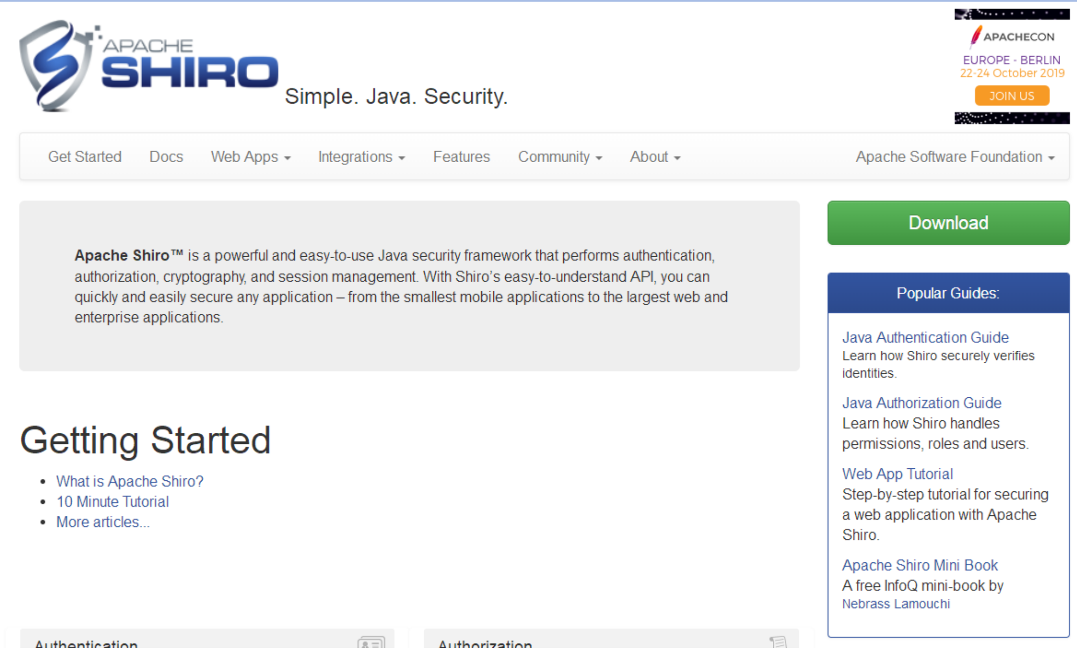
1、Shiro简介

1.1、什么是Shiro?

- Apache Shiro 是一个Java 的安全（权限）框架。
- Shiro 可以非常容易的开发出足够好的应用，其不仅可以用在JavaSE环境，也可以用在JavaEE环境。
- Shiro可以完成，认证，授权，加密，会话管理，Web集成，缓存等。
- 下载地址：http://shiro.apac he.org/
- 

Apache Shiro™ is a powerful and easy-to-use Java security framework that performs authentication, authorization, cryptography, and session management. With Shiro's easy-to-understand API, you can quickly and easily secure any application – from the smallest mobile applications to the largest web and enterprise applications.

Getting Started

- What is Apache Shiro?
- 10 Minute Tutorial
- More articles...

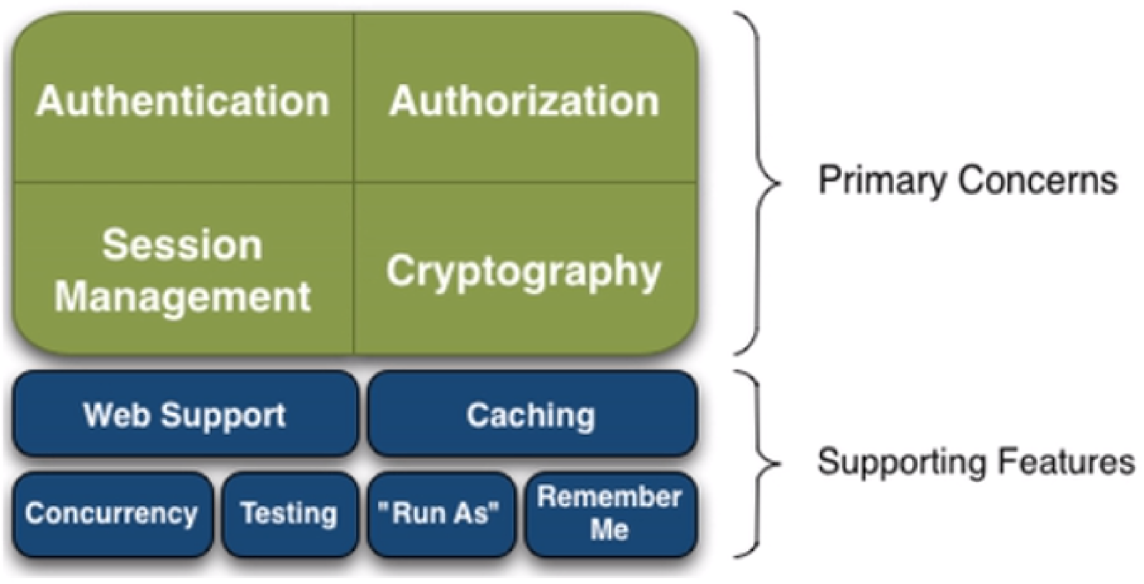
Java Authentication Guide
Learn how Shiro securely verifies identities.

Java Authorization Guide
Learn how Shiro handles permissions, roles and users.

Web App Tutorial
Step-by-step tutorial for securing a web application with Apache Shiro.

Apache Shiro Mini Book
A free InfoQ mini-book by Nebrass Lamouchi

1.2、有哪些功能?



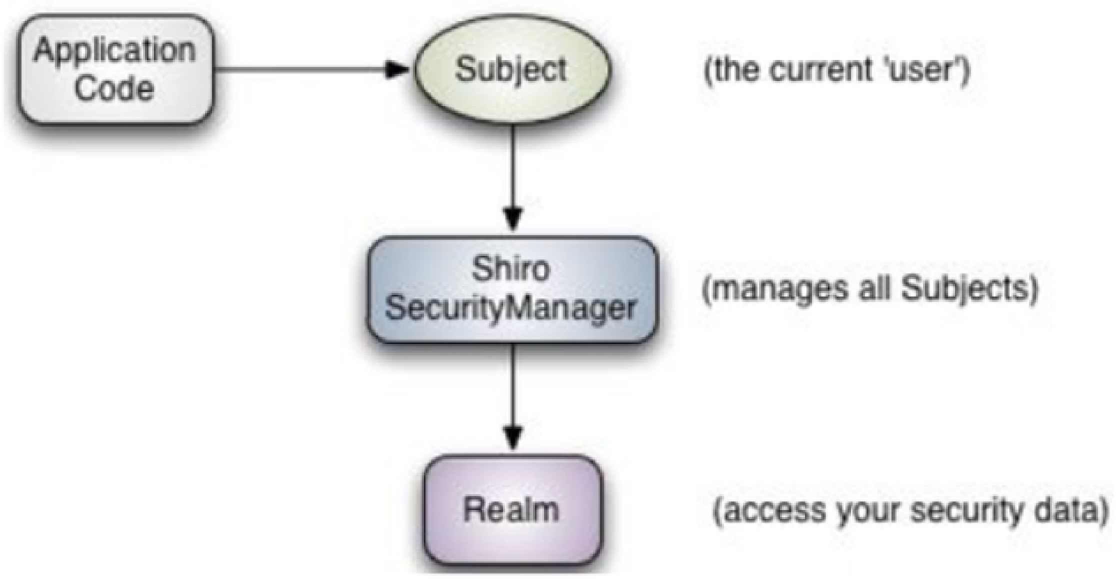
- Authentication：身份认证、登录，验证用户是不是拥有相应的身份；
- Authorization：授权，即权限验证，验证某个已认证的用户是否拥有某个权限，即判断用户能否进行什么操作，如：验证某个用户是否拥有某个角色，或者细粒度的验证某个用户对某个资源是否

