IT 497 – Project Refinement and Ethical Integration Report

Introduction

This report documents the refinement of my S.P.S.B. System project and places it in the broader context of my spiritual and professional development. The assignment invited me to improve a meaningful project, address complex technical challenges, and integrate ethical and spiritual principles in a deliberate and transparent way.

My refined project, the S.P.S.B. System, began as a simple Google Form workflow and grew into a secure, fair, and accountable web application that stewards can use to reserve Sunday prayer slots. Along the way I implemented stronger authentication, authorization, data validation, and ethical user experience patterns. I also connected this work to my guiding principles of resilience, courage, and integrity.

In addition, this report situates the refined project inside a larger portfolio of six significant projects and an explicit ethical dilemma case. Together they show how my professional competencies in systems administration, cloud architecture, embedded systems, and safety critical work are aligned with my spiritual beliefs and desire to lead as a disciple of Jesus Christ.

Guiding Principles: Resilience, Courage, and Integrity

My work in this course and in this project has been shaped by three guiding principles: resilience, courage, and integrity. These principles are reinforced by talks and resources that I studied during the term.

Resilience is strengthened by Elder Joseph B. Wirthlin's counsel to "come what may, and love it." His invitation to learn to laugh, seek an eternal perspective, understand the principle of compensation, and trust in the Father and the Son has helped me respond to adversity with faith and steady effort rather than discouragement. When parts of the system failed, when designs needed to be rewritten, or when late discoveries required significant rework, this principle helped me keep moving forward with hope rather than frustration.

Courage is deepened by President Dieter F. Uchtdorf's message "Be Not Afraid, Only Believe." His description of Daniel's courage in Babylon and his warning about cynicism reminded me that belief and moral conviction require strength. Applying this principle in my technical work meant being willing to confront real security and fairness problems in the original system rather than pretending that a prototype was "good enough." It also meant receiving feedback with humility and using it to change the design.

Integrity is reinforced by Kim B. Clark's teachings about ethics and leadership. He emphasizes that leadership is fundamentally moral and that honesty and fairness are non negotiable foundations for trust. In the context of the S.P.S.B. System, integrity meant facing the consequences of plaintext passwords, incomplete authorization, and opaque logging, and then doing the harder work to correct them. It also meant aligning user experience decisions with respect for privacy, transparency, and moral stewardship rather than simple convenience.

These principles do not live only on paper. They show up in the way I design systems, document changes, receive correction, and serve the people who will rely on the tools I build.

Overview of the Original S.P.S.B. System and Its Limitations

The original Sunday Prayer Slot Booking System was a functional but limited prototype. Stewards could log in, see upcoming Sundays, and reserve opening or closing prayer slots. Administrators could add users, configure dates, and manage bookings through a separate admin page. All data, including users and dates, was stored in a single JSON file on the server, accessed synchronously by the Node.js and Express application.

However, several serious limitations emerged as I looked at the system through both a technical and an ethical lens. Passwords for both stewards and administrators were stored in plaintext. The admin interface displayed steward passwords directly in a table. A token was created at admin login, but the protected routes did not actually verify it, which meant that anyone who knew the endpoint URLs could potentially perform administrative actions. Date validation was weak and assumed that inputs were valid Sundays without consistently enforcing format or "future only" rules. The single JSON file had no concurrency safeguards and would not scale well under concurrent use.

Ethically, the system enforced the one slot rule only partially, which could lead to unfair distribution of responsibilities. Logging of cancellations and administrative actions was inconsistent and not clearly communicated to stewards. Interface labels relied on community assumptions without explanation. These limitations showed that the prototype was not yet appropriate for a real congregational setting. Refinement was needed to protect privacy, uphold fairness, and strengthen trust.

Technical and Ethical Refinements to the S.P.S.B. System

The refined S.P.S.B. System implements extensive changes in authentication, authorization, data integrity, booking logic, logging, and user experience. These changes are documented in detail in Appendix A but can be summarized in several key areas.

