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| IMS |
| Non-functional requirements doc |
| Version 1.0.0 |

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| Prepared by me  10-10-2024 |

# Introduction

## Purpose

This document outlines the non-functional requirements for the Inventory Management System (IMS). Non-functional requirements define how the system performs and focuses on aspects such as usability, performance, security, and scalability.

## Scope

The non-functional requirements apply to the overall operation of the Inventory Management System and ensure that the system meets business expectations for performance, reliability, and security while scaling as needed.

# Non-Functional Requirements

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| --- | --- | --- | --- |
| ID | Requirement Description | Priority | Comments |
| Performance Requirements | | | |
|  | The system must handle at least 50 concurrent users without performance degradation. | High |  |
|  | The system must process and complete transactions (e.g., inventory updates, order processing) within 2 seconds under normal load conditions. | high |  |
|  | The system must be able to generate and display reports (e.g., sales, inventory lists) within 5 seconds for datasets under 100,000 records. | high |  |
|  | The system must ensure that background processes such as data synchronization or backups do not impact the performance of user-facing operations. | high |  |
| Scalability Requirements | | | |
|  | The system must be able to scale to handle at least 500,000 inventory items and 10,000 sales transactions per day. | High |  |
|  | The system must be scalable to accommodate additional warehouses and users as the business grows. | High |  |
|  | The system must support horizontal and vertical scaling as required, including the ability to add more servers or resources when needed. |  |  |
| Availability and Reliability Requirements | | | |
|  | The system must provide 99.9% uptime availability during business hours (Monday to Friday, 8 AM to 6 PM). |  |  |
|  | The system must support automatic failover to a backup server in case of a primary system failure, ensuring continued access to critical functionality. |  |  |
|  | The system must automatically retry any failed transactions or data syncs to ensure no data is lost |  |  |
|  | The system must notify administrators immediately via email or SMS in the event of a critical system failure or outage. |  |  |
| Security Requirements | | | |
|  | The system must enforce user authentication using strong password policies, including a minimum of 8 characters with at least one uppercase letter, one number, and one special character. |  |  |
|  | The system must implement role-based access control (RBAC) to restrict users' access to specific features based on their roles (e.g., admin, warehouse staff, sales team). |  |  |
|  | |  | | --- | |  |  |  | | --- | | The system must ensure all sensitive data, including user credentials and financial transactions, are encrypted using industry-standard encryption methods (e.g., AES-256). | |  |  |
|  | The system must provide audit logs to track user activities, such as login attempts, inventory updates, and order processing. |  |  |
|  | The system must use HTTPS for all communications between client and server to ensure data integrity and confidentiality. |  |  |
| Usability Requirements | | | |
|  | The system interface must be user-friendly and require minimal training for new users (no more than 1 day). |  |  |
|  | The system must support multi-language functionality to accommodate users in different regions. | low |  |
|  | The system must provide clear error messages with instructions on how to resolve common user errors. | medium |  |
|  | The system must provide a mobile-friendly interface, optimized for smartphones and tablets, allowing warehouse staff to manage inventory on-the-go. |  |  |
| Maintainability Requirements | | | |
|  | The system must be modular and allow easy updates or changes to individual components without affecting overall system functionality. |  |  |
|  | The system must include detailed documentation for system administrators, including instructions on configuration, maintenance, and troubleshooting. |  |  |
|  | The system must allow administrators to apply software updates and patches with minimal downtime (no more than 15 minutes of downtime for updates). |  |  |
| Backup and Recovery Requirements | | | |
|  | The system must automatically back up inventory, sales, and order data daily to a secure, off-site location. |  |  |
|  | The system must allow administrators to restore the most recent backup in case of data loss, with no more than 15 minutes of downtime. |  |  |
|  | The system must store backups for a minimum of 90 days, ensuring data can be recovered for any period within this timeframe. |  |  |
| Compliance Requirements | | | |
|  | The system must comply with local and international data protection laws (e.g., GDPR for EU-based users). |  |  |
