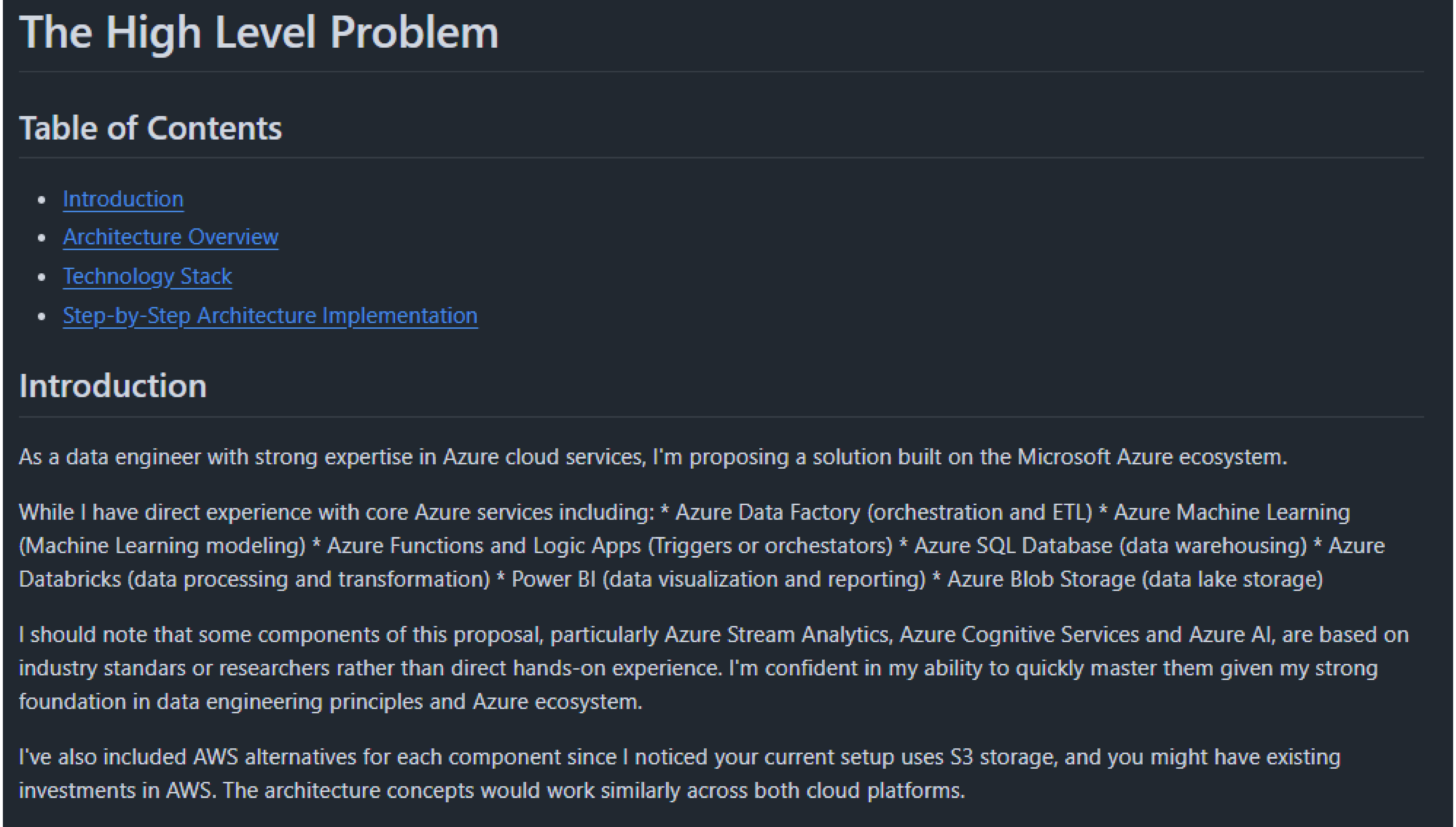

The High Level Problem

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Introduction

