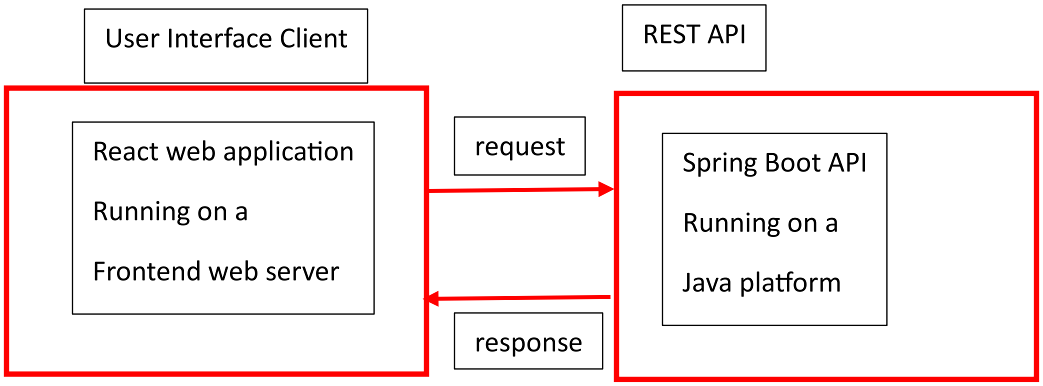
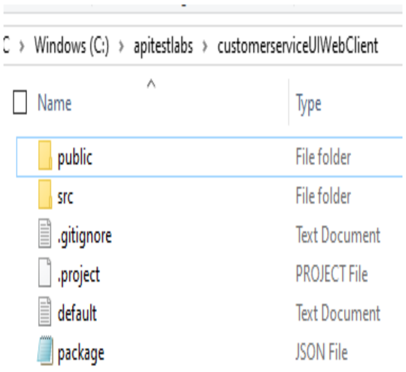
Spring Boot Microservices API Test using User Interface Test

In this lab, we will work with a spring boot microservice that can service the following REST API requests: GET, POST, PUT DELETE API requests to perform CRUD (Create Read Update Delete) operations.

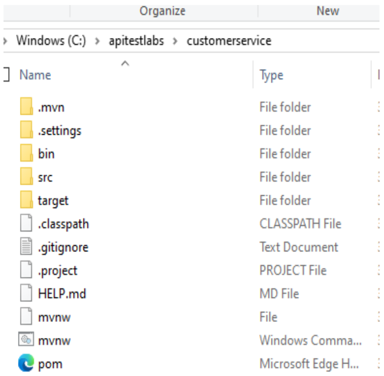
We will test the API Calls using a User Interface application. This UI application is a react based web application that runs on frontend web server. This UI application will make REST API calls to perform CRUD operations on customers.

- Create a new customer
- Update an existing customer
- Get all customers data
- Get a single customer data
- Delete an existing customer





Name	Type
public	File folder
src	File folder
.gitignore	Text Document
.project	PROJECT File
default	Text Document
package	JSON File



Name	Type
.mvn	File folder
.settings	File folder
bin	File folder
src	File folder
target	File folder
.classpath	CLASSPATH File
.gitignore	Text Document
.project	PROJECT File
HELP.md	MD File
mvnw	File
mvnw	Windows Comma...
pom	Microsoft Edge H...

Open a File explorer to navigate to API directory and review the resources.

C:\apitestlabs\customerservice

Open a File explorer to navigate to UI Web Client directory and review the resources.

C:\apitestlabs\customerserviceUIWebClient

Summary of API Calls:

GET request to get all customers
URL: http://localhost:8090/api/customers

GET request to get a customer using customer id
URL: http://localhost:8090/api/customers/{id}
id is the template variable
For example http://localhost:8090/api/customers/2 will return customer data for a customer id value 2

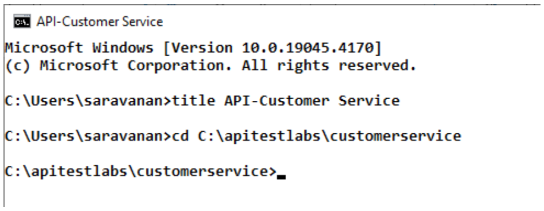
POST request to create a new customer
URL: http://localhost:8090/api/customers
Post a Json data via request body

PUT request to update an existing customer with an id
URL: http://localhost:8090/api/customers/{id}
id is the template variable
For example http://localhost:8090/api/customers/2

