**PROJECT PROPOSAL**

**LOGISTICAL TRANSPORT MANAGEMENT SYSTEM (TMS)**

**Quality Management**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Characteristics | Sub-Characteristics | | Definition of Done criteria |
| **General Criteria** | | | | |
| G.1 | Maintainability | Modularity | | Codes are separated into modules and classes with relevant documents for ease of maintaining and updating. |
| G.2 | Reusability | | Code comments, and naming convention rules are followed. |
| G.3 | Performance Efficiency | Resource Utilization | | CPU usage of the system on AWS maintained under 80%.  Memory consumption of the system on AWS maintained under 70%. |
| G.4 | Capacity | | System must handle 1000 users concurrently without performance degrade.  System must be able to scale up to 50% of its capacity. |
| G.5 | Portability | Adaptability | | AMIs and backup data of the system must be available to redeploy in case of failure. |
| G.6 | Installability | | Modules of the system are pre-deployed on AWS for testing and final installation should be under 1 day. |
| G.7 | Replaceability | | System’s components on AWS must be able to change to different tiers or types in case changes are needed |
| G.8 | Compatibility | Interoperability | | The TMS is compatible with all browsers on the market, mobile compatibility is also a must for carrier. |
| G.9 | Co-existence | | Different functions of the system must be able to operates efficiently without crashing/conflicting. |
| G.10 | Reliability | Availability | | The feature should be accessible and responsive, downtime and unavailability must be significantly minimized to ensure 99.999% of availability. |
| G.11 | Recoverability | | At least 80% of the system’s main functionalities must be able to operates normally after recovery from failure. |
| G.12 | Maturity | | The module functions must undergo SIT and UAT to operate reliably and consistently, and various scheduling scenarios must be tested to handle unexpected issues or failures. |
| G.13 | Fault Tolerance | | the feature's database needs to be replicated across a minimum of two regions. Additionally, scaling on demand should be implemented to handle any potential failures in the application server. |
| G.14 | Usability | User error protection | | Display an error message whenever invalid input is submitted by the end-user. |
| G.15 | User interface aesthetics | | The colour palettes, page structure, elements (icons, fonts, text size) must be compatible with the prototype design |
| **Sprint 1: Order Management and Shipment Tracking** | | | | |
| 1.1 | Functionality Suitability | Functional Appropriateness | | The order process and shipment tracking meet all requirements specified by the stakeholders. |
| 1.2 | The user is able to create new order using the registered account. |
| 1.3 | GPS and RFID work correctly for real-time tracking of shipment |
| 1.4 | 100% notifications are sent to relevant stakeholders based on predefined metrics. |
| 1.5 | Overall information of order and shipment tracking are displayed on the dashboard. |
| 1.6 | Functional Correctness | | 100% users are able to create new order. |
| 1.7 | The newly created order is recorded correctly in the database. |
| 1.8 | Real-time data of order and shipment tracking are displayed correctly on the dashboard with delays under 45 minutes. |
| 1.9 | Functional Completeness | | All required fields in the TMS databases must have data with  appropriate format. |
| 1.10 | Data are recorded and sent to analytical system with delays under 2 hours before analytic batch job. |
| 1.11 | Performance Efficiency | Time Behaviour | | The order is created and recorded correctly under 1 minute. |
| 1.12 | The information on overview dashboard in refreshed after 4 minutes. |
| 1.13 | Notifications are sent to relevant stakeholders under 1 minute after incidents. |
| 1.14 | Usability | Learnability | | The order creation process is easy to understand for end-users.  At least 90% of users can complete the process in 5 minutes. |
| 1.15 | The order creation process is clear to learn without additional training.  After submitting the form, the system displays a confirmation message to users. |
| 1.16 | Operability | | The order creation is clear enough to allow at least 95% of test users to create order without any difficulties. |
| 1.17 | Security | Confidentiality | | Order creation data in the database is protected from authorized access by applying encryption and authentication protocols |
| 1.18 | Order creation data in the database must not be modified by any principals after being submitted. |
| 1.19 | Authenticity | | OTP is sent to the user’s devices to confirm the order creation via SMS or phone calls. |
| 1.20 | Accountability | | The evidence of user order creation is recorded in the logbook for further auditing. |
| 1.21 | Integrity | | 100% of data in the databases is reflected correctly on the overview dashboard. |
| **Sprint 2: Carrier Management** | | | | |
| 2.1 | Functionality Suitability | Functional Completeness | Carrier management form is able to record appropriate predefined fields of data into the database. | |
| 2.2 | Carrier approval workflow allows the administrator to perform predefined actions on carriers. | |
| 2.3 | The administrator can view additional information regarding the carrier if necessary. | |
| 2.4 | The administrator can search, and filter carrier based on specific criteria. | |
| 2.5 | Carrier performance is tracked and recorded in the system. | |
| 2.6 | The customer is able to provide feedback on the carrier. | |
| 2.7 | Functional Correctness | Carrier data is recorded 100% correctly in the database. | |
| 2.8 | Search and filter functionalities on carrier work correctly and data is updated after 5 minutes. | |
| 2.9 | Carrier performance data is updated after 5 minutes | |
| 2.10 |  | Functional Completeness | Carrier performance data is synchronized with the database and other system if necessary. | |
| 2.11 | Performance Efficiency | Time Behaviour | The status of carrier approval actions is updated onto the database and dashboard under 1 minute. | |
| 2.12 | Carrier performance is updated onto the database and dashboard under 5 minutes. | |
| 2.13 | Usability | Learnability | The carrier approval workflow is easy to understand for end-users.  At least 90% of administrators can complete the workflow in 3 minutes. | |
| 2.14 | The dashboard must show all the overview information about the carrier in user-friendly format. | |