First, I replaced plaintext password comparison with bcrypt based password verification for both steward and admin logins. I added a password migration helper that automatically hashes legacy plaintext passwords on successful login so that existing accounts continue to

work. New users now have their passwords hashed before storage, and the admin interface no longer displays passwords at all. This directly addresses the ethical concern of exposing sensitive credentials and models respect for user privacy.

Second, I introduced a time limited admin token and a requireAdmin middleware. All administrative endpoints now verify this token, and only an enabled admin user can access protected routes. On the client side, the admin interface uses a reusable helper to send the token in an Authorization header and enforces automatic expiry. This change closes the gap between the intention of having admin sessions and the actual behavior of the routes, and it aligns with the principle of least privilege.

Third, I enforced fairness and data integrity in the booking logic. The system now guarantees a "one active slot per steward" rule across all booking paths. Opening and closing slots are represented in a standardized way, and the system creates them only when they are truly booked. A steward facing cancellation endpoint allows users to release a slot, records the cancellation with an optional reason, and logs the action in an audit trail. Stewards can see their own bookings by name, but other occupied slots are labeled "Booked by another member." This pattern preserves necessary transparency about availability while protecting personal information.

Fourth, I added centralized audit logging for key events such as user creation and deletion, date changes, slot assignments, and cancellations. Admin only views now surface this information in a way that supports accountability and avoids the feeling of secret surveillance. In the steward interface, I explicitly explain that cancellations are logged for the purpose of maintaining coverage, and that the information is not publicly shared.

Finally, I refined the user interface to express ethical values directly. Text labels and inline guidance emphasize fairness, responsibility, and respectful handling of steward information. I added clear sign out controls, improved status indicators, and confirmation prompts for destructive actions. Together these choices make the application not only more secure but more aligned with the spiritual goals of stewardship and mutual trust.

Peer Review and Iterative Improvement

Peer review and collaboration played a strong role in the refinement of this project. I received a written review from Aiden that was both brief and deeply meaningful. He expressed that he was impressed by the technical level of the changes and how they promoted fair access to prayer slots. He also admitted that he would not know how to begin implementing similar changes. His message reminded me how far the project had progressed from a simple Google Form to a full custom application.

Aiden also suggested an additional safeguard: implementing some form of block out system for individuals who attempt to book multiple slots inappropriately. His feedback confirmed that fairness and deterrence were visible and important themes, and it encouraged me to make the one slot rule clearer and more robust. In response I strengthened booking

validations and added explicit error messages when someone attempts to hold more than one slot or more than one household slot on a given Sunday. I also updated the household rule so that only one slot per household can be held on any given Sunday.

I provided Aiden with dedicated test accounts and invited him to explore the refined system further. This step turned the peer review into an ongoing conversation instead of a one time event.

I also conducted a peer review of Dallin's Heritage Vault 2.0 project. That experience helped me articulate what strong technical and ethical integration looks like and influenced the standard I applied to my own work. Dallin's project blended advanced engineering, layered security, and explicit ethical reasoning. Writing a comprehensive peer review forced me to look for the same elements in my own system and to document my decisions with the same level of clarity. Seeing another student succeed at that level was both motivating and instructive.

In summary, peer review confirmed strengths, exposed gaps, and reminded me that growth is a shared process. It also reinforced the spiritual principle that learning in Zion is often collaborative. We lift each other, and our projects improve together.

Integrated Project Narratives

The S.P.S.B. System does not stand alone. It is part of a broader pattern of projects where technical work, ethical responsibility, and spiritual growth converge. The following six projects are featured prominently in my portfolio and in my Wix site. Each description is written in a way that is ready to use as portfolio content.

Project 1 – S.P.S.B. System – Custom Booking System

S.P.S.B. System – Custom Booking System

Role: Creator and Lead Developer
Technologies: Node.js, Express, JSON datastore, bcrypt, AWS EC2, NGINX

The S.P.S.B. System is a fully customized scheduling platform designed to replace an earlier Google Form process that could no longer guarantee fairness, accuracy, or security. I architected and deployed the system from the ground up, building a secure backend, a steward facing interface, and an administrative dashboard.

