Introduction:

[[TutsNode.com] - Spring Security Core Beginner to Guru\02 - Introduction to Spring Security\26127142-IntrotoSpringSecurity.pdf](%5bTutsNode.com%5d%20-%20Spring%20Security%20Core%20Beginner%20to%20Guru/02%20-%20Introduction%20to%20Spring%20Security/26127142-IntrotoSpringSecurity.pdf)

OWASP : **Open Web Application Security Project** (OWASP) is a nonprofit foundation dedicated to improving software security.

PDF Link: [[TutsNode.com] - Spring Security Core Beginner to Guru\02 - Introduction to Spring Security\25604716-CommonWebVulner.pdf](%5bTutsNode.com%5d%20-%20Spring%20Security%20Core%20Beginner%20to%20Guru/02%20-%20Introduction%20to%20Spring%20Security/25604716-CommonWebVulner.pdf) \*\*

Will be used in FE.

Cross Site Scripting (XSS) \*\*:

[[TutsNode.com] - Spring Security Core Beginner to Guru\02 - Introduction to Spring Security\25605506-CrossSiteScripting.pdf](%5bTutsNode.com%5d%20-%20Spring%20Security%20Core%20Beginner%20to%20Guru/02%20-%20Introduction%20to%20Spring%20Security/25605506-CrossSiteScripting.pdf)

Injectiong js scripts in input fields.

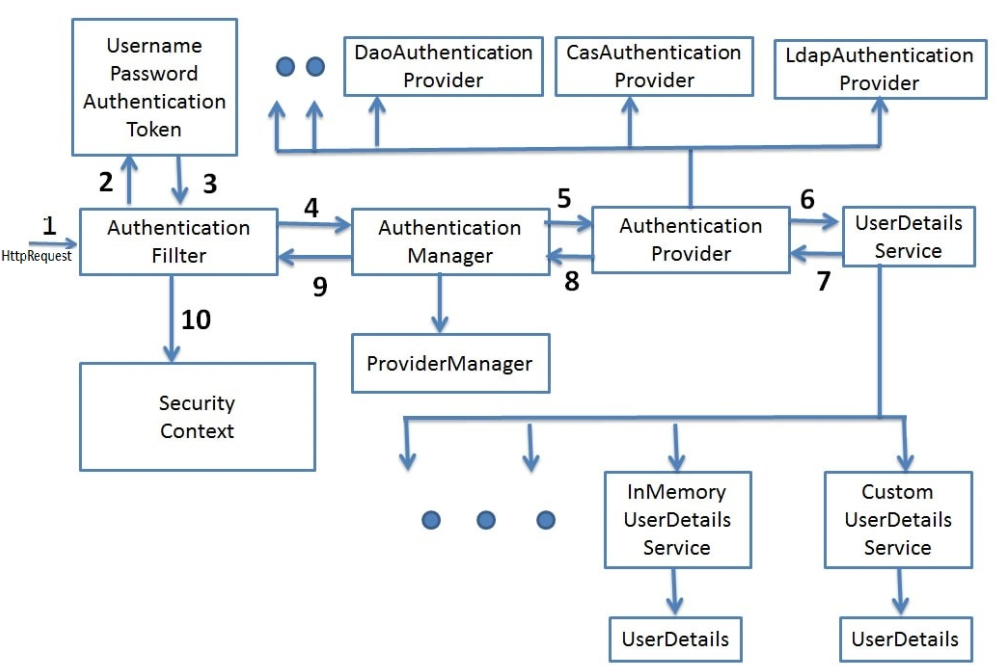
CSRF \*\*:

[[TutsNode.com] - Spring Security Core Beginner to Guru\02 - Introduction to Spring Security\25605760-CrossSiteForgery.pdf](%5bTutsNode.com%5d%20-%20Spring%20Security%20Core%20Beginner%20to%20Guru/02%20-%20Introduction%20to%20Spring%20Security/25605760-CrossSiteForgery.pdf)

Sending a redirect link which has cookies in it.

Csrf is a token that will be passed in the header or url to the server(from the Original Page). Bcz hacker is just redirecting, browser will not have the csrf token in url or header.

Authentication Flow



3.Http basic auth

User credentials are either be sending in **url** or **Header**

**url**: <https://username:password@www.xyz.com>

**Header**: Authorization: Basic <Base64 Encoded String> (encoded string = username:password (for testing, goto base64 encoder, then username:password and pass it to Authorization))

**Note:** Spring Security uses web mvc in the background.

3.6 testing spring security with Junit5

3.8 Spring security filter chain

[[TutsNode.com] - Spring Security Core Beginner to Guru\03 - HTTP Basic Auth\25683390-SpringSecurityFilterChain.pdf](%5bTutsNode.com%5d%20-%20Spring%20Security%20Core%20Beginner%20to%20Guru/03%20-%20HTTP%20Basic%20Auth/25683390-SpringSecurityFilterChain.pdf)

Spring Security filter chains will come before and after Dispatcher Servlet (front controller).

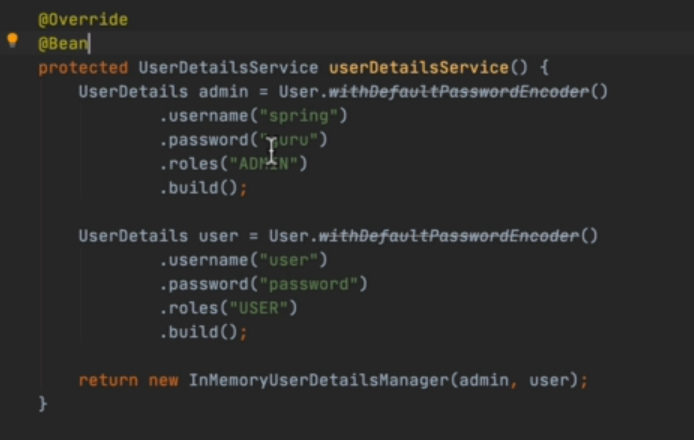
5.in memory authentication provider

5.1 Spring security Authentication flow:

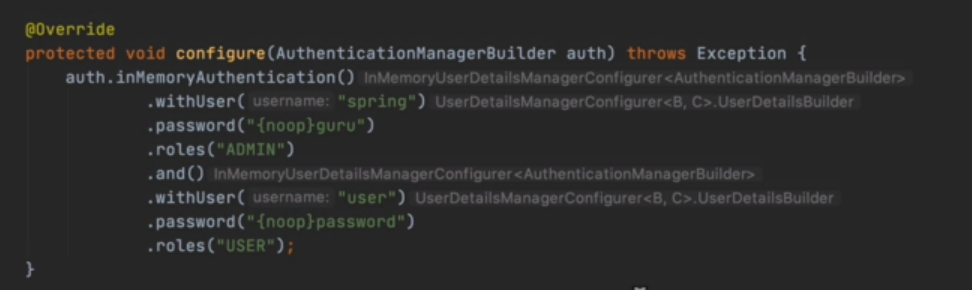
[[TutsNode.com] - Spring Security Core Beginner to Guru\05 - In Memory Authentication Provider\25732492-SpringSecAuthProcess.pdf](%5bTutsNode.com%5d%20-%20Spring%20Security%20Core%20Beginner%20to%20Guru/05%20-%20In%20Memory%20Authentication%20Provider/25732492-SpringSecAuthProcess.pdf)

We were doing configuration of basic inMemory http auth by, spring.security.user.name=”xx” spring.security.user.password=”xx”

We can do this manually by



Using Fluent Api technique:



Delegating Password Encoder

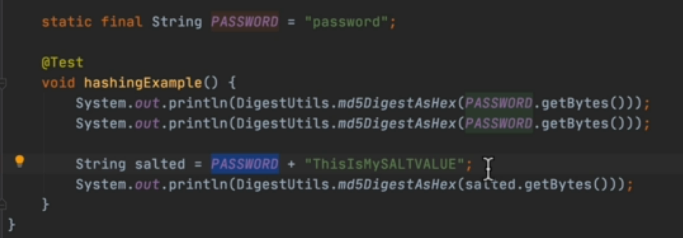
Allows storage of password hashes in multiple formats: {encodername}<somepasswordHashValue>.

Encodername= noop, bcrypt, …etc

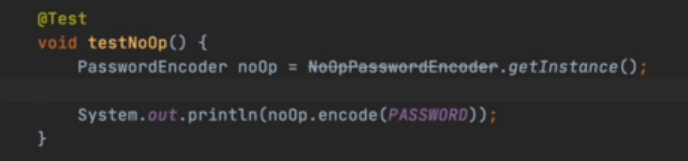
[[TutsNode.com] - Spring Security Core Beginner to Guru\06 - Password Security\25734930-PasswordEncoding.pdf](%5bTutsNode.com%5d%20-%20Spring%20Security%20Core%20Beginner%20to%20Guru/06%20-%20Password%20Security/25734930-PasswordEncoding.pdf) \*\*

5.3 Hashing Algorithms

MD5 hash & password salt: (not recommended)

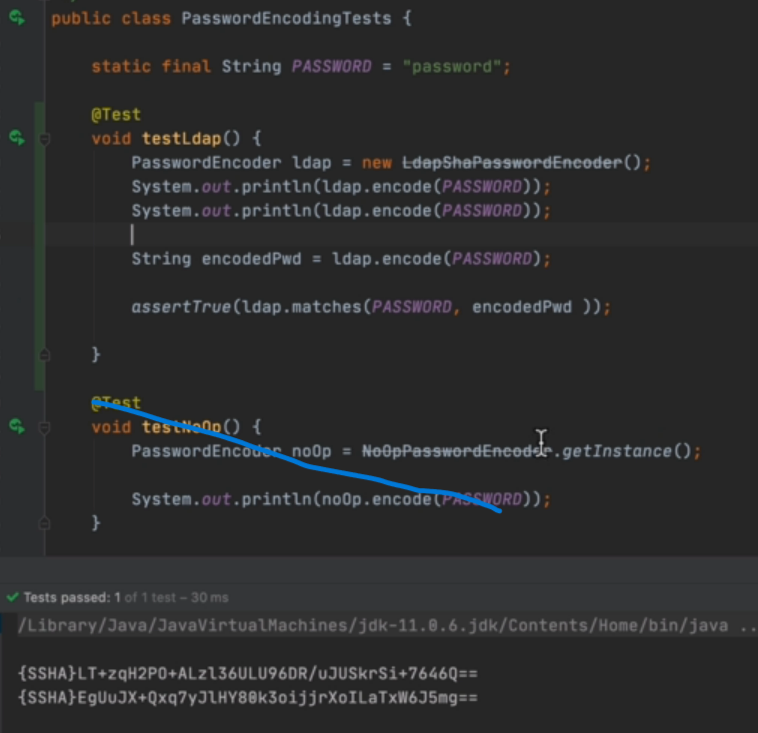


NoOp password Encoder: (not recommended)

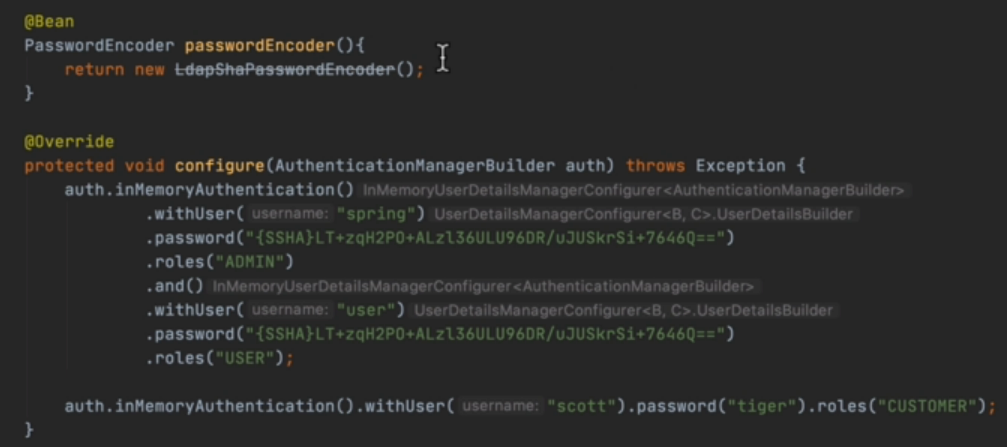


Ldap password Encoder: (not recommended)

-uses random salt



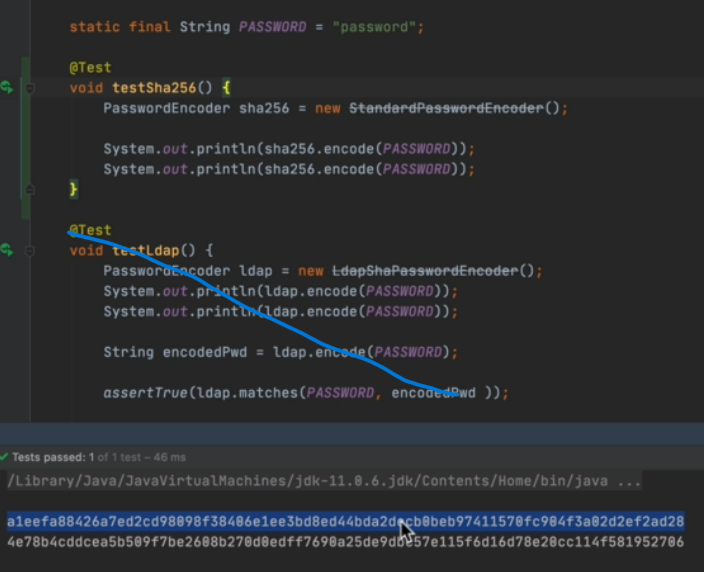
Declaring as Bean,



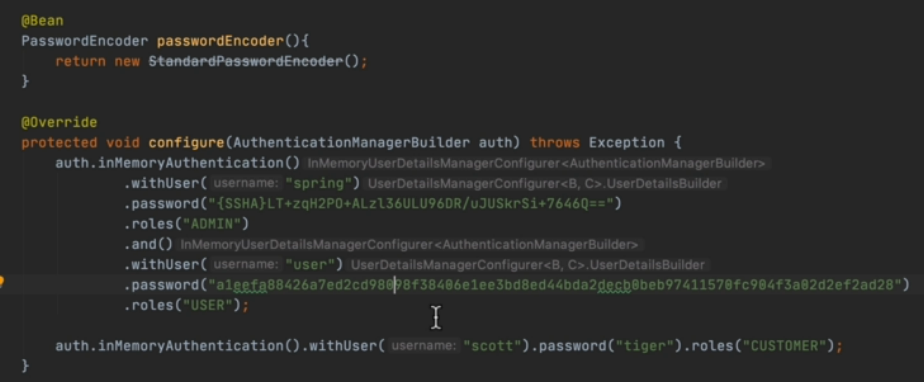
SHA-256 Password Encoder(not recommended)

-It was default in previous versions of spring security

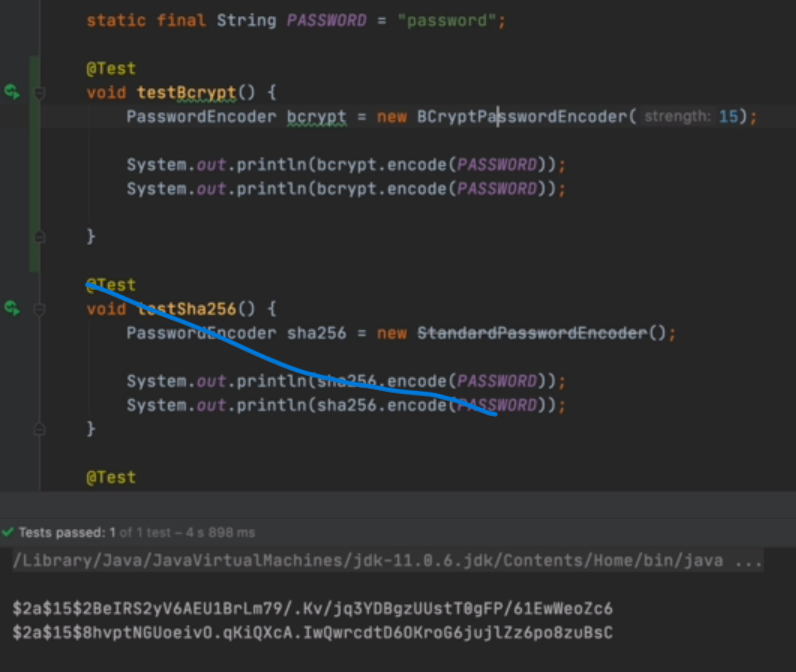
- Cons: tooFast in case of brut force attack. Brut Force attack requires more computational power. So other algorithms are slow compare to this.



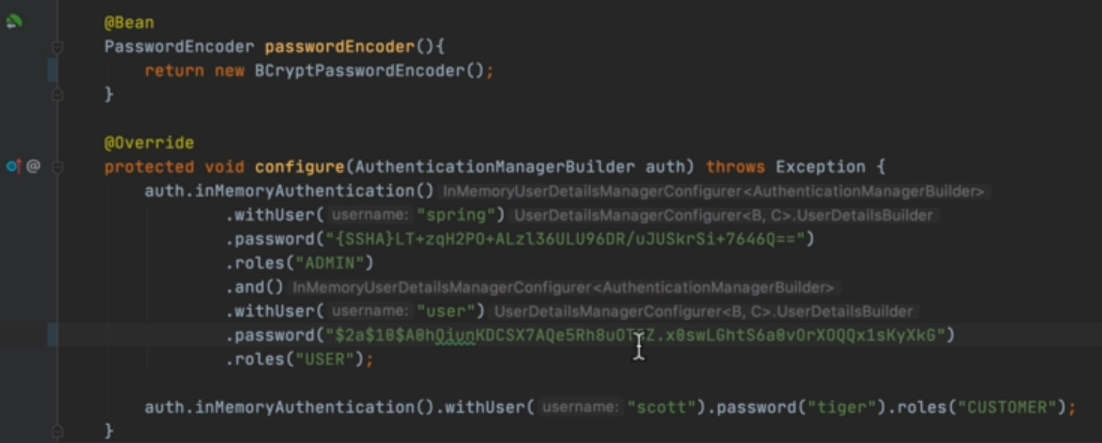
Declaring as Bean,



Bcrypt Password Encoder



Observation: It is decrypting the password that we passed in the config ( we are passing normal password in test cases, which is working)

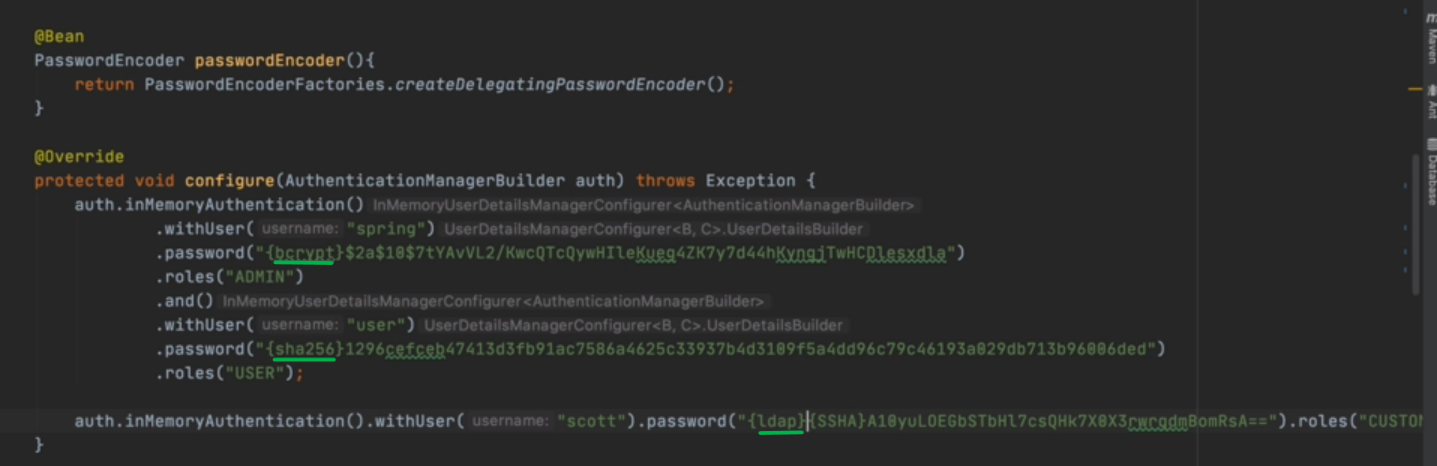


In testCase,



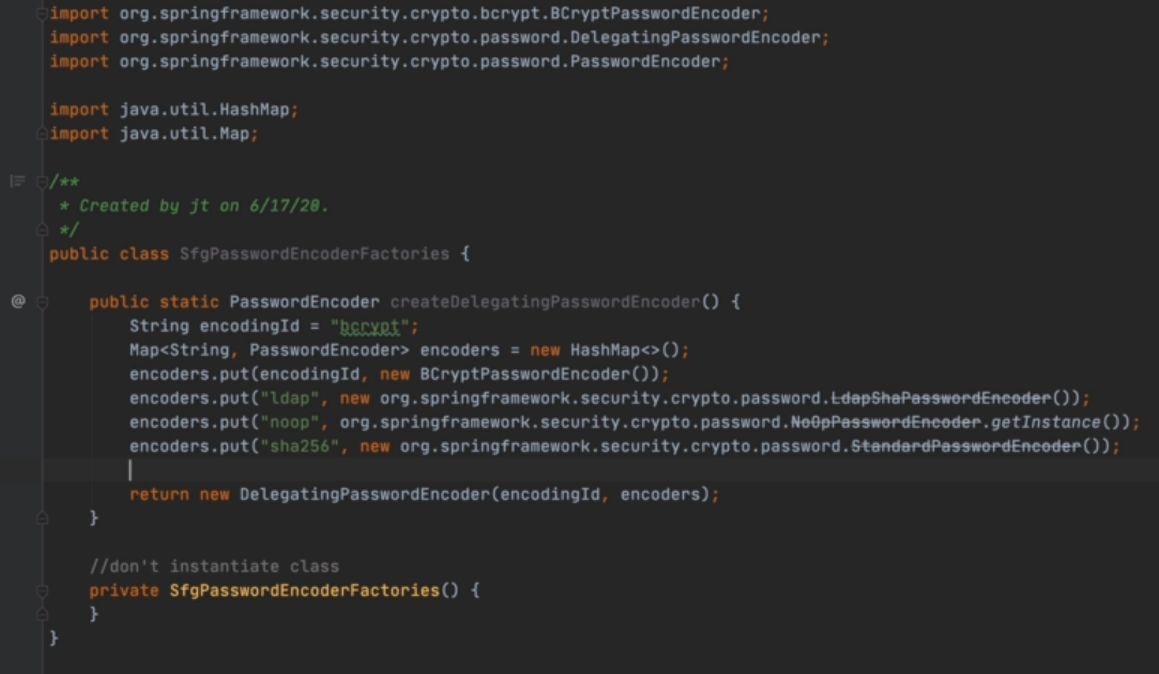
Delegating Password Encoder

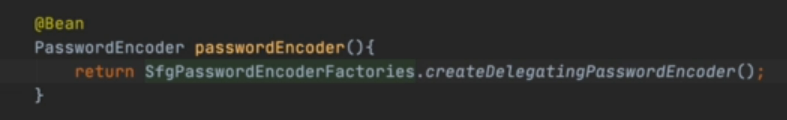
We can use multiple encoding algorithms at a time.



