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Introduction to the Spring Security REST plugin

The Spring Security REST Grails plugin allows you to use Spring Security for a stateless, token-based, RESTful authentication.



This plugin depends on [Spring Security Core 2.x](#). Make sure your application is compatible with that version first. There is a [feature request](#), that may be addressed in the future if there is enough community interest / love :)



This plugin is only for Grails 2.x, and it requires at least Java 7.

The default behaviour of Spring Security is to store the authenticated principal in the HTTP session. However, in a RESTful scenario, we need to make sure our server is stateless.

The typical flow could be the following:

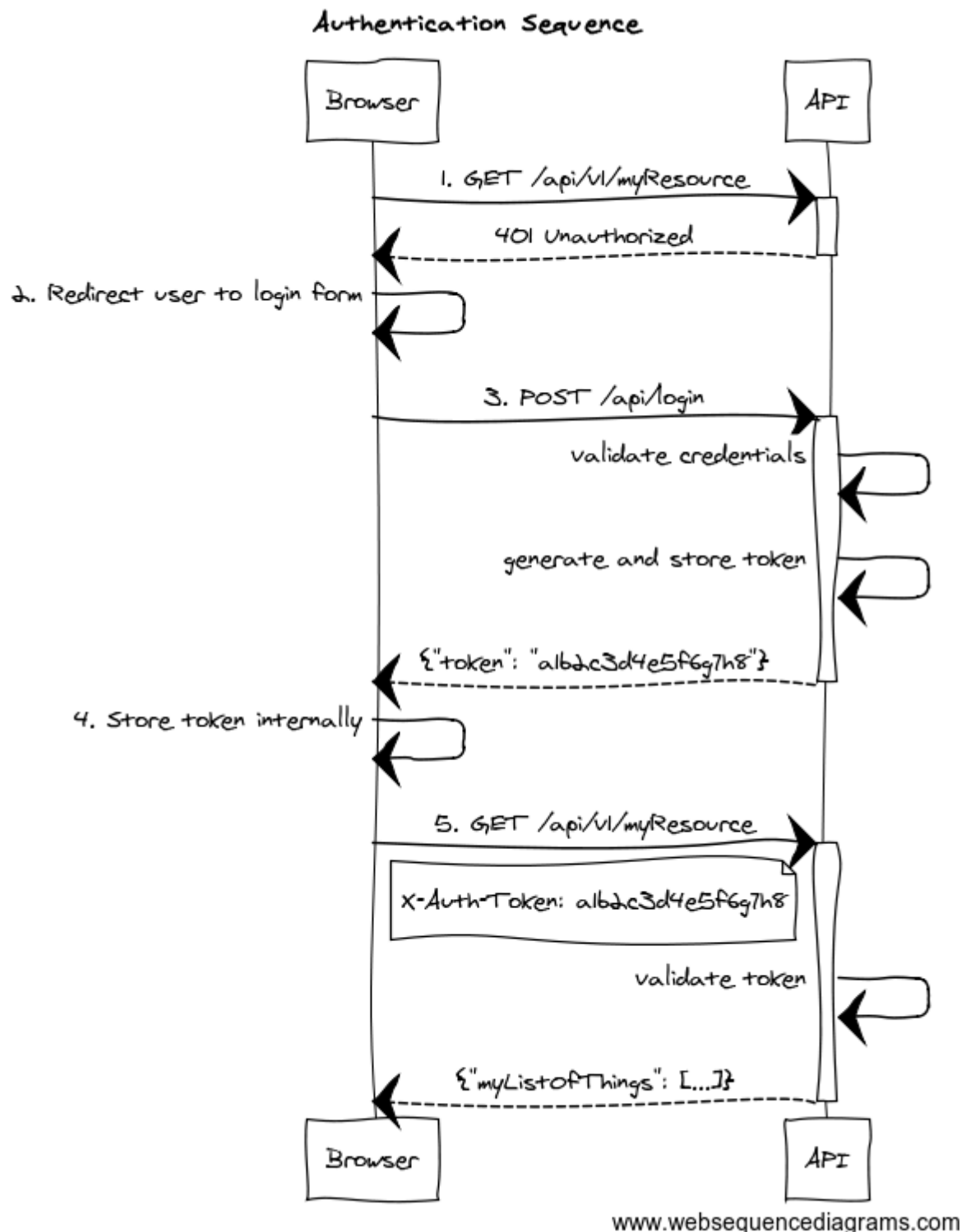


Figure 1. Sequence diagram overview of the plugin behavior

1. The client application requests and endpoint that requires authentication, so the server responds with a 401 response.
2. The client redirects the user to the login form.

3. The user enter credentials, and the client sends a request to the authentication endpoint. The server validates credentials, and if valid, generates, stores and sends back a token to the client.
4. The client then stores the token internally. It will be sent on every API method request.
5. The client sends again a request to the protected resource, passing the token as an HTTP header.
6. The server validates the token, and if valid, executes the actual operation requested.

As per the [REST definition](#), the client is transferring its state on every request so the server is truly stateless.

This plugin helps you to wire your existing Spring Security authentication mechanism, provides you with ready-to-use token generation strategies and comes prepackaged with JWT, Memcached, GORM, Redis and Grails Cache support for token storage.



Release History

You can view all releases at <https://github.com/alvarosanchez/grails-spring-security-rest/releases>.

- 19 August 2015
 - 1.5.2
- 6 May 2015
 - 1.5.1
- 6 May 2015
 - 1.5.0
- 21 April 2015
 - 1.5.0.RC4
- 13 April 2015
 - 1.5.0.RC3
- 9 April 2015
 - 1.5.0.RC2
- 2 April 2015
 - 1.5.0.RC1
- 1 April 2015
 - 1.5.0.M3
- 24 February 2015
 - 1.5.0.M2
- 3 February 2015
 - 1.5.0.M1
- 28 January 2015
 - 1.4.1
- 12 November 2014
 - 1.4.1.RC2

- 20 October 2014
 - 1.4.1.RC1
- 12 August 2014
 - 1.4.0
- 14 July 2014
 - 1.4.0.RC5
- 4 July 2014
 - 1.4.0.RC4
- 24 June 2014
 - 1.4.0.RC3
- 24 June 2014
 - 1.4.0.RC2
- 20 June 2014
 - 1.4.0.RC1
- 11 June 2014
 - 1.4.0.M3
- 1 June 2014
 - 1.4.0.M2
- 29 May 2014
 - 1.4.0.M1
- 23 April 2014
 - 1.3.4
- 16 April 2014
 - 1.3.3
- 3 April 2014
 - 1.3.2
- 18 March 2014
 - 1.3.1



- 4 March 2014
 - 1.3.0
- 17 February 2014
 - 1.2.5
- 10 February 2014
 - 1.2.4
- 4 February 2014
 - 1.2.3
- 31 January 2014
 - 1.2.2
- 15 January 2014
 - 1.2.0
- 14 January 2014
 - 1.1.0
- 13 January 2014
 - 1.0.1
- 12 January 2014
 - 1.0.0
- 10 January 2014
 - 1.0.0.RC2
- 31 December 2013
 - Initial 1.0.0.RC1 release.

What's new in 1.5?

JWT support

JWT is fully supported and is now the default token "storage" mechanism. If you still want to use your previous storage (such as Memcached or GORM), make sure you explicitly set to true one of the following properties:

Table 1. New configuration values in 1.5

| Config key | Default value |
|-----------------------------------------------------------------------------|---------------|
| <code>grails.plugin.springsecurity.rest.token.storage.useMemcached</code> | false |
| <code>grails.plugin.springsecurity.rest.token.storage.useGorm</code> | false |
| <code>grails.plugin.springsecurity.rest.token.storage.useGrailsCache</code> | false |

If switching over JWT, the logout behavior is not available anymore. Read the documentation on how to implement your own logout strategy if you want to.

