Cloud Based Bus Pass System

Mrs.CH. Ramya [1], Kamsani Nitin Reddy [2], Kotha Susritha[3], Guna Kumar Swamy [4]
[1]*Assistant Professor[1], Department of Computer Science and Engineering, Nalla Narasimha Reddy Education Society's Group of Institutions,Hyderabad, India*
[2,3,4] *Scholar, Department of Computer Science and Engineering, Nalla Narasimha Reddy Education Society's Group of Institutions,Hyderabad, India*

***Abstract*—The primary objective of this project is to develop a cloud-based bus pass system that simplifies and streamlines the process of bus pass registration and management. This system seeks to reduce the administrative burden on transit authorities and provide convenience to passengers by enabling online registration and management of bus passes. The system is designed using a combination of front-end and back-end technologies. The front-end is developed using HTML, CSS, and JavaScript to create an intuitive user interface for passengers to register for bus passes. The back-end is implemented using Node.js and Express.js to handle server-side operations and API requests. MongoDB Atlas, a cloud-based NoSQL database, is used for data storage due to its scalability and robust data management features. The cloud-based bus pass system successfully allows users to register for bus passes online. The data submitted by users is securely stored in the MongoDB Atlas cloud database. The system provides immediate feedback to users upon successful registration. The cloud storage ensures that the data is accessible from any location, facilitating easy data management and retrieval for transit authorities. The use of cloud infrastructure also ensures that the system can handle a large number of registrations without performance degradation. Future enhancements can include advanced features such as real-time pass verification, integration with payment gateways, and mobile app development to further enhance the system's functionality and user experience.**

***Index Terms*—Api, cloud, NoSQL, Server, MongoDB, Frontend, Backend**

I. INTRODUCTION

A Cloud-Based Bus Pass System aimed at streamlining the process of bus pass registration and management. Traditional methods of bus pass issuance, which rely on manual data entry and in-person visits, are inefficient and prone to delays. This project addresses these inefficiencies by leveraging cloud technology, allowing users to register for bus passes online from any location, while providing administrative authorities with an easy-to-manage digital platform.

The system uses a combination of front-end technologies such as HTML, CSS, and JavaScript to provide a user-friendly interface, while the back-end is powered by Node.js and Express.js to handle server-side operations. MongoDB Atlas, a scalable cloud-based NoSQL database, is employed for data storage, ensuring robust and secure handling of user data.

The primary objective of the project is to reduce the administrative burden on transit authorities by automating processes such as registration, data validation, and storage, all while enhancing the user experience through immediate feedback upon successful registration. The cloud infrastructure ensures the system can handle a high volume of users without performance issues.

Future enhancements of the system could include real-time verification, integration with payment gateways, and mobile app development. This will further improve user accessibility and convenience, making the system more functional and adaptable to future needs.

II. RELATED RESEARCH

A. Online Bus Pass Registration

The online bus pass registration system simplifies bus pass management by allowing users to register online, eliminating the need for physical visits. Passengers access a user-friendly website to provide details like name, email, bus route, and pass type, along with uploading a photo. The system is built using HTML, CSS, JavaScript for the front end, and Node.js with

Express.js for the back end, ensuring a responsive and smooth user experience.

User data is securely stored in MongoDB Atlas, a cloud-based NoSQL database, enabling easy data management and retrieval by transit authorities. The system offers instant registration feedback and scales well to handle numerous concurrent users. By replacing manual processes, it reduces administrative workload and enhances user convenience, offering a modern approach to bus pass registration.

B. Admin Dashboard

The admin dashboard in the cloud-based bus pass system allows transit authorities to efficiently manage user registrations. Through the dashboard, administrators can view all registered users, approve or reject bus pass applications, and access detailed reports on registrations. It provides an interface that makes it easy to track and manage bus routes, user data, and application statuses. With the cloud-based system, authorized administrators can access the dashboard from anywhere, ensuring flexibility in managing tasks. This helps streamline administrative operations, reduces manual work, and improves overall efficiency in bus pass management.