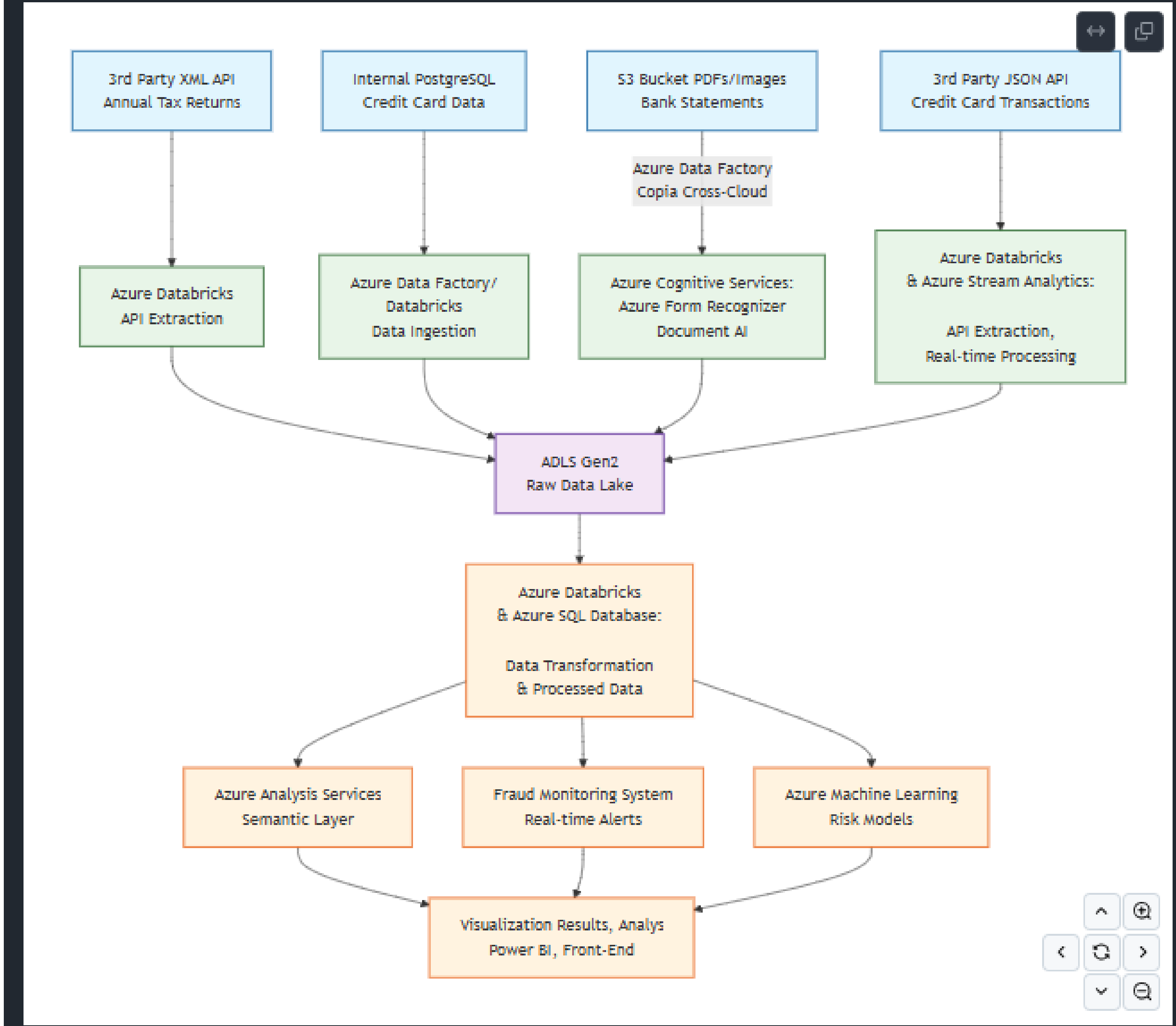
As a data engineer with strong expertise in Azure cloud services, I'm proposing a solution built on the Microsoft Azure ecosystem.

