John Munguia

CS 499

July 20, 2025

Milestone Two Narrative – Enhancement One: Software Design/Engineering

**Artifact Description**  
The artifact I selected is the app.js file from the full-stack travel booking web application I developed during CS 465: Full-Stack Development. This file serves as the main entry point of the backend and is responsible for server configuration, middleware setup, routing, CORS handling, and error management using the Node.js and Express frameworks. It was originally created in Spring 2025 and has been enhanced to align with modern industry practices and improve maintainability.

**Why I Selected This Artifact**  
I chose this artifact because it demonstrates key software engineering principles, including modular design, configuration management, secure middleware use, and robust error handling. It forms the backbone of the application's backend, making it an ideal representation of my skills in building scalable server-side solutions. The original version worked, but improvements were needed to meet professional expectations, especially regarding maintainability and flexibility across environments.

**Enhancements and Skills Demonstrated**  
The enhancements I performed focused on refactoring the code for maintainability, security, and environmental flexibility:

* I moved the hardcoded CORS origin into a .env file using process.env.CLIENT\_URL. This change allows the app to adapt across development and production environments more easily.
* I modularized the middleware logic by creating separate files for CORS (cors.js), logging (logger.js), and error handling (errorHandler.js) under a middleware directory.
* I replaced the default morgan('dev') logging with a custom logger that writes access logs to a file inside a new logs directory.
* I improved the commenting throughout the file and ensured that route handlers and middleware are clearly grouped and labeled.

These enhancements reflect my understanding of best practices in backend engineering, such as separation of concerns, environment-aware configuration, and observability (logging).

**Outcome Alignment**  
This work directly supports Outcome 4 of the Computer Science program: "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." I also made progress toward Outcome 3 by applying structural and algorithmic improvements to how the server processes and handles requests.

I followed the plan laid out in my code review script, completing every enhancement I committed to except automated testing, which I plan to address in a future iteration. The improvements completed already strengthen the overall quality of the application’s server design.

**Reflection on the Enhancement Process**  
This enhancement taught me the importance of designing for scale and maintainability from the start. Breaking the middleware and error handling into modules made the structure easier to follow and more flexible to update later. Using .env variables for configuration like the CORS origin made the app more production-ready. Implementing file-based logging helped me simulate real-world practices for monitoring backend services.

The most challenging part was ensuring that all pieces still worked correctly after splitting up the logic, especially since middleware order matters in Express. Testing each change one step at a time helped prevent breaking the application.

Overall, this enhancement sharpened my backend engineering skills and gave me confidence in preparing code that would hold up in a real team or production environment. This artifact now better represents my technical ability and readiness for industry work.