Project Design Phase-II
Technology Stack (Architecture & Stack)

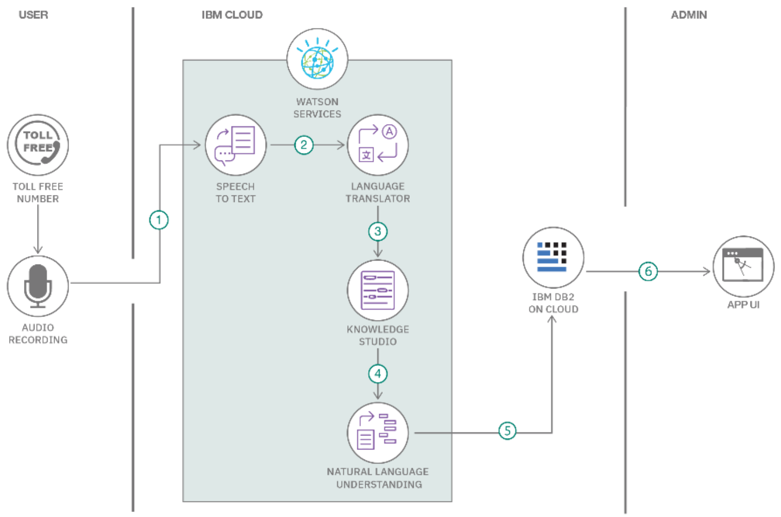
Date	27 june 2025
Team ID	LTVIP2025TMID49260
Project Name	ToyCraft Tales: Tableau's Vision into Toy Manufacturer Data
Maximum Marks	4 Marks

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

Example: Order processing during pandemics for offline mode

Reference: https://developer.ibm.com/patterns/ai-powered-backend-system-for-order-processing-during-pandemics/



Guidelines:

- Include all the processes (As an application logic / Technology Block)
- Provide infrastructural demarcation (Local / Cloud)
- Indicate external interfaces (third party API's etc.)
- Indicate Data Storage components / services
- Indicate interface to machine learning models (if applicable)

S.No	Component	Description	Technology
1	User Interface	Interactive dashboard for exploring toy manufacturing trends (2005-2016)	Tableau (Desktop/Server)
2	Application Logic-1	Data cleaning and preprocessing (missing values, state standardization)	Python (Pandas, NumPy)
3	Application Logic-2	Predictive analytics (decline-risk scores, trend forecasting)	Python (Scikit-learn, StatsModels)
4	Application Logic-3	Policy impact simulation engine	Python (SciPy, Matplotlib)
5	Database	Store processed toy manufacturer data	PostgreSQL (AWS RDS)
6	Cloud Database	Backup and replication	AWS Aurora
7	File Storage	Raw dataset storage (CSV)	AWS S3
8	External API-1	U.S. Census data integration (for demographic insights)	Census Bureau API
9	External API-2	Economic policy data (tax incentives by state)	Tax Foundation API
10	Machine Learning Model	Time-series forecasting for manufacturer growth/decline	Facebook Prophet
11	Infrastructure	Host Tableau Server and backend services	AWS EC2 (Auto-scaling)

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology/Approach
1. 1	Open-Source Frameworks	- Pandas (data processing) - Scikit-learn (predictive modeling)	**Python ecosystem**
2. 2	Security Implementations	- Data encryption (AWS KMS) - Role-based access control (IAM)	**AWS Security Hub**
3. 3	Scalable Architecture	Microservices for ETL and analytics; decoupled from visualization layer	**AWS Lambda + EC2**
4. 4	Availability	Multi-AZ deployment for PostgreSQL; 99.9% uptime SLA	**AWS RDS Multi-AZ**
5. 5	Performance	- Cached queries in Tableau - CDN for dashboard assets (AWS CloudFront)	**Redis Cache + CloudFront**