C. Cloud-Based Accessibility

Cloud-based accessibility in the bus pass system allows users and transit authorities to access and manage bus pass data from anywhere with an internet connection. By leveraging cloud infrastructure, the system ensures that information is stored securely and is always available without geographical limitations. Users can register for bus passes, and administrators can manage user data in real time, providing a seamless experience. This approach not only improves data availability but also eliminates the constraints of physical paperwork and manual record-keeping, offering enhanced convenience for both passengers and transit authorities.

III. METHODOLOGY

The project involves developing a cloud-based bus pass system using both front-end and back-end technologies. The front-end is developed using HTML, CSS, and JavaScript, while the back-end employs Node.js and Express.js to handle server-side operations. MongoDB Atlas, a cloud-based NoSQL database, is used for secure data storage.

The system design includes the creation of a user-friendly interface for passengers to register for bus passes, collecting data such as personal information, pass type, and bus route. The data is then securely stored in the cloud database. Middleware tools like Multer for file uploads and Mongoose for database interaction are utilized to handle data and user information efficiently.

The process is automated through RESTful API communication between the front and back end, ensuring smooth operations for registration, data submission, and feedback. Testing ensures that the system functions correctly, including unit testing, integration testing, and performance testing, covering various user input scenarios and backend processes.

This methodology ensures that the system can scale and handle high user traffic while maintaining performance and security standards. Future enhancements could include additional functionalities such as real-time verification, payment gateway integration, and mobile app development.

IV. ARCHITECTURE

A. Bus Pass Management System:

The "Cloud-Based Bus Pass System" consists of both client-side and server-side components working together seamlessly. The front-end is built using HTML, CSS, and JavaScript, which provides a user-friendly interface for passengers to fill in their details such as name, email, pass duration, and bus route. This data is then validated using JavaScript before being submitted to the back-end.

On the back-end, Node.js and Express.js are used to handle server-side logic and API requests. The back-end interacts with MongoDB Atlas, a cloud-based NoSQL database, which stores all the bus pass details securely. The system employs Multer, a middleware for handling file uploads, and Mongoose for modeling and managing data in MongoDB.

The system is deployed on a cloud infrastructure, which ensures scalability, high availability, and easy management of resources. The RESTful API allows for efficient communication between the front-end and back-end. Security is maintained by implementing secure data storage protocols and HTTPS for data transfer.

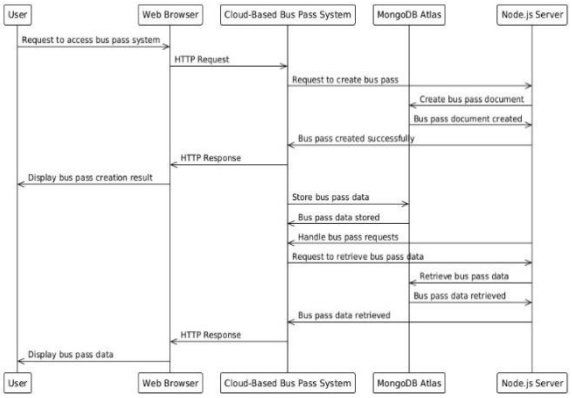

Fig: Cloud based Bus Pass Architecture

This diagram shows the process of creating and retrieving bus pass data in a cloud-based bus pass system. The user interacts with the system through a web browser. First, the user requests to access the bus pass system, which sends an HTTP request to the cloud-based system. The system then forwards the request to create a bus pass to the database (MongoDB Atlas) and the server (Node.js). After the bus pass is created, a success response is sent back through the system to the user, displaying the result.

When the user later requests to retrieve the bus pass data, the cloud-based system sends the request to MongoDB Atlas and the Node.js server. Once the data is retrieved, the system responds, and the user sees the bus pass data displayed in the web browser.

