Container for advanced pages in hybrid applications

This tutorial covers the following topics:

Prerequisites

This tutorial assumes that you know how to create a MobileFirst hybrid application and add Android and iPhone environments. For more information, see the following tutorials:

- Your first hybrid application (../../hello-world/your-first-hybrid-application/)
- Previewing your hybrid application (../../hello-world/previewing-your-hybrid-application/)

Using this tutorial and its associated sample

This tutorial and its companion sample are intended for use with either the IBM® MobileFirst® Consumer Edition or the IBM MobileFirst Enterprise Edition.
You cannot use the sample that is associated with this tutorial as is with the free IBM MobileFirst Developer Edition. This sample provides a WAR file that demonstrates the remote load functionality in this tutorial. This WAR file requires a servlet container, such as Apache Tomcat, WebSphere®Application Server Full profile, or WebSphere Application Server Liberty profile.

Background of IBM Mobile Conference application

- Mobile web application
- Server programming model
  - JavaServer™ Pages (JSP)
  - JavaServer Pages Standard Tag Library (JSTL)
  - JavaServer Pages Expression Language (EL)
- Client programming model
  - Dojox Mobile
  - Dojo Mobile Device Theming
- Security
  - Container managed
  - Java™ Enterprise Edition (Java EE) form-based login

Mobile views

Dojo provides mobile widgets that developers can use to quickly generate mobile views.

```
<div id="locations" dojoType="dojox.mobile.ScrollableView" selected="true">
   <h1 dojoType="dojox.mobile.Heading" label="Locations" fixed="top"></h1>
   <div class="list-category" dojoType="dojox.mobile.RoundRectCategory">USA</div>
   <ul dojoType="dojox.mobile.RoundRectList">
      <c:forEach var="location" items="${applicationScope.locationRegistryList['usa']}"
>
         <li dojoType="dojox.mobile.ListItem" class="mblVariableHeight"
         url="./conferences.jsp?locationId=${location}"
         urlTarget="conferences" transition="slide">
            <div class="list-detail">
               <div>${locationMap[location].city}, ${locationMap[location].state}</div>
            </div>
         </li>
      </c:forEach>
   </ul>
</div>
```

JSTL provides a simple API for iterating over lists to generate Dojox Mobile list items dynamically on the server.

Form-based authentication - client

IBM Mobile Conference application requires users to be registered and authenticated with the enterprise that is hosting the application. The application is protected by a form-based login, by using a mobile web form that is contained within a Dojox Mobile view.

```
<div dojoType="dojox.mobile.View">
   <c:set var="conferences" scope="session"
      value=""></c:set>
   <!-- a sample heading -->
   <h1 style="text-align: center;" dojoType="dojox.mobile.Heading">IBM Mobile Conference App</h1
>
   <form action="j_security_check" method="post" name="loginForm">
      <div class="logonClass">
         <div>
            <span>Username </span> <input id="username" dojoType="dojox.mobile.TextBox"
               name="j_username" />
         </div>
         <div>
            <span>Password </span> <input id="password" type=password name="j_password"
               dojoType="dojox.mobile.TextBox"> </input>
         </div>
         <div style="text-align: center;">
            <input id="login" type="submit" class="mblButton" value="Login"/>
         </div>
      </div>
   </form>
</div>
```

Form-based authentication - server

IBM Mobile Conference application is configured to use Java Enterprise Edition Role Support.

- White list or pattern-based URIs of secured resources
- Support for logout in addition to Java Enterprise Edition standard logout functionality

```
<security-role>
   <role-name>worklightadmin</role-name>
</security-role>
<security-constraint>
   <display-name>SecurityConstraint</display-name>
   <web-resource-collection>
      <web-resource-name>Conference</web-resource-name>
      <url-pattern>/common/location.jsp</url-pattern>
      <url-pattern>/common/confs.jsp</url-pattern>
      <url-pattern>/common/presenter.jsp</url-pattern>
      <url-pattern>/common/sessions.jsp</url-pattern>
   </web-resource-collection>
   <auth-constraint>
      <role-name>worklightadmin</role-name>
   </auth-constraint>
</security-constraint>
<login-config>
   <auth-method>FORM</auth-method>
   <form-login-config>
      <form-login-page>/common/logon.jsp</form-login-page>
      <form-error-page>/common/logonError.jsp</form-error-page
>
   </form-login-config>
</login-config>
```

```
<div style="position: relative; float: left;">
   <form method="post" action="conferenceLogout.jsp" name="logout"
>
      <span data-dojo-type="dojox.mobile.ToolBarButton"
         data-dojo-props='onClick:function(){
            document.forms["logout"].submit();
         },
         transition:"slide"'>Logout</span>
      <input type="hidden" name="logoutExitPage" value="/">
   </form>
</div>
```

