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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

LITERATURE REVIEW

On 31st December 2019, Wuhan health commission in the Hubei province of the Republic of China notified the National Health Commission, China CDC and WHO of a cluster of 27 cases of pneumonia of unknown etiology [1]. These patients presented with a constellation of symptoms such as fever, dyspnea, dry cough, and radiological findings showed bilateral lung glassy opacities.

Furthermore, the public health office traced all these 27 cases to Huanan Seafood Wholesale Market which trades live species of bats, snakes, pangolins, and badgers [1]. Multiple intrinsic variables led to rapid early transmission dynamics, and this made Wuhan the flashpoint of the pandemic. In 2018, Wuhan had a documented population of 11.08 million, this made Wuhan one of the top five most populated cities in China [2]. Wuhan's large population density and proximity of the marketplace that sold live animals made it the epicenter for the human-animal interface. Additionally, the lack of early containment due to the inability to accurately trace the history of exposure in the early patient cases contributed to the rapid rate of spread in Wuhan. This eventually precipitated into the WHO declaring this viral pneumonia as an outbreak on 30th January 2020. On 11th March 2020, due to the global logarithmic expansion of the cases the coronavirus disease 2019 (COVID-19) was declared as a pandemic by the WHO.

SARS-CoV2 is from the beta Coronavirus family, it is a positive-sense, singlestranded RNA, enveloped virus that is 50-200 nm in diameter [3]. The genomic RNA is 30 Kb, one vital encoded structural protein is the Spike Glycoprotein (S) that consists of three S1-S2 heterodimers that bind to angiotensin-converting enzyme 2 (ACE2) receptor on type II pneumocyte [3,4]. The other surface protein such as the hemagglutinin-esterase (HE) dimer is shown in Figure *1*. The entry of SARS-CoV-2 into the type II pneumocyte is via endocytosis and then multiplies in the cytoplasm. The high protein manufacturing stress induced upon the

type II pneumocytes leads to apoptosis. Additionally, the RNA from the SARS-CoV-2 acts as a pathogen-associated molecular pattern (PAMP) and will be recognized by the pattern recognition receptor or toll-like receptors. This leads to a chemokine surge which causes neutrophil migration and activation. This leads to the destruction of the alveolar-capillary walls. At a microscopic level, this leads to a loss in the interface between the intra-alveolar space and the surrounding stroma. Therefore, fluid leaks through and fills into the alveolar sacs.

The origin of the SARS-CoV-2 genome has been linked to bats akin to the SARSCoV-1 and MERS-CoV viruses [5]. Interestingly, the SARS-CoV-2 whole-genome aligned with the genomes of viruses (Bat-CoV and Bat-CoV RaTG13) in Rhinolophus affinis species of Yunnan province with 96% similarity [6]. As seen previously in SARS-CoV-1 and MERS-CoV viruses that undertake residence in the intermediate hosts shown in Figure *2*, it was suspected that in SARS-CoV-2 pangolins were the natural reservoir. This was based on the analysis of the genome contig alignment of SARS-CoV-2 like CoV (Renamed: Pangolin-CoV) harbored in the lung tissue of two dead Malayan pangolins [7]. This Pangolin-CoV's whole genome had 91.02% similarity with SARS-CoV-2 and 90.55% similarity with BatCoV RaTG13 [8]. Proteomic analysis revealed that the S1 subunit of Spike glycoprotein (S) was more closely related to that of SARS-CoV-2 compared to BaT-CoV RaTG13. Furthermore, five amino acid residues of the S protein of
SARS-CoV-2 interacting with the ACE2 receptor are identical in Pangolin-
CoV [8]. Contrastingly, only four amino acid residues are identical in the S protein of BaT-CoV RaTG13. Interestingly, both Pangolin-CoV and BaT-CoV RaTG13 have lost the furin recognition motif, vital to the S1/S2 cleavage [8]. This putative furin recognition sequence is still intact within the SARS-CoV-2. A compilation of all these findings portrays that pangolins are the intermediate hosts for SARSCoV-2.