|  | The system must provide a mechanism for users to export and delete their personal data to comply with privacy regulations. |  |  |
| Integration Requirements | | | |
|  | The system must provide APIs for integration with third-party systems, including accounting software, point-of-sale (POS) systems, and e-commerce platforms. | low |  |
|  | The system must support real-time synchronization with third-party sales and financial systems to maintain up-to-date inventory and transaction records. | low |  |
| Data Consistency and Integrity | | | |
|  | The system must ensure data consistency across all modules, ensuring that any changes to inventory, orders, or sales are reflected in real-time throughout the system. |  |  |
|  | The system must enforce database constraints (e.g., foreign keys, unique keys) to maintain data integrity and prevent duplication or corruption. |  |  |
|  | The system must ensure that inventory stock levels and financial data are always in sync and reflect current transactions. |  |  |
| Data Retention and Archiving | | | |
|  | The system must support the archiving of historical sales, order, and inventory data older than 5 years. Archived data should be retrievable on-demand. |  |  |
|  | The system must retain all financial transaction records for a minimum of 7 years to comply with accounting and tax regulations. |  |  |
| Localization and Internalization | | | |
|  | The system must support multi-currency operations, allowing prices and financial records to be displayed and processed in local currencies. |  |  |
|  | The system must allow localization of date formats, number formats, and other region-specific settings to accommodate global users. |  |  |
| Transaction Integrity and Atomicity | | | |
|  | The system must ensure that critical transactions, such as inventory updates and sales processing, are atomic, meaning they either fully succeed or fail without partial completion. |  |  |
|  | The system must roll back any changes in case of transaction failure, ensuring no partial or incomplete data is stored. |  |  |
| **System Monitoring and Logging** | | | |
|  | The system must support real-time monitoring of system performance, tracking metrics such as CPU usage, memory usage, and database query performance. |  |  |
|  | The system must maintain detailed logs of all user activities and system operations, such as login attempts, inventory updates, and transaction processing. |  |  |
|  | The system must allow administrators to configure alerts for critical events, such as system performance degradation, security breaches, or failed transactions. |  |  |
| **Disaster Recovery and Business Continuity** | | | |
|  | The system must have a disaster recovery plan in place to ensure business continuity in case of major system failures, cyberattacks, or natural disasters. |  |  |
|  | The system must ensure that recovery time for business-critical functions is no longer than 1 hour in the event of a major failure. |  |  |
| User Experience (UX) Requirements | | | |
|  | The system must provide consistent navigation and layout across all modules to enhance usability and reduce training time for new users. |  |  |
|  | The system must ensure that key functions, such as inventory search and sales processing, can be performed with minimal clicks or steps. |  |  |
|  | The system must ensure that load times for user interface elements are under 2 seconds to promote a responsive experience. |  |  |
| **API Availability and Rate Limiting** | | | |
|  | The system must provide an API with availability of 99.9% to ensure smooth integration with third-party applications (e.g., accounting, POS). |  |  |
|  | The system must implement rate limiting on API requests to prevent overloading and abuse of system resources. |  |  |
| Energy Efficiency | | | |
|  | The system must optimize energy consumption by minimizing server resource usage during idle periods. |  |  |
|  | The system must utilize cloud infrastructure features such as auto-scaling and resource optimization to reduce costs and environmental impact. |  |  |

# Assumptions and Constraints

## **Assumptions**:

* + The system will be hosted on a cloud platform with scalable resources.
  + Users will have reliable internet access for using the system.
  + mobile devices will be available to warehouse staff.

## **Constraints**:

* + Budget constraints may limit the use of some advanced features like AI-based forecasting or high-end data encryption.
  + Compliance with local regulations may limit some functionality (e.g., data retention policies).

# **Acceptance Criteria**

* The system must meet performance standards under typical load conditions.
* The system must enforce security protocols and user access controls to ensure data safety.
* The system must provide a mobile-friendly interface for warehouse staff.
* The system must handle scalability for increasing inventory and user numbers over time.
* Data backups must occur daily, and data recovery processes must be smooth with minimal downtime.