Spring Boot 3.0 - JWT Authentication with Spring Security using MySQL Database

Last Updated : 23 Jul, 2025

In **Spring Security 5.7.0**, the Spring team deprecated the **WebSecurityConfigurerAdapter**, as they encourage users to move towards a component-based security configuration. Spring Boot 3.0 has come with many changes in Spring Security. In this article, we are going to learn how to implement **JWT authentication and authorization** in a Spring Boot 3.0 application using Spring Security 6 with MySQL Database.

Demo Project

Step 1: Create a New Spring Boot Project in Spring Initializr

To create a new Spring Boot project, please refer to How to Create a Spring Boot Project in Spring Initializr and Run it in IntelliJ IDEA . For this project, choose the following things:

- Project: Maven
- Language: Java
- Packaging: Jar
- Java: 17

Please choose the following dependencies while creating the project.

- Spring Web
- Spring Security
- MySQL Driver
- Spring Data JPA
- Lombok

Additionally, we have added dependencies for JWT also. Below are the dependencies

```
<dependency>
   <groupId>io.jsonwebtoken</groupId>
   <artifactId>jjwt-api</artifactId>
   <version>0.11.5</version>
</dependency>
<dependency>
   <groupId>io.jsonwebtoken</groupId>
   <artifactId>jjwt-impl</artifactId>
   <version>0.11.5</version>
</dependency>
<dependency>
</dependency>
```

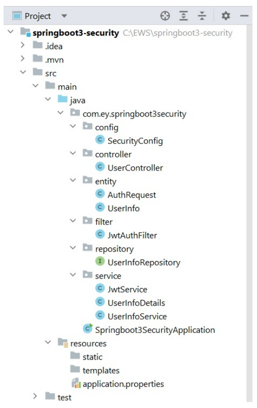
Below is the complete **pom.xml** file. Please cross-verify if you have missed some dependencies.

```
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="https://maven.apache.org/POM/4.0.0"
         xmlns:xsi="https://www.w3.org/2001/XMLSchema-instance"
         xsi:schemaLocation="https://maven.apache.org/POM/4.0.0
https://maven.apache.org/xsd/maven-4.0.0.xsd">
    <modelVersion>4.0.0</modelVersion>
```

```xml
    <parent>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-parent</artifactId>
        <version>3.0.8</version>
        <relativePath/> <!-- lookup parent from repository -->
    </parent>

    <groupId>com.gfg</groupId>
    <artifactId>springboot3-security</artifactId>
    <version>0.0.1-SNAPSHOT</version>
    <name>springboot3-security</name>
    <description>Demo project for Spring Boot 3 Security</description>

    <properties>
        <java.version>17</java.version>
        <jjwt.version>0.11.5</jjwt.version>
    </properties>

    <dependencies>
        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-starter-data-jpa</artifactId>
        </dependency>
        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-starter-security</artifactId>
        </dependency>
        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-starter-web</artifactId>
        </dependency>

        <dependency>
            <groupId>com.mysql</groupId>
            <artifactId>mysql-connector-j</artifactId>
            <scope>runtime</scope>
        </dependency>
        <dependency>
            <groupId>org.projectlombok</groupId>
            <artifactId>lombok</artifactId>
            <optional>true</optional>
        </dependency>
        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-starter-test</artifactId>
            <scope>test</scope>
        </dependency>
        <dependency>
            <groupId>org.springframework.security</groupId>
            <artifactId>spring-security-test</artifactId>
            <scope>test</scope>
        </dependency>
        <dependency>
            <groupId>io.jsonwebtoken</groupId>
            <artifactId>jjwt-api</artifactId>
            <version>${jjwt.version}</version>
        </dependency>
        <dependency>
            <groupId>io.jsonwebtoken</groupId>
            <artifactId>jjwt-impl</artifactId>
            <version>${jjwt.version}</version>
        </dependency>
        <dependency>
            <groupId>io.jsonwebtoken</groupId>
            <artifactId>jjwt-jackson</artifactId>
            <version>${jjwt.version}</version>
        </dependency>
    </dependencies>

    <build>
        <plugins>
            <plugin>
                <groupId>org.springframework.boot</groupId>
                <artifactId>spring-boot-maven-plugin</artifactId>
                <version>3.0.8</version> <!-- Specify the version explicitly -->
                <configuration>
                    <excludes>
                        <exclude>
                            <groupId>org.projectlombok</groupId>
                            <artifactId>lombok</artifactId>
                        </exclude>
                    </excludes>
                </configuration>
            </plugin>
        </plugins>
    </build>
</project>
```

