WORKSHOP N° 4
SOFTWARE ENGINEERING II

Presented by:

Michael Stiven Betancourt Gelves
Cristhian Yamith Cely Oliveros

Professor:
Carlos Andres Sierra Virguez

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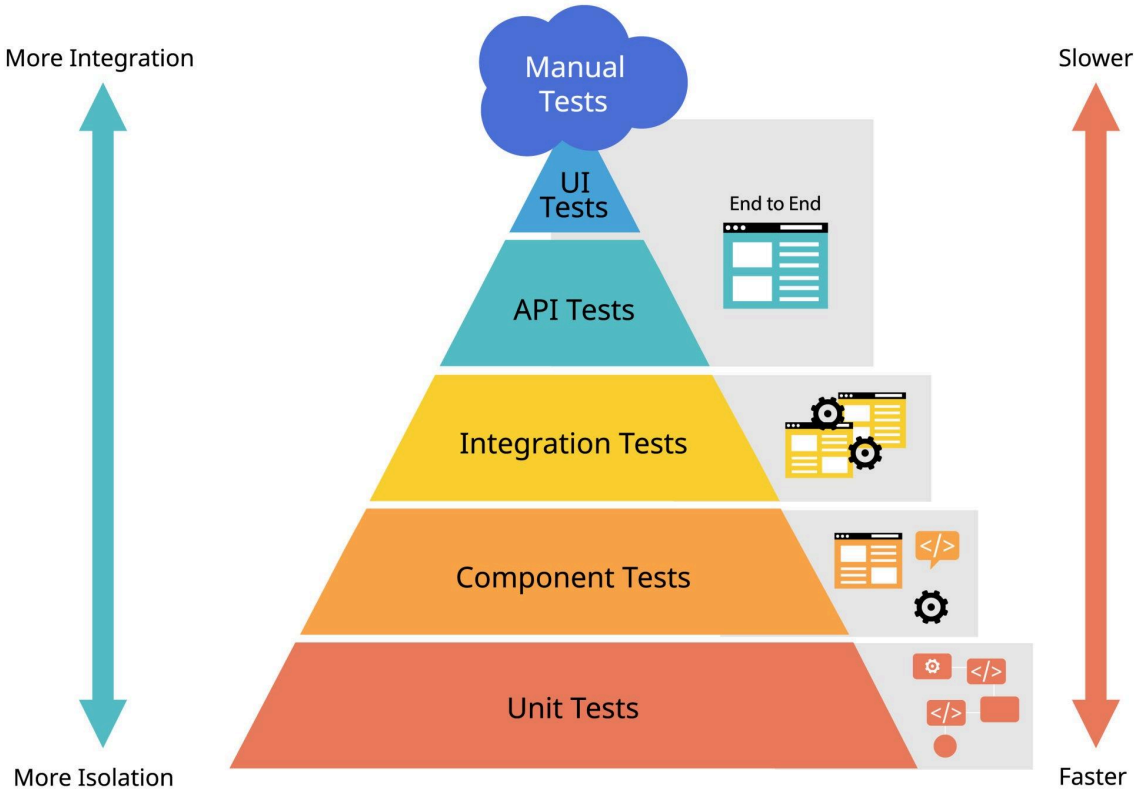
Workshop 4: Methodology and Deliverables