Modes of transmission traced in an imported case are through droplet transmission, fecal-oral route, conjunctiva and fomites [10, 11]. Additionally, local transmission can be traced back to the patient's bodily fluids such as respiratory droplets, saliva, feces, and urine [11]. The virion is stabilized at lower temperatures, i.e., 4°C has higher survival than 22°C [12, 13]. As SARS-CoV-2 virions are shed throughout the clinical course, patients with COVID-19 can spread the infection prior to symptom presentation, during the symptomatic course and during the clinical recovery period. Additional considerations must be made regarding the residence time of the SARS-CoV-2 virion on surfaces. The half-life of SARS-CoV-2 in aerosols, copper, cardboard, stainless steel, and plastic are 1.5 h, 1 h, 3.4 h, 5.6 h, and 6.8 h, respectively. The viable residence time of SARS-CoV-1 in aerosols, copper, cardboard, stainless steel, and plastic are 3 h, 4 h, 24 h, 48 h, and 72 h, respectively [14].

PROPOSED SOLUTION

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	There may be a massive impact of disease in various country and might not provide the accurate information about the containment zone and there is no proper evidence.
2.	Idea / Solution description	This application will give accurate results as possible and provides instantsolution for the customer problems in addition to that , customers can interact with the application where the containment zone is there and the situation about that zone which is searched by the users.
3.	Novelty / Uniqueness	Our uniqueness is all users can find the containment zone which has been searched by the uses.Customers will be treated same for everytime and every situation in our app.And also we don't have any premium or subscription plans in our app it is same for all the users.
4.	Social Impact / Customer Satisfaction	After launching of this application many peoples burden will reduce to search the containment zone. This will create huge benefit for customers to find the correct situation which is going on.
5.	Business Model (Revenue Model)	At present many applications exist all over the world, which give information related to COVID-19. In India, many states have developed an application to provide their state COVID-19 updates and information. The mobile applications for safeguarding the lives of their states' people [10]. There are API's which provide data regarding COVID-19 cases and updates [11]. These API's make work easier as there is no need to update the database manually. Existing API's provide data related to countries and states round the globe.
6.	Scalability of the Solution	• Our application takes less time to respond. • Our application will response many requests simultaneously without making any server
		crashes. • So this will ensure our application will scalable.

PROBLEM SOLUTION FIT

Project Title: Containment Zone Alerting Application | **Project Design Phase-I - Solution Fit Template** | **Team ID: PNT2022TMID25417**

Define CS, fit into CC

1. CUSTOMER SEGMENT(S) — CS

Who is your customer?
i.e. working parents of 0-5 y.o. kids

Public, Police, Household, Community such as Neighbors & Vegetable vendors, Travel and Social gatherings etc,...

6. CUSTOMER — CC

What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.

Proper internet connection and switched on GPA in all time.

5. AVAILABLE SOLUTIONS — AS

Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital

Tracing app facilitates digital tracing of users to identify the COVID-19 zone but whole area's can't be cover.

Explore AS, differentiate

Focus on J&P, tap into BE, understand RC

2. JOBS-TO-BE-DONE / PROBLEMS — J&P

Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides.

Spot out the COVID-19 affected zones and provide safest routes to the user.

9. PROBLEM ROOT CAUSE — RC

What is the real reason that this problem exists? What is the back story behind the need to do this job?
i.e. customers have to do it because of the change in regulations.

The solution of this problem is give the information about affected zones.

7. BEHAVIOUR — BE

i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace)

In order to address the problem, user can give the feedback and reviews.

Focus on J&P, tap into BE, understand RC

3. TRIGGERS — TR

What triggers customers to act?
i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news.

Using the app after hearing its uses like precautionary arrangement, intensity of containment zones while social gathering or travelling.

4. EMOTIONS: BEFORE / AFTER — EM

How do customers feel when they face a problem or a job and afterwards?
i.e. lost, insecure > confident, in control - use it in your communication strategy & design.