Project Structure:

Before moving to the project here is the complete project structure.



```
Project
springboot3-security C:\EWS\springboot3-security
  .idea
  .mvn
  src
    main
      java
        com.ey.springboot3security
          config
            SecurityConfig
          controller
            UserController
          entity
            AuthRequest
            UserInfo
          filter
            JwtAuthFilter
          repository
            UserInfoRepository
          service
            JwtService
            UserInfoDetails
            UserInfoService
          Springboot3SecurityApplication
      resources
        static
        templates
        application.properties
    test
```

Step 2: Create a Controller

Go to the **src > main > java > controller** and create a class **UserController** and put the below code. In this, we have created a simple **REST API** in our controller class.

UserController.java:

```java
package com.ey.springboot3security.controller;

import com.ey.springboot3security.entity.AuthRequest;
import com.ey.springboot3security.entity.UserInfo;
import com.ey.springboot3security.service.JwtService;
import com.ey.springboot3security.service.UserInfoService;

import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.security.access.prepost.PreAuthorize;
import org.springframework.security.authentication.AuthenticationManager;
import org.springframework.security.authentication.UsernamePasswordAuthenticationToken;
import org.springframework.security.core.Authentication;
import org.springframework.security.core.userdetails.UsernameNotFoundException;

import org.springframework.web.bind.annotation.*;

@RestController
@RequestMapping("/auth")
@RequiredArgsConstructor
public class UserController {

    private UserInfoService service;

    private JwtService jwtService;

    private AuthenticationManager authenticationManager;

    @GetMapping("/welcome")
    public String welcome() {
        return "Welcome this endpoint is not secure";
    }

    @PostMapping("/addNewUser")
    public String addNewUser(@RequestBody UserInfo userInfo) {
        return service.addUser(userInfo);
    }

    // Removed the role checks here as they are already managed in SecurityConfig

    @PostMapping("/generateToken")
    public String authenticateAndGetToken(@RequestBody AuthRequest authRequest) {
        Authentication authentication = authenticationManager.authenticate(
            new UsernamePasswordAuthenticationToken(authRequest.getUsername(),
authRequest.getPassword())
        );
        if (authentication.isAuthenticated()) {
            return jwtService.generateToken(authRequest.getUsername());
        } else {
            throw new UsernameNotFoundException("Invalid user request!");
        }
    }
}
```

