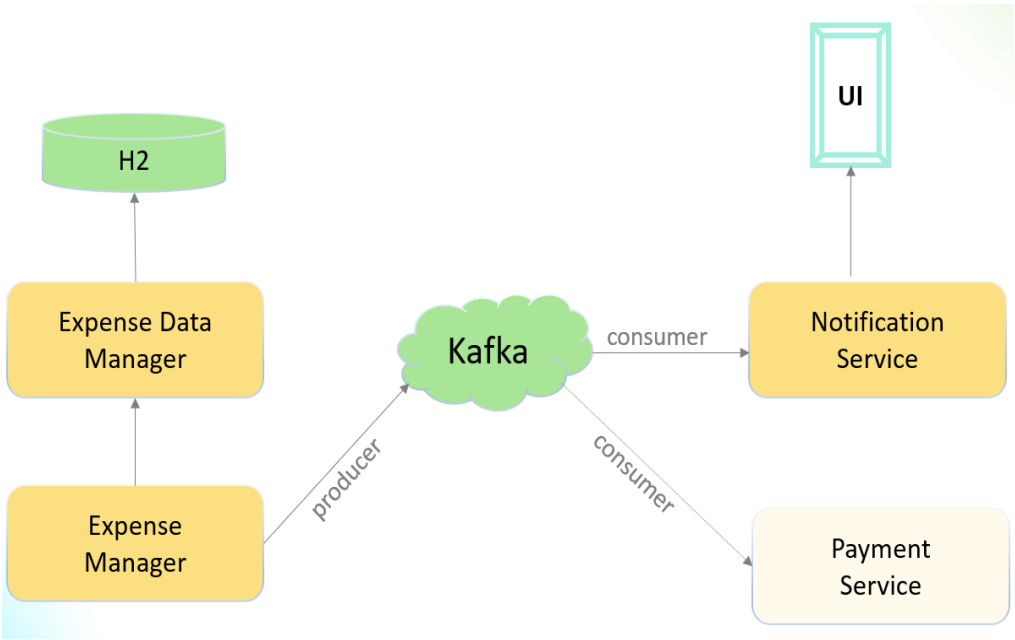


PART 1: Project Setup

Step 1: Clone the project

Clone the github repo containing the boiler plate code:

```
git clone https://github.com/zuliatowoade/divvy-up-starter.git
cd <git-project-directory>
```

Step 2: Open the Project in Your IDE

Open the project in your favorite IDE (IntelliJ, VSCode, etc.).
Ensure your Gradle dependencies are resolved by running the following in the terminal:

```
./gradlew build
```

PART 2: Setup Data Access (ExpenseDataManager)

Step 1: Review Data Model Classes

Review content of the data model class, user, expense, CreateExpenseAllocationRequest

PART 3: Setup Services (ExpenseDataManager)

Step 1: Review Friends Service

Review **getFriendsByInitiatorName()** method

Step 2: Update Friends Service

Add The following code to the **getFriendsByInitiatorName()** method

```
public List<User> getFriendsByInitiatorName(String username) {
        var result = friendsRepository.findByInitiatorName(username);
        List<User> response = new ArrayList<User>();
```

```
        for (Friends friend : result) {
            response.add(friend.getFriend());
        }
        return response;
    }
```

Step 3: Update Expense Service

Review expense service (saveExpense())

Step 4: Update ExpenseAllocation Service

Review expense service (saveExpense())

PART 4: Setup Controllers (ExpenseDataManager)

Step 1: Update Expense Controller

Add the following code to the **createExpense()** method

```
   @PostMapping
    public ResponseEntity<Expense> createExpense(@RequestBody
Expense expense) {
        return
ResponseEntity.ok(expenseService.saveExpense(expense));
    }
```

Step 2: Update Friends Controller

Add the following code to the **getAllFriends()** method

```
@GetMapping("/{username}")
public List<User> getAllFriends(@PathVariable String username) {
        return friendsService.getFriendsByInitiatorName(username);
    }
```

Step 3: Review User Controller

Review the UserController class

PART 5: Setup Data Access (ExpenseManager)

Step 1: Review Data Model Classes

Review content of the data model class, expense, CreateExpenseAllocationRequest

PART 6: Setup Services (ExpenseManager)