Before:- Insecure, fear of infection.

After:- No fear because the user will be known about safes zones while social gathering.

10. YOUR SOLUTION — SL

If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality.
If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.

The solution of this containment zone alerting application provides information about affected regions in particular area and alerts public, through continuous monitoring of an individual location.

8. ANNELS OF BEHAVIOUR — CH

8.1 ONLINE
What kind of actions do customers take online? Extract online channels from #7

8.2 OFFLINE
What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.

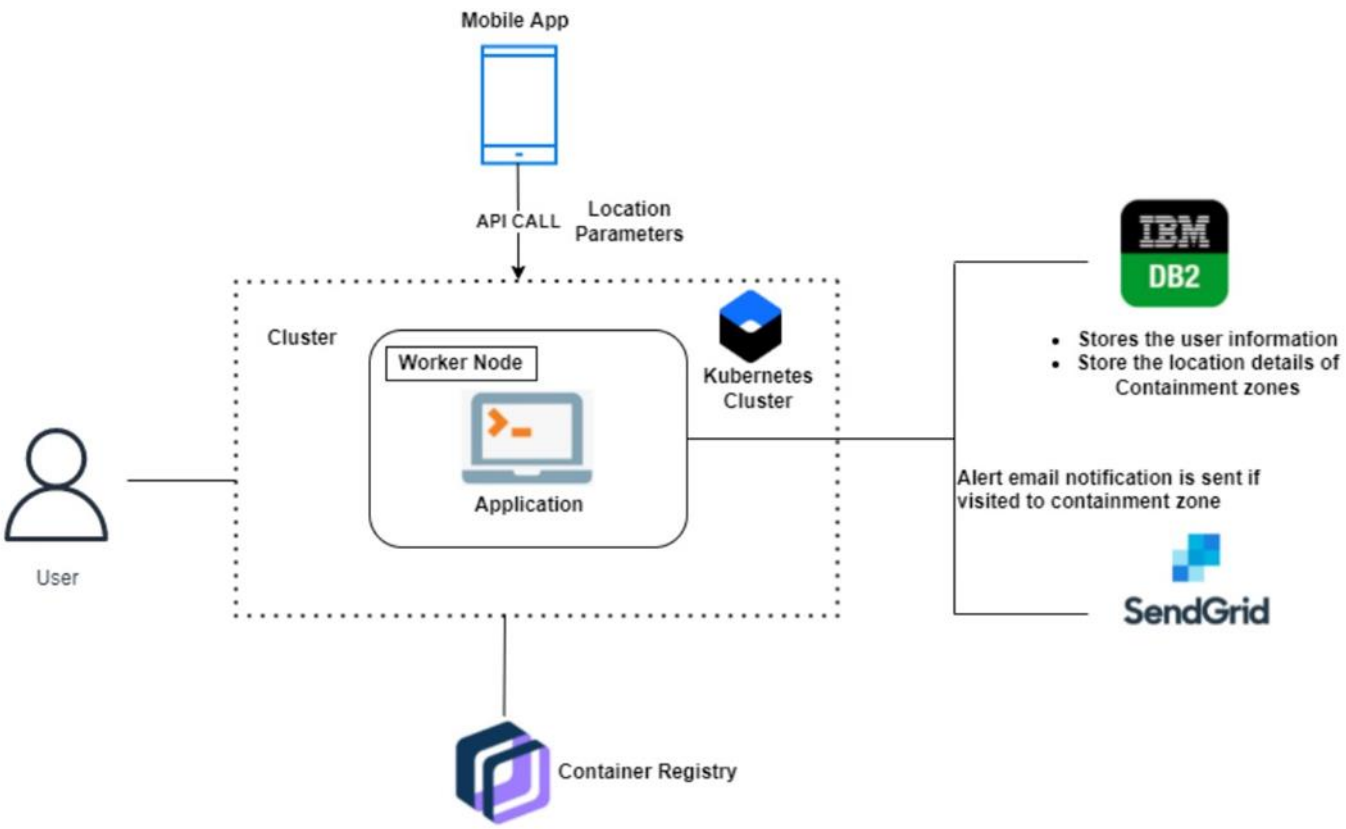
Suggested features and also report in case of any issues.

