



POC  
**Low Level Design (LLD)**

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**DOCUMENT APPROVAL**

Approvers of this document

| Name | Department | Role | Signature | Date |
|------|------------|------|-----------|------|
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**DOCUMENT CHANGE HISTORY**

| Document Version # | Author                 | Date | Description                   |
|--------------------|------------------------|------|-------------------------------|
| 1.0                | Sayantan Bhattacharjee |      | On-Demand Car Wash System LLD |
|                    |                        |      |                               |
|                    |                        |      |                               |
|                    |                        |      |                               |

## Table of Contents

- 1.0 Document Purpose
- 2.0 Intended Audience
- 3.0 Project Background, Objective(s)
  - 3.1 Project Background
  - 3.2 Project Objective
- 4.0 Hardware and Software requirements
- 5.0 Design Pattern
- 6.0 Solution Diagram
- 7.0 Solution Steps
- 8.0 Classes/function name
- 9.0 Validations
- 10.0 Data model/Tables
- 11.0 API Canvas
- 12.0 Env variables
- 13.0 Integrations
- 14.0 AWS Role
- 15.0 HTTP Status Code
- 16.0 Unit Testing
- 17.0 Request
- 18.0 Response

## 1.0 Document Purpose

This document describes the solution architecture for an On-demand car wash system.

## 2.0 Intended Audience

The target market for a car wash includes people who have a need to keep their car clean but are not willing to do the work themselves. This document is intended as a reference for the following roles and stakeholders who are interested in the On-demand car wash system technical architecture.

| Role                  | Nature of Engagement of Stakeholders  |
|-----------------------|---|
| Product Owners/SME    | Key stakeholders to ensure that the architecture is aligned with business goals.  |
| Business Analysts     | Business analysts are one of the stakeholders who are informed of the key architectural decisions.  |
| Enterprise Architects | To enforce Customer management Platform Architecture is aligned to business goals and architecture, and architectural guidelines.               |
| Solution Architects   | To ensure solution design and architecture are aligned to business requirements and architectural guidelines.                                   |
| Developers            | Use Technical Architecture Document as the guiding document for detail design and implantation approach to align with On-demand car wash system |

## 3.0 Project Background, Objective(s)

### 3.1 Project Background

On-demand car wash system leads to providing the best car wash services at the customer's doorstep.

### 3.2 Project Objective

To develop an On-demand car wash system that will allow users to book a car wash at the specified time and location. The system is equipped with services like easy signup/in, editing their personal details, entering car details for further washes, selecting the date, time, and add-ons or package details of wash, one-tap booking, and rating the wash service.

