

Executive MTECH in Cloud Computing

Semester - 1 Project

Batch - 2 (Session: 2023-25)

Subject: Virtualization & Cloud Computing

Project Name: Electronic MutiChannel-OWN eCommerce website

Team Name: Team - 21

Team Members:

SANJIB Saha

- Role: **Project Management and Product Owner**

Shaurya Pratap Singh

- Role: **Technology Lead Development (Fullstack)**

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- Role: **Provisioning and Deployment**

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- Role: **Database Management, Testing, and Documentation**

Document Version

Version	Author	Reason for change	Date
1	Team 21	Project Idea Submission	5 th Oct 2023
2	Team 21	Final Project Submission	15th Dec 2023

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1. Introduction:

An e-commerce platform for an electronics retail store, involving the deployment of the retail application to a virtual sandbox on AWS/GCP using a centralization technique. The application deployment is facilitated through Kubernetes and Docker technologies.

2. Functional Specification

We are in the process of creating an eCommerce platform with role-based functionalities. Upon logging in, consumers will be assigned a specific role that dictates their level of access. Depending on their access permissions, users will be directed to either the consumer page or the admin page.

For users with consumer role access, the platform allows them to browse and purchase electronic items. On the other hand, users with admin access have the additional capability to add or remove products and make modifications to product specifications.

3. Technical Specification

Front-end (React.js):

1. User Authentication:

- Implemented user authentication using JWT for secure logins and stored tokens securely on the client side.

- Utilized React Context API or Redux for managing global state, including user authentication status and role.

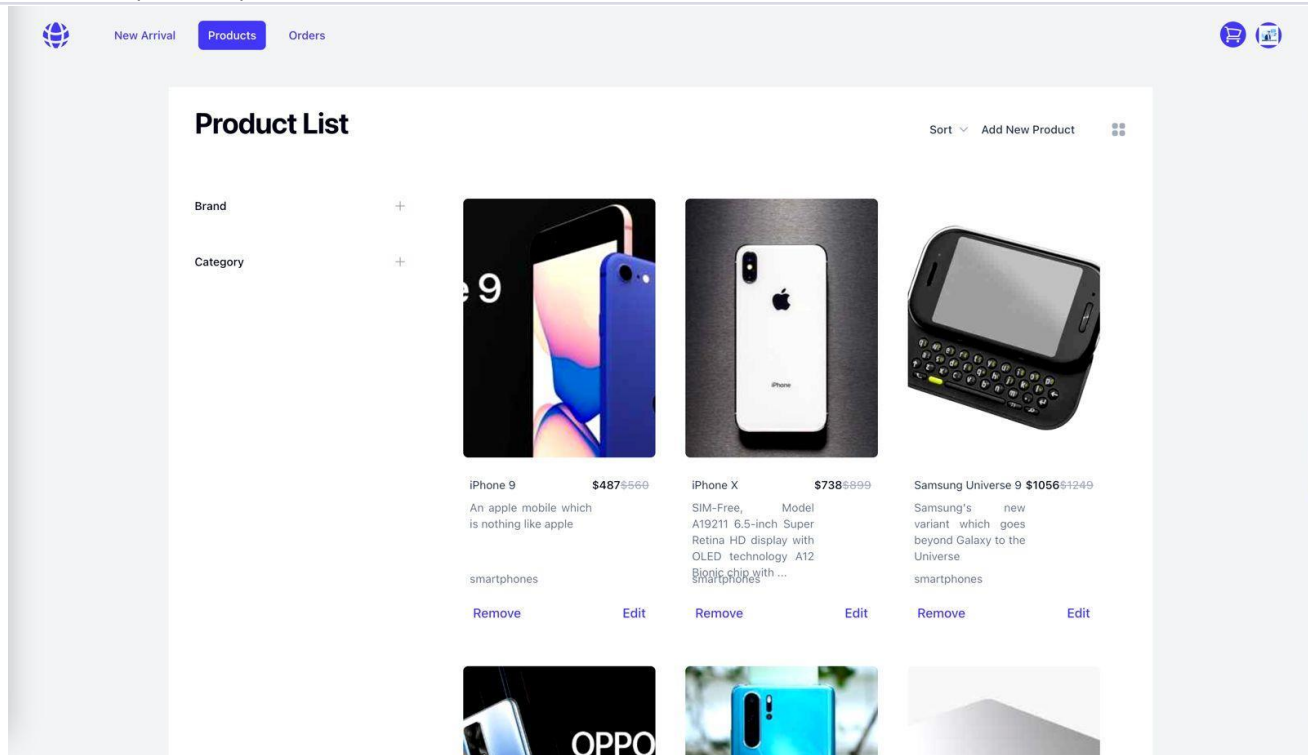
2. Role-Based Routing:

- Integrated React Router to manage role-based navigation, directing users to the consumer or admin pages based on their assigned roles.