Custom Delegating Password Encoder

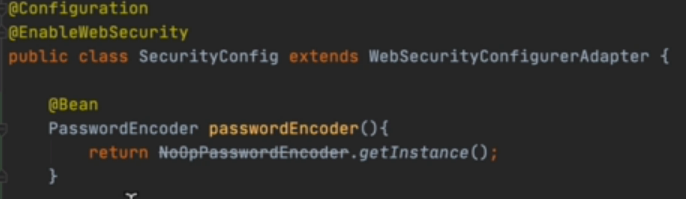
Create a class, here we are copying and paste the method “createDelegatingPasswordEncoder” from “PasswordEncoderFactoriesClass” and modify according to our need.





**Note:** By defining a specific password encoder bean, we can avoid doing {encodertype}”password” to “password” directly.

Example:



7. custom authentication filter

Intro: [pdfs\25757902-CustomAuthFilter.pdf](pdfs/25757902-CustomAuthFilter.pdf)

# Add a customAuthenticationfilter class extends AbstractAuthenticationProcessingFilter

**-attemptAuthentication** method is a abstract method inside AbstractAuthenticationProcessingFilter so we have to provide implementation for it (we have to implement logic for authentication).

-This class constructor takes api path for which it should apply this filter.

-The filter requires that you set the authenticationManager property. An AuthenticationManager is required to process the authentication request tokens created by implementing classes. (doing setAuthenticationManager in Img: filterConfig)

-This filter will intercept a request and attempt to perform authentication from that request if the request matches the [setRequiresAuthenticationRequestMatcher(RequestMatcher)](https://docs.spring.io/spring-security/site/docs/current/api/org/springframework/security/web/authentication/AbstractAuthenticationProcessingFilter.html#setRequiresAuthenticationRequestMatcher(org.springframework.security.web.util.matcher.RequestMatcher)).

-Authentication is performed by the [attemptAuthentication](https://docs.spring.io/spring-security/site/docs/current/api/org/springframework/security/web/authentication/AbstractAuthenticationProcessingFilter.html#attemptAuthentication(jakarta.servlet.http.HttpServletRequest,jakarta.servlet.http.HttpServletResponse)) method, which must be implemented by subclasses.

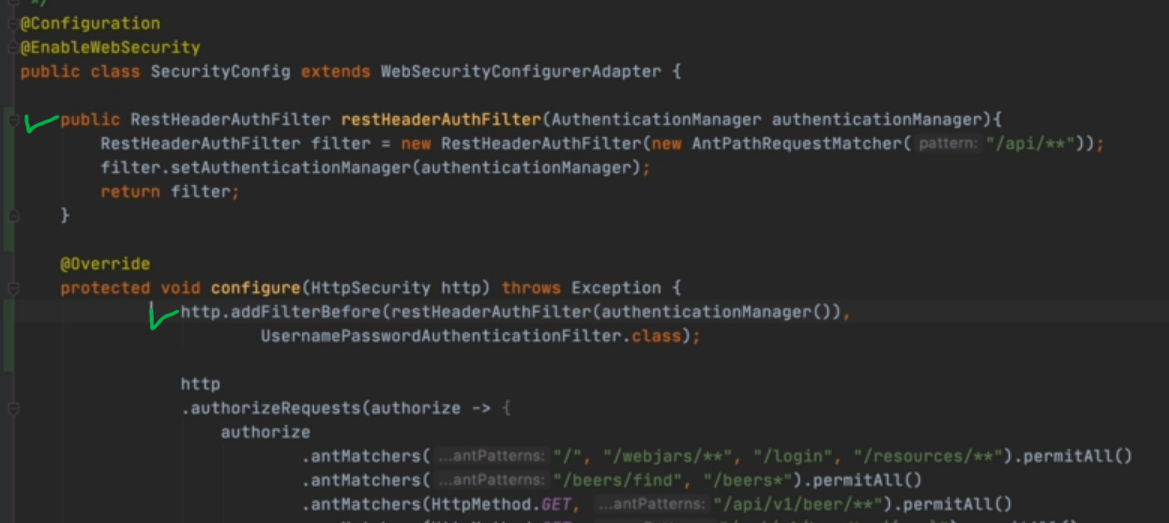
- If authentication is successful, the resulting [Authentication](https://docs.spring.io/spring-security/site/docs/current/api/org/springframework/security/core/Authentication.html) object will be placed into the SecurityContext for the current thread, which is guaranteed to have already been created by an earlier filter.

# Override dofilter(), successullAuthentication(), unsuccessfullAuthenticaton() to the same class

package guru.sfg.brewery.filters;  
  
import lombok.extern.slf4j.Slf4j;  
import org.springframework.http.HttpStatus;  
import org.springframework.security.authentication.UsernamePasswordAuthenticationToken;  
import org.springframework.security.core.Authentication;  
import org.springframework.security.core.AuthenticationException;  
import org.springframework.security.core.context.SecurityContextHolder;  
import org.springframework.security.web.authentication.AbstractAuthenticationProcessingFilter;  
import org.springframework.security.web.util.matcher.RequestMatcher;  
import org.springframework.util.StringUtils;  
import javax.servlet.FilterChain;  
import javax.servlet.ServletException;  
import javax.servlet.ServletRequest;  
import javax.servlet.ServletResponse;  
import javax.servlet.http.HttpServletRequest;  
import javax.servlet.http.HttpServletResponse;   
  
@Slf4j  
public class RestHeaderAuthFilter extends AbstractAuthenticationProcessingFilter {  
  
 public RestHeaderAuthFilter(RequestMatcher requiresAuthenticationRequestMatcher) {  
 super(requiresAuthenticationRequestMatcher);  
 }  
  
 @Override  
 public void doFilter(ServletRequest req, ServletResponse res, FilterChain chain)  
 throws IOException, ServletException {  
  
 HttpServletRequest request = (HttpServletRequest) req;  
 HttpServletResponse response = (HttpServletResponse) res;  
  
// if (!requiresAuthentication(request, response)) {  
// chain.doFilter(request, response);  
// return;  
// }  
  
 if (logger.isDebugEnabled()) {  
 logger.debug("Request is to process authentication");  
 }  
  
 try{  
 //call attemptAuthenticate() method  
 Authentication authResult = attemptAuthentication(request, response);  
  
 if(authResult!=null) {  
 successfulAuthentication(request, response, chain, authResult);  
 chain.doFilter(request, response);  
 }  
 else {  
 //right now even if user is not authenticated we are not doing anything, just continuing the filter.  
 chain.doFilter(request, response);  
 }  
 }catch (AuthenticationException e){  
 unsuccessfulAuthentication(request, response, e);  
 }  
 }  
  
 @Override  
 public Authentication attemptAuthentication(HttpServletRequest request, HttpServletResponse response) throws AuthenticationException, IOException, ServletException {  
 String username = getUserName(request);  
 String password = getPassword(request);  
  
 if(username==null){  
 username="";  
 }  
 if(password == null){  
 password ="";  
 }  
  
 //Note: depending on the Authentication technique, it will compare the username and Password (http basic, custom userDetailService...)  
 //So if we configured Custom userDetailsService from db, it will take username and password in db.  
 UsernamePasswordAuthenticationToken token = new UsernamePasswordAuthenticationToken(username, password);  
  
 if(!StringUtils.*isEmpty*(username)) {  
 return this.getAuthenticationManager().authenticate(token);  
 }  
 else {  
 return null;  
 }  
 }  
  
 @Override  
 protected void successfulAuthentication(HttpServletRequest request,  
 HttpServletResponse response, FilterChain chain, Authentication authResult)  
 throws IOException, ServletException {  
  
 if (logger.isDebugEnabled()) {  
 logger.debug("Authentication success. Updating SecurityContextHolder to contain: "  
 + authResult);  
 }  
  
 SecurityContextHolder.*getContext*().setAuthentication(authResult);  
 }  
  
 @Override  
 protected void unsuccessfulAuthentication(HttpServletRequest request,  
 HttpServletResponse response, AuthenticationException failed)  
 throws IOException, ServletException {  
 SecurityContextHolder.*clearContext*();  
  
 if (logger.isDebugEnabled()) {  
 logger.debug("Authentication request failed: " + failed.toString(), failed);  
 logger.debug("Updated SecurityContextHolder to contain null Authentication");  
 }  
  
 response.sendError(HttpStatus.*UNAUTHORIZED*.value(),  
 HttpStatus.*UNAUTHORIZED*.getReasonPhrase());  
 }  
  
 private String getPassword(HttpServletRequest request) {  
 return request.getHeader("username");  
 }  
  
 private String getUserName(HttpServletRequest request) {  
 return request.getHeader("password");  
 }  
}

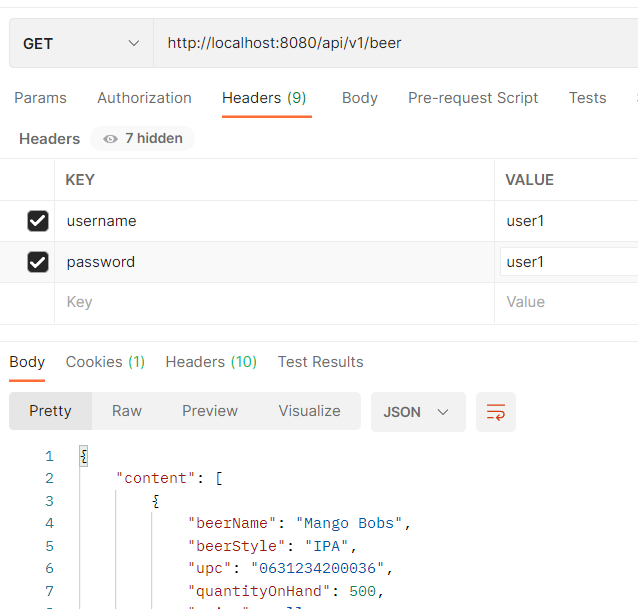
#Add this custom filter to security configuration

For all the matching api “/api/\*\*” this filter will apply.

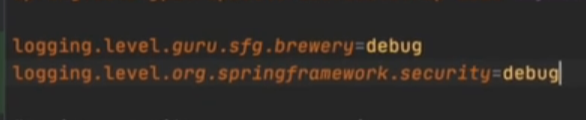


Img: filterConfig

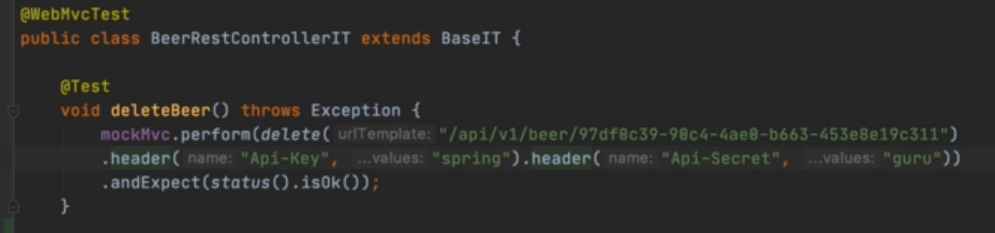
Observation: Hitting api in postman, we have added username and password in the header(in RestHeaderAuthFilter we are checking the headers for username and password). So based on the Authentication technique whether its httpbasic or custom userDetailsService …etc, it will fetch the username and password.



*Security debugging configuration:*



Checking in Test Case



8. database authentication

Intro: [pdfs\25761462-SpringSecurity.pdf](pdfs/25761462-SpringSecurity.pdf)

**Note:** User(c) implements UserDetails(i)

#Create User and Authority Class (similar to one in spring security)

User.java

package guru.sfg.brewery.domain.security;   
@Getter  
@Setter  
@AllArgsConstructor  
@NoArgsConstructor  
@Builder  
@Entity  
public class User {  
 @Id  
 @Column(name = "id", nullable = false)  
 @GeneratedValue(strategy = GenerationType.*AUTO*)  
 private Long id;  
  
 private String username;  
 private String password;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private boolean accountNonExpired = true;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private boolean accountNonLocked = true;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private boolean credentialsNonExpired = true;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private boolean enabled = true;  
  
 @Singular //provide a singular method for adding an authority (refer usage example below img:Singular)  
 @ManyToMany(cascade = CascadeType.*MERGE*)  
 @JoinTable(name="user\_authority",  
 joinColumns = {@JoinColumn(name = "USER\_ID", referencedColumnName = "ID")},  
 inverseJoinColumns = {@JoinColumn(name = "AUTHORITY\_ID", referencedColumnName = "ID")})  
 private Set<Authority> authorities;  
}

Authority.java

package guru.sfg.brewery.domain.security;   
  
@Getter  
@Setter  
@AllArgsConstructor  
@NoArgsConstructor  
@Builder  
@Entity  
public class Authority {  
  
 @Id  
 @Column(name = "id", nullable = false)  
 @GeneratedValue(strategy = GenerationType.*AUTO*)  
 private Long id;  
 private String role;  
  
 @ManyToMany(mappedBy = "authorities")  
 private Set<User> users;  
}

usage of @Singular in entity class

Authority authorityAdmin = Authority.*builder*()  
 .role("ADMIN")  
 .build();  
  
Authority authorityUser = Authority.*builder*()  
 .role("USER")  
 .build();  
  
Authority authoritySuperAdmin = Authority.*builder*()  
 .role("SUPER\_ADMIN")  
 .build();  
  
User user1 = User.*builder*()  
 .username("user1")  
 .password(passwordEncoder.encode("user1"))  
 .authority(authorityAdmin) //here we are setting single entity instead of a Set<Authority>  
 .authority(authorityUser)  
 .build();

img: Singular

# Create UserRepo & AuthorityRepo

public interface UserRepository extends JpaRepository<User, Long> {  
 Optional<User> findByUsername(String username);  
}

public interface AuthorityRepository extends JpaRepository<Authority, Long> {  
}

bcz h2 db console does use frames, we need to set frame option, and we have to set it to same origin, so it function normally.

JFR :

(below classes (userDetails, User) are from java doc, jfr)

UserDetails:

public interface UserDetails extends Serializable {

Collection<? extends GrantedAuthority> getAuthorities();

String getPassword();

String getUsername();boolean isAccountNonExpired();boolean isAccountNonLocked();boolean isCredentialsNonExpired();  
boolean isEnabled();  
}

User:

public class User implements UserDetails, CredentialsContainer {  
  
 private static final long *serialVersionUID* = SpringSecurityCoreVersion.*SERIAL\_VERSION\_UID*;  
  
 private static final Log *logger* = LogFactory.*getLog*(User.class);  
  
 private String password;  
 private final String username;  
 private final Set<GrantedAuthority> authorities;  
 private final boolean accountNonExpired;  
 private final boolean accountNonLocked;  
 private final boolean credentialsNonExpired;  
 private final boolean enabled;  
public User(String username, String password,  
 Collection<? extends GrantedAuthority> authorities) {  
 this(username, password, true, true, true, true, authorities);  
 }

public User(String username, String password, boolean enabled,  
 boolean accountNonExpired, boolean credentialsNonExpired,  
 boolean accountNonLocked, Collection<? extends GrantedAuthority> authorities) {  
  
 if (((username == null) || "".equals(username)) || (password == null)) {  
 throw new IllegalArgumentException(  
 "Cannot pass null or empty values to constructor");  
 }  
  
 this.username = username;  
 this.password = password;  
 this.enabled = enabled;  
 this.accountNonExpired = accountNonExpired;  
 this.credentialsNonExpired = credentialsNonExpired;  
 this.accountNonLocked = accountNonLocked;  
 this.authorities = Collections.*unmodifiableSet*(*sortAuthorities*(authorities));  
 }  
  
 public Collection<GrantedAuthority> getAuthorities() {  
 return authorities;  
 }  
  
 public String getPassword() {  
 return password;  
 }  
  
 public String getUsername() {  
 return username;  
 }  
  
 public boolean isEnabled() {  
 return enabled;  
 }  
  
 public boolean isAccountNonExpired() {  
 return accountNonExpired;  
 }  
  
 public boolean isAccountNonLocked() {  
 return accountNonLocked;  
 }  
  
 public boolean isCredentialsNonExpired() {  
 return credentialsNonExpired;  
 }  
  
 public void eraseCredentials() {  
 password = null;  
 }

“””””””””

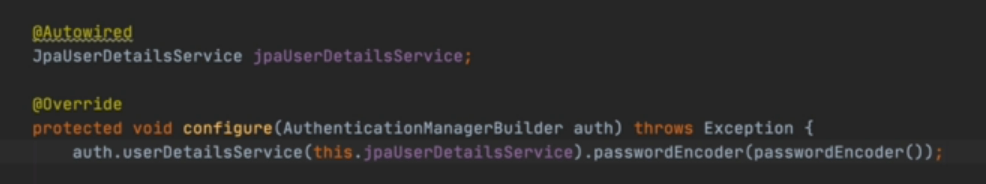
“””””””””

“”””””””” (refer doc)

8.7 Implementing UserDetailsService

@RequiredArgsConstructor  
@Service  
public class JpaUserDetailsService implements UserDetailsService {  
  
 private final UserRepository userRepository;  
  
 @Override  
 public UserDetails loadUserByUsername(String username) throws UsernameNotFoundException {  
 User user = userRepository.findByUsername(username).orElseThrow(()-> new UsernameNotFoundException("username "+username+" not found"));  
 return new org.springframework.security.core.userdetails.User(user.getUsername(), user.getPassword(),  
 user.getEnabled(), user.getAccountNonExpired(), user.getCredentialsNonExpired(),  
 user.getAccountNonLocked(), convertToGrantedAuthorites(user.getAuthorities()));  
 }  
  
 private Collection<? extends GrantedAuthority> convertToGrantedAuthorites(Set<Authority> authorities) {  
 if(authorities!=null && authorities.size()>0){  
 return authorities.stream()  
 .map(Authority::getRole)  
 .map(SimpleGrantedAuthority::new)  
 .collect(Collectors.*toList*());  
 }else{  
 return new HashSet<>();  
 }  
 }  
}

Observation: As we annotated this class with @Service, spring will come to know about this userDetailsService config component, so no need to mention this class in SecurityConfig.java (below img). If we have multiple type of authentication we can use this technique (below img).



9. USER ROLE

Intro: [pdfs\25783944-AuthorizationInSpringSec.pdf](pdfs/25783944-AuthorizationInSpringSec.pdf) \*\*

**Note:**

-User Role should start with “ROLE\_” while saving in entity. But in security config we should use it without “ROLE\_”.

-User Authorities can ba any String

#Set a Specific role for deleting a beer and breweries

So here except ADMIN Role, no one can delete user, it is forbidden.

