A Cloud-Powered Newsfeed Application : Microservices Approach

Software and Data Engineering (CSL7090) Course Project

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Team Members

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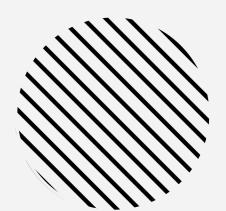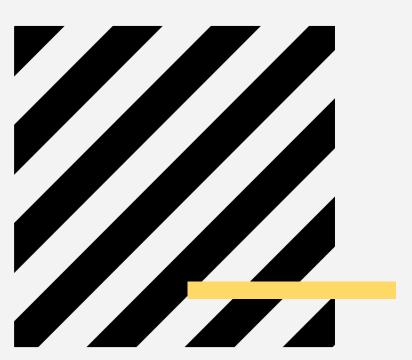Ritu Singh (M23CSE017)

Table of contents

01

Introduction

BreakingNews application introduces an microservices architecture for an enhanced news consumption experience.

Introduction

Microservices Modularity

The application's architecture is efficiently divided into microservices, with dedicated functions for user management, content retrieval, and subscriptions. Each microservice is only responsible for a specific functionality of the overall application ensuring separation of concerns.

Development Efficiency

The implemented modular approach simplifies development and maintenance, enhancing efficiency and adaptability. Any developer in a team can independently work on a microservice. This results in enhanced flexibility.

Main ideas

Seamless Communication

Well-defined APIs facilitate seamless communication between microservices, fostering cohesion and efficient data flow.

User-Centric Experience

The cloud-native architecture ensures a seamless and responsive news consumption experience for users.

Efficient Content Retrieval

A dedicated microservice ensures efficient content retrieval, optimizing the process of delivering breaking news to users.

02

Microservices Architecture

A Closer look at Microservices

- BreakingNews employs a microservices architecture, breaking down the application into independent, manageable units.

- Each microservice is engineered for specific functionalities, promoting a modular and scalable approach.

- Empowering users to stay effortlessly informed, personalize news preferences, and securely manage subscriptions.

Advantages of Using Microservices

Flexibility

Modular design allows for easy updates and modifications without affecting the entire system.

Scalability

Each microservice can scale independently, ensuring optimal resource allocation based on demand.

Elasticity

The system adapts seamlessly to shifting user demands, maintaining responsiveness and reliability.
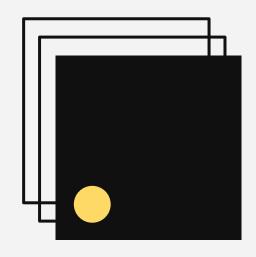
Robustness

Isolated microservices enhance system robustness, minimizing the impact of failures.
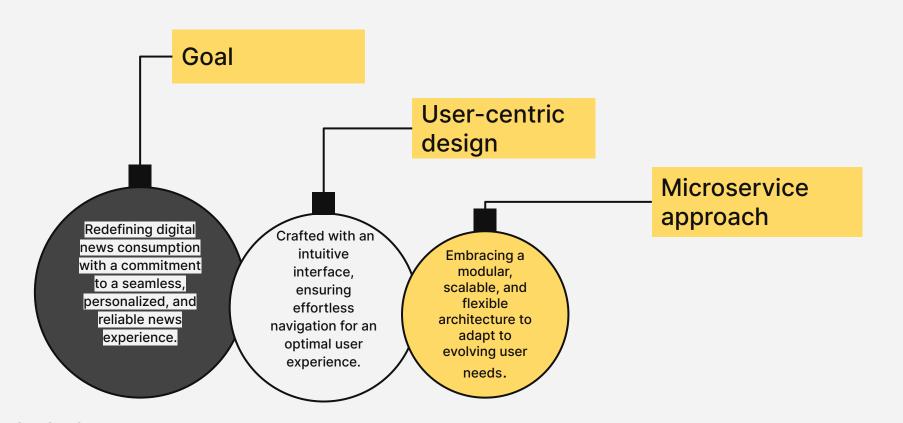
Microservices Details

Authentication Microservice	Manages Single Sign-On (SSO) for secure user authentication. It enables seamless login and logout processes.
Cart Microservice	Facilitates buying news subscriptions through a streamlined and secure checkout process with RazorPay integration. Manages subscription transactions, ensuring a smooth user experience
Payment Microservice	Allows users to add, manage, and review multiple subscriptions in their shopping cart. Enhances the overall shopping experience by simplifying subscription management.
News Microservice	Retrieves news content based on user preferences, such as categories (general, science, business, health, etc.). Ensures dynamic content delivery tailored to individual user interests.

