Assignment for ITS 4243 - Microservices and Cloud Computing

University of Sri Jayewardenepura – Faculty of Technology

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Smart Travel Booking Platform

Github Repository: *https://github.com/NadunDalu/smart-travel-platform*

Postman Collection: *https://github.com/NadunDalu/smart-travel-platform/tree/main/postman/collections*

Architecture Overview

Services

1. **User Service** (Port 8081) - Manages user information
2. **Flight Service** (Port 8082) - Manages flight details and availability
3. **Hotel Service** (Port 8083) - Manages hotel details and availability
4. **Booking Service** (Port 8084) - Main orchestrator for booking workflow
5. **Payment Service** (Port 8085) - Handles payment processing
6. **Notification Service** (Port 8086) - Sends notifications to users

Communication Flow

1. User sends booking request to Booking Service

2. Booking Service → User Service (WebClient)

   - Validates user exists and is active

3. Booking Service → Flight Service (Feign Client)

   - Checks flight availability

4. Booking Service → Hotel Service (Feign Client)

   - Checks hotel availability

5. Booking Service

   - Calculates total cost

   - Stores booking as PENDING

6. Booking Service → Notification Service (WebClient)

   - Sends booking created notification

7. Payment Service → Booking Service (WebClient)

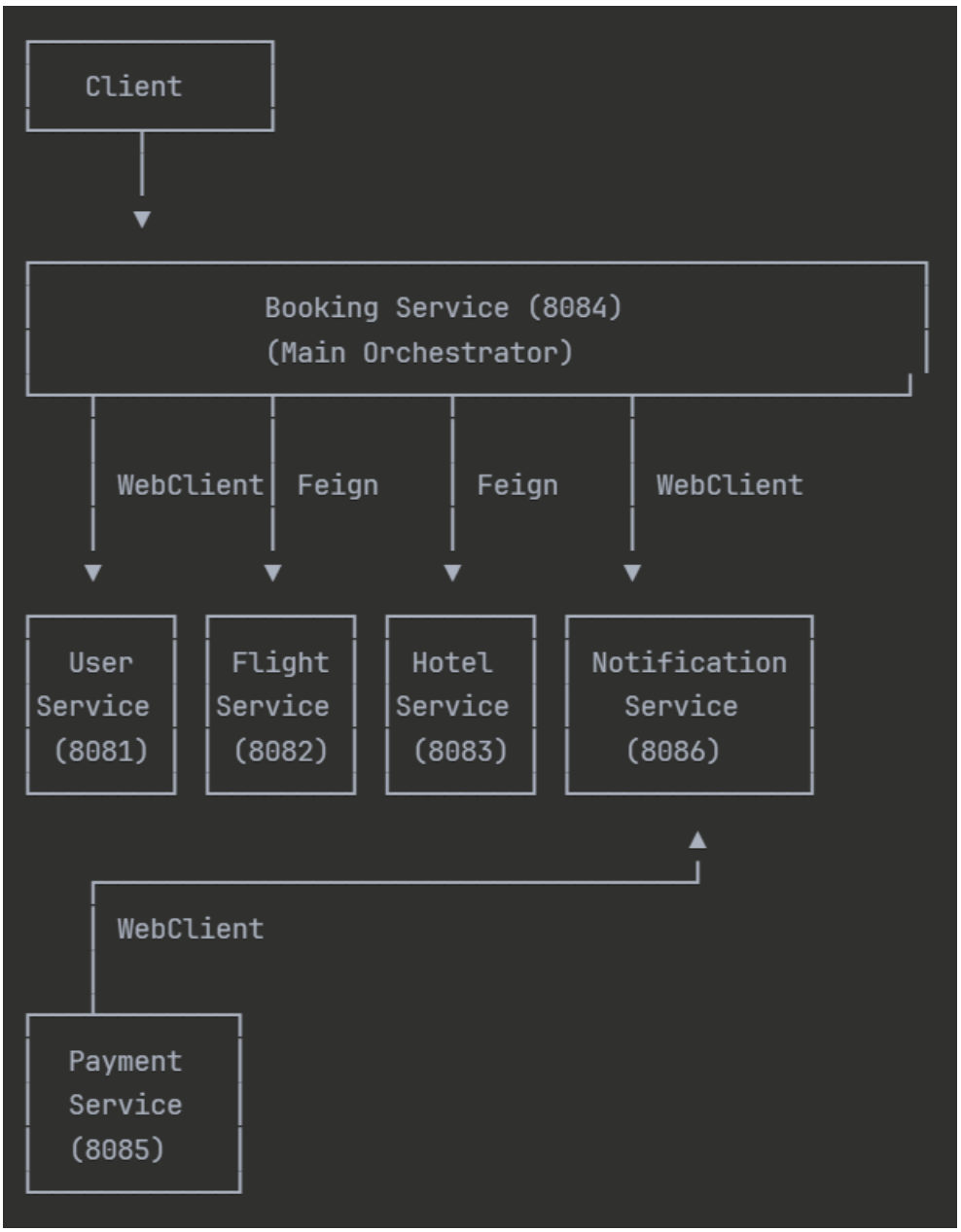
   - Processes payment

   - Updates booking status to CONFIRMED

8. Booking Service → Notification Service (WebClient)

   - Sends booking confirmed notification

Architecture Diagram



Setup Instructions

Used tools

- Java 17
- Maven 3.6+
- MySQL 8.0+
- Postman (for testing)

Step 1: Database Setup

Create 6 MySQL databases

```
CREATE DATABASE user_db;

CREATE DATABASE flight_db;

CREATE DATABASE hotel_db;

CREATE DATABASE booking_db;

CREATE DATABASE payment_db;

CREATE DATABASE notification_db;
```

Step 2: Clone and Setup

Create project directory

```
mkdir smart-travel-platform

cd smart-travel-platform
```

Create 6 service directories

```
mkdir user-service flight-service hotel-service booking-service payment-service notification-service
```