ADMIN & CUSTOMER can access breweries

package guru.sfg.brewery.config;  
@Configuration  
@EnableWebSecurity  
public class SecurityConfig extends WebSecurityConfigurerAdapter {  
  
 public RestHeaderAuthFilter restHeaderAuthFilter(AuthenticationManager authenticationManager){  
 RestHeaderAuthFilter filter = new RestHeaderAuthFilter(new AntPathRequestMatcher("/api/\*\*"));  
 filter.setAuthenticationManager(authenticationManager);  
 return filter;  
 }  
  
 @Override  
 protected void configure(HttpSecurity http) throws Exception {  
 http.addFilterBefore(restHeaderAuthFilter(authenticationManager()), UsernamePasswordAuthenticationFilter.class);  
 http  
 .authorizeRequests(authorize->{  
 authorize  
 .antMatchers(("/h2-console/\*\*")).permitAll() //not recomemded in production  
 .antMatchers("/","/webjars/\*\*","/login","/resources/\*\*").permitAll()  
 .antMatchers("/beers/find","/beers").permitAll()  
 .antMatchers(HttpMethod.*GET*, "/api/v1/beer/\*\*").permitAll()  
 .mvcMatchers(HttpMethod.*DELETE*, "/api/v1/beer/\*\*").hasRole("ADMIN")  
 .mvcMatchers(HttpMethod.*GET*, "/api/v1/beerUpc/{upc}").permitAll();

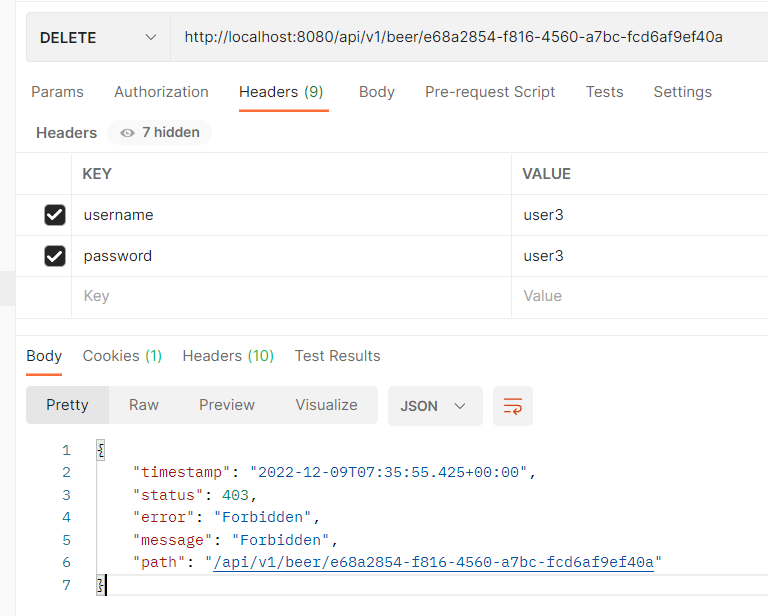
.mvcMatchers("/brewery/breweries").hasAnyRole("ADMIN","CUSTOMER")  
 .mvcMatchers(HttpMethod.*GET*, "brewery/api/v1/breweries").hasAnyRole("ADMIN","CUSTOMER");

})  
 .authorizeRequests()  
 .anyRequest().authenticated()  
 .and()  
 .formLogin()  
 .and()  
 .csrf().disable()  
 .httpBasic();  
  
 //h2 console config  
 http.headers().frameOptions().disable();  
 }

@Bean  
 PasswordEncoder passwordEncoder(){  
 return PasswordEncoderFactories.*createDelegatingPasswordEncoder*();  
 }}

Observation: hit delete api with user3 (role=”USER”), we will get forbidden error. User3 is authenticated but delete operation is forbideen.

(user1= ADMIN, user2=CUSTOMER, user3=USER) (refer to bootstrap class)



9.7 Adding Role Security at method level

#add @EnableGlobalMethodSecurity

@Configuration  
@EnableWebSecurity  
@EnableGlobalMethodSecurity(securedEnabled = true) //securedEnabled = Determines if Spring Security's Secured annotations should be enabled  
public class SecurityConfig extends WebSecurityConfigurerAdapter {  
  
 public RestHeaderAuthFilter restHeaderAuthFilter(AuthenticationManager authenticationManager){  
 RestHeaderAuthFilter filter = new RestHeaderAuthFilter(new AntPathRequestMatcher("/api/\*\*"));  
 filter.setAuthenticationManager(authenticationManager);  
 return filter;  
 }  
  
 @Override  
 protected void configure(HttpSecurity http) throws Exception {  
 http.addFilterBefore(restHeaderAuthFilter(authenticationManager()), UsernamePasswordAuthenticationFilter.class);  
  
 http  
 .authorizeRequests(authorize->{  
 authorize  
 .antMatchers(("/h2-console/\*\*")).permitAll() //not recomemded in production  
 .antMatchers("/","/webjars/\*\*","/login","/resources/\*\*").permitAll()  
 .antMatchers("/beers/find","/beers").permitAll()  
 .antMatchers(HttpMethod.*GET*, "/api/v1/beer/\*\*").permitAll()  
 .mvcMatchers(HttpMethod.*DELETE*, "/api/v1/beer/\*\*").hasRole("ADMIN")  
 .mvcMatchers(HttpMethod.*GET*, "/api/v1/beerUpc/{upc}").permitAll()  
 .mvcMatchers("/brewery/breweries").hasAnyRole("ADMIN","CUSTOMER")  
 .mvcMatchers(HttpMethod.*GET*, "brewery/api/v1/breweries").hasAnyRole("ADMIN","CUSTOMER");  
 })  
 .authorizeRequests()  
 .anyRequest().authenticated()  
 .and()  
 .formLogin()  
 .and()  
 .csrf().disable()  
 .httpBasic();  
  
 //h2 console config  
 http.headers().frameOptions().disable();  
 }  
  
 @Bean  
 PasswordEncoder passwordEncoder(){  
 return PasswordEncoderFactories.*createDelegatingPasswordEncoder*();  
 }  
}

#add @Secure annotation at the method with allowed Roles.

@RequiredArgsConstructor  
@RequestMapping("/customers")  
@Controller  
public class CustomerController {

-----

@Secured({"ROLE\_ADMIN","ROLE\_CUSTOMER"})  
@GetMapping  
public String processFindFormReturnMany(Customer customer, BindingResult result, Model model){  
 // find customers by name  
 //*ToDO: Add Service* List<Customer> customers = customerRepository.findAllByCustomerNameLike("%" + customer.getCustomerName() + "%");  
 if (customers.isEmpty()) {  
 // no customers found  
 result.rejectValue("customerName", "notFound", "not found");  
 return "customers/findCustomers";  
 } else if (customers.size() == 1) {  
 // 1 customer found  
 customer = customers.get(0);  
 return "redirect:/customers/" + customer.getId();  
 } else {  
 // multiple customers found  
 model.addAttribute("selections", customers);  
 return "customers/customerList";  
 }  
}

9.71 Adding Role Security at method level using Spring Expression language

@Configuration  
@EnableWebSecurity  
@EnableGlobalMethodSecurity(securedEnabled = true, prePostEnabled = true)   
public class SecurityConfig extends WebSecurityConfigurerAdapter {

----

Img: SecurityconfigSEL

method in

@RequiredArgsConstructor  
@RequestMapping("/customers")  
@Controller  
public class CustomerController {

-------

@PreAuthorize("hasRole('ADMIN')") //we can use hasAnyRole,.. also  
@PostMapping("/new")  
public String processCreationForm(Customer customer) {  
 //*ToDO: Add Service* Customer newCustomer = Customer.*builder*()  
 .customerName(customer.getCustomerName())  
 .build();  
  
 Customer savedCustomer= customerRepository.save(newCustomer);  
 return "redirect:/customers/" + savedCustomer.getId();  
}

10. USER authorities

10.1 Refactor Entities, Add Role entity and add RoleRepository

[pdfs\26063020-RefactorRoles.pdf](pdfs/26063020-RefactorRoles.pdf) \* (refer image of entity mapping)

User.java:

package guru.sfg.brewery.domain.security;   
  
@Getter  
@Setter  
@AllArgsConstructor  
@NoArgsConstructor  
@Builder  
@Entity  
public class User {  
 @Id  
 @Column(name = "id", nullable = false)  
 @GeneratedValue(strategy = GenerationType.*AUTO*)  
 private Long id;  
  
 private String username;  
 private String password;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private Boolean accountNonExpired = true;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private Boolean accountNonLocked = true;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private Boolean credentialsNonExpired = true;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private Boolean enabled = true;

----------------------------------------------

@Singular //provide a singular method for adding an role  
 @ManyToMany(cascade = {CascadeType.*MERGE*, CascadeType.*PERSIST*}, fetch = FetchType.*EAGER*)  
 @JoinTable(name="user\_role",  
 joinColumns = {@JoinColumn(name = "USER\_ID", referencedColumnName = "ID")},  
 inverseJoinColumns = {@JoinColumn(name = "ROLE\_ID", referencedColumnName = "ID")})  
 private Set<Role> roles;  
  
 @Transient  
 private Set<Authority> authorities;  
  
 public Set<Authority> getAuthorities() {  
 return this.roles.stream()  
 .map(Role::getAuthorities)  
 .flatMap(Set::stream)  
 .collect(Collectors.*toSet*());  
 }

----------------------------------------------

}

Role.js:

package guru.sfg.brewery.domain.security;

@Getter  
@Setter  
@AllArgsConstructor  
@NoArgsConstructor  
@Builder  
@Entity  
public class Role {  
  
 @Id  
 @Column(name = "id", nullable = false)  
 @GeneratedValue(strategy = GenerationType.*AUTO*)  
 private Long id;  
  
 private String name;  
  
 @ManyToMany(mappedBy = "roles")  
 private Set<User> users;  
  
 @Singular //provide a singular method for adding an role  
 @ManyToMany(cascade = {CascadeType.*MERGE*, CascadeType.*PERSIST*}, fetch = FetchType.*EAGER*)  
 @JoinTable(name="role\_authority",  
 joinColumns = {@JoinColumn(name = "ROLE\_ID", referencedColumnName = "ID")},  
 inverseJoinColumns = {@JoinColumn(name = "AUTHORITY\_ID", referencedColumnName = "ID")})  
 private Set<Authority> authorities;  
  
}

Authority.js:

@Getter  
@Setter  
@AllArgsConstructor  
@NoArgsConstructor  
@Builder  
@Entity  
public class Authority {  
  
 @Id  
 @Column(name = "id", nullable = false)  
 @GeneratedValue(strategy = GenerationType.*AUTO*)  
 private Long id;  
  
 private String permission;  
  
 @ManyToMany(mappedBy = "authorities")  
 private Set<Role> roles;  
}

RoleRepository.java:

public interface RoleRepository extends JpaRepository<Role, Long> {  
}

10.4 Bootstrap class. Data configuration to db.

package guru.sfg.brewery.bootstrap;  
@RequiredArgsConstructor  
@Component  
public class DefaultBreweryLoader implements CommandLineRunner {

------  
  
 public void loadUserAndAuthorityData(){  
  
 //Authorities  
 Authority createBeer = authorityRepository.save(Authority.*builder*().permission("beer.create").build());  
 Authority readBeer = authorityRepository.save(Authority.*builder*().permission("beer.read").build());  
 Authority updateBeer = authorityRepository.save(Authority.*builder*().permission("beer.update").build());  
 Authority deleteBeer = authorityRepository.save(Authority.*builder*().permission("beer.delete").build());

//Role   
 Role adminRole = roleRepository.save(Role.*builder*()  
 .name("ADMIN")  
 .authorities(Set.*of*(createBeer, readBeer, updateBeer, deleteBeer))  
 .build());  
 Role customerRole = roleRepository.save(Role.*builder*()  
 .name("CUSTOMER")  
 .authorities(Set.*of*(readBeer))  
 .build());  
 Role userRole = roleRepository.save(Role.*builder*()  
 .name("USER")  
 .authorities(Set.*of*(readBeer))  
 .build());

//User   
 User user1 = User.*builder*()  
 .username("user1")  
 .password(passwordEncoder.encode("user1"))  
 .role(adminRole) //here we are setting single entity instead of a Set<Authority>  
 .build();  
  
 User user2 = User.*builder*()  
 .username("user2")  
 .password(passwordEncoder.encode("user2"))  
 .role(customerRole)  
 .build();  
  
 User user3 = User.*builder*()  
 .username("user3")  
 .password(passwordEncoder.encode("user3"))  
 .role(userRole)  
 .build();  
  
 userRepository.save(user1);  
 userRepository.save(user2);  
 userRepository.save(user3);  
  
 System.*out*.println("saved successfully...");  
 }  
}

10.5 Refactoring hasRole() techniques in security config

If we see SecurityConfig we are using antMatchers, hasRole technique. When the application becomes large or complex, this technique will lead to complexity & errors. So to avoid this we will set authorities at the method level.

( Config remember: Img: SecurityconfigSEL )

#add @PreAuthorize to the controllers @preAuth -> [TLM]

package guru.sfg.brewery.web.controllers.api;   
@Slf4j  
@RequiredArgsConstructor  
@RequestMapping("/api/v1/")  
@RestController  
public class BeerRestController {  
 private static final Integer *DEFAULT\_PAGE\_NUMBER* = 0;  
 private static final Integer *DEFAULT\_PAGE\_SIZE* = 25;  
 private final BeerService beerService;  
  
 @PreAuthorize("hasAuthority('beer.read')")  
 @GetMapping(produces = { "application/json" }, path = "beer")  
 public ResponseEntity<BeerPagedList> listBeers(@RequestParam(value = "pageNumber", required = false) Integer pageNumber,  
 @RequestParam(value = "pageSize", required = false) Integer pageSize,  
 @RequestParam(value = "beerName", required = false) String beerName,  
 @RequestParam(value = "beerStyle", required = false) BeerStyleEnum beerStyle,  
 @RequestParam(value = "showInventoryOnHand", required = false) Boolean showInventoryOnHand){  
  
 *log*.debug("Listing Beers");  
  
 if (showInventoryOnHand == null) {  
 showInventoryOnHand = false;  
 }  
  
 if (pageNumber == null || pageNumber < 0){  
 pageNumber = *DEFAULT\_PAGE\_NUMBER*;  
 }  
  
 if (pageSize == null || pageSize < 1) {  
 pageSize = *DEFAULT\_PAGE\_SIZE*;  
 }  
  
 BeerPagedList beerList = beerService.listBeers(beerName, beerStyle, PageRequest.*of*(pageNumber, pageSize), showInventoryOnHand);  
  
 return new ResponseEntity<>(beerList, HttpStatus.*OK*);  
 }  
  
 @PreAuthorize("hasAuthority('beer.read')")  
 @GetMapping(path = {"beer/{beerId}"}, produces = { "application/json" })  
 public ResponseEntity<BeerDto> getBeerById(@PathVariable("beerId") UUID beerId,  
 @RequestParam(value = "showInventoryOnHand", required = false) Boolean showInventoryOnHand){  
  
 *log*.debug("Get Request for BeerId: " + beerId);  
  
 if (showInventoryOnHand == null) {  
 showInventoryOnHand = false;  
 }  
  
 return new ResponseEntity<>(beerService.findBeerById(beerId, showInventoryOnHand), HttpStatus.*OK*);  
 }  
  
 @PreAuthorize("hasAuthority('beer.read')")  
 @GetMapping(path = {"beerUpc/{upc}"}, produces = { "application/json" })  
 public ResponseEntity<BeerDto> getBeerByUpc(@PathVariable("upc") String upc){  
 return new ResponseEntity<>(beerService.findBeerByUpc(upc), HttpStatus.*OK*);  
 }  
  
 @PreAuthorize("hasAuthority('beer.create')")  
 @PostMapping(path = "beer")  
 public ResponseEntity saveNewBeer(@Valid @RequestBody BeerDto beerDto){  
  
 BeerDto savedDto = beerService.saveBeer(beerDto);  
  
 HttpHeaders httpHeaders = new HttpHeaders();  
  
 //*todo hostname for uri* httpHeaders.add("Location", "/api/v1/beer\_service/" + savedDto.getId().toString());  
  
 return new ResponseEntity(httpHeaders, HttpStatus.*CREATED*);  
 }  
  
 @PreAuthorize("hasAuthority('beer.update')")  
 @PutMapping(path = {"beer/{beerId}"}, produces = { "application/json" })  
 public ResponseEntity updateBeer(@PathVariable("beerId") UUID beerId, @Valid @RequestBody BeerDto beerDto){  
  
 beerService.updateBeer(beerId, beerDto);  
  
 return new ResponseEntity<>(HttpStatus.*NO\_CONTENT*);  
 }  
  
 @PreAuthorize("hasAuthority('beer.delete')")  
 @DeleteMapping({"beer/{beerId}"})  
 @ResponseStatus(HttpStatus.*NO\_CONTENT*)  
 public void deleteBeer(@PathVariable("beerId") UUID beerId){  
 beerService.deleteById(beerId);  
 }  
  
 @ExceptionHandler(ConstraintViolationException.class)  
 @ResponseStatus(HttpStatus.*BAD\_REQUEST*)  
 ResponseEntity<List> badReqeustHandler(ConstraintViolationException e){  
 List<String> errors = new ArrayList<>(e.getConstraintViolations().size());  
  
 e.getConstraintViolations().forEach(constraintViolation -> {  
 errors.add(constraintViolation.getPropertyPath().toString() + " : " + constraintViolation.getMessage());  
 });  
  
 return new ResponseEntity<>(errors, HttpStatus.*BAD\_REQUEST*);  
 }}

Do the same in CustomerController.java and BeerController.java

#Refactor securityConfig (remove already configured code antMatchers, hasRole)

package guru.sfg.brewery.config;  
  
import guru.sfg.brewery.filters.RestHeaderAuthFilter;  
import org.springframework.context.annotation.Bean;  
import org.springframework.context.annotation.Configuration;  
import org.springframework.http.HttpMethod;  
import org.springframework.security.authentication.AuthenticationManager;  
import org.springframework.security.config.annotation.method.configuration.EnableGlobalMethodSecurity;  
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.crypto.factory.PasswordEncoderFactories;  
import org.springframework.security.crypto.password.PasswordEncoder;  
import org.springframework.security.web.authentication.UsernamePasswordAuthenticationFilter;  
import org.springframework.security.web.util.matcher.AntPathRequestMatcher;  
  
@Configuration  
@EnableWebSecurity  
@EnableGlobalMethodSecurity(securedEnabled = true, prePostEnabled = true) //securedEnabled = Determines if Spring Security's Secured annotations should be enabled  
public class SecurityConfig extends WebSecurityConfigurerAdapter {  
  
 public RestHeaderAuthFilter restHeaderAuthFilter(AuthenticationManager authenticationManager){  
 RestHeaderAuthFilter filter = new RestHeaderAuthFilter(new AntPathRequestMatcher("/api/\*\*"));  
 filter.setAuthenticationManager(authenticationManager);  
 return filter;  
 }  
  
 @Override  
 protected void configure(HttpSecurity http) throws Exception {  
 http.addFilterBefore(restHeaderAuthFilter(authenticationManager()), UsernamePasswordAuthenticationFilter.class);  
  
 http  
 .authorizeRequests(authorize->{  
 authorize  
 .antMatchers(("/h2-console/\*\*")).permitAll() //not recomemded in production  
 .antMatchers("/","/webjars/\*\*","/login","/resources/\*\*").permitAll()

----------------------------------------------  
// .antMatchers("/beers/find","/beers").permitAll()  
// .antMatchers(HttpMethod.GET, "/api/v1/beer/\*\*").permitAll()  
// .mvcMatchers(HttpMethod.DELETE, "/api/v1/beer/\*\*").hasRole("ADMIN")  
// .mvcMatchers(HttpMethod.GET, "/api/v1/beerUpc/{upc}").permitAll()  
// .mvcMatchers("/brewery/breweries").hasAnyRole("ADMIN","CUSTOMER")  
// .mvcMatchers(HttpMethod.GET, "brewery/api/v1/breweries").hasAnyRole("ADMIN","CUSTOMER");

----------------------------------------------  
 })  
 .authorizeRequests()  
 .anyRequest().authenticated()  
 .and()  
 .formLogin()  
 .and()  
 .csrf().disable()  
 .httpBasic();  
  
 //h2 console config  
 http.headers().frameOptions().disable();  
 }  
  
 @Bean  
 PasswordEncoder passwordEncoder(){  
 return PasswordEncoderFactories.*createDelegatingPasswordEncoder*();  
 }  
}

# [TLM] -> @preAuth

if we see here we can see @PreAuthorize("hasAuthority('beer.read')") is repeated multiple time. To avoid this we can create a custom Annotation for ‘beer.create, beer.read, beer.update, beer.delete’.

