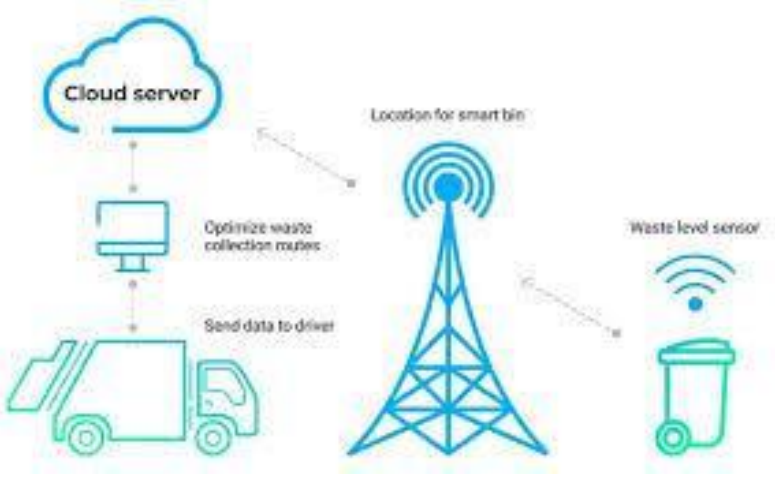
Project Design Phase-II
Technology Stack(Architecture&Stack)

Date	03October2022
TeamID	PNT2022TMID37209
ProjectName	Project- Smart Waste Management for Metropolitan Cities using IOT
MaximumMarks	4Marks

TechnicalArchitecture:

TheDeliverableshallinclude thearchitecturaldiagramas belowandtheinformation asperthetable1&table2



Guidelines:

- Includealltheprocesses(Asanapplicationlogic/TechnologyBlock)
- Provideinfrastructuraldemarcation (Local/Cloud)
- Indicateexternalinterfaces(thirdpartyAPI'setc.)
- IndicateDataStoragecomponents/services
- Indicateinterfaceto machinelearningmodels(if applicable)

1) The different levels of garbage in the garbage bins are sensed using different sensors and obtained value is stored intheIBMcloud.
2) Arduino UNO is used as a processing Unit that process the data obtained from the sensors and whether data from the API.

3) NODE-RED is used as a programming tool to write the hardware, software, and APIs. The MQTT protocol is followed for the communication.All thevcollected data are provided to theuser through a mobile application that was developed using the MITappinventor.
4) The user could decide through an app, to check the garbage bins placed on the particular locations inorder to empty the garbage bins for public use.

Table-1:Components&Technologies:

S.No	Component	Description	Technology
1.	User Interface	How user interacts with application e.g.WebUI, MobileApp, Chatbotetc.	HTML,CSS,JavaScript/AngularJs/ReactJs etc.
2.	Application Logic-1	Logic for a process in the application	Python
3.	Application Logic-2	Logic for a process in the application	IBM Watson IOTservice
4.	Application Logic-3	Logic for abprocess in the application	IBMbWatsonAssistant
5.	Database	DataType,Configurationsetc.	MySQL,NoSQL,etc.
6.	Cloud Database	Database Service on Cloud	IBMDB2,IBMCloudantetc.
7.	File Storage	File storage requirements	IBM Block Storage or Other StorageServiceor Local Filesystem
8.	External API-1	Purpose of ExternalAPI used in the application	IBMWeatherAPI,etc.
9.	Machine Learning Model	Purpose of Machine Learning Model	ObjectRecognitionModel,etc.
10.	Infrastructure(Server/Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: CloudServer Configuration:	Local,CloudFoundry,Kubernetes,etc.

Table-2:ApplicationCharacteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frame works used	Technology of Openbsource framework
2.	Security Implementations	Sensitive and private data must be protected from their production until the decision-making andstorage stages.	e.g.Node-Red,OpenweatherAppA PI,MIT App Inventor, etc.
3.	Scalable Architecture	scalability is a major concern for IoTplatforms.It has been shown that different architectural choices of IoT platforms affect system scalabilityand that automatic real time decision-making isfeasiblein an environment composed of dozens of thousand.	Technology used
4.	Availability	Automatic adjustment of frequent readings taken by the kit and prepare the message to the corporation to know about the status of the Garbage bin.	Technology used
5.	Performance	The idea of implementing integrated sensors with sensing level of garbage bins and environmental or ambient parameters will be more efficient for overall monitoring.	Technology used