BUAN 6390.S01 S25 – Analytics Practicum

Group 6 - Healthcare Costs: Stop Guessing, Start Saving

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Problem Overview and Strategic Approach

Problem Statement
Patients lack transparent, accessible data to compare treatment costs across hospitals and insurance providers, leading to uninformed healthcare decisions and unexpected expenses.

Proposed Solution
We collect, clean, and analyze hospital and insurance pricing data to present clear cost comparisons, helping users choose affordable, suitable healthcare options through data-driven insights.

Discovery

Source:
We downloaded price transparency data from 3–4 hospitals in each of the 8 cities.

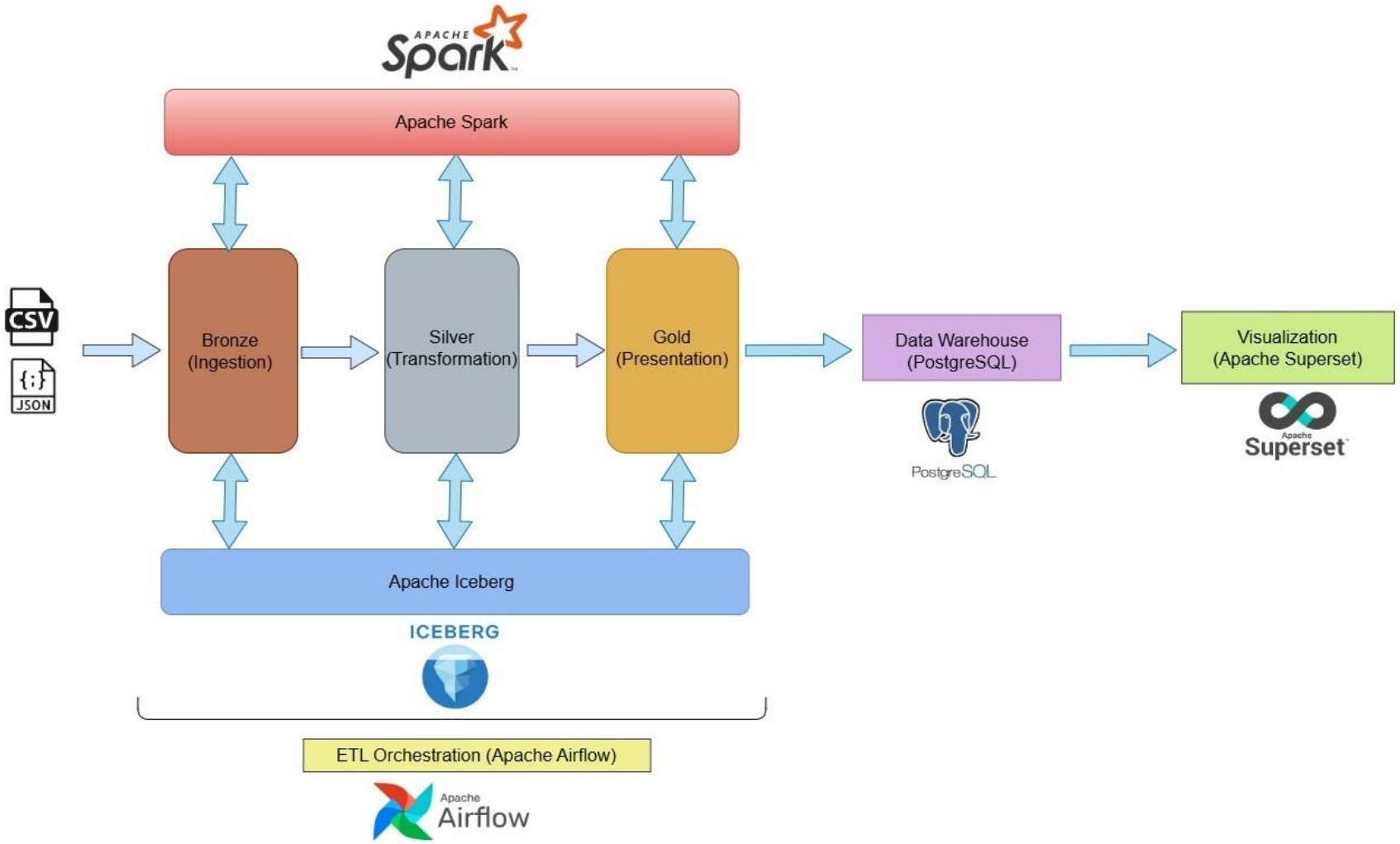
Dataset Details:
Each file is approximately 400 MB in size.

Architecture Used:
Medallion Architecture (Bronze, Silver, Gold layers) to manage data lifecycle.

