PROJECT REPORT

PROJECT NAME : Smart waste management system for metropolitan cities

Team ID	PNT2022TMID05219
Project Name	Smart waste management system andmetropolitan cities

Project Overview:

The solid waste is increasing in urban and rural areas as the population is increasing andwaste management has become a global concern. In implementing the smart cities the great challenge is how to manage waste with low cost and high performance. Waste has a negative impact on the quality of society which smart cities aim to improve. The process of collecting wastes, separating it, and transporting the containers daily and quickly to avoid any prospect ofa spread of diseases is a complex process. The Internet and its applications have become an integral part of today's human lifestyle. It has become an essential tool in every aspect. Due to the tremendous demand and necessity, researchers wentbeyond connecting just computers intothe web. With the help of IOT, garbage in the cities can be collected on monitoring the bin level, to prevent overflow of the garbage which negatively impacts the environment and to avoid orpostpone garbage collection schedules in case of low garbage levels.

Purpose:

We amalgamate technology along with waste management in order to effectively create a safe and a hygienic environment. Smart waste management is about using technology and data to create a more efficient waste industry. Based on IoT (Internet of Things) technology, smart waste management aims to optimize resource allocation, reduce running costs, and increase the sustainability of waste services. This makes it possible to plan more efficient

routes for the trash collectors who empty the bins, but also lowersthe chance of any bin being full for over aweek. A good level of coordination exists between the garbage collectors and the information supplied via technology. This makes them well aware of the existing garbage level and instigatethem whenever the bins reach the threshold level. They are sent with alert messages so that theycan collect the garbage on time without littering the surrounding area. The fill patterns of specific containers can be identified by historical data and managed accordingly in the long term. Thus, smart waste management provides us with the most optimal way of managing the waste in an efficient manner using technology

.IDEATION PHASE
LITERATURE SURVEY

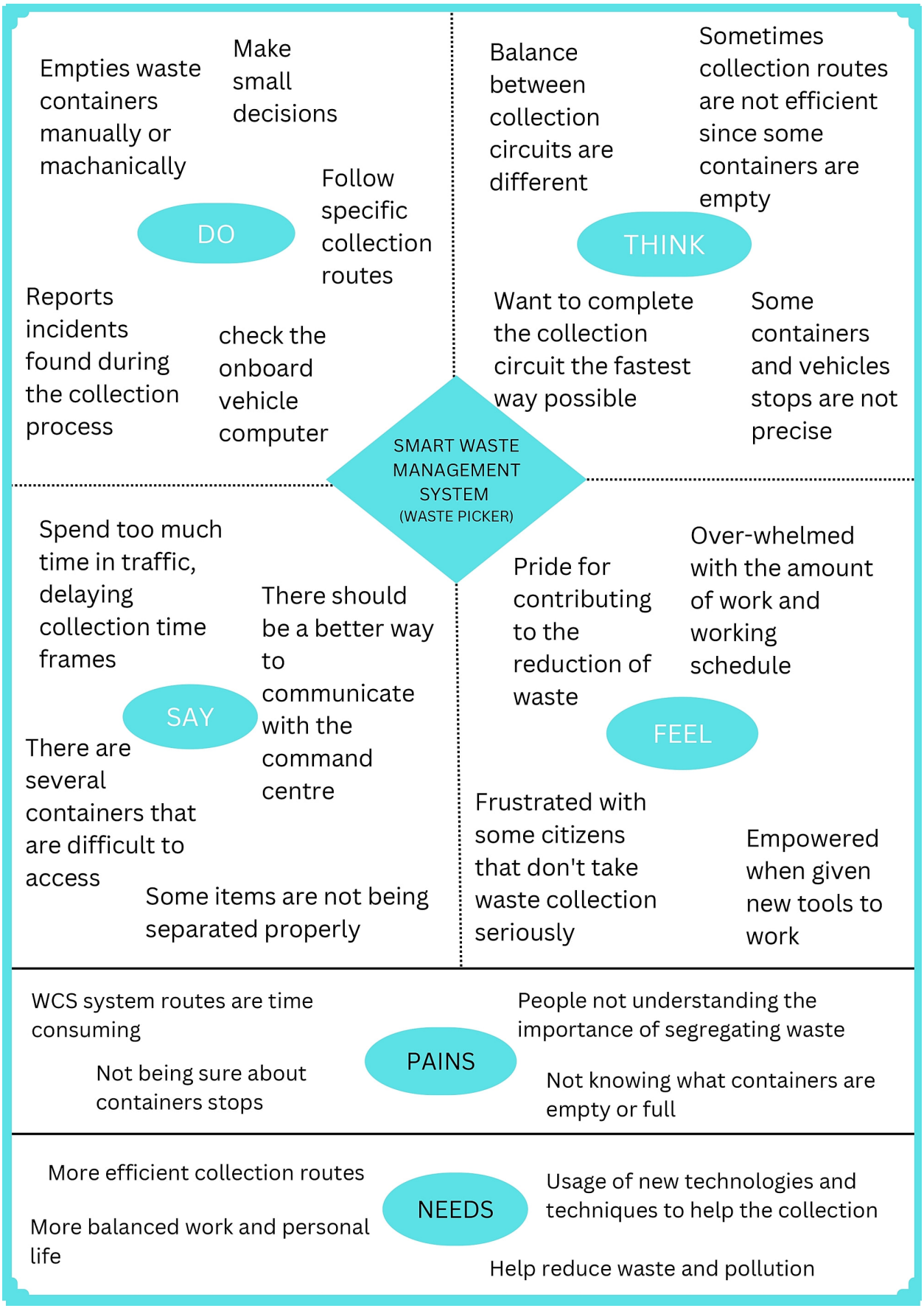
Date	3 September 2022
TeamID	PNT2022TMID05219
Project Name	Smart Waste Management System For Metropolitan Cities
Maximum Marks	4Marks

SI :NO	TITLEOF THE PAPERT	AUTHOR	METHODOLOGY	MERITS	YEAR OF PUBLICATION
1	Smart waste bin Management	Parthasarathi Manickaraja	Usesthe Ultrasonic sensorto level the dustbin and also uses the GSM module	Provides an alert message once the level has reached to the authority	2022
2	Smart	Tejashree Kadus	Technolo	Segregate	2020

	waste manage ment using IOT		gy usedis a loadcell and aWi-Fi module	thewaste in the dustbin and provides and alert message	
3	Smart waste managem ent systems using machine learning	David Rutgvist	Uses automated machine learning for a real life smart waste managemen t	It focuses on problems of detection of emptying of a recycling container using sensor measurem ents	2019

