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**Software Requirements Specification**

**for**

**Bus Rapid Transit Application**

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**1. Introduction**

**1.2 Purpose**The purpose of this SRS document is to provide a detailed overview of our   
Software Requirements Specification for BRT Application, its parameters and goals. This document describes the project's target audience and its user interface, hardware and software requirements. It defines how our client, team and audience see the product and its functionality. This document provides a description of the interfaces, key concept, and overall purpose of the software project “BRT Application”. This document intends to comprehend and clarify the requirements, also serving as the basis of further design. The application design in SRS makes the implementation consistent and removes ambiguity in any process during the development and testing phase. It not only predicts the results but gives the project the base structure to implement the process.

**1.2. Document Conventions:**

**1.2.1. Alignment:**

The entire document is in justified alignment.

**1.2.2. Convention for the Main Title:**

**1.2.2.1.** Font Face: Times New Roman

**1.2.2.2.**  Font Style: Bold

**1.2.2.3.** Font Size: 24

**1.2.3. Convention for the Sub Title:**

**1.2.3.1.** Font Face: Times New Roman

**1.2.3.2.** Font Style: Bold

**1.2.3.3.** Font Size: 18

**1.2.4. Convention for the Sub Subtitle:**

**1.2.4.1.** Font Face: Times New Roman

**1.2.4.2.** Font Style: Bold

**1.2.4.3.** Font Size: 16

**1.2.5. Convention for the Body:**

**1.2.5.1.**  Font Face: Times New Roman

**1.2.5.2.** Font Size: 15

**1.3 Intended audience and reading suggestions:**

This project, which is restricted to the BRT grounds, is a prototype for the BRT Application. The Sindh Mass Transit Authority provided instructions for its implementation. The BRT system crew, as well as users and drivers, will all benefit from this effort. For example, developers, project managers, marketing personnel, users, testers, and documentation writers are among the people this paper is meant for. The applicant's main goal is to offer services inside a constrained urban area at competitive costs while reducing waiting times and choosing the most efficient routes in light of the existing situation.

**1.4 Product Scope:**

**Background:**

Transport contributes directly and indirectly to economic growth by connecting production markets to consumption markets and by facilitating the travel of populace. Concurrently, transport is one of the major consumers of petroleum products. For an oil importing country, a significant proportion of export earnings is required for importing crude oil and petroleum products, which otherwise could have been utilized in other constructive and development activities. Urban transport problems in Pakistan are managed by building larger and better roads. By contrast, the principles of sustainable transport encourage using low-cost public transport that could accomplish well in mixed land use and high-density Pakistani cities.

Cities Total Trips Private Public Non-Motorized Transport (%) Transport (%) Transport (%) Lahore 69 25 10 Karachi 72 20 8

The problems facing the citizens are that they have to pay directly cash and they must have change to buy bus ticket or ask for bus schedule, citizens will also have to queue up for a long time in order to secure a seat in bus.

Due to chaos in public transport in Pakistan, people are preffering to use private transport. Online bus booking applications have been in the market for quite some time now. They are of great use when you want to book a bus ticket quickly just sitting at your place. Additionally they are of great use when you are running short on time. Since you can very quickly book your bus ticket from the bus ticket booking application. Therefore, government has decided to introduce the BRT service application to deliver people better facilities.

**Vision statement:**

For those who want to avail of bus service of red, blue, green and orange lines through the application, the BRT service is an online application that will allow the registered users to book and cancel the ride, find the routes and the timing of bus, look all the location of buses through google maps, get notification when the bus approaches their stops, avail discount offers, complain, and pays online through Easypaisa, JazzCash, card and through bank transaction. Unlike the manual system, customers’ needs to queue up a long queue to buy bus ticket and ask for information and this brings a lot of inconveniences to customers, the conductor does not need to take fare by approaching each person on the bus, and the users do not require to stand and wait for the bus for 30 to 40 minutes at the bus stop, the BRT service permits the user to pay through the online transaction and scanning the card and book the ride for them and view the location of the bus and also notify them when the bus reaches to their stop.

**Project justification:**

Currently, about 17 million registered motor vehicles are in Pakistan (Government of Pakistan, 2018). It is expected to surpass 30 million by 2025. Demand for oil consumption in the transport sector will also increase accordingly by 2025, which at present is about 302 thousand barrels per day. Over the last few years, Pakistan witnessed only a small increase in domestic oil production. Thus has to rely increasingly on imports to meet domestic requirements. The main objective of the application is to save the economy by reducing the use of private transport from 77% to 27% in the city by providing the people of Karachi with a better bus service with various facilities. Therefore, by increasing the use of public transport petroleum consumption could be reduced.

