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

Date	17-10-2022
Team ID	PNT2022TMID28837
Project Name	Project -Smart Waste Management For Metropolitan Cities
Maximum Marks	4 Marks

Technical Architecture:

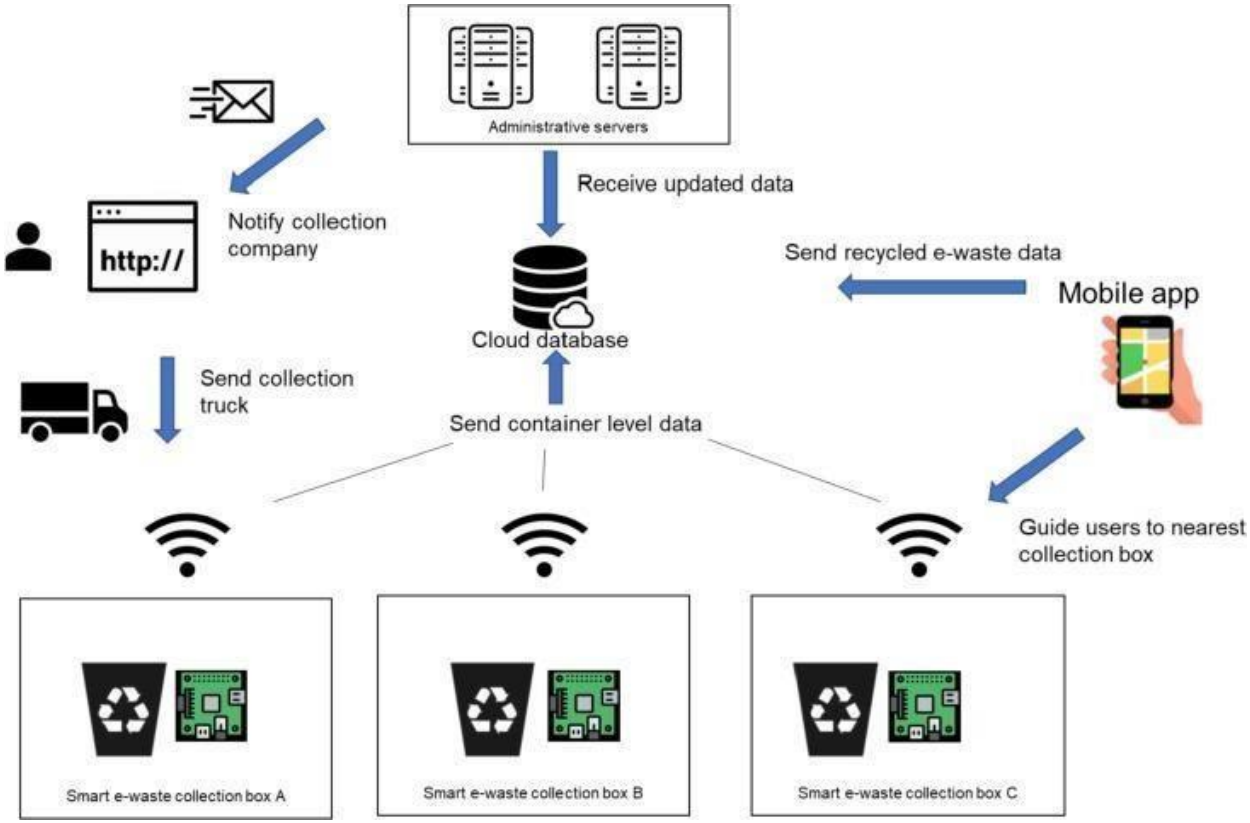
Administrative servers
Receive updated data
Notify collection company
http://
Send recycled e-waste data
Mobile app
Cloud database
Send collection truck
Send container level data
Guide users to nearest collection box
Smart e-waste collection box A
Smart e-waste collection box B
Smart e-waste collection box C

Table-1 : Components & Technologies:

S. No	Component	Description	Technology
1.	User Interface	IOT cloud platform /WEB PORTAL	HTML,CSS,NODE RED,JAVASCRIPT /MQTT PROTOCOL
2.	Application Logic-1	The bin waste data's are collected using sensors	Python /ultrasonic sensor
3.	Application Logic-2	The data which is collected are monitored using IOT	IBM Watson STT service
4.	Application Logic-3	To Get the location of the garbage	GPS
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	Database service on cloud	IBM DB2, IBM Cloud etc
7.	File Storage	File storage requirements	IBM Block Storage, local file system
8.	External API-1	External APIs expose a project's internal resources to outside users or applications	IBM Weather API, etc.
9.	External API-2	External API allow you to access third party resources that are available through RESTful web services	Aadhar API, etc.
10.	Machine Learning Model	The proper algorithm makes planning good. It will guide the goodness character and which path should be taken and which garbage bin should be collected first	Python IDLE or Anaconda navigator or Jupitar

11.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Cloud Server Configuration: Cloud deployment is the process of deploying an application through one or more hosting models—software as a service (SaaS), platform as a service (PaaS) and or infrastructure as a service (IaaS) that leverage the cloud Local Server Configuration : A local server gives you exclusive access to data and objects in a set of Windows folders called data directories	Cloud server- MySQL Local server-HTTP

Table-2: Application Characteristics:

S. No	Characteristics	Description	Technology
1.	Open-Source Frameworks	NodeRed ,python ,IBM Simulator	IOT
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	By Using smart waste bins ,we can decrease the number of bins used in cities and towns so that we can able to monitor the garbage anytime .It will be more cost efficient and scalable when we moves to smarter.	IOT
4.	Availability	By Automatic adjustment of farming equipment made possible by linking information like crops/weather and equipment to auto-adjust temperature, humidity, etc.	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