具有某个权限！

- Session Manager：会话管理，即用户登录后就是第一次会话，在没有退出之前，它的所有信息都在会话中；会话可以是普通的JavaSE环境，也可以是Web环境；
- Cryptography：加密，保护数据的安全性，如密码加密存储到数据库中，而不是明文存储；
- Web Support：Web支持，可以非常容易的集成到Web环境；
- Caching：缓存，比如用户登录后，其用户信息，拥有的角色、权限不必每次去查，这样可以提高效率
- Concurrency：Shiro支持多线程应用的并发验证，即，如在一个线程中开启另一个线程，能把权限自动的传播过去
- Testing：提供测试支持；
- Run As：允许一个用户假装为另一个用户（如果他们允许）的身份进行访问；
- Remember Me：记住我，这个是非常常见的功能，即一次登录后，下次再来的话不用登录了

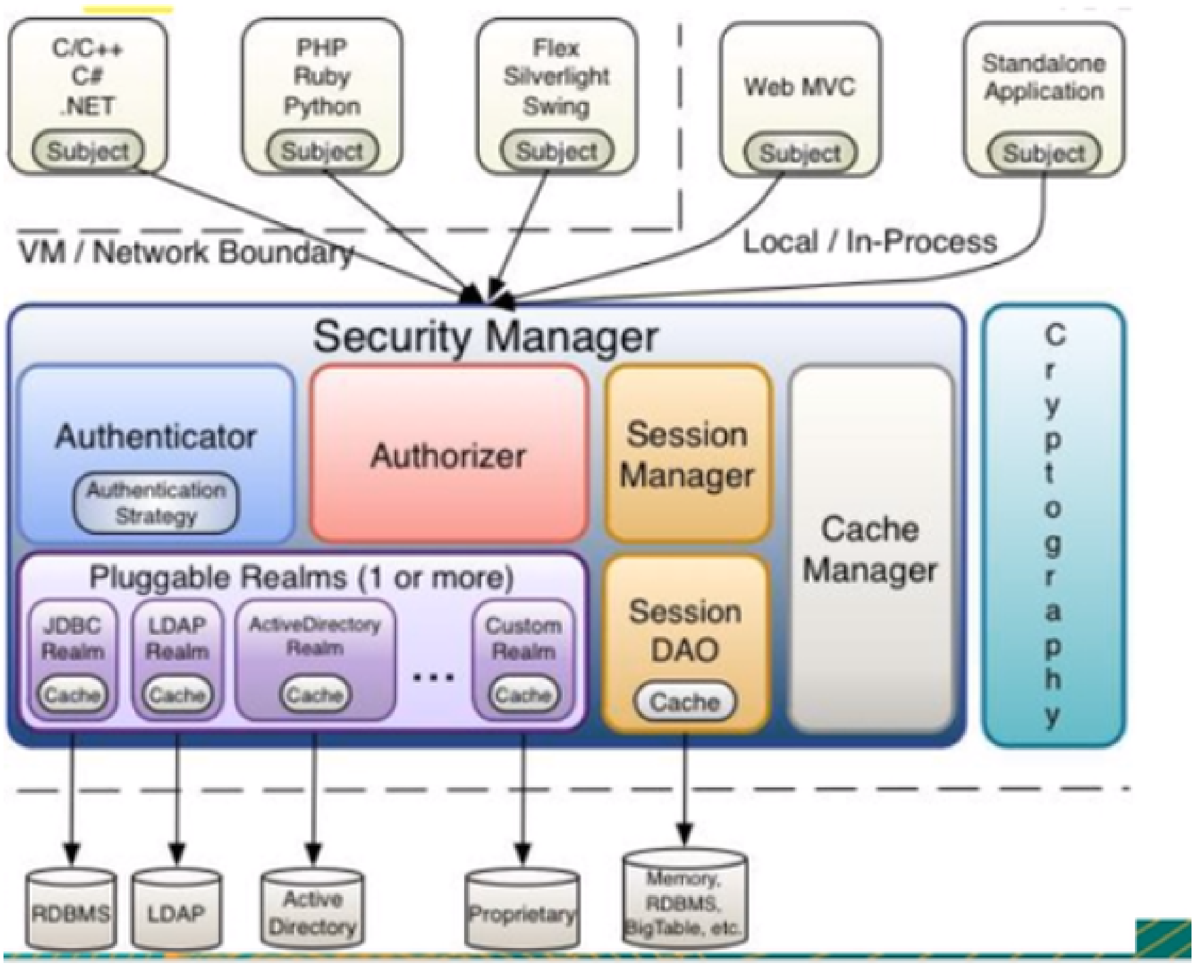
1.3、Shiro架构（外部）

从外部来看Shiro，即从应用程序角度来观察如何使用shiro完成工作：



- subject： 应用代码直接交互的对象是Subject，也就是说Shiro的对外API核心就是Subject，Subject代表了当前的用户，这个用户不一定是一个具体的人，与当前应用交互的任何东西都是Subject，如网络爬虫，机器人等，与Subject的所有交互都会委托给SecurityManager；Subject其实是一个门面，SecurityManageer 才是实际的执行者
- SecurityManager：安全管理器，即所有与安全有关的操作都会与SercurityManager交互，并且它管理着所有的Subject，可以看出它是Shiro的核心，它负责与Shiro的其他组件进行交互，它相当于SpringMVC的DispatcherServlet的角色
- Realm：Shiro从Realm获取安全数据（如用户，角色，权限），就是说SecurityManager 要验证用户身份，那么它需要从Realm 获取相应的用户进行比较，来确定用户的身份是否合法；也需要从Realm得到用户相应的角色、权限，进行验证用户的操作是否能够进行，可以把Realm看成DataSource；

1.4、Shiro架构（内部）



- Subject：任何可以与应用交互的 ‘用户’;
- Security Manager：相当于SpringMVC中的DispatcherServlet；是Shiro的心脏，所有具体的交互都通过Security Manager进行控制，它管理者所有的Subject，且负责进行认证，授权，会话，及缓存的管理。
- Authenticator：负责Subject认证，是一个扩展点，可以自定义实现；可以使用认证策略（Authentication Strategy），即什么情况下算用户认证通过了；
- Authorizer：授权器，即访问控制器，用来决定主体是否有权限进行相应的操作；即控制着用户能访问应用中的那些功能；
- Realm：可以有一个或者多个的realm，可以认为是安全实体数据源，即用于获取安全实体的，可以用JDBC实现，也可以是内存实现等等，由用户提供；所以一般在应用中都需要实现自己的realm
- SessionManager：管理Session生命周期的组件，而Shiro并不仅仅可以用在Web环境，也可以用在普通的JavaSE环境中
- CacheManager：缓存控制器，来管理如用户，角色，权限等缓存的；因为这些数据基本上很少改变，放到缓存中后可以提高访问的性能；
- Cryptography：密码模块，Shiro 提高了一些常见的加密组件用于密码加密，解密等

2、HelloWorld

2.1、快速实践

查看官网文档：http://shiro.apache.org/tutorial.html

官方的quickstart：https://github.com/apache/shiro/tree/master/samples/quickstart/

1. 创建一个maven父工程，用于学习Shiro，删掉不必要的东西
2. 创建一个普通的Maven子工程：shiro-01-helloworld
3. 根据官方文档，我们来导入Shiro的依赖

```xml
<dependencies>
    <dependency>
        <groupId>org.apache.shiro</groupId>
        <artifactId>shiro-core</artifactId>
        <version>1.4.1</version>
    </dependency>
    <!-- Shiro uses SLF4J for logging.  We'll use the 'simple' binding
         in this example app.  See http://www.slf4j.org for more info. -->
    <dependency>
        <groupId>org.slf4j</groupId>
        <artifactId>slf4j-simple</artifactId>
        <version>1.7.21</version>
        <scope>test</scope>
    </dependency>
    <dependency>
        <groupId>org.slf4j</groupId>
        <artifactId>jcl-over-slf4j</artifactId>
        <version>1.7.21</version>
        <scope>test</scope>
    </dependency>
</dependencies>
```

