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By

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CONTAINMENT ZONE ALERTING APPLICATION

A PROJECT REPORT

Submitted by

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ABSTRACT

The novel Corona virus (covid-19) n break out was declared as a global pandemic by the world health organization on 11th March 2020. Covid-19 spread has its origin from the wet markets of Wuhan city of China. Different strain of Vaccine has been developed by different countries.

In India two vaccines have been approved by the government of India. One is Covid shield by the Oxford University and other is CoVaxin by pharmaceutical company Bharat biotech. To supervises and monitor the vaccination administrator, the government of India has developed a mobile application called CoWin.

It will play an essential role in managing the entire vaccination process and help to record vaccine data. The cons and pros of this application are yet to be identified.

We are developing a similar app that notifies and alerts users about COVID Containment zone with the help of user's location data and Containment zone identification using collected data from CoWin App.

DELIVERABLES

This application is intended to provide information about containment zones in a particular region by alerting people, through continuous monitoring of an individual's location. Key benefits of the application are monitoring people's activity and alerting them of their safety movements.

Solution Requirement

The project aims at building an application that provides information about the containment zones of a particular region by continuously monitoring an individual's location. Location of the individual must be stored in the Database. Alerts are sent using the notification service.

Features of the Application

Admin App (portal)

They should login to the app and update the containment zone's locations in the portal. Based on the location a Geofence will be created within a 100 meters radius. They should be able to see how many people are visiting that zone.

User App (Mobile App)

The app should have a user registration and login. After the user logged into the app it will track the user's location and update the database with the current location. If the user is visiting the containment zone, he will get an alert notification.

LITERATURE SURVEY

T. Kalyani, S. Monika, B. Neresh, Mahendra Vucha [1] – "**Accident Detection and Alert System"** (**December-2018)**. To protect the vehicle and tracking so many advanced technologies are available in a day. The Existing system also provides the location of the accident using at mega 328 Microcontroller and RF transmitter and receiver. The information is sent to the saved mobile number.

Pallavi T, Dhotre [2] – "**Disaster Monitoring & Alarming System for Mountains Foothills" (12 December 2015)**. Communication systems are needed for delivering warming message to be potentially affected locations to alert local and regional governmental agencies. The message needs to be ethical, reproducible and easy to be understood by authorities.

M. Ramana Rao, T. Adilakshmi, M. Venkatesh J.R,[3]- "**Mobile Geo-Fencing Triggers for Alerting Entries into COVID-19" (june-2021).** A disaster information system using the geo fencing technology to detect the movement of users and provide information of the risk for the location of the user was detected with high accuracy when entering the fence, but the accuracy was low when existing the fence.

Jonathan, Munson, Vineet K. Gupta [4] – "Location based notification as a general-purpose service". Current Architecture deployed by wireless carriers to service location-aware application cannot handle the load of positioning requests implied by a general-purpose location-based notification services, and the need for such a service is motivated.

T. Nakagawa, Wataru Yamada, H. Morikawa [5] - **"Variable interval partitioning method for Smartphone-based power saving geofencing**". A method for position detection whose activation frequency is determined by speed towards the target spot is proposed, which is robust against positioning error and fluctuation of the terminal's movement by leveraging the access angle to the target spot.

Stephan Clark, D. Watling [6]- "Sensitivity analysis of the probit-based stochastic user equilibrium model." An efficient computational method for performing a sensitivity analysis of probit-based stochastic user Equilibrium for general networks, which uses information on SUE path flows but is not specific to any particular equilibrium.

Kharabela Rout, Sonalimayee sahu[7] - "Exploring factors influencing the user's intention to use Aarogya Setu contact Tracing Mobile Health Application during COVID Pandemic (October 2020)." Perceived usefulness of Aarogya Setu m-health app will have a significant impact on intention to use Aarogya Setu m-health app, which helps to understand the intention to use Aarogya Setu app during pandemic. We proposed four factors influence the intention to use Aarogya Setu m-health app and conceptually defined each factor for Aarogya Setu m-health app context. This study will provide a theoretical understanding for contact tracing and m-health apps for future studies.

R. Vijayanand, Prabhu Jayagopal, R. Jothikumar [8] - "Role in prevention of covid 19 and health care work forces behavioral intention in India-an empirical examination". The role of preventing covid 19 is addressed and many propelled cloud-based administrations and offices to serve a greater number of patients effectively and the remote medicinal services framework provides a lot of significations in such a crucial time of lockdown.

Ranajoy Mallik, Amlan protim Hazarika 9] - "Development of an android application for viewing covid-19 containment zones and monitoring violators who are trespassing into it using firebases and Geofencing". The android application source the location of the containment zone to the users. It also notifies the user when he or she trespasses the boundary of a containment zone or stays in the containment zones.

Fie-ying kuo and Tzai-Hung Wen [10] - "Regionalization for infection control: An algorithm for delinating containment zones considering the regularity of human mobility". The zoning patterns proposed in our algorithm could also allow for more life functions in a zone and more evenly distributed life resources across zones than those of zones generated by other methods. It implements control measure against an epidemic.

Akira Suyama, Ushio Inoue [11] - "Using geofencing for a disaster information system". It proposes a disaster information system using the geofencing technology to detect the movement of user and provide information of the risk of them. To detect the user's movement, the client creates a virtual fence called geofence at the dangerous are based on the risk information stored in server and monitors the user's entry and exist of the fence.

Ranajoy Mallik, Amlan Protim Hazarika and Rajib Bandyopadhyay [12] - "Development of an Android Application for viewing Covid-19 Containment zone and Monitoring Violators Who are Trespassing into it using Firebase and Geofencing". The application provides an efficient way of showing the identified covid-19 containment zones to the users in a Google map. It sends separate notification alerts to the user on entering. The application can be further used for many purposes like maritime and forest safety to prevent users from entering restricted areas.

M.V. Ramana Rao, Thondepu Adilakshmi, M. Gokul Venkatesh, Jothikumar R and Shadan [13] - "Mobile Geo-fencing Triggers for Alerting Entries into Covid-19 Containment Zone using IoT". It is focuses on informing the public about the containment zone when they are in travel and also sends an alert to the police when enters the containment zone without permission using the containment zone alert system.

Shubham Yelne, Vishal Kapade [14] - "Human Protection with the Disaster Management Using an Android Application". This application was designed to help me which is useful for saving so many human being lives. This application is helping the android users who are in climatic situation like this by sending some information about the location of that person who is in trouble via message their love once, fire station, police station and ambulance.

Bharath P, Saravana M, Aravindan K [15] - "Smart Vehicle accident prediction using alert system". Using this technique, the vehicle tracking system can be built. Vehicle tracking system combine the use of automatic vehicle location of individual vehicle with software that collect this feet's data for a comprehensive picture of vehicle location modern tracking system tracking system commonly used GPS or GLONASS technology. Vehicle information viewed on electronic maps via internet with specialized software.

Sagar Gore, Nitesh Sonawane, Sayali Pawar, Mrunal Nerkar [16] - "An Android based mobile framework for student alert notification". An alert notification as service. They have been working in the field with either concentrate online website run using the browser. They have been application which focus on android apps. But this system focused on both android user and non-android user. This became a timeconsuming process to open and check notification. In the survey E-notice board but they have drawback again and again to see noticed it has no alarm system. So, we design this system to overcome the problem in e-notice board. Our System first gives notification to Student's phones.

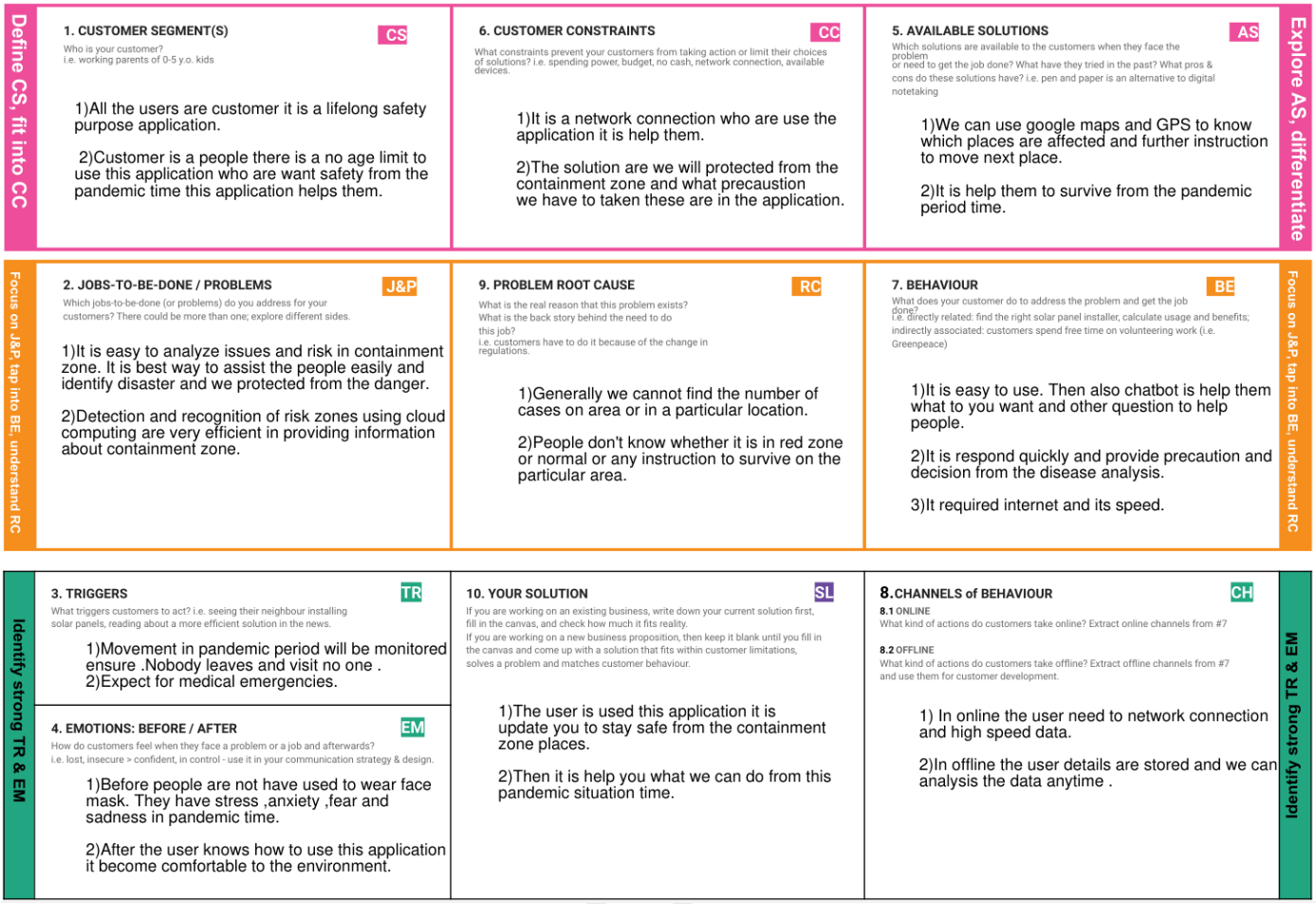
Pavan Pawar, Juberoddin Sayyad, Sagar Bhilare, Dheeraj Choudhari [17] - "Emergency Alert System". This systematic literature review was conducted by researching databases of google scholar, web of science, IEEE explore Digital library using the search term emergency application to identify relevant literature. The emergency caller android app is needed case medical emergency the user can make emergency call to nearer hospital. The user of application needs to conflict application for the first time the user short medical survey. In case of emergency system will find out the nearest hospital based on current location of the user and call will be inciated also the medical details about the patients will be sent to the hospital.

