

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

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| Date | 18 October 2022 |
| Team ID | PNT2022TMID10401 |
| Project Name | Trip Based Modeling of Fuel Consumption in Modern Fleet Vehicles Using Machine Learning |
| Maximum Marks | 4 Marks |

Table-1 : Components & Technologies:

| S.No | Component | Description | Technology |
|------|------------------------|--|--------------------------------------|
| 1. | Website | User interacts with the prediction model through website to predict the fuel consumption | HTML, CSS, JavaScript, Bootstrap |
| 2. | Cloud Database | The model is provided with data from IBM cloud database | IBM Cloud DB, ibm_db(python package) |
| 3. | API | Used to extend the service to other applications | Flask Application |
| 4. | JWT & Sessions | It is used for Handling JSON web tokens (signing, verifying, decoding) | PyJWT, Flask-Sessions |
| 5. | Machine Learning Model | This model is developed to predict the fuel consumption using ML algorithms | Sklearn, Algorithms - SVM & MLR |
| 6. | Data processing | Data is pre-processed and used for training the model which is then used for prediction. | Pandas, NumPy, Matplotlib |

Table-2: Application Characteristics:

| S.No | Characteristics | Description | Technology |
|------|--------------------------|---|---------------------------------------|
| 1. | Open-Source Frameworks | Backend Framework, CSS Styling framework, Relational Database | PyJWT, Flask, Bootstrap, IBM Cloud DB |
| 2. | Security Implementations | Session Handling, Request authentication using JWT Tokens, Traffic Encryption | HS-256, Encryptions, SSL Certs |

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|----|-----------------------|--|-------------------------------------|
| 3. | Scalable Architecture | Support for Multiple Sample prediction using Excel File | Pandas, Numpy |
| 4. | Availability | Availability is increased by Load Balancers in Cloud VPS | IBM Cloud Hosting |
| 5. | Performance | The application is expected to handle up to 10000 predictions per second | Load Balancers, Distributed Servers |

Technology Architecture:

