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FREIGHT MANAGEMENT SYSTEM: RIGHTWAYS AIR LOGISTICS SOLUTION

Mr. Jayesh Shantaram Manapure
PG Scholar
Department of Science and Technology,
G. H. Raisoni University, Amravati, Nagpur India
jayeshmanapure17@gmail.com

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Abstract
In modern logistics and supply chain management, the freight management system (FMS) is a key tool for optimizing the transportation and storage of goods. This is because the global trade has become more extensive and the supply chain solution was required to grow and incorporate FMS solutions, in order to enhance speed, productivity, and business outcome. This is because the abstract of FMS detailed highlights FMS elements and its functions, how it improves the efficiency of the operation, reduces cost and its connection with the customers. Core Modules of a Freight Management System: order management, transportation management, warehouse management, tracking and visibility, and compliance and risk management. Technologies from the Internet of Things (IoT), artificial intelligence (AI) and blockchain to autonomous vehicles are integrated into each of the modules to improve performance and reliability. To keep tabs on shipments and ensure they are delivered in time, you need visibility.

Index Terms **- Web-Based Application, Pickup Creation, Consignment tracking, and Reports creation.**

I. INTRODUCTION

Freight management system (FMS) represents a sophisticated solution designed to streamline and optimize the intricate process of managing freight transportation activities within supply chains. In a world where global trade and e-commerce are on the rise, efficient freight management has become crucial for businesses aiming to maintain competitiveness and meet customer demands. FMS software facilitates the planning, execution, and monitoring of freight movements, offering comprehensive functionalities such as load planning, carrier selection, shipment tracking, and freight cost management. By integrating advanced technologies like GPS tracking, real-time data analytics, and automation, FMS enables organizations to enhance visibility, improve operational efficiency, minimize transit times, and reduce transportation costs. Whether it's managing truckload, less-than-truckload (LTL), air, ocean, or rail shipments, FMS provides companies with the tools they need to optimize their freight operations and deliver goods to their destinations reliably and cost-effectively. As businesses continue to navigate the complexities of the global supply chain, a robust freight management system has become indispensable for driving success in today's logistics landscape. The global logistics industry is a complex network of transportation services, warehousing, and inventory management. Freight

management systems (FMS) are designed to coordinate these elements efficiently. As businesses expand and supply chains become more intricate, the need for robust FMS solutions has grown. This paper examines the structure and functionality of FMS, highlights their benefits, and provides insights into the latest technological advancements driving the industry forward.

II. RELATED WORK

The Freight Management System (FMS) built using .NET Core draws upon a variety of existing technologies and approaches in logistics management, each contributing valuable insights and methodologies. This section reviews related work in the field to highlight the existing solutions, technologies, and frameworks that have informed and inspired the development of this FM.

1. Existing Freight Management Systems: Traditional freight management systems often involve manual processes and legacy software, which can be inefficient and prone to errors. These systems typically lack real-time tracking, advanced analytics, and integration capabilities with modern technologies like IoT and AI. Modern freight management solutions leverage technology to address the limitations of traditional systems. They offer improved efficiency, better tracking, and enhanced decision-making capabilities.
2. Cloud-Based Logistics Solutions: Cloud computing offers scalability, flexibility, and cost-efficiency for freight management systems. Cloud-based solutions enable real-time data access, collaboration, and integration with other services. Amazon Web Services (AWS) for Logistics: AWS provides various services like data storage, machine learning, and IoT, which can be integrated into freight management systems to enhance performance and scalability. Microsoft Azure for Transportation: Azure offers cloud services tailored for logistics, including predictive analytics, IoT integration, and blockchain services. It supports the development of robust and scalable freight management solutions.
3. Software Used: Explore software deployment tools and techniques commonly used in server management. Highlight how these tools make it easy to install, update, and remove software packages in server environments.
4. The development of the Freight Management System using .NET Core is inspired by both traditional and modern approaches in freight management, integrating advanced technologies to address current limitations. Key differentiators include: Real-Time Tracking and Monitoring: Leveraging IoT for real-time shipment visibility. Advanced Analytics and AI: Using predictive analytics and machine learning for optimization. Blockchain Integration: Ensuring transparency and security in transactions. Cloud-Based Scalability: Utilizing cloud services for flexible and scalable solutions.