Complex challenges included secure authentication with hashed passwords, a rule based booking engine that prevents slot hoarding, and a clear separation between steward and admin responsibilities. I implemented strong admin authorization, cancellation workflows, audit logging, and a one slot per household rule. Privacy was a central concern, so the system hides the names of other stewards and simply indicates that a slot is booked by another member.

Spiritually, this project reflects resilience and effort. There were moments when starting over with a custom application felt overwhelming compared to the simplicity of Google Forms. Remembering that God loves effort helped me continue. The system now serves as a concrete expression of fairness, stewardship, and trust in a community setting.

Project 2 – Linux Deployment Project – PromisedLand Infrastructure

Linux Deployment Project – PromisedLand Infrastructure

Role: Systems Administrator and Deployment Lead
Technologies: Ubuntu Server, user and group management, ACLs, Samba, NFS, cron, security hardening

The PromisedLand Deployment Project required the design and rollout of a multi server Linux environment for a simulated organization with several departments. I built structured user and group hierarchies, implemented ACL based permissions, configured Samba and NFS shares, and automated recurring tasks with cron. I also applied security hardening practices to reduce unnecessary exposure and protect sensitive folders and logs.

The main challenges involved designing a scalable directory structure, preventing privilege creep, and ensuring that different departments had appropriate but limited access to shared resources. I validated access patterns using test accounts that represented real roles and documented commands and procedures in an administrative workbook.

This project deepened my sense of technical stewardship. Creating just access rules and safeguarding confidential data mirrors spiritual stewardship. Doctrine and Covenants 58:26–28 encouraged me to act proactively rather than waiting to be compelled. In this environment, integrity is expressed in the way permissions are designed, documented, and maintained.

Project 3 – Embedded Security System – Express Union Finance

Embedded Security System – Express Union Finance

Role: Electronics and IT Technician
Technologies: PIC microcontrollers, sensor integration, GSM communication, custom phone interface

At Express Union I helped design and deploy a custom embedded intrusion detection system using the PIC 16F877A microcontroller and a Nokia based communication module. The system integrated infrared sensors, keypad authentication, and audible and visual alerts. It could initiate remote notifications when suspicious activity was detected. I also modified an office phone with LEDs and buzzer indicators to enable quiet but clear communication between the chief executive and an assistant.

The challenges included reliable sensor logic, stable communication over constrained hardware, and building systems that were robust enough for live banking environments. We tested the design in multiple agencies and iterated based on feedback from field staff.

Spiritually and ethically, this work carried a clear stewardship obligation. These systems were designed to protect people, assets, and sensitive financial information. Integrity meant avoiding shortcuts that would weaken security and being transparent with stakeholders about system capabilities and limitations. It also showed me that innovation, when grounded in moral purpose, can strengthen trust in an organization.

Project 4 – Journey Preschool – Cloud Migration Proposal

Journey Preschool – Cloud Migration Proposal

Role: Cloud Consultant and Strategist
Technologies: AWS services, IAM, backup strategies, compliance aligned architecture

Journey Preschool needed a secure and sustainable way to store and access records related to children, families, and staff. I evaluated their current state, identified risks, and proposed a cloud migration plan that used AWS services, structured IAM roles, and reliable backup routines. The design balanced access needs for teachers and administrators with protections that limited who could see sensitive data.

The most important challenges were aligning the solution with privacy and regulatory expectations and creating a design that non technical staff could use comfortably. I focused on clear role definitions, simple workflows, and consistent backup policies that would not depend on perfect human memory.

This project brought my spiritual values into sharp focus. Working with children's data highlighted the importance of compassion, protection, and respect. I saw cloud architecture as an expression of stewardship. Each decision needed to reflect a commitment to safeguard families and enable educators to focus on their mission.