Can MIHCI, Nesrin OZDENER DONMERZ [18] - "User notification system in using social networks". The survey has been used to find out about the mobile phones, mobile internet and social networks usage habits of students. Comprised of items of ordinary measurements and open ended well as for determined which group will receive which interview to be network oriented process used for discovering reason behind student interaction with the practice's programs and the lack thereof. To provide for reliability of coding measures, but content has been coded by two results to yield a good product.

PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	It is a concise description of provide information about pandemic places in a particular region and it is alerting people. Then continuously monitoring the containment zone place, people activity and alerting them.
2.	Idea / Solution description	It is an application to provide information about containment place. It is intended to provide in a particular region and it is alerting people. Key benefits of monitoring people activity and alerting them of their safety movements.
3.	Novelty / Uniqueness	Logged into the app it tracks location update database current location. Instead of searching manually a chatbot will help to find the right way effectively, with this feature user can save time and it is easy process, chat keep send notification.
4.	Social Impact / Customer Satisfaction	Entire containment zone with helps them to take precaution measures also provide alternative routes to reach destination. This chatbot helps the users to find the right location easily, a particular region continuously monitoring an individual location. Location must store database. Alerting is sent using the notification service.
5.	Business Model (Revenue Model)	It is a strategy is used to contain people and contain diseased people within a geographical area by early detection of cases, breaking the chain of cases. Awareness is shared through SMS, Ads, Newspaper and Radio.

PROBLEM SOLUTION FIT



SOLUTION ARCHITECTURE

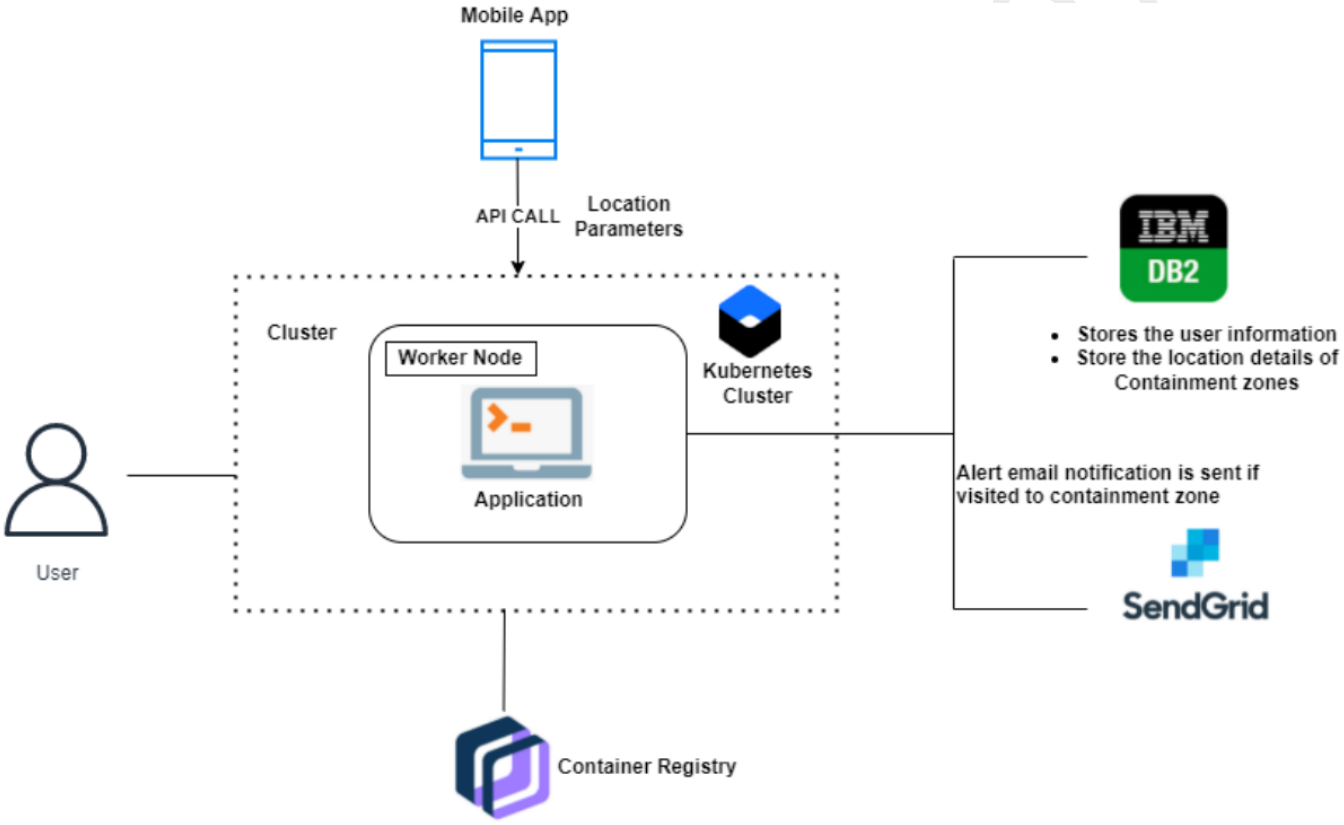
Solution Architecture is a complex process with many sub processes that bridges the gap between business problems and technology solutions. The project aims at building an application that provides information about the containment zones of a particular region by continuously monitoring an individual's location. The location of the individual must be stored in the Database. Alerts are sent using the notification service.

The app should have a user registration and login. After the user logged into the app it will track the user's location and update the database with the current location. If the user is visiting the containment zone, he will get an alert notification. They should login to the app and update the containment zone’s locations in the portal. Based on the location a Geofence will be created within a 100 meters radius. They should be able to see how many people are visiting that zone.

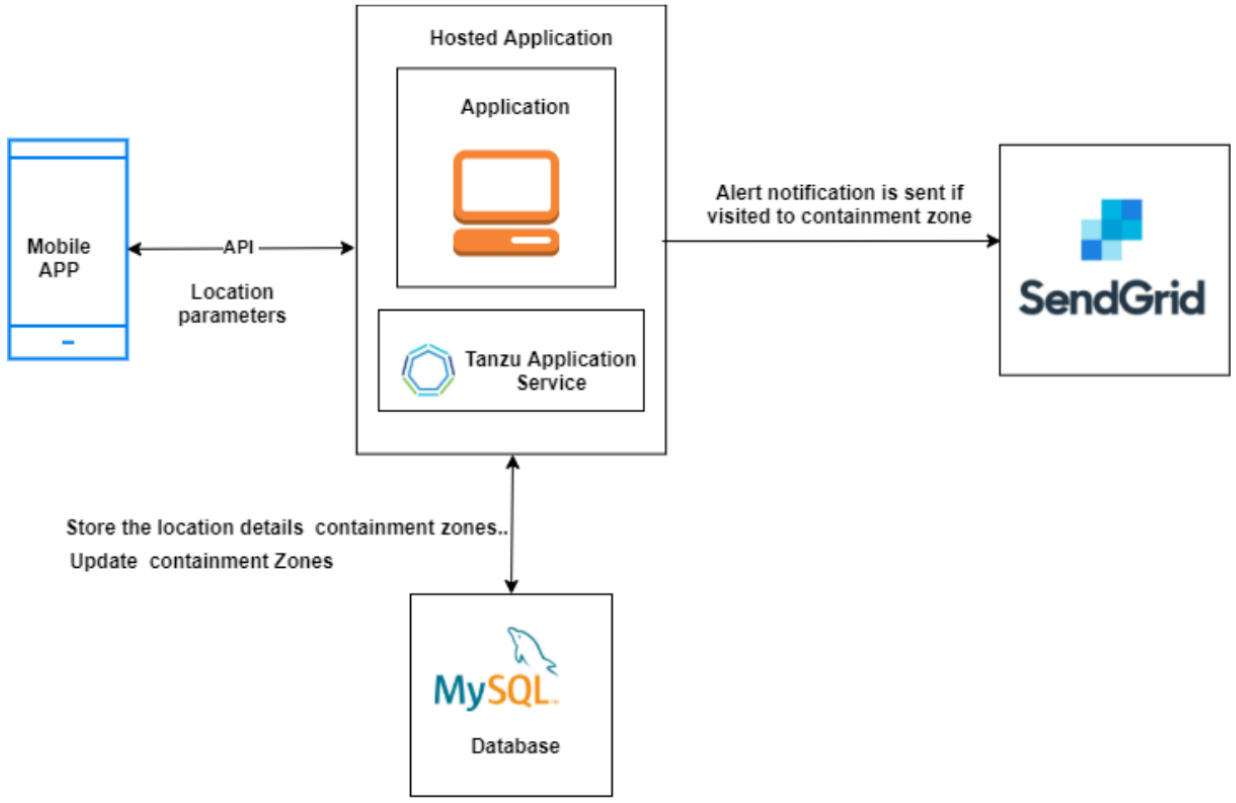
Its goals are:

1. Find the best tech solution to solve existing problems.
2. Describe the structure, characteristics, behavior and other aspects of the software the project takes holders.
3. Define the features, development phases, and solution requirement.
4. Provides specification according to which the solution is defined, managed and delivered.