Redis support

Redis can now be used as token storage service. Thanks to [Philipp Eschenbach](#) for his initial contribution.

New package base

Packages `com.odobo.grails.plugin.springsecurity.rest.*` have been refactored to simply `grails.plugin.springsecurity.rest.*`. Make sure to double-check your imports when upgrading to 1.5.

Other minor changes

- The plugin now uses Grails 2.4.4, and the build and tests are executed with Java 8.
- Documentation for older versions is now published at <http://alvarosanchez.github.io/grails-spring-security-rest>

What's new in 1.4?

Full compatibility with Spring Security core.

Up to previous releases, this plugin was overriding "stateful" Spring Security core beans, to ensure a stateless behaviour. After some users reported issues integrating this plugin with existing installations, version 1.4 now follows a more friendly approach.

A new chapter has been created explaining how to configure the filter chains appropriately.

RFC 6750 Bearer Token support by default

Now, the token validation and rendering aligns with the [RFC 6750 Bearer Token](#) spec. If you want to keep the old behaviour, simply disable it by setting `grails.plugin.springsecurity.rest.token.validation.useBearerToken = false`

Credentials are extracted from JSON by default

It makes more sense in a REST application. The old behaviour can still be used by using the corresponding configuration property.

Anonymous access is allowed

In case you want to enable anonymous access (read: not authenticated) to certain URL patterns, you can do so. Take a look at the [new chapter in the documentation | [guide:tokenValidation](#)].

Other minor changes

- Upgraded dependencies:
 - `spring-security-core:2.0-RC3`.
 - `cors:1.1.6`.

Configuration

Once the plugin is installed, you are ready to go. The default configuration is to use signed JWT's for tokens. However, you can select any other token storage strategy:

1. Grails Cache.
2. Memcached.
3. GORM.
4. Redis.
5. Provide your own: implement [TokenStorageService](#) and register it in `resources.groovy` as `tokenStorageService`.

Plugin configuration



This plugin depends on [Spring Security Core 2.x](#). Make sure your application is compatible with that version first.

This plugin is compatible by default with Spring Security core traditional, form-based authentication. The important thing to remember is: you have to separate the filter chains, so different filters are applied on each case.

The stateless, token-based approach of this plugin is incompatible with the HTTP session-based approach of Spring Security, core, so the trick is to identify what URL patterns have to be stateless, and what others have to be stateful (if any).

To configure the chains properly, you can use the `grails.plugin.springsecurity.filterChain.chainMap` property:

Listing 1. `grails.plugin.springsecurity.filterChain.chainMap`

```
grails.plugin.springsecurity.filterChain.chainMap = [  
    '/api/**': 'JOINED_FILTERS,-exceptionTranslationFilter,-  
authenticationProcessingFilter,-securityContextPersistenceFilter,-  
rememberMeAuthenticationFilter', // Stateless chain  
    '/*': 'JOINED_FILTERS,-restTokenValidationFilter,-  
restExceptionTranslationFilter'  
// Traditional chain  
]
```

To understand this syntax, please read the [Spring Security Core documentation](#). Long story short: `JOINED_FILTERS` refers to all the configured filters. The minus (-) notation means all the previous values but the neglected one.

So the first chain applies all the filters except the stateful ones. The second one applies all the filters but the stateless ones.



Make sure that the stateless chain applies not only to your REST controllers, but also to the URL's where this plugin filters are listening: by default, `/api/login` for authentication, `/api/logout` for logout and `/api/validate` for token validation.

The difference is that, in a traditional form-based authentication, Spring Security will respond with an HTTP 302 redirect to the login controller. That doesn't work for an API, so in the stateless approach, an HTTP 401 response will be sent back.

Events

The Spring Security Rest plugin fires events exactly like Spring Security Core does.

Event Notification

You can set up event notifications in two ways. The sections that follow describe each approach in more detail.

1. Register an event listener, ignoring events that do not interest you. Spring allows only partial event subscription; you use generics to register the class of events that interest you, and you are notified of that class and all subclasses.
2. Register one or more callback closures in `grails-app/conf/Config.groovy` that take advantage of the plugin's `grails.plugin.springsecurity.rest.RestSecurityEventListener`. The listener does the filtering for you.

AuthenticationEventPublisher

Spring Security REST publishes events using an [AuthenticationEventPublisher](#) which in turn fire events using the [ApplicationEventPublisher](#). By default no events are fired since the `AuthenticationEventPublisher` instance registered is a `grails.plugin.springsecurity.rest.authentication.NullRestAuthenticationEventPublisher`. But you can enable event publishing by setting `grails.plugin.springsecurity.useSecurityEventListener = true` in `grails-app/conf/Config.groovy`.

You can use the `useSecurityEventListener` setting to temporarily disable and enable the callbacks, or enable them per-environment.

Token Creation

Currently the Spring Security REST plugin supports a single event in addition to the default spring security events. The event is fired whenever a new token is created. See `grails.plugin.springsecurity.rest.RestTokenCreationEvent`



Every time a token is successfully submitted, an `AuthenticationSuccessEvent` will be fired.

Registering an Event Listener

Enable events with `grails.plugin.springsecurity.useSecurityEventListener = true` and create one or more Groovy or Java classes, for example:

Listing 2. Custom event listener

```
package com.foo.bar

import org.springframework.context.ApplicationListener
import grails.plugin.springsecurity.rest.RestTokenCreationEvent

class MySecurityEventListener
    implements ApplicationListener<RestTokenCreationEvent> {

    void onApplicationEvent(RestTokenCreationEvent event) {
        // The access token is a delegate of the event, so you have access to an
        instance of `grails.plugin.springsecurity.rest.token.AccessToken`
    }
}
```

Register the class in `grails-app/conf/spring/resources.groovy`:

Listing 3. Event listener registration

```
import com.foo.bar.MySecurityEventListener

beans = {
    mySecurityEventListener(MySecurityEventListener)
}
```

Registering Callback Closures

Alternatively, enable events with `grails.plugin.springsecurity.useSecurityEventListener = true` and register one or more callback closure(s) in `grails-app/conf/Config.groovy` and let `SecurityEventListener` do the filtering.

Implement the event handlers that you need, for example:

Listing 4. Callback closures

```
grails.plugin.springsecurity.useSecurityEventListener = true

grails.plugin.springsecurity.onRestTokenCreationEvent = { e, appCtx ->
    // handle RestTokenCreationEvent
}
```

None of these closures are required; if none are configured, nothing will be called. Just implement the event handlers that you need.

Authentication Endpoint

The [authentication filter](#) uses the default `authenticationManager` bean, which in turn uses all the registered authentication providers. See the [Spring Security Core guide](#) for more information about how to define your own providers. Note that you can easily plug any Spring Security sub-plugin (like the LDAP one) to use a different authentication strategy.

If the authentication is successful, a token generator is used to generate a token, and a token storage implementation is used to store the token. Finally, the JSON response sent back to the client is rendered by a `restAuthenticationTokenJsonRenderer` bean. See the [token rendering documentation](#) for more details.



This authentication filter will only be applied to the above configured URL and can also be disabled, in case a different approach for token creation is followed. In the rest of the cases, the request will continue through the filter chain, reaching Spring Security Core filters. Bear in mind that, by default, Spring Security Core 2.x locks down all URL's unless a explicit security rule has been specified for each of them.

See [Spring Security Core documentation](#) for more information.

