

ORTHOPEDIC MEDICAL SUPPLIES MANAGEMENT SYSTEM

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01

PROBLEM DESCRIPTION

Problem description

Why Focus on Orthopedic Inventory?

- Complex Inventory:
 - Handling diverse consumables (implants, sutures, sterilized gauze, surgical instruments).
- Current Limitations:
 - Reliance on manual entry or simple spreadsheets.
 - Fragmented management systems in small-to-medium hospitals.
- Consequences:
 - Operational inefficiencies.
 - Compromised patient safety.
 - Lack of administrative transparency.

Problem description

Challenges

1. Cost Inefficiency:

- Overstocking, expired items, and duplicate orders lead to waste.

2. Operational Delays:

- Lack of real-time stock info causes delays in surgeries and treatments.

3. Low Data Reliability:

- Manual data entry errors and absence of automated workflows reduce traceability.

4. Lack of Transparency:

- No structured approval process for high-cost/high-risk items.

Digital Transformation

Goal:

- Replace manual/fragmented methods with a Web-Based Integrated Solution.

Core Objectives:

- **Real-time Visibility:** Instant tracking of stock levels and expiration dates.
- **Cost Efficiency:** Minimizing waste and optimizing stock levels.
- **Audit Readiness:** Enforcing approval workflows and maintaining reliable audit logs.

Target:

- Optimized for adoption by small- and medium-sized orthopedic hospitals.

Problem description

System Actors & Roles

Nurse (Dual Role)

- General Role: Handles inbound/outbound ops, monitors expirations, requests items.
- Inventory Admin (Senior): Manages policies, adjustments, and reporting/auditing.

Doctor

- Approval Authority: Approves or rejects requests for high-cost or high-risk consumables (e.g., specific implants).

System (Automated)

- Automation: Generates alerts for low stock and expiration dates.
- Logging: Automatically maintains audit logs for all transactions.

Expected Value & Impact

- Ensures Patient Safety through strict expiration management.
- Maximizes Operational Efficiency via automation.
- Establishes Transparency with data-driven decision-making.
- "A reliable standard for orthopedic inventory management."

02

FR SPECIFICATION

FR Specification

ID	Requirement	Acceptance Criteria (AC)
FR-01	Item Registration / Query / Update	Each item must have a unique itemCode (e.g., ITEM-2025-0001) and include details such as category, specification, expiration date, storage location, and Approval policy (e.g. general, high cost, high risk), minimum stock quantity (minQuantity). The system must support create, update, and delete operations.
FR-02	Inbound / Outbound Record Management	All inventory movements should be recorded at the lotNumber level. The system should allow all transaction history inquiry including warehousing, shipping, stock adjustment (e.g. disposal, due diligence, damage).
FR-03	Electronic Approval Workflow	The approval process must follow the sequence: Request → Approve/Reject → Disbursement. Disbursement is not permitted before approval. Each stage must be logged.
FR-04	Automated Approval Criteria	The system shall trigger the approval workflow strictly based on the 'Approval Policy' attribute (e.g., 'Approval Required' or 'Auto-Approval') explicitly configured for each item by the administrator. The system must not permit disbursement of items marked as 'Approval Required' without a doctor's electronic signature.
FR-05	Role-Based Access Control (RBAC)	Roles include Doctor (approval), Nurse (request), Inventory Manager (inbound/outbound), and Admin (policy management). Screen and API access must be restricted by role.
FR-06	Approval Notification	When the request, approval, or disbursement status changes, the system must send a notification via the UI to the relevant users.
FR-07	Audit Log History	All operations such as requests, approvals, and disbursements must be recorded with user, timestamp, action, result, and reason. Logs must be immutable.

FR Specification

ID	Requirement	Acceptance Criteria (AC)
FR-08	Statistics and Report Generation	<p>The system must visualize key operational indicators using specific chart types and provide data export capabilities.</p> <p>AC-8.1: Inbound/Outbound Trend (Grouped Bar Chart) The dashboard shall display a Grouped Bar Chart showing the monthly volume of Inbound (Blue) vs. Outbound (Green) items for the last 6 months.</p> <p>AC-8.2: Approved Workflow Status (Pie Chart) The dashboard shall display a Pie Chart representing the distribution of current approval statuses (e.g., Rejected, Pending, Approved, Outbound Completed) to identify bottlenecks.</p> <p>AC-8.3: Monthly Usage Trend (Vertical Bar Chart) The system shall provide a Vertical Bar Chart illustrating the total quantity of items used on a monthly basis over the selected period (e.g., last 11 months).</p> <p>AC-8.4: Approval Duration Trend (Line Chart) The system shall visualize the average time required for approval processing using a Line Chart, tracking efficiency changes over months.</p> <p>AC-8.5: Approved vs. Rejected Count (Grouped Bar Chart) The system shall display a Grouped Bar Chart comparing the count of Approved vs. Rejected requests monthly to monitor rejection rates.</p> <p>AC-8.6: Usage by Category (Donut/Pie Chart) The system shall visualize the proportion of inventory usage by item category (e.g., General, Syringes, High Risk) using a Donut or Pie Chart.</p> <p>AC-8.7: Data Export Users must be able to export the visualized data and underlying tables via the "Export CSV" or "PDF Report" buttons located on the dashboard header</p>

FR Specification

ID	Requirement	Acceptance Criteria (AC)
FR-09	Administration Tools	<p>The system shall provide tools for managing item policies, categories, and user permissions. All changes must be recorded in history logs.</p>
FR-10	Low Stock Alert Based on Safety Stock (minQuantity)	<p>The system must detect and notify users when an item's stock level falls below the defined minimum safety stock quantity (minQuantity).</p> <p>AC-10.1: The administrator must be able to set and modify each item's minimum safety stock quantity during item registration (FR-01) or via the management tool (FR-09).</p> <p>AC-10.2: Upon completion of an item's dispatch, if the total stock quantity of that item becomes equal to or less than the defined minimum safety stock quantity, the system must immediately send a "Low Stock" alert (via UI) to both the inventory manager (nurse) and the administrator.</p> <p>AC-10.3: On the inventory status screen, items with stock levels at or below the minimum safety stock quantity must be visually highlighted as "Low Stock" (e.g., with a red marker).</p>

FR Specification

ID	Requirement	Acceptance Criteria (AC)
FR-11	Item Registration / Query / Update	<p>The system must provide an inventory adjustment feature to reconcile discrepancies between actual stock and system-recorded stock.</p> <p>AC-11.1: The inventory manager (nurse) must be able to adjust the stock quantity for a specific lotNumber.</p> <p>AC-11.2: A reason code must be selected during adjustment (e.g., Disposal-Expired, Disposal-Damaged, Adjustment-Loss, Adjustment-PhysicalCount).</p> <p>AC-11.3: The adjusted quantity (increase or decrease) and a detailed comment explaining the reason must be entered as required fields.</p> <p>AC-11.4: All inventory adjustment records must be immediately logged in both the Movement record (FR-02) and the Audit Log (FR-07), and the change must be reflected in the current Lot quantity.</p>

FR Specification

ID	Requirement	Acceptance Criteria (AC)
FR-12	Real-Time Inventory Dashboard	<p>The system must provide a real-time dashboard that allows users to view key inventory and approval statuses across the entire hospital at a glance.</p> <p>AC-12.1: The dashboard must be displayed as the default screen upon login.</p> <p>AC-12.2: The dashboard must display the following four Key Performance Indicators (KPIs) in real time (NFR-09), each compared to the previous month:</p> <ol style="list-style-type: none">1. Total Inventory Items (vs last month)2. Pending Approvals (vs last month)3. This Month's Outbound Transactions (vs last month)4. Expiring Soon (within 30 days) (vs last month) <p>AC-12.3: The dashboard must include both the Inbound/Outbound Trend Chart and the Approval Workflow Status Chart as defined in FR-08.</p> <p>AC-12.4: When the user clicks on the Pending Approvals or Expiring Soon KPI widgets, the system must perform a drill-down navigation to the corresponding detailed list screens.</p> <p>AC-12.5: The dashboard must include item name search, notification view, and export (data download) functionalities.</p>

03

DOMAIN SPECIFICATION

Blueprint for System Logic & Operations

1. Scope & Definition

- Defines the comprehensive domain model including Key Entities, Business Rules, Constraints, and Relationships.
- Establishes the vocabulary and logic for the Orthopedic Medical Supplies Management System.

2. Strategic Focus

- Inventory Management: Lot-level traceability of consumables (Implants, Sutures, etc.).
- Approval Workflows: Structured control for high-cost and high-risk items.
- Audit Transparency: Ensuring accountability via immutable logging.

3. Purpose & Alignment

- Foundation: Acts as the basis for detailed requirement analysis and system architecture.
- Reality Check: Ensures the technical design aligns strictly with real-world hospital operations.

Domain Overview

1. Domain Scope

- Target: Orthopedic Hospital Operations.
- Managed Assets: Diverse consumables ranging from High-Value (Implants, Surgical Instruments) to General (Sutures, Gauze, Syringes).

2. Key Functional Pillars

- Item & Inventory Management
 - Lifecycle tracking from registration to disposal.
 - Lot-Level Traceability for all Inbound/Outbound transactions.
- Approval Workflow
 - Structured process for High-Cost/High-Risk item disbursement.
 - Enforces approval logic to prevent unauthorized usage.

• User Roles & Security

- RBAC (Role-Based Access Control): Distinct permissions for Doctors, Nurses, and Admins.
 - Ensures accountability and operational security.
- Monitoring & Intelligence
 - Real-time Alerts for low stock and expirations.
 - Immutable Audit Logs and statistical reporting.

3. System Transformation Goal

- Transition: Manual/Spreadsheet \rightarrow Integrated Web-Based Solution.
- Value: Real-time Visibility, Cost Efficiency, and Regulatory Compliance.
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Key Entities

1. Item (Master Data)

- Definition: Represents a specific type of medical supply.
- Key Attributes: itemCode (PK), category, approvalPolicy (High-Risk/Cost), minQuantity (Safety Stock).
- Operations: CRUD management (FR-01).

2. Lot (Traceability Unit)

- Definition: A specific batch of items for expiration & movement tracking.
- Key Attributes: lotNumber (PK), itemCode (FK), quantity, expirationDate, transactionType (Inbound/Outbound).
- Operations: Warehousing, Shipping, Damage recording (FR-02, FR-11).

3. Request (Initiation)

- Definition: A formal request for item disbursement by a Nurse.
- Key Attributes: requestID, lotNumber, requester (User ID), status (Pending/Approved), timestamp.
- Operations: Policy Check & Submission (FR-03, FR-04).

