwxr-x 8 ec2-user apache 163 Jan 2 10:19 .git
-rw-rw-r-- 1 ec2-user apache 186 Jan 2 10:19 .gitattributes
-rw-rw-r-- 1 ec2-user apache 285 Jan 2 10:19 .gitignore
-rw-rw-r-- 1 ec2-user apache 378 Jan 2 10:19 package.json
-rw-rw-r-- 1 ec2-user apache 1191 Jan 2 10:19 phpunit.xml
-rw-rw-r-- 1 ec2-user apache 93 Jan 2 10:19 postcss.config.js
drwxrwxr-x 2 ec2-user apache 77 Jan 2 10:19 public
-rw-rw-r-- 1 ec2-user apache 4109 Jan 2 10:19 README.md
drwxrwxr-x 5 ec2-user apache 40 Jan 2 10:19 resources
drwxrwxr-x 2 ec2-user apache 40 Jan 2 10:19 routes
drwxrwxr-x 5 ec2-user apache 46 Jan 2 10:19 storage
-rw-rw-r-- 1 ec2-user apache 551 Jan 2 10:19 tailwind.config.js
drwxrwxr-x 4 ec2-user apache 53 Jan 2 10:19 tests
drwxrwxr-x 40 ec2-user apache 4096 Jan 2 10:28 vendor
-rw-rw-r-- 1 ec2-user apache 263 Jan 2 10:19 vite.config.js
[ec2-user@ip-172-31-26-57 cognitolaravel]$
```

```
④ VirtualHost
  1   <VirtualHost *:80>
  2     DocumentRoot /var/www/html/cognitolaravel/public
  3     <Directory "/var/www/html/cognitolaravel/public">
  4       Options FollowSymLinks Multiviews
  5         order Allow,Deny
  6         Allow from all
  7     </Directory>
  8
  9   </VirtualHost>
```

ec2-user@ip-172-31-26-57:/etc/httpd/conf

```
GNU nano 2.9.8                                     httpd.conf

#
# https://httpd.apache.org/docs/2.4/mod/core.html#protocols

<IfModule mod_http2.c>
  Protocols h2 h2c http/1.1
</IfModule>

<VirtualHost *:80>

  DocumentRoot /var/www/html/cognitolaravel/public
  <Directory "/var/www/html/cognitolaravel/public">
    Options FollowSymLinks Multiviews
      order Allow,Deny
      Allow from all
  </Directory>
  ErrorLog ${APACHE_LOG_DIR}/error.log
  CustomLog ${APACHE_LOG_DIR}/access.log combined
</VirtualHost>