SOLUTION ARCHITECTURE

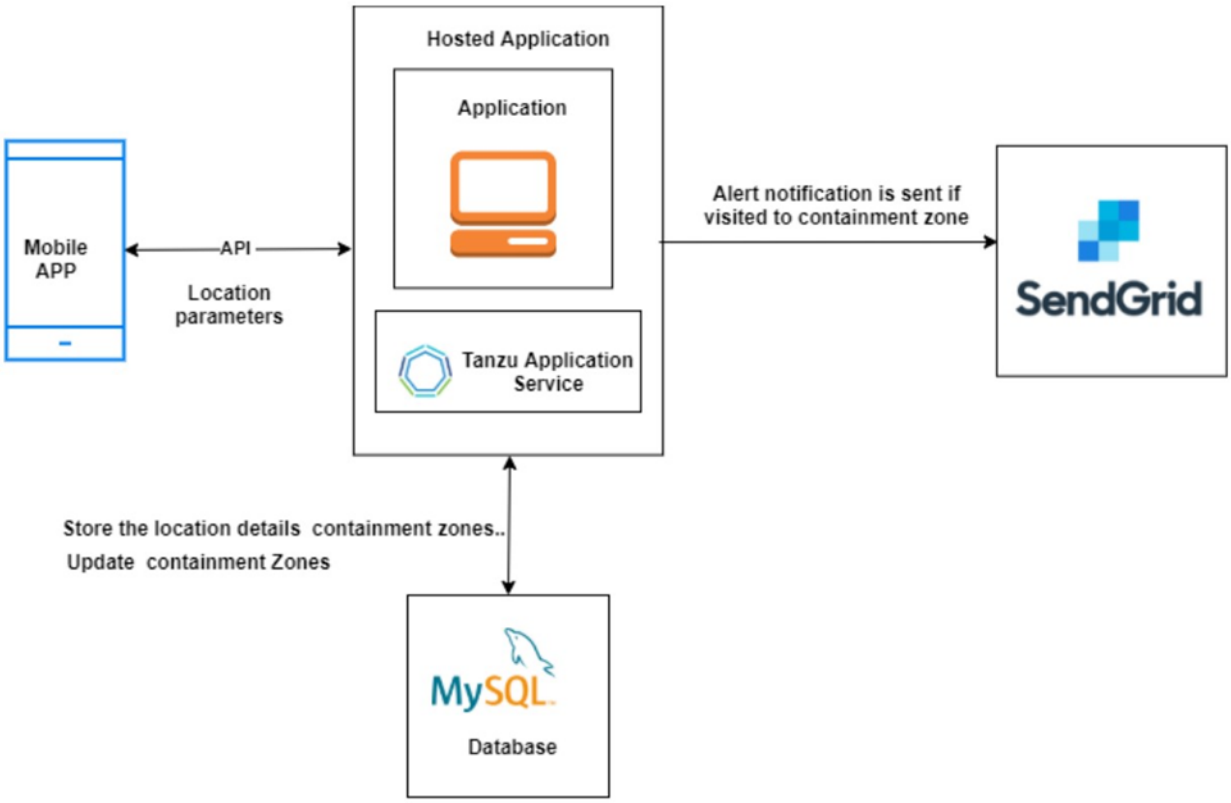
Solution Architecture is a complex process with many sub processes that bridges the gap between business problems and technology solutions. The project aims at building an application that provides information about the containment zones of a particular region by continuously monitoring an individual's 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.

