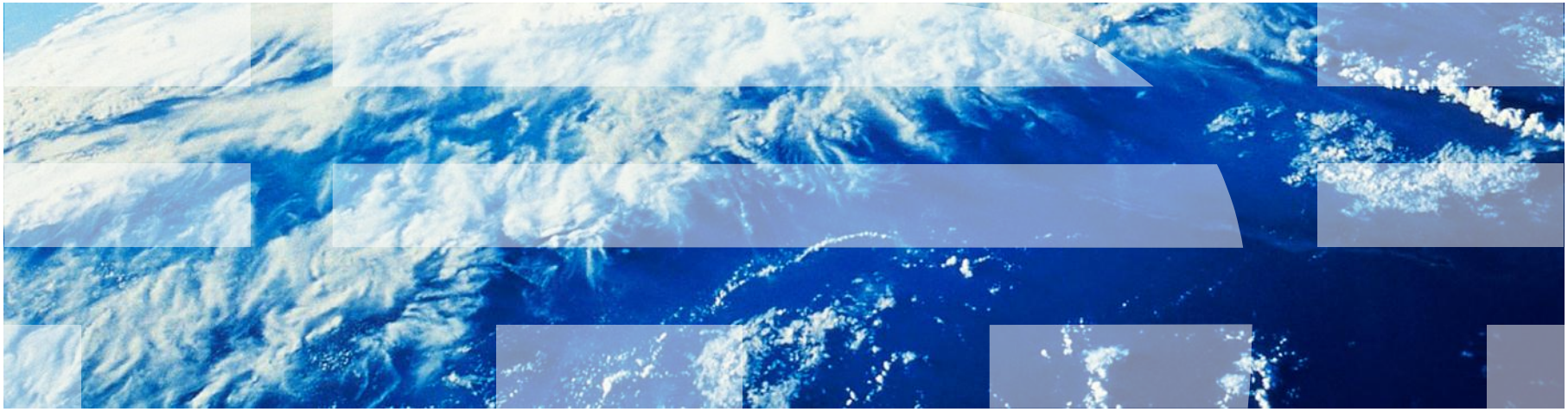
IBM Worklight Foundation V6.2.0 Getting Started

Adapter-based authentication in hybrid applications



20 June 2014

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Agenda

- Introduction to adapter-based authentication
- Configuring the authenticationConfig.xml file
- Creating the server-side authentication components
- Creating the client-side authentication components
- Examining the result
- Exercise
- Quiz

Introduction to adapter-based authentication

- Adapter-based authentication is the most flexible type of authentication to implement and contains all the benefits of the Worklight® Server authentication framework.
- When you use adapter-based authentication, you can implement the entire authentication logic, including validation of the credentials, an adapter by using plain JavaScript™.
- Nevertheless, you can also use any login module as an extra authentication layer.
- In this module, you implement an adapter-based authentication mechanism that relies on a user name and a password.

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Configuring the authenticationConfig.xml file

- Add two authentication realms to the `<realms>` section of the **authenticationConfig.xml** file.

```
<realm loginModule="AuthLoginModule" name="SingleStepAuthRealm">
    <className>com.worklight.integration.auth.AdapterAuthenticator</className>
    <parameter name="login-function" value="SingleStepAuthAdapter.onAuthRequired"/>
    <parameter name="logout-function" value="SingleStepAuthAdapter.onLogout"/>
</realm>
<realm loginModule="AuthLoginModule" name="DoubleStepAuthRealm">
    <className>com.worklight.integration.auth.AdapterAuthenticator</className>
    <parameter name="login-function" value="DoubleStepAuthAdapter.onAuthRequired"/>
    <parameter name="logout-function" value="DoubleStepAuthAdapter.onLogout"/>
</realm>
```

- These realms use the `AuthLoginModule` login module, which is defined later.

