Offline Authentication

Overview

This tutorial explains a sample implementation of offline user authentication.
The goal of offline authentication is to make the login/logout end-user experience consistent whether online or offline.

Prerequisites:

It is assumed that the developer is familiar with IBM MobileFirst Platform Foundation application development, adapter-based authentication and JSONStore.
The associated sample project demonstrates an end-to-end scenario. However, there are many ways to achieve the same results.

Topics covered, are:

- Offline authentication concept
- Implementing the authentication flows
- Sample application

Offline authentication concept

By using offline authentication, an end-user is able to authenticate even if an Internet connection is unavailable.

An *Online login* is necessary when logging-in is attempted for the first time, so that the MobileFirst Server validates the user's credentials. After successful validation, a JSONStore is created for the logged-in user. The Offline authentication is implemented by opening the mentioned JSONStore for the supplied username and password. This is further explained below.

The sample application for this tutorial has the following structure:

- An unsecured area, which is accessible without authentication
- A secured area, which is accessible only after authentication, whether online or offline
- The same login form for both online and offline authentication, so that the end-user experience is the same whether online and offline
- Support for logging-out

Going through the online and offline flows from a high-level point of view:

Step 1:

Before either online or offline authentication occurs, an Internet connection is checked for first. Depending on the result, the appropriate authentication flow is used.

Online Authentication

Steps 2 and 3:

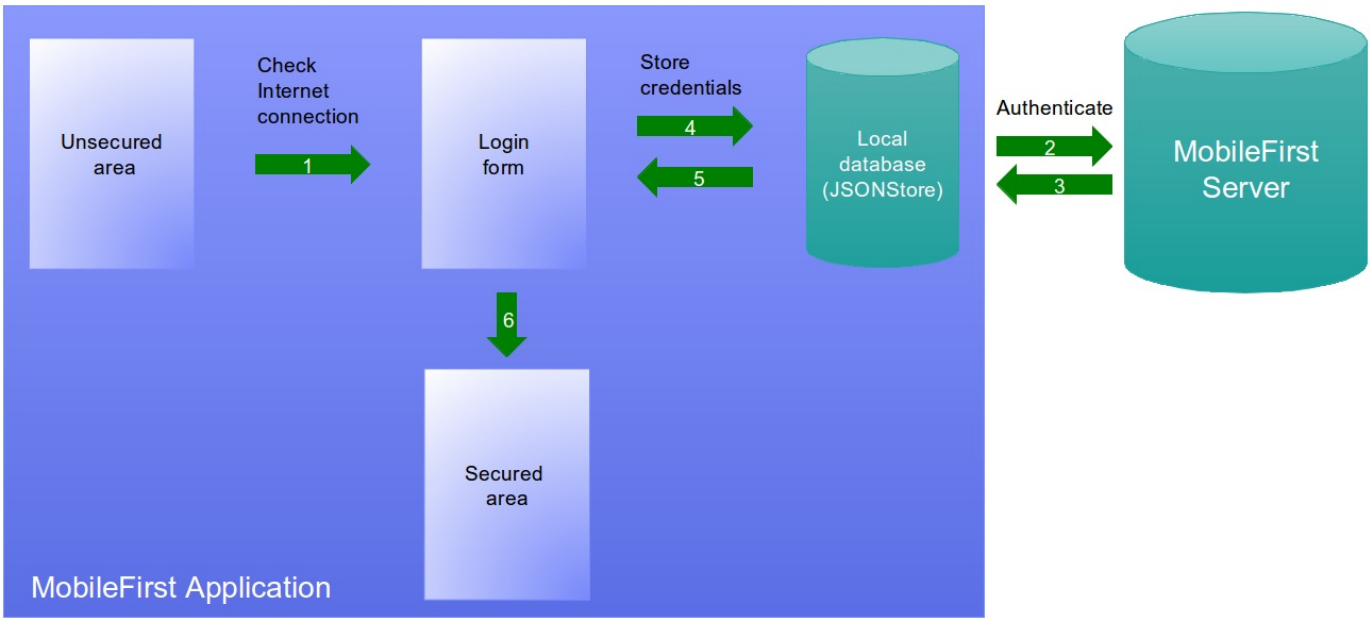
The online authentication flow is implemented as explained in the adapter-based authentication in hybrid applications (../adapter-based-authentication/adapter-based-authentication-hybrid-applications/) tutorial.

