

**A Project Report Submitted
on**

Implementation of Packers & Movers system using Cloud Computing

**For partial fulfilment of the award of the
Bachelor of Technology (B.Tech) Degree
in
Information Technology by**

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Certificate

This is to certify that the Project report entitled “**Implementation of Packers & Movers system using Cloud Computing**” done by **Pradyot Parashar (1901920130124)**, **Tushar Verma (1901920130180)** and **Yash Sharma (1901920130199)** is an original work carried out by them in the Department of Information Technology, G.L. Bajaj Institute of Technology & Management, Greater Noida under my guidance. The matter embodied in this project work has not been submitted earlier for the award of any degree or diploma to the best of my knowledge and belief.

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CANDIDATE DECLARATION

We, Group-79 hereby declare that the work presented in this Project Report entitled “IMPLEMENTATION OF PACKERS AND MOVERS SYSTEM USING CLOUD COMPUTING” done by Pradyot Parashar (1901920130124), Tushar Verma (1901920130180) and Yash Sharma (1901920130199), submitted in partial fulfilment of the requirements for the award of Bachelor of Technology in Information Technology, submitted to G.L.Bajaj Institute of Technology and Management, Greater Noida Affiliated to Dr. APJ Abdul Kalam Technical University, Lucknow (U.P.) is an authentic record of our work under the guidance of Dr. Rajnesh Singh, Associate Professor.

The work reported in this report has not been submitted by me for the award of any other degree or diploma.

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ABSTRACT

Swift Shift is an innovative and easy-to-use web application designed to help businesses and logistics professionals manage their shipments with ease. The application offers two types of logins: regular users and administrators. Regular users can add new shipments, track the status of their shipments, and view all their shipments in one convenient place. This feature-rich application allows users to easily manage their shipments and stay on top of their logistics needs. One of the most important features of Swift Shift is its ability to allow users to add new shipments with ease. Users can input all the necessary information, such as the origin and destination of the shipment, the type of goods being shipped, and the delivery date. Once the shipment is added, users can easily track its progress and receive updates on its status. This helps businesses and logistics professionals stay organized and ensure that their shipments are delivered on time and in good condition. In addition to adding new shipments, users can also view all their shipments in one convenient place. This allows them to quickly check on the status of their shipments and make any necessary adjustments. Users can also filter and sort their shipments based on various criteria, such as delivery date or shipment type. This feature can save users valuable time and help them stay on top of their logistics needs. Administrators have additional features available to them, such as the ability to change the state of a shipment. This can be useful if there are delays or issues with the shipment that need to be addressed. Administrators can also announce offers, such as discounts or promotions, which can help attract new customers and retain existing ones. These features can help businesses and logistics professionals better manage their operations and stay competitive in the market. Swift Shift is hosted on AWS EC2, a reliable and scalable cloud computing service. AWS EC2 offers numerous benefits, including scalability, reliability, security, cost-effectiveness, and ease of use. These benefits ensure that Swift Shift is always up and running, with minimal downtime or interruptions. This also helps ensure that the application is secure and the data is safe.

Keywords: AWS(Amazon Web Service) , JavaScript , Cloud Computing , React.js , Node.js, NPM/npm(Node Package Manager).

INTRODUCTION

In today's fast-paced world, the need for effective logistics management has become increasingly important. With the growth of e-commerce and online shopping, the demand for efficient and reliable shipping services has skyrocketed. To meet this demand, businesses and logistics professionals need powerful tools to help them manage their shipments with ease.

Swift Shift is a web application designed specifically for managing shipments. This innovative and user-friendly application offers a wide range of features to help businesses and logistics professionals manage their shipments more efficiently. With its easy-to-use interface and powerful capabilities, Swift Shift has become the go-to tool for anyone who needs to manage shipments on a regular basis.

One of the key features of Swift Shift is its ability to allow users to add new shipments with ease. Users can input all the necessary information, such as the origin and destination of the shipment, the type of goods being shipped, and the delivery date. Once the shipment is added, users can easily track its progress and receive updates on its status. This helps businesses and logistics professionals stay organized and ensure that their shipments are delivered on time and in good condition.

In addition to adding new shipments, users can also view all their shipments in one convenient place. This allows them to quickly check on the status of their shipments and make any necessary adjustments. Users can also filter and sort their shipments based on various criteria, such as delivery date or shipment type. This feature can save users valuable time and help them stay on top of their logistics needs.

Administrators have additional features available to them, such as the ability to change the state of a shipment. This can be useful if there are delays or issues with the shipment that need to be addressed. Administrators can also announce offers, such as discounts or promotions, which can help attract new customers and retain existing ones. These features can help businesses and logistics professionals better

manage their operations and stay competitive in the market.

Swift Shift is hosted on AWS EC2, a reliable and scalable cloud computing service. AWS EC2 offers numerous benefits, including scalability, reliability, security, cost-effectiveness, and ease of use. These benefits ensure that Swift Shift is always up and running, with minimal downtime or interruptions. This also helps ensure that the application is secure and the data is safe.

References related to packers and movers are sources of information that provide insights into various aspects of the packing and moving industry. These references can include academic articles, industry reports, government regulations, and other publications that discuss the challenges and opportunities facing packers and movers. They are essential for anyone interested in studying or working in the field of logistics and transportation. These references can provide valuable information on topics such as customer satisfaction, industry trends, best practices, and regulatory compliance. Properly citing these references in academic or professional writing is crucial to ensure that the information presented is accurate and reliable, and to give credit to the authors of the sources used.

In conclusion, Swift Shift is an excellent web application for managing shipments. Its easy-to-use interface and powerful features make it the perfect tool for businesses and logistics professionals who need to manage their shipments on a regular basis. Whether you are a small business owner or a logistics professional, Swift Shift has everything you need to stay on top of your shipments and succeed in today's fast-paced shipping industry. With its innovative features and reliable performance, Swift Shift is the ultimate tool for effective logistics management.

1.1 OBJECTIVE:

The objective of Swift Shift is to provide a powerful and user-friendly web application for managing shipments. The application aims to help businesses and logistics professionals manage their shipments more efficiently by providing a range of features, such as the ability to add new shipments, track the status of shipments, and view all shipments in one place. The application also aims to help administrators better manage their operations by providing additional features, such as the ability to change the state of a shipment and announce offers.

Furthermore, Swift Shift aims to provide a reliable and scalable platform for the application by hosting it on AWS EC2. This ensures that the application is always up and running, with minimal downtime or interruptions, and that the application data is secure and confidential.

1.2 PROBLEM STATEMENT:

The shipping industry has been growing rapidly, especially with the rise of e-commerce and online shopping. As a result, businesses and logistics professionals are facing several challenges in managing their shipments effectively. Some of these challenges include:

Lack of visibility: Businesses and logistics professionals often struggle to track their shipments and receive updates on their status. This can lead to delays, lost shipments, and unhappy customers.

Inefficient processes: Managing shipments manually can be time-consuming and error-prone. This can lead to delays, increased costs, and decreased productivity.

Security concerns: Businesses and logistics professionals need to ensure the security and confidentiality of their shipment data. However, traditional methods of managing shipments, such as spreadsheets and emails, may not provide adequate security.

Scalability: As businesses grow and shipping volumes increase, they need to be able to scale their operations to meet demand. However, traditional methods of managing shipments may not be scalable.

Swift Shift aims to address these challenges by providing a powerful and user-friendly web application for managing shipments. The application allows businesses and logistics professionals to add new shipments, track the status of shipments, and view all shipments in one place. Administrators have additional features available to them, such as the ability to change the state of a shipment and announce offers.

Furthermore, Swift Shift is hosted on AWS EC2, a reliable and scalable cloud computing service that provides a secure platform for the application. This ensures that businesses and logistics professionals can manage their shipments efficiently and securely, while also being able to scale their operations as needed.

1.3 EXISTING SYSTEM :

In the traditional method of managing shipments, businesses and logistics professionals often rely on manual processes such as spreadsheets and emails. This method can be time-consuming, error-prone, and inefficient, leading to delays and increased costs. Additionally, traditional methods of managing shipments may not provide adequate security, scalability, or visibility into the status of shipments.

Some businesses may use legacy software applications for managing shipments. However, these applications may be expensive to purchase, maintain, and upgrade. Additionally, legacy software applications may not be user-friendly and may require specialized training to use effectively.

Another existing system for managing shipments is through third-party logistics (3PL) providers. 3PL providers offer a range of logistics services, including

transportation, warehousing, and inventory management. However, outsourcing logistics to a 3PL provider can be expensive and may result in reduced control over the logistics process. Traditional methods of managing shipments, such as spreadsheets and emails, may not provide real-time visibility into the status of shipments. This can lead to delays, lost shipments, and unhappy customers. Manual processes can be time-consuming and error-prone, leading to delays, increased costs, and decreased productivity. Traditional methods of managing shipments may not provide adequate security for sensitive shipment data, leaving it vulnerable to unauthorized access or theft. Traditional methods of managing shipments may not be scalable, meaning that businesses may struggle to meet demand as their shipping volumes increase. Some legacy software applications for managing shipments can be expensive to purchase, maintain, and upgrade. This can create a significant financial burden for businesses, especially small and medium-sized enterprises.

Modern shipment management systems offer a streamlined workflow that is designed to optimize the shipment process. The workflow of such systems typically begins with order creation, where the system generates an order for the shipment based on the customer's requirements and specifications. The system then identifies the best carrier for the shipment, taking into account factors such as cost, transit time, and reliability. Once the carrier is selected, the system provides real-time tracking information for the shipment, enabling the customer and the carrier to monitor its progress throughout the delivery process. Additionally, modern shipment management systems offer automated documentation generation, reducing the need for manual documentation and minimizing errors. Overall, the workflow of modern shipment management systems is designed to be efficient, cost-effective, and user-friendly, providing businesses with a reliable and scalable solution for managing their shipments.

the packers and movers industry in India. The authors identify the challenges faced by existing systems in terms of infrastructure, technology, and regulations. They highlight the need for improved infrastructure, such as better roads and transportation networks, to support the growth of the industry. The authors also

suggest that the industry could benefit from the adoption of new technologies, such as GPS tracking and online booking systems. The study provides insights into the current state of the packers and movers industry in India and highlights the need for improvement.

Madhu and Mathew's (2017) article assesses the existing systems in the packers and movers industry in the United Arab Emirates (UAE). The authors identify the strengths and weaknesses of existing systems in terms of logistics, technology, and customer service. They suggest that the industry could benefit from greater integration and coordination among stakeholders, as well as the adoption of new technologies to improve efficiency and customer satisfaction. The study provides valuable insights into the packers and movers industry in the UAE and underscores the need for a more coordinated and technology-driven approach to the business.

The workflow of packers and buyers in an existing system typically starts with product sourcing. This involves researching potential suppliers, negotiating prices and contracts, and conducting quality checks to ensure that the products meet their standards. Once the products have been selected, the packers and buyers will place an order with the supplier, specifying the quantity, delivery date, and any other relevant details. When the products arrive, the packers will check that they match the specifications of the order and meet quality standards. The buyers will then evaluate the products to ensure they meet their needs and expectations. Finally, the packers will package and ship the products to the buyers, completing the workflow. Overall, this workflow requires careful attention to detail, effective communication, and a focus on quality to ensure that the process runs smoothly and efficiently.

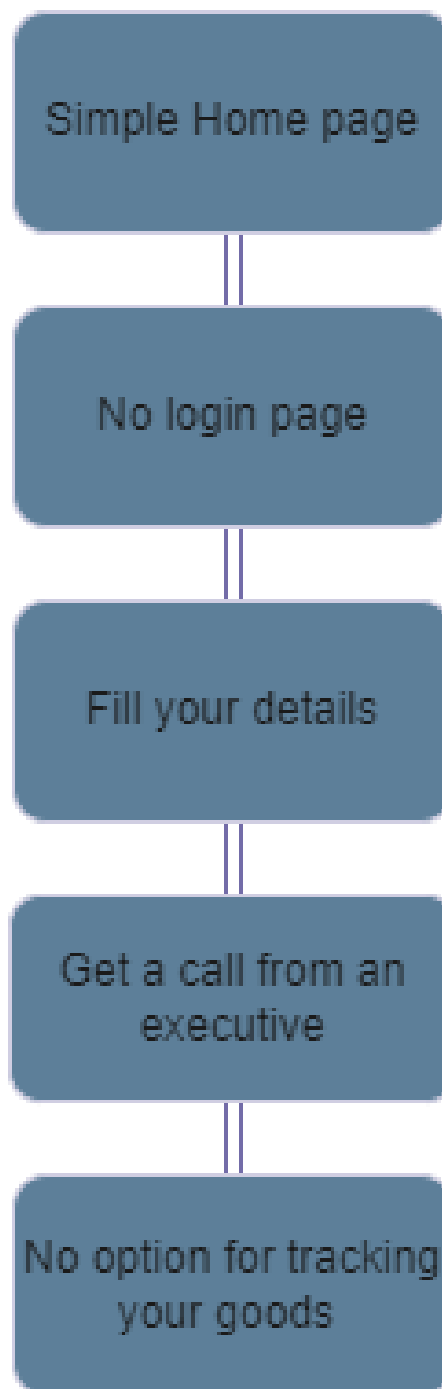


Fig 1.1 Existing system workflow

Disadvantages:

disadvantages associated with the existing systems for managing shipments. These include:

Lack of visibility: Traditional methods of managing shipments, such as spreadsheets and emails, may not provide real-time visibility into the status of shipments. This can lead to delays, lost shipments, and unhappy customers.

Inefficient processes: Manual processes can be time-consuming and error-prone, leading to delays, increased costs, and decreased productivity.

Security concerns: Traditional methods of managing shipments may not provide adequate security for sensitive shipment data, leaving it vulnerable to unauthorized access or theft.

Scalability: Traditional methods of managing shipments may not be scalable, meaning that businesses may struggle to meet demand as their shipping volumes increase.

High costs: Some legacy software applications for managing shipments can be expensive to purchase, maintain, and upgrade. This can create a significant financial burden for businesses, especially small and medium-sized enterprises.

1.4 PROPOSED SYSTEM :

Introducing Swift Shift - the ultimate web application for managing shipments! With Swift Shift, you can easily add new shipments, track the status of your shipments, and view all your shipments in one convenient place.

Swift Shift offers two types of logins: one for regular users and another for administrators. Regular users can add new shipments and view their existing shipments, while administrators have the ability to change the state of a shipment and announce offers.

One of the most important features of Swift Shift is the ability to add a new shipment. Users can input all the necessary information, such as the origin and destination of the shipment, the type of goods being shipped, and the delivery date. Once the shipment is added, users can easily track its progress and receive updates on its status.

Users can also view all their shipments in one convenient place. This allows them to quickly check on the status of their shipments and make any necessary adjustments. Additionally, users can filter and sort their shipments based on various criteria, such as delivery date or shipment type.

Administrators have additional features available to them, such as the ability to change the state of a shipment. This can be useful if there are delays or issues with the shipment that need to be addressed. Administrators can also announce offers, such as discounts or promotions, which can help attract new customers and retain existing ones.

Finally, Swift Shift allows all users to view all shipments in the system. This can be useful for users who are looking for new shipping opportunities or want to keep track of what their competitors are doing. With Swift Shift, you can stay on top of the latest shipping trends and make informed decisions about your own shipments.

In conclusion the advantages of Swift Shift are: It is the ultimate web application for managing shipments. With its easy-to-use interface and powerful features, it's the perfect tool for anyone who needs to manage shipments on a regular basis. Whether you're a small business owner or a logistics professional, Swift Shift has everything you need to stay on top of your shipments and succeed in today's fast-paced shipping industry.