Solution Architecture Model 1

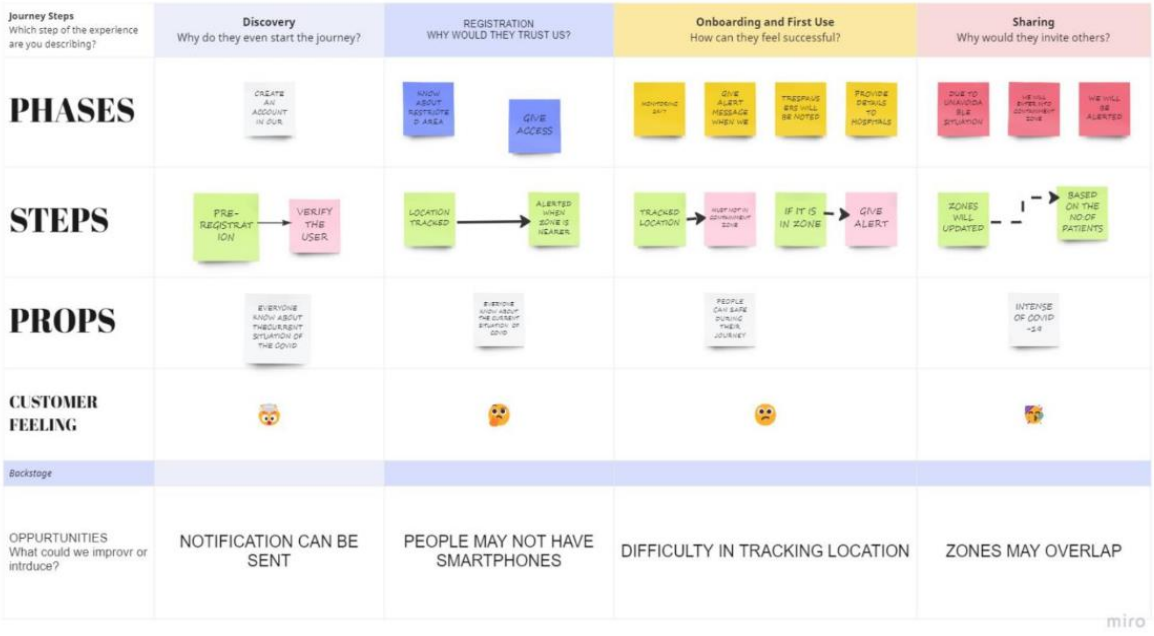


Solution Architecture Model 2



CUSTOMER JOURNEY

C



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

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User login	User should login the with the user name and password.
FR-4	User installation	User can install the app from Google play store or Apple store or directly from the website.

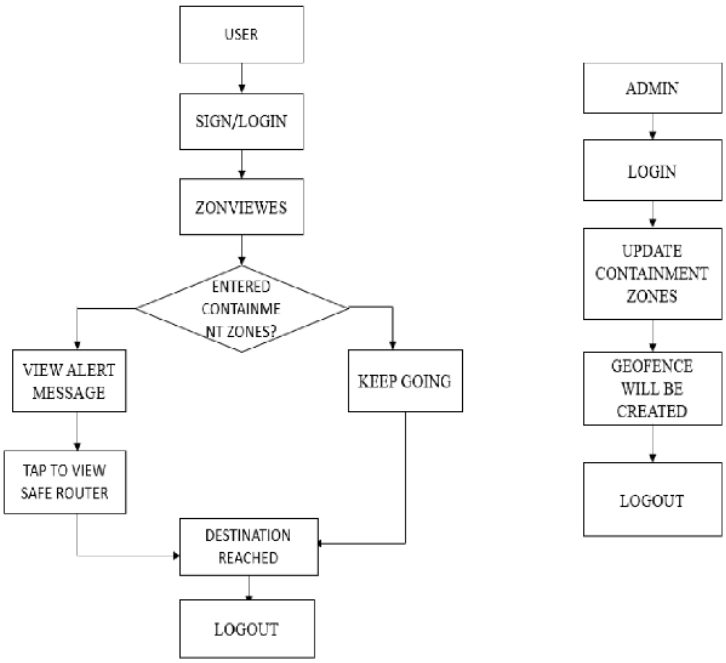
Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

