Step Up Authentication

Overview

Resources can be protected by several security checks. In this case, the MobileFirst Server sends all the relevant challenges simultaneously to the application.

A security check can be dependent on another security check. Therefore, it is important to be able to control when the challenges are sent.
For example, this tutorial describes an application that has two resources protected by a user name and password, where the second resource also requires an additional PIN code.

Prerequisite: Read the CredentialsValidationSecurityCheck (../credentials-validation) and UserAuthenticationSecurityCheck (../user-authentication) tutorials before continuing.

Jump to:

Referencing a Security Check

Create two security checks: `StepUpPinCode` and `StepUpUserLogin`. Their initial implementation is the same as the implementation described in the Credentials Validation (../credentials-validation/security-check/) and User Authentication (../user-authentication/security-check/) tutorials.

In this example, `StepUpPinCode` **depends on** `StepUpUserLogin`. The user should be asked to enter a PIN code only after a successful login to `StepUpUserLogin`. For this purpose, `StepUpPinCode` must be able to **reference** the `StepUpUserLogin` class.

The MobileFirst Foundation framework provides an annotation to inject a reference.
In your `StepUpPinCode` class, at the class level, add:

```
@SecurityCheckReference
private transient StepUpUserLogin userLogin;
```

> **Important:** Both security check implementations need to be bundled inside the same adapter.

To resolve this reference, the framework looks up for a security check with the appropriate class, and injects its reference into the dependent security check.
If there are more than one security check of the same class, the annotation has an optional `name` parameter, which you can use to specify the unique name of the referred check.

State machine

All classes that extend `CredentialsValidationSecurityCheck` (which includes both `StepUpPinCode` and `StepUpUserLogin`) inherit a simple state machine. At any given moment, the security check can be in one of these states:

- `STATE_ATTEMPTING`: A challenge has been sent and the security check is waiting for the client response. The attempt count is maintained during this state.
- `STATE_SUCCESS`: The credentials have been successfully validated.
- `STATE_BLOCKED`: The maximum number of attempts has been reached and the check is in locked state.

The current state can be obtained using the inherited `getState()` method.

In `StepUpUserLogin`, add a convenience method to check whether the user is currently logged-in. This method is used later in the tutorial.

```
public boolean isLoggedIn(){
    return this.getState().equals(STATE_SUCCESS);
}
```

The Authorize Method

The `SecurityCheck` interface defines a method called `authorize`. This method is responsible for implementing the main logic of the security check, such as sending a challenge or validating the request. The class `CredentialsValidationSecurityCheck`, which `StepUpPinCode` extends, already includes an implementation for this method. However, in this case, the goal is to check the state of `StepUpUserLogin` before starting the default behavior of the `authorize` method.

To do so, **override** the `authorize` method:

```
@Override
public void authorize(Set<String> scope, Map<String, Object> credentials, Http
ServletRequest request, AuthorizationResponse response) {
    if(userLogin.isLoggedIn()){
        super.authorize(scope, credentials, request, response);
    }
}
```

This implementation checks the current state of the `StepUpUserLogin` reference:

- If the state is `STATE_SUCCESS` (the user is logged in), the normal flow of the security check continues.
- If `StepUpUserLogin` is in any other state, nothing is done: no challenge is sent, neither success nor failure.

Assuming the resource is protected by **both** `StepUpPinCode` and `StepUpUserLogin`, this flow makes sure that the user is logged in before being prompted for the secondary credential (PIN code). The client never receives both challenges at the same time, even though both security checks are activated.

Alternatively, if the resource is protected **only** by `StepUpPinCode` (the framework will activate only this security check), you can change the `authorize` implementation to trigger `StepUpUserLogin` manually:

```
@Override
public void authorize(Set<String> scope, Map<String, Object> credentials, Http
ServletRequest request, AuthorizationResponse response) {
    if(userLogin.isLoggedIn()){
        //If StepUpUserLogin is successful, continue the normal processing of Ste
pUpPinCode
        super.authorize(scope, credentials, request, response);
    } else {
        //In any other case, process StepUpUserLogin instead.
        userLogin.authorize(scope, credentials, request, response);
    }
}
```

Retrieve current user

In the `StepUpPinCode` security check, you are interested in knowing the current user's ID so that you can look up this user's PIN code in some database.