Step 1: Review Expense Service

Add the following code to the **createExpense()** method

```
// Generate UUID for the expense
        var expenseId = UUID.randomUUID();

        // Prepare the request body to send to the database service
        var databaseServiceUrl = "http://localhost:8090/";// URL of the
Database Service Application
        var expense = new Expense();
        expense.setId(expenseId);
        expense.setAmount(request.getAmount());
        expense.setDescription(request.getDescription());
        expense.setSplitType(request.getSplitType());
        expense.setDate(LocalDate.now());

        var updatedExpenses =
restTemplate.postForObject(databaseServiceUrl + "expenses", expense,
Expense.class);

        for (var friend : request.getFriends()) {
            CreateExpenseAllocationRequest allocationRequest = new
CreateExpenseAllocationRequest();
            allocationRequest.setExpenseId(expenseId);
            allocationRequest.setFriendId(friend.getUsername());

allocationRequest.setInitatorUser(request.getInitatorUser());
            allocationRequest.setAmount(friend.getAmount());

if(request.getSplitType().equals("EXACT_AMOUNT")) {
   allocationRequest.setAmount(friend.getAmount());
}
else {
   allocationRequest.setAmount(request.getAmount()
           .divide(BigDecimal.valueOf(request.getFriends().size()),
RoundingMode.HALF_UP));
}

            restTemplate.postForObject(databaseServiceUrl +
"expenseAllocation", allocationRequest,
CreateExpenseAllocationRequest.class);
        }
```

Step 3: Review Friends Service
Review the FriendsService class in ExpenseManager (could be used later as you build on to the project)

Step 4: Review User Service
Review the UserService class in ExpenseManager (could be used later as you build on to the project)

PART 7: Review Controller Classes (ExpenseManager)
Step 1: Review Controller Classes
Review content of all controller classes

PART 8: Kafka Set Up
Step 1: Download kafka
Download kafka: Apache Kafka Downloads page
Download the latest binary release (choose **Scala 2.13** if unsure)
Extract zip file
Open a terminal and cd into the folder (e.g cd kafka_2.13-3.3.2)

Step 2: Start Zookeeper
Run the following command

```
bin/zookeeper-server-start.sh config/zookeeper.properties
```

Step 3: Start Kafka Broker
Open new terminal tab and run

```
bin/kafka-server-start.sh config/server.properties
```

Step 4: Create Topic
Open new terminal tab and run

```
bin/kafka-topics.sh --create --topic expenses-topic --bootstrap-server
localhost:9092 --partitions 1 --replication-factor 1
```

Step 5: List Kafka Topic (Optional)
Run command to list Kafka topic

```
bin/kafka-topics.sh --list --bootstrap-server localhost:9092
```

Step 6: Open Producer (Optional)

Run command to list Kafka topic

```
bin/kafka-console-producer.sh --topic expenses-topic --bootstrap-server
localhost:9092
```

Step 7: Open Consumer(Optional)

Run command to list Kafka topic

```
bin/kafka-console-consumer.sh --topic expenses-topic --from-beginning --
bootstrap-server localhost:9092
```

PART 9: Update ExpenseManager to Publish to Kafka

Step 1: Update createExpense method

Add the following code to the **createExpense()** method at the end

```
if(updatedExpenses != null) {
            var message = "Expense added: " + updatedExpenses.getId() +
" - " + updatedExpenses.getDescription();
            // Publish the event to Kafka
            kafkaProducerService.sendMessage("expenses-topic", message);
        }
```

PART 10: Update NotificationService to Consume from Kafka

Step 1: Add code below to consumeBillSplitEvent()

```
 @KafkaListener(topics = "expenses-topic", groupId = "my-group-
id")
    public void consumeBillSplitEvent(String message) {
        // Process the incoming message
        String notificationMessage =
createNotificationMessage(message);

        // Send notification to the frontend
        notifyFrontend(notificationMessage);
    }
```

Step 2: Add code below to createNotificationMessage()

```
// Helper method to create a notification message based on the Kafka
message
    private String createNotificationMessage(String message) {
```

```
        return "Your friend has been notified to pay the bill. Event
details: " + message;
    }
```

