Project Design Phase-II

Technology Stack (Architecture & Stack)

Date	26 June 2025
Team ID	LTVIP2025TMID50160
Project Name	Heritage Treasures:An In-Depth Analysis of UNESCO World Heritage Sites in Tableau
Maximum Marks	4 Marks

Technical Architecture:

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

Technical Architecture Diagram Overview

The architecture follows a **three-tier architecture**:

- **Presentation Layer:** Web & mobile interface using HTML/JS

- **Application Layer:** Python scripts, Tableau dashboards, and scheduling logic

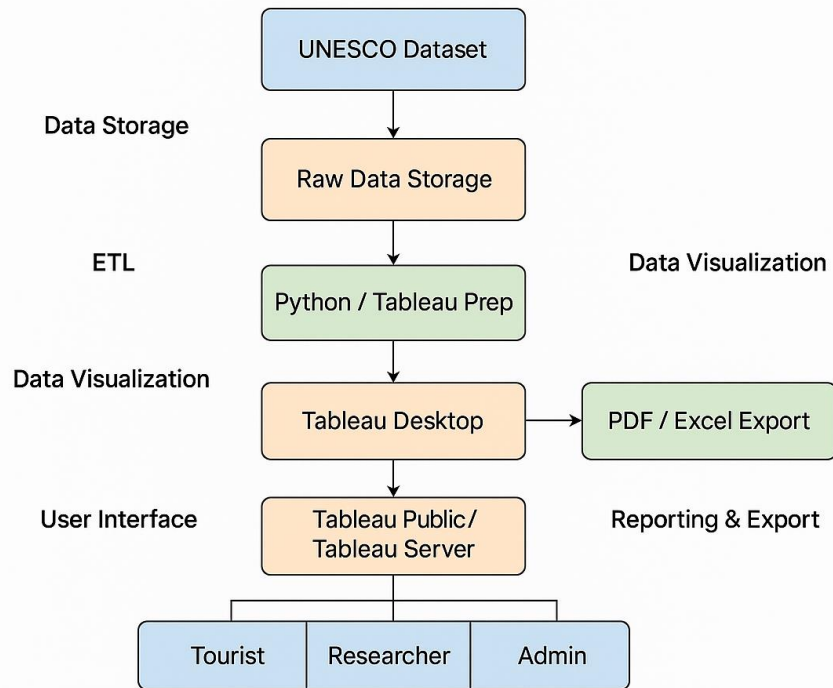- **Data Layer:** Cloud database + CSV inputs + Tableau extracts

Technology Stack

Data Storage

ETL

Data Visualization

User Interface

Data Visualization

Reporting & Export

UNESCO Dataset → Raw Data Storage → Python / Tableau Prep → Tableau Desktop → PDF / Excel Export

Tableau Desktop → Tableau Public/ Tableau Server

Tourist | Researcher | Admin

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Interface to explore dashboards via web/mobile	HTML, CSS, JavaScript ,Tableau Public.
2.	Application Logic-1	Data cleaning &transformation for Tableau	Python (Pandas,Numpy)
3.	Application Logic-2	Automated updates &scheduling scripts	Python+Tableau Prep
4.	Application Logic-3	Optional chatbot for heritage queries	IBM Watson Assistant
5.	Database	Primary dataset(Structured)	MySQL or PostgreSQL
6.	Cloud Database	Cloud-hosted historical UNESCO data	IBM DB2 on cloud/Google Big Query.
7.	File Storage	Uploaded CSV files and Tableau extract files	Google Drive/IBM Block Storage

8.	External API-1	Geolocation of heritage sites	Google Maps API
9.	External API-2	Country-wise statistics API	RESTful APIs(e.g.,World Bank).
10.	Machine Learning Model	Optional NLP model for tag extraction(future phase)	HuggingFace Transformers/scikit-learn
11.	Infrastructure (Server / Cloud)	Hosted Tableau dashboards on cloud.	Tableau Public/Cloud Foundry/Kubernetes.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Python ,Pandas ,Numpy,React (Optional for UI),Flask(for APIs)	Python ,React,Flask
2.	Security Implementations	OAuth(Google,LinkedIn),data encryption,Tableau access restrictions	OAuth 2.0,IAM,HTTPS,JWT.
3.	Scalable Architecture	Tiered architecture with support for cloud deployement and multiple data sources	3-Tier Design,Tableau Cloud,Kubernetes.
4.	Availability	Hosted Tableau dashboards ensure 99.9% uptime	Load balancetrs(cloud-based),Tableau Online.
5.	Performance	Optimized queries,extract refresh scheduling ,and CDN for static resources	Tableau Extracts,Redis,CDN,Scheduler