## 4.0 Hardware and Software Requirements

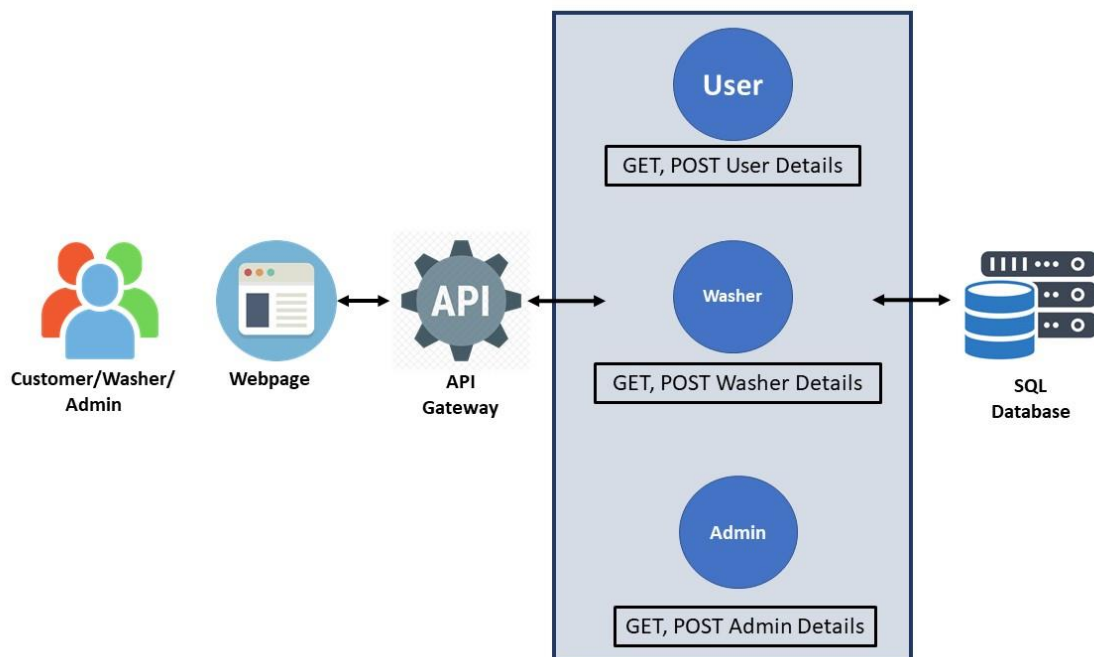
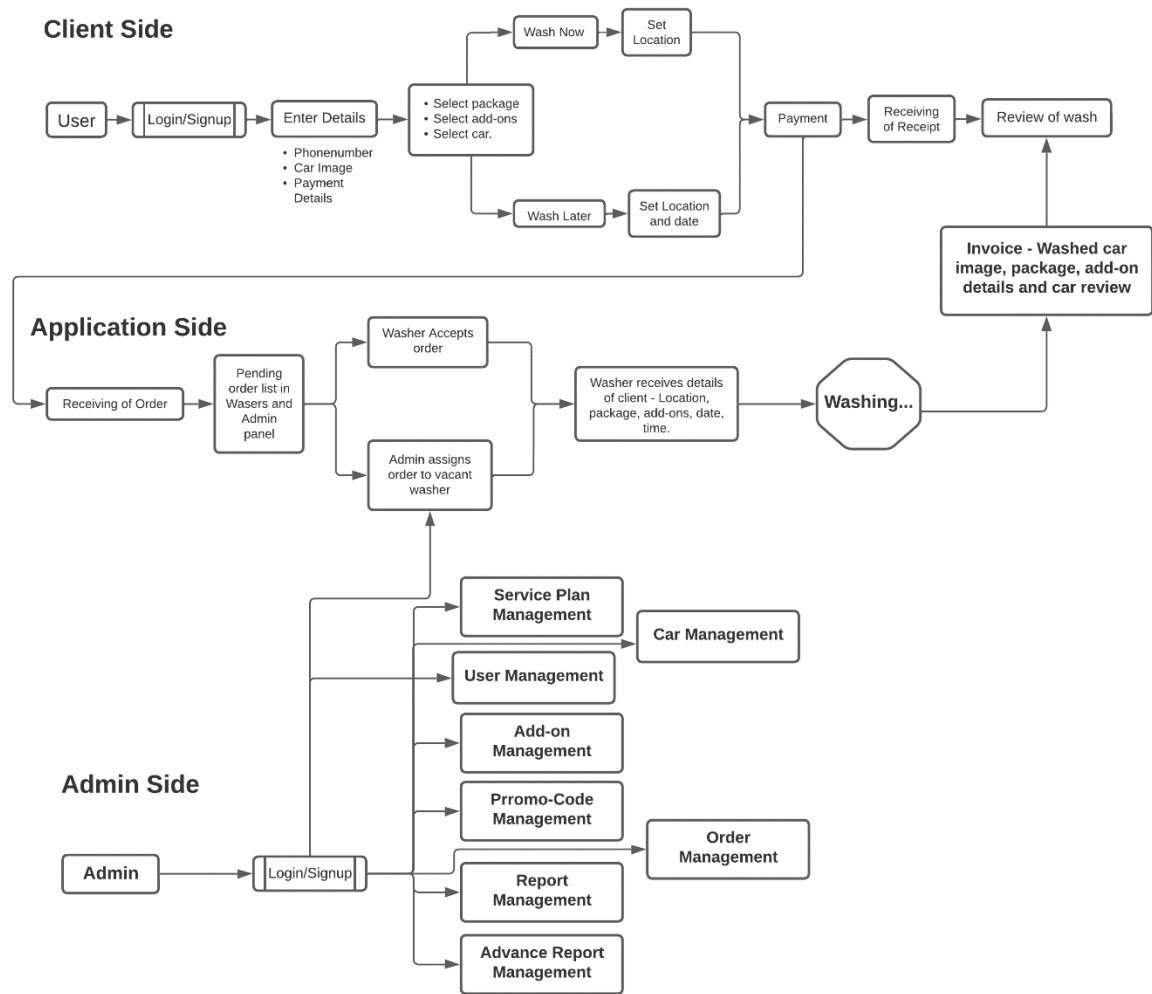
| # | Software                               | Version     |
|---|--|-------------|
| 1 | Microsoft SQL Server Management Studio | 12.0.2269.0 |
| 2 | Visual Studio Community 2019           | 16.11.17    |
| 3 | Target Framework                       | .NET 5.0    |
| 4 | NodeJS                                 | 16.16.0     |
| 5 | Angular CLI                            | 14.0.6      |

