

# Java HTTP Adapter

## Overview

Java adapters provide free reign over connectivity to your backend. It is therefore your responsibility to ensure best practices regarding performance and other implementation details.

This tutorial covers an example of a Java adapter that connects to an RSS feed by using a Java `HttpClient`.

**Prerequisite:** Make sure to read the Java Adapters (../) tutorial first.

## RSSAdapterApplication

`RSSAdapterApplication` extends `MFPJAXRSApplication` and is a good place to trigger any initialization required by your application.

```
@Override
protected void init() throws Exception {
    RSSAdapterResource.init();
    logger.info("Adapter initialized!");
}
```

## RSSAdapterResource

`RSSAdapterResource` is where we handle the requests to your adapter.

```
@Path("/")
public class RSSAdapterResource {
}
```

`@Path("/")` means that the resources will be available at the URL `http(s)://host:port/ProjectName/adapters/AdapterName/`.

## HTTP Client

`RSSAdapterResource`

```
private static CloseableHttpClient client;
private static HttpHost host;

public static void init() {
    client = HttpClients.createDefault();
    host = new HttpHost("developer.ibm.com");
}
```

Because every request to your resource will create a new instance of `RSSAdapterResource`, it is important to reuse objects that may impact performance. In this example we made the `Http` client a static object and initialized it in a static `init()` method, which gets called by the `init()` of

RSSAdapterApplication as described above.

## Procedure resource

RSSAdapterResource

```
@GET
@Produces("application/json")
public void get(@Context HttpServletResponse response, @QueryParam("tag") String tag)
    throws ClientProtocolException, IOException, IllegalStateException, SAXException {
    if(tag!=null && !tag.isEmpty()){
        execute(new HttpGet("/mobilefirstplatform/tag/"+ tag +"/feed"), response);
    }
    else{
        execute(new HttpGet("/mobilefirstplatform/feed"), response);
    }
}
```

Our adapter exposes just one resource URL which allows to retrieve the RSS feed from the backend service.

- @GET means that this procedure only responds to HTTP GET requests.
- @Produces("application/json") specifies the Content Type of the response to send back. We chose to send the response as a JSON object to make it easier on the client-side.
- @Context HttpServletResponse response will be used to write to the response output stream. This enables us more granularity than returning a simple string.
- @QueryParam("tag") String tag enables the procedure to receive a parameter. The choice of QueryParam means the parameter is to be passed in the query ( /RSSAdapter/?tag=MobileFirst\_Platform). Other options include @PathParam, @HeaderParam, @CookieParam, @FormParam, etc.
- throws ClientProtocolException, ... means we are forwarding any exception back to the client. The client code is responsible for handling potential exceptions which will be received as HTTP 500 errors. Another solution (more likely in production code) is to handle exceptions in your server Java code and decide what to send to the client based on the exact error.
- execute(new HttpGet("/mobilefirstplatform/feed"), response). The actual HTTP request to the backend service is handled by another method defined later.

Depending if you pass a tag parameter, execute will retrieve a different build a different path and retrieve a different RSS file.

## execute()

RSSAdapterResource

```

public void execute(HttpUriRequest req, HttpServletResponse resultResponse)
    throws ClientProtocolException, IOException,
        IllegalStateException, SAXException {
    HttpResponse RSSResponse = client.execute(host, req);
    ServletOutputStream os = resultResponse.getOutputStream();
    if (RSSResponse.getStatusLine().getStatusCode() == HttpStatus.SC_OK){
        resultResponse.addHeader("Content-Type", "application/json");
        String json = XML.toJson(RSSResponse.getEntity().getContent());
        os.write(json.getBytes(Charset.forName("UTF-8")));

    }else{
        resultResponse.setStatus(RSSResponse.getStatusLine().getStatusCode());
        RSSResponse.getEntity().getContent().close();
        os.write(RSSResponse.getStatusLine().getReasonPhrase().getBytes());
    }
    os.flush();
    os.close();
}

```

- `HttpResponse RSSResponse = client.execute(host, req)`. We use our static HTTP client to execute the HTTP request and store the response.
- `ServletOutputStream os = resultResponse.getOutputStream()`. This is the output stream to write a response to the client.
- `resultResponse.addHeader("Content-Type", "application/json")`. As mentioned before, we chose to send the response as JSON.
- `String json = XML.toJson(RSSResponse.getEntity().getContent())`. We used `org.apache.wink.json4j.utils.XML` to convert the XML RSS to a JSON string.
- `os.write(json.getBytes(Charset.forName("UTF-8")))` the resulting JSON string is written to the output stream.