Project 5 – BitBeat Inc. – AWS Business Solutions

BitBeat Inc. – AWS Business Solutions

Role: Cloud Architect and Security Advisor
Technologies: AWS EC2, VPC, IAM, monitoring, cost control

BitBeat Inc. required a scalable and secure cloud environment to support its services. I designed a phased deployment strategy that began with a small but well structured footprint and could grow over time. The environment included segregated networks, role based access control through IAM, and monitoring that supported operational awareness and accountability.

Complex challenges included balancing cost considerations with reliability, avoiding over granting permissions, and designing with future growth in mind. I created clear documentation and diagrams so that stakeholders could understand the structure and rationale.

Spiritually, this project reinforced the importance of foresight and accountability. Technical decisions create long term paths, and leaders are responsible for the safety and sustainability of those paths. Integrity required me to avoid quick but risky shortcuts and to communicate both opportunities and constraints honestly.

Project 6 – Fire Alarm As-Built Assembly Installation – WMATA

Fire Alarm As Built Assembly Installation – WMATA

Role: Team Lead and Field Coordinator
Technologies: Fire alarm panels, field installation, documentation, safety procedures

In this project I led a two person team that installed and documented fire alarm as built assemblies across 94 WMATA stations. This work required careful coordination with engineering, safety, and operations teams. We verified panel information, updated labeling, documented status, and ensured that information flowed back to centralized records.

The challenges were logistical and ethical. Logistically, we needed to manage travel, equipment, and scheduling across a large network. Ethically, we were handling life safety systems that might one day make the difference in an emergency. Precision was not optional.

For me, this project was a direct expression of discipleship in the workplace. Protecting riders and staff through accurate documentation and readiness is a quiet but sacred form of service. It represents charity in a technical context and shows how faith can motivate careful, diligent work for the benefit of thousands of people.

Ethical Dilemma Alternative – Balancing Truth and Loyalty

Case Description

The ethical dilemma I chose to focus on is Balancing Truth and Loyalty in Team Communication. In this scenario, David, a mid level technician, discovers that a colleague has overlooked a critical safety step. Reporting the issue could strain relationships and might be perceived as disloyal. Ignoring it would preserve surface level harmony but place passengers at risk.

David chooses to speak up respectfully. He brings the issue to the attention of the team and focuses on correcting the process rather than blaming an individual. Together they correct the oversight and strengthen the procedure to prevent similar gaps in the future.

Ethical Principles

Several ethical principles are involved in this case. Honesty requires that a safety risk be named clearly. Responsibility demands action when others are in danger, even if that action feels uncomfortable. Loyalty must be reframed as loyalty to the mission and to the well being of the people served, not only to the feelings of colleagues. Fairness requires that everyone on the team share responsibility for safety rather than allowing one person's mistake to remain hidden.

Spiritual Reflection and Alternative

This case reminds me that discipleship often requires courage to speak truth when it is not convenient. Elder Jeffrey R. Holland has taught that we should speak with the tongue of angels. That counsel suggests that correction should be rooted in love and concern, not in condemnation or pride. The alternative I support is the one David chose: address the issue directly, protect passengers, and preserve the dignity of the colleague through a respectful tone and a process focused frame.

This approach aligns with my guiding principles. Resilience is shown when someone is willing to face tension and work toward improvement rather than avoiding discomfort. Courage is visible in the decision to act when silence might seem easier. Integrity is preserved when safety and truth are valued more than convenience. Over time, this pattern can build a culture where speaking up about risks is normal and appreciated rather than feared.

Spiritual and Professional Integration Reflection

This assignment invited me to weave together spiritual reflection, professional growth, and concrete technical work. The refined S.P.S.B. System gave me a focused space to practice that integration. It required me to face real weaknesses in an existing design and to apply resilience, courage, and integrity in a sustained way.

Resilience appeared when new security requirements forced me to refactor parts of the code base and rework front end logic. Instead of treating those setbacks as failures, I viewed them as part of my learning curve. Courage appeared when I chose to name and correct ethical risks such as plaintext passwords, incomplete authorization, and opaque logging. Integrity appeared in the decision to align user experience choices with privacy, fairness, and accountability, even when those decisions required more effort.

