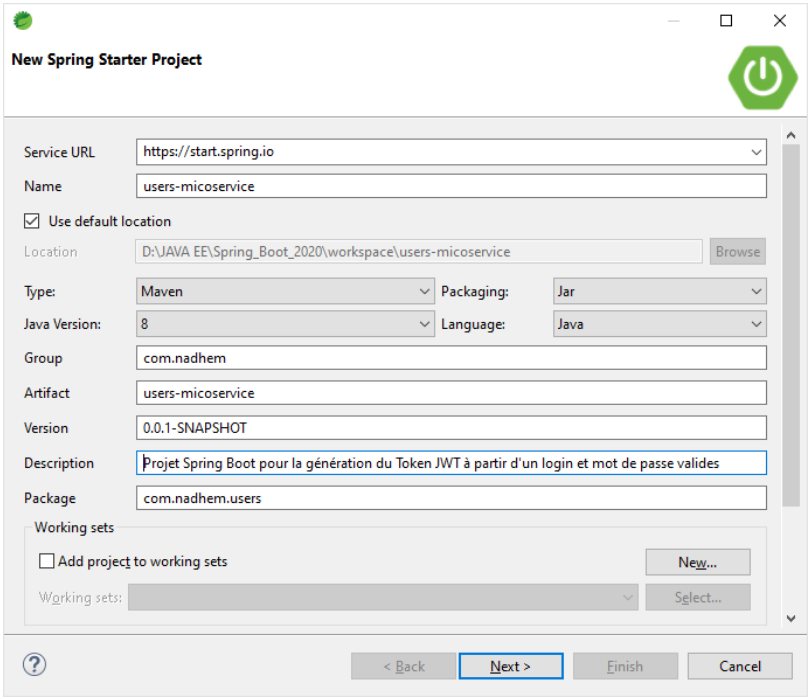
Spring Boot : Génération du JWT Token

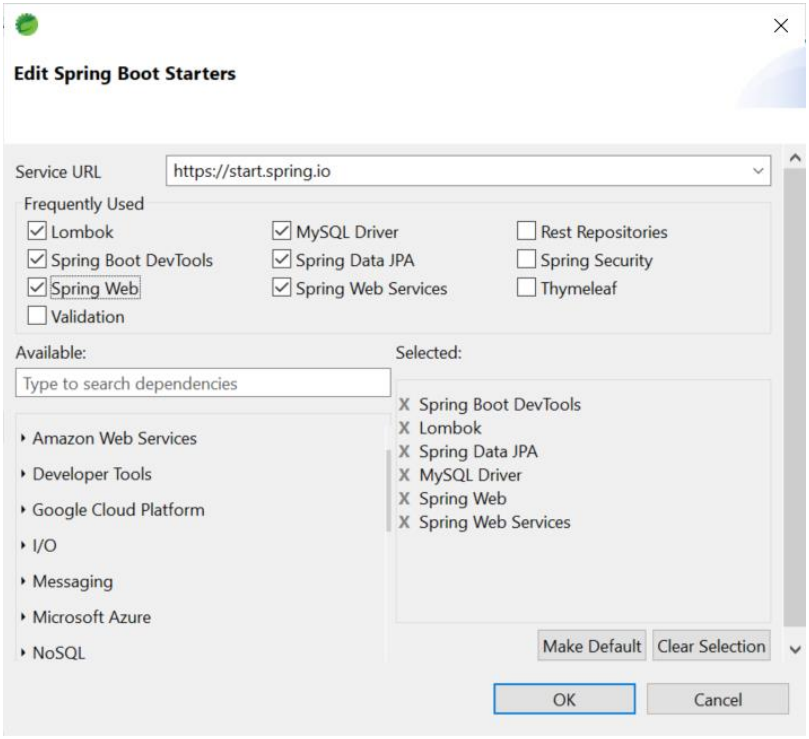
Objectifs :

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* suite à 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





2. Editer le fichier pom.xml et modifier la version de spring boot

```
<version>2.3.1.RELEASE</version>
```

Editer le fichier application.properties

3. 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
```

Créer les entités User et Rôle et leurs interfaces Repository

4. 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;
}
```

5. 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;
}
```

6. 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);

}
```

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

```
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

8. Ajouter les dépendances Spring security et JWT au fichier pom.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

9. Créer l'interface UserService

```
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);
}
```

10. Créer l'implémentation UserServiceImpl

```
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;
```

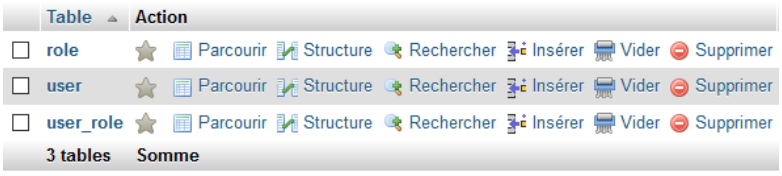
```java
import com.nadhem.users.repos.UserRepository;