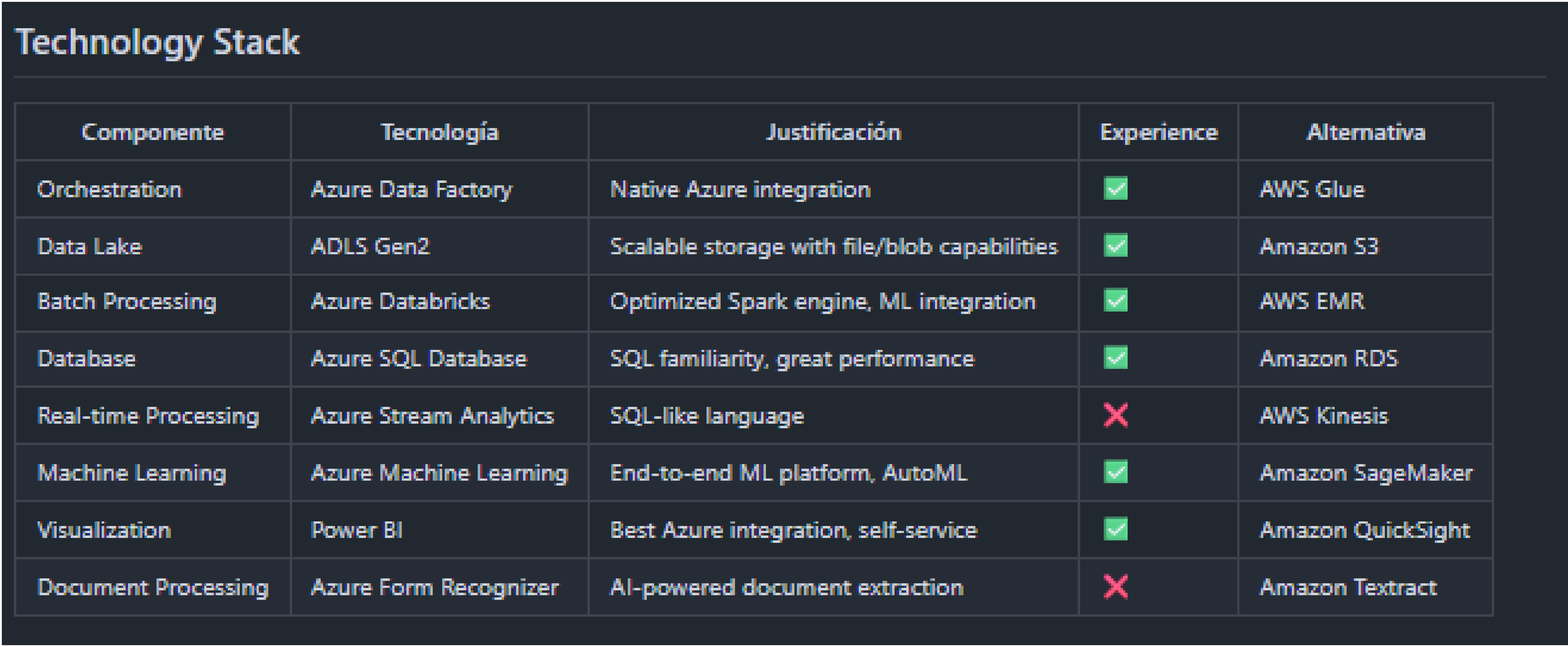
While I have direct experience with core Azure services including: * Azure Data Factory (orchestration and ETL) * Azure Machine Learning (Machine Learning modeling) * Azure Functions and Logic Apps (Triggers or orchestators) * Azure SQL Database (data warehousing) * Azure Databricks (data processing and transformation) * Power BI (data visualization and reporting) * Azure Blob Storage (data lake storage)

I should note that some components of this proposal, particularly Azure Stream Analytics, Azure Cognitive Services and Azure AI, are based on industry standars or researchers rather than direct hands-on experience. I'm confident in my ability to quickly master them given my strong foundation in data engineering principles and Azure ecosystem.

I've also included AWS alternatives for each component since I noticed your current setup uses S3 storage, and you might have existing investments in AWS. The architecture concepts would work similarly across both cloud platforms.