4. Approval (Decision)

- Definition: The authoritative decision made by a Doctor.
- Key Attributes: approvalID, requestID (FK), approver (User ID), decision (Approve/Reject).
- Operations: Decision logging (FR-03, FR-07).

Key Entities

5. User (Access Control)

- Definition: System actors with defined security roles.
- Key Attributes: userID, role (Doctor, Nurse, Manager, Admin), permissions.
- Operations: Role-Based Access Control (RBAC) enforcement (FR-05).

6. Log (Audit Trail)

- Definition: Immutable records of all critical system actions.
- Key Attributes: logID, userID, action, result, timestamp.
- Operations: Automatic logging (No Update/Delete allowed) (FR-07).

7. Notification (Alerts)

- Definition: Real-time system signals for urgency.
- Key Attributes: recipient, type (Low Stock, Approval Needed), message.
- Operations: UI Pop-ups & Alerts (FR-06, FR-10).

8. Report/Statistic (Analytics)

- Definition: Aggregated data for decision support.
- Key Attributes: reportType (Bar/Pie), metrics (Stock Levels, Rejection Rates), period.
- Operations: Dashboard Visualization & Export (FR-08).

Business Rules

1. BR-01 & BR-02: Inventory Control

- Item Registration:
 - Enforces unique itemCode and mandatory approvalPolicy assignment.
 - minQuantity (Safety Stock) must be defined to enable monitoring.
- Adjustment Logic:
 - Restricted to Inventory Manager.
 - Mandatory reasonCode (e.g., Damage, Expiration) required for any stock deduction.
 - Trigger: Any stock update automatically initiates a Low Stock Check.

2. BR-03: Approval Workflow Enforcement

- Strict Sequence: High-Cost/High-Risk items must follow: Request → Approve/Reject → Disbursement.
- Blocking Mechanism: System physically blocks the 'Disburse' action until the status is explicitly Approved by a Doctor.
- Policy application: Policy updates apply immediately to new requests.

3. BR-04: Automated Low Stock Alerts

- Condition: Current Stock \leq minQuantity.
- Action:
 - Send immediate UI Notification to Nurse & Admin.
 - Highlight the item in Red on the dashboard.

Business Rules

4. BR-05: Immutable Audit Logging

- Scope: Records all operations (Requests, Approvals, Adjustments).
- Content: Logs User ID, Timestamp, Action, Result, and Reason.
- Integrity: Logs are Immutable (No Update/Delete) and visible only to Admins.

5. BR-06: Role-Based Access Control (RBAC)

- Strict Role Segregation:
 - Doctor: Approval Authority only.
 - Nurse: Request initiation & Daily disbursement.
 - Manager: Inbound/Outbound & Adjustments.
 - Admin: User Policy & Audit Log review.

6. BR-07: Data Reporting & Export

- Visualization:
 - Bar Charts: 6-month stock trends.
 - Pie Charts: Approval status distribution.
- Export: Data must be exportable via CSV (raw data) or PDF (formal report).

Constraints

1. Data Integrity & Security

- Validity Checks:
 - itemCode & lotNumber must be Unique.
 - Expiration Date must be a future timestamp.
 - minQuantity must be ≥ 0 (Non-negative).
- Security Enforcement:
 - RBAC: Strict API & UI restrictions (e.g., Nurses cannot access Policy Settings).
 - Immutability: Audit logs are Insert-Only (No Update/Delete capabilities).

2. Performance & Technical Environment

- Performance Goals:
 - Latency: Real-time stock queries must respond in < 1 second.
 - Scalability: Supports up to 50 concurrent users (Medium-sized hospital benchmark).
- Technical Scope:
 - Platform: Web-based (Optimized for Chrome, Firefox).
 - Notification: In-app UI Alerts only (SMS/Email out of scope for MVP).

3. Business Operational Constraints

- Mandatory Approval: High-Cost items (`policy=high-cost`) require Doctor approval.
- Evidence Handling: Adjustments for 'Damage' or 'Loss' support (optional) photographic evidence upload.

Relationships

1. Inventory Hierarchy (Master-Detail)

- Item \leftrightarrow Lot (1 : N)
 - One Master Item manages multiple Lot entries.
 - Context: Tracking different expiration dates and batches for the same medical supply.

2. Workflow Dynamics

- Request \leftrightarrow Approval (1 : 1)
 - Each Request has exactly one corresponding Approval decision.
 - Context: Ensures a clear decision trail for every disbursement attempt.
- Request \leftrightarrow Lot (N : 1)
 - Multiple Requests can draw stock from the same Lot until depleted.

3. User Activity & Monitoring

- User \leftrightarrow Operations (1 : N)
 - One User (Doctor/Nurse) generates multiple Requests, Approvals, or Logs.
- Item \leftrightarrow Notification (1 : N)
 - One Item can trigger multiple alerts (e.g., Low Stock, Expired) over time.

4. Data Aggregation

- Report Generation:
 - Log + Lot Data \rightarrow Aggregated Statistics.
 - Used for generating Dashboards and Monthly Usage Reports.

04

NFR SPECIFICATION

NFR Specification

ID	Requirement	Criteria / Target
NFR-01	Performance	The average response time of major screens shall be ≤ 1.5 seconds.
NFR-02	Availability	The system shall operate under a 9x5 service schedule with a target of zero critical failures during demonstrations.
NFR-03	Security	Passwords shall be hashed using BCrypt, and the system shall enforce Role-Based Access Control (RBAC) and maintain audit logs for all critical actions.
NFR-04	Auditability & Traceability	All state changes must be recorded as immutable logs to ensure full traceability.
NFR-04	Reliability	Approval and disbursement transactions shall guarantee atomic commits to prevent partial updates or data loss.

NFR Specification

ID	Requirement	Criteria / Target
NFR-06	Scalability	The system shall maintain the same Service Level Agreement (SLA) performance even when the number of items increases tenfold.
NFR-07	Compatibility	The system shall be compatible with the latest two versions of Chrome and Edge browsers.
NFR-08	Standards & Coding Conventions	All APIs must follow the RESTful architecture, be documented using OpenAPI, and comply with defined commit message conventions.
NFR-09	Data Freshness (Real Time)	The dashboard (FR-12) and all inventory-related screens must reflect the latest server data within 3 seconds after any inbound, outbound, or adjustment transaction is committed.

05

USE CASE SCENARIO

1. Inventory Operations

Streamlining daily workflows for Nurses

- UC-01: General Consumable Inbound Registration
- UC-02: General Consumable Disbursement (Auto-Approval)
- UC-09: Inventory Adjustment (Disposal, Damage, Counts)

2. Approval Workflow (Core)

Securing high-value & high-risk items

- UC-03: High-Value Consumable Approval Request
- UC-04: Rejection Process
- UC-06: Prevention of Unauthorized Disbursement

3. Automation & Monitoring

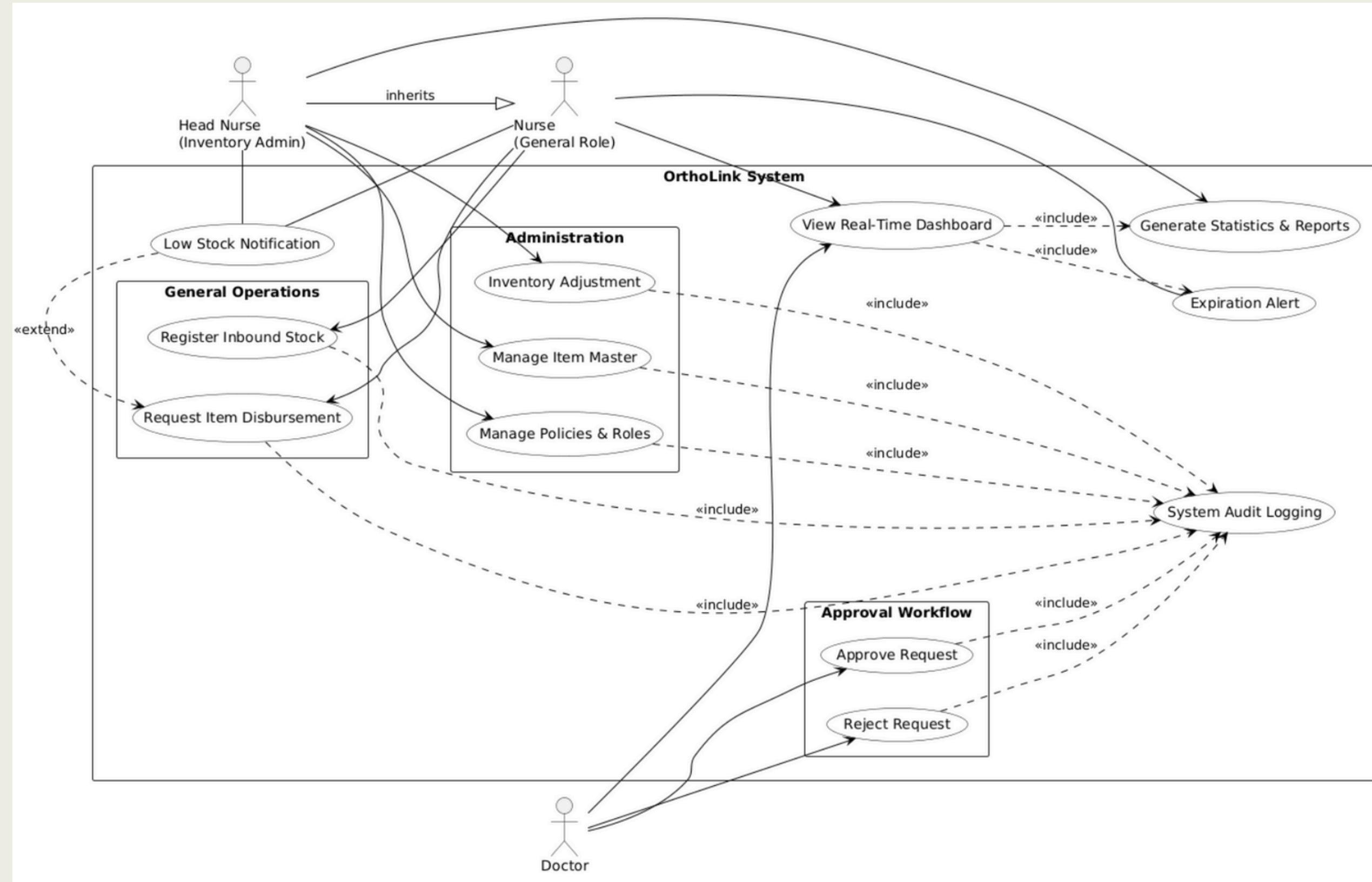
Enhancing visibility for Administrators

- UC-05: Expiration Date Alert
- UC-08: Low Stock Notification
- UC-07: Statistics & Report Generation
- UC-10: Real-Time Dashboard & Approval Management