The additional five projects in my portfolio show that this integration is not limited to one assignment. In embedded systems work I learned to see security as stewardship. In cloud solutions I saw data protection as an expression of compassion and responsibility. In large scale safety work I discovered that technical precision can be an act of love for strangers.

Overall, this project has helped me move from seeing myself only as a technician to seeing myself as a disciple leader in technical environments. I want to build systems that protect,

uplift, and empower. I want my professional decisions to reflect my spiritual commitments. This report and the associated portfolio are a snapshot of that transformation in progress.

Conclusion

The S.P.S.B. System refinement, the six featured projects, and the ethical dilemma analysis together demonstrate my ability to combine technical competency with ethical and spiritual awareness. This report has documented the original limitations of the system, the concrete improvements made, the influence of peer review, and the ways in which my guiding principles shaped the final result.

Going forward, I intend to continue refining my systems with the same pattern: honest assessment of risks, thoughtful design grounded in best practices, and a commitment to fairness and stewardship. In every environment where I serve, I hope to bring resilience, courage, and integrity to the work, trusting that the Savior will magnify my efforts as I strive to lead and build in His way.

Appendix A – Change Log (Summary)

This appendix summarizes the main categories of changes applied to the S.P.S.B. System.

Security and Authentication

• Replaced plaintext password comparison with bcrypt based password verification for steward and admin logins.
• Implemented a password migration helper to hash legacy plaintext passwords on successful login.
• Ensured that new user passwords are always stored in hashed form and that no interface displays passwords.

Authorization and Route Protection

• Introduced a time limited admin token with helper functions to create and verify admin sessions.
• Added a requireAdmin middleware and updated all administrative endpoints to enforce token verification.
• Updated the admin frontend to send the token in an Authorization header and to expire sessions cleanly.

User Management and Data Integrity

• Updated the Add User endpoint to prevent duplicate usernames.
• Normalized server side data loading and writing by validating arrays before saving.
• Added stricter future Sunday validation for new dates to avoid invalid or ambiguous entries.

Booking and Cancellation Logic

• Enforced a one active slot per steward rule across user and admin booking paths.
• Standardized booking structures so that slots are created only when they are actually booked.
• Implemented a steward facing cancellation endpoint that clears the slot and records the cancellation in an audit trail.

Logging, Transparency, and Accountability

• Centralized audit logging for key actions and provided admin only views for cancellations and audit events.
• Clarified in the steward UI that cancellations are logged for the purpose of maintaining coverage.

User Interface and Ethical UX Adjustments

• Removed the password column from the admin user table.
• Improved status indicators, inline guidance, and confirmation prompts.
• Added a Sign Out control and refined messaging to emphasize fairness, responsibility, and respectful handling of steward information.

Appendix B – Summary of Original System and Limitations

The original S.P.S.B. System provided basic functionality but suffered from serious technical and ethical limitations.

Original Design

- Stewards could log in, view upcoming Sundays, and reserve an opening or closing slot.
- Administrators could add users, configure dates, and manage bookings through a separate admin page.
- All data was stored in a single JSON file accessed synchronously by the Node.js and Express application.

Security and Privacy Limitations

- User and admin passwords were stored in plaintext and compared directly during login.
- The admin interface displayed steward passwords, increasing the risk of misuse and exposure.
- Admin tokens were created but not actually validated on protected routes.

Data Integrity and Validation

- The system assumed that dates were valid Sundays and did not consistently enforce format or future only constraints.
- The single file datastore lacked concurrency safeguards and could produce inconsistent data under load.
- Slot semantics were implicit, which made it difficult to distinguish between defined but unused slots and truly booked slots.

Fairness and Transparency

- The one slot rule was only partially enforced, allowing some stewards to hold multiple active slots in certain paths.
- Logging for cancellations and administrative actions was incomplete and not clearly communicated to users.
- Interface assumptions reflected existing culture without explanation or options for those who did not fit expected patterns.

These limitations justified a comprehensive refinement effort. The changes described in the main body of this report were designed to correct these problems and align the system with best practices in security, fairness, and ethical user experience.