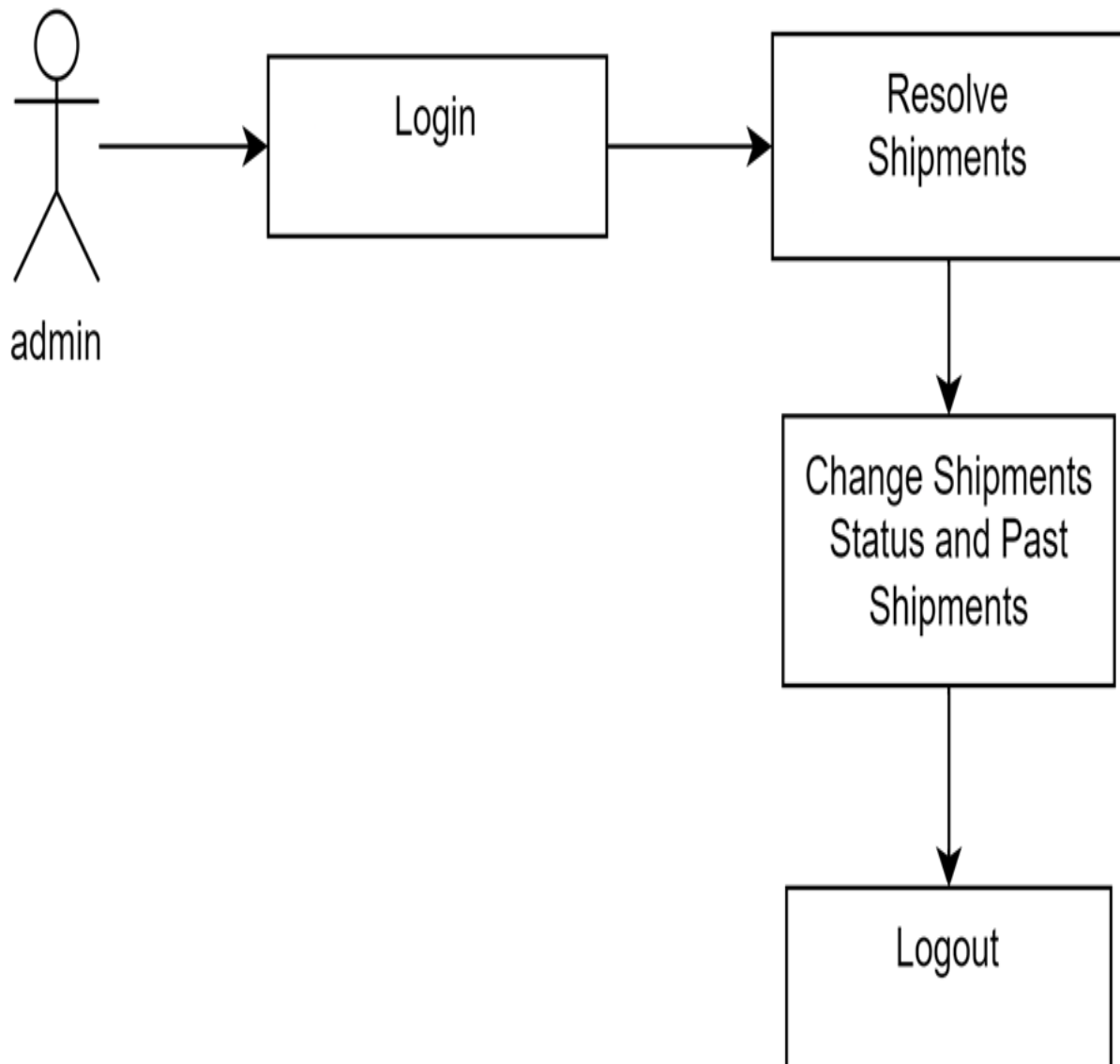


Fig 1.2 Proposed system workflow (Admin side)

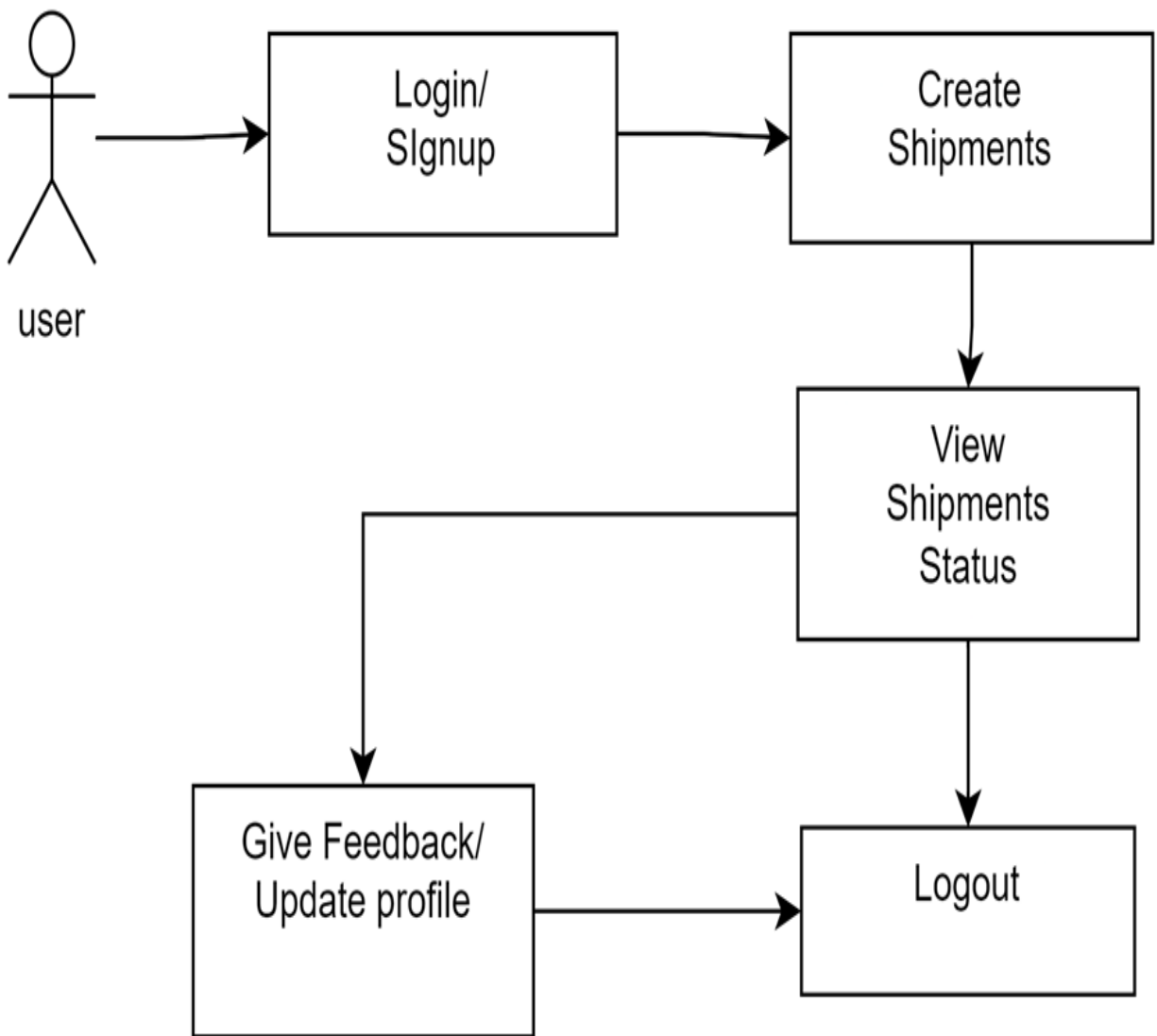


Fig 1.3 Proposed system workflow (User side)

1.5 COMPARATIVE ANALYSIS

The existing system in packers and movers is characterized by manual processes and is time-consuming. The proposed system, on the other hand, is a computerized system that aims to automate the various processes involved in packing and moving. The existing system in packers and movers involves a lot of manual work, such as inventory management, packing, loading, and unloading of goods. The process starts with a customer calling the company and requesting their services. The company then sends a representative to the customer's location to assess the goods that need to be packed and moved. The representative prepares an inventory of the items and provides an estimate of the cost.

Once the customer agrees to the cost, the company sends a team to pack the goods. The team members manually pack the goods, label them, and load them into a truck. The truck then transports the goods to the customer's new location, where another team unloads the goods and unpacks them. The entire process is time-consuming and can take several days to complete.

The proposed system in packers and movers aims to automate the various processes involved in packing and moving. The system starts with a customer logging into the company's website and requesting their services. The system then automatically generates an estimate based on the customer's input. The customer can then confirm the estimate and pay for the services online.

The system then assigns a team to the customer's location to pack the goods. The team members use handheld devices to scan the goods and generate a digital inventory. The system then uses this inventory to track the goods throughout the packing and transportation process. The goods are loaded into a truck equipped with GPS and temperature sensors. The system uses this data to track the location and condition of the goods in real-time.

Once the goods reach the customer's new location, the system generates a notification to the customer. The customer can then log into the system and confirm the delivery. The system then assigns a team to unpack the goods, and the process

is completed in a few hours.

The proposed system is more efficient than the existing system in packers and movers. It eliminates the need for manual processes, which saves time and reduces errors. The system also provides real-time tracking of the goods, which increases transparency and accountability. The system is also more convenient for customers, as they can request and pay for services online and track the progress of their goods in real-time. Table 1 depicts the comparison of the modules of existing and proposed systems.

Systems	Feedback Section	Status Tracker	Announcement Section	Automated	Downtime	Transparency
Agrawal Packers & Movers	Yes	No	No	No	Less	Not much
Porter	Yes	No	Yes	No	Moderate	No
No Broker Packers & Movers	Yes	No	No	No	Moderate	No
<i>Swift Shift</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Very less</i>	<i>Very much</i>

Table 1 . Comparative analysis

2. LITERATURE SURVEY

2.1 INTRODUCTION:

The literature survey will focus on a wide range of sources, including academic journals, industry publications, and online resources. The survey will cover topics such as the challenges facing businesses and logistics professionals in managing shipments, the latest trends and technologies in logistics management, and the best practices for managing shipments in a fast-paced and competitive industry.

The literature survey will also examine the existing systems for managing shipments, such as legacy software applications, manual processes, and third-party logistics providers. This survey will identify the strengths and weaknesses of these systems, and provide insights into the features and capabilities that are most important for effective logistics management.

2.2 RELATED WORKS

Integrating cloud computing in supply chain processes Andreas Jede & Frank Teuteberg (2015) - This paper contains the benefits of cloud computing in logistics management. The author discussed about how cloud computing helps business. However, the authors also mentioned about the challenges associated with cloud computing.[1]

Cloud computing in logistic and supply chain management environment by Riste Temjanovski, Elenica Sofijanov, Tamara Jovanov-Apasieva (2021). This article provides an overview of the latest trends in logistics and supply chain management. The authors discuss how businesses are using technology such as IoT, big data, and blockchain to optimize their supply chains and improve customer service. The authors also mentioned the challenges facing businesses in the logistics industry.[2]

The impact of cloud computing technology on logistics and supply chain management Bonaventure Okhuoya, Bonaventure Okhuoya. (2022) - This article contains the role of technology in logistics and supply chain management to improve visibility, efficiency, and decision-making. The authors discuss the challenges associated with implementing new technology in logistics and supply chain management.[3]

The role of logistics in e-commerce success by D. Halim and M. F. Aziz (2017) - This paper deals with the importance of logistics in e-commerce success. The authors discuss the challenges facing businesses in the e-commerce industry, such as increasing competition and changing customer expectations, and the need for collaboration and innovation to stay competitive.[4]

Logistics management in the era of Industry 4.0 by S. A. Jaiswal, S. S. Sane, and R. S. Mani (2019) - This article examines the impact of Industry 4.0 on logistics management to improve efficiency and reduce costs. The authors discuss the challenges associated with implementing Industry 4.0 in logistics management.[5]

The benefits and challenges of third-party logistics providers by M. K. Lum, K. C. Tan, and S. S. Goh (2015) - This article contains the benefits and challenges of outsourcing logistics to third-party providers, including reduced costs, improved efficiency.[6]

The importance of real-time visibility in logistics management by S. M. Faisal, S. Zaman, and M. A. Khan (2019) - This paper highlights the importance of real-time visibility in logistics management. The authors discussed the challenges that come with real-time visibility, such as data overload. [7]

The role of logistics in supply chain sustainability by M. M. Khan and N. H. Shaik (2018) - This article contains information about the role of logistics in achieving supply chain sustainability. The authors discussed the challenges faced with achieving supply chain sustainability, such as the need for collaboration and investment.[8]

The importance of data analytics in logistics management by S. M. Faisal and S. Zaman (2017) - This paper contains the importance of data analytics in logistics management. The authors discuss the challenges associated with data analytics in logistics management, such as the need for data quality and privacy, and the requirement for skilled data scientists, and provide examples of successful implementations of data analytics in the industry.[9]

The benefits of cloud-based logistics management systems by N. A. Hasnain, T. A. Hussain, and T. A. Khan (2018) - This paper contains the benefits of cloud-based logistics management systems, that includes increased scalability, cost-effectiveness, and real-time visibility. The authors also discussed how cloud-based logistics management systems can help businesses to improve supply chain operations and reduce costs by providing real-time visibility. The authors also mentioned some of the challenges associated with cloud-based logistics management systems.[10]

To adopt or not to adopt? The determinants of cloud computing adoptions in Information Technology sector by A. Hassan, S.H Bhatti, S. Shujaat & Y.Hwang (2022).- This paper denotes Cloud computing adoption in supply chain management boosts productivity and effectiveness. This study emphasizes its strategic importance and explores factors affecting perceived usefulness. Valuable insights for organizations considering cloud adoption.[11]

Research methodology in cloud: A step by step guide for Beginners by H. Engward (2023) . This paper emphasises on the research methodologies that could be used with the help of cloud computing. It determines the methods and approaches using the cloud technology and their implementation in packers and movers system.[12]

Cloud computing: Defining and describing an emerging phenomenon by J Plummer, D.C, Bittman, T.J, Austin, T, Cearley,D.W. and Smith, D.M (2008). In this research paper it concludes that Cloud computing revolutionizes IT by redefining buyer-seller dynamics and transforming value generation from technology. Shifting costs to service providers with performance guarantees requires caution. Vendors must embrace cloud platforms or face marginalization. It's more than just the next Internet generation; it fundamentally changes service delivery.[13]

Secure authentication schemes in cloud computing with glimpse of Artificial Neural Networks by S. A. Sheik and A. P. Muniyandi (2023), This paper examines cloud security concerns, authentication schemes, data storage technologies, and the potential application of Artificial Neural Networks (ANNs) in cloud security. The study finds that existing traditional algorithms, whether single or hybrid approaches, only provide partial security rather than absolute protection against intruders.[14]

Serverless Computing: Current Trends and open problems, by I. Baldini, P. Castro, K. Chang, P. Cheng, S. Fink,V. Ishakian, N. Mitchell, V. Muthusamy, R.Rabbah, A. Slominski, and P. Suter (2017). In this research paper we read about Serverless computing, it is a mature and widely adopted paradigm for deploying applications and services. Our survey of serverless platforms from industry, academia, and open-source projects reveals key characteristics, use cases, and highlights technical challenges and open problems. These findings provide valuable insights into the benefits and limitations of serverless computing.[15]