@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);
	}

}
```

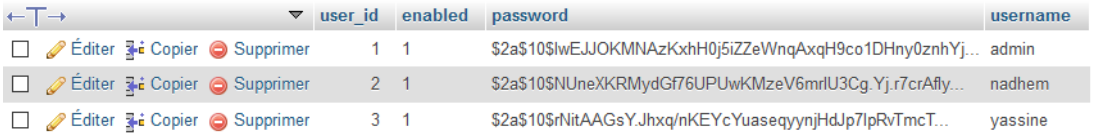
11. Modifier la classe *`UsersMicoserviceApplication`* pour ajouter les rôles et les utilisateurs

```java
@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();

    }
```

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





Remarque :

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

Créer la classe *SecurityConfig*

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.security.config.annotation.authentication.builders.AuthenticationManagerBuilder;
import org.springframework.security.config.annotation.web.builders.HttpSecurity;
import org.springframework.security.config.annotation.web.configuration.EnableWebSecurity;
import org.springframework.security.config.annotation.web.configuration.WebSecurityConfigurerAdapter;
import org.springframework.security.config.http.SessionCreationPolicy;
import org.springframework.security.core.userdetails.UserDetailsService;
import org.springframework.security.crypto.bcrypt.BCryptPasswordEncoder;
```

```
@EnableWebSecurity
public class SecurityConfig extends WebSecurityConfigurerAdapter {

   @Autowired
   UserDetailsService userDetailsService;

   @Autowired
   BCryptPasswordEncoder bCryptPasswordEncoder;


   @Override
    protected void configure(AuthenticationManagerBuilder auth) throws
Exception {
       auth.userDetailsService(userDetailsService)
           .passwordEncoder(bCryptPasswordEncoder);

    }

  @Override
  protected void configure(HttpSecurity http) throws Exception {
     http.csrf().disable();

     http.sessionManagement().
          sessionCreationPolicy(SessionCreationPolicy.STATELESS);

     http.authorizeRequests().antMatchers("/login").permitAll();
     http.authorizeRequests().anyRequest().authenticated();

  }

}
```

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`

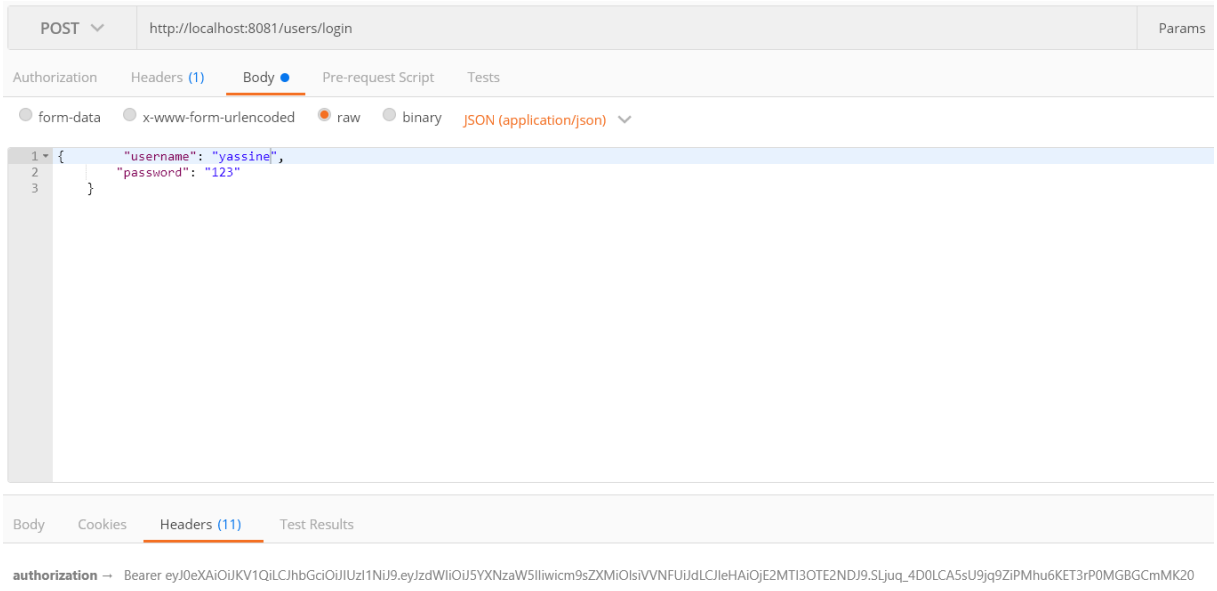
```
package com.nadhem.users.security;

import java.io.IOException;
import java.util.ArrayList;
import java.util.Date;
import java.util.List;
import javax.servlet.FilterChain;
import javax.servlet.ServletException;
import javax.servlet.http.HttpServletRequest;
import javax.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.UsernamePasswordAuthenticationF
ilter;
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 configure de la classe SecurityConfig :

```
@Override
protected void configure(HttpSecurity http) throws Exception {

 •••
   http.addFilter(new  JWTAuthenticationFilter (authenticationManager())) ;

}
```

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";

}
```