**Brief Description of Project’s Products**:

The main purpose of this study is to automate the manual procedures of bus services for any journey made. This system is said to be an automatic system and customers can select seats by themselves. Specifically, project of this product will consist of following functionalities:

**User Panel Features:**

The user panels of a bus booking app include-

* Easy and secure registration using email, CNIC, name
* OTP verification secure in-app experience
* API integration to view all the important info about bus timing, location, etc
* Seat selection and Ticket booking
* Online payment option via different modes
* Sort and Filter option for user preference
* Pickup and Drop location selection option
* Multi payment method support for easier payment
* Multi Language support
* Graphical map showing booked and available seats
* Fare calculator for the journey from pickup to drop location
* Live Bus Tracking option
* Show all the red, green, blue and orange buses on google map
* Push Notifications of Ticket confirmation through SMS or email
* 24/7 In-App Support for Passengers
* Request Cancellation of ticket and Refund option
* Feedback and Reviews Option for Customers
* Automated Bus Reminders
* Discount offers and Loyalty points redemption option
* Buy golden, silver and platinum cards on monthly and weekly bases
* Get notifications in case of strike and late bus service and server down

**BRT Transport Office Panel Features:**

* Easy and quick registration through email
* Secure login with OTP option
* Real time location tracker for bus
* Easy and efficient dashboard management
* Effective management of profiles
* Detailed view of total bookings, cancellations, refunds and total revenue for easy tracking.
* View passenger feedbacks and ratings
* User/Passenger Management
* Manage bus routes and tracks
* Total sales summary view on dashboard
* Manage ticket bookings and cancellations
* Real-time passenger onboarding checking
* Sales and analytics

These are some of the features that should be integrated in the Travel agency/Operator Panel of your bus booking app.

**Admin Panel Features:**

* Quick registration and secure login
* Management of user/passenger Profiles
* Push Notifications
* User permission management
* Customer Relationship Management (CRM) integration
* Manage payment to operators, income and total revenue
* Real-time Bus tracking
* Integration of Content Management System (CMS)
* Commissions Management
* Provide discounts and gift vouchers
* Email and SMS marketing management
* Admin dashboard Management
* Travel agency/ operator management
* Direct connection to the driver in each bus

**Driver Panel Features:**

* Connect to BRT office agents for updates and issues.
* Get notification in case of strikes and emergency.
* Get routes updates.

Statement of Project Success Criteria:

SC\_1: Application must be downloaded by 65% of people who uses BRT service at least 6 times a week for 5 months.

SC\_2: Public transportation must be increased from 20% to 40% within three months after the release of the application.

SC\_3: The application must be rated 4 out of 5 stars by 2 lakh people of the city who have used the application for at least 5 trips within 6 months.

SC\_4: The import of petroleum for transport usage must be decreased by 9% after the 8th month of release.

SC\_5: The profit of BRT service must be increased by 5% per month within 7 months.

SC\_6: GDP growth must be increased from 10% to 12% within a year after the release of the application.

SC\_7: BRT service must become the number 1 service of the city after the 2 years of release by ABC organization.

Project exclusion:

E\_1: Government must place the GPS in each bus. The development team will only connect it with the application.

E\_2: The card scanners will be provided by the government on each bus.

E\_3: In case of complaints in bus service quality software development company will not be responsible.

E\_4: In case of the new update and additional functionality separate charges will be applied.

E\_5: Screen in each bus will not be provided by the company.

E\_6: International quality buses are the responsibility of the government.

E\_7: Verification system for CNIC will not be provided by the development company.

E\_8: For a decrease in the use of BRT service due to an increase in fare the development company will not be responsible.

E\_9: Monthly maintenance of software will not be provided freely.

E\_10: Charges for maintenance will be variable according to requirements.

E\_11: If the load on the server increases 20% more than the mentioned by product owner then performance of the application will be slow down, for which software development company could not be blamed.

E\_12: In case of increase in delivery time due to changes in requirement company will not be responsible.

E\_13: Any mobile phone and computer devices will not be provided by company.

E\_14: Basic computer use training will not be provided only training for application use to the admin and BRT office will be provided for 3 days.

Constraints:

C1-The budget of the application must not exceed 22,000 USD.

C2-The software will be released in three releases.

C3-The complete application has to be delivered within 1.5 years.

C4-Users cannot use applications without an internet connection.

C5-The application tracking service will slow down in the case of a low-quality server.

C6-Product insurance will not be provided.

C7-Product performance can be affected because of an unstable internet connection.

C8-The user cannot use the application without registration.

C9-If the user cancels the ride after 15 minutes then he cannot refund.

C10-The user cannot book a ride until his dues are clear.

C11-the user cannot book a ride for 4 days if cancels the ride 3 times in a week.

C12-The user cannot use the application without a touch mobile phone.

C13-The user cannot book rides without allowing GPS location in a mobile phone.

**ASSCUMPTION:**

A1-All customer have a phone with an active internet connection.

A2-The BRT system in online bus service contain an active internet connection.