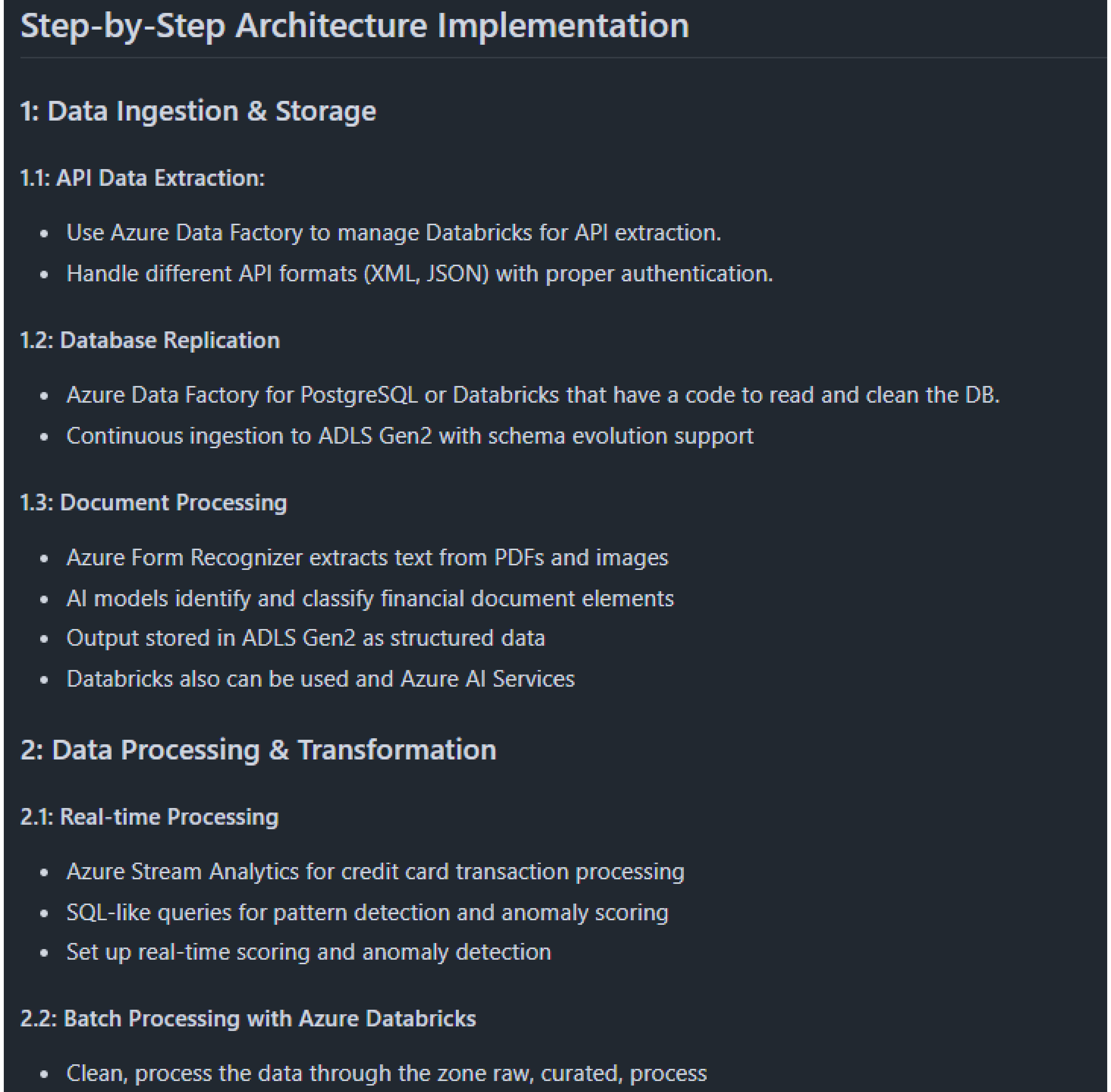
Architecture Overview





Technology Stack

Componente	Tecnología	Justificación	Experience	Alternativa
Orchestration	Azure Data Factory	Native Azure integration	✅	AWS Glue
Data Lake	ADLS Gen2	Scalable storage with file/blob capabilities	✅	Amazon S3
Batch Processing	Azure Databricks	Optimized Spark engine, ML integration	✅	AWS EMR
Database	Azure SQL Database	SQL familiarity, great performance	✅	Amazon RDS
Real-time Processing	Azure Stream Analytics	SQL-like language	❌	AWS Kinesis
Machine Learning	Azure Machine Learning	End-to-end ML platform, AutoML	✅	Amazon SageMaker
Visualization	Power BI	Best Azure integration, self-service	✅	Amazon QuickSight
Document Processing	Azure Form Recognizer	AI-powered document extraction	❌	Amazon Textract



Step-by-Step Architecture Implementation

1: Data Ingestion & Storage

1.1: API Data Extraction:

- Use Azure Data Factory to manage Databricks for API extraction.
- Handle different API formats (XML, JSON) with proper authentication.

1.2: Database Replication

- Azure Data Factory for PostgreSQL or Databricks that have a code to read and clean the DB.
- Continuous ingestion to ADLS Gen2 with schema evolution support

1.3: Document Processing

- Azure Form Recognizer extracts text from PDFs and images
- AI models identify and classify financial document elements
- Output stored in ADLS Gen2 as structured data
- Databricks also can be used and Azure AI Services

