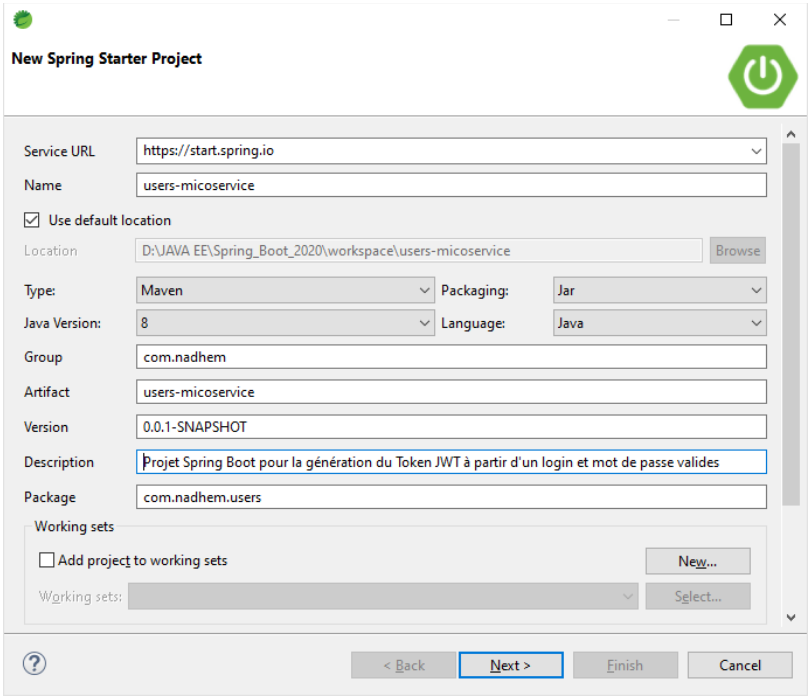
Spring Boot : Génération du JWT Token Version 3.2.x

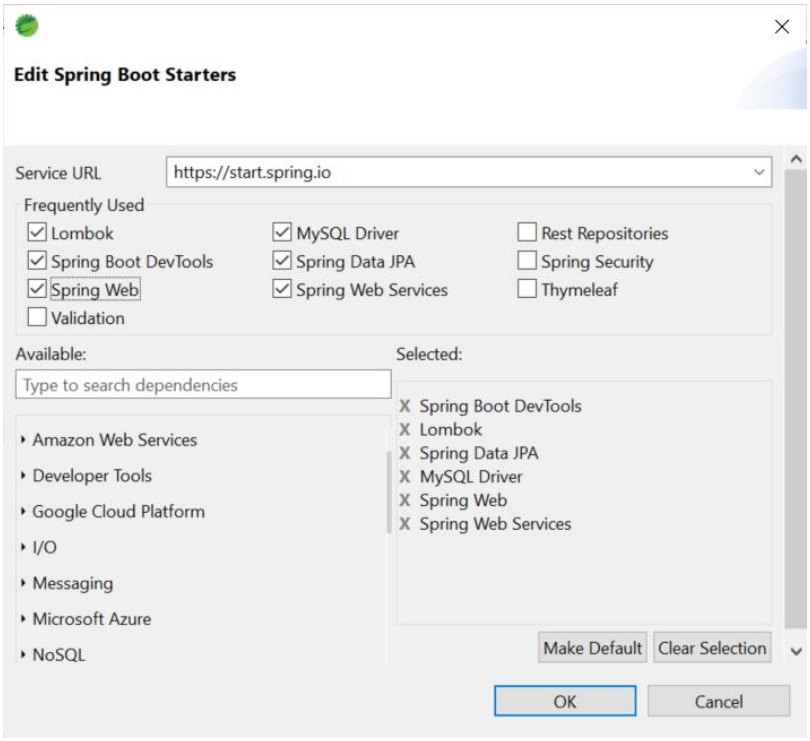
Objectifs :

1. Créer le projet et ajouter les dépendances,
2. Editer le fichier *application.properties*,
3. Créer les entités *User* et *Role* et leurs interfaces *Repository*,
4. Ajouter *Spring Security* et *auth0* au projet,
5. Créer la couche service,
6. Créer la classe *SecurityConfig*,
7. Créer la classe *MyUserDetailsService*,
8. Générer le token *JWT* à la suite d'une authentication,
9. Tester la génération du *JWT* avec *POSTMAN*.