A3-The system have their own GPS location and tracking device.

A4=customer must login to google map to use this system.

A5-System account must be in jazz cash or another bank.

A6-The employee of system are qualified enough to use the system.

DEPENDENCY:

ED1-The tracking device depend upon google map.

ED2-The transaction process depend upon banking application and online transaction application.

**1.5 References**

Research gate

**2. Overall Description**

**2.1 Product Perspective**

Currently, about 17 million registered motor vehicles are in Pakistan (Government of Pakistan, 2018). It is expected to surpass 30 million by 2025. Demand for oil consumption in the transport sector will also increase accordingly by 2025, which at present is about 302 thousand barrels per day. Over the last few years, Pakistan witnessed only a small increase in domestic oil production. Thus has to rely increasingly on imports to meet domestic requirements. The main objective of the application is to save the economy by reducing the use of private transport from 77% to 27% in the city by providing the people of Karachi with a better bus service with various facilities. Therefore, by increasing the use of public transport petroleum consumption could be reduced.

**2.2 Product Functions**

* Online registration is provided to the passengers to register themselves.
* In registration form passengers fill the details: name, CNIC , registered phone number, email address and password, Area and city .
* Email for verification code is sent to the passengers to verify their phone number.
* Edit profile option will available for passengers for editing if they want changes.
* Passenger pay for ticket online from wallet option.
* Wallet recharge option is available for users to recharge easily.
* User can set the application language according to their known language through language option.
* For users, there are multiple settings in settings option.
* Available help center solves user problem with terms and policies.
* Passengers can complain if they face critical problem during their travelling or have issues from the driver or other services in bus through complain option.
* In case of complain, system will provide the form for filling the details of route, and after that user chat their problem through chatbot.
* For travelers, system will provide the silver, gold and platinum card on monthly and weekly bases payment.
* System provides four buttons for 4 types of buses: Red, blue, green and Orange.
* For all buses, there is an option for book ride through which passenger book his ride by filling the proper form for booking ride.
* User can see the location of bus through Google map
* Tracker is provided to user to track bus location.
* If the user cancels his trip, easily cancel his ride through cancel option.
* Without booking a ride, users can easily see the schedule of buses when they start and stop with mentioned routes.
* After completing the ride, passenger can pay their ticket through credit card, jazz cash, easy paisa app or directly through cash.
* System shows the graphical map for booked and available seats.
* System pushes the notification for ticket confirmation.
* when bus will be near the route, system will send the reminder or notify the user.
* There will be discount offers for passengers.
* System notified the users in case of strike, late bus service, or server down problem.
* System will provide the tracker for transport office to track the bus location.
* Office users view the details of total booking, cancellations, refunds, and total revenue to track their goals.
* Through this system, office users view the feedback and their rating.
* System will manage the ticket booking and cancellations.
* System shows the graphs of sales and analytics for office users.
* Through admin pane feature, admin manage the user /passenger profiles.
* System manages the customer relationship.
* Manage operators, income and total revenue.
* Through system admin will directly connect to the driver.

**2.3 User Classes and Characteristics:**

**USER CLASS STAKEHOLDER**

|  |  |
| --- | --- |
| Focused user classes | Product champion |
| Disfavored user classes | Complain |
| Ignored user classes | Customer, lawyer |
| Non-human user classes | QR code, networks |
| Indirect user classes | Customer(past and future) |

**FEATURE DIAGRAM:**

BRT BUS SERVICE

REGISTRATION

CNIC

Email

Password

Contact number

city

Name

PAYMENT

SCHEDULE

Route

Time

Number plate

Wallet

Cash

Jazz cash

Easy paisa

LOCATION

ACCESS

BOOK A RIDE

View seats

Bus near me

Select bus

Picking location

View

Internet

Tracking device

Map

Mobile

**2.4 Operating Environment:**

The BRT application is an online mobile phone application and shall operate on all android phones, tablets, iPads, and iPhones that have an active internet connection and have at least 2 GB RAM.

**2.5 Design and Implementation Constraints:**

The information of all users, drivers, BRT employees, and admin must be stored in a database that is accessible in the BRT office and admin office panel of the application.MS SQL will be used as an SQL engine and database.The online application of BRT must be available at least 20 hours a day.The users must have an ID and password to login into the application.An unstable internet connection will reduce the performance of the application.The application will be implemented by java, my SQL.The user cannot open applications without an internet connection.The user cannot book a ride without opening the GPS of the phone.

**2.6 User Documentation**

**2.6.1 LOGIN/SIGN UP:**

When the user starts using the application, if he has an account, he will log in and if he does not have an account, he will Sign up.

For sign up user needs to enter your ID card number, mobile phone number, the account user will withdraw money from, and email address.

**2.6.2 CURRENT LOCATION AND ENTER LOCATION:**

Once the account is created, the user can easily use the application and since this application is designed to book a ticket.