4. 编写Shiro配置

   log4j.properties

```properties
log4j.rootLogger=INFO, stdout

log4j.appender.stdout=org.apache.log4j.ConsoleAppender
log4j.appender.stdout.layout=org.apache.log4j.PatternLayout
log4j.appender.stdout.layout.ConversionPattern=%d %p [%c] - %m %n

# General Apache libraries
log4j.logger.org.apache=WARN

# Spring
log4j.logger.org.springframework=WARN

# Default Shiro logging
log4j.logger.org.apache.shiro=INFO

# Disable verbose logging
log4j.logger.org.apache.shiro.util.ThreadContext=WARN
log4j.logger.org.apache.shiro.cache.ehcache.EhCache=WARN
```

   shiro.ini

```ini
# -----------------------------------------------------------------------------
# Users and their assigned roles
#
# Each line conforms to the format defined in the
# org.apache.shiro.realm.text.TextConfigurationRealm#setUserDefinitions
JavaDoc
# -----------------------------------------------------------------------------
[users]
# user 'root' with password 'secret' and the 'admin' role
root = secret, admin
# user 'guest' with the password 'guest' and the 'guest' role
guest = guest, guest
# user 'presidentskroob' with password '12345' ("That's the same
combination on
# my luggage!!!" ;)), and role 'president'
presidentskroob = 12345, president
# user 'darkhelmet' with password 'ludicrousspeed' and roles 'darklord'
and 'schwartz'
darkhelmet = ludicrousspeed, darklord, schwartz
# user 'lonestarr' with password 'vespa' and roles 'goodguy' and
'schwartz'
lonestarr = vespa, goodguy, schwartz

# -----------------------------------------------------------------------------
# Roles with assigned permissions
#
# Each line conforms to the format defined in the
# org.apache.shiro.realm.text.TextConfigurationRealm#setRoleDefinitions
JavaDoc
# -----------------------------------------------------------------------------
[roles]
# 'admin' role has all permissions, indicated by the wildcard '*'
admin = *
# The 'schwartz' role can do anything (*) with any lightsaber:
schwartz = lightsaber:*
# The 'goodguy' role is allowed to 'drive' (action) the winnebago (type)
with
# license plate 'eagle5' (instance specific id)
goodguy = winnebago:drive:eagle5
```

5. 编写我们的QuickStrat

```java
import org.apache.shiro.SecurityUtils;
import org.apache.shiro.authc.*;
import org.apache.shiro.config.IniSecurityManagerFactory;
import org.apache.shiro.mgt.SecurityManager;
import org.apache.shiro.session.Session;
import org.apache.shiro.subject.Subject;
import org.apache.shiro.util.Factory;
import org.slf4j.Logger;
import org.slf4j.LoggerFactory;


/**
 * Simple Quickstart application showing how to use Shiro's API.
 */
public class Quickstart {

    private static final transient Logger log = LoggerFactory.getLogger(Quickstart.class);


    public static void main(String[] args) {

        // The easiest way to create a Shiro SecurityManager with configured
        // realms, users, roles and permissions is to use the simple INI config.
        // We'll do that by using a factory that can ingest a .ini file and
        // return a SecurityManager instance:

        // Use the shiro.ini file at the root of the classpath
        // (file: and url: prefixes load from files and urls respectively):
        Factory<SecurityManager> factory = new IniSecurityManagerFactory("classpath:shiro.ini");
        SecurityManager securityManager = factory.getInstance();

        // for this simple example quickstart, make the SecurityManager
        // accessible as a JVM singleton.  Most applications wouldn't do this
        // and instead rely on their container configuration or web.xml for
        // webapps.  That is outside the scope of this simple quickstart, so
        // we'll just do the bare minimum so you can continue to get a feel
        // for things.
        SecurityUtils.setSecurityManager(securityManager);

        // Now that a simple Shiro environment is set up, let's see what you can do:

        // get the currently executing user:
        Subject currentUser = SecurityUtils.getSubject();

        // Do some stuff with a Session (no need for a web or EJB container!!!)
        Session session = currentUser.getSession();
        session.setAttribute("someKey", "aValue");
        String value = (String) session.getAttribute("someKey");
        if (value.equals("aValue")) {
            log.info("Retrieved the correct value! [" + value + "]");
        }

        // let's login the current user so we can check against roles and permissions:
        if (!currentUser.isAuthenticated()) {
            UsernamePasswordToken token = new UsernamePasswordToken("lonestarr", "vespa");
            token.setRememberMe(true);
            try {
                currentUser.login(token);
            } catch (UnknownAccountException uae) {
                log.info("There is no user with username of " + token.getPrincipal());
            } catch (IncorrectCredentialsException ice) {
                log.info("Password for account " + token.getPrincipal() + " was incorrect!");
            } catch (LockedAccountException lae) {
                log.info("The account for username " + token.getPrincipal() + " is locked.  " +
                        "Please contact your administrator to unlock it.");
            }
            // ... catch more exceptions here (maybe custom ones specific to your application?
            catch (AuthenticationException ae) {
                //unexpected condition?  error?
            }
        }

        //say who they are:
        //print their identifying principal (in this case, a username):
        log.info("User [" + currentUser.getPrincipal() + "] logged in successfully.");

        //test a role:
        if (currentUser.hasRole("schwartz")) {
            log.info("May the Schwartz be with you!");
        } else {
            log.info("Hello, mere mortal.");
        }

        //test a typed permission (not instance-level)
        if (currentUser.isPermitted("lightsaber:wield")) {
            log.info("You may use a lightsaber ring.  Use it wisely.");
        } else {
            log.info("Sorry, lightsaber rings are for schwartz masters only.");
        }

        //a (very powerful) Instance Level permission:
        if (currentUser.isPermitted("winnebago:drive:eagle5")) {
            log.info("You are permitted to 'drive' the winnebago with license plate (id) 'eagle5'.  " +
                    "Here are the keys - have fun!");
        } else {
            log.info("Sorry, you aren't allowed to drive the 'eagle5' winnebago!");
        }

        //all done - log out!
        currentUser.logout();

        System.exit(0);
    }
}
```

6. 测试运行一下

7. 报错，则导入一下 `commons-logging` 的依赖

```xml
<!-- https://mvnrepository.com/artifact/commons-logging/commons-logging -->
<dependency>
    <groupId>commons-logging</groupId>
    <artifactId>commons-logging</artifactId>
    <version>1.2</version>
</dependency>

```

8. 发现，执行完毕什么都没有，可能是maven依赖中的作用域问题，我们需要将scope作用域删掉，默认是在test，然后重启，那么我们的quickstart就结束了，默认的日志消息！

```
[main] INFO org.apache.shiro.session.mgt.AbstractValidatingSessionManager - Enabling session validation scheduler...
[main] INFO Quickstart - Retrieved the correct value! [aValue]
[main] INFO Quickstart - User [lonestarr] logged in successfully.
[main] INFO Quickstart - May the Schwartz be with you!
[main] INFO Quickstart - You may use a lightsaber ring.  Use it wisely.
[main] INFO Quickstart - You are permitted to 'drive' the winnebago with license plate (id) 'eagle5'.  Here are the keys - have fun!
```

9. OK，开始解释！

2.2、阅读代码

1. 导入了一堆包！
2. 类的描述

```java
/**
* Simple Quickstart application showing how to use Shiro's API.
* 简单的快速启动应用程序，演示如何使用Shiro的API。
*/
```