1. Testing Strategy & Execution

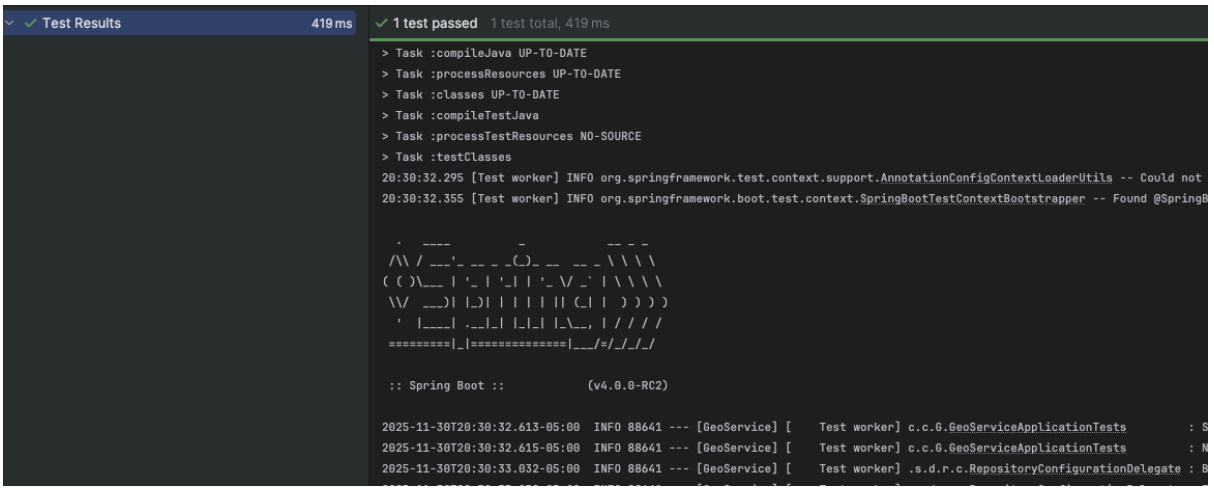


1.1 Unit Tests

The library that was used for testing was Mockito, which is a proven to work library for unit testing. All endpoints had unit tests as per requirements by the project leader to guarantee that each endpoint was fully functional. For both front-end applications, we used Jest as our testing framework alongside @testing-library/react-native to validate component rendering, behavior, and user interactions. In the Expo-based project, we also integrated jest-expo to ensure full compatibility with Expo modules and native features. This setup allowed us to detect issues early, maintain UI consistency, and ensure reliable component behavior across both applications.

- **Backend Component:**

AuthService:

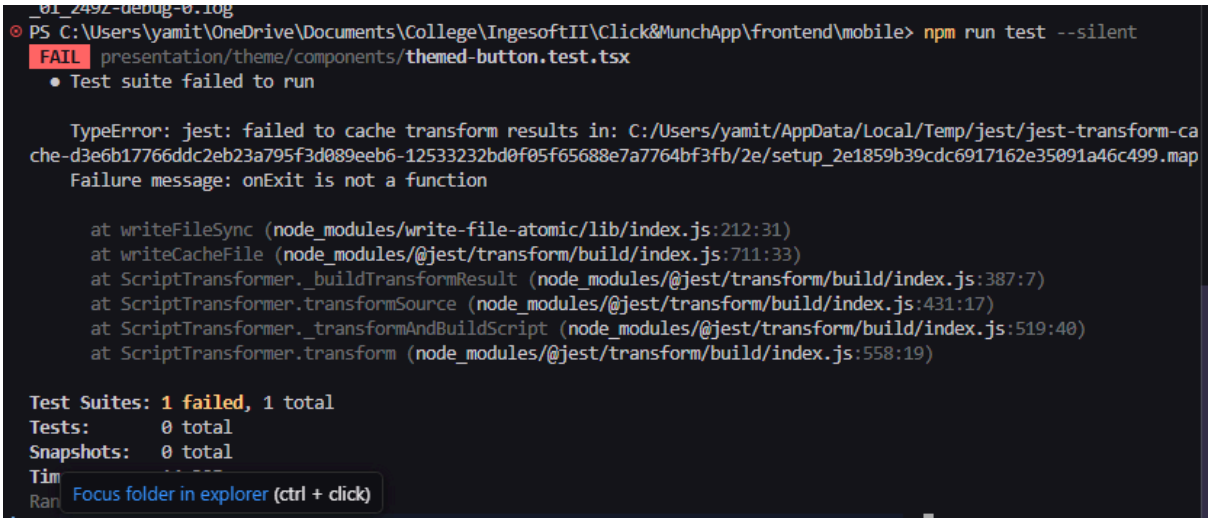


- **Frontend Component:**

themed-button.test.tsx:

```tsx
import React from 'react';
import { render } from '@testing-library/react-native';
import { test, expect } from '@jest/globals';
import ThemedButton from './themed-button';

test('renders label', () => {
  const { getByText } = render(<ThemedButton>Tap</ThemedButton>);
  expect(getByText('Tap')).toBeTruthy();
});
```



1.2 Integration Tests

Once the Unit tests were validated, we proceeded to the integration tests, where the backend microservices and the frontend controllers were tested to work together to make sure that all requests were valid.