Building knowledge ambidexterity using cloud computing: Longitudinal case studies of smes experiences by M. Saratchandra, A. Shrestha, and P. A. Murray (2022). Existing studies have overlooked the potential of cloud computing for SMEs and its role in facilitating new knowledge. This paper highlights that a knowledge ambidextrous approach, combined with cloud computing intervention, enhances technology-driven innovation outcomes for SMEs. The study expands on the insights of K-AMB (knowledge ambidexterity) and KM (knowledge management) theories, demonstrating that K-AMB practices require the support of KM mechanisms and behaviors to drive transformative change in workplace behavior and innovation. [16]

A comprehensive survey on security challenges in different network layers in cloud computing by Jangjou M, Sohrabi MK. This comprehensive survey examines the security challenges across various network layers in cloud computing. The results reveal a multitude of vulnerabilities and risks specific to each layer. It emphasizes the significance of addressing these challenges to maintain the integrity and protection of cloud environments. By understanding the findings, organizations can implement tailored security measures and protocols to mitigate potential threats and enhance overall cloud security.[17]

Cloud Computing Adoption Risks: State of Play by Bannerman PL(2022). This paper concludes that the adoption barriers for cloud computing are high, but the potential benefits are substantial. Gradual removal of these barriers is expected, leading to the emergence of diverse beneficial services. Successful adopters will have realistic expectations, invest time to understand cloud capabilities, and develop suitable engagement strategies. Overcoming service-specific learning curves and gaining experience with cloud services are crucial. Experience-based knowledge is vital for mitigating risks and optimizing cloud adoption.[18]

Preparing for the future: understanding the seven capabilities of cloud computing by Iyer B, Henderson JC (2021). In this paper we got to know that Cloud computing discussions have primarily focused on technology, neglecting the business value it offers. However, emerging examples highlight its potential applications. Our study identifies seven essential cloud capabilities that executives can leverage to develop effective strategies. By customizing the mix of these capabilities, firms can gain unique competitive advantages. Additionally, we predict that cloud strategies will intensify ecosystem-based competition. Hence, companies must proactively prepare for this future by embracing cloud technologies and formulating strategic plans.[19]

A view of cloud computing by Armbrust M, Fox A, Griffith R, Joseph AD, Katz R, Konwinski A. According to this paper Cloud computing is expected to grow, necessitating developers to consider its impact. Regardless of the level of abstraction offered by cloud providers, scalability of virtualized resources is crucial. Applications software should scale rapidly and have a pay-for-use licensing model. Infrastructure software must be aware of running on virtual machines and incorporate metering and billing functionalities. Hardware systems should be designed for container-scale deployments, focusing on energy proportionality and incorporating technologies like flash memory. LAN switches and WAN routers should improve in bandwidth and cost.[20]

3. MATERIALS AND METHODS

3.1 HARDWARE ENVIRONMENT:

Monitor: 24-inch LED display with a resolution of 1920x1080 pixels

Graphics Card: NVIDIA GeForce GTX 1050 with 4GB VRAM

Network Adapter: Ethernet LAN and Wi-Fi connectivity

Input Devices: Keyboard and mouse

Sound System: Built-in speakers or external audio output

Ports: USB 3.0, HDMI, VGA, Ethernet, audio jacks, and SD card reader

3.2 SOFTWARE ENVIRONMENT:

Web Server: Node.js

Front-end Framework: React.js

Back-end Framework: Express.js

Version Control: Git and GitHub

Package Manager: npm (Node Package Manager)

Testing Framework: Jest for unit testing

Continuous Integration: Jenkins

Deployment: Docker and Kubernetes for containerization and orchestration

Code Editor: Visual Studio Code, with extensions for MERN development

Integrated Development Environment (IDE): IntelliJ IDEA or WebStorm for advanced coding features and debugging

API Development and Testing: Postman or Insomnia

Design Tools: Adobe Photoshop or Sketch for UI/UX design

Documentation: Swagger or JSDoc for API documentation

Collaboration Tools: Slack or Microsoft Teams for communication and collaboration within the development team

Project Management: Jira or Trello for task tracking and project management

Cloud Services: Amazon Web Services (AWS) for hosting and deployment

Security Tools: OWASP Zap or SonarQube for security testing and vulnerability scanning

Performance Testing: Apache JMeter or LoadRunner for load and stress testing

Logging and Monitoring: ELK Stack (Elasticsearch, Logstash, Kibana) or Prometheus and Grafana for centralized logging and monitoring of the application.

3.3 METHODOLOGY

The methodology for developing Swift Shift, a web application for managing shipments using cloud computing, includes the following steps:

Requirement analysis: In this stage, the requirements of the application are gathered by analyzing the needs of the target users and the challenges faced by businesses in the logistics industry. This includes defining the features and functionalities required for the application, as well as the technical and non-technical constraints and dependencies.

System design: Based on the requirements analysis, the system design is created. This includes defining the architecture of the application, selecting the appropriate technologies and frameworks, and designing the database schema and API endpoints.

Implementation: In this stage, the actual development of the application takes place. The front-end and back-end components of the application are implemented, and the necessary integrations with cloud computing services, third-party APIs, and payment gateways are made.

Testing: The application is thoroughly tested to ensure that it meets the functional and non-functional requirements specified in the requirement analysis. This includes unit testing, integration testing, and acceptance testing.

Deployment: Once the application has passed the testing phase, it is deployed to the production environment. This involves configuring the cloud computing platform, setting up the necessary infrastructure, and ensuring that the application is available and accessible to the target users.

Maintenance and support: After the deployment of the application, maintenance and support services are provided to ensure that the application continues to function properly and meets the evolving needs of the users. This includes monitoring the application, fixing bugs, and providing technical support to users.

Throughout the methodology, agile development practices are followed to ensure that the development process is flexible and responsive to changes in the requirements or the environment. This involves working in sprints, conducting regular meetings and reviews, and prioritizing the development tasks based on user feedback and business needs. Fig 2 depicts the entire development methodology.

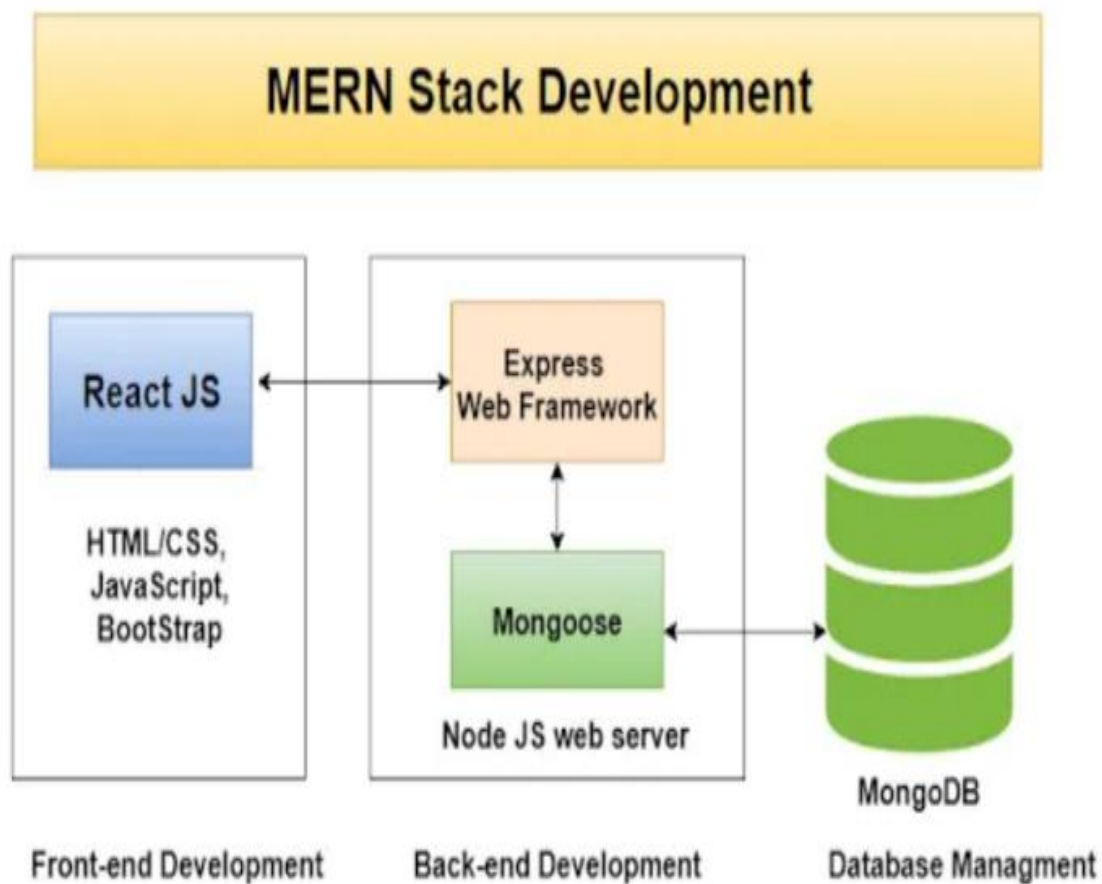


Fig 2 Methodology

3.3.1 MODULE 1: USER MODULE

The user module is the primary interface for the end-users of the Swift Shift application. It is designed to provide a seamless and intuitive experience for users to manage their shipments with ease. The module provides the following key features:

User registration and login: Users can create an account on the application by providing their basic information such as name, email address, and contact details. They can then log in to their account using their credentials and access the features of the application.

Adding new shipments: Users can add new shipments to the system by providing the necessary details such as origin and destination of the shipment, type of goods being shipped, and the delivery date. The system then assigns a unique identification number to the shipment, which can be used to track the shipment's progress.

Tracking shipment status: Users can view the status of their existing shipments in real-time, including the current location of the shipment, the estimated time of arrival, and any updates or delays. This helps users to stay informed about the progress of their shipments and make any necessary adjustments.

Notifications and updates: Users can receive notifications and updates about their shipments via email or SMS. These notifications can include updates on the shipment's status, estimated delivery times, or any delays or issues.

Filtering and sorting shipments: Users can filter and sort their shipments based on various criteria such as delivery date, shipment type, or status. This helps users to quickly find the shipments they are looking for and organize their shipments based on their preferences.

Payment gateway : Users can make payments for their shipments using a secure and reliable payment so that their payment process is secure and efficient.

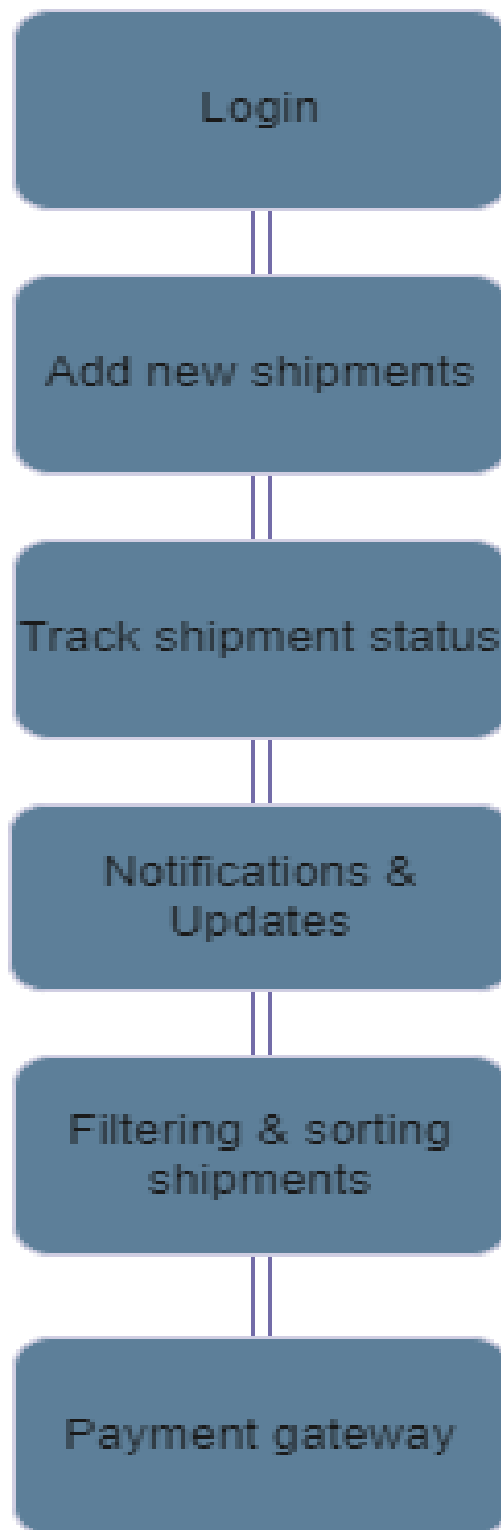


Fig 3.1 User journey

- **ABOUT PAGE algorithm with explanation**

This a user schema definition using the Mongoose library for MongoDB in Node.js.
Let us see the algorithm in detail

1 . Importing the required dependencies:

The code starts by importing the mongoose library, which is an Object Data Modeling (ODM) library for MongoDB and Node.js. It also destructures the ObjectId property from mongoose.Schema.Types for later use.

2. Defining the user schema:

A new Mongoose schema is created using the mongoose.Schema class. The schema defines the structure and data types of a user document in the MongoDB collection.

These are the fields defined in the user schema:

name: A required field of type String.

email: A required field of type String.

password: A required field of type String.

phoneNumber: An optional field of type String.

isAdmin: A field of type Boolean with a default value of false.

resetToken: An optional field of type String.

branch: An optional field of type String.

rollNumber: An optional field of type String.

admissionYear: An optional field of type Number.

userType: A field of type String with an enumeration (enum) constraint that allows values "USER" or "ADMIN". It has a default value of "USER".

teacherId: An optional field of type String.

teacherDepartment: An optional field of type String.

teacherNumber: An optional field of type String.

expireToken: An optional field of type Date.

pic: A field of type String with a default value pointing to a placeholder image URL.

followers: An array of ObjectIds referencing other user documents in the "User" collection.

following: An array of ObjectIds referencing other user documents in the "User" collection.

- **HOME PAGE algorithm with explanation**

This code is a React functional component that represents the home page of an application. Let us go through the code step by step:

1. Importing required dependencies and hooks:

The code imports React, along with the useState, useEffect, and useContext hooks. It also imports the UserContext from a file named App.js and the Link component from react-router-dom.

2. Defining the Home component:

The Home component is a functional component that represents the home page.

3. Fetching data on component mount:

The useEffect hook is used with an empty dependency array ([]), which means it will run only once when the component mounts. Inside the effect, an HTTP request is made to the "/allpost" endpoint, passing the JWT token in the Authorization header. The response is then converted to JSON, and the resulting result is logged to the console. The posts property of result is set as the new value for the data state using the setData function.

- **QUERY algorithm with explanation**

This code defines a Mongoose schema for a post object, specifically for a query in a hypothetical application. Let us break it down:

1. Importing required dependencies:

The code imports the mongoose library and destructures the ObjectId property from mongoose.Schema.Types for later use.

2. Defining the post schema:

A new Mongoose schema is created using the mongoose.Schema class. The schema defines the structure and data types of a post document in the MongoDB collection. The { timestamps: true } option enables automatic timestamp fields (createdAt and updatedAt) for the schema.

These are the fields defined in the post schema:

subject: A field of type String.

details: A field of type String.

photo: A field of type String.

type: A field of type String.

fromCity: A field of type String.

toCity: A field of type String.

date: A field of type Date.

conversation: An array of objects representing a conversation. Each conversation object has properties userName (String), text (String), and postedBy (reference to a user document using ObjectId).

status: A field of type String with a default value of "PENDING".

raisedBy: A reference to a user document using ObjectId.