06

USE CASE DIAGRAM

Use Case Diagram

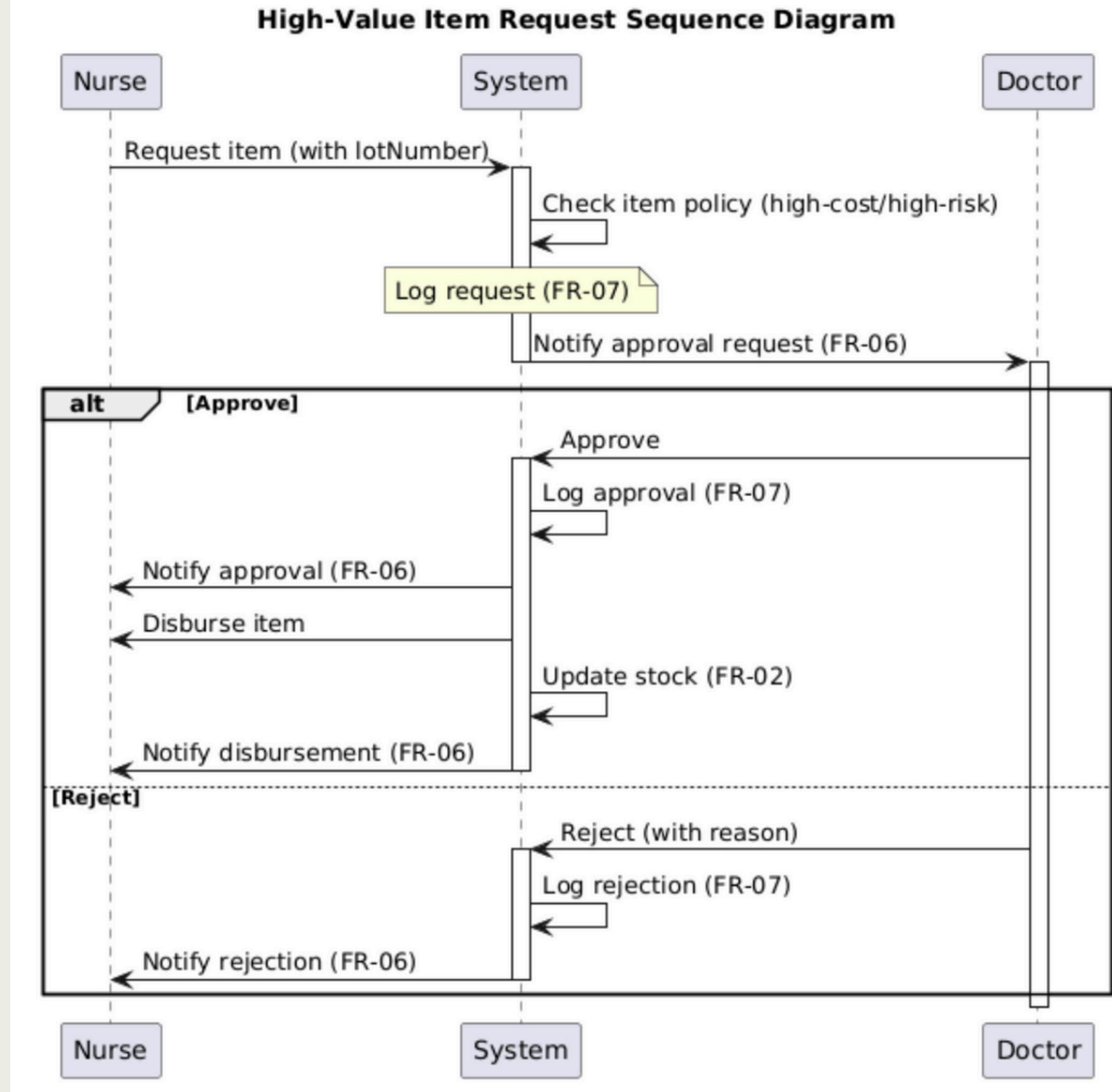


07

SEQUENCE DIAGRAM

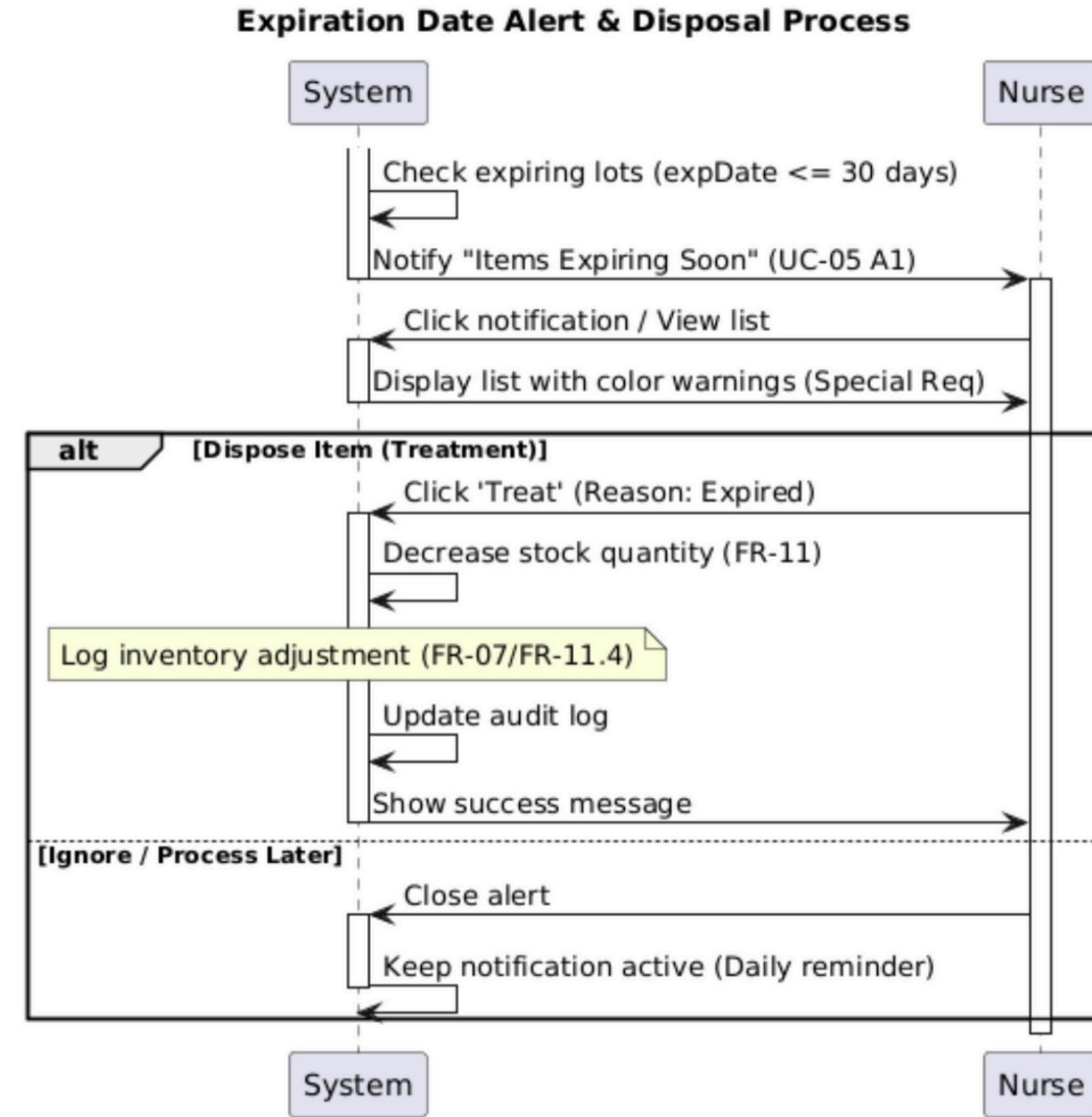
Sequence Diagram

7.1 High-Value Item Request Sequence Diagram



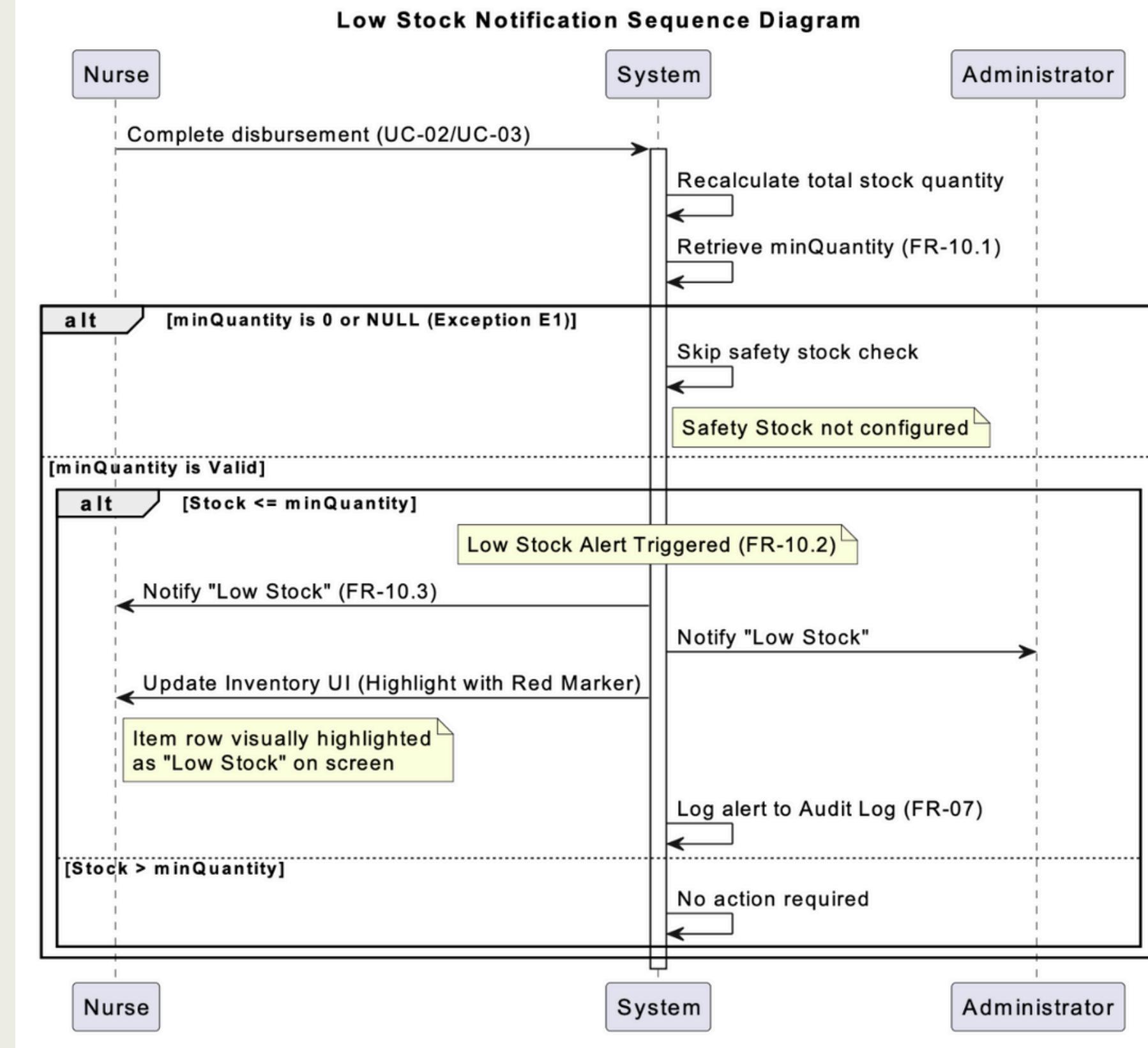
Sequence Diagram

7.2 Expiration Date Alert & Disposal Process



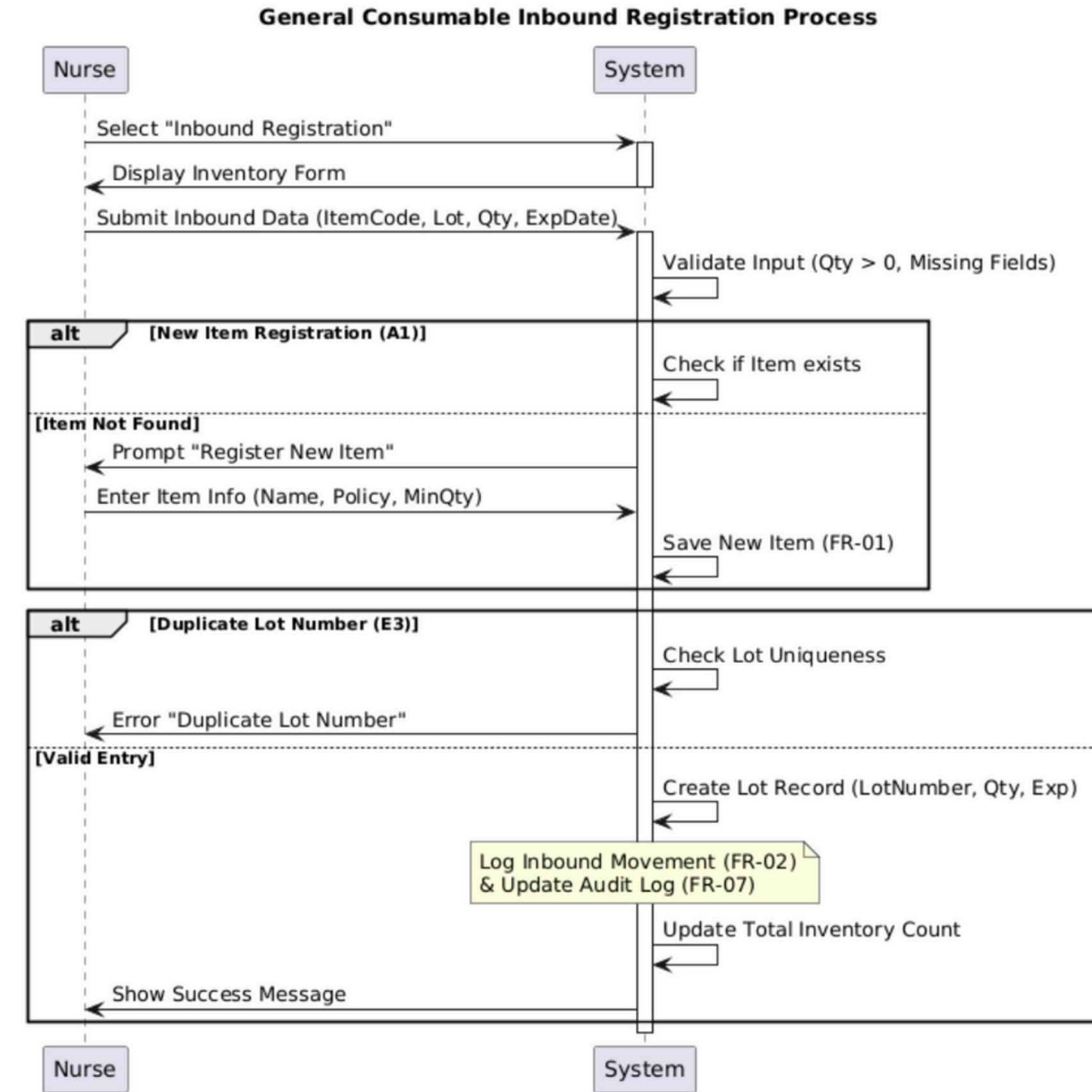
Sequence Diagram

7.3 Low Stock Notification Sequence Diagram



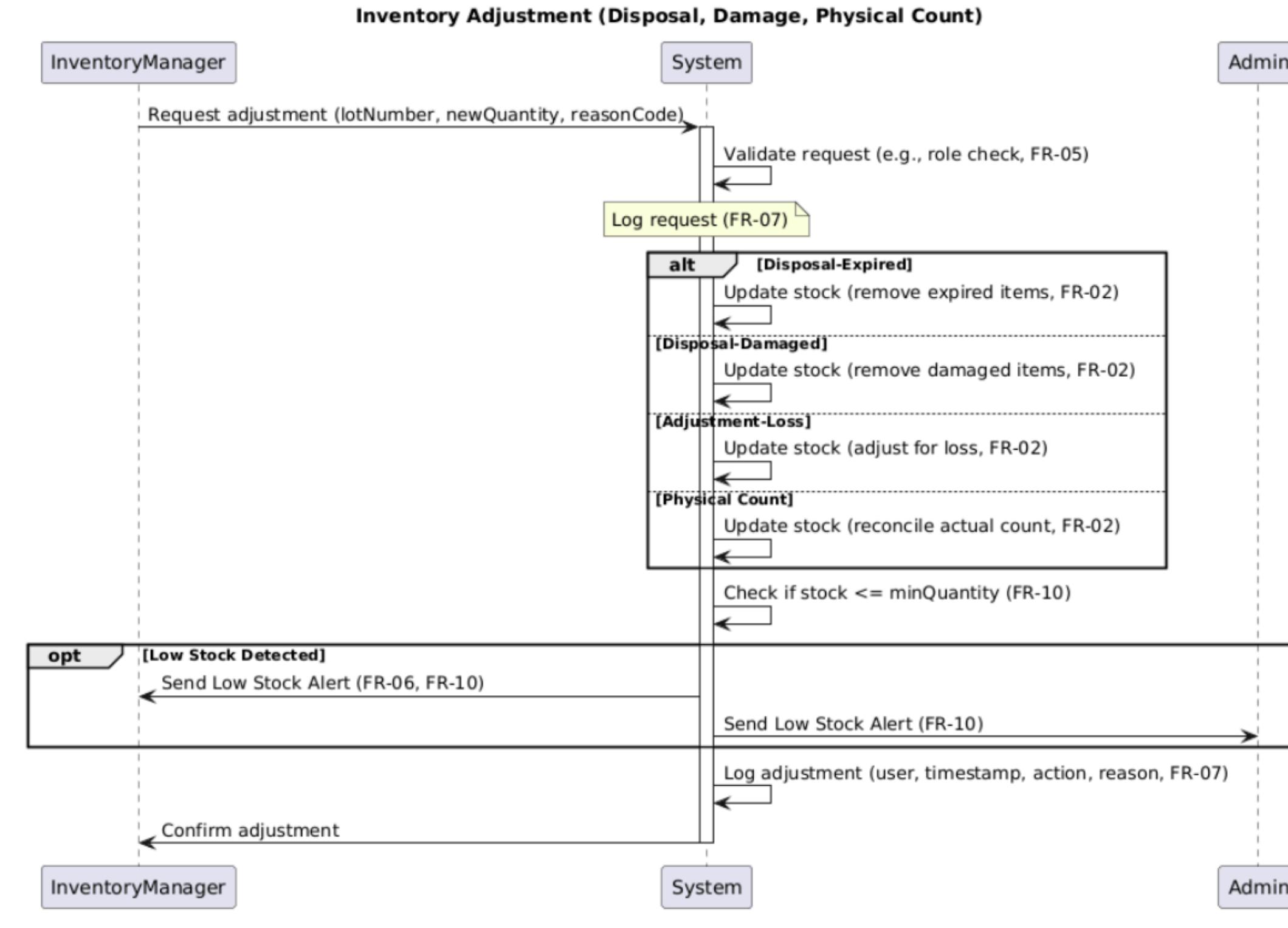
Sequence Diagram

7.4 General Consumable Inbound Registration Process



Sequence Diagram

7.5 Inventory Adjustment(Disposal, Damage, Physical Count)

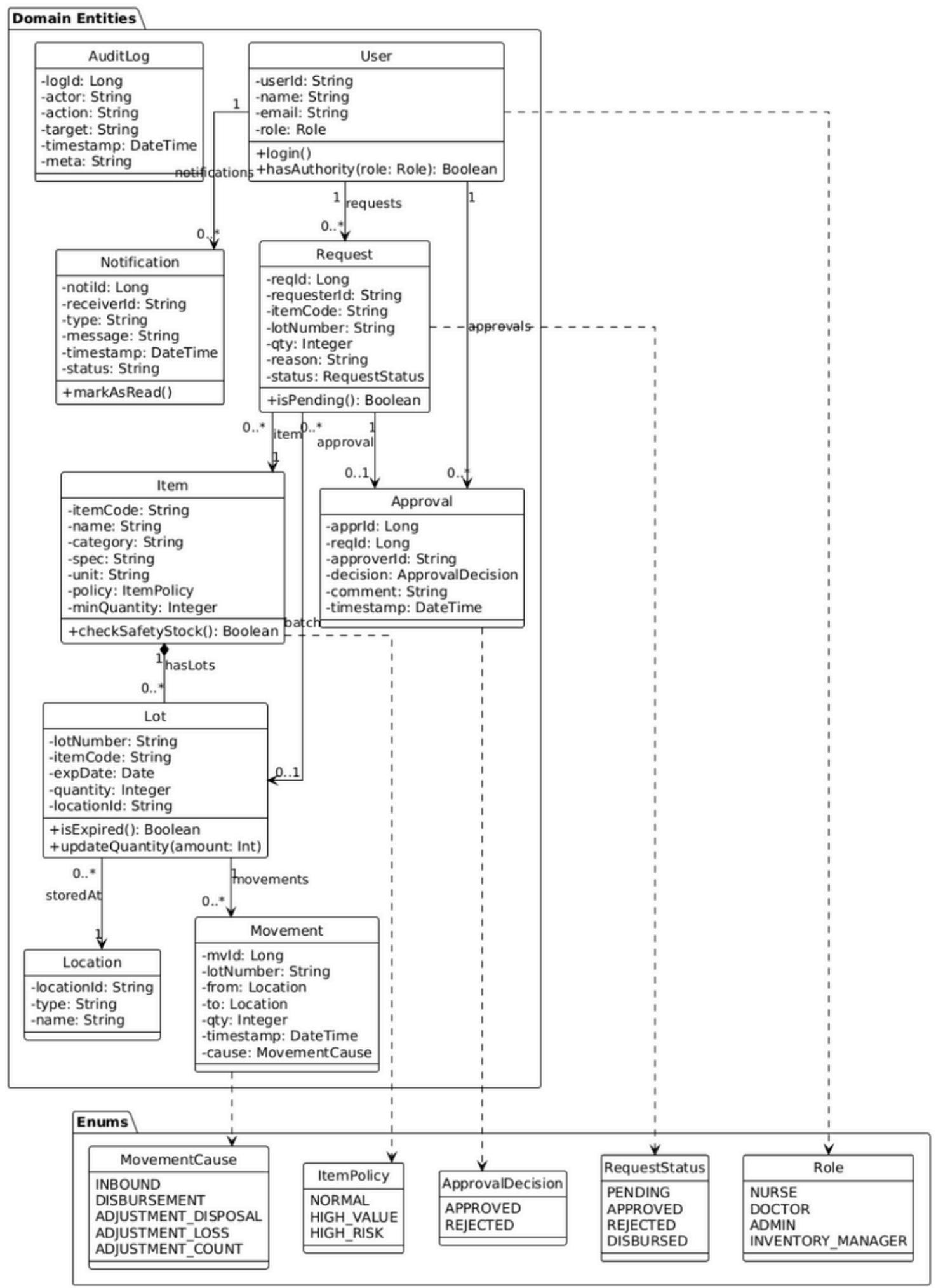


08

CLASS DIAGRAM

Class Diagram: OrthoLink Domain Model

Class Diagram



09

INTERFACE DESIGN

interface Design

1. Function: loginUser

→ User login and authentication

Endpoint: **POST /api/auth/login**

Parameters

- **userId**: The unique identifier for the user (e.g., Nurse, Doctor, Admin)
- **password**: The user's password for authentication

Return

Success (200 OK)

- User information (ID, name, role)
- “Login successful” message
- Access & Refresh JWT tokens

Error (401 Unauthorized)

- “Invalid credentials” message

2. Function: getDashboardKPI

Endpoint: **GET (/api/dashboard/kpi)**

Parameters

- **Headers**: JWT token issued upon login.

Return

Success (200 OK)

Returns dashboard KPI data:

- **totalInventory**
- **pendingApprovals**
- **monthlyOutbound**
- **expiringSoon**
- **comparison** (percentage change vs. previous month)

Error (500 Internal Server Error)

- “Failed to fetch KPI data”

3. Function: registerInbound

Endpoint: **POST** (`/api/inventory/inbound`)

Parameters

- itemCode: Unique code of the medical consumable.
- lotNumber: Manufacturer's unique batch number.
- quantity: Number of items to be registered.
- expirationDate: Expiry date of the lot.
- locationId: Storage location identifier.

Return

Success (201 Created)

- Inbound registration successful"
- Newly created lotId

Error (400 Bad Request)

- "Duplicate Lot Number"

4. Function: requestDisbursement

Endpoint: **POST** (`/api/inventory/request`)

Parameters

- itemCode: The code of the item requested.
- quantity: Amount required.
- reason: Purpose of use (e.g., Surgery, Treatment).

Return

Success (Auto-Approved, 200 OK)

- status: "APPROVED"
- "Disbursement completed (Auto-Approved)"

Success (Approval Required, 202 Accepted)

- status: "PENDING"
- "Request submitted for doctor approval"

interface Design

5. Function: approveRequest

