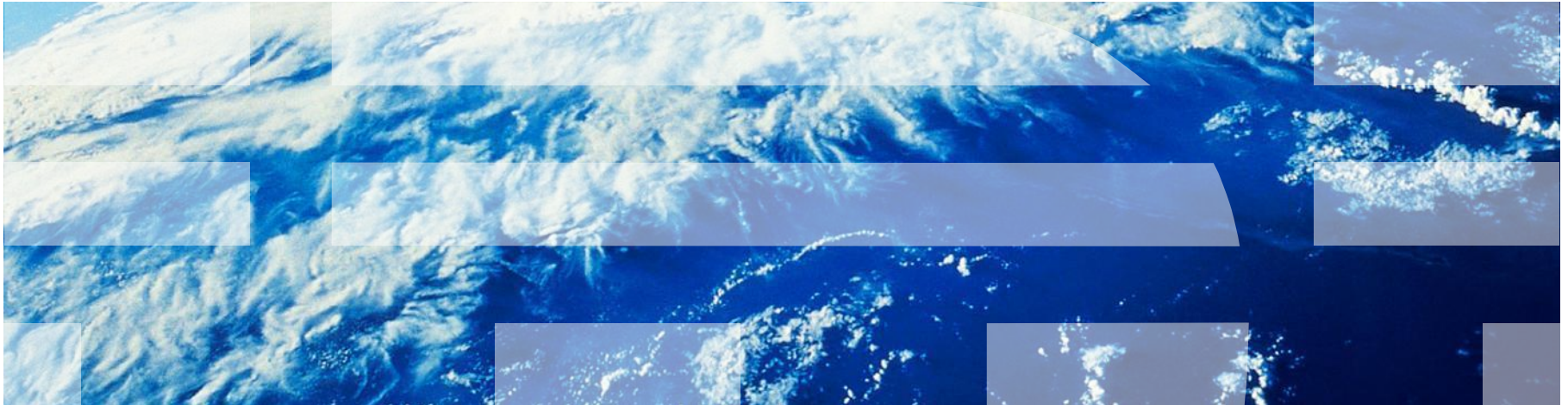


# ***IBM Worklight Foundation V6.2.0 Getting Started***

**Custom authenticator and login module in iOS native applications**



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# Agenda

- Introduction to authentication
- Configuring the authenticationConfig.xml file
- Creating a custom Java authenticator
- Creating a custom Java login module
- Creating client-side authentication components
- Examining the result

# Introduction to authentication (1 of 3)



- The authentication process can be interactive:
  - For example, user name and password
- Or non-interactive:
  - For example, header-based authentication
- This process can involve a single step:
  - For example, a simple user name/password form)
- Or multiple steps:
  - For example, it might have to add a challenge after it issues the first password.
- The definition of the authentication realm includes the class name of an authenticator and a reference to a login module.
- An authenticator is an entity that collects user information.
  - For example, a login form
- A login module is a server entity that validates the retrieved user credentials and builds the user identity.
- You configure authentication settings such as realms, authenticators, and login modules, in the authenticationConfig.xml file that comes with Worklight Server.

An unauthenticated user tries to access the resource that is protected by an authentication realm.

An *authenticator* is called to collect user credentials, that is, the user name and password.

The *Login module* receives the collected credentials and validates them.

If the supplied credentials pass validation, the Login Module creates the *User Identity* object and flags the session as authenticated in a specified realm.

## ***Introduction to authentication (2 of 3)***

- The authenticator, login module, and user identity instances are stored in a session scope. Therefore they exist while the session is alive.
- You can write custom login modules and authenticators when the default ones do not match your requirements.
- In previous modules:
  - You implemented a form-based authentication and used a non-validating login module.
  - You implemented an adapter-based authentication without having to add login modules, and validated credentials manually.
- In some cases, when credentials cannot be validated at adapter level and validation requires more complex code, you can implement an extra login module.
  - For example, when the validation of credentials must be customized for a specific enterprise; or when more information must be retrieved from each client request, such as cookie, header, and user-agent.

## ***Introduction to authentication (3 of 3)***

- This module explains how to create a custom authenticator and a login module:
  - You learn how to implement a custom authenticator that collects the user name and password by using a request to a predefined URL.
  - You learn how to implement a custom login module that checks credentials that are received from the authenticator.
  - You learn how to define a realm that uses your custom authenticator and login module.
  - You learn how to use this realm to protect resources.
- For more information about authentication concepts, see IBM® Worklight ® Foundation user documentation.

# Agenda

- Introduction to authentication
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## Configuring authenticationConfig.xml (1 of 2)

- Add authentication information to the **authenticationConfig.xml** file.
- In the `<realms>` section, define a realm called **CustomAuthenticatorRealm**.
  - Make sure that it uses **CustomLoginModule**.
- Specify **MyCustomAuthenticator** as the class name. You implement it in subsequent slides.

```
<realm name="CustomAuthenticatorRealm" loginModule="CustomLoginModule">  
  <className>com.mypackage.MyCustomAuthenticator</className>  
</realm>  
<realm name="SampleAppRealm" loginModule="StrongoDummy">
```

- In the `<loginModules>` section, add a **loginModule** called **CustomLoginModule**.

```
<loginModule name="CustomLoginModule">  
  <className>com.mypackage.MyCustomLoginModule</className>  
</loginModule>
```

- Specify **MyCustomLoginModule** as the class name; you implement it in subsequent slides.



## Configuring authenticationConfig.xml (2 of 2)

- In the `<securityTests>` section, add a security test.
- Later, you use this security test to protect the adapter procedure. Therefore, use a `<customSecurityTest>` element.

```
<securityTests>
  <customSecurityTest name="CustomAuthSecurityTest">
    <test isInternalUserID="true" realm="CustomAuthenticatorRealm"/>
  </customSecurityTest>
</securityTests>
```

- Remember the security test name, because you use in the next slides.