Simplified user registry and role configuration

1. Modify the `server.xml` file as follows, depending on which application server you use:
   - **MobileFirst Development Server** (Liberty)

```
<server description="new server">
   <featureManager>
      <feature>servlet-3.0</feature>
      <feature>jndi-1.0</feature>
      <feature>jdbc-4.0</feature>
      <feature>localConnector-1.0</feature>
      <feature>restConnector-1.0</feature>
      <feature>jsp-2.2</feature>
      <feature>appSecurity-1.0</feature>
      <feature>ssl-1.0</feature>
   </featureManager></p>
   ...</p>
   <httpEndpoint host="*" httpPort="10080" httpsPort="10443" id="defaultHttpEndpoint">
      <tcpOptions soReuseAddr="true"/></p>
   </httpEndpoint></p>
   ...
   <applicationMonitor updateTrigger="mbean"/></p>
   ...</p>
   <basicRegistry id="worklight" realm="worklightRealm">
      <user name="demo" password="demo"/>
      <user name="monitor" password="demo"/>
      <user name="deployer" password="demo"/>
      <user name="operator" password="demo"/>
      <user name="admin" password="admin"/>
   </basicRegistry></p>
   ...
   <webApplication contextRoot="conference" id="ContainerForAdvancedPagesWar" loc
ation="module_45_1_IntegrateExistingWebContentWar.war" name="ContainerForAdvance
dPagesWar">
      <application-bnd>
         <security-role name="worklightadmin">
            <user name="admin"/>
         </security-role>
      </application-bnd>
   </webApplication></p>
   <application context-root="/ContainerForAdvancedPages" id="ContainerForAdvancedP
ages" location="ContainerForAdvancedPages.war" name="ContainerForAdvancedPages" t
ype="war">
      <classloader commonLibraryRef="worklight-6.3.0">
         <privateLibrary>
            <fileset dir="${wlp.user.dir}/shared/resources" includes="org.hsqldb.hsqldb_2.2.
5.jar"/>
         </privateLibrary>
      </classloader>
   </application></p>
      ...
</server></p>
<p>
```

- **Tomcat**

```
<GlobalNamingResources>
<!-- Editable user database that can also be used by
     UserDatabaseRealm to authenticate users
-->
<Resource auth="Container"
   description="User database that can be updated and saved"
   factory="org.apache.catalina.users.MemoryUserDatabaseFactory
"
   name="UserDatabase"
   pathname="conf/tomcat-users.xml"
   type="org.apache.catalina.UserDatabase"/>
</GlobalNamingResources>
```

2. Add the role and user in the `tomcat-users.xml` file:

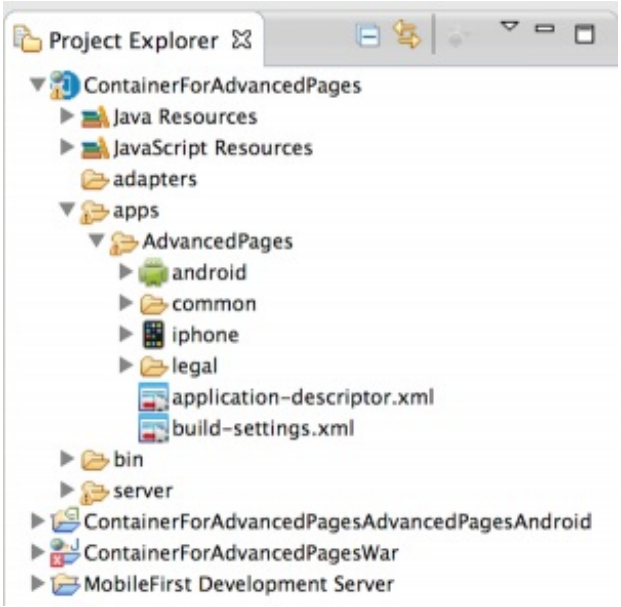
```
<role rolename="worklightadmin"/>
<user username="tomcat" password="tomcat" roles="worklightadmin"/>
```

Migrating applications to IBM MobileFirst Platform Foundation

By using mobile web technology, you can deploy applications to the widest variety of devices.
The presence of application stores (for example: Apple App Store and Google Play) adds a dimension where the hosting and marketing of these applications makes broader-reaching applications less relevant.
IBM MobileFirst Platform Foundation provides the hybrid application programming model as the solution to building cross platform applications that can be distributed through the application stores.
In the hybrid model, developers typically package the application HTML, CSS, and JavaScript™ code as part of the application that is deployed to the application store. In this tutorial, you see the remote loading of dynamic content capability, where the HTML, CSS, and JavaScript code is hosted externally from the natively packaged hybrid application.