- **Integration Strategy:** Prior to continuing to deploy, the front and backend were executed in single machines. Tests were passed as per team metrics.

- **Key Test Snippet:**

  One of the main and most important tests for integration to be valid was the communication between services. Here, there are several test snippets that were developed to make it work only within the backend services, but Frontend vs Backend were the most interesting to see:

  When integrating Backend and Frontend, the "Find Nearby Restaurants" request was sent using a GET method:

  GET localhost:8082/api/restaurants/nearby:

  The body must have these components:

```
{
 "latitude": 52.75214,
 "longitude": -72.886547,
 "radiusInKm": 5
}
```

And the response was

```
[
{
    "id": 1,
    "name": "Burger Station",
    "description": "Best burgers in town",
    "phone": "300123456",
    "email": "contact@burger.com",
    "locationId": 2
```

```
},
{
    "id": 2,
    "name": "Burger Station",
    "description": "Best burgers in town",
    "phone": "300123456",
    "email": "contact@burger.com",
    "locationId": 3
},
{
    "id": 3,
    "name": "Burger Station",
    "description": "Best burgers in town",
    "phone": "300123456",
    "email": "contact@burger.com",
    "locationId": 4
},
{
    "id": 4,
    "name": "Burger Station",
    "description": "Best burgers in town",
    "phone": "300123456",
    "email": "contact@burger.com",
    "locationId": 5
},
{
```

```
    "id": 5,
    "name": "Burger Station",
    "description": "Best burgers in town",
    "phone": "300123456",
    "email": "contact@burger.com",
    "locationId": 6
},
{
    "id": 6,
    "name": "Burger Station",
    "description": "Best burgers in town",
    "phone": "300123456",
    "email": "contact@burger.com",
    "locationId": 7
},
{
    "id": 7,
    "name": "Burger Station",
    "description": "Best burgers in town",
    "phone": "300123456",
    "email": "contact@burger.com",
    "locationId": 8
},
{
    "id": 8,
    "name": "Burger Station",
```

```
        "description": "Best burgers in town",
        "phone": "300123456",
        "email": "contact@burger.com",
        "locationId": 9
    }
]
```

In the integration tests.

1.3 Acceptance Tests (User Stories)

Some of the key user stories that were tested are:

- **User Story 1:**

  US-01: As a Customer, I want to register and log in so I can use the platform.

  The acceptance criteria here was based on the following:

  Given the registration screen, when I enter valid details, then my account is created.
  Given the login screen, when I enter valid credentials, then I am authenticated.
  Given invalid credentials, when I try to log in, then I receive an error message.

- **User Story 2:**

  US-02: As a Restaurant Manager, I want to create and manage my restaurant account.

  The acceptance criteria here was based on the following:

  Given the registration form, when I submit valid business data, then the account is created and pending approval.
  Given an approved restaurant account, when I update information, then it is saved.

2. Deployment Configuration

2.1 Dockerfiles

The following dockerfile was created to orchestrate the creation of all databases at the same time using a single host but several microservices:

This is the Docker-compose.yml file used to compose the entire database on a per-microservice basis.

```
version: '3.8'

services:
 auth-db:
  image: postgres:16
  container_name: auth-db
  restart: always
  environment:
   POSTGRES_DB: auth_db
   POSTGRES_USER: mike
   POSTGRES_PASSWORD: secret
  ports:
   - "5433:5432"
  volumes:
   - auth_data:/var/lib/postgresql/data


 restaurant-db:
  image: postgres:16
  container_name: restaurant-db
  restart: always
```

```
  environment:
    POSTGRES_DB: restaurant_db
    POSTGRES_USER: mike
    POSTGRES_PASSWORD: secret
  ports:
    - "5434:5432"
  volumes:
    - restaurant_data:/var/lib/postgresql/data


geo-db:
  image: postgis/postgis:16-3.4
  container_name: geo-db
  restart: always
  environment:
    POSTGRES_DB: geo_db
    POSTGRES_USER: mike
    POSTGRES_PASSWORD: secret
  ports:
    - "5435:5432"
  volumes:
    - geo_data:/var/lib/postgresql/data


menu-db:
  image: postgres:16
  container_name: menu-db
```

```
  restart: always
  environment:
    POSTGRES_DB: menu_db
    POSTGRES_USER: mike
    POSTGRES_PASSWORD: secret
  ports:
    - "5436:5432"
  volumes:
    - auth_data:/var/lib/postgresql/data



volumes:
 auth_data:
 restaurant_data:
 geo_data:
 menu_data:
```