# Agenda

- Introduction to authentication
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## Creating a custom Java™ authenticator (1 of 21)

- The authenticator API includes the following methods:
  - `void init(Map<String, String> options)`
  - `AuthenticationResult processRequest(HttpServletRequest request, HttpServletResponse response, boolean isAccessToProtectedResource)`
  - `AuthenticationResult processAuthenticationFailure(HttpServletRequest request, HttpServletResponse response, String errorMessage)`
  - `AuthenticationResult processRequestAlreadyAuthenticated(HttpServletRequest request, HttpServletResponse response)`
  - `Map<String, Object> getAuthenticators(HttpServletRequest request)`
  - `Boolean changeResponseOnS(HttpServletRequest request, HttpServletResponse response)`
  - `WorkLightAuthenticator clone(WorkLightAuthenticator authenticator)`

The `init` method of the authenticator is called when the authenticator instance is created. It takes the parameters that are specified in the definition of the realm in the `authenticationConfig.xml` file.

## Creating a custom Java authenticator (2 of 21)

- The authenticator API includes the following methods:
  - void **init**(Map<String, String> options)
  - AuthenticationResult **processRequest**(HttpServletRequest request, HttpServletResponse response, boolean isAccessToProtectedResource)
  - AuthenticationResult **processAuthenticationFailure**(HttpServletRequest request, HttpServletResponse response, String errorMessage)
  - AuthenticationResult **processRequestAlreadyAuthenticated**(HttpServletRequest request, HttpServletResponse response)
  - Map<String, Object> **getAuthenticators**(HttpServletRequest request)
  - Boolean **changeResponseOnSuccessfulAuthentication**(HttpServletRequest request, HttpServletResponse response)
  - WorkLightAuthenticator **clone**(WorkLightAuthenticator authenticator)

The processRequest method is called for each request from an unauthenticated session.

## Creating a custom Java authenticator (3 of 21)

- The authenticator API includes the following methods:
  - void **init**(Map<String, String> options)
  - AuthenticationResult **processRequest**(HttpServletRequest request, HttpServletResponse response, boolean isAccessToProtectedResource)
  - AuthenticationResult **processAuthenticationFailure**(HttpServletRequest request, HttpServletResponse response, String errorMessage)
  - AuthenticationResult **processRequestAlreadyAuthenticated**(HttpServletRequest request, HttpServletResponse response)
  - Map<String, Object> **getAuthenticationData**()
  - Boolean **changeResponseOnSuccess**(HttpServletRequest request, HttpServletResponse response)
  - WorkLightAuthenticator **clone**

The `processAuthenticationFailure` method is called if the login module returns a failure of credentials validation.

## Creating a custom Java authenticator (4 of 21)

- The authenticator API includes the following methods:
  - void **init**(Map<String, String> options)
  - AuthenticationResult **processRequest**(HttpServletRequest request, HttpServletResponse response, boolean isAccessToProtectedResource)
  - AuthenticationResult **processAuthenticationFailure**(HttpServletRequest request, HttpServletResponse response, String errorMessage)
  - AuthenticationResult **processRequestAlreadyAuthenticated**(HttpServletRequest request, HttpServletResponse response)
  - Map<String, Object> **getAuthenticationData**()
  - request, HttpServletResponse
  - WorkLightAuthenticator

The `processRequestAlreadyAuthenticated` method is called for each request from an already authenticated session.

## Creating a custom Java authenticator (5 of 21)

- The authenticator API includes the following methods:

- void **init**(Map<String, String> config)
- AuthenticationResult **process**(HttpServletRequest request, HttpServletResponse response, boolean isAccessToProtectedResource)
- AuthenticationResult **processAuthenticationFailure**(HttpServletRequest request, HttpServletResponse response)
- AuthenticationResult **processRequestAlreadyAuthenticated**(HttpServletRequest request, HttpServletResponse response)
- Map<String, Object> **getAuthenticationData**()
- Boolean **changeResponseOnSuccess**(HttpServletRequest request, HttpServletResponse response)
- WorkLightAuthenticator **clone**()

The `getAuthenticationData` method is used by a login module to get the credentials that are collected by an authenticator.

## Creating a custom Java authenticator (7 of 21)

- The authenticator API includes the following methods:

- void **init**(Map<String, String> configuration)
- AuthenticationResult **process**(HttpServletRequest request, HttpServletResponse response, boolean isAccessToProtectedResource)
- AuthenticationResult **processAuthenticationFailure**(HttpServletRequest request, HttpServletResponse response)
- AuthenticationResult **processRequestAlreadyAuthenticated**(HttpServletRequest request, HttpServletResponse response)
- Map<String, Object> **getAuthenticationData**()
- Boolean **changeResponseOnSuccess**(HttpServletRequest request, HttpServletResponse response)
- WorkLightAuthenticator **clone**()

The `changeResponseOnSuccess` method is called after authentication success. It is used to add data to the response after the authentication is successful.



## Creating a custom Java authenticator (8 of 21)

- The authenticator API includes the following methods:
  - void **init**(Map<String, String> configuration)
  - AuthenticationResult **process**(HttpServletRequest request, HttpServletResponse response, boolean isAccessToProtectedResource)
  - AuthenticationResult **processAuthenticationFailure**(HttpServletRequest request, HttpServletResponse response)
  - AuthenticationResult **processRequestAlreadyAuthenticated**(HttpServletRequest request, HttpServletResponse response)
  - Map<String, Object> **getAuthenticationData**()
  - Boolean **changeResponseOnSuccess**(HttpServletRequest request, HttpServletResponse response)
  - WorkLightAuthenticator **clone**()

The `clone` method is used to create a deep copy of class members.

## Creating a custom Java authenticator (9 of 21)

- Create a **MyCustomAuthenticator** class in the **server\java** folder.
- Make sure that this class implements the **WorkLightAuthenticator** interface.

```
public class MyCustomAuthenticator implements WorkLightAuthenticator {
```

- Add the **authenticationData** map to your authenticator to hold the credentials information.
  - This object is retrieved and used by a login module.

```
private Map<String, Object> authenticationData = null;
```

## *Creating a custom Java authenticator (10 of 21)*

- You must add a dependency on server runtime libraries to use server-related classes, for example, **HttpServletRequest**.
- Right-click your Worklight project and select **Properties**.
- Select **Java Build Path** → **Libraries** and click **Add Library**.
- Select **Server Runtime** and click **Next**.
- You see a list of server runtimes that are installed in your Eclipse.
- Select one and click **Finish**.
- Click **OK**.

