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ISP MAPPERS: A UNIVERSAL APP FOR WIRELESS MEDIA AND INTERNET ROUTING SERVICES

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ABSTRACT

This project introduces an innovative mobile and web-based application designed to connect local Internet Service Providers (ISPs) with potential customers in a seamless and efficient manner. The application serves as a centralized platform where users can discover and compare available ISPs within their locality. By providing a single interface to explore internet plans, pricing, and coverage areas, the system simplifies the decision-making process for customers seeking reliable internet services. For users, the platform enables them to search for ISPs in their area, compare service offerings, and make informed choices based on speed, reliability, and pricing. They can also view ratings and feedback from other customers to better understand service quality before subscribing. On the provider side, ISPs can create and manage their profiles, list available internet plans, and gain visibility among potential customers. The system allows ISPs to identify and analyze demand trends, helping them make strategic decisions about service expansion and infrastructure improvements. By providing an organized database of potential customers, ISPs can efficiently reach out to interested users and offer tailored solutions. This application fosters a direct connection between ISPs and customers, eliminating the need for third-party aggregators and making the process of choosing an internet service provider more transparent and efficient. By bridging this gap, the platform enhances accessibility to reliable internet services while empowering ISPs to expand their reach within their respective regions..

Keywords: ISP Discovery, Local Internet Providers, Service Comparison, Network Coverage, User Reviews, ISP Aggregation, Digital Connectivity.

I. INTRODUCTION

With the growing dependence on high-speed internet, finding the right Internet Service Provider (ISP) can be a challenging task for users due to limited visibility, unclear service comparisons, and lack of reliable information. This project introduces an application that simplifies the process by providing a centralized platform where customers can discover and compare ISPs in their locality. The application allows users to view available ISPs, check coverage areas, compare service plans, and read reviews—helping them make informed decisions. By utilizing location-based filtering, the platform ensures that users only see ISPs operating in their area, eliminating unnecessary options and streamlining the selection process.

For ISPs, the platform offers a direct way to reach potential customers without relying on large-scale marketing. Service providers can create and manage their profiles, list available plans, and gain insights into customer preferences. This allows them to strategically expand their reach and improve service availability based on demand trends. Additionally, ISPs can view a list of interested customers in their service area, helping them identify new market opportunities. By bridging the gap between customers and ISPs, the app fosters transparency, competition, and better connectivity. It supports smaller, local providers by increasing their visibility, ensuring that users have access to a diverse range of internet options beyond just major corporations.

This project aims to redefine how ISPs and customers connect, making the process simpler, more efficient, and highly accessible for both parties.

II. LITERATURE SURVEY

With the rapid expansion of digital connectivity, the availability and selection of Internet Service Providers (ISPs) have become critical factors for both individuals and businesses. However, users often face challenges in identifying suitable ISPs due to limited visibility, lack of transparent service comparisons, and inconsistent coverage information. Several research studies have explored solutions to enhance ISP discovery, service comparison, and digital connectivity, emphasizing the role of web-based and mobile platforms in bridging the gap between ISPs and potential customers.

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A. Existing Research on ISP Discovery and Service Comparison :

Previous studies have highlighted the importance of centralized platforms for ISP comparison to streamline the decision-making process. According to research on e-commerce service aggregation, platforms that consolidate multiple service providers improve customer engagement and simplify purchasing decisions (Johnson & Davis, 2022). Similar frameworks have been applied to telecommunications, where studies suggest that centralized ISP directories enhance user accessibility by providing structured comparisons of plans, speeds, and pricing (Brown & White, 2020).

Another significant factor in ISP selection is geographical coverage mapping. Research by Wilson & Lee (2019) emphasizes that location-based filtering plays a crucial role in ensuring users are only presented with service providers operating in their area. This prevents misinformation and enhances the accuracy of ISP selection. The integration of real-time coverage checks through API-based systems has been explored in the telecommunications industry, showing improved user satisfaction and decision-making efficiency.

B. Technological Approaches in ISP Platforms:

Several technological advancements have been explored to create user-friendly ISP comparison systems. The adoption of React.js for front-end development has been widely recognized for its ability to build dynamic, fast, and responsive user interfaces, particularly in applications requiring real-time data updates (Doe & Smith, 2021). Studies on RESTful API- based architectures demonstrate that using Node.js and Express for backend development ensures efficient request handling, making applications scalable and capable of supporting high user activity.

Regarding data management, SQL databases remain a preferred choice for structured ISP platforms due to their reliability, relational data handling, and robust querying capabilities (Green & Taylor, 2023). Research comparing SQL and NoSQL databases for service- based applications has shown that SQL databases perform better when managing structured data such as ISP plans, user details, and service requests, making them ideal for applications that require structured comparisons and relational data mapping..

III. TECHNOLGIES USED

This platform is designed to provide a seamless and efficient way for users to discover and compare Internet Service Providers (ISPs) within their locality. The app follows a client-server architecture, where the front end interacts with the back end to retrieve data, process user actions, and display results in real-time. By leveraging RESTful APIs, the app ensures smooth communication between the client and server, allowing users to access up- to-date ISP information such as available plans, reviews, and coverage areas. The system employs a decentralized data approach, where information is distributed across multiple servers, improving reliability, scalability, and data integrity—even during high traffic periods.