| 2.15 | The dashboard must allow for disabling certain information if the user sees fit. | |
| 2.16 | Operability | The carrier approval workflow is clear enough to allow at least 95% of test users to complete a workflow without any difficulties. | |
| 2.17 | Security | Confidentiality | The carrier approval workflow is only accessible by the administrator. | |
| 2.18 | The overview dashboard is only accessible by appropriate roles or identities. | |
| 2.19 | Integrity | The feature must implement security measures such as access control, data validation, or checksum to prevent carrier approval workflow from being modified. | |
| 2.20 | 100% of data in the databases is reflected correctly on the dashboard. | |
| 2.21 | Accountability | The feature must implement audit logs and digital signatures to provide a trail of evidence. | |
| **Sprint 3: Route Planning and Optimization** | | | | |
| 3.1 | Functionality Suitability | Functional Completeness | Route planning algorithm is developed. | |
| 3.2 | Route planning algorithm can integrate data from real-time traffic data and weather data | |
| 3.3 | Route optimization can be filtered based on predefined criteria. | |
| 3.4 | User can customize basic configuration of the route optimization interface. | |
| 3.5 | Functional Correctness | Route planning algorithm works correctly based on provided data with accuracy over 75% | |
| 3.6 | Real-time traffic and weather data is integrated correctly with accuracy over 90% | |
| 3.7 | Functional Appropriateness | Route optimization can be recalculated based on other criteria such as costs, mileage, fuel efficiency... | |
| 3.8 | Performance Efficiency | Time Behaviour | Route planning and optimization must be completed under 1 minute. | |
| 3.9 | If the calculation process spans beyond the limited time, an error is displaying prompting for a refresh of the system. | |
| 3.10 | Usability | Learnability | The route planning and optimization function is easy to understand for end-users.  At least 90% of users can use the function under 2 minutes on the first time. | |
| 3.11 | Operability | The route planning and optimization function is clear enough to allow at least 95% of test users to use without any difficulties. | |
| 3.12 | Instructions on how to use this feature are displayed the first time the user uses this feature; additional help can be requested via email. | |
| 3.13 | Security | Confidentiality | Data on carrier’s route and gathered information must be encrypted with SSL/TLS and appropriate encryption method both at rest and in transit. | |
| 3.14 | Integrity | The feature must implement security measures such as access control, data validation, or checksum to prevent route data from being modified. | |
| **Sprint 4: Inventory Management – Billing and Invoicing** | | | | |
| 4.1 | Functionality Suitability | Functional Completeness | Inventory tracking functionality in warehouses and during transportation is implemented | |
| 4.2 | Reconciliation function using barcode or RFID is implemented. | |
| 4.3 | Daily batch job on inventory is implement and alerts are sent when needed. | |
| 4.4 | Billing structure on currently format is supported | |
| 4.5 | Invoices are automatically generated based on shipment data and predefined billing rules. | |
| 4.6 | Functional Correctness | Reconciliation process for inventory levels is performed 100% correctly. | |
| 4.7 | Billing and invoices are calculated 100% correctly. | |
| 4.8 | Performance Efficiency | Time Behaviour | Inventory levels are examined daily after predefined time, data is updated under 5 minutes. | |
| 4.9 | Billing and invoices are done under 5 minutes. | |
| 4.10 | Security | Confidentiality | Data on inventory levels and inventory must be encrypted both in transit and at rest. | |
| 4.11 | Billing and invoices must be encrypted both in transit and at rest. | |
| **Sprint 5: Data Analytics and Reporting** | | | | |
| 5.1 | Functionality Suitability | Functional Completeness | Mechanisms to summarize key metrics from order, carrier, inventory, shipment, and other relevant reports are implemented. | |
| 5.2 | The collected data is stored adequately in the TMS’s database. | |
| 5.3 | Algorithms are implemented to identify trends and patterns from the collected data. | |
| 5.4 | Data visualization tools are integrated to create visualizations that illustrate business trends. | |
| 5.5 | The TMS can generate a report in .pdf format summarizing metrics related to logistical operations and carrier performance. | |
| 5.6 | Daily backup for data in the TMS is implemented. | |
| 5.7 | Functional Correctness | Collected data are correctly visualized and updated with delays under 1 hour. | |
| 5.8 | Performance Efficiency | Capacity | The reporting and analytics feature must be able to handle large volumes of data and scale up or down when necessary | |
| 5.9 | Resource Utilization | Dashboards are integrated to provide system administrators and executives with insights into business trends. | |
| 5.10 | Security | Confidentiality | The dashboard’s data and visualization must be encrypted in transit to prevent data leaks. | |
| 5.11 | Maintainability | Modifiability | The TMS is designed to automatically scale to handle increasing data volume and includes a scheduled daily backup to prevent data loss. | |
| **Sprint 6: Security and Further Support** | | | | |
| 6.1 | Functionality Suitability | Functional Completeness | The security and compliance aspects of the software meets all requirements specified by the stakeholders such as encryption in transit for uploading data, encryption at rest for data on database. | |
| 6.2 | Password policies with complexity and MFA are implemented to enhance system security. | |
| 6.3 | User management interface allows administrator to perform various actions on roles and identities across the system. | |
| 6.4 | Training materials, manuals, and guidelines are prepared for smooth transition. | |
| 6.5 | Maintenance plan and staff allocation to the new system are made to further support the initial operation of the new TMS. | |
| 6.6 | Functional Correctness | Penetration testing and internal audit are done periodically to ensure regulation and security compliance. | |
| 6.7 | Roles and Identities are audited semi-annually to access appropriateness of IAM policy. | |
| 6.8 | Usability | Learnability | Training materials regarding security procedures, new TMS operations are logically structured for all staff. | |
| 6.9 | Practical drills are performed annually with at least 75% satisfaction among all criteria. | |