CAPSTONE PROJECT

E-COMMERCE APPLICATION

BATCH-8-JAVA J2EE

Name:- PAYANI DHANA SEKHAR

Batch:- 8 (JAVA J2EE)

Group-4(ecommerce-application):

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TEAM LEADER :- Ankit Chauhan

Objective:

Develop a comprehensive eCommerce application using Spring Microservices with features for authentication, product management, cart management (including item entry), order processing, and customer management.

Phases & Tasks:

Planning:

- **Requirements Gathering (1 day):**
    - Identify required microservices: Auth-Service, Customer-Service, Product-Service, Cart-Service, Order-Service.
    - Define the interactions between services via API Gateway.
- **Architecture Design (1 day):**
    - Design the microservices architecture.
    - Set up the Eureka Server for Service Registry and Discovery.
    - Set up the API Gateway for routing requests.

Development:

- **Day 1:**
    - **Eureka Server & API Gateway Setup:**
        - Set up Eureka Server for service registration and discovery.
        - Implement API Gateway to route requests to microservices.
- **Day 2:**
    - **Customer-Service Development:**
        - Develop CRUD operations for customer profiles.
        - Integrate with Auth-Service to handle customer data upon registration.
- **Day 3:**
    - **Product-Service Development:**
        - Build functionalities for managing products, including categories and search.
        - Implement APIs for product CRUD operations.
- **Day 4-5:**
    - **Cart-Service Development:**
        - Develop features for managing the shopping cart, including adding, updating, and deleting items.
        - Integrate with Product-Service to fetch product details.
        - Implement the item_entry table to store individual cart items.
- **Day 6:**

- **Order-Service Development:**
    - Implement order processing functionalities, including placing orders and tracking status.
    - Integrate with Cart-Service to process the cart items during order placement.

- **Day 7-8:**
    - **Auth-Service Development:**
        - Create registration and login functionalities.
        - Implement JWT token generation and validation for secure access.

Microservices

1. E-commerce Service Registry (Eureka Server)

- Service Discovery: Enables dynamic discovery and registration of microservices.
- Load Balancing: Distributes requests across available service instances.
- Monitoring: Provides a UI for tracking service health and status.

2. E-commerce API Gateway

- Centralized Routing: Directs client requests to the appropriate microservices.
- Security: Implements authentication and authorization at the gateway level.
- Traffic Management: Handles load balancing, rate limiting, and API monitoring.

3. E-commerce Config Server

- Centralized Configuration: Manages and serves externalized configurations for microservices.
- Environment Support: Provides environment-specific configurations (e.g., dev, prod).
- Dynamic Updates: Allows microservices to refresh configurations without downtime.

4. Customer Service

- Profile Management: Manages customer profiles, including personal details and addresses.
- Order History: Provides access to customer order history and status updates.

- Authentication Integration: Secures customer data through integration with the Authentication Service.

5. Authentication Service

- User Management: Handles user registration, login, and role-based access.
- JWT Security: Secures API access with JWT-based authentication.
- Password and Session Management: Manages user sessions and password resets.

6. Product Service

- Product Catalogue: Manages product listings, categories, and details.
- Search & Filter: Provides search and filtering options for products.
- Inventory Check: Ensures product availability before purchase.

7. Cart Service

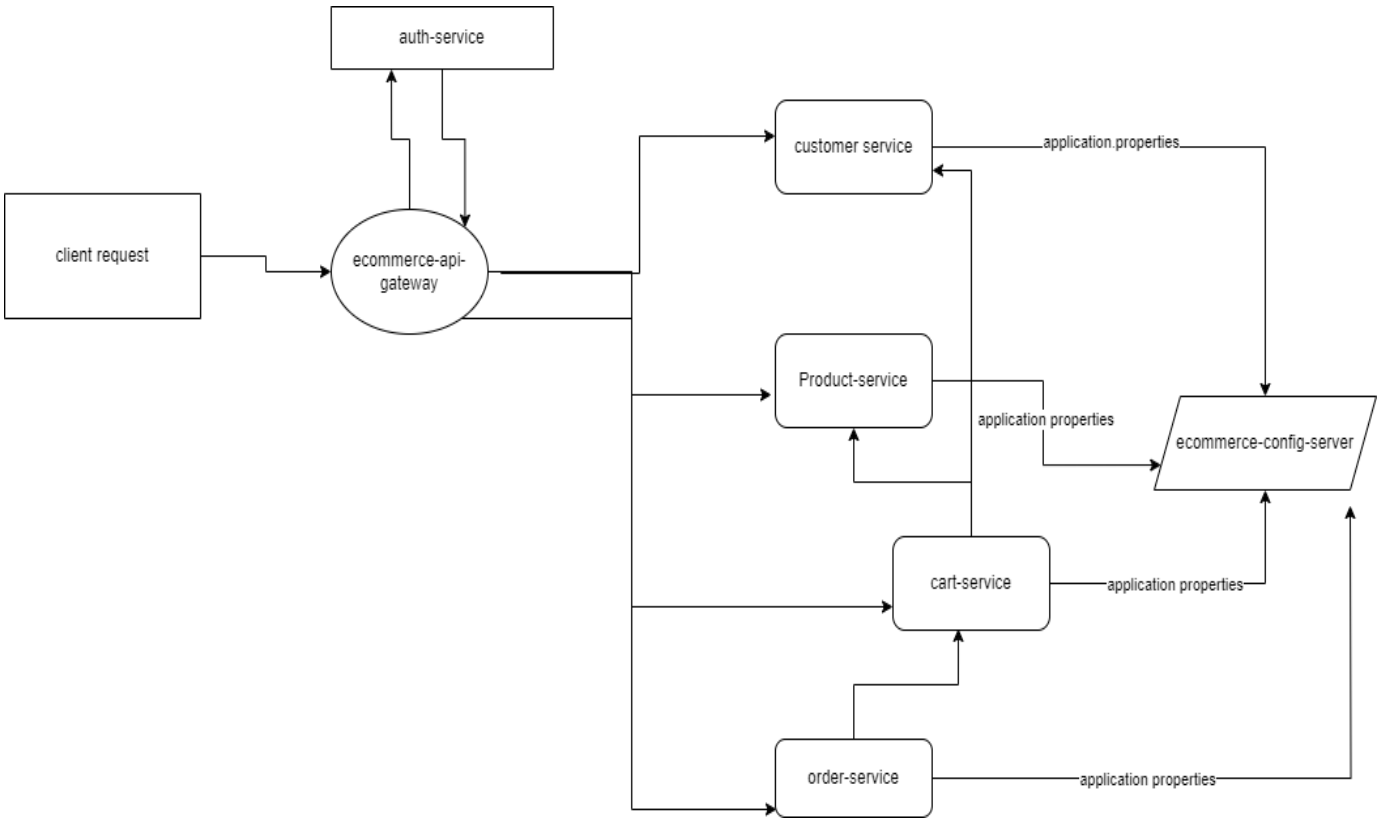
- Cart Management: Manages the user's shopping cart, including adding, updating, and removing items.
- Persistent Cart: Maintains the cart state across user sessions.
- Checkout Preparation: Prepares the cart for the order placement process.

8. Order Service

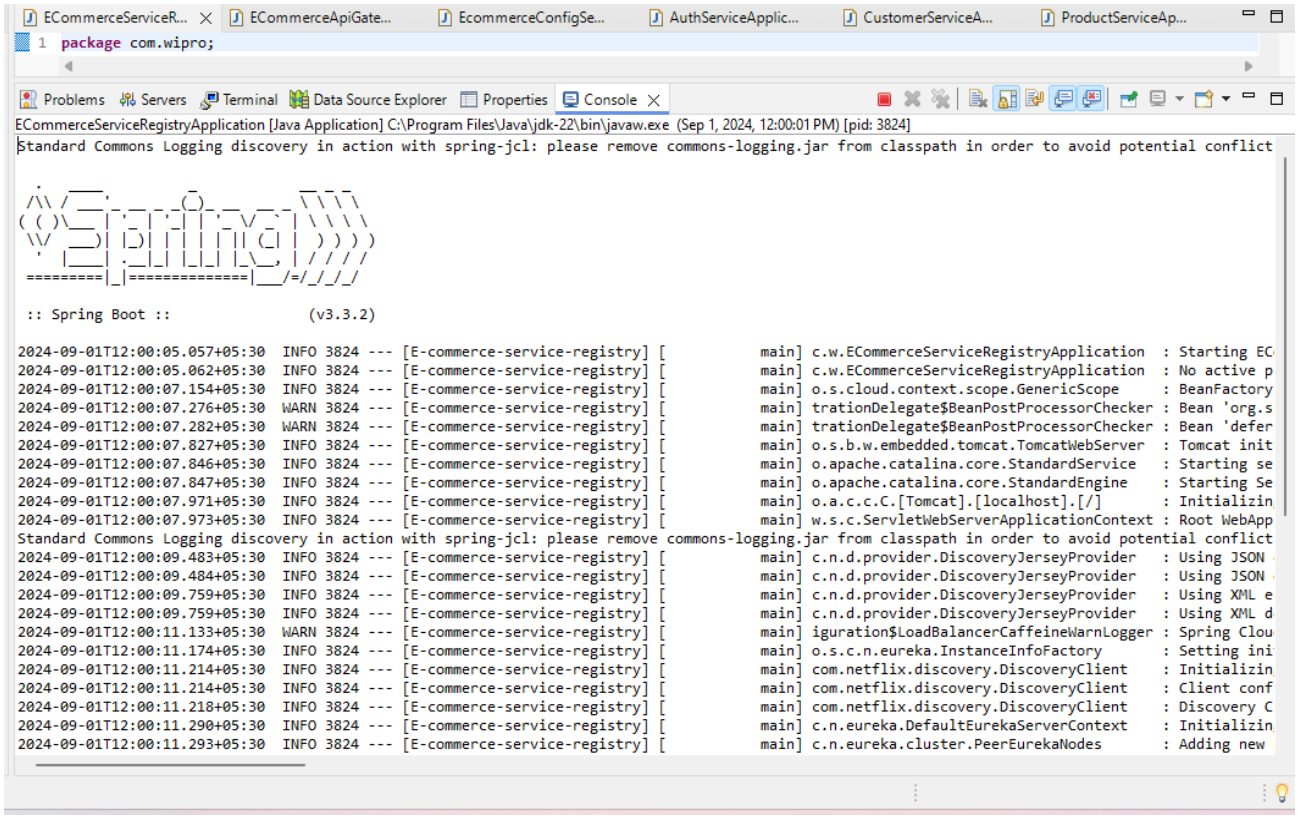
- Order Lifecycle Management: Oversees order placement, payment, and status updates.
- Payment Integration: Processes payments securely.
- Order Tracking: Provides real-time order tracking and history.