2.2 Azure Environment Setup

Below is the configuration used for the VM in azure:

- **VM Specs:** Azure B1s, Ubuntu 20.04 LTS
- **Prerequisites Installed:** Docker, Docker Compose, Git.
- **Port Configuration:** Ports were opened in Azure Network Security Group: 80, 443, 8081, 8082, 8083, 8084.

3. CI/CD Pipeline Implementation

3.1 Pipeline Workflow

The tools leveraged for CI/CD implementation were Github Actions + Azure VM with Linux as a host. The referenced workflow is mentioned in the Readme.md file located in the repository with the instructions to deploy the app and manage microservices.

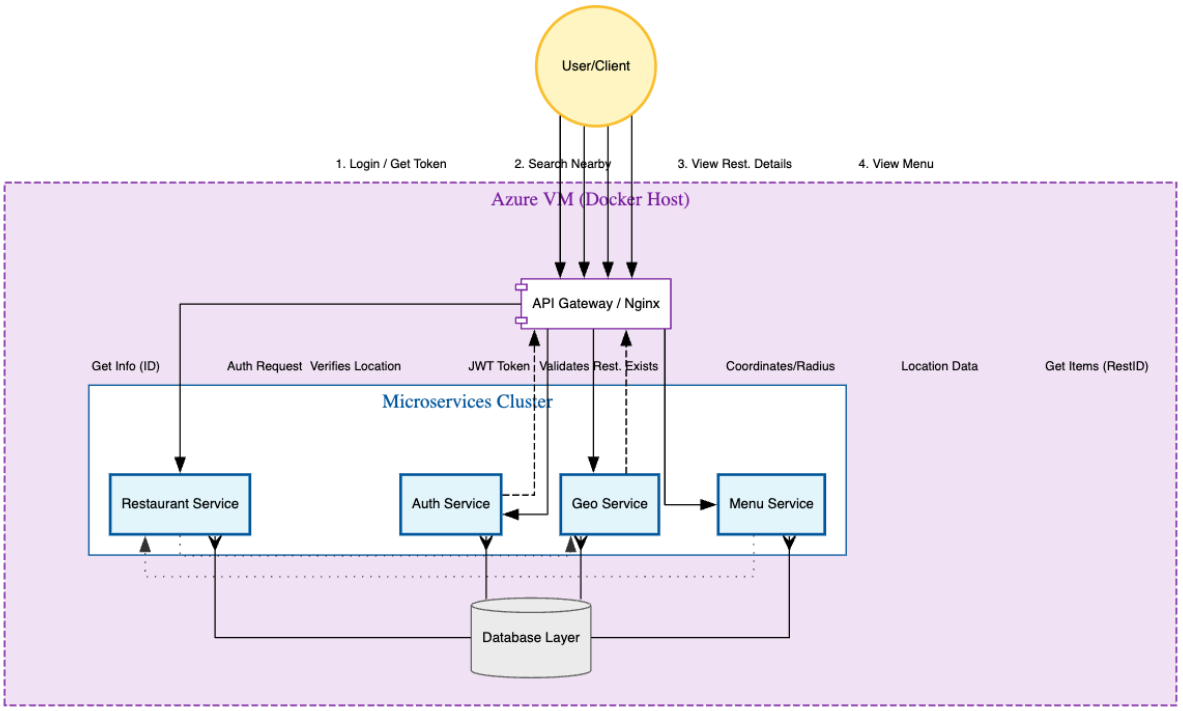
This is the basic workflow:

1. **Build:** GitHub Actions builds Docker images for all 4 services.
2. **Test:** Runs unit tests inside the containers.
3. **Push:** Pushes images to Docker Hub.
4. **Deploy:** SSH into Azure VM, pulls new images, and restarts containers.