When booking a ride, users will first open their current location or enter a location to let you know if their service is available or not.

**2.6.3 DESITINATION:**

When the user enters his location, the next step is to enter the destination so that app can tell him whether the destination he is on also provides the service.The test session will be doing something after the internet that the destination is in the same country system until the user or your service posts even then it can add you further.

**2.6.4 DIFFRERNT BUSES OPTION:**

Once the user has confirmed their destination, the app will provide the different types of buses such as

* Red bus
* Blue bus
* Green bus
* Orange bus

Each bus has their own routes, timing and stations. the user has to match his destination with the given information and confirm the ride the ride.

In case if the user destination and timing is not matching with the given schedule so there will be another option that user can create a ride according to his timing and destination and can add the nearest stop too.

**2.6.5 TRANSCATION:**

Once the user confirms the ride then he has paid the fare of the ride by multiple baking account such as:

* [EasyPaisa](https://pdf.co/blog/payment-methods-in-pakistan?utm_referer=https%3A%2F%2Fwww.google.com%2F" \l "4)
* [Jazz Cash](https://pdf.co/blog/payment-methods-in-pakistan?utm_referer=https%3A%2F%2Fwww.google.com%2F" \l "5)
* [Upaisa](https://pdf.co/blog/payment-methods-in-pakistan?utm_referer=https%3A%2F%2Fwww.google.com%2F" \l "6)
* [Payoneer](https://pdf.co/blog/payment-methods-in-pakistan?utm_referer=https%3A%2F%2Fwww.google.com%2F" \l "7)
* [GoLootLO](https://pdf.co/blog/payment-methods-in-pakistan?utm_referer=https%3A%2F%2Fwww.google.com%2F" \l "8)
* [PayPak](https://pdf.co/blog/payment-methods-in-pakistan?utm_referer=https%3A%2F%2Fwww.google.com%2F" \l "9)
* [MoneyGram](https://pdf.co/blog/payment-methods-in-pakistan?utm_referer=https%3A%2F%2Fwww.google.com%2F" \l "10)
* [Western Union](https://pdf.co/blog/payment-methods-in-pakistan?utm_referer=https%3A%2F%2Fwww.google.com%2F" \l "11)
* [Ria Money Transfer](https://pdf.co/blog/payment-methods-in-pakistan?utm_referer=https%3A%2F%2Fwww.google.com%2F" \l "12)
* [HBL-Konnect](https://pdf.co/blog/payment-methods-in-pakistan?utm_referer=https%3A%2F%2Fwww.google.com%2F" \l "13)
* [Keanu Wallet](https://pdf.co/blog/payment-methods-in-pakistan?utm_referer=https%3A%2F%2Fwww.google.com%2F" \l "14)
* [Foreplay](https://pdf.co/blog/payment-methods-in-pakistan?utm_referer=https%3A%2F%2Fwww.google.com%2F" \l "15)
* [Virtual Card](https://pdf.co/blog/payment-methods-in-pakistan?utm_referer=https%3A%2F%2Fwww.google.com%2F" \l "16)
* [Bank Transfer](https://pdf.co/blog/payment-methods-in-pakistan?utm_referer=https%3A%2F%2Fwww.google.com%2F" \l "1)
* [Wire Transfer](https://pdf.co/blog/payment-methods-in-pakistan?utm_referer=https%3A%2F%2Fwww.google.com%2F" \l "2)

When the fare is received by the app the confirmation message will receive to the user about the drive detail and on other hand the drive will receive a message about the user detail (stop, user name, etc.)

**2.6.5 QR CODE:**

When there will be 15 mins in arriving the bus, the user will receive the QR code, when he or she will scan in order to open the door of the bus if he or she will not scan or any error occurs the bus driver will understand that the person is strangers.

**2.6.6 CANCELLING THE RIDE:**

If the user mind changes and he want to cancel the ride. There is a rule if the user cancels the ride within 5 mins of conformation of ride, the whole fare will be transfer to the user account without any deduction automatically.

On the 6 min of the confirmation of the ride 5% fare will be deducted and then will be transfer to the user account, after the five min 5% of fare will be dedicated on each min.

**2.6.7 ALTERING MESSAGES:**

When the driver is fifteen minutes away the destination then, after every three minutes, the user will get a reverse message in which he will be inform the driver current location and distance the away from the user.

**2.7 Assumptions and Dependencies:**

**ASSUMPTIONS:**

A1-All customer have a phone with an active internet connection.

A2-The BRT system in online bus service contain an active internet connection.

A3-The system have their own GPS location and tracking device.

A4=customer must login to google map to use this system.

A5-System account must be in jazz cash or another bank.

A6-The employee of system are qualified enough to use the system.

**DEPENDENCY:**

ED1-The tracking device depend upon google map.

