SOFTWARE REQUIREMENT SPECIFICATION

1. Introduction

1.1 Purpose

The purpose of this Software Requirements Specification (SRS) document is to detail the functional and non-functional requirements for the Real-Time Supply Chain Visibility Platform. This platform will provide centralized visibility into shipments, inventory levels, and overall supply chain operations, enabling real-time data exchange, improving decision-making, and enhancing efficiency.

1.2 Scope

The Real-Time Supply Chain Visibility Platform will be a centralized system that integrates with internal ERP, WMS, and external partners' (suppliers and carriers) systems. It will provide features such as real-time shipment tracking, automated inventory management, data integration, reporting, and notifications. This document will define the platform's software functionality, performance requirements, interface requirements, and system attributes.

1.3 Definitions, Acronyms, and Abbreviations

- **API:** Application Programming Interface
- **ERP:** Enterprise Resource Planning
- **WMS:** Warehouse Management System
- **EDI:** Electronic Data Interchange
- **SLA:** Service Level Agreement
- **ETA:** Estimated Time of Arrival

1.4 References

- Business Requirements Document (BRD) for Real-Time Supply Chain Visibility Platform
- API Documentation Standards (OAuth 2.0, RESTful APIs)
- Industry Standards (ISO 27001 for security, GDPR for data privacy)

1.5 Overview

This SRS document provides a detailed description of the system's functional and non-functional requirements, interface designs, performance

expectations, data management, security, and operational constraints.

2. System Overview

The Real-Time Supply Chain Visibility Platform aims to centralize and automate the tracking of shipments and inventory. The system will integrate with various internal and external systems to provide real-time visibility across the supply chain, delivering insights and alerts to users and improving operational efficiencies.

3. Functional Requirements

3.1 Shipment Tracking and Management

- **3.1.1 Shipment Data Collection:**
    - The system must collect real-time shipment data from external carriers using APIs.

    - The system must support batch processing for carriers that do not support real-time updates via EDI.
- **3.1.2 Shipment Status Updates:**
    - The platform will automatically update shipment statuses, including in-transit, delayed, and delivered.
    - Users should be able to view detailed shipment information, including origin, destination, content, and ETA.
- **3.1.3 Exception Handling:**
    - The platform must automatically identify and flag delayed shipments.
    - Users should receive real-time notifications for exceptions such as delays or route deviations.

3.2 Inventory Management

- **3.2.1 Inventory Data Collection:**
    - The system will collect real-time inventory data from internal WMS and ERP systems.

    - The system must automatically adjust inventory levels after each shipment is received or dispatched.
- **3.2.2 Monitor Inventory Levels:**
    - The system must track real-time inventory levels across all warehouses and suppliers.
    - The platform must trigger alerts when stock levels fall below predefined thresholds.
- **3.2.3 Reorder Management:**
    - The platform will automatically trigger reorder notifications when inventory reaches minimum levels.
    - Users must be able to set reorder rules based on stock levels, forecast demand, or sales velocity.

3.3 Integration with External Systems

- **3.3.1 API Integration:**
    - The system must support RESTful API integration with external carriers for real-time data exchange.

    - The system must use secure authentication methods (OAuth 2.0) for external data exchange.
- **3.3.2 EDI Integration:**
    - For carriers using legacy systems, the platform must support batch data transfer via EDI.
- **3.3.3 Data Validation:**
    - The system must validate incoming data from external sources to ensure accuracy and consistency before updating the database.

3.4 Data Processing and Management

- **3.4.1 Data Storage:**
    - All shipment, inventory, and partner data must be stored in a structured database.
    - The system must support data retention for at least 7 years for regulatory compliance.
- **3.4.2 Data Cleansing:**
    - The system must have mechanisms to automatically clean, validate, and remove duplicates from incoming data.

- **3.4.3 Historical Data Management:**
  - Users must be able to access and query historical shipment and inventory data for reporting and compliance purposes.

3.5 Reporting and Analytics

- **3.5.1 Real-Time Dashboards:**
  - The platform must provide real-time dashboards displaying shipment status, inventory levels, and key performance indicators (KPIs).
- **3.5.2 Report Generation:**
  - Users must be able to generate custom reports on supply chain performance, shipment history, and inventory levels.
  - The system must support exporting reports in multiple formats (Excel, PDF, CSV).

3.6 Notifications and Alerts

- **3.6.1 Real-Time Alerts:**

    - The platform must send real-time alerts for shipment delays, inventory thresholds, and system exceptions.
- **3.6.2 Customizable Alerts:**
    - Users must be able to configure and customize alerts based on shipment status, inventory levels, and supply chain performance metrics.