3. 通过工厂模式创建SecurityManager的实例对象

```java
// The easiest way to create a Shiro SecurityManager with configured
// realms, users, roles and permissions is to use the simple INI config.
// We'll do that by using a factory that can ingest a .ini file and
// return a SecurityManager instance:

// 使用类路径根目录下的shiro.ini文件
// Use the shiro.ini file at the root of the classpath
// (file: and url: prefixes load from files and urls respectively):
Factory<SecurityManager> factory = new IniSecurityManagerFactory("classpath:shiro.ini");
SecurityManager securityManager = factory.getInstance();

// for this simple example quickstart, make the SecurityManager
// accessible as a JVM singleton.  Most applications wouldn't do this
// and instead rely on their container configuration or web.xml for
// webapps.  That is outside the scope of this simple quickstart, so
// we'll just do the bare minimum so you can continue to get a feel
// for things.
```

```
SecurityUtils.setSecurityManager(securityManager);

// 现在已经建立了一个简单的Shiro环境，让我们看看您可以做什么：
// Now that a simple Shiro environment is set up, let's see what you can
do:
```

4. 获取当前的Subject

```
// get the currently executing user: 获取当前正在执行的用户
Subject currentUser = SecurityUtils.getSubject();
```

5. session的操作

```
// 用会话做一些事情（不需要web或EJB容器！!!)
// Do some stuff with a Session (no need for a web or EJB container!!!)
Session session = currentUser.getSession(); //获得session
session.setAttribute("someKey", "aValue"); //设置Session的值!
String value = (String) session.getAttribute("someKey"); //从session中获取
值
if (value.equals("aValue")) { //判断session中是否存在这个值!
    log.info("==Retrieved the correct value! [" + value + "]");
}
```

6. 用户认证功能

```
// 测试当前的用户是否已经被认证，即是否已经登录!
// let's login the current user so we can check against roles and
permissions:
if (!currentUser.isAuthenticated()) { // isAuthenticated();是否认证
    //将用户名和密码封装为 UsernamePasswordToken ；
    UsernamePasswordToken token = new UsernamePasswordToken("lonestarr",
"vespa");
    token.setRememberMe(true); //记住我功能
    try {
        currentUser.login(token); //执行登录，可以登录成功的!
    } catch (UnknownAccountException uae) { //如果没有指定的用户，则
UnknownAccountException异常
        log.info("There is no user with username of " +
token.getPrincipal());
    } catch (IncorrectCredentialsException ice) { //密码不对的异常!
        log.info("Password for account " + token.getPrincipal() + " was
incorrect!");
    } catch (LockedAccountException lae) { //用户被锁定的异常
        log.info("The account for username " + token.getPrincipal() + "
is locked.  " +
                 "Please contact your administrator to unlock it.");
    }
    // ... catch more exceptions here (maybe custom ones specific to
your application?
    catch (AuthenticationException ae) { //认证异常，上面的异常都是它的子类
        //unexpected condition?  error?
    }
}

//说出他们是谁:
//say who they are:
//打印他们的标识主体（在本例中为用户名）：
//print their identifying principal (in this case, a username):
```

```
log.info("User [" + currentUser.getPrincipal() + "] logged in successfully.");
```

7. 角色检查

```
//test a role:
//是否存在某一个角色
if (currentUser.hasRole("schwartz")) {
    log.info("May the Schwartz be with you!");
} else {
    log.info("Hello, mere mortal.");
}
```

8. 权限检查，粗粒度

```
//测试用户是否具有某一个权限，行为
//test a typed permission (not instance-level)
if (currentUser.isPermitted("lightsaber:wield")) {
    log.info("You may use a lightsaber ring.  Use it wisely.");
} else {
    log.info("Sorry, lightsaber rings are for schwartz masters only.");
}
```

9. 权限检查，细粒度

```
//测试用户是否具有某一个权限，行为，比上面更加的具体！
//a (very powerful) Instance Level permission:
if (currentUser.isPermitted("winnebago:drive:eagle5")) {
    log.info("You are permitted to 'drive' the winnebago with license plate (id) 'eagle5'.  " +
             "Here are the keys - have fun!");
} else {
    log.info("Sorry, you aren't allowed to drive the 'eagle5' winnebago!");
}
```

10. 注销操作

```
//执行注销操作！
//all done - log out!
currentUser.logout();
```

11. 退出系统 `System.exit(0);`

OK，一个简单的Shiro程序体验，我们就在官方的带领下初步认识了！

3、SpringBoot集成

3.1、准备工作

1. 搭建一个SpringBoot项目、选中web模块即可！
2. 导入Maven依赖 `thymeleaf`

```xml
<!--thymeleaf模板-->
<dependency>
    <groupId>org.thymeleaf</groupId>
    <artifactId>thymeleaf-spring5</artifactId>
</dependency>
<dependency>
    <groupId>org.thymeleaf.extras</groupId>
    <artifactId>thymeleaf-extras-java8time</artifactId>
</dependency>
```

3. 编写一个页面 index.html `templates`

```html
<!DOCTYPE html>
<html lang="en"xmlns:th="http://www.thymeleaf.org">
<head>
    <meta charset="UTF-8">
    <title>Title</title>
</head>
<body>

<h1>首页</h1>
<p th:text="${msg}"></p>

</body>
</html>
```

4. 编写controller进行访问测试

```java
package com.kuang.controller;

import org.springframework.stereotype.Controller;
import org.springframework.ui.Model;
import org.springframework.web.bind.annotation.RequestMapping;

@Controller
public class MyController {

    @RequestMapping({"/","/index"})
    public String toIndex(Model model){
        model.addAttribute("msg","hello,Shiro");
        return "index";
    }

}
```

5. 测试访问首页！

3.2、整合Shiro

回顾核心API：

1. Subject：用户主体
2. SecurityManager：安全管理器
3. Realm：Shiro 连接数据

步骤：

1. 导入Shiro 和 spring整合的依赖

```xml
<dependency>
    <groupId>org.apache.shiro</groupId>
    <artifactId>shiro-spring</artifactId>
    <version>1.4.1</version>
</dependency>
```

2. 编写Shiro 配置类 `config包`

```java
package com.kuang.config;

import org.springframework.context.annotation.Configuration;

//声明为配置类
@Configuration
public class ShiroConfig {

    //创建 ShiroFilterFactoryBean

    //创建 DefaultWebSecurityManager

    //创建 realm 对象
}
```

3. 我们倒着来，先想办法创建一个 `realm` 对象
4. 我们需要自定义一个 realm 的类，用来编写一些查询的方法，或者认证与授权的逻辑

```java
package com.kuang.config;

import org.apache.shiro.authc.AuthenticationException;
import org.apache.shiro.authc.AuthenticationInfo;
import org.apache.shiro.authc.AuthenticationToken;
import org.apache.shiro.authz.AuthorizationInfo;
import org.apache.shiro.realm.AuthorizingRealm;
import org.apache.shiro.subject.PrincipalCollection;

//自定义Realm
public class UserRealm extends AuthorizingRealm {

    //执行授权逻辑
    @Override
    protected AuthorizationInfo
doGetAuthorizationInfo(PrincipalCollection principals) {
        System.out.println("执行了=>授权逻辑PrincipalCollection");
        return null;
    }

    //执行认证逻辑
    @Override
    protected AuthenticationInfo
doGetAuthenticationInfo(AuthenticationToken token) throws
AuthenticationException {
        System.out.println("执行了=>认证逻辑AuthenticationToken");
        return null;
    }

}
```

5. 将这个类注册到我们的Bean中！ `ShiroConfig`

```java
@Configuration
public class ShiroConfig {

    //创建 ShiroFilterFactoryBean

    //创建 DefaultWebSecurityManager

    //创建 realm 对象
    @Bean
    public UserRealm userRealm(){
        return new UserRealm();
    }
}
```

6. 接下来我们该去创建 `DefaultWebSecurityManager` 了

```java
//创建 DefaultWebSecurityManager
@Bean(name = "securityManager")
public DefaultWebSecurityManager getDefaultWebSecurityManager(@Qualifier("userRealm")UserRealm userRealm){
    DefaultWebSecurityManager securityManager = new DefaultWebSecurityManager();
    //关联Realm
    securityManager.setRealm(userRealm);
    return securityManager;
}
```