use case diagrams:-

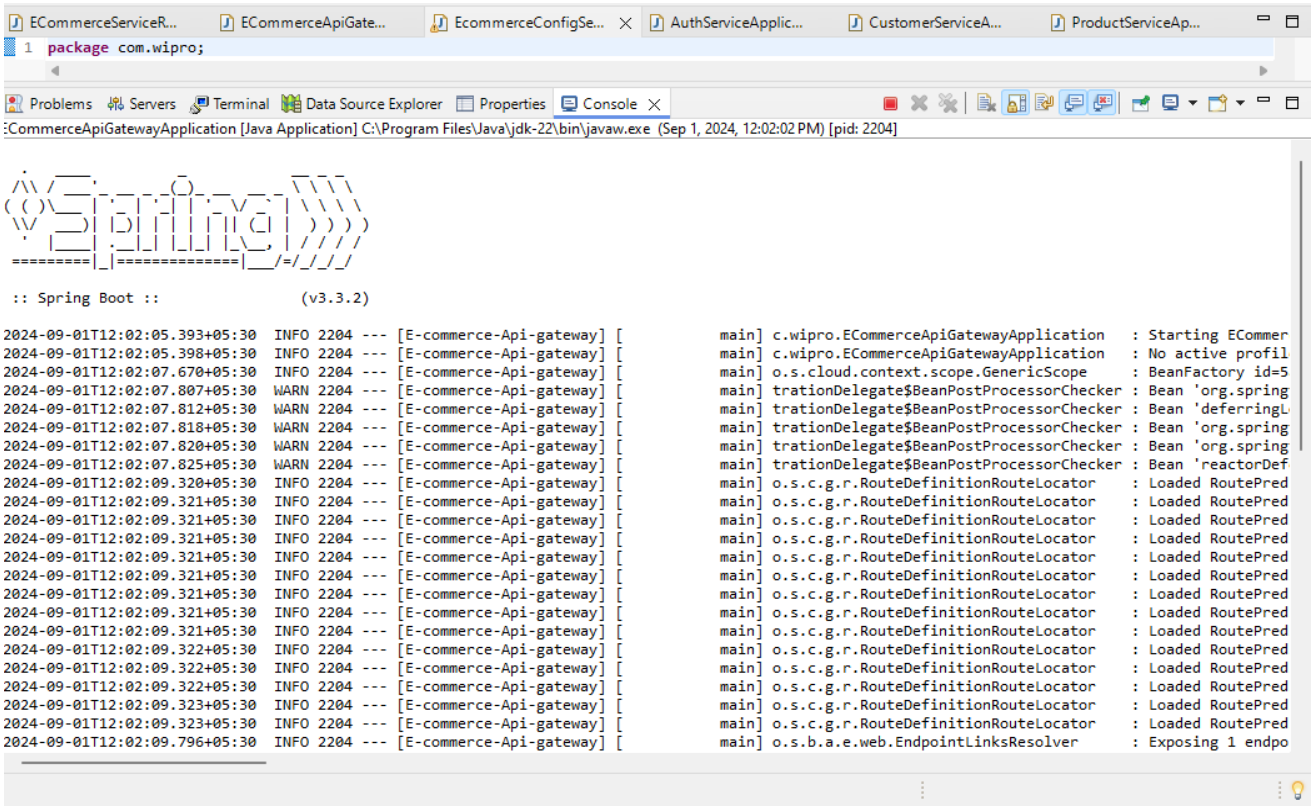
Flow Diagram:-



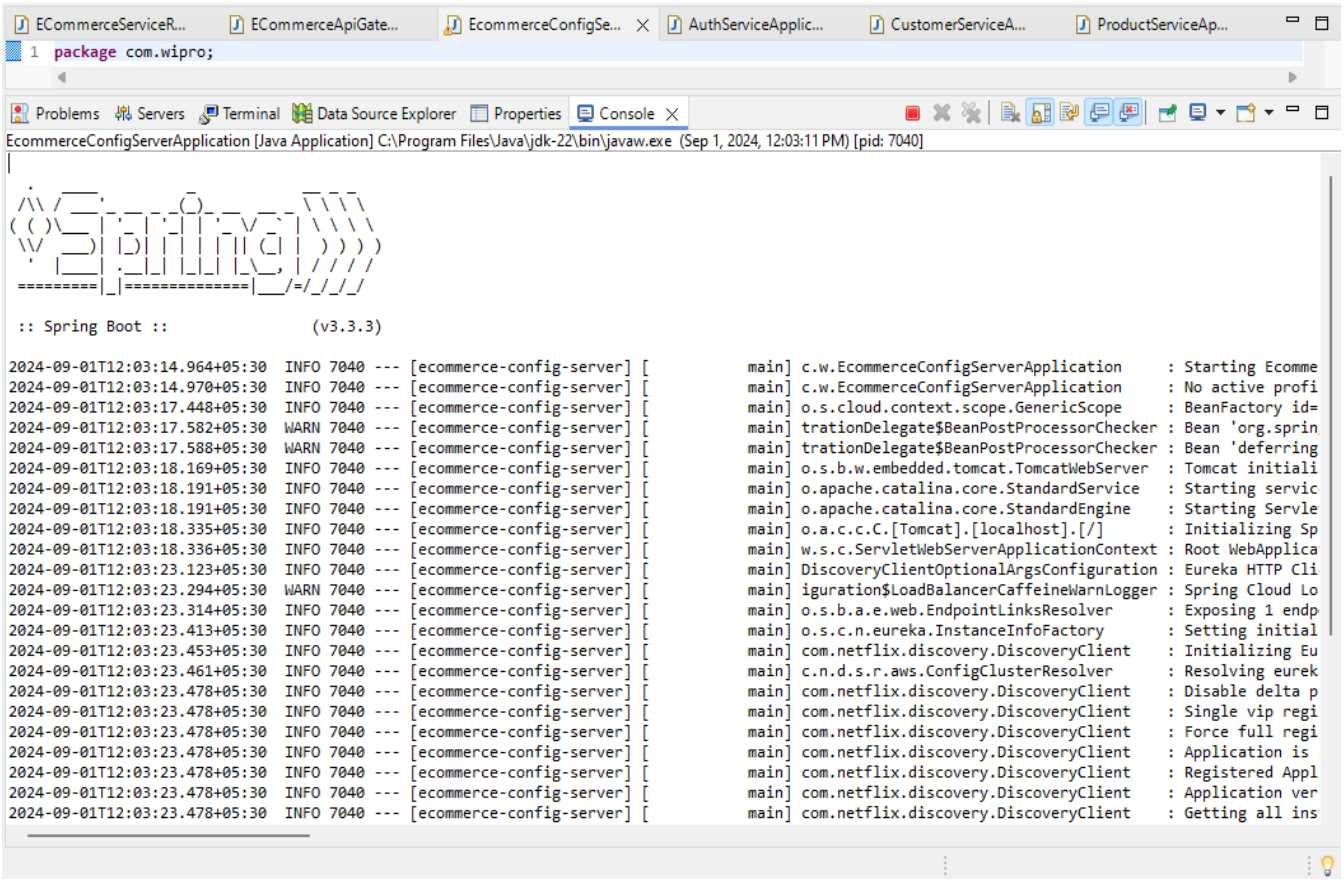
Running E-commerce-service-registry:-



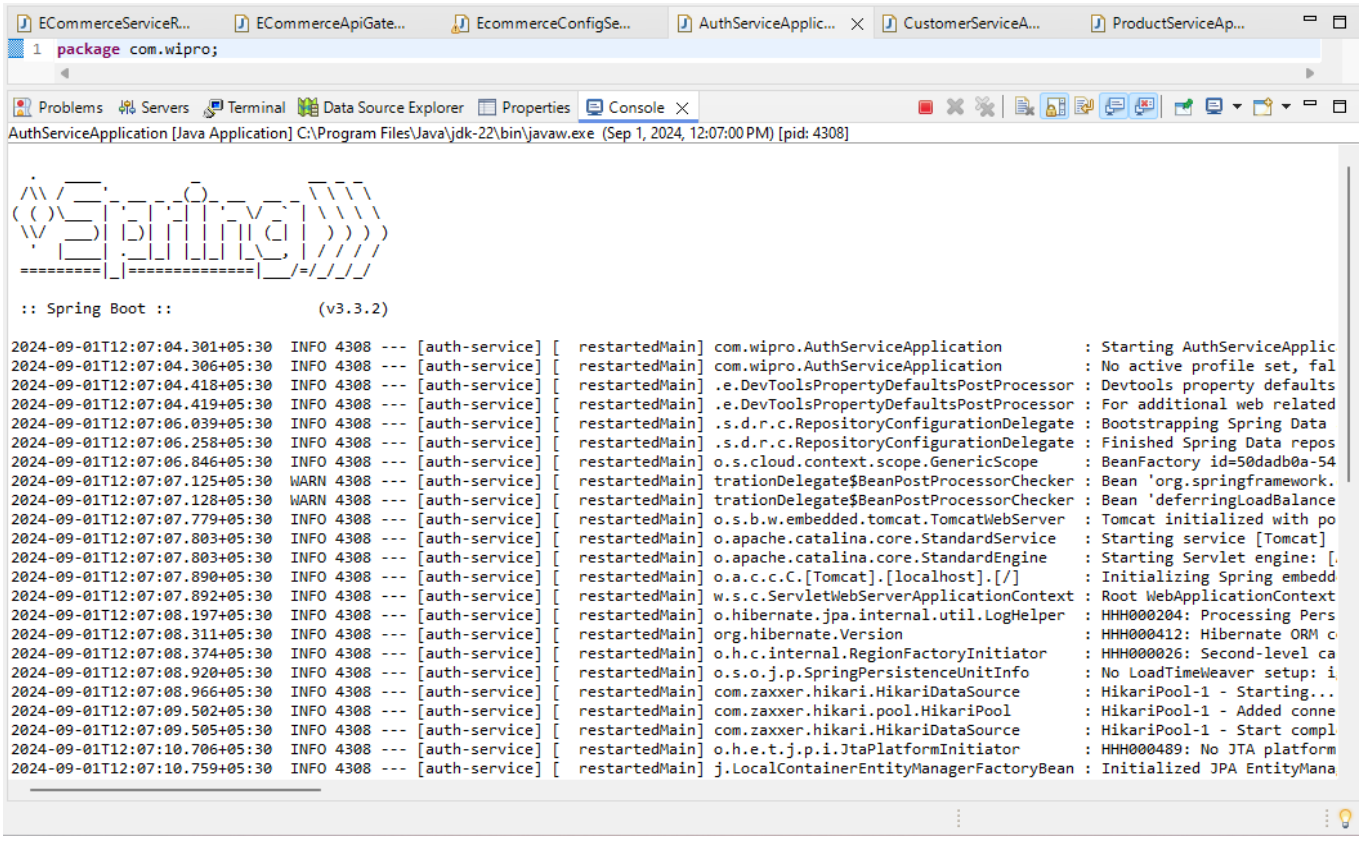
Running E-commerce-ApiGateway:-



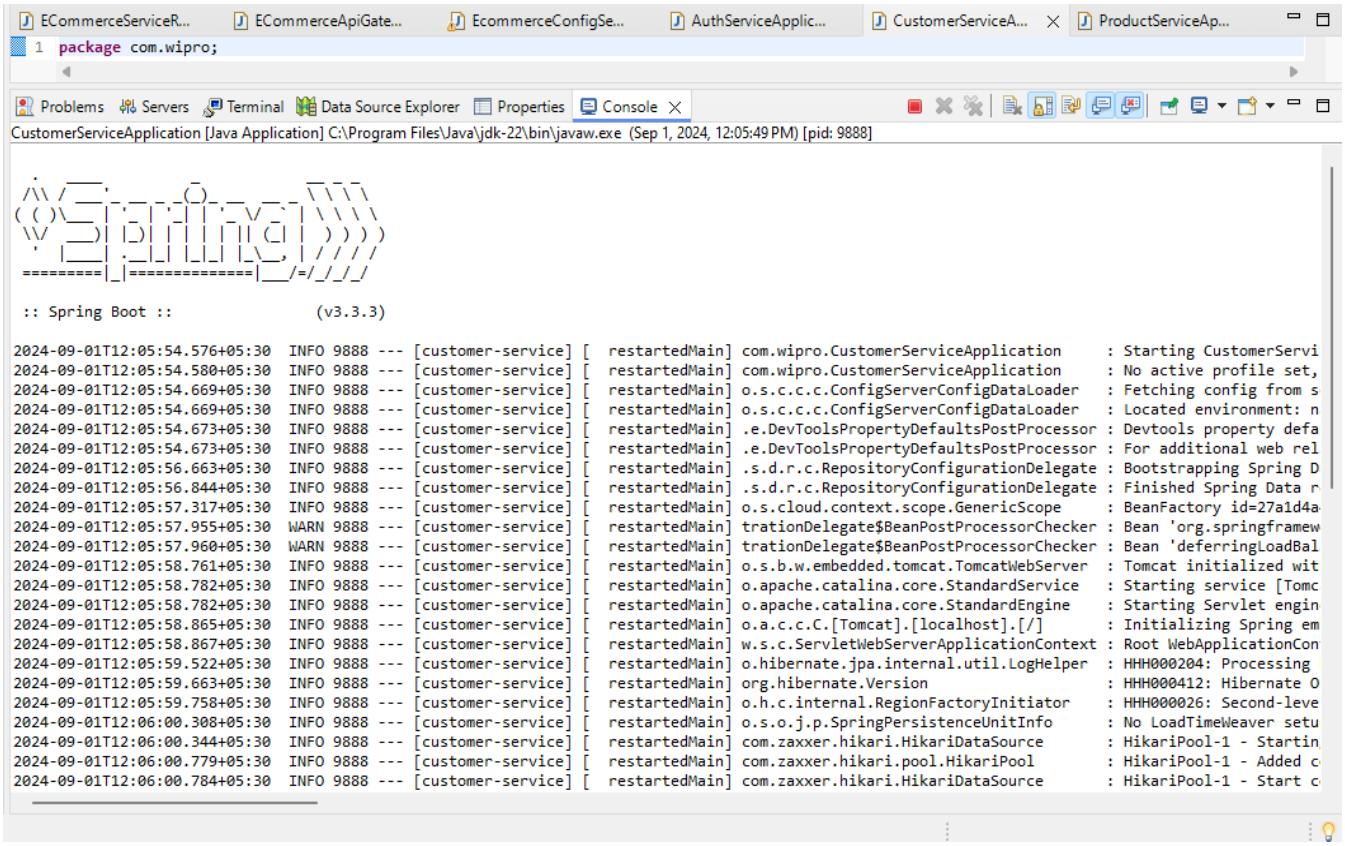
Running Ecommerce-config-server:-



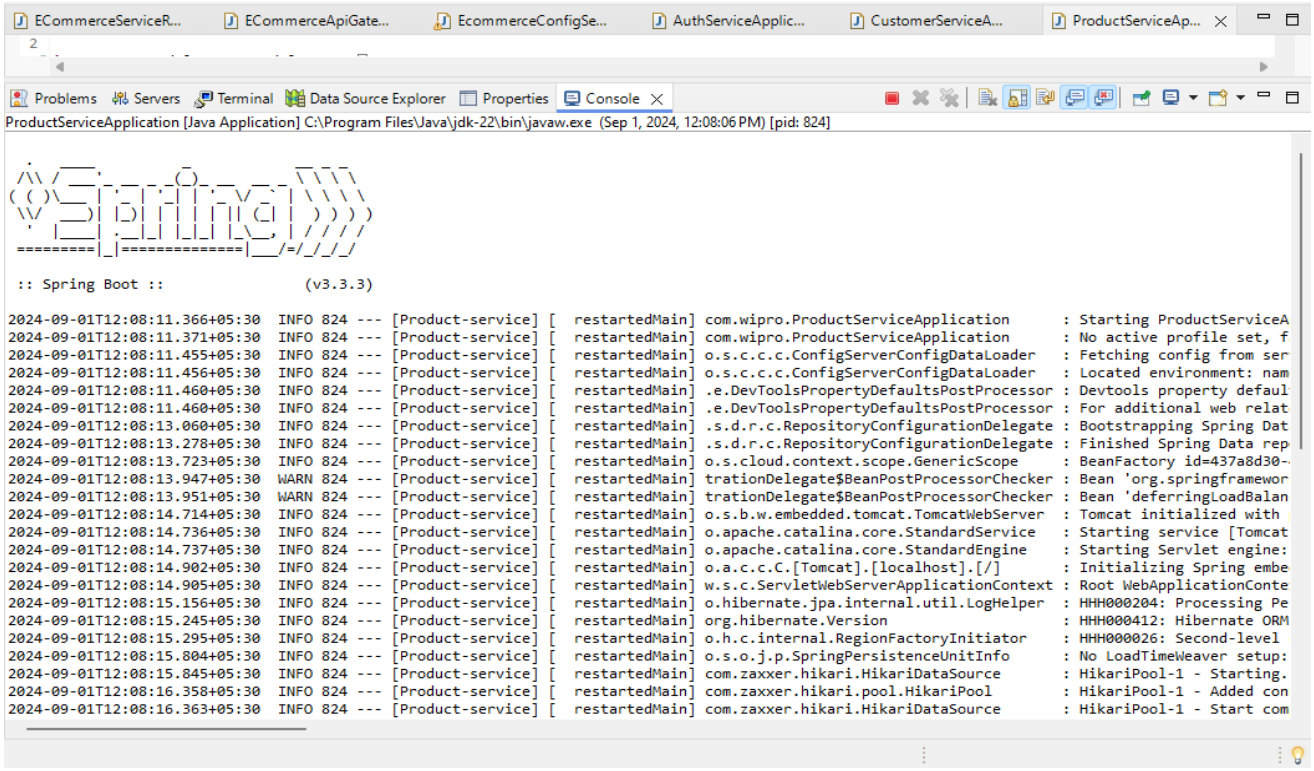
Running Auth-service:-



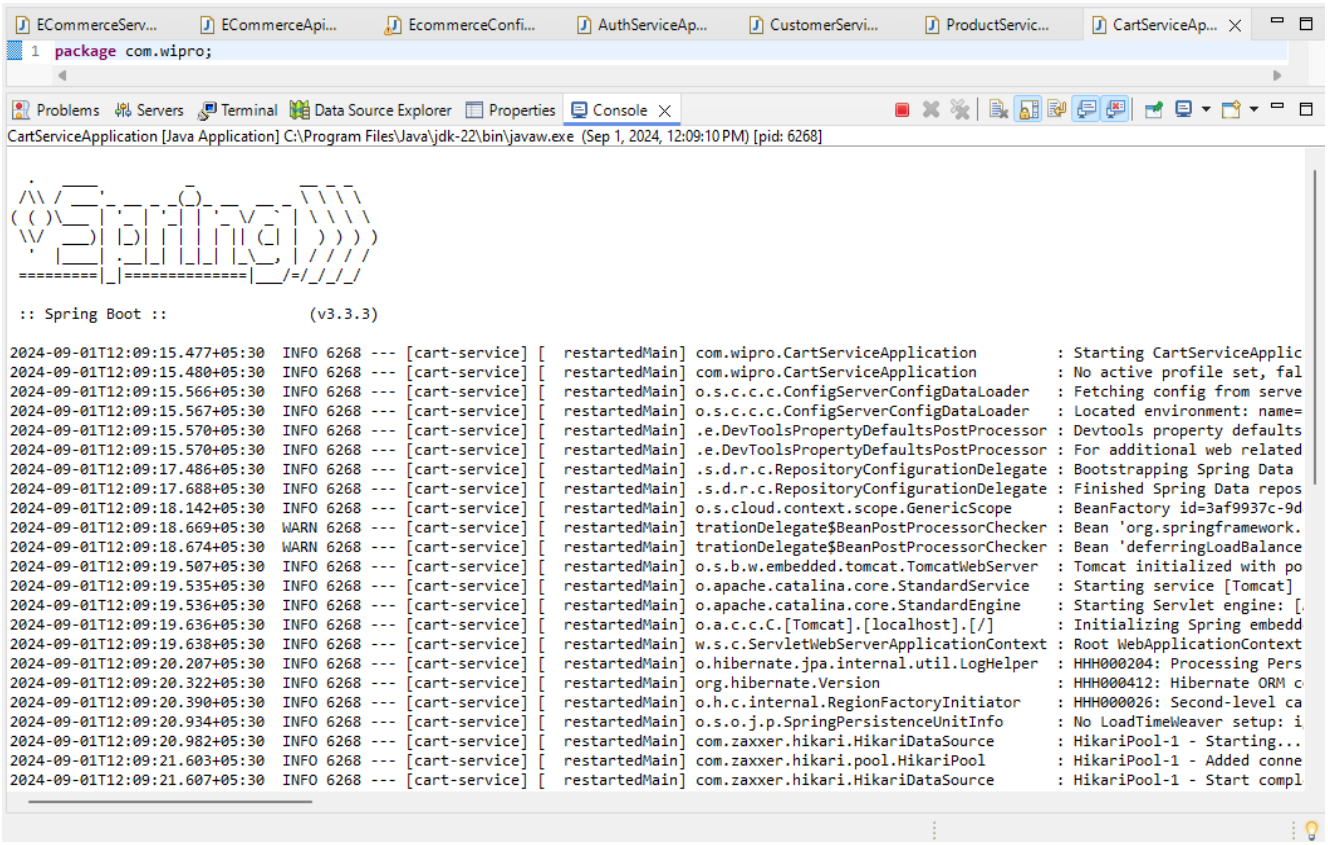
Running customer-service:-



Running Product-service:-



Running Cart-service:-



```
package com.wipro;

CartServiceApplication [Java Application] C:\Program Files\Java\jdk-22\bin\javaw.exe  (Sep 1, 2024, 12:09:10 PM) [pid: 6268]

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 :: Spring Boot ::                (v3.3.3)

2024-09-01T12:09:15.477+05:30  INFO 6268 --- [cart-service] [  restartedMain] com.wipro.CartServiceApplication         : Starting CartServiceApplic
2024-09-01T12:09:15.480+05:30  INFO 6268 --- [cart-service] [  restartedMain] com.wipro.CartServiceApplication         : No active profile set, fal
2024-09-01T12:09:15.566+05:30  INFO 6268 --- [cart-service] [  restartedMain] o.s.c.c.c.ConfigServerConfigDataLoader   : Fetching config from serve
2024-09-01T12:09:15.567+05:30  INFO 6268 --- [cart-service] [  restartedMain] o.s.c.c.c.ConfigServerConfigDataLoader   : Located environment: name=
