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CS-499 Milestone Two Narrative

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## **Artifact Overview and Justification**

The artifact I selected for enhancement is the Grazioso Salvare dashboard, originally developed in CS-340 Client/Server Development. It is a Dash-based web application that visualizes animal rescue data from a MongoDB database. The dashboard includes interactive filters, a data table, a pie chart of breed distribution, and a map showing the location of selected animals. I chose this artifact because it integrates multiple components of software design and engineering: user interface layout, backend database interaction, and real-time data visualization. It also reflects my ability to work with APIs, manage data flow, and build responsive applications.

This artifact is ideal for my ePortfolio because it demonstrates my technical depth and design thinking in a single, cohesive project. It showcases my ability to write clean, modular code, handle real-world data, and present information in a user-friendly format. The enhancements I made further elevate its quality and align with professional standards in software engineering.

## **Enhancements and Course Outcomes**

For Milestone Two, I focused on improving the software design and engineering aspects of the dashboard. Enhancements included:

- Adding try/except blocks to all CRUD operations in the AnimalShelter class to improve error handling and system resilience.
- Writing docstrings for all major functions and classes to improve code readability and maintainability.
- Enhancing inline comments throughout the dashboard code to clarify logic and support future developers.
- Improving callback structure and consistency, including better exception handling and layout adjustments.

These enhancements align with the following Computer Science program outcomes:

- Outcome 1: Demonstrating innovative techniques in software design and implementation.
- Outcome 3: Designing computing solutions using algorithmic principles and managing trade-offs.
- Outcome 4: Communicating technical ideas clearly through documentation and visual presentation.

## **Reflection and Learning**

Through this enhancement process, I deepened my understanding of modular design and defensive programming. Adding structured error handling helped me anticipate edge cases and improve system reliability. Writing docstrings and comments forced me to think critically about how each function contributes to the overall architecture. I also gained confidence in refactoring callback logic to make the dashboard more maintainable and scalable.

One challenge I faced was ensuring that enhancements didn't break existing functionality. I had to test each change carefully and verify that the dashboard remained responsive and accurate. Another challenge was deciding how much to modularize without overcomplicating the structure. I learned to balance clarity with simplicity — a key principle in software engineering.

Overall, this milestone helped me refine a project I'm proud of and prepare it for professional presentation in my ePortfolio.