

Software Requirements Specification (SRS)

WhatsApp Package Notification System

Version: 1.0

Date: December 4, 2025

Prepared for: Shipping Company - Import Services Division

1. Introduction

1.1 Purpose

This document specifies the requirements for a WhatsApp-integrated notification system designed to improve customer engagement and reduce missed notifications for package arrival at a shipping company that handles import services for customers.

1.2 Document Conventions

- **High Priority:** Critical features required for initial launch
- **Medium Priority:** Important features for operational efficiency
- **Low Priority:** Nice-to-have features for future enhancement

1.3 Intended Audience

This document is intended for developers, project managers, QA testers, shipping company staff, and system administrators.

1.4 Project Scope

The system will replace or supplement existing Gmail and SMS notification channels with WhatsApp messaging to notify customers when their imported packages arrive at the company's facility, and to collect delivery preferences.

2. Overall Description

2.1 Product Perspective

The WhatsApp Package Notification System is a new, standalone system that will integrate with:

- Existing customer database/CRM system
- Package tracking/inventory management system
- WhatsApp Business API
- Optional: Existing email and SMS systems for multi-channel communication

2.2 Product Functions

The system shall provide the following key functions:

- Automated WhatsApp notifications when packages arrive
- Bulk messaging capability for multiple customers
- Targeted messaging to specific customers
- Collection of customer delivery preferences
- Tracking of message delivery status and customer responses
- Management dashboard for staff operations

2.3 User Classes and Characteristics

Primary Users:

- **Shipping Company Staff:** Operators who manage package arrivals and trigger notifications
- **System Administrator:** Technical staff managing system configuration and maintenance
- **Customers:** End-users receiving notifications about their packages

User Expertise Levels:

- Staff: Basic to intermediate computer literacy
- Customers: Basic smartphone/WhatsApp usage skills

2.4 Operating Environment

- **Server-side:** Cloud-based infrastructure (AWS, Azure, or Google Cloud)
- **Client-side (Staff):** Web-based interface accessible via modern browsers (Chrome, Firefox, Safari, Edge)
- **Client-side (Customers):** WhatsApp mobile application
- **API Integration:** WhatsApp Business API

2.5 Design and Implementation Constraints

- Must comply with WhatsApp Business API policies and rate limits
- Must adhere to data protection regulations (GDPR, local privacy laws)
- Must integrate with existing customer database without disrupting current operations
- Maximum message sending rate determined by WhatsApp API tier
- Requires valid WhatsApp Business Account approval

2.6 Assumptions and Dependencies

- Customers have provided valid phone numbers with country codes

- Customers have WhatsApp installed and active accounts
 - Company has or will obtain WhatsApp Business API access
 - Existing customer database is accessible via API or database connection
 - Internet connectivity is reliable at company facility
-

3. System Features

3.1 Package Arrival Registration

Priority: High

Description: Staff can register when a package arrives in the system.

Functional Requirements:

- FR-1.1: System shall allow staff to input or scan package tracking numbers
- FR-1.2: System shall match tracking numbers with customer records
- FR-1.3: System shall retrieve customer phone numbers from database
- FR-1.4: System shall validate phone number format (international format required)
- FR-1.5: System shall display customer details for verification before notification

3.2 Automated WhatsApp Notification Sending

Priority: High

Description: System automatically sends WhatsApp messages to customers when packages arrive.

Functional Requirements:

- FR-2.1: System shall compose notification messages with package details (tracking number, description, arrival date)
- FR-2.2: System shall send WhatsApp messages via WhatsApp Business API
- FR-2.3: System shall support message templates approved by WhatsApp
- FR-2.4: System shall include delivery preference options (home delivery or pickup)
- FR-2.5: System shall handle message sending failures with retry logic
- FR-2.6: System shall log all message sending attempts with timestamps

3.3 Bulk Messaging Capability

Priority: High

Description: Staff can send notifications to multiple customers simultaneously.