Steps 4 and 5:

After a successful login, a JSONStore is created using the end-user's username and encrypted using the user's password.

Step 6:

The secured area is displayed.



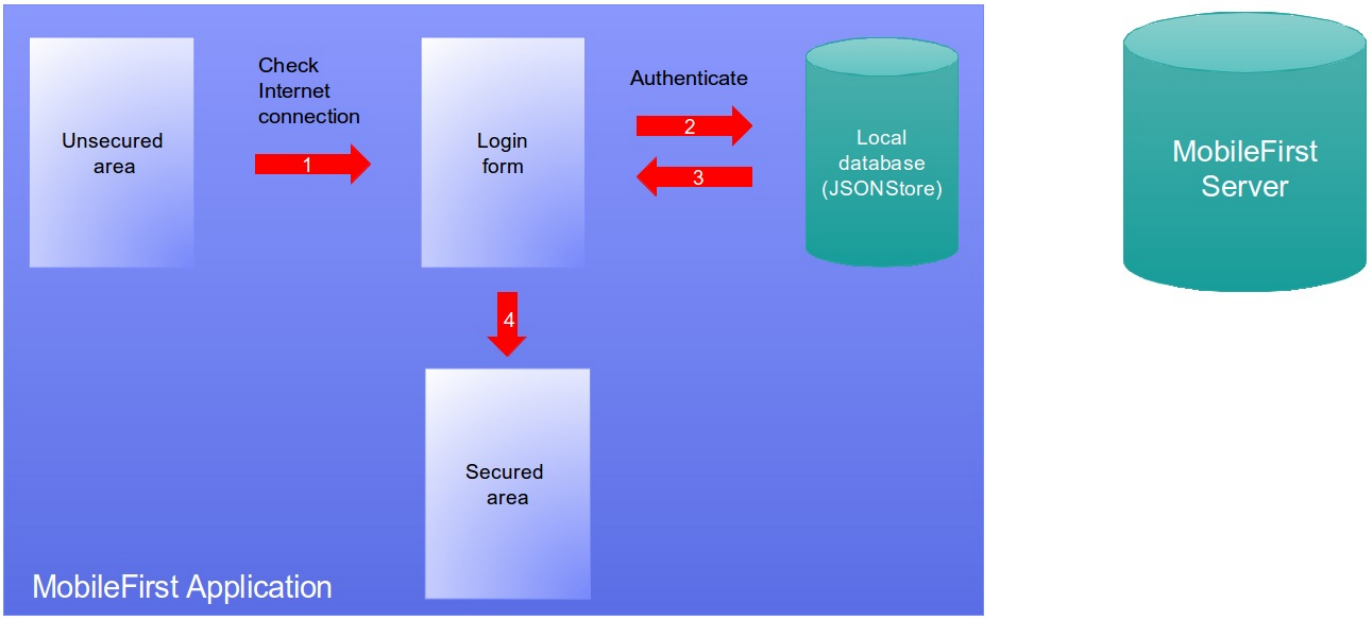
Offline Authentication

Steps 2 and 3:

The authentication process tries to open the previously created JSONStore by using the end-user's password that was passed as input.

Step 4:

If the attempt is successful, the secured area is displayed.



Implementing the authentication flows

Keep in mind that some of the implementation code relates to the application UI.
You can find the rest of the application code (HTML, CSS, additional JavaScript) in the provided sample application.