DELETE request to delete an existing customer with an id
URL: http://localhost:8090/api/customers/{id}
id is the template variable
For example http://localhost:8090/api/customers/2

1. Open a command window, change directory to **C:\apitestlabs\customerservice**

   cd C:\apitestlabs\customerservice

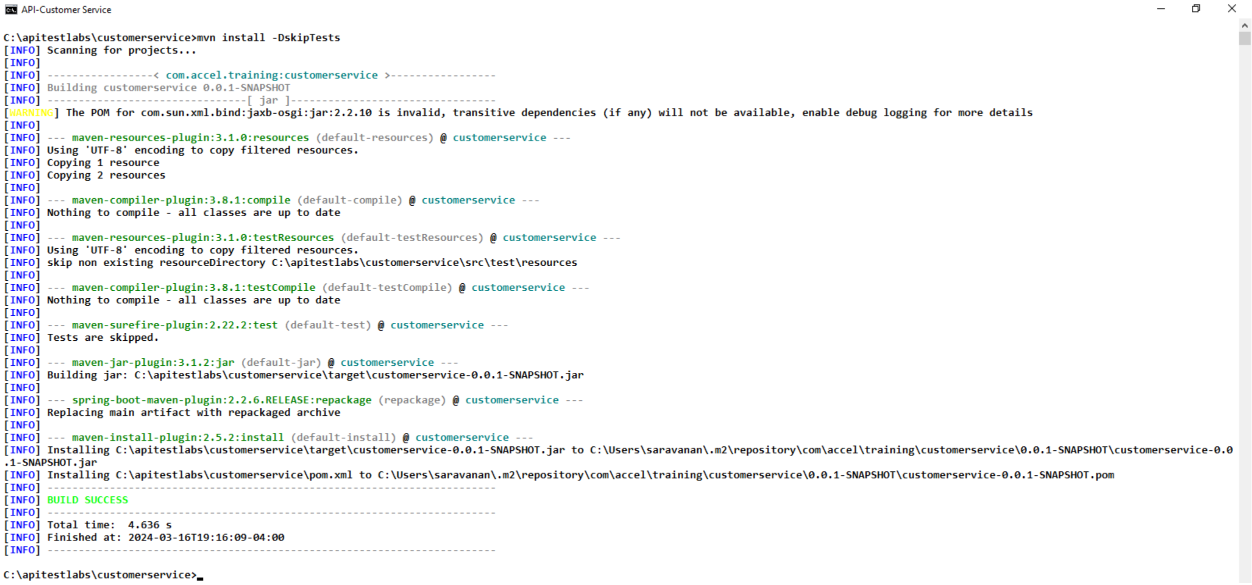


```
Microsoft Windows [Version 10.0.19045.4170]
(c) Microsoft Corporation. All rights reserved.

C:\Users\saravanan>title API-Customer Service

C:\Users\saravanan>cd C:\apitestlabs\customerservice

C:\apitestlabs\customerservice>_
```