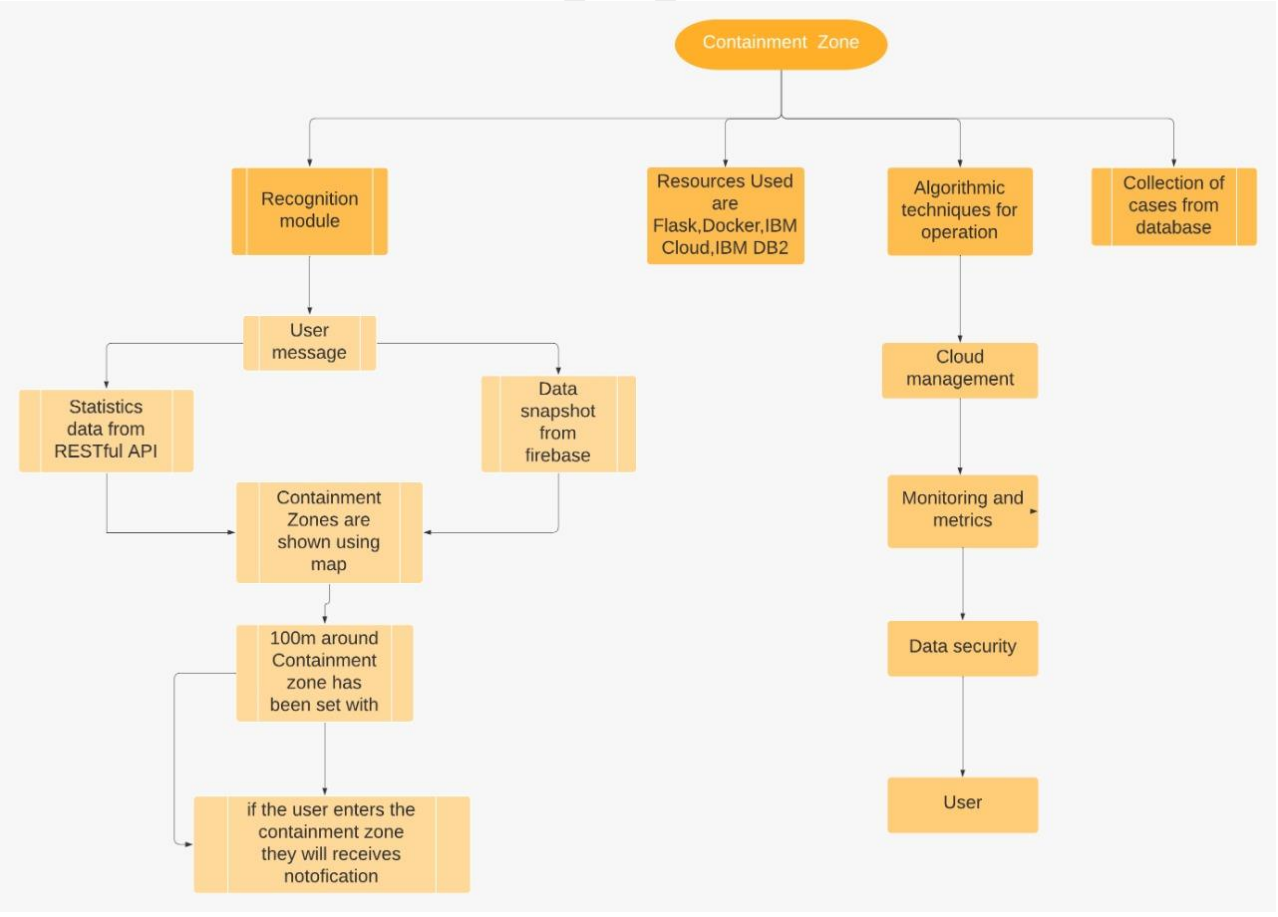
Solution Architecture Model 1



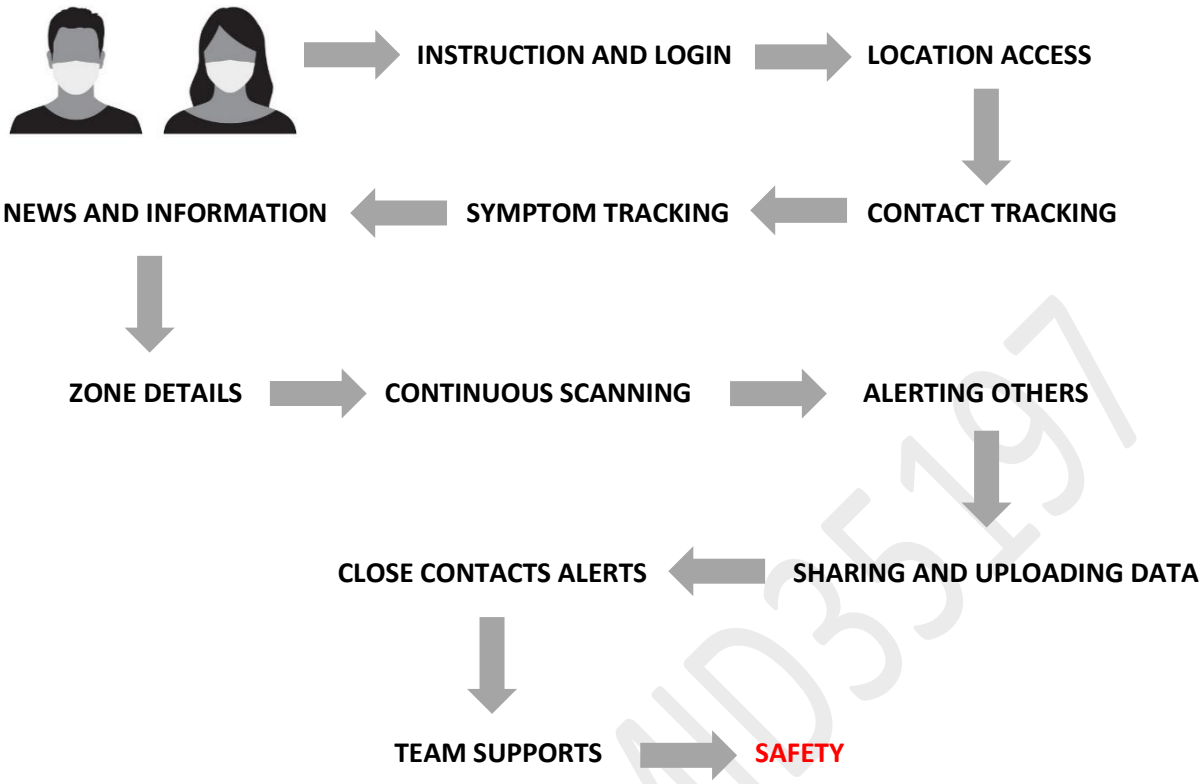
Solution Architecture Model 2



Solution Architecture Diagram



CUSTOMER JOURNEY



SOLUTION REQUIREMENTS

The project aims at building an application that provides information about the containment zones of a particular region by continuously monitoring an individual's location. Location of the individual must be stored in the Database. Alerts are sent using the notification service.