The output stream is then flushed and closed.

If `RSSResponse` is not 200 OK, we write the status code and reason in the response instead.

## Results

The adapter should return the RSS feed converted to JSON.

```

{
  "rss": {
    "channel": {
      "description": "Develop, test, manage, and secure your mobile web, native
and hybrid apps",
      "generator": "http://wordpress.org/?v=4.2.4",
      "item": [
        {
          "category": [
            "Mobile",
            "android",
            "Mobile Quality Assurance",
            "mobile_development",
            "mobilefirst",
            "xamarin"

```

```

    ],
    "commentRss": "https:\\\\developer.ibm.com\\mobilefirstplatform\\2015\\09\\01\\integrating-mqa-into-xamarin-android-app\\feed\\",
    "comments": [
        "https:\\\\developer.ibm.com\\mobilefirstplatform\\2015\\09\\01\\integrating-mqa-into-xamarin-android-app\\#comments",
        "0"
    ],
    "creator": "Vidyasagar MSC",
    "description": "<p>The post <a rel=\\\"nofollow\\\" href=\\\"https:\\\\developer.ibm.com\\mobilefirstplatform\\2015\\09\\01\\integrating-mqa-into-xamarin-android-app\\\">Integrating MQA into Xamarin.Android app</a> appeared first on <a rel=\\\"nofollow\\\" href=\\\"https:\\\\developer.ibm.com\\mobilefirstplatform\\\">IBM Mobile First Platform</a>.</p>",
    "encoded": "<p>It all startedÂ when I received an email seeking help on using MQA or to be more precise integrating MQA into Xamarin based android app. Before jumping into addressing the problem, let&#8217;s define MQA.</p>\\n<h4>What is MQA?</h4>\\n<p>MQA stands for &#8220;Mobile Quality Assurance&#8221; and is part of the IBM MobileFirst Platform.</p>\\n<blockquote><p><em><span style=\\\"line-height: 1.5\\\">IBM MQA provides line of business professionals and development teams with insightful and streamlined quality feedback and metrics from both pre-production and production, enabling them to prioritize and take action to support a dynamic mobile app strategy.</span></em></p></blockquote>\\n<p>The Features of MQA are</p>>\\n<div style=\\\"width: 1058px\\\" class=\\\"wp-caption aligncenter\\\"><a href=\\\"http:\\\\vidyasagarmsc.com\\wp-content\\uploads\\2015\\09\\MQA1.png\\\"><img class=\\\"size-full wp-image-65\\\" src=\\\"http:\\\\vidyasagarmsc.com\\wp-content\\uploads\\2015\\09\\MQA1.png\\\" alt=\\\"Features of Mobile Quality Assurance.\\\" width=\\\"1048\\\" height=\\\"350\\\" \\/></a><p class=\\\"wp-caption-text\\\">Features of Mobile Quality Assurance.</p></div>\\n<p><em><strong>Note</strong></em>: To understand more about MQA, visitÂ <a href=\\\"http:\\\\www-03.ibm.com\\software\\products\\en\\ibm-mobilefirst-platform-quality-assurance\\\">IBM Mobile Quality Assurance</a></p>\\n<p>So, by now we should be good with the first part of our blog title that is MQA. So, the next question is</p>\\n<h4>What is Xamarin.Android?</h4>\\n<p>Xamarin is a platform to create nativeÂ iOS, Android, Mac and Windows apps in C#.Â Xamarin.Android allows us to create native Android applications using the same UI controls we would in Java, except with the flexibility and elegance of a modern language (C#).</p>\\n<p>As we are good with the definitions, let&#8217;s address the problem.</p>\\n<p><strong>What&#8217;s the problem in integrating MQA into Xamarin Android app?</strong></p>\\n<p>At the time of this blog post, the available MQA SDKs are iOS native SDK, Android native SDK and Javascript Â SDK.</p>\\n<p>So, we have to find a workaround to address this use-case. The initial step is to download the Android MQA SDK and see what&#8217;s provided. you can download it from <a href=\\\"http:\\\\www-01.ibm.com\\support\\knowledgecenter\\#!\\SSJML5_6.0.0\\com.ibm.mqa.uau.saas.doc\\topics\\c_AndroidSDKsForDownload.html\\\">here</a>. Once successfully downloaded and unzipped, we should see a jar file namely <strong><em>MQA-Android-library-&lt;version number&gt;.jar</em>Â</strong> under lib folder<strong>.</strong></p>\\n<div style=\\\"width: 634px\\\" class=\\\"wp-caption aligncenter\\\"><a href=\\\"http:\\\\vidyasagarmsc.com\\wp-content\\uploads\\2015\\09\\MQA2.png\\\"><img class=\\\"size-full wp-image-70\\\" src=\\\"http:\\\\vidyasagarmsc.com\\wp-content\\uploads\\2015\\09\\MQA2.png\\\" alt=\\\"MQA Android SDK \\\" width=\\\"624\\\" height=\\\"440\\\" \\/></a><p class=\\\"wp-caption-text\\\">MQA Android SDK</p></div>\\n<p>As Xamarin is C# based, What can we do with this jar file?</p>\\n<p>We haveÂ <strong>Xamarin bindings</strong> to our rescue, which helps using in consuming .JARs from C#.</p>\\n<p><strong><em>Note</em>:</strong> Steps to consume MQA Android JAR in a Xamarin.Android app is mentionedÂ <a href=\\\"https:\\\\developer.xamarin.com\\guides\\android\\advanced_topics\\java_integration_overview\\binding_a_java_library_(.jar)\\\">here</a></p>\\n<div style=\\\"width: 257px\\\" class=\\\"wp-caption aligncenter\\\"><a href=\\\"http:\\\\vidyasagarmsc.com\\wp-content\\uploads\\2015