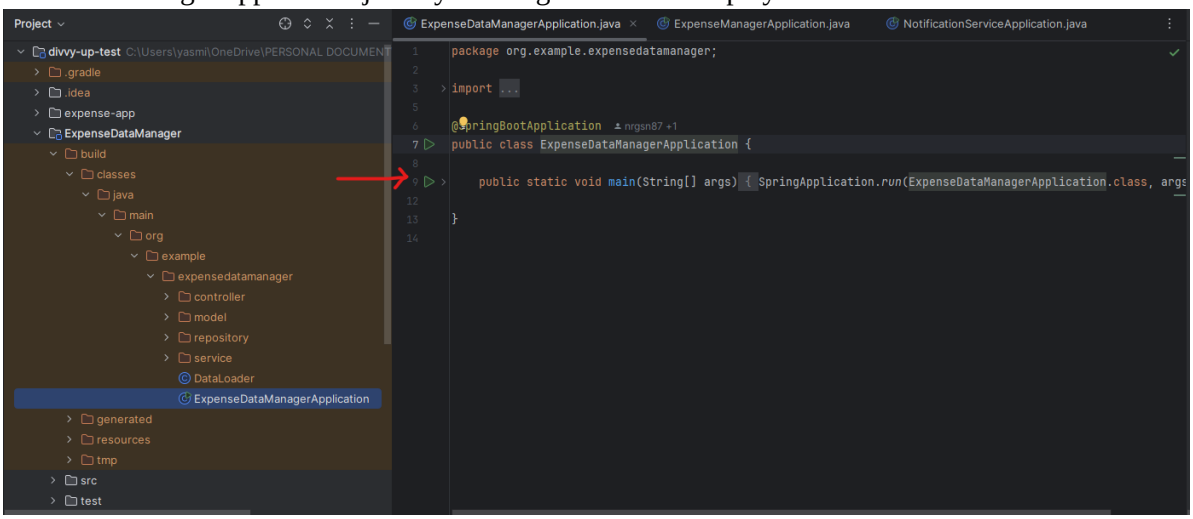
Step 3: Add code below to notifyFriends()

```
   // Notify the frontend via WebSocket
    private void notifyFrontend(String notificationMessage) {
        messagingTemplate.convertAndSend("/topic/notifications",
notificationMessage);
    }
```

PART 11: Run Backend

Step 1: Run all three Backend Services

Search for the “expenseDataManagerApplication.java” file (Shift, Shift)
Run expenseDataManagerApplication.java by clicking on the second play button.



Search for the “expenseManagerApplication.java” file (Shift, Shift)
Run expenseManagerApplication.java by clicking on the second play button.

Search for the “NotificationServiceApplication.java” file (Shift, Shift)
Run NotificationServiceApplication.java by clicking on the second play button.

Step 2: Review Data Loader Class

Navigate to DataLoader.java in ExpenseDataManager and review

Step 3: Navigate to H2 (database) Url

Navigate to h2 url to view the data loaded in the db and all other consequent data we will include

http://localhost:8090/h2-console/login.jsp?jsessionid=49e016d4ce88b05e6744f46e70d65b34

Change the JDBC url to: **jdbc:h2:mem:testdb;NON_KEYWORDS=user**

Password: sa

PART 12: Review UI Code (expense-app)

Step 1: Starting the UI

Navigate to expense-app folder and review the code

From a terminal, run the following command to start the UI.

```
cd expense-app
npm install
npm run build
npm start
```

PART 13: Authentication (Auth0) (Optional)

Step 1: Import Auth0 Library

Navigate to App.js and add the code below to import the Auth0 library and the Login page

```
import LoginButton from './LoginButton';
import { useAuth0 } from '@auth0/auth0-react';
```

Step 2: Authenticate User

comment the whole function “function App() and add the code below to verify if the user is authenticated if not, it will route the user to the login page

```
function App() {
  const { user, isAuthenticated, isLoading } = useAuth0();

  return (
    isAuthenticated ? (
      <div>
        <ExpensePage/>
        <NotificationComponent />
      </div>
    ): <LoginButton/>
  );
}
export default App;
```

Step 4: Import Logout Button

Navigate to ExpensePage.js and add the following code to import the logout page

```
import LogoutButton from './LogoutButton';
```

Step 5: Add Logout Button

On the same page ExpensePage.js add the following after line 168 (<button type="submit" className="submit-btn">Add Expense</button>)

```
<LogoutButton/>
```

Step 6: Import Autho library in index.js

Navigate to index.js import the Auth0 library by adding the following code

```
import {Auth0Provider} from '@auth0/auth0-react';
```

Step 7: Add Autho Domain and Client Domain for API connection

on the same file, index.js, comment line 7-13 and add the following code: the following code

```
const domain = process.env.REACT_APP_AUTH0_DOMAIN;
const clientId = process.env.REACT_APP_AUTH0_CLIENT_ID;
const root = ReactDOM.createRoot(document.getElementById('root'));

root.render(
  <React.StrictMode>
    <Auth0Provider
      domain={domain}
      clientId={clientId}
      redirectUri={window.location.origin}
    >
       <Router>
        <FriendsProvider>
          <App />
        </FriendsProvider>
      </Router>
    </Auth0Provider>
  </React.StrictMode>
);
```

Step 8: Rerun the application

```
npm install
npm run build
npm start
```

Step 9: Review LoginButton and LogoutButton files

Open LoginButton.js and LogoutButton.js and review

Final Solution: https://github.com/zuliatowoade/divvy-up-test