The following are the `Config.groovy` properties available:

Table 2. Authentication configuration options

| Config key | Default value |
|------------------------------------------------------------------------|-------------------------|
| <code>grails.plugin.springsecurity.rest.login.active</code> | <code>true</code> |
| <code>grails.plugin.springsecurity.rest.login.endpointUrl</code> | <code>/api/login</code> |
| <code>grails.plugin.springsecurity.rest.login.failureStatusCode</code> | <code>401</code> |

Extracting credentials from the request

The plugin supports 2 ways of extracting the username and password: using request parameters, and using a JSON payload. To align with the RESTful principles, JSON payload is the default behaviour.

From a JSON request

Table 3. JSON credentials extraction configuration properties

| Config key | Default value |
|---------------------------------------------------------------------------|-----------------------|
| <code>grails.plugin.springsecurity.rest.login.useJsonCredentials</code> | <code>true</code> |
| <code>grails.plugin.springsecurity.rest.login.usernamePropertyName</code> | <code>username</code> |
| <code>grails.plugin.springsecurity.rest.login.passwordPropertyName</code> | <code>password</code> |

The default implementation expects a request like this:

Listing 5. Example JSON authentication request

```
{
  "username": "john.doe",
  "password": "dontTellAnybody"
}
```

If you use `usernamePropertyName` and `passwordPropertyName` properties mentioned above, your JSON request can look like:

Listing 6. Custom JSON authentication request

```
{
  "login": "john.doe",
  "pwd": "dontTellAnybody"
}
```

With the following config:

Listing 7. Custom JSON authentication configuration properties

```
grails.plugin.springsecurity.rest.login.usernamePropertyName = 'login'  
grails.plugin.springsecurity.rest.login.passwordPropertyName = 'pwd'
```

If your JSON request format is different, you can plug your own implementation by defining a class which extends <http://alvarosanchez.github.io/grails-spring-security-rest/latest/docs/gapi/grails/plugin/springsecurity/rest/credentials/AbstractJsonPayloadCredentialsExtractor.html> [AbstractJsonPayloadCredentialsExtractor]. The default implementation looks like this:

Listing 8. DefaultJsonPayloadCredentialsExtractor

```
@Slf4j  
class DefaultJsonPayloadCredentialsExtractor extends  
    AbstractJsonPayloadCredentialsExtractor {  
  
    String usernamePropertyName  
    String passwordPropertyName  
  
    UsernamePasswordAuthenticationToken extractCredentials(HttpServletRequest  
    httpRequest) {  
        def jsonBody = getJsonBody(httpServletRequest)  
  
        if (jsonBody) {  
            String username = jsonBody."${usernamePropertyName}"  
            String password = jsonBody."${passwordPropertyName}"  
  
            log.debug "Extracted credentials from JSON payload. Username:  
            ${username}, password: ${password?.size()?'[PROTECTED]':'[MISSING]'}"  
  
            new UsernamePasswordAuthenticationToken(username, password)  
        } else {  
            log.debug "No JSONbody sent in the request"  
            return null  
        }  
    }  
}
```

Once you are done, register it in `resources.groovy` with the name `credentialsExtractor`.

From request parameters

Note that the name of the parameters can also be customised:

Table 4. Parameter extraction configuration options

| Config key | Default value |
|---------------------------------------------------------------------|---------------|
| grails.plugin.springsecurity.rest.login.useRequestParamsCredentials | false |
| grails.plugin.springsecurity.rest.login.usernamePropertyName | username |
| grails.plugin.springsecurity.rest.login.passwordPropertyName | password |

Logout

Logout is not possible when using JWT tokens (the default strategy), as no state is kept in the server. If you still want to have logout, you can provide your own implementation by creating a subclass of `JwtTokenStorageService` and overriding the methods `storeToken` and `removeToken`.



Then, register your implementation in `resources.groovy` as `tokenStorageService`.

However, a more rational approach would be just to remove the token from the client (eg, browser's local storage) and let the tokens expire (they will expire anyway, unlike with other storages like Memcached or Redis where they get refreshed on every access).

The `logout filter` exposes an endpoint for deleting tokens. It will read the token from an HTTP header. If found, will delete it from the storage, sending a 200 response. Otherwise, it will send a 404 response.

You can configure it in `Config.groovy` using this properties:

Table 5. Logout configuration options

| Config key | Default value |
|----------------------------------------------------------------------------|---------------------------|
| <code>grails.plugin.springsecurity.rest.logout.endpointUrl</code> | <code>/api/logout</code> |
| <code>grails.plugin.springsecurity.rest.token.validation.headerName</code> | <code>X-Auth-Token</code> |

Token Generation

By default, the plugin generates JWT tokens. Note that when using JWT, you can't plug any other token generator.

If you are not using JWT, but any stateful strategy like Memcached or GORM, the following strategies are available:

- [Using `java.security.SecureRandom`.](#)
- [Using `java.util.UUID`.](#)

The strategy used is configurable in `Config.groovy`:

Table 6. Token generation configuration options

| Config key | Default value |
|---------------------------------------------------------------------------------|--------------------|
| <code>grails.plugin.springsecurity.rest.token.generation.useSecureRandom</code> | <code>true</code> |
| <code>grails.plugin.springsecurity.rest.token.generation.useUUID</code> | <code>false</code> |

Both of them generate tokens of 32 alphanumeric characters.

That should be enough for most of the human beings. But if you still want to provide your own implementation, simply write a class implementing [TokenGenerator](#) and wire it up in `resources.groovy` as `tokenGenerator`.

Token Storage

The tokens are stored on the server using a `tokenStorageService` bean. The plugin comes with out-of-the-box support for JWT, Memcached, GORM and [Grails Cache](#), but you can use your own strategy implementing the `TokenStorageService` interface.



The default implementation, JWT, is stateless. Nothing is really stored. However, the plugin still gives a chance to the other implementations to store the principal if they need to.

JSON Web Token

JSON Web Token (JWT) is an [IETF standard](#) (in progress) which defines a secure way to encapsulate arbitrary data that can be sent over unsecure URL's.

Generally speaking, JWT's can be useful in the following use cases:

- When generating "one click" action emails, like "delete this comment" or "add this to favorites". Instead of giving the users URL's like `/comment/delete/123`, you can give them something like `/comment/delete/<JWT_TOKEN>`, where the `JWT_TOKEN` contains encapsulated information about the user and the comment, in a safe way, so authentication is not required.
- To achieve single sign-on, by sharing a JWT across applications.

In the context of authentication and authorization, JWT will help you implement a stateless implementation, as the principal information is stored directly in the JWT.

How does a JWT looks like?



Figure 2. JWT example

Header

A base64-encoded JSON like:

Listing 9. JWT header

```
{
  "alg": "HS256",
  "typ": "JWT"
}
```

Claims

A base64-encoded JSON like:

Listing 10. JWT claims

```
{
  "exp": 1422990129,
  "sub": "jimi",
  "roles": [
    "ROLE_ADMIN",
    "ROLE_USER"
  ],
  "iat": 1422986529
}
```

Signature

Depends on the algorithm specified on the header, it can be a digital signature of the base64-encoded header and claims, or an encryption of them using RSA.