@BeerCreatePermission

import org.springframework.security.access.prepost.PreAuthorize;  
import java.lang.annotation.Retention;  
import java.lang.annotation.RetentionPolicy;  
  
@Retention(RetentionPolicy.*RUNTIME*)  
@PreAuthorize("hasAuthority('beer.create')")  
public @interface BeerCreatePermission {  
}

@BeerReadPermission

import org.springframework.security.access.prepost.PreAuthorize;  
import java.lang.annotation.Retention;  
import java.lang.annotation.RetentionPolicy;  
  
@Retention(RetentionPolicy.*RUNTIME*)  
@PreAuthorize("hasAuthority('beer.read')")  
public @interface BeerReadPermission {  
}

@BeerUpdatePermission

import org.springframework.security.access.prepost.PreAuthorize;  
import java.lang.annotation.Retention;  
import java.lang.annotation.RetentionPolicy;  
  
@Retention(RetentionPolicy.*RUNTIME*)  
@PreAuthorize("hasAuthority('beer.read')")  
public @interface BeerReadPermission {  
}

@BeerDeletePermission

import org.springframework.security.access.prepost.PreAuthorize;  
import java.lang.annotation.Retention;  
import java.lang.annotation.RetentionPolicy;  
  
@Retention(RetentionPolicy.*RUNTIME*)  
@PreAuthorize("hasAuthority('beer.delete')")  
public @interface BeerDeletePermission {  
}

# Add above Annotations to required class (BeerRestController, CustomerController, BeerController)

@Slf4j  
@RequiredArgsConstructor  
@RequestMapping("/api/v1/")  
@RestController  
public class BeerRestController {  
  
 private static final Integer *DEFAULT\_PAGE\_NUMBER* = 0;  
 private static final Integer *DEFAULT\_PAGE\_SIZE* = 25;  
  
 private final BeerService beerService;  
  
 @BeerReadPermission  
 @GetMapping(produces = { "application/json" }, path = "beer")  
 public ResponseEntity<BeerPagedList> listBeers(@RequestParam(value = "pageNumber", required = false) Integer pageNumber,  
 @RequestParam(value = "pageSize", required = false) Integer pageSize,  
 @RequestParam(value = "beerName", required = false) String beerName,  
 @RequestParam(value = "beerStyle", required = false) BeerStyleEnum beerStyle,  
 @RequestParam(value = "showInventoryOnHand", required = false) Boolean showInventoryOnHand){  
  
 *log*.debug("Listing Beers");  
  
 if (showInventoryOnHand == null) {  
 showInventoryOnHand = false;  
 }  
  
 if (pageNumber == null || pageNumber < 0){  
 pageNumber = *DEFAULT\_PAGE\_NUMBER*;  
 }  
  
 if (pageSize == null || pageSize < 1) {  
 pageSize = *DEFAULT\_PAGE\_SIZE*;  
 }  
 BeerPagedList beerList = beerService.listBeers(beerName, beerStyle, PageRequest.*of*(pageNumber, pageSize), showInventoryOnHand);  
  
 return new ResponseEntity<>(beerList, HttpStatus.*OK*);  
 }  
  
 @BeerReadPermission  
 @GetMapping(path = {"beer/{beerId}"}, produces = { "application/json" })  
 public ResponseEntity<BeerDto> getBeerById(@PathVariable("beerId") UUID beerId,  
 @RequestParam(value = "showInventoryOnHand", required = false) Boolean showInventoryOnHand){  
  
 *log*.debug("Get Request for BeerId: " + beerId);  
  
 if (showInventoryOnHand == null) {  
 showInventoryOnHand = false;  
 }  
  
 return new ResponseEntity<>(beerService.findBeerById(beerId, showInventoryOnHand), HttpStatus.*OK*);  
 }  
  
 @BeerReadPermission  
 @GetMapping(path = {"beerUpc/{upc}"}, produces = { "application/json" })  
 public ResponseEntity<BeerDto> getBeerByUpc(@PathVariable("upc") String upc){  
 return new ResponseEntity<>(beerService.findBeerByUpc(upc), HttpStatus.*OK*);  
 }  
  
 @BeerCreatePermission  
 @PostMapping(path = "beer")  
 public ResponseEntity saveNewBeer(@Valid @RequestBody BeerDto beerDto){  
  
 BeerDto savedDto = beerService.saveBeer(beerDto);  
  
 HttpHeaders httpHeaders = new HttpHeaders();  
  
 //*todo hostname for uri* httpHeaders.add("Location", "/api/v1/beer\_service/" + savedDto.getId().toString());  
  
 return new ResponseEntity(httpHeaders, HttpStatus.*CREATED*);  
 }  
  
 @BeerUpdatePermission  
 @PutMapping(path = {"beer/{beerId}"}, produces = { "application/json" })  
 public ResponseEntity updateBeer(@PathVariable("beerId") UUID beerId, @Valid @RequestBody BeerDto beerDto){  
  
 beerService.updateBeer(beerId, beerDto);  
  
 return new ResponseEntity<>(HttpStatus.*NO\_CONTENT*);  
 }  
  
 @BeerDeletePermission  
 @DeleteMapping({"beer/{beerId}"})  
 @ResponseStatus(HttpStatus.*NO\_CONTENT*)  
 public void deleteBeer(@PathVariable("beerId") UUID beerId){  
 beerService.deleteById(beerId);  
 }  
  
 @ExceptionHandler(ConstraintViolationException.class)  
 @ResponseStatus(HttpStatus.*BAD\_REQUEST*)  
 ResponseEntity<List> badReqeustHandler(ConstraintViolationException e){  
 List<String> errors = new ArrayList<>(e.getConstraintViolations().size());  
  
 e.getConstraintViolations().forEach(constraintViolation -> {  
 errors.add(constraintViolation.getPropertyPath().toString() + " : " + constraintViolation.getMessage());  
 });  
  
 return new ResponseEntity<>(errors, HttpStatus.*BAD\_REQUEST*);  
 }  
  
}

Observation: \*\*

- Once the User is authenticated in the backend, a session is assigned for the user in the SecurityContextHolder and a JSESSIONID will get stored in browser (http only Cookie). For subsequent request this JSESSIONID will be passed in the requestHeader. So this JSESSIONID cookie will verified in the backend and whether session already exist for this user. If so the request is success.

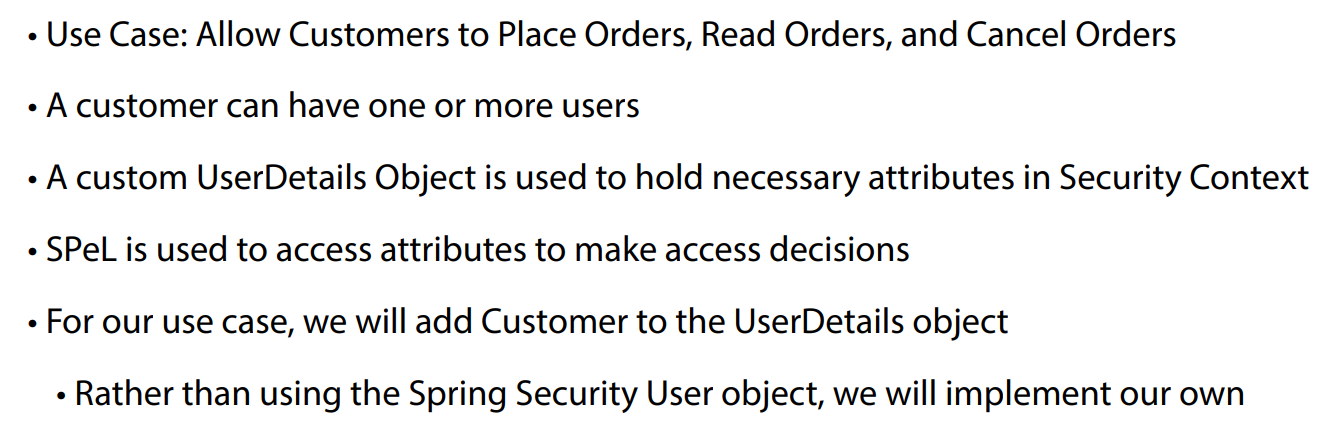
- Other filters can also access this SecurityContext, so no need of authentication again and again.

- below image we have given JSESSIONID in the header, without this we will get 401 error.



11. multitenancy security

Intro: [pdfs\26092220-MultitenancyOverview.pdf](pdfs/26092220-MultitenancyOverview.pdf) \*\*\*



#Add BeerOrderController

package guru.sfg.brewery.web.controllers.api;

@RequestMapping("/api/v1/customers/{customerId}/")  
@RestController  
public class BeerOrderController {  
 private static final Integer *DEFAULT\_PAGE\_NUMBER* = 0;  
 private static final Integer *DEFAULT\_PAGE\_SIZE* = 25;  
  
 private final BeerOrderService beerOrderService;  
  
 public BeerOrderController(BeerOrderService beerOrderService) {  
 this.beerOrderService = beerOrderService;  
 }  
  
 @GetMapping("orders")  
 public BeerOrderPagedList listOrders(@PathVariable("customerId") UUID customerId,  
 @RequestParam(value = "pageNumber", required = false) Integer pageNumber, @RequestParam(value = "pageSize", required = false) Integer pageSize) {  
 if (pageNumber == null || pageNumber < 0) {  
 pageNumber = *DEFAULT\_PAGE\_NUMBER*;  
 }  
  
 if (pageSize == null || pageSize < 1) {  
 pageSize = *DEFAULT\_PAGE\_SIZE*;  
 }  
 return beerOrderService.listOrders(customerId, PageRequest.*of*(pageNumber, pageSize));  
 }  
  
 @PostMapping("orders")  
 @ResponseStatus(HttpStatus.*CREATED*)  
 public BeerOrderDto placeOrder(@PathVariable("customerId") UUID customerId, @RequestBody BeerOrderDto beerOrderDto) {  
 return beerOrderService.placeOrder(customerId, beerOrderDto);  
 }  
  
 @GetMapping("orders/{orderId}")  
 public BeerOrderDto getOrder (@PathVariable("customerId") UUID customerId, @PathVariable("orderId") UUID orderId) { return beerOrderService.getOrderById(customerId, orderId);  
 }  
 @PutMapping("/orders/{orderId}/pickup") @ResponseStatus(HttpStatus.*NO\_CONTENT*)  
 public void pickupOrder (@PathVariable("customerId") UUID customerId, @PathVariable("orderId") UUID orderId) { beerOrderService.pickupOrder (customerId, orderId);  
 }  
}

#Configure bootstrap class for customer

@RequiredArgsConstructor  
@Component  
@Transactional  
public class DefaultBreweryLoader implements CommandLineRunner {  
  
 public static final String *TASTING\_ROOM* = "Tasting Room";  
 public static final String *BEER\_1\_UPC* = "0631234200036";  
 public static final String *BEER\_2\_UPC* = "0631234300019";  
 public static final String *BEER\_3\_UPC* = "0083783375213";  
  
 private final BreweryRepository breweryRepository;  
 private final BeerRepository beerRepository;  
 private final BeerInventoryRepository beerInventoryRepository;  
 private final BeerOrderRepository beerOrderRepository;  
 private final CustomerRepository customerRepository;  
 private final PasswordEncoder passwordEncoder;  
 private final UserRepository userRepository;  
 private final AuthorityRepository authorityRepository;  
 private final RoleRepository roleRepository;  
  
 @Override  
 public void run(String... args) {  
 loadBreweryData();  
 loadCustomerData();  
 loadUserAndAuthorityData();  
 }  
  
 private void loadCustomerData() {  
 Customer tastingRoom = Customer.*builder*()  
 .customerName(*TASTING\_ROOM*)  
 .apiKey(UUID.*randomUUID*())  
 .build();  
  
 customerRepository.save(tastingRoom);  
  
 beerRepository.findAll().forEach(beer -> {  
 beerOrderRepository.save(BeerOrder.*builder*()  
 .customer(tastingRoom)  
 .orderStatus(OrderStatusEnum.*NEW*)  
 .beerOrderLines(Set.*of*(BeerOrderLine.*builder*()  
 .beer(beer)  
 .orderQuantity(2)  
 .build()))  
 .build());  
 });  
 }  
  
 private void loadBreweryData() {  
 if (breweryRepository.count() == 0) {  
 breweryRepository.save(Brewery  
 .*builder*()  
 .breweryName("Cage Brewing")  
 .build());  
  
 Beer mangoBobs = Beer.*builder*()  
 .beerName("Mango Bobs")  
 .beerStyle(BeerStyleEnum.*IPA*)  
 .minOnHand(12)  
 .quantityToBrew(200)  
 .upc(*BEER\_1\_UPC*)  
 .build();  
  
 beerRepository.save(mangoBobs);  
 beerInventoryRepository.save(BeerInventory.*builder*()  
 .beer(mangoBobs)  
 .quantityOnHand(500)  
 .build());  
  
 Beer galaxyCat = Beer.*builder*()  
 .beerName("Galaxy Cat")  
 .beerStyle(BeerStyleEnum.*PALE\_ALE*)  
 .minOnHand(12)  
 .quantityToBrew(200)  
 .upc(*BEER\_2\_UPC*)  
 .build();  
  
 beerRepository.save(galaxyCat);  
 beerInventoryRepository.save(BeerInventory.*builder*()  
 .beer(galaxyCat)  
 .quantityOnHand(500)  
 .build());

Beer pinball = Beer.*builder*()  
 .beerName("Pinball Porter")  
 .beerStyle(BeerStyleEnum.*PORTER*)  
 .minOnHand(12)  
 .quantityToBrew(200)  
 .upc(*BEER\_3\_UPC*)  
 .build();  
  
 beerRepository.save(pinball);  
 beerInventoryRepository.save(BeerInventory.*builder*()  
 .beer(pinball)  
 .quantityOnHand(500)  
 .build());  
  
 }  
 }

public void loadUserAndAuthorityData(){  
 //beer authorities  
 Authority createBeer = authorityRepository.save(Authority.*builder*().permission("beer.create").build());  
 Authority readBeer = authorityRepository.save(Authority.*builder*().permission("beer.read").build());  
 Authority updateBeer = authorityRepository.save(Authority.*builder*().permission("beer.update").build());  
 Authority deleteBeer = authorityRepository.save(Authority.*builder*().permission("beer.delete").build());

----------------------------------------------  
 //customer authorities  
 Authority createCustomer = authorityRepository.save(Authority.*builder*().permission("customer.create").build());  
 Authority readCustomer = authorityRepository.save(Authority.*builder*().permission("customer.read").build());  
 Authority updateCustomer = authorityRepository.save(Authority.*builder*().permission("customer.update").build());  
 Authority deleteCustomer = authorityRepository.save(Authority.*builder*().permission("customer.delete").build());  
  
 //brewery  
 Authority createBrewery = authorityRepository.save(Authority.*builder*().permission("brewery.create").build());  
 Authority readBrewery = authorityRepository.save(Authority.*builder*().permission("brewery.read").build());  
 Authority updateBrewery = authorityRepository.save(Authority.*builder*().permission("brewery.update").build());  
 Authority deleteBrewery = authorityRepository.save(Authority.*builder*().permission("brewery.delete").build());  
  
 //beer order customer  
 Authority createOrderCustomer = authorityRepository.save(Authority.*builder*().permission("customer.order.create").build());  
 Authority readOrderCustomer = authorityRepository.save(Authority.*builder*().permission("customer.order.read").build());  
 Authority updateOrderCustomer = authorityRepository.save(Authority.*builder*().permission("customer.order.update").build());  
 Authority deleteOrderCustomer = authorityRepository.save(Authority.*builder*().permission("customer.order.delete").build());  
  
 //beer order Admin  
 Authority createOrder = authorityRepository.save(Authority.*builder*().permission("order.create").build());  
 Authority readOrder = authorityRepository.save(Authority.*builder*().permission("order.read").build());  
 Authority updateOrder = authorityRepository.save(Authority.*builder*().permission("order.update").build());  
 Authority deleteOrder = authorityRepository.save(Authority.*builder*().permission("order.delete").build());  
----------------------------------------------  
 Role adminRole = roleRepository.save(Role.*builder*()  
 .name("ADMIN")  
 .authorities(Set.*of*(createBeer, readBeer, updateBeer, deleteBeer, createCustomer, readCustomer, updateCustomer, deleteCustomer, createBrewery, readBrewery, updateBrewery, deleteBrewery, createOrder, readOrder, updateOrder, deleteOrder))  
 .build());  
 Role customerRole = roleRepository.save(Role.*builder*()  
 .name("CUSTOMER")  
 .authorities(Set.*of*(readBeer, readCustomer, readBrewery, createOrderCustomer, readOrderCustomer, updateOrderCustomer, deleteOrderCustomer))  
 .build());  
 Role userRole = roleRepository.save(Role.*builder*()  
 .name("USER")  
 .authorities(Set.*of*(readBeer))  
 .build());  
  
 User user1 = User.*builder*()  
 .username("user1")  
 .password(passwordEncoder.encode("user1"))  
 .role(adminRole) //here we are setting single entity instead of a Set<Authority>  
 .build();  
  
 User user2 = User.*builder*()  
 .username("user2")  
 .password(passwordEncoder.encode("user2"))  
 .role(customerRole)  
 .build();  
  
 User user3 = User.*builder*()  
 .username("user3")  
 .password(passwordEncoder.encode("user3"))  
 .role(userRole)  
 .build();  
  
 userRepository.save(user1);  
 userRepository.save(user2);  
 userRepository.save(user3);  
  
 System.*out*.println("saved successfully...");  
 }  
}

# Update JPA User class

Implement with UserDetails and CredentialsContainer and override its methods. . ( we will be creating a map between User and Customer in the future, So if it was like before we cant achieve loadByUsername technique, because while returning in this method(loadByusername) we are using class **User** from the spring, which doesnot have Customer mapping).

Observation: here we are overriding getAuthorities() from the UserDetails interface

package guru.sfg.brewery.domain.security;  
  
@Getter  
@Setter  
@AllArgsConstructor  
@NoArgsConstructor  
@Builder  
@Entity

public class User implements UserDetails, CredentialsContainer {  
 @Id  
 @Column(name = "id", nullable = false)  
 @GeneratedValue(strategy = GenerationType.*AUTO*)  
 private Long id;  
  
 private String username;  
 private String password;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private Boolean accountNonExpired = true;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private Boolean accountNonLocked = true;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private Boolean credentialsNonExpired = true;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private Boolean enabled = true;  
  
 @Singular //provide a singular method for adding an role  
 @ManyToMany(cascade = {CascadeType.*MERGE*, CascadeType.*PERSIST*}, fetch = FetchType.*EAGER*)  
 @JoinTable(name="user\_role",  
 joinColumns = {@JoinColumn(name = "USER\_ID", referencedColumnName = "ID")},  
 inverseJoinColumns = {@JoinColumn(name = "ROLE\_ID", referencedColumnName = "ID")})  
 private Set<Role> roles;  
  
// @Transient  
// private Set<Authority> authorities;  
  
 @Transient  
 @Override  
 public Set<GrantedAuthority> getAuthorities() {  
 return this.roles.stream()  
 .map(Role::getAuthorities)  
 .flatMap(Set::stream)  
 .map(authority -> new SimpleGrantedAuthority(authority.getPermission()))  
 .collect(Collectors.*toSet*());  
 }  
----------------------------------------------  
 @Override  
 public boolean isAccountNonExpired() {  
 return this.accountNonExpired;  
 }  
  
 @Override  
 public boolean isAccountNonLocked() {  
 return this.accountNonLocked;  
 }  
  
 @Override  
 public boolean isCredentialsNonExpired() {  
 return this.credentialsNonExpired;  
 }  
  
 @Override  
 public boolean isEnabled() {  
 return this.enabled;  
 }  
  
 @Override  
 public void eraseCredentials() {  
 this.password = null;  
 }

----------------------------------------------  
}

#Update custom userDetailsService class

package guru.sfg.brewery.services.security;   
  
@Slf4j  
@RequiredArgsConstructor  
@Service  
public class JpaUserDetailsService implements UserDetailsService {  
  
 private final UserRepository userRepository;  
  
 @Override  
 public UserDetails loadUserByUsername(String username) throws UsernameNotFoundException {  
 *log*.debug("inside loadUserByUsername");  
  
 return userRepository.findByUsername(username).orElseThrow(()-> new UsernameNotFoundException("username "+username+" not found"));  
//before   
// return new org.springframework.security.core.userdetails.User(user.getUsername(), user.getPassword(),  
// user.getEnabled(), user.getAccountNonExpired(), user.getCredentialsNonExpired(),  
// user.getAccountNonLocked(), convertToGrantedAuthorites(user.getAuthorities()));  
 }  
  
// private Collection<? extends GrantedAuthority> convertToGrantedAuthorites(Set<Authority> authorities) {  
// if(authorities!=null && authorities.size()>0){  
// return authorities.stream()  
// .map(Authority::getPermission)  
// .map(SimpleGrantedAuthority::new)  
// .collect(Collectors.toList());  
// }else{  
// return new HashSet<>();  
// }  
// }  
}

# User & Customer class JPA mapping.

User:

package guru.sfg.brewery.domain.security;

@Getter  
@Setter  
@AllArgsConstructor  
@NoArgsConstructor  
@Builder  
@Entity  
public class User implements UserDetails, CredentialsContainer {  
 @Id  
 @Column(name = "id", nullable = false)  
 @GeneratedValue(strategy = GenerationType.*AUTO*)  
 private Long id;  
  
 private String username;  
 private String password;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private Boolean accountNonExpired = true;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private Boolean accountNonLocked = true;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private Boolean credentialsNonExpired = true;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private Boolean enabled = true;  
  
 @Singular //provide a singular method for adding an role  
 @ManyToMany(cascade = {CascadeType.*MERGE*, CascadeType.*PERSIST*}, fetch = FetchType.*EAGER*)  
 @JoinTable(name="user\_role",  
 joinColumns = {@JoinColumn(name = "USER\_ID", referencedColumnName = "ID")},  
 inverseJoinColumns = {@JoinColumn(name = "ROLE\_ID", referencedColumnName = "ID")})  
 private Set<Role> roles;

----------------------------------------------  
 @ManyToOne(fetch = FetchType.*EAGER*)  
 private Customer customers;

----------------------------------------------  
  
// @Transient  
// private Set<Authority> authorities;  
  
 @Transient  
 @Override  
 public Set<GrantedAuthority> getAuthorities() {  
 return this.roles.stream()  
 .map(Role::getAuthorities)  
 .flatMap(Set::stream)  
 .map(authority -> new SimpleGrantedAuthority(authority.getPermission()))  
 .collect(Collectors.*toSet*());  
 }  
  
 @Override  
 public boolean isAccountNonExpired() {  
 return this.accountNonExpired;  
 }  
  
 @Override  
 public boolean isAccountNonLocked() {  
 return this.accountNonLocked;  
 }  
  
 @Override  
 public boolean isCredentialsNonExpired() {  
 return this.credentialsNonExpired;  
 }  
  
 @Override  
 public boolean isEnabled() {  
 return this.enabled;  
 }  
  
 @Override  
 public void eraseCredentials() {  
 this.password = null;  
 }  
}

Customer:

package guru.sfg.brewery.domain;

@Getter  
@Setter  
@NoArgsConstructor  
@Entity  
public class Customer extends BaseEntity {  
  
 @Builder  
 public Customer(UUID id, Long version, Timestamp createdDate, Timestamp lastModifiedDate, String customerName,  
 UUID apiKey, Set<BeerOrder> beerOrders) {  
 super(id, version, createdDate, lastModifiedDate);  
 this.customerName = customerName;  
 this.apiKey = apiKey;  
 this.beerOrders = beerOrders;  
 }  
  
 private String customerName;  
  
 @Column(length = 36, columnDefinition = "varchar")  
 private UUID apiKey;  
  
 @OneToMany(mappedBy = "customer")  
 private Set<BeerOrder> beerOrders;

----------------------------------------------  
 @OneToMany(mappedBy = "customers", cascade = CascadeType.*ALL*, fetch = FetchType.*EAGER*)  
 private Set<User> users;

----------------------------------------------  
  
}

# Refactor bootstrap class

Adding 3 Customers and his 3 Users.

package guru.sfg.brewery.bootstrap;