ED2-The transaction process depends upon banking application and online transaction application.

**3. External Interface Requirements**

**3.1 User Interfaces:**

Bus Rapid Transit Application is desired to be used by as many people as possible, we will aim that user interfaces of this application will be comprehensible and easy to use. In this section, we will try to give the best explanations about the interfaces.

**3.1.1 Welcome Page Interface:**

This is the first interface that users will see when they use the application for the first time. In this interface, there will be a logo of BRT.

**3.1.2 Phone Number Verification Interface**:

This is the first interface when a user registers to the BRT application. BRT application will have to verify the user's phone number for the security and avoid fake accounts. In this interface, after the user enters his phone number, verifying process will start. After verifying phone number, this interface directs users to register interface.

**3.1.3 Register Interface In this interface:**

BRT application will enable users to register into the BRT system. After entering necessary information, users can register to the application. Furthermore, in this interface, users can also upload their profile photo to the PHP web server.

**3.1.4 User Profile Interface:**

In this interface, a user can see his information, profile photos, past rides, canceled rides, upcoming rides etc. Also, in this interface a user may change his information like password or profile photo.

**3.1.5 Notification Interface:**

In this interface, notifications will be shown. These notifications are something like your ride has been booked, your ride has been canceled, your captain is about to arrive at your station or promotional offers etc.

**3.1.6 Main Interface:**

This interface is the main interface after registration and welcome page. This interface is mainly about selecting a bus. This interface will split up into four sub interfaces such as a separated interface for red bus, a separated interface for green bus, a separated interface for blue bus, a separated interface for orange bus.

**3.1.7 Sub interfaces for Buses:**

All the Sub interfaces of the buses shall have the similar features where a user can see the timings\schedule for the arrival of the bus, driver’s information, Bus number etc. In this interface the user can book a ride after entering their destination.

**3.1.8 Payment Interface:**

This interface will enable users to select a payment method such as bank transfer, mobile banking options will also be available like jazz cash, easy-paisa etc. Users shall also be able to pay through the inbuilt wallet of the BRT application or use their premium card for booking the ride. This interface will also provide the feature of recharging the wallet or purchase of a premium card to the user.

**3.1.9 Help Interface**:

In this interface users can talk to the representative through a chatting feature and ask about queries that they have or look at the FAQs.

**3.2 Hardware Interface:**

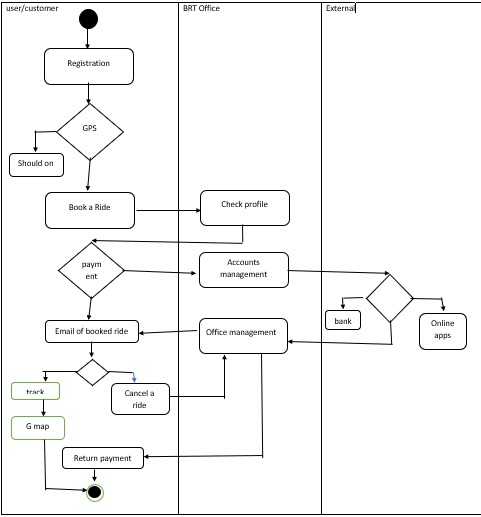
The application shall function on any Internet-enabled computer with a Google Chrome, Firefox, Safari or Internet Explorer 11 browser

Server-class computers must be used to run all server-side components. Workstation-class and personal PCs must be used for the execution of all client-side components.  
 **3.3 Software Interface:**

The BRT system needs a database management system since all system data, such as user and route information, must be kept there for subsequent usage and system functionality. For that reason, the MySQL database management system is employed, Google Map Server will also be utilized to display transportation data and other geographic services. HTML and the Bootstrap library will be utilized to illustrate the system's user interface in an appealing way. JavaScript and PHP languages will use HTTP requests to manage these client- and server-side features. All the necessary software will be used to make applications usable on any smartphone and personal computers etc. The application shall make use of several software interfaces to interact with external software systems.

**3.3 Communication Interface:**

BRT application will use a PHP web server and cloud services named Google Cloud Messaging. It shall push all the necessary notifications as a message to mobile devices via the Internet to drivers and to the users of BRT application. Thus, for that reason, we will use HTTP protocols and methods inside this protocol for communication over the internet. Furthermore, for packet transmissions are achieved through using TCP/IP because of its reliability is important for the application.



**4.System Features:**

**4.1 User Panel Features**

**4.1.1 Registration:**

If user want to be a registered user, he/she will register their selves

through registration form. Registration form interface will be familiar to

other registration forms. In which user fill the details like name, CNIC,

registered phone number, City area, password. For verification of phone

number system provides verification code. After submitting the form user will

get notification that he/she is now registered for user confirmation.

**4.1.2 View schedule:**

Once user open a bus button, there will the view schedule option from

which user can easily view the routes and their timings of buses.