Configuring the authenticationConfig.xml file

- Add two authentication realms to the `<realms>` section of the **authenticationConfig.xml** file.

```
<realm loginModule="AuthLoginModule" name="SingleStepAuthRealm">
    <className>com.worklight.integration.auth.AdapterAuthenticator</className>
    <parameter name="login-function" value="SingleStepAuthAdapter.onAuthRequired"/>
    <parameter name="logout-function" value="SingleStepAuthAdapter.onLogout"/>
</realm>
<realm loginModule="AuthLoginModule" name="DoubleStepAuthRealm">
    <className>com.worklight.integration.auth.AdapterAuthenticator</className>
    <parameter name="login-function" value="DoubleStepAuthAdapter.onAuthRequired"/>
    <parameter name="logout-function" value="DoubleStepAuthAdapter.onLogout"/>
</realm>
```

- Using the `com.worklight.integration.auth.AdapterAuthenticator` class means that the server-side part of the authenticator is defined in the adapter.

Configuring the authenticationConfig.xml file

- Add two authentication realms to the `<realms>` section of the **authenticationConfig.xml** file.

```
<realm loginModule="AuthLoginModule" name="SingleStepAuthRealm">
    <className>com.worklight.integration.auth.AdapterAuthenticator</className>
    <parameter name="login-function" value="SingleStepAuthAdapter.onAuthRequired"/>
    <parameter name="logout-function" value="SingleStepAuthAdapter.onLogout"/>
</realm>
<realm loginModule="AuthLoginModule" name="DoubleStepAuthRealm">
    <className>com.worklight.integration.auth.AdapterAuthenticator</className>
    <parameter name="login-function" value="DoubleStepAuthAdapter.onAuthRequired"/>
    <parameter name="logout-function" value="DoubleStepAuthAdapter.onLogout"/>
</realm>
```

- Whenever the Worklight authentication framework detects an attempt to access a protected resource, an adapter function that is defined in a **login-function parameter** is called automatically.
- When logout is detected (explicit or session timeout), a **logout-function** is called automatically.
- In both cases, the parameter value syntax is `adapterName.functionName`.

Configuring the authenticationConfig.xml file

- Add a login module to the `<loginModules>` section of the **authenticationConfig.xml** file and call it `AuthLoginModule`.

```
<loginModule name="AuthLoginModule">
    <className>com.worklight.core.auth.ext.NonValidatingLoginModule</className>
</loginModule>
```

- Using a `NonValidatingLoginModule` class name means that no additional validation is performed by the Worklight platform, and the developer takes responsibility for the validation of credentials within the adapter.
- Because all authentication-related actions are done in the adapter code, using `NonValidatingLoginModule` is mandatory for adapter-based authentication.

Configuring the authenticationConfig.xml file

- Add security tests to the `<securityTests>` section of the **authenticationConfig.xml** file.
- You must use this security test to protect the adapter procedure, so use the `<customSecurityTest>` element.

```
<customSecurityTest name="SingleStepAuthAdapter-securityTest">
    <test isInternalUserID="true" realm="SingleStepAuthRealm"/>
</customSecurityTest>
<customSecurityTest name="DoubleStepAuthAdapter-securityTest">
    <test isInternalUserID="true" realm="DoubleStepAuthRealm"/>
</customSecurityTest>
```

- Remember the security test names. You must use them in subsequent slides.