4	Real time solid waste bin monitoring system framework using wireless sensor network	Thiyaga priya dharshini	Smart bin based ona microcontr oller based platform Arduino which is interfaced with GSM module	Waste manageme nt efficiency and itavoids lumping of wastes	2019
5	Smart waste collectio n system	Muhamd JavedRa mzan	Technolog y basedon sensor based collection and uses route algorithm	It identifies the statusof waste bin levels along with the location to replace the bin	2018
6	Waste manage ment and tracking	B Keerthana	Technology based on ZigBee.	Less expensive Lock based System with	2017

				acknowledg mentalert system	
7	Smart Recycle Bin	Mohd Helmy Abd Wahab, Aeslina Abdul Kadir	AConceptual Approach of Smart Waste Management with Integrated WebBased System	At the time of trash disposal, the material to be recycled could be identified using RFID technology	2015


Empties waste containers manually or machanically
Make small decisions
Follow specific collection routes
DO
Reports incidents found during the collection process
check the onboard vehicle computer
Balance between collection circuits are different
Sometimes collection routes are not efficient since some containers are empty
THINK
Want to complete the collection circuit the fastest way possible
Some containers and vehicles stops are not precise
SMART WASTE MANAGEMENT SYSTEM (WASTE PICKER)
Spend too much time in traffic, delaying collection time frames
There should be a better way to communicate with the command centre
SAY
There are several containers that are difficult to access
Some items are not being separated properly
Pride for contributing to the reduction of waste
Over-whelmed with the amount of work and working schedule
FEEL
Frustrated with some citizens that don't take waste collection seriously
Empowered when given new tools to work
WCS system routes are time consuming
Not being sure about containers stops
PAINS
People not understanding the importance of segregating waste
Not knowing what containers are empty or full
More efficient collection routes
More balanced work and personal life
NEEDS
Usage of new technologies and techniques to help the collection
Help reduce waste and pollution

TEAM ID	**PNT2022TMID05219**
PROJECT TITLE	**SMART WASTEMANAGEMENT SYSTEM FOR METROPOLITAN CITIES**
DATE	**24 SEPT 2022**

Problem Statement:

The collection and disposal of garbage wasteis in unordered, inefficient way which leads tooverfilling of bins, rottinggarbage smell and morefuel consumption of collecting trucks.

Purpose Statement (Goals):

The purpose of this projectis to focus on problems of detection of emptying of a recycling container using sensormeasurements.

Solution description:

1. Using sensors, weighing machine; real timemonitoring the levelof waste in bins.
2. The information gets shared with appropriate authorities and fellow citizens throughweb application

Uniqueness/ Novelty:

Citizens &industries behaviors duringspecific festival, eventsat different seasons are monitoredand are predicted for garbage overflowing. Also, to find the shortest path to reach the destiny fortrucksin basis of fueland time consumption.

Social Impact/ Customer Satisfaction:

Informative, effective management of waste in big citiesreduces waste impactsover environmentpollution

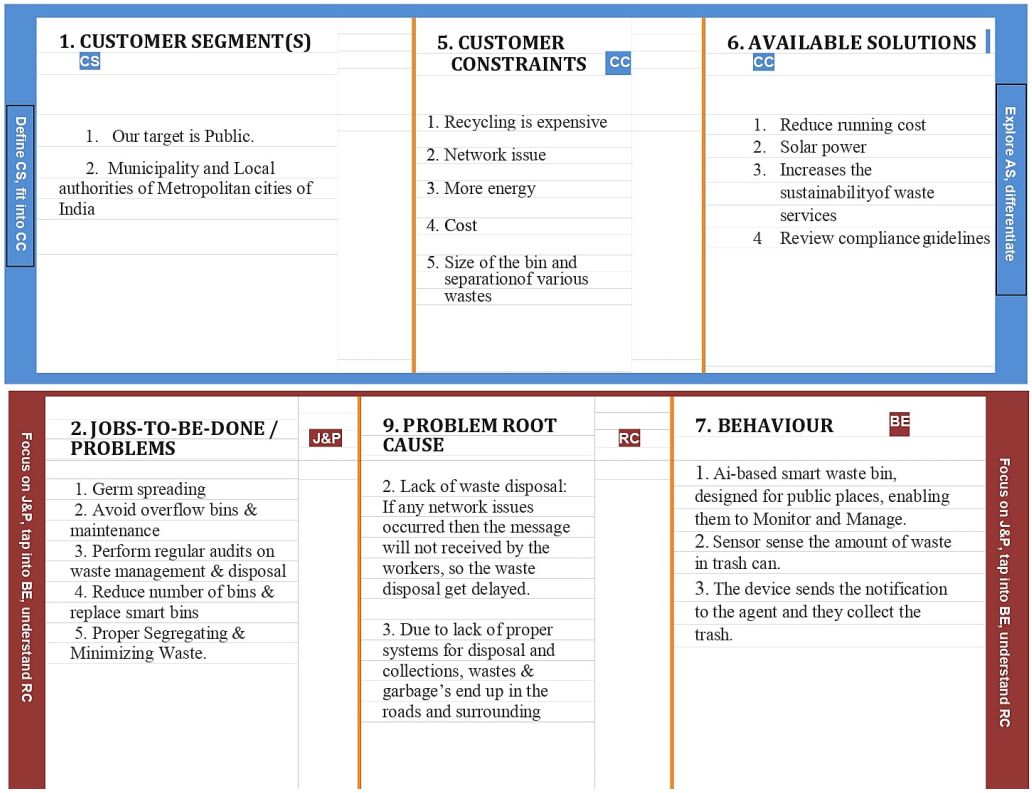
Business Model(Revenue Model):