2024-09-01T12:09:15.570+05:30  INFO 6268 --- [cart-service] [  restartedMain] .e.DevToolsPropertyDefaultsPostProcessor : Devtools property defaults
2024-09-01T12:09:15.570+05:30  INFO 6268 --- [cart-service] [  restartedMain] .e.DevToolsPropertyDefaultsPostProcessor : For additional web related
2024-09-01T12:09:17.486+05:30  INFO 6268 --- [cart-service] [  restartedMain] .s.d.r.c.RepositoryConfigurationDelegate : Bootstrapping Spring Data
2024-09-01T12:09:17.688+05:30  INFO 6268 --- [cart-service] [  restartedMain] .s.d.r.c.RepositoryConfigurationDelegate : Finished Spring Data repos
2024-09-01T12:09:18.142+05:30  INFO 6268 --- [cart-service] [  restartedMain] o.s.cloud.context.scope.GenericScope     : BeanFactory id=3af9937c-9d
2024-09-01T12:09:18.669+05:30  WARN 6268 --- [cart-service] [  restartedMain] trationDelegate$BeanPostProcessorChecker : Bean 'org.springframework.
2024-09-01T12:09:18.674+05:30  WARN 6268 --- [cart-service] [  restartedMain] trationDelegate$BeanPostProcessorChecker : Bean 'deferringLoadBalance
2024-09-01T12:09:19.507+05:30  INFO 6268 --- [cart-service] [  restartedMain] o.s.b.w.embedded.tomcat.TomcatWebServer  : Tomcat initialized with po