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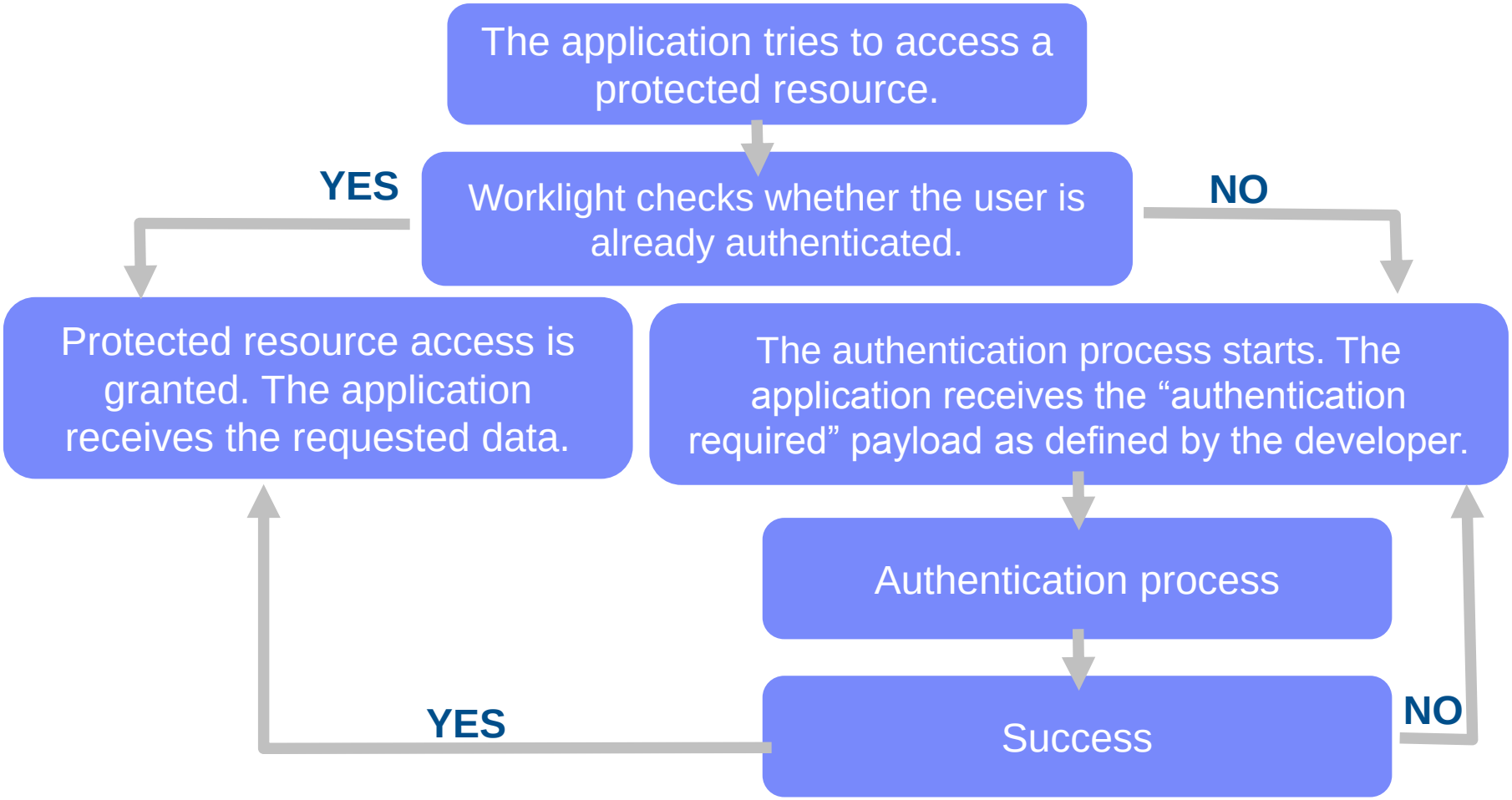
Creating the server-side authentication components

- The following diagram illustrates the adapter-based authentication process:



Creating the server-side authentication components

- The sample that is provided with this training module uses two applications and two adapters. The next slides focus on the SingleStepAuth application and adapter. The DoubleStepAuth application and adapter are just an extension of the same technique.
- Create an adapter that takes care of the authentication process. Name it **SingleStepAuthAdapter.**
- **SingleStepAuthAdapter** includes the following two procedures:

```
<procedure name="submitAuthentication"/>

<procedure name="getSecretData" securityTest="AdapterSecurityTest"/>
```

- The `submitAuthentication` procedure takes care of the authentication process and authentication is not required to call it.
- The second procedure, however, is available to authenticated users only.

Creating the server-side authentication components

- The following diagram shows the flow to implement:

Creating the server-side authentication components

- Whenever the Worklight framework detects an unauthenticated attempt to access a protected resource, the `onAuthRequired` function is called, as defined in the **authenticationConfig.xml** file).

```
function onAuthRequired(headers, errorMessage){
    errorMessage = errorMessage ? errorMessage : null;
    return {
        authRequired: true,
        errorMessage: errorMessage
    };
}
```

This object is a **custom** challenge object that is sent to the application.