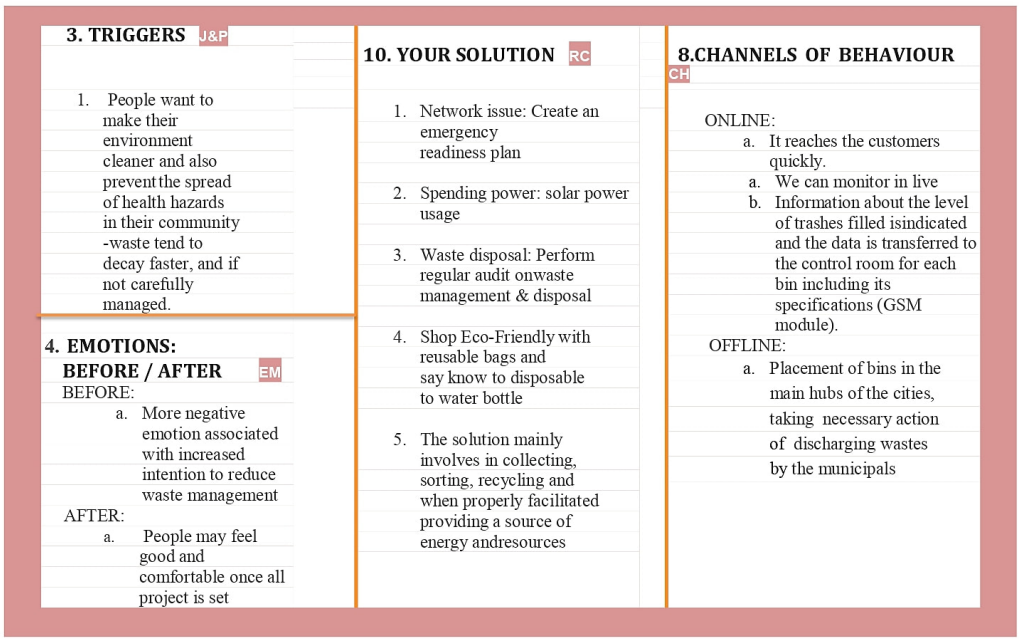
1. Eco-friendly.
2. Optimized route navigation system.
3. Reduce fuel consumption.
4. Alerts authority by real-time monitoring.
5. Promote 3R's (Reduce, Reuse, Recycle).

Scalability of the Solution:

1. The need-driven wastecollection eliminates unnecessary traffic blockage.
2. Generate important statistical data for monitoring for waste collection.
3. Recycling is promoted between residents, results in clean & sustainable environment.

Project Title: Smart Waste Management System **Project Design Phase-I - Solution Fit Template** **Team ID:** PNT2022TMID05219





Project DesignPhase-II

Solution Requirements (Functional & Non-functional)

Date	10 October2022
Team ID	PNT2022TMID05219
Project Name	Smart Waste Management SystemFor Metropolitan Cities
Maximum Marks	4 Marks

Functional Requirements:

Following are the functional requirements of the proposedsolution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story/ Sub-Task)

FR-1	**Fitting IoT device in thetrashcans**	1. The IoT deviceneed to be fixed in thedustbin with Water proofsafety. 2. The IoT deviceconsists Ultrasonicsensor, IR sensor, Weightsensor. 3. To send data to the cloud GPRS/GSM isused.
FR-2	**Detailed bin inventory**	1. Allmonitored bins andstands can be seenonthe map, and you can visit them at anytime via the StreetView feature fromGoogle. 2. Bins or standsare visible on the map asgreen, orange or red circles. 3. You can see bin details in the Dashboard – capacity, waste type, last measurement, GPSlocation and collection schedule or pick recognition.
FR-3	**Real TimeBin monitoring**	1. The Dashboard displays real-time data onfill-levels of bins monitored by smart sensors. 2. Inaddition to the % of fill-level, basedon thehistorical data, the tool predicts when the bin will become full, one of the functionalities that are not included even in the bestwaste management software.

		1. Sensors recognize picksas well; so you cancheck when the bin was lastcollected. 2. Withreal-time data andpredictions, you caneliminate the overflowing bins and stop collecting half-empty ones.

FR-4	**Expensive bins**	1. Wehelp you identify bins that driveup yourcollection costs. 2. The tool calculates arating for each bin interms of collection costs. 3. The tool considers the average distance depo-bin-discharge in the area. 4. The tool assigns bin a rating(1-10) and calculates distance from depo-bin discharge
FR-5	**Eliminate unefficientpicks**	1. Eliminate the collection of half-empty bins. 2. The sensors recognize picks. 3. By using real-time data on fill-levels and pick recognition, we can showyou how fullthe binsyou collect are.
FR-6	**Predictions for binfullness**	1. It is a 24×7 monitoring system is designed formonitoring the dumpster. 2. If either of thecontainers is full then an alert message is sent from the dustbin to employeesand the cloud. In turn, employees can clear thecorresponding dumpster. 3. The bin has Sensors that can recognize picks aswell; so you can check when the bin was last collected. With real-time data and predictions,you can eliminate the 4. overflowing bins and stop collecting half-emptyones.
FR-7	**Plan waste collectionroutes**	1. Based on current bin fill-levels and predictions of reaching fullcapacity,you are ready to respond and schedule wastecollection. 2. You can compare planned vs. executed routes toidentify any inconsistencies.

Non-functional Requirements:

Following are the non-functional requirements of proposed solution

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	1. A smart solution has been proposed to make the waste by sorting more simpleand accurate and improve the user experience, usability, and satisfaction. 2. It aims to optimize ease of use whileoffering maximumfunctionality.
NFR-2	**Security**	1. Building and deploying IoT-based smart waste management in cities can be a complex, time consuming and resource-intensive process. 2. Many municipal IT departments will not have the resources or in-house skills to support such a projectinternally.
NFR-3	**Reliability**	1. Smart waste management is also aboutcreating better working conditions for wastecollectors and drivers. 2. Operates in a defined environmentwithout failure resulting in less manpower, emissions, fueluse andtraffic congestion.

NFR-4	**Performance**	1. The system will provide accurate reports,thus increasing the efficiency ofthe system. 2. The real-time monitoring ofthe garbage level with the help of sensors and wirelesscommunication will reduce the total number of trips required of Garbage collecting truck. 3. This will reduce the total expenditure associated with the garbagecollection.
NFR-5	**Availability**	1. Another purpose of thisproject is tomake the proposed waste management system ascheap as possible. 2. By this we empowercities,businesses, and countries to managewaste smarter.

NFR-6	**Scalability**	1. Using smart waste bins reduce the number of binsinside town , cities cozwe able to monitor the garbage 24/7more cost effectand scalability whenwe moves to smarter.

.

Project Design Phase-II
Data Flow Diagram & UserStories

Date	14 October 2022
Team ID	PNT2022TMID05219
Project Name	Project – SmartWaste Management
Maximum Marks	4 Marks

Data Flow Diagrams:

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict theright amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.

Flow Diagram:

Our waste generation is constantly growing to form a **global garbage crisis**. Even though we indulge in creating a more sustainable and greener, we still fail to handle our waste generation and management. Combining technology support with a vision ofsocial, economicand environmental sustainabilityis the best way out of this problem. It is done in the following manner:

1. The smart bin system undergoes a thorough system check in order to function efficiently.

2. The threshold level levels of the bin are indicated my multiple sensors attached to bin. If the garbage exceeds the level, then analert message is sent tothe garbagecollectors as well asto the municipality or area administration.

3. The area in which garbageis found to overflow is allocated to respective garbagecollectors in the form of messages

throughGSM system.