2. Build the spring boot microservice using the following command:

   mvn install -DskipTests

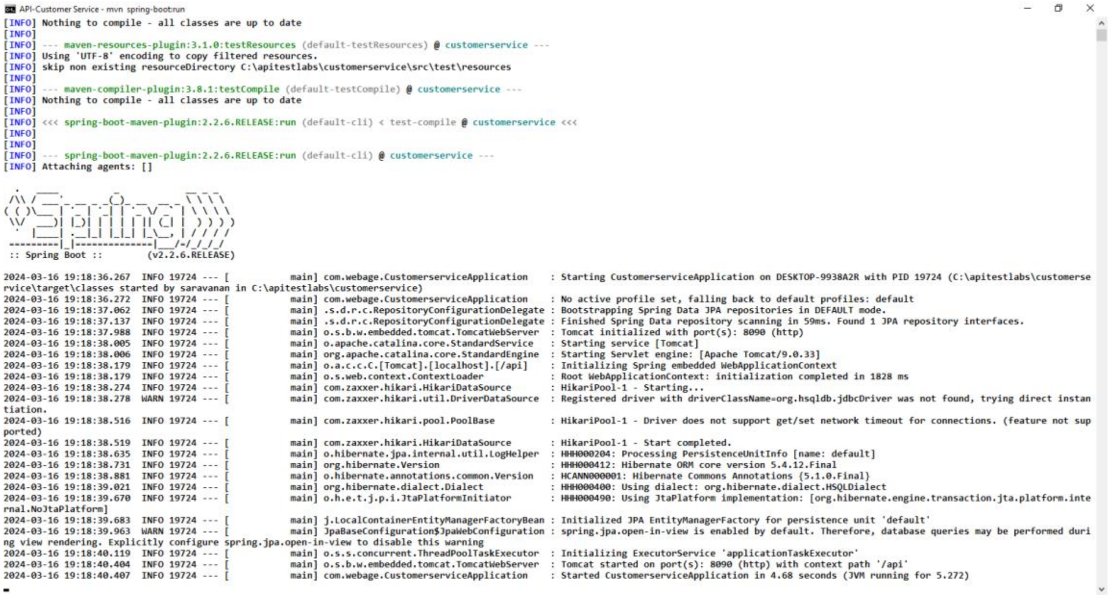
-DskipTests will skip the Tests and complete the build.



```
C:\apitestlabs\customerservice>mvn install -DskipTests
[INFO] Scanning for projects...
[INFO]
[INFO] ----------------< com.accel.training:customerservice >----------------
[INFO] Building customerservice 0.0.1-SNAPSHOT
[INFO] --------------------------------[ jar ]---------------------------------
[WARNING] The POM for com.sun.xml.bind:jaxb-osgi:jar:2.2.10 is invalid, transitive dependencies (if any) will not be available, enable debug logging for more details
[INFO]
[INFO] --- maven-resources-plugin:3.1.0:resources (default-resources) @ customerservice ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 1 resource
[INFO] Copying 2 resources
[INFO]
[INFO] --- maven-compiler-plugin:3.8.1:compile (default-compile) @ customerservice ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-resources-plugin:3.1.0:testResources (default-testResources) @ customerservice ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory C:\apitestlabs\customerservice\src\test\resources
[INFO]
[INFO] --- maven-compiler-plugin:3.8.1:testCompile (default-testCompile) @ customerservice ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-surefire-plugin:2.22.2:test (default-test) @ customerservice ---
[INFO] Tests are skipped.
[INFO]
[INFO] --- maven-jar-plugin:3.1.2:jar (default-jar) @ customerservice ---
[INFO] Building jar: C:\apitestlabs\customerservice\target\customerservice-0.0.1-SNAPSHOT.jar
[INFO]
[INFO] --- spring-boot-maven-plugin:2.2.6.RELEASE:repackage (repackage) @ customerservice ---
[INFO] Replacing main artifact with repackaged archive
[INFO]
[INFO] --- maven-install-plugin:2.5.2:install (default-install) @ customerservice ---
[INFO] Installing C:\apitestlabs\customerservice\target\customerservice-0.0.1-SNAPSHOT.jar to C:\Users\saravanan\.m2\repository\com\accel\training\customerservice\0.0.1-SNAPSHOT\customerservice-0.0
.1-SNAPSHOT.jar
[INFO] Installing C:\apitestlabs\customerservice\pom.xml to C:\Users\saravanan\.m2\repository\com\accel\training\customerservice\0.0.1-SNAPSHOT\customerservice-0.0.1-SNAPSHOT.pom
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  4.636 s
[INFO] Finished at: 2024-03-16T19:16:09-04:00
[INFO] ------------------------------------------------------------------------

C:\apitestlabs\customerservice>_
```