Goal:
Improve healthcare cost transparency by aggregating and standardizing pricing data.

Expected Outcomes:
Enable patients and stakeholders to make informed decisions through automated pipelines and insightful dashboards.

Solution Architecture



Tools used for Development

Apache Iceberg (Data Storage)
•Why: Provides a scalable, ACID-compliant table format ideal for large-scale analytics. It ensures data versioning, time travel, and schema evolution—all important for healthcare data integrity.

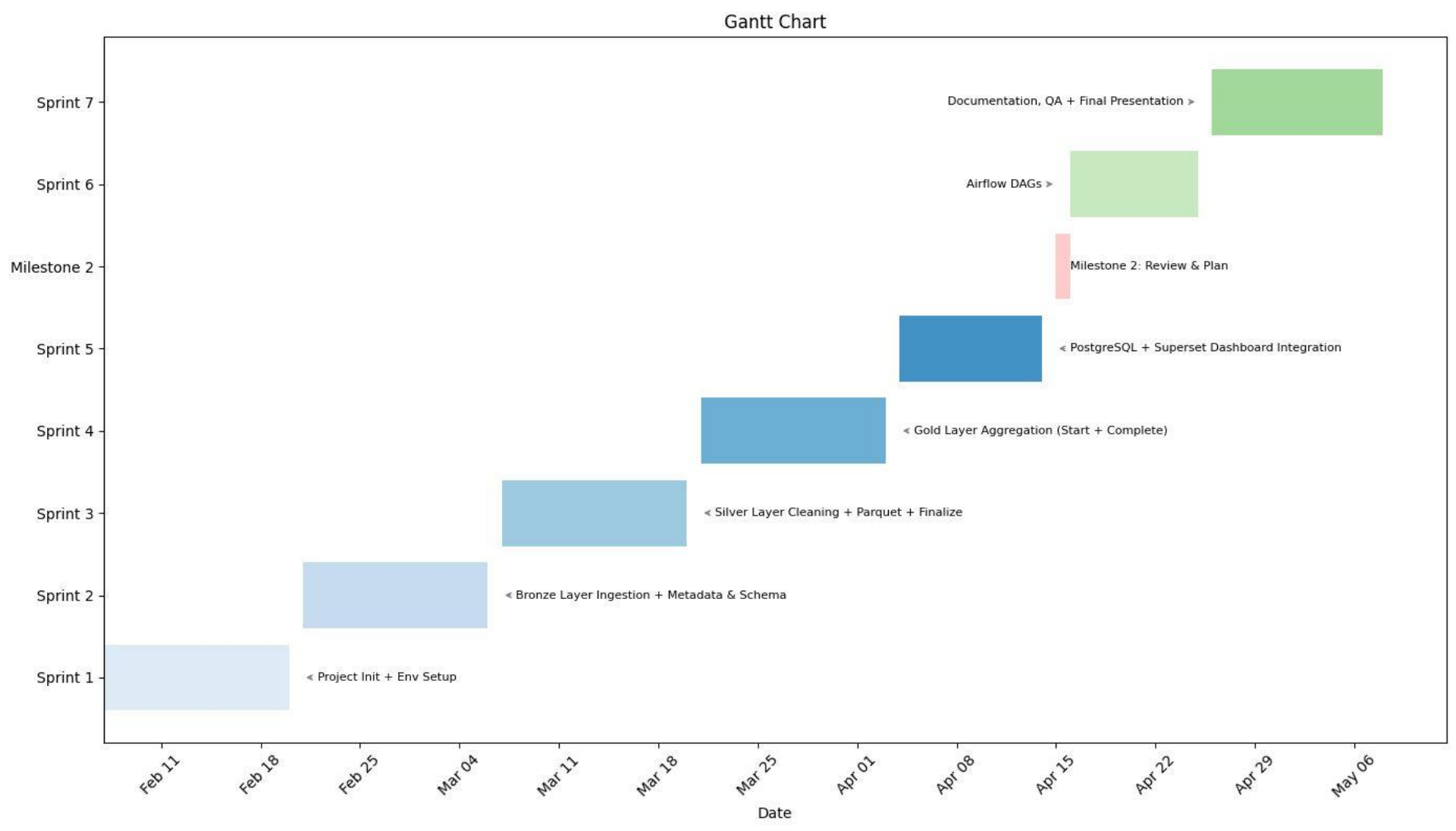
PostgreSQL (Data Warehouse)
Stores the final, processed (Gold Layer) data in a structured format that's easy to query for dashboard tools. It supports complex joins and analytics.

Apache Spark (Data Processing)
Handles distributed data processing efficiently. It's ideal for cleaning, transforming, and aggregating large CSV/JSON healthcare datasets into Parquet format.