Endpoint: **PUT** (`/api/approval/{reqId}`)

Parameters

- `reqId`: The ID of the disbursement request.
- `decision`: The doctor's decision.
- `comment`: Reason for rejection or optional comments for approval

Return

Success (200 OK)

- Request ID (`reqId`)
- Updated status ("APPROVED" or "REJECTED")
- Timestamp of update (`updatedAt`)

Error (403 Forbidden)

- "User does not have approval authority"

6. Function: adjustInventory

Endpoint: **POST** (`/api/inventory/adjust`)

Parameters

- `lotNumber`: Target lot for adjustment.
- `adjustQty`: Quantity to add or subtract.
- `reasonCode`: Standardized code for the adjustment reason (FR-11).
- `comment`: Mandatory detailed explanation.

Return

Success (200 OK)

- Inventory adjusted successfully"
- Updated current quantity (`currentQty`)

Error (400 Bad Request)

- "Detailed comment is required for this reason code"

interface Design

7. Function: getLowStockItems

Endpoint: **GET** (/api/inventory/alerts/low-stock)

Parameters: None

Reutrn

Success (200 OK)

- Returns a list of low-stock items, each containing:
- itemCode
- item name
- currentTotal (current stock quantity)-
- minQuantity (safety stock threshold)

8. Function: getStatistics

Endpoint: **GET** (/api/reports/statistics)

Parameters

- period: The time range for the statistics (FR-08).

Return

Success (200 OK)

- usageTrend: monthly usage data
- approvalStatus: counts of approved, rejected, pending requests

Example:

usageTrend:

- {month: "2025-10", count: 150}
- {month: "2025-11", count: 180}

approvalStatus:

- approved: 80
- rejected: 5
- pending: 15

10

DETAILED DESIGN

Detailed Design

1. Function: loginUser

→ User login and authentication

Class Name: AuthService

Process

- Validates user ID and password using BCrypt hashing.
- Retrieves user profile and role for RBAC (Role-Based Access Control).
- Issues JWT Access/Refresh tokens for session management.
- Returns user info + tokens if authentication succeeds.

2. Function: getDashboardKPI

ClassName: DashboardService

Process

- Retrieves all KPI values required for the dashboard:
 - Total Inventory
 - Pending Approvals
 - Monthly Outbound
 - Expiring Soon
- Calculates month-over-month change (%) for trend comparison.
- Provides real-time metrics used in FR-12 and dashboard UI.

interface Design

3. Function: registerInbound

ClassName: InventoryService

Process

- Registers a new inbound lot with validation of unique lotNumber.
- Creates Lot record + Movement record (INBOUND).
- Records Audit Log entry for traceability.