The `username`, `password` and `offlineLoggedIn` global variables help determine the user's login state, whether connected or not connected to the Internet.

```
var username = null, password = null;
var offlineLoggedIn = false;
```

Prerequisite: When an end-user tries to log in for the very first time, Internet connection must be available so that the user credentials can be verified against the server backend.

Therefore, before any authentication is performed, Internet connection is checked so that the appropriate authentication flow is executed.

```
function goToSecuredArea() {
    WL.Device.getNetworkInfo(
        function (networkInfo) {
            if (networkInfo.isNetworkConnected == "true")
{
                onlineAuthentication();
            } else {
                offlineAuthentication();
            }
        }
    );
}
```

Implementation notes

Single-Step Authentication

1. The online authentication flow uses the same code as provided in the single-step adapter authentication sample application (../).
2. In order to simulate a back-end of multiple users, a valid login is considered one where the `username == password`, no matter what the username is.
   The `submitAuthentication` function in the adapter's `*-impl.js` file is therefore modified to:

   ```
   function submitAuthentication (username, password){
       if (username == password) {
   ```

JSONStore

Because the authentication simulates multiple users, usage of multiple JSONStores is required as well, in order to accommodate for the many users.

Thus, in `WL.JSONStore.init`, the username is passed as a parameter for a new JSONStore to be opened for each authenticated user. For this, declare a collection to define the structure of the JSONStore:

```
var collectionName = "userCredentials";
var collections = {
    userCredentials : {
        searchFields : {
            collectionNotEmpty: "string"
        }
    }
};
```

Next,

Online authentication

Below is the complete implementation, followed by a breakdown and explanation code block by code block. The sample application contains additional comments.

```
function onlineAuthentication() {
  if (WL.Client.isUserAuthenticated("myCustomRealm")) {
    if (username == null) {
      WL.Client.logout("myCustomRealm", {
        onSuccess: function() {
          onlineAuthentication();
        },
        onFailure: function() {
          WL.SimpleDialog.show("Logout", "Unable to logout at this time. Try again later.", [{
            text: "OK",
            handler: function() {}
          }]);
        }
      });
    } else {
      displaySecuredArea();
    }
  } else if (username) {
    var invocationData = {
      adapter: "authenticationAdapter",
      procedure: "submitAuthentication",
      parameters: [$("#username").val(), $("#password").val()]
    };
    myCustomRealmChallengeHandler.submitAdapterAuthentication(
      invocationData, {
        onSuccess: onlineAuthenticationSuccess,
        onFailure: onlineAuthenticationFailure
      });
  } else {
    WL.Client.login("myCustomRealm", {
      onSuccess: onlineAuthenticationSuccess,
      onFailure: onlineAuthenticationFailure
    });
  }
}
```

Check whether the user is already authenticated
If `true`, display the secured area.
If `false`, display the login form and start authentication via the challenge handler.

```
function onlineAuthentication() {
  if (WL.Client.isUserAuthenticated("myCustomRealm"))
{
    if (username == null) {
      //...
      });
    } else {
      displaySecuredArea();
    }
  } else if (username) {
    //...
  } else {
    WL.Client.login("myCustomRealm", {
      onSuccess: onlineAuthenticationSuccess,
      onFailure: onlineAuthenticationFailure
    });
  }
}
```

If the connection to the Internet is established and the user is authenticated on the back end but the username variable is empty, assume that a logout happened offline.
Log out the user from the realm before trying to log in again online.

```
if (WL.Client.isUserAuthenticated("myCustomRealm")) {
  if (username == null) {
    WL.Client.logout("myCustomRealm", {
      onSuccess: function() {
        onlineAuthentication();
      },
      onFailure: function() {
        WL.SimpleDialog.show("Logout", "Unable to logout at this time. Try again later.", [{
          text: "OK",
          handler: function() {}
        }]);
      }
    });
  } else {
    displaySecuredArea();
  }
}
```