Working with IBM MobileFirst projects and environments

This tutorial comes with a MobileFirst project called **ContainerForAdvancedPages**, which contains an **AdvancedPages** hybrid application. This application already has the iPhone and Android environments added to it.



Running the sample on an Android environment

1. Make the following changes to the `AdvancedPages/android/nativeResources/src/com/AdvancedPages/AdvancedPages.java` file:

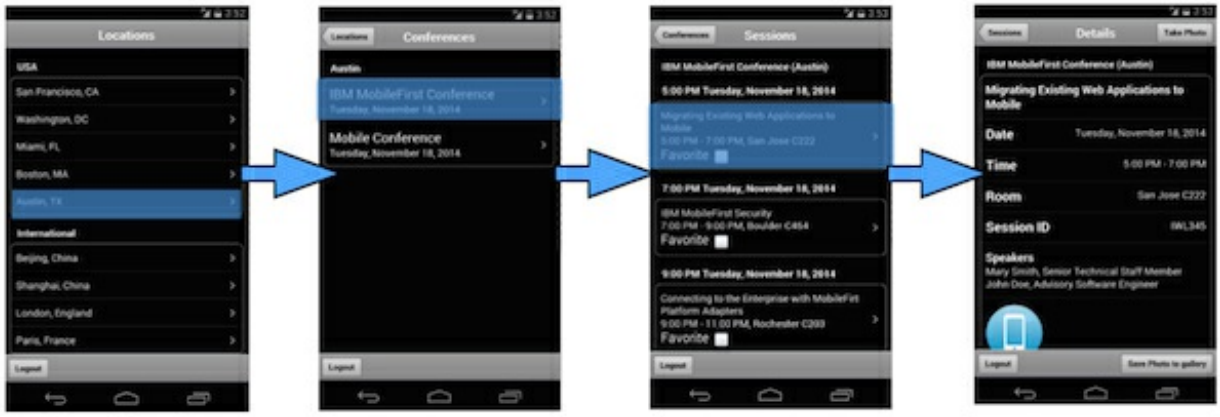
```
public void onInitWebFrameworkComplete(WLInitWebFrameworkResult result){
    if (result.getStatusCode() == WLInitWebFrameworkResult.SUCCESS) {
        WL.getInstance().hideSplashScreen();
        super.loadUrl("http://localhost:10080/conference/common/location.jsp");
    }
    else {
        handleWebFrameworkInitFailure(result);
    }
}
```

2. If the application is running on a Tomcat application server, change the port to `8080`.
3. If the application is running on an actual Android device, replace `localhost` with the public IP address of your computer. Make sure that the device and your server are on the same network.
4. Right-click the WAR file and select **Run As > Run on Server**, and then select the MobileFirst Development Server.
5. Right-click the hybrid application and select **Run As > Run on MobileFirst Development Server**.

   > **Note:** Due to some domain restrictions of the browser (web view), the remotely loaded application and MobileFirst Development Server must either be colocated on the same host and port, or have a common proxy host and port.

6. Right-click the Android project and select **Run As > Android Application**.

After the application is installed, authenticate with a username and password, such as `admin` / `admin`, or whatever credentials you specified in your `server.xml` file.
Each view for the IBM Mobile Conference app is loaded through Ajax XHR where each view is generated by the JSP responsible for each distinct view.