- Ensures transaction integrity via DB transaction block.

4. Function: requestDisbursement

Class: requestDisbursement

Process

- Evaluates item approval policy:
- NORMAL items → Auto-approved & stock deducted immediately.
- HIGH_VALUE / HIGH_RISK items → Request created with PENDING status.
- Sends notification to doctor for approval if required.
- Runs automatic low-stock check after processing.

interface Design

5. Function: approveRequest

ClassName: InventoryService

Process

- Doctor approves or rejects pending requests.
- APPROVE → Deduct stock, create Movement record, notify nurse.
- REJECT → Save comment, update status, notify nurse.
- All decisions recorded in AuditLog.

6. Function: adjustInventory

ClassName: InventoryService

Process

- Handles stock adjustments due to expiration, damage, physical count, or loss.
- Requires reasonCode + comment (mandatory).
- Updates lot quantity and creates Movement record.
- Runs “Low Stock” check on negative adjustments.

7. Function: getLowStockItems

ClassName: InventoryService

Process

- Queries all items where `currentTotal ≤ minQuantity`.
- Returns list used by:
- Low Stock Dashboard Widget
- Inventory screen red-highlighting
- Notification panel
- Supports FR-10 safety stock logic

8. Function: getStatistics

ClassName: InventoryService

Process Summary

- Aggregates usage, approval, and rejection data for reporting.
- Prepares datasets for trend charts (bar/line/pie)
- Used in the Statistics/Reports page and dashboard charts.
- Supports CSV/PDF export.

11

UI DESIGN

UI Design

1. Inventory Management Dashboard

OrthoLink

재고 관리 대시보드

총 재고 품목 1,234 vs 지난 달 +12.5%

승인 대기 23 vs 지난 달 -5.2%

이번 달 출고 456 vs 지난 달 +8.3%

만료 예정 (30일) 18 vs 지난달 +3

입출고 추이
최근 6개월 입출고 현황

승인 워크플로우 현황
이번 달 승인 처리 통계

반려 3%
출고 완료 43%
승인 대기 7%
승인 완료 47%

반려 ■ 승인 대기 ■ 승인 완료 ■ 출고 완료

관리자 김재고 (Admin) inventory@ortho.com

만료 예정 품목 알림

재고 부족 품목 알림

CSV PDF 리포트

OrthoLink

재고 관리 대시보드

만료 예정 품목 목록 (4건)

Pain Relief Patch ITEM-2025-0156
Lot: LOT-2025-01-0234 | 수량: 25 | 위치: 선반 C-3
만료일: 2025-11-20 (13일 남음)
만료 진행도 (30일 기준) 17일 경과

Hyaluronic Acid Injection ITEM-2025-0312
Lot: LOT-2025-02-0089 | 수량: 8 | 위치: 냉장고 A-1
만료일: 2025-12-05 (28일 남음)
만료 진행도 (30일 기준) 2일 경과

Steroid Injection ITEM-2025-0287
Lot: LOT-2025-03-0124 | 수량: 12 | 위치: 냉장고 B-2
만료일: 2025-12-15 (38일 남음)
만료 진행도 (30일 기준) -8일 경과

Injection Needle 23G ITEM-2025-0567
카테고리: 의료기기 | 재고율: 53%
위치: 캐비넷 C-4
발생: 2025-11-07 11:30 (출고(REQ-2025-0042))

재고 부족 품목 알림 (4건)
안전재고(minQuantity) 이하로 떨어진 품목 목록 (FR-10)