Signed JWT's

By default, this plugin uses signed JWT's as specified by the [JSON Web Signature](#) specification. More specifically, the algorithm used is HMAC SHA-256 with a specified shared secret. The relevant configuration properties are:

Table 7. JWT configuration options for signing

| Config key | Default value |
|-------------------------------------------------------------------------------|-------------------------------------------------|
| <code>grails.plugin.springsecurity.rest.token.storage.useJwt</code> | <code>true</code> |
| <code>grails.plugin.springsecurity.rest.token.storage.jwt.useSignedJwt</code> | <code>true</code> |
| <code>grails.plugin.springsecurity.rest.token.storage.jwt.secret</code> | <code>'qrD6h8K6S9503Q06Y6Rfk21TErImPYqa'</code> |
| <code>grails.plugin.springsecurity.rest.token.storage.jwt.expiration</code> | <code>3600</code> |

Encrypted JWT's



Grails's `grails-docs` artifact includes a version of `com.lowagie:itext` which in turns bring old BouncyCastle's libraries into the classpath. To avoid the problem, you have to override explicitly that dependency:

Listing 11. Excluding BouncyCastle's libraries

```
build("com.lowagie:itext:2.0.8") { excludes "bouncycastle:bcprov-jdk14:138", "org.bouncycastle:bcprov-jdk14:1.38" }  
{code}
```

In the previous strategy, the claims are just signed, so it prevents an attacker to tamper its contents to introduce malicious data or try a privilege escalation by adding more roles. However, the claims can be decoded just by using Base 64.

If the claims contains sensitive information, you can use a [JSON Web Encryption](#) algorithm to prevent them to be decoded. Particularly, this plugin uses RSAES OAEP for key encryption and AES GCM (Galois/Counter Mode) algorithm with a 256 bit key for content encryption.

By default, RSA public/private keys are generated every time the application runs. This means that generated tokens won't be decrypted across executions of the application. So better create your own key pair using OpenSSL:

Listing 12. Certificate generation for JWT

```
openssl genrsa -out private_key.pem 2048  
openssl pkcs8 -topk8 -inform PEM -outform DER -in private_key.pem -out private_key.der -nocrypt  
openssl rsa -in private_key.pem -pubout -outform DER -out public_key.der
```


Then, configure the keys properly, along with the rest of the configuration:

Table 8. JWT configuration options for signing

| Config key | Default value |
|---------------------------------------------------------------------|---------------|
| grails.plugin.springsecurity.rest.token.storage.useJwt | true |
| grails.plugin.springsecurity.rest.token.storage.jwt.useEncryptedJwt | false |
| grails.plugin.springsecurity.rest.token.storage.jwt.privateKeyPath | null |
| grails.plugin.springsecurity.rest.token.storage.jwt.publicKeyPath | null |

Example configuration:

Listing 13. JWT encryption example configuration

```
grails.plugin.springsecurity.rest.token.storage.jwt.useEncryptedJwt = true
grails.plugin.springsecurity.rest.token.storage.jwt.privateKeyPath =
'/path/to/private_key.der'
grails.plugin.springsecurity.rest.token.storage.jwt.publicKeyPath =
'/path/to/public_key.der'
```



The performance of encryption algorithms is much slower compared with signing ones. If you are considering encrypting your JWT's, think if you really need it.

Token expiration and refresh tokens

When using JWT, issued access tokens expire after a period of time, and they are paired with refresh tokens, eg:

Listing 14. Sample access token response, including refresh token

```
{
  "username": "jimi",
  "roles": [
    "ROLE_ADMIN",
    "ROLE_USER"
  ],
  "expires_in": 3600,
  "token_type": "Bearer",
  "refresh_token":
    "eyJhbGciOiJIUzU0etiT0FFUCIsImVuYyI6IkJkYmNTZHQ00ifQ.fUaSWIdZakFX7CyimRIPhuw0sfevgmwL2x
    zm5H0TuaqwKx24EafC00TruGKG-lN-
    w6CITssnF2LQTqRzQGp0PoLXHfUJ0kkz5rB16LtnRu7cdD1ZUNYXLJtFjQ3IATzoo15tPafRPyStG1Qm7-
    1L0VxquhrLxkkpti0F1_VTyTZAq8ltFrnxM4ahJUwS7eriivvdLqmHtnwXw0kBXEseIyCkiyKklWDJAcD
    _P_gHoQJvSCoXedlr7Pp0n6LEUrRWJ2Hb-
    Zyt9dWqWDXm9nyDeEVtEZGcQtpgCGgbXxaUpULIy5nvrbrRzXSnyT6iXhK1CLqiFVkfH-Y-
    DHXdB6Q4sg.uYdpXl835Kn1kqC5.gBgSnPWZ0o6FINovJNG7Xx2RuS09QJbU4-_J4EgZQkygt8xE-
    HfdYa0mtmJLjGJR1XKoaRsuX1gNjFoCZgqWAon6.Zsrk52dkjskSVQLXZBQooQ",
  "access_token": "eyJhbGciOiJIUzU0etiT0FFUCIsImVuYyI6IkJkYmNTZHQ00ifQ.n-
    gGe65x0SLSXS3fTG8ZLdXvv6b5_1pDvkcGyCjFy-
    vm1VhaBEQL5p3hc6iUcACuyrqzGk951V9dHCv46cNfCiUFHWfbEcd4nqScIxBbc28x09L1mNLnZ0G1rx1
    Mx1L0Y_ZPoSxDXpJaHCT28cdZffHLxx2B9ioIClgdLYBAJ50z8VT39-
    D0QSomS6QhFqmcpcbDsXrsKxs545Pn-TIlu-fSQ4wpIvAxus0KB6CV2EYKqBp1MBRh-
    3btE8WksVcX2N3LsrcMhrKxSKi93c06MZh6JzSLWe5b19hvUvBdEuwDrk-
    fQgD3ZlmjjoevRWYhv_kslW1PlqUHYmKOQ7csUw.3mvvsFWikEjZzExA.YixjnnzzcPRy_uUpgPv5zq0fs
    hv3pUwfrME0AijpsB7u9CmJe94g6f2y_3vqUps-5weKKGZyk3ZtnwEbPVak9-HZt-
    Y27SbZ14JNCFEOLVsMsK8.h4j9BdFXuWKKez6xxRAwJA"
}
```

Refresh tokens never expire, and can be used to obtain a new access token by sending a POST request to the /oauth/access_token endpoint:

Listing 15. Sample HTTP request to obtain an access token

```
POST /myApp/oauth/access_token HTTP/1.1
Host: server.example.com
Content-Type: application/x-www-form-urlencoded

grant_type=refresh_token&refresh_token=eyJhbGciOiJSU0EtT0FFUCIsImVuYyI6IkJkEYNTZHQ00ifQ....
```

As you can see, is a form request with 2 parameters:

- grant_type: must be refresh_token always.
- refresh_token: the refresh token provided earlier.



As refresh tokens never expire, they must be securely stored in your client application. See [section 10.4 of the OAuth 2.0 spec](#) for more information.

Memcached

To use Memcached, simply define the following configuration properties to match your environments accordingly:

Table 9. Memcached configuration options

| Config key | Default value |
|-----------------------------------------------------------------------------------|------------------------------|
| <code>grails.plugin.springsecurity.rest.token.storage.useMemcached</code> | <code>false</code> |
| <code>grails.plugin.springsecurity.rest.token.storage.memcached.hosts</code> | <code>localhost:11211</code> |
| <code>grails.plugin.springsecurity.rest.token.storage.memcached.username</code> | <code>' '</code> |
| <code>grails.plugin.springsecurity.rest.token.storage.memcached.password</code> | <code>' '</code> |
| <code>grails.plugin.springsecurity.rest.token.storage.memcached.expiration</code> | <code>3600</code> |

For development, if you have Memcached installed locally with the default settings, just define

`grails.plugin.springsecurity.rest.token.storage.useMemcached = true`. It should work.