4. Once the wastebin is emptied, an information update is sent to the municipality and server is updated.

This is how the waste from bins canbe efficiently handledand managed usingtechnology which in turn keeps the environment clean andhealthy.

User Stories:

User Type	**Functional Requirement(Epic)**	**User StoryNumber**	**User Story/ Task**	**Acceptance criteria**	**Priority**	**Release**
Admin (Corporate Authority)	Login	USN-1	As an administrator, I have assigned user names and passwords to each employee and add newdustbins and theirlocation and send mailto Truck Driverwhen the location isfilled	I can manage my online account and dashboard.	Medium	Sprint-2

Truck Driver	Login	USN-2	As a Truck Driver, I'll follow Admin's instruction and the route assigned to reach thefilled garbage.	I can take the shortest path assigned to me and reach the waste filled land.	Medi um	Sprint-2
Local Garbage Collector	Login	USN-3	As a Local Garbage Collector, I’II gather all the wastecollected from the garbageand houseandload it onto a garbage truck.	I can collect the trach,pull it to the truck,and send it out.	Medi um	Sprint-2
Municipali tyofficer	Login	USN-4	As a Municipality officer, I'll make sure everything is sticked to plan andwithout anyissues.	All of these process es are under my control.	High	Sprint-1

ProjectPlannPhase Milestone andActivity List

Date	21 October 2022
Team ID	PNT2022TMID05219
Proje ct Name	Smart Waste Management System forMetropolitan Cities

TITLE	DESCRIPTION	DATE
Literature Survey& InformationGathering	Literature survey on the selected project & gatheringinformation by referring the,technical papers, research publications etc.	3 SEPTEMBER 2022
Prepare Empathy Map	Prepare Empathy MapCanvasto capture the user Pains & Gains, Prepare list of problem statements	10 SEPTEMBER 2022
Ideation	List the by organizing the brainstorming session andprioritize the top 3 ideas based on the feasibility & importance.	17 SEPTEMBER 2022
Proposed Solution	Prepare the proposed solution document, which includes the novelty, feasibility of idea, business model, social impact,scalability of solution, etc.	24 SEPTEMBER 2022
Problem Solution Fit	Prepare problem - solution fitdocument.	30 SEPTEMBER 2022
Solution Architecture	Prepare solution architecturedocument.	24 SEPTEMBER 2022

Customer Journey	Prepare the customer journey maps to understand the user interactions & experiences withthe application (entry to exit).	8 OCTOBER2022
Functional Requirement	Prepare the functional requirement document.	10 OCTOBER2022
Data Flow Diagrams	Draw the data flow diagrams andsubmit for review.	14 OCTOBER2022
Technology Architecture	Prepare the technology architecture diagram.	15 OCTOBER2022
Prepare Milestone & ActivityList	Prepare the milestones & activity list of the project.	21 OCTOBER2022
Project Development - Delivery ofSprint-1, 2, 3 & 4	Develop & submitthe developed code by testing it.	IN PROGRESS..

Date	22October 2022
Team ID	PNT2022TMID05219
Project Name	Project – Smart WasteManagement System forMetropolitan Cities
Maximum Marks	8 Marks

Product Backlog,Sprint Schedule, and Estimation (4 Marks)

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Login	USN-1	As an Administrator, I can have total access to all the Co-Admin and Truck driver and monitorthe waste.	20	High	Karkuvel Devi . J
Sprint-2	Login In	USN-2	As a Co-Admin, I'll control the waste level bymonitoring them via IBM Iot. Once the filling happens, I'll notifytrash truck withlocation of bin with bin ID.	20	High	Kirantara . B
Sprint-3	Dashboard	USN-3	As a Co-Admin, I will set the Notification process and other management are done.	20	High	Geetanjali Ray
Sprint-4	Dashboard	USN-4	As a Truck Driver,I can able to see the filled dustbin in my Dashboard and empty them.	10	Medium	Pradeep . V
Sprint-4	Dashboard	USN-5	As a Municipality officer I canview all the process is proceeding without any problems.	10	High	Pradeep . V

Project Tracker,Velocity & BurndownChart: (4 Marks)

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022

Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	

Velocity:
Imaginewe have a 10-day sprint duration, and the velocityof the team is 20 (points per sprint). Let's calculate the team's averagevelocity (AV) per iteration unit (story pointsper day)

SPRINT - 1

Date	29 October 2022
Team ID	PNT2022TMID05219
Project	Smart Waste Management system for metropolitancities

OBJECTIVE:

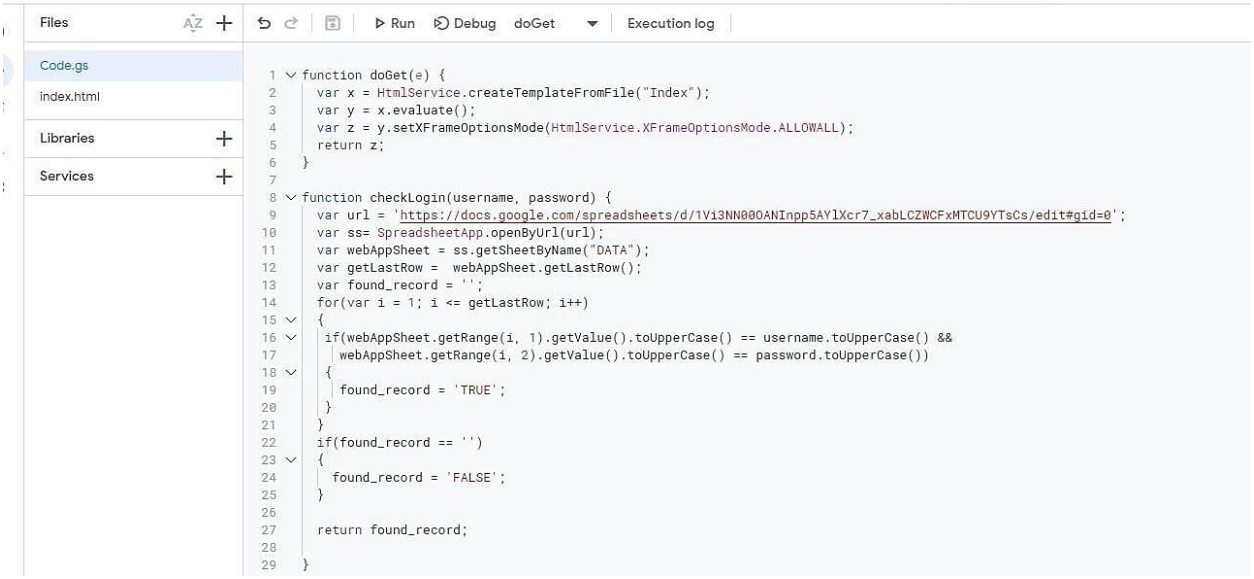
A 24×7 monitoring system is designed for monitoring dumpsters. The ultrasonic sensor is used for measuring the level of waste in the dustbin. The DC motorpowered platform is usedfor segregating wet and dry waste. The IR sensor and moisture sensor is used for separating wet and dry waste. If either of the containers is full then an alert message is sent from the dustbin to garbage collector and the cloud. In turn, based on the allotment garbage collector can clear the corresponding dumpster.

