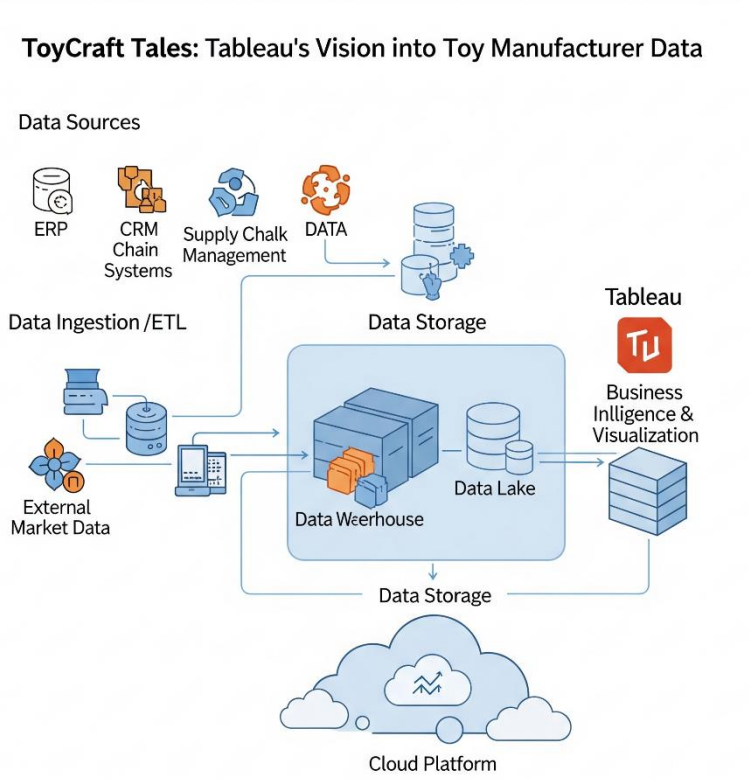
Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	31 January 3035
Team ID	LTVIP2025TMID48331
Project Name	ToyCraft Tales: Tableau's Vision into Toy Manufacturer Data
Maximum Marks	4 Marks

Technical Architecture:

- Core Purpose: "ToyCraft Tales" leverages a Tableau-centric architecture to transform raw toy manufacturer data into actionable insights, driving informed decision-making.
- Data Integration & Processing: It seamlessly integrates diverse internal ERP data (e.g., sales, inventory, production) and external market data. This is achieved through a robust ETL pipeline that handles cleansing, modelling, and ensures data integrity.
- Data Storage & Performance: The processed information resides in a scalable data warehouse, optimized for historical analysis and ensuring high performance.
- Visualization & User Access: Tableau Server serves as the central platform, delivering interactive dashboards and reports with high availability and usability to various user roles, including Sales Analysts and Executives.
- Security & Automation: The system incorporates strong security measures like user authentication and role-based access, including row-level security, alongside reliable automated data refreshes.

Example: A Sales Analyst, for instance, can quickly access a real-time sales performance dashboard, effortlessly drilling down by specific product categories or geographic regions to identify emerging trends.



Guidelines:

- ✓ Data Integration: Information is gathered from factory systems (like sales, inventory) and outside market sources. This raw data is then cleaned and organized, ready for use.
- ✓ Data Storage: All prepared data is stored in a scalable data warehouse for analyzing past trends. A data lake also holds raw, unprocessed information.
- ✓ Visualization: Tableau creates clear, interactive dashboards from this data, letting different company roles easily see important business numbers.
- ✓ Infrastructure: The main parts of the system operate on a cloud platform, ensuring it can grow and is always available. It securely connects to the factory's local systems.
- ✓ Smart Features & Security: The system uses smart programs (ML) to help predict sales or spot inventory issues. Strong security ensures only approved people can see specific data.

Example: A Sales Analyst can quickly view a dashboard showing how toys are selling in different regions right now.

Table-1: Components & Technologies

S.No.	Component	Description	Technology
1	User Interface	How users interact with the analytics dashboards and reports, typically through web browsers.	Tableau Web Interface, Tableau Desktop, Web Browsers
2	Application Logic-1 (Data Ingestion & ETL)	Processes for extracting raw data from various sources, cleansing, transforming, and loading it into the data storage layer.	Python (Pandas, PySpark), SQL, Cloud ETL Services (e.g., Azure Data Factory, AWS Glue, Google Cloud Dataflow)
3	Application Logic-2 (Data Preparation & Analytics Engine)	Custom logic for data modeling, aggregations, calculations, and preparing optimized datasets specifically for Tableau consumption.	SQL (stored procedures, views), Python scripts, Tableau Prep
4	Database (Data Warehouse)	The central, structured repository for integrated and transformed analytical data. Optimized for complex queries and reporting.	Snowflake, Google BigQuery, Amazon Redshift, Azure Synapse Analytics
5	Cloud Database (Data Lake)	Stores raw, unstructured, or semi-structured data from various sources before transformation, used for future analysis.	Amazon S3, Azure Data Lake Storage (ADLS), Google Cloud Storage (GCS)
6	File Storage	Temporary or archival storage for raw data files, logs, or intermediate ETL outputs.	Cloud Blob Storage (e.g., AWS S3, Azure Blob Storage)
7	External API-1 (ERP/CRM Connectors)	Integrates with the toy manufacturer's internal operational systems to pull sales, inventory, production, and customer data.	REST APIs, JDBC/ODBC Connectors, Custom Data Connectors
8	External API-2 (Market Data Providers)	Connectors/APIs to ingest external market trends, competitor analysis, and demographic data.	REST APIs, Vendor-specific SDKs
9	Machine Learning Model	Utilized for predictive analytics capabilities such as sales forecasting, demand prediction, or inventory anomaly detection.	Python (Scikit-learn, TensorFlow), Cloud ML Services (e.g., AWS SageMaker, Azure ML)
10	Infrastructure (Cloud Platform)	The underlying cloud computing environment hosting all services and managing resources.	Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP)
11	Infrastructure (BI Server)	The dedicated server environment for hosting, managing, and delivering Tableau dashboards and user interactions.	Tableau Server (deployed on Cloud VMs like EC2, Azure VMs, GCE)

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1	Open-Source Frameworks	Tools used in the system for processing and handling data.	Python libraries (like Pandas), Apache Spark, SQL.
2	Security Implementations	How we keep data safe and control who can see what.	Secure logins (SSO), data rules (Row-Level Security in Tableau), data encryption.
3	Scalable Architecture	How the system can grow to handle more data and users easily.	Cloud services that grow automatically, elastic data warehouses.
4	Availability	Making sure the system is always working and reachable when needed.	Cloud features for always-on service, like backup systems and load balancers.
5	Performance	How fast dashboards load and how quickly you get answers to your questions.	Fast databases, smart ways to store data for quick access, and efficient queries.