In Memcached tokens will expire automatically after the configured timeout (1h by default). They get refreshed on every access

GORM

To use GORM, these are the relevant configuration properties:

Table 10. GORM configuration options

| Config key | Default value |
|------------------------------------------------------------------------------------------|-------------------------|
| <code>grails.plugin.springsecurity.rest.token.storage.useGorm</code> | <code>false</code> |
| <code>grails.plugin.springsecurity.rest.token.storage.gorm.tokenDomainClassName</code> | <code>null</code> |
| <code>grails.plugin.springsecurity.rest.token.storage.gorm.tokenValuePropertyName</code> | <code>tokenValue</code> |
| <code>grails.plugin.springsecurity.rest.token.storage.gorm.usernamePropertyName</code> | <code>username</code> |

The relevant domain class should look something like this:

Listing 16. Authentication token domain class example

```
package org.example.product

class AuthenticationToken {

    String tokenValue
    String username

    static mapping = {
        version false
    }
}
```



For the `tokenDomainClassName` configuration you must enter a fully qualified class name. In the case of the example above: `grails.plugin.springsecurity.rest.token.storage.gorm.tokenDomainClassName = 'org.example.product.AuthenticationToken'`

A few things to take into consideration when using GORM for token storage:

- Instead of storing the whole UserDetails object, probably only the username is needed. This is because applications using this strategy will probably have the standard User and Role domain classes. When the token is verified the username is passed to the default userDetailsService bean, which in the case of the default Spring Security Core GORM implementation will fetch the information from the mentioned domain classes.
- GORM's optimistic locking feature is likely unnecessary and may cause performance issues.
- You'll have to handle token expiration by yourself via Quartz jobs or a similar mechanism. There are various ways you might go about this.

GORM Token Expiration Examples

Adding a GORM autoTimestamp property like lastUpdated or dateCreated and sorting out stale or old tokens with Quartz jobs are the most obvious routes. Each has its drawbacks though.

dateCreated is useful if you want tokens to expire a set time after they are issued. However, API users who didn't pay attention to when their token was issued may find themselves needing a new token unexpectedly.

```
Date dateCreated
```

lastUpdated requires a change to the token domain instance in order to be triggered. Something as simple as an access counter may work as a strategy to keep Tokens fresh, but doing a write to a disk based database on each token access may be something you would prefer to avoid for the sake of performance.

```
Date lastUpdated
Integer accessCount = 0

def afterLoad() {
    accessCount++
}
```

Simply using your own date or timestamp is also a valid option.

```
Date refreshed = new Date()

def afterLoad() {
    // if being accessed and it is more than a day since last marked as refreshed
    // and it hasn't been wiped out by Quartz job (it exists, duh)
    // then refresh it
    if (refreshed < new Date() -1) {
        refreshed = new Date()
        it.save()
    }
}
```

Here is an example quartz job to go with the custom refresh timestamp above:

```
class RemoveStaleTokensJob {
    static triggers = {
        cron name: 'every4hours', cronExpression: '0 0 */4 * * *'
    }

    void execute() {
        AuthenticationToken.executeUpdate('delete AuthenticationToken a where
a.refreshed < ?' [new Date()-1])
    }
}
```

Redis

To use Redis as a token store simply you just have to enable it in you configuration by setting `useRedis` to `true` (see table below).

You have to have the `redis` plugin installed in order to be able to use Redis as your token store. Refer to the [Redis plugin documentation](#) for more details about how to configure it.

Configuration options for Redis:

Table 11. Redis configuration options

| Config key | Default value |
|-------------------------------------------------------------------------------|--------------------|
| <code>grails.plugin.springsecurity.rest.token.storage.useRedis</code> | <code>false</code> |
| <code>grails.plugin.springsecurity.rest.token.storage.redis.expiration</code> | <code>3600</code> |

Grails Cache

To use [Grails Cache](#), simply define a cache name:

Table 12. Redis configuration options

| Config key | Default value |
|-----------------------------------------------------------------|---------------|
| grails.plugin.springsecurity.rest.token.storage.useGrailsCache | false |
| grails.plugin.springsecurity.rest.token.storage.grailsCacheName | null |

The cache name should correspond to a name specified in the [cache DSL | <http://grails-plugins.github.io/grails-cache/docs/manual/guide/usage.html#dsl>].

Token expiration / eviction / TTL

By default, Spring Cache abstraction [does not support expiration](#). It depends on the specific support of the actual providers. Grails has several plugins for this:



- [Core](#): unsupported.
- [Ehcache](#): supported.
- [Redis](#): unsupported.
- [Gemfire](#): unsupported.



There is a bug in `:cache-ehcache:1.0.0` plugin that will cause issues. It's recommended that you use the latest version. See [#89](#) for more information.

Token Rendering

By default, this plugin renders the token in [RFC 6750 Bearer Token](#) format:

Sample Access token response

```
HTTP/1.1 200 OK
Content-Type: application/json;charset=UTF-8
Cache-Control: no-store
Pragma: no-cache

{
  "access_token": "eyJhbGciOiJIUzI1NiJ9.eyJleHAiOjE0MjI5OTU5MjIsInN1YiI6ImppbWkiLCJyb2xlcYI6WyJST0xFX0FETU10IiwiaWUk9MRV9VU0VSIl0sImIhdCI6MTQyMjk5MjMyMn0.rA7A2Gwt14LaYMpxNRtrCd024RGrfHtZXY9fIjV8x8o",
  "token_type": "Bearer",
  "username": "john.doe",
  "roles": [
    "ROLE_ADMIN",
    "ROLE_USER"
  ]
}
```



As per the RFC, `access_token` and `token_type` property names cannot be customised.

The JSON structure can be customised with the following configuration keys:

Table 13. Token rendering configuration options

| Config key | Default value |
|----------------------------------------------------------------------------------------|-----------------------|
| <code>grails.plugin.springsecurity.rest.token.rendering.usernamePropertyName</code> | <code>username</code> |
| <code>grails.plugin.springsecurity.rest.token.rendering.authoritiesPropertyName</code> | <code>roles</code> |

E.g., with the following configuration:

```
grails.plugin.springsecurity.rest.token.rendering.usernamePropertyName = 'login'  
grails.plugin.springsecurity.rest.token.rendering.authoritiesPropertyName =  
'permissions'
```

The output will look like:

```
{  
  
  "access_token": "eyJhbGciOiJIUzI1NiJ9.eyJleHAiOjE0MjI5OTU5MjIsInN1YiI6ImppbWkiLCJyb2xlcYI6WyJST0xFX0FETU10IiwiaWUiOiJMRV9VU0VSIl0sImhhdCI6MTQyMjk5MjMyMn0.rA7A2Gwt14LaYmpxNRtrCd024RGrfHtZXY9fIjV8x8o",  
    "token_type": "Bearer",  
    "login": "john.doe",  
    "permissions": [  
      "ROLE_ADMIN",  
      "ROLE_USER"  
    ]  
}
```

Disabling bearer tokens support for full response customisation

In order to fully customise the response, you need first to disable bearer tokens support by setting `grails.plugin.springsecurity.rest.token.validation.useBearerToken = false`. That will enable you to use this additional property:

Table 14. Token rendering configuration options

| Config key | Default value |
|------------------------------------------------------------------------------|---------------------------|
| <code>grails.plugin.springsecurity.rest.token.rendering.tokenProperty</code> | <code>access_token</code> |



Disabling bearer token support impacts the way tokens are extracted from the HTTP request. Please, read carefully the chapter about token validation first.

If you want your own implementation, simply create a class implementing [AccessTokenJsonRenderer](#) and wire it up in `resources.groovy` with name `accessTokenJsonRenderer`.