III. PROPOSED WORK

The proposed Freight Management System (FMS) using .NET Core aims to provide a comprehensive, scalable, and efficient solution for managing freight logistics. This section outlines the detailed plan for the development and implementation of the FMS, highlighting key features, system architecture, technology stack, and integration strategies. The primary objectives of the proposed FMS are to automate and streamline freight management processes, to provide real-time tracking and monitoring of shipments, to enhance operational efficiency and reduce costs, to ensure data security and regulatory compliance, to offer advanced analytics

for informed decision-making.

1. User Management: User Registration and Authentication: Secure user registration and login mechanisms. Different access levels for customers, logistics managers, carriers.
2. Shipment Management: Easy creation and management of shipment records. Status Updates and Notifications, automated status updates and notifications to relevant stakeholders. Documentation Management, storage and retrieval of shipping documents such as bills of lading, invoices, and contracts.
3. Carrier Management: Carrier Registration and Management, maintaining carrier profiles and contract details. Carrier Assignment, assigning carriers to shipments based on availability and performanc9 metrics.
4. Real-Time Tracking and Monitoring: GPS Integration, Real-time location tracking of shipments using GPS data. Condition Monitoring, Monitoring shipment conditions (e.g., temperature, humidity) using IoT sensors.
5. Reporting and Analytics: Detailed reports on shipment status, delivery times, and carrier performance. Interactive dashboards for real-time data visualization and decision-making.