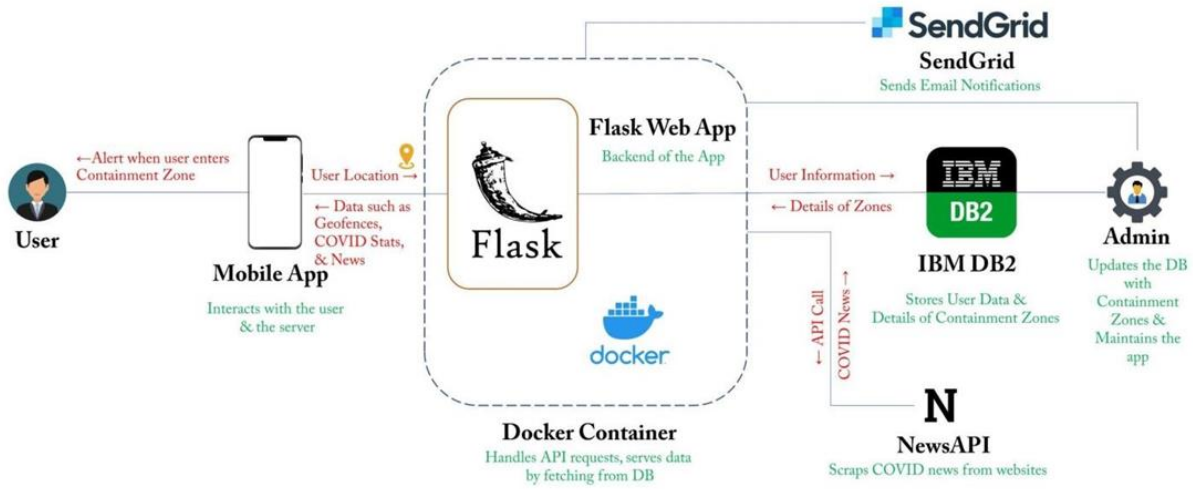
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Everyone can easily install and use from the play store by using the instructions in the app.
NFR-2	**Security**	The application is very secure and confidential.
NFR-3	**Performance**	The app can work fast and more reliable.
NFR-4	**Availability**	It is available in all kind of play stores and more categories and jobs are recommended.
NFR-5	**Scalability**	Our application takes less time to response many requests simultaneously without making any server crashes,so this will ensure our application will scalable.

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.