7. 接下来我们该去创建 `ShiroFilterFactoryBean` 了

```java
//创建 ShiroFilterFactoryBean
@Bean
public ShiroFilterFactoryBean getShiroFilterFactoryBean(@Qualifier("securityManager")DefaultWebSecurityManager securityManager){
    ShiroFilterFactoryBean shiroFilterFactoryBean = new ShiroFilterFactoryBean();
    //设置安全管理器
    shiroFilterFactoryBean.setSecurityManager(securityManager);

    return shiroFilterFactoryBean;
}
```

最后上完整的配置：

```java
package com.kuang.config;

import org.apache.shiro.spring.web.ShiroFilterFactoryBean;
import org.apache.shiro.web.mgt.DefaultWebSecurityManager;
import org.springframework.beans.factory.annotation.Qualifier;
import org.springframework.context.annotation.Bean;
import org.springframework.context.annotation.Configuration;

//声明为配置类
@Configuration
public class ShiroConfig {

    //创建 ShiroFilterFactoryBean
    @Bean
    public ShiroFilterFactoryBean getShiroFilterFactoryBean(@Qualifier("securityManager")DefaultWebSecurityManager securityManager){
        ShiroFilterFactoryBean shiroFilterFactoryBean = new ShiroFilterFactoryBean();
        //设置安全管理器
        shiroFilterFactoryBean.setSecurityManager(securityManager);

        return shiroFilterFactoryBean;
    }

    //创建 DefaultWebSecurityManager
    @Bean(name = "securityManager")
    public DefaultWebSecurityManager getDefaultWebSecurityManager(@Qualifier("userRealm")UserRealm userRealm){
        DefaultWebSecurityManager securityManager = new DefaultWebSecurityManager();
        //关联Realm
        securityManager.setRealm(userRealm);
        return securityManager;
    }

    //创建 realm 对象
    @Bean
    public UserRealm userRealm(){
        return new UserRealm();
    }
}
```

3.3、页面拦截实现

1. 编写两个页面、在templates目录下新建一个 user 目录 `add.html` `update.html`

```html
<body>
<h1>add</h1>
</body>
```

```html
<body>
<h1>update</h1>
</body>
```

2. 编写跳转到页面的controller

```java
@RequestMapping("/user/add")
public String toAdd(){
    return "user/add";
}

@RequestMapping("/user/update")
public String toUpdate(){
    return "user/update";
}
```

3. 在index页面上，增加跳转链接

```html
<a th:href="@{/user/add}">add</a> | <a
th:href="@{/user/update}">update</a>
```

4. 测试页面跳转是否OK
5. 准备添加Shiro的内置过滤器

```java
@Bean
public ShiroFilterFactoryBean
getShiroFilterFactoryBean(@Qualifier("securityManager")DefaultWebSecurit
yManager securityManager){
    ShiroFilterFactoryBean shiroFilterFactoryBean = new
ShiroFilterFactoryBean();
    //设置安全管理器
    shiroFilterFactoryBean.setSecurityManager(securityManager);
    /*
        添加Shiro内置过滤器，常用的有如下过滤器：
            anon： 无需认证就可以访问
            authc： 必须认证才可以访问
            user： 如果使用了记住我功能就可以直接访问
            perms： 拥有某个资源权限才可以访问
            role： 拥有某个角色权限才可以访问
     */
    Map<String,String> filterMap = new LinkedHashMap<String, String>();
    filterMap.put("/user/add","authc");
    filterMap.put("/user/update","authc");
    shiroFilterFactoryBean.setFilterChainDefinitionMap(filterMap);


    return shiroFilterFactoryBean;
}
```

6. 再起启动测试，访问链接进行测试！拦截OK！但是发现，点击后会跳转到一个Login.jsp页面，这个不是我们想要的效果，我们需要自己定义一个Login页面！
7. 我们编写一个自己的Login页面

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>登录页面</title>
</head>
<body>

<h1>登录页面</h1>
```

```html
<hr>

<form action="">
    <p>
        用户名： <input type="text" name="username">
    </p>
    <p>
        密码： <input type="text" name="password">
    </p>
    <p>
        <input type="submit">
    </p>
</form>

</body>
</html>
```

8. 编写跳转的controller

```java
@RequestMapping("/toLogin")
public String toLogin(){
    return "login";
}
```

9. 在shiro中配置一下！ `ShiroFilterFactoryBean() 方法下面`

```java
//修改到要跳转的login页面；
shiroFilterFactoryBean.setLoginUrl("/toLogin");
```

10. 再次测试，成功的跳转到了我们指定的Login页面！
11. 优化一下代码，我们这里的拦截可以使用 通配符来操作

```java
Map<String,String> filterMap = new LinkedHashMap<String, String>();
//filterMap.put("/user/add","authc");
//filterMap.put("/user/update","authc");
filterMap.put("/user/*","authc");
shiroFilterFactoryBean.setFilterChainDefinitionMap(filterMap);
```

12. 测试，完全OK！

3.4、登录认证操作

1. 编写一个登录的controller

```java
//登录操作
@RequestMapping("/login")
public String login(String username,String password,Model model){
    //使用shiro，编写认证操作

    //1. 获取Subject
    Subject subject = SecurityUtils.getSubject();
    //2. 封装用户的数据
    UsernamePasswordToken token = new UsernamePasswordToken(username,
password);
    //3. 执行登录的方法，只要没有异常就代表登录成功！
    try {
        subject.login(token); //登录成功！返回首页
        return "index";
    } catch (UnknownAccountException e) { //用户名不存在
        model.addAttribute("msg","用户名不存在");
        return "login";
    } catch (IncorrectCredentialsException e) { //密码错误
        model.addAttribute("msg","密码错误");
        return "login";
    }
}
```

2. 在前端修改对应的信息输出或者请求！

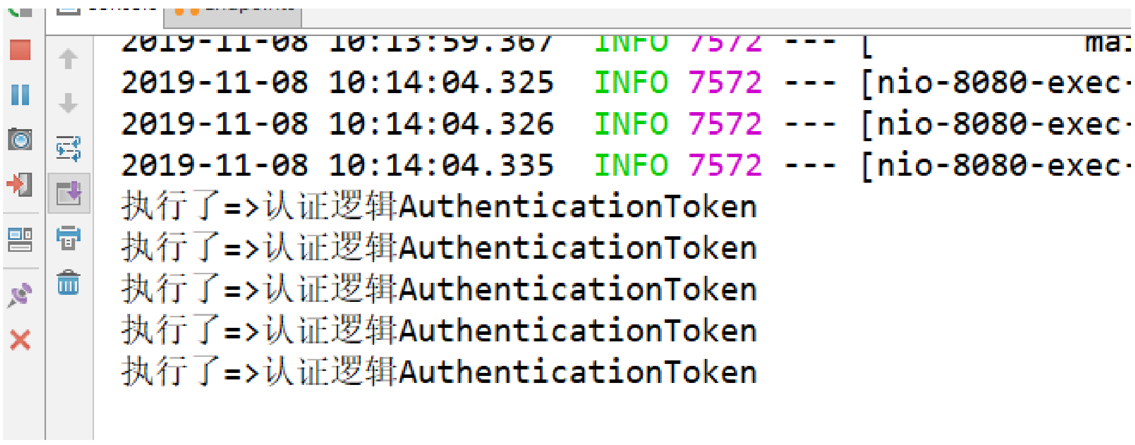
   登录页面增加一个 msg 提示：

```
<p style="color:red;" th:text="${msg}"></p>
```

   给表单增加一个提交地址：

```
<form th:action="@{/login}">
    <p>用户名： <input type="text" name="username"></p>
    <p>密码： <input type="text" name="password"></p>
    <p> <input type="submit"> </p>
</form>
```

3. 理论，假设我们提交了表单，他会经过我们刚才编写的UserRealm，我们提交测试一下