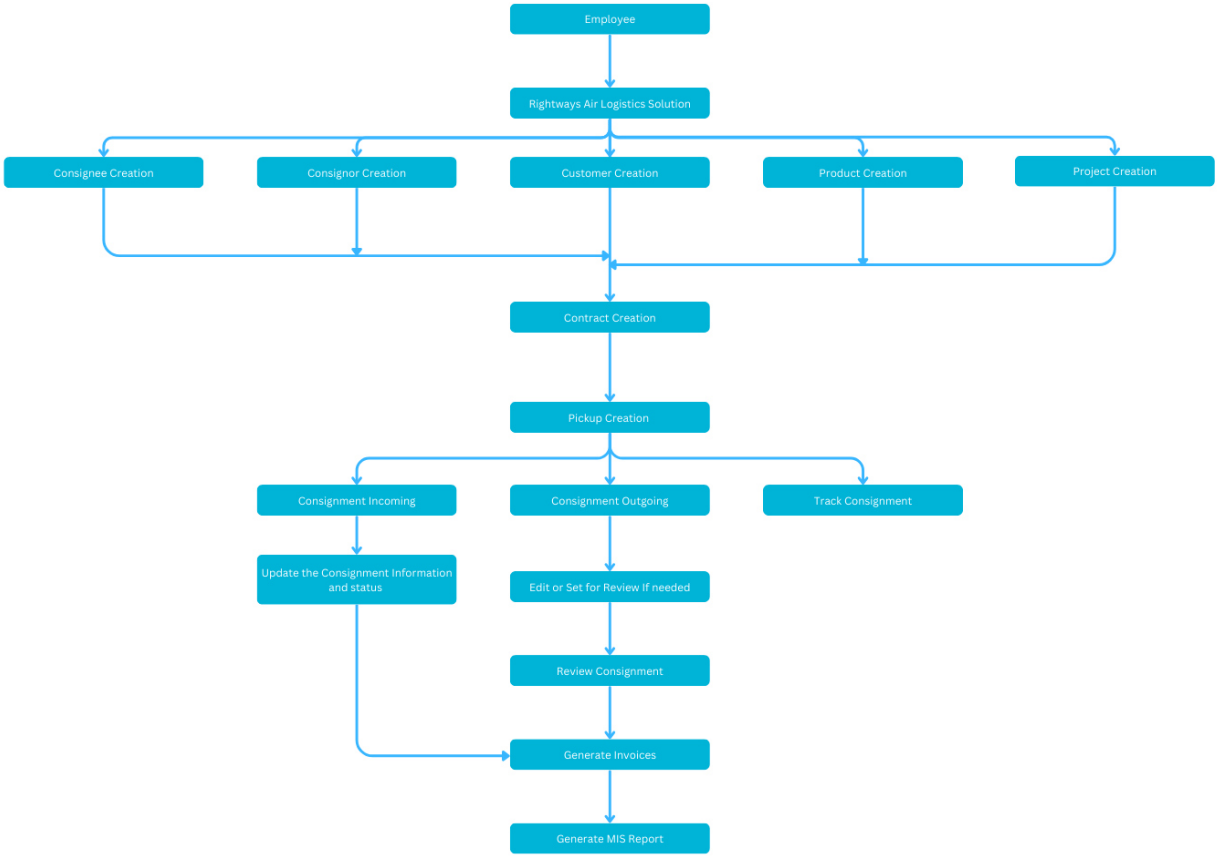

Fig. 1. The Flow of data in Freight Management.