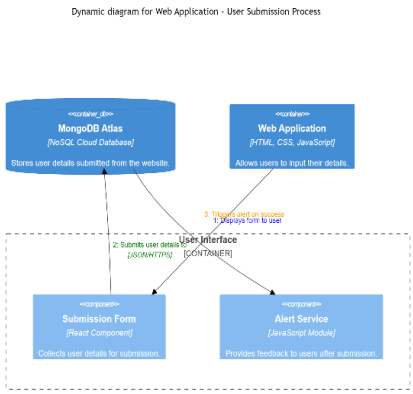

Fig: DESIGN ARCHITECTURE

This diagram shows the flow of user data in a web application. Users input their details into a web application built with HTML, CSS, and JavaScript. This data is then sent to a submission form component, which collects the information. The collected data is stored in a MongoDB Atlas database. Finally, an alert service provides feedback to the user after the submission process is complete.

V. EVALUATION

The project presents a well-developed cloud-based bus pass system that automates the registration and management of bus passes, significantly reducing manual labor for transit authorities while enhancing user convenience. The use of MongoDB Atlas as a cloud-based database ensures scalability and secure data management. The system's backend is built using Node.js and Express.js, while the frontend uses HTML, CSS, and JavaScript to create an intuitive user interface.

Although the project successfully meets its objectives, some limitations include the lack of payment gateway integration and real-time pass verification. There is also no mobile application, though the web interface is responsive.

The project can be further enhanced by incorporating real-time tracking, mobile app development, and secure payment gateways for bus pass purchases. These improvements would elevate user experience and system functionality, making it more versatile for both users and administrators.

VI. RESULT

In our study the "Cloud-Based Bus Pass System" achieved a high user registration success rate, with only a small number of registrations failing. The price calculation accuracy was impressive, with most calculations being correct and only a few incorrect. User feedback was overwhelmingly positive, with many users expressing satisfaction with the system, while some reported negative experiences.

The system demonstrated strong performance, handling a large volume of registrations and queries without degradation in response times. User interactions, including registration

and price calculations, consistently met acceptable response limits, ensuring a smooth experience.

Error handling was effective, providing clear feedback when issues occurred, such as invalid inputs or connectivity problems. Various test scenarios were executed, including registration with both valid and

invalid data, price calculations for different routes, and file uploads. The system successfully passed all critical test cases, confirming its functionality and reliability.