Step 3: Configure Database Password

Update application.properties in each service

```
spring.datasource.password= mysql_password
```

Step 4: Build All Services

Build each service

```
cd user-service
mvn clean install
cd ..
```

```
cd flight-service
mvn clean install
cd ..
```

```
cd hotel-service
mvn clean install
cd ..
```

```
cd notification-service
mvn clean install
cd ..
```

```
cd payment-service
mvn clean install
cd ..
```

```
cd booking-service
mvn clean install
cd ..
```

Step 5: Run All Services

Important: Start services in this order:

Terminal 1 - User Service

```
cd user-service

mvn spring-boot:run
```

Terminal 2 - Flight Service

```
cd flight-service

mvn spring-boot:run
```

Terminal 3 - Hotel Service

```
cd hotel-service

mvn spring-boot:run
```

Terminal 4 - Notification Service

```
cd notification-service

mvn spring-boot:run
```

Terminal 5 - Payment Service

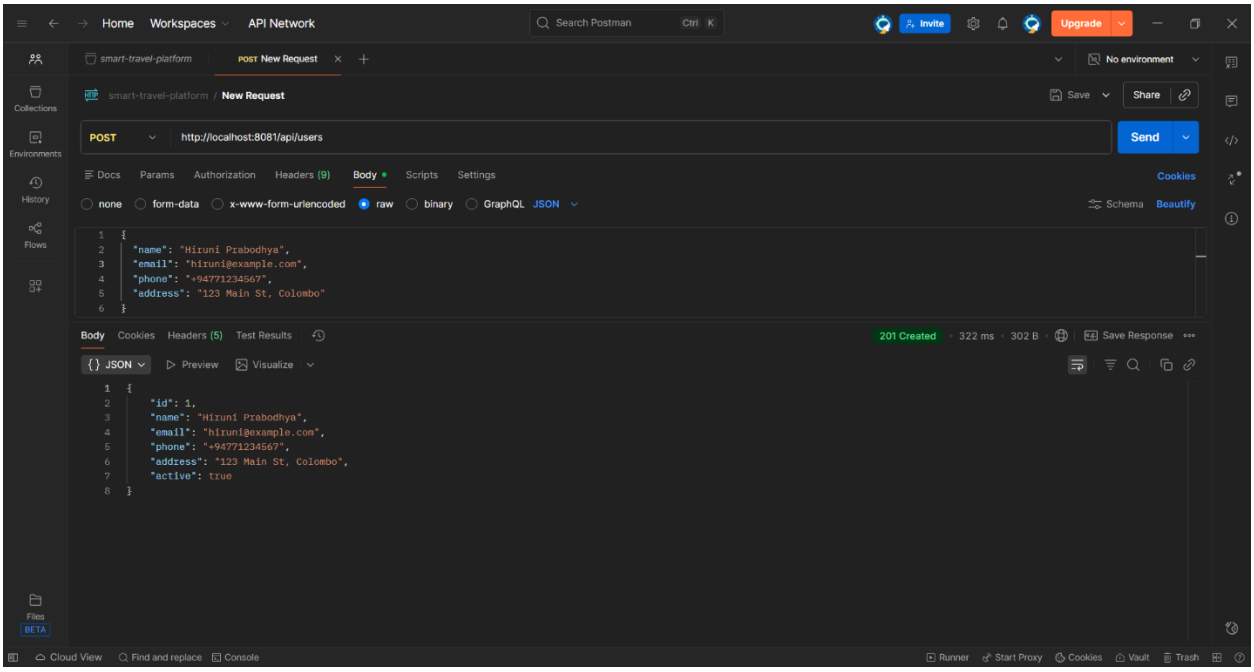
```
cd payment-service

mvn spring-boot:run
```

Terminal 6 - Booking Service

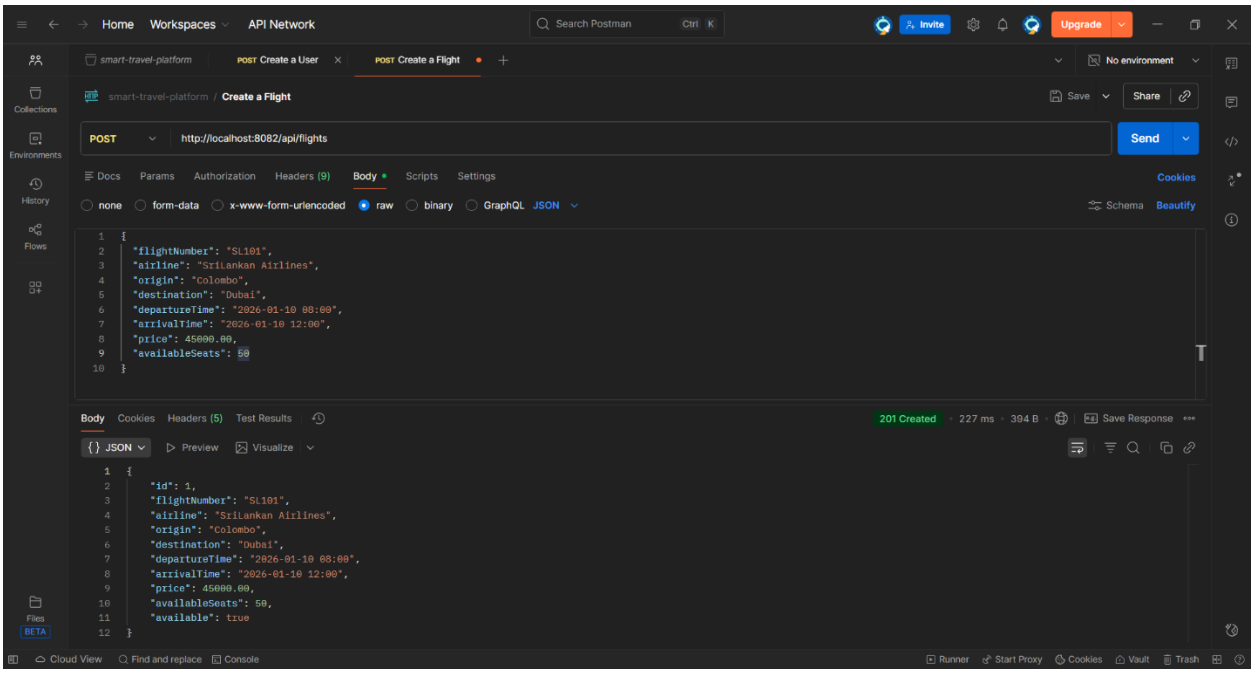
```
cd booking-service

mvn spring-boot:run
```