2024-09-01T12:09:19.535+05:30  INFO 6268 --- [cart-service] [  restartedMain] o.apache.catalina.core.StandardService   : Starting service [Tomcat]
2024-09-01T12:09:19.536+05:30  INFO 6268 --- [cart-service] [  restartedMain] o.apache.catalina.core.StandardEngine    : Starting Servlet engine: [
2024-09-01T12:09:19.636+05:30  INFO 6268 --- [cart-service] [  restartedMain] o.a.c.c.C.[Tomcat].[localhost].[/]       : Initializing Spring embedd
2024-09-01T12:09:19.638+05:30  INFO 6268 --- [cart-service] [  restartedMain] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext
2024-09-01T12:09:20.207+05:30  INFO 6268 --- [cart-service] [  restartedMain] o.hibernate.jpa.internal.util.LogHelper  : HHH000204: Processing Pers
2024-09-01T12:09:20.322+05:30  INFO 6268 --- [cart-service] [  restartedMain] org.hibernate.Version                    : HHH000412: Hibernate ORM c
2024-09-01T12:09:20.390+05:30  INFO 6268 --- [cart-service] [  restartedMain] o.h.c.internal.RegionFactoryInitiator    : HHH000026: Second-level ca
2024-09-01T12:09:20.934+05:30  INFO 6268 --- [cart-service] [  restartedMain] o.s.o.j.p.SpringPersistenceUnitInfo      : No LoadTimeWeaver setup: i
2024-09-01T12:09:20.982+05:30  INFO 6268 --- [cart-service] [  restartedMain] com.zaxxer.hikari.HikariDataSource       : HikariPool-1 - Starting...