- This function receives the response headers and an optional `errorMessage` parameter. The object that is returned by this function is sent to the client application.
- Note the `authRequired: true` property. You use this property in a challenge handler to detect that the server is requesting authentication.

Creating the server-side authentication components

- The `submitAuthentication` function is called by a client application to validate the user name and password.

```
function submitAuthentication(username, password){
    if (username==="worklight" && password === "worklight"){

        var userIdentity = {
                userId: username,
                displayName: username,
                attributes: {
                    foo: "bar"
                }
        };

        WL.Server.setActiveUser("SingleStepAuthRealm", userIdentity);

        return {
            authRequired: false
        };
    }

    return onAuthRequired(null, "Invalid login credentials");
}
```

The user name and password are received from the application as parameters.

Creating the server-side authentication components

- The `submitAuthentication` function is called by a client application to validate the user name and password.

```
function submitAuthentication(username, password){
    if (username==="worklight" && password === "worklight"){

        var userIdentity = {
                userId: username,
                displayName: username,
                attributes: {
                    foo: "bar"
                }
        };

        WL.Server.setActiveUser("SingleStepAuthRealm", userIdentity);

        return {
            authRequired: false
        };
    }

    return onAuthRequired(null, "Invalid login credentials");
}
```

In this sample, the credentials are validated against some hardcoded values, but any other validation mode is valid, for example by using SQL or web services.

Creating the server-side authentication components

- The `submitAuthentication` function is called by a client application to validate the user name and password.

```
function submitAuthentication(username, password){
    if (username==="worklight" && password === "worklight"){

        var userIdentity = {
                userId: username,
                displayName: username,
                attributes: {
                    foo: "bar"
                }
        };

        WL.Server.setActiveUser("SingleStepAuthRealm", userIdentity);

        return {
            authRequired: false
        };
    }

    return onAuthRequired(null, "Invalid login credentials");
}
```

If the validation passed successfully, the WL.Server.setActiveUser method is called to create an authenticated session for the SingleStepAuthRealm, with user data stored in a userIdentity object. You can add your own custom properties to the user identity attributes.

Creating the server-side authentication components

- The `submitAuthentication` function is called by a client application to validate the user name and password.

```
function submitAuthentication(username, password){
    if (username==="worklight" && password === "worklight"){

        var userIdentity = {
                userId: username,
                displayName: username,
                attributes: {
                    foo: "bar"
                }
        };

        WL.Server.setActiveUser("SingleStepAuthRealm", userIdentity);

        return {
            authRequired: false
        };
    }

    return onAuthRequired(null, "Invalid login credentials");
}
```

An object is sent to the application, stating that the authentication screen is no longer required.

Creating the server-side authentication components

- The `submitAuthentication` function is called by a client application to validate the user name and password.

```
function submitAuthentication(username, password){
    if (username==="worklight" && password === "worklight"){

        var userIdentity = {
                userId: username,
                displayName: username,
                attributes: {
                    foo: "bar"
                }
        };

        WL.Server.setActiveUser("SingleStepAuthRealm", userIdentity);

        return {
            authRequired: false
        };
    }

    return onAuthRequired(null, "Invalid login credentials");
}
```

If the credentials validation fails, an object that is built by the onAuthRequired function is returned to the application with a suitable error message.

Creating the server-side authentication components

- For training purposes, the `getSecretData` function returns a hardcoded value. Keep in mind that `getSecretData` is protected by a security test, as defined in the adapter XML.
- The `onLogout` function is defined in the **authenticationConfig.xml** file to be called automatically on logout, for example to perform a cleanup.

```
function getSecretData(){
    return {
        secretData: "A very very very very secret data"
    };
}

function onLogout(){
    WL.Logger.debug("Logged out");
}
```

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Creating the client-side authentication components

- Create a Worklight application.
- The application consists of two main `<div>` elements:
  - The **`<div id="AppDiv">`** element is used to display the application content.
  - The **`<div id="AuthDiv">`** element is used for authentication forms.
- When authentication is required, the application hides the `AppDiv` element and shows the `AuthDiv` element.
- When authentication is complete, it does the opposite.