```



Xamarin binding project with MQA Android .JAR file

The files of our interest here are **MQA-Android-library-2.7.4.jar** (Version number may vary) and **Metadata.xml**.

- MQA-Android-library-2.7.4.jar file will have all the MQA related classes and methods required for us to start an Android MQA session.
- Metadata.xml- Allows changes to be made to the final API, such as changing the namespace of the generated binding.

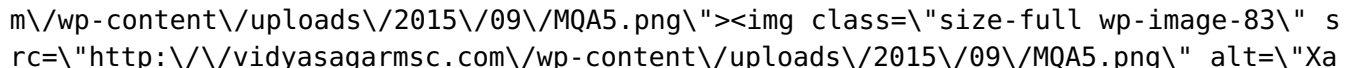
Based on the errors thrown while building the project, Metadata.xml in my case looks like this

```

brush: xml; title: ; notranslate
<?xml version="1.0" encoding="utf-8" ?>
<!-- This sample removes the class: android.support.v4.content.AsyncTaskLoader.LoadTask:
remove-node path="/api/package[@name='android.support.v4.content']/class[@name='AsyncTaskLoader.LoadTask']" -->
<!-- This sample removes the method: android.support.v4.content.CursorLoader.loadInBackground:
remove-node path="/api/package[@name='android.support.v4.content']/class[@name='CursorLoader']/method[@name='loadInBackground']" -->
<!-- This sample removes the class: ext.com.google.inject.spi.InjectionPoint.Factory.1
remove-node path="/api/package[@name='ext.com.google.inject.spi']/class[@name='InjectionPoint.Factory.1']" -->
<!-- This sample removes the class: ext.com.google.inject.spi.InjectionPoint.Factory.2
remove-node path="/api/package[@name='ext.com.google.inject.spi']/class[@name='InjectionPoint.Factory.2']" -->
<!-- This sample removes the interface: com.applause.android.log.LoggerInterface
remove-node path="/api/package[@name='ext.com.google.inject.internal']/interface[@name='LoggerInterface']" -->
<!-- This sample removes the class: ext.com.google.inject.matcher.Matcher
remove-node path="/api/package[@name='ext.com.google.inject.matcher']/class[@name='AbstractRequest']" -->
<!-- This sample removes the method: ext.com.google.inject.spi.Elements.RecordingBinder.bind
and count(parameter)=1 and parameter[1][@type='ext.com.google.inject.Key']
remove-node path="/api/package[@name='com.applause.android.util']/class[@name='AbstractRequest']/method[@name='bind']" -->
<!-- This sample removes the class: ext.com.google.inject.spi.Elements.RecordingBinder
and count(parameter)=1 and parameter[1][@type='ext.com.google.inject.Key']
remove-node path="/api/package[@name='com.applause.android.util']/class[@name='AbstractRequest']/method[@name='bind']" -->
<!-- This sample removes the class: ext.com.google.inject.spi.Elements.RecordingBinder
and count(parameter)=1 and parameter[1][@type='ext.com.google.inject.Key']
remove-node path="/api/package[@name='com.applause.android.util']/class[@name='AbstractRequest']/method[@name='bind']" -->
<!-- This sample removes the class: ext.com.google.inject.spi.Elements.RecordingBinder
and count(parameter)=1 and parameter[1][@type='ext.com.google.inject.Key']
remove-node path="/api/package[@name='com.applause.android.util']/class[@name='AbstractRequest']/method[@name='bind']" -->
  
```

Once all the errors are fixed and your binding project builds successfully, add a new Xamarin Android project (if you haven't added yet). Now, add MQA binding project reference in our Xamarin android app.

