Module 5-2 Milestone Four:

Enhancement Three – Databases

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# Module 5-2 Milestone Four: Enhancement Three – Databases

This paper provides a narrative accompanying the database enhancement artifact included in the ePortfolio. It outlines the rationale behind the selection of the artifact, its relevance to database concepts, and reflects on the creation and refinement processes. The artifact represents not just a technical project, but also a demonstration of my growth and learning throughout the development process.

## Artifact Overview

The chosen artifact is the "Salvare Search for Rescue" web application, developed during the CS340 Client/Server Development course. The app was designed to interface with animal shelter databases, enabling users to identify and categorize dogs suitable for rescue training. Developed using Python and the Dash framework, the application uses MongoDB as a non-relational database with PyMongo as the connector. It can be run through Jupyter Notebook or a local terminal with a browser-based dashboard interface.

## Design and Implementation

The application is built on a multi-tier architecture incorporating a Model-View-Controller (MVC) structure and RESTful API design. The MVC architecture promotes a separation of concerns: the model handles data management via MongoDB and Python, the view manages user interface elements using Dash, and the controller oversees data flow through PyMongo. Each MongoDB document is stored in BSON and retrieved in JSON format.  
  
Upon launching the application, users access the dashboard through a web browser (e.g., http://127.0.0.1:8050/), where they can interact with the data. This setup supports input validation and secure database access, reinforcing a security-first mindset in software design.

A screenshot of a search dashboard

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## Code Structure and Security

The application’s source code is well-documented and adheres to clean coding standards, including descriptive variable and function names. The CRUD operations are encapsulated in a reusable Python module that promotes maintainability and modular development. The application uses IF-ELIF-ELSE logic to handle various cases, ensuring robust execution and error handling.  
A screenshot of a computer program

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The transition from a Linux-based development environment (Apporto Virtual Lab) to Windows introduced new challenges, particularly in configuring Python and MongoDB locally. This effort enhanced my adaptability and problem-solving skills while refining my understanding of version differences in PyMongo and MongoDB.

A screen shot of a computer program

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## Technical Enhancements and Documentation

During enhancement, the web application was successfully recreated on a Windows environment, requiring updates to both the code and documentation to accommodate newer software versions. The modifications improved compatibility and usability across platforms. I documented the entire process, ensuring clear and accessible guidance for replicating the environment on either Linux or Windows.  
  
This artifact showcases proficiency in professional communication and technical documentation tailored to specific audiences and environments. It also reflects my capability to utilize innovative tools and methodologies to meet industry requirements and deliver high-quality software solutions.

A screenshot of a computer

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A screen shot of a computer program

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A computer screen shot of a program code

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## Conclusion

Recreating the application in a different operating system environment expanded my skills in cross-platform development, documentation, and secure coding practices. The revised project illustrates my ability to implement real-world solutions through modern computing principles and standards.