<center>**PROJECT PROPOSAL**</center>

<center>**LOGISTICAL TRANSPORT MANAGEMENT SYSTEM (TMS)**</center>

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 must be replicated across at least 2 regions, scaling on demand must 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.