**4.1.3 Booking:**

Booking option is available for users. User can easily book themselves

through this feature by just filling necessary details of name and route,

according to the destinated place and distance the charges will show before

finalizing booking ride, according to the available seats. But only registered

user can book a ride.

**4.1.4 Cancel ride:**

If user once book a ride, in case of any problem user want to cancel ride.

They can easily cancel and refund their payment by this cancel ride option.

**4.1.5 Payment:**

There are multiple methods of payment if user want to pay directly through

cash or credit card user can. But if user want online to feel secure user can

pay through the jazz cash, easy-paisa. Once user pay for their ticket get

notified that successfully paid.

**4.1.6 Language:**

If user don’t understand the international language can switch to his known

language available in language option for better understanding. Whole

system will be translated into the language which is set by user.

**4.1.7 Google map:**

Google map is also available for user to find the bus location of different

buses Green, Red, Blue, Orange with blue, green, red and orange colours to

easily identify. Also, for those who are not educated get better understanding

by just having the real-world experience.

**4.1.8 Fare calculator:**

Fare calculator calculate the total fare cost of user transport journey, if he

is not able or have some difficulties to find the cost. This may help the

passenger, if they don’t get updated by current fares. This also make

passenger save if passenger already know the actual cost, they can manage

the charges and not get cheated by the conductors.

**4.1.9 Feedback:**

User can give review about ride through feedback. This helps developers

for updating the software or make changes in system.

**4.1.10 View Seats:**

User/passenger can view the seats available in bus. This make user travel

easy and save. Or before booking a ride user get informed by this option that

seats are available or not. In case seats are available in bus passenger can

book the seat through this passenger will be on time on their desired place.

This help user easy to make decision.

**4.1.11 Complain:**

User can complain through this complain portal option available in app. If

user face any difficulty or problem in driver or any problem with the system.

This makes user more comfortable before complaining user fill some details

bout the route then chat-bot.

**4.1.12 Wallet:**

Wallet is really good feature for those who always prefers smart work or always want to feel secure. From this feature user can view the amount of money in his wallet. Can recharge online and pay online can use this feature.A lot of people feel not secure in our country when they get a little big amount of money in their pockets, so from this feature they always get unfearful.

**4.1.13 Edit profile:**

If user enter his profile and feel uncomfortable and want some changes in

his/her profile can easily make changes through this feature.

**4.2 Office Panel Features**

**4.2.1 Registration:**

Office staff will always be the registered users of this app. Same process

for them but they can directly register through email.

**4.2.2 Location tracker:**

For security and safety for passengers, office staff can also track the bus by This feature of location tracker. This option builds the trust from passengers and Users.

**4.2.3 Profile management:**

Office staff have the users and their profiles with their data. System allows them to have this profile management feature through this they can easily manage the profile, if someone get register or logout from this app. This feature can do this add and cancel task.

**4.2.4 Detail view:**

Staff can have the track of ticket cancellation, booked ride, refunds and total revenue in this feature without making the excel sheets of something else make easy task with less labor work and time.

**4.2.5 View Passenger Feedback:**

If someone is feedbacking, this is responsibility to check the user’s feedback and get update. This system provides this passenger’s feedback options from this staff can view the feedback without going to check the email.

**4.2.6 Bus Routes:**

This feature manages the routes of buses according to the situation of country and the number of passengers. According to the situation and passengers staff make the routes and for booked rides manages the stops.

**4.2.7 Tickets:**

For booking of the passengers and incase of cancellation of ride refunds their costs. This feature will do the tasks having the table of book rides cancellation of rides with refund option.

**4.2.8 Sales and Analytics:**

This feature shows the graphs of sales with sales table for manager to easily track their sale. All the companies are conscious about their sales they always makes the charts of sales but this feature makes things easier.

**4.3 Admin Panel Features**

**4.3.1 Profile Manager:**

Admin can also manage the profiles of the workers with this profile

manager feature.

**4.3.2 Notification:**

Admin notify the users if they book ride, cancel ride, refunds payment, ticket payment, when the bus will near by the stop. Admin have builtin emails. They just get notified by events will notify the users easily with this separate feature.

**4.3.3 Payment Operator:**

Admin manage the payment operators like income and total revenues with this payment operator feature.

**4.3.4 Connection:**

Admin should manage the relationship with the customers, and should connect with the drivers to notify the driver this feature separately do this task.

**4.4 Driver Panel Features**

**4.4.1 Updates:**

Drivers can also want notification if they face any difficulty about the route and the situations of country like strikes, if they want to change the route to be in comfort zone mail the admin and get notification and updates of all kind of situations. This feature gets the updates from the admin. From this feature drivers will also trust on system.

