**Milestone Two Narrative: Software Design and Engineering Artifact Enhancement**

**Artifact Overview**

The artifact I selected for enhancement is the **Animal Shelter Dashboard Project** developed for Grazioso Salvare. This full stack CRUD application, built using Python, MongoDB, and Dash, was originally designed to help the organization identify and manage dogs suitable for rescue training. The original version allowed users to view, filter, and update animal records through a dashboard interface and perform basic data operations on a MongoDB database.

This project was initially created earlier in my Computer Science program and reflected my growing capabilities in backend logic, database integration, and interactive web design. However, the original version had opportunities for improvement, particularly in areas such as modularity, error handling, and UI usability.

**Justification for Inclusion**

I selected this artifact for my ePortfolio because it represents a practical and functional software solution that aligns with real-world needs in the nonprofit sector. It showcases my ability to integrate multiple layers of technology—from data access and processing to interactive frontend visualizations—all tied together with clean, functional Python code.

The enhancements I made demonstrate my growth as a software designer. I refactored the CRUD module into a more modular and testable format, separating concerns for data access and business logic. I also improved error handling to catch and log database connection issues, added input validation for animal attributes, and polished the dashboard layout by improving visual clarity and interactivity.

These enhancements not only improve the user experience but also reflect my understanding of scalable design and professional coding practices. By enhancing this artifact, I am able to showcase my technical breadth and depth in software design and engineering.

**Progress Toward Course Outcomes**

In Module One, I identified the following course outcome as the target for this enhancement:  
**“Demonstrate an ability to use well-founded and innovative techniques, skills, and tools in computing practices for the purpose of implementing computer solutions that deliver value and accomplish industry-specific goals.”**

I believe I’ve made strong progress toward this outcome. My work shows clear application of design principles like modularity, error handling, and abstraction. I applied reusable code practices, improved the separation of concerns in the CRUD logic, and structured the app in a way that would allow future contributors to scale or extend the application.

I’ve also made partial progress toward the course outcome that involves professional communication. The improvements I made are documented and accompanied by inline comments and meaningful function names. The application now contains more readable code that would be easier for a team to maintain and build on.

I currently do not have updates to my original outcome-coverage plan, though I am more confident now that this artifact also demonstrates practical understanding of secure and maintainable design.

**Reflection on the Enhancement Process**

Working on this enhancement helped me better understand the value of clean, well-organized code and its impact on long-term maintainability. During the enhancement process, I restructured the code to break up long functions, extracted repeated logic, and created utility functions for common tasks like validating animal data and formatting dashboard outputs.

One of the challenges I faced was ensuring that database queries returned consistent and meaningful results, especially when filtering based on multiple criteria. Another challenge was managing state within the Dash interface and preventing stale data from being displayed after updates. To solve these problems, I researched best practices for Dash callbacks and used MongoDB query operators more effectively.

Enhancing this artifact reminded me that software design is just as much about clarity and usability as it is about functionality. This project now reflects a more polished, professional-grade application that I feel confident sharing in my ePortfolio and presenting to potential employers.