## Creating a custom Java authenticator (11 of 21)

- The `init` method is called when the authenticator is created.
- As its parameter, this method takes the map of options that is specified in a realm definition in the **authenticationConfig.xml** file.

```
@Override
public void init(Map<String, String> options) throws MissingConfigurationException {
    logger.info("init");
}
```

- The `clone` method of the authenticator creates a deep copy of the object members.

```
@Override
public WorkLightAuthenticator clone() throws CloneNotSupportedException {
    MyCustomAuthenticator otherAuthenticator = (MyCustomAuthenticator) super.clone();
    otherAuthenticator.authenticationData = new HashMap<String, Object>(authenticationData);
    return otherAuthenticator;
}
```

## Creating a custom Java authenticator (12 of 21)

- The `processRequest` method is called for each unauthenticated request to collect credentials.

```
@Override
public AuthenticationResult processRequest(HttpServletRequest request, HttpServletResponse response, boolean isAccessToProtectedResource) {
    Logger.info("myCustomAuthenticator :: processRequest");
    if (request.getRequestURI().contains("my_custom_auth_request_url")){
        String username = request.getParameter("username");
        String password = request.getParameter("password");

        if (null != username && null != password) {
            authenticationData = new HashMap<String, String>();
            authenticationData.put("username", username);
            authenticationData.put("password", password);
            return AuthenticationResult.createFrom(authenticationData);
        } else {
            response.setContentType("application/json");
            response.setHeader("Cache-Control", "no-cache");
            response.getWriter().print("{\"authStatus\": \"failure\"}");
            return AuthenticationResult.createFrom(authenticationData);
        }
    }

    if (!isAccessToProtectedResource)
        return AuthenticationResult.createFrom(authenticationData);

    response.setContentType("application/json");
    response.setHeader("Cache-Control", "no-cache");
    response.getWriter().print("{\"authStatus\": \"failure\"}");
    return AuthenticationResult.createFrom(authenticationData);
}
```

The `processRequest()` method takes the request, response, and `isAccessToProtectedResource` arguments. The method might retrieve data from a request and write data to a response, and must return a specific `AuthenticationResult` status as described in subsequent slides. **Reminder:** the authenticator collects the credentials for a login module; it **does not** validate them.

## Creating a custom Java authenticator (13 of 21)

- The `processRequest` method is called for each unauthenticated request to collect credentials.

```
@Override
public AuthenticationResult processRequest(HttpServletRequest request, HttpServletResponse response, boolean isAccessToProtectedResource) {
    logger.info("MyCustomAuthenticator :: processRequest");
    if (request.getRequestURI().contains("my_custom_auth_request_url")){
        String username = request.getParameter("username");
        String password = request.getParameter("password");

        if (null != username && null != password && username.length() > 0 && password.length() > 0){
            authenticationData = new HashMap<String, Object>();
            authenticationData.put("username", username);
            authenticationData.put("password", password);
            return AuthenticationResult.createFrom(AuthenticationData);
        } else {
            response.setContentType("application/json; charset=UTF-8");
            response.setHeader("Cache-Control", "no-cache, must-revalidate");
            response.getWriter().print("{\"authStatus\":\"required\"}");
            return AuthenticationResult.createFrom(AuthenticationData);
        }
    }

    if (!isAccessToProtectedResource)
        return AuthenticationResult.createFrom(AuthenticationData);

    response.setContentType("application/json; charset=UTF-8");
    response.setHeader("Cache-Control", "no-cache, must-revalidate");
    response.getWriter().print("{\"authStatus\":\"required\"}");
    return AuthenticationResult.createFrom(AuthenticationData);
}
```

The application sends an authentication request to a specific URL. This request URL contains a `my_custom_auth_request_url` component, which is used by the authenticator to make sure that this request is an authentication request. It is recommended to have a different URL component in every authenticator.

## Creating a custom Java authenticator (14 of 21)

- The `processRequest` method is called for each unauthenticated request to collect credentials.

```
@Override
public AuthenticationResult processRequest(HttpServletRequest request, HttpServletResponse response, boolean isAccessToProtectedResource) {
    Logger.info("MyCustomAuthenticator :: processRequest");
    if (request.getRequestURL().contains("my_custom_auth_request_url")){
        String username = request.getParameter("username");
        String password = request.getParameter("password");

        if (null != username && null != password && username.length() > 0 && password.length() > 0) {
            authenticationData = new HashMap<String, Object>();
            authenticationData.put("username", username);
            authenticationData.put("password", password);
            return AuthenticationResult.createFrom(AuthenticationStatus.SUCCESS);
        } else {
            response.setContentType("application/json; charset=UTF-8");
            response.setHeader("Cache-Control", "no-cache, must-revalidate");
            response.getWriter().print("{\"authStatus\":\"required\", \"errorMessage\":\"\"}");
            return AuthenticationResult.createFrom(AuthenticationStatus.CLIENT_INTERACTION_REQUIRED);
        }
    }

    if (!isAccessToProtectedResource)
        return AuthenticationResult.createFrom(AuthenticationStatus.REQUEST_NOT_RECOGNIZED);

    response.setContentType("application/json; charset=UTF-8");
    response.setHeader("Cache-Control", "no-cache, must-revalidate");
    response.getWriter().print("{\"authStatus\":\"required\"}");
    return AuthenticationResult.createFrom(AuthenticationStatus.CLIENT_INTERACTION_REQUIRED);
}
```

The authenticator retrieves the user name and password that are passed as request parameters.

## Creating a custom Java authenticator (15 of 21)

- The `processRequest` method is called for each unauthenticated request to collect credentials.

```

@Override
public AuthenticationResult processRequest(HttpServletRequest request, HttpServletResponse response, boolean isAccessToProtectedResource) {
    Logger.info("MyCustomAuthenticator :: processRequest");
    if (request.getRequestURI().contains("my_custom_auth_request_url")){
        String username = request.getParameter("username");
        String password = request.getParameter("password");

        if (null != username && null != password && username.length() > 0 && password.length() > 0){
            authenticationData = new HashMap<String, Object>();
            authenticationData.put("username", username);
            authenticationData.put("password", password);
            return AuthenticationResult.createFrom(AuthenticationStatus.SUCCESS);
        } else {
            response.setContentType("application/json; charset=UTF-8");
            response.setHeader("Cache-Control", "no-cache, must-revalidate");
            response.getWriter().print("{\"authStatus\":\"required\"}");
            return AuthenticationResult.createFrom(AuthenticationStatus.REQUIRED);
        }
    }

    if (!isAccessToProtectedResource)
        return AuthenticationResult.createFrom(AuthenticationStatus.SUCCESS);

    response.setContentType("application/json; charset=UTF-8");
    response.setHeader("Cache-Control", "no-cache, must-revalidate");
    response.getWriter().print("{\"authStatus\":\"required\"}");
    return AuthenticationResult.createFrom(AuthenticationStatus.REQUIRED);
}

```

The authenticator checks the credentials for basic validity, creates an `authenticationData` object, and returns `SUCCESS`. `SUCCESS` means only that the credentials were successfully collected; after that, the login module is called to validate the credentials.