Functional Requirements

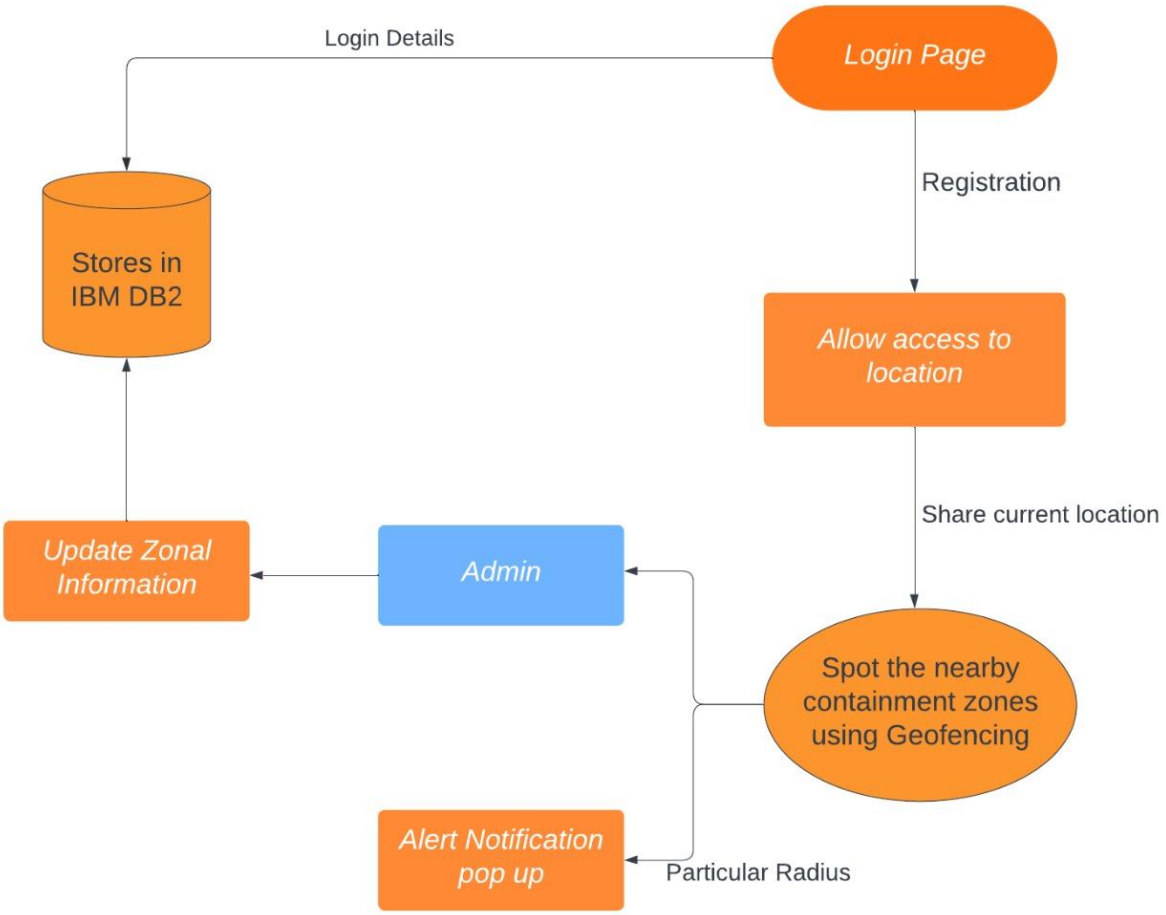
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Mobile number Registration through Gmail
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	App Permissions	Enabling location Access (Mandatory) Permission to Media Access Permission to Camera
FR-4	Connectivity	The user and server were connected through the internet.
FR-5	Data fetching	The Users Personal data and a result of self-analysis updated with app server.
FR-6	Support functions	The Users gets teleconsultation using helpline and supports by chatbot.
FR-7	End user benefits	To protect the people from the disease spread by knowing containment zones using contact tracing.

Non-functional Requirements

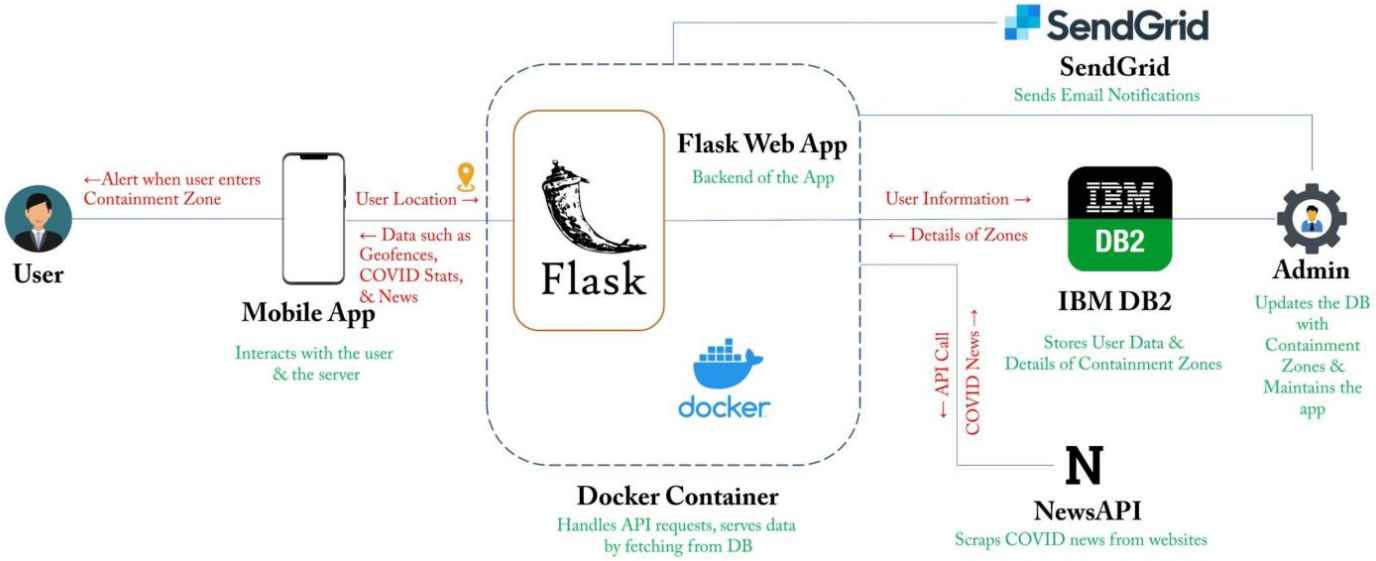
FR No.	Non-Functional Requirement	Description
NFR-1	Usability	It is an effective way to find a containment zone. It can easily access by everyone.
NFR-2	Security	It is secured because confirmation through User own Email or OTP and also the data were stored in encrypted format to main anonymity.
NFR-3	Reliability	It is a high reliability based on development and deployment.
NFR-4	Performance	High efficiency outcomes with respect to simple user Interface.
NFR-5	Availability	Anyone from anywhere can access it through internet.
NFR-6	Scalability	It has ability to handle a growing user base without affecting the user experience and app performance.

DATA FLOW DIAGRAM

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



TECHNOLOGY ARCHITECTURE



Components and Technologies

Component	Descript ion	Technology
User Interface	Interaction of user to the mobile interface (i.e.- developers).	HTML, CSS, JavaScript / Angular Js / React Js etc.
Application Logic- 1	Logic that has been kickstarted first, for the process in the application.	Java / Python
Application Logic- 2	Intermediate Logic for the process in the application.	IBM Watson STT service
Application Logic- 3	Logic which came Last but not least for the process in the application.	IBM Watson Assistant
Database	Storing purposes.	MySQL, NoSQL, etc.
Cloud Database	Database Service on IBM Cloud.	IBM DB2, IBM Cloud etc.
File Storage	Storage requirements.	IBM Block Storage
External API - 1	API used external in the application.	Google API, etc.
External API - 2	API used external in the application.	Aadhar API, etc.
Machine Learning Model	Machine learning is mostly used for AI purposes (i.e.: Recognition).	Object Recognition Model, etc.
Infrastructure (Server / Cloud)	Application Deployment on Cloud and Server Configuration	Cloud Foundry, Kubernetes etc.

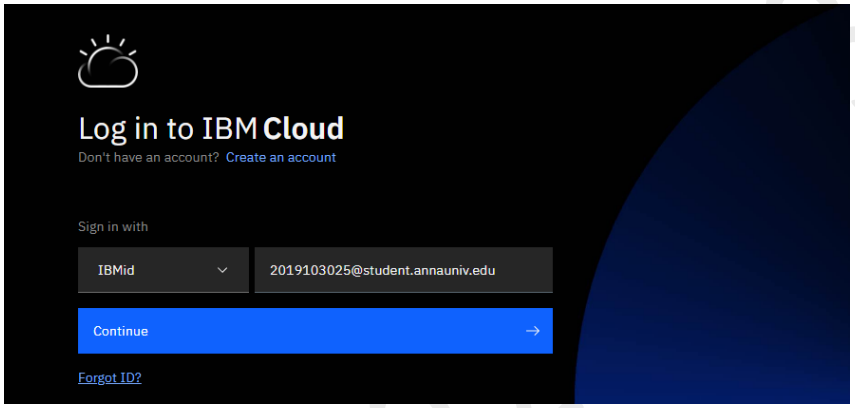
SETTING APPLICATION ENVIRONMENT

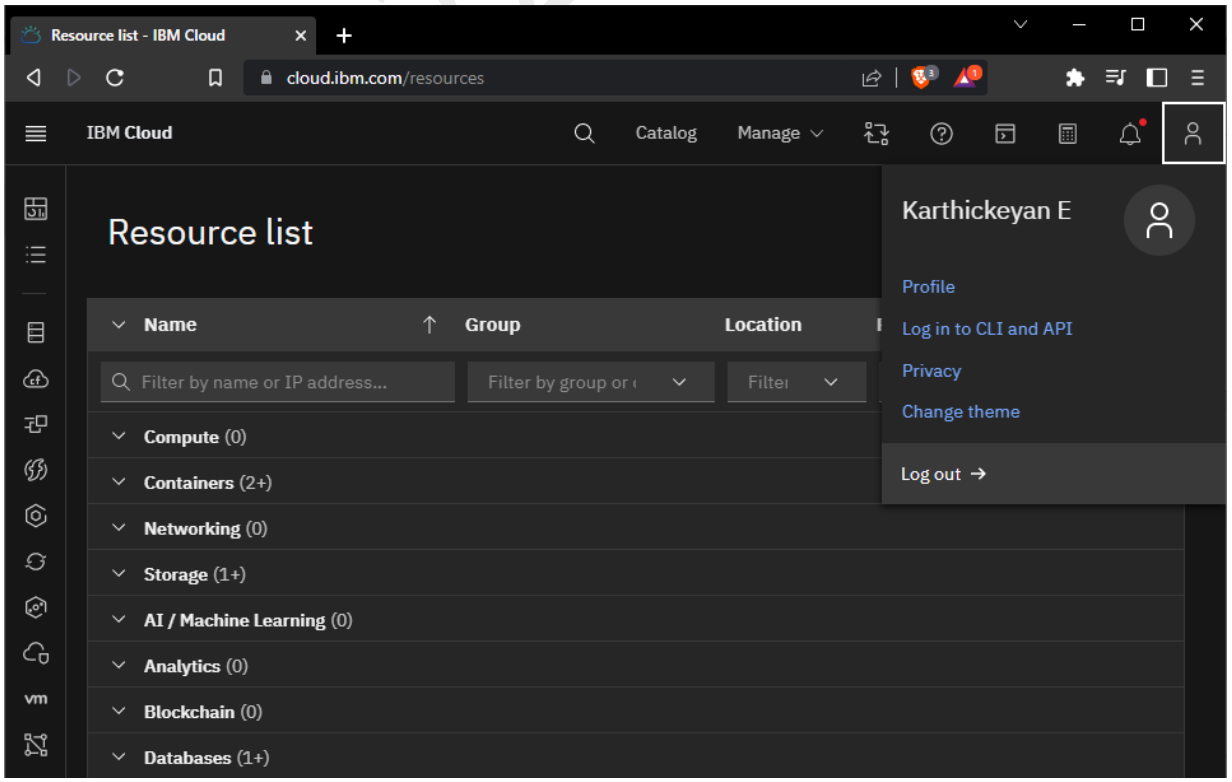
Various application needed for development and implementation should be set up.