The principal object stored in the security context, and passed to the JSON renderer, is coming from the configured authentication providers. In most cases, this will be a `UserDetails` object retrieved using the `userDetailsService` bean.

If you want to render additional information in your JSON response, you have to:

1. Configure an alternative `userDetailsService` bean that retrieves the additional information you want, and put it in a principal object.
2. Configure an alternative `accessTokenJsonRenderer` that reads that information from the `restAuthenticationToken.principal` object.

Token Validation Filter

The token validation filter looks for the token in the request and then tries to validate it using the configured token storage implementation.

If the validation is successful, the principal object is stored in the security context. This allows you to use in your application `@Secured`, `springSecurityService.principal` and so on.



`springSecurityService.currentUser` expects a `grails.plugin.springsecurity.userdetails.GrailsUser` to perform a DB query. However, this plugin stores in the security context just a `principal` object, because it does not assume you are using domain classes to store the users. Use `springSecurityService.principal` instead.

This plugin supports [RFC 6750 Bearer Token](#) specification out-of-the-box.

Sending tokens in the request

The token can be sent in the Authorization request header:

Listing 17. Accessing a protected resource using Authorization request header

```
GET /protectedResource HTTP/1.1
Host: server.example.com
Authorization: Bearer
eyJhbGciOiJIUzI1NiJ9.eyJleHAiOiJlZ0MjI5OTU5MjIsInN1YiI6ImppbWkiLCJyb2xlcYI6WyJST0xFOX
0FETU1OIiwiaWUk9MRV9VU0VSIl0sImIhdCI6MTQyMjk5MjMyMn0.rA7A2Gwt14LaYmpxNRtrCd024RGrfHt
ZXY9fIjV8x8o
```

Or using form-encoded body parameters:

Listing 18. Accessing a protected resource using body parameters

```
POST /protectedResource HTTP/1.1
Host: server.example.com
Content-Type: application/x-www-form-urlencoded

access_token=eyJhbGciOiJIUzI1NiJ9.eyJleHAiOiJlZ0MjI5OTU5MjIsInN1YiI6ImppbWkiLCJyb2xlcYI6WyJST0xFOX
0FETU1OIiwiaWUk9MRV9VU0VSIl0sImIhdCI6MTQyMjk5MjMyMn0.rA7A2Gwt14LaYmpxNRtrCd024RGrfHtZXY9fIjV8x8o
```

If you need to use the GET HTTP method (to render images in an `img` tag, for example), you can also send the access token in a query string parameter named `access_token`:

If you disable the bearer token support, you can customise it further:

```
grails.plugin.springsecurity.rest.token.validation.useBearerToken = false
grails.plugin.springsecurity.rest.token.validation.headerName = 'X-Auth-Token'
```

If you still want to have full access and read the token from a different part of the request, you can implement a [TokenReader](#) and register it in your `resources.groovy` as `tokenReader`.



You must disable bearer token support to register your own `tokenReader` implementation.

Anonymous access

If you want to enable anonymous access to URL's where this plugin's filters are applied, you need to:

1. Configure `enableAnonymousAccess = true` (see table below).
2. Make sure that the `anonymousAuthenticationFilter` is applied before `restTokenValidationFilter`. See how to configure filters for more details.

For example, with this configuration:

Sample configuration to allow anonymous access

```
grails {
    plugin {
        springsecurity {
            filterChain {
                chainMap = [
                    '/api/guest/**':
                    'anonymousAuthenticationFilter,restTokenValidationFilter,restExceptionTranslationF
                    ilter,filterInvocationInterceptor',
                    '/api/**': 'JOINED_FILTERS,-anonymousAuthenticationFilter,-
                    exceptionTranslationFilter,-authenticationProcessingFilter,-
                    securityContextPersistenceFilter',
                    '/*': 'JOINED_FILTERS,-restTokenValidationFilter,-
                    restExceptionTranslationFilter'
                ]
            }

            //Other Spring Security settings
            //...

            rest {
                token {
                    validation {
                        enableAnonymousAccess = true
                    }
                }
            }
        }
    }
}
```

The following chains are configured:

1. `/api/guest/**` is a stateless chain that allows anonymous access when no token is sent. If however a token is on the request, it will be validated.
2. `/api/**` is a stateless chain that doesn't allow anonymous access. Thus, the token will always be required, and if missing, a Bad Request response will be sent back to the client.
3. `/**` (read: everything else) is a traditional stateful chain.

Validation Endpoint

There is also an endpoint available that you can call in case you want to know if a given token is valid. It looks for the token in a HTTP header as well, and if the token is still valid, it renders `guide:authentication[its JSON representation]`. If the token does not exist, it will render a `grails.plugin.springsecurity.rest.login.failureStatusCode` response (401 by default).

The relevant configuration properties for the validation endpoint are:

Table 15. Validation endpoint configuration options

| Config key | Default value |
|-----------------------------------------------------------------------------|----------------------------|
| <code>grails.plugin.springsecurity.rest.token.validation.active</code> | <code>true</code> |
| <code>grails.plugin.springsecurity.rest.token.validation.headerName</code> | <code>X-Auth-Token</code> |
| <code>grails.plugin.springsecurity.rest.token.validation.endpointUrl</code> | <code>/api/validate</code> |

Note that `headerName` is only considered if `grails.plugin.springsecurity.rest.token.validation.useBearerToken` is set to `false`. Otherwise (the default approach), as per RFC 6750, the header name will be `Authorization` and the value will be `Bearer TOKEN_VALUE`.

CORS support

This plugin comes pre-installed with the [CORS plugin](#), which enables [Cross-Origin Resource Sharing](#). Refer to the [plugin documentation](#) to learn how to configure it.

The CORS plugin activates itself by default. If you don't want it for some environments, you can use `cors.enabled = false` within the appropriate environment block in your `Config.groovy`.

If you don't want CORS support at all, you can skip the plugin by excluding it when defining this plugin in your `BuildConfig.groovy`:

Listing 19. Excluding the CORS plugin

```
compile 'spring-security-rest:{{VERSION}}', {  
    exclude 'cors'  
}
```

Note that you have to explicitly expose the headers you are using for token validation. Otherwise, the frontend application won't be allowed to read them:

```
cors.headers = ['Access-Control-Allow-Headers': 'Content-Type, Authorization']
```

Be also aware of the default behaviour of the CORS plugin for `Access-Control-Allow-Origin` is to just echo the `Origin` header sent by the browser. Make sure that in your production environment you properly configure the header.

Delegating authentication to OAuth providers

This plugin is meant to be used in applications serving a REST API's to pure Javascript clients. The main authentication flow of this plugin is to allow you to authenticate your users against any Spring Security-compatible user directory (like a DB or an LDAP server).

However, there might be situations where you want to delegate the authentication against a third-party provider, like Google or Facebook. Unfortunately, your pure Javascript front-end application cannot request the providers directly using OAuth, because then the access keys will be made public.

So is this plugin's responsibility to provide endpoints so your Grails backend acts as a proxy for your front-end client.