## Creating a custom Java authenticator (16 of 21)

- The `processRequest` method is called for each unauthenticated request to collect credentials.

```
@Override
public AuthenticationResult processRequest(HttpServletRequest request) {
    logger.info("MyCustomAuthenticator :: processRequest");
    if (request.getRequestURI().contains("my_custom_auth_")) {
        String username = request.getParameter("username");
        String password = request.getParameter("password");

        if (null != username && null != password && username.length() > 0 && password.length() > 0) {
            authenticationData = new HashMap<String, Object>();
            authenticationData.put("username", username);
            authenticationData.put("password", password);
            return AuthenticationResult.createFrom(AuthenticationStatus.SUCCESS);
        } else {
            response.setContentType("application/json; charset=UTF-8");
            response.setHeader("Cache-Control", "no-cache, must-revalidate");
            response.getWriter().print("{\"authStatus\":\"required\", \"errorMessage\":\"Please enter username and password\"}");
            return AuthenticationResult.createFrom(AuthenticationStatus.CLIENT_INTERACTION_REQUIRED);
        }
    }

    if (!isAccessToProtectedResource) {
        return AuthenticationResult.createFrom(AuthenticationStatus.REQUEST_NOT_RECOGNIZED);
    }

    response.setContentType("application/json; charset=UTF-8");
    response.setHeader("Cache-Control", "no-cache, must-revalidate");
    response.getWriter().print("{\"authStatus\":\"required\"}");
    return AuthenticationResult.createFrom(AuthenticationStatus.CLIENT_INTERACTION_REQUIRED);
}
```

If a problem occurs with the received credentials, the authenticator adds an error message to the response and returns `CLIENT_INTERACTION_REQUIRED`. The client must still supply authentication data.

## Creating a custom Java authenticator (17 of 21)

- The `processRequest` method is called for each unauthenticated request to collect credentials.

```

@Override
public AuthenticationResult processRequest(HttpServletRequest request) {
    Logger.info("MyCustomAuthenticator :: processRequest");
    if (request.getRequestURI().contains("my_custom_auth_request")) {
        String username = request.getParameter("username");
        String password = request.getParameter("password");

        if (null != username && null != password && username.length() > 0) {
            authenticationData = new HashMap<String, Object>();
            authenticationData.put("username", username);
            authenticationData.put("password", password);
            return AuthenticationResult.createFrom(AuthenticationStatus.REQUEST_NOT_RECOGNIZED);
        } else {
            response.setContentType("application/json; charset=UTF-8");
            response.setHeader("Cache-Control", "no-cache, must-revalidate");
            response.getWriter().print("{\"authStatus\":\"required\"}");
            return AuthenticationResult.createFrom(AuthenticationStatus.CLIENT_INTERACTION_REQUIRED);
        }
    }
}

```

The `isAccessToProtectedResource` argument specifies whether an access attempt was made to a protected resource. If not, the method returns `REQUEST_NOT_RECOGNIZED`, which means that the authenticator treatment is not required, and can proceed with the request as is.

```

if (!isAccessToProtectedResource)
    return AuthenticationResult.createFrom(AuthenticationStatus.REQUEST_NOT_RECOGNIZED);

```

```

response.setContentType("application/json; charset=UTF-8");
response.setHeader("Cache-Control", "no-cache, must-revalidate");
response.getWriter().print("{\"authStatus\":\"required\"}");
return AuthenticationResult.createFrom(AuthenticationStatus.CLIENT_INTERACTION_REQUIRED);
}

```

## Creating a custom Java authenticator (18 of 21)

- The `processRequest()` method is called for each unauthenticated request to collect credentials.

```

@Override
public AuthenticationResult processRequest(HttpServletRequest request, HttpServletResponse response, boolean isAccessToProtectedResource) {
    Logger.info("MyCustomAuthenticator :: processRequest");
    if (request.getRequestURI().contains("my_custom_auth_request_url")){
        String username = request.getParameter("username");
        String password = request.getParameter("password");

        if (null != username && null != password && username.length() > 0 && password.length() > 0) {
            authenticationData = new HashMap<String, Object>();
            authenticationData.put("username", username);
            authenticationData.put("password", password);
            return AuthenticationResult.createFrom(AuthenticationStatus.CLIENT_INTERACTION_REQUIRED);
        } else {
            response.setContentType("application/json; charset=UTF-8");
            response.setHeader("Cache-Control", "no-cache, must-revalidate");
            response.getWriter().print("{\"authStatus\":\"required\"}");
            return AuthenticationResult.createFrom(AuthenticationStatus.CLIENT_INTERACTION_REQUIRED);
        }
    }

    if (!isAccessToProtectedResource)
        return AuthenticationResult.createFrom(AuthenticationStatus.CLIENT_INTERACTION_REQUIRED);

    response.setContentType("application/json; charset=UTF-8");
    response.setHeader("Cache-Control", "no-cache, must-revalidate");
    response.getWriter().print("{\"authStatus\":\"required\"}");
    return AuthenticationResult.createFrom(AuthenticationStatus.CLIENT_INTERACTION_REQUIRED);
}

```

If the request made to a protected resource does not contain authentication data, the authenticator adds an `authStatus:required` property to the response, and also returns a `CLIENT_INTERACTION_REQUIRED` status.

## Creating a custom Java authenticator (19 of 21)

- The authenticator `getAuthenticationData` method is used by a login module to get collected credentials.

```
@Override
public Map<String, Object> getAuthenticationData() {
    logger.info("getAuthenticationData");
    return authenticationData;
}
```

- After the authenticated session is established, all requests are transported through the `changeResponseOnSuccess` and `processRequestAlreadyAuthenticated` methods.
- You can use these methods to retrieve data from requests and to update responses.

