

Introduction

The Inventory Management System is designed to streamline inventory operations for companies with multiple branches, each containing various storage locations. This system offers robust capabilities to track individual products, including critical details such as expiration dates. Users benefit from timely alerts when product quantities fall below predefined thresholds, ensuring that they can manage stock levels effectively.

In addition to inventory tracking, the system logs every user action, providing a comprehensive audit trail that enhances accountability and transparency. It also facilitates the management of suppliers and clients, allowing users to register procurement and sales transactions seamlessly. With real-time visibility into product quantities.

Technologies Used

The Inventory Management System leverages a variety of modern technologies to ensure a robust and efficient architecture. Below are the key technologies and design patterns utilized:

1. **.NET 8 API:** This framework provides a powerful environment for building scalable web applications. Its performance improvements and support for modern development practices make it an excellent choice for backend services.
2. **Clean Architecture:** By following Clean Architecture principles, the system separates concerns, making it easier to maintain and test. This modular approach allows for independent development of components and enhances code readability.
3. **Domain-Driven Design (DDD):** DDD focuses on the core domain of the application, ensuring that the system closely aligns with business requirements. This approach fosters collaboration between technical and domain experts, resulting in a more effective solution.
4. **Command Query Responsibility Segregation (CQRS):** This pattern separates read and write operations, optimizing performance and scalability. It allows the system to handle complex queries more efficiently while simplifying data updates.
5. **Result Pattern:** This pattern enhances error handling by providing a standardized way to manage success and failure outcomes. It improves code clarity and ensures that errors are handled gracefully.
6. **SignalR:** This library facilitates real-time communication between the server and clients, enabling instant updates for inventory changes and alerts. It enhances user experience by providing immediate feedback on actions taken within the system.
7. **React + Vite:** On the frontend, React is used for building a dynamic and responsive user interface, while Vite serves as a fast development environment. This combination allows for rapid prototyping and a smooth user experience, ensuring that users can interact with the inventory management system efficiently.

Features

The Inventory Management System is equipped with a range of features designed to enhance inventory management and streamline operations. The following features have been successfully implemented:

1. **Creating Categories:** Users can create categories for organizing products, with the ability to establish a hierarchical category tree. This feature ensures that products can only be added to leaf nodes of the category tree, promoting structured organization.
2. **Creating Brands:** The system allows users to create and manage brands, facilitating better identification and categorization of products.
3. **Creating Products with Attributes:** Users can define attributes and their corresponding values to describe products comprehensively. This feature enhances product identification and classification.
4. **Creating Generic Products and Instances:** The system supports the creation of generic products, along with the ability to generate specific instances based on defined attributes. This ensures that duplicate products are prevented, maintaining inventory integrity.
5. **Creating Suppliers with Multiple Addresses:** Users can register suppliers within the system, allowing for the management of multiple addresses associated with each supplier. This feature aids in effective supplier relationship management.

The remaining features are currently underway and will be detailed in future updates.