Step 3: Create a SecurityConfig Class

Go to the **src > main > java > config** and create a class **SecurityConfig** and put the below code. This is the new changes brought in Spring Boot 3.0.

```java
package com.ey.springboot3security.config;

import com.ey.springboot3security.filter.JwtAuthFilter;
import com.ey.springboot3security.service.UserInfoDetails;

import org.springframework.context.annotation.Bean;
import org.springframework.context.annotation.Configuration;
import org.springframework.security.authentication.AuthenticationManager;
import org.springframework.security.authentication.AuthenticationProvider;
import org.springframework.security.authentication.dao.DaoAuthenticationProvider;
import
org.springframework.security.config.annotation.authentication.builders.AuthenticationManage
rBuilder;
import
org.springframework.security.config.annotation.authentication.configuration.AuthenticationC
onfiguration;
import
org.springframework.security.config.annotation.method.configuration.EnableMethodSecurity;
import org.springframework.security.config.annotation.web.builders.HttpSecurity;
import org.springframework.security.config.annotation.web.configuration.EnableWebSecurity;
import org.springframework.security.config.http.SessionCreationPolicy;
import org.springframework.security.core.userdetails.UserDetailsService;
import org.springframework.security.crypto.bcrypt.BCryptPasswordEncoder;
import org.springframework.security.crypto.password.PasswordEncoder;
import org.springframework.security.web.SecurityFilterChain;
import
org.springframework.security.web.authentication.UsernamePasswordAuthenticationFilter;

@Configuration
@EnableWebSecurity
public class SecurityConfig {

    private final JwtAuthFilter jwtAuthFilter;
    private final UserDetailsService userDetailsService;

    // Constructor injection for required dependencies
    public SecurityConfig(JwtAuthFilter jwtAuthFilter,
                         UserDetailsService userDetailsService) {
    this.jwtAuthFilter = jwtAuthFilter;
    this.userDetailsService = userDetailsService;
}


    /*
     * Main security configuration
     * Defines endpoint access rules and JWT filter setup
     */
    @Bean
    public SecurityFilterChain securityFilterChain(HttpSecurity http) throws Exception {
        http
            // Disable CSRF (not needed for stateless JWT)
            .csrf(csrf -> csrf.disable())

            // Configure endpoint authorization
            .authorizeHttpRequests(auth -> auth
                // Public endpoints
                .requestMatchers("/auth/welcome", "/auth/addNewUser",
"/auth/generateToken").permitAll()

                // Role-based endpoints
                .requestMatchers("/auth/user/**").hasAuthority("ROLE_USER")
                .requestMatchers("/auth/admin/**").hasAuthority("ROLE_ADMIN")

                // All other endpoints require authentication
                .anyRequest().authenticated()
            )

            // Stateless session (required for JWT)
            .sessionManagement(sess ->
sess.sessionCreationPolicy(SessionCreationPolicy.STATELESS))

            // Set custom authentication provider
            .authenticationProvider(authenticationProvider())

            // Add JWT filter before Spring Security's default filter
            .addFilterBefore(jwtAuthFilter, UsernamePasswordAuthenticationFilter.class);
        return http.build();
    }

    /*
     * Password encoder bean (uses BCrypt hashing)
     * Critical for secure password storage
     */
    @Bean
    public PasswordEncoder passwordEncoder() {
        return new BCryptPasswordEncoder();
    }

    /*
     * Authentication provider configuration
     * Links UserDetailsService and PasswordEncoder
     */
    @Bean
    public AuthenticationProvider authenticationProvider() {
        DaoAuthenticationProvider provider = new DaoAuthenticationProvider();
        provider.setUserDetailsService(userDetailsService);
        provider.setPasswordEncoder(passwordEncoder());
        return provider;
    }

    /*
     * Authentication manager bean
     * Required for programmatic authentication (e.g., in /generateToken)
     */
    @Bean
    public AuthenticationManager authenticationManager(AuthenticationConfiguration config)
throws Exception {
        return config.getAuthenticationManager();
    }
}
```

Step 4: Create Entity Classes

Go to the **src > main > java > entity** and create a class **UserInfo** and put the below code.

```
package com.ey.springboot3security.entity;

import jakarta.persistence.Entity;
import jakarta.persistence.GeneratedValue;
import jakarta.persistence.GenerationType;
import jakarta.persistence.Id;
import lombok.AllArgsConstructor;
import lombok.Data;
import lombok.NoArgsConstructor;

@Entity
@Data
@AllArgsConstructor
@NoArgsConstructor
public class UserInfo {

    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    private int id;
    private String name;
    private String email;
    private String password;
    private String roles;

}
```

Similarly, create a class **AuthRequest** and put the below code.

```
package com.ey.springboot3security.entity;

import lombok.AllArgsConstructor;
import lombok.Data;
import lombok.NoArgsConstructor;

@Data
@AllArgsConstructor
@NoArgsConstructor
public class AuthRequest {

    private String username;
    private String password;

}
```