4. MVP Delivery

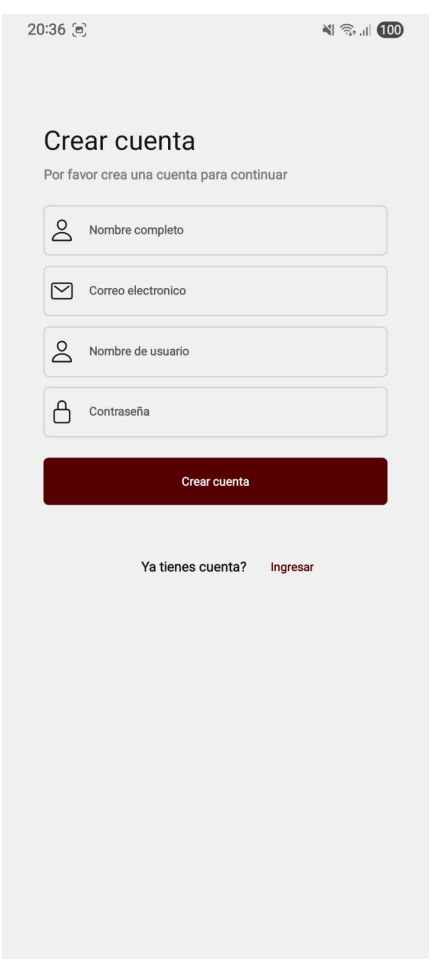
4.1 Architecture Overview

Below is the high-level interaction diagram of the reservation system.