Gauze Bandage ITEM-2025-0234 최신
카테고리: 일반 소모품 | 재고율: 28%
위치: 선반 B-1
발생: 2025-11-07 14:20 (출고(REQ-2025-0045))
현재 재고: 28개 부족: 72개 (안전재고: 100개)

Surgical Gloves (M) ITEM-2025-0189
카테고리: 일반 소모품 | 재고율: 30%
위치: 선반 A-2
발생: 2025-11-07 15:45 (출고(REQ-2025-0048))
현재 재고: 15개 부족: 35개 (안전재고: 50개)

CSV PDF 리포트

UI Design

1. Inventory Management Dashboard

OrthoLink

대시보드

- 품목 관리
- 입고 관리
- 출고 관리
- 내 요청 현황
- 승인 관리
- 사용자 관리
- 정책 설정

재고 관리 대시보드

통계 및 분석

월간 사용량 추이
최근 11개월 재고 사용량

승인 소요 시간 추이
평균 승인 처리 시간 (단위: 시간)

승인 vs 반려 건수
월별 승인 및 반려 처리 현황

카테고리별 사용 분포
품목 카테고리별 사용량 비율

관리자 김재고 (Admin) inventory@ortho.com

OrthoLink

대시보드

- 품목 관리
- 입고 관리
- 출고 관리
- 내 요청 현황
- 승인 관리
- 사용자 관리
- 정책 설정

재고 관리 대시보드

승인 vs 반려 건수
월별 승인 및 반려 처리 현황

카테고리별 사용 분포
품목 카테고리별 사용량 비율

승인 요청 내역
최근 승인 요청 및 처리 현황

요청 번호	품목명	품목 코드	수량	요청자	상태	요청 일시	작업
REQ-2025-0045	Hyaluronic Acid Injection	ITEM-2025-0312	5	김민지 (간호사)	승인 대기	2025-11-07 14:30	
REQ-2025-0044	Steroid Injection	ITEM-2025-0287	10	이서준 (간호사)	승인 완료	2025-11-07 13:15	

UI Design

1. Inventory Management Dashboard

OrthoLink

재고 관리 대시보드

총 재고 품목 1,234 vs 지난 달 +12.5%

승인 대기 23 vs 지난 달 -5.2%

이번 달 출고 456 vs 지난 달 +8.3%

만료 예정 (30일) 18 vs 지난달 +3

입출고 추이
최근 6개월 입출고 현황

승인 워크플로우 현황
이번 달 승인 처리 통계

반려 3%
출고 완료 43%
승인 대기 7%
승인 완료 47%

반려 ■ 승인 대기 ■ 승인 완료 ■ 출고 완료

관리자 김재고 (Admin) inventory@ortho.com

만료 예정 품목 알림

재고 부족 품목 알림

CSV PDF 리포트

OrthoLink

재고 관리 대시보드

만료 예정 품목 목록 (4건)

Pain Relief Patch ITEM-2025-0156
Lot: LOT-2025-01-0234 | 수량: 25 | 위치: 선반 C-3
만료일: 2025-11-20 (13일 남음)
만료 진행도 (30일 기준) 17일 경과

Hyaluronic Acid Injection ITEM-2025-0312
Lot: LOT-2025-02-0089 | 수량: 8 | 위치: 냉장고 A-1
만료일: 2025-12-05 (28일 남음)
만료 진행도 (30일 기준) 2일 경과

Steroid Injection ITEM-2025-0287
Lot: LOT-2025-03-0124 | 수량: 12 | 위치: 냉장고 B-2
만료일: 2025-12-15 (38일 남음)
만료 진행도 (30일 기준) -8일 경과

Injection Needle 23G ITEM-2025-0567
카테고리: 의료기기 | 재고율: 53%
위치: 캐비넷 C-4
발생: 2025-11-07 11:30 (출고(REQ-2025-0042))

재고 부족 품목 알림 (4건)
안전재고(minQuantity) 이하로 떨어진 품목 목록 (FR-10)

Gauze Bandage ITEM-2025-0234 최신
카테고리: 일반 소모품 | 재고율: 28%
위치: 선반 B-1
발생: 2025-11-07 14:20 (출고(REQ-2025-0045))
현재 재고: 28개 부족: 72개 (안전재고: 100개)

Surgical Gloves (M) ITEM-2025-0189
카테고리: 일반 소모품 | 재고율: 30%
위치: 선반 A-2
발생: 2025-11-07 15:45 (출고(REQ-2025-0048))
현재 재고: 15개 부족: 35개 (안전재고: 50개)

CSV PDF 리포트

UI Design

2. Inventory Management

The OrthoLink inventory management system provides a user-friendly interface for managing medical supplies. It includes features for product listing, reordering, and new product entry.

Product Listing: The main screen displays a list of products with columns for Product ID, Product Name, Category, Specification, Storage Location, Expiry Date, Current Stock, Minimum Stock, Lot Number, and Action buttons.

품목코드	품목명	카테고리	규격	보관위치	승인정책	현재재고	최소재고	Lot 수	작업
ITEM-2025-0001	Hyaluronic Acid Injection	주사제	1ml/Ampule	냉장고 A-1	승인 필요	120	50	3	상세보기 수정
ITEM-2025-0002	Steroid Injection	주사제	2ml/Vial	냉장고 B-2	승인 필요	45	30	2	상세보기 수정
ITEM-2025-0003	Pain Relief Patch	일반 소모품	10cm x 14cm	선반 C-3	자동 승인	98	100	2	상세보기 수정
ITEM-2025-0004	Calcium Supplement	주사제	10ml/Ampule	냉장고 A-2	자동 승인	85	60	2	상세보기 수정
ITEM-2025-0005	Surgical Gloves	일반 소모품	Size M, Latex-free	선반 D-1	자동 승인	42	200	1	상세보기 수정

Reordering: A modal window allows users to search for products and view their current stock levels. It also includes fields for selecting a lot number and specifying a quantity.

New Product Entry: A modal window for adding new products includes fields for Product Name, Category, Specification, Storage Location, and Expiry Date.

UI Design

2. Inventory Management

The image displays three screenshots of the OrthoLink inventory management application, showing different features of the product catalog and management.

Screenshot 1: Product Catalog (품목 관리)

This screenshot shows the main product catalog screen. It includes a search bar at the top, a sidebar with navigation links like '보드', '관리', '관리', '자료', and '설정', and a central grid displaying product details. A modal window titled '품목 정보 수정' (Product Information Modification) is open, showing fields for '품목명' (Product Name), '카테고리' (Category), '규격/사양' (Specification/Specification), '주사제' (Injection), '최소 재고량' (Minimum Stock Level), and '기본 보관 위치' (Default Storage Location). The product 'Hyaluronic Acid Injection' is selected.

Screenshot 2: Product Catalog (품목 관리)

This screenshot shows the product catalog with a focus on lot management. A modal window titled 'Lot 상세 재고' (Detailed Stock by Lot) is open, displaying a table of stock levels by lot number. The table includes columns for '품목코드' (Product Code), '품목명' (Product Name), 'Lot Number', '수량' (Quantity), '만료일' (Expiry Date), '보관 위치' (Storage Location), and '상태' (Status). The status for most lots is '정상' (Normal), except for one which is '경상' (Warning).

Screenshot 3: Audit Log (재고 조정 이력)

This screenshot shows the audit log for stock adjustments. A table titled '재고 조정 이력' (Stock Adjustment History) lists two entries. The first entry, 'ADJ-2025-001', occurred on 2025-11-06 at 14:20, adjusting the count from 100 to 98. The second entry, 'ADJ-2025-002', occurred on 2025-11-05 at 09:30, adjusting the count from 50 to 45. Both entries mention 'Pain Relief Patch' and 'Steroid Injection' respectively.

This screenshot shows the audit log for stock adjustments. A table titled '재고 조정 이력' (Stock Adjustment History) lists two entries. The first entry, 'ADJ-2025-001', occurred on 2025-11-06 at 14:20, adjusting the count from 100 to 98. The second entry, 'ADJ-2025-002', occurred on 2025-11-05 at 09:30, adjusting the count from 50 to 45. Both entries mention 'Pain Relief Patch' and 'Steroid Injection' respectively.

UI Design

3. Inbound Management

OrthoLink

입고 관리

신규 입고 품목을 등록하고 재고를 업데이트합니다.

품목 선택

기존 품목 선택 + 신규 품목 등록

로트번호 *

LOT-2025-XX-XXXX

남용서의 제조사 고유 코드와 일치해야 합니다.

수량 *

0

만료일 *

yyyy-mm-dd

보관 위치 *

냉장고 A-1

초기화

입고 등록

관리 김재고 (Admin)
다 inventory@ortho.com

OrthoLink

입고 관리

신규 입고 품목을 등록하고 재고를 업데이트합니다.

신규 품목 등록

새로운 품목을 등록합니다. 모든 필수 항목(*)을 입력해주세요.

품목 코드 *

ITEM-2025-2719

고유한 품목 코드입니다. 자동 생성되지만 수정 가능합니다.

품목명 *

예: Hyaluronic Acid Injection

카테고리 *

카테고리 선택 예: 2ml, 10mg/vial

기본 보관 위치 *

예: 냉장고 A-1, 선반 B-3

최소 재고량 *

0

제고가 이 수량 이하로 떨어지면 알림이 발송됩니다.

승인 정책 *

승인 정책 선택

취소

품목 등록

관리 김재고 (Admin)
다 inventory@ortho.com

UI Design

4. Outbound Management

The screenshot displays two views of the OrthoLink Outbound Management interface.

Left View (Initial Request Screen):

- Header:** OrthoLink, 총고 관리 (Outbound Management).
- Section:** 총고 요청 (Outbound Request).
- Message:** 품목 출고를 요청하고 재고를 업데이트합니다. (The item will be shipped and the inventory will be updated.)
- Product Selection:** Disposable Gloves (자동승인) - Selected.
- Lot Number Selection:** LOT-2025-GL-0034 (재고: 300개 | 만료: 2026-03-20 | 위치: 선반 B-1).
- Current Stock:** 현재 재고: 300개.
- Expiration Date:** 만료일: 2026-03-20.
- Storage Location:** 보관 위치: 선반 B-1.
- Lot Number:** Lot 번호: LOT-2025-GL-0034.
- Quantity:** 출고 수량: 10 (최대 출고 가능 수량: 300개).
- Usage:** 출고 사유 / 용도: 출고 사유 또는 용도를 입력하세요 (선택사항).
- Buttons:** 초기화, 출고 요청 (자동 승인) (Outbound Request (Automatic Approval)).