3. Launch the spring boot application using the following mvn command.

mvn spring-boot:run



```
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] --- maven-resources-plugin:3.1.0:testResources (default-testResources) @ customerservice ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] skip non existing resourceDirectory C:\apitestlabs\customerservice\src\test\resources
[INFO]
[INFO] --- maven-compiler-plugin:3.8.1:testCompile (default-testCompile) @ customerservice ---
[INFO] Nothing to compile - all classes are up to date
[INFO]
[INFO] <<< spring-boot-maven-plugin:2.2.6.RELEASE:run (default-cli) < test-compile @ customerservice <<<
[INFO]
[INFO]
[INFO] --- spring-boot-maven-plugin:2.2.6.RELEASE:run (default-cli) @ customerservice ---
[INFO] Attaching agents: []

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 :: Spring Boot ::        (v2.2.6.RELEASE)

2024-03-16 19:18:36.267  INFO 19724 --- [           main] com.webage.CustomerserviceApplication    : Starting CustomerserviceApplication on DESKTOP-9938A2R with PID 19724 (C:\apitestlabs\customerse
rvice\target\classes started by saravanan in C:\apitestlabs\customerservice)
2024-03-16 19:18:36.272  INFO 19724 --- [           main] com.webage.CustomerserviceApplication    : No active profile set, falling back to default profiles: default
2024-03-16 19:18:37.062  INFO 19724 --- [           main] .s.d.r.c.RepositoryConfigurationDelegate : Bootstrapping Spring Data JPA repositories in DEFAULT mode.
2024-03-16 19:18:37.137  INFO 19724 --- [           main] .s.d.r.c.RepositoryConfigurationDelegate : Finished Spring Data repository scanning in 59ms. Found 1 JPA repository interfaces.
2024-03-16 19:18:37.988  INFO 19724 --- [           main] o.s.b.w.embedded.tomcat.TomcatWebServer  : Tomcat initialized with port(s): 8090 (http)
2024-03-16 19:18:38.005  INFO 19724 --- [           main] o.apache.catalina.core.StandardService   : Starting service [Tomcat]
2024-03-16 19:18:38.006  INFO 19724 --- [           main] org.apache.catalina.core.StandardEngine  : Starting Servlet engine: [Apache Tomcat/9.0.33]
2024-03-16 19:18:38.179  INFO 19724 --- [           main] o.a.c.c.C.[Tomcat].[localhost].[/api]    : Initializing Spring embedded WebApplicationContext
2024-03-16 19:18:38.179  INFO 19724 --- [           main] o.s.web.context.ContextLoader            : Root WebApplicationContext: initialization completed in 1828 ms
2024-03-16 19:18:38.274  INFO 19724 --- [           main] com.zaxxer.hikari.HikariDataSource       : HikariPool-1 - Starting...
2024-03-16 19:18:38.278  WARN 19724 --- [           main] com.zaxxer.hikari.util.DriverDataSource  : Registered driver with driverClassName=org.hsqldb.jdbcDriver was not found, trying direct instan
tiation.
2024-03-16 19:18:38.516  INFO 19724 --- [           main] com.zaxxer.hikari.pool.PoolBase          : HikariPool-1 - Driver does not support get/set network timeout for connections. (feature not sup
ported)
2024-03-16 19:18:38.519  INFO 19724 --- [           main] com.zaxxer.hikari.HikariDataSource       : HikariPool-1 - Start completed.
2024-03-16 19:18:38.635  INFO 19724 --- [           main] o.hibernate.jpa.internal.util.LogHelper  : HHH000204: Processing PersistenceUnitInfo [name: default]
2024-03-16 19:18:38.731  INFO 19724 --- [           main] org.hibernate.Version                    : HHH000412: Hibernate ORM core version 5.4.12.Final
2024-03-16 19:18:38.881  INFO 19724 --- [           main] o.hibernate.annotations.common.Version   : HCANN000001: Hibernate Commons Annotations {5.1.0.Final}
2024-03-16 19:18:39.021  INFO 19724 --- [           main] org.hibernate.dialect.Dialect            : HHH000400: Using dialect: org.hibernate.dialect.HSQLDialect
2024-03-16 19:18:39.670  INFO 19724 --- [           main] o.h.e.t.j.p.i.JtaPlatformInitiator       : HHH000490: Using JtaPlatform implementation: [org.hibernate.engine.transaction.jta.platform.inte
rnal.NoJtaPlatform]
2024-03-16 19:18:39.683  INFO 19724 --- [           main] j.LocalContainerEntityManagerFactoryBean : Initialized JPA EntityManagerFactory for persistence unit 'default'
2024-03-16 19:18:39.963  WARN 19724 --- [           main] JpaBaseConfiguration$JpaWebConfiguration : spring.jpa.open-in-view is enabled by default. Therefore, database queries may be performed duri
ng view rendering. Explicitly configure spring.jpa.open-in-view to disable this warning
2024-03-16 19:18:40.119  INFO 19724 --- [           main] o.s.s.concurrent.ThreadPoolTaskExecutor  : Initializing ExecutorService 'applicationTaskExecutor'
2024-03-16 19:18:40.404  INFO 19724 --- [           main] o.s.b.w.embedded.tomcat.TomcatWebServer  : Tomcat started on port(s): 8090 (http) with context path '/api'
2024-03-16 19:18:40.407  INFO 19724 --- [           main] com.webage.CustomerserviceApplication    : Started CustomerserviceApplication in 4.68 seconds (JVM running for 5.272)
_
```
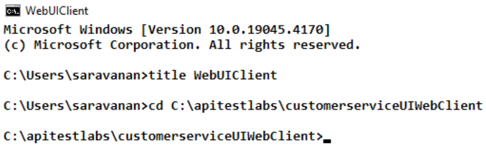