Application environment for WebApp

Setting up Flask

IBM cloud account creation





IBM CLI Installation

```
[node1] (local) root@192.168.0.13 ~
$ ibmcloud login
API endpoint: https://cloud.ibm.com

Email> 2019103025@student.annauniv.edu

Password>
Authenticating...
OK

Targeted account Karthickeyan E's Account (0276affbdd74403daf5519bed5fce942)


Select a region (or press enter to skip):
1. au-syd
2. in-che
3. jp-osa
4. jp-tok
5. kr-seo
6. eu-de
7. eu-gb
8. ca-tor
9. us-south
10. us-east
11. br-sao
Enter a number>


API endpoint:      https://cloud.ibm.com
Region:
User:              2019103025@student.annauniv.edu
Account:           Karthickeyan E's Account (0276affbdd74403daf5519bed5fce942)
Resource group:    No resource group targeted, use 'ibmcloud target -g RESOURCE_GROUP'
CF API endpoint:
Org:
Space:
```

Docker Installation

```
ubuntu@home-server: ~
ubuntu@home-server:~$ docker --version
Docker version 20.10.21, build baeda1f
ubuntu@home-server:~$ docker compose version
Docker Compose version v2.11.2
ubuntu@home-server:~$
```

SendGrid account creation

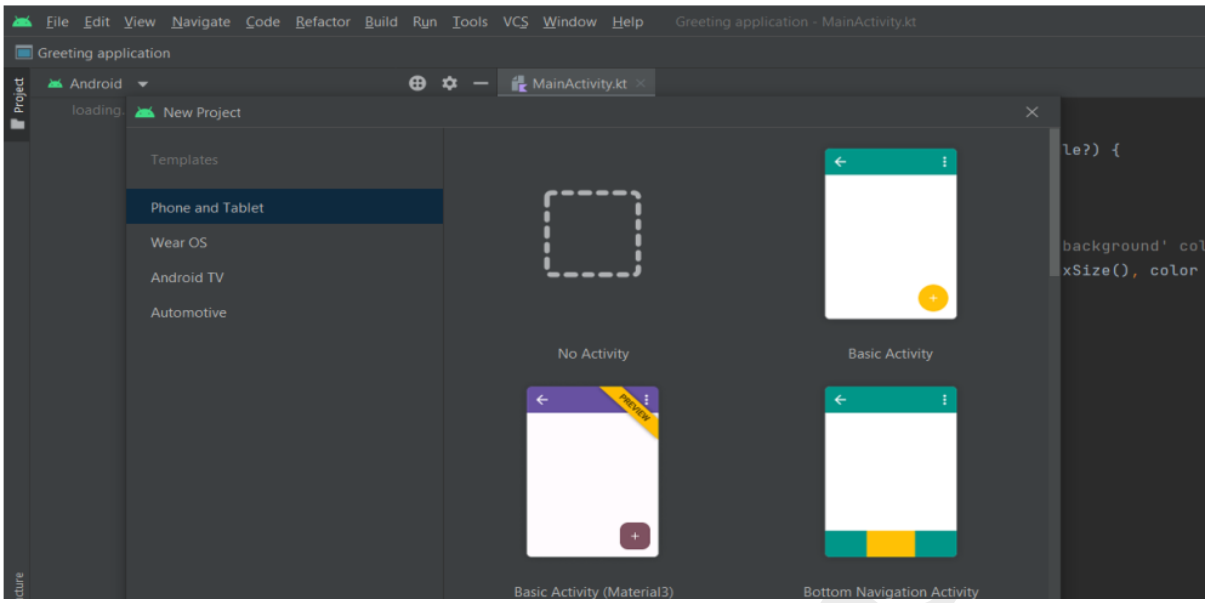
TWILIO SendGrid

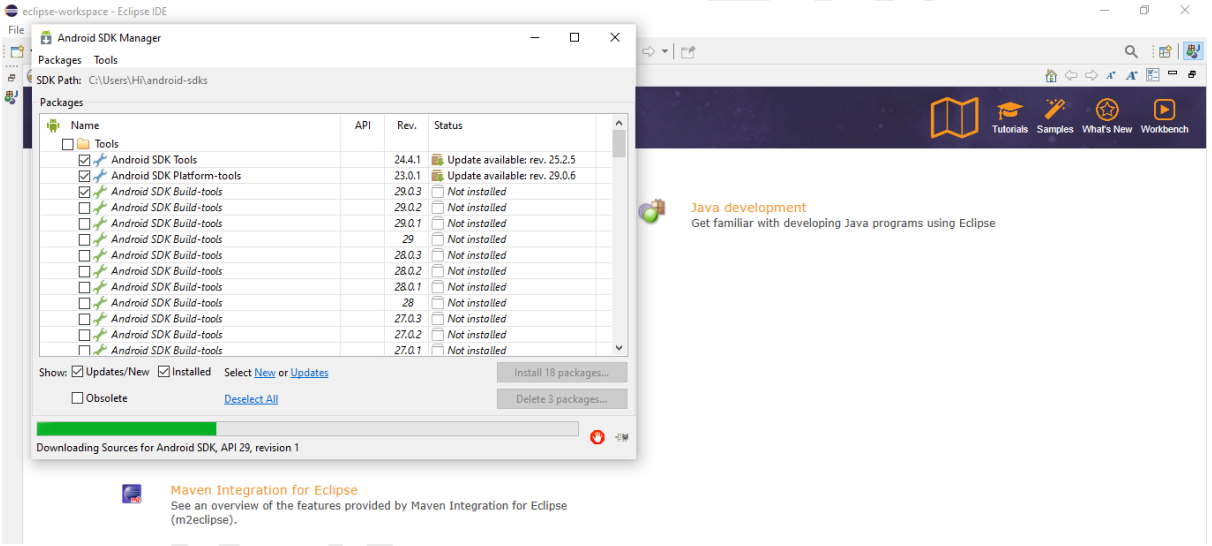
Username

2019103025@student.annauniv.edu

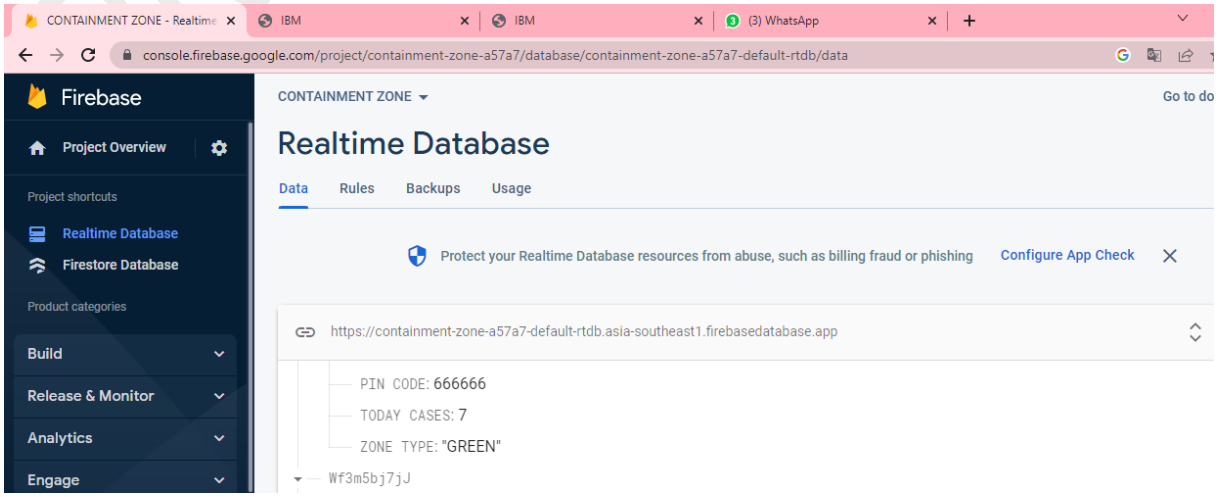
Application environment for Android dev