3.7 User Management and Security

- **3.7.1 Authentication and Access Control:**
    - The platform must implement multi-factor authentication (MFA) for user login.
    - The system must enforce role-based access control (RBAC) to restrict data access based on user roles.
- **3.7.2 Audit Trails:**
    - The system must log all user activity, including data access, changes, and administrative actions.

4. Non-Functional Requirements

4.1 Performance Requirements

- **4.1.1 System Uptime:**
  - The platform must have an uptime of 99.9% to ensure business continuity.
- **4.1.2 Data Processing Speed:**
  - Real-time data updates must be reflected in the system within 2 minutes of the event occurrence.

4.2 Scalability

- **4.2.1 User Scalability:**
  - The system must support up to 1,000 concurrent users without performance degradation.
- **4.2.2 Data Scalability:**
  - The platform must be scalable to accommodate data growth over the next 10 years, including increased shipment and inventory data.

4.3 Security

- **4.3.1 Data Security:**
  - The system must comply with industry-standard data security protocols, including ISO 27001, to protect sensitive supply chain information.
- **4.3.2 Data Encryption:**
  - All data exchanged between the platform and external systems must be encrypted using industry-standard encryption protocols (e.g., TLS 1.2).

4.4 Usability

- **4.4.1 User Interface:**
  - The platform must have an intuitive user interface that minimizes the learning curve for end-users.
- **4.4.2 Training and Support:**
  - The system should provide in-app tutorials and guides for new users.
  - Dedicated support must be available for post-implementation troubleshooting.

5. System Interface Requirements

5.1 User Interface (UI) Requirements

- **5.1.1 Dashboard Interface:**
  - The platform must provide an interactive dashboard where users can view shipment status, inventory levels, and KPIs in real-time.
- **5.1.2 Report Interface:**
  - The platform must provide an easy-to-use report generation interface where users can create, customize, and export reports.

5.2 External System Interfaces

- **5.2.1 Carrier API Integration:**
  - The system must expose secure APIs for real-time data exchange with external carriers and suppliers.
- **5.2.2 ERP and WMS Integration:**
  - The platform must integrate with internal ERP and WMS systems to synchronize shipment and inventory data.

6. Database Requirements

6.1 Database Structure

- **6.1.1 Transactional Data:**
  - The database must store all transactional data, including shipment status, inventory levels, and partner data.
- **6.1.2 Historical Data:**
  - The system must store historical data for reporting and compliance purposes, with a retention period of 7 years.

6.2 Data Backup and Recovery

- **6.2.1 Backup Frequency:**
  - The system must perform daily backups to ensure data recovery in case of failure.
- **6.2.2 Data Recovery:**
  - The platform must have a data recovery plan to restore operations within 4 hours of a system failure.

7. Transition Requirements (continued)

7.1 Data Migration

- **7.1.1 Data Conversion:**
  - Data from existing manual systems, spreadsheets, and legacy platforms (e.g., ERP, WMS, and external carrier systems) must be accurately migrated to the new real-time visibility platform. This includes historical shipment records, inventory data, and partner details.
  - A data cleansing process must be in place to remove duplicates, resolve inconsistencies, and ensure data accuracy before migration.
- **7.1.2 Data Migration Plan:**
  - A detailed migration plan must be developed to ensure minimal downtime and smooth transition from the old systems to the new platform.
  - The migration must include a comprehensive testing phase to verify data integrity post-migration.

- **7.1.3 Data Validation:**
  - Post-migration, data validation checks must be conducted to ensure that the migrated data is accurate and aligns with the new system's formats and structures.

7.2 User Training

- **7.2.1 Training Sessions:**
  - Training sessions must be conducted for all end-users, including supply chain managers, warehouse staff, and administrative personnel.
  - Training should focus on key functionalities such as shipment tracking, inventory management, reporting, and dashboard customization.
- **7.2.2 Training Materials:**
  - Detailed user manuals, quick start guides, and video tutorials must be provided to help users familiarize themselves with the new platform.

    - In-app support tools, such as tooltips and contextual help, should be embedded within the system to assist users.
- **7.2.3 Post-Deployment Support:**
    - A helpdesk or support team must be available post-implementation to address any issues or questions during the platform adoption phase.
    - Ongoing training should be available for new hires or as the system undergoes updates.