**5- Functional Requirements:**

**5.1 Registration:**

* Online registration is provided to the passengers to register themselves.
* In registration form passengers fill the details: name, CNIC, registered phone number, email address and password, Area and city.
* Email for verification code is sent to the passengers to verify their phone number.

**5.2 Settings:**

* Edit profile option will available for passengers for editing if they want changes.
* Passenger pay for ticket online from wallet option.
* Wallet recharge option is available for users to recharge easily.
* User can set the application language according to their known language through language option.
* For users, there are multiple settings in settings option.
* Available help center solves user problem with terms and policies.
* Passengers can complain if they face critical problem during their travelling or have issues from the driver or other services in bus through complain option.
* In case of complain, system will provide the form for filling the details of route, and after that user chat their problem through chatbot.
* For travelers, system will provide the silver, gold and platinum card on monthly and weekly bases payment.
* System provides four buttons for 4 types of buses: Red, blue, green and Orange.
* For all buses, there is an option for book ride through which passenger book his ride by filling the proper form for booking ride.

**5.3 User Driven Functional Requirements:**

**5.3.1 User Requirement:**

* User can see the location of bus through Google map
* Tracker is provided to user to track bus location.
* If the user cancels his trip, easily cancel his ride through cancel option.
* Without booking a ride, users can easily see the schedule of buses when they start and stop with mentioned routes.
* After completing the ride, passenger can pay their ticket through credit card, jazz cash, easy paisa app or directly through cash.
* System shows the graphical map for booked and available seats.
* System push the notification for ticket confirmation.
* when bus will be near the route, system will send the reminder or notify the user.
* There will be discount offers for passengers.
* System notified the users in case of strike, late bus service, or server down problem.

**5.3.2 BRT Office requirement:**

* System will provide the tracker for transport office to track the bus location.
* Office users view the details of total booking, cancellations, refunds, and total revenue to track their goals.
* Through this system, office users view the feedback and their rating.
* System will manage the ticket booking and cancellations.
* System shows the graphs of sales and analytics for office users.

**5.3.3 Admin Requirements:**

* Through admin pane feature, admin manage the user /passenger profiles.
* System manages the customer relationship.
* Manage operators, income and total revenue.
* Through system admin will directly connect to the driver.

**6. Non-Functional Requirements:**

**6.1 Product Requirements:**

**6.1.1 Usability:**

* User can pay for ticket online through different modes like: jazz cash, easy paisa and through credit card.
* Sort and filters options are available for user preferences.
* Easy registration through email.
* Multi-payment methods support for easier payment.
* Graphical representations are also provided for user to identify the booked and available seats.
* Fare calculator for the journey from pickup to drop location for user.
* User can easily track the bus through tracking.
* Showing the different buttons for users of green, blue, red, orange buses to easily identify the locations on google maps.
* In case of cancelling the ride due to some reason can easily refund his payment.
* Admin can view the sales summary and analytics by graphs and descriptions to easily track, on dashboard.

**6.1.2 Efficiency:**

* **Performance:**

1. App is open within a second.
2. Notifications and reminders for users pop up before bus reaches on the stop.

* **Space:**

1. This online BRT system app easily download in just 20MBs.
2. This system takes Arduino kind of servers.

**6.1.3 Reliability:**

* Book ride option book passenger’s ride and also cancel the ride through cancel button.
* Through registration user will be registered.
* Google map options user can view the different buses by their representation, available seats and booked seats.
* User pay for their ticket and recharge wallet through wallet option.
* View discount show the discounts offers for users.
* User will view the schedule through view schedule.

**6.1.4 Portability:**

* Users can use this app online on android, iPhone.

**6.2 Organizational Requirements:**

**6.2.1 Implementation:**

* + - The source code will provide in java language.
    - System language will be English but user can also the system’s language according to user’s preference.

**6.2.3 Standards:**

* Techniques are used in this system is brain storming and user observation.

**6.3 External Requirement:**

**6.3.1 Interportability:**

* Booking a ride is only for registered users.
* Online payment is interconnected with bank.
* Silver, Gold, Platinum card are just for student and travelers.

**6.3.2 Ethical:**

* Tracking options to track the bus by user and office users.
* Notification for users in case of late bus service and server down.
* Users can see the reviews of passengers.
* Users can view driver details.

**6.3.3 Legislative:**

**6.3.3.1 Safety:**

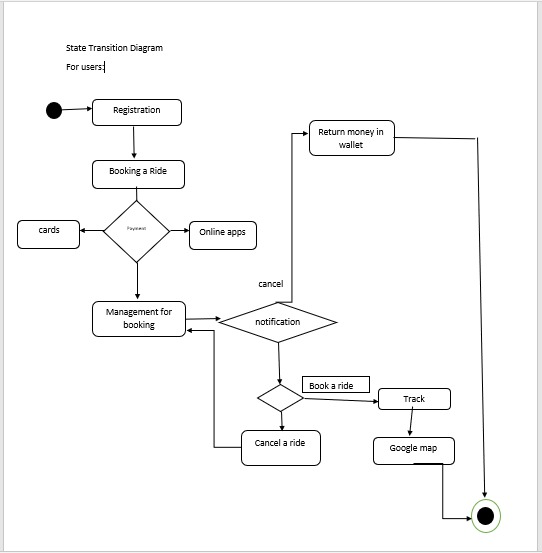
* OTP verification.
* Secure OTP login.