Running the sample on an iPhone environment

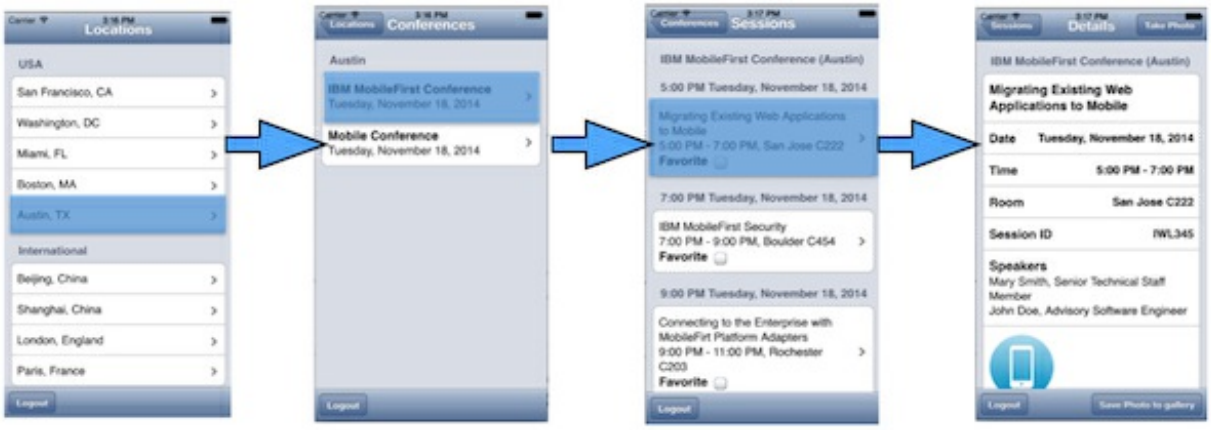
1. Make the following changes to the `AdvancedPages/iphone/nativeResources/Classes/AdvancedPages.m` file:

```
-(void)wlInitDidCompleteSuccessfully {
    [[WL sharedInstance] hideSplashScreen];
    UIViewController* rootViewController = self.window.rootViewController;
    // Create a Cordova View Controller
    CDVViewController* cordovaViewController = [[CDVViewController alloc] init] ;
    cordovaViewController.startPage = [[WL sharedInstance] mainHtmlFilePath];
    // Adjust the Cordova view controller view frame to match its parent view bounds
    cordovaViewController.view.frame = rootViewController.view.bounds;
    // Display the Cordova view
    [rootViewController addChildViewController:cordovaViewController];
    [rootViewController.view addSubview:cordovaViewController.view];
    NSString* remoteURLStr= @"http://localhost:10080/conference/common/location.jsp"
;
    NSURL* remoteURL = [NSURL URLWithString: remoteURLStr];
    NSURLRequest* request= [NSURLRequest requestWithURL:remoteURL];
    [cordovaViewController.webView loadRequest:request];
}
```

2. If the application is running on a Tomcat application server, change the port to `8080`.
3. Right-click the WAR file and select **Run As > Run on Server**, and then select the MobileFirst Development Server.
4. Right-click the hybrid application and select **Run As > Run on MobileFirst Development Server**.

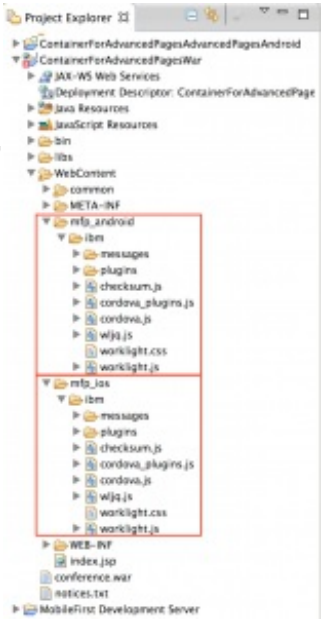
> **Note:** Due to some domain restrictions of the browser (web view), the remotely loaded application and MobileFirst Development Server must either be colocated on the same host and port, or have a common proxy host and port.

5. Right-click the iPhone folder and select **Run As > Xcode project**.
6. Run the Xcode project on an iOS simulator or device running iOS 7 or later.



Extending IBM Mobile Conference app to IBM MobileFirst Platform Foundation

Integration with IBM MobileFirst Platform Foundation



IBM MobileFirst Platform provides client libraries for hybrid application development. Although the APIs are platform-neutral, they are often backed by platform-specific implementations. Because the conference app is served remotely, these client-side libraries must be packaged with the conference app (WAR). Each platform-specific implementation is in its own folder structure in the web application.

