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

Date	03 October 2022
Team ID	PNT2022TMIDxxxxxx
Project Name	Project - xxx
Maximum Marks	4 Marks

Technical Architecture:

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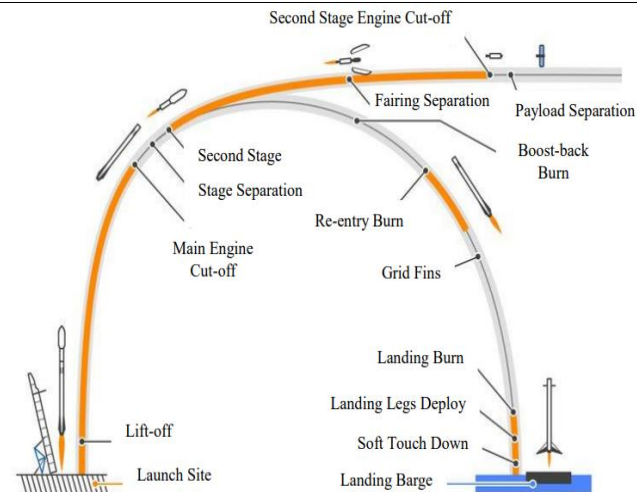
Guidelines:

1. Include all the   processes   (As an application logic / Technology Block)
2. Provide infrastructural demarcation (Local / Cloud)
3. Indicate external interfaces (third party API's etc.)
4. Indicate Data Storage components / services

5. Indicate interface to machine learning models (if applicable)

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1	User Interface	How users (data scientists, engineers) interact with the application; view predictions and analytics.	HTML, CSS, JavaScript, React.js or Angular
2	Data Collection	Collects data from historical Falcon 9 launches, telemetry, and weather APIs.	Python (for data scraping), RESTful APIs
3	Data Storage	Stores raw and processed data for analysis and model training.	AWS S3, Google Cloud Storage, or Azure Blob
4	Data Processing and Preprocessing	Cleans and prepares data for analysis and machine learning.	Python (Pandas, NumPy), Apache Spark
5	Machine Learning Model Training	Builds and trains models to predict landing success.	Scikit-Learn, TensorFlow, PyTorch
6	Model Evaluation and Tuning	Evaluates model performance and selects the best model based on accuracy.	Scikit-Learn (for evaluation metrics)
7	Model Deployment	Deploys the trained model for real-time prediction capabilities.	AWS SageMaker, Google AI Platform, Docker
8	Prediction API	Exposes model predictions to be accessed by the front-end interface or other applications.	FastAPI, Flask, or Django REST Framework

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1	Open-Source Frameworks	List of open-source frameworks used in the project for frontend, backend, and data processing.	React.js, Flask, FastAPI, Scikit-Learn
2	Security Implementations	Security and access control mechanisms to protect data and user access; includes encryption and firewall configurations.	HTTPS, JWT (JSON Web Tokens), IAM, SHA-256
3	Scalable Architecture	The architecture is designed for scalability, using a microservices-based model that can scale horizontally as needed.	Microservices, Kubernetes, Docker
4	Cloud Infrastructure	Leveraging cloud services for storage, computing, and model deployment.	AWS, Google Cloud Platform, Azure
5	Data Backup and Recovery	Ensures that data is backed up and can be recovered in case of failure.	Cloud Backup Services, AWS Backup
6	Logging and Monitoring	Provides logging and monitoring for system health, model performance, and user activity.	ELK Stack (Elasticsearch, Logstash, Kibana), Prometheus
7	Real-Time Data Processing	Handles real-time data inputs from live launches or telemetry feeds for immediate predictions.	Apache Kafka, Spark Streaming
8	Model Versioning and Registry	Keeps track of model versions and metadata, enabling easy rollback and monitoring of model updates.	MLflow, DVC (Data Version Control)

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