Goal

User-centric design

Microservice approach

Redefining digital news consumption with a commitment to a seamless, personalized, and reliable news experience.

Crafted with an intuitive interface, ensuring effortless navigation for an optimal user experience.

Embracing a modular, scalable, and flexible architecture to adapt to evolving user needs.

Key Features

Seamless News Consumption

Personalized content retrieval aligning with user preferences.

User friendly interface

Intuitive design for easy navigation and customization.

Agile Scalability

Dynamic adaptation to changing user demands for optimal performance.

Effortless Transactions

Simplified subscription transactions through RazorPay integration.

Secure Authentication
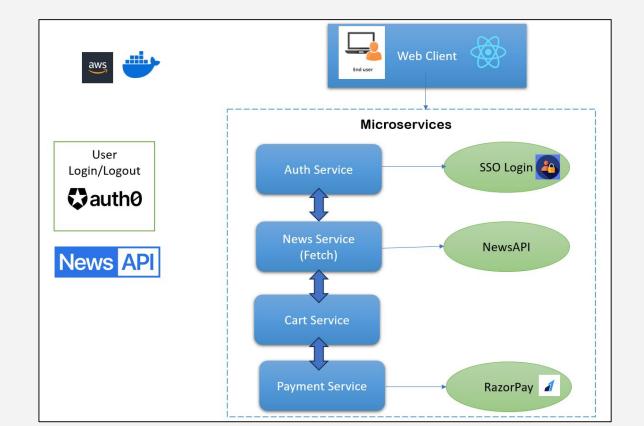
Auth0-powered Single Sign-On (SSO) for robust user security.

Architecture

1.

Authentication

Functions: Authentication Service

User Verification

Implements multi-layered authentication protocols for enhanced security.

Password Management

Empowers users with secure password management features

Enhanced security measures

Leverages Auth0 for robust and secure user authentication.

Secure Data Transmission

Utilizes token-based authentication for secure microservices communication.

User Account Management

Identity Management

The centralized login feature allows the user to automatically sign in with single set of credentials (Gmail credentials, GitHub etc.)

Authorization of Users

Effortlessly handles user login and logout functionalities by verifying the user account. This passwordless sign up feature is user-friendly

2.

Payment Integration

Functions: Payment Service

RazorPay Integration

Enhancing BreakingNews with seamless and secure subscription transactions. Facilitates user-friendly subscription purchases and integrated cart management.

Secure Transactions

Ensures user payment information is safeguarded with industry-standard encryption.

User-Friendly Checkout

Streamlined and intuitive checkout process for efficient subscription purchases.

Functions: Payment Service

Integration with Carts

Coordinates seamlessly with Cart microservice for unified and cohesive subscription management

Transaction confirmation

Instant confirmation for enhanced user trust and satisfaction

Reliable & Scalable

Aligns with other BreakingNews' microservices for scalable and reliable subscription services

3.

Cart Management

Functions: Cart Service

Central Hub

Effortless management of news subscriptions

Easy-to-use UI

Facilitates easy addition and modification of subscriptions.

Integration with RazorPay

Collaborates seamlessly for a unified checkout experience

Real-time Updates

Dynamically updates the cart in real-time for transparency

Scalability and Flexibility

Adapts efficiently to changing user demands and preferences

User Empowerment

Provides users with centralized control over their BreakingNews experience

4.