CODE FOR REGISTRATION AND LOGIN CREDENTIALS:

Code.gs:

```
function doGet(e) {
    var x =
    HtmlService.createTemplateFromFile("Ind
    ex");var y =x.evaluate();
    var z = y.setXFrameOptionsMode(HtmlService.XFrameOptionsMode.ALLOWALL);return z;
}

function checkLogin(username, password){
    var url =
    'https://docs.google.com/spreadsheets/d/1Vi3NN00OANInpp5AYlXcr7_xabLCZWCFxMTCU9YTsCs/ed
    it#gid=0';var ss= SpreadsheetApp.openByUrl(url);
    var webAppSheet =
    ss.getSheetByName("DATA");var
    getLastRow =
    webAppSheet.getLastRow(); var
    found_record = '';
    for(var i = 1; i <= getLastRow; i++)
    {
      if(webAppSheet.getRange(i, 1).getValue().toUpperCase() ==
         username.toUpperCase() &&webAppSheet.getRange(i,
         2).getValue().toUpperCase() == password.toUpperCase())
      {
         found_record = 'TRUE';
      }
    }
    if(found_record == '')
    {
       found_record = 'FALSE';
    }

    return found_record;

}

function AddRecord(usernamee, passwordd, email, phone) {
```

```
    var url =
    'https://docs.google.com/spreadsheets/d/1Vi3NN00OANInpp5AYlXcr7_xabLCZWCFxMTCU9YTsCs/edit
    #gid=0'; var ss= SpreadsheetApp.openByUrl(url);
    var webAppSheet = ss.getSheetByName("DATA");
    webAppSheet.appendRow([usernamee,passwordd,email,phone]);

}
```



index.html:

```
<!DOCTYPE html>
<html>
    <head>
        <style>
            body{
                background-
                image:url('background.jpg');backg
                round-repeat: no-repeat;
                background-attachment: fixed;
                background-size:100% 100%;
            }
        </style>
```

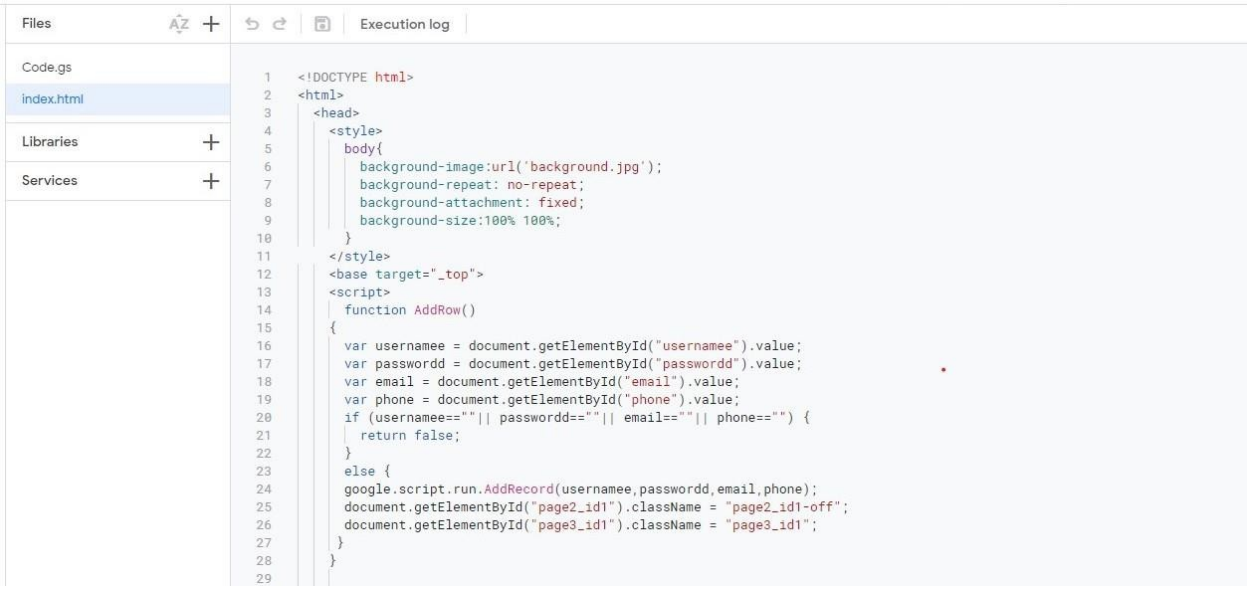
```
<base target="_top">
<script>
    function AddRow()
{
    var usernamee = document.getElementById("usernamee").value;var passwordd
    =         document.getElementById("passwordd").value;
    var         email         =
    document.getElementById("email").value;
    var phone = document.getElementById("phone").value;
    if (usernamee==""|| passwordd==""|| email==""|| phone=="") {returnfalse;
    }
    else { google.script.run.AddRecord(usernamee,passwordd,email,phone);

    document.getElementById("page2_id1").className
    = "page2_id1-off";
    document.getElementById("page3_id1").className
    = "page3_id1";
  }
}

  function LoginUser()
{
var username = document.getElementById("username").value;var
password=document.getElementById("password").value;
google.script.run.withSuccessHandler(function(output)
{
    if(output == 'TRUE')
    {
        var url1 ='https://node-red-jrfhu-2022-10-06.eu-
gb.mybluemix.net/ui/#!/0?socketid=kVaDwxl44Sp25mOZAAAX';
        var winRef = window.open(url1);
        winRef ? google.script.host.close() : window.onload=function(){document.getElementById('url').href
        = url1;}
    }
    else if(output == 'FALSE')
    {
       document.getElementById("errorMessage").innerHTML = "Invalid data";
    }
}).checkLogin(username, password);
}
```

```
function function1(){
        document.getElementById("page1_id1").className =
        "page1_class1-off";
        document.getElementById("page2_id1").className =
        "page2_id1";
}

function function3(){
    document.getElementById("page3_id1").className = "page3_id1-
    off";document.getElementById("page1_id1").className =
    "page1_id1";
}

    </script>
    <style>

/*page1*/
/*page2*/
.pag
.page2_id1-off{
        display:none;
}

/*page3*/
.page3_class1{
        display:none;

}
.page3_id1-off{
        display:none;
}


input[type=text]:hover{
                border-bottom:2px solid black;
            }
input[type=number]:hover{
                border-bottom:2px solid black;
            }
input[type=password]:hover{
                border-bottom:2px solid black;
```