Créer le projet et ajouter les dépendances

1. Créer le projet *users-microservice* et ajouter les dépendances





Editer le fichier application.properties

2. Editer le fichier *application.properties*

```
spring.datasource.url=jdbc:mysql://localhost:3306/users_db?createDatabaseIf
NotExist=true&useSSL=false&serverTimezone=UTC
spring.datasource.username=root
spring.jpa.show-sql=true
spring.jpa.hibernate.ddl-auto=update
server.servlet.context-path=/users
server.port=8081
spring.main.allow-circular-references=true
```

Créer les entités User et Rôle et leurs interfaces Repository

3. Créer dans le package entities l'entité User :

```
package com.nadhem.users.entities;
import java.util.List;
import javax.persistence.CascadeType;
import javax.persistence.Column;
import javax.persistence.Entity;
import javax.persistence.FetchType;
import javax.persistence.GeneratedValue;
import javax.persistence.GenerationType;
import javax.persistence.Id;
import javax.persistence.JoinColumn;
import javax.persistence.JoinTable;
import javax.persistence.ManyToMany;
import lombok.Data;
```

```
@Data @NoArgsConstructor @AllArgsConstructor
@Entity
public class User {
 @Id
 @GeneratedValue (strategy=GenerationType.IDENTITY)
 private Long user_id;

 @Column(unique=true)
 private String username;
 private String password;
 private Boolean enabled;

    @ManyToMany(cascade=CascadeType.ALL, fetch = FetchType.EAGER)
 @JoinTable(name="user_role",joinColumns = @JoinColumn(name="user_id") ,
                 inverseJoinColumns = @JoinColumn(name="role_id"))
 private List<Role> roles;
}
```

4. Créer dans le package entities l'entité Role :

```
package com.nadhem.users.entities;

import javax.persistence.Entity;
import javax.persistence.GeneratedValue;
import javax.persistence.GenerationType;
import javax.persistence.Id;
import lombok.Data;

@Data @NoArgsConstructor @AllArgsConstructor
@Entity
public class Role {
 @Id
 @GeneratedValue (strategy=GenerationType.IDENTITY)
 private Long role_id;
 private String role;
}
```

5. Créer dans le package repos, l'interface UserRepository

```
package com.nadhem.users.repos;

import org.springframework.data.jpa.repository.JpaRepository;
import com.nadhem.users.entities.User;

public interface UserRepository extends JpaRepository<User, Long> {

        User findByUsername(String username);

}
```

6. Créer dans le package repos, l'interface RoleRepository

```java
package com.nadhem.users.repos;

import org.springframework.data.jpa.repository.JpaRepository;
import com.nadhem.users.entities.Role;

public interface RoleRepository extends JpaRepository<Role, Long> {

	Role findByRole(String role);

}
```

Ajouter *Spring Security* et *auth0* au projet

7. Ajouter les dépendances Spring security et JWT au fichier pom.xml :

```xml
<dependency>
	<groupId>org.springframework.boot</groupId>
	<artifactId>spring-boot-starter-security</artifactId>
</dependency>

<dependency>
	<groupId>com.auth0</groupId>
	<artifactId>java-jwt</artifactId>
	<version>3.4.1</version>
</dependency>
```

Créer la couche service

8. Créer l'interface UserService

```java
package com.nadhem.users.service;

import com.nadhem.users.entities.Role;
import com.nadhem.users.entities.User;

public interface UserService {
	User saveUser(User user);
	User findUserByUsername (String username);
	Role addRole(Role role);
	User addRoleToUser(String username, String rolename);
}
```

9. Créer l'implémentation UserServiceImpl

```java
package com.nadhem.users.service;

import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.security.crypto.bcrypt.BCryptPasswordEncoder;
import org.springframework.stereotype.Service;
import org.springframework.transaction.annotation.Transactional;
import com.nadhem.users.entities.Role;
import com.nadhem.users.entities.User;
import com.nadhem.users.repos.RoleRepository;
import com.nadhem.users.repos.UserRepository;
```

```
@Transactional
@Service
public class UserServiceImpl  implements UserService{

	@Autowired
	UserRepository userRep;

	@Autowired
	RoleRepository roleRep;


	@Autowired
	BCryptPasswordEncoder bCryptPasswordEncoder;

	@Override
	public User saveUser(User user) {

		user.setPassword(bCryptPasswordEncoder.encode(user.getPassword()));
		return userRep.save(user);
	}

	@Override
	public User addRoleToUser(String username, String rolename) {
		User usr = userRep.findByUsername(username);
		Role r = roleRep.findByRole(rolename);

		usr.getRoles().add(r);
		return usr;
	}


	@Override
	public Role addRole(Role role) {
		return roleRep.save(role);
	}

	@Override
	public User findUserByUsername(String username) {
		return userRep.findByUsername(username);
	}

}
```