| # | Hardware   | Specifications                                |
|---|------------|---|
| 1 | Processor  | Minimum 1.8 GHz : Recommended 2 GHz and above |
| 2 | RAM        | Minimum 4 GB : Recommended 8 GB and above     |
| 3 | Hard Drive | Minimum 32 GB : Recommended 64 GB and above   |

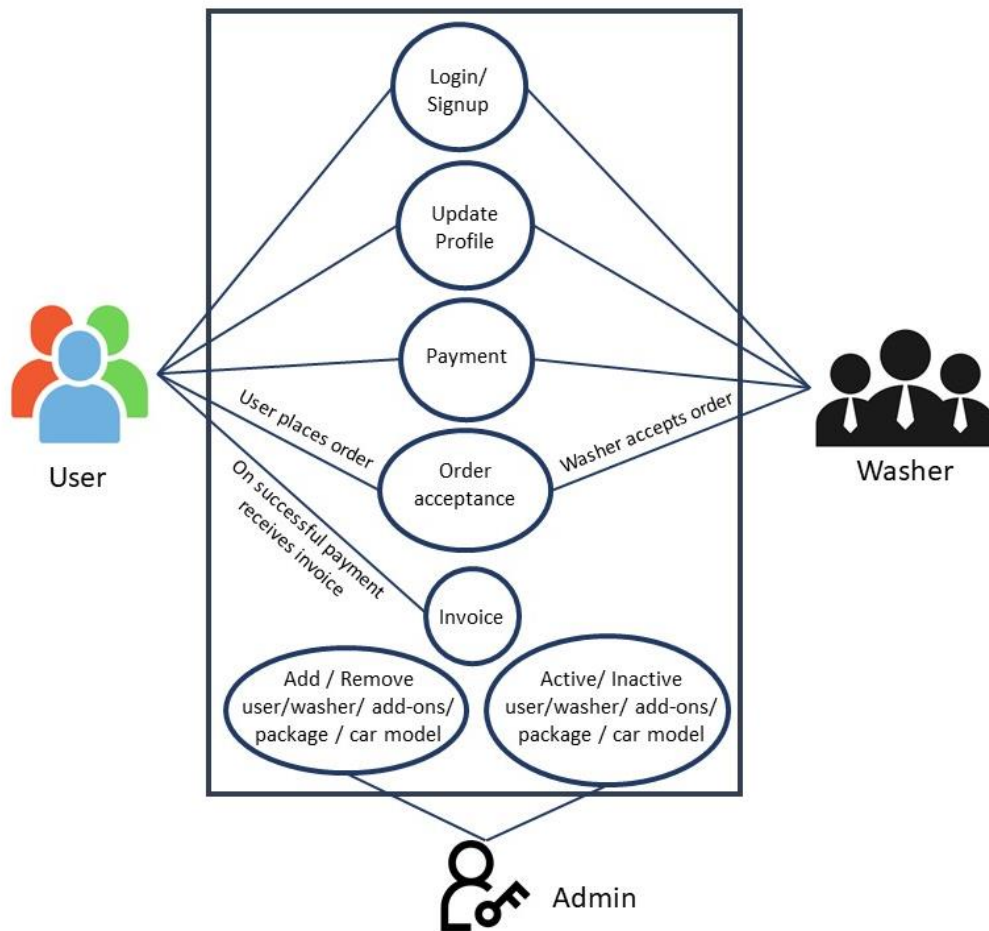
## 5.0 Design Pattern

| # | Name     | Description                      |
|---|----------|----------------------------------|
| 1 | API      | Using Http requests              |
| 2 | Angular  | Front End                        |
| 3 | Database | For storing and maintaining data |