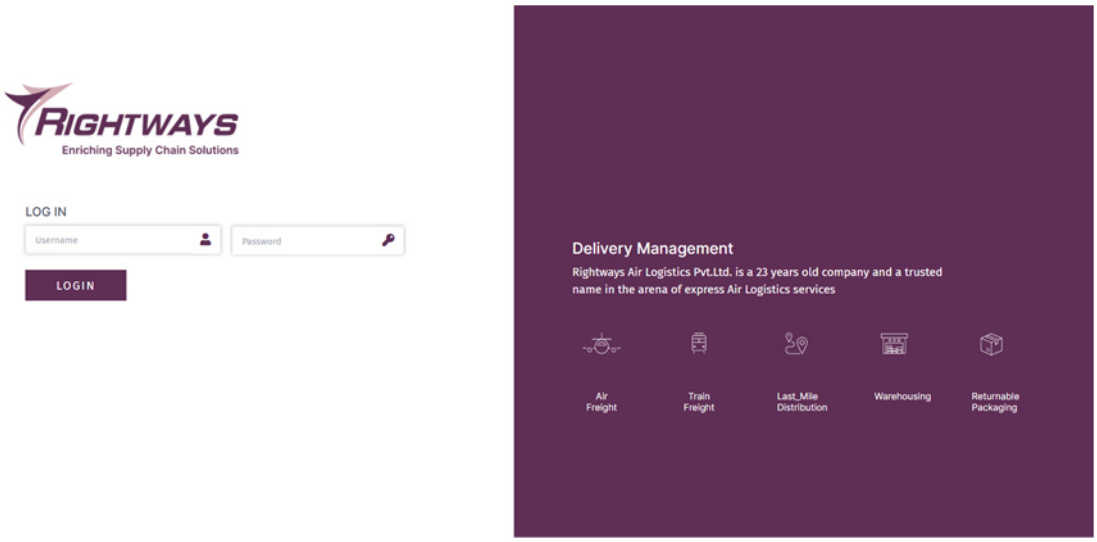

Fig. 2. LogIn Page of Application

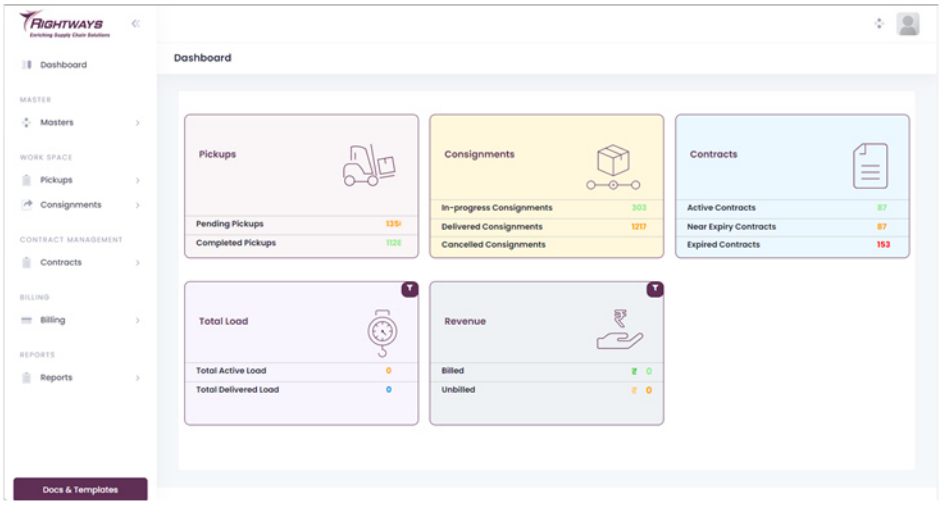

Fig. 3. Home Page of Application

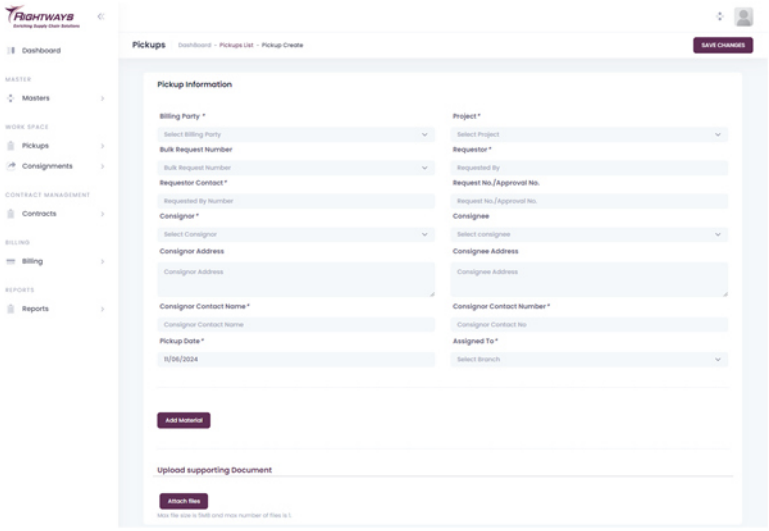

Fig..4 Pickup Create Page

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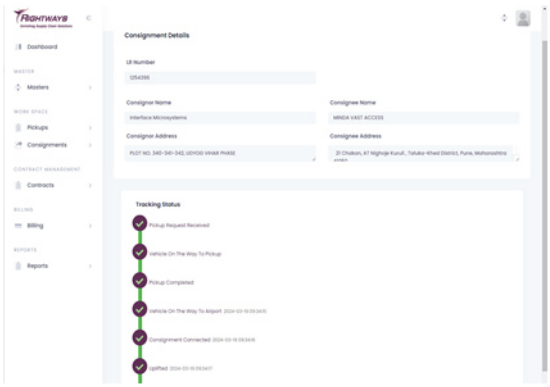