API Testing

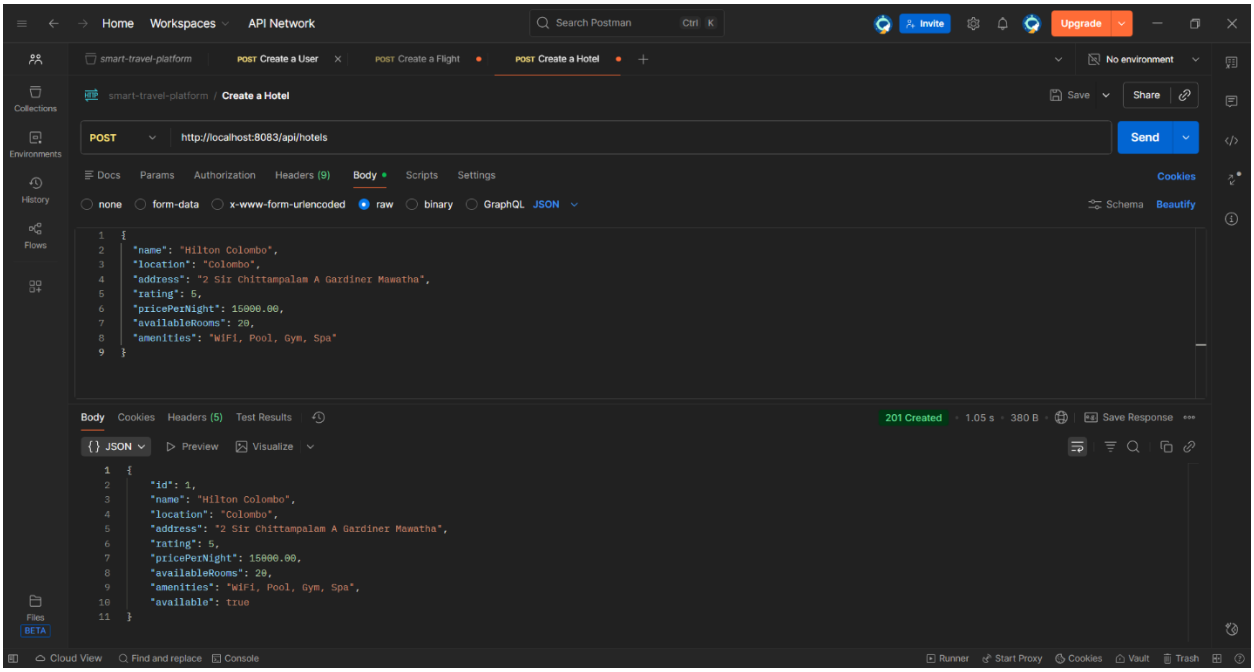
1. Create a User



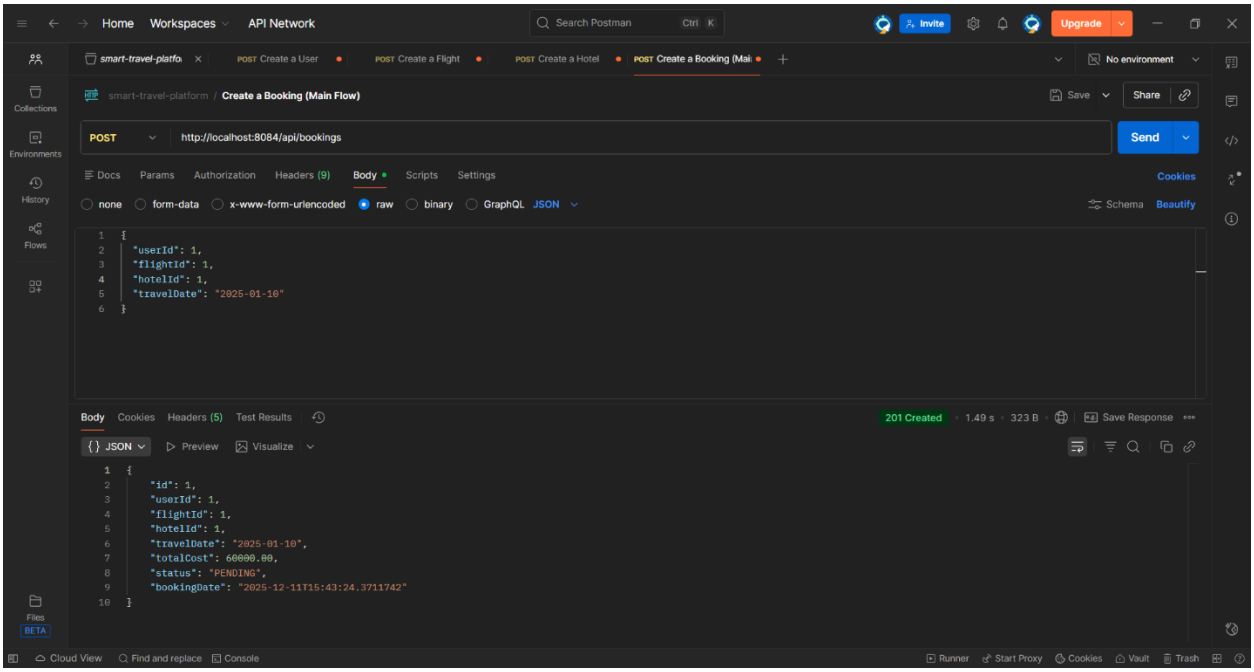
2. Create a Flight



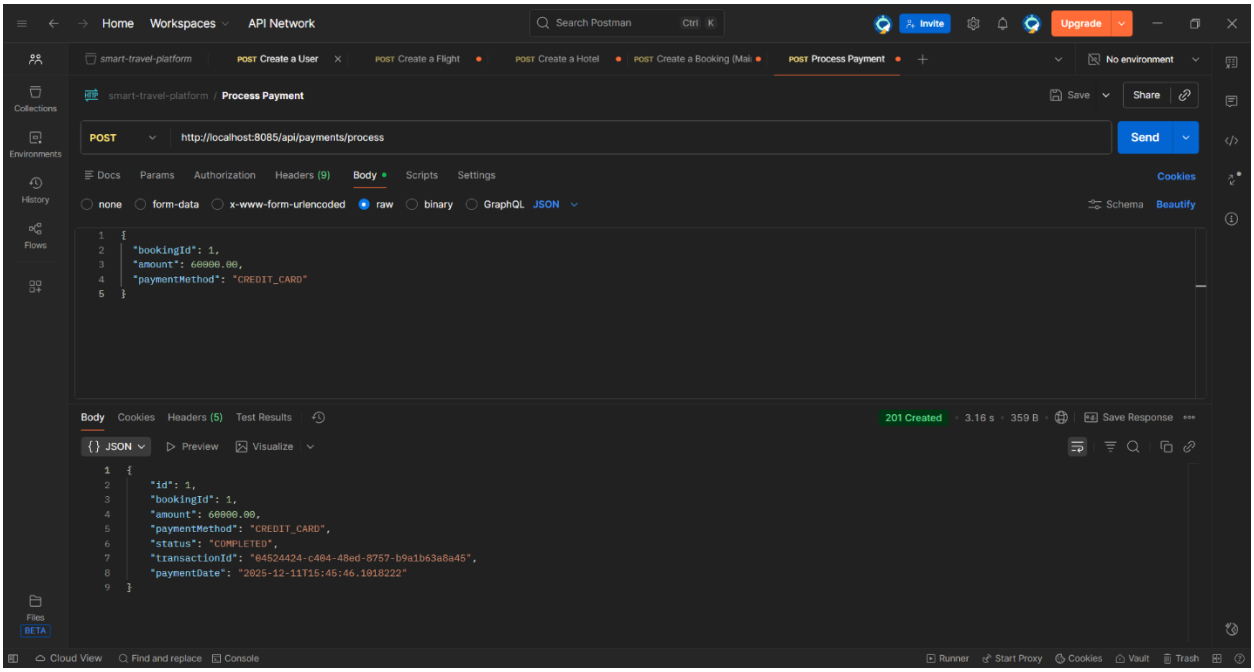
3. Create a Hotel



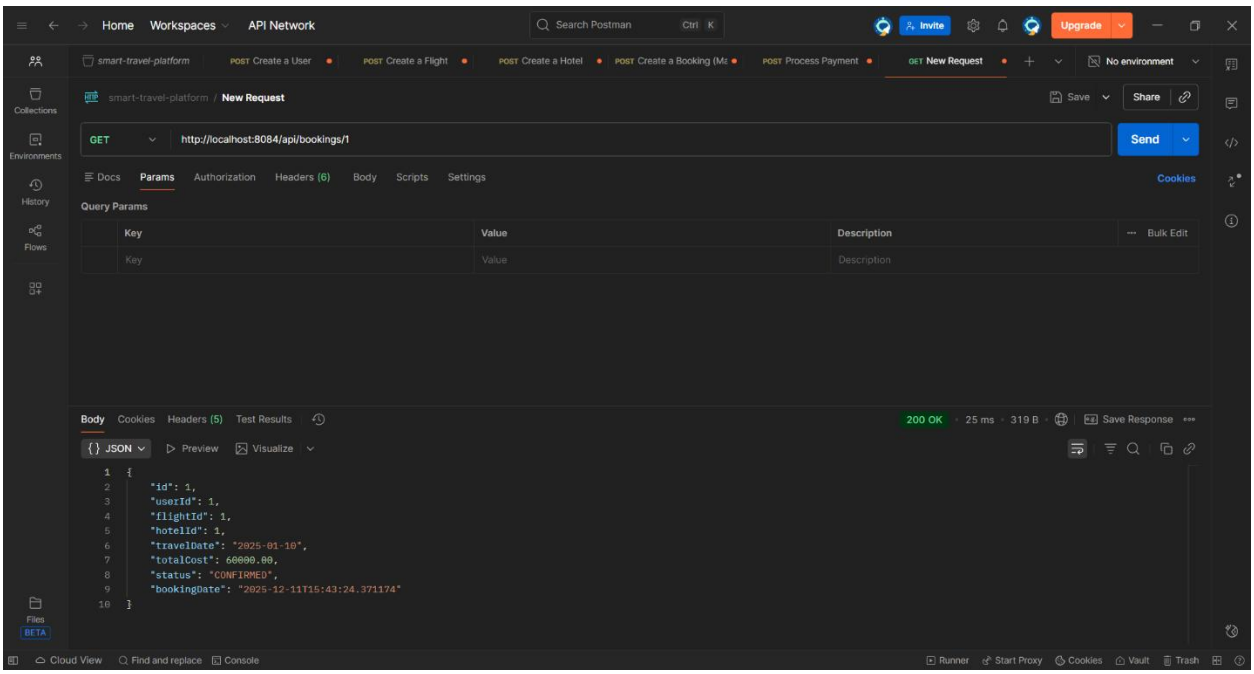
4. Create a Booking



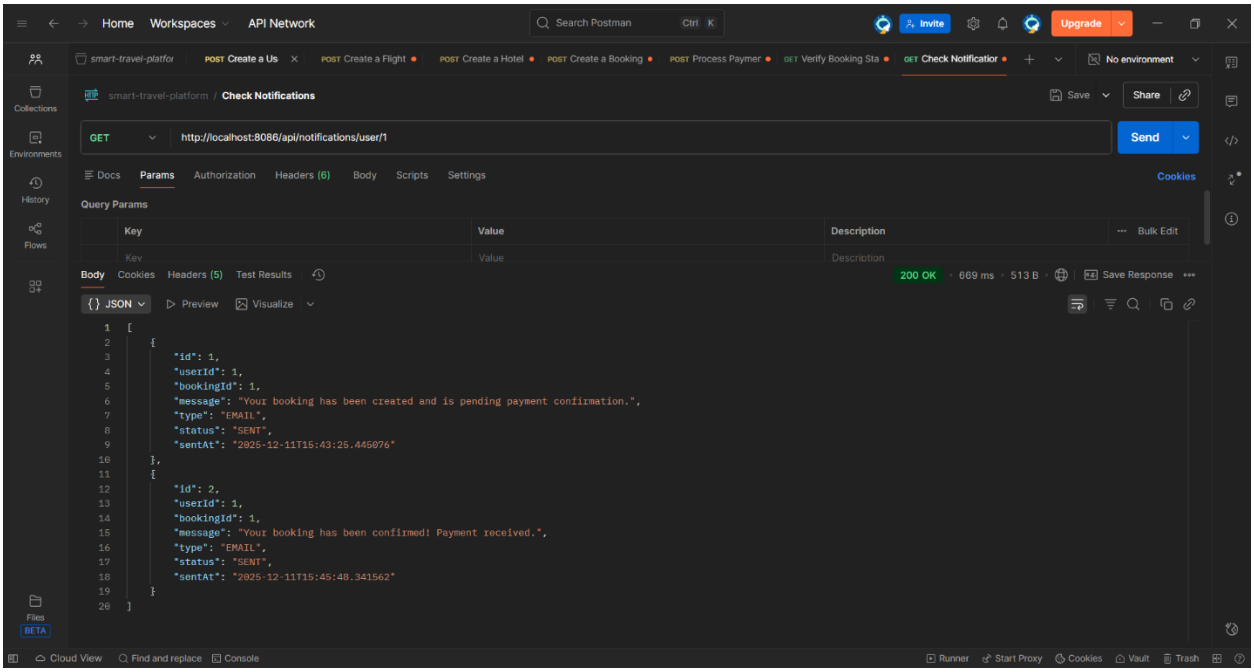
5. Process Payment



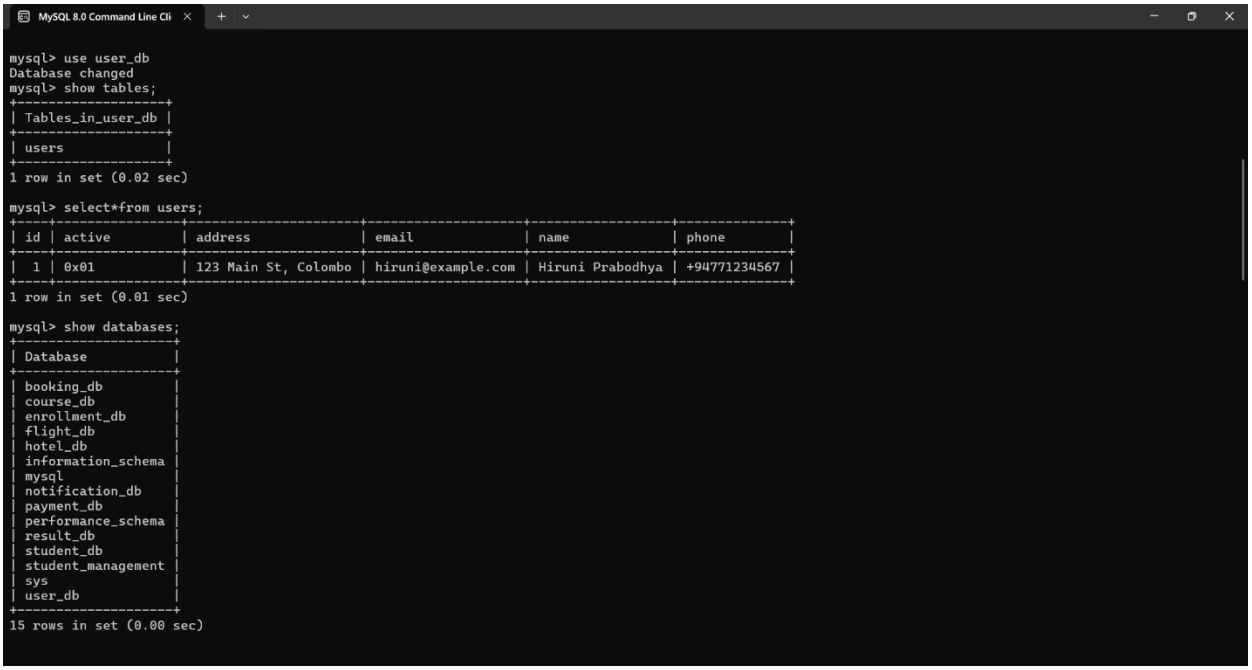
6. Verify Booking Status

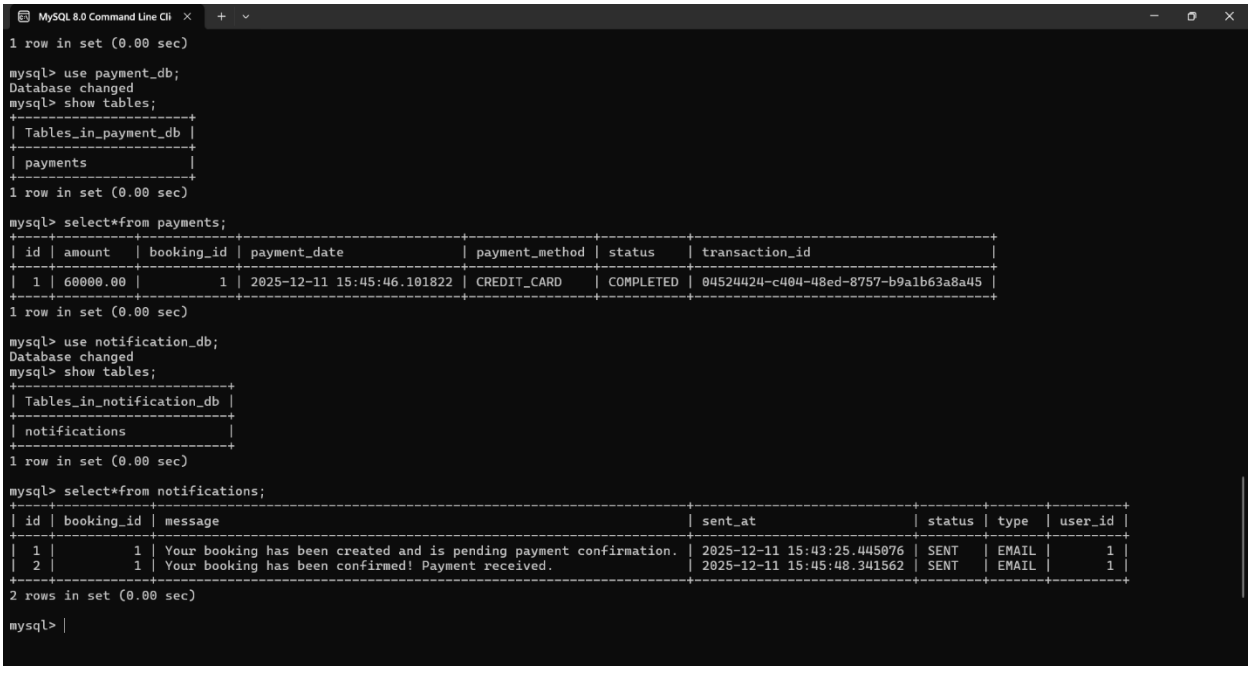


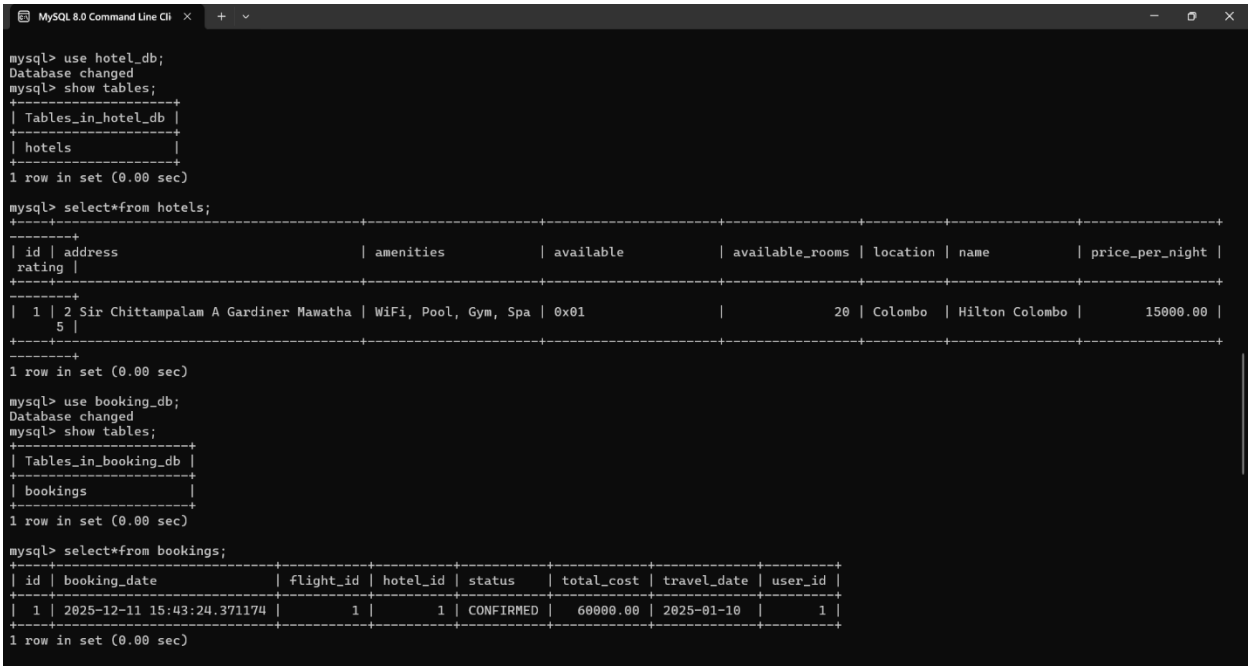
7. Check Notifications

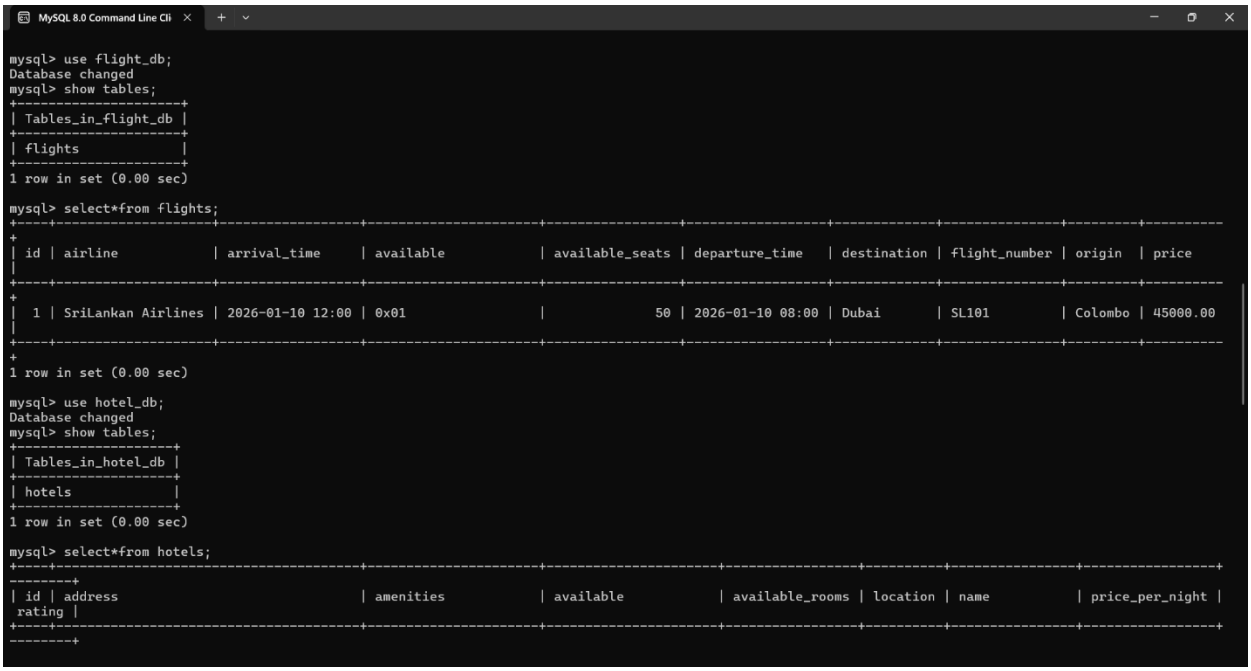


Database


MySQL 8.0 Command Line Cli
mysql> use user_db
Database changed
mysql> show tables;
+------------------+
| Tables_in_user_db |
+------------------+
| users |
+------------------+
1 row in set (0.02 sec)
mysql> select*from users;
+----+----------+-----------------+-----------------+-----------------+--------------+