The flow is something like the following:

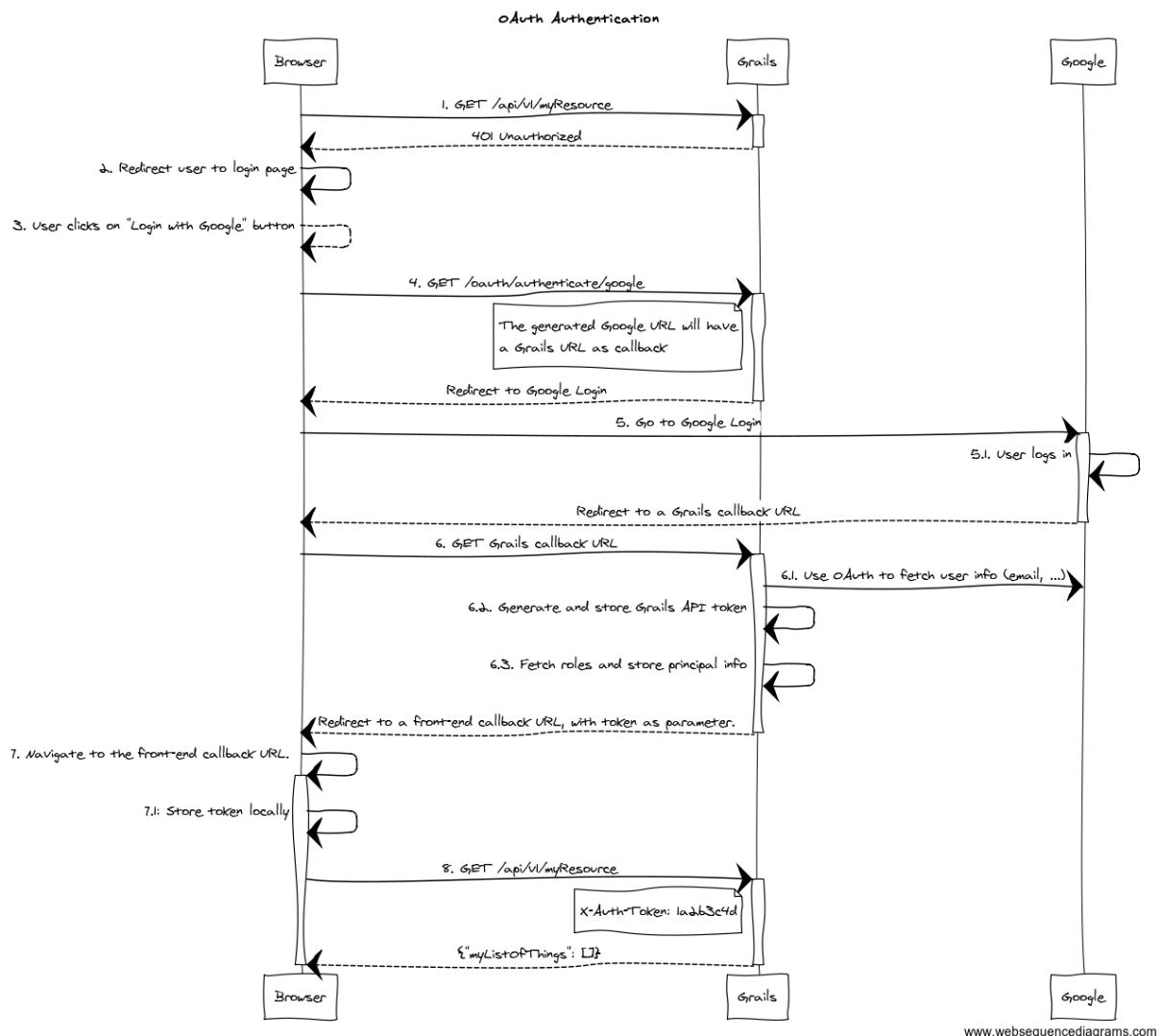


Figure 3. OAuth delegation protocol

1. The client application requests and endpoint that requires authentication, so the server responds with a 401 response (*).
2. The client redirects the user to the login form (*).
3. This time, instead of using username and password, the user clicks on "Login with Google" button.
4. Browser navigates to a Grails URL. Grails will generate a Google Login URL, giving Google a Grails callback URL.
5. Browser navigates to Google Login. User logs in, and Google redirects the browser to the Grails callback URL.

6. Browser navigates to that Grails callback URL. Then, Grails will use OAuth to fetch user information (like email) from Google. Based on that, will generate a REST API token and fetch and store principal information. The response from Grails will be a front-end URL where the token is a parameter.
7. The browser will navigate to that URL, and the Javascript logic will read the token from the URL and store it locally.
8. The client sends again a request to the protected resource, passing the token as an HTTP header (*).

The steps flagged with (*) remain unchanged from the normal flow.

The Grails callback URL mentioned above has this general format: `${grails.serverURL}/oauth/callback/${providerName}`. You will need to configure such URL in your OAuth 2.0 provider.

To support OAuth, this plugin uses [Profile & Authentication Client for Java](#). So you can use any OAuth 2.0 provider they support. This includes at the time of writing:

- Dropbox.
- Facebook.
- GitHub.
- Google.
- LinkedIn.
- Windows Live.
- Wordpress.
- Yahoo.
- Paypal.

Note that OAuth 1.0a providers also work, like Twitter.

The plugin also supports [CAS \(Central Authentication Service\)](#) using the OAuth authentication flow. See CAS Authentication for details.

To start the OAuth authentication flow, from your frontend application, generate a link to `<YOUR_GRAILS_APP>/oauth/authenticate/<provider>`. The user clicking on that link represents step 4 in the previous diagram.

Note that you can define the frontend callback URL in `Config.groovy` under `grails.plugin.springsecurity.rest.oauth.frontendCallbackUrl`. You need to define a closure that will be called with the token value as parameter:

```
grails.plugin.springsecurity.rest.oauth.frontendCallbackUrl = { String tokenValue  
-> "http://my.frontend-app.com/welcome.token=${tokenValue}" }
```

You can also define the URL as a callback parameter in the original link, eg:

```
http://your-grails-api.com/oauth/authenticate/google?callback=http://your-frontend-app.com/auth-success.html?token=
```

In this case, the token will be **concatenated** to the end of the URL.

Upon successful OAuth authorisation (after step 6.1 in the above diagram), an **OAuthUser** will be stored in the security context. This is done by a bean named `oauthUserDetailsService`. The **default implementation** delegates to the configured `userDetailsService` bean, passing the profile ID as the username:

Listing 20. DefaultOAuthUserDetailsService

```
/**
 * Builds an {@link OAuthUser}. Delegates to the default {@link
 UserDetailsService.loadUserByUsername(java.lang.String)}
 * where the username passed is {@link UserProfile.getId()}. If the user is not
 found, it will create a new one with
 * the the default roles.
 */
@Slf4j
class DefaultOAuthUserDetailsService implements OAuthUserDetailsService {

    @Delegate
    UserDetailsService userDetailsService

    UserDetailsChecker preAuthenticationChecks

    OAuthUser loadUserByUserProfile(CommonProfile userProfile,
 Collection<GrantedAuthority> defaultRoles)
        throws UsernameNotFoundException {
        UserDetails userDetails
        OAuthUser oAuthUser

        try {
            log.debug "Trying to fetch user details for user profile:
${userProfile}"
            userDetails = userDetailsService.loadUserByUsername userProfile.id

            log.debug "Checking user details with
${preAuthenticationChecks.class.name}"
            preAuthenticationChecks?.check(userDetails)

            Collection<GrantedAuthority> allRoles = userDetails.authorities +
defaultRoles
            oAuthUser = new OAuthUser(userDetails.username, userDetails.password,
allRoles, userProfile)
        } catch (UsernameNotFoundException unfe) {
            log.debug "User not found. Creating a new one with default roles:
${defaultRoles}"
            oAuthUser = new OAuthUser(userProfile.id, 'N/A', defaultRoles,
userProfile)
        }

        return oAuthUser
    }
}
```

If you want to provide your own implementation, define it in `resources.groovy` with bean name `oauthUserDetailsService`. Make sure you implements the interface `OauthUserDetailsService`