Fig. 5. Status Tracking Page View Page

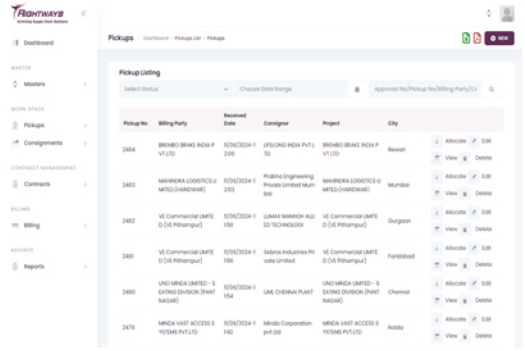

Fig.6 Pickups List

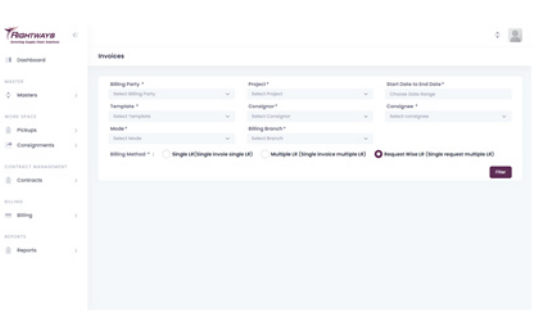

Fig.7. Invoice Filter Page

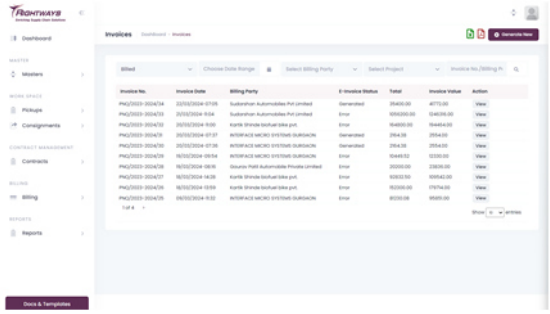

Fig. 8. Invoice List

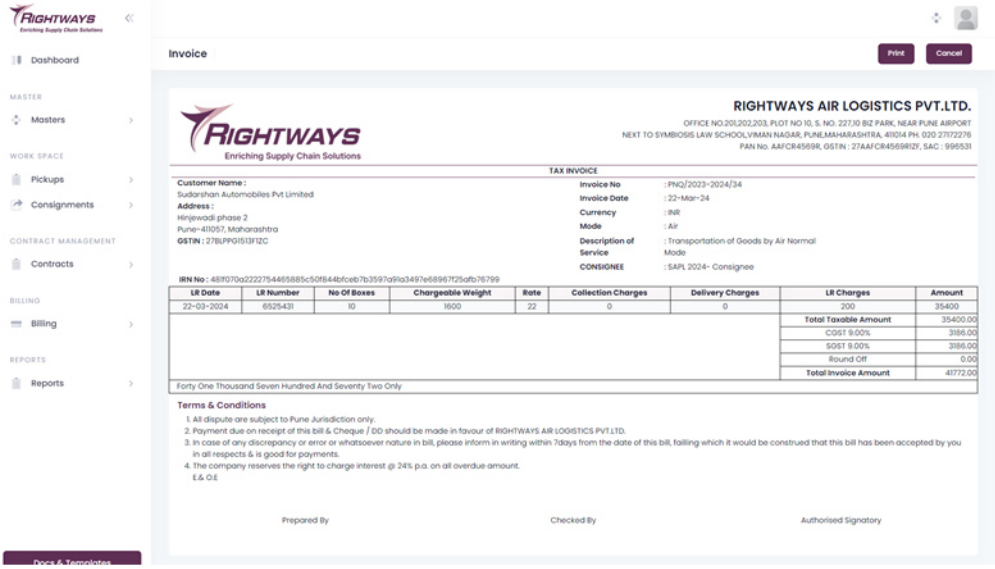

Fig. 9. Generated Invoice Page

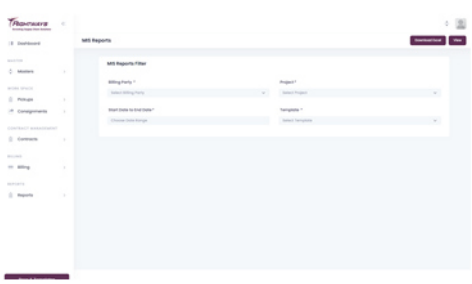

Fig. 10. MIS Report Filter Page

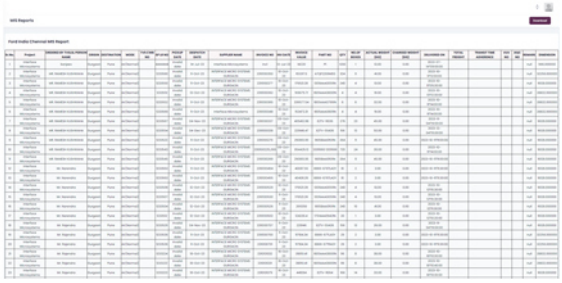

Fig. 11. MIS Report Page

IV. PROPOSED RESEARCH MODEL

The proposed research model for the Freight Management System (FMS) using .NET Core is designed to address the challenges in logistics and freight management by integrating advanced technologies and best practices. This model encompasses the development, implementation, and evaluation of a comprehensive FMS, focusing on the following key components: The main objectives of the proposed research are:

1. To design a scalable and efficient Freight Management System using .NET Core.
2. To integrate advanced technologies such as IoT, AI, and blockchain to enhance system functionalities.
3. To evaluate the system's performance, security, and user satisfaction through rigorous testing and feedback.