If logging-in while offline and Internet connection is then available, log in to the realm without showing the login form.

```
function onlineAuthentication() {
  if (WL.Client.isUserAuthenticated("myCustomRealm")) {
    //...
  } else if (username) {
    var invocationData = {
      adapter: "authenticationAdapter",
      procedure: "submitAuthentication",
      parameters: [$("#username").val(), $("#password").val()]
    };
    myCustomRealmChallengeHandler.submitAdapterAuthentication
(
      invocationData, {
        onSuccess: onlineAuthenticationSuccess,
        onFailure: onlineAuthenticationFailure
      });
  } else {
    //...
  }
}
```

If online authentication fails, for example if MobileFirst Server is unavailable, offline authentication is attempted instead.

```
function onlineAuthenticationFailure() {
    offlineAuthentication();
}
```

onlineAuthenticationSuccess

Upon successful online authentication, the secured area can be displayed.

The username and password are saved for future use.
A JSONStore for the user is initialized from the user's username and encrypted by using the user's password.

Before populating the collection, it is best to check whether it is already populated from a previous login attempt. Return the contents of the collection.
If the collection is empty, populate it.
If the collection is not empty, do not populate it again.

Finally, the username and password variables are emptied, the JSONStore is closed and the secured area is displayed.

```
function onlineAuthenticationSuccess() {
    username = $("#username").val();
    password = $("#password").val();</p>
<p>    WL.JSONStore.init(collections, {password:password, username:username, localKeyGen:true})
    .then(function() {
        return WL.JSONStore.get(collectionName).findAll();
    })
    .then(function(findAllResult) {
        if (findAllResult.length == 0) {
            // The JSONStore collection is empty, populate it.
            var data = [{isEmpty:"false"}];
            return WL.JSONStore.get(collectionName).add(data);
        }
    })
    .then(function() {
        password = null;
        username = null;
        WL.JSONStore.closeAll();
        displaySecuredArea();
    })
}
```

Offline authentication

In the offline authentication flow, a couple of additional scenarios require dealing with:

- Empty username and password fields
- First-time log-in when offline
- Already authenticated users

In online authentication, if `username != password`, the authentication process stops. In contrast, during offline authentication in JSONStore, the following cases must be addressed:

- Empty username and password fields destroy your JSONStore. As a result, users can no longer log in offline until the next online authentication, where the JSONStore is created again if it does not exist.
- First-time log-in cannot happen because there is no JSONStore yet.

```
function offlineAuthentication() {
  $("#username").val('');
  $("#password").val('');
  $("#authInfo").empty();
  // Don't show the login form  if already offline-logged-in via JSONStore, or previously logged-in online (bu
t have yet logged-out).
  if (offlineLoggedIn === true || username) {
    offlineLoggedIn = true;
    displaySecuredAreaOffline();
  } else {
    // Prepare the login form.
    $("#unsecuredDiv").hide();
    $("#authDiv").show();
    $("#offlineLoginButton").show();
    $("#onlineLoginButton").hide();
    $("#offlineLoginButton").unbind("click");
```

```
    $("#offlineLoginButton").bind("click", function() {</p>
    // Don't allow empty username/password field.
      if (($("#username").val() == '') || ($("#password").val() == '')) {
        $("#authInfo").html("Invalid credentials. Please try again.");
      } else {
        WL.JSONStore.init(collections, {
            password: $("#password").val(),
            username: $("#username").val(),
            localKeyGen: true
          })
          .then(function() {
            /*
             * Need to handle the case where logging in when offline for the first time, in which case logging i
n cannot be done as there wouldn't be a
             * JSONStore available yet.
             */
            WL.JSONStore.get(collectionName).count()
              .then(function(countResult) {
                if (countResult == 0) {
                  WL.JSONStore.destroy($("#username").val());
                  $("#authInfo").html("First time login must be done when Internet connection is available.");
                  $("#username").val("");
                  $("#password").val("");
                } else {
                  // Preserve the username and password, set the offline-logged-in flag and dislay the secured
area.
                  offlineLoggedIn = true;
                  username = $("#username").val();
                  password = $("#password").val();
                  displaySecuredAreaOffline();
                }
              })
          })
          .fail(function() {
            $("#authInfo").html("Invalid credentials. Please try again.");
            $("#username").val("");
            $("#password").val("");
          })
      }
    });
  }
}
```

