Setting Up a Spring Boot Application

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1 Introduction

This guide provides a simple setup for configuring a Spring Boot application before starting the persistence layer. We will cover project setup, application properties configuration, and testing the setup.

2 Step 1: Set Up Your Project

2.1 Create a New Spring Boot Project

- Use **Spring Initializr** or your IDE to create a new project.
- Choose **Maven** or **Gradle** as the build tool.
- Select **Java** as the language.
- Add the following dependencies:
  - **Spring Web** (for creating REST APIs)
  - **Spring Data JPA** (for persistence layer with JPA)
  - **H2 Database** (for an in-memory database to simplify setup)

2.2 Import the Project into Your IDE

- Open the project in your preferred IDE.
- Wait for the dependencies to download.

3 Step 2: Configure Application Properties

In the `src/main/resources` directory, open the `application.properties` (or `application.yml` if you prefer YAML format) file to configure the application settings.

3.1 Essential Configurations

Add the following configuration for connecting to an H2 database:

Listing 1: application.properties Configuration

```
# Server Configuration
server.port=8080

# H2 Database Configuration
spring.datasource.url=jdbc:h2:mem:testdb
spring.datasource.driverClassName=org.h2.Driver
spring.datasource.username=sa
spring.datasource.password=password
spring.datasource.initialization-mode=always

# JPA Configuration
spring.jpa.hibernate.ddl-auto=update
spring.jpa.show-sql=true
spring.jpa.properties.hibernate.format_sql=true
```

Explanation of Properties:

- `server.port`: Specifies the port the application will run on.
- `spring.datasource.url`: Sets the H2 in-memory database URL.
- `spring.datasource.initialization-mode=always`: Ensures the schema is initialized each time the app starts.
- `spring.jpa.hibernate.ddl-auto=update`: Configures Hibernate to update the database schema based on entity mappings.
- `spring.jpa.show-sql`: Enables SQL query logging for debugging.
- `spring.jpa.properties.hibernate.format_sql`: Formats SQL for easier reading in the console.

3.2 Optional Configurations

To access the H2 Console for database exploration, add:

Listing 2: Enabling the H2 Console

```
# H2 Console Configuration
spring.h2.console.enabled=true
spring.h2.console.path=/h2-console
```

This will enable the H2 console at `http://localhost:8080/h2-console`.

4 Step 3: Verify Dependencies and Structure

Make sure the following dependencies are present in your `pom.xml` (for Maven):

Listing 3: Dependencies in pom.xml

```
<dependency>
    <groupId>org.springframework.boot</groupId>
    <artifactId>spring-boot-starter-web</artifactId>
</dependency>
<dependency>
    <groupId>org.springframework.boot</groupId>
    <artifactId>spring-boot-starter-data-jpa</artifactId>
</dependency>
<dependency>
    <groupId>com.h2database</groupId>
    <artifactId>h2</artifactId>
    <scope>runtime</scope>
</dependency>
```

For Gradle, they will be in `build.gradle` as:

Listing 4: Dependencies in build.gradle

```
implementation 'org.springframework.boot:spring-boot-starter-web'
implementation 'org.springframework.boot:spring-boot-starter-data-jpa'
runtimeOnly 'com.h2database:h2'
```

5 Step 4: Test Your Configuration

- Run the Spring Boot application by executing `mvn spring-boot:run` (for Maven) or `./gradlew bootRun` (for Gradle).
- Check for any startup errors to ensure your configurations are correct.
- Visit `http://localhost:8080/h2-console` and log in with the credentials `sa` (username) and `password` to test the H2 Console.

This setup provides a simple yet powerful base configuration that lets you add entities and repository classes in the persistence layer smoothly. You're now ready to start implementing your persistence logic!