```
2019-11-08 10:13:59.367  INFO 7572 --- [           ma
2019-11-08 10:14:04.325  INFO 7572 --- [nio-8080-exec
2019-11-08 10:14:04.326  INFO 7572 --- [nio-8080-exec
2019-11-08 10:14:04.335  INFO 7572 --- [nio-8080-exec
执行了=>认证逻辑AuthenticationToken
执行了=>认证逻辑AuthenticationToken
执行了=>认证逻辑AuthenticationToken
执行了=>认证逻辑AuthenticationToken
执行了=>认证逻辑AuthenticationToken
```

   确实执行了我们的认证逻辑！

4. 在 UserRealm 中编写用户认证的判断逻辑

```
//执行认证逻辑
@Override
protected AuthenticationInfo doGetAuthenticationInfo(AuthenticationToken token) throws AuthenticationException {
    System.out.println("执行了=>认证逻辑AuthenticationToken");

    //假设数据库的用户名和密码
    String name = "root";
    String password = "123456";

    //1.判断用户名
    UsernamePasswordToken userToken = (UsernamePasswordToken)token;
    if (!userToken.getUsername().equals(name)){
        //用户名不存在
        return null; //shiro底层就会抛出 UnknownAccountException
    }

    //2. 验证密码,我们可以使用一个AuthenticationInfo实现类SimpleAuthenticationInfo
    //    shiro会自动帮我们验证！重点是第二个参数就是要验证的密码！
    return new SimpleAuthenticationInfo("", password, "");
}

```

5. 测试一下！成功实现登录的认证操作！

3.5、整合数据库

1. 导入Mybatis相关依赖

```xml
<!-- 引入 myBatis，这是 MyBatis官方提供的适配 Spring Boot 的，而不是Spring Boot自己的-->
<dependency>
    <groupId>org.mybatis.spring.boot</groupId>
    <artifactId>mybatis-spring-boot-starter</artifactId>
    <version>2.1.0</version>
</dependency>
<dependency>
    <groupId>mysql</groupId>
    <artifactId>mysql-connector-java</artifactId>
    <scope>runtime</scope>
</dependency>
<!-- https://mvnrepository.com/artifact/log4j/log4j -->
<dependency>
    <groupId>log4j</groupId>
    <artifactId>log4j</artifactId>
    <version>1.2.17</version>
</dependency>
<!-- https://mvnrepository.com/artifact/com.alibaba/druid -->
<dependency>
    <groupId>com.alibaba</groupId>
    <artifactId>druid</artifactId>
    <version>1.1.12</version>
</dependency>
```

2. 编写配置文件-连接配置 `application.yml`

```yaml
spring:
  datasource:
    username: root
    password: 123456
    #?serverTimezone=UTC解决时区的报错
    url: jdbc:mysql://localhost:3306/mybatis?serverTimezone=UTC&useUnicode=true&characterEncoding=utf-8
    driver-class-name: com.mysql.jdbc.Driver
    type: com.alibaba.druid.pool.DruidDataSource

    #Spring Boot 默认是不注入这些属性值的，需要自己绑定
    #druid 数据源专有配置
    initialSize: 5
    minIdle: 5
    maxActive: 20
    maxWait: 60000
    timeBetweenEvictionRunsMillis: 60000
    minEvictableIdleTimeMillis: 300000
    validationQuery: SELECT 1 FROM DUAL
    testWhileIdle: true
    testOnBorrow: false
    testOnReturn: false
    poolPreparedStatements: true

    #配置监控统计拦截的filters，stat:监控统计、log4j：日志记录、wall：防御sql注入
    #如果允许时报错  java.lang.ClassNotFoundException: org.apache.log4j.Priority
    #则导入 log4j 依赖即可，Maven 地址：https://mvnrepository.com/artifact/log4j/log4j
    filters: stat,wall,log4j
    maxPoolPreparedStatementPerConnectionSize: 20
    useGlobalDataSourceStat: true
    connectionProperties: druid.stat.mergeSql=true;druid.stat.slowSqlMillis=500
```

3. 编写mybatis的配置 `application.properties`

```
#别名配置
mybatis.type-aliases-package=com.kuang.pojo
mybatis.mapper-locations=classpath:mapper/*.xml
```

4. 编写实体类,引入Lombok

```
<dependency>
    <groupId>org.projectlombok</groupId>
    <artifactId>lombok</artifactId>
    <version>1.16.10</version>
</dependency>
```

```
package com.kuang.pojo;

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

@Data
@AllArgsConstructor
@NoArgsConstructor
public class User {

    private int id;
    private String name;
    private String pwd;

}
```

5. 编写Mapper接口

```java
@Repository
@Mapper
public interface UserMapper {

    public User queryUserByName(String name);

}
```

6. 编写Mapper配置文件

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE mapper
        PUBLIC "-//mybatis.org//DTD Mapper 3.0//EN"
        "http://mybatis.org/dtd/mybatis-3-mapper.dtd">

<mapper namespace="com.kuang.mapper.UserMapper">

    <select id="queryUserByName" parameterType="String"
resultType="User">
    select * from user where name = #{name}
</select>

</mapper>
```

7. 编写UserService 层

```java
public interface UserService {

    public User queryUserByName(String name);
}
```

```java
package com.kuang.service;

import com.kuang.mapper.UserMapper;
import com.kuang.pojo.User;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.stereotype.Service;

@Service
public class UserServiceImpl implements UserService {

    @Autowired
    UserMapper userMapper;

    @Override
    public User queryUserByName(String name) {
        return userMapper.queryUserByName(name);
    }
}
```

8. 好了，一口气写了这些常规操作，可以去测试一下了，保证能够从数据库中查询出来

```java
class Shiro02SpringbootApplicationTests {

    @Autowired
    UserServiceImpl userService;

    @Test
    void contextLoads() {
        User user = userService.queryUserByName("root");
        System.out.println(user);
    }

}
```

完全OK，成功查询出来了！

9. 改造UserRealm，连接到数据库进行真实的操作！

```java
//自定义Realm
public class UserRealm extends AuthorizingRealm {

    @Autowired
    UserService userService;

    //执行授权逻辑
    @Override
    protected AuthorizationInfo
doGetAuthorizationInfo(PrincipalCollection principals) {
        System.out.println("执行了=>授权逻辑PrincipalCollection");
        return null;
    }

    //执行认证逻辑
    @Override
    protected AuthenticationInfo
doGetAuthenticationInfo(AuthenticationToken token) throws
AuthenticationException {
        System.out.println("执行了=>认证逻辑AuthenticationToken");


        UsernamePasswordToken userToken = (UsernamePasswordToken)token;
        //真实连接数据库
        User user =
userService.queryUserByName(userToken.getUsername());

        if (user==null){
            //用户名不存在
            return null; //shiro底层就会抛出 UnknownAccountException
        }

        return new SimpleAuthenticationInfo("", user.getPwd(), "");
    }

}
```