@Slf4j  
@RequiredArgsConstructor  
@Component  
public class DefaultBreweryLoader implements CommandLineRunner {  
  
 public static final String *TASTING\_ROOM* = "Tasting Room";  
 public static final String *ST\_PETE\_DISTRIBUTING* = "St Pete distributing";  
 public static final String *DUNEDIN\_DISTRIBUTING* = "Dunedin distributing";  
 public static final String *KEY\_WEST\_DISTRIBUTORS* = "Key West Distributors";  
  
 public static final String *BEER\_1\_UPC* = "0631234200036";  
 public static final String *BEER\_2\_UPC* = "0631234300019";  
 public static final String *BEER\_3\_UPC* = "0083783375213";  
  
 private final BreweryRepository breweryRepository;  
 private final BeerRepository beerRepository;  
 private final BeerInventoryRepository beerInventoryRepository;  
 private final BeerOrderRepository beerOrderRepository;  
 private final CustomerRepository customerRepository;  
 private final PasswordEncoder passwordEncoder;  
 private final UserRepository userRepository;  
 private final AuthorityRepository authorityRepository;  
 private final RoleRepository roleRepository;

@Transactional  
 @Override  
 public void run(String... args) {  
 loadUserAndAuthorityData();  
 loadBreweryData();  
 loadTastingRoomData();  
 loadCustomerData();  
 }

----------------------------------------------  
 private void loadCustomerData() {  
 Role customerRole = roleRepository.findByName("CUSTOMER").orElseThrow(); //by default it throws NoSuchElementException("No value present")  
  
 //create customers  
 Customer stPeteCustomer = customerRepository.save(Customer.*builder*().customerName(*ST\_PETE\_DISTRIBUTING*)  
 .apiKey(UUID.*randomUUID*())  
 .build());  
 Customer dunedinCustomer = customerRepository.save(Customer.*builder*().customerName(*DUNEDIN\_DISTRIBUTING*).apiKey(UUID.*randomUUID*())  
 .build());  
 Customer keyWestCustomer = customerRepository.save(Customer.*builder*().customerName(*KEY\_WEST\_DISTRIBUTORS*)  
 .apiKey(UUID.*randomUUID*())  
 .build());  
  
 //create users (as of now we are not using this user data)  
 User stPeteUser = userRepository.save(User.*builder*().username("state")  
 .password(passwordEncoder.encode("password"))  
 .customer(stPeteCustomer)  
 .role(customerRole).build());  
 User dunedinUser = userRepository.save(User.*builder*().username("dunedin").password(passwordEncoder.encode("password"))  
 .customer(dunedinCustomer)  
 .role(customerRole).build());  
 User keywest = userRepository.save(User.*builder*().username("keywest").password(passwordEncoder.encode("password"))  
 .customer(keyWestCustomer)  
 .role(customerRole).build());  
  
 *log*.debug("Users loaded:"+userRepository.count()); //6   
  
 //create orders  
 createOrder(stPeteCustomer);  
 createOrder(dunedinCustomer);  
 createOrder(keyWestCustomer);  
  
 *log*.debug("Orders loaded:"+beerOrderRepository.count()); //6  
 }  
  
 private BeerOrder createOrder(Customer customer) {  
 return beerOrderRepository.save(BeerOrder.*builder*()  
 .customer(customer)  
 .orderStatus(OrderStatusEnum.*NEW*)  
 .beerOrderLines(Set.*of*(BeerOrderLine.*builder*()  
 .beer(beerRepository.findByUpc(*BEER\_1\_UPC*))  
 .orderQuantity(2)  
 .build()))  
 .build());  
 }  
----------------------------------------------

//just method name changed, before it was loadCustomerData  
 private void loadTastingRoomData() {   
 Customer tastingRoom = Customer.*builder*()  
 .customerName(*TASTING\_ROOM*)  
 .apiKey(UUID.*randomUUID*())  
 .build();  
  
 customerRepository.save(tastingRoom);  
  
 beerRepository.findAll().forEach(beer -> {  
 beerOrderRepository.save(BeerOrder.*builder*()  
 .customer(tastingRoom)  
 .orderStatus(OrderStatusEnum.*NEW*)  
 .beerOrderLines(Set.*of*(BeerOrderLine.*builder*()  
 .beer(beer)  
 .orderQuantity(2)  
 .build()))  
 .build());  
 });  
 }  
  
 private void loadBreweryData() {  
 if (breweryRepository.count() == 0) {  
 breweryRepository.save(Brewery  
 .*builder*()  
 .breweryName("Cage Brewing")  
 .build());  
  
 Beer mangoBobs = Beer.*builder*()  
 .beerName("Mango Bobs")  
 .beerStyle(BeerStyleEnum.*IPA*)  
 .minOnHand(12)  
 .quantityToBrew(200)  
 .upc(*BEER\_1\_UPC*)  
 .build();  
  
 beerRepository.save(mangoBobs);  
 beerInventoryRepository.save(BeerInventory.*builder*()  
 .beer(mangoBobs)  
 .quantityOnHand(500)  
 .build());  
  
 Beer galaxyCat = Beer.*builder*()  
 .beerName("Galaxy Cat")  
 .beerStyle(BeerStyleEnum.*PALE\_ALE*)  
 .minOnHand(12)  
 .quantityToBrew(200)  
 .upc(*BEER\_2\_UPC*)  
 .build();  
  
 beerRepository.save(galaxyCat);  
 beerInventoryRepository.save(BeerInventory.*builder*()  
 .beer(galaxyCat)  
 .quantityOnHand(500)  
 .build());  
  
 Beer pinball = Beer.*builder*()  
 .beerName("Pinball Porter")  
 .beerStyle(BeerStyleEnum.*PORTER*)  
 .minOnHand(12)  
 .quantityToBrew(200)  
 .upc(*BEER\_3\_UPC*)  
 .build();  
  
 beerRepository.save(pinball);  
 beerInventoryRepository.save(BeerInventory.*builder*()  
 .beer(pinball)  
 .quantityOnHand(500)  
 .build());  
  
 }  
 }  
  
 public void loadUserAndAuthorityData() {  
 //beer authorities  
 Authority createBeer = authorityRepository.save(Authority.*builder*().permission("beer.create").build());  
 Authority readBeer = authorityRepository.save(Authority.*builder*().permission("beer.read").build());  
 Authority updateBeer = authorityRepository.save(Authority.*builder*().permission("beer.update").build());  
 Authority deleteBeer = authorityRepository.save(Authority.*builder*().permission("beer.delete").build());  
  
 //customer authorities  
 Authority createCustomer = authorityRepository.save(Authority.*builder*().permission("customer.create").build());  
 Authority readCustomer = authorityRepository.save(Authority.*builder*().permission("customer.read").build());  
 Authority updateCustomer = authorityRepository.save(Authority.*builder*().permission("customer.update").build());  
 Authority deleteCustomer = authorityRepository.save(Authority.*builder*().permission("customer.delete").build());  
  
 //brewery  
 Authority createBrewery = authorityRepository.save(Authority.*builder*().permission("brewery.create").build());  
 Authority readBrewery = authorityRepository.save(Authority.*builder*().permission("brewery.read").build());  
 Authority updateBrewery = authorityRepository.save(Authority.*builder*().permission("brewery.update").build());  
 Authority deleteBrewery = authorityRepository.save(Authority.*builder*().permission("brewery.delete").build());  
  
 //beer order customer  
 Authority createOrderCustomer = authorityRepository.save(Authority.*builder*().permission("customer.order.create").build());  
 Authority readOrderCustomer = authorityRepository.save(Authority.*builder*().permission("customer.order.read").build());  
 Authority updateOrderCustomer = authorityRepository.save(Authority.*builder*().permission("customer.order.update").build());  
 Authority deleteOrderCustomer = authorityRepository.save(Authority.*builder*().permission("customer.order.delete").build());  
  
 // beer order Admin  
 Authority createOrder = authorityRepository.save(Authority.*builder*().permission("order.create").build());  
 Authority readOrder = authorityRepository.save(Authority.*builder*().permission("order.read").build());  
 Authority updateOrder = authorityRepository.save(Authority.*builder*().permission("order.update").build());  
 Authority deleteOrder = authorityRepository.save(Authority.*builder*().permission("order.delete").build());  
  
 Role adminRole = roleRepository.save(Role.*builder*()  
 .name("ADMIN")  
 .authorities(Set.*of*(createBeer, readBeer, updateBeer, deleteBeer, createCustomer, readCustomer, updateCustomer, deleteCustomer,  
 createBrewery, readBrewery, updateBrewery, deleteBrewery, createOrder, readOrder, updateOrder, deleteOrder))  
 .build());  
 Role customerRole = roleRepository.save(Role.*builder*()  
 .name("CUSTOMER")  
 .authorities(Set.*of*(readBeer, readCustomer, readBrewery, createOrderCustomer, readOrderCustomer, updateOrderCustomer, deleteOrderCustomer))  
 .build());  
 Role userRole = roleRepository.save(Role.*builder*()  
 .name("USER")  
 .authorities(Set.*of*(readBeer))  
 .build());  
  
 User user1 = User.*builder*()  
 .username("user1")  
 .password(passwordEncoder.encode("user1"))  
 .role(adminRole) //here we are setting single entity instead of a Set<Authority>  
 .build();  
  
 User user2 = User.*builder*()  
 .username("user2")  
 .password(passwordEncoder.encode("user2"))  
 .role(customerRole)  
 .build();  
  
 User user3 = User.*builder*()  
 .username("user3")  
 .password(passwordEncoder.encode("user3"))  
 .role(userRole)  
 .build();  
  
 userRepository.save(user1);  
 userRepository.save(user2);  
 userRepository.save(user3);  
  
 System.*out*.println("saved successfully...");  
 }  
}

11.8 Use Case [pdfs\26100804-Use-Case.pdf](pdfs/26100804-Use-Case.pdf) \*\*\*

#Set up Custom Authentication Manager

package guru.sfg.brewery.security;  
  
@Slf4j  
@Component  
public class BeerOrderAuthenticationManager {  
  
 public boolean customerIdMatches(Authentication authentication, UUID customerId){  
 User authenticationUser = (User) authentication.getPrincipal();  
  
 *log*.debug("Auth user customerId: "+authenticationUser.getCustomer().getId()+" customerId: "+customerId);  
  
 return customerId.equals(authenticationUser.getCustomer().getId());  
 }  
}

#Using Authentication principle in controller

( we are going to depricate this V1 bcz we are not supposed to show customerId in the url) (refer below for V2)

Using BeerOrderAuthenticationManager in the @PreAthorize

package guru.sfg.brewery.web.controllers.api;   
  
@RequestMapping("/api/v1/customers/{customerId}/")  
@RestController  
public class BeerOrderController {  
 private static final Integer *DEFAULT\_PAGE\_NUMBER* = 0;  
 private static final Integer *DEFAULT\_PAGE\_SIZE* = 25;  
 private final BeerOrderService beerOrderService;  
  
 public BeerOrderController(BeerOrderService beerOrderService) {  
 this.beerOrderService = beerOrderService;  
 }  
  
 @PreAuthorize("hasAuthority('order.read') OR " +  
 "hasAuthority('customer.order.read') AND " +  
 "@beerOrderAuthenticationManager.customerIdMatches(authentication, #customerId)")  
 @GetMapping("orders")  
 public BeerOrderPagedList listOrders(@PathVariable("customerId") UUID customerId,   
 @RequestParam(value = "pageNumber", required = false) Integer pageNumber, @RequestParam(value = "pageSize", required = false) Integer pageSize) {  
 if (pageNumber == null || pageNumber < 0) {  
 pageNumber = *DEFAULT\_PAGE\_NUMBER*;  
 }  
  
 if (pageSize == null || pageSize < 1) {  
 pageSize = *DEFAULT\_PAGE\_SIZE*;  
 }  
 return beerOrderService.listOrders(customerId, PageRequest.*of*(pageNumber, pageSize));  
 }  
  
 @PostMapping("orders")  
 @ResponseStatus(HttpStatus.*CREATED*)  
 public BeerOrderDto placeOrder(@PathVariable("customerId") UUID customerId, @RequestBody BeerOrderDto beerOrderDto) {  
 return beerOrderService.placeOrder(customerId, beerOrderDto);  
 }

@PreAuthorize("hasAuthority('order.read') OR " +  
 "hasAuthority('customer.order.read') AND " +  
 "@beerOrderAuthenticationManager.customerIdMatches(authentication, #customerId)")  
 @GetMapping("orders/{orderId}")  
 public BeerOrderDto getOrder (@PathVariable("customerId") UUID customerId, @PathVariable("orderId") UUID orderId) { return beerOrderService.getOrderById(customerId, orderId);  
 }

@PutMapping("/orders/{orderId}/pickup") @ResponseStatus(HttpStatus.*NO\_CONTENT*)  
 public void pickupOrder (@PathVariable("customerId") UUID customerId, @PathVariable("orderId") UUID orderId) { beerOrderService.pickupOrder (customerId, orderId);  
 }  
}

#Refactor BeerPermission Annotations

@Retention(RetentionPolicy.*RUNTIME*)  
@PreAuthorize("hasAuthority('beer.create') OR hasAuthority('customer.order.create')")  
public @interface BeerCreatePermission {  
}

@Retention(RetentionPolicy.*RUNTIME*)  
@PreAuthorize("hasAuthority('beer.read') OR hasAuthority('customer.order.read')")  
public @interface BeerReadPermission {  
}

@Retention(RetentionPolicy.*RUNTIME*)  
@PreAuthorize("hasAuthority('beer.update') OR hasAuthority('customer.order.update')")  
public @interface BeerUpdatePermission {  
}

@Retention(RetentionPolicy.*RUNTIME*)  
@PreAuthorize("hasAuthority('beer.delete') OR hasAuthority('customer.order.delete')")  
public @interface BeerDeletePermission {  
}

**Using Spring Security with Spring Data Jpa \*\***

Advantage: we can use spring security techniques like hasRole, hasAuthority,principal… in the sql query. (quick refer Img:SWJ )

#dependency

<dependency>  
 <groupId>org.springframework.security</groupId>  
 <artifactId>spring-security-data</artifactId>  
</dependency>

#Declare a bean in SecurityConfig

package guru.sfg.brewery.config;  
  
@Configuration  
@EnableWebSecurity  
@EnableGlobalMethodSecurity(securedEnabled = true, prePostEnabled = true) //securedEnabled = Determines if Spring Security's Secured annotations should be enabled  
public class SecurityConfig extends WebSecurityConfigurerAdapter {  
----------------------------------------------  
 // needed for use Spring Security with Spring Data JPA SPel  
 @Bean  
 public SecurityEvaluationContextExtension securityEvaluationContextExtension(){  
 return new SecurityEvaluationContextExtension();  
 }

@Override  
 protected void configure(HttpSecurity http) throws Exception {  
 http  
 .authorizeRequests(authorize->{  
 authorize  
 .antMatchers(("/h2-console/\*\*")).permitAll() //not recomemded in production  
 .antMatchers("/","/webjars/\*\*","/login","/resources/\*\*").permitAll();  
 })  
 .authorizeRequests()  
 .anyRequest().authenticated()  
 .and()  
 .formLogin()  
 .and()  
 .csrf().disable()  
 .httpBasic();  
  
 //h2 console config  
 http.headers().frameOptions().disable();  
 }  
 @Bean  
 PasswordEncoder passwordEncoder(){  
 return PasswordEncoderFactories.*createDelegatingPasswordEncoder*();  
 }  
}

# Create V2 for BeerOrderController

package guru.sfg.brewery.web.controllers.api;  
  
@RequestMapping("/api/v2/orders/")  
@RestController  
public class BeerOrderControllerV2 {  
 private static final Integer *DEFAULT\_PAGE\_NUMBER* = 0;  
 private static final Integer *DEFAULT\_PAGE\_SIZE* = 25;  
 private final BeerOrderService beerOrderService;  
  
 public BeerOrderControllerV2(BeerOrderService beerOrderService) {  
 this.beerOrderService = beerOrderService;  
 }  
  
 @BeerReadPermission  
 @GetMapping  
 public BeerOrderPagedList listOrders(@AuthenticationPrincipal User user, //removed customerId PathParam  
 @RequestParam(value = "pageNumber", required = false) Integer pageNumber,  
 @RequestParam(value = "pageSize", required = false) Integer pageSize) {  
 if (pageNumber == null || pageNumber < 0) {  
 pageNumber = *DEFAULT\_PAGE\_NUMBER*;  
 }  
  
 if (pageSize == null || pageSize < 1) {  
 pageSize = *DEFAULT\_PAGE\_SIZE*;  
 }  
 ----------------------------------------------  
 //If customer exist for the user fetch based on customerId or fetch All beerOrders.  
 // (only Admin(user1),Customer(user2),User(user3) don't have customer)  
 if(user.getCustomer()!=null){  
 return beerOrderService.listOrders(user.getCustomer().getId(), PageRequest.*of*(pageNumber, pageSize));  
 }else{  
 return beerOrderService.listOrders(PageRequest.*of*(pageNumber, pageSize));  
 }

----------------------------------------------  
 }  
  
 @PostMapping  
 @ResponseStatus(HttpStatus.*CREATED*)  
 public BeerOrderDto placeOrder(@PathVariable("customerId") UUID customerId, @RequestBody BeerOrderDto beerOrderDto) {  
 return beerOrderService.placeOrder(customerId, beerOrderDto);  
 }

@BeerReadPermission  
 @GetMapping("{orderId}")  
 public BeerOrderDto getOrder (@PathVariable("orderId") UUID orderId) { //removed customerId PathParam  
 ----------------------------------------------

BeerOrderDto beerOrderDto = beerOrderService.getOrderById(orderId);  
  
 if(beerOrderDto == null){  
 throw new ResponseStatusException(HttpStatus.*NOT\_FOUND*, "Order not found");  
 }  
 *log*.debug("Found Order: "+beerOrderDto);  
  
 return beerOrderDto;

----------------------------------------------  
 }  
  
 @PutMapping("{orderId}/pickup") @ResponseStatus(HttpStatus.*NO\_CONTENT*)  
 public void pickupOrder (@PathVariable("customerId") UUID customerId,  
 @PathVariable("orderId") UUID orderId) {  
 beerOrderService.pickupOrder (customerId, orderId);  
 }  
}

BeerOrderService.java (I)

public interface BeerOrderService {  
 BeerOrderPagedList listOrders(UUID customerId, Pageable pageable);  
 BeerOrderDto placeOrder(UUID customerId, BeerOrderDto beerOrderDto);  
 BeerOrderDto getOrderById(UUID customerId, UUID orderId);  
 void pickupOrder(UUID customerId, UUID orderId);  
 BeerOrderPagedList listOrders(Pageable pageable);  
  
 BeerOrderDto getOrderById(UUID orderId);  
}

BeerOrderServiceImpl.java

package guru.sfg.brewery.services;  
  
@Slf4j  
@Service  
@AllArgsConstructor  
public class BeerOrderServiceImpl implements BeerOrderService {  
  
 private final BeerOrderRepository beerOrderRepository;  
 private final CustomerRepository customerRepository;  
 private final BeerOrderMapper beerOrderMapper;  
  
 @Override  
 public BeerOrderPagedList listOrders(UUID customerId, Pageable pageable) {  
 Optional<Customer> customerOptional = customerRepository.findById(customerId);  
  
 if (customerOptional.isPresent()) {  
 Page<BeerOrder> beerOrderPage =  
 beerOrderRepository.findAllByCustomer(customerOptional.get(), pageable);  
  
 return new BeerOrderPagedList(beerOrderPage  
 .stream()  
 .map(beerOrderMapper::beerOrderToDto)  
 .collect(Collectors.*toList*()), PageRequest.*of*(  
 beerOrderPage.getPageable().getPageNumber(),  
 beerOrderPage.getPageable().getPageSize()),  
 beerOrderPage.getTotalElements());  
 } else {  
 return null;  
 }  
 }  
  
 @Override  
 public BeerOrderPagedList listOrders(Pageable pageable) {  
 Page<BeerOrder> beerOrderPage =  
 beerOrderRepository.findAll(pageable);  
  
 return new BeerOrderPagedList(beerOrderPage  
 .stream()  
 .map(beerOrderMapper::beerOrderToDto)  
 .collect(Collectors.*toList*()), PageRequest.*of*(  
 beerOrderPage.getPageable().getPageNumber(),  
 beerOrderPage.getPageable().getPageSize()),  
 beerOrderPage.getTotalElements());  
 }  
  
 @Transactional  
 @Override  
 public BeerOrderDto placeOrder(UUID customerId, BeerOrderDto beerOrderDto) {  
 Optional<Customer> customerOptional = customerRepository.findById(customerId);  
  
 if (customerOptional.isPresent()) {  
 BeerOrder beerOrder = beerOrderMapper.dtoToBeerOrder(beerOrderDto);  
 beerOrder.setId(null); //should not be set by outside client  
 beerOrder.setCustomer(customerOptional.get());  
 beerOrder.setOrderStatus(OrderStatusEnum.*NEW*);  
  
 beerOrder.getBeerOrderLines().forEach(line -> line.setBeerOrder(beerOrder));  
  
 BeerOrder savedBeerOrder = beerOrderRepository.saveAndFlush(beerOrder);  
  
 *log*.debug("Saved Beer Order: " + beerOrder.getId());  
  
 return beerOrderMapper.beerOrderToDto(savedBeerOrder);  
 }  
 //*todo add exception type* throw new RuntimeException("Customer Not Found");  
 }  
  
 @Override  
 public BeerOrderDto getOrderById(UUID customerId, UUID orderId) {  
 return beerOrderMapper.beerOrderToDto(getOrder(customerId, orderId));  
 }  
 ----------------------------------------------  
 @Override  
 public BeerOrderDto getOrderById(UUID orderId) {  
 BeerOrder beerOrder = beerOrderRepository.findOrderByIdSecure(orderId);  
 return beerOrderMapper.beerOrderToDto(beerOrder);  
 }

----------------------------------------------

@Override  
 public void pickupOrder(UUID customerId, UUID orderId) {  
 BeerOrder beerOrder = getOrder(customerId, orderId);  
 beerOrder.setOrderStatus(OrderStatusEnum.*PICKED\_UP*);  
  
 beerOrderRepository.save(beerOrder);  
 }

private BeerOrder getOrder(UUID customerId, UUID orderId){  
 Optional<Customer> customerOptional = customerRepository.findById(customerId);  
  
 if(customerOptional.isPresent()){  
 Optional<BeerOrder> beerOrderOptional = beerOrderRepository.findById(orderId);  
  
 if(beerOrderOptional.isPresent()){  
 BeerOrder beerOrder = beerOrderOptional.get();  
  
