**Project Design Phase-II**

**Technology Stack (Architecture & Stack)**

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| --- | --- |
| Date | 27-06-2025 |
| Team ID | LTVIP2025TMID48676 |
| Project Name | Cosmetic Insights |
| 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/>

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| --- | --- | --- | --- |
| **S.No** | **Component** | **Description** | **Technology** |
| 1 | User Interface | How user interacts with application e.g., Web UI, Mobile App, Chatbot | HTML, CSS, JavaScript / AngularJS / ReactJS etc |
| 2 | Application Logic-1 | Logic for a process in the application | Java / Python |
| 3 | Application Logic-2 | Logic for a process in the application | IBM Watson STT service |
| 4 | Application Logic-3 | Logic for a process in the application | IBM Watson Assistant |
| 5 | Database | Data Type, Configurations etc. | MySQL, NoSQL, etc |
| 6 | Cloud Database | Database Service on Cloud | IBM DB2, IBM Cloudant etc. |
| 7 | File Storage | File storage requirements | IBM Block Storage or Other Storage Services |
| 8 | API Gateway | Manages and routes API calls between client and backend | IBM API Connect, AWS API Gateway, Postman |
| 9 | Authentication Service | Handles login, registration, and access control | Firebase Auth, OAuth 2.0, JWT, IBM App ID |
| 10 | Notification Service | Sends alerts/notifications to users | Firebase Cloud Messaging, Twilio, SendGrid, IBM Push Notifications |

**Table-2: Application Characteristics:**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Characteristics** | **Description** | **Technology** |
| 1 | Data Ingestion & Storage | How raw cosmetic data (e.g., product reviews, ingredient lists, social media trends, sales data) is collected, processed, and stored efficiently for analysis | e.g., Apache Kafka, AWS S3, Google Cloud Storage, PostgreSQL, MongoDB, Snowflake, Databricks |
| 2 | Data Processing & ETL | The methods and tools used for cleaning, transforming, and loading raw data into a format suitable for analysis and model training. | e.g., Apache Spark, Pandas, SQL, AWS Glue, Google Dataflow, Azure Data Factory |
| 3 | Machine Learning Models | The types of AI/ML models employed for tasks like sentiment analysis, trend prediction, product recommendation, image recognition (for product attributes), or ingredient analysis. Justify model choices. | e.g., TensorFlow, PyTorch, Scikit-learn, XGBoost, Hugging Face Transformers, AWS SageMaker, Google AI Platform |
| 4 | Scalable Analytics | Justify the scalability of the analytics infrastructure to handle growing datasets and increasing query loads for real-time or batch insights. | e.g., Distributed computing frameworks (Spark), Cloud-native analytics services (BigQuery, Redshift) |
| 5 | API & Integration | How the cosmetic insights are exposed to other applications or front-end interfaces, including data retrieval and model inference endpoints. | e.g., REST APIs, GraphQL, FastAPI, Django REST Framework, Flask, AWS API Gateway, Google Cloud Endpoints |

**Reference:**

* <https://www.prophecy.io/blog/data-pipeline-architecture-modern-best-practices>
* <https://www.striim.com/blog/guide-to-data-pipelines/>
* <https://medium.com/sciforce/machine-learning-changing-the-beauty-industry-ab3a2fa0aaf>
* <https://theappsolutions.com/blog/how-to/how-to-use-ai-in-the-beauty-industry/>
* <https://www.guardianowldigital.com/2024/04/01/ai-in-the-cosmetics-industry/>