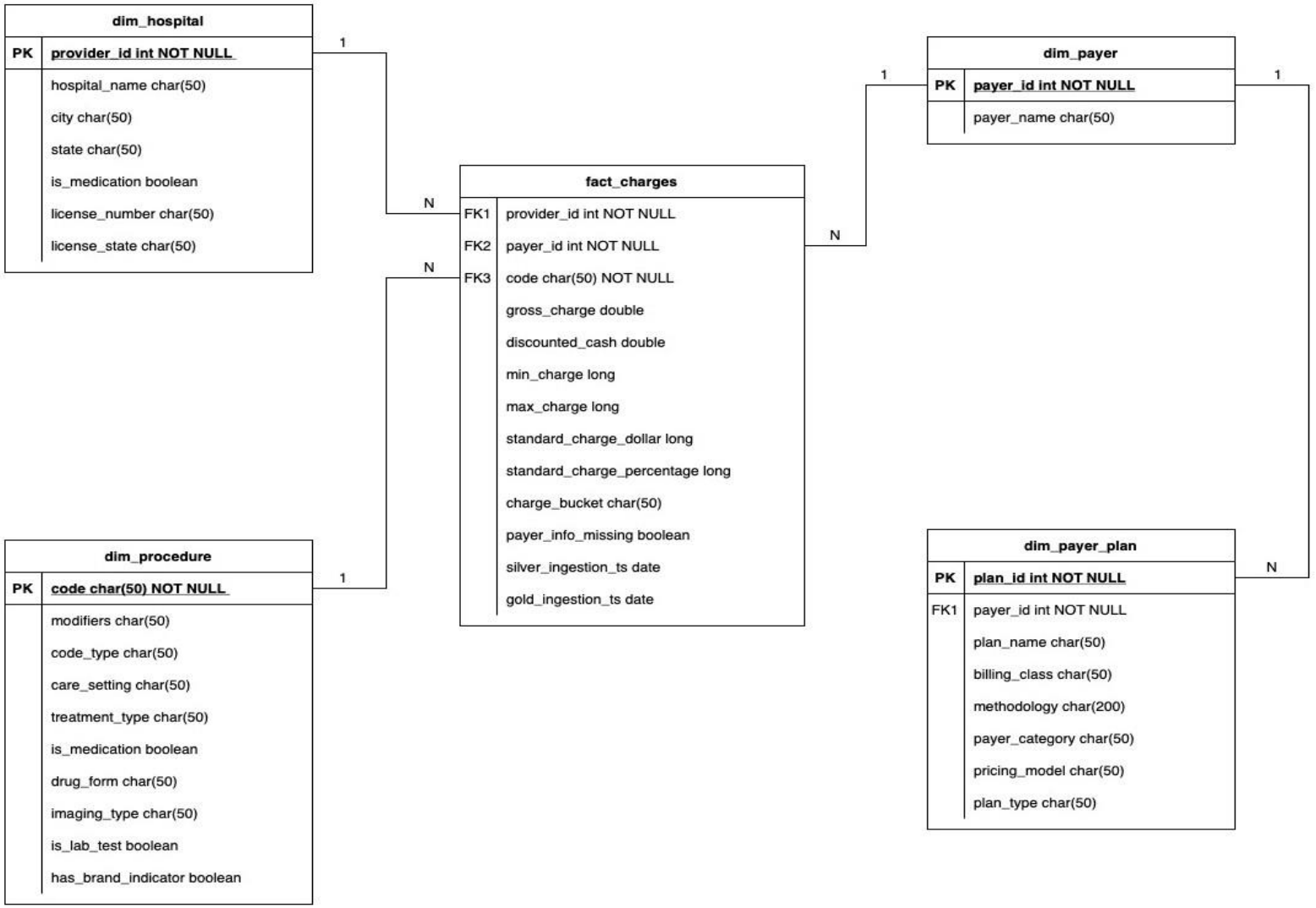
Apache Superset (Visualization)
Creates interactive dashboards that provide cost insights, risk analysis, and trends, helping stakeholders and patients make data-driven decisions.

Apache Airflow (Workflow Orchestration)
Automates the end-to-end workflow—from ingestion to transformation to reporting—through DAGs (Directed Acyclic Graphs), reducing manual intervention and improving reliability.