Android Studio Installation



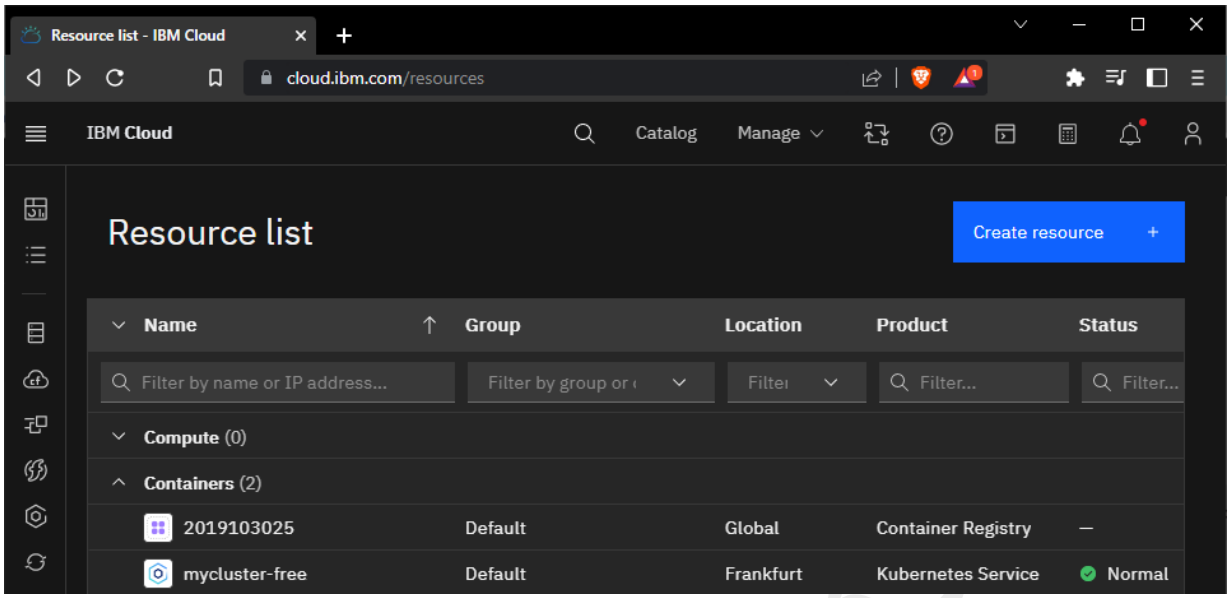


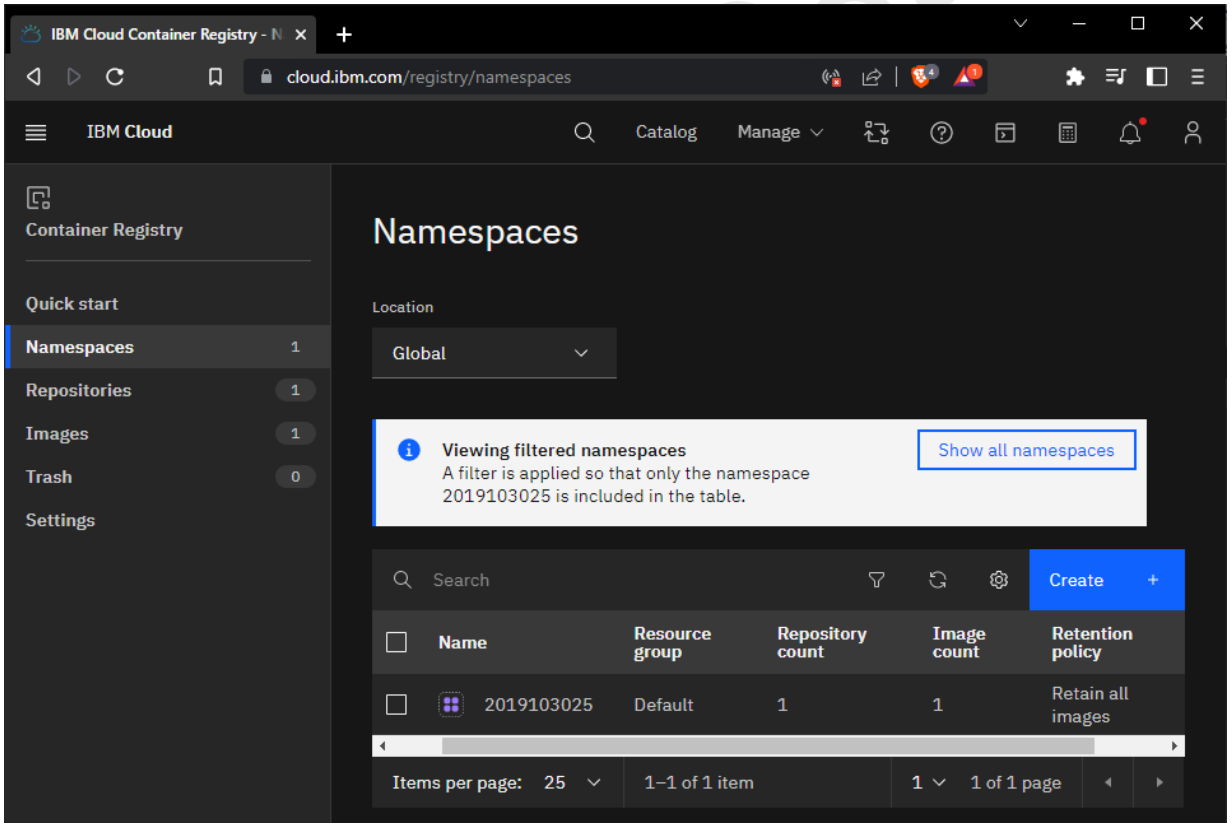
Firebase setup

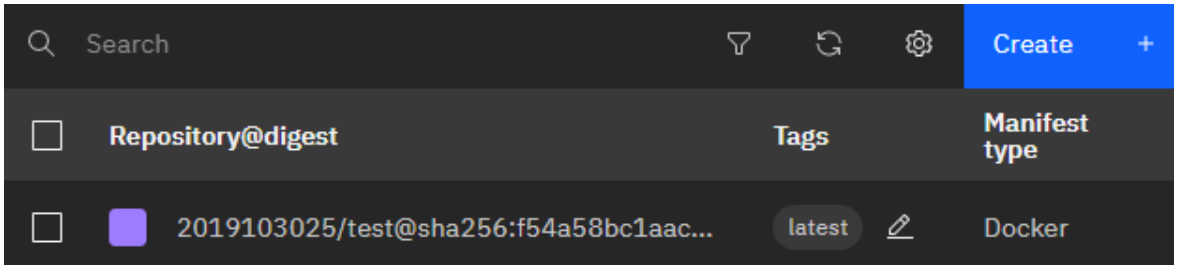


APPLICATION DEPLOYMENT IN IBM CLOUD

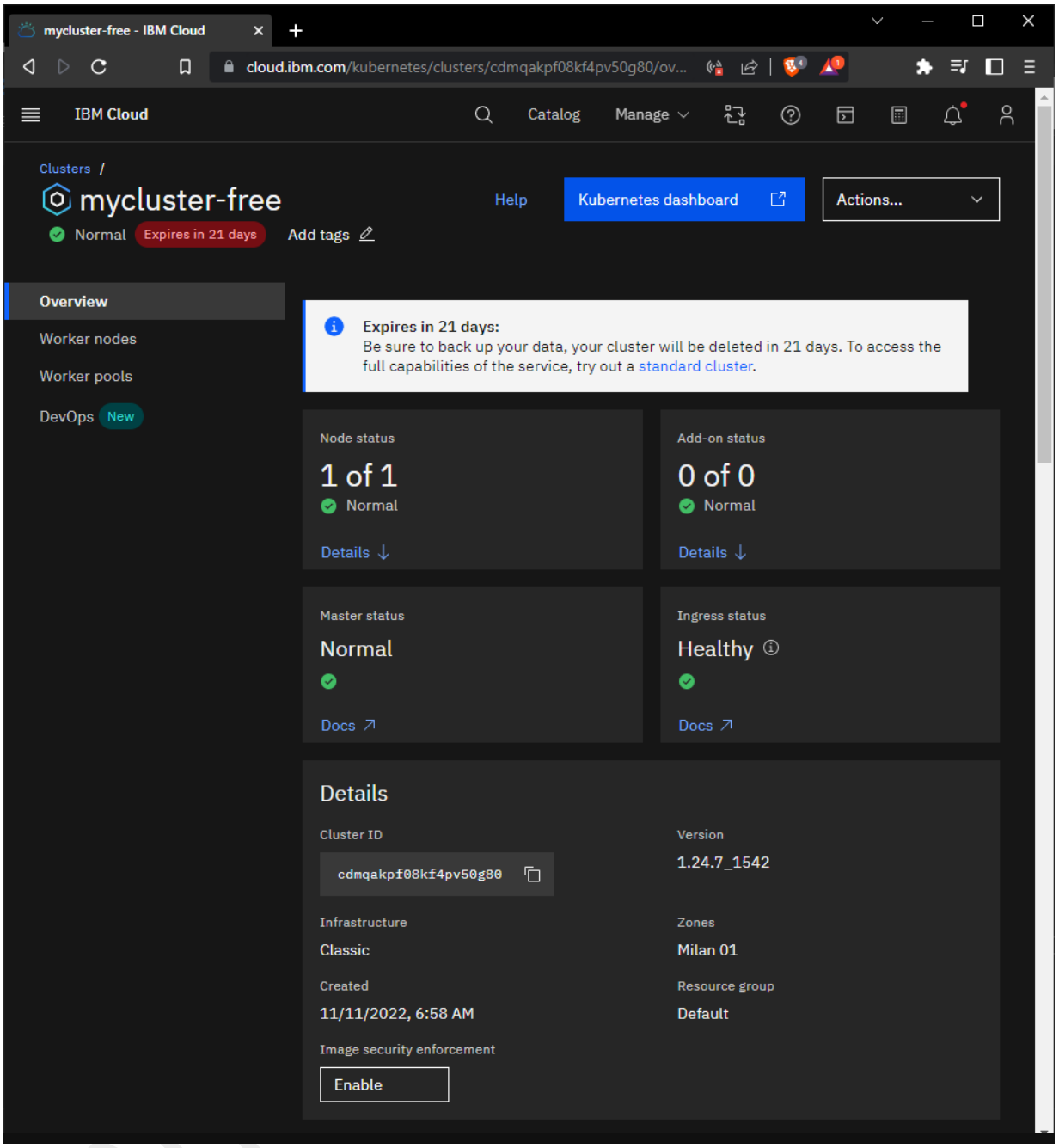
Upload image to Container Registry





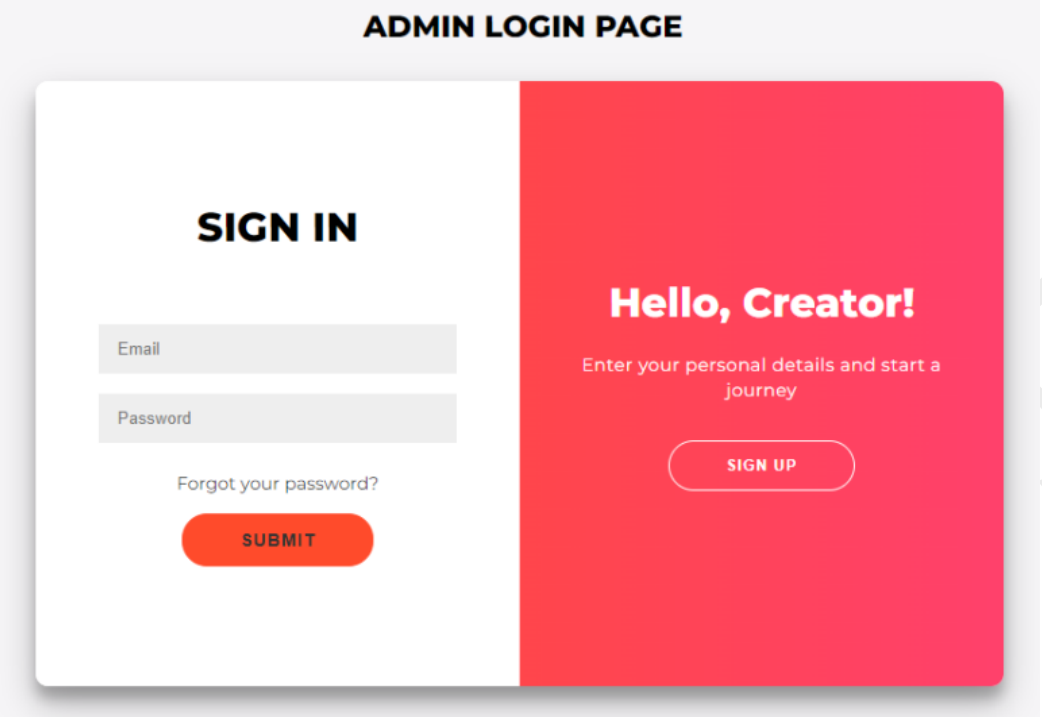


Deployment in Kubernetes Cluster

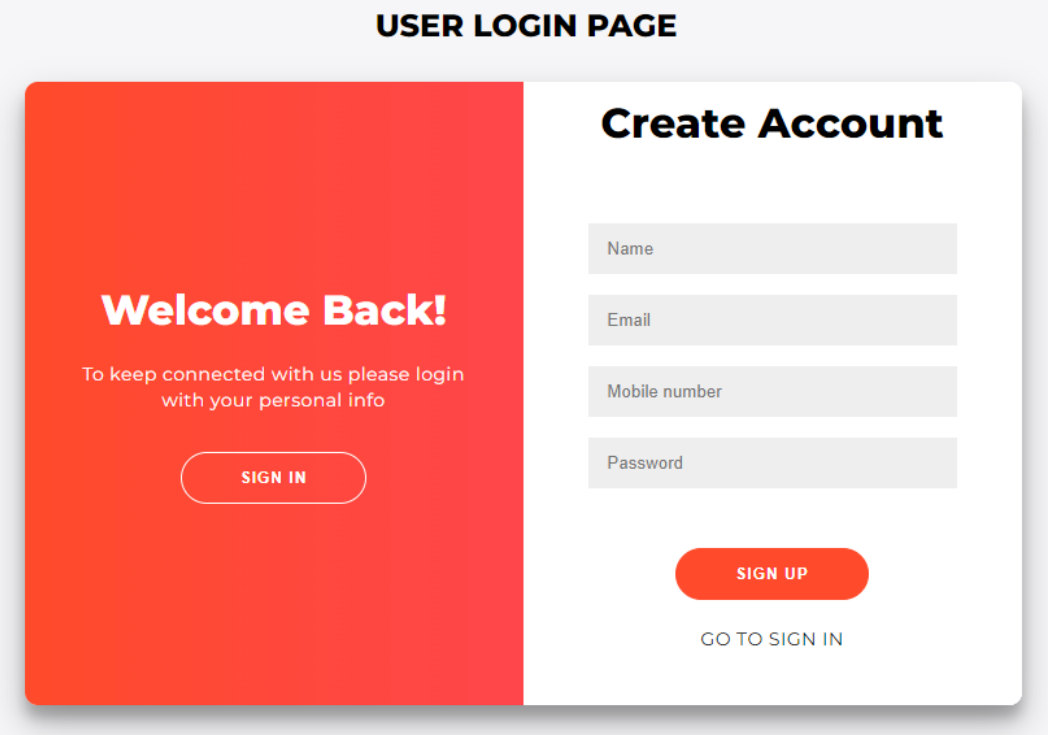


RESULTS

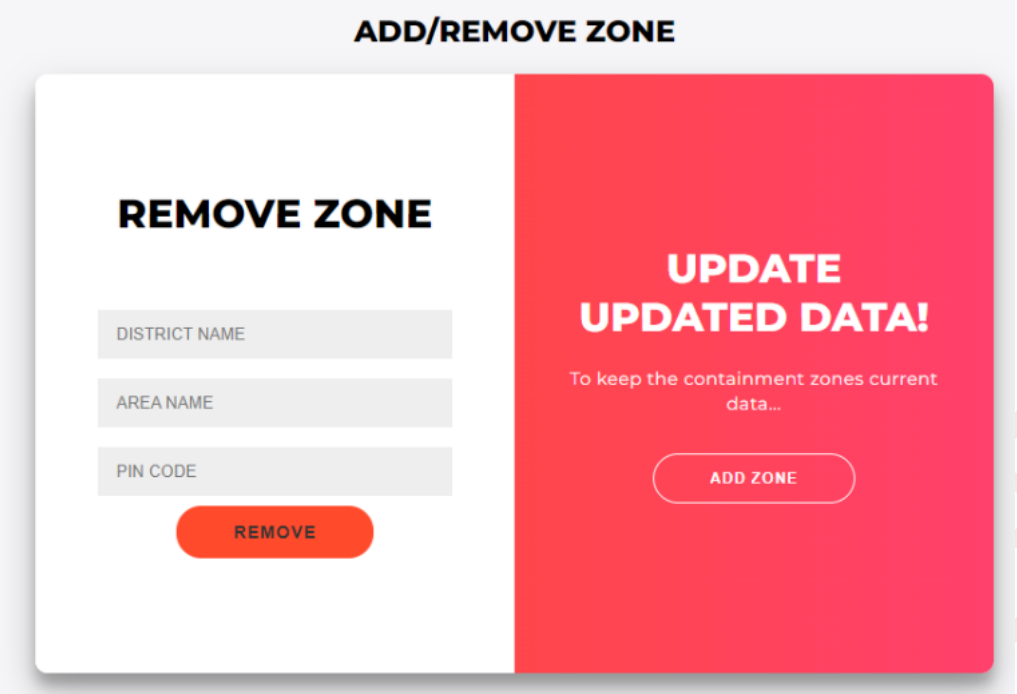
Admin Sign In and Sign Up page



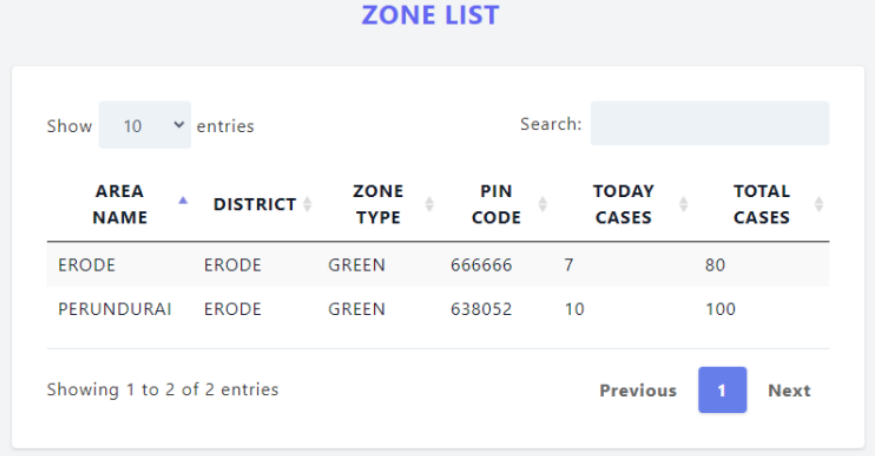
User Sign In and Sign Up page



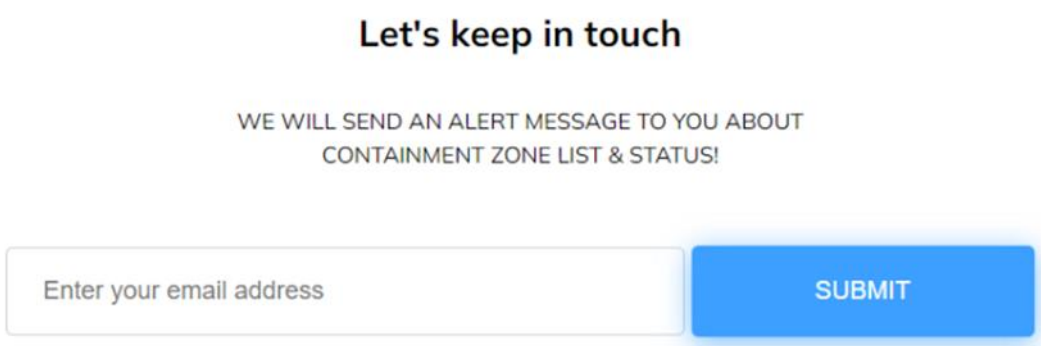
Zone Update Page