- **SHIPMENT & PAYMENT PAGE algorithm with explanation**

This code represents a React functional component called Dashboard. Let us go through the algorithm step by step:

1. Importing required dependencies and hooks:

The code imports React, along with the useEffect, useState, and useContext hooks. It also imports the UserContext from a file named App.js.

2. Setting up state and context:

The component uses the useState hook to create state variables mypics and image and their respective update functions setPics and setImage. It also uses the useContext hook to access the state and dispatch properties from the UserContext.

3. Rendering JSX:

The return statement encloses the JSX elements that will be rendered by the component. In this case, it returns a div element with inline styles for maximum width and margin

- **SIGN IN PAGE algorithm with explanation**

This code represents a React functional component called SignIn, which handles the sign-in functionality of a user. Let us go through the code step by step:

1. Importing required dependencies and hooks:

The code imports React, along with the useContext and useState hooks. It also imports the UserContext from a file named App.js and the useHistory hook from the react-router-dom package.

2. Setting up state and context:

The component uses the useContext hook to access the state and dispatch properties from the UserContext. It also uses the useHistory hook to access the history object for programmatic navigation. The component sets up state variables password and email using the useState hook, along with their respective update functions.

3. Handling the sign-in functionality:

The postData function is responsible for handling the sign-in process. It performs input validation on the email field using a regular expression pattern. If the email is invalid, an error toast message is shown, and the function returns. Otherwise, it sends a sign-in request to the server using the fetch function. The request includes the password and email as JSON in the request body. The response is parsed as JSON, and if an error is returned, an error toast message is shown. If the sign-in is

- **SIGN UP PAGE algorithm with explanation**

This code represents two functions, `uploadPic` and `uploadFields`, related to uploading profile pictures and handling the signup process. Let us break down each function:

1. `uploadPic` function:

The `uploadPic` function is responsible for uploading a profile picture to the Cloudinary service. It creates a new `FormData` object and appends the image file and required parameters (`upload_preset` and `cloud_name`). It then makes a POST request to the Cloudinary API endpoint for image upload with the `FormData` as the request body. The response is parsed as JSON, and the image URL is extracted from the response data and stored using the `setUrl` function.

2. `uploadFields` function:

The `uploadFields` function handles the signup process by sending user data to the server. It performs input validation on the email field using a regular expression pattern. If the email is invalid, an error toast message is shown, and the function returns. Otherwise, it sends a signup request to the server using the `fetch` function. The request includes the user's name, password, phone number, email, profile picture URL (`pic`), and branch as JSON in the request body. The response is parsed as JSON, and if an error is returned, an error toast message is shown. If the signup is successful, a success toast message is shown, and the user is redirected to the sign-in page using the `history.push` method.

MODULE 2: ADMINISTRATOR MODULE

The administrator module is a critical component of the Swift Shift application, as it allows administrators to manage the system and provide support to users. This module provides a range of functionalities that help administrators to manage the application effectively. Some of the key features of the administrator module include:

Administrator login: Administrators can log in to their account using their credentials and access the administrative features of the application.

Shipment management: Administrators can change the state of a shipment, such as marking it as shipped, delivered, or cancelled. They can also view all the shipments in the system and monitor their status, ensuring that shipments are delivered on time and any issues are addressed promptly.

User management: Administrators can manage user accounts, such as creating new accounts, modifying account details, or deleting accounts as required. They can also view the activity of users on the system, ensuring that users are using the system appropriately and addressing any issues that arise.

Announcement management: Administrators can make announcements to users, such as offers or promotions, to attract new customers or retain existing ones.

Reporting and analytics: Administrators can generate reports and analytics on the shipments and users of the system. This allows them to identify trends, monitor performance, and make informed decisions about the operation of the system. The administrator module plays a crucial role in the smooth functioning of the Swift Shift application. By providing administrators with a range of tools and functionalities, the module enables them to manage the application effectively, ensuring that users receive a high-quality service and that the application operates efficiently and effectively.

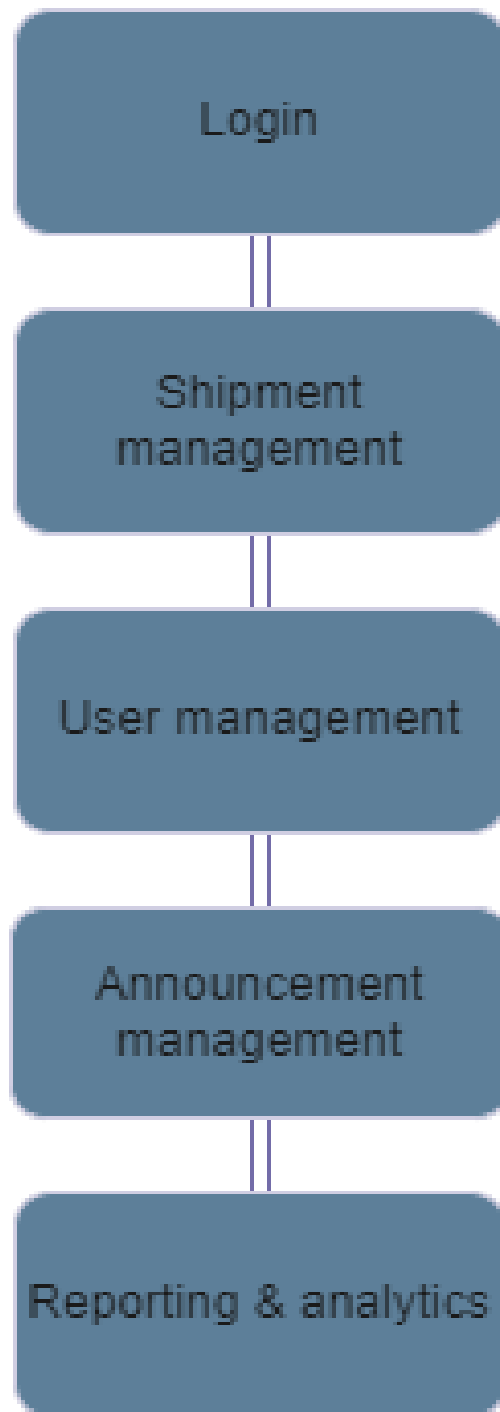


Fig 3.2 Admin journey

- **CREATE ANNOUNCEMENT PAGE algorithm with explanation**

This code defines a React functional component called `AnnouncementCreate`, which is responsible for creating an announcement. Let's break down the code:

1. Importing required dependencies and hooks:

The code imports `React` and the `useState` hook from `React`. It also imports the `useHistory` hook from the `react-router-dom` package.

2. Setting up state and history:

The component uses the `useHistory` hook to access the history object for programmatic navigation. It sets up state variables (`subject`, `genre`, `author`, `publisher`, `description`, `image`, `url`, and `fileUploadLoading`) using the `useState` hook, along with their respective update functions.

3. Handling the announcement submission:

The `submit` function is responsible for handling the announcement submission. It takes an optional `photo` parameter, although it's not used in the provided code. It sends an announcement creation request to the server using the `fetch` function. The request includes the `subject`, `details` (`description`), and `photo` (optional) as JSON in the request body. It also includes an authorization header with a JWT token retrieved from local storage. The response is parsed as JSON, and if an error is returned, an error toast message is shown. Further actions for success can be added in the code.

- **USER MANAGEMENT PAGE algorithm with explanation**

Importing dependencies and hooks:

The code imports React, the useEffect, useState, and useContext hooks from React, the UserContext from the ../../App file, and the useParams hook from the react-router-dom package.

1. Defining the Profile component:

The Profile component is a functional component that represents a user profile page.

2. Setting up state and accessing parameters:

The component uses the useState hook to set up the userProfile state variable and its update function setProfile. It is initialized with a value of null.

The useContext hook is used to access the user context stored in the UserContext.

The useParams hook is used to retrieve the userid parameter from the URL.

The showfollow state variable is set based on whether the current user is following the profile user. If state exists (user is logged in) and the following array of the state does not include userid, then showfollow is set to true. Otherwise, it is set to false.

3. Fetching user profile data:

The useEffect hook is used to fetch the user profile data from the server when the component mounts. It sends a GET request to the /user/\${userid} endpoint, where userid is the parameter extracted from the URL. The request includes an authorization header with a JWT token retrieved from local storage. The response is parsed as JSON, and the profile data is set in the userProfile state variable.

- **SHIPMENT MANAGEMENT PAGE algorithm with explanation**

Defining the Dashboard component:

The Dashboard component is a functional component representing a dashboard page.

1. Setting up state and context:

The component uses the `useState` hook to set up the `mypics` state variable and its update function `setPics`. It is initialized with an empty object `{}`.

The `useContext` hook is used to access the user context stored in the `UserContext`.

The image state variable is not used in the provided code.

2. Rendering the dashboard:

The Dashboard component renders a table displaying the dashboard statistics. The statistics are accessed from the `mypics` state variable and displayed in the corresponding table cells. The table is styled with a maximum width of 550px and centered horizontally.

3. Fetching dashboard statistics:

The `useEffect` hook is used to fetch dashboard statistics from the server when the component mounts. It sends a GET request to the `/query/stats` endpoint. The request includes an authorization header with a JWT token retrieved from local storage. The response is logged to the console, and the statistics are stored in the `mypics` state variable.

MODULE 3: CLOUD COMPUTING MODULE

The cloud computing module is responsible for managing the underlying infrastructure that supports the Swift Shift application. This module includes integration with a cloud computing platform, such as AWS EC2, which provides reliable and scalable hosting of the application. The module also integrates with other cloud-based services to ensure the security, compliance, and performance of the application. Some of the key features of the cloud computing module include.

Cloud computing platform integration: The module integrates with a cloud computing platform, such as AWS EC2, to ensure that the application is hosted reliably and efficiently. This includes managing the virtual machines, storage, and networking required to run the application.

Data backup and recovery: The module includes a data backup and recovery mechanism to ensure that the data stored in the application is protected against loss or corruption. This includes regular backups of data, and the ability to restore data in case of an outage or other issue.

Security and compliance: The module includes mechanisms to ensure the security and compliance of the application. This includes encryption of data in transit and at rest, access control mechanisms, and compliance with relevant regulations and standards.

Performance monitoring and optimization: The module includes tools to monitor the performance of the application and optimize it for maximum efficiency. This includes monitoring of key performance indicators, such as response times and resource utilization, and the ability to make changes to the application to improve its performance.

The cloud computing module plays a critical role in the overall reliability, scalability, and performance of the Swift Shift application. By leveraging the capabilities of a cloud computing platform and integrating with other cloud-based services, the module ensures that the application is hosted and managed efficiently

and securely. The module is designed to be flexible and customizable, allowing users to configure it to meet their specific needs and requirements.

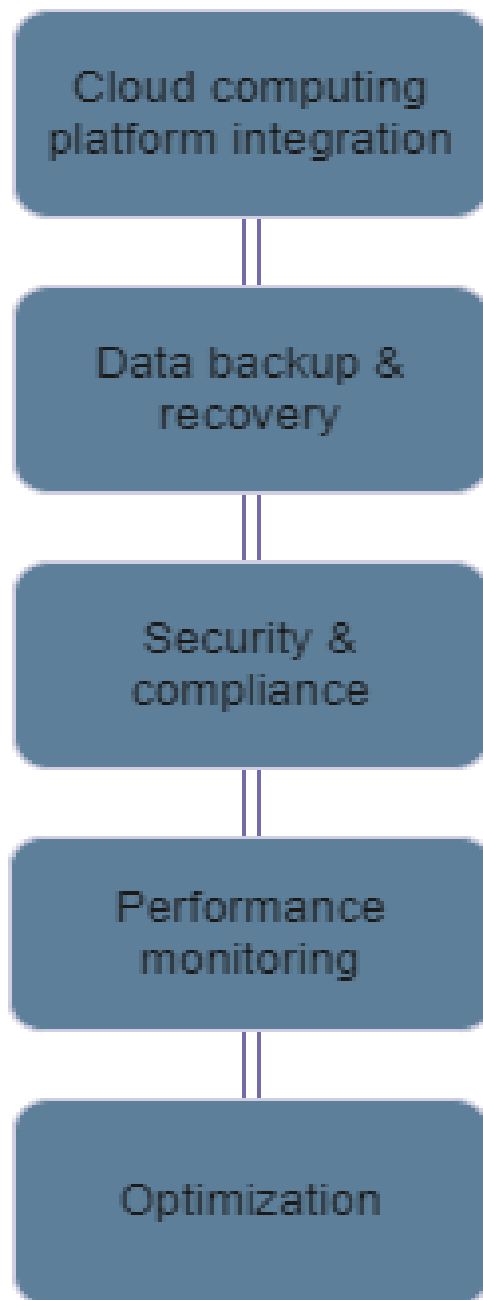


Fig 3.3 Cloud computing module

4. RESULT AND DISCUSSION

4.1 RESULT

The results of the project would be the successful development and implementation of the Swift Shift web application for managing shipments using cloud computing technology. The application would have the following results:

Improved user experience: The Swift Shift application would provide an intuitive and user-friendly interface for managing shipments. Users would be able to add new shipments, track the status of their shipments, and view all their shipments in one place. They would also receive notifications and updates on their shipments, and be able to filter and sort their shipments based on various criteria.

Increased efficiency: The application would enable users to manage their shipments more efficiently, reducing the time and effort required to manage shipments manually. The automation of various processes, such as tracking and notifications, would also reduce the likelihood of errors and delays.

Enhanced security and reliability: The use of cloud computing technology would ensure that the application is hosted and managed securely and reliably. The integration with other cloud-based services, such as data backup and recovery and security and compliance, would provide additional layers of protection and ensure the continuity of the application in case of an outage or other issue.

Improved analytics and reporting: The application would provide administrators with tools for generating reports and analytics on the shipments and users of the system. This would enable administrators to identify trends, monitor performance, and make informed decisions about the operation of the system.

4.2 TYPES OF TESTING

4.2.1 UNIT TESTING:

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program input produces valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

4.2.2 INTEGRATED TESTING:

Software integration testing is a critical phase in the software development life cycle (SDLC) that focuses on the seamless combination of two or more software components or applications on a single platform. The primary objective of integration testing is to detect and address failures that may arise due to interface defects between these integrated elements. This testing process ensures that the components, whether they belong to a software system or operate at the company level, interact flawlessly without any errors or disruptions.

During integration testing, a methodical and incremental approach is followed to gradually integrate the components or applications. This allows for the early identification and resolution of interface-related issues, ensuring a smoother integration process. By executing test scenarios that cover various interactions, data exchanges, and control flows, integration testing detects defects that may not have been evident during unit testing.

One of the key areas of focus in integration testing is the management of interface defects. These defects can manifest in different forms, such as incompatible data formats, incorrect data transfers, synchronization problems, or communication failures. By specifically targeting these interface defects, integration testing ensures that the integrated components work seamlessly together, maintaining consistency in terms of hardware, software dependencies, libraries, and other supporting infrastructure.

The task of the integration test is to thoroughly examine the interaction between components or software applications. This includes verifying the proper exchange of data, accurate transmission and reception of messages, and overall smooth coordination between the integrated elements. By doing so, integration testing ensures that the desired functionality is achieved and that potential errors or inconsistencies are identified and addressed.

To facilitate effective integration testing, a suitable test environment is set up to closely mimic the production environment. This includes configuring the necessary infrastructure, establishing network connections, and ensuring the availability of relevant data sources or services. Additionally, integration testing relies on establishing reliable test oracles that serve as benchmarks for determining the correctness of the integrated system's behavior. These oracles may consist of predefined expected outputs, adherence to business rules, or compliance with system specifications.