Step 5: Create Filter Class

Go to the **src > main > java > filter** and create a class **JwtAuthFilter** and put the below code.

```
package com.ey.springboot3security.filter;

import com.ey.springboot3security.service.UserInfoDetails;
import com.ey.springboot3security.service.JwtService;

import jakarta.servlet.FilterChain;
import jakarta.servlet.ServletException;
import jakarta.servlet.http.HttpServletRequest;
import jakarta.servlet.http.HttpServletResponse;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.security.authentication.UsernamePasswordAuthenticationToken;
import org.springframework.security.core.context.SecurityContextHolder;
import org.springframework.security.core.userdetails.UserDetails;
import org.springframework.security.web.authentication.WebAuthenticationDetailsSource;
import org.springframework.stereotype.Component;
import org.springframework.web.filter.OncePerRequestFilter;

import java.io.IOException;

@Component
public class JwtAuthFilter extends OncePerRequestFilter {

    private final UserDetailsService userDetailsService;
    private final JwtService jwtService;

    @Autowired
    public JwtAuthFilter(UserDetailsService userDetailsService, JwtService jwtService) {
        this.userDetailsService = userDetailsService;
        this.jwtService = jwtService;
    }

    @Override
    protected void doFilterInternal(HttpServletRequest request, HttpServletResponse
response, FilterChain filterChain) throws ServletException, IOException {
        String authHeader = request.getHeader("Authorization");
        String token = null;
        String username = null;

        if (authHeader != null && authHeader.startsWith("Bearer ")) {
            token = authHeader.substring(7);
            username = jwtService.extractUsername(token);
        }

        if (username != null && SecurityContextHolder.getContext().getAuthentication() ==
null) {
            UserDetails userDetails = userDetailsService.loadUserByUsername(username);
            if (jwtService.validateToken(token, userDetails)) {
                UsernamePasswordAuthenticationToken authToken = new
UsernamePasswordAuthenticationToken(
                        userDetails,
                        null,
                        userDetails.getAuthorities());
                authToken.setDetails(new
WebAuthenticationDetailsSource().buildDetails(request));
                SecurityContextHolder.getContext().setAuthentication(authToken);
            }
        }
        filterChain.doFilter(request, response);
    }
}
```

Step 6: Create a Repository Interface

Go to the **src > main > java > repository** and create an interface **UserInfoRepository** and put the below code.

```
package com.ey.springboot3security.repository;

import com.ey.springboot3security.entity.UserInfo;

import org.springframework.data.jpa.repository.JpaRepository;
import java.util.Optional;

@Repository
public interface UserInfoRepository extends JpaRepository<UserInfo, Integer> {
    Optional<UserInfo> findByEmail(String email); // Use 'email' if that is the correct
field for login
}
```

Step 7: Create Service Classes

Go to the **src > main > java > service** and create a class **JwtService** and put the below code.

```
package com.ey.springboot3security.service;

import io.jsonwebtoken.Claims;
import io.jsonwebtoken.Jwts;
import io.jsonwebtoken.SignatureAlgorithm;
import io.jsonwebtoken.io.Decoders;
import io.jsonwebtoken.security.Keys;
import org.springframework.security.core.userdetails.UserDetails;
import org.springframework.stereotype.Component;

import java.security.Key;
import java.util.Date;
import java.util.HashMap;
import java.util.Map;
import java.util.function.Function;

@Component
public class JwtService {

    public static final String SECRET =
"5367566859703373367639792F423F452848284D6251655468576D5A71347437";

    public String generateToken(String email) { // Use email as username
        Map<String, Object> claims = new HashMap<>();
        return createToken(claims, email);
    }

    private String createToken(Map<String, Object> claims, String email) {
        return Jwts.builder()
                .setClaims(claims)
                .setSubject(email)
                .setIssuedAt(new Date())
                .setExpiration(new Date(System.currentTimeMillis() + 1000 * 60 * 30))
                .signWith(getSignKey(), SignatureAlgorithm.HS256)
                .compact();
    }

    private Key getSignKey() {
        byte[] keyBytes = Decoders.BASE64.decode(SECRET);
        return Keys.hmacShaKeyFor(keyBytes);
    }

    public String extractUsername(String token) {
        return extractClaim(token, Claims::getSubject);
    }

    public Date extractExpiration(String token) {
        return extractClaim(token, Claims::getExpiration);
    }

    public <T> T extractClaim(String token, Function<Claims, T> claimsResolver) {
        final Claims claims = extractAllClaims(token);
        return claimsResolver.apply(claims);
    }

    private Claims extractAllClaims(String token) {
        return Jwts.parserBuilder()
                .setSigningKey(getSignKey())
                .build()
                .parseClaimsJws(token)
                .getBody();
    }

    private Boolean isTokenExpired(String token) {
        return extractExpiration(token).before(new Date());
    }

    public Boolean validateToken(String token, UserDetails userDetails) {
        final String username = extractUsername(token);
        return (username.equals(userDetails.getUsername()) && !isTokenExpired(token));
    }
}
```