10. Modifier la classe *`UsersMicoserviceApplication`* pour ajouter les rôles et les utilisateurs

```
	@Autowired
	UserService userService;

	@PostConstruct
	void init_users() {
		//ajouter les rôles
		userService.addRole(new Role(null,"ADMIN"));
		userService.addRole(new Role(null,"USER"));

		//ajouter les users
		userService.saveUser(new User(null,"admin","123",true,null));
```

```
        userService.saveUser(new User(null,"nadhem","123",true,null));
        userService.saveUser(new User(null,"yassine","123",true,null));

        //ajouter les rôles aux users
        userService.addRoleToUser("admin", "ADMIN");
        userService.addRoleToUser("admin", "USER");

        userService.addRoleToUser("nadhem", "USER");
        userService.addRoleToUser("yassine", "USER");
}


@Bean
BCryptPasswordEncoder getBCE() {
        return new BCryptPasswordEncoder();

}
```

11. Démarrer l'application pour tester l'ajout des utilisateurs et leurs rôles dans la base de données

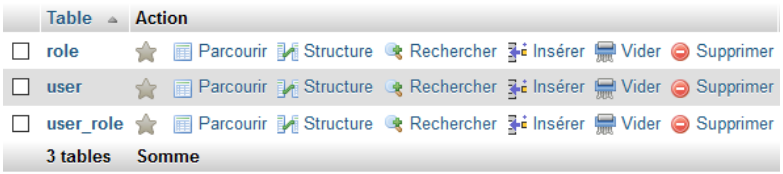
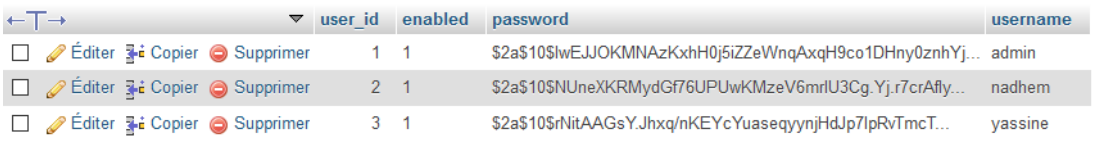


Table	Action
role	Parcourir Structure Rechercher Insérer Vider Supprimer
user	Parcourir Structure Rechercher Insérer Vider Supprimer
user_role	Parcourir Structure Rechercher Insérer Vider Supprimer
3 tables	Somme



←T→	user_id	enabled	password	username
Éditer Copier Supprimer	1	1	$2a$10$lwEJJOKMNAzKxhH0j5iZZeWnqAxqH9co1DHny0znhYj...	admin
Éditer Copier Supprimer	2	1	$2a$10$NUneXKRMydGf76UPUwKMzeV6mrlU3Cg.Yj.r7crAfly...	nadhem
Éditer Copier Supprimer	3	1	$2a$10$rNitAAGsY.Jhxq/nKEYcYuaseqyynjHdJp7IpRvTmcT...	yassine

Remarque :

Une fois les utilisateurs et leurs rôles sont enregistrés dans la base de données commentez la méthode init_users()

Créer la classe *SecurityConfig*

12. Créer la classe de configuration SecurityBeansConfiguration, placez la dans le package security :

```
package com.nadhem.users.security;

import org.springframework.context.annotation.Bean;
import org.springframework.context.annotation.Configuration;
import org.springframework.security.authentication.AuthenticationManager;
import org.springframework.security.config.annotation.authentication.configuration.AuthenticationConfiguration;
import org.springframework.security.crypto.bcrypt.BCryptPasswordEncoder;

@Configuration
public class SecurityBeansConfiguration {
    @Bean
    public BCryptPasswordEncoder passwordEncoder() {
        return new BCryptPasswordEncoder();
    }

 @Bean
 public AuthenticationManager
authenticationManager(AuthenticationConfiguration config) throws Exception
{
        return config.getAuthenticationManager();
    }
}
```