## Creating a custom Java authenticator (20 of 21)

- The `changeResponseOnSuccess` method is called after credentials are successfully validated by the login module.
- You can use this method to modify the response before you return it to the client.
- This method must return `true` if the response was modified, `false` otherwise.
- Use it to notify a client application about the authentication success.

```
@Override
public boolean changeResponseOnSuccess(HttpServletRequest request, HttpServletResponse response) throws IOException {
    logger.info("MyCustomAuthenticator :: changeResponseOnSuccess");
    if (request.getRequestURI().contains("my_custom_auth_request_url")){
        response.setContentType("application/json; charset=UTF-8");
        response.setHeader("Cache-Control", "no-cache, must-revalidate");
        response.getWriter().print("{\"authStatus\":\"complete\"}");
        return true;
    }
    return false;
}
```

## Creating a custom Java authenticator (21 of 21)

- The `processRequestAlreadyAuthenticated` method returns `AuthenticationResult` objects for authenticated requests.

```
@Override
public AuthenticationResult processRequestAlreadyAuthenticated(HttpServletRequest request,
    logger.info("processRequestAlreadyAuthenticated");
    return AuthenticationResult.REQUEST_NOT_RECOGNIZED;
}
```

- If the login module returns an authentication failure, the `processAuthenticationFailure` method is called. This method writes an error message to a response body, and returns the `CLIENT_INTERACTION_REQUIRED` status.

```
@Override
public AuthenticationResult processAuthenticationFailure(HttpServletRequest request, HttpServletResponse response,
    String errorMessage) throws IOException, ServletException {

    logger.info("processAuthenticationFailure");
    response.setContentType("application/json; charset=UTF-8");
    response.setHeader("Cache-Control", "no-cache, must-revalidate");
    response.getWriter().print("{\"authRequired\":true, \"errorMessage\":\"" + errorMessage + "\"}");
    return AuthenticationResult.CLIENT_INTERACTION_REQUIRED;
}
```

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## Creating a custom Java login module (1 of 20)

- The login module API includes the following methods:
  - `void init(Map<String, String> options)`
  - `boolean login(Map<String, Object> authenticationData)`
  - `UserIdentity createIdentity(String loginModule)`
  - `void logout()`
  - `void abort()`
  - `WorkLightAuthLoginModule`

The `init` method of the login module is called when the login module instance is created. This method receives the options that are specified in the login module definition of the `authenticationConfig.xml` file.



## Creating a custom Java login module (2 of 20)

- The login module API is:
  - void **init**(Map<String, String> options)
  - boolean **login**(Map<String, Object> authenticationData)
  - UserIdentity **createIdentity**(String loginModule)
  - void **logout**()
  - void **abort**()
  - WorkLightAuthLoginModule

The `login` method of the login module is used to validate the credentials that are collected by the authenticator.

## Creating a custom Java login module (3 of 20)

- The login module API is:
  - void **init**(Map<String, String> options)
  - boolean **login**(Map<String, Object> authenticationData)
  - `UserIdentity` **createIdentity**(String loginModule)
  - void **logout**()
  - void **abort**()
  - WorkLightAuthLoginModule

The `createIdentity` method of the login module is used to create a `userIdentity` object after validation of the credentials succeeds.

## Creating a custom Java login module (4 of 20)

- The login module API is:
  - void **init**(Map<String, String> options)
  - boolean **login**(Map<String, Object> authenticationData)
  - UserIdentity **createIdentity**(String loginModule)
  - void **logout**()
  - void **abort**()
  - WorkLightAuthLoginModule

The `logout` and `abort` methods are used to clean up cached data after a logout or authentication aborts.

## Creating a custom Java login module (5 of 20)

- The login module API is:
  - void **init**(Map<String, String> configuration)
  - boolean **login**(Map<String, String> authenticationData)
  - UserIdentity **createIdentity**(String name, String password)
  - void **logout**()
  - void **abort**()
  - WorkLightLoginModule **clone**()

The `clone` method is used to create a deep copy of the class members.

## Creating a custom Java login module (6 of 20)

- Create a **MyCustomLoginModule** class in the **server\java** folder.
- Make sure that this class implements the **WorkLightAuthLoginModule** interface.

```
public class MyCustomLoginModule implements WorkLightAuthLoginModule {
```

- Add two private class members, **USERNAME** and **PASSWORD**, to hold the user credentials

```
private String USERNAME;  
private String PASSWORD;
```

## Creating a custom Java login module (7 of 20)

- The `init` method is called when the login module instance is created. As its parameter, it takes the map of options that are specified in a login module definition in the **authenticationConfig.xml** file.

```
@Override
public void init(Map<String, String> options) throws MissingConfigurationException {
    logger.info("init");
}
```

- The `clone` method of the login module creates a deep copy of the object members.

```
@Override
public MyCustomLoginModule clone() throws CloneNotSupportedException {
    return (MyCustomLoginModule) super.clone();
}
```

## Creating a custom Java login module (8 of 20)

- The `login` method is called after the authenticator returns the `SUCCESS` status.

```
@Override
public boolean login(Map<String, Object> authenticationData) {
    logger.info("MyCustomLoginModule :: login");
    USERNAME = (String) authenticationData.get("username");
    PASSWORD = (String) authenticationData.get("password");

    if (USERNAME.equals("wuser") && PASSWORD.equals("12345"))
        return true;
    else
        throw new RuntimeException("Invalid credentials");
}
```

When called, the `login` method gets an `authenticationData` object from the authenticator.

## Creating a custom Java login module (9 of 20)

- The `login` method is called after the authenticator returns the `SUCCESS` status.

```
@Override
public boolean login(Map<String, Object> authenticationData) {
    logger.info("MyCustomLoginModule :: login");
    USERNAME = (String) authenticationData.get("username");
    PASSWORD = (String) authenticationData.get("password");

    if (USERNAME.equals("wuser") && PASSWORD.equals("12345"))
        return true;
    else
        throw new RuntimeException("Invalid credentials");
}
```

The `login` method retrieves the user name and password that the authenticator previously stored.