Content Retrieval

Functions: NewsFetch Service

Selection of Categories

Allows users to select news categories for tailored content

Real-time Updates

Delivers the latest news content in real-time from NEWSAPI.org from wide range of trending stories and news articles

User Engagement and Satisfaction

Enhances engagement by tailoring content, increasing user satisfaction

Personalized news content

Fetches up-to-date and relevant news based on user preferences

Technology Stack

Frontend Tech: ReactJs

Powers dynamic and user-friendly frontend for real-time updates

Backend Tech: NodeJS

Drives robust, scalable backend architecture for efficient data processing

Authentication: Auth0

Ensures secure Single Sign-On (SSO) capabilities

Breaking News

Payment Gateway Integration: RazorPay

Seamlessly integrated for secure and efficient transactions

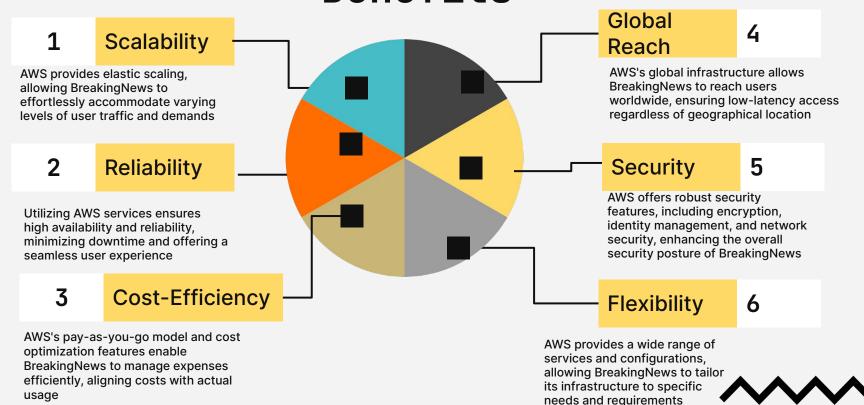**Cloud-Native Tech: AWS**

Provides a reliable and scalable hosting environment

Containerization: Docker

Plays a crucial role in application deployment, management, and scalability

AWS Deployment of BreakingNews: Benefits

1 Scalability

AWS provides elastic scaling, allowing BreakingNews to effortlessly accommodate varying levels of user traffic and demands

2 Reliability

Utilizing AWS services ensures high availability and reliability, minimizing downtime and offering a seamless user experience

3 Cost-Efficiency

AWS's pay-as-you-go model and cost optimization features enable BreakingNews to manage expenses efficiently, aligning costs with actual usage

4 Global Reach

AWS's global infrastructure allows BreakingNews to reach users worldwide, ensuring low-latency access regardless of geographical location

5 Security

AWS offers robust security features, including encryption, identity management, and network security, enhancing the overall security posture of BreakingNews

6 Flexibility

AWS provides a wide range of services and configurations, allowing BreakingNews to tailor its infrastructure to specific needs and requirements

Conclusion

- BreakingNews redefines news consumption through a scalable microservices architecture hosted on AWS, prioritizing a user-centric design.
- Auth0-powered authentication and RazorPay integration ensure secure and streamlined subscription transactions, fostering user trust.
- The Cart Microservice centralizes subscription management, seamlessly integrating with RazorPay for an efficient user experience.
- The Fetch News Microservice tailors content dynamically, providing users with relevant and up-to-date information aligned with their preferences.
- A robust technology stack, featuring ReactJS, NodeJS, Auth0, RazorPay, and AWS, contributes to scalability, reliability, and cost-efficiency.
- Embracing cloud-native computing, BreakingNews ensures efficient orchestration, containerization, and continuous integration for adaptability.
- BreakingNews is not just a news platform; it's an innovative, secure, and user-centric experience that evolves with the ever-changing information landscape.

Resources

Websites

- https://reactrouter.com/en/main
- https://docs.docker.com/desktop/
- https://auth0.com/
- https://razorpay.com/docs/payments/payment-gateway/web-integration/standard/
- https://newsapi.org/
- https://blog.logrocket.com/building-microservices-node-js/

Reference Paper

- Periwal, Nikit, et al. "News Curation, Abstract, and Recommender App using Deep Learning Attention Models." 2022 International Conference on Edge Computing and Applications (ICECAA). IEEE, 2022.

  (https://ieeexplore.ieee.org/document/9936420)

Thank You!