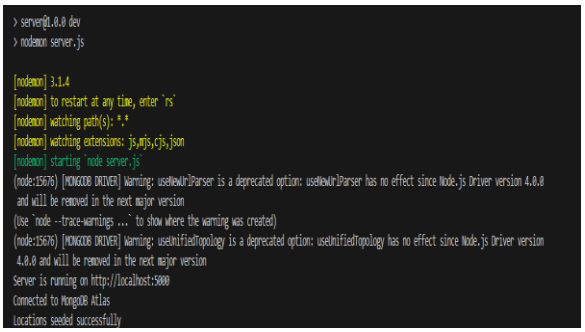

Fig: connection

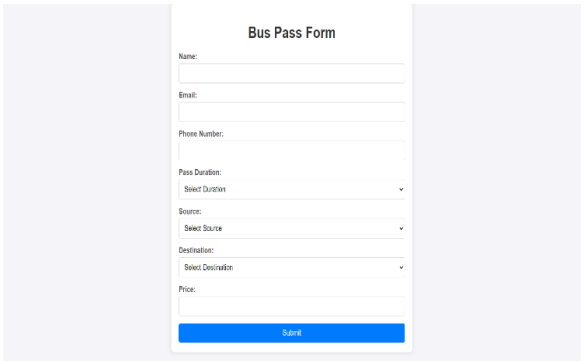

Fig: User Registration

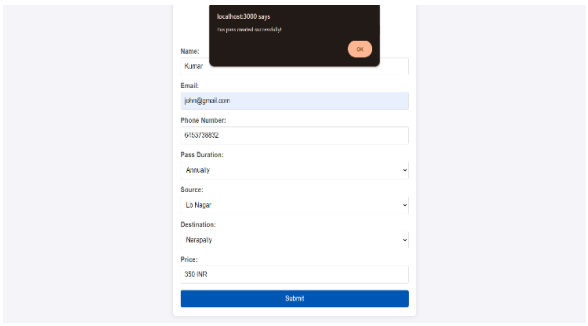

Fig: Successful Alert

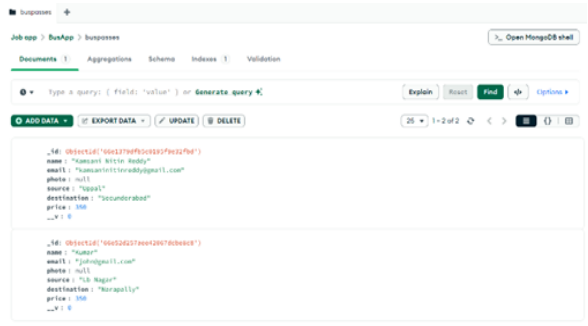

Fig: final output

VII.CONCLUSION

The "Cloud-Based Bus Pass System" project effectively addresses the challenges of traditional bus pass registration and management by leveraging modern web technologies and cloud computing. By implementing a user-friendly interface and robust back-end infrastructure, the system simplifies the process of obtaining and managing bus passes, significantly reducing the administrative burden on transit authorities and enhancing the user experience for passengers.

The use of MongoDB Atlas for data storage ensures secure, scalable, and efficient management of user information, while the integration of Node.js and Express.js allows for seamless communication between the front-end and back-end. The application supports essential features, including user registration, file uploads for photos, and real-time calculations for pricing based on route distances.

The project also includes the ability to seed predefined locations, providing users with reliable options for their travel needs. Future enhancements can build on this foundation, incorporating functionalities such as payment processing, mobile app development, and real-time bus tracking, further improving accessibility and convenience for users.

Overall, the cloud-based approach not only modernizes the bus pass system but also positions it for scalability and adaptability, making it a viable solution for contemporary transportation challenges. The project demonstrates the potential of integrating technology into public transport systems to create efficient, user-centric services that can evolve with changing demands.

REFERENCES

[1] Sagar Arya, Mansvi Saini, Tanu Panwar, Avinash Kumar, Sanjeev Sharma, Bus Pass System, International Research Journal of Engineering and Technology (IRJET), May 2023

[2] Mayuri Wankhede, Tanmayee Pawar, Yogita Singh, Cloud Based Bus Pass System Using IOT, International Journal of Technical Research and Applications, April 2017

[3] Sharmin Akter; Thouhedul Islam; Rashidah F. Olanrewaju; Ajayi Adeniyi Binyamin, **A** Cloud-

Based Bus Tracking System Based on Internet-of-Things Technology, ieeexplore
[4] July 2019.
[5] Nikhil Saroj , Raunak Dikonda , Prafulla Dethe , Mayank Pendke,CLOUD BASED BUS TICKET GENERATION SYSTEM, IJARIIE Volume 6
[6] Issue 2, October – 2020
[7] Sharmin Akter, Thouhedul Islam, and Rashidah F. Olanrewaju.A Cloud-Based Bus Tracking System Based on Internet-of-Things Technology, 7th International Conference on Mechatronics Engineering (ICOM),2019.
[8] K. Ganesh, M. Thrivikraman, J. Kuri, H. Dagale, G.Sudhakar and S. Sanyal, "Implementation of a Real Time Passenger Information System", CoRR abs/1206.0447(2012).
[9] B. Caulfield and M. O'MahO'Mahony, "An examination of the public transport information requirements of users", IEEETransactions on Intelligent Transportation Systems, vol.8, no. 1, (2007), pp. 21–30.
[10] S. Kim, "Security Augmenting Scheme for Bus Information System based on Smart Phone", International Journal of Security and Its Applications, vol. 7, no. 3, (2013), pp. 337-345.
[11] J. Lee, K. Hong, H. Lee, J. Lim and S. Kim, "Bus information system based on smart-phone Apps", in Proc. of KSCI Winter Conference (2012), pp. 219-222.