| id | active | address | email | name | phone |
+----+----------+-----------------+-----------------+-----------------+--------------+
| 1 | 0x01 | 123 Main St, Colombo | hiruni@example.com | Hiruni Prabodhya | +94771234567 |
+----+----------+-----------------+-----------------+-----------------+--------------+
1 row in set (0.01 sec)
mysql> show databases;
+--------------------+
| Database |
+--------------------+
| booking_db |
| course_db |
| enrollment_db |
| flight_db |
| hotel_db |
| information_schema |
| mysql |
| notification_db |
| payment_db |
| performance_schema |
| result_db |
| student_db |
| student_management |
| sys |
| user_db |
+--------------------+
15 rows in set (0.00 sec)


MySQL 8.0 Command Line Cli
1 row in set (0.00 sec)
mysql> use payment_db;
Database changed
mysql> show tables;
+----------------------+
| Tables_in_payment_db |
+----------------------+
| payments |
+----------------------+
1 row in set (0.00 sec)
mysql> select*from payments;
+----+----------+------------+----------------------------+----------------+-----------+--------------------------------------+
| id | amount | booking_id | payment_date | payment_method | status | transaction_id |
+----+----------+------------+----------------------------+----------------+-----------+--------------------------------------+
| 1 | 60000.00 | 1 | 2025-12-11 15:45:46.101822 | CREDIT_CARD | COMPLETED | 04524424-c404-48ed-8757-b9a1b63a8a45 |
+----+----------+------------+----------------------------+----------------+-----------+--------------------------------------+
1 row in set (0.00 sec)
mysql> use notification_db;
Database changed
mysql> show tables;
+--------------------------+
| Tables_in_notification_db |