4. Open a web browser and go to the API test page to make sure you can access it.

http://localhost:8090/api

5. Open another command window, change directory to **C:\apitestlabs\customerserviceUIWebClient**

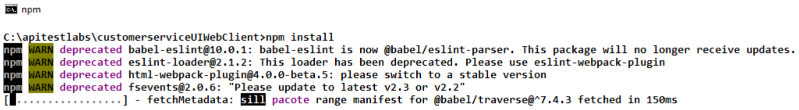
   cd C:\apitestlabs\customerserviceUIWebClient



```
WebUIClient
Microsoft Windows [Version 10.0.19045.4170]
(c) Microsoft Corporation. All rights reserved.

C:\Users\saravanan>title WebUIClient

C:\Users\saravanan>cd C:\apitestlabs\customerserviceUIWebClient

C:\apitestlabs\customerserviceUIWebClient>
```

6. Let us run npm command to install all javascript application dependencies. Type the following **command**

   npm install



```
npm

C:\apitestlabs\customerserviceUIWebClient>npm install
npm WARN deprecated babel-eslint@10.0.1: babel-eslint is now @babel/eslint-parser. This package will no longer receive updates.
npm WARN deprecated eslint-loader@2.1.2: This loader has been deprecated. Please use eslint-webpack-plugin
npm WARN deprecated html-webpack-plugin@4.0.0-beta.5: please switch to a stable version
npm WARN deprecated fsevents@2.0.6: "Please update to latest v2.3 or v2.2"
[█.................] - fetchMetadata: sill pacote range manifest for @babel/traverse@^7.4.3 fetched in 150ms
```

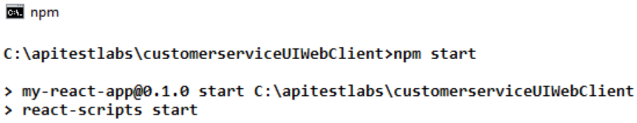
   You may have to wait for 1-2 minutes to install all dependencies required for this application. Ignore any warnings.

7. Run the following npm command to fix the vulnerabilities.

   npm audit fix

8. Start the web server and launch a browser based react application using the following command

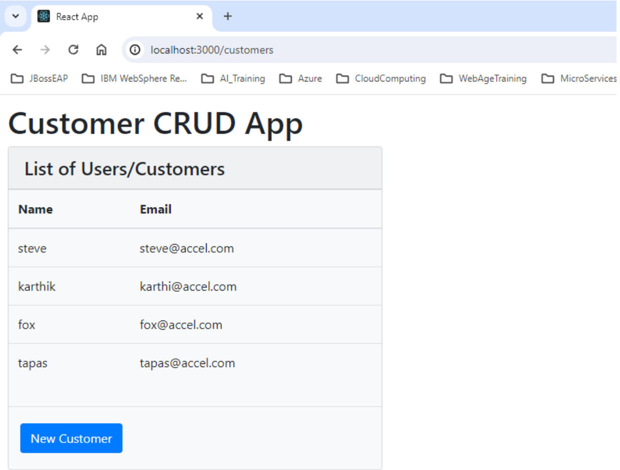
   npm start



```
npm

C:\apitestlabs\customerserviceUIWebClient>npm start

> my-react-app@0.1.0 start C:\apitestlabs\customerserviceUIWebClient
> react-scripts start
```