If you want to do any additional post-OAuth authorisation check, you should do it on your `loadUserByUserProfile` implementation. This is useful if you want to allow your corporate users to log into your application using their Gmail account. In this case, you should decide based on `OAuth20Profile.getEmail()`, for instance:

Listing 21. Custom `loadUserByUserProfile` implementation

```
OauthUser loadUserByUserProfile(OAuth20Profile userProfile,
Collection<GrantedAuthority> defaultRoles) throws UsernameNotFoundException {
    if (userProfile.email.endsWith('example.org')) {
        return new OauthUser(userProfile.id, 'N/A', defaultRoles, userProfile)
    } else {
        throw new UsernameNotFoundException("User with email ${userProfile.email}
now allowed. Only 'example.org' accounts are allowed.")
    }
}
```

In case of any OAuth authentication failure, the plugin will redirect back to the frontend application anyway, so it has a chance to render a proper error message and/or offer the user the option to try again. In that case, the token parameter will be empty, and both error and message params will be appended:

`http://your-frontend-app.com/auth-success.html?token=&error=403&message=User+with+email+jimmy%40gmail.com+now+allowed.+Only+%40example.com+accounts+are+allowed`

Below are some examples on how to configure it for Google, Facebook and Twitter.

Google

Define the following block in your Config.groovy:

Listing 22. Google OAuth sample configuration

```
grails {
    plugin {
        springsecurity {

            rest {

                oauth {

                    frontendCallbackUrl = { String tokenValue ->
                        "http://my.frontend-app.com/welcome#token=${tokenValue}" }

                    google {

                        client = org.pac4j.oauth.client.Google2Client
                        key = 'xxxx.apps.googleusercontent.com'
                        secret = 'xxx'
                        scope =
                        org.pac4j.oauth.client.Google2Client.Google2Scope.EMAIL_AND_PROFILE
                        defaultRoles = ['ROLE_USER', 'ROLE_GOOGLE']

                    }

                }

            }

        }

    }
}
```



The scope can be from any value of the enum `org.pac4j.oauth.client.Google2Client.Google2Scope`. But if you use the default `OAuthUserDetailsService`, you need to use `EMAIL_AND_PROFILE`. That is because the default implementation uses the profile ID as the username, and that is only returned by Google if `EMAIL_AND_PROFILE` scope is used.

Facebook

Define the following block in your `Config.groovy`:

Listing 23. Facebook OAuth sample configuration

```
grails {
    plugin {
        springsecurity {

            rest {

                oauth {

                    frontendCallbackUrl = { String tokenValue ->
                        "http://my.frontend-app.com/welcome#token=${tokenValue}" }

                    facebook {

                        client = org.pac4j.oauth.client.FacebookClient
                        key = 'xxx'
                        secret = 'yyy'
                        scope = 'email,user_location'
                        fields =
                            'id,name,first_name,middle_name,last_name,username'
                        defaultRoles = ['ROLE_USER', 'ROLE_FACEBOOK']
                    }
                }
            }
        }
    }
}
```

The scope is a comma-separated list, **without blanks**, of Facebook permissions. See the [Facebook documentation](#) for more details.

fields may contain a comma-separated list, **without blanks**, of [user fields](#).

Both scope and fields are optional, but it's highly recommendable to fine tune those lists so you don't ask for information you don't need.

Twitter

Define the following block in your `Config.groovy`:

Listing 24. Twitter OAuth sample configuration

```
grails {
    plugin {
        springsecurity {

            rest {

                oauth {

                    frontendCallbackUrl = { String tokenValue ->
                        "http://my.frontend-app.com/welcome#token=${tokenValue}" }

                    twitter {

                        client = org.pac4j.oauth.client.TwitterClient
                        key = 'xxx'
                        secret = 'yyy'
                        defaultRoles = ['ROLE_USER', 'ROLE_TWITTER']
                    }
                }
            }
        }
    }
}
```

There is no additional configuration for Twitter.

CAS (Central Authentication Service)

Define the following block in your `Config.groovy`:

Listing 25. CAS sample configuration

```
grails {
    plugin {
        springsecurity {

            rest {

                oauth {

                    frontendCallbackUrl = { String tokenValue ->
                        "http://my.frontend-app.com/welcome#token=${tokenValue}" }

                    cas {

                        client = org.pac4j.cas.client.CasClient
                        casLoginUrl = "https://my.cas-server.com/cas/login"
                    }
                }
            }
        }
    }
}
```

Set `casLoginUrl` to the login URL of your CAS server.

Debugging

If you need debug information, you can specify the following entries in `Config.groovy`:

Listing 26. Logging setup

```
log4j = {  
    ...  
  
    debug 'grails.plugin.springsecurity',  
          'grails.app.controllers.grails.plugin.springsecurity',  
          'grails.app.services.grails.plugin.springsecurity',  
          'org.pac4j',  
          'org.springframework.security'  
  
    ...  
}
```

Frequently Asked Questions

Why this token-based implementation? Can't I use HTTP basic authentication?

In theory you can. The only restriction to be truly stateless is to not use HTTP sessions at all. So if you go with basic authentication, you need to transfer the credentials back and forth every time.

Let's think about that. Keep in mind that your frontend is a pure HTML/Javascript application, consuming a REST API from the Grails side. So the first time, the Javascript application will make an API query and will receive a 401 response indicating that authentication is required. Then you present the user a form to enter credentials, you grab them, **encode** them with Base64 and in the next request, you send an HTTP header like `Authorization: Basic QWxhZGRpbjpvYVUHNlc2FtZQ==`.

Now remember you are doing RESTful application, so the session state is maintained in the client. That means that you would need to store that Base64 encoded string somewhere: cookies? HTML5 local storage? In any case, they are accessible using browser tools. And that's the point: there is a huge security risk because Base64 it's not encryption, just encoding. And it can be easily decoded.

You could argue that someone can access the token in the browser. Yes, but having the token will not allow him to obtain user's credentials. The tokens are just not decodable. And they can be revoked if necessary.

Fortunately for you, a token-based solution is not a magic idea that I only got; it's actually a specification: [RFC 6750 - The OAuth 2.0 Authorization Framework: Bearer Token Usage](#).

Moreover, if you use tokens, you have the chance to implement expiration policies.

A couple of link with further explanations on the token-based flow:

- <http://www.jamesward.com/2013/05/13/securing-single-page-apps-and-rest-services>
- <http://blog.brunoscopelliti.com/authentication-to-a-restful-web-service-in-an-angularjs-web-app>

Why can't the API be secured with OAuth?

[RFC 6749 - OAuth 2.0](#) specification does cover this scenario in what they call "public clients":

Clients incapable of maintaining the confidentiality of their credentials (e.g., clients executing on the device used by the resource owner, such as an installed native application or a web browser-based application), and incapable of secure client authentication via any other means.

The OAuth 2.0 specification supports public clients with the implicit grant. This plugin supports that by default when you delegate the authentication to another OAuth provider. If it's you who are authenticating the users (via DB, LDAP, etc), the token-based flow of this plugin is *OAuth-ish*.

Why you didn't use any of the existing OAuth plugins? Why pac4j?

I'm aware of plugins like [OAuth](#) and [Spring Security OAuth](#), but all of them rely on Spring Security Core's way of using HTTP sessions. So not acceptable.

I chose pac4j because:

1. They support major OAuth 2.0 providers out-of-the-box, whereas Scribe does not.
2. It's deadly simple and works just fine.

I'm also aware of a pac4j-spring-security module. See my previous response on HTTP sessions.

Dude, this is awesome. How can I compensate you?

I doubt you can :). You may try giving me free beers the next time you see me in a conference. Or you can just express your gratitude via [Twitter](#).