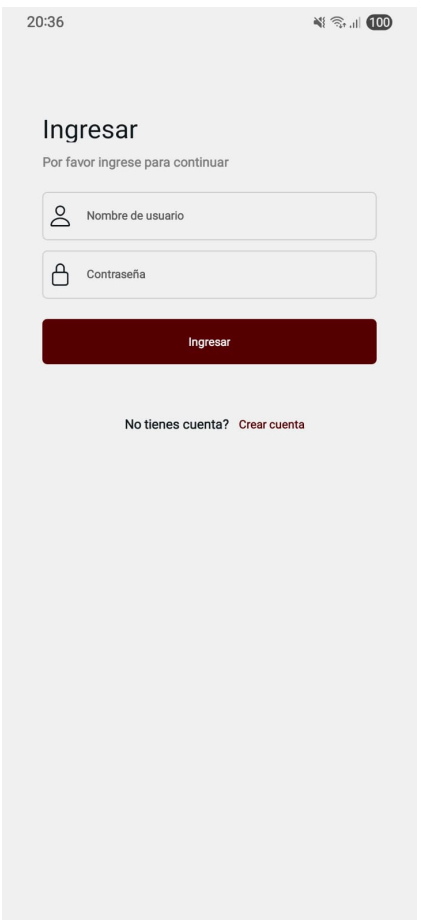


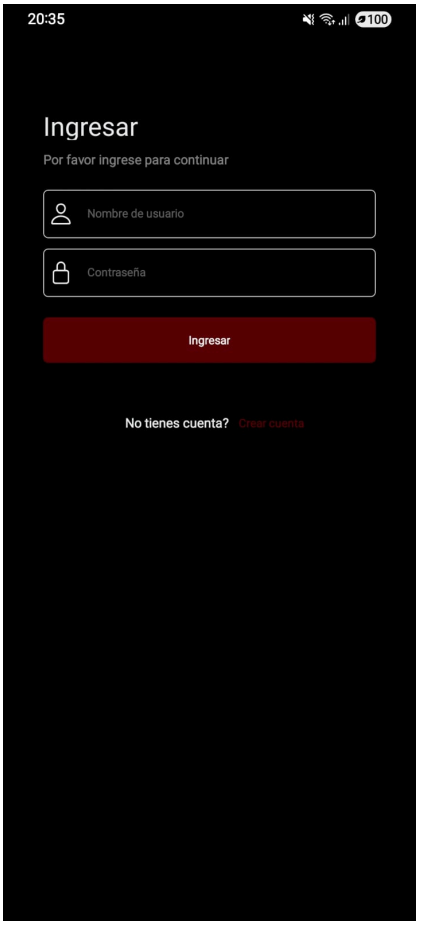
4.2 Functional Features

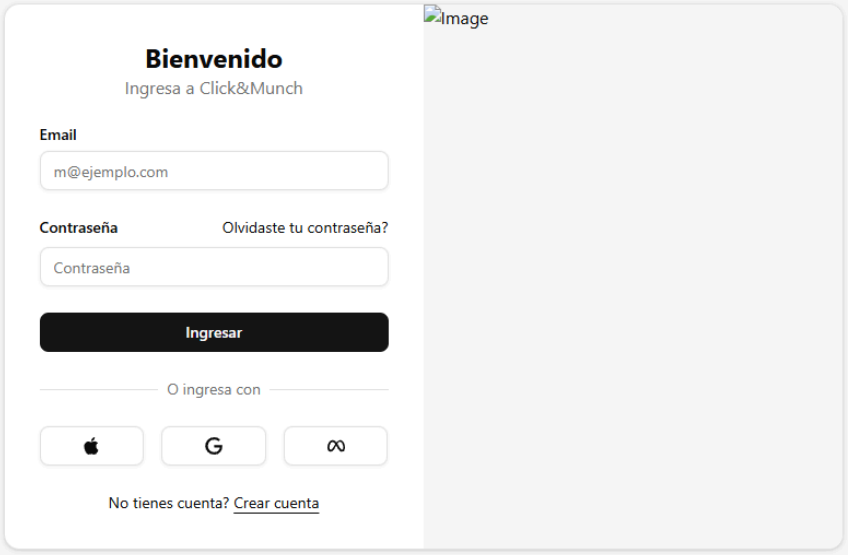
- **Authentication:** Users can register/login (Auth Service).


20:36
100
Crear cuenta
Por favor crea una cuenta para continuar
Nombre completo
Correo electronico
Nombre de usuario
Contraseña
Crear cuenta
Ya tienes cuenta?
Ingresar


20:35
100
Crear cuenta
Por favor crea una cuenta para continuar
Nombre completo
Correo electronico
Nombre de usuario
Contraseña
Crear cuenta
Ya tienes cuenta?
Ingresar


20:36
100
Ingresar
Por favor ingrese para continuar
Nombre de usuario
Contraseña
Ingresar
No tienes cuenta? Crear cuenta


20:35
100
Ingresar
Por favor ingrese para continuar
Nombre de usuario
Contraseña
Ingresar
No tienes cuenta? Crear cuenta