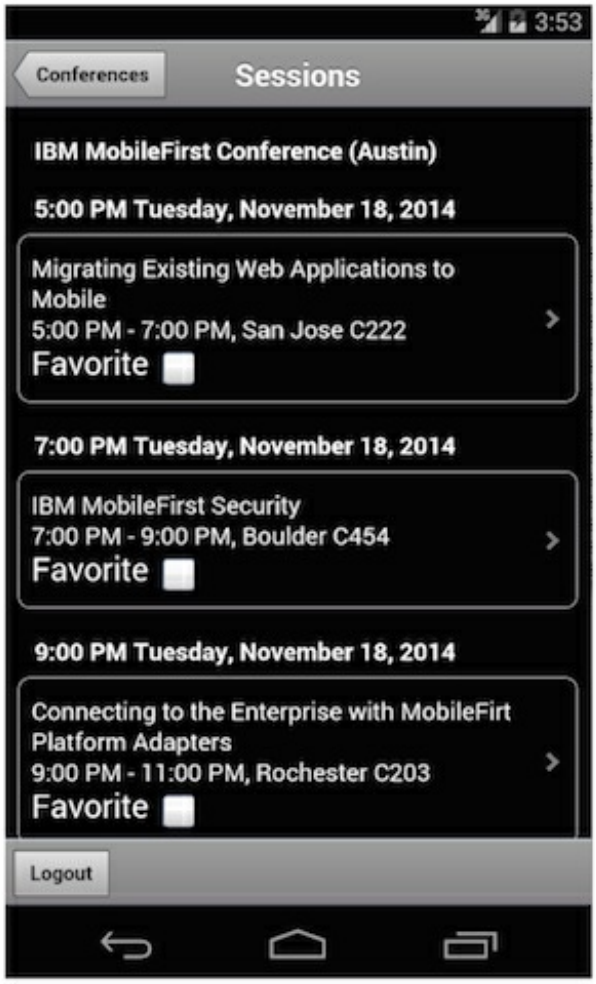
When the IBM Mobile Conference application completes the authentication process, the mobile device client initializes the device with the server by using `WL.Client.init()`. This provides a flexible model for application integrity validation, application updates, and other features.

```
<c:choose>
   <c:when test="${fn:contains(iOSClient, 'Android')}">
      <link rel="stylesheet" type="text/css"
         href="dojox/mobile/themes/android/android.css"></link>
   </c:when>
   <c:otherwise>
      <link rel="stylesheet" type="text/css"
         href="dojox/mobile/themes/iphone/iphone.css"></link>
   </c:otherwise>
</c:choose>
</head>
<body id="content" onload="WL.Client.init({onSuccess:function success(){ console.info('WL init success..
.'); }, connectOnStartup:false});">
   <c:set var="locationMap" value='${applicationScope.locationRegistry}' scope="session"/>
...
```

```
<c:choose>
   <c:when test="${fn:contains(iOSClient, 'Android')}">
   <script>
      // Define WL namespace.
      var WL = WL ? WL : {};
      /**
       * WLClient configuration variables.
       * Values are injected by the deployer that packs the gadget.
       */
       WL.StaticAppProps = {
  "APP_DISPLAY_NAME": "AdvancedPages",
  "APP_ID": "AdvancedPages",
  "APP_SERVICES_URL": "\/apps\/services\/",
  "APP_VERSION": "1.0",
  "ENVIRONMENT": "android",
  "LOGIN_DISPLAY_TYPE": "embedded",
  "WORKLIGHT_NATIVE_VERSION": "3826723549",
  "WORKLIGHT_PLATFORM_VERSION": "6.3.0.0",
  "WORKLIGHT_ROOT_URL": "\/apps\/services\/api\/AdvancedPages\/android\/
"
};
</script></p>
...
   </c:when>
   <c:otherwise></p>
    <script>
      // Define WL namespace.
      var WL = WL ? WL : {};
      /**
       * WLClient configuration variables.
       * Values are injected by the deployer that packs the gadget.
       */
       WL.StaticAppProps = {
  "APP_DISPLAY_NAME": "AdvancedPages",
  "APP_ID": "AdvancedPages",
  "APP_SERVICES_URL": "\/apps\/services\/",
  "APP_VERSION": "1.0",
  "ENVIRONMENT": "iphone",
  "LOGIN_DISPLAY_TYPE": "embedded",
  "WORKLIGHT_NATIVE_VERSION": "270878231",
  "WORKLIGHT_PLATFORM_VERSION": "6.3.0.0",
  "WORKLIGHT_ROOT_URL": "\/apps\/services\/api\/AdvancedPages\/iphone\/"
};
</script>
...
   </c:otherwise>
</c:choose>
```

Encrypted Cache

The Encrypted Offline Cache (EOC) API is used for securely storing data by using HTML5 local cache. The Conference app uses EOC to save a list of favorite sessions in a secure way.