Functional Requirements:

- FR-3.1: System shall allow selection of multiple packages/customers for batch notification
- FR-3.2: System shall queue messages to comply with WhatsApp rate limits
- FR-3.3: System shall display estimated completion time for bulk operations
- FR-3.4: System shall show progress indicator during bulk sending
- FR-3.5: System shall generate summary report after bulk operation completion

3.4 Targeted Messaging

Priority: Medium

Description: Staff can send notifications to specific customers or groups based on criteria.

Functional Requirements:

- FR-4.1: System shall support filtering customers by arrival date, package type, or delivery status
- FR-4.2: System shall allow manual selection of individual customers
- FR-4.3: System shall support custom message content for specific scenarios
- FR-4.4: System shall preview selected recipients before sending

3.5 Response Collection and Tracking

Priority: High

Description: System collects and manages customer responses regarding delivery preferences.

Functional Requirements:

- FR-5.1: System shall receive incoming WhatsApp messages from customers
- FR-5.2: System shall parse customer responses for delivery preference keywords ("deliver," "pickup," "collect," etc.)
- FR-5.3: System shall support interactive message buttons for delivery options
- FR-5.4: System shall update package status based on customer response
- FR-5.5: System shall flag packages requiring follow-up if no response received within configurable timeframe
- FR-5.6: System shall allow staff to manually update response status

3.6 Delivery Status Management Dashboard

Priority: High

Description: Staff interface for monitoring notifications and customer responses.

Functional Requirements:

- FR-6.1: System shall display list of all packages with notification status
- FR-6.2: System shall show message delivery status (sent, delivered, read, failed)
- FR-6.3: System shall indicate customer response status (pending, delivery requested, pickup requested)
- FR-6.4: System shall provide search and filter capabilities
- FR-6.5: System shall support export of notification reports to CSV/Excel
- FR-6.6: System shall display conversation history for each customer

3.7 Message Template Management

Priority: Medium

Description: Administrators can manage WhatsApp message templates.

Functional Requirements:

- FR-7.1: System shall allow creation of message templates with variable fields
- FR-7.2: System shall support multiple language templates
- FR-7.3: System shall validate templates against WhatsApp Business API requirements
- FR-7.4: System shall submit templates for WhatsApp approval
- FR-7.5: System shall track template approval status

3.8 User Authentication and Authorization

Priority: High

Description: Secure access control for staff and administrators.

Functional Requirements:

- FR-8.1: System shall require username and password authentication
- FR-8.2: System shall support role-based access control (Administrator, Staff, Viewer)
- FR-8.3: System shall enforce password complexity requirements
- FR-8.4: System shall log all user actions for audit purposes
- FR-8.5: System shall support session timeout after inactivity

3.9 Reporting and Analytics

Priority: Medium

Description: Generate insights on notification performance and customer engagement.

Functional Requirements:

- FR-9.1: System shall track notification delivery rates
- FR-9.2: System shall measure customer response rates
- FR-9.3: System shall calculate average response time
- FR-9.4: System shall generate daily/weekly/monthly summary reports
- FR-9.5: System shall provide comparison with previous notification methods (email/SMS)

3.10 AI-Powered Chatbot for Customer Service

Priority: Medium

Description: Automated conversational interface to handle common customer inquiries without human intervention.

Functional Requirements:

- FR-10.1: System shall provide 24/7 automated responses to customer inquiries via WhatsApp
- FR-10.2: Chatbot shall answer frequently asked questions including:
 - Company location and operating hours
 - Package tracking status
 - Delivery fees and timelines
 - Import procedures and requirements
 - Customs clearance information
 - Payment methods accepted
 - Contact information for specific departments
- FR-10.3: Chatbot shall recognize customer intent from natural language queries
- FR-10.4: System shall maintain conversation context across multiple messages
- FR-10.5: Chatbot shall support multiple languages (configurable based on customer base)
- FR-10.6: System shall provide quick reply buttons for common inquiries
- FR-10.7: Chatbot shall seamlessly escalate complex queries to human agents
- FR-10.8: System shall trigger human agent notification when escalation is needed
- FR-10.9: Chatbot shall provide package tracking information when customer provides tracking number
- FR-10.10: System shall log all chatbot interactions for quality improvement
- FR-10.11: Chatbot shall identify returning customers and personalize responses
- FR-10.12: System shall allow administrators to update chatbot knowledge base without coding

