CS 499 Milestone Four – Databases Enhancement

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## Artifact Description

The artifact enhanced in this milestone is my Dispatcher App, a scheduling system built with a Vite + React frontend and a Node.js/Express backend. Originally, the project simulated data using static TypeScript arrays. In this enhancement, I integrated a real MongoDB database to persist flight, agent, and assignment data dynamically between dispatcher and agent roles.

## Justification for Inclusion

I chose this artifact because it demonstrates my understanding of full-stack architecture and practical database integration. The new MongoDB layer showcases my ability to design schemas, connect APIs to persistent data storage, and maintain data consistency across the system.

## Enhancement Summary

I implemented a database schema for flights, agents, and assignments using Mongoose models. I created REST API routes in Express to retrieve and store assignment data, which the frontend consumes via TypeScript API calls. This enhancement transformed the application from a static simulation into a persistent, real-world scheduling system.

## Course Outcomes Met

This enhancement demonstrates proficiency in:  
- Software engineering and database design: implementing persistent data models and RESTful APIs.  
- Algorithmic integration: combining scheduling logic with persistent storage.  
- Secure system design: separating client and server concerns while using environment variables for database credentials.

## Reflection

During this enhancement, I learned how to structure and connect full-stack components effectively using modern web technologies. A challenge I faced was ensuring schema consistency between the frontend TypeScript types and backend Mongoose models, which I solved by defining shared model interfaces. The result is a scalable and maintainable architecture aligned with professional software engineering practices.