2024-09-01T12:09:21.603+05:30  INFO 6268 --- [cart-service] [  restartedMain] com.zaxxer.hikari.pool.HikariPool        : HikariPool-1 - Added conne
2024-09-01T12:09:21.607+05:30  INFO 6268 --- [cart-service] [  restartedMain] com.zaxxer.hikari.HikariDataSource       : HikariPool-1 - Start compl
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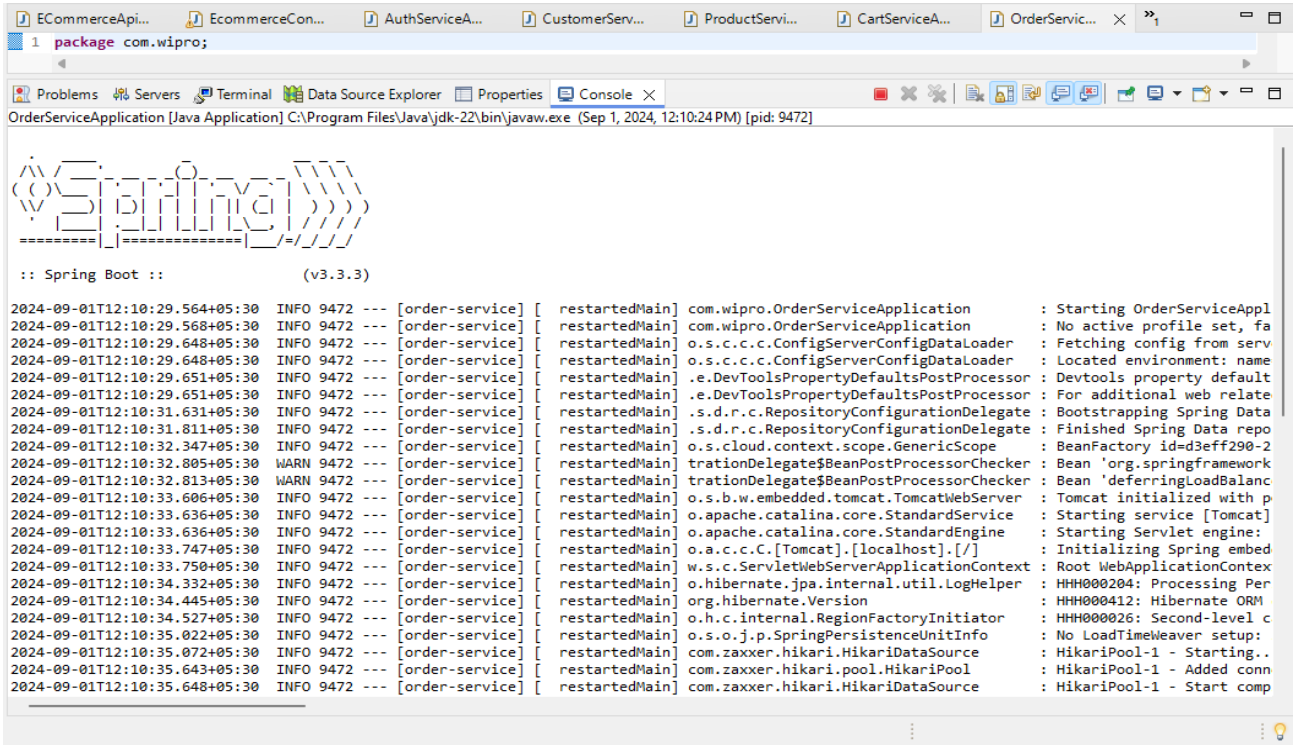
Running Order-service:-



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package com.wipro;

OrderServiceApplication [Java Application] C:\Program Files\Java\jdk-22\bin\javaw.exe  (Sep 1, 2024, 12:10:24 PM) [pid: 9472]

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 :: Spring Boot ::                (v3.3.3)

2024-09-01T12:10:29.564+05:30  INFO 9472 --- [order-service] [  restartedMain] com.wipro.OrderServiceApplication        : Starting OrderServiceAppl
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2024-09-01T12:10:29.648+05:30  INFO 9472 --- [order-service] [  restartedMain] o.s.c.c.c.ConfigServerConfigDataLoader   : Fetching config from serv
2024-09-01T12:10:29.648+05:30  INFO 9472 --- [order-service] [  restartedMain] o.s.c.c.c.ConfigServerConfigDataLoader   : Located environment: name
2024-09-01T12:10:29.651+05:30  INFO 9472 --- [order-service] [  restartedMain] .e.DevToolsPropertyDefaultsPostProcessor : Devtools property default