## Creating a custom Java login module (10 of 20)

- The `login` method is called after the authenticator returns the `SUCCESS` status.

```
@Override
public boolean login(Map<String, Object> authenticationData) {
    Logger.info("MyCustomLoginModule :: login");
    USERNAME = (String) authenticationData.get("username");
    PASSWORD = (String) authenticationData.get("password");

    if (USERNAME.equals("wuser") && PASSWORD.equals("12345"))
        return true;
    else
        throw new RuntimeException("Invalid credentials");
}
```

In this example, the login module validates the credentials against hardcoded values. You can implement your own validation rules. The `login` method returns `true` if the credentials are valid.

## Creating a custom Java login module (11 of 20)

- The `login` method is called after the authenticator returns the `SUCCESS` status.

```
@Override
public boolean login(Map<String, Object> authenticationData) {
    logger.info("MyCustomLoginModule :: login");
    USERNAME = (String) authenticationData.get("username");
    PASSWORD = (String) authenticationData.get("password");

    if (USERNAME.equals("wuser") && PASSWORD.equals("12345"))
        return true;
    else
        throw new RuntimeException("Invalid credentials");
}
```

If the validation fails, the `login` method can either return `false` or throw a `RuntimeException`. The exception string is returned to the authenticator as an `errorMessage` parameter.

## Creating a custom Java login module (12 of 20)

- The `createIdentity` method is called when the `login` method returns `true`. It is used to create an authenticated user identity object.

```
@Override
public UserIdentity createIdentity(String loginModule) {
    logger.info("MyCustomLoginModule :: createIdentity");

    HashMap<String, Object> customAttributes = new HashMap<String, Object>();
    customAttributes.put("AuthenticationDate", new Date());

    UserIdentity identity = new UserIdentity(loginModule, USERNAME, null, null, customAttributes, PASSWORD);
    return identity;
}
```

After the `login` method returns `true`, the `createIdentity` method is called. It is used to create a `UserIdentity` object. You can store your own custom attributes in it to use later in Java or adapter code.

## Creating a custom Java login module (13 of 20)

- The `createIdentity` method is called when the `login` method returns `true`. It is used to create an authenticated user identity object.

```
@Override
public UserIdentity createIdentity(String loginModule) {
    logger.info("MyCustomLoginModule :: createIdentity");

    HashMap<String, Object> customAttributes = new HashMap<String, Object>();
    customAttributes.put("AuthenticationDate", new Date());

    UserIdentity identity = new UserIdentity(loginModule, USERNAME, null, null, customAttributes, PASSWORD);
    return identity;
}
```

The `UserIdentity` object contains user information. Its constructor is:

```
public
UserIdentity(String loginModule,
             String name,
             String displayName,
             Set<String> roles,
             Map<String, Object> attributes,
             Object credentials)
```

## Creating a custom Java login module (14 of 20)

- The `createIdentity` method is called when the `login` method returns `true`. It is used to create an authenticated user identity object.

```
@Override
public UserIdentity createIdentity(String loginModule) {
    Logger.info("MyCustomLoginModule :: createIdentity");

    HashMap<String, Object> customAttributes = new HashMap<String, Object>();
    customAttributes.put("AuthenticationDate", new Date());

    UserIdentity identity = new UserIdentity(loginModule, USERNAME, null, null, customAttributes, PASSWORD);
    return identity;
}
```

Login module  
name to set user  
for

The `UserIdentity` object contains user information. Its constructor is:

```
public
UserIdentity(String loginModule,
              String name,
              String displayName,
              Set<String> roles,
              Map<String, Object> attributes,
              Object credentials)
```

## Creating a custom Java login module (15 of 20)

- The `createIdentity` method is called when the `login` method returns `true`. It is used to create an authenticated user identity object.

```
@Override
public UserIdentity createIdentity(String loginModule) {
    Logger.info("MyCustomLoginModule :: createIdentity");

    HashMap<String, Object> customAttributes = new HashMap<String, Object>();
    customAttributes.put("AuthenticationDate", new Date());

    UserIdentity identity = new UserIdentity(loginModule, USERNAME, null, null, customAttributes, PASSWORD);
    return identity;
}
```

A unique user identifier

The `UserIdentity` object contains user

information. Its constructor is:

```
public
UserIdentity(String loginModule,
              String name,
              String displayName,
              Set<String> roles,
              Map<String, Object> attributes,
              Object credentials)
```

## Creating a custom Java login module (16 of 20)

- The `createIdentity` method is called when the `login` method returns `true`. It is used to create an authenticated user identity object.

```
@Override
public UserIdentity createIdentity(String loginModule) {
    logger.info("MyCustomLoginModule :: createIdentity");

    HashMap<String, Object> customAttributes = new HashMap<String, Object>();
    customAttributes.put("AuthenticationDate", new Date());

    UserIdentity identity = new UserIdentity(loginModule, USERNAME, null, null, customAttributes, PASSWORD);
    return identity;
}
```

User display name

The `UserIdentity` object contains user

information. Its constructor is:

```
public
UserIdentity(String loginModule,
              String name,
              String displayName,
              Set<String> roles,
              Map<String, Object> attributes,
              Object credentials)
```

## Creating a custom Java login module (17 of 20)

- The `createIdentity` method is called when the `login` method returns `true`. It is used to create an authenticated user identity object.

```
@Override
public UserIdentity createIdentity(String loginModule) {
    logger.info("MyCustomLoginModule :: createIdentity");

    HashMap<String, Object> customAttributes = new HashMap<String, Object>();
    customAttributes.put("AuthenticationDate", new Date());

    UserIdentity identity = new UserIdentity(loginModule, USERNAME, null, null, customAttributes, PASSWORD);
    return identity;
}
```

User Java security roles

The `UserIdentity` object contains user information. Its constructor is:

```
public
UserIdentity(String loginModule,
              String name,
              String displayName,
              Set<String> roles,
              Map<String, Object> attributes,
              Object credentials)
```



## Creating a custom Java login module (18 of 20)

- The `createIdentity` method is called when the `login` method returns `true`. It is used to create an authenticated user identity object.

```
@Override
public UserIdentity createIdentity(String loginModule) {
    logger.info("MyCustomLoginModule :: createIdentity");

    HashMap<String, Object> customAttributes = new HashMap<String, Object>();
    customAttributes.put("AuthenticationDate", new Date());

    UserIdentity identity = new UserIdentity(loginModule, USERNAME, null, null, customAttributes, PASSWORD);
    return identity;
}
```

Custom user attributes

The `UserIdentity` object contains user information. Its constructor is:

```
public
UserIdentity(String loginModule,
              String name,
              String displayName,
              Set<String> roles,
              Map<String, Object> attributes,
              Object credentials)
```

## Creating a custom Java login module (19 of 20)

- The `createIdentity` method is called when the `login` method returns `true`. It is used to create an authenticated user identity object.

```
@Override
public UserIdentity createIdentity(String loginModule) {
    logger.info("MyCustomLoginModule :: createIdentity");

    HashMap<String, Object> customAttributes = new HashMap<String, Object>();
    customAttributes.put("AuthenticationDate", new Date());

    UserIdentity identity = new UserIdentity(loginModule, USERNAME, null, null, customAttributes, PASSWORD);
    return identity;
}
```

Sensitive user credentials that are not to be persisted.