**Note:** Both your binding project and Xamarin.Android project should be of same **target framework**. You can verify this by right clicking on your project -> Options -> General.



Xamarin Android project with added reference to MQA

Now, let's start MQA android session in our Count.Android app. Before doing this, we should create a MQA service on IBM Bluemix. You can follow the instructions mentioned at <https://www.ng.bluemix.net/docs/#services/MobileQualityAssurance/index.html#MobileQualityAssurance> or watch this video.



Starting a session with the Android SDK entails three steps. First, build a configuration to define how a session works with your app. Second, start the session itself. Third,

So, open <strong>MainActivity.cs</strong> file (Android Project) and paste the code provided below</p>

```

using System;
using Android.App;
using Android.Content;
using Android.Runtime;
using Android.Views;
using Android.Widget;
using Android.OS;

namespace Count.Android
{
    [Activity (Label = "Count.Android", MainLauncher = true, Icon = "@drawable/icon")]
    public class MainActivity : Activity
    {
        int count = 1;
        // Use your own generated APP KEY
        const string APP_KEY = "lg59b7d884f9fdf5426162e5cb1f87a700648bce4fg0glg379e0d3a";
        protected override void onCreate (Bundle bundle)
        {
            base.OnCreate (bundle);
            // MQA Android session configuration
            Configuration configuration = new Configuration.Builder(this)
                .WithAPIKey(APP_KEY) // Provides the quality assurance application APP_KEY
                .WithMode(MQA.Mode.Qa) // Selects the quality assurance application mode
                .WithReportOnShakeEnabled(true) // Enables shake report trigger
                .WithDefaultUser("default_user@email.com") // Sets a default user and user selection
                .Build();
            // Starting MQA Android Session
            MQA.StartNewSession (this, configuration);
            // Set our view from the "main" layout resource
            SetContentView (Resource.Layout.Main);
            // Get our button from the layout resource, and attach an event to it
            Button button = FindViewById<Button>(Resource.Id.myButton);
            button.Click += delegate {button.Text = string.Format("{0} clicks!", count++);};
        }
    }
}

```

Now, MQA is integrated into Xamarin.Android app and we are good to go.</p>
 What we have implemented above is just a drop in the Ocean of MQA, to know more about MQA and its features &#8211; Visit [http://www-01.ibm.com/support/knowledgecenter/?lang=en#/SSJML5\\_6.0.0/com.ibm.mqa.uau.saas.doc/mqa600saas\\_welcome.html](http://www-01.ibm.com/support/knowledgecenter/?lang=en#/SSJML5_6.0.0/com.ibm.mqa.uau.saas.doc/mqa600saas_welcome.html) target="\_blank">MQA Knowledge Centre</a></p>
 Happy Coding !!!</p>
 The post <https://developer.ibm.com/mobilefirstplatform/2015/09/01/integrating-mqa-into-xamarin-android-app/>>I ntegrating MQA into Xamarin.Android app</a> appeared first on <https://developer.ibm.com/mobilefirstplatform/>>IBM MobileFirst Platform</a>.</p>

```

    "guid": {
        "content": "https://developer.ibm.com/mobilefirstplatform/?p=16964",
        "isPermaLink": "false"
    },
    "link": "https://developer.ibm.com/mobilefirstplatform/2015/09/01/integrating-mqa-into-xamarin-android-app/",
    "pubDate": "Tue, 01 Sep 2015 20:27:07 +0000",
    "title": "Integrating MQA into Xamarin.Android app"
},
{
    "category": [
        "Uncategorized",
        "MobileFirst_Platform"
    ],
    "commentRss": "https://developer.ibm.com/mobilefirstplatform/2015/08/19/try-on-bluemix-and-buy-mfp/feed/",
    "comments": [
        "https://developer.ibm.com/mobilefirstplatform/2015/08/19/try-on-bluemix-and-buy-mfp/#comments",
        "0"
    ],
    "creator": "ChethanKumar",
    "description": "<p>The post 
```

```

developer.ibm.com/mobilefirstplatform/2015/06/19/try-on-bluemix-and-buy-mp/\>
Try on Bluemix and migrate to on-prem MobileFirst Platform</a> appeared first on <
a rel="nofollow" href="https://developer.ibm.com/mobilefirstplatform">IBM Mo
bileFirst Platform</a>.</p>",