Escalation Triggers:

- Customer explicitly requests human assistance
 - Query involves complaints or disputes
 - Customer expresses frustration (sentiment analysis)
 - Chatbot confidence level falls below threshold (e.g., 70%)
 - Financial transactions or payment issues
 - Sensitive personal information changes
 - After 3 unsuccessful attempts to resolve query
-

4. External Interface Requirements

4.1 User Interfaces

- **Web Dashboard:** Responsive design supporting desktop and tablet devices
- **Minimum Screen Resolution:** 1280x720
- **Navigation:** Intuitive menu structure with clear labeling
- **Accessibility:** WCAG 2.1 Level AA compliance

4.2 Hardware Interfaces

- None specific; standard server and network infrastructure required

4.3 Software Interfaces

SI-1: WhatsApp Business API

- Protocol: HTTPS REST API
- Data Format: JSON
- Authentication: API key/token-based
- Purpose: Send and receive WhatsApp messages

SI-2: Customer Database/CRM

- Protocol: Database connection (MySQL, PostgreSQL) or REST API
- Data Format: SQL queries or JSON
- Purpose: Retrieve customer contact information and package details

SI-3: Package Tracking System

- Protocol: REST API or database connection

- Data Format: JSON or SQL
- Purpose: Retrieve package arrival information

4.4 Communication Interfaces

- **HTTPS:** All web communications encrypted via TLS 1.2 or higher
 - **Webhook Support:** For receiving incoming WhatsApp messages
 - **Email (Optional):** For system alerts and reports to administrators
-

5. Non-Functional Requirements

5.1 Performance Requirements

- NFR-1.1: System shall send individual WhatsApp messages within 5 seconds of trigger
- NFR-1.2: System shall support minimum 100 messages per minute (subject to WhatsApp API limits)
- NFR-1.3: Dashboard shall load within 3 seconds under normal network conditions
- NFR-1.4: System shall support at least 50 concurrent staff users
- NFR-1.5: Database queries shall return results within 2 seconds for typical operations

5.2 Safety Requirements

- NFR-2.1: System shall implement automatic data backup every 24 hours
- NFR-2.2: System shall maintain audit logs for minimum 12 months
- NFR-2.3: System shall prevent accidental deletion of customer data with confirmation prompts

5.3 Security Requirements

- NFR-3.1: All customer data shall be encrypted at rest using AES-256
- NFR-3.2: All data transmission shall use TLS 1.2 or higher
- NFR-3.3: System shall implement protection against SQL injection and XSS attacks
- NFR-3.4: System shall enforce principle of least privilege for all user roles
- NFR-3.5: System shall mask sensitive customer information in logs
- NFR-3.6: System shall comply with applicable data protection regulations

5.4 Software Quality Attributes

Reliability:

- System uptime target: 99.5% during business hours
- Mean Time Between Failures (MTBF): Minimum 720 hours

- Maximum data loss in case of failure: 1 hour of transactions

Availability:

- System shall be available 24/7 with planned maintenance windows announced 48 hours in advance
- Maximum planned downtime: 4 hours per month

Maintainability:

- Code shall follow established coding standards and include inline documentation
- System shall generate detailed error logs for troubleshooting
- System architecture shall support modular updates without full system restart

Usability:

- Staff shall be able to send notifications with maximum 5 clicks
- New staff members shall complete basic operations training within 2 hours
- System shall provide helpful error messages and guidance
- Chatbot response time shall be under 2 seconds for standard queries

Scalability:

- System architecture shall support scaling to 10,000 customers without redesign
- System shall handle 5x current message volume during peak seasons
- Chatbot shall handle minimum 100 concurrent conversations

Chatbot Accuracy:

- Chatbot shall achieve minimum 85% accuracy in intent recognition
- Chatbot shall provide correct answers to FAQ queries 90% of the time
- System shall continuously improve through machine learning from interactions

6. Other Requirements

6.1 Database Requirements

- Customer contact information (name, phone number, email)
- Package details (tracking number, description, arrival date, weight, declared value)
- Notification history (message content, timestamp, delivery status)
- Customer responses (response text, timestamp, parsed preference)

- User accounts and permissions

6.2 Internationalization Requirements

- System shall support multiple languages for message templates
- System shall handle international phone number formats
- System shall accommodate different date/time formats

6.3 Legal and Regulatory Requirements

- System shall comply with WhatsApp Business Policy
- System shall obtain customer consent for WhatsApp communications
- System shall provide opt-out mechanism for customers
- System shall comply with local telecommunications regulations

6.4 Training Requirements

- User manual for staff operations
 - Administrator guide for system configuration
 - Video tutorials for common tasks
 - On-site training session for initial deployment
-

7. Appendix

7.1 Glossary

- **WhatsApp Business API:** Official API provided by Meta for business communication
- **Rate Limit:** Maximum number of messages allowed per time period
- **Message Template:** Pre-approved message format required by WhatsApp for notifications
- **Webhook:** HTTP callback that receives real-time updates

7.2 Sample Message Templates

Template 1: Package Arrival Notification

Hello [Customer Name],

Good news! Your package with tracking number [Tracking Number] has arrived at our facility.

Package Details:

- Description: [Package Description]
- Arrival Date: [Date]

Please let us know your preference:

1. Home Delivery
2. Pickup from our office

Reply with your choice or contact us at [Company Phone].

[Company Name]

Template 2: Delivery Confirmation

Hello [Customer Name],

Thank you for your response. We confirm your request for [Delivery Type] for package [Tracking Number].

Expected [Delivery/Pickup] Date: [Date]

For questions, contact us at [Company Phone].

[Company Name]

7.3 Open Issues

- Final decision on fallback notification method if WhatsApp delivery fails
- Integration approach if multiple package tracking systems exist
- Customer consent collection mechanism for existing customers
- Multi-language support priority and languages to include
- Selection of chatbot AI engine (rule-based vs. machine learning vs. hybrid approach)
- Chatbot training data collection and quality assurance process

7.4 Chatbot Sample Interactions

Interaction 1: Location Inquiry

Customer: Where is your office located?

Chatbot: We're located at [Company Address].

Our office hours are:

Monday - Friday: 8:00 AM - 5:00 PM

Saturday: 9:00 AM - 2:00 PM

Sunday: Closed

Would you like directions or need anything else?

Interaction 2: Package Tracking

Customer: How can I check my package status?

Chatbot: I can help you check your package status!

Please provide your tracking number (e.g., TRK123456789).

Or you can:

1. Check status online at [website]
2. Speak with an agent

What would you prefer?

Interaction 3: Delivery Fees

Customer: How much does delivery cost?

Chatbot: Our delivery fees depend on your location:

Within city: GHS 50

Suburbs: GHS 80-120

Other regions: Based on distance

Package weight and size may also apply. Would you like:

1. Specific quote for your address
2. Speak with our delivery team
3. Other questions

Interaction 4: Escalation Example

Customer: My package was damaged!

Chatbot: I'm sorry to hear about the damage to your package. This requires immediate attention from our customer service team.

I'm connecting you with an agent now who will assist you with filing a claim and resolving this issue.

An agent will respond within 5 minutes during business hours.

Your reference number: [Auto-generated ID]

Document Approval

Role	Name	Signature	Date
Project Sponsor			
Project Manager			
Lead Developer			
QA Manager			

Revision History

Version	Date	Author	Description
1.0	2025-12-04	[Author]	Initial SRS document