10. 测试，现在查询都是从数据库查询的了！

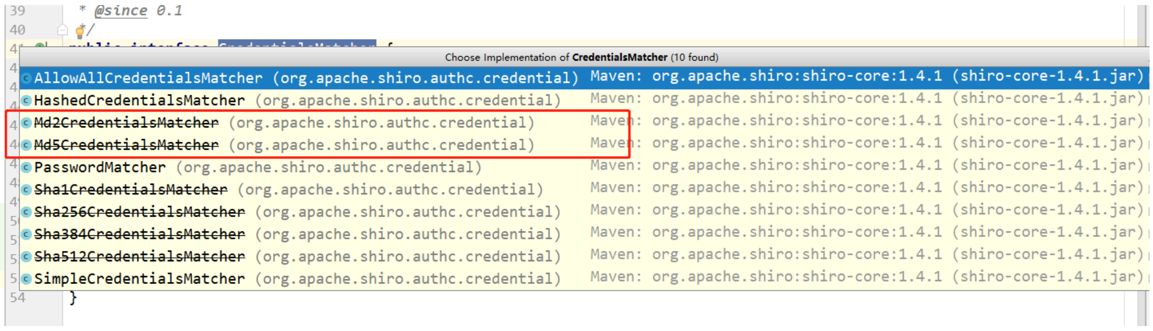
3.5 思考：密码比对原理探究

思考？这个Shiro，是怎么帮我们实现密码自动比对的呢？

我们可以去 realm的父类 `AuthorizingRealm` 的父类 `AuthenticatingRealm` 中找一个方法

核心：`getCredentialsMatcher()` 翻译过来：获取证书匹配器

我们去看这个接口 CredentialsMatcher 有很多的实现类，MD5盐值加密



```
 * @since 0.1
 */
Choose Implementation of CredentialsMatcher (10 found)
AllowAllCredentialsMatcher (org.apache.shiro.authc.credential)  Maven: org.apache.shiro:shiro-core:1.4.1 (shiro-core-1.4.1.jar)
HashedCredentialsMatcher (org.apache.shiro.authc.credential)    Maven: org.apache.shiro:shiro-core:1.4.1 (shiro-core-1.4.1.jar)
~~Md2CredentialsMatcher~~ (org.apache.shiro.authc.credential)   Maven: org.apache.shiro:shiro-core:1.4.1 (shiro-core-1.4.1.jar)
~~Md5CredentialsMatcher~~ (org.apache.shiro.authc.credential)   Maven: org.apache.shiro:shiro-core:1.4.1 (shiro-core-1.4.1.jar)
PasswordMatcher (org.apache.shiro.authc.credential)             Maven: org.apache.shiro:shiro-core:1.4.1 (shiro-core-1.4.1.jar)
~~Sha1CredentialsMatcher~~ (org.apache.shiro.authc.credential)  Maven: org.apache.shiro:shiro-core:1.4.1 (shiro-core-1.4.1.jar)
~~Sha256CredentialsMatcher~~ (org.apache.shiro.authc.credential) Maven: org.apache.shiro:shiro-core:1.4.1 (shiro-core-1.4.1.jar)
~~Sha384CredentialsMatcher~~ (org.apache.shiro.authc.credential) Maven: org.apache.shiro:shiro-core:1.4.1 (shiro-core-1.4.1.jar)
~~Sha512CredentialsMatcher~~ (org.apache.shiro.authc.credential) Maven: org.apache.shiro:shiro-core:1.4.1 (shiro-core-1.4.1.jar)
SimpleCredentialsMatcher (org.apache.shiro.authc.credential)    Maven: org.apache.shiro:shiro-core:1.4.1 (shiro-core-1.4.1.jar)
}
```

我们的密码一般都不能使用明文保存？需要加密处理；思路分析

1. 如何把一个字符串加密为MD5
2. 替换当前的Realm 的 CredentialsMatcher 属性，直接使用 `Md5CredentialsMatcher` 对象，并设置加密算法

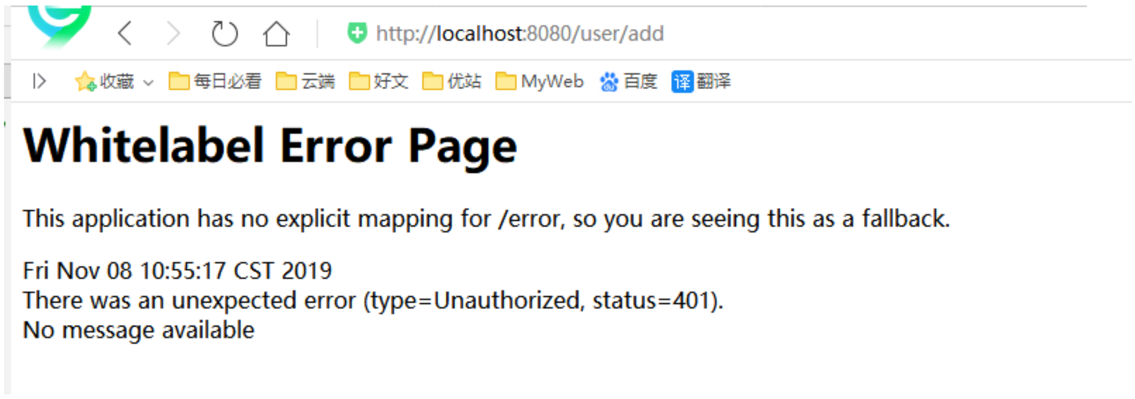
3.6、用户授权操作

使用shiro的过滤器来拦截请求即可！

1. 在 `ShiroFilterFactoryBean` 中添加一个过滤器

```
//授权过滤器
filterMap.put("/user/add","perms[user:add]"); //大家记得注意顺序！
```

2. 我们再次启动测试一下，访问add，发现以下错误！未授权错误！



Whitelabel Error Page

This application has no explicit mapping for /error, so you are seeing this as a fallback.

Fri Nov 08 10:55:17 CST 2019
There was an unexpected error (type=Unauthorized, status=401).
No message available

3. 注意：当我们实现权限拦截后，shiro会自动跳转到未授权的页面，但我们没有这个页面，所有401了
4. 配置一个未授权的提示的页面，增加一个controller提示

```java
@RequestMapping("/noauth")
@ResponseBody
public String noAuth(){
    return "未经授权不能访问此页面";
}
```

然后再 `shiroFilterFactoryBean` 中配置一个未授权的请求页面！

```java
shiroFilterFactoryBean.setUnauthorizedUrl("/noauth");
```

5. 测试，现在没有授权，可以跳转到我们指定的位置了！

3.7、Shiro授权

在UserRealm 中添加授权的逻辑，增加授权的字符串！

```java
//执行授权逻辑
@Override
protected AuthorizationInfo doGetAuthorizationInfo(PrincipalCollection principals) {
    System.out.println("执行了=>授权逻辑PrincipalCollection");

    //给资源进行授权
    SimpleAuthorizationInfo info = new SimpleAuthorizationInfo();
    //添加资源的授权字符串
    info.addStringPermission("user:add");

    return info;
}
```

我们再次登录测试，发现登录的用户是可以进行访问add 页面了！授权成功！

问题，我们现在完全是硬编码，无论是谁登录上来，都可以实现授权通过，但是真实的业务情况应该是，每个用户拥有自己的一些权限，从而进行操作，所以说，权限，应该在用户的数据库中，正常的情况下，应该数据库中是由一个权限表的，我们需要联表查询，但是这里为了大家操作理解方便一些，我们直接在数据库表中增加一个字段来进行操作！