9. Open a browser and go to the web server app URL

   http://localhost:3000

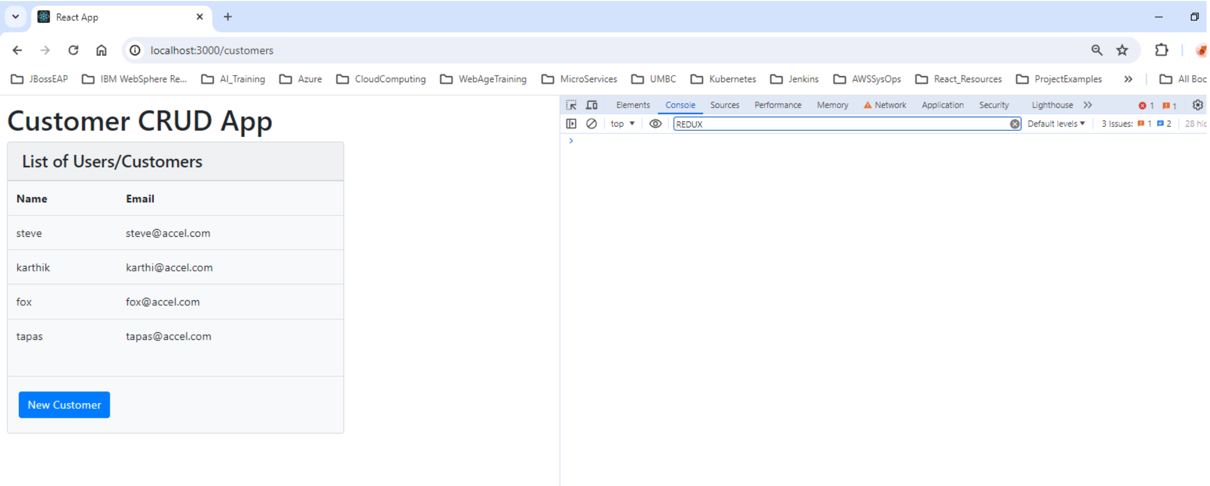


Customer CRUD App

List of Users/Customers

Name	Email
steve	steve@accel.com
karthik	karthi@accel.com
fox	fox@accel.com
tapas	tapas@accel.com

10. Open developer tools. Right click anywhere in the browser -→ inspect.

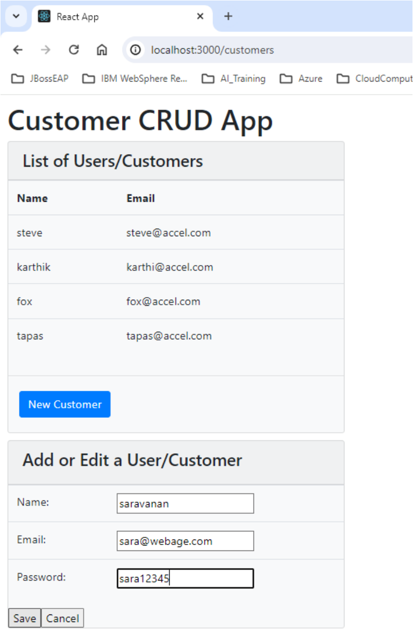


Customer CRUD App

List of Users/Customers

Name	Email
steve	steve@accel.com
karthik	karthi@accel.com
fox	fox@accel.com
tapas	tapas@accel.com

11. Click on New Customer → enter customer data and click on save.



Customer CRUD App

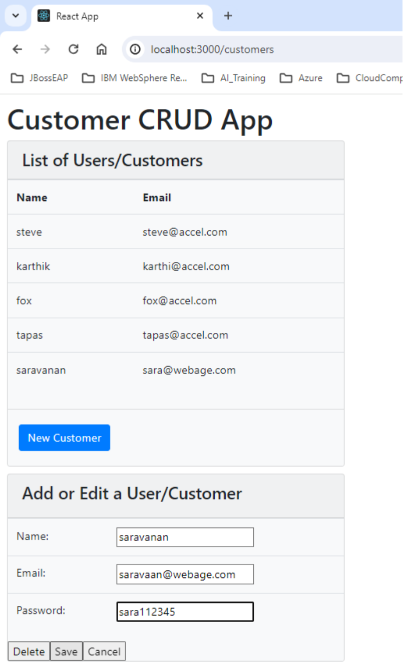
List of Users/Customers

Name	Email
steve	steve@accel.com
karthik	karthi@accel.com
fox	fox@accel.com
tapas	tapas@accel.com

Add or Edit a User/Customer

Name:	saravanan
Email:	sara@webage.com
Password:	sara12345

12. Select any customer in the list, Edit customer data to update the customer and Save.



Customer CRUD App

List of Users/Customers

Name	Email
steve	steve@accel.com
karthik	karthi@accel.com
fox	fox@accel.com
tapas	tapas@accel.com
saravanan	sara@webage.com

Add or Edit a User/Customer

Name:	saravanan
Email:	saravaan@webage.com
Password:	sara112345

13. Select any customer in the list, click Edit → Click on Delete.

14. Add a few Customers and perform CRUD operations.

Have fun !

15. You may terminate the processes after all tests and close the windows.