Remarque :

Avant de continuer, N'oubliez pas de supprimer la Bean `getBCE()` de la classe de démarrage : `UsersMicroserviceApplication`

13. Créer la classe SecurityConfig, placez la dans le package security :

```
package com.nadhem.users.security;

import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.context.annotation.Bean;
import org.springframework.context.annotation.Configuration;
import org.springframework.security.authentication.AuthenticationManager;
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.web.SecurityFilterChain;


@Configuration
@EnableWebSecurity
public class SecurityConfig {

    @Autowired
    AuthenticationManager authMgr;
```

```
    @Bean
    public SecurityFilterChain filterChain(HttpSecurity http) throws
   Exception {

        http.sessionManagement(session ->
session.sessionCreationPolicy(SessionCreationPolicy.STATELESS))

         .csrf(csrf -> csrf.disable())

      .authorizeHttpRequests(requests->
requests.requestMatchers("/login").permitAll()

      .anyRequest().authenticated() ) ;


      return http.build();
      }


   }
```

Créer la classe *MyUserDetailsService*

14. Créer la classe MyUserDetailsService qui implémente UserDetailsService:

```
   package com.nadhem.users.security;

   import java.util.ArrayList;
   import java.util.List;
   import org.springframework.beans.factory.annotation.Autowired;
   import org.springframework.security.core.GrantedAuthority;
   import org.springframework.security.core.authority.SimpleGrantedAuthority;
   import org.springframework.security.core.userdetails.UserDetails;
   import org.springframework.security.core.userdetails.UserDetailsService;
   import org.springframework.security.core.userdetails.UsernameNotFoundException;
   import org.springframework.stereotype.Service;
   import com.nadhem.users.entities.User;
   import com.nadhem.users.service.UserService;



   @Service
   public class MyUserDetailsService implements UserDetailsService {
      @Autowired
      UserService userService;

   @Override
   public UserDetails loadUserByUsername(String username) throws
   UsernameNotFoundException {
      User user = userService.findUserByUsername(username);

   if (user==null)
       throw new UsernameNotFoundException("Utilisateur introuvable !");
```

```
    List<GrantedAuthority> auths = new ArrayList<>();

     user.getRoles().forEach(role -> {
           GrantedAuthority auhority = new
SimpleGrantedAuthority(role.getRole());
           auths.add(auhority);
     });

    return new org.springframework.security.core.
                userdetails.User(user.getUsername(),user.getPassword(),auths);
  }
}
```

Générer le token JWT suite à une authentication

15. Créer la classe `JWTAuthenticationFilter`

```
package com.nadhem.users.security;

import java.io.IOException;
import java.util.ArrayList;
import java.util.Date;
import java.util.List;
import jakarta.servlet.FilterChain;
import jakarta.servlet.ServletException;
import jakarta.servlet.http.HttpServletRequest;
import jakarta.servlet.http.HttpServletResponse;
import org.springframework.security.authentication.AuthenticationManager;
import org.springframework.security.authentication.UsernamePasswordAuthenticationToken;
import org.springframework.security.core.Authentication;
import org.springframework.security.core.AuthenticationException;
import org.springframework.security.web.authentication.UsernamePasswordAuthenticationFilter;
import com.auth0.jwt.JWT;
import com.auth0.jwt.algorithms.Algorithm;
import com.fasterxml.jackson.core.JsonParseException;
import com.fasterxml.jackson.databind.JsonMappingException;
import com.fasterxml.jackson.databind.ObjectMapper;
import com.nadhem.users.entities.User;

public class JWTAuthenticationFilter extends
UsernamePasswordAuthenticationFilter{


    private AuthenticationManager authenticationManager;



    public JWTAuthenticationFilter(AuthenticationManager authenticationManager)
{
          super();
          this.authenticationManager = authenticationManager;
    }

    @Override
    public Authentication attemptAuthentication(HttpServletRequest request,
HttpServletResponse response)
                throws AuthenticationException {

          User user =null;
```

```
            try {
                  user = new ObjectMapper().readValue(request.getInputStream(),
    User.class);
            } catch (JsonParseException e) {
                  e.printStackTrace();
            } catch (JsonMappingException e) {
                  e.printStackTrace();
            } catch (IOException e) {
                  e.printStackTrace();
            }

            return authenticationManager.
                        authenticate(new
    UsernamePasswordAuthenticationToken(user.getUsername(),user.getPassword()));
        }

        @Override
        protected void successfulAuthentication(HttpServletRequest request,
    HttpServletResponse response, FilterChain chain,
                  Authentication authResult) throws IOException, ServletException
    {

            org.springframework.security.core.userdetails.User springUser =
                  (org.springframework.security.core.userdetails.User)
    authResult.getPrincipal();

            List<String> roles = new ArrayList<>();
            springUser.getAuthorities().forEach(au-> {
                  roles.add(au.getAuthority());
            });

            String jwt = JWT.create().
                        withSubject(springUser.getUsername()).
            withArrayClaim("roles", roles.toArray(new String[roles.size()])).
            withExpiresAt(new Date(System.currentTimeMillis()+10*24*60*60*1000)).
            sign(Algorithm.HMAC256("nadhemb@yahoo.com"));

            response.addHeader("Authorization", jwt);

        }

    }
```