3. Consumer Page:

- Developed a visually appealing consumer page featuring a product catalog, detailed product views, and a shopping cart component.
- Utilized React hooks (e.g., useState, useEffect) for state management within functional components.



Consumer product page






Product specifications page




DashboardProductNew ArrivalCalendarReports



Huawei P30





Huawei P30

Huawei P30

Huawei's re-badged P30 Pro New Edition was officially unveiled yesterday in Germany and now the device has made its way to the UK.


Highlights

~~\$499~~
\$446



★★★★★

117 reviews




Color




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Consumer Profile page

 [New Arrival](#) [Products](#) [Orders](#)




My Account

Name : Shaurya Pratap Singh
Email: admin@gmail.com
Role: ADMIN


Address : [Add Address](#)

back

Consumer Shopping cart

 [Dashboard](#) [Product](#) [New Arrival](#) [Calendar](#) [Reports](#)

Cart



Microsoft Surface Laptop 4
Microsoft Surface

Qty

1

Order ID

Order Successfully Placed

Order Number #657b2b2e15097468b6e3ea89


You can check your order in My Account > My Orders

Go back home



4. Admin Page:






































- Designed a responsive admin dashboard with features for product management, including add, delete, and modify functionalities.
- Implemented conditional rendering to display admin-specific components based on the user's role.

Admin page to view orders




New ArrivalProductsOrders





#ORDER	ITEM	TOTAL AMOUNT	STATUS	ACTIONS
65783c6f818fb937fe934580	 MacBook Pro  Brown Perfume	1590	dispatched	 
6579b8c8865ce4faf03f103d	 Tree Oil 30ml	12	delivered	 
657a9bc6916b5c15c199efda	 Microsoft Surface Laptop 4	1346	pending	 
657aa321ce355cd292dbfe56	 Microsoft Surface Laptop 4	1346	cancelled	 
657aa81eda718fcec08a5938	 Microsoft Surface Laptop 4	1346	pending	 
657aa98631caec180875efe5	 Microsoft Surface Laptop 4	1346	pending	 
657aacb331caec180875effb	 Microsoft Surface Laptop 4	1346	pending	 
657aacfa31caec180875f01f	 Infinix INBOOK	969	pending	 
657abbbe74b53b6aabfe6312	 Microsoft Surface Laptop 4  HP Pavilion 15-DK1056WM	3408	pending	 
657abd33058a77d1efe60b0d	 Microsoft Surface Laptop 4  HP Pavilion 15-DK1056WM	3408	pending	 
657abde5d8cd2e9cd62d894c	 Microsoft Surface Laptop 4  HP Pavilion 15-DK1056WM	3408	pending	 

Admin page to add product



New ArrivalProductsOrders



Add Product

Please fill are required filed to add product in Cloud

Product Title*

iPhone 9

Product Description*

An apple mobile which is nothing like apple

Product Thumbnail*

https://i.dummyjson.com/data/products/1/thumbnail.jpg

Product Details

Brand*

SAMSUNG

Category*

SMARTPHONES

Price*

Discount Price*

5. Responsive Design:

- Ensured a responsive and mobile-friendly design using CSS Grid, Flexbox, or a responsive UI library (e.g., Bootstrap) for a seamless cross-device experience.

Back-end (Express.js/Node.js):

1. RESTful API Endpoints:

- Created RESTful API endpoints for user authentication, product retrieval, purchase transactions, and admin functionalities using Express.js.

2. Middleware:

- Implemented middleware functions for authentication and authorization, ensuring that only authorized users can access certain routes.
- Employed error-handling middleware to gracefully handle and log errors.

