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

Date	07 MAY 2023
Team ID	NM2023TMID09640
Project Name	IoT Based Weather Adaptive Street Lighting System
Maximum Marks	4 Marks

Technical Architecture:

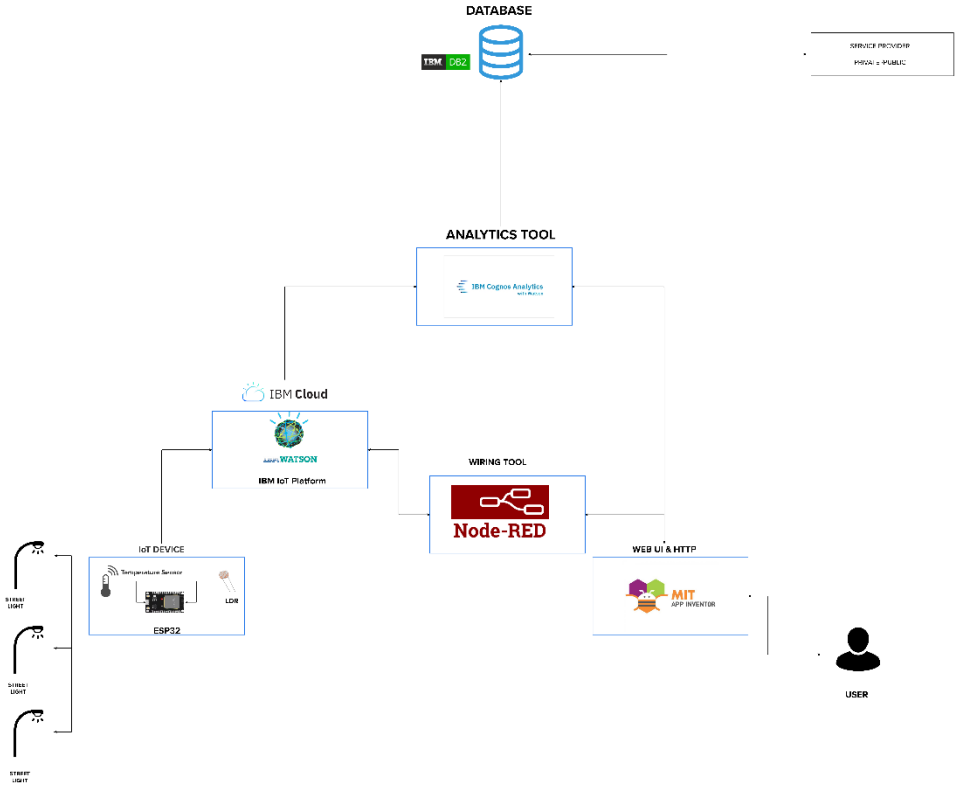

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Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	The user interface component provides an interface for the user to interact with the system. In this case, it is a web-based dashboard created using Node-RED. It allows the user to control the streetlights, monitor their status and configure the system parameters.	HTML, CSS, JavaScript / Angular Js / React Js etc.
2.	IOT DEVICE (ESP32 , LDR)	This component is responsible for handling the incoming data from the LDR sensor attached to the streetlight. It processes the data and determines the current light intensity required by the streetlight.	Java / Python/Embedded C
3.	Device Platform	This Component act as storage and holds a device that can control IoT device remotely.	IBM Watson STT service
4.	Database	The database component stores all the information related to the system, including the streetlight configurations, weather data, and user settings.	MySQL, NoSQL, etc.
5.	Cloud Database	This component is used to store and manage the data generated by the system in the cloud.	IBM DB2, IBM Cloudant etc.
6.	File Storage	This component is used to store any files required by the system, such as machine learning models, sensor data, etc.	IBM Block Storage or Other Storage Service or Local Filesystem
7.	Machine Learning Model	an AI model that can learn from the data collected from the streetlight and adjust the brightness based on patterns.	Object Recognition Model, etc.
8.	Infrastructure (Server / Cloud)	The hardware and software components used to support the IoT flow and store data in the cloud.	Local, Cloud Foundry, Kubernetes, etc.

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Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Real-time data processing	The system is designed to collect and process data from the LDR sensor on the streetlight in real-time, enabling it to respond quickly to changes in weather and lighting conditions.	Apache Kafka, Apache Storm, Apache Flink, Apache Spark Streaming
2.	Cloud-based architecture	The system is built on a cloud-based architecture, allowing for scalability, high availability, and easy accessibility from anywhere with an internet connection.	IBM WATSON ,Amazon Web Services (AWS), Microsoft Azure, Google Cloud Platform (GCP)
3.	Automation	The system is designed to automate the process of adjusting streetlight brightness levels based on weather and lighting conditions, reducing the need for manual intervention.	Ansible, Puppet, Chef
4.	Machine learning	The system incorporates machine learning models to analyze data and optimize streetlight brightness levels, improving energy efficiency and reducing costs.	TensorFlow, PyTorch, Scikit-learn, Keras
5.	User-friendly interface	The system features a user-friendly web UI built on Node-RED, allowing users to easily monitor and control streetlight brightness levels.	React, Angular, Vue.js

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