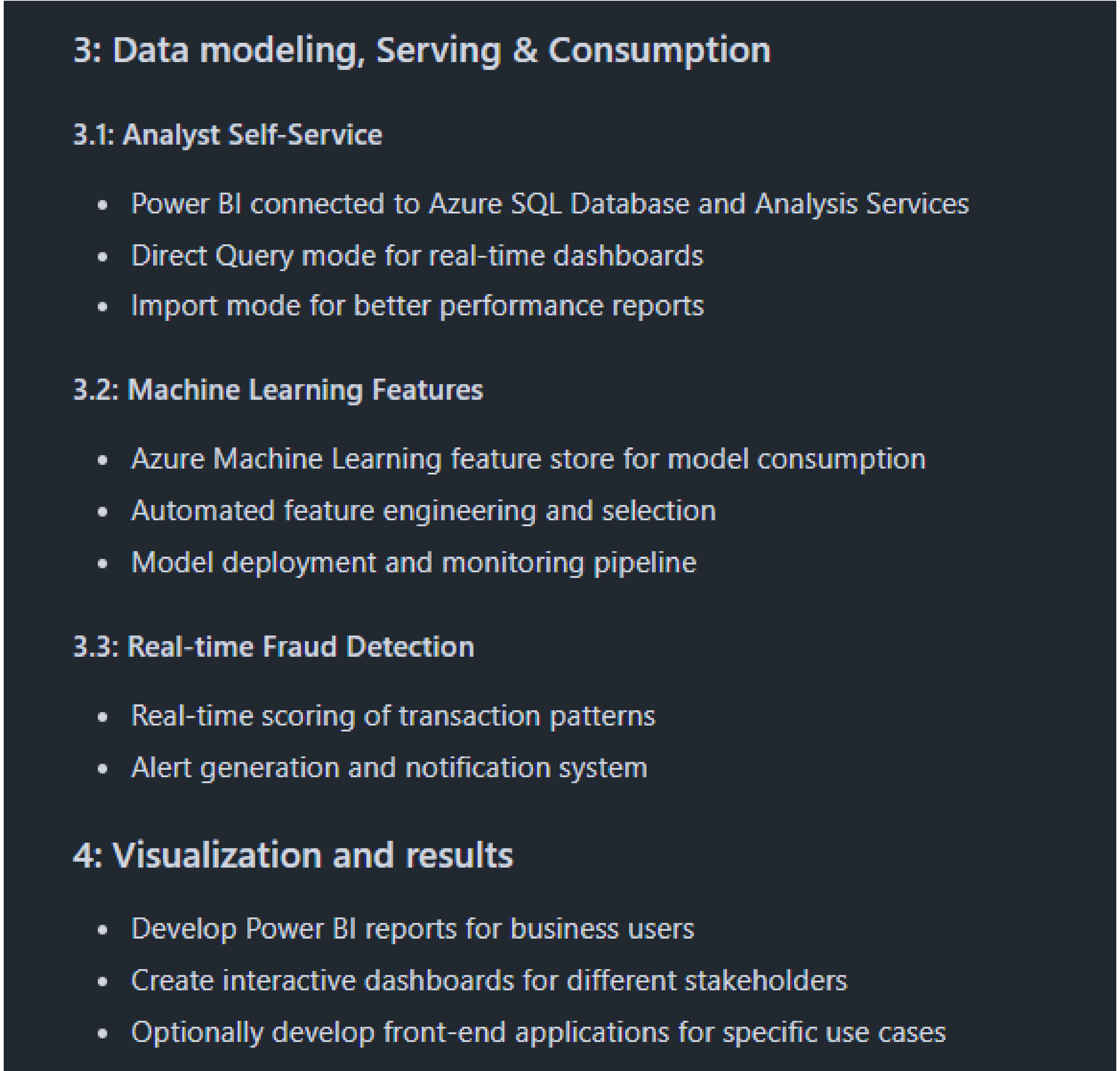
2: Data Processing & Transformation

2.1: Real-time Processing

- Azure Stream Analytics for credit card transaction processing
- SQL-like queries for pattern detection and anomaly scoring
- Set up real-time scoring and anomaly detection

2.2: Batch Processing with Azure Databricks

- Clean, process the data through the zone raw, curated, process



3: Data modeling, Serving & Consumption

3.1: Analyst Self-Service

- Power BI connected to Azure SQL Database and Analysis Services
- Direct Query mode for real-time dashboards
- Import mode for better performance reports

3.2: Machine Learning Features

- Azure Machine Learning feature store for model consumption
- Automated feature engineering and selection
- Model deployment and monitoring pipeline

3.3: Real-time Fraud Detection

- Real-time scoring of transaction patterns
- Alert generation and notification system

4: Visualization and results

- Develop Power BI reports for business users
- Create interactive dashboards for different stakeholders
- Optionally develop front-end applications for specific use cases