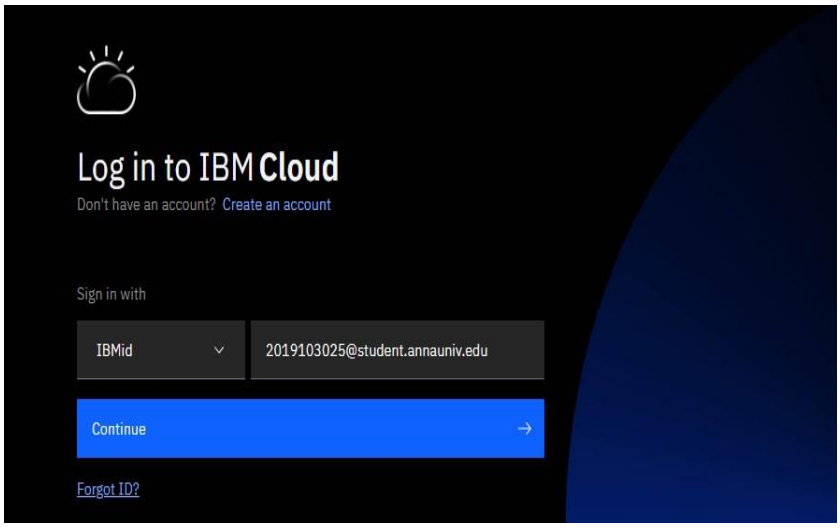
SETTING APPLICATION ENVIRONMENT

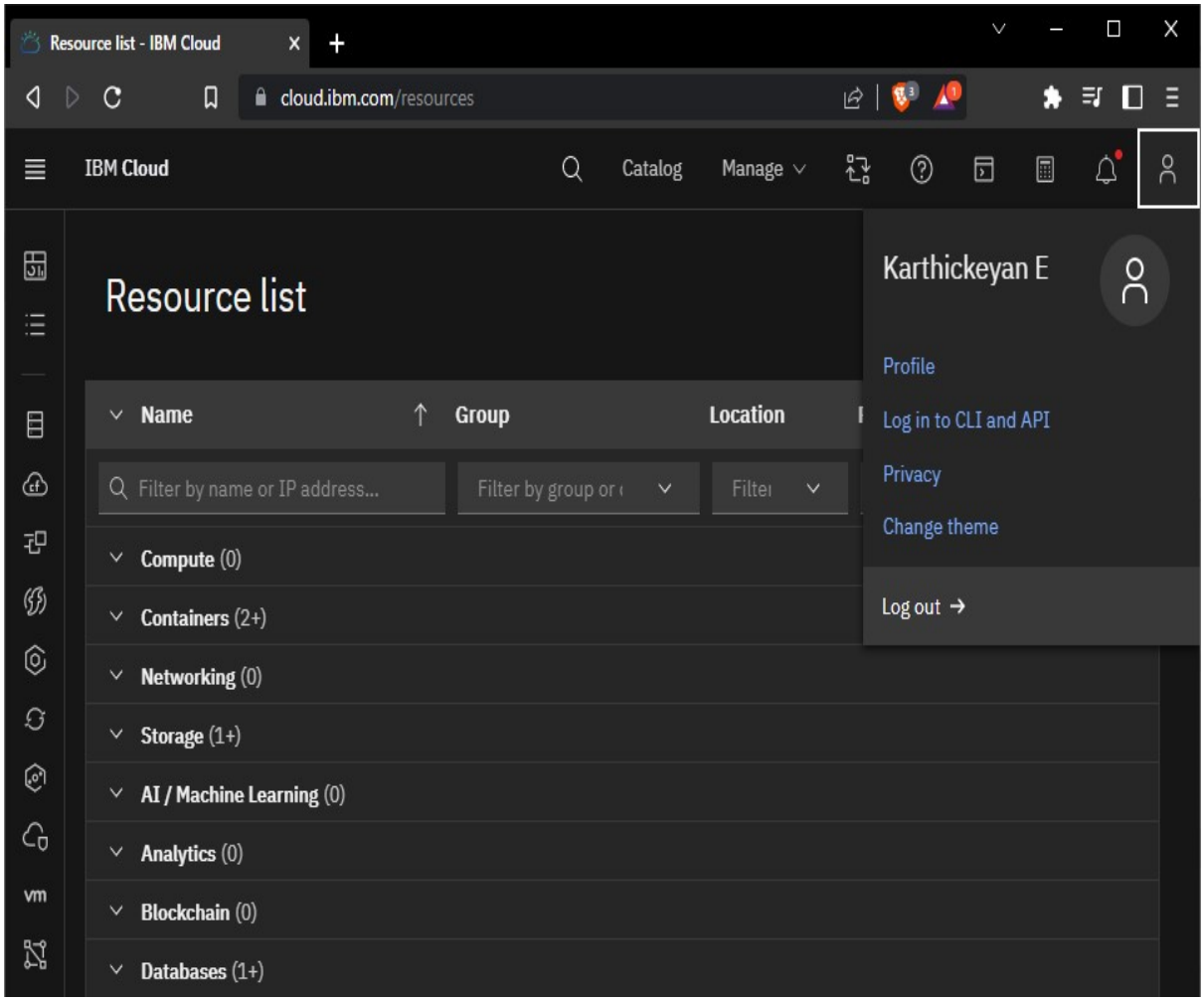
Various application needed for development and implementation should be set up.