[ Wrote 373 lines ]
^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text  ^J Justify  ^C Cur Pos  M-U Undo  M-A Mark Text
^X Exit     ^R Read File  ^\ Replace   ^U Uncut Text  ^T To Spell  ^_ Go To Line M-E Redo  M-C Copy Text
```

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Laravel

VERSION
11.x

Search

Installation

- # Meet Laravel
- # Why Laravel?
- # Creating a Laravel Application
- # Installing PHP and the Laravel Installer
- # Creating an Application
- # Initial Configuration
- # Environment Based Configuration
- # Databases and Migrations
- # Directory Configuration
- # Local Installation Using Herd
- # Herd on macOS
- # Herd on Windows

Auth0 by Okta

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ADS VIA CARBON

The screenshot shows the AWS Cognito console interface. On the left, a sidebar navigation includes 'Amazon Cognito', 'Current user pool' (set to 'User pool - 1iaxj2'), 'Overview', 'Applications' (selected), 'App clients' (selected), 'User management' (with 'Users' and 'Groups' options), and 'Authentication' (with 'Authentication methods', 'Sign-in', 'Sign-up', 'Social and external providers', and 'Extensions' options). The main content area is titled 'App client: My web app - 1iaxj2'. It displays 'App client information' with fields like 'Client name' (My web app - 1iaxj2), 'Client ID' (4k9r6jpldgfcnsi9m1tsrfik...), 'Client secret' (*****), and 'Authentication flows' (Choice-based sign-in, Secure remote password (SRP), Get user tokens from existing authenticated sessions). It also shows 'Authentication flow session duration' (3 minutes), 'Refresh token expiration' (5 day(s)), 'Access token expiration' (60 minutes), 'ID token expiration' (60 minutes), and 'Advanced authentication settings' (Enable token revocation, Enable prevent user existence errors). A 'Created time' (January 4, 2025 at 19:28 GMT+5:30) and 'Last updated time' (January 4, 2025 at 19:28 GMT+5:30) are listed. At the bottom, tabs for 'Quick setup guide', 'Attribute permissions', 'Login pages' (selected), 'Threat protection', and 'Analytics' are visible. The status bar at the bottom right shows '2021 ENG IN 04-01-2025'.