+--------------------------+
| notifications |
+--------------------------+
1 row in set (0.00 sec)
mysql> select*from notifications;
+----+------------+---+----------------------------+--------+-------+---------+
| id | booking_id | message | sent_at | status | type | user_id |
+----+------------+---+----------------------------+--------+-------+---------+
| 1 | 1 | Your booking has been created and is pending payment confirmation. | 2025-12-11 15:43:25.445076 | SENT | EMAIL | 1 |
| 2 | 1 | Your booking has been confirmed! Payment received. | 2025-12-11 15:45:48.341562 | SENT | EMAIL | 1 |
+----+------------+---+----------------------------+--------+-------+---------+
2 rows in set (0.00 sec)
mysql>





Technology Stack

- **Framework:** Spring Boot 3.2.0
- **Language:** Java 17

- **Database:** MySQL 8.0
- **Communication:**
    - Spring Cloud OpenFeign (Feign Client)
    - Spring WebFlux (WebClient)
    - REST APIs
- **ORM:** Spring Data JPA
- **Build Tool:** Maven
- **Libraries:** Lombok

Communication Technologies Used

Feign Client

- Booking Service → Flight Service
- Booking Service → Hotel Service

WebClient

- Booking Service → User Service
- Booking Service → Notification Service
- Payment Service → Booking Service

Troubleshooting

Service Won't Start

- Check if the port is already in use
- Verify MySQL is running
- Check database credentials in application.properties

Feign Client Error

- Ensure Flight and Hotel services are running
- Check the URLs in booking-service application.properties

WebClient Timeout

- Increase timeout in application.properties
- Verify target service is responding

Database Connection Error

- Verify MySQL is running
- Check database exists
- Verify username/password

END.