 // fall to exception if customer id's do not match - order not for customer  
 if(beerOrder.getCustomer().getId().equals(customerId)){  
 return beerOrder;  
 }  
 }  
 throw new RuntimeException("Beer Order Not Found");  
 }  
 throw new RuntimeException("Customer Not Found");  
 }  
}

BeerOrderRepository.java:

package guru.sfg.brewery.repositories;  
public interface BeerOrderRepository extends JpaRepository<BeerOrder, UUID> {  
  
 Page<BeerOrder> findAllByCustomer(Customer customer, Pageable pageable);  
  
 List<BeerOrder> findAllByOrderStatus(OrderStatusEnum orderStatusEnum);  
  
 @Lock(LockModeType.*PESSIMISTIC\_WRITE*)  
 BeerOrder findOneById(UUID id);

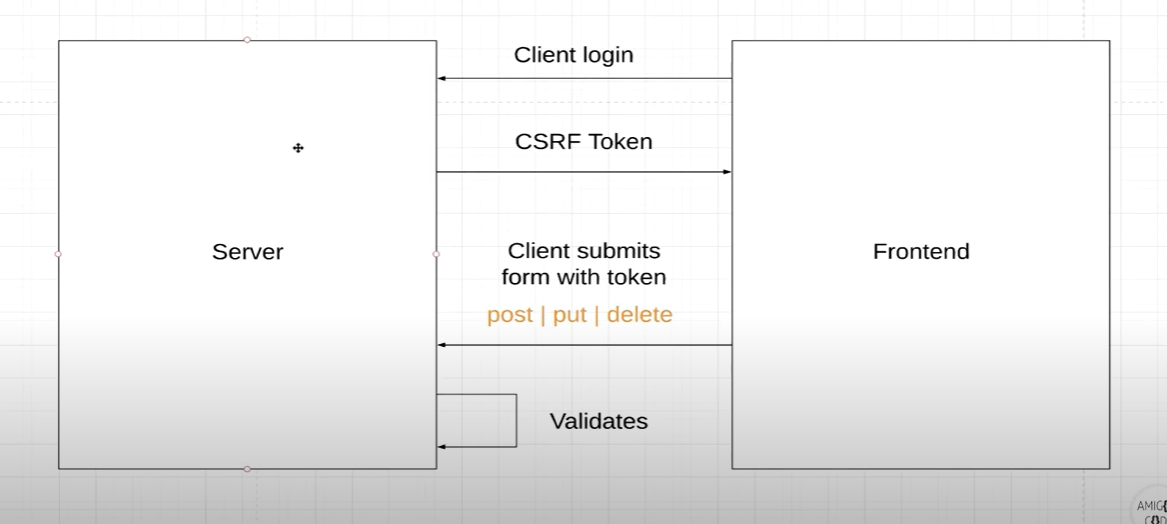
// Using Spring security with Spring Data Jpa   
 ----------------------------------------------   
 @Query("select o from BeerOrder o where o.id=?1 and " +  
 "(true = :#{hasAuthority('order.read')} or " + // : helps hibernate to understand it is a method  
 "o.customer.id = ?#{principal?.customer?.id})")  
 BeerOrder findOrderByIdSecure(UUID orderId);

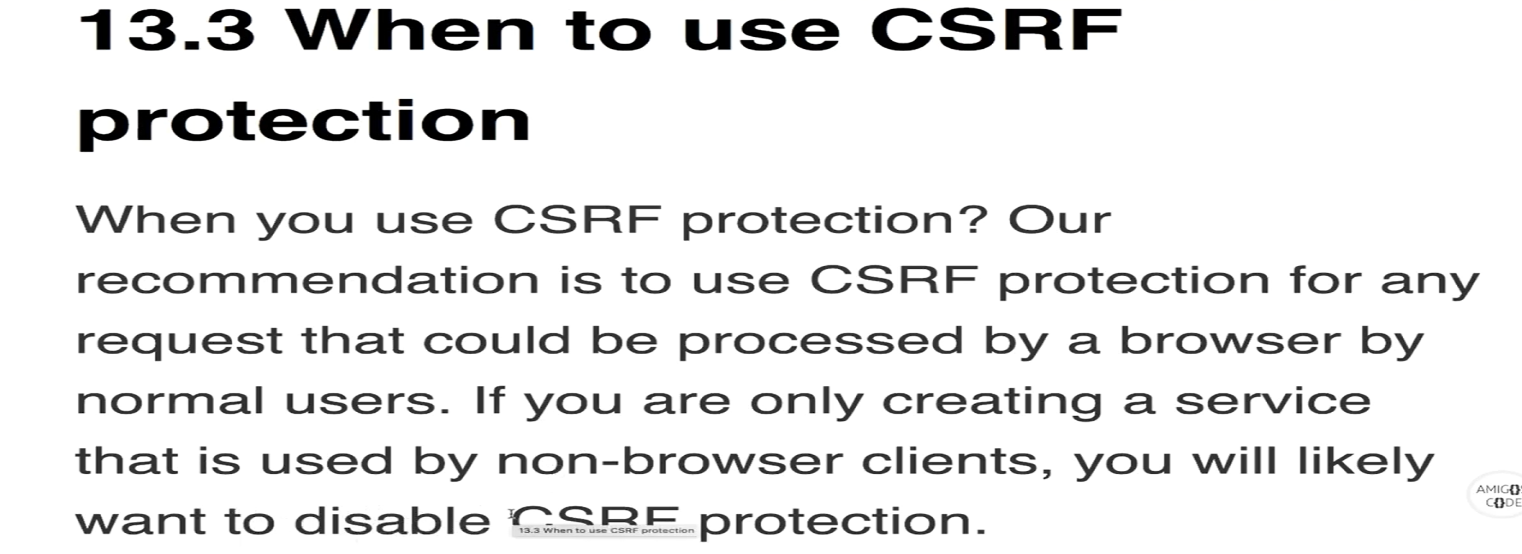
----------------------------------------------  
}

Img:SWJ

12. Enable csrf protection in spring security

YT: <https://www.youtube.com/watch?v=Ub5TLow9GL4> \*\*\* (if you want to understand)



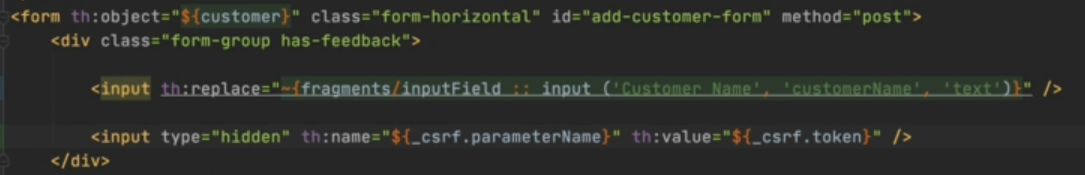


# Ignore csrf() for some endpoints

.csrf().ignoringAntMatchers("/h2-console/\*\*","/api/\*\*");

# Enabling CSRF in html/thymeleaf page.

Adding csrf to a input tag inside a form tag (thymeleaf ex)



In the browser



14. remember me

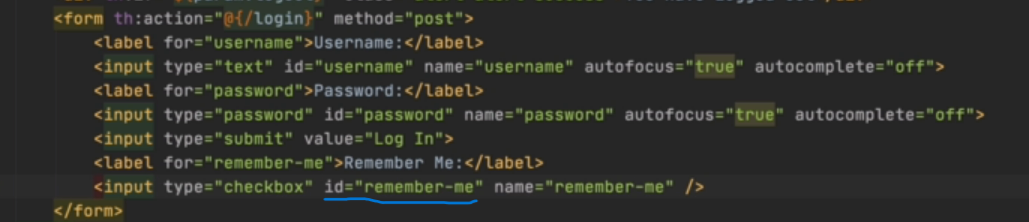
Introduction: [pdfs\26447394-RememberMeOverview.pdf](pdfs/26447394-RememberMeOverview.pdf) \*\*\*

2 types: 1.Hash based token 2.Persistant token (both works in cases of thymeleaf or front end is in java)

**Note:all these rememberMe technique below run only with jsp, thymeleaf, springSecurity default loginForm.**

# Index.html

Add input tag with id=”remember-me” , it is default in spring Security. Or if you did not have custom form like below, spring securities default form will come with Remember Me option.

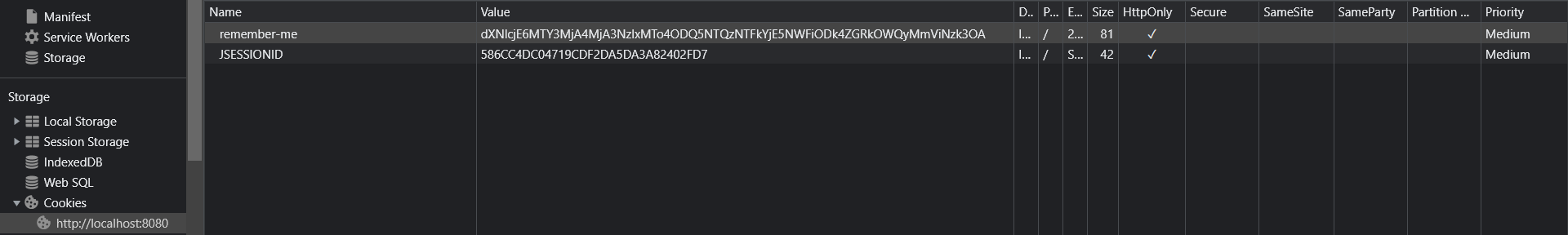


# 1. Simple Hash Based token Remember Me

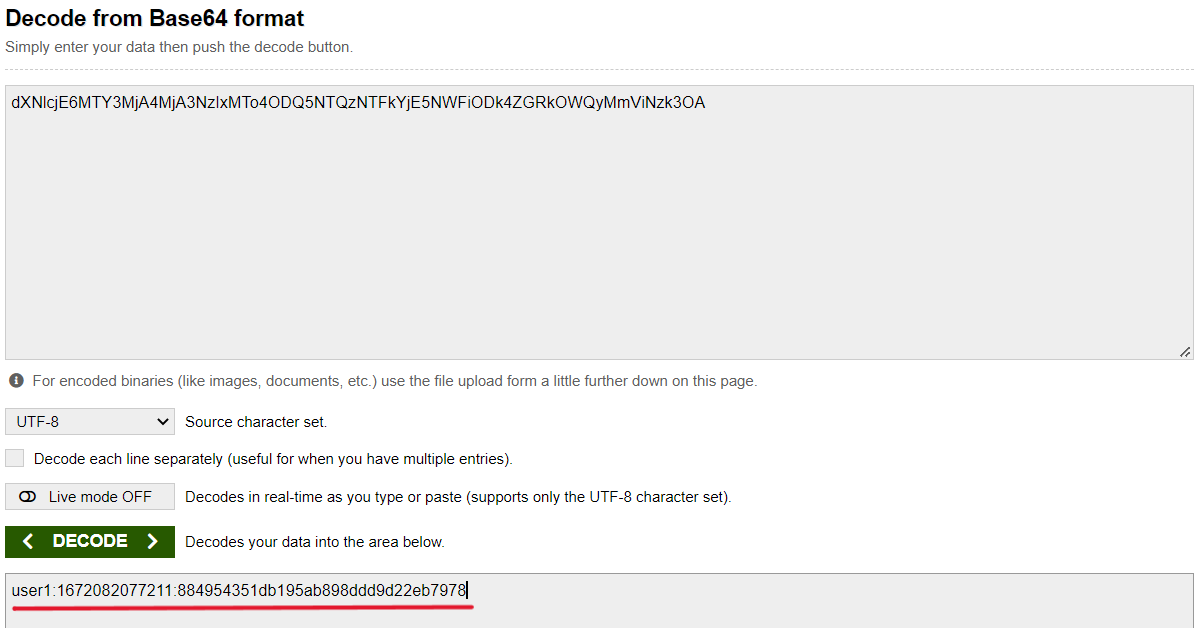
-We can decode the base64 token stored in cookies.

package guru.sfg.brewery.config;  
  
@RequiredArgsConstructor  
@Configuration  
@EnableWebSecurity  
@EnableGlobalMethodSecurity(securedEnabled = true, prePostEnabled = true) //securedEnabled = Determines if Spring Security's Secured annotations should be enabled  
public class SecurityConfig extends WebSecurityConfigurerAdapter {  
  
 private final UserDetailsService userDetailsService;  
  
 // needed for use Spring Security with Spring Data JPA SPel  
 @Bean  
 public SecurityEvaluationContextExtension securityEvaluationContextExtension(){  
 return new SecurityEvaluationContextExtension();  
 }  
  
 @Override  
 protected void configure(HttpSecurity http) throws Exception {  
 http  
 .authorizeRequests(authorize->{  
 authorize  
 .antMatchers(("/h2-console/\*\*")).permitAll() //not recomemded in production  
 .antMatchers("/","/webjars/\*\*","/login","/resources/\*\*").permitAll();  
 })  
 .authorizeRequests()  
 .anyRequest().authenticated()  
 .and()  
 .formLogin()  
 .and()  
 .httpBasic()  
 .and()  
 .csrf().ignoringAntMatchers("/h2-console/\*\*","/api/\*\*")  
 .and().rememberMe().key("sfg-key").userDetailsService(userDetailsService);  
  
 //h2 console config  
 http.headers().frameOptions().disable();  
 }  
  
 @Bean  
 PasswordEncoder passwordEncoder(){  
 return PasswordEncoderFactories.*createDelegatingPasswordEncoder*();  
 }  
}

*token in browser*



*We can decode this remember-me token in Base64 decoder*



# 2.Persistent token

-We can’t decode it.

2.1 create schema.sql (which runs automatically on application starts)

It initializes the required table and its fields. Note: Table name and Fields should be matching as below. We cant use custom names.

create table persistent\_logins (username varchar(64) not null,  
 series varchar(64) primary key,  
 token varchar(64) not null,  
 last\_used timestamp not null);

2.2 Create bean of PersistentTokenRepository

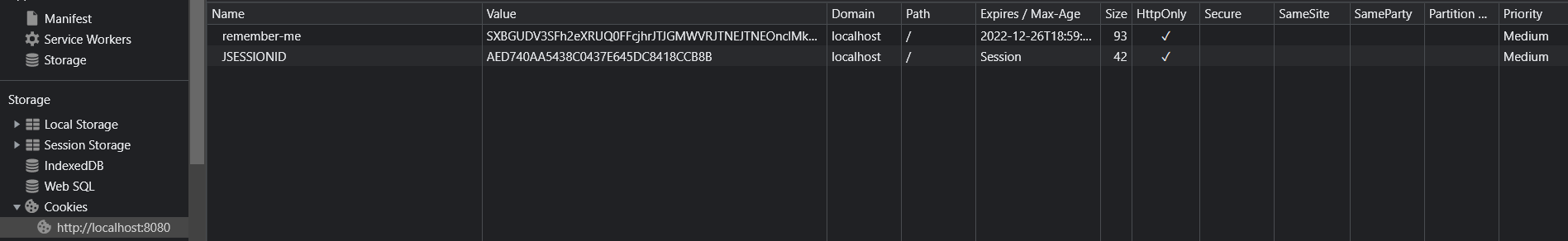
package guru.sfg.brewery.config;  
import org.springframework.security.web.authentication.rememberme.JdbcTokenRepositoryImpl;  
import org.springframework.security.web.authentication.rememberme.PersistentTokenRepository;  
import javax.sql.DataSource;  
  
@Configuration  
public class SecurityBeans {  
  
 @Bean  
 public PersistentTokenRepository persistentTokenRepository(DataSource dataSource){  
 JdbcTokenRepositoryImpl jdbcTokenRepository = new JdbcTokenRepositoryImpl();  
 jdbcTokenRepository.setDataSource(dataSource);  
 return jdbcTokenRepository;  
 }  
}

2.3 Security Config

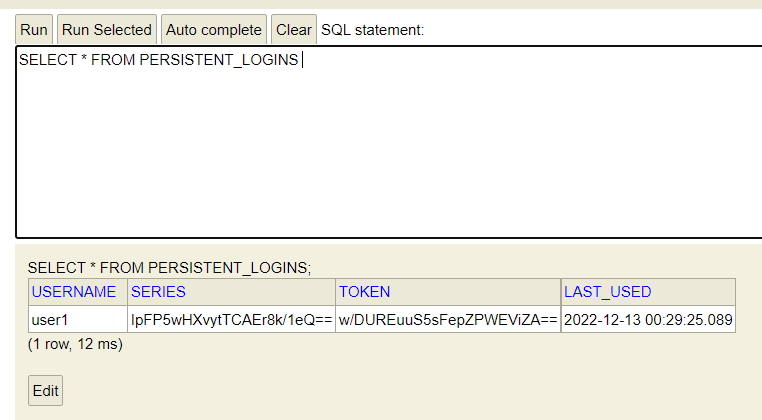
package guru.sfg.brewery.config;   
  
@RequiredArgsConstructor  
@Configuration  
@EnableWebSecurity  
@EnableGlobalMethodSecurity(securedEnabled = true, prePostEnabled = true) //securedEnabled = Determines if Spring Security's Secured annotations should be enabled  
public class SecurityConfig extends WebSecurityConfigurerAdapter {  
  
 private final UserDetailsService userDetailsService;  
 private final PersistentTokenRepository persistentTokenRepository;  
  
 // needed for use Spring Security with Spring Data JPA SPel  
 @Bean  
 public SecurityEvaluationContextExtension securityEvaluationContextExtension(){  
 return new SecurityEvaluationContextExtension();  
 }  
  
 @Override  
 protected void configure(HttpSecurity http) throws Exception {  
 http  
 .authorizeRequests(authorize->{  
 authorize  
 .antMatchers(("/h2-console/\*\*")).permitAll() //not recomemded in production  
 .antMatchers("/","/webjars/\*\*","/login","/resources/\*\*").permitAll();  
 })  
 .authorizeRequests()  
 .anyRequest().authenticated()  
 .and()  
 .formLogin()  
 .and()  
 .httpBasic()  
 .and()  
 .csrf().ignoringAntMatchers("/h2-console/\*\*","/api/\*\*")  
 //persistent token  
 .and().rememberMe()  
 .tokenRepository(persistentTokenRepository)  
 .userDetailsService(userDetailsService);  
  
 //h2 console config  
 http.headers().frameOptions().disable();  
 }  
  
 @Bean  
 PasswordEncoder passwordEncoder(){  
 return PasswordEncoderFactories.*createDelegatingPasswordEncoder*();  
 }  
}

token in browser

-if we try to delete JSESSIONID and reload, user wont logout.



**PersistentLogins** table (this table will be populated after user logged in and also clicked remember me button)



**Remember me authentication with persistent JWT tokens**

Link: <https://craftingjava.com/blog/user-management-remember-me-jwt-token/>

**Cookie based authentication**

Jwt can be used by multiply application until its expiry date is reached, but while creating a Cookie we can specify on which domain cookie must be used and the browser will help to maintain the cookie safe. Cookie based is harder to use on SSO where the third party system authenticate into the application, so in this SSO case Jwt is the best option.