The screenshot shows a Laravel application running on a local host. The URL in the browser is 'localhost:8000/?code=48ee8d1b-b95a-449a-948c-cc30af937e85'. The page features a dark theme with a red gradient background. At the top, there's a search bar and a 'Laravel' logo. Below the search bar, there's a list of items, some of which are blurred. To the right, there are two cards: 'Laracasts' (with a video camera icon) and 'Laravel News' (with a document icon). Both cards have a brief description and a red '→' button. The status bar at the bottom right shows '2022 ENG IN 04-01-2025'.

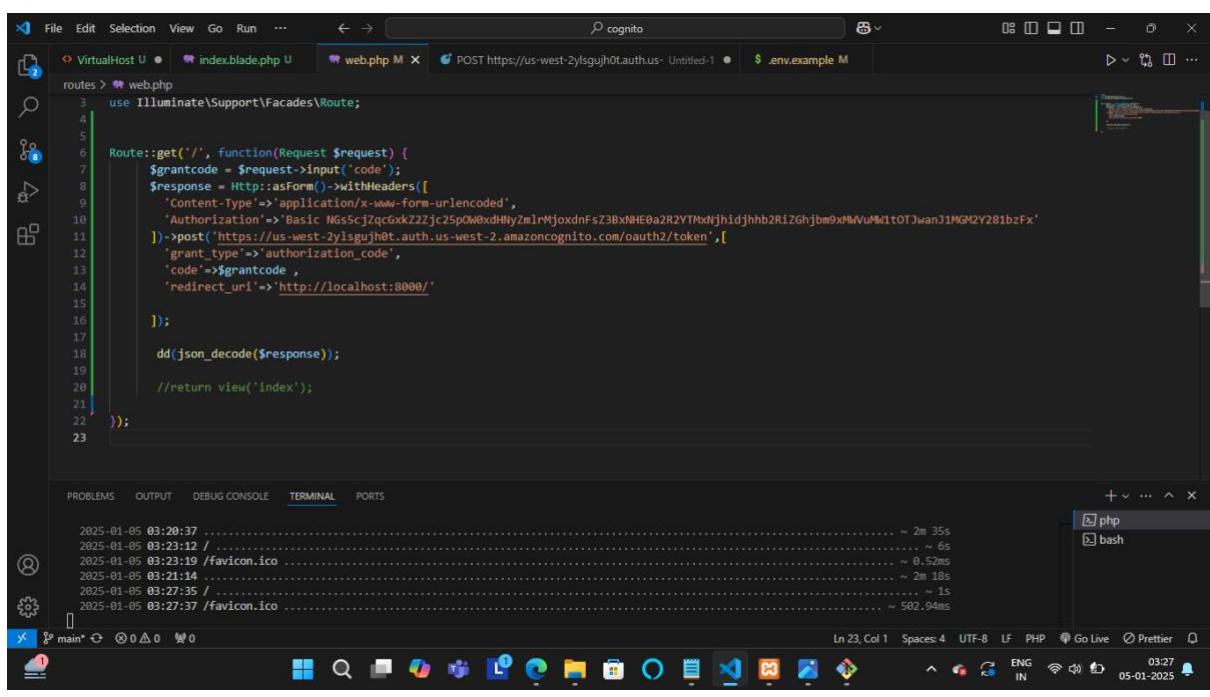
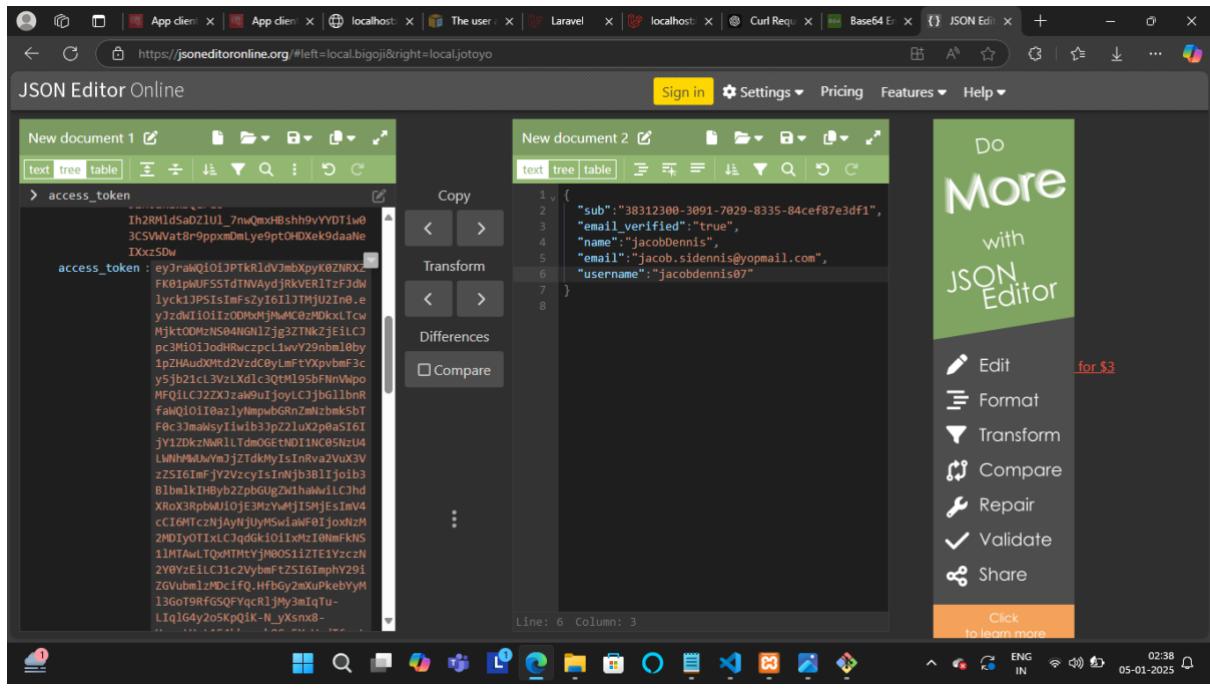
The screenshot shows the 'Overview' page for a user pool named 'User pool - 1iaxj2'. The left sidebar includes sections for Applications (App clients), User management (Users, Groups), and Authentication (Authentication methods, Sign-in, Sign-up, Social and external providers, Extensions). The main content area displays the 'User pool overview' with details like the User pool name ('User pool - 1iaxj2'), User pool ID ('us-west-2_ylSgUjh0T'), ARN ('arn:aws:cognito-idp:us-west-2:120569638613:userpool/us-west-2_ylSgUjh0T'), Token signing key URL ('https://cognito-idp.us-west-2.amazonaws.com/us-west-2_ylSgUjh0T/.well-known/jwks.json'), Estimated number of users ('3'), and Feature plan ('Essentials'). It also shows the Created time ('January 4, 2025 at 19:28 GMT+5:30') and Last updated time ('January 4, 2025 at 19:28 GMT+5:30'). Below this, there are 'Recommendations' for setting up the app and applying branding to managed login pages.

The screenshot shows a browser window with the address bar containing 'localhost:8000/?code=912c662d-21c1-4897-96fe-6f0f766cea33' and the URL 'routes\web.php:7'. The main content area is entirely blank, displaying only a few small, illegible characters at the top. The browser's taskbar at the bottom shows various open tabs and system icons.

The screenshot shows a terminal window in VS Code with the following command history:

```
curl --location --request POST 'https://us-west-2ylsgujh0t.auth.us-west-2.amazonaws.com/oauth2/token' \
--header 'Content-Type:application/x-www-form-urlencoded' \
--header 'Authorization:Basic NG5cJzqcGxkZ2Zjc25p0w0xdHNYzmlrMjoxdnFsZ3BxNHE0a2R2YTMxNjhidjhbb2Ri2Ghjbm9xMvUW1tOTJwanJ1MG2Y281bzFxFx' \
--data-urlencode 'grant_type=authorization_code' \
--data-urlencode 'code=912c662d-21c1-4897-96fe-6f0f766cea33' \
--data-urlencode 'redirect_uri=http://localhost:8000'
```

The terminal output shows log entries from January 1st, 2025, indicating successful file access and processing.



The screenshot shows a Microsoft Visual Studio Code (VS Code) interface. The top navigation bar includes File, Edit, Selection, View, Go, Run, and a search bar containing 'cognito'. The left sidebar has icons for file operations like Open, Save, and Find. The main editor area displays a PHP script named 'index.blade.php' with the following code:

```
routes > web.php
6
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```

The code handles a POST request to an AWS Lambda endpoint. It extracts a 'code' parameter from the request, creates a form with headers, and sends it to the Lambda URL. The response is decoded and passed to a view named 'index'. The code is as follows:

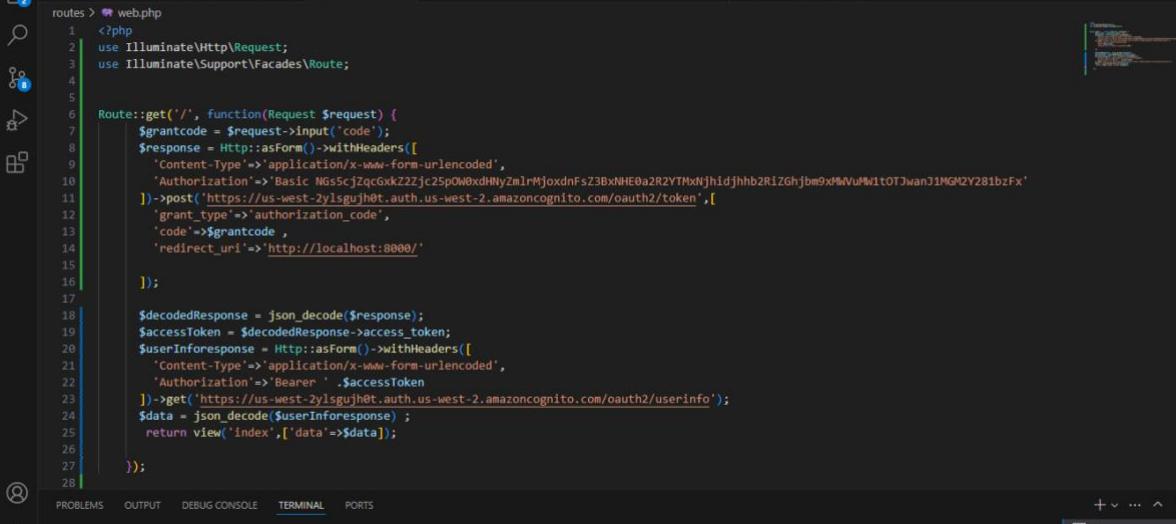
```
Route::get('/', function(Request $request) {
    $grantcode = $request->input('code');
    $response = Http::asForm()->withHeaders([
        'Content-Type'=>'application/x-www-form-urlencoded',
        'Authorization'=>'Basic NG55cJzQcGxkZzJc25p0w0xdNlyZmlrMjoxdnFsZ3BxNHE0a2R2YTMxNjh1djhbb2R1ZGhjbm9xMwVUW1tOTJwanJ1MGM2Y281bzFx'
    ])->post('https://us-west-2ylsgujh0t.auth.us-west-2.amazoncognito.com/oauth2/token',[

        'grant_type'=>'authorization_code',
        'code'=>$grantcode,
        'redirect_uri'=>'http://localhost:8000/'

    ]);

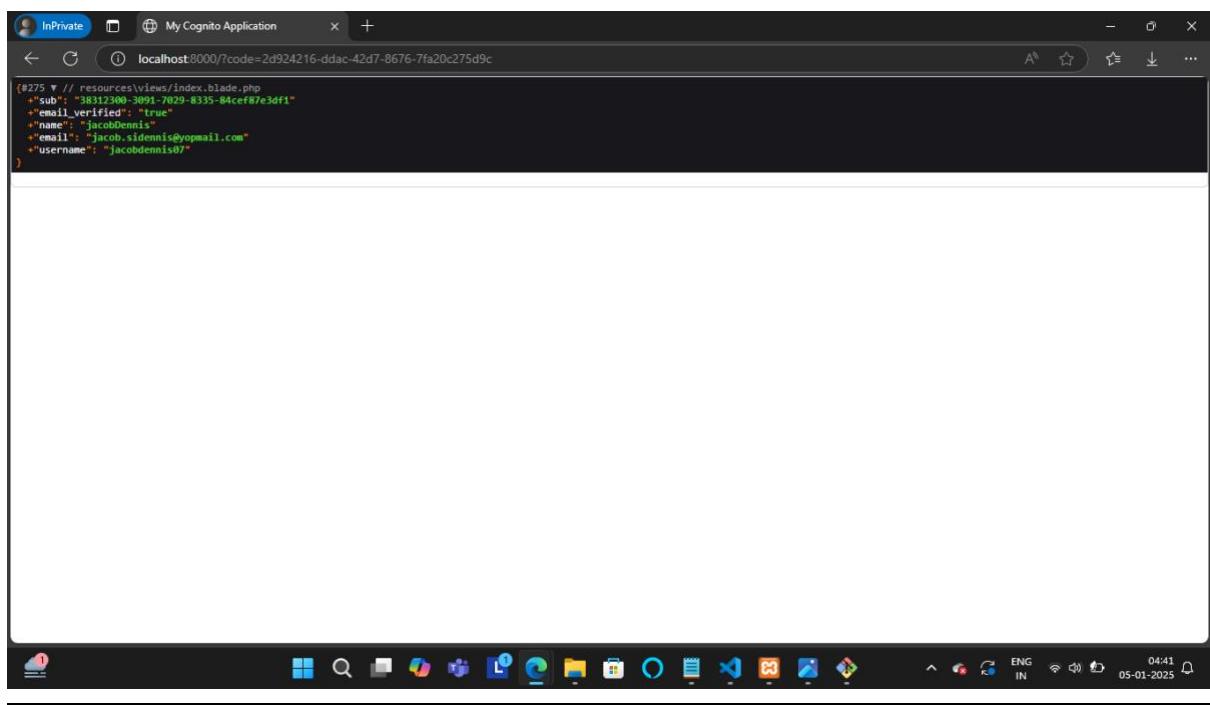
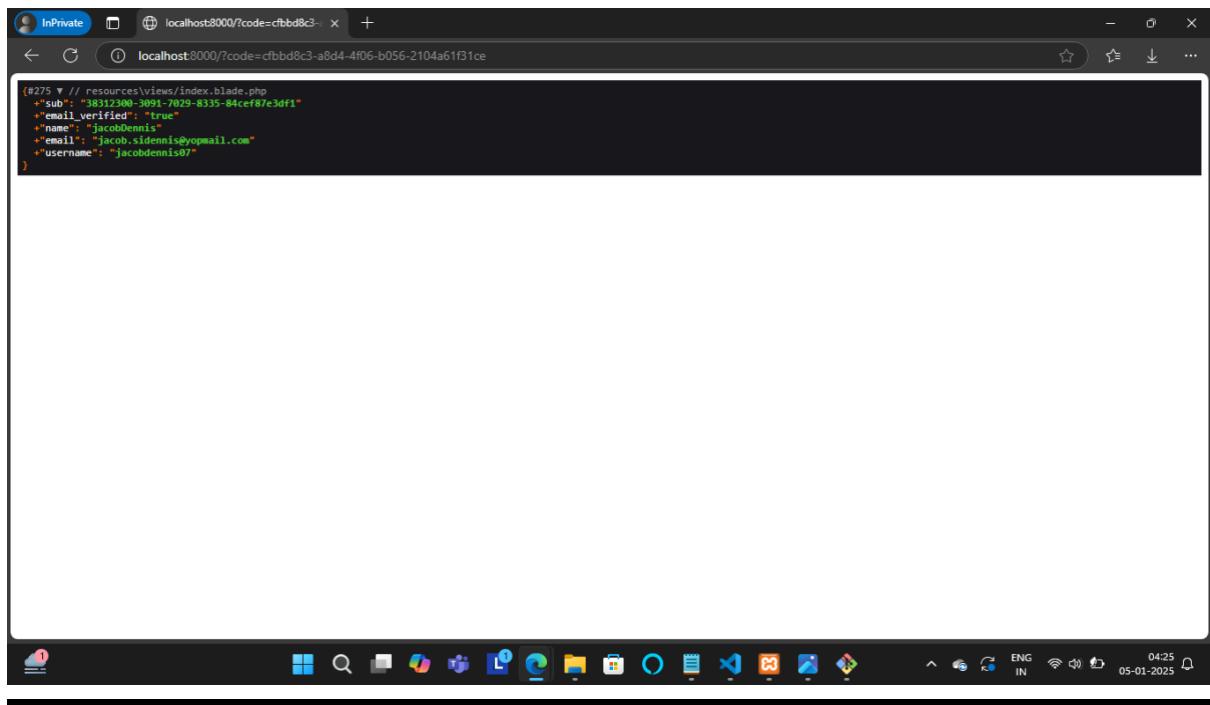
    return view('index',[ 'data'=>json_decode($response)]);
});
```