2024-09-01T12:10:29.651+05:30  INFO 9472 --- [order-service] [  restartedMain] .e.DevToolsPropertyDefaultsPostProcessor : For additional web relate
2024-09-01T12:10:31.631+05:30  INFO 9472 --- [order-service] [  restartedMain] .s.d.r.c.RepositoryConfigurationDelegate : Bootstrapping Spring Data
2024-09-01T12:10:31.811+05:30  INFO 9472 --- [order-service] [  restartedMain] .s.d.r.c.RepositoryConfigurationDelegate : Finished Spring Data repo
2024-09-01T12:10:32.347+05:30  INFO 9472 --- [order-service] [  restartedMain] o.s.cloud.context.scope.GenericScope     : BeanFactory id=d3eff290-2
2024-09-01T12:10:32.805+05:30  WARN 9472 --- [order-service] [  restartedMain] trationDelegate$BeanPostProcessorChecker : Bean 'org.springframework
2024-09-01T12:10:32.813+05:30  WARN 9472 --- [order-service] [  restartedMain] trationDelegate$BeanPostProcessorChecker : Bean 'deferringLoadBalanc
2024-09-01T12:10:33.606+05:30  INFO 9472 --- [order-service] [  restartedMain] o.s.b.w.embedded.tomcat.TomcatWebServer  : Tomcat initialized with p
2024-09-01T12:10:33.636+05:30  INFO 9472 --- [order-service] [  restartedMain] o.apache.catalina.core.StandardService   : Starting service [Tomcat]
