Software Design and Engineering

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This artifact is a mobile application designed to be an inventory management app I originally developed in CS360: Mobile Architecture and Programming. The initial mobile application was designed to help users track inventory in environments like warehouses, with features focused on improving real-time visibility and automating logistics through mobile devices. The Android app included user authentication, a grid-style inventory display, functionality to add, remove, or adjust quantities of items, and a notification system that alerted users when an item’s count reached zero. It also used a local database with two tables to store login credentials and inventory data.

For this enhancement, I expanded the original mobile app into a full-stack web application using the MEAN stack (MongoDB, Express.js, Angular, and Node.js). The web version replicates the main functionality of the mobile app—excluding the SMS alert feature—and offers a responsive, browser-based interface for managing inventory. Users can log in, view all inventory items, and adjust quantities as needed. This transition to a new platform demonstrates my ability to adapt and extend existing software solutions using modern full-stack development practices.

I selected this artifact for my ePortfolio because it showcases my growth in both mobile and web development. It reflects my skills in building scalable, full-featured applications across platforms, and my ability to solve logic-based challenges while applying software engineering best practices. The project highlights my work in front-end Angular development, back-end API design with Node.js and Express, and data management with MongoDB. I also placed a strong emphasis on clean, well-documented code to support team collaboration and future maintenance.

The development process presented some challenges, especially as I was still becoming familiar with the MEAN stack. Building the web application from the ground up took more time than expected, but by applying concepts from CS350: Emerging Systems Architectures and Technologies, I was able to complete a working version in just over a week. This was a significant improvement over the seven weeks it originally took me to build the mobile version, which demonstrates my technical growth and improved efficiency.

This enhancement helped me meet several program outcomes. I wrote readable, well-commented code to support collaborative development. I applied algorithmic and software design principles to develop a practical, functional solution. I also used industry-relevant tools and frameworks to build a more robust and modern application, preparing it for future enhancements such as connecting the mobile and web versions to a shared cloud database.

The one outcome I haven’t fully met yet is developing a strong security architecture. While basic authentication is implemented, features like token validation, secure API handling, and data encryption will be addressed in a future update. My plan is to implement these security enhancements when I integrate both platforms with a shared MongoDB instance, further strengthening the system’s reliability and protecting user data.