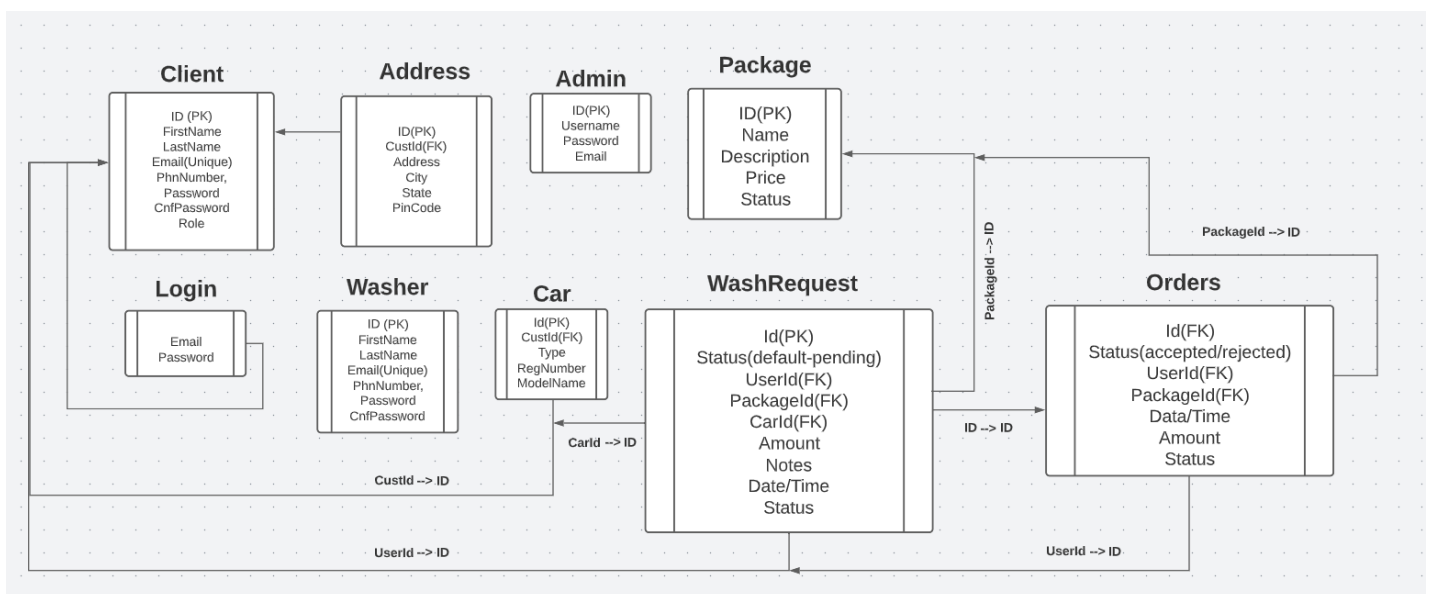
## 6.0 Solution Diagram



## 7.0 Use Case Diagram



## 8.0 Entity Relationship Diagram



## 9.0 Solution Steps

### Customer Login/Signup

1. User will enter either the Facebook or Email login button on the home page.
2. As the user clicks the Login/Signup button, the browser directs the request to isNewCustomer().
3. API gateway does the routing and forwards the request to isNewCutomer().
4. The isNewCustomer() will validate if the user exists in the database or not
  - a. If function returns true, user will be directed to the userRegistration() function.
  - b. If function returns false, the getUserDetails API will be called and the user will be greeted with his username and index page of the website.
5. userRegistration() - User will enter the required details email, Phone number, car details, car image, and payment details to register.
6. The entered details will be validated by the function validateProfile().
7. On Successful validation and registration user will have to login again either using his email id or Facebook Id.

### Wash Now

1. User will first have to login.
2. As the user enters the details and clicks the login button, browser directs the request to Customer List API.
3. After validating the user login credentials, the user will be redirected to the webpage's index page
4. As the user clicks on the Wash now button, the user will be redirected to the Wash\_request view.
5. The user needs to select car model, wash package, add-ons and some special instruction message.
6. The user then needs to click either on wash now or wash later button based on the needs.
  - a. If wash now is clicked, the user needs to set a location for wash.
  - b. If wash later is clicked, the user needs to set a location, date and time for wash.
7. The user will be then redirected to the Payments View. The user will be needed to fill up the payment details and on successful payment the user will receive a payment receipt.

### User Profile View/ update

1. User will first have to login.
2. As the user enters the details and clicks the login button, browser directs the request to Customer List API.
3. After validating the user login credentials, the user will be redirected to the webpage's index page.
4. As the user clicks on the profile button, the user will be redirected to the profile page.
5. The user can view or edit his personal details such as Name, email, Phone number, car details, car image, and payment details.



6. When the user clicks on update profile, validateProfile() functions will be called for validating the entered details.