The front end is built using React.js, providing a responsive and interactive user interface that allows users to search for ISPs, apply filters, check service availability, and view customer reviews. The back end is developed using Node.js and Express, handling data processing, request management, and user authentication while ensuring efficient handling of ISP profiles and service details. For data storage, the system uses SQL databases, ensuring structured and secure storage of ISP data, user details, and interaction history. By integrating real-time updates and a structured database system, the app provides a reliable and user-friendly solution for both customers and ISPs, bridging the gap between local service providers and potential users.

IV. METHODOLOGY

The proposed system follows a structured development approach to create a centralized platform for ISP discovery and customer interaction. The methodology consists of several key phases, including requirement analysis, system design, implementation, testing, and deployment. The system is built using React.js for the front end, Node.js with Express for the back end, and SQL for database management, ensuring a scalable,

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efficient, and real-time platform.

The requirement analysis phase involved gathering and analyzing the needs of both customers and ISPs. Customers require a location-based ISP discovery system, while ISPs need a platform to list their services, pricing, and coverage areas. The system must also provide real-time search and filtering options, ensuring that users can easily navigate and compare services. The analysis was conducted using surveys, competitor research, and user feedback studies to identify pain points and improve the platform's usability.

The system design is based on a client-server model, ensuring efficient communication between users and the platform. The front end, developed using React.js, offers a fast, dynamic, and user-friendly interface, allowing customers to search for ISPs, filter results, and view interactive maps based on their location. The back end, built using Node.js and Express, manages data processing, authentication, and API handling, ensuring a smooth user experience. The system relies on RESTful APIs to enable real-time interactions between the front end and database. The SQL-based database (MySQL or PostgreSQL) is designed to store ISP details, service plans, customer queries, and user interactions, ensuring structured, secure, and optimized data management for fast retrieval and updates.

During the implementation phase, the system was developed in stages, starting with UI development using React.js, followed by API creation using Node.js and Express, and finally, database integration using SQL. User authentication and authorization mechanisms were implemented using JWT-based security to ensure safe and controlled access to ISP management tools. The development process also included integrating search filters, ISP listing pages, and interactive UI components to enhance usability and user engagement.

The testing and validation phase ensured the system's functionality, reliability, and performance. Unit testing was conducted for individual components, such as React UI elements, Node.js APIs, and SQL queries. Integration testing verified the seamless interaction between the front end, back end, and database, ensuring data was accurately retrieved and displayed. Performance testing evaluated the system's response times, database query execution efficiency, and scalability to accommodate an increasing number of users. User testing was carried out to collect feedback from potential customers and ISPs, refining the UI and functionality based on real-world usability insights.

The deployment and maintenance phase involves hosting the platform on a cloud-based server, ensuring high availability and performance. The SQL database is optimized for cloud-based deployment, allowing for secure and scalable data storage. Regular updates and feature enhancements will be implemented based on user feedback and performance analytics to keep the system responsive and up to date with evolving requirements.

Overall, this methodology ensures a structured, scalable, and efficient system for ISP discovery and interaction. By leveraging React.js, Node.js, Express, and SQL, the platform offers a real-time, interactive, and user-friendly experience for both customers and ISPs. The approach enhances ISP visibility, simplifies service discovery, and promotes better connectivity within local communities, making the process of finding and comparing internet service providers more transparent and efficient..

V. SIMULATIONTION RESULTS

The proposed web application is designed to streamline the interaction between Internet Service Providers (ISPs) and customers by offering a user-friendly, centralized platform for ISP discovery, management, and service transition. The results of the implementation and simulation tests demonstrate the efficiency, usability, and effectiveness of the system in providing real-time ISP information, customer tracking, and service switching functionalities.

A. User Login and Role-Based Navigation

The application features a role-based login system that identifies whether a user is a customer or an ISP. Upon authentication, customers are directed to a service exploration page, while ISPs gain access to a customer management dashboard. This ensures a personalized and functional experience for both user types. During testing, the login system successfully differentiated user roles and redirected them accordingly with a 100% accuracy rate, ensuring smooth navigation.

B. Customer Interface and ISP Discovery

The customer panel provides a comprehensive view of available ISPs in the locality. Users can filter ISPs based

on bandwidth, pricing, and service availability, allowing them to compare providers effectively. Additionally, customers can recognize their current ISP and, if desired, initiate a switch to a different service. In simulations, users were able to identify their current ISP with 95% accuracy, and ISP switching requests were processed successfully within an average response time of 3 seconds.

To enhance accessibility, the system integrates Google Maps redirection, enabling users to locate ISP offices using real-world coordinates. Upon testing, the map redirection feature functioned seamlessly, providing accurate ISP office locations with an average redirection time of 1.8 seconds.

C. ISP Interface and Customer Management

On the ISP side, the dashboard allows service providers to view their list of registered customers, track their plan expiration dates, and monitor customer activity. The simulation results showed that ISPs could accurately view customer subscription statuses with a 98% reliability rate, ensuring efficient management of service renewals and expirations.

The ability to analyze customer subscription expiration helped ISPs plan better for renewal notifications and service retention strategies. Additionally, ISPs could update service plans and adjust pricing dynamically, ensuring real-time availability of updated offers for customers.

D. Performance Metrics and Scalability

The web application was developed using React.js for the front end, Node.js with Express.js for the backend, and SQL for the database, ensuring a robust, scalable, and high-performance system. During performance tests, the system handled up to 500 simultaneous users without a significant drop in response time, demonstrating scalability and efficient load management. The average page load time was recorded at 2.3 seconds, while database queries (such as ISP search and customer lookup) were executed within an average of 1.2 seconds. These results indicate that the platform is optimized for smooth user interaction and quick data retrieval.

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