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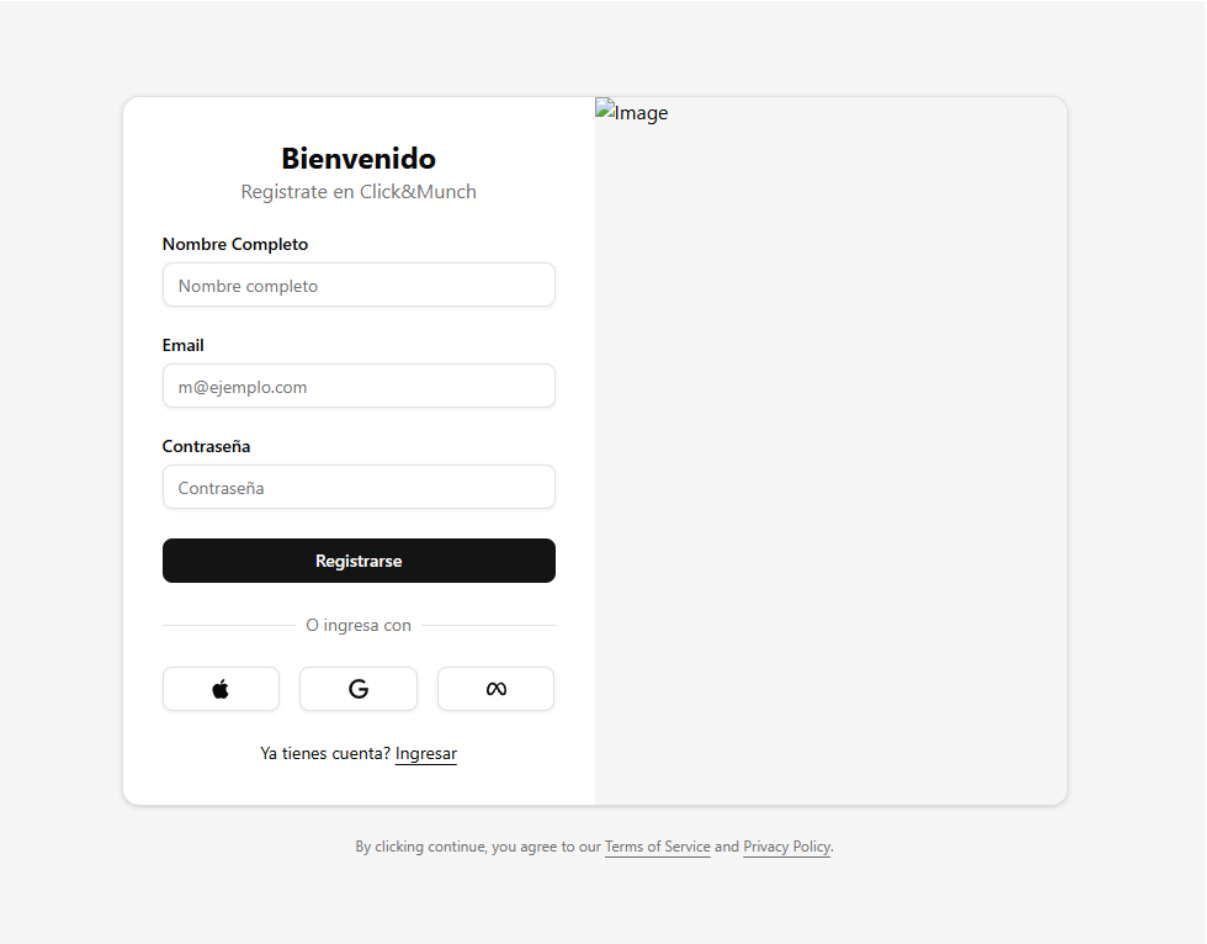
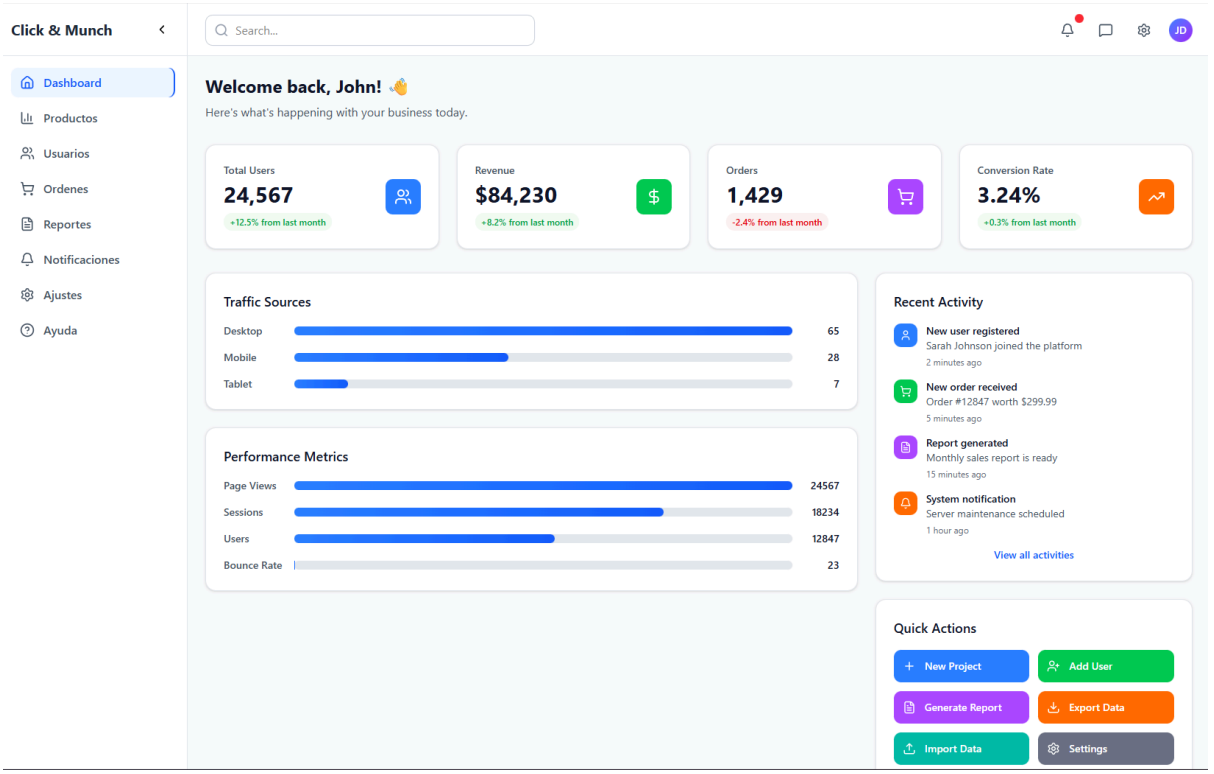
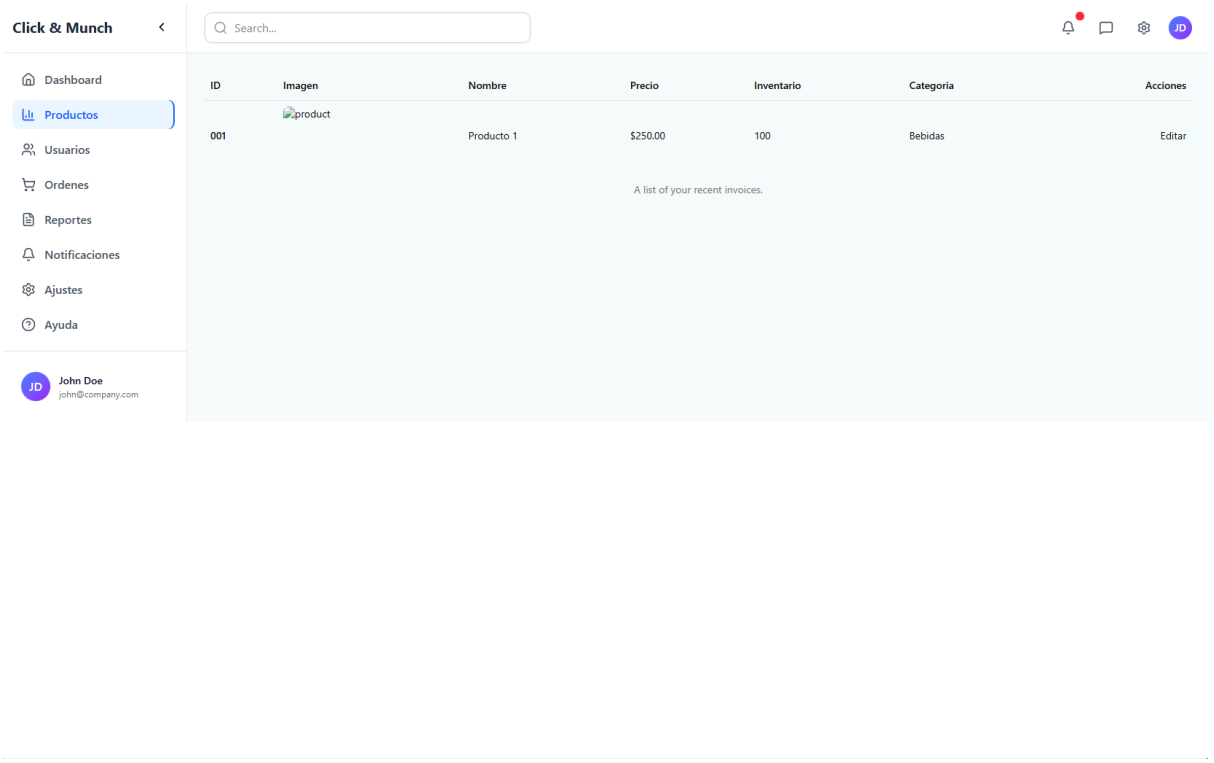


- **Discovery:** Users can find restaurants by location (Geo Service).
- **Browsing:** Users can view restaurant details (Restaurant Service).





- **Selection:** Users can view specific menus for a restaurant (Menu Service).

References

EngAndres. (n.d.). *unal_public* [Folder: Software Engineering 2_Morning (G3)/slides]. GitHub. https://github.com/EngAndres/unal_public/tree/main/Software%20Engineering%202_Morning%20(G3)/slides