16. Ajouter le filtre JWTAuthenticationFilter à la méthode `filterChain` de la classe *SecurityConfig* :

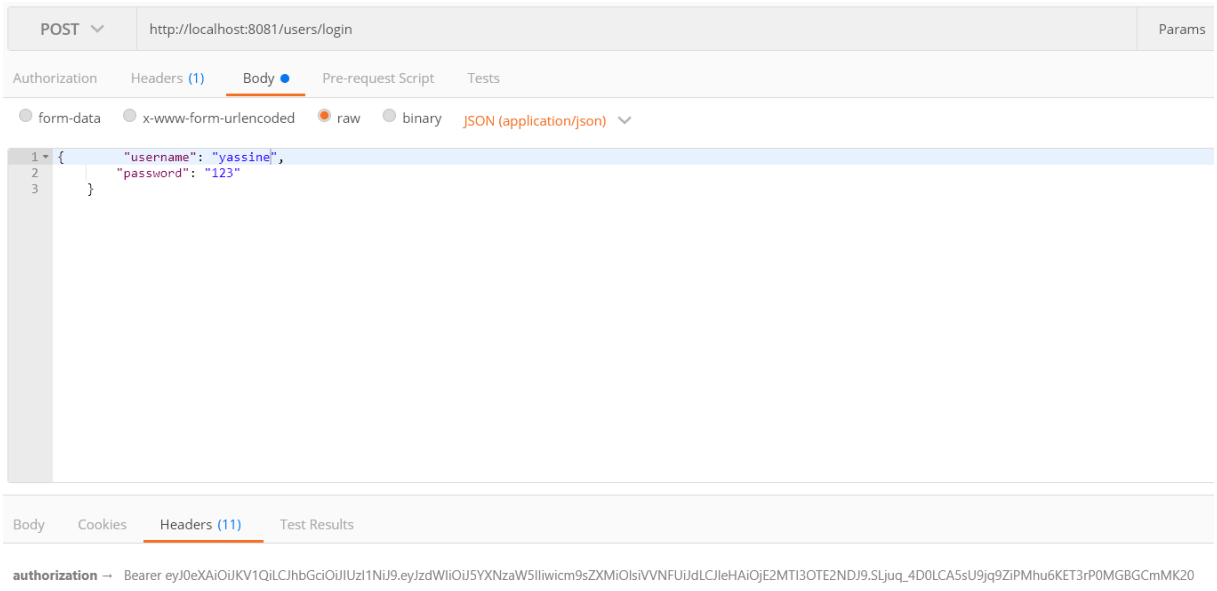
```
    ...

.authorizeHttpRequests((requests)->requests
                        .requestMatchers("/login").permitAll()
                         .anyRequest().authenticated() )

                .addFilterBefore(new JWTAuthenticationFilter (authMgr),
                        UsernamePasswordAuthenticationFilter.class);
```

```
                return http.build();
    }
```

17. Tester la génération du JWT avec POSTMAN



Vérifier votre token JWT sur : https://jwt.io/

18. Créer une interface pour regrouper les constantes

```
package com.nadhem.users.sercurity;

public interface SecParams {
    public static final long  EXP_TIME = 10*24*60*60*1000;
    public static final String SECRET = "nadhemb@yahoo.com";

}
```