```

[illegible]

```

ntId"); String deviceId, \n\t\t\t\t@PathParam(&quot;realName&quot;); String realName) throws Exception {\n\t\t\t\t\n\t\t\t\tJSONObject userStoreJson = (JSONObject) JSON.parse(USER_STORE_JSON);\n\t\t\t\tJSONObject failedResponseJson = (JSONObject) JSON.parse(FAILURE_JSON);\n\t\t\t\t\n\t\t\t\tif(payload == null || payload.isEmpty()) {\n\t\t\t\t\treturn failedResponseJson;\n\t\t\t\t}\n\t\t\t\tJSONObject payloadJson = (JSONObject) JSON.parse(payload);\n\t\t\t\tJSONObject challengeAnswer = (JSONObject) payloadJson.get(&quot;challengeAnswer&quot;);\n\t\t\t\t\n\t\t\t\tif (challengeAnswer == null ) {\n\t\t\t\t\treturn failedResponseJson;\n\t\t\t\t}\n\t\t\t\t\n\t\t\t\tString userName = (String) challengeAnswer.get(&quot;userName&quot;);\n\t\t\t\tString password = (String) challengeAnswer.get(&quot;password&quot;);\n\t\t\t\t\n\t\t\t\tif (userName == null || userName.isEmpty() || password == null || password.isEmpty()) {\n\t\t\t\t\treturn failedResponseJson;\n\t\t\t\t}\n\t\t\t\t\n\t\t\t\tif (userStoreJson.containsKey(userName)) {\n\t\t\t\t\tJSONObject userInfoJson = (JSONObject) userStoreJson.get(userName);\n\t\t\t\t\tString userPassword = (String) userInfoJson.get(&quot;password&quot;);\n\t\t\t\t\tString userDisplayName = (String) userInfoJson.get(&quot;displayName&quot;);\n\t\t\t\t\t\n\t\t\t\t\tif (password.equals(userPassword)) {\n\t\t\t\t\t\tJSONObject returnJson = new JSONObject();\n\t\t\t\t\t\tJSONObject userIdentityJson = new JSONObject();\n\t\t\t\t\t\tuserIdentityJson.put(&quot;userName&quot;, userName);\n\t\t\t\t\t\tuserIdentityJson.put(&quot;displayName&quot;, userDisplayName);\n\t\t\t\t\t\treturnJson.put(&quot;status&quot;, &quot;success&quot;);\n\t\t\t\t\t\treturnJson.put(&quot;userIdentity&quot;, userIdentityJson);\n\t\t\t\t\t\treturn returnJson;\n\t\t\t\t\t}\n\t\t\t\t\t\n\t\t\t\t\treturn failedResponseJson;\n\t\t\t\t}\n\t\t\t\t\n</pre>\n<p>The Locals store adapter contains few http APIs to perform some basic operations like Add, Update, Create and Delete in client application.</p>\n<pre class=\"brush: java; title: ; notranslate\"> @GET\n\t\t@Path(&quot;/getAllItems&quot;)\n\t\tpublic String getAllItems() throws IOException{\n\t\t\t\tinit();\n\t\t\t\tJSONArray jsonArray = new JSONArray();\n\t\t\t\tfor(Object key : props.keySet()){ \n\t\t\t\t\tjsonArray.add(parser.parse(props.getProperty((String) key)).getAsJsonObject());\n\t\t\t\t}\n\t\t\t\treturn jsonArray.toString();\n\t\t}\n\t\t\n\t\t@PUT\n\t\t@Path(&quot;/addItem&quot;)\n\t\tpublic void addItem(String itemJson) \n\t\t\t\tthrows IOException, URISyntaxException{\n\t\t\t\t\ttry{\n\t\t\t\t\t\tinit();\n\t\t\t\t\t\tint newKey = props.keySet().size()+1;\n\t\t\t\t\t\tprops.put(String.valueOf(newKey), itemJson);\n\t\t\t\t\t\tURL url = this.getClass().getClassLoader().getResource(&quot;data.properties&quot;);\n\t\t\t\t\t\tFile file = new File(url.toURI().getPath());\n\t\t\t\t\t\tFileOutputStream foStream = new FileOutputStream(file);\n\t\t\t\t\t\tprops.store(foStream, &quot;saving new item&quot;);\n\t\t\t\t\t\tfoStream.close();\n\t\t\t\t\t\tcatch(IOException ioe){\n\t\t\t\t\t\t\tioe.printStackTrace();\n\t\t\t\t\t\t}\n\t\t\t\t\t\n\t\t\t\t\t@POST\n\t\t\t\t\t@Path(&quot;/addAllItems&quot;)\n\t\t\t\t\tpublic String addAllItems(String itemsJson) \n\t\t\t\t\t\tthrows URISyntaxException, IOException{\n\t\t\t\t\t\t\ttry{\n\t\t\t\t\t\t\t\tinit();\n\t\t\t\t\t\t\t\tclearAllData();\n\t\t\t\t\t\t\t\tJSONArray jsonArr = parser.parse(itemsJson).getAsJSONArray();\n\t\t\t\t\t\t\t\tfor(int i=0;i<jsonArr.size();i++){ \n\t\t\t\t\t\t\t\t\tprops.put(String.valueOf(i+1), jsonArr.get(i).toString());\n\t\t\t\t\t\t\t\t}\n\t\t\t\t\t\t\t\tURL url = this.getClass().getClassLoader().getResource(&quot;data.properties&quot;);\n\t\t\t\t\t\t\t\tFile file = new File(url.toURI().getPath());\n\t\t\t\t\t\t\t\tFileOutputStream foStream = new FileOutputStream(file);\n\t\t\t\t\t\t\t\tprops.store(foStream, &quot;saving new item&quot;);\n\t\t\t\t\t\t\t\tfoStream.close();\n\t\t\t\t\t\t\t\treturn &quot;true&quot;;\n\t\t\t\t\t\t\tcatch(IOException ioe){\n\t\t\t\t\t\t\t\tioe.printStackTrace();\n\t\t\t\t\t\t\t}\n\t\t\t\t\t\t\treturn &quot;false&quot;;\n\t\t\t\t\t\t}\n\t\t\t\t\t\t\n\t\t\t\t\t\t@DELETE\n\t\t\t\t\t\t@Path(&quot;/clearAll&quot;)\n\t\t\t\t\t\tpublic String clearAllData() \n\t\t\t\t\t\t\tthrows MissingConfigurationException, URISyntaxException, IOException{\n\t\t\t\t\t\t\t\tinit();\n\t\t\t\t\t\t\t\tprops.clear();\n\t\t\t\t\t\t\t\tSystem.out.println(&quot;Size : &quot;+props.size());\n\t\t\t\t\t\t\t\tURL url = this.getClass().getClassLoader().getResource(&quot;data.properties&quot;);\n\t\t\t\t\t\t\t\tFile file = new File(url.toURI().getPath());\n\t\t\t\t\t\t\t\tFileOutputStream foStream = new FileOutputStream(file);\n\t\t\t\t\t\t\t\tprops.store(foStream, &quot;clearing all data&quot;);\n\t\t\t\t\t\t\t\tfoStream.close();\n\t\t\t\t\t\t\t\treturn &quot;cleared&quot;;\n\t\t\t\t\t\t\t}\n\t\t\t\t\t\t\n</pre>\n</li>\n<li> Add TAI Extension in the following path of server directory server\usr\extensions<br \/>\nTAI Extension Link : Download the extension.zip from <a href=\"https://hub.jazz.net/project/chethan/parkstore-bluemix-server/overview\" target=\"_blank\">here</a>\n</li>\n<li> Add TAI Security constraint in web.xml file for both the projects.\n<pre class=\"brush: xml; title: ; notranslate\"><!--security