7. The user's personal details will be then updated in the database and finally shown to the user.

#### Washer Login

1. Washer will enter his login Id and password.
2. As the washer clicks on the login button, the browser directs the request to the washer login API.
3. Call reaches the API gateway.
4. API gateway does the routing and forwards the request to washer\_validate() function.
  - a. If the function returns true, the browser displays the dashboard for the washer.
  - b. If the function returns false, the browser displays the error message to the washer.

#### Admin Login

1. Admin will enter his login Id and password.
2. As the washer clicks on the login button, the browser directs the request to the washer login API.
3. Call reaches the API gateway.
4. API gateway does the routing and forwards the request to admin\_validate() function.
  - a. If the function returns true, the browser displays the dashboard for the admin.
  - b. If the function returns false, the browser displays the error message to the admin.

### 8.0 Classes/function

#### Data Model Classes

| # | Class          | Description   |
|---|----------------|---|
| 1 | Customer       | Model holds the <b>customers schema</b> details       |
| 2 | Admin          | Model holds the <b>admin schema</b> details           |
| 3 | Washer         | Model holds the <b>Washer schema</b> details          |
| 4 | Package        | Model holds the <b>Package schema</b> details         |
| 5 | OrderDetails   | Model holds the <b>Order details schema</b> details   |
| 6 | AddOns         | Model holds the <b>add-ons schema</b> details         |
| 7 | PaymentDetails | Model holds the <b>payment details schema</b> details |
| 8 | PromoCode      | Model holds the <b>promo code schema</b> details      |
| 9 | CarModels      | Model holds the <b>car models schema</b> details      |

| # | Functions             | Description  |
|---|-----------------------|--|
| 1 | userRegistration.cs   | It contains the logic for the registration of new customers  |
| 2 | getCustomerDetails.cs | It contains the logic for getting the details of customers   |
| 3 | updateCustomer.cs     | It contains the logic for updating the details of a customer |
| 4 | removeCustomer.cs     | It contains the logic for deleting a customer                |
| 5 | Washer.cs             | Model holds the Washer schema details                        |
| 6 | Admin.cs              | Model holds the admin schema details                         |