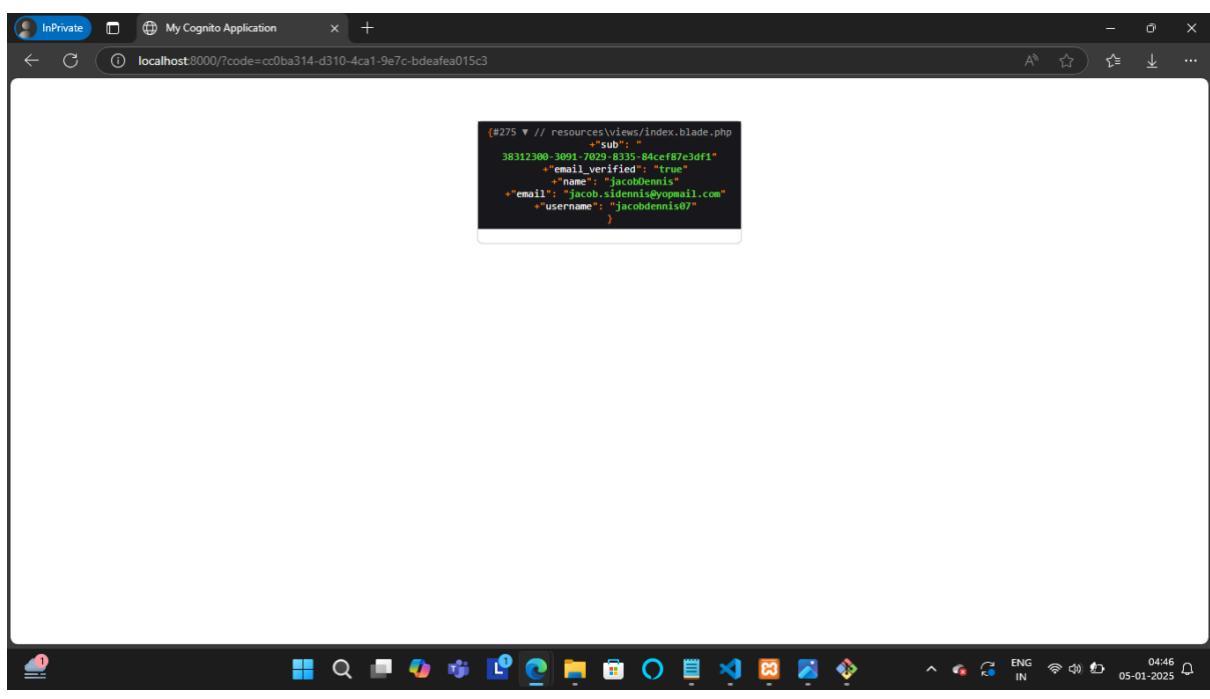
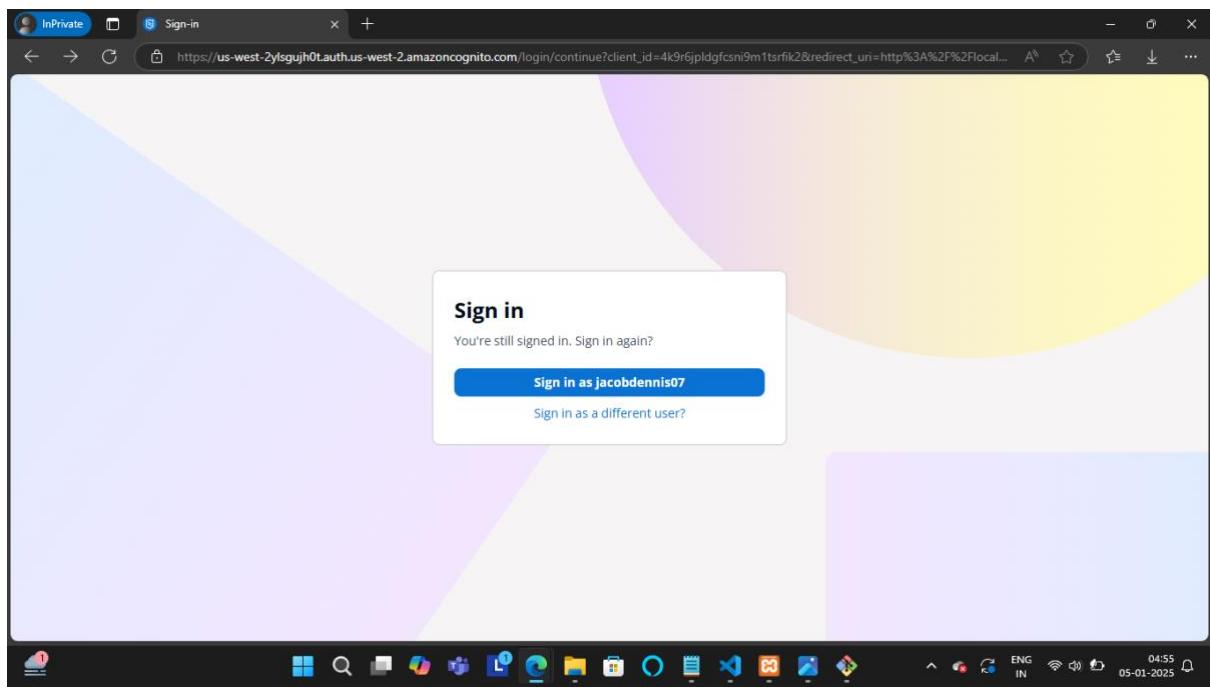
The bottom of the screen shows the terminal output, which logs requests for favicon.ico at various times. The status bar indicates the current file is 'main*' and shows other settings like 'Spaces: 4', 'UTF-8', and 'PHP'. A 'php' and 'bash' icon are also visible in the bottom right.