The `UserIdentity` object contains user information. Its constructor is:

```
public
UserIdentity(String loginModule,
              String name,
              String displayName,
              Set<String> roles,
              Map<String, Object> attributes,
              Object credentials)
```

## Creating a custom Java login module (20 of 20)

- The `logout` and `abort` methods are used to clean up class members after the user logs out or aborts the authentication flow.

```
@Override
public void logout() {
    logger.info("MyCustomLoginModule :: logout");
    USERNAME = null;
    PASSWORD = null;
}

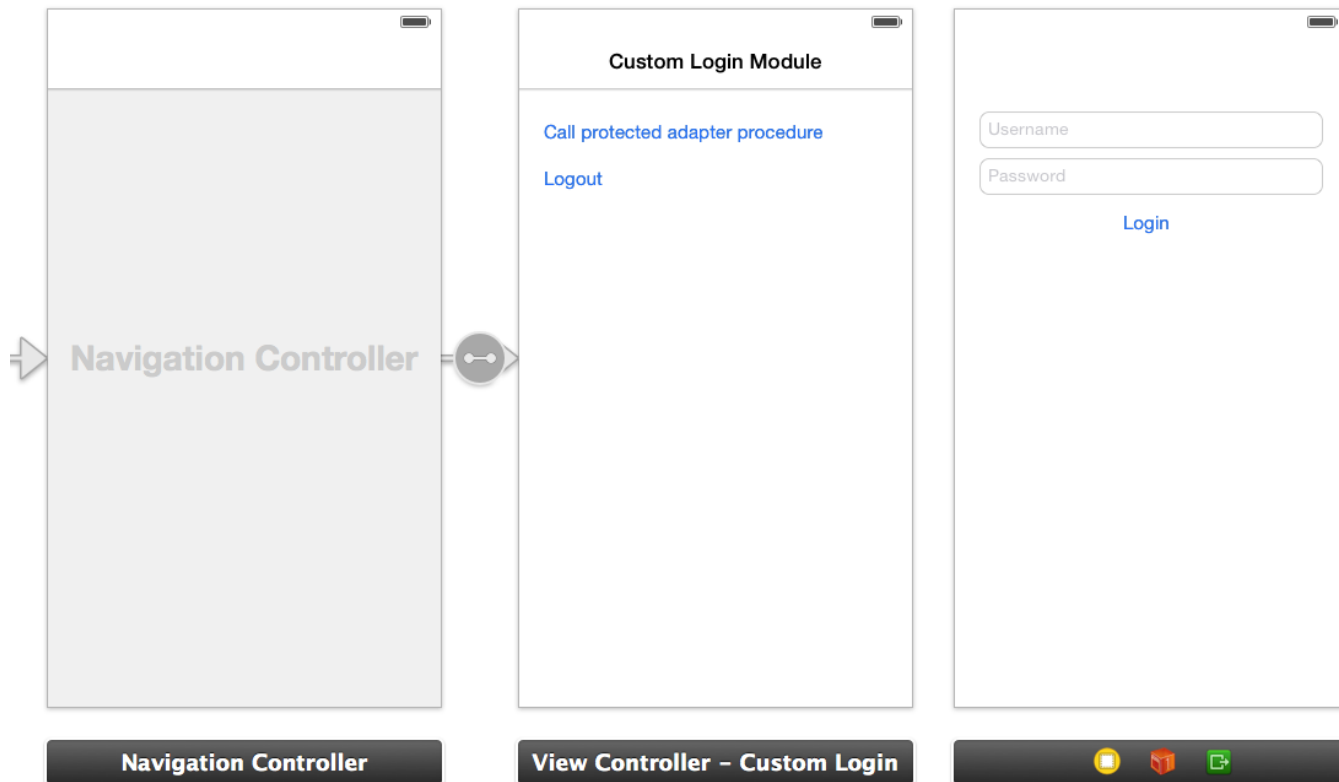
@Override
public void abort() {
    logger.info("MyCustomLoginModule :: abort");
    USERNAME = null;
    PASSWORD = null;
}
```

# Agenda

- Introduction to authentication
- Configuring the authenticationConfig.xml file
- Creating a custom Java authenticator
- Creating a custom Java login module
- **Creating client-side authentication components**
- Examining the result

# Creating the client-side authentication components (1 of 7)

1. Create a native iOS application and add the Worklight native APIs as explained in the documentation.
2. In your storyboard, add a ViewController that contains a login form.



## Creating the client-side authentication components (2 of 7)

3. Create a `MyChallengeHandler` class as a subclass of `ChallengeHandler`.
4. Implement some of the `ChallengeHandler` methods to respond to the form-based challenge.

```
@interface MyChallengeHandler : ChallengeHandler
@property ViewController* vc;

//A convenient way of updating the View
-(id)initWithViewController: (ViewController*) vc;
@end
```

## ***Creating the client-side authentication components (3 of 7)***

- Before calling your protected adapter, make sure to register your challenge handler by using the `registerChallengeHandler` method on the `WLClient` instance.

```
[[WLClient sharedInstance] registerChallengeHandler:[MyChallengeHandler  
alloc] initWithViewController:self] ];
```

## Creating the client-side authentication components (4 of 7)

- The `isCustomResponse` method of the challenge handler is called each time that a response is received from the server. It detects whether the response contains data that is related to this challenge handler. It must return either `true` or `false`.

```
@implementation MyChallengeHandler
//...
-(BOOL) isCustomResponse:(WLResponse *)response {
    if(response && [response getResponseJson]){
        if ([[response getResponseJson] objectForKey:@"authStatus"]) {
            NSString* authRequired = (NSString*) [[response getResponseJson]
objectForKey:@"authStatus"];
                //return if auth is required
                return ([authRequired compare:@"required"] == NSOrderedSame);
        }
    }
    return false;
}
@end
```