Right View (Confirmation Screen):

- Header:** OrthoLink, 총고 관리.
- Section:** 총고 요청 확인 (Outbound Request Confirmation).
- Message:** 품목 출고를 요청하고 재고를 업데이트합니다. (The item will be shipped and the inventory will be updated.)
- Product Selection:** Medical Gauze (4x4) (자동승인) - Selected.
- Lot Number Selection:** LOT-2024-GA-0089 (재고: 45개 | 만료: 2025-06-15 | 위치: 선반 A-3).
- Current Stock:** 현재 재고: 45개.
- Expiration Date:** 만료일: 2025-06-15.
- Storage Location:** 보관 위치: 선반 A-3.
- Quantity:** 출고 수량: 28 (최대 출고 가능 수량: 45개).
- Usage:** 출고 사유 / 용도: 출고 사유 또는 용도를 입력하세요 (선택사항).
- Buttons:** 취소, 출고 요청 (자동 승인) (Outbound Request (Automatic Approval)).

User Profile: 관리자 김재고 (Admin), inventory@ortho.com.

UI Design

4. Outbound Management

The image displays two side-by-side screenshots of the OrthoLink software interface, specifically the Outbound Management module. Both screenshots show a similar form for creating an outbound request.

Screenshot 1 (Left): Initial Request Form

- Header:** OrthoLink, 출고 관리 (Outbound Management).
- Section 1: 출고 요청 (Outbound Request)**
 - Message: 이 품목은 관리자 승인이 필요합니다. 요청 후 승인이 완료되면 출고 처리됩니다.
 - Product Selection: 품목 선택 * (Steroid Injection, 승인 필요).
 - Product Name: Steroid Injection
 - Approval Status: 관리자 승인 필요
 - Lot Number Selection: Lot 번호 선택 * (LOT-2025-ST-0045).
 - Lot Number: LOT-2025-ST-0045
 - Manufacture Date: 2025-09-10
 - Storage Location: 냉장고 A-1
 - Quantity: 현재 재고 25개, 만료일 2025-09-10, 보관 위치 냉장고 A-1, Lot 번호 LOT-2025-ST-0045.
 - Delivery Quantity: 출고 수량 * (20).
 - Max Outbound: 최대 출고 가능 수량: 25개
 - Delivery Notes: 출고 사유 / 용도 (선택사항).
- Footer:** 관리자 김재고 (Admin), inventory@ortho.com.

Screenshot 2 (Right): Confirmation Step

- Header:** OrthoLink, 출고 관리 (Outbound Management).
- Section 1: 출고 요청 (Outbound Request)**
 - Message: 이 품목은 관리자 승인이 필요합니다. 요청 후 승인이 완료되면 출고 처리됩니다.
 - Product Selection: 품목 선택 * (Steroid Injection, 승인 필요).
 - Product Name: Steroid Injection
 - Approval Status: 관리자 승인 필요
 - Lot Number Selection: Lot 번호 선택 * (LOT-2025-ST-0045).
 - Lot Number: LOT-2025-ST-0045
 - Manufacture Date: 2025-09-10
 - Storage Location: 냉장고 A-1
 - Quantity: 현재 재고 25개, 만료일 2025-09-10, 보관 위치 냉장고 A-1, Lot 번호 LOT-2025-ST-0045.
 - Delivery Quantity: 출고 수량 * (20).
 - Max Outbound: 최대 출고 가능 수량: 25개
 - Delivery Notes: 출고 사유 / 용도 (선택사항).
- Section 2: 출고 요청 확인 (Outbound Request Confirmation)**
 - Message: 다음 내용으로 출고를 요청하시겠습니까?
 - Product Selection: 품목명 Steroid Injection, Lot 번호 LOT-2025-ST-0045, 출고 수량 20개, 만료일 2025-09-10, 보관 위치 냉장고 A-1.
 - Delivery Notes: 승인 방식 관리자 승인 필요.
 - Buttons: 취소, 출고 요청 (Outbound Request).
- Footer:** 관리자 김재고 (Admin), inventory@ortho.com.

UI Design

5. Request Status

OrthoLink

내 요청 현황

내 출고 요청 현황

출고 요청의 승인 상태를 확인하고 승인된 요청을 불출 처리합니다.

불출 처리 안내:

승인 완료된 요청만 불출이 가능합니다. 승인 대기 중인 요청은 의사/관리자의 승인 후 불출할 수 있습니다. 긴급한 경우 '긴급 사용' 버튼을 클릭하여 사후 승인으로 처리할 수 있습니다.

전체	승인 대기	승인 완료	불출 완료	반려	긴급 사용
6	2	1	1	1	1

전체 6 승인 대기 2 승인 완료 1 불출 완료 반려 긴급 사용

전체 요청

모든 출고 요청 목록입니다.

요청번호	품목명	수량	요청일시	상태	작업
REQ-2025-0045	Hyaluronic Acid Injection ITEM-2025-0312	5개	2025. 11. 7. 오후 3:40:39	승인 대기	불출 수 긴급 사용
REQ-2025-0046	Steroid Injection ITEM-2025-0287	10개	2025. 11. 7. 오후 4:40:39	승인 대기	불출 수 긴급 사용
REQ-2025-0044	Hyaluronic Acid Injection ITEM-2025-0312	3개	2025. 11. 7. 오후 12:40:39	승인 완료	불출
REQ-2025-0043	Steroid Injection ITEM-2025-0287	8개	2025. 11. 6. 오후 5:40:39	반려	반려됨
REQ-2025-0042	Bone Cement ITEM-2025-0523	1개	2025. 11. 4. 오후 5:40:39	불출 완료	완료
REQ-2025-0041	Pain Relief Patch ITEM-2025-0156	20개	2025. 11. 5. 오후 5:40:39	수 긴급 사용	사후 승인 대기

관리 김재고 (Admin)
inventory@ortho.com

OrthoLink

내 요청 현황

내 출고 요청 현황

출고 요청의 승인 상태를 확인하고 승인된 요청을 불출 처리합니다.

불출 처리 안내:

승인 완료된 요청만 불출이 가능합니다. 승인 대기 중인 요청은 의사/관리자의 승인 후 불출할 수 있습니다. 긴급한 경우 '긴급 사용' 버튼을 클릭하여 사후 승인으로 처리할 수 있습니다.

전체	승인 대기	승인 완료	불출 완료	반려	긴급 사용
6	2	1	1	1	1

전체 6 승인 대기 2 승인 완료 1 불출 완료 반려 긴급 사용

승인 대기 중인 요청

의사/관리자의 승인을 기다리는 요청입니다. 불출 버튼은 승인 후 활성화됩니다.

요청번호	품목명	수량	요청일시	상태	작업
REQ-2025-0045	Hyaluronic Acid Injection ITEM-2025-0312	5개	2025. 11. 7. 오후 3:40:39	승인 대기	불출 수 긴급 사용
REQ-2025-0046	Steroid Injection ITEM-2025-0287	10개	2025. 11. 7. 오후 4:40:39	승인 대기	불출 수 긴급 사용

관리 김재고 (Admin)
inventory@ortho.com

OrthoLink

내 요청 현황

내 출고 요청 현황

출고 요청의 승인 상태를 확인하고 승인된 요청을 불출 처리합니다.

불출 처리 안내:

승인 완료된 요청만 불출이 가능합니다. 승인 대기 중인 요청은 의사/관리자의 승인 후 불출할 수 있습니다. 긴급한 경우 '긴급 사용' 버튼을 클릭하여 사후 승인으로 처리할 수 있습니다.

전체	승인 대기	승인 완료	불출 완료	반려	긴급 사용
6	2	1	1	1	1

전체 6 승인 대기 2 승인 완료 1 불출 완료 반려 긴급 사용

승인 완료 요청

승인되어 불출 가능한 요청 목록입니다.

요청번호	품목명	수량	요청일시	상태	작업
REQ-2025-0044	Hyaluronic Acid Injection ITEM-2025-0312	3개	2025. 11. 7. 오후 12:40:39	승인 완료	불출

관리 김재고 (Admin)
inventory@ortho.com

UI Design

5. Request status

The image displays three separate screenshots of the OrthoLink application's 'Request Status' section, each showing a different view of the request backlog and processing status.

Screenshot 1: Internal Request Status (Left)

- Header:** OrthoLink, Internal Request Status.
- Section:** Internal Request Status.
- Summary:** Total 6 requests, 2 pending, 1 approved, 1 rejected, 1 urgent.
- Table:** Shows a list of 1 request (REQ-2025-0042) with details: Item: Bone Cement, Status: Approved.
- Footer:** Admin: 김재고 (Admin), inventory@ortho.com.

Screenshot 2: Internal Request Status (Middle)

- Header:** OrthoLink, Internal Request Status.
- Section:** Internal Request Status.
- Summary:** Total 6 requests, 2 pending, 1 approved, 1 rejected, 1 urgent.
- Table:** Shows a list of 1 request (REQ-2025-0043) with details: Item: Steroid Injection, Status: Rejected.
- Footer:** Admin: 김재고 (Admin), inventory@ortho.com.

Screenshot 3: Internal Request Status (Right)

- Header:** OrthoLink, Internal Request Status.
- Section:** Internal Request Status.
- Summary:** Total 6 requests, 2 pending, 1 approved, 1 rejected, 1 urgent.
- Table:** Shows a list of 1 request (REQ-2025-0041) with details: Item: Pain Relief Patch, Status: Pending.
- Footer:** Admin: 김재고 (Admin), inventory@ortho.com.

This screenshot shows the 'Internal Request Status' page with a focus on urgent requests.

- Header:** OrthoLink, Internal Request Status.
- Section:** Internal Request Status.
- Summary:** Total 6 requests, 2 pending, 1 approved, 1 rejected, 1 urgent.
- Table:** Shows a list of 1 request (REQ-2025-0041) with details: Item: Pain Relief Patch, Status: Pending.
- Footer:** Admin: 김재고 (Admin), inventory@ortho.com.

UI Design

6. Approval Management

OrthoLink

승인 관리

승인 대기 대기 중입니다. 신속한 검토가 필요합니다.

2건
의 요청이 1시간 이상 대기 중입니다. 신속한 검토가 필요합니다.

1건
의 응급 불출 건이 사후 승인 기한(72시간) 내에 처리되어야 합니다. 즉시 검토가 필요합니다.

승인 대기 3 | 사후 승인 대기 3 | 승인 완료 1 | 불출 완료 1 | 반려 1

사전 승인 대기 3 | 사후 승인 대기 3 | 승인 완료 1 | 불출 완료 반려

사전 승인 대기 중인 요청
승고 천 검토 및 승인/반려 처리가 필요한 요청 목록입니다.

