Project Design Phase-II

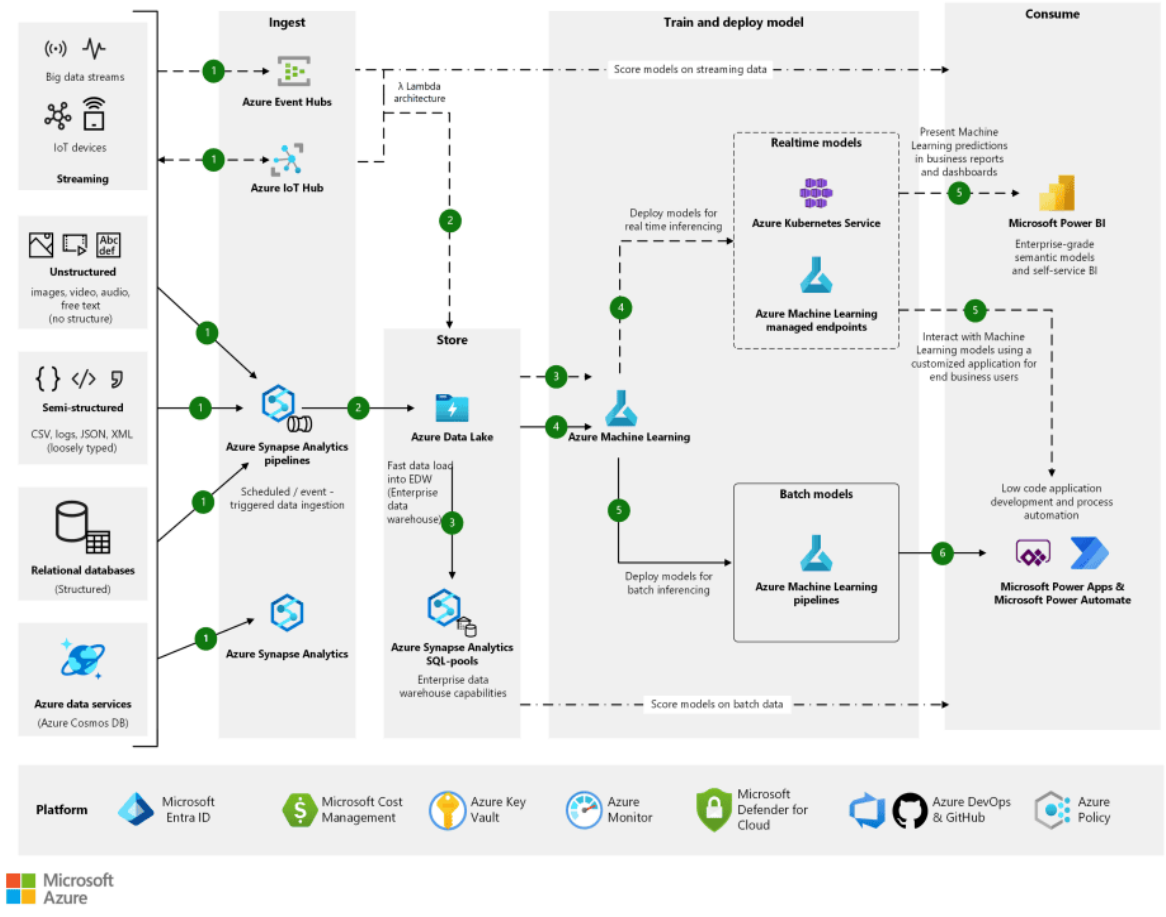
Technology Stack (Architecture & Stack)

Date	27 June 2025
Team ID	LTVIP2025TMID59193
Project Name	SmartSDLC – AI-Enhanced Software Development Lifecycle
Maximum Marks	4 Marks

Technical Architecture:

The Deliverable shall include the architectural diagram as below

Reference : https://media.licdn.com/dms/image/v2/D5612AQGoOy9qq1XaLQ/article-cover_image-shrink_720_1280/article-cover_image-shrink_720_1280/0/1718681607278?e=2147483647&v=beta&t=ZaJc-o7l_AmDm7MWsf0Hnlq1rtqUQWVQhGIzCEUq7hg



S.No	Component	Description	Technology
1	User Interface	Interface to interact with SmartSDLC features	Streamlit, HTML, CSS
2	Application Logic-1	AI-based requirement classification logic	Python (Scikit-learn, spaCy)
3	Application Logic-2	Bug Fixing logic based on LLMs and AST parsing	Python, OpenAI API (GPT models)
4	Application Logic-3	Code generation from natural language input	Hugging Face Transformers, Python
5	Database	Stores user queries, classified requirements, feedback	SQLite / MongoDB
6	Cloud Database	Store results & feedback securely in the cloud	Firebase / MongoDB Atlas
7	File Storage	For saving user-uploaded files or temporary code files	Local FileSystem / Firebase Storage
8	External API-1	Used for bug-fix suggestions via AI	OpenAI API
9	External API-2	Used for code generation logic	Hugging Face Inference API
10	Machine Learning Model	Classifies requirements, generates code, detects bugs	NLP Classifier, CodeGen Model, LLM APIs
11	Infrastructure	Deployment of full stack application	Localhost (Streamlit), Ngrok for public URL

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1	Open-Source Frameworks	Used for frontend and ML integration	Streamlit, Scikit-learn, Transformers
2	Security Implementations	Basic protection on API calls, local access controls, data validation	API Key Authentication, Form Validation
3	Scalable Architecture	Modular architecture for requirement classifier, bug fixer, and code generator	Microservices-style modules, Streamlit Apps
4	Availability	Can be run locally or made available via ngrok/public endpoints	Ngrok, Cloud Hosting (Firebase optional)
5	Performance	Optimized AI processing, async responses, local caching for performance	Python Asyncio, LRU Cache, Fast APIs

References:

- https://c4model.com/
- https://developer.ibm.com/patterns/online-order-processing-system-during-pandemic/
- https://www.ibm.com/cloud/architecture
- https://aws.amazon.com/architecture
- https://medium.com/the-internal-startup/how-to-draw-useful-technical-architecture-diagrams-2d20c9fda90d