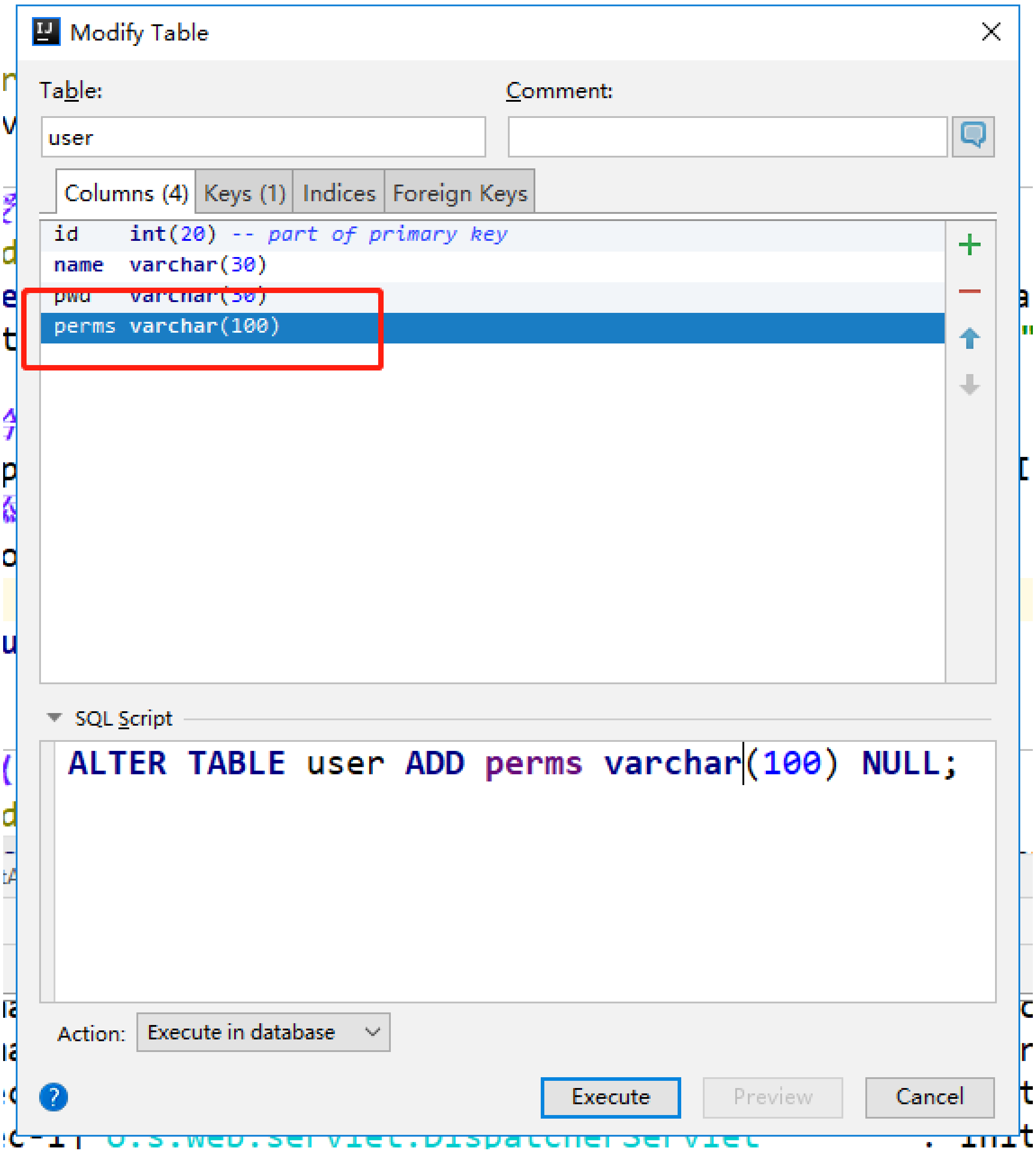


Table: user

```
id    int(20) -- part of primary key
name  varchar(30)
pwd   varchar(30)
perms varchar(100)
```

```
ALTER TABLE user ADD perms varchar(100) NULL;
```

Action: Execute in database

1. 修改实体类，增加一个字段

```
@Data
@AllArgsConstructor
@NoArgsConstructor
public class User {

    private int id;
    private String name;
    private String pwd;
    private String perms;

}
```

2. 我们现在需要再自定义的授权认证中，获取登录的用户，从而实现动态认证授权操作！
    - 在用户登录授权的时候，将用户放在 Principal 中，改造下之前的代码

```
return new SimpleAuthenticationInfo(user, user.getPwd(), "");
```

- 然后再授权的地方获得这个用户，从而获得它的权限

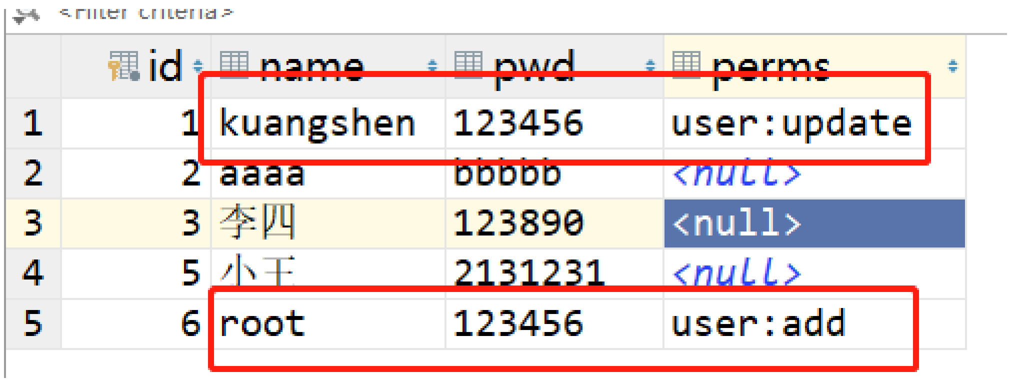
```java
//执行授权逻辑
@Override
protected AuthorizationInfo doGetAuthorizationInfo(PrincipalCollection principals) {
    System.out.println("执行了=>授权逻辑PrincipalCollection");

    //给资源进行授权
    SimpleAuthorizationInfo info = new SimpleAuthorizationInfo();
    //添加资源的授权字符串
    //info.addStringPermission("user:add");

    Subject subject =  SecurityUtils.getSubject(); //获得当前对象
    User currentUser = (User) subject.getPrincipal(); //拿到User对象

    info.addStringPermission(currentUser.getPerms()); //设置权限
    return info;
}
```

3. 我们给数据库中的用户增加一些权限



	id	name	pwd	perms
1	1	kuangshen	123456	user:update
2	2	aaaa	bbbbb	<null>
3	3	李四	123890	<null>
4	5	小王	2131231	<null>
5	6	root	123456	user:add

4. 在过滤器中，将 update 请求也进行权限拦截下

```java
//授权过滤器
filterMap.put("/user/add","perms[user:add]");
filterMap.put("/user/update","perms[user:update]");
```

5. 我们启动项目，登录不同的账户，进行测试一下！
6. 测试完美通过OK！

3.8、整合Thymeleaf

根据权限展示不同的前端页面

1. 添加Maven的依赖；

```xml
<!--
https://mvnrepository.com/artifact/com.github.theborakompanioni/thymeleaf-extras-shiro -->
<dependency>
    <groupId>com.github.theborakompanioni</groupId>
    <artifactId>thymeleaf-extras-shiro</artifactId>
    <version>2.0.0</version>
</dependency>
```

2. 配置一个shiro的Dialect，在shiro的配置中增加一个Bean

```java
//配置ShiroDialect：方言，用于 thymeleaf 和 shiro 标签配合使用
@Bean
public ShiroDialect getShiroDialect(){
    return new ShiroDialect();
}
```

3. 修改前端的配置

```html
<div shiro:hasPermission="user:add">
    <a th:href="@{/user/add}">add</a>
</div>


<div shiro:hasPermission="user:update">
    <a th:href="@{/user/update}">update</a>
</div>
```

4. 我们在去测试一下，可以发现，现在首页什么都没有了，因为我们没有登录，我们可以尝试登录下，来判断这个Shiro的效果！登录后，可以看到不同的用户，有不同的效果，现在就已经接近完美了~！还不是最完美
5. 为了完美，我们在用户登录后应该把信息放到Session中，我们完善下！在执行认证逻辑时候，加入session

```java
Subject subject =  SecurityUtils.getSubject();
subject.getSession().setAttribute("loginUser",user);
```

6. 前端从session中获取，然后用来判断是否显示登录

```html
<p th:if="${session.loginUser==null}">
    <a th:href="@{/toLogin}">登录</a>
</p>
```

7. 测试，效果完美~

3.9、小结

今天花了一天时间给大家讲解了SpringSecurity 和 Shiro 两个安全的框架，主要是想让大家多一些思路，其实什么都不用，我们靠拦截器也可以实现这些功能对吧，但是可能需要花费大量的时间和代码，还有就是Bug多，思考不全，而现在，我们两个框架都会使用了，也给大家对比的进行学习了，当然真实的工作中，可能代码会更加的复杂。需要大家在工作中再多去练习和使用，将这些框架可以运用到自己的项目中才是王道，不然学了也是白学对吧，几天就忘记了，没有什么用，关于底层的实现原理，也希望大家下去可以多看源码学习，后面的学习中已经带大家看了很多源码了，希望大家能够自己多去总结和吸收！