Project Design Phase-II

Technology Stack (Architecture & Stack)

Date	21 October 2022
Team ID	PNT2022TMID42807
Project Name	Project - Smart waste management system for metropolitan cities
Maximum Marks	4 Marks

Technical Architecture:

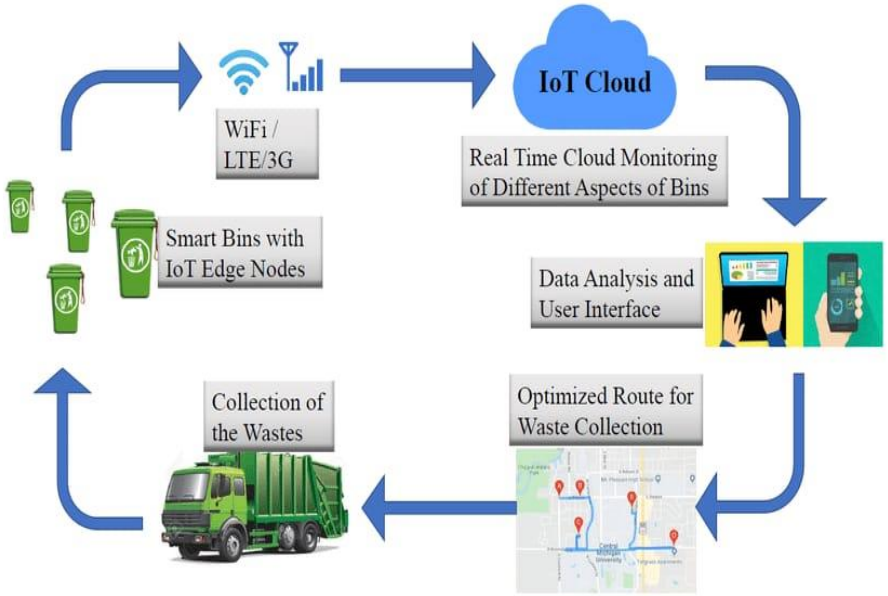
The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

Example: Order processing during pandemics for offline mode

Reference: https://developer.ibm.com/patterns/ai-powered-backend-system-for-order-processing-during-pandemics/

Smart waste management system for metropolitan cities:

- It is a platform uses analytics to translate the data gather in your bin into actionable insights to help to improve our smart city
- The first test conducted is the situation garbage bin empty or full
- Then, the bin is filled 70% it gives the notification the admin.
- When it reaches 90%it gives SMS its full the garbage needs to collect immediately. The admin will post the location and garbage id to the truck driver. Then the truck driver reaches the destination and pick up the trash in a proper time. When used this idea it eliminates the missed pickups.
- The number of bins avoided
- The number of collection services that could be saved
- Driving distance could be saved
- Fuel is saved
- If it not cleared properly the notifications sends to higher authority



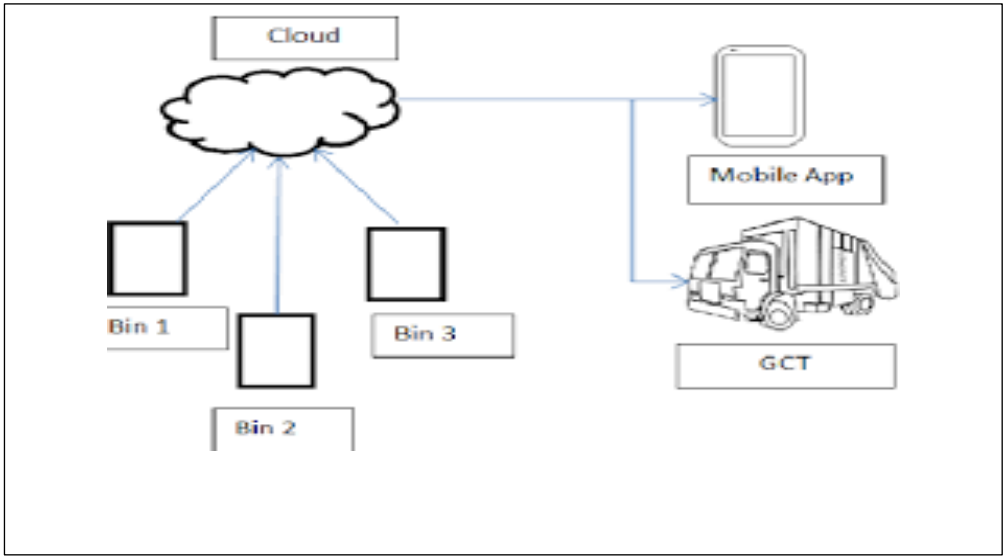


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	IBM Watson IOT cloud platform	MQTT protocol
2.	Application Logic-1	Bin level status are collected by sensors	Python
3.	Application Logic-2	Data are Monitored by IOT	IBM Watson STT service
4.	Application Logic-3	Based on the level the message is send to the workers to clear the Wastes	IBM Watson Assistant

5.	Database	MySQL- It is database to collect the data NoSQL-It is an approach to database design that enables the storage and quiring of the data outside the traditional structures found in relational database.	MySQL, NoSQL.
6.	Cloud Database	It will receive the real time updates from all the garbage bins and continuously display it on the web application and also send notification to the receiver. Using mobile application.	IBM DB2, IBM Cloudant
7.	File Storage	It is an easy way to back up and quick recovery to collect the old data.	IBM Block Storage or Other Storage Service or Local Filesystem
8.	External API-1	External API is exposing a projects internal resource to the outside users.	IBM Weather API, etc.
9.	External API-2	It is used to allow you to access the third party.	Aadhar API, etc.
10.	Machine Learning Model	It is used to track the bin and collect the wastes in proper manner.	Python IDLE, Anaconda navigator or Jupitar.
11.	Infrastructure (Server / Cloud)	Server: In computing, information technology infrastructure is composed of physical and virtual resources that support the flow, storage, processing and analysis of data. Cloud: It includes computing power, networking, and storage, as well as an interface for users to access their virtualized resources.	Cloud - MySQL server-HTTP

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Real time monitoring system is used in bins and it will notify the level and give notification to the receiver. This system allows the user to know the fill level of each garbage bin in a locality or city at	Technology of Opensource framework

S.No	Characteristics	Description	Technology
		all times, to give a cost-effective and time-saving route to the truck drivers.	
2.	Security Implementations	Data security is implemented who's allowed to use and Firewalls provide protection against outside cyber attackers by shielding your computer or network from malicious or unnecessary network traffic. These are all implemented for our security	Data security, Firewall
3.	Scalable Architecture	If use these types it will reduce the bins and time saving purpose. It leads to smart city in future because we monitor 24*7. cost wise is higher.	Technology used
4.	Availability	Waste management reduces the effect of waste on the environment, health, and so on. It can also help reuse or recycle resources, such as; paper, cans, glass, and so on. It leads to smart city.	IOT, Mobile application
5.	Performance	IoT and cloud computing technology provide high-tech sensors and enable waste management companies to optimize routes. To help minimize unnecessary trips to and from landfills, companies and communities can install waste level sensors in bins or dumpsters of any size. These devices collect and store data on fill levels, allowing collection services to predict how often bins need to be emptied.	IOT,RFID

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