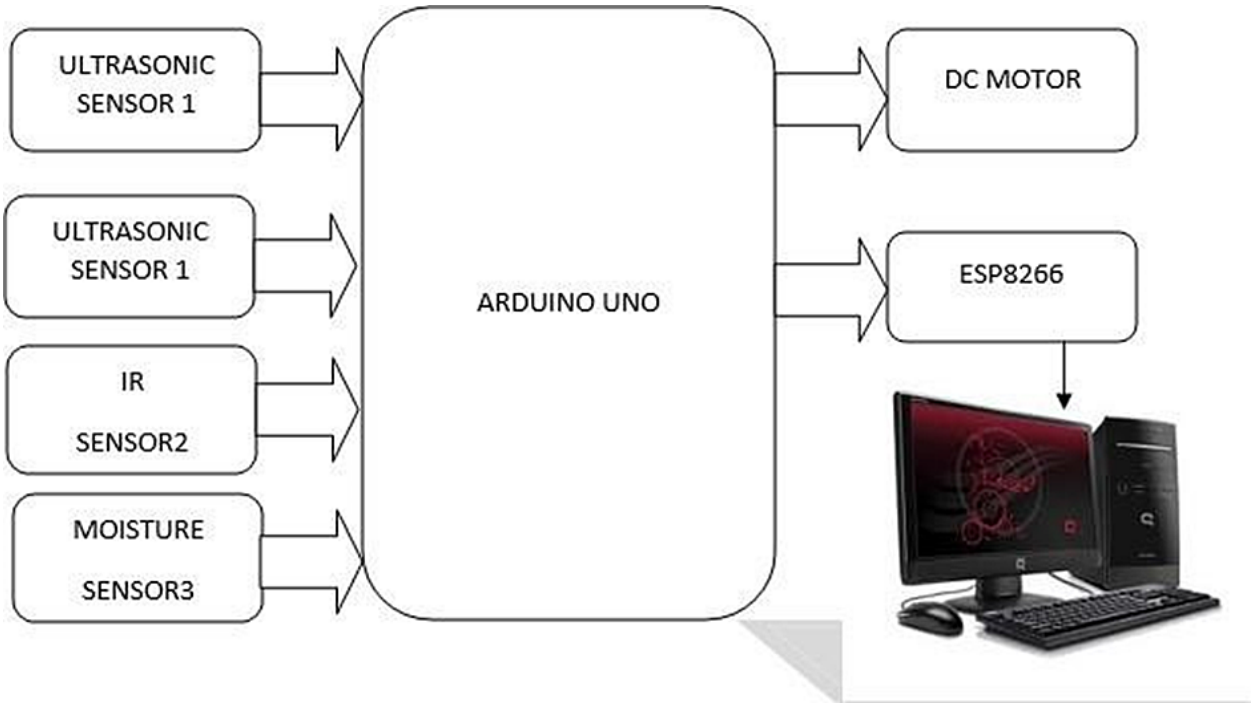
```
            }


 </style>
 <meta name="viewport" content="width=device-width, initial-scale=1.0">
    </head>
    <body>
<br
 ><
br>
 <!-
   -
pag
 e1-
 ->
 <center>
   <div class="page1_class1" id="page1_id1" style="background-
 color:rgb(135, 207, 235);border:2px solid gray;border-radius: 20px;width: 250px;padding-top:
 10px;padding-bottom:20px;padding-left: 20px;padding-right: 20px;">
        <h1>Login Here</h1>
        <br>
        <p>Username</p>
        <input type="text" id="username" placeholder=" Enter Username" style=";outline: none; text-align:
        center;font-size:0.9em
 ;width: 50%;font-weight:bold;"/><br>
        <br>
        <p>Password</p>
        <input type="password" id="password" placeholder=" Enter Password" style="border-
 top: none;border-right:none;border-left: none;outline: none; text-align: center;font-size:0.9em
 ;width:50%;font-weight:bold;"/>
        <br><span id="errorMessage" style="color: red" ></span><br>
        <br>
        <input type="submit" value="Login" onclick="LoginUser()" style="float: centre;padding-top:
 1px;padding-bottom:1px;padding-left: 10px;padding-right: 10px;font-size: 0.9em;font- weight:bold;"
 /><br>
        <br><br>
        <b>If you don't have an account,</b><input type="button" onClick="function1()" value="Create New"
 style="margin-top:5px;font-weight:bold;" />
   </div>

 <!--page2-->
 <div class="page2_class1" id="page2_id1" style="background-
```

```
color:rgb(135, 207, 235);border:2px solid gray;border-radius: 20px;width: 250px;padding-top:
10px;padding-bottom:20px;padding-left: 20px;padding-right: 20px;">
  <h1>Register Here</h1>
  <p>Name</p>
      <input type="text" id="usernamee" placeholder=" Enter Name" style="border-top: none;border-
right: none;border-left:none;outline: none; text-align: center;font-
size:0.9em ;width: 50%;font-weight:bold;"/><br>


      <br>
  <p>Password</p>
      <input type="password" id="passwordd" placeholder="Create password" style="border-top:
none;border-right:none;border-left: none;outline: none; text-align: center;font-size: 0.9;width:
50%;font-weight:bold;" /><br>
<b
r>
<p
>E
mai
l</
p>
      <input type="text" id="email" placeholder=" Enter Email" style="border-top: none;border-
right: none;border-left:none;outline: none; text-align: center;font-
size:0.9em ;width: 50%;font-weight:bold;"/><br>
      <br>
  <p>Phone Number</p>
      <input type="number" id="phone" placeholder="Enter number" style="border-top: none;border-
right: none;border-left:none;outline: none; text-align: center;font-
size:0.9em ;width:50%;font-weight:bold;" /><br><br>
      <br><br>
      <input type="submit" value="Create" onclick="AddRow()" style="float: centre;padding- top:
1px;padding-bottom:1px;padding-left: 10px;padding-right: 10px;font-size: 0.9em;font-weight:bold;"
/>
      <br>
</div>

<!--page3-->
  <div class="page3_class1" id="page3_id1" style="background:none;border:2px solid gray;border-
radius: 20px;width:250px;padding-top: 10px;padding-bottom: 20px;padding-left: 20px;padding-
right: 20px;"><center>
      <h2> REGISTRATION SUCCESSFUL! Login to your account</h2>
      <input type="submit"  onClick="function3()" value="Login" style="font-weight:bold;"><br>
  </div>
```

```
</center>
 </body>
</html>
```