```



```

rity-constraint>\n \t<web-resource-collection>\n \t \t <web-resou
rce-name>LocalstoreApplication</web-resource-name>\n \t \t <url-pa
ttern>/apps/*</url-pattern>\n \t \t </web-resource-collection>\n
\t \t <auth-constraint>\n \t \t \t <role-name>TAIUserRole</role-name>
t;\n \t \t </auth-constraint>\n \t \t </security-constraint>\n \t \t <security-
role id="SecurityRole_TAIUserRole" >\n \t \t \t <role-name>TAIUserR
ole</role-name>\n \t \t </security-role></pre>\n</li>\n<li> Add OAuthTai f
eature in server.xml\n<pre class="brush: plain; title: ; nottranslate"><!--featur
e>usr:OAuthTai-1.0</feature></pre>\n</li>\n<li> Protect the Url&#8217;s
using TAI by adding following code in server.xml\n<pre class="brush: xml; title: ;
nottranslate"> \t \t <usr_OAuthTAI id="myOAuthTAI" realmName="imfRealm
">\n \t \t \t <securityConstraint httpMethods="GET, POST">\n \t \t \t \t <securityConstraint httpMethods=
">GET, POST">\n \t \t \t \t \t <securedURLs=">\n \t \t \t \t \t \t <securedURLs="
"/usr_OAuthTAI>\n \n \t \t <webApplication id="custom-oauth-java" locat
ion="custom-oauth-java.war" name="custom-oauth-java">\n
\t \t <application-bnd>\n \t \t \t <security-role name="TAIUserRole">\n \t
\t \t \t <special-subject type="ALL_AUTHENTICATED_USERS">\n \t \t \t \t </s
ecurity-role>\n \t \t \t </application-bnd>\n \t \t </webApplication>\n \t
\t <webApplication id="LocalstoreAdapter" location="LocalstoreAdapte
r.war" name="LocalstoreAdapter">\n
\t \t <application-bnd>\n \t \t \t <security-role name="TAIUserRole">\n \t
\t \t \t <special-subject type="ALL_AUTHENTICATED_USERS">\n \t \t \t \t </s
ecurity-role>\n \t \t \t </application-bnd>\n \t \t </webApplication></pre>\n</li>\n<li> Specify the
IMF Auth Url inside Server.env file in liberty.\n<pre class="brush: xml; title: ;
nottranslate">imfServiceUrl=https://imf-authserver.ng.bluemix.net/imf-authserver
</pre>\n</li>\n<li> Create a server package which contains above two application
s using following command.\n<pre class="brush: plain; title: ; nottranslate">.\n/s
erver package ${server_name} --include=usr</pre>\n</li>\n<li> Push the newly crea
ted server package to Bluemix using following command.\n<pre class="brush: plain;
title: ; nottranslate">cf push ${app_name} -p ${path_to_server_package_zip}</pre>
\n</li>\n</ul>\n<h3>Advance Mobile Access service</h3>\n<ul>\n<li> Bind the pus
hed application to Advance Mobile Access Service.\n<p><a href="https://developer
.ibm.com/mobilefirstplatform/wp-content/uploads/sites/32/2015/07/Screen-Sho
t-2015-07-17-at-3.28.04-pm.png"></a>\n</li>\n<li> Register your cl
ient application in AMA dashboard. For more info refer documentation : <a href="ht
tps://www.ng.bluemix.net/docs/services/mobileaccess/index.html" target="_bl
ank">click here</a>\n<p><a href="https://developer.ibm.com/mobilefirstplatfor
m/wp-content/uploads/sites/32/2015/07/Screen-Shot-2015-07-17-at-3.42.32-pm.p
ng"></a>\n</li>\n<li> AMA provides Facebook, Google, or a custom identity
provider to authenticate access to protected resources. Add Custom identity provide
r feature as it can be migrated to MFPPF and specify the corresponding JAX-RS custom
authentication application URL and realm name.<br \/>\n<a href="https://develope
r.ibm.com/mobilefirstplatform/wp-content/uploads/sites/32/2015/07/Screen-Sh
ot-2015-07-17-at-4.03.21-pm.png"></a>\n</li>\n<li> Add the following code inside
didFinishLaunchingWithOptions function in AppDelegate of client application which w
ill register the realm and initialize connection with Bluemix Application.\n<pre cl
ass="brush: plain; title: ; nottranslate"> IMFClient.sharedInstance().registerAut