Creating the client-side authentication components

- Start by creating an `AppDiv` element.
- It has a basic structure and functions:

```
<div id="AppDiv">
    <div class="header">
        <h1>Single Step Adapter Based Authentication</h1>
    </div>
    <input type="button" value="Get secret data" onclick="getSecretData()" />
    <input type="button" value="Logout" onclick="WL.Client.logout('SingleStepAuthRealm', {onSuccess:WL.Client.reloadApp})" />
    <div id="ResponseDiv"></div>
</div>
```

- The buttons are used to call the `getSecretData` procedure and to log out.
- The `<div id="ResponseDiv">` element is used to display the `getSecretData` response.

Creating the client-side authentication components

- The `AuthDiv` element contains the following subelements:

```
<div id="AuthDiv" style="display:none">
    <div class="header">
        <h1>Single Step Adapter Based Authentication</h1>
    </div>
    <p id="AuthInfo"></p>
    <input type="text" placeholder="Enter username" id="AuthUsername"/><br />
    <input type="password" placeholder="Enter password" id="AuthPassword"/><br />
    <input type="button" value="Submit" id="AuthSubmitButton" />
    <input type="button" value="Cancel" id="AuthCancelButton" />
</div>
```

  - `AuthInfo` to display error messages.
  - `AuthUsername` and `AuthPassword` to enter elements.
  - `AuthSubmitButton` and `AuthCancelButton` to submit or cancel the authentication request.
- The `AuthDiv` element is styled as `display:none` because it must not be displayed before authentication is requested by server.

Creating the client-side authentication components

- Finally, create a challenge handler.
- Use the following API to create this handler and implement its functionality.

```
var singleStepAuthRealmChallengeHandler = WL.Client.createChallengeHandler("SingleStepAuthRealm");

singleStepAuthRealmChallengeHandler.isCustomResponse = function(response) {
    if (!response || !response.responseJSON || response.responseText === null) {
        return false;
    }
    if (typeof(response.responseJSON.authRequired) !== 'undefined'){
        return true;
    } else {
        return false;
    }
};
```

Use the `WL.Client.createChallengeHandler` method to create a challenge handler object. Supply a realm name as a parameter.

Create a challenge handler to define a customized authentication flow. In your challenge handler, do not add code that modifies the user interface when this modification is not related to the authentication flow.

Creating the client-side authentication components

- Finally, create a challenge handler.
- Use the following API to create this handler and implement its functionality.

```
var singleStepAuthRealmChallengeHandler = WL.Client.createChallengeHandler("SingleStepAuthRealm");

singleStepAuthRealmChallengeHandler.isCustomResponse = function(response) {
    if (!response || !response.responseJSON || response.responseText === null) {
        return false;
    }
    if (typeof(response.responseJSON.authRequired) !== 'undefined'){
        return true;
    } else {
        return false;
    }
};
```

The `isCustomResponse` function of the challenge handler is called each time a response is received from the server. That function is used to detect whether the response contains data that is related to this challenge handler.
The function returns `true` or `false`.

Creating the client-side authentication components

- Finally, create a challenge handler.
- Use the following API to create this handler and implement its functionality.

```
singleStepAuthRealmChallengeHandler.handleChallenge = function(response){
    var authRequired = response.responseJSON.authRequired;

    if (authRequired == true){
        $("#AppDiv").hide();
        $("#AuthDiv").show();
        $("#AuthPassword").empty();
        $("#AuthInfo").empty();

        if (response.responseJSON.errorMessage)
            $("#AuthInfo").html(response.responseJSON.errorMessage);

    } else if (authRequired == false){
        $("#AppDiv").show();
        $("#AuthDiv").hide();
        singleStepAuthRealmChallengeHandler.submitSuccess();
    }
};
```

If the `isCustomResponse` function returns `true`, the framework calls the `handleChallenge` function. This function is used to perform required actions, such as hide the application screen or show the login screen.