Annexture 1 – Postman Collection


```
{
 "info": {
  "_postman_id": "21eec738-565e-474b-ba2c-727ee29be48d",
  "name": "smart-travel-platform",
  "schema": "https://schema.getpostman.com/json/collection/v2.1.0/collection.json",
  "_exporter_id": "49881238",
  "_collection_link": "https://nadundaluwatta0426-4321055.postman.co/workspace/9433a909-f925-4013-839f-df80b41484e6/collection/49881238-21eec738-565e-474b-ba2c-727ee29be48d?action=share&source=collection_link&creator=49881238"
 },
 "item": [
  {
   "name": "Create a User",
   "id": "453dcc1e-c550-4922-a1b4-848270a60876",
   "request": {
    "method": "POST",
    "header": [
     {
      "key": "Content-Type",
      "value": "application/json",
      "type": "text"
     }
```

```
      ],
      "body": {
        "mode": "raw",
        "raw": "{\r\n  \"name\": \"Hiruni Prabodhya\",\r\n  \"email\":
\"hiruni@example.com\",\r\n  \"phone\": \"+94771234567\",\r\n  \"address\": \"123 Main St,
Colombo\"\r\n}",
        "options": {
          "raw": {
            "language": "json"
          }
        }
      },
      "url": {
        "raw": "http://localhost:8081/api/users",
        "protocol": "http",
        "host": [
          "localhost"
        ],
        "port": "8081",
        "path": [
          "api",
          "users"
        ]
      }
    },
    "response": []
  },
  {
    "name": "Create a Flight",
    "id": "c7e84e6c-a228-4381-9147-3b8f51e262bf",
    "request": {
      "method": "POST",
      "header": [
        {
          "key": "Content-Type",
          "value": "application/json",
          "type": "text"
        }
```

```
      ],
      "body": {
        "mode": "raw",
        "raw": "{\r\n  \"flightNumber\": \"SL101\",\r\n  \"airline\": \"SriLankan Airlines\",\r\n
\"origin\": \"Colombo\",\r\n  \"destination\": \"Dubai\",\r\n  \"departureTime\": \"2026-01-10
08:00\",\r\n  \"arrivalTime\": \"2026-01-10 12:00\",\r\n  \"price\": 45000.00,\r\n
\"availableSeats\": 50\r\n}",
        "options": {
          "raw": {
            "language": "json"
          }
        }
      },
      "url": {
        "raw": "http://localhost:8082/api/flights",
        "protocol": "http",
        "host": [
          "localhost"
        ],
        "port": "8082",
        "path": [
          "api",
          "flights"
        ]
      }
    },
    "response": []
  },
  {
    "name": "Create a Hotel",
    "id": "8149b2ae-bbda-4720-9901-00af1accd709",
    "request": {
      "method": "POST",
      "header": [
        {
          "key": "Content-Type",
          "value": "application/json",
          "type": "text"
```

```
        }
       ],
       "body": {
        "mode": "raw",
        "raw": "{\r\n  \"name\": \"Hilton Colombo\",\r\n  \"location\": \"Colombo\",\r\n
\"address\": \"2 Sir Chittampalam A Gardiner Mawatha\",\r\n  \"rating\": 5,\r\n
\"pricePerNight\": 15000.00,\r\n  \"availableRooms\": 20,\r\n  \"amenities\": \"WiFi, Pool, Gym,
Spa\"\r\n}",
        "options": {
         "raw": {
          "language": "json"
         }
        }
       },
       "url": {
        "raw": "http://localhost:8083/api/hotels",
        "protocol": "http",
        "host": [
         "localhost"
        ],
        "port": "8083",
        "path": [
         "api",
         "hotels"
        ]
       }
      },
      "response": []
     },
     {
      "name": "Create a Booking (Main Flow)",
      "id": "24c944ea-c133-4358-9786-9a921bfcc343",
      "request": {
       "method": "POST",
       "header": [
        {
         "key": "Content-Type",
         "value": "application/json",
```

```
        "type": "text"
       }
      ],
      "body": {
       "mode": "raw",
       "raw": "{\r\n  \"userId\": 1,\r\n  \"flightId\": 1,\r\n  \"hotelId\": 1,\r\n  \"travelDate\":
\"2025-01-10\"\r\n}",
       "options": {
        "raw": {
         "language": "json"
        }
       }
      },
      "url": {
       "raw": "http://localhost:8084/api/bookings",
       "protocol": "http",
       "host": [
        "localhost"
       ],
       "port": "8084",
       "path": [
        "api",
        "bookings"
       ]
      }
     },
     "response": []
    },
    {
     "name": "Process Payment",
     "id": "f2199e2c-aad2-4ed6-a0f6-8946827cd8f9",
     "request": {
      "method": "POST",
      "header": [
       {
        "key": "Content-Type",
        "value": "application/json",
        "type": "text"
```

```
        }
       ],
       "body": {
        "mode": "raw",
        "raw": "{\r\n  \"bookingId\": 1,\r\n  \"amount\": 60000.00,\r\n  \"paymentMethod\":
\"CREDIT_CARD\"\r\n}",
        "options": {
         "raw": {
          "language": "json"
         }
        }
       },
       "url": {
        "raw": "http://localhost:8085/api/payments/process",
        "protocol": "http",
        "host": [
         "localhost"
        ],
        "port": "8085",
        "path": [
         "api",
         "payments",
         "process"
        ]
       }
      },
      "response": []
     },
     {
      "name": "Verify Booking Status",
      "id": "29c510d3-a016-4c62-a874-220d1c06ba54",
      "request": {
       "method": "GET",
       "header": [],
       "url": {
        "raw": "http://localhost:8084/api/bookings/1",
        "protocol": "http",
        "host": [
```

```
          "localhost"
        ],
        "port": "8084",
        "path": [
          "api",
          "bookings",
          "1"
        ]
      }
    },
    "response": []
  },
  {
    "name": "Check Notifications",
    "id": "dc452abe-c848-4a9f-97ff-9ab267c9c04b",
    "request": {
      "method": "GET",
      "header": [],
      "url": {
        "raw": "http://localhost:8086/api/notifications/user/1",
        "protocol": "http",
        "host": [
          "localhost"
        ],
        "port": "8086",
        "path": [
          "api",
          "notifications",
          "user",
          "1"
        ]
      }
    },
    "response": []
  }
 ]
}
```