Individual – Charter SmartDataProject

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1 Introduction

Initially, I was tasked with designing a database based on a conceptual schema and a short project description provided by the client. The goal was to automate and centralize the tracking of technical and financial activities related to ongoing engineering projects.

Following this, several coordination meetings were held with collaborators to identify emerging needs. Based on their feedback, the system evolved to integrate a more familiar Excel-like interface and a simplified web menu for encoding hours worked. This ensured better usability and real-time data entry from mobile or desktop devices.

In the final stages, secure access via OpenVPN was added, allowing encrypted remote access. A full integration with Microsoft Outlook was also developed to synchronize project calendars and task lists automatically. Tasks could be created directly from recognized email content using natural language processing, facilitating task insertion into the database.

2 Functional Overview

- **Database Core:** Centralized management of personnel, projects, clients, planning, time tracking, and billing, structured through a normalized relational schema.
- **Web Interface:** FastAPI-based backend and responsive front-end for role-based interaction (project manager, technician, finance).
- **Excel-Like Import:** Intelligent import module supporting Excel file structure recognition and data mapping with suggestion via DeepSeek.
- **Time Entry:** Dual method for encoding hours:
  1. via task management,
  2. or manual input (date, code, duration, description).

  Late entry alerts are generated after 2 days (user), and after 7 days (user + finance).
- **Outlook Sync:** Calendar synchronization through Microsoft Graph API. Events and tasks are visualized in a weekly agenda view. Emails are parsed to automatically identify actionable tasks.
- **OpenVPN Security:** Access control by signed certificates and Common Name (CN) whitelist, with encrypted tunnel and detailed connection logs.

3 Progress Summary

The project progressed in the following key phases:

1. **Database Modeling (June 12–14, 2025):** Schema design and SQL implementation (refer to *14-06-2025 – BaseDonnee.pdf*).
2. **Collaborator Feedback (June 19, 2025):** Adjustments based on task planning and real-time needs (refer to *19-06-2025 – BaseDonnee.pdf*).
3. **Interface UX (June 20, 2025):** Outlook-connected agenda, task detail views, mobile optimization (*20-06-2025 – Prototype.pdf*).
4. **VPN Access Layer:** Certificate-based OpenVPN deployment for secure access (*20-06-2025 – OpenVpnWindows.pdf*).

4 Challenges and Solutions

Challenge 1: Outlook API Integration

Integration with Microsoft Graph required authentication via OAuth2 and management of token expiration. The solution involved setting up secure environment variables and storing access tokens as encrypted cookies.

Challenge 2: Task Extraction from Emails

Recognizing tasks in email content was addressed using an AI prompt sent via OpenRouter to a language model, which parsed relevant information (task, deadline, context) and injected it into the task table.

Challenge 3: UX Adaptation

Several collaborators were unfamiliar with traditional admin panels. A simplified interface was developed using progressive disclosure techniques and mobile-first layouts.

Challenge 4: Data Import Flexibility

Excel import often resulted in format mismatches. We introduced AI-guided structure recognition and field mapping suggestion using Levenshtein distance and deep model hints.

5 Conclusion

The project successfully evolved from a classical database assignment to a full-scale secure, intelligent platform. It aligns with real enterprise needs and integrates a modern UI/UX, secure connectivity, and Microsoft services.

The combined use of OpenVPN, Graph API, and intelligent import offers a seamless experience for users with different profiles. The next steps include performance monitoring and eventual deployment in production.