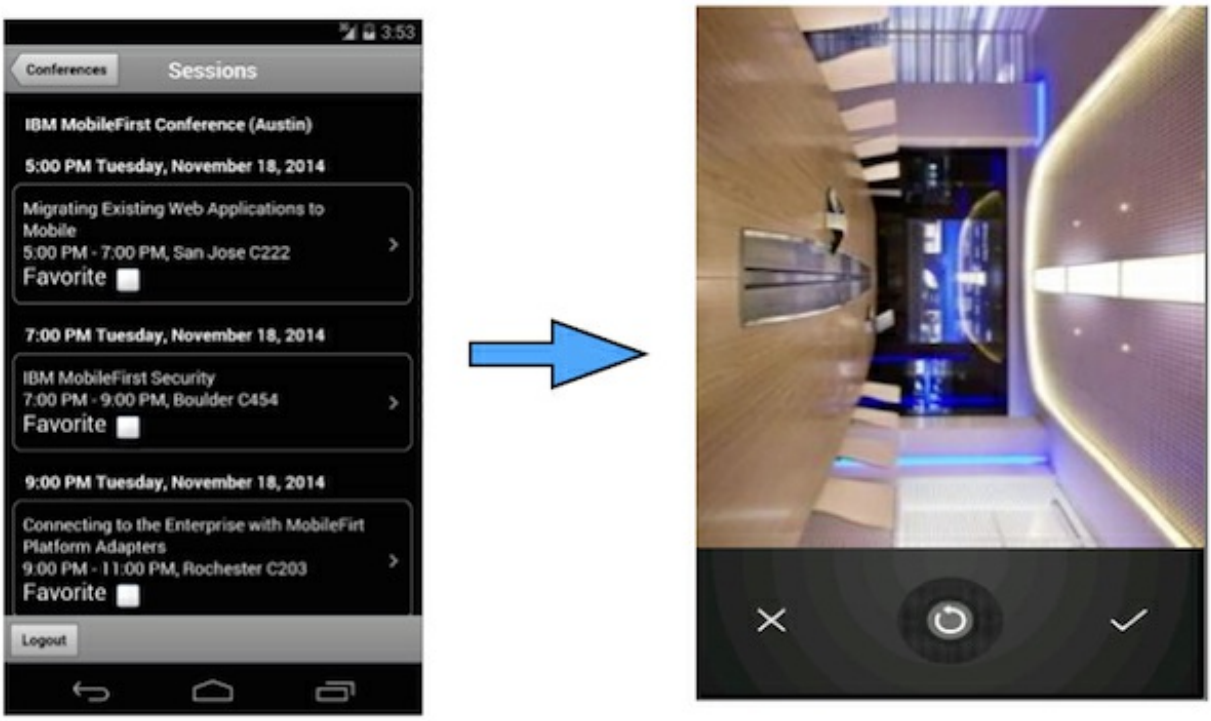



```
function __writeEOC(mykey, mydata, callback) {
    WL.EncryptedCache.write(mykey, mydata, function() {
        callback();
    }, function() {
        alert('An error occurred writing to the encrypted cache');
    });
}
...
function saveToCache(key, value) {
    if (isEOCOpen == false) {
        __openEOC(function() {
            __writeEOC(key, value, function() {
            });
        });
    } else {
        __writeEOC(key, value, function() {
        }, function() {
            alert('Unable to write to encrypted cache');
        });
    }
}
```

Camera support

Use the IBM MobileFirst Client API to extend the application to take photos of the conference. The

application has a social aspect, where users can view photos from the other conference attendees.



Proxy considerations

IBM MobileFirst Platform Foundation is compatible with most known proxy solutions.

- WebSphere HTTP Plug-in support: Requires a single shared `plugin-cfg.xml` file for routing requests to both the MobileFirst Development Server and the WebSphere Application Server instance that is hosting the IBM Mobile Conference App.
- Apache Web Server support: Requires a `mod_proxy` module to be loaded by the web server.

Sample application

Download the MobileFirst project (https://github.com/MobileFirst-Platform-Developer-Center/ContainerForAdvancedPages/tree/release71) and the server WAR project (https://github.com/MobileFirst-Platform-Developer-Center/ContainerForAdvancedPagesWar/tree/release71).