In the `StepUpUserLogin` security check, add the following method to obtain the current user from the **authorization context**:

```
public AuthenticatedUser getUser(){
    return authorizationContext.getActiveUser();
}
```

In `StepUpPinCode`, you can then use the `userLogin.getUser()` method to get the current user from the `StepUpUserLogin` security check, and check the valid PIN code for this specific user:

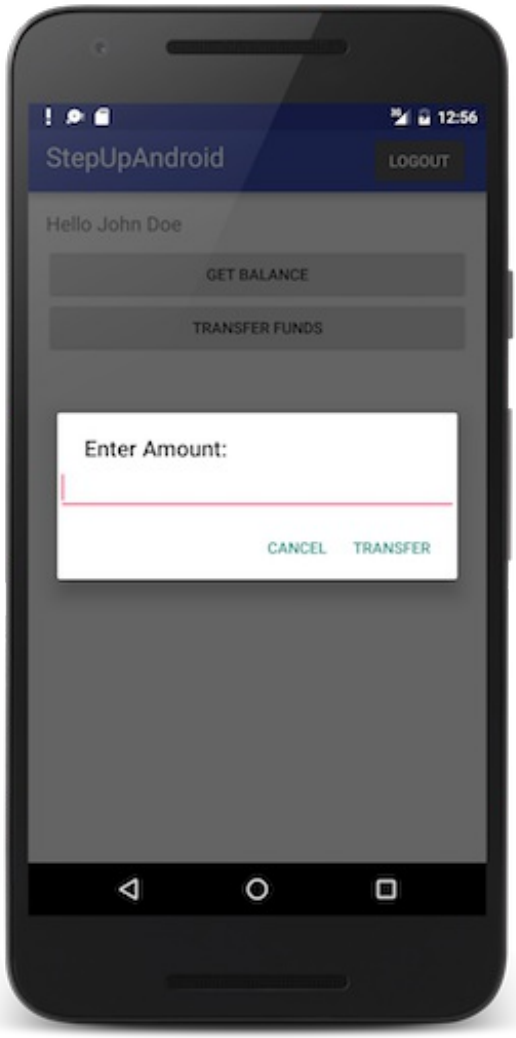
```
@Override
protected boolean validateCredentials(Map<String, Object> credentials) {
    //Get the correct PIN code from the database
    User user = userManager.getUser(userLogin.getUser().getId());

    if(credentials!=null && credentials.containsKey(PINCODE_FIELD)){
        String pinCode = credentials.get(PINCODE_FIELD).toString();

        if(pinCode.equals(user.getPinCode())){
            errorMsg = null;
            return true;
        }
        else{
            errorMsg = "Wrong credentials. Hint: " + user.getPinCode();
        }
    }
    return false;
}
```

Challenge Handlers

On the client side, there are no special APIs to handle multiple steps. Rather, each challenge handler handles its own challenge. In this example, you must register two separate challenge handlers: one to handle challenges from `StepUpUserLogin` and one to handle challenges from `StepUpPincode`.

Sample Applications

Security check



The `StepUpUserLogin` and `StepUpPinCode` security checks are available in the SecurityChecks project under the StepUp Maven project. Click to download (https://github.com/MobileFirst-Platform-Developer-Center/SecurityCheckAdapters/tree/release80) the Security Checks Maven project.

Applications

Sample applications are available for iOS (Swift), Android, Windows 8.1/10, Cordova, and Web.

- Click to download (https://github.com/MobileFirst-Platform-Developer-Center/StepUpCordova/tree/release80) the Cordova project.
- Click to download (https://github.com/MobileFirst-Platform-Developer-Center/StepUpSwift/tree/release80) the iOS Swift project.
- Click to download (https://github.com/MobileFirst-Platform-Developer-Center/StepUpAndroid/tree/release80) the Android project.
- Click to download (https://github.com/MobileFirst-Platform-Developer-Center/StepUpWin8/tree/release80) the Windows 8.1 project.
- Click to download (https://github.com/MobileFirst-Platform-Developer-Center/StepUpWin10/tree/release80) the Windows 10 project.
- Click to download (https://github.com/MobileFirst-Platform-Developer-Center/StepUpWeb/tree/release80) the Web app project.

Sample usage

Follow the sample's README.md file for instructions.

Last modified on November 20, 2016