The screenshot shows a Microsoft Visual Studio Code (VS Code) interface with the following details:

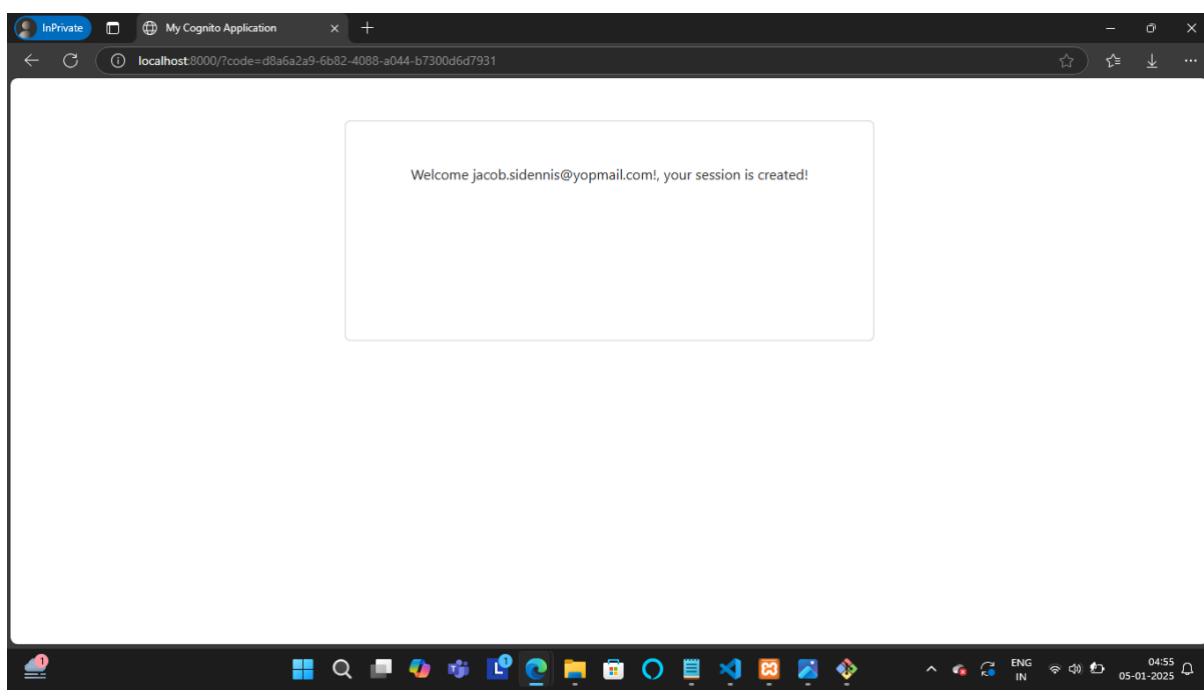
- File Explorer:** Shows a file tree with files like `VirtualHost U`, `index.blade.php U`, `web.php M`, `.env.example M`, and a `Thumbnails` folder.
- Search Bar:** Contains the text "cognito".
- Code Editor:** Displays PHP code for handling OAuth2 requests. The code includes logic for generating a token, decoding the response, and retrieving user information from Amazon Cognito. It uses the Illuminate framework's Request and Response classes, as well as its Facades.
- Terminal:** Shows the command `php main` and the output `2025-01-05 04:24:41 /favicon.ico`.
- Status Bar:** Shows the current file is `web.php`, the file size is 0.71ms, and the status bar includes icons for Go Live, bash, and Prettier.