Similarly, create a class **UserInfoDetails** and put the below code.

```
package com.ey.springboot3security.service;

import com.ey.springboot3security.entity.UserInfo;

import org.springframework.security.core.GrantedAuthority;
import org.springframework.security.core.authority.SimpleGrantedAuthority;
import org.springframework.security.core.userdetails.UserDetails;

import java.util.Collection;
import java.util.List;
import java.util.stream.Collectors;

public class UserInfoDetails implements UserDetails {

    private String username; // Changed from 'name' to 'email' for clarity
    private String password;
    private List<GrantedAuthority> authorities;

    public UserInfoDetails(UserInfo userInfo) {
        this.username = userInfo.getEmail(); // Use email as username
        this.password = userInfo.getPassword();
        this.authorities = List.of(userInfo.getRoles().split(","))
                .stream()
                .map(SimpleGrantedAuthority::new)
                .collect(Collectors.toList());
    }

    @Override
    public Collection<? extends GrantedAuthority> getAuthorities() {
        return authorities;
    }

    @Override
    public String getUsername() {
        return username;
    }

    @Override
    public boolean isAccountNonExpired() {
        return true;
    }

    @Override
    public boolean isAccountNonLocked() {
        return true;
    }

    @Override
    public boolean isCredentialsNonExpired() {
        return true;
    }

    @Override
    public boolean isEnabled() {
        return true;
    }
}
```

Similarly, create a class **UserInfoService** and put the below code.

```
package com.ey.springboot3security.service;

import com.ey.springboot3security.entity.UserInfo;
import com.ey.springboot3security.repository.UserInfoRepository;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.security.core.userdetails.User;
import org.springframework.security.core.userdetails.UserDetails;
import org.springframework.security.core.userdetails.UsernameNotFoundException;
import org.springframework.security.crypto.password.PasswordEncoder;
import org.springframework.stereotype.Service;

import java.util.Optional;

@Service
public class UserInfoService implements UserDetailsService {

    private final UserInfoRepository repository;
    private final PasswordEncoder encoder;
    @Autowired
    public UserInfoService(UserInfoRepository repository, PasswordEncoder encoder) {
        this.repository = repository;
        this.encoder = encoder;
    }

    // Method to load user details by username (email)
    @Override
    public UserDetails loadUserByUsername(String username) throws UsernameNotFoundException
{
        // Fetch user from the database by email (username)
        Optional<UserInfo> userInfo = repository.findByEmail(username);

        if (userInfo.isEmpty()) {
            throw new UsernameNotFoundException("User not found with email: " + username);
        }

        // Convert UserInfo to UserDetails (UserInfoDetails)
        UserInfo user = userInfo.get();
        return new User(user.getEmail(), user.getPassword(), user.getRoles());
    }

    // Add any additional methods for registering or managing users
    public String addUser(UserInfo userInfo) {
        // Encrypt password before saving
        userInfo.setPassword(encoder.encode(userInfo.getPassword()));
        repository.save(userInfo);
        return "User added successfully!";
    }
}
```

Step 8: application.properties

Make the following changes in the **application.properties** file:

```
spring.datasource.driver-class-name=com.mysql.cj.jdbc.Driver
spring.datasource.url = jdbc:mysql://localhost:3306/university
spring.datasource.username = root
spring.datasource.password = 143@Arpilu
spring.jpa.hibernate.ddl-auto = update
spring.jpa.properties.hibernate.dialect = org.hibernate.dialect.MySQLDialect
spring.jpa.hibernate.naming.physical-strategy=org.hibernate.boot.model.naming.PhysicalNamingStrategyStandardImpl
```

Test the Application

Now run your application and test it out. Hit the following URL:

http://localhost:8080/auth/addNewUser

It will add the user to the database.

Below is our database screenshot.

Now, hit the following URL to generate the token.

http://localhost:8080/auth/generateToken

It will generate the token.

Now using this take we can access our endpoint according to the ROLE. Hit the following URL and put the Bearer token.

http://localhost:8080/auth/user/userProfile

Refer to the screenshot below.

Comment More info Advertise with us

Explore