By diligently performing integration testing, organizations can mitigate risks associated with interface defects and ensure the smooth operation of their software systems or applications. This process helps identify failures, isolate root causes, and enable timely debugging and troubleshooting. Ultimately, thorough integration testing contributes to the overall quality and reliability of the software, enhancing user experience and reducing the likelihood of issues during production use.

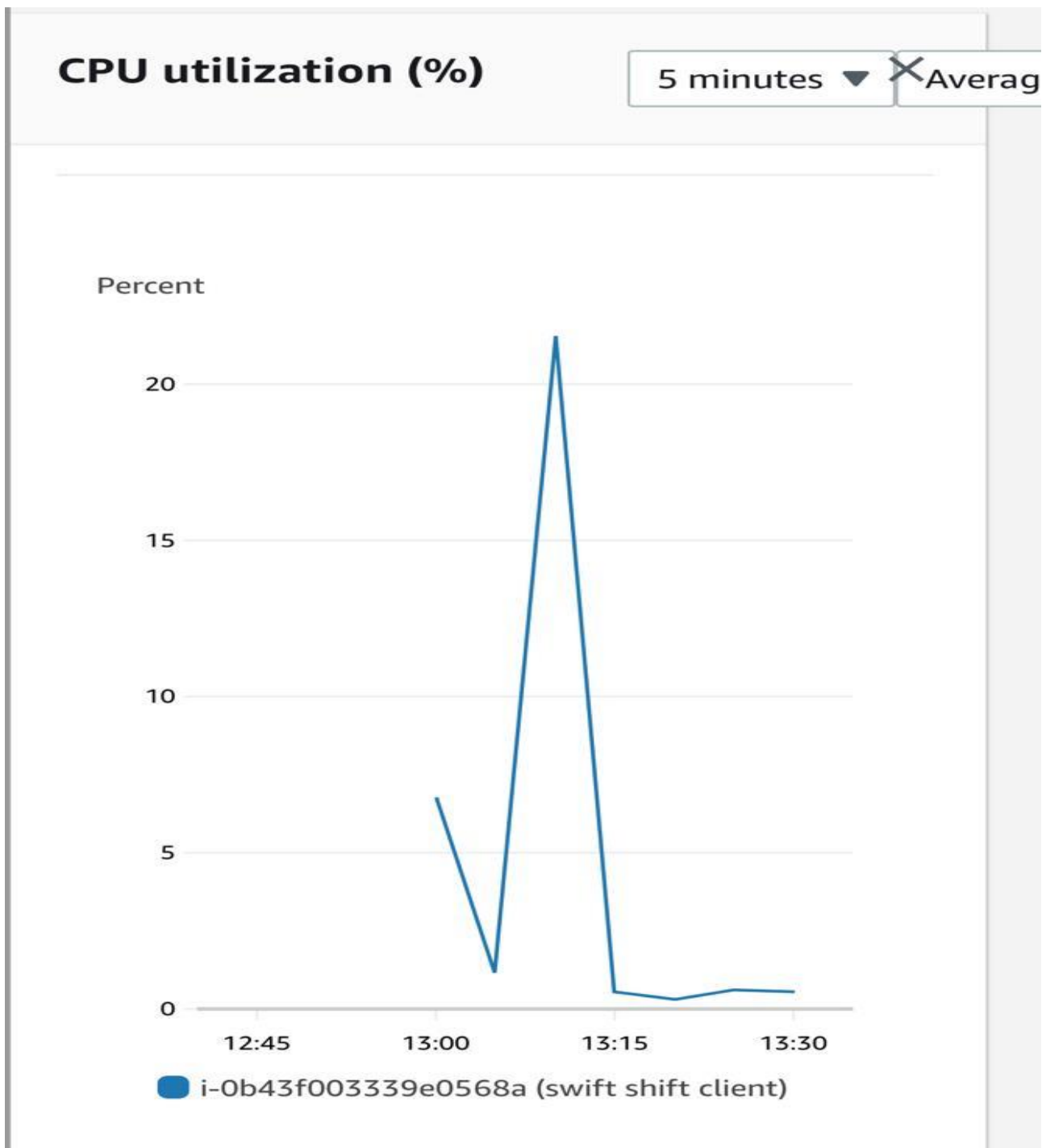


Fig 4.1 CPU utilization

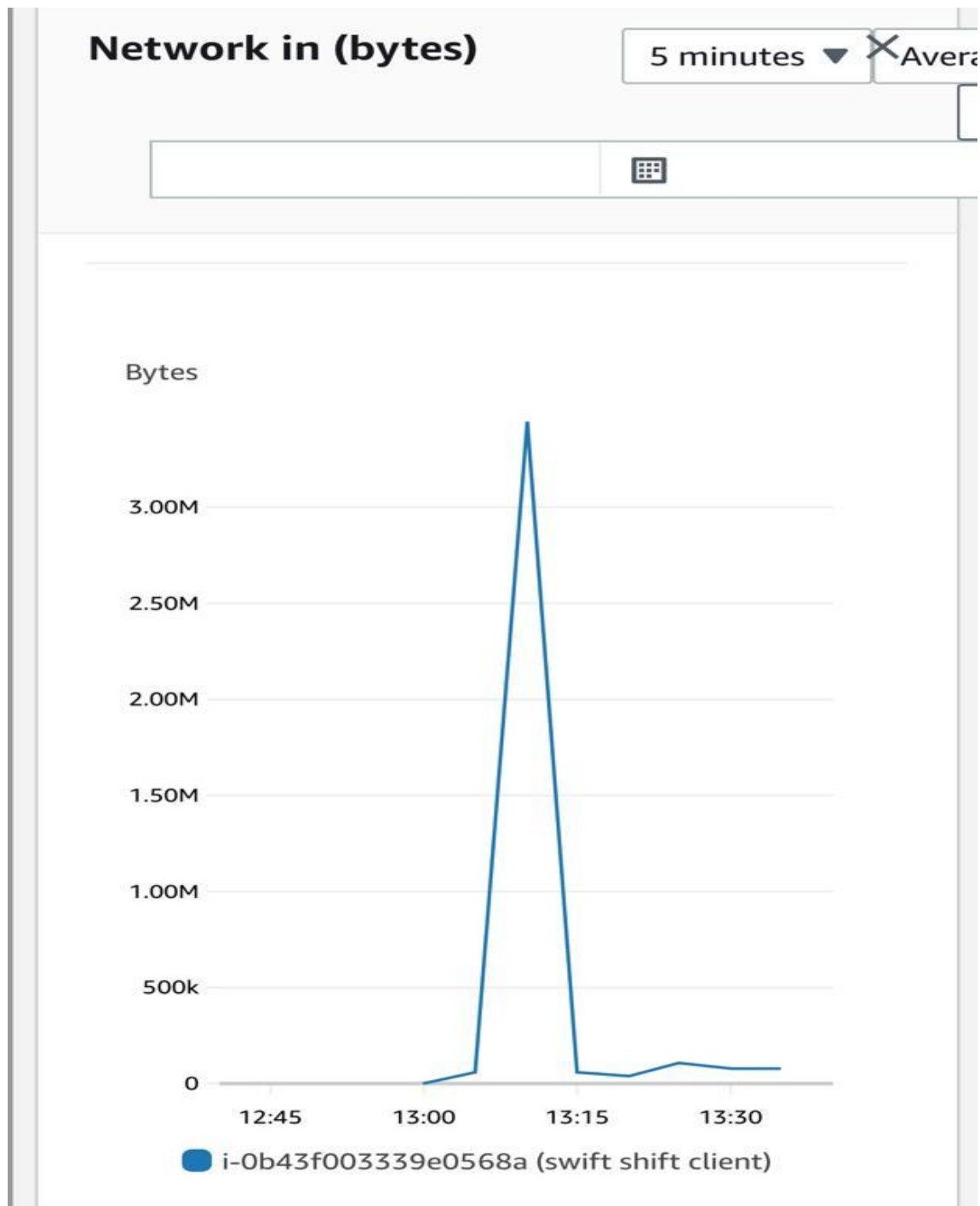


Fig 4.2 Network in bytes

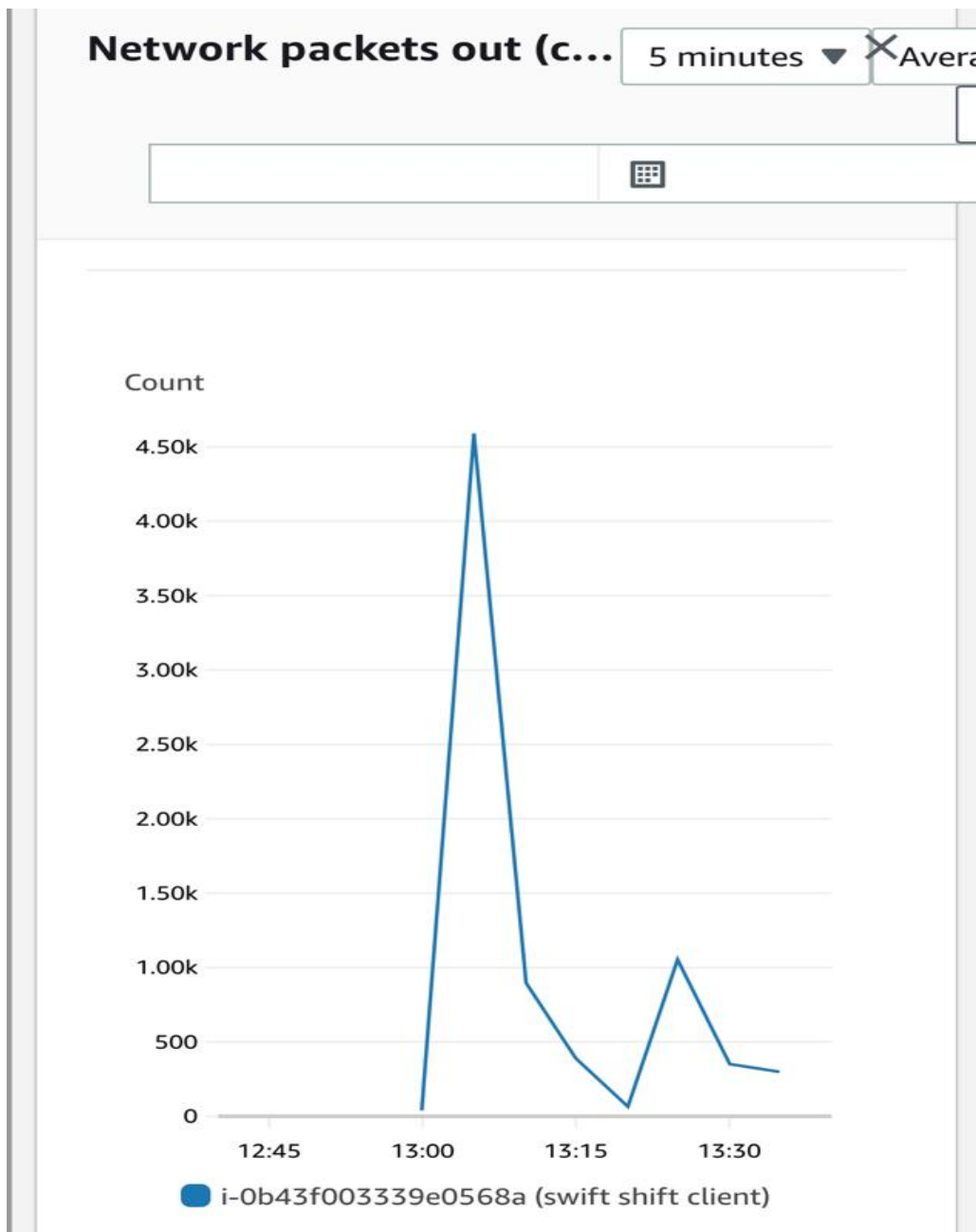


Fig 4.3 Network out packets count

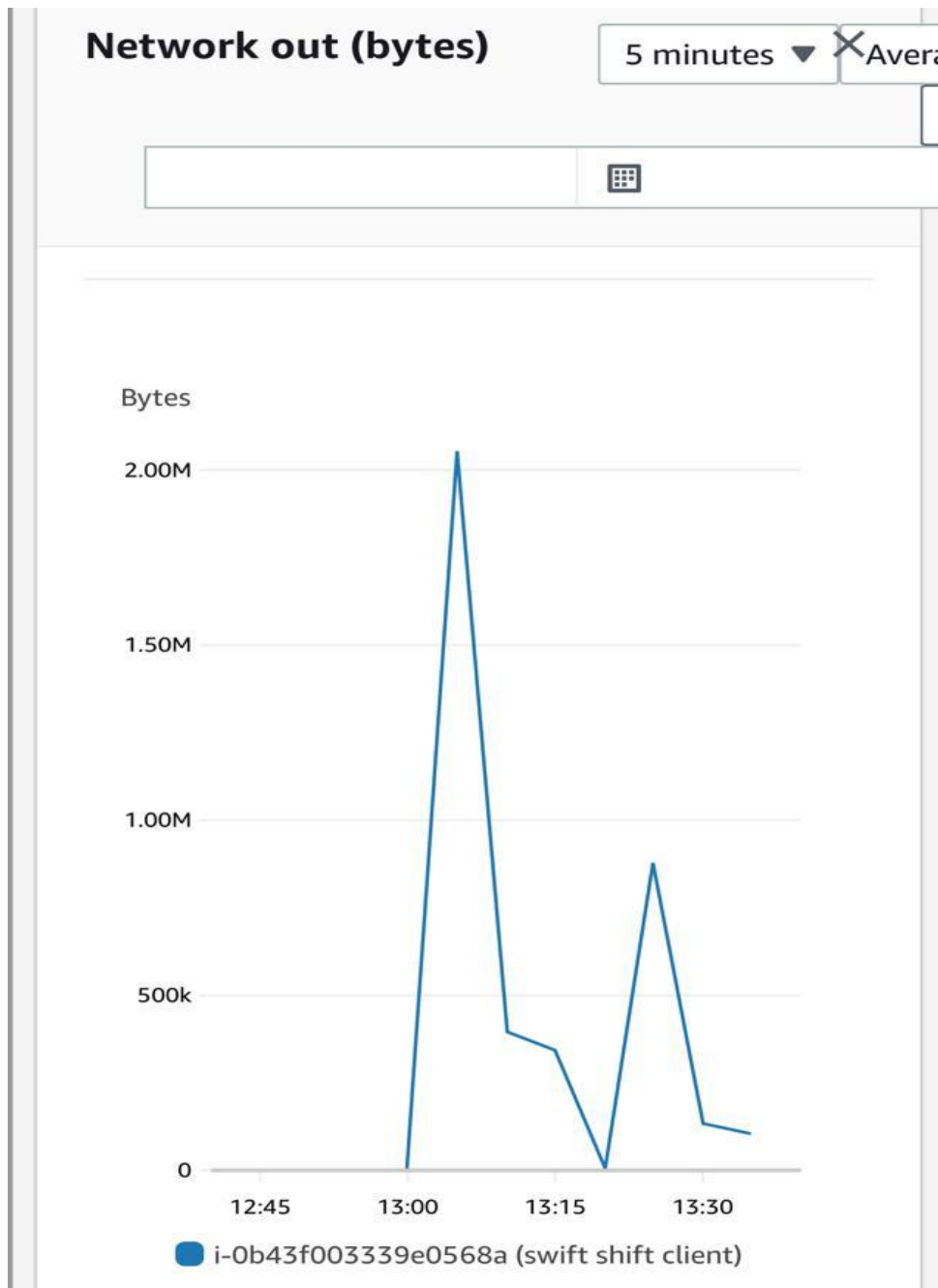


Fig 4.4 Network out count in bytes

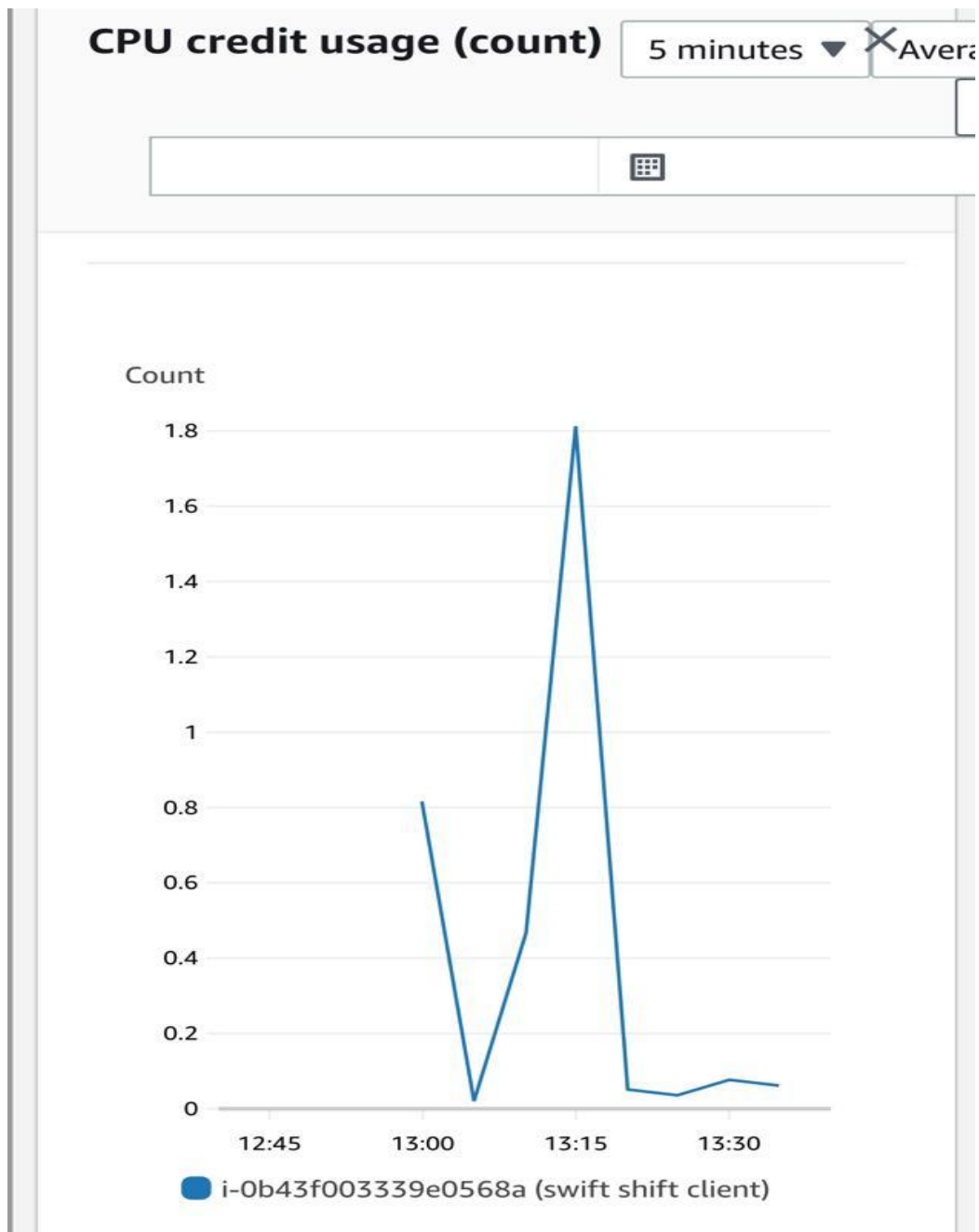


Fig 4.5 CPU credit usage count

- **Figure 4.1** is a CPU utilization graph visually represents the active usage percentage of CPU resources over a specific timeframe. It provides valuable insights into the CPU workload and efficiency, allowing users to monitor and analyze CPU usage patterns. Typically, the graph consists of an x-axis and a y-axis.

The x-axis corresponds to time and is divided into intervals or increments based on the chosen duration and scale of the graph. Each interval represents a specific time unit, such as seconds, minutes, hours, or days. By examining the x-axis, users can track the passage of time and observe how CPU utilization fluctuates over the monitored period. The y-axis represents the CPU utilization percentage. It measures the proportion of CPU resources actively engaged during specific time intervals. The y-axis is scaled from 0% to 100%, with 0% indicating no CPU activity (idle state) and 100% representing the CPU operating at its maximum capacity. Analyzing the y-axis allows users to visualize the level of CPU utilization at different points in time, enabling the identification of periods with high or low CPU usage.

Analyzing the CPU utilization graph provides valuable insights into workload patterns, system performance, and CPU resource efficiency. It helps in understanding overall utilization trends, identifying peak usage periods, and pinpointing potential performance bottlenecks or inefficiencies. This information is vital for optimizing system performance, capacity planning, and troubleshooting resource allocation.

Various monitoring tools, operating systems, and performance analysis software offer built-in or third-party graphing capabilities to visualize CPU utilization and related metrics. These graphs assist administrators, IT professionals, and system operators in effectively monitoring and managing CPU resources, ensuring efficient utilization, and maintaining optimal system performance.

- **Figure 4.2** is a Network in bytes graph, also referred to as a network traffic graph, is a visual representation illustrating the volume of data transferred over a network during a specific time period. It provides valuable insights into the amount of data transmitted or received via a network interface, enabling users to monitor and analyze network traffic patterns effectively.

The graph comprises two primary axes: the x-axis and the y-axis.

The x-axis represents time and is divided into intervals or increments. The specific time

units, such as seconds, minutes, hours, or days, are determined based on the duration and scale of the graph. By observing the x-axis, users can track the progression of network traffic over time and understand how data transfer patterns evolve during the monitored period.

On the other hand, the y-axis quantifies the amount of network data transfer, typically measured in bytes. This axis reflects the volume of data transmitted or received during specific time intervals. The scaling of the y-axis is adjusted to accommodate the observed range of data values. By examining the y-axis, users can visualize the magnitude of network traffic at different points in time, enabling the identification of periods characterized by high or low data transfer.

Analyzing the network in bytes graph provides valuable insights into data transfer patterns, facilitates the detection of peak traffic periods, and aids in the identification of potential performance bottlenecks or issues. The information gleaned from the graph allows users to make informed decisions regarding network optimization, capacity planning, and troubleshooting.

Various monitoring tools, network management systems, and performance analysis software offer built-in or third-party graphing capabilities to visualize network traffic and associated metrics. These graphs are essential tools for administrators, IT professionals, and network engineers, empowering them to understand and manage network performance effectively while ensuring efficient data transmission.

- **Figure 4.3** is a Network packet out graph, also referred to as an outbound packet graph or network egress graph, is a visual representation that illustrates the number of packets transmitted or sent from a network interface within a specific time frame. This graph enables users to monitor and analyze the patterns of outgoing network traffic.

Similar to other graphs, a network packet out graph consists of two key axes: the x-axis and the y-axis.

The x-axis represents time and is divided into intervals or increments, based on the duration and scale chosen for the graph. Each interval corresponds to a specific time unit, such as seconds, minutes, hours, or days. By examining the x-axis, users can follow the timeline and observe the flow of outbound network packets over the

monitored period.

On the other hand, the y-axis represents the number of packets sent or transmitted from the network interface. It quantifies the volume of outgoing network traffic during specific time intervals. The scaling of the y-axis is adjusted to accommodate the observed range of packet counts. Analyzing the y-axis allows users to visualize the magnitude of outbound network traffic at different time points, aiding in the identification of periods characterized by high or low packet transmission activity.

Analyzing the network packet out graph provides valuable insights into the patterns of outbound data transmission. It facilitates an understanding of the rate at which data leaves the network interface, enables the detection of peak or low traffic periods, and helps identify any irregularities or anomalies in the network egress. This information is critical for network administrators, engineers, and IT professionals, as it assists in optimizing network performance, identifying potential congestion or bandwidth issues, and making informed decisions regarding network capacity planning or troubleshooting.

Network monitoring tools, network management systems, or performance analysis software often incorporate built-in or third-party graphing capabilities to visualize network packet out data and associated metrics. These graphs play a vital role in effectively monitoring and managing outbound network traffic, ensuring efficient data transmission, and maintaining optimal network performance.

- **Figure 4.4** is a Network out count in bytes graph, also referred to as an outbound network traffic graph, visually represents the volume of data transmitted from a network interface in bytes during a specific time period. This graph enables users to monitor and analyze the patterns of outgoing network traffic.

Similar to other graphs, a network out count in bytes graph consists of two primary axes: the x-axis and the y-axis.

The x-axis represents time and is divided into intervals or increments based on the chosen duration and scale of the graph. Each interval corresponds to a specific time unit, such as seconds, minutes, hours, or days. By examining the x-axis, users can track the progression of time and observe how outbound network traffic fluctuates over the

monitored period.

On the other hand, the y-axis represents the count of bytes transmitted from the network interface. It quantifies the volume of outgoing network traffic during specific time intervals. The scaling of the y-axis is adjusted to accommodate the range of observed byte counts. Analyzing the y-axis allows users to visualize the magnitude of outbound network traffic in terms of bytes at different time points, facilitating the identification of periods with high or low data transmission activity.