2024-09-01T12:10:33.636+05:30  INFO 9472 --- [order-service] [  restartedMain] o.apache.catalina.core.StandardEngine    : Starting Servlet engine:
2024-09-01T12:10:33.747+05:30  INFO 9472 --- [order-service] [  restartedMain] o.a.c.c.C.[Tomcat].[localhost].[/]       : Initializing Spring embed
2024-09-01T12:10:33.750+05:30  INFO 9472 --- [order-service] [  restartedMain] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContex
2024-09-01T12:10:34.332+05:30  INFO 9472 --- [order-service] [  restartedMain] o.hibernate.jpa.internal.util.LogHelper  : HHH000204: Processing Per
2024-09-01T12:10:34.445+05:30  INFO 9472 --- [order-service] [  restartedMain] org.hibernate.Version                    : HHH000412: Hibernate ORM
2024-09-01T12:10:34.527+05:30  INFO 9472 --- [order-service] [  restartedMain] o.h.c.internal.RegionFactoryInitiator    : HHH000026: Second-level c
2024-09-01T12:10:35.022+05:30  INFO 9472 --- [order-service] [  restartedMain] o.s.o.j.p.SpringPersistenceUnitInfo      : No LoadTimeWeaver setup:
2024-09-01T12:10:35.072+05:30  INFO 9472 --- [order-service] [  restartedMain] com.zaxxer.hikari.HikariDataSource       : HikariPool-1 - Starting..
2024-09-01T12:10:35.643+05:30  INFO 9472 --- [order-service] [  restartedMain] com.zaxxer.hikari.pool.HikariPool        : HikariPool-1 - Added conn