Link: <https://www.youtube.com/watch?v=TggWLDAXmb4&list=PLab_if3UBk9-TuyqwMy3JvNHeCh7Ll9Wz&index=8>

15. user locked using spring security events

Intro for Spring Securith Authentication event: [pdfs\26530692-SpringSecEvents.pdf](pdfs/26530692-SpringSecEvents.pdf) \*\*

15.5 Creating Authentication Success Event listener

#Add AuthenticationEventPublisher bean

package guru.sfg.brewery.config;

@Configuration  
public class SecurityBeans {  
----------------------------------------------

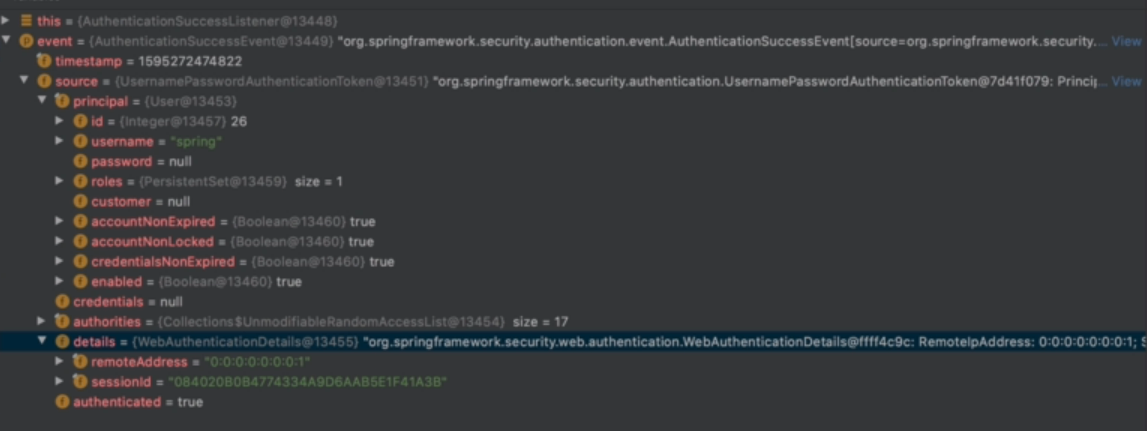
//allows spring Authentication providers to publish events once as defined in spring context  
// (ApplicationEventPublisher bean will be in spring context already, it is not from spring security)   
 @Bean  
 public AuthenticationEventPublisher authenticationEventPublisher(ApplicationEventPublisher applicationEventPublisher){  
 return new DefaultAuthenticationEventPublisher(applicationEventPublisher);  
 }  
----------------------------------------------   
 @Bean  
 public PersistentTokenRepository persistentTokenRepository(DataSource dataSource){  
 JdbcTokenRepositoryImpl jdbcTokenRepository = new JdbcTokenRepositoryImpl();  
 jdbcTokenRepository.setDataSource(dataSource);  
 return jdbcTokenRepository;  
 }  
}

#Add event listener

package guru.sfg.brewery.security.listeners;   
@Slf4j  
@Component  
public class AuthenticationSuccessListener {  
  
 @EventListener  
 public void listen(AuthenticationSuccessEvent authenticationSuccessEvent){  
 *log*.debug("User logged in Okay");

if(event.getSource() instanceof UsernamePasswordAuthenticationToken){  
 UsernamePasswordAuthenticationToken token = (UsernamePasswordAuthenticationToken) event.getSource();  
  
 if(token.getPrincipal() instanceof User){  
 User user = (User) token.getPrincipal();  
  
 *log*.debug("Logged Username: "+user.getUsername());  
 }  
  
 if(token.getDetails() instanceof WebAuthenticationDetails){  
 WebAuthenticationDetails details = (WebAuthenticationDetails) token.getDetails();  
  
 *log*.debug("Source IP: "+details.getRemoteAddress());  
 }  
 }  
 }  
}

debug point:



#diable show sql and tracing for better visiblity of logs

##show sql  
#spring.jpa.properties.hibernate.show\_sql=true  
##pretty format Sql  
#spring.jpa.properties.hibernate.format\_sql=true  
##show bind parameters  
#logging.level.org.hibernate.type.descriptor.sql =trace

#add below  
logging.level.guru.sfg.brewery=debug  
logging.level.org.springframework.security=error

15.6 saving autheticated user details to db

#create LoginSuccess entity

package guru.sfg.brewery.domain.security;  
--  
import java.sql.Timestamp;  
  
@AllArgsConstructor  
@NoArgsConstructor  
@Builder  
@Getter  
@Setter  
@Entity  
public class LoginSuccess {  
 @Id  
 @Column(name = "id", nullable = false)  
 @GeneratedValue(strategy = GenerationType.*AUTO*)  
 private Integer id;  
  
 @ManyToOne  
 private User user;  
  
 private String sourceIp;  
  
 @CreationTimestamp  
 @Column(updatable = false)  
 private Timestamp createdDate;  
  
 @UpdateTimestamp  
 private Timestamp lastModifiedDate;  
  
}

# add LoginSuccess Repo

public interface LoginSuccessRepository extends JpaRepository<LoginSuccess, Integer> {  
}

#AuthenticationSuccessListeners

package guru.sfg.brewery.security.listeners;  
  
@Slf4j  
@RequiredArgsConstructor  
@Component  
public class AuthenticationSuccessListener {  
  
 private final LoginSuccessRepository loginSuccessRepository;  
  
 @EventListener  
 public void listen(AuthenticationSuccessEvent event){  
 *log*.debug("User logged in Okay");  
 if(event.getSource() instanceof UsernamePasswordAuthenticationToken){  
 LoginSuccess.LoginSuccessBuilder builder = LoginSuccess.*builder*();  
  
 UsernamePasswordAuthenticationToken token = (UsernamePasswordAuthenticationToken) event.getSource();  
  
 if(token.getPrincipal() instanceof User){  
 User user = (User) token.getPrincipal();  
 builder.user(user);  
  
 *log*.debug("Logged Username: "+user.getUsername());  
 }  
  
 if(token.getDetails() instanceof WebAuthenticationDetails){  
 WebAuthenticationDetails details = (WebAuthenticationDetails) token.getDetails();  
  
 *log*.debug("Source IP: "+details.getRemoteAddress());  
 builder.sourceIp(details.getRemoteAddress());  
 }  
 LoginSuccess loginSuccess = loginSuccessRepository.save(builder.build());  
  
 *log*.debug("Login success, saved Id: "+loginSuccess.getId());  
 }  
 }  
}

#DB

SELECT \* FROM LOGIN\_SUCCESS;

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| [ID](http://localhost:8080/h2-console/query.do?jsessionid=b07880fdcf5c34e6134d4ab47ff5811e) | [CREATED\_DATE](http://localhost:8080/h2-console/query.do?jsessionid=b07880fdcf5c34e6134d4ab47ff5811e) | [LAST\_MODIFIED\_DATE](http://localhost:8080/h2-console/query.do?jsessionid=b07880fdcf5c34e6134d4ab47ff5811e) | [SOURCE\_IP](http://localhost:8080/h2-console/query.do?jsessionid=b07880fdcf5c34e6134d4ab47ff5811e) | [USER\_ID](http://localhost:8080/h2-console/query.do?jsessionid=b07880fdcf5c34e6134d4ab47ff5811e) |
| 30 | 2022-12-16 01:00:23.085 | 2022-12-16 01:00:23.085 | 0:0:0:0:0:0:0:1 | 24 |

15.7 Creating Authentication Failure Event Listener

and also lock account if user try invalid credential more than 3 times.

#create LoginFailure class

package guru.sfg.brewery.domain.security;

@AllArgsConstructor  
@NoArgsConstructor  
@Builder  
@Getter  
@Setter  
@Entity  
public class LoginFailure {  
  
 @Id  
 @Column(name = "id", nullable = false)  
 @GeneratedValue(strategy = GenerationType.*AUTO*)  
 private Integer id;  
  
 private String username;  
  
 @ManyToOne  
 private User user;  
  
 private String sourceIp;  
  
 @CreationTimestamp  
 @Column(updatable = false)  
 private Timestamp createdDate;  
  
 @UpdateTimestamp  
 private Timestamp lastModifiedDate;  
}

# create LoginFailure repo

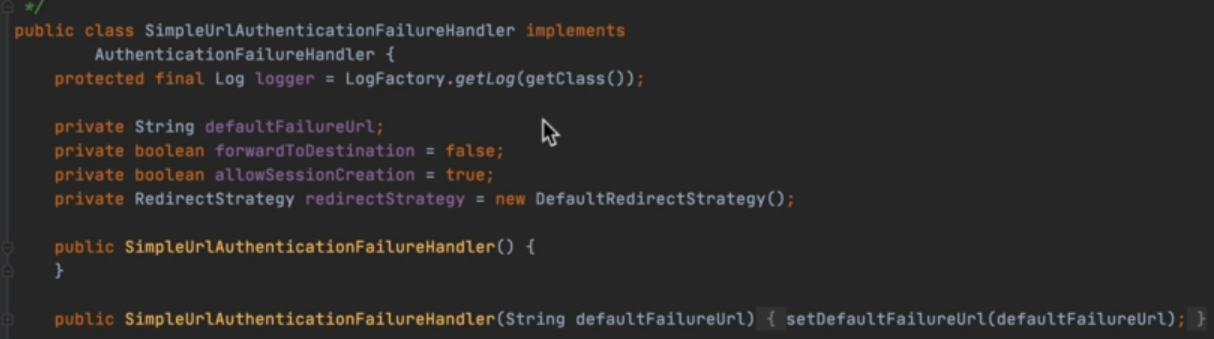
public interface LoginFailureRepository extends JpaRepository<LoginFailure, Integer> {  
  
 List<LoginFailure> findAllByUserAndCreatedDateIsAfter(User user, Timestamp timestamp);  
}

#Create the listener and also write logic to block the account

package guru.sfg.brewery.security.listeners;  
  
@Slf4j  
@RequiredArgsConstructor  
@Component  
public class AuthenticationFailureListener {  
  
 private final LoginFailureRepository loginFailureRepository;  
 private final UserRepository userRepository;  
  
 @EventListener  
 public void listen(AuthenticationFailureBadCredentialsEvent event){  
 *log*.debug("login failure");  
  
 if(event.getSource() instanceof UsernamePasswordAuthenticationToken){  
 UsernamePasswordAuthenticationToken token = (UsernamePasswordAuthenticationToken) event.getSource();  
 LoginFailure.LoginFailureBuilder builder = LoginFailure.*builder*();  
  
 if(token.getPrincipal() instanceof String){  
 *log*.debug("Attempted Username: "+token.getPrincipal());  
  
 builder.username((String) token.getPrincipal());  
 userRepository.findByUsername((String) token.getPrincipal()).ifPresent(builder::user);  
 }  
  
 if(token.getDetails() instanceof WebAuthenticationDetails){  
 WebAuthenticationDetails details = (WebAuthenticationDetails) token.getDetails();  
  
 *log*.debug("Source IP: "+details.getRemoteAddress());  
 builder.sourceIp(details.getRemoteAddress());  
 }  
 LoginFailure loginFailure = loginFailureRepository.save(builder.build());  
  
 *log*.debug("Login failed, failed Id: "+loginFailure.getId());  
  
 if(loginFailure.getUser()!=null){  
 this.lockUserAccount(loginFailure.getUser());  
 }  
 }  
 }  
  
 private void lockUserAccount(User user) {  
 List<LoginFailure> failures = loginFailureRepository.findAllByUserAndCreatedDateIsAfter(user,  
 Timestamp.*valueOf*(LocalDateTime.*now*().minusDays(1)));  
  
 if(failures.size()>3){  
 *log*.debug("Locking user account!!!");  
 user.setAccountNonLocked(false);  
 userRepository.save(user);  
 }  
 }  
  
  
}

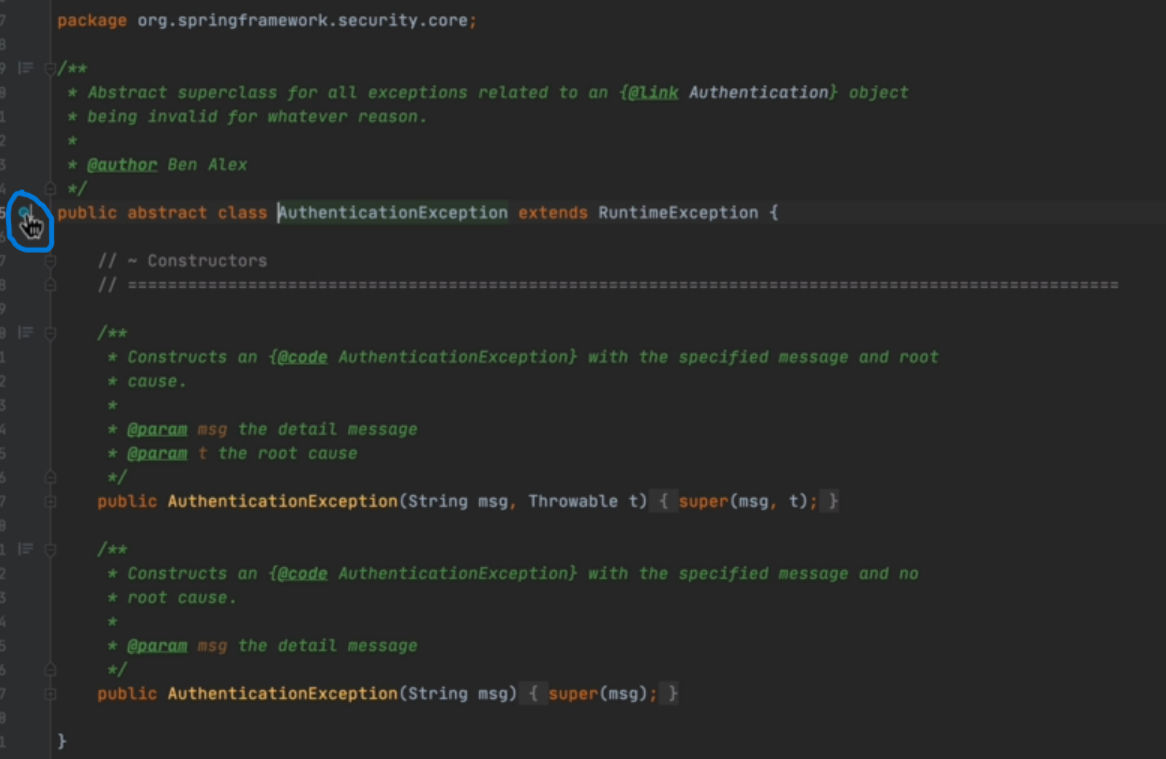
15.8 Printing Message (thymeleaf)

Spring Security provides default authetication failure handler class (SimpleUrlAuthenticationFailureHandler) . We can implement our own for custom functionalities.

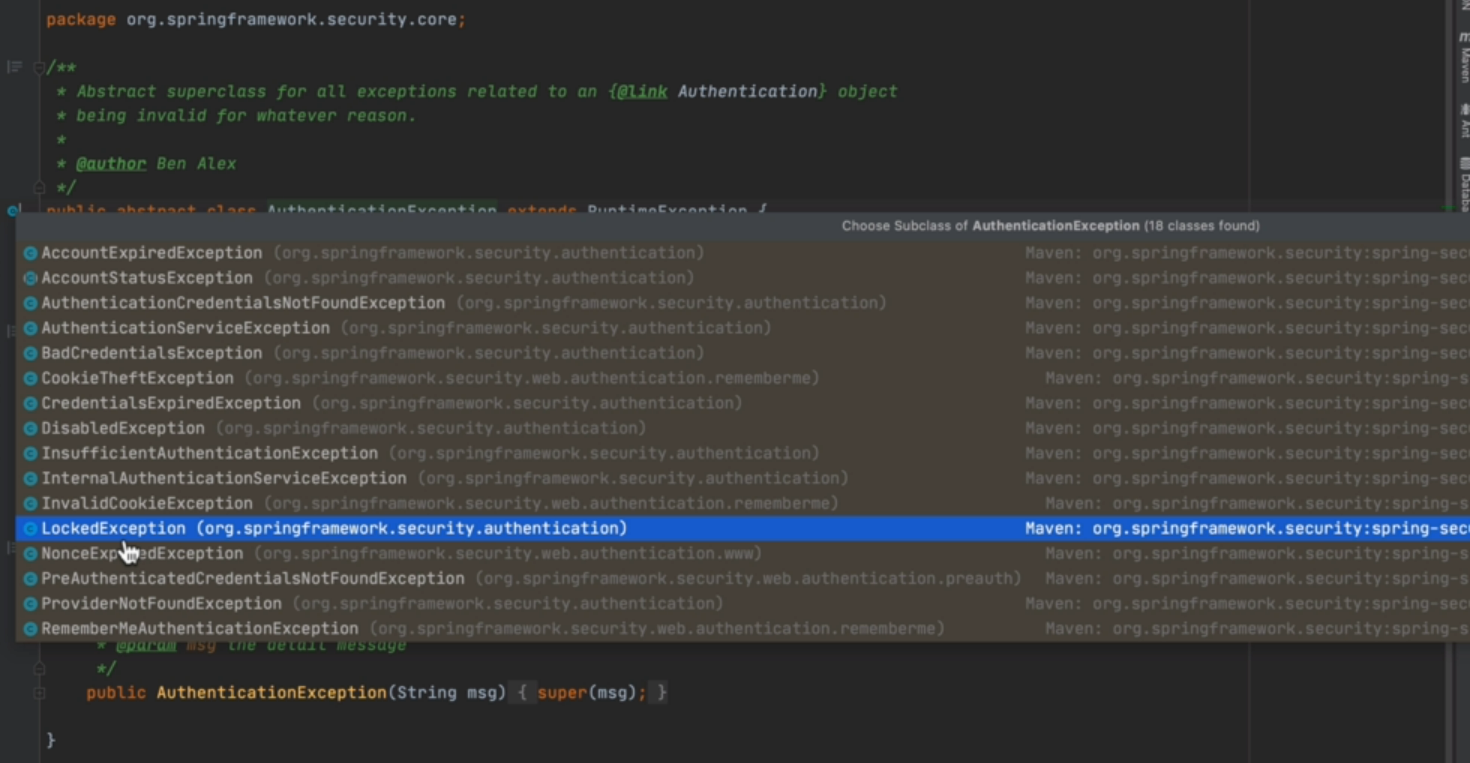




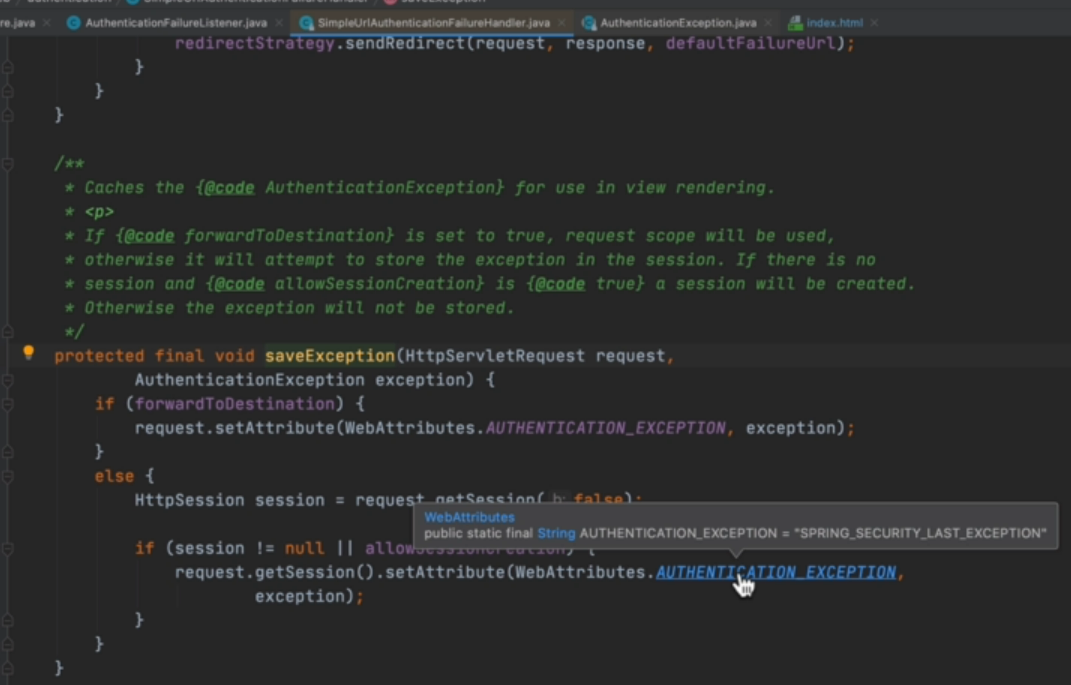
AuthenticationException Class:



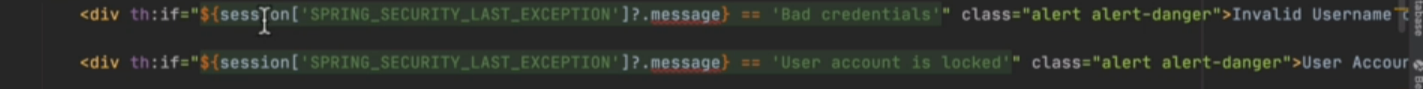
Its subclasses



Inside SimpleUrlAuthenticationFailureHandler class



Index.html



15.9 Automatically Unblocking the Account

We are just running a method for every 5 second, to unblock the account.