3. Database Integration:

- Connected Express.js with MongoDB using Mongoose for schema definition, data validation, and database operations.
- Utilized Mongoose population to efficiently retrieve related data.

4. Security Measures:

- Implemented secure password hashing for user credentials.
- Configured CORS settings to control cross-origin resource sharing.
- Employed Helmet.js middleware for HTTP security headers.

Database (MongoDB):

1. Data Schema:

- Designed MongoDB schemas for user profiles, product details, and transaction records.
- Established relationships between collections to represent associations (e.g., user roles).

2. Indexing:

- Applied appropriate indexes to optimize query performance for common operations, such as user authentication and product retrieval.

3. Data Validation:

- Implemented Mongoose validation to ensure data integrity and consistency.
- Validated incoming data against predefined schemas.

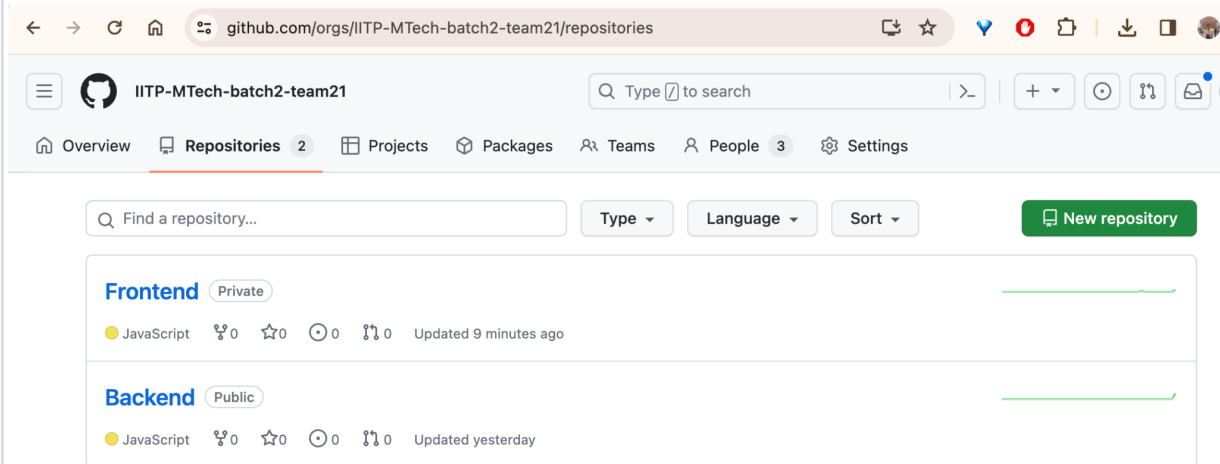
4. Scalability Considerations:

- Explored sharding strategies and optimized queries for potential future scalability.
- Monitored database performance using tools like MongoDB Atlas monitoring.