2024-09-01T12:10:35.648+05:30  INFO 9472 --- [order-service] [  restartedMain] com.zaxxer.hikari.HikariDataSource       : HikariPool-1 - Start comp
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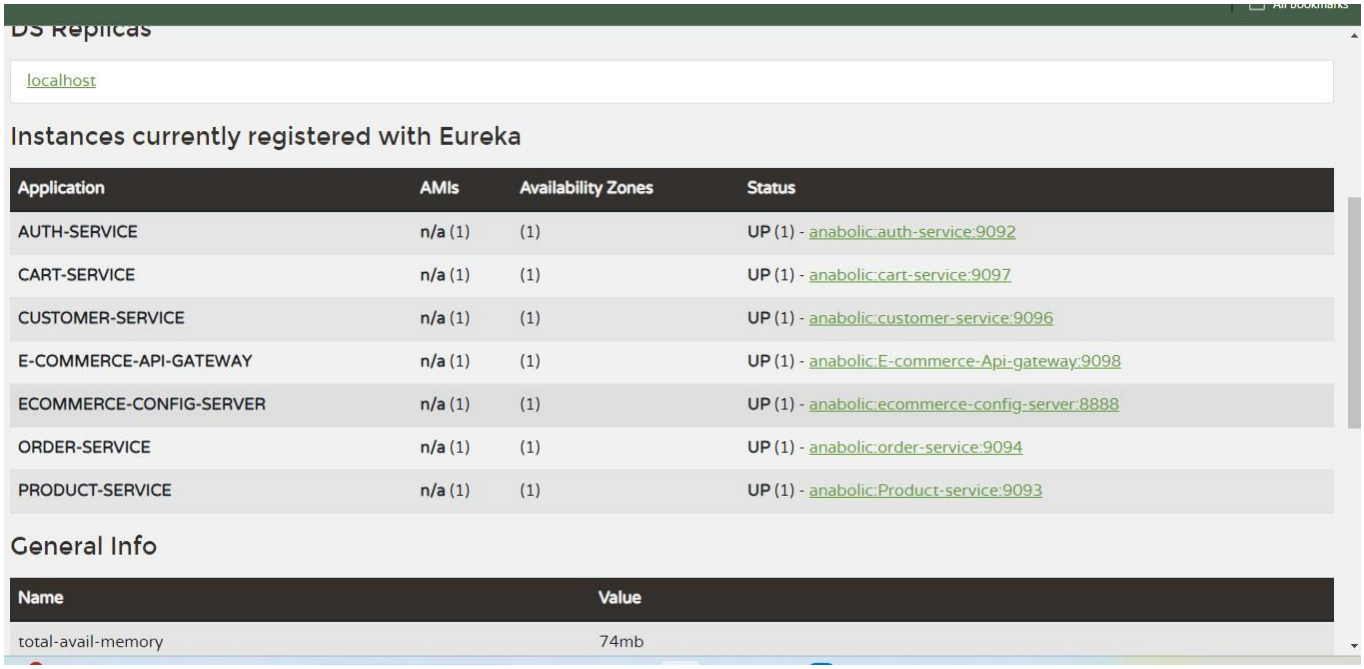
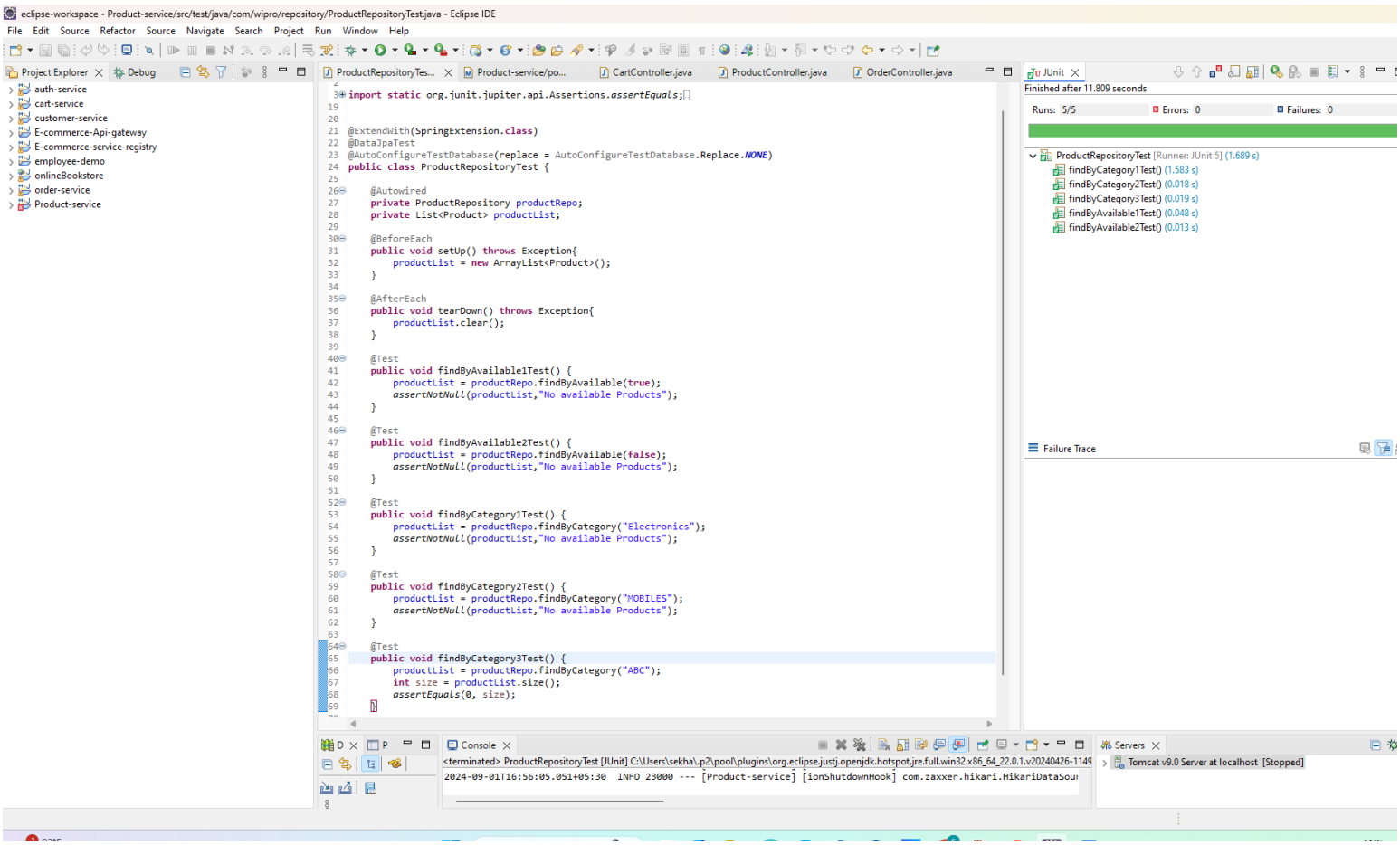
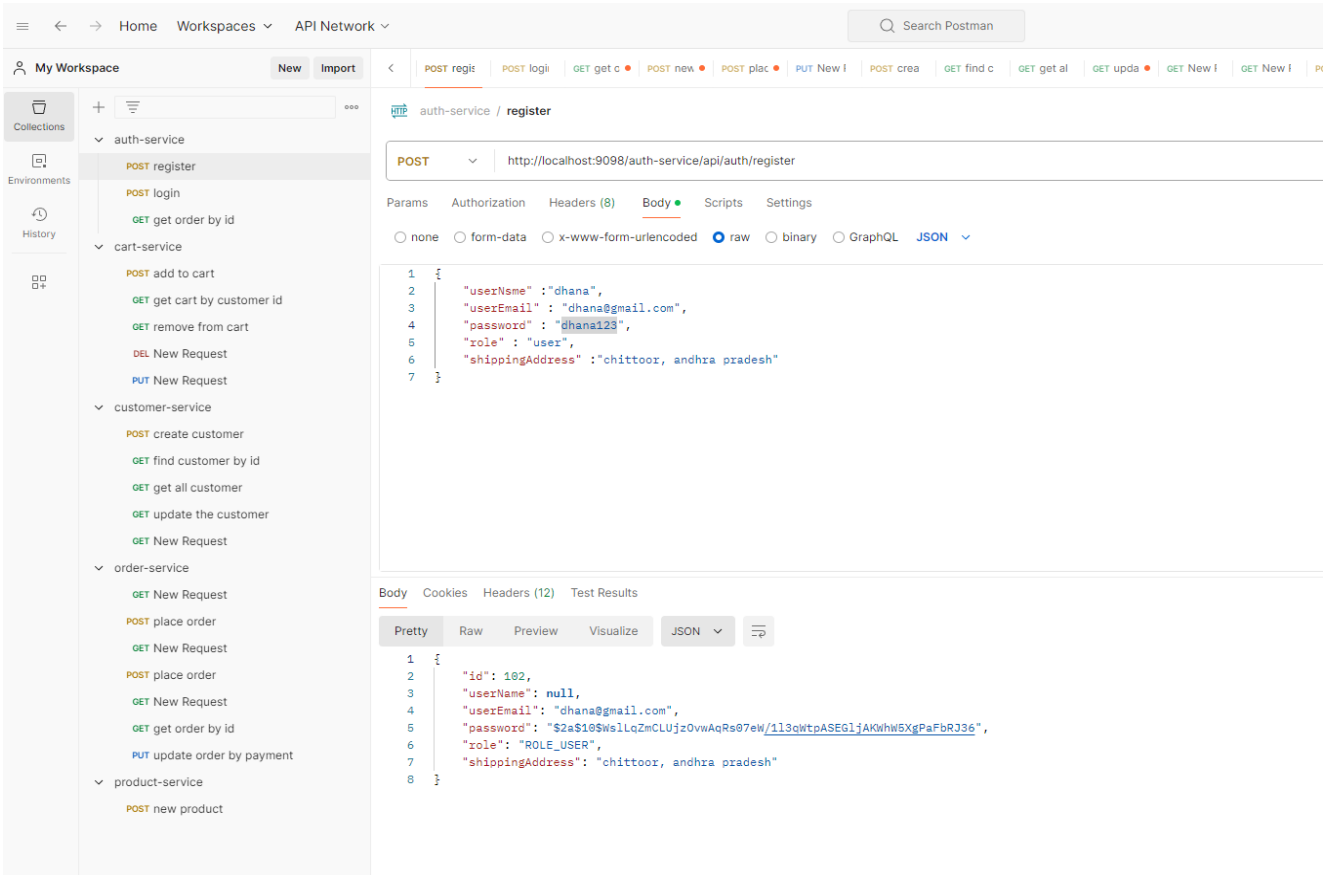
This is the Eureka Service where we show all Microservices:



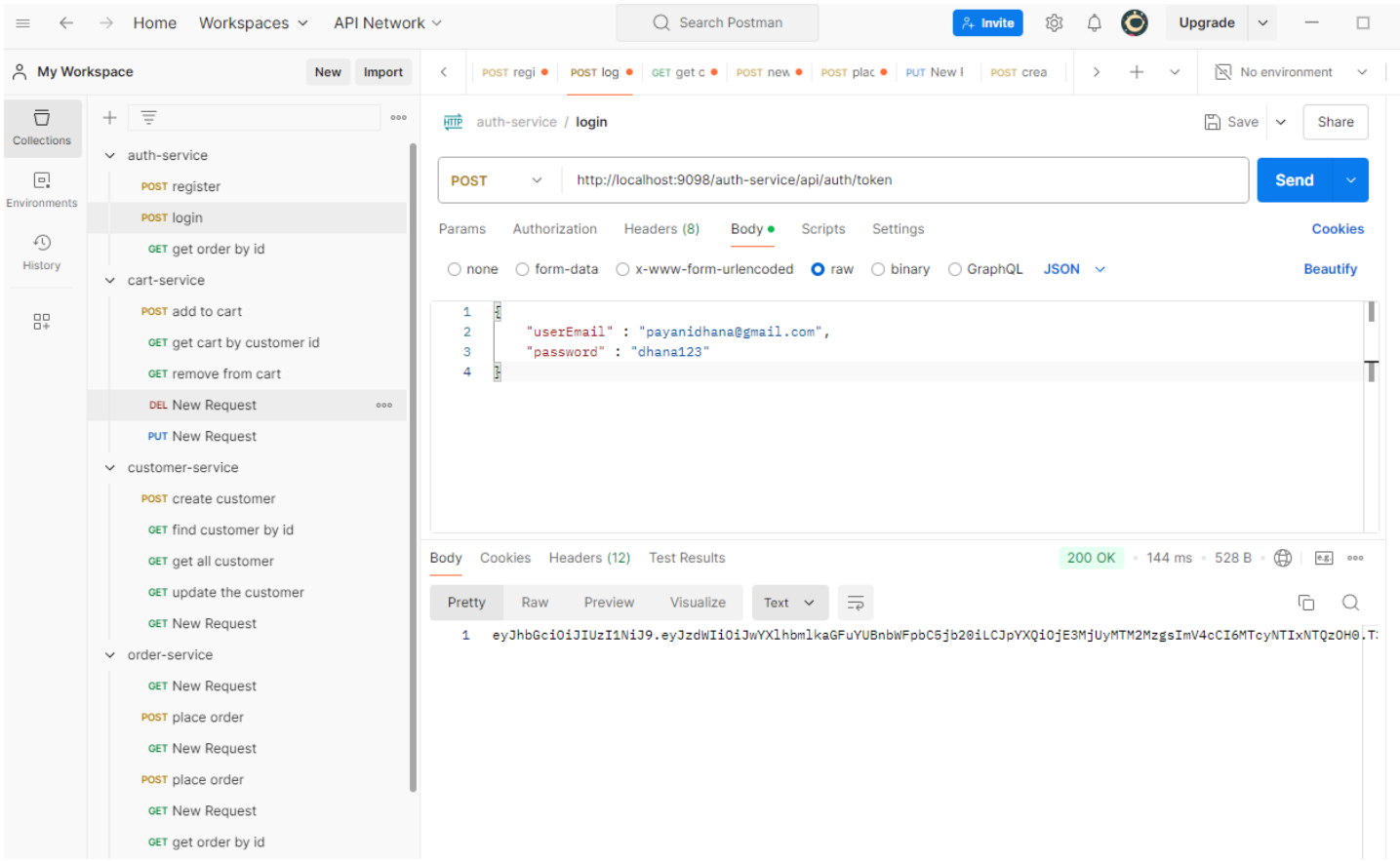
Junit Testing



Registrate User

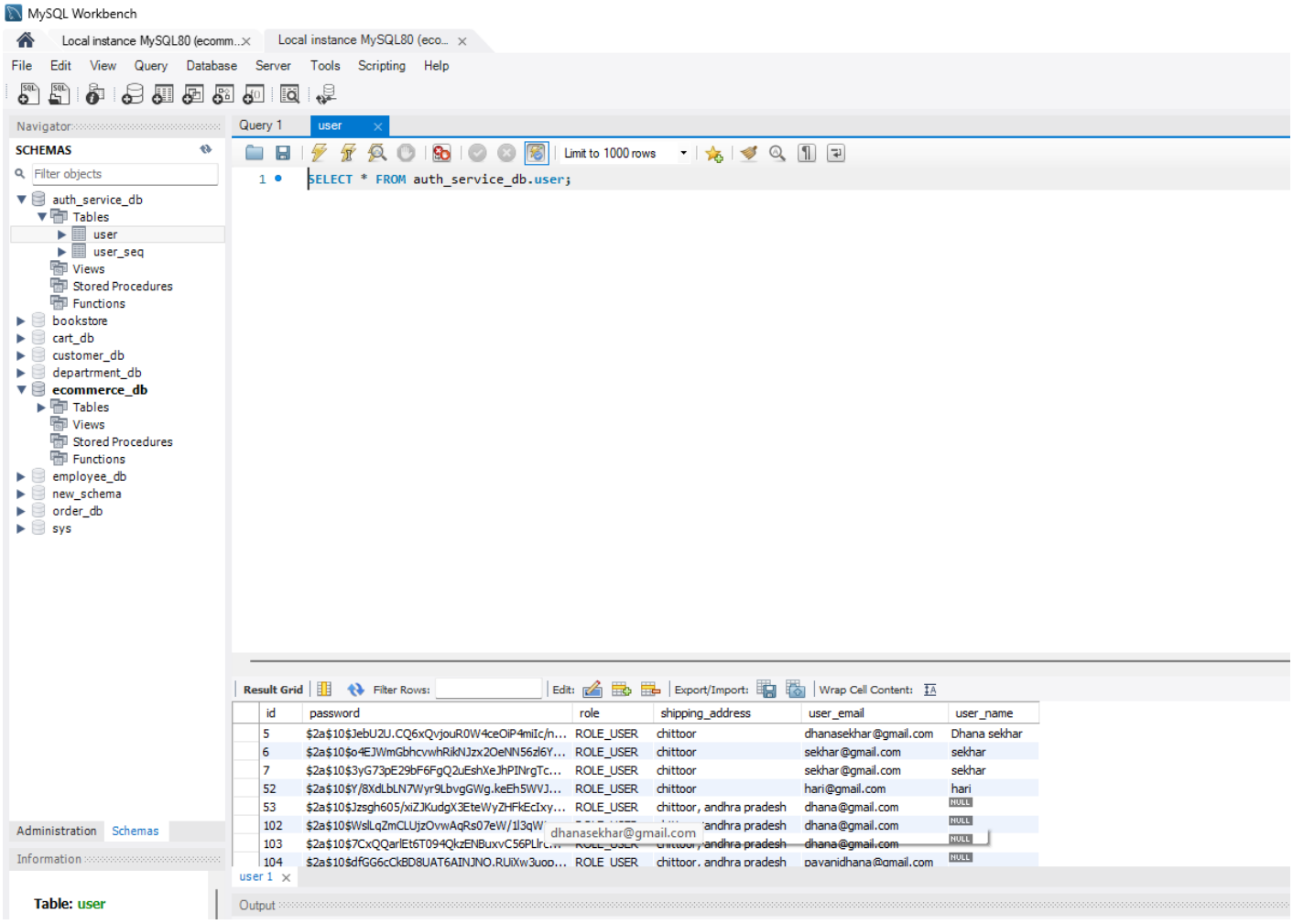


Token generation

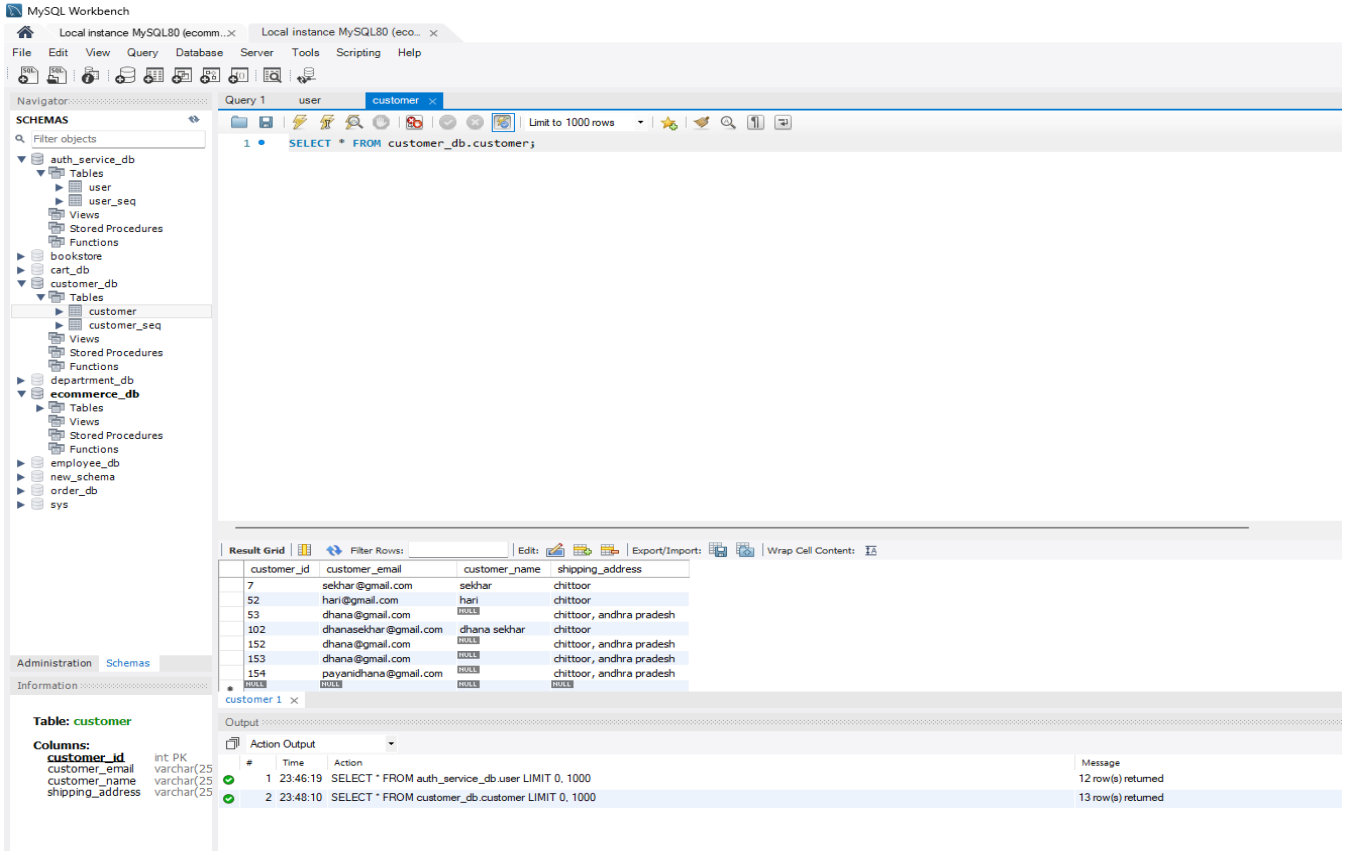


Database Design

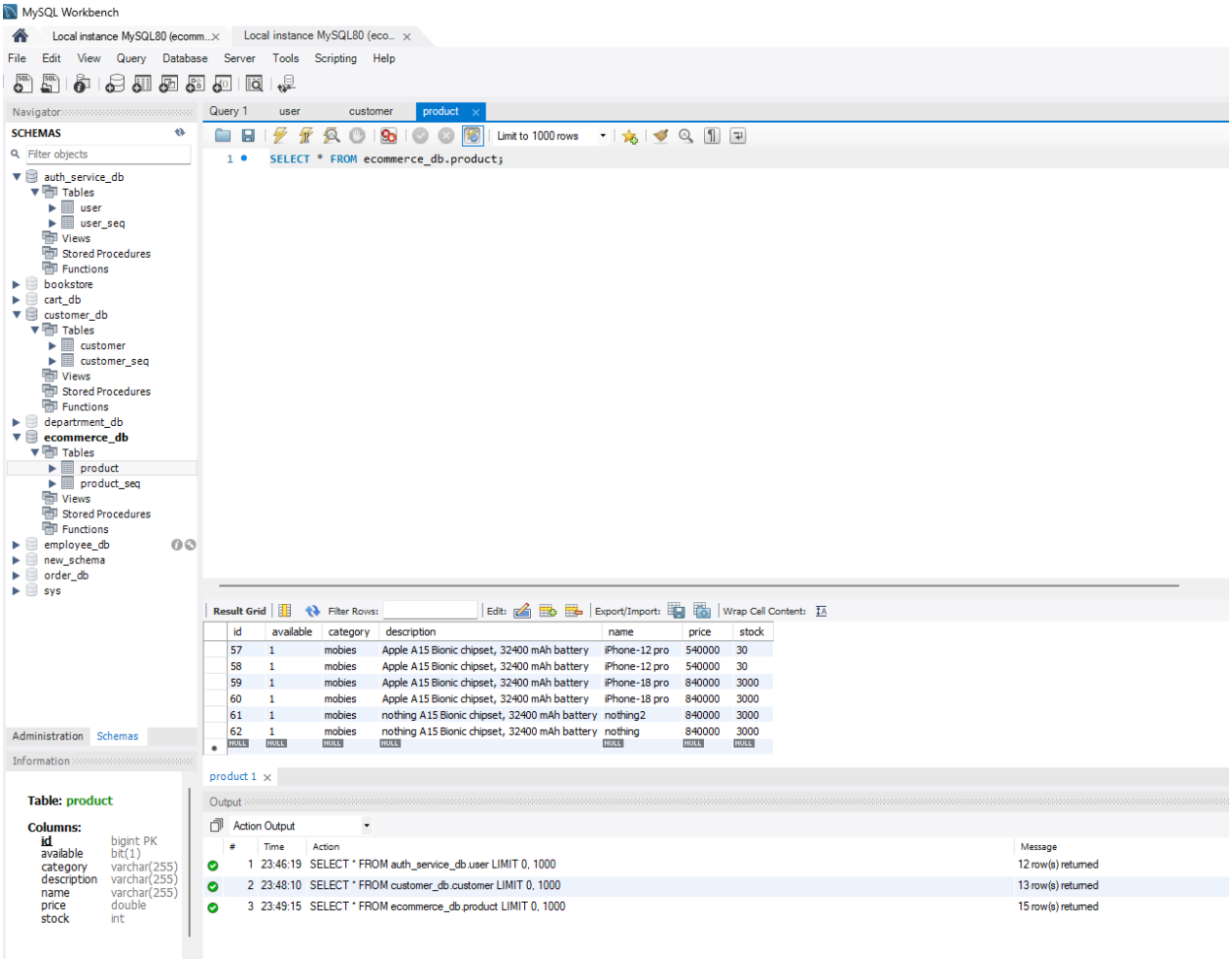
- users: id, shipping_address ,user_name, password, user_email, role



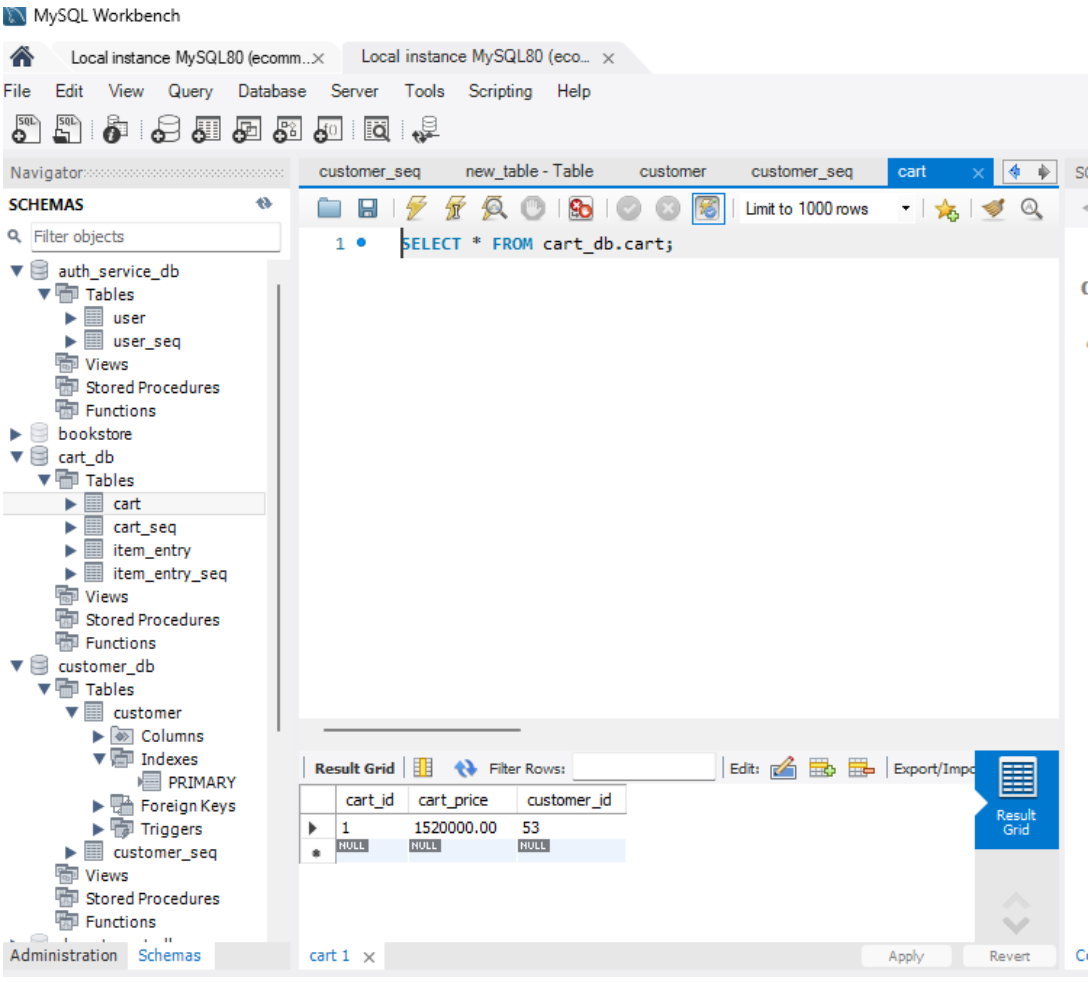
- customers: customer_id, customer_name, customer_email, shipping_address



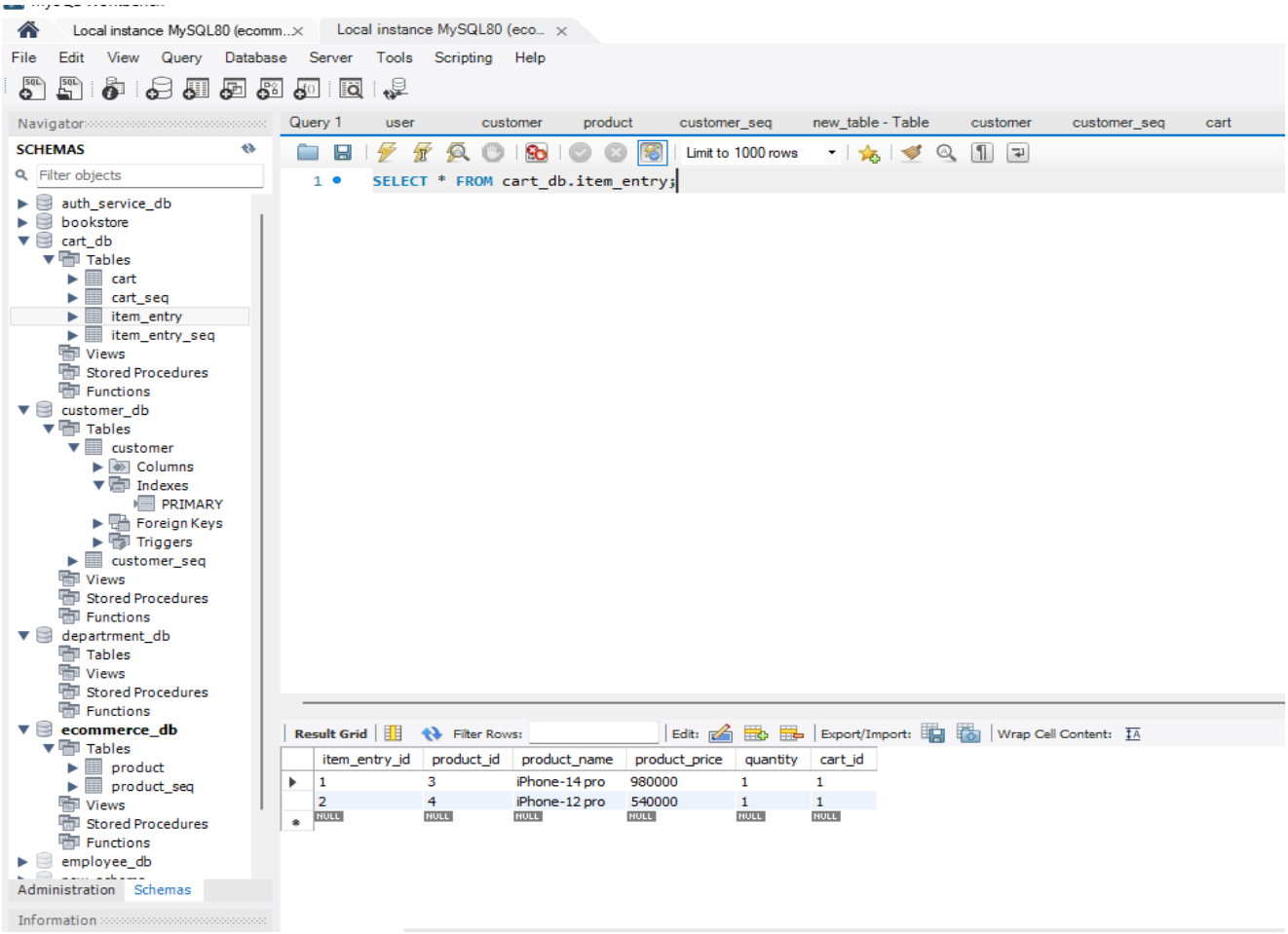
- products: id, name, description, price, category, stock, available



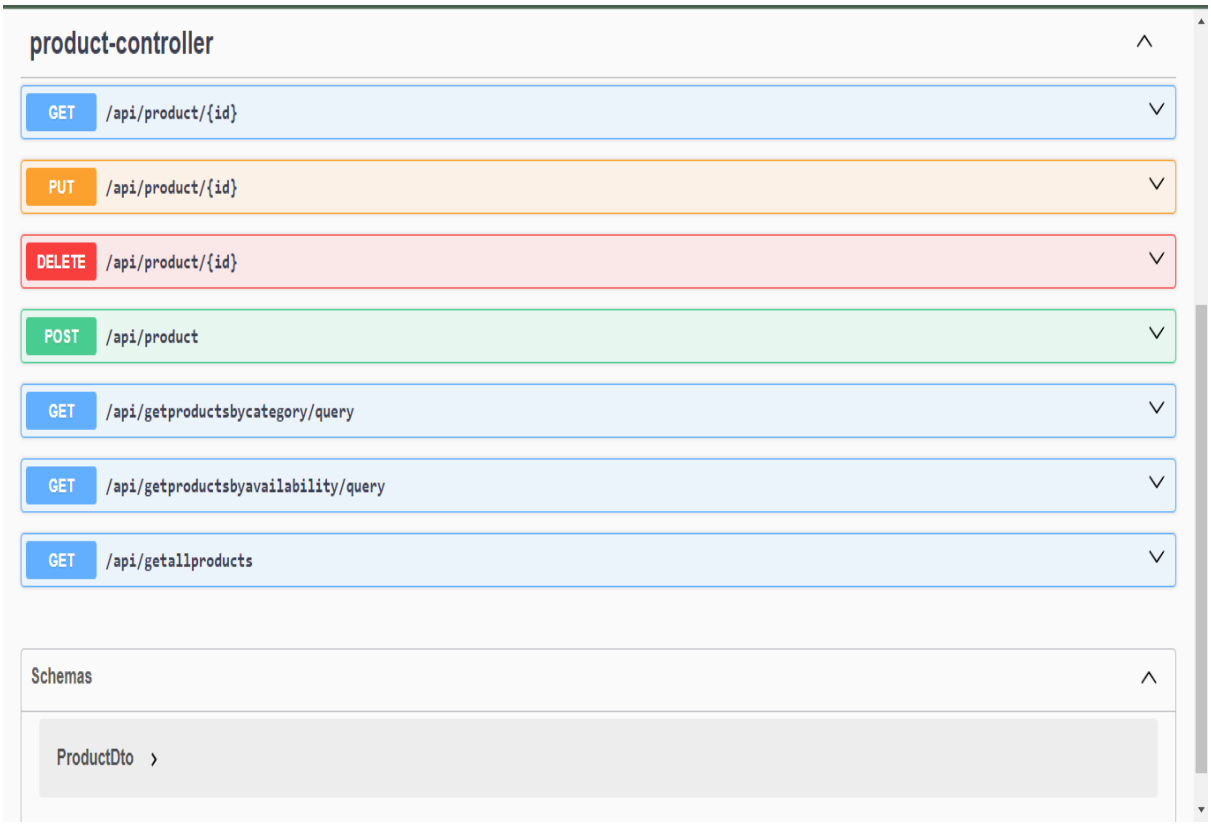
- carts: cart_id, customer_id, cart_price



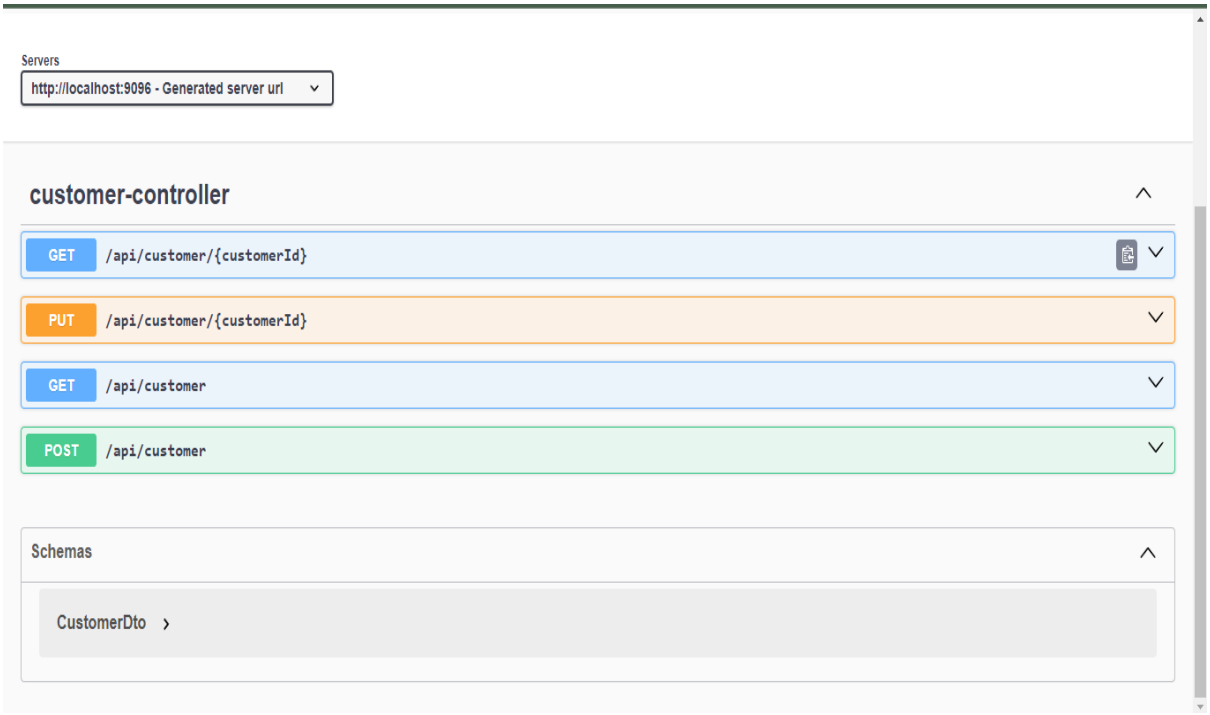
- item_entry:item_entry_ id, cart_id, product_id, quantity, product_price, product_name



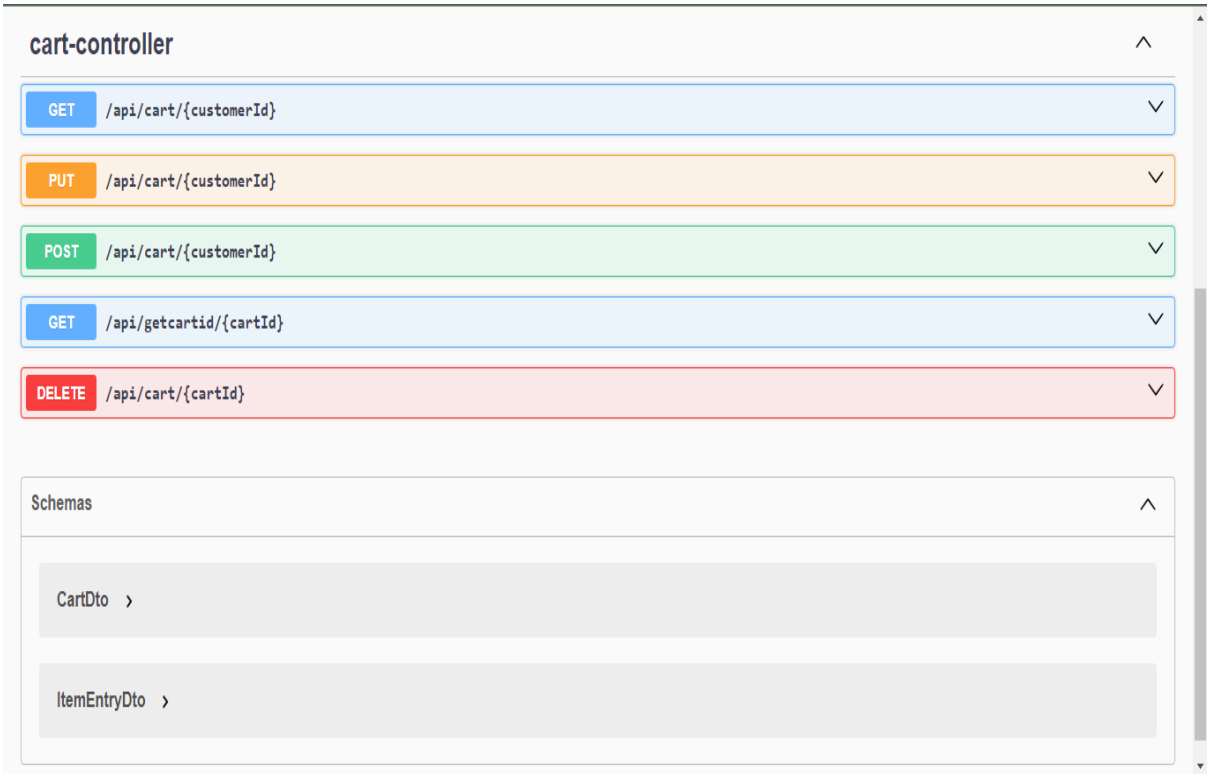
Product :-microservice



Customer microservice:-



Cart microservice:-



Order microservice:-