## Validations

### 9.0Data model/Table

| Customer    |              |          |            |                |         |
|-------------|--------------|----------|------------|----------------|---------|
| Name        | DataType     | Key Type | Min Length | Default Value  | Is Null |
| ID          | Int          | PK       | NA         | Auto Increment | No      |
| Name        | Varchar(max) | NA       | 3          | NA             | No      |
| Email       | Varchar(max) | NA       | 3          | NA             | No      |
| PhnNumber   | Varchar(10)  | NA       | 10         | NA             | No      |
| Password    | Varchar(max) | NA       | 5          | NA             | No      |
| CarID       | Varchar(max) | FK       | NA         | NA             | yes     |
| Address     | Varchar(max) | NA       | 10         | NA             | No      |
| PaymentType | Varchar(max) | NA       | 3          | NA             | No      |
| Status      | Varchar(max) | NA       | 5          | NA             | No      |
| CarImage    | Binary       | NA       | NA         | NA             | Yes     |

| Admin    |              |          |            |                |         |
|----------|--------------|----------|------------|----------------|---------|
| Name     | DataType     | Key Type | Min Length | Default Value  | Is Null |
| ID       | Int          | PK       | NA         | Auto Increment | No      |
| Username | Varchar(max) | NA       | 3          | NA             | No      |
| Password | Varchar(max) | NA       | 5          | NA             | No      |
| Email    | Varchar(max) | NA       | 3          | NA             | No      |

**Washer**

| Name      | DataType     | Key Type | Min Length | Default Value  | Is Null |
|-----------|--------------|----------|------------|----------------|---------|
| ID        | Int          | PK       | NA         | Auto Increment | No      |
| Name      | Varchar(max) | NA       | 3          | NA             | No      |
| Email     | Varchar(max) | NA       | 3          | NA             | No      |
| Password  | Varchar(max) | NA       | 5          | NA             | No      |
| PhnNumber | Varchar(max) | NA       | 10         | NA             | No      |
| Rating    | Int          | NA       | 1          | NA             | YES     |
| Status    | Varchar(max) | NA       | 5          | NA             | No      |

**Payment**

| Name    | DataType     | Key Type | Min Length | Default Value  | Is Null |
|---------|--------------|----------|------------|----------------|---------|
| TxId    | Int          | PK       | NA         | Auto Increment | No      |
| OrderId | Int          | FK       | NA         | NA             | No      |
| Amount  | Decimal      | NA       | 1          | NA             | No      |
| Type    | Varchar(max) | NA       | NA         | NA             | No      |
| Date    | Varchar(max) | NA       | NA         | NA             | No      |
| Status  | Varchar(max) | NA       | NA         | NA             | No      |

**CarDetails**

| Name   | DataType     | Key Type | Min Length | Default Value  | Is Null |
|--------|--------------|----------|------------|----------------|---------|
| ID     | Int          | PK       | NA         | Auto Increment | No      |
| Type   | Varchar(MAX) | NA       | NA         | NA             | No      |
| Status | Varchar(MAX) | NA       | NA         | NA             | No      |

**AddOn**

| Name        | DataType     | Key Type | Min Length | Default Value  | Is Null |
|-------------|--------------|----------|------------|----------------|---------|
| ID          | Int          | PK       | NA         | Auto Increment | No      |
| Name        | Varchar(MAX) | NA       | 3          | NA             | No      |
| Description | Varchar(MAX) | NA       | 10         | NA             | Yes     |
| Price       | Varchar(MAX) | NA       | NA         | NA             | No      |
| Status      | Varchar(MAX) | NA       | NA         | NA             | No      |