## Creating the client-side authentication components (5 of 7)

- If `isCustomResponse` returns `true`, the framework calls the `handleChallenge` method. This function performs the required actions, such as hiding the application screen and showing the login screen.

```
@implementation MyChallengeHandler
//...
-(void) handleChallenge:(WLResponse *)response {
    NSLog(@"Inside handleChallenge - need to show form on the screen");
    LoginViewController* loginController = [self.vc.storyboard
instantiateViewControllerWithIdentifier:@"LoginViewController"];
    loginController.challengeHandler = self;
    [self.vc.navigationController pushViewController:loginController
animated:YES];
}
@end
```

## Creating the client-side authentication components (6 of 7)

- The `onSuccess` and `onFailure` methods are triggered when authentication ends.
- Call the `submitSuccess` method to notify the framework that the authentication process is over, so that the success handler is called.

```
@implementation MyChallengeHandler
//...
-(void) onSuccess:(WLResponse *)response {
    NSLog(@"inside challenge success");
    [self.vc.navigationController popViewControllerAnimated:YES];
    [self submitSuccess:response];
}

-(void) onFailure:(WLFailResponse *)response {
    NSLog(@"inside challenge failure");
    [self submitFailure:response];
}
```

## Creating the client-side authentication components (6 of 7)

- In your LoginViewController instance, when the user clicks to submit his credentials, call the `submitLoginForm` method to send the credentials to the Worklight Server instance.

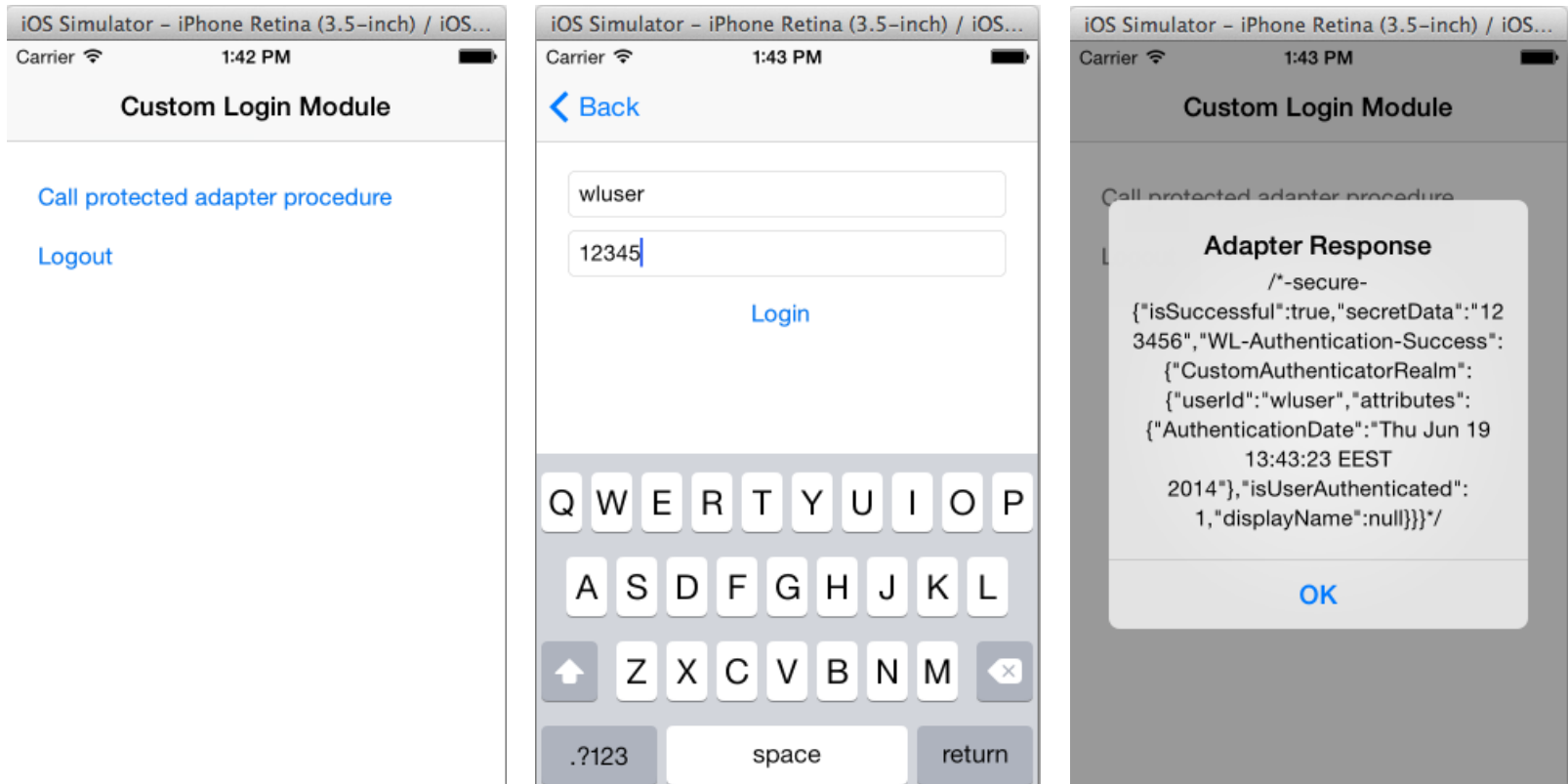
```
@implementation LoginViewController
/**
- (IBAction)login:(id)sender {
    [self.challengeHandler
        submitLoginForm:@"my_custom_auth_request_url"
        requestParameters:@{@"username": self.username.text, @"password":
self.password.text}
        requestHeaders:nil
        requestTimeoutInMilliseconds:0
        requestMethod:@"POST"];
}
```

# Agenda

- Introduction to authentication
- Configuring the authenticationConfig.xml file
- Creating a custom Java authenticator
- Creating a custom Java login module
- Creating client-side authentication components
- **Examining the result**

## Examining the result

- You can find the sample for this training module in the Getting Started page of the IBM Worklight Foundation documentation website at <http://www.ibm.com/mobile-docs>
- Enter *wluser* and *12345* as the user credentials



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