CIRCUIT DIAGRAM:



SPRINT - 2

Date	17 October 2022
Team ID	PNT2022TMID05219
Project Name	Project – SmartWaste Management systemfor metropolitan cities

Python Code

```
import time import sys

import

ibmiotf.application

import ibmiotf.device

importrandom

#Provide your IBM

WatsonDevice

Credentials

organization


= "2melo1" deviceType =

"waste" deviceId = "1234"

authMethod ="token" authToken =

"12345678"

# Initialize GPIO

def myCommandCallback(cmd):

print("Commandreceived: %s" %
```

```
cmd.data['command'])

status=cmd.data['command']

if status=="waste level":

        print ("waste level

    monitored")else :

        print ("weight level monitored")

    #print(
    cmd)
    try:
    deviceOptions = {"org": organization, "type": deviceType, "id": deviceId, "auth-
    method":authMethod,"auth-token": authToken} deviceCli = ibmiotf.device.Client(deviceOptions)
            #.....

exceptException as e:

            print("Caughtexception connecting device: %s" % str(e))

            sys.exit()



# Connectand send a datapoint "hello" with value "world" into the cloud as an event of type
"greeting"10 times deviceCli.connect()



whileTrue:

        #GetSensor Data from DHT11

        level=random.randint(0,100)weight=random.randint(0,100)



        data = { 'level' : level, 'weight':
```

```
        weight }#print data

        def myOnPublishCallback():

           print ("Published Level = %s %%" % level, "Weight = %s %%"% weight, "toIBM Watson")

        success = deviceCli.publishEvent("IoTSensor", "json", data,
  qos=0,on_publish=myOnPublishCallback)
        if not success:

        print("Not connectedto IOTF")

 time.sleep(20)



deviceCli.commandCallback= myCommandCallback



  # Disconnect the device and application from the clouddeviceCli.disconnect()
```

Delivery of Sprint – 3

Node Red Connection to IBM Cloudant

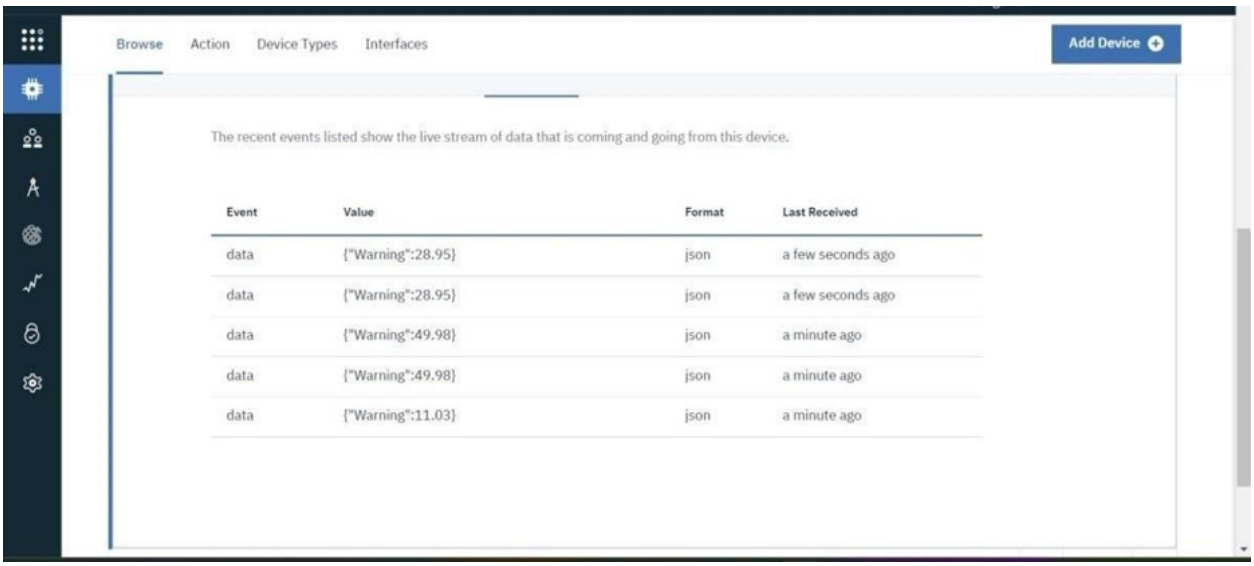
Date	17 October 2022
Team ID	PNT2022TMID05219
Project Name	Smart Waste Management system formetropolitan cities
Maximum Marks	4 Marks

1.Node-RED Connection setup for data transmission from IBM Watson IOTplatform to Node-REDdashboard.

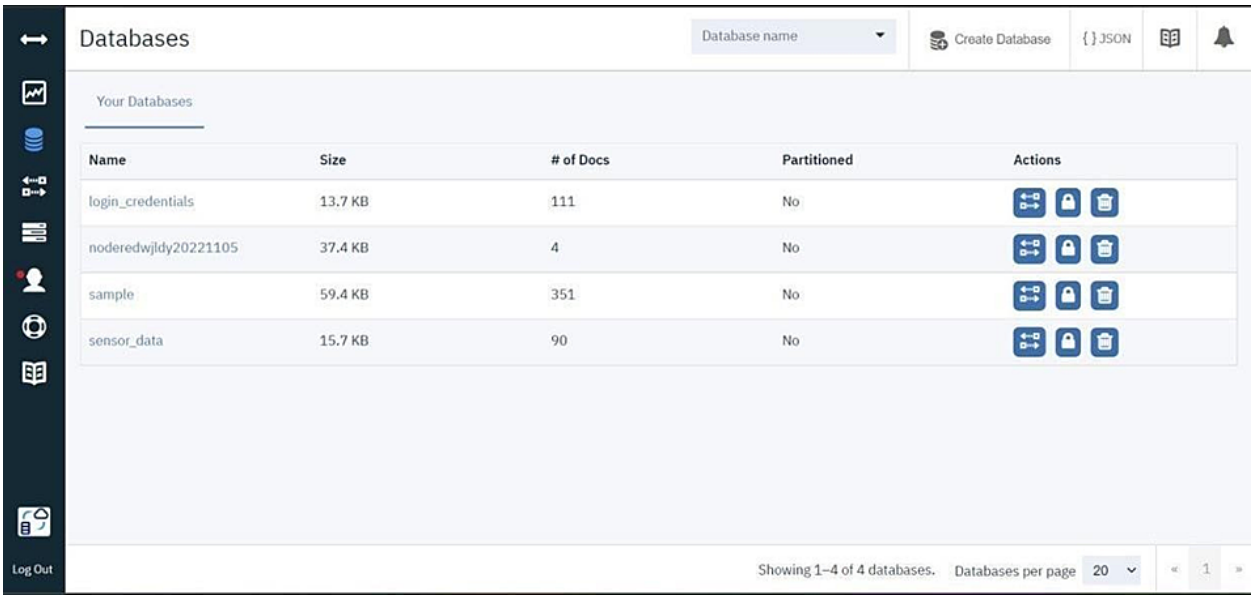
2.Simulate Wokwiconnection to transmitdata from wokwiaccount to IBM WatsonIOT platform and then toNode Red dashboard.