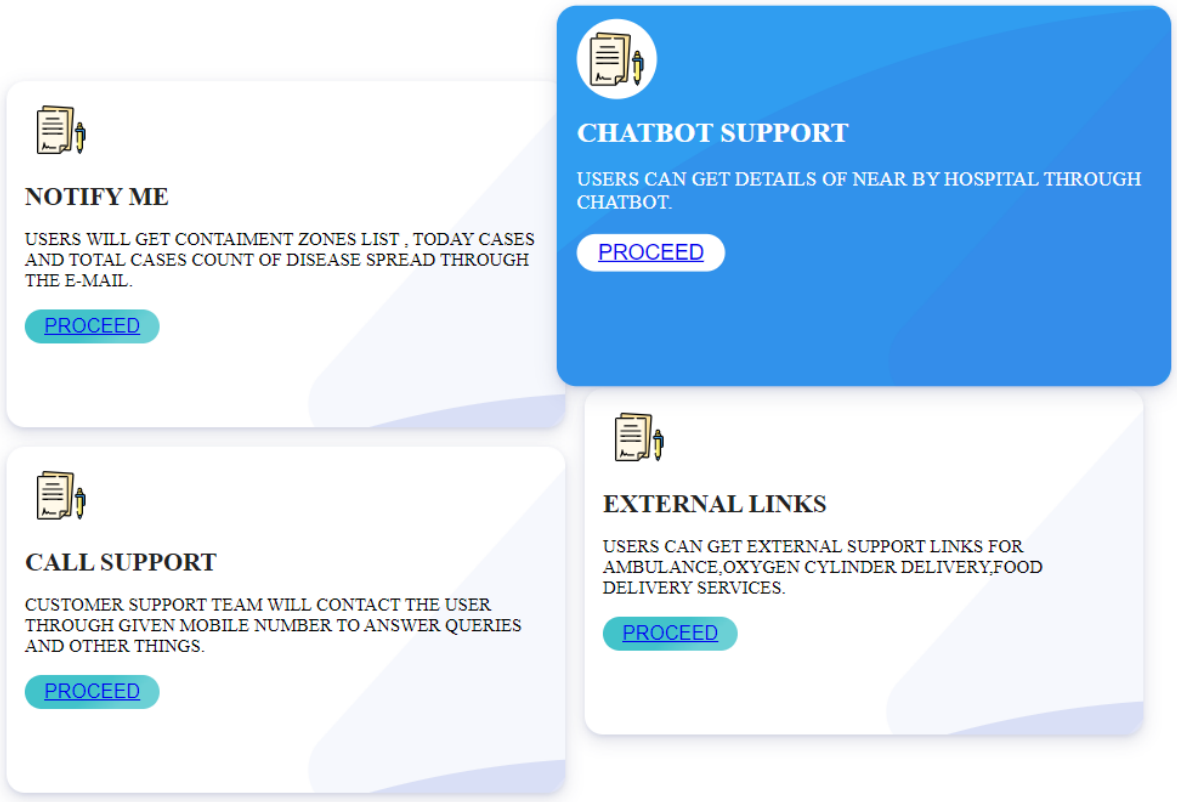
Zone List



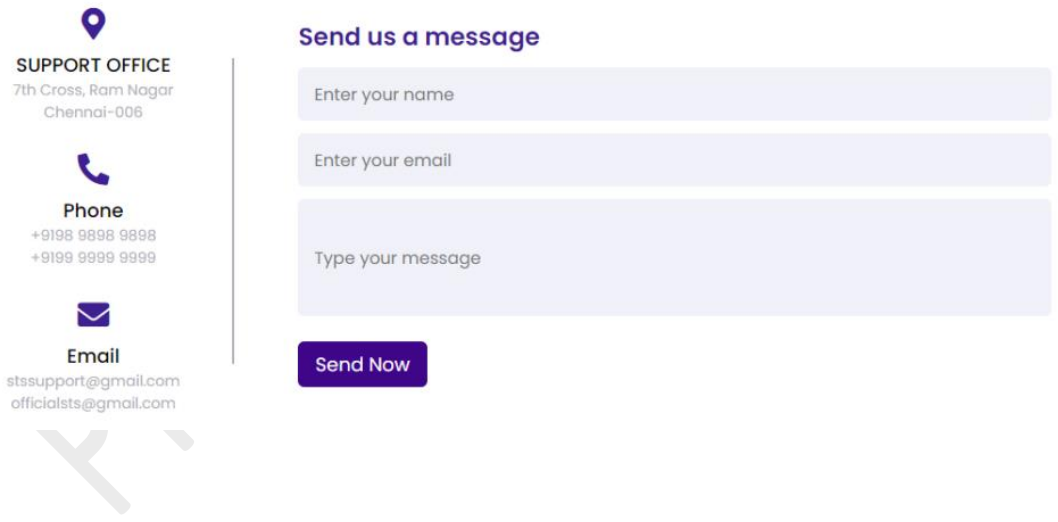
Subscription Page



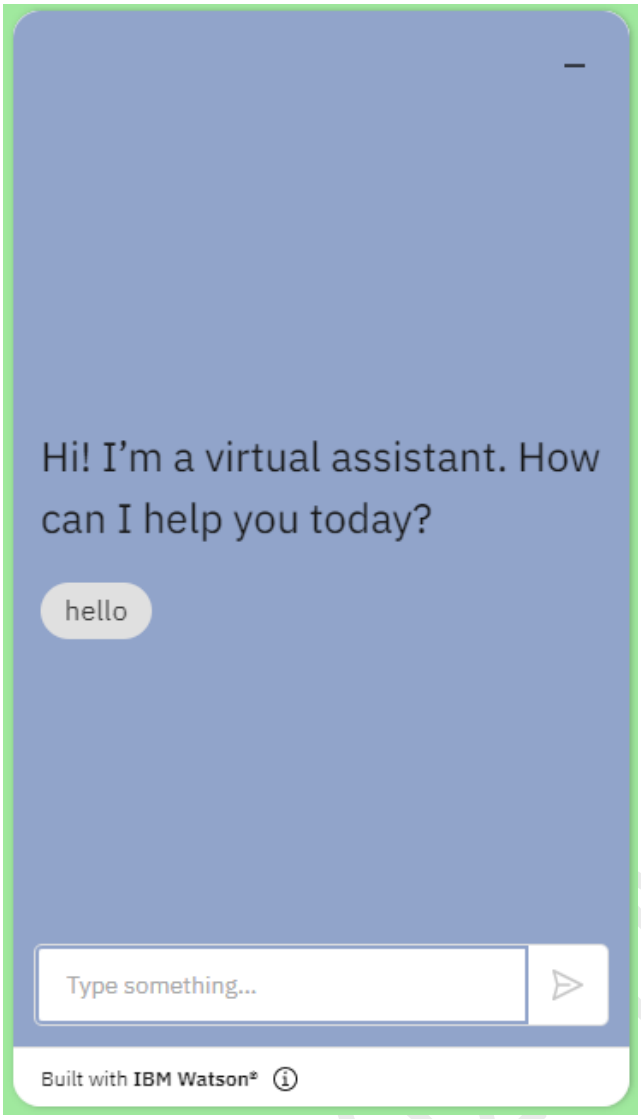
Support Dashboard

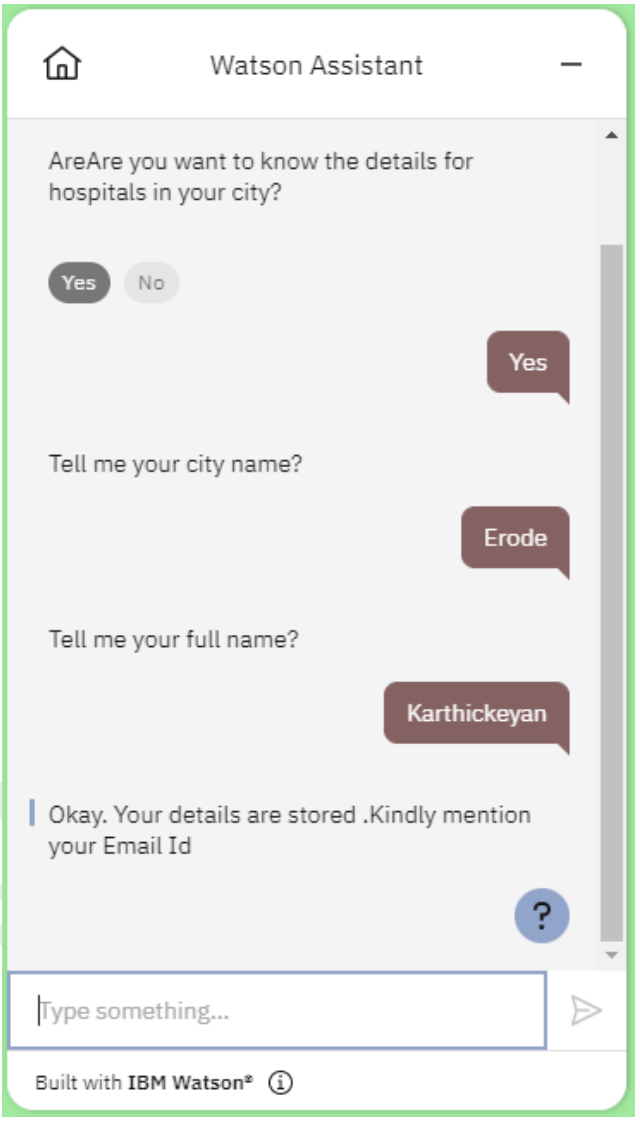


Support Page



Chat Bot


Hi! I'm a virtual assistant. How can I help you today?
hello
Type something...
Built with IBM Watson®


Watson Assistant
AreAre you want to know the details for hospitals in your city?
Yes
No
Yes
Tell me your city name?
Erode
Tell me your full name?
Karthickeyan
Okay. Your details are stored .Kindly mention your Email Id
Type something...
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Android App : Covid-19 Tracker