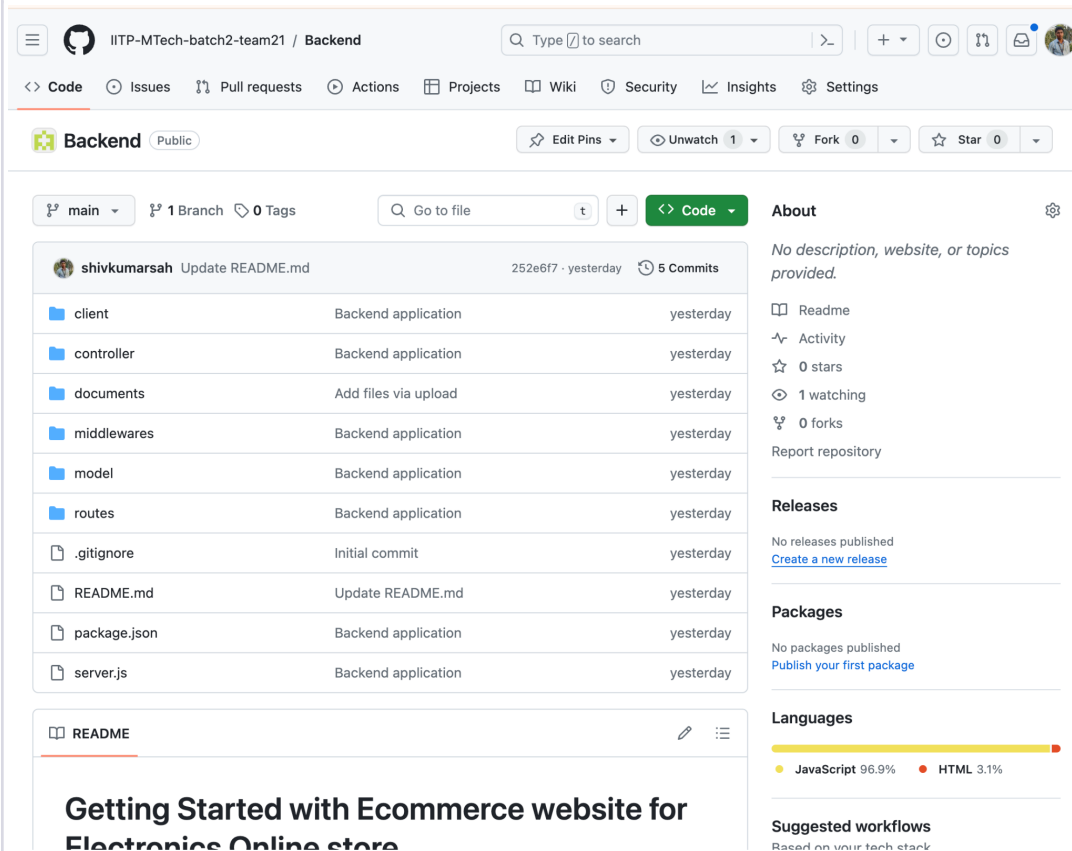
4. Code repository

Project code and articles are committed at the GitHub repository at the below URL.

Team: <https://github.com/IITP-MTech-batch2-team21>



Backend Code: <https://github.com/IITP-MTech-batch2-team21/Backend>



Frontend: <https://github.com/IITP-MTech-batch2-team21/Frontend>

The screenshot shows the GitHub interface for a repository named 'Frontend' under the organization 'IITP-MTech-batch2-team21'. The repository is private and has 1 branch and 0 tags. The file list shows a recent commit by shivkumarsah updating the README.md. The README content is titled 'Deploy Frontend Application: Wiki' and mentions the project was bootstrapped with Create React App, using Redux and Redux Toolkit. The right sidebar shows no releases or packages published, and two contributors: shivkumarsah and Shaurya-567.

File	Description	Commit
documents	Add files via upload	yesterday
public	frontend ui application	yesterday
src	frontend ui application	yesterday
.gitignore	Initial commit	2 months ago
README.md	Update README.md	4 minutes ago
data.json	frontend ui application	yesterday
db-1695987634866.json	frontend ui application	yesterday
package.json	frontend ui application	yesterday
tailwind.config.js	frontend ui application	yesterday

5. Future Landscape

The existing e-commerce website offers product suggestions primarily based on product price and features. In our project, we will enhance this by sharing version specifications of a product, including its relationship with predecessor or successor products. This added information will provide consumers with valuable insights, helping them make informed decisions when selecting the right product version.

Benefit/Impact

1. Microservice hosting on the cloud (AWS/GCP) using Containerization, Kubernetes and Docker enables us to Scalability, High Availability, Flexibility, and Cost Efficiency of the e-commerce application to accommodate increased traffic and demand. This ensures that the website can handle traffic surges during peak times, such as sales events or holidays.

2. **Faster Time-to-Market:** The use of CI/CD pipelines and containerization simplifies and accelerates the deployment process, enabling developers to quickly push updates and new features to the e-commerce site.
3. **Improved Security:** By following best practices for securing data and implementing role-based access control, the e-commerce site can protect sensitive customer data and maintain compliance with industry regulations.
4. **Enhanced Performance:** Performance optimization techniques like caching, load balancing, and auto-scaling ensure that the e-commerce site delivers a fast and seamless user experience, even during periods of high traffic.
5. **Better User Experience:** A user-friendly and responsive web interface ensures that customers can easily navigate and shop on the e-commerce site across various devices and platforms.
6. **Seamless Payment and Shipping Integrations:** By integrating popular payment gateways and shipping APIs, the e-commerce site can provide a streamlined and convenient shopping experience for customers.

References: eCommerce portals like Amazon and Flipkart