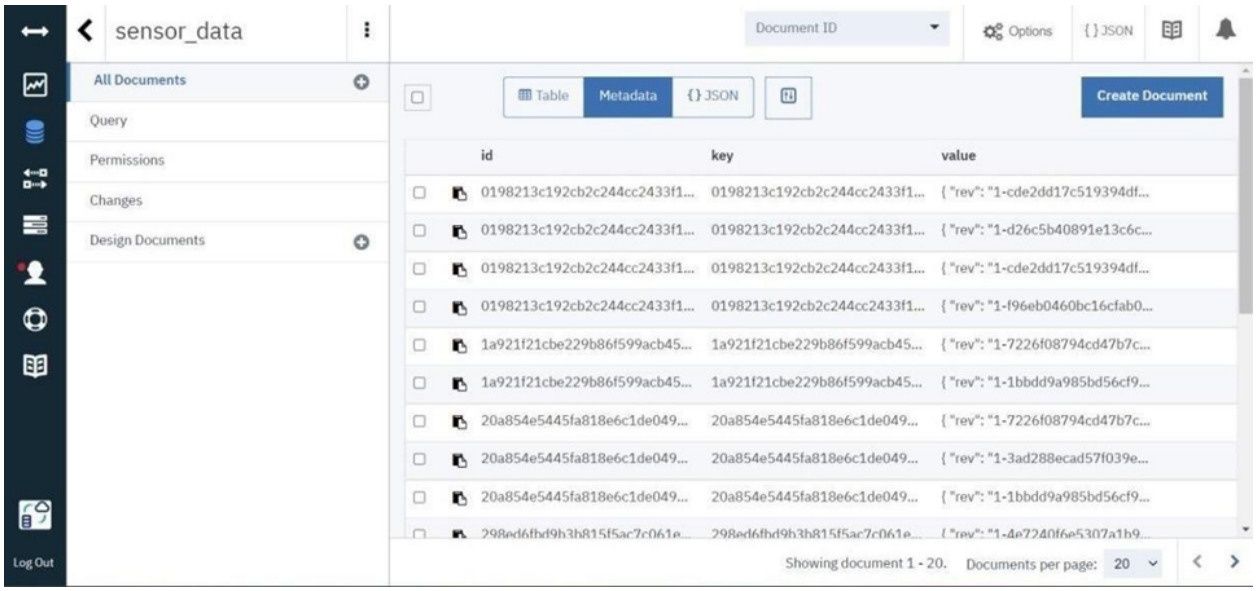
3.Data transferto Watson IOT platform

4.Data transferfrom IBM Watson IOT platformand wokwi to Node red

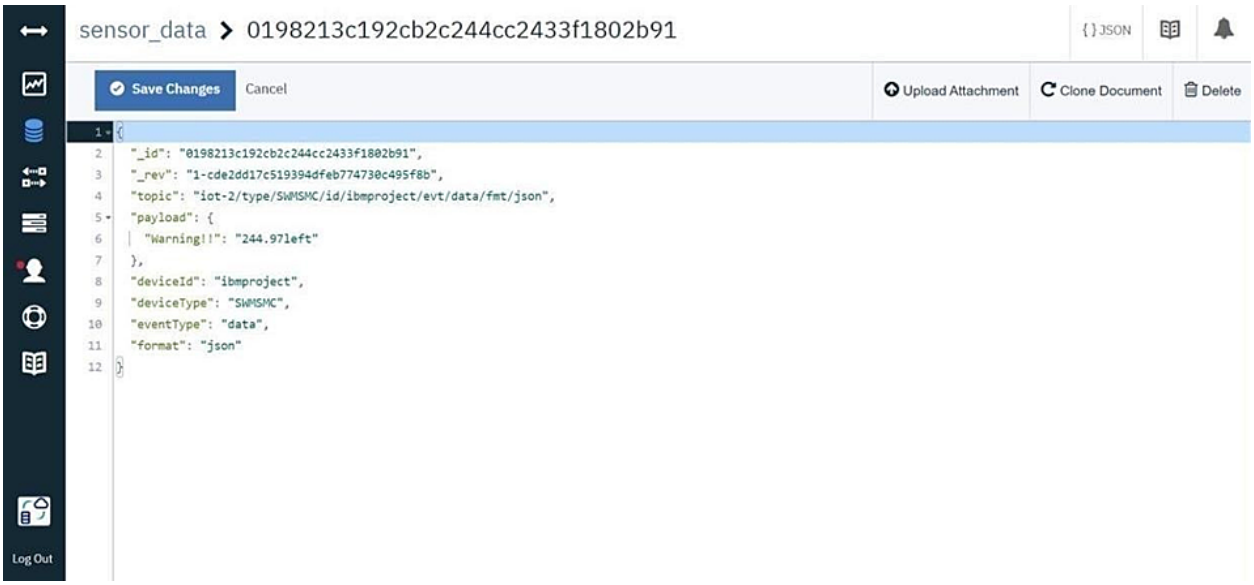


5.Storing databasein IBM cloudant DB.





6.Data is stored in JSON format



Delivery of Sprint – 4

Web UI Design and Deploy

Date	17 November 2022

Team ID	PNT2022TMID05219
Project Name	Smart Waste Management for Metropolitan Cities -IOT

Node-RED Connection setup for data transmission from IBM WatsonIOT platformto Node-REDdashboard.

Simulate Wokwi connection to transmit data from wokwi account to IBMWatsonIOTplatform and then to Node Red dashboard.

Data transferto Watson IOT platform

Data transferfrom IBM WatsonIOT platform and wokwi to Node red.

Storing databasein IBM cloudant DB

Data is stored in JSON format

Web UI


Bin Status
Bin Status
Bin Level
Today Used
Bin Level
27
date
06/11/2022
Today Used
27gallons