1. System Architecture: The system architecture is based on a modular, microservices-oriented approach to ensure scalability, flexibility, and ease of maintenance. User interfaces for customers, logistics managers, carriers, and administrators, developed using modern frontend frameworks like Angular or React. Core functionalities including user management, shipment management, carrier management, tracking and monitoring, and reporting. Data interaction logic, using Entity Framework Core for database operations.
2. Ideas for Working: To ensure the successful development and implementation of the Freight Management System (FMS) using .NET Core, it is crucial to adopt a structured approach and leverage best practices in software development and project management. Below are some ideas for effectively working on the FMS project.
3. The way it works: The Freight Management System (FMS) built using .NET Core streamlines logistics operations by allowing users (customers, logistics managers, carriers, and administrators) to manage and track shipments efficiently. Users register and authenticate securely, with role-based access ensuring appropriate permissions. Logistics managers create and update shipments, leveraging AI algorithms for route optimization to minimize costs and delivery times. Real-time tracking is enabled through IoT devices and GPS, providing visibility into shipment locations and conditions. Carrier management features allow for automated carrier assignment based on performance metrics. The system also includes comprehensive reporting and analytics, offering insights into operational performance and enabling data-driven decision-making. All components interact

seamlessly via RESTful APIs, and the system is deployed on a scalable cloud infrastructure, ensuring reliability and performance.

4. Data analysis and results: In developing and evaluating the Freight Management System (FMS), comprehensive data analysis is crucial to understand its impact on logistics operations, identify areas for improvement, and ensure that it meets its objectives.
5. Discussion and Implications: The implementation of the Freight Management System (FMS) using .NET Core has demonstrated significant improvements in logistics operations through enhanced efficiency, real-time tracking, and data-driven decision-making. By integrating advanced technologies such as AI for route optimization and IoT for real-time shipment monitoring, the system has reduced delivery times and operational costs, while ensuring shipment safety and compliance. The robust security measures, including role-based access control and data encryption, have strengthened data protection and user trust.

V. PERFORMANCE EVALUATION

The performance evaluation of the Freight Management System (FMS) involves assessing various metrics to ensure the system meets its goals of efficiency, reliability, scalability, and user satisfaction. The evaluation process includes testing the system under different conditions and analyzing the results to identify strengths and areas for improvement:

1. Functionality: The application should provide comprehensive features to manage all aspects of a FMS project, including hardware, software, network settings, and user accounts.
2. Usability: The application should have an intuitive interface that allows administrators to easily navigate and perform tasks.
3. Efficiency: The application should be able to perform tasks quickly and with minimal resource usage.
4. Scalability: The application should be able to scale with increasing workloads in performance.
5. Security: The application should have robust security features to protect the workstations and the network from threats.
6. Integration: The application should be able to integrate with other systems and applications used in the organization.

VI. RESULT ANALYSIS

The experiments were done on a computer with an Intel core-I5 CPU and four GB of RAM. And additionally, Software for heavy models. The experimental outcomes deliver an accuracy of 50.14% for the model. It proved to be excellent and became capable to properly detect.

Introduction: Describe briefly the purpose of analysis and the Freight management application being evaluated.

Methodology: Explain methods used for gathering and analyzing data – these could include surveys, user feedback, performance metrics etc.

Findings: Present data/findings in tables/graphs/descriptive statistics.

Analysis: Analyze data – discuss trends, patterns, any significant findings.

Conclusions: Based on your analysis draw conclusions; Discuss what this means in the context of workstation management.

Recommendations: Make recommendations for improving the workstation management

application from your conclusions

VII. CONCLUSION

In conclusion, the implementation of a Freight Management System (FMS) built on .NET Core represents a transformative step in optimizing logistics and freight operations. The comprehensive approach encompassing robust hardware and software requirements, meticulous testing, and strategic planning for implementation, evaluation, and maintenance ensures the system's reliability, efficiency, and security. The automation of routine tasks and optimized route planning significantly enhance operational efficiency. This leads to reduced manual errors, lower fuel consumption, and overall cost savings. Real-time tracking and transparent reporting provide stakeholders with detailed insights into shipment status and logistics performance. This improved visibility facilitates proactive management and boosts customer satisfaction. Stringent security measures, including data encryption and regular vulnerability assessments, ensure the system's robustness against cyber threats. Compliance with relevant regulations further protects the organization from legal risks. The modular architecture and cloud deployment options offer scalability, allowing the system to grow alongside the business. Future integrations with advanced technologies such as AI, IoT, and blockchain pave the way for continuous improvement and innovation. By optimizing routes and integrating eco-friendly practices, the FMS contributes to reducing the environmental impact of freight operations, aligning with global sustainability goals.

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