This function first checks whether the user is already authenticated.

```
  if (offlineLoggedIn === true || username) {
    offlineLoggedIn = true;
    displaySecuredAreaOffline();
  }
```

If the user is not authenticated, offline authentication is attempted.
Check the validity of the user credentials.
If they are not valid, display an error message.

If they are valid, try to open and decrypt the user's JSONStore by using the user's password.

```
    $("#offlineLoginButton").bind("click", function() {
      // Don't allow empty username/password field.
      if (($("#username").val() == '') || ($("#password").val() == ''))
{
        $("#authInfo").html("Invalid credentials. Please try again.");
      } else {
        WL.JSONStore.init(collections, {
          password: $("#password").val(),
          username: $("#username").val(),
          localKeyGen: true
         })
```

Then, Check the contents of the store.
If the store is empty, this user did not previously log in: no stored data in the collection.
Destroy the store for this username and provide an appropriate error message.

```
          .then(function() {
            /*
             * Need to handle the case where logging in when offline for the first time, in which case logging i
n cannot be done as there wouldn't be a JSONStore available yet.
             */
            WL.JSONStore.get(collectionName).count()
              .then(function(countResult) {
                if (countResult == 0) {
                  WL.JSONStore.destroy($("#username").val());
                  $("#authInfo").html("First time login must be done when Internet connection is available.");
                  $("#username").val('');
                  $("#password").val('');
```

If the JSON store is NOT empty, set the offlineLoggedIn flag to true and display the secured area.

```
                } else {
                  // Preserve the username and password, set the offline-logged-in flag and dislay the secured
area.
                  offlineLoggedIn = true;
                  username = $("#username").val();
                  password = $("#password").val();
                  displaySecuredAreaOffline();
                }
```

Logout

```
function logout() {
  password = null;
  username = null;
  WL.JSONStore.closeAll();
  offlineLoggedIn = false;
  WL.Device.getNetworkInfo(
    function(networkInfo) {
      if (networkInfo.isNetworkConnected == "true") {
        WL.Client.logout("myCustomRealm", {onSuccess: displayUnsecuredArea, onFailure: displayUnsecu
redArea});
      }
    }
  );
  displayUnsecuredArea();
}
```

Upon logout, mark the user as logged out:
Empty the username and password variables.
Close the JSONStore.
Set the offlineLoggedIn flag to false.

```
  password = null;
  username = null;
  WL.JSONStore.closeAll()
;
  offlineLoggedIn = false;
```

Check the Internet connection before logging out.
If available, log out the user from the realm and display the unsecured area.

```
  WL.Device.getNetworkInfo(
    function(networkInfo) {
      if (networkInfo.isNetworkConnected == "true") {
        WL.Client.logout("myCustomRealm", {onSuccess: displayUnsecuredArea, onFailure: displayUnsecu
redArea});
      }
    }
  );
  displayUnsecuredArea();
```

If online logout fails (for example because MobileFirst Server is not available), logging out will take place anyway. See online authentication in case the *username* variable is empty.

The end result

Note: The sample code that is written in this tutorial is only a suggestion. You can use other implementation methods.
To use the sample:

1. Import the MobileFirst project into MobileFirst Studio.

2. Deploy the adapter and application.
3. Launch the application on a device.
4. Start online and log in by using, for example, mobile/mobile as the username and password. The secured area is then displayed
5. Log out.
6. In the device settings, change to airplane mode and log in again. The secured area is then displayed, in “offline access”.

Sample application

Click to download (http://public.dhe.ibm.com/software/products/en/MobileFirstPlatform/docs/v630/OfflineAuthenticationProject.zip) the Studio project.