요청번호	품목명	수량	요청자	요청일시	경과시간	상태	작업
REQ-2025-0045	Hyaluronic Acid Injection ITEM-2025-0312	5개	김민지 간호사	2025. 11. 7. 오후 3:41:52	△ 2시간 0분 경과	승인 대기	승인 반려
REQ-2025-0046	Steroid Injection ITEM-2025-0287	10개	이서준 간호사	2025. 11. 7. 오후 4:41:52	△ 1시간 0분 경과	승인 대기	승인 반려
REQ-2025-0047	Bone Cement ITEM-2025-0523	2개	박지원 간호사	2025. 11. 7. 오후 5:11:52	30분 경과	승인 대기	승인 반려

관리 김재고 (Admin) inventory@ortho.com

OrthoLink

승인 관리

승고 요청을 검토하고 승인/반려 처리합니다.

2건
의 요청이 1시간 이상 대기 중입니다. 신속한 검토가 필요합니다.

1건
의 응급 불출 건이 사후 승인 기한(72시간) 내에 처리되어야 합니다. 즉시 검토가 필요합니다.

승인 대기 3 | 사후 승인 대기 3 | 승인 완료 1 | 불출 완료 1 | 반려 1

사전 승인 대기 3 | 사후 승인 대기 3 | 승인 완료 1 | 불출 완료 반려

사후 승인 대기 (응급 불출)
응급 상황으로 사전 승인 없이 불출된 품목입니다. 불출 후 72시간 이내 사후 승인이 필요합니다.

요청번호	품목명	수량	요청자	불출일시	승인 기한	상태	작업
REQ-2025-0050	Bone Cement ITEM-2025-0523	1개	한지우 간호사	2025. 11. 4. 오후 7:41:52	△ 1시간 59분 남음	응급 불출 (사후승인 대기)	사후 승인 반려
REQ-2025-0049	Hyaluronic Acid Injection ITEM-2025-0312	3개	최민수 간호사	2025. 11. 5. 오후 5:41:52	23시간 남음	응급 불출 (사후승인 대기)	사후 승인 반려
REQ-2025-0048	Emergency Splint Kit ITEM-2025-0721	2개	윤서연 간호사	2025. 11. 7. 오전 7:41:52	2월 13시간 남음	응급 불출 (사후승인 대기)	사후 승인 반려

관리 김재고 (Admin) inventory@ortho.com

OrthoLink

승인 관리

승고 요청을 검토하고 승인/반려 처리합니다.

2건
의 요청이 1시간 이상 대기 중입니다. 신속한 검토가 필요합니다.

1건
의 응급 불출 건이 사후 승인 기한(72시간) 내에 처리되어야 합니다. 즉시 검토가 필요합니다.

승인 대기 3 | 사후 승인 대기 3 | 승인 완료 1 | 불출 완료 1 | 반려 1

사전 승인 대기 3 | 사후 승인 대기 3 | 승인 완료 1 | 불출 완료 반려

승인 완료 요청
승인되어 불출 대기 중인 요청 목록입니다.

요청번호	품목명	수량	요청자	요청일시	경과시간	상태	작업
REQ-2025-0044	Hyaluronic Acid Injection ITEM-2025-0312	3개	최수현 간호사	2025. 11. 7. 오후 12:41:52	5시간 0분 경과	승인 완료	불출

관리 김재고 (Admin) inventory@ortho.com

UI Design

6. Approval Management

OrthoLink

승인 관리

승인 관리
출고 요청을 검토하고 승인/반려 처리합니다.

2건
의 요청이 1시간 이상 대기 중입니다. 신속한 검토가 필요합니다.

1건
의 응급 불출 건이 사후 승인 기한(72시간) 내에 처리되어야 합니다. 즉시 검토가 필요합니다.

승인 대기	사후 승인 대기	승인 완료	불출 완료	반려
3	3	1	1	1

사전 승인 대기 3 | 사후 승인 대기 3 | 승인 완료 1 | 불출 완료 | 반려

불출 완료
승인 후 불출이 완료된 요청 목록입니다.

요청번호	품목명	수량	요청자	요청일시	경과시간	상태
REQ-2025-0042	Bone Cement ITEM-2025-0523	1개	강예진 간호사	2025. 11. 4. 오후 5:41:52	72시간 0분 경과	불출 완료

관리 김재고 (Admin)
inventory@ortho.com

OrthoLink

승인 관리

승인 관리
출고 요청을 검토하고 승인/반려 처리합니다.

2건
의 요청이 1시간 이상 대기 중입니다. 신속한 검토가 필요합니다.

1건
의 응급 불출 건이 사후 승인 기한(72시간) 내에 처리되어야 합니다. 즉시 검토가 필요합니다.

승인 대기	사후 승인 대기	승인 완료	불출 완료	반려
3	3	1	1	1

사전 승인 대기 3 | 사후 승인 대기 3 | 승인 완료 1 | 불출 완료 | 반려

반려된 요청
반려 처리된 요청 목록입니다.

요청번호	품목명	수량	요청자	요청일시	경과시간	상태
REQ-2025-0043	Steroid Injection ITEM-2025-0287	8개	정민호 간호사	2025. 11. 6. 오후 5:41:52	24시간 0분 경과	반려

관리 김재고 (Admin)
inventory@ortho.com

UI Design

7. User Management

OrthoLink User Management Dashboard

The dashboard displays the following sections:

- 사용자 관리**: A summary of user counts across three roles:
 - 간호사 (Nurse): 2 명
 - 의사 (Doctor): 2 명
 - 재고 관리자 (Inventory Manager): 1 명
- 역할 설정**: A note about system automation.
- 사용자 목록**: A table listing users with columns: 이름 (Name), 이메일 (Email), 역할 (Role), 부서 (Department), 최근 로그인 (Last Login), 로그인 상태 (Login Status), and 작업 (Actions).

OrthoLink User Profile View

A modal window titled "사용자 정보 수정" (User Information Modification) is open, showing the following details for the user "김지영":

- 이름 ***: 김지영
- 이메일 ***: jiyoung.kim@hospital.com
- 역할 ***: 재고 관리자 (Inventory Manager)
- 검색**: A search bar for filtering users.
- 부서 ***: 정형외과
- 로그인**: A table showing login history with columns: 날짜 (Date), 로그인 상태 (Login Status), 편집 (Edit), and 삭제 (Delete).

UI Design

7. User Management

The screenshot shows the OrthoLink User Management interface. At the top, there are three main categories: 간호사 (Nurse), 의사 (Doctor), and 재고 관리자 (Inventory Manager). Below each category, there is a count: 2명 for Nurses, 2명 for Doctors, and 1명 for Inventory Managers. A central modal dialog titled "사용자 삭제 확인" (User Deletion Confirmation) asks if the user wants to delete the selected user. The background table lists user details such as name, email, role, location, last login, log-in status, and actions (Edit, Delete).

이름	이메일	역할	부서	최근 로그인	로그인 상태	작업
김지영	jiyoung.kim@hospital.com	재고 관리자 (Inventory Manager)	정형외과	2025-11-07 09:30	로그인 중	<input checked="" type="checkbox"/> 편집 <input type="checkbox"/> 삭제
이수진	sujin.lee@hospital.com	간호사 (Nurse)	정형외과	2025-11-07 10:15	로그인 중	<input checked="" type="checkbox"/> 편집 <input type="checkbox"/> 삭제
박민호	minho.park@hospital.com	의사 (Doctor)	정형외과	2025-11-07 08:45	오프라인	<input checked="" type="checkbox"/> 편집 <input type="checkbox"/> 삭제
최은혜	eunhye.choi@hospital.com	간호사 (Nurse)	정형외과	2025-11-06 16:20	오프라인	<input checked="" type="checkbox"/> 편집 <input type="checkbox"/> 삭제
정현우	hyunwoo.jung@hospital.com	의사 (Doctor)	정형외과	2025-10-28 14:30	오프라인	<input checked="" type="checkbox"/> 편집 <input type="checkbox"/> 삭제

The screenshot shows the OrthoLink User Management interface with a modal dialog for adding a new user. The dialog has fields for Name (예: 김지영), Email (예: jiyoung.kim@hospital.com), Location (역할 선택), and Department (부서 선택). The background table shows the current user list.

이름	이메일	부서	최근 로그인	로그인 상태	작업
김지영	jiyoung.kim@hospital.com	간호사 (Nurse)	2025-11-07 09:30	로그인 중	<input checked="" type="checkbox"/> 편집 <input type="checkbox"/> 삭제
이수진	sujin.lee@hospital.com	간호사 (Nurse)	2025-11-07 10:15	로그인 중	<input checked="" type="checkbox"/> 편집 <input type="checkbox"/> 삭제
박민호	minho.park@hospital.com	의사 (Doctor)	2025-11-07 08:45	오프라인	<input checked="" type="checkbox"/> 편집 <input type="checkbox"/> 삭제
최은혜	eunhye.choi@hospital.com	간호사 (Nurse)	2025-11-06 16:20	오프라인	<input checked="" type="checkbox"/> 편집 <input type="checkbox"/> 삭제
정현우	hyunwoo.jung@hospital.com	의사 (Doctor)	2025-10-28 14:30	오프라인	<input checked="" type="checkbox"/> 편집 <input type="checkbox"/> 삭제

12

CONCLUSION & REFERENCE

Optimizing Medical Supply Chain with OrthoLink

1. Key Achievements

Enhanced Operational Visibility

- Real-Time Dashboard enables proactive control over low-stock and expiring items.

Strengthened Governance & Safety

- Electronic Approval Workflow ensures no high-risk material is disbursed without doctor authorization.

Data Integrity & Accountability

- Immutable Audit Logs & RBAC guarantee full transparency for every transaction.

2. Business Impact & Future Work

- **Impact:** Replaced fragmented manual practices with a centralized system, reducing costs and waste.
- **Value:** Allows hospitals to focus resources on their primary mission: Patient Care.
- **Future:** Integration of AI-driven demand forecasting and mobile application.

Reference

- **Material Logistics in Hospitals: A Literature Review** — Volland, J., Fügener, A., Schoenfelder, J., & Brunner, J. (2017), Omega, 69, 82–101
https://www.sciencedirect.com/science/article/pii/S0305048316304881?utm_source=chatgpt.com
- **Medical device regulations: Global overview and guiding principles** — World Health Organization (WHO) https://iupesm.org/wp-content/uploads/2014/06/WHO-Medical_Device_Regulatns.pdf?utm_source=chatgpt.com
- **U.S. Food and Drug Administration (FDA) Unique Device Identification System (UDI System) documents** https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance/unique-device-identification-system-udi-system?utm_source=chatgpt.com

Q & A

THANK YOU