Roadmap


Gantt Chart
Sprint 7
Sprint 6
Milestone 2
Sprint 5
Sprint 4
Sprint 3
Sprint 2
Sprint 1
Documentation, QA + Final Presentation
Airflow DAGs
Milestone 2: Review & Plan
PostgreSQL + Superset Dashboard Integration
Gold Layer Aggregation (Start + Complete)
Silver Layer Cleaning + Parquet + Finalize
Bronze Layer Ingestion + Metadata & Schema
Project Init + Env Setup
Feb 11
Feb 18
Feb 25
Mar 04
Mar 11
Mar 18
Mar 25
Apr 01
Apr 08
Apr 15
Apr 22
Apr 29
May 06
Date

Entity Relationship Diagram (ERD)



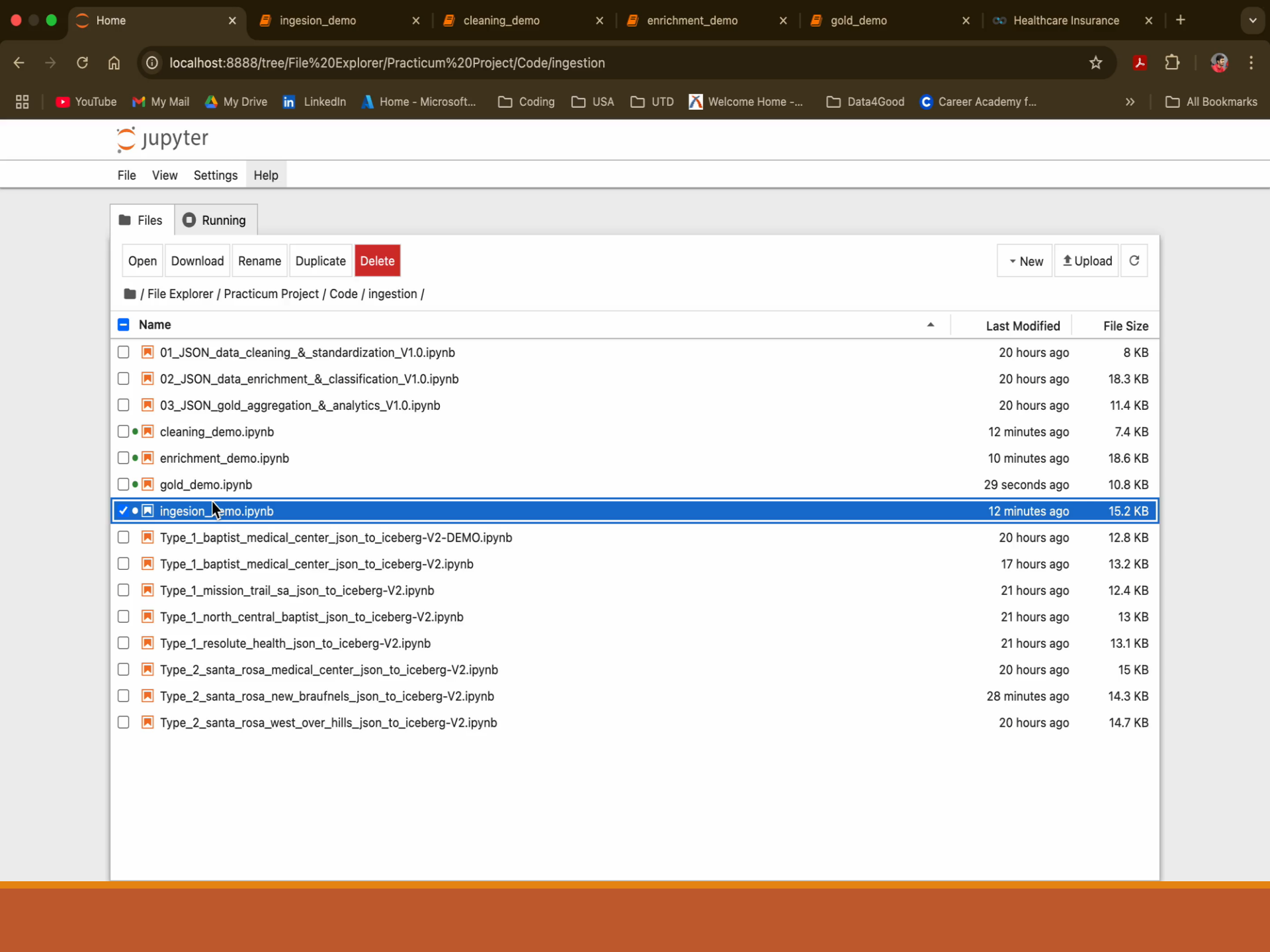
Future Extension

1. **Workflow Automation**: Implement Apache Airflow to orchestrate and automate data pipeline tasks for enhanced efficiency and reliability.

2. **Standardized Framework:** Establish a unified workflow and standardization process to ensure consistency across the entire pipeline.

3. **Documentation Creation:** Develop clear and concise project documentation to outline the architecture, workflow, and implementation details.

Demonstration of the project
Video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THANK YOU