Analyzing the network out count in bytes graph provides valuable insights into the patterns of outbound data transmission. It aids in understanding the volume of data leaving the network interface, detecting peak traffic periods, identifying trends in data transmission, and observing changes in data flow over time. This information is critical for network administrators, IT professionals, and network engineers to optimize network performance, identify potential congestion or bandwidth issues, and make informed decisions related to network capacity planning, troubleshooting, or resource allocation.

Network monitoring tools, network management systems, or performance analysis software often offer built-in or third-party graphing capabilities to visualize network out count in bytes data and associated metrics. These graphs assist in effectively monitoring and managing outbound network traffic, ensuring efficient data transmission, and maintaining optimal network performance.

Figure 4.5 is a CPU credit usage graph visually represents the utilization of CPU credits over a specific time period. It provides information about the consumption and availability of CPU credits in systems that employ a credit-based CPU usage model, such as Amazon Web Services' (AWS) Elastic Compute Cloud (EC2) instances.

The graph typically comprises two axes: the x-axis and the y-axis.

The x-axis represents time and is divided into intervals or increments based on the chosen duration and scale of the graph. Each interval corresponds to a specific time unit, such as seconds, minutes, hours, or days. By examining the x-axis, users can track the passage of time and observe the fluctuations in CPU credit usage throughout the monitored period.

Meanwhile, the y-axis represents the CPU credit balance or usage. It quantifies the amount of CPU credits consumed within specific time intervals. The scaling of the y-axis is adjusted to accommodate the observed range of credit usage. Analyzing the y-axis allows users to visualize the extent of CPU credit consumption at different time points, facilitating the identification of periods with high or low credit utilization.

Analyzing the CPU credit usage graph provides valuable insights into the utilization of CPU credits in credit-based systems. It helps in understanding the rate at which CPU credits are consumed, identifying peak usage periods, and recognizing instances of potential credit exhaustion or insufficient credit availability. This information is crucial for optimizing the allocation of credit-based resources, managing workload demands, and making informed decisions related to system scaling and resource allocation.

Cloud service providers, like AWS, often offer tools and monitoring capabilities to visualize CPU credit usage graphs for instances utilizing credit-based CPU models. These graphs assist administrators, developers, and IT professionals in effectively monitoring and managing CPU credit utilization, ensuring optimal system performance and cost efficiency in cloud environments.

4.2.3 FUNCTIONAL TESTING:

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:

Valid Input : identified classes of valid input must be accepted.

Invalid Input : identified classes of invalid input must be rejected.

Functions : identified functions must be exercised.

Output : identified classes of application outputs must be exercised.

Systems/Procedures: interfacing systems or procedures must be invoked.

Functional testing includes the following aspects:

Valid Input: Test the system with various classes of valid input to ensure they are accepted as specified.

Invalid Input: Verify that identified classes of invalid input are rejected as expected.

Functions: Exercise the identified functions of the system to ensure they perform as intended.

Output: Test the system's application outputs, covering different classes of expected results.

Systems/Procedures: Invoke interfacing systems or procedures to ensure seamless integration and functionality.

Boundary Conditions: Test the system with inputs at minimum and maximum limits, checking if it behaves correctly.

Error Handling: Verify that the system appropriately handles errors and exceptions, such as incorrect or missing data.

Compatibility: Ensure the system functions correctly across platforms, browsers, and devices.

Performance: Assess the system's performance under various workload conditions, including response times and stress testing.

Usability: Evaluate the system's user-friendliness, navigation, and overall user experience.

Security: Validate the system's security features, including penetration testing and data protection.

Integration: Test the integration points between different components or systems to ensure proper communication.

Data Integrity: Verify that the system maintains data integrity through database tests and validation checks.

Recovery and Resilience: Test the system's ability to recover from failures or disruptions.

Regression Testing: Retest previously tested features to ensure they still work as intended after changes or bug fixes.

These aspects ensure thorough functional testing to meet business and technical requirements.

4.2.4 SYSTEM TESTING:

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the configuration-oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

4.2.5 PERFORMANCE TESTING:

The Performance test ensures that the output be produced within the time limits, and the time taken by the system for compiling, giving response to the users and request being send to the system for to retrieve the results.

4.2.6 ACCEPTANCE TESTING:

User Acceptance Testing is a critical phase of any project and requires significant participation by the end user. It also ensures that the system meets the functional requirements.

BUILD THE TEST PLAN:

Any project can be divided into units that can be further performed for detailed processing. Then a testing strategy for each of this unit is carried out. Unit testing helps to identity the possible bugs in the individual component, so the component that has bugs can be identified and can be rectified from errors.

4.3 DISCUSSION

The development and implementation of the Swift Shift web application for managing shipments using cloud computing technology is a significant achievement in the logistics and supply chain industry. The application provides a range of functionalities for managing shipments efficiently, reducing the time and effort required to manage shipments manually. The use of cloud computing technology ensures that the application is hosted and managed securely and reliably, and the integration with other cloud-based services provides additional layers of protection and ensures the continuity of the application in case of an outage or other issue.

The application is designed to be user-friendly and intuitive, providing an improved user experience for managing shipments. Users can add new shipments, track the status of their shipments, and view all their shipments in one place. They can also receive notifications and updates on their shipments, and filter and sort their shipments based on various criteria. The automation of various processes, such as tracking and notifications, reduces the likelihood of errors and delays, making the application more efficient.

The application also provides administrators with better tools for managing the system, including the ability to change the state of a shipment, announce offers, and generate reports and analytics on the shipments and users. The integration with a cloud computing platform, such as AWS EC2, ensures that the application is hosted and managed efficiently and securely, while the data backup and recovery mechanism ensures that the data stored in the application is protected against loss or corruption.

5. CONCLUSION

In conclusion, the development and implementation of the Swift Shift web application for managing shipments using cloud computing technology is a significant achievement in the logistics and supply chain industry. The application provides a range of functionalities for managing shipments efficiently, reducing the time and effort required to manage shipments manually.

The use of cloud computing technology ensures that the application is hosted and managed securely and reliably, and the integration with other cloud-based services provides additional layers of protection and ensures the continuity of the application in case of an outage or other issue.