Application environment for WebApp

Setting up Flask

IBM cloud account creation





IBM CLI Installation

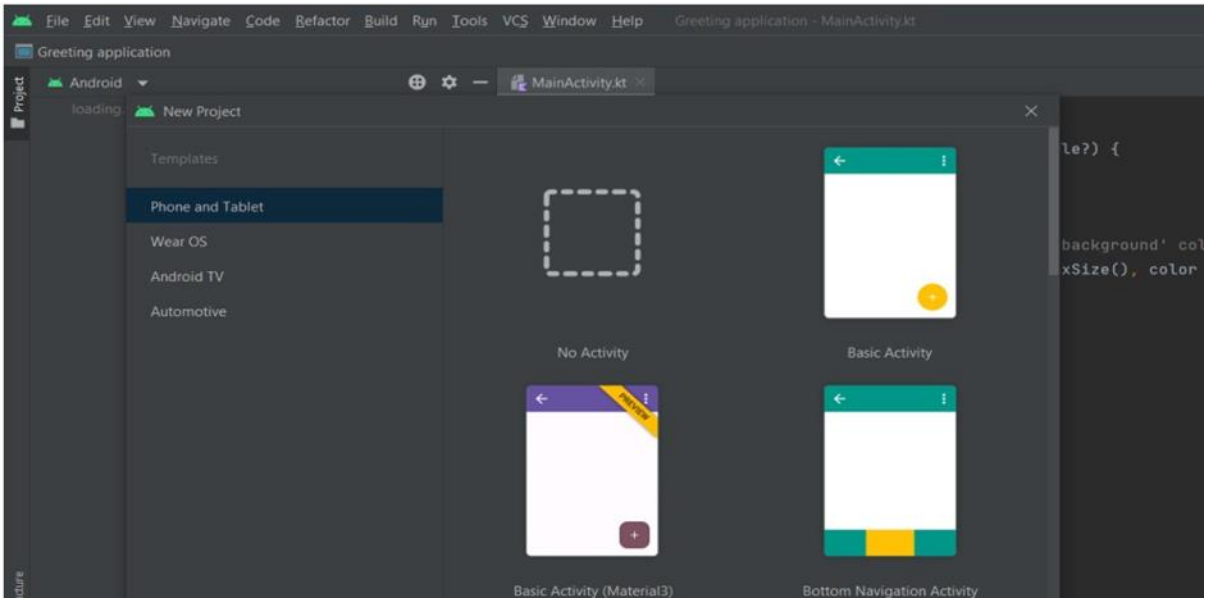
```
[node1] (local) root@192.168.0.13 ~
$ ibmcloud login
API endpoint: https://cloud.ibm.com

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:~$
```

Application environment for Android dev

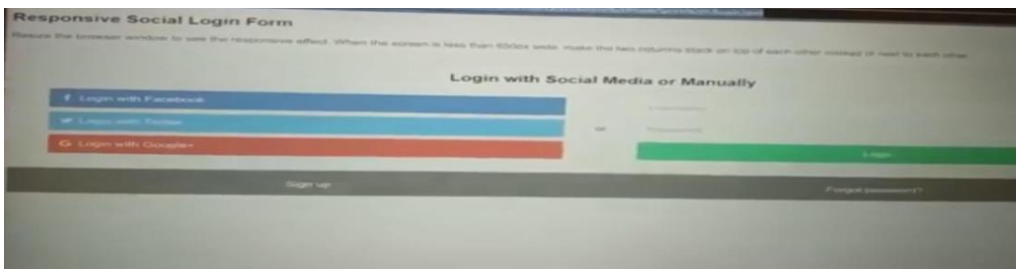
Android Studio Installation



RESULTS

REGISTERTION PAGE

LOGIN FORM



ABOUT

VIDEO LINK:

https://youtu.be/hAqYXIKomGk.