Creating the client-side authentication components

- Finally, create a challenge handler.
- Use the following API to create this handler and implement its functionality.

```
singleStepAuthRealmChallengeHandler.handleChallenge = function(response){
    var authRequired = response.responseJSON.authRequired;

    if (authRequired == true){
        $("#AppDiv").hide();
        $("#AuthDiv").show();
        $("#AuthPassword").empty();
        $("#AuthInfo").empty();

        if (response.responseJSON.errorMessage)
            $("#AuthInfo").html(response.responseJSON.errorMessage);
    } else if (authRequired == false){
        $("#AppDiv").show();
        $("#AuthDiv").hide();
        singleStepAuthRealmChallengeHandler.submitSuccess();
    }
};
```

If `authRequired` is `true`, it shows the login screen, cleans up the password field, and shows an error message (if applicable).

Creating the client-side authentication components

- Finally, create a challenge handler.
- Use the following API to create this handler and implement its functionality.

```
singleStepAuthRealmChallengeHandler.handleChallenge = function(response){
    var authRequired = response.responseJSON.authRequired;

    if (authRequired == true){
        $("#AppDiv").hide();
        $("#AuthDiv").show();
        $("#AuthPassword").empty();
        $("#AuthInfo").empty();

        if (response.responseJSON.errorMessage)
            $("#AuthInfo").html(response.responseJSON.error

    } else if (authRequired == false){
        $("#AppDiv").show();
        $("#AuthDiv").hide();
        singleStepAuthRealmChallengeHandler.submitSuccess();
    }
};
```

If `authRequired` is `false`, it shows AppDiv, hides AuthDiv, and notifies the Worklight framework that authentication completed successfully.

Creating the client-side authentication components

- In addition to the methods that the developer must implement, the challenge handler contains functionalities that the developer might want to use:
  - The `submitAdapterAuthentication` function is used to send collected credentials to a specific adapter procedure. It has the same signature as the `WL.Client.invokeProcedure` API.
  - The `submitSuccess` function notifies the Worklight framework that the authentication process completed successfully. The Worklight framework then automatically issues the original request that triggered authentication.
  - The `submitFailure` function notifies the Worklight framework that the authentication process completed with failure. The Worklight framework then disposes of the original request that triggered authentication.

**** Note: You must attach each of these functions to its object. For example:*** *`myChallengeHandler.submitSuccess()`*

Creating the client-side authentication components

- Clicking the submit button triggers the function that collects the user name and the password from the HTML input fields and submits them to the adapter.
- Note that the challenge handler uses the `submitAdapterAuthentication` method.

```
$("#AuthSubmitButton").bind('click', function () {
    var username = $("#AuthUsername").val();
    var password = $("#AuthPassword").val();

    var invocationData = {
        adapter : "SingleStepAuthAdapter",
        procedure : "submitAuthentication",
        parameters : [ username, password ]
    };

    singleStepAuthRealmChallengeHandler.submitAdapterAuthentication(invocationData, {});
});
```