**6.3.3.2 Privacy:**

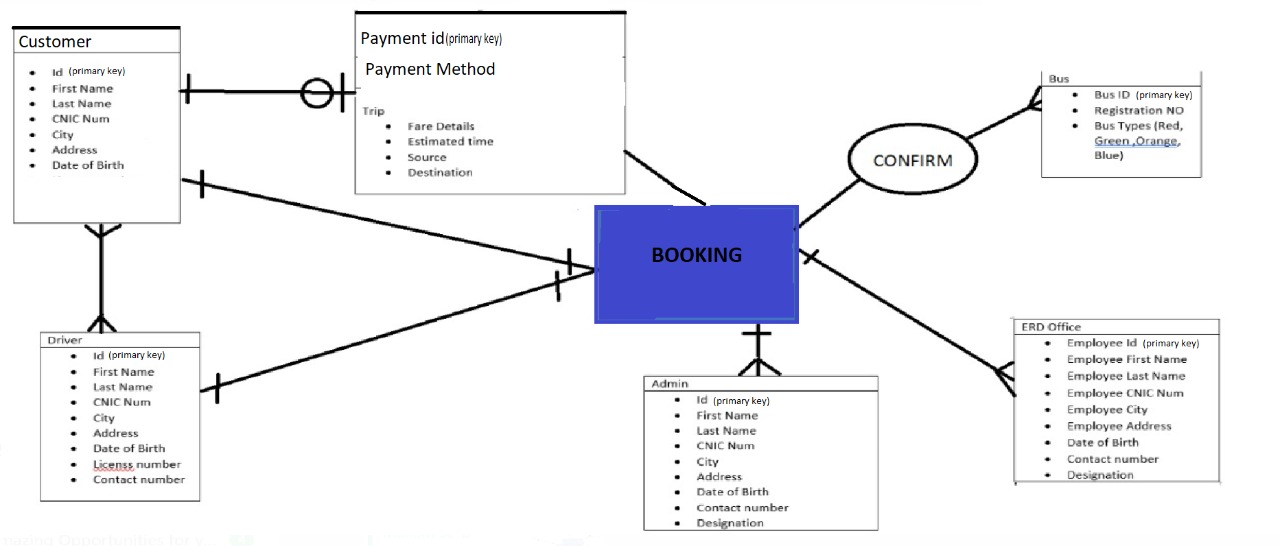
* User data will be secure, any other user cannot see the details of others.

**6.4 Diagram:**

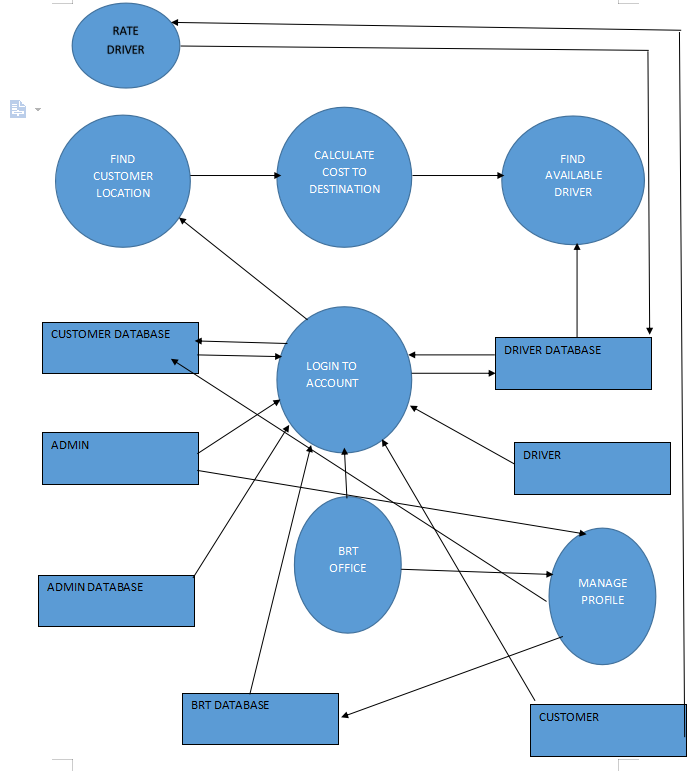
**6.4.1State transition diagram:**

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**Entity Relationship Diagram**

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**Data Flow Diagram**

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