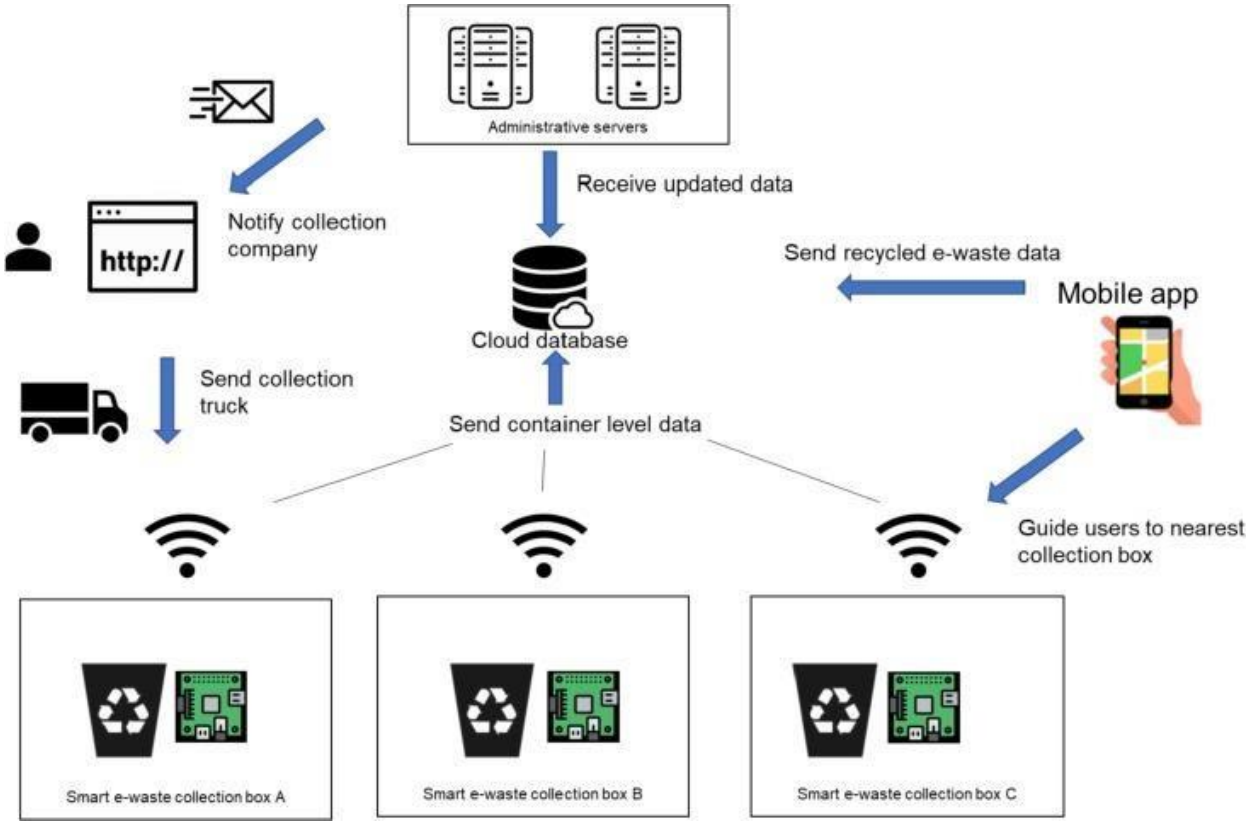
Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	29 October 2022
Team ID	PNT2022TMID51107
Project Name	Smart Waste Management System For Metropolitan Cities
Maximum Marks	4 Marks

TECHNOLOGY ARCHITECTURE:



Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table2

Table-1 : Components & Technologies:

S. No	Component	Description	Technology
1.	**User Interface**	IOT cloud platform from IBM.	MQTT Protocol
2.	**Application Logic-1**	Sensors are used to collect the data from the trash bins.	Python
3.	**Application Logic-2**	IOT is used to monitor the acquired data.	IBM Watson STT service
4.	**Application Logic-3**	A warning message will be sent to the employees to dispose of the waste based on the data.	IBM Watson Assistant
5.	**Database**	✓ MySQL is a relational database that is based on a tabular design. ✓ NoSQL is non-relational and has a document-based design.	MySQL, NoSQL

6.	**Cloud Database**	This module will continuously display real-time garbage bin status updates on the web application and send client-side notifications in addition to receiving real-time status updates from all of the garbage cans (Municipal Corporation, Garbage collector truck drivers etc.) mobile application.	IBM DB2, IBM Cloud
7.	**File Storage**	Data storage makes it simple to back up files for storage and speedy recovery in the case of an unanticipated computer failure or cyberattack.	IBM Block Storage or Other Storage Service
8.	**External API-1**	A project's internal resources can be made accessible to outside users or apps through external APIs.	IBM Weather API, etc.
9.	**External API-2**	You can use external API to access resources provided by third parties using RESTful web services.	Aadhar API, etc.
10.	**Machine Learning Model**	Planning is made effective by the right algorithm. It will provide direction for the excellent character, the best course of action, and the order of waste collection.	Python IDLE or Anaconda navigator or Jupitar
11.	**Infrastructure (Server / Cloud)**	Application Deployment on Local System / Cloud **Cloud Server Configuration:** The process of delivering an application using one or more cloud-based hosting models, such as software as a service (SaaS), platform as a service (PaaS), or infrastructure as a service (IaaS), is known as cloud deployment. Local Server. **Configuration:** Access to data and objects in a collection of Windows folders known as data directories is restricted unless you use a local server.	Cloud server- MySQL Local server-HTTP

Table-2: Application Characteristics:

S. No	Characteristics	Description	Technology
1.	**Open-Source Frameworks**	✓ Transport, treatment, and disposal of waste together with monitoring and regulation. ✓ It also encompasses the legal and regulatory framework that relates to waste management encompassing guidance on recycling."	Python
2.	**Security Implementations**	✓ Fundamental component of data security that dictates who's allowed to access and use company information and resources. ✓ Firewalls use a rule-based access control model with rules expressed in an access control list.	Firewall
3.	**Scalable Architecture**	Using smart waste bins, reduce the number of bins inside town and cities because that we can able to monitor the garbage 24/7. It will be more cost efficient and scalable when we moves to smarter.	Technology used
4.	**Availability**	By developing & deploying resilient hardware and beautiful software we empower cities, businesses, and countries to manage waste smarter.	IOT, RFID
5.	**Performance**	✓ The Smart Sensors use ultrasound technology to measure the fill levels (along with other data) in bins several times a day. ✓ Using a variety of IoT networks (NB- IoT, GPRS), the sensors send the data to Sensor's Smart Waste Management Software System, a powerful cloud-based platform, for data-driven daily operations, available also as a waste management app.	IOT, GPRS