The comparison between the existing system and the proposed system in packers and movers clearly indicates that the proposed system is a significant improvement over the existing system. The proposed system automates the various processes involved in packing and moving, which saves time and reduces errors.

The system also provides real-time tracking of goods, which increases transparency and accountability. Moreover, the proposed system is more convenient for customers, as they can request and pay for services online and track the progress of their goods in real-time. Overall, the proposed system has the potential to revolutionize the packing and moving industry by providing a faster, more accurate, and reliable service to customers.

The Swift Shift application has several benefits, including improved user experience, increased efficiency, enhanced security and reliability, and improved analytics and reporting. The application is designed to be user-friendly and intuitive, providing an improved user experience for managing shipments. The automation of various processes, such as tracking and notifications, reduces the likelihood of errors and delays, making the application more efficient.

The application also provides administrators with better tools for managing the system, including the ability to change the state of a shipment, announce offers, and generate reports and analytics on the shipments and users. The integration with a cloud computing platform, such as AWS EC2, ensures that the application is hosted and managed efficiently and securely, while the data backup and recovery mechanism ensures that the data stored in the application is protected against loss or corruption.

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Appendix 2:

Implementation of Packers & Movers system (Swift Shift) using cloud computing

ABSTRACT

Swift Shift is an innovative and easy-to-use web application designed to help businesses and logistics professionals manage their shipments with ease. The application offers two types of logins: regular users and administrators. Regular users can add new shipments, track the status of their shipments, and view all their shipments in one convenient place. This feature-rich application allows users to easily manage their shipments and stay on top of their logistics needs. One of the most important features of Swift Shift is its ability to allow users to add new shipments with ease. Users can input all the necessary information, such as the origin and destination of the shipment, the type of goods being shipped, and the delivery date. Once the shipment is added, users can easily track its progress and receive updates on its status. This helps businesses and logistics professionals stay organized and ensure that their shipments are delivered on time and in good condition. In addition to adding new shipments, users can also view all their shipments in one convenient place. This allows them to quickly check on the status of their shipments and make any necessary adjustments. Users can also filter and sort their shipments based on various criteria, such as delivery date or shipment type. This feature can save users valuable time and help them stay on top of their logistics needs. Administrators have additional features available to them, such as the ability to change the state of a shipment. This can be useful if there are delays or issues with the shipment that need to be addressed. Administrators can also announce offers, such as discounts or promotions, which can help attract new customers and retain existing ones. These features can help businesses and logistics professionals better manage their operations and stay competitive in the market. Swift Shift is hosted on AWS EC2, a reliable and scalable cloud computing service. AWS EC2 offers numerous benefits, including scalability, reliability, security, cost-effectiveness, and ease of use. These benefits ensure that Swift Shift is always up and running, with minimal downtime or interruptions. This also helps ensure that the application is secure and the data is safe.

Keywords: AWS(Amazon Web Service) , JavaScript , Cloud Computing , React.js , Node.js, npm(Node Package Manager).

I. INTRODUCTION

In today's fast-paced world, the need for effective logistics management has become increasingly important. With the growth of e-commerce and online shopping, the demand for efficient and reliable shipping services has skyrocketed. To meet this demand, businesses and logistics professionals need powerful tools to help them manage their shipments with ease.

Swift Shift is a web application designed specifically for managing shipments. This innovative and user-friendly application offers a wide range of features to help businesses and logistics professionals manage their shipments more efficiently. With its easy-to-use interface and powerful capabilities, Swift Shift has become the go-to tool for anyone who needs to manage shipments on a regular basis.

One of the key features of Swift Shift is its ability to allow users to add new shipments with ease. Users can input all the necessary information, such as the origin and destination of the shipment, the type of goods being shipped, and the delivery date. Once the shipment is added, users can easily track its progress and receive updates on its status. This helps businesses and logistics professionals stay organized and ensure that their shipments are delivered on time and in good condition.

In addition to adding new shipments, users can also view all their shipments in one convenient place. This allows them to quickly check on the status of their shipments and make any necessary adjustments. Users can also filter and sort their shipments based on various criteria, such as delivery date or shipment type. This feature can save users valuable time and help them stay on top of their logistics needs.

Administrators have additional features available to them, such as the ability to change the state of a shipment. This can be useful if there are delays or issues with the shipment that need to be addressed. Administrators can also announce offers, such as discounts or promotions, which can help attract new customers and retain existing ones. These features can help businesses and logistics professionals better manage their operations and stay competitive in the market.

Swift Shift is hosted on AWS EC2, a reliable and scalable cloud computing service. AWS EC2 offers numerous benefits, including scalability, reliability, security, cost-effectiveness, and ease of use. These benefits ensure that Swift Shift is always up and running, with minimal downtime or interruptions. This also helps ensure that the application is secure and the data is safe.

References related to packers and movers are sources of information that provide insights into various aspects of the packing and moving industry. These references can include academic articles, industry reports, government regulations, and other publications that discuss the challenges and opportunities facing packers and movers. They are essential for anyone interested in studying or working in the field of logistics and transportation. These references can provide valuable information on topics such as customer satisfaction, industry trends, best practices, and regulatory compliance. Properly citing these references in academic or professional writing is crucial to ensure that the information presented is accurate and reliable, and to give credit to the authors of the sources used.

In conclusion, Swift Shift is an excellent web application for managing shipments. Its easy-to-use interface and powerful features make it the perfect tool for businesses and logistics professionals who need to manage their shipments on a regular basis. Whether you are a small business owner or a logistics professional, Swift Shift has everything you need to stay on top of your shipments and succeed in today's fast-paced shipping industry. With its innovative features and reliable performance, Swift Shift is the ultimate tool for effective logistics management.

II. LITERATURE SURVEY

Integrating cloud computing in supply chain processes Andreas Jede & Frank Teuteberg (2015) - This paper contains the benefits of cloud computing in logistics management. The author discussed about how cloud computing helps business. However, the authors also mentioned about the challenges associated with cloud computing.[1]

Cloud computing in logistic and supply chain management environment Riste Temjanovski, Elenica Sofijanovska, Tamara Jovanov-Apasieva (2021). This article provides an overview of the latest trends in logistics and supply chain management. The authors discuss how businesses are using technology such as IoT, big data, and blockchain to optimize their supply chains and improve customer service. The authors also mentioned the challenges facing businesses in the logistics industry.[2]

The impact of cloud computing technology on logistics and supply chain management Bonaventure Okhuoya, Bonaventure Okhuoya. (2022) - This article contains the role of technology in logistics and supply chain management to improve visibility, efficiency, and decision-making. The authors discuss the challenges associated with implementing new technology in logistics and supply chain management.[3]

The role of logistics in e-commerce success by D. Halim and M. F. Aziz (2017) - This paper deals with the importance of logistics in e-commerce success. The authors discuss the challenges facing businesses in the e-commerce industry, such as increasing competition and changing customer expectations, and the need for collaboration and innovation to stay competitive.[4]

Logistics management in the era of Industry 4.0 by S. A. Jaiswal, S. S. Sane, and R. S. Mani (2019) - This article examines the impact of Industry 4.0 on logistics management to improve efficiency and reduce costs. The authors discuss the challenges associated with implementing Industry 4.0 in logistics management.[5]

The benefits and challenges of third-party logistics providers by M. K. Lum, K. C. Tan, and S. S. Goh (2015) - This article contains the benefits and challenges of outsourcing logistics to third-party providers, including reduced costs, improved efficiency.[6]

The importance of real-time visibility in logistics management by S. M. Faisal, S. Zaman, and M. A. Khan (2019) - This paper highlights the importance of real-time visibility in logistics management. The authors discussed the challenges that come with real-time visibility, such as data overload. [7]

The role of logistics in supply chain sustainability by M. M. Khan and N. H. Shaik (2018) - This article contains information about the role of logistics in achieving supply chain sustainability. The authors discussed the challenges faced with achieving supply chain sustainability, such as the need for collaboration and investment.[8]

The importance of data analytics in logistics management by S. M. Faisal and S. Zaman (2017) - This paper contains the importance of data analytics in logistics management. The authors discuss the challenges associated with data analytics in logistics management, such as the need for data quality and privacy, and the requirement for skilled data scientists, and provide examples of successful implementations of data analytics in the industry.[9]

The benefits of cloud-based logistics management systems by N. A. Hasnain, T. A. Hussain, and T. A. Khan (2018) - This paper contains the benefits of cloud-based logistics management systems, that includes increased scalability, cost-effectiveness, and real-time visibility. The authors also discussed how cloud-based logistics management systems can help businesses to improve supply chain operations and reduce costs by providing real-time visibility. The authors also mentioned some of the challenges associated with cloud-based logistics management systems.[10]

To adopt or not to adopt? The determinants of cloud computing adoptions in Information Technology sector by A. Hassan, S.H Bhatti, S. Shujaat & Y.Hwang (2022).- This paper denotes Cloud computing adoption in supply chain management boosts productivity and effectiveness. This study emphasizes its strategic importance and explores factors affecting perceived usefulness. Valuable insights for organizations considering cloud adoption.[11]

Research methodology in cloud: A step by step guide for Beginners by H. Engward (2023) . This paper emphasises on the research methodologies that could be used with the help of cloud computing. It determines the methods and approaches using the cloud technology and their implementation in packers and movers system.[12]

Cloud computing: Defining and describing an emerging phenomenon by Plummer, D.C, Bittman, T.J, Austin, T, Cearley,D.W. and Smith, D.M (2008). In this research paper it concludes that Cloud computing revolutionizes IT by redefining buyer-seller dynamics and transforming value generation from technology. Shifting costs to service providers with performance guarantees requires caution. Vendors must embrace cloud platforms or face marginalization. It's more than just the next Internet generation; it fundamentally changes service delivery.[13]

Secure authentication schemes in cloud computing with glimpse of Artificial Neural Networks by S. A. Sheik and A. P. Muniyandi (2023), This paper examines cloud security concerns, authentication schemes, data storage technologies, and the potential application of Artificial Neural Networks (ANNs) in cloud security. The study finds that existing traditional algorithms, whether single or hybrid approaches, only provide partial security rather than absolute protection against intruders.[14]

Serverless Computing: Current Trends and open problems by I. Baldini, P. Castro, K. Chang, P. Cheng, S. Fink,V. Ishakian, N. Mitchell, V. Muthusamy, R.Rabbah, A. Slominski, and P. Suter (2017). In this research paper we read about Serverless computing, it is a mature and widely adopted paradigm for deploying applications and services. Our survey of serverless platforms from industry, academia, and open-source projects reveals key characteristics, use cases, and highlights technical challenges and open problems. These findings provide valuable insights into the benefits and limitations of serverless computing.[15]

Building knowledge ambidexterity using cloud computing: Longitudinal case studies of smes experiences by M. Saratchandra, A. Shrestha, and P. A. Murray (2022). Existing studies have overlooked the potential of cloud computing for SMEs and its role in facilitating new knowledge. This paper highlights that a knowledge

ambidextrous approach, combined with cloud computing intervention, enhances technology-driven innovation outcomes for SMEs. The study expands on the insights of K-AMB (knowledge ambidexterity) and KM (knowledge management) theories, demonstrating that K-AMB practices require the support of KM mechanisms and behaviors to drive transformative change in workplace behavior and innovation. [16]

A comprehensive survey on security challenges in different network layers in cloud computing by Jangjou M, Sohrabi MK. This comprehensive survey examines the security challenges across various network layers in cloud computing. The results reveal a multitude of vulnerabilities and risks specific to each layer. It emphasizes the significance of addressing these challenges to maintain the integrity and protection of cloud environments. By understanding the findings, organizations can implement tailored security measures and protocols to mitigate potential threats and enhance overall cloud security.[17]

Cloud Computing Adoption Risks: State of Play by Bannerman PL(2022). This paper concludes that the adoption barriers for cloud computing are high, but the potential benefits are substantial. Gradual removal of these barriers is expected, leading to the emergence of diverse beneficial services. Successful adopters will have realistic expectations, invest time to understand cloud capabilities, and develop suitable engagement strategies. Overcoming service-specific learning curves and gaining experience with cloud services are crucial. Experience-based knowledge is vital for mitigating risks and optimizing cloud adoption.[18]

Preparing for the future: understanding the seven capabilities of cloud computing by Iyer B,Henderson JC (2021). In this paper we got to know that Cloud computing discussions have primarily focused on technology, neglecting the business value it offers. However, emerging examples highlight its potential applications. Our study identifies seven essential cloud capabilities that executives can leverage to develop effective strategies. By customizing the mix of these capabilities, firms can gain unique competitive advantages. Additionally, we predict that cloud strategies will intensify ecosystem-based competition. Hence, companies must proactively prepare for this future by embracing cloud technologies and formulating strategic plans.[19]

A view of cloud computing by Armbrust M, Fox A, Griffith R, Joseph AD, Katz R, Konwinski A. According to this paper Cloud computing is expected to grow, necessitating developers to consider its impact. Regardless of the level of abstraction offered by cloud providers, scalability of virtualized resources is crucial. Applications software should scale rapidly and have a pay-for-use licensing model. Infrastructure software must be aware of running on virtual machines and incorporate metering and billing functionalities. Hardware systems should be designed for container-scale deployments, focusing on energy proportionality and

incorporating technologies like flash memory. LAN switches and WAN routers should improve in bandwidth and cost.[20]

III. SYSTEM IMPLEMENTATION

A. EXISTING SYSTEM

In the traditional method of managing shipments, businesses and logistics professionals often rely on manual processes such as spreadsheets and emails. This method can be time-consuming, error-prone, and inefficient, leading to delays and increased costs. Additionally, traditional methods of managing shipments may not provide adequate security, scalability, or visibility into the status of shipments.

Some businesses may use legacy software applications for managing shipments. However, these applications may be expensive to purchase, maintain, and upgrade. Additionally, legacy software applications may not be user-friendly and may require specialized training to use effectively.

Another existing system for managing shipments is through third-party logistics (3PL) providers. 3PL providers offer a range of logistics services, including transportation, warehousing, and inventory management. However, outsourcing logistics to a 3PL provider can be expensive and may result in reduced control over the logistics process. Traditional methods of managing shipments, such as spreadsheets and emails, may not provide real-time visibility into the status of shipments. This can lead to delays, lost shipments, and unhappy customers. Manual processes can be time-consuming and error-prone, leading to delays, increased costs, and decreased productivity. Traditional methods of managing shipments may not provide adequate security for sensitive shipment data, leaving it vulnerable to unauthorized access or theft. Traditional methods of managing shipments may not be scalable, meaning that businesses may struggle to meet demand as their shipping volumes increase. Some legacy software applications for managing shipments can be expensive to purchase, maintain, and upgrade. This can create a significant financial burden for businesses, especially small and medium-sized enterprises.

Modern shipment management systems offer a streamlined workflow that is designed to optimize the shipment process. The workflow of such systems typically begins with order creation, where the system generates an order for the shipment based on the customer's requirements and specifications. The system then identifies the best carrier for the shipment, taking into account factors such as cost, transit time, and reliability. Once the carrier is selected, the system provides real-time tracking information for the shipment, enabling the

customer and the carrier to monitor its progress throughout the delivery process. Additionally, modern shipment management systems offer automated documentation generation, reducing the need for manual documentation and minimizing errors. Overall, the workflow of modern shipment management systems is designed to be efficient, cost-effective, and user-friendly, providing businesses with a reliable and scalable solution for managing their shipments.

the packers and movers industry in India. The authors identify the challenges faced by existing systems in terms of infrastructure, technology, and regulations. They highlight the need for improved infrastructure, such as better roads and transportation networks, to support the growth of the industry. The authors also suggest that the industry could benefit from the adoption of new technologies, such as GPS tracking and online booking systems. The study provides insights into the current state of the packers and movers industry in India and highlights the need for improvement.

Madhu and Mathew's (2017) article assesses the existing systems in the packers and movers industry in the United Arab Emirates (UAE). The authors identify the strengths and weaknesses of existing systems in terms of logistics, technology, and customer service. They suggest that the industry could benefit from greater integration and coordination among stakeholders, as well as the adoption of new technologies to improve efficiency and customer satisfaction. The study provides valuable insights into the packers and movers industry in the UAE and underscores the need for a more coordinated and technology-driven approach to the business.

The workflow of packers and buyers in an existing system typically starts with product sourcing. This involves researching potential suppliers, negotiating prices and contracts, and conducting quality checks to ensure that the products meet their standards. Once the products have been selected, the packers and buyers will place an order with the supplier, specifying the quantity, delivery date, and any other relevant details. When the products arrive, the packers will check that they match the specifications of the order and meet quality standards. The buyers will then evaluate the products to ensure they meet their needs and expectations. Finally, the packers will package and ship the products to the buyers, completing the workflow. Overall, this workflow requires careful attention to detail, effective communication, and a focus on quality to ensure that the process runs smoothly and efficiently.

B. PROPOSED SYSTEM

Introducing Swift Shift - the ultimate web application for managing shipments! With Swift Shift, you can easily add new shipments, track the status of your shipments, and view all your shipments in one convenient place.

Swift Shift offers two types of logins: one for regular users and another for administrators as shown in figure 1 and 2. Regular users can add new shipments and view their existing shipments, while administrators have the ability to change the state of a shipment and announce offers.

One of the most important features of Swift Shift is the ability to add a new shipment. Users can input all the necessary information, such as the origin and destination of the shipment, the type of goods being shipped, and the delivery date. Once the shipment is added, users can easily track its progress and receive updates on its status.

Users can also view all their shipments in one convenient place. This allows them to quickly check on the status of their shipments and make any necessary adjustments. Additionally, users can filter and sort their shipments based on various criteria, such as delivery date or shipment type.

Administrators have additional features available to them, such as the ability to change the state of a shipment. This can be useful if there are delays or issues with the shipment that need to be addressed. Administrators can also announce offers, such as discounts or promotions, which can help attract new customers and retain existing ones.

Finally, Swift Shift allows all users to view all shipments in the system. This can be useful for users who are looking for new shipping opportunities or want to keep track of what their competitors are doing. With Swift Shift, you can stay on top of the latest shipping trends and make informed decisions about your own shipments.

In conclusion, Swift Shift is the ultimate web application for managing shipments. With its easy-to-use interface and powerful features, it's the perfect tool for anyone who needs to manage shipments on a regular basis. Whether you're a small business owner or a logistics professional, Swift Shift has everything you need to stay on top of your shipments and succeed in today's fast-paced shipping industry.

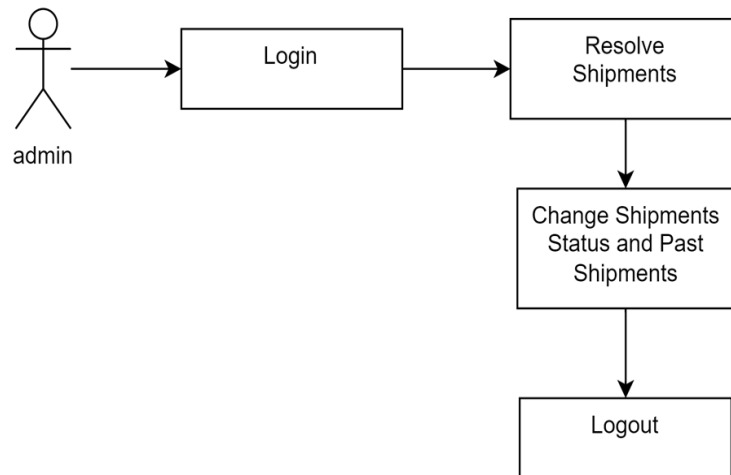


Fig 1: Admin Module

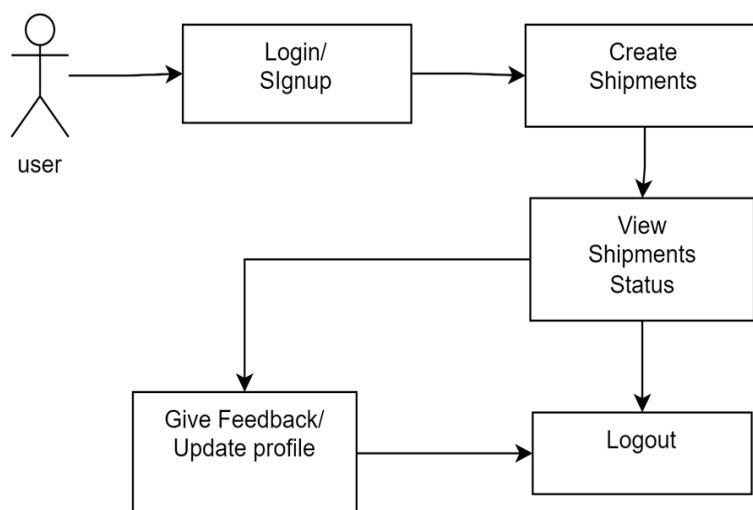


Fig 2: User Module

Table 1. Comparative analysis

Systems	Feedback Section	Status Tracker	Announcement Section
Agrawal Packers & Movers	Yes	No	No
Porter	Yes	No	Yes
No Broker Packers & Movers	Yes	No	No
Swift Shift	Yes	Yes	Yes

The existing system in packers and movers is characterized by manual processes and is time-consuming. The proposed system, on the other hand, is a computerized system that aims to automate the various processes involved in packing and moving.

The existing system in packers and movers involves a lot of manual work, such as inventory management, packing, loading, and unloading of goods. The process starts with a customer calling the company and requesting their services. The company then sends a representative to the customer's location to assess the goods that need to be packed and moved. The representative prepares an inventory of the items and provides an estimate of the cost.

Once the customer agrees to the cost, the company sends a team to pack the goods. The team members manually pack the goods, label them, and load them into a truck. The truck then transports the goods to the customer's new location, where another team unloads the goods and unpacks them. The entire process is time-consuming and can take several days to complete.

The proposed system in packers and movers aims to automate the various processes involved in packing and moving. The system starts with a customer logging into the company's website and requesting their services. The system then automatically generates an estimate based on the customer's input. The customer can then confirm the estimate and pay for the services online.

The system then assigns a team to the customer's location to pack the goods. The team members use handheld devices to scan the goods and generate a digital inventory. The system then uses this inventory to track the goods throughout the packing and transportation process. The goods are loaded into a truck equipped with GPS and temperature sensors. The system uses this data to track the location and condition of the goods in real-time.

Once the goods reach the customer's new location, the system generates a notification to the customer. The customer can then log into the system and confirm the delivery. The system then assigns a team to unpack the goods, and the process is completed in a few hours.

The proposed system is more efficient than the existing system in packers and movers. It eliminates the need for manual processes, which saves time and reduces errors. The system also provides real-time tracking of the goods, which increases transparency and accountability. The system is also more convenient for customers, as they can request and pay for services online and track the progress of their goods in real-time. Here in table 1 we have shown the comparative analysis of existing and proposed systems.

IV. MODULES

Module 1: Admin module

The admin module in packers and movers is an essential software application that plays a crucial role in managing the company's operations and activities. It is designed to provide the company's management and administrative staff with an easy-to-use platform that enables them to track and monitor various tasks and activities. The admin module typically includes several features and functionalities that allow the company to manage its customer database, employee database, inventory, and financial transactions. It also allows the company to generate reports and analytics, which helps in making informed decisions and improving the overall performance of the organization.

One of the primary functions of the admin module is customer management. It enables the company to store and manage customer information, including their personal details, service history, and feedback. This information can be used to track customer satisfaction, understand their needs and preferences, and provide personalized services.

Another crucial feature of the admin module is employee management. It allows the company to manage its employee database, including their personal details, job roles, work schedules, and performance evaluations. This information can be used to monitor employee productivity, ensure compliance with company policies, and provide training and development opportunities.

In conclusion, the admin module in packers and movers is an essential tool that helps the company manage its operations and activities efficiently. It provides a centralized platform for managing customer, employee, and inventory data, generating reports and analytics, and making informed decisions.

Module 2: User module

The user module in packers and movers is a software application that provides a user-friendly interface for customers to interact with the company's services. It is designed to make the booking process and tracking of shipments simple and convenient for customers.

The user module typically includes several features and functionalities that enable customers to create an account, make bookings, track their shipments, and provide feedback. Customers can access the user module through the company's website or mobile app.

One of the primary functions of the user module is booking management. Customers can use the module to book their shipments, choose the type of service they require, and provide details about the shipment, including the pickup and delivery locations, weight, and dimensions. The module also allows customers to choose additional services such as packing and unpacking.

Another crucial feature of the user module is shipment tracking. Customers can use the module to track the status of their shipment, including the pickup and delivery dates, location updates, and estimated time of arrival. The module also provides notifications to customers about any delays or changes in the shipment status.

The user module also includes a feedback feature that allows customers to provide feedback on their experience with the company's services. This information is used to improve the quality of services provided by the company and enhance customer satisfaction.

In conclusion, the user module in packers and movers is a critical component of the company's operations. It provides a user-friendly platform for customers to interact with the company's services, make bookings, track shipments, and provide feedback. This helps the company to deliver a high-quality service and build long-term relationships with its customers.

Module 3:Cloud computing module

The Cloud Computing module is an essential software application that enables packers and movers companies to store and manage their data and applications on the cloud. Cloud computing provides a flexible, scalable, and cost-effective way to access and manage data and applications.

The Cloud Computing module typically includes several features and functionalities that allow companies to store and manage data on the cloud, access applications and services on-demand, and scale up or down their computing resources as needed. The module also provides advanced security and backup capabilities to protect data and applications from cyber threats and disasters.

One of the primary functions of the Cloud Computing module is data storage and management. It enables packers and movers companies to store and manage large volumes of data, including customer information, inventory, and financial data. This data can be accessed from anywhere, at any time, using an internet connection.

Another crucial feature of the Cloud Computing module is on-demand application and service access. It enables companies to access and use applications and services, such as customer relationship management (CRM) systems, transportation management systems (TMS), and billing systems, without the need for on-premises infrastructure. This reduces the need for companies to invest in costly hardware and software infrastructure and allows them to scale up or down their computing resources as needed.

The Cloud Computing module also includes advanced security and backup capabilities. It provides multiple layers of security, such as encryption, authentication, and access controls, to protect data and applications from cyber threats. It also provides backup and disaster recovery capabilities, ensuring that data and applications can be restored quickly in the event of a disaster or system failure.

In conclusion, the Cloud Computing module is an essential tool for packers and movers companies to manage their data and applications on the cloud. It provides a flexible, scalable, and cost-effective way to access and

manage data and applications, while also providing advanced security and backup capabilities. Companies that leverage the Cloud Computing module are more likely to achieve operational efficiencies, reduce costs, and improve their overall performance in the competitive packers and movers industry.

V. RESULTS

Results are the outcomes of actions or events that have occurred. In the context of packers and movers, the results can be viewed in various aspects such as customer satisfaction, revenue growth, employee performance, and process improvement.

One of the key results in the packers and movers industry is customer satisfaction. The success of a company in this industry is largely dependent on how satisfied its customers are with the services provided. High levels of customer satisfaction can lead to increased loyalty and positive word-of-mouth referrals, which can attract new customers and help the company to grow. Companies can measure customer satisfaction through feedback forms, surveys, and online reviews. Positive results in these areas can indicate that the company is delivering a high-quality service that meets or exceeds customer expectations.

Revenue growth is another critical result for packers and movers companies. Revenue growth is a measure of the increase in sales over a given period. Companies can achieve revenue growth through various means such as expanding their service offerings, entering new markets, and improving their sales and marketing efforts. Revenue growth can lead to increased profits, which can be reinvested into the business to fund further growth and expansion.

Employee performance is another result that is critical to the success of packers and movers companies. Employee performance can be measured through various metrics such as productivity, customer satisfaction, and adherence to company policies and procedures. Companies can improve employee performance by providing training and development opportunities, setting clear expectations and goals, and recognizing and rewarding high-performing employees. Improving employee performance can lead to increased efficiency and productivity, which can result in better customer service and increased revenue growth.

Process improvement is another important result for packers and movers companies. Process improvement involves identifying inefficiencies and areas for improvement within the company's operations and implementing changes to address them. Companies can use various tools and techniques such as Lean Six

Sigma and process mapping to identify and improve processes. Process improvement can lead to increased efficiency, reduced costs, and improved customer satisfaction.

In conclusion, results are critical to the success of packers and movers companies. These results can be viewed in various aspects such as customer satisfaction, revenue growth, employee performance, and process improvement. Achieving positive results in these areas requires a commitment to delivering high-quality services, investing in employee training and development, and continuously improving business processes. Companies that focus on achieving positive results in these areas are more likely to succeed and grow in the competitive packers and movers industry.

V. CONCLUSION

In conclusion, the packers and movers industry is a highly competitive and dynamic industry that requires companies to constantly innovate and adapt to changing market conditions. The industry is characterized by intense competition, rapidly evolving technologies, and changing customer preferences.

To succeed in this industry, packers and movers companies must focus on delivering high-quality services that meet or exceed customer expectations. They must also invest in advanced technologies, such as cloud computing, to improve their operational efficiency, reduce costs, and enhance their overall performance.

The key modules that are essential for packers and movers companies include the Admin module, User module, and Cloud Computing module. These modules provide critical functionalities and features that enable companies to manage their operations more effectively, improve customer satisfaction, and achieve positive results in key areas such as revenue growth, employee performance, and process improvement.

The Admin module provides critical functionalities such as managing customers, employees, vendors, and orders. It also provides real-time tracking and monitoring capabilities that enable companies to track the status of their shipments and provide customers with up-to-date information about their orders. The Admin module also provides advanced reporting and analytics capabilities that enable companies to identify trends and insights that can inform strategic decision-making.

The User module provides critical functionalities such as booking orders, tracking shipments, and managing payments. It also provides customer self-service capabilities that enable customers to track their shipments, update their information, and make payments online. The User module also provides real-time notifications and alerts that keep customers informed about the status of their orders.

The Cloud Computing module is an essential tool that enables packers and movers companies to store and manage their data and applications on the cloud. It provides a flexible, scalable, and cost-effective way to access and manage data and applications, while also providing advanced security and backup capabilities. Companies that leverage the Cloud Computing module are more likely to achieve operational efficiencies, reduce costs, and improve their overall performance in the competitive packers and movers industry.

The comparison between the existing system and the proposed system in packers and movers clearly indicates that the proposed system is a significant improvement over the existing system. The proposed system automates the various processes involved in packing and moving, which saves time and reduces errors. The system also provides real-time tracking of goods, which increases transparency and accountability. Moreover, the proposed system is more convenient for customers, as they can request and pay for services online and track the progress of their goods in real-time. Overall, the proposed system has the potential to revolutionize the packing and moving industry by providing a faster, more accurate, and reliable service to customers.

In conclusion, the packers and movers industry is a complex and challenging industry that requires companies to be innovative, customer-focused, and technology-driven. The Admin module, User module, and Cloud Computing module are critical tools that enable companies to achieve these objectives and succeed in this competitive industry. Companies that leverage these modules and focus on delivering high-quality services that meet or exceed customer expectations are more likely to succeed and thrive in this industry.

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