

## Technology Stack (Architecture & Stack)

### Components & Technologies:

#### 1. User Interface - Web Portal

Technology: HTML, CSS, NodeRed, Javascript.

**2. Application Logic-1** - To calculate the distance of dreck and show the real time level in web portal, information getting via ultra sonic sensor and the alert message activate with python script to web portal.

Technology: Ultrasonic sensor/ Python.

**3. Application Logic-2** - To calculate the weight of the garbage and show the real time weight in web portal, this info getting via load cell and the alert message activate with python to web portal.

Technology: Load cell/Python.

**4. Application Logic-3** - Getting location of the Garbage.

Technology :GSM / GPS.

**5. Cloud Database** - Database Service on Cloud

Technology :IBM DB2, IBM Cloudant etc.

**6. File Storage** - File storage requirements

Technology :Github, Local file system.

**7. Ultrasonic Sensor** - To throw alert message when garbage is getting full.

Technology :Distance Recognition Model.

**8. Infrastructure (Server / Cloud)** - Application Deployment on Local System / Cloud Local

Server Configuration:localhost

Cloud Server

Configuration:localhost, Firebase.

Technology :Localhost, Web portal.

### Application Characteristics:

- **Technology - IOT**

**1. Open-Source Frameworks** - NodeRed, Python, IBM Simulator.

**2. Security Implementations** - Raspberry Pi is connected to the internet and for example used to broadcast live data, further security measures are recommended and use the UFW(uncomplicated Firewall)

**3. Scalable Architecture** - Raspberry pi: Specifications

Soc: rspi ZERO W

CPU: 32-bit computer with a 1 GHz ARMv6

RAM: 512MB

Networking: Wi-Fi

Bluetooth: Bluetooth 5.0, Bluetooth Low Energy (BLE).

Storage: MicroSD

GPIO: 40-pin GPIO header, populated

Ports: micro HDMI 2.0, 3.5mm analogue audiovideo jack, 2x USB 2.0, 2x USB 3.0, Ethernet Dimensions: 88mm x 58mm x 19.5mm, 46g .

**4.Availability** - These smart bins use sensors like ultrasonic and load cell to send alert message about the trash level recognition technology, and artificial intelligence, enabling them to automatically sort and categorize recycling litter into one of its smaller bin.

**5.Performance** - Number of request:RPI manages to execute 129139 read requests per second.

Use of Cache:512mb

Use of CDN's:Real time