**Package**

| Name        | DataType     | Key Type | Min Length | Default Value  | Is Null |
|-------------|--------------|----------|------------|----------------|---------|
| Id          | Int          | PK       | NA         | Auto Increment | No      |
| Name        | Varchar(MAX) | NA       | 3          | NA             | No      |
| Description | Varchar(MAX) | NA       | 10         | NA             | Yes     |
| Price       | Varchar(MAX) | NA       | NA         | NA             | No      |
| Status      | Varchar(MAX) | NA       | NA         | NA             | No      |

**PromoCode**

| Name        | DataType     | Key Type | Min Length | Default Value  | Is Null |
|-------------|--------------|----------|------------|----------------|---------|
| Id          | Int          | PK       | NA         | Auto Increment | No      |
| Name        | Varchar(MAX) | NA       | 3          | NA             | No      |
| Description | Varchar(MAX) | NA       | 10         | NA             | Yes     |
| Discount    | Decimal      | NA       | NA         | NA             | No      |
| Status      | Varchar(MAX) | NA       | NA         | NA             | No      |

| Orders       |              |          |            |                |         |
|--------------|--------------|----------|------------|----------------|---------|
| Name         | DataType     | Key Type | Min Length | Default Value  | Is Null |
| Id           | Int          | PK       | NA         | Auto Increment | No      |
| Status       | Varchar(MAX) | NA       | NA         | NA             | No      |
| CustId       | Varchar(MAX) | FK       | NA         | NA             | No      |
| Location     | Varchar(MAX) | NA       | 2          | NA             | No      |
| WasherId     | Varchar(MAX) | FK       | NA         | NA             | No      |
| PackageId    | Varchar(MAX) | FK       | NA         | NA             | No      |
| AddOnId      | Varchar(MAX) | FK       | NA         | NA             | Yes     |
| PromoCodeId  | Varchar(MAX) | FK       | NA         | NA             | Yes     |
| Amount       | Decimal      | NA       | 1          | NA             | No      |
| Date/Time    | DateTime     | NA       | NA         | NA             | No      |
| CustRatings  | Varchar(MAX) | NA       | 1          | NA             | Yes     |
| CustReview   | Varchar(MAX) | NA       | 1          | NA             | Yes     |
| WasherReview | Varchar(MAX) | NA       | 1          | NA             | Yes     |

| Micro-Service | Path        | Verb   | API Description                  | Role   | Auth |
|---------------|-------------|--------|----------------------------------|--------|------|
| Car-Wash      | /users/id   | GET    | To get particular user details   | User   | True |
| Car-Wash      | /users/id   | PUT    | To Update user details           | User   | True |
| Car-Wash      | /users      | POST   | User Registration                | User   | True |
| Car-Wash      | /users/id   | DELETE | To remove user                   | User   | True |
| Car-Wash      | /users/     | GET    | To get all users                 | None   | True |
| Car-Wash      | admin/id    | GET    | To get particular admin details  | Admin  | True |
| Car-Wash      | /admin/id   | PUT    | To Update admin details          | Admin  | True |
| Car-Wash      | /admin      | POST   | admin Registration               | Admin  | True |
| Car-Wash      | /admin /id  | DELETE | To remove admin                  | Admin  | True |
| Car-Wash      | /admin /    | GET    | To get all admins                | None   | True |
| Car-Wash      | washer/id   | GET    | To get particular washer details | Washer | True |
| Car-Wash      | /washer /id | PUT    | To Update washer details         | Washer | True |
| Car-Wash      | washer      | POST   | washer Registration              | Washer | True |
| Car-Wash      | /washer /id | DELETE | To remove washer                 | Washer | True |
| Car-Wash      | /washer /   | GET    | To get all washer                | Washer | True |

## 11.0 ENV variables

## 12.0 Integration

N/A

### **13.0 AWS Role**

### **14.0 HTTP Status Code**

201 – Customer Registered

200 - Request succeeded

400 – Inputs are invalid

404 – Customer Not found

502 – Bad gateway

### **15.0 Unit Testing**

### **16.0 Request**

### **17.0 Response:**