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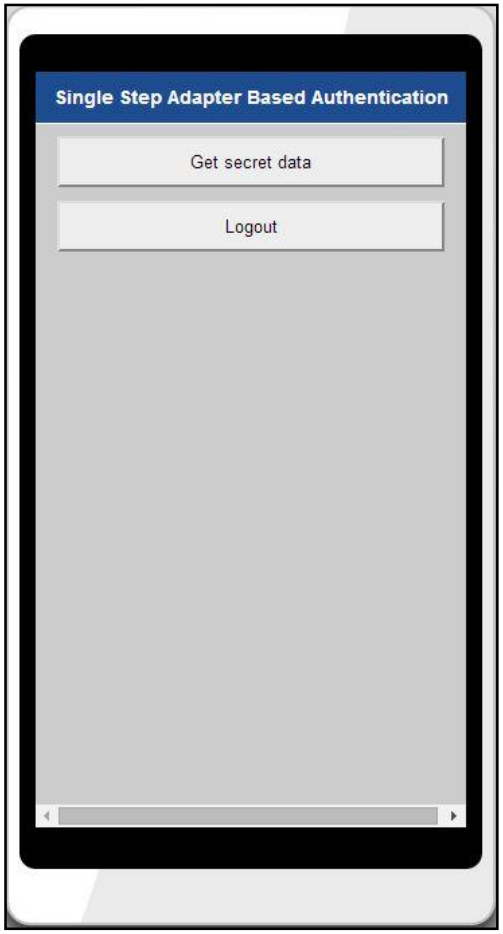
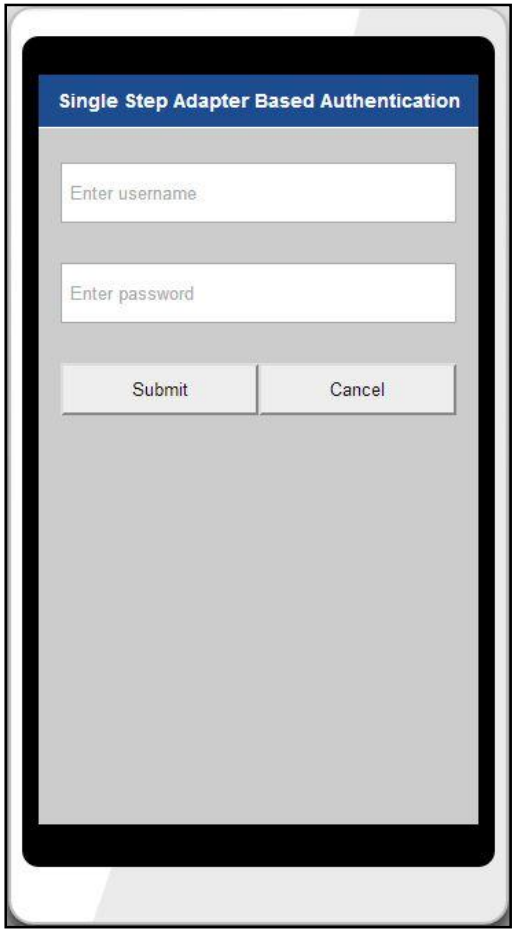
Examining the result





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Exercise

- Implement the adapter authentication as described in this training module.
- You can find the sample for this training module in the **Getting Started** page of the IBM® Worklight ® Foundation sdocumentation website at http://www.ibm.com/mobile-docs.

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Quiz
Test your knowledge – Answers on the next slide

- When you define a realm that uses an adapter-based authentication in the authenticationConfig.xml, which two parameters are mandatory?
  - The login-function, the logout-function.
  - The adapter-name, the realm-name.
  - The adapter-name, the login-function.
  - The login-function, the login-module.
- How can a developer specify which adapter procedures are protected by an authentication realm?
  - When the authentication realm is specified in the adapter XML file, all the adapter procedures are protected by it.
  - The developer does not have to specify it. Authentication credentials are added on the client side when you use WL.Client.invokeProcedure for the procedure to work.
  - By adding a securityTest property to the procedure definition in the adapter XML.
  - You cannot protect the adapter procedures by an authentication realm. The protection is for applications only.
- What client-side mechanism is used to detect that the server requires authentication for the client request?
  - The challengeHandler.isAuthenticationRequired
  - The challengeHandler.isUserAuthenticated
  - The challengeHandler.analyzeServerResponse
  - The challengeHandler.isCustomResponse

Quiz - Answers

- When you define a realm that uses an adapter-based authentication in the authenticationConfig.xml, which two parameters are mandatory?
  - The login-function, the logout-function.
  - The adapter-name, the realm-name.
  - The adapter-name, the login-function.
  - The login-function, the login-module.
- How can a developer specify which adapter procedures are protected by an authentication realm?
  - When the authentication realm is specified in the adapter XML file, all the adapter procedures are protected by it.
  - The developer does not have to specify it. Authentication credentials are added on the client side when you use WL.Client.invokeProcedure for the procedure to work.
  - By adding a securityTest property to the procedure definition in the adapter XML.
  - You cannot protect the adapter procedures by an authentication realm. The protection is for applications only.
- What client side mechanism is used to detect that the server requires authentication for the client request?
  - The challengeHandler.isAuthenticationRequired
  - The challengeHandler.isUserAuthenticated
  - The challengeHandler.analyzeServerResponse
  - The challengeHandler.isCustomResponse

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