7.3 System Rollout

- **7.3.1 Phased Rollout:**
    - A phased rollout plan should be developed, starting with pilot testing in select locations or departments (e.g., a specific warehouse or region) before company-wide deployment.
    - Feedback from the pilot phase should be collected and incorporated into the final system deployment.
- **7.3.2 Parallel Run:**

    - During the transition, a parallel run (where the old and new systems operate simultaneously) may be implemented to mitigate risks and ensure business continuity.
- **7.3.3 Change Management:**
    - A change management plan must be developed to ensure user buy-in and to minimize resistance to the new system.
    - Clear communication regarding system benefits, training timelines, and expected outcomes should be maintained throughout the transition.

8. Data Dictionary

- **ShipmentID:** Unique identifier for each shipment in the system.
- **OrderID:** Unique identifier for customer orders associated with shipments.
- **ProductID:** Unique identifier for each product being tracked.

- **LocationCode:** Unique code representing a warehouse, distribution center, or storage facility.
- **ETA (Estimated Time of Arrival):** The predicted time at which the shipment is expected to reach its destination.
- **Status:** Current status of the shipment (e.g., In Transit, Delivered, Delayed).
- **InventoryLevel:** Current stock level of a product at a specific location.
- **SupplierID:** Unique identifier for suppliers involved in the supply chain.
- **CarrierID:** Unique identifier for carriers transporting goods in the supply chain.

9. Project Risks

- **Risk 1: Delays in Integration with External Partners**
  - **Impact:** Delayed data exchange with suppliers and carriers could affect real-time visibility and platform effectiveness.

    - **Mitigation:** Conduct early assessments of external systems and establish clear timelines and Service Level Agreements (SLAs).
- **Risk 2: Inaccurate Data Migration**
    - **Impact:** Data inconsistencies during migration may lead to errors in shipment tracking and inventory management.
    - **Mitigation:** Implement thorough data cleansing and validation processes before, during, and after migration.
- **Risk 3: User Resistance to New System**
    - **Impact:** Resistance to adopting the new platform may lead to poor user engagement and system underutilization.
    - **Mitigation:** Provide comprehensive training and clear communication on system benefits to ensure user buy-in.
- **Risk 4: API Failure or Security Breach**
    - **Impact:** External API failures or data breaches during integration could

compromise real-time data availability and security.
    - **Mitigation:** Implement robust encryption protocols and continuous API monitoring to detect and address failures.

10. Project Dependencies

- **Dependency 1:** Availability of APIs or data exchange mechanisms from external carriers and suppliers.
- **Dependency 2:** Internal system upgrades (ERP, WMS) must be completed to support integration.
- **Dependency 3:** Vendor cooperation is required for timely delivery of hardware and software components.
- **Dependency 4:** Compliance with data privacy and security regulations, such as GDPR or industry-specific standards.

11. Project Issues

- **Issue 1: Carrier Systems Incompatibility**
  - Some external carriers may use legacy systems incompatible with the real-time API, necessitating batch processing.
  - **Resolution:** Implement both real-time API integration and batch processing via EDI for legacy systems.
- **Issue 2: Data Inconsistency Across Partners**
  - Different data formats from external partners may cause discrepancies in shipment tracking and inventory records.
  - **Resolution:** Develop data normalization and validation processes to standardize incoming data from all partners.

12. Project Constraints

- **Constraint 1:** The project must be completed within a 12-month timeline to avoid operational disruptions.

- **Constraint 2:** The budget is limited to $2 million, and any scope expansion must be carefully evaluated for impact on costs.
- **Constraint 3:** Compliance with regulatory and industry standards (e.g., ISO 27001, GDPR) must be maintained throughout the project.

13. Project Assumptions

- **Assumption 1:** All external partners (suppliers, carriers) will cooperate in integrating their systems with the new platform.
- **Assumption 2:** The technical resources required for development, integration, and implementation will be available as scheduled.
- **Assumption 3:** No significant changes to regulatory requirements (such as data privacy laws) will occur during the project timeline.

14. Glossary

- **API (Application Programming Interface):** A set of protocols that allow different software applications to communicate with each other.
- **EDI (Electronic Data Interchange):** The electronic exchange of business documents in a standardized format between trading partners.
- **ERP (Enterprise Resource Planning):** Software systems that integrate business processes such as supply chain, inventory, and finance.
- **WMS (Warehouse Management System):** A software system designed to optimize warehouse operations, including inventory tracking and management.
- **Real-Time Supply Chain Visibility:** The ability to monitor and track the movement of goods and materials across the entire supply chain in real-time.

15. Appendix

- **A.1:** Detailed Migration Plan (Attachment)

- **A.2:** API Documentation (Attachment)
- **A.3:** User Training Materials (Attachment)