#create Schedular config class

package guru.sfg.brewery.config;  
  
import org.springframework.context.annotation.Bean;  
import org.springframework.context.annotation.Configuration;  
import org.springframework.core.task.SimpleAsyncTaskExecutor;  
import org.springframework.core.task.TaskExecutor;  
import org.springframework.scheduling.annotation.EnableAsync;  
import org.springframework.scheduling.annotation.EnableScheduling;  
  
@EnableScheduling  
@EnableAsync  
@Configuration  
public class TaskConfig {  
  
 @Bean  
 TaskExecutor taskExecutor(){  
 return new SimpleAsyncTaskExecutor();  
 }  
}

#add queryMethod to find locked accounts in UserRepo

package guru.sfg.brewery.repositories.security;  
  
public interface UserRepository extends JpaRepository<User, Long> {  
 Optional<User> findByUsername(String username);  
  
 //find locked accounts  
 List<User> findAllByAccountNonLockedAndLastModifiedDateIsBefore(Boolean locked, Timestamp timestamp);  
}

#Create UnlockService (runs every 5 seconds)

package guru.sfg.brewery.security;   
  
@Slf4j  
@RequiredArgsConstructor  
@Service  
public class UserUnlockedService {  
  
 private final UserRepository userRepository;  
  
 @Scheduled(fixedRate = 5000)  
 public void unlockAccounts(){  
 *log*.debug("running unlock account Schedular");  
  
 List<User> lockedUsers = userRepository.findAllByAccountNonLockedAndLastModifiedDateIsBefore(false,  
 Timestamp.*valueOf*(LocalDateTime.*now*().minusSeconds(30)));  
  
 if(lockedUsers.size()>0){  
 *log*.debug("unlocking the user...");  
 lockedUsers.forEach(user-> user.setAccountNonLocked(true));  
 userRepository.saveAll(lockedUsers);  
 }  
 }  
}

16. Two factor authentication

Introduction: [pdfs\26608224-2FAOverview.pdf](pdfs/26608224-2FAOverview.pdf)

googleAuth\_Intro:[pdfs\26608368-GoogleAuthSpringSec.pdf](pdfs/26608368-GoogleAuthSpringSec.pdf) \*

# Add required field in User class, for 2fa

package guru.sfg.brewery.domain.security;  
  
@Getter  
@Setter  
@AllArgsConstructor  
@NoArgsConstructor  
@Builder  
@Entity  
public class User implements UserDetails, CredentialsContainer {  
 @Id  
 @Column(name = "id", nullable = false)  
 @GeneratedValue(strategy = GenerationType.*AUTO*)  
 private Long id;  
  
 private String username;  
 private String password;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private Boolean accountNonExpired = true;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private Boolean accountNonLocked = true;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private Boolean credentialsNonExpired = true;  
  
 @Builder.Default //bcz @Builder will not pick up default properties  
 private Boolean enabled = true;  
  
 @Singular //provide a singular method for adding an role  
 @ManyToMany(cascade = {CascadeType.*MERGE*, CascadeType.*PERSIST*}, fetch = FetchType.*EAGER*)  
 @JoinTable(name="user\_role",  
 joinColumns = {@JoinColumn(name = "USER\_ID", referencedColumnName = "ID")},  
 inverseJoinColumns = {@JoinColumn(name = "ROLE\_ID", referencedColumnName = "ID")})  
 private Set<Role> roles;  
  
 @ManyToOne(fetch = FetchType.*EAGER*)  
 private Customer customer;   
  
 @Transient  
 @Override  
 public Set<GrantedAuthority> getAuthorities() {  
 return this.roles.stream()  
 .map(Role::getAuthorities)  
 .flatMap(Set::stream)  
 .map(authority -> new SimpleGrantedAuthority(authority.getPermission()))  
 .collect(Collectors.*toSet*());F  
 }  
  
 @Builder.Default  
 private Boolean useGoogle2fa = false;  
  
 private String google2FaSecret;  
  
 //once the user log in spring security will have this User object. and we are comparing  
 // "userGoogle2fa" with "google2faRequired", if both are true, then enable 2fa. after  
 //2fa done make "google2faRequired" as false.  
 @Transient  
 private Boolean google2faRequired = true;  
  
 @Override  
 public boolean isAccountNonExpired() {  
 return this.accountNonExpired;  
 }  
  
 @Override  
 public boolean isAccountNonLocked() {  
 return this.accountNonLocked;  
 }  
  
 @Override  
 public boolean isCredentialsNonExpired() {  
 return this.credentialsNonExpired;  
 }  
  
 @Override  
 public boolean isEnabled() {  
 return this.enabled;  
 }  
  
 @Override  
 public void eraseCredentials() {  
 this.password = null;  
 }  
  
 @CreationTimestamp  
 @Column(updatable = false)  
 private Timestamp createdDate;  
  
 @UpdateTimestamp  
 private Timestamp lastModifiedDate;  
}

# add controller [TLM] @2faC

package guru.sfg.brewery.web.controllers;  
  
@Slf4j  
@RequestMapping  
@Controller  
@RequiredArgsConstructor  
public class UserController {  
  
 private final UserRepository userRepository;

@GetMapping("/register2fa")  
 public String register2fa(Model model){  
 model.addAttribute("googleUrl","todo");  
 return "user/register2fa";  
 }

@PostMapping("/register2fa")  
 public String confirm2Fa(@RequestParam Integer verifyCode){  
 return "index";  
 }  
}

# add nav option to select 2FA page

----

<li th:replace="::menuItem ('/user/register2fa','user','register','th-list','Enable 2FA')">  
 <span class="glyphicon glyphicon-wrench" aria-hidden="true"></span>  
 <span>Enable 2FA</span>  
</li> ---

# add thymeleaf page (shows QR code for enabling 2FA)

Register2fa.html :

---  
 <div class="col-md-12">  
 <img th:src="${googleurl}"/>  
 </div>  
  
<div class="row">  
 <form th:action="@{/user/register2fa}" class="form-horizontal" id="verify-code-form" method="post">  
 <div class="form-group has-feedback">  
 <label class="control-label" for="verifyCode">Enter Code</label>  
 <input class="form-control" type="number" id="verifyCode" name="verifyCode" autofocus="true" autocomplete="off" b />  
  
 <input type="hidden" th:name="${\_csrf.parameterName}" th:value="${\_csrf.token}"/>  
 </div>  
 <div class="form-group">  
 <div class="col-sm-offset-2 col-sm-10">  
 <button class="btn btn-default" type="submit" >Verify Code</button>  
 </div>  
 </div>  
 </form>

---

16.6 add dependency for Google 2FA

Link: <https://github.com/wstrange/GoogleAuth>

#add dependency

<!-- wstrage google 2Fa-->  
 <dependency>  
 <groupId>com.warrenstrange</groupId>  
 <artifactId>googleauth</artifactId>  
 <version>1.5.0</version>  
 </dependency>

#create GoogleCredentialRepo

Customizing to use our User class ( save userSecretkey and get userSecretKey)

package guru.sfg.brewery.security.google;  
  
import com.warrenstrange.googleauth.ICredentialRepository;   
  
@Slf4j  
@RequiredArgsConstructor  
@Component  
public class GoogleCredentialRepository implements ICredentialRepository {  
  
 private final UserRepository userRepository;  
  
 @Override  
 public void saveUserCredentials(String username, String secretKey, int validationCode, List<Integer> scratchCodes) {  
 User user = userRepository.findByUsername(username).orElseThrow();  
 user.setGoogle2FaSecret(secretKey);

//set useGoogle2fa to true  
 user.setUseGoogle2fa(true);  
 userRepository.save(user);  
 }  
  
 @Override  
 public String getSecretKey(String userName) {  
 User user = userRepository.findByUsername(userName).orElseThrow();  
 return user.getGoogle2FaSecret();  
 }  
}

16.7 Generating QR code for Google authenticator

#create a bean for GoogleAuthenticator

Pass our custom GoogleCredentialRepository

package guru.sfg.brewery.config;  
  
import com.warrenstrange.googleauth.GoogleAuthenticator;  
import com.warrenstrange.googleauth.GoogleAuthenticatorConfig;  
import com.warrenstrange.googleauth.ICredentialRepository;  
import org.springframework.context.ApplicationEventPublisher;  
import org.springframework.context.annotation.Bean;  
import org.springframework.context.annotation.Configuration;  
import org.springframework.security.authentication.AuthenticationEventPublisher;  
import org.springframework.security.authentication.DefaultAuthenticationEventPublisher;  
import org.springframework.security.web.authentication.rememberme.JdbcTokenRepositoryImpl;  
import org.springframework.security.web.authentication.rememberme.PersistentTokenRepository;  
  
import javax.sql.DataSource;  
import java.util.concurrent.TimeUnit;  
  
@Configuration  
public class SecurityBeans {

--------------------------------  
 @Bean  
 public GoogleAuthenticator googleAuthenticator(ICredentialRepository iCredentialRepository){  
 GoogleAuthenticatorConfig.GoogleAuthenticatorConfigBuilder configBuilder  
 = new GoogleAuthenticatorConfig.GoogleAuthenticatorConfigBuilder();  
  
 configBuilder

//this token works on unix time (time on the device and server could be different)  
 .setTimeStepSizeInMillis(TimeUnit.*SECONDS*.toMillis(60))  
 .setWindowSize(10)  
 .setNumberOfScratchCodes(0);  
  
 GoogleAuthenticator googleAuthenticator = new GoogleAuthenticator(configBuilder.build());  
 googleAuthenticator.setCredentialRepository(iCredentialRepository);  
 return googleAuthenticator;  
 }

--------------------------------  
  
 //allows spring Authentication providers to publish events once as defined in spring context  
 // (ApplicationEventPublisher bean will be in spring context already, it is not from spring security)  
 @Bean  
 public AuthenticationEventPublisher authenticationEventPublisher(ApplicationEventPublisher applicationEventPublisher){  
 return new DefaultAuthenticationEventPublisher(applicationEventPublisher);  
 }  
  
 @Bean  
 public PersistentTokenRepository persistentTokenRepository(DataSource dataSource){  
 JdbcTokenRepositoryImpl jdbcTokenRepository = new JdbcTokenRepositoryImpl();  
 jdbcTokenRepository.setDataSource(dataSource);  
 return jdbcTokenRepository;  
 }  
}

# customize controller [TLM] @2faC

**Get method**: Generate QR code and give it to thymeleaf . Here a Secret key will be generated to the User. For subsequent request we will get the secret key from the Db (refer getmethod in GoogleCredentialRepository class). Here we are using H2 Db. So we need to register with GoogleAuthenticator again (scan QR) if we restart our application, bcz we lost our secret key.

**Post method**: after they scan the QR code with their google Authentication app, post the verify code . and it will check the verify code matches the googleauthentication verify code.

package guru.sfg.brewery.web.controllers;  
  
import com.warrenstrange.googleauth.GoogleAuthenticator;  
import com.warrenstrange.googleauth.GoogleAuthenticatorQRGenerator;   
  
@Slf4j  
@RequestMapping  
@Controller  
@RequiredArgsConstructor  
public class UserController {  
 private final UserRepository userRepository;  
 private final GoogleAuthenticator googleAuthenticator;  
  
 @GetMapping("/register2fa")  
 public String register2fa(Model model){  
 User user = getUser();  
  
 //Generate QR code  
 String url = GoogleAuthenticatorQRGenerator.*getOtpAuthURL*("SFG", user.getUsername(),  
 googleAuthenticator.createCredentials(user.getUsername()));  
 *log*.debug("Google QR Url: "+url);  
  
 model.addAttribute("googleUrl", url);  
  
 return "user/register2fa";  
 }  
  
 @PostMapping("/register2fa")  
 public String confirm2Fa(@RequestParam Integer verifyCode){  
 User user = getUser();  
  
 //check whether verify code is correct  
 if(googleAuthenticator.authorizeUser(user.getUsername(), verifyCode)){  
 User savedUser = userRepository.findById(user.getId()).orElseThrow();  
 savedUser.setUseGoogle2fa(true);  
 userRepository.save(savedUser);  
  
 return "/index";  
 }else{  
 //bad code  
 return "user/register2fa";  
 }  
 }  
  
 private User getUser() {  
 return (User) SecurityContextHolder.*getContext*().getAuthentication().getPrincipal();  
 }  
}

16.9 Create the Verification UI (thymeleaf)

User scan the QR code and register with 2FA, then he will logout from the application, when he try to login back he should get a form to enter his verification code from the GoogleAuthentication app (following ui) .

Verify2fa.html :

---

<h2>Enter Your Google Auth Code</h2>  
<div class="row">  
 <div class="col-md-4">  
 <form th:action="@{/user/verify2fa}" class="form-horizontal" id="verify-code-form" method="post">  
 <div class="form-group has-feedback">  
 <label class="control-label" for="verifyCode">Enter Code</label>  
 <input class="form-control" type="number" id="verifyCode" name="verifyCode" autofocus="true" autocomplete="false" />  
 <input type="hidden" th: name="${\_csrf.parameterName}" th:value="${\_csrf.token}"/>  
 </div>  
 <div class="form-group">  
 <div class="col-sm-offset-2 col-sm-10">  
 <button class="btn btn-default" type="submit" >Verify Code</button>  
 </div>  
 </div>  
 </form>

----

# Customize controller @2faC

Get method: render verify2fa.html page

Post method: verify enterd verify code matches the googleauthentication verify code.

package guru.sfg.brewery.web.controllers;  
  
import com.warrenstrange.googleauth.GoogleAuthenticator;  
import com.warrenstrange.googleauth.GoogleAuthenticatorQRGenerator;   
  
@Slf4j  
@RequestMapping  
@Controller  
@RequiredArgsConstructor  
public class UserController {  
  
 private final UserRepository userRepository;  
 private final GoogleAuthenticator googleAuthenticator;  
  
 @GetMapping("/register2fa")  
 public String register2fa(Model model){  
 User user = getUser();  
  
 //Generate QR code  
 String url = GoogleAuthenticatorQRGenerator.*getOtpAuthURL*("SFG", user.getUsername(),  
 googleAuthenticator.createCredentials(user.getUsername()));  
 *log*.debug("Google QR Url: "+url);  
  
 model.addAttribute("googleUrl", url);  
  
 return "user/register2fa";  
 }  
  
 @PostMapping("/register2fa")  
 public String confirm2Fa(@RequestParam Integer verifyCode){  
 User user = getUser();  
  
 //check whether verify code is correct  
 if(googleAuthenticator.authorizeUser(user.getUsername(), verifyCode)){  
 User savedUser = userRepository.findById(user.getId()).orElseThrow();  
 savedUser.setUseGoogle2fa(true);  
 userRepository.save(savedUser);  
  
 return "/index";  
 }else{  
 //bad code  
 return "user/register2fa";  
 }  
 }  
---------------  
 @GetMapping("/verify2fa")  
 public String verify2fa(){  
 return "user/verify2fa";  
 }  
  
 @PostMapping("/verify2fa")  
 public String verifyPostOf2Fa(@RequestParam Integer verifyCode){  
 User user = getUser();  
  
 //check whether verify code is correct  
 if(googleAuthenticator.authorizeUser(user.getUsername(), verifyCode)){  
 ((User)SecurityContextHolder.*getContext*().getAuthentication().getPrincipal()).setGoogle2faRequired(false);  
 return "/index";  
 }else{  
 return "user/verify2fa";  
 }  
 }

-----------------  
  
 private User getUser() {  
 return (User) SecurityContextHolder.*getContext*().getAuthentication().getPrincipal();  
 }  
}

16.11 set up Google2FaFailure handler

Set up a handler for 2FA failure

package guru.sfg.brewery.security.google;  
  
import lombok.extern.slf4j.Slf4j;  
import org.springframework.security.core.AuthenticationException;  
import org.springframework.security.web.authentication.AuthenticationFailureHandler;  
  
import javax.servlet.ServletException;  
import javax.servlet.http.HttpServletRequest;  
import javax.servlet.http.HttpServletResponse;  
import java.io.IOException;  
  
@Slf4j  
public class Google2faFailureHandler implements AuthenticationFailureHandler {  
  
 @Override  
 public void onAuthenticationFailure(HttpServletRequest request, HttpServletResponse response, AuthenticationException exception) throws IOException, ServletException {  
 *log*.debug("Forward to 2FA");  
  
 request.getRequestDispatcher("/user/verify2fa").forward(request, response);  
 }  
}

16.10 spring Security 2FA filter

Here we are checking whether logged in user verified with 2fa (only if we enabled the 2fa (if “useGoogle2fa” and “google2faRequired” property inUser is true))

package guru.sfg.brewery.security.google;  
  
import guru.sfg.brewery.domain.security.User;  
import lombok.extern.slf4j.Slf4j;  
import org.springframework.boot.autoconfigure.security.servlet.PathRequest;  
import org.springframework.boot.autoconfigure.security.servlet.StaticResourceRequest;  
import org.springframework.security.authentication.AuthenticationTrustResolver;  
import org.springframework.security.authentication.AuthenticationTrustResolverImpl;  
import org.springframework.security.core.Authentication;  
import org.springframework.security.core.context.SecurityContextHolder;  
import org.springframework.security.web.util.matcher.AntPathRequestMatcher;  
import org.springframework.security.web.util.matcher.RequestMatcher;  
import org.springframework.stereotype.Component;  
import org.springframework.web.filter.GenericFilterBean;  
  
import javax.servlet.FilterChain;  
import javax.servlet.ServletException;  
import javax.servlet.ServletRequest;  
import javax.servlet.ServletResponse;  
import javax.servlet.http.HttpServletRequest;  
import javax.servlet.http.HttpServletResponse;  
import java.io.IOException;  
  
@Slf4j  
@Component  
public class Google2faFilter extends GenericFilterBean {  
  
 private final AuthenticationTrustResolver authenticationTrustResolver = new AuthenticationTrustResolverImpl();  
 private final Google2faFailureHandler google2faFailureHandler = new Google2faFailureHandler();  
 //allow verify2fa.html (if we did not allow it, it will be endless loop (refer "Google2faFailureHandler"))  
 private final RequestMatcher urlIs2fa = new AntPathRequestMatcher("/user/verify2fa");  
 //allow static sources (js, css...)  
 private final RequestMatcher urlResource = new AntPathRequestMatcher("/resources/\*\*");  
  
 @Override  
 public void doFilter(ServletRequest servletRequest, ServletResponse servletResponse, FilterChain filterChain) throws IOException, ServletException {  
  
 HttpServletRequest request = (HttpServletRequest) servletRequest;  
 HttpServletResponse response = (HttpServletResponse) servletResponse;  
  
 StaticResourceRequest.StaticResourceRequestMatcher staticResourceRequestMatcher =  
 PathRequest.*toStaticResources*().atCommonLocations();  
  
 if(urlIs2fa.matches(request) || urlResource.matches(request) || staticResourceRequestMatcher.matcher(request).isMatch()){  
 filterChain.doFilter(request, response);  
 return;  
 }  
  
 Authentication authentication = SecurityContextHolder.*getContext*().getAuthentication();  
  
 if(authentication !=null && !authenticationTrustResolver.isAnonymous(authentication)){  
 *log*.debug("Processing 2FA filter");  
  
 if(authentication.getPrincipal() !=null && authentication.getPrincipal() instanceof User){  
 User user = (User) authentication.getPrincipal();  
  
 if(user.getUseGoogle2fa() && user.getGoogle2faRequired()){  
 *log*.debug("2FA Required");  
 google2faFailureHandler.onAuthenticationFailure(request, response, null);  
 return;  
 }  
 }  
 }  
  
 filterChain.doFilter(request, response);  
 }  
}

16.13 add above filter to SecurityConfig

package guru.sfg.brewery.config;  
  
@RequiredArgsConstructor  
@Configuration  
@EnableWebSecurity  
@EnableGlobalMethodSecurity(securedEnabled = true, prePostEnabled = true) //securedEnabled = Determines if Spring Security's Secured annotations should be enabled  
public class SecurityConfig extends WebSecurityConfigurerAdapter {  
  
 private final UserDetailsService userDetailsService;  
 private final PersistentTokenRepository persistentTokenRepository;  
 private final Google2faFilter google2faFilter;  
  
 // needed for use Spring Security with Spring Data JPA SPel  
 @Bean  
 public SecurityEvaluationContextExtension securityEvaluationContextExtension(){  
 return new SecurityEvaluationContextExtension();  
 }  
  
 @Override  
 protected void configure(HttpSecurity http) throws Exception {  
  
 // apply this filter before user session works begins (create, store ...)  
 http.addFilterBefore(google2faFilter, SessionManagementFilter.class);  
  
 http  
 .authorizeRequests(authorize->{  
 authorize  
 .antMatchers(("/h2-console/\*\*")).permitAll() //not recomemded in production  
 .antMatchers("/","/webjars/\*\*","/login","/resources/\*\*").permitAll();  
 })  
 .authorizeRequests()  
 .anyRequest().authenticated()  
 .and()  
 .formLogin()  
 .and()  
 .httpBasic()  
 .and()  
 .csrf().ignoringAntMatchers("/h2-console/\*\*","/api/\*\*")  
 //hash based token  
 .and().rememberMe().key("sfg-key").userDetailsService(userDetailsService);  
 //persistent token  
// .and().rememberMe()  
// .tokenRepository(persistentTokenRepository)  
// .userDetailsService(userDetailsService);  
  
 //h2 console config  
 http.headers().frameOptions().disable();  
 }  
  
 @Bean  
 PasswordEncoder passwordEncoder(){  
 return PasswordEncoderFactories.*createDelegatingPasswordEncoder*();  
 }  
  
  
}

**ERROR!! : Exception processing template "user/register2fa": An error happened during template parsing (template: "class path resource [templates/user/register2fa.html]")**

**Solution: (pending)**

17. cors

Introduction: [pdfs\26779118-CORSOverview.pdf](pdfs/26779118-CORSOverview.pdf) \*\*

We can do cors configuration through spring mvc and spring security. Spring security is going to working in conjuntion with spring Mvc.

Spring security takes what configured inside spring mvc and utilize. And if we enable spring security cors filter then anything happening inside spring mvc will be ignored bcz spring security cors filter comes before mvc.

Spring MVC configuration:

package guru.sfg.brewery.config;  
  
import org.springframework.context.annotation.Configuration;  
import org.springframework.web.servlet.config.annotation.CorsRegistry;  
import org.springframework.web.servlet.config.annotation.WebMvcConfigurer;  
  
@Configuration  
public class WebConfig implements WebMvcConfigurer {  
  
 @Override  
 public void addCorsMappings(CorsRegistry registry) {  
 registry.addMapping("/\*\*").allowedMethods("GET", "POST", "PUT", "DELETE");  
 }  
}

OR we can use @CrossOrigin at method level or class level.

Spring security Configuration

package guru.sfg.brewery.config;   
  
@RequiredArgsConstructor  
@Configuration  
@EnableWebSecurity  
@EnableGlobalMethodSecurity(securedEnabled = true, prePostEnabled = true) //securedEnabled = Determines if Spring Security's Secured annotations should be enabled  
public class SecurityConfig extends WebSecurityConfigurerAdapter {  
  
 private final UserDetailsService userDetailsService;  
 private final PersistentTokenRepository persistentTokenRepository;  
 private final Google2faFilter google2faFilter;  
  
 // needed for use Spring Security with Spring Data JPA SPel  
 @Bean  
 public SecurityEvaluationContextExtension securityEvaluationContextExtension(){  
 return new SecurityEvaluationContextExtension();  
 }  
  
 @Override  
 protected void configure(HttpSecurity http) throws Exception {  
// http.addFilterBefore(restHeaderAuthFilter(authenticationManager()), UsernamePasswordAuthenticationFilter.class);  
  
 // apply this filter before user session works begins (create, store ...)  
 http.addFilterBefore(google2faFilter, SessionManagementFilter.class);  
  
 http  
 .authorizeRequests(authorize->{  
 authorize  
 .antMatchers(("/h2-console/\*\*")).permitAll() //not recomemded in production  
 .antMatchers("/","/webjars/\*\*","/login","/resources/\*\*").permitAll();  
 })  
 .authorizeRequests()  
 .anyRequest().authenticated()  
 .and()  
 .formLogin()  
 .and()  
 .httpBasic()  
 .and()  
 .csrf().ignoringAntMatchers("/h2-console/\*\*","/api/\*\*")  
 //hash based token  
 .and().rememberMe().key("sfg-key").userDetailsService(userDetailsService);  
 //persistent token  
// .and().rememberMe()  
// .tokenRepository(persistentTokenRepository)  
// .userDetailsService(userDetailsService);  
  
 //h2 console config  
 http.headers().frameOptions().disable();  
 http.cors();  
 }  
  
 @Bean  
 PasswordEncoder passwordEncoder(){  
 return PasswordEncoderFactories.*createDelegatingPasswordEncoder*();  
 }  
}