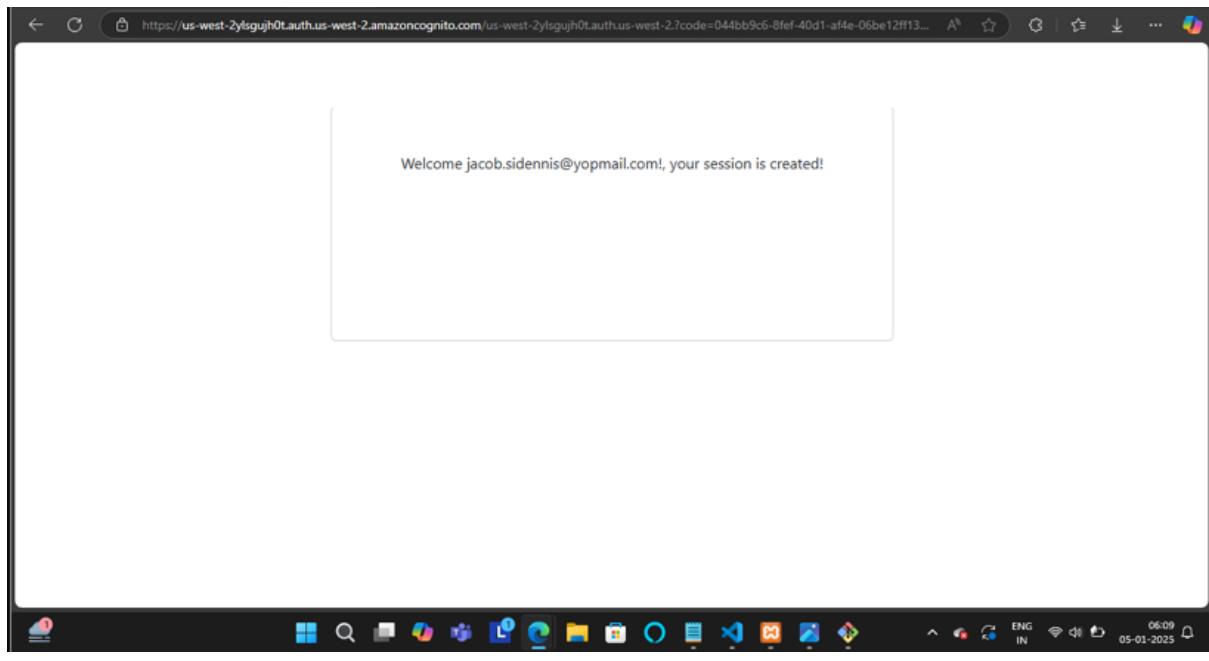


The screenshot shows the Visual Studio Code interface. The Explorer sidebar on the left displays a file tree for a project named 'cognito'. The 'OPEN EDITORS' section shows two files: 'VirtualHost U' and 'index.blade.php U'. The 'COGNITO' section contains 'public', 'resources', 'views', 'routes', 'console.php', 'web.php', 'storage', 'framework', 'logs', 'tests', 'vendor', and 'OUTLINE'. The 'views' folder contains 'index.blade.php' and 'welcome.blade.php'. The 'index.blade.php' file is currently open in the code editor, showing PHP and Blade template code. The 'TERMINAL' tab is selected at the bottom, showing a command-line interface with tabs for 'php' and 'bash'. The status bar at the bottom right shows the date and time as '05-01-2025'.

```
<!DOCTYPE html>
<html lang="{{ str_replace('_', '-', app()->getLocale()) }}>
    <head>
        <meta charset="utf-8">
        <meta name="viewport" content="width=device-width, initial-scale=1">
        <title>My Cognito Application</title>
        <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.3/dist/css/bootstrap.min.css" rel="stylesheet" integrity="sha384-YvpcrY</pre>
```



OUTPUT



CONCLUSION

In an era where digital security is paramount, the development of a user login system utilizing AWS Cognito and the LAMP stack embodies a forward-thinking approach to creating secure, scalable, and user-friendly authentication solutions. This project highlights the fusion of AWS's advanced cloud capabilities with the foundational reliability of the LAMP stack, demonstrating how traditional server-side technologies can effectively integrate with modern cloud services to address contemporary web development challenges.

By leveraging AWS Cognito, the project provides a robust authentication framework equipped with features such as multi-factor authentication (MFA), social identity federation, and token-based access control. These functionalities ensure that the system meets stringent security standards while delivering an intuitive and seamless user experience. The LAMP stack complements Cognito's cloud-based services by providing a stable and efficient environment for backend operations, database management, and server-side scripting, ensuring the system remains versatile and maintainable.

This project's implementation not only addresses the technical complexities of authentication systems but also emphasizes scalability, flexibility, and ease of deployment. Through careful configuration of the AWS Cognito User Pool, integration with MySQL databases, and development of user-friendly interfaces, the

system demonstrates how cloud-native solutions and traditional stacks can coalesce to produce a highly effective user management system.

Furthermore, this project underscores the importance of balancing security with accessibility. Features such as password recovery, role-based access control (RBAC), and integration with industry-standard protocols like OAuth 2.0 ensure a comprehensive approach to user authentication. This balance makes the system suitable for a wide range of applications, from small businesses seeking cost-effective solutions to enterprises requiring sophisticated security measures.

The successful completion of this project illustrates the value of combining modern cloud technologies with established development frameworks. It serves as a practical guide for developers aiming to create secure login systems that are both robust and adaptable to evolving requirements. Beyond technical achievements, this initiative reflects a commitment to enhancing user trust and safeguarding digital assets in an increasingly interconnected world.

In conclusion, the creation of a user login system using AWS Cognito and the LAMP stack demonstrates a pioneering approach to authentication system design. It paves the way for future innovations, empowering organizations to build secure, scalable, and user-centric applications that meet the demands of today's digital landscape.