```

```

henticationDelegate(customAuthDelegate, forRealm: &quot;customAuthRealm_3&quot;)\n
MFClient.sharedInstance().initializeWithBackendRoute(&quot;https://parkstore.myblu
uemix.net&quot;;, backendGUID: &quot;5e3ad88d-dd48-469d-b46f-2c4ad66b5345&quot;)<\p
re>\n<\li>\n<li> The following is the sample code to invoke the Rest url&#8217;s i
n client application.\n<pre class="brush: plain; title: ; notranslate">var reques
t: IMFResourceRequest = IMFResourceRequest(path: &quot;https://parkstore.mybluem
ix.net/LocalstoreAdapter/apps/5e3ad88d-dd48-469d-b46f-2c4ad66b5345/localstore/
getAllItems&quot;;, method: &quot;GET&quot;)\n          request.sendWithCompletionHand
ler { (wlResponse:IMFResponse!, err:NSError!) -&gt; Void in<\pre>\n<\li>\n<\ul>\n
<h3>Push Service for iOS 8<\h3>\n<ul>\n<li> Bind the application with Push Servic
e for iOS 8<br \/>\n<a href="https://developer.ibm.com/mobilefirstplatform/wp-
content/uploads/sites/32/2015/07/Screen-Shot-2015-07-17-at-4.07.01-pm.png"><
img src="https://developer.ibm.com/mobilefirstplatform/wp-content/uploads/si
tes/32/2015/07/Screen-Shot-2015-07-17-at-4.07.01-pm-1024x367.png" alt="Push A
MA" width="980" height="351" class="alignnone size-large wp-image-14891" \/>
</a>\n<\li>\n<li> Configure Apple Push Notification service (APNs) which requir
es Apple Developer Account and Generate pl2 certificates. Documentation link : <a h
ref="https://www.ng.bluemix.net/docs/services/mobilepush/index.html#certific
ates" target="_blank">click here</a>\n<\li>\n<li> Upload the generated pl2 cer
tificate in Push service dashboard\n<p><a href="https://developer.ibm.com/mobil
efirstplatform/wp-content/uploads/sites/32/2015/07/Screen-Shot-2015-07-12-at
-6.47.14-pm.png"></a>\n<\li>\n<li>Add the following code inside didFinishLa
unchingWithOptions function in AppDelegate of client application which will regist
er notifications in client app.\n<pre class="brush: plain; title: ; notranslate">
let notificationTypes: UIUserNotificationType = UIUserNotificationType.Badge | UIUs
erNotificationType.Alert | UIUserNotificationType.Sound\n          let notificationSe
ttings: UIUserNotificationSettings = UIUserNotificationSettings(forTypes: notificat
ionTypes, categories: nil)\n          \n          application.registerUserNotification
Settings(notificationSettings)\n          application.registerForRemoteNotifications(
)<\pre>\n<\li>\n<li>Add the following code inside didRegisterForRemoteNotificatio
nsWithDeviceToken function in AppDelegate of client application which will regist
er pushclient and subscribe to tag in client app.\n<pre class="brush: plain; title:
; notranslate">IMFPushClient.sharedInstance().registerDeviceToken(deviceToken, com
pletionHandler: { (response, error) -&gt; Void in\n          if error != nil {\n
println(&quot;Error during device registration \\\(error.description)&quot;)\n
}\n          else {\n          println(&quot;Response during device regist
ration json: \\\(response.responseJson.description)&quot;)\n          var tags
= [&quot;parkstore&quot;]\n          IMFPushClient.sharedInstance().subscrib
eToTags(tags, completionHandler: { (response:IMFResponse!, err:NSError!) -&gt; Void
in\n          if err != nil {\n          println(&quot;The
re was an error while subscribing to tag&quot;)\n          }else{\n
println(&quot;Successfully subscribe to tag parkstore&quot;)\n
}\n          })\n          }<\pre>\n<\li>\n<li>Add the following functio
n inside Appdelegate which triggers when push notification arrived in client app.\n
<pre class="brush: plain; title: ; notranslate">func application(application: UIA
pplication, didReceiveRemoteNotification userInfo: [NSObject : AnyObject]) {\n
println(&quot;Got remote Notification. Data : \\\(userInfo.description)&quot;)\n
let info = userInfo as NSDictionary\n          let data = info.objectForKey(&quot;aps
&quot;)?.objectForKey(&quot;alert&quot;) as! NSDictionary\n          let userData = d
ata.objectForKey(&quot;body&quot;) as! String\n          let alertView = UIAlertView(
title: &quot;WishList!&quot;, message: &quot;\\(userData)&quot;, delegate: nil, can
celButtonTitle: &quot;OK&quot;)\n          alertView.show()\n          }\n}<\pre>\n<\li>\n<\ul>\n<h2 id="migrateblu">Existing Bluemix Client Application</h2>\n<p>Ad
d the following code snippets to the existing Bluemix Client Application and name t

```

and the following code snippets to the existing Bluemix client application and name the application with same name which you have registered in Advance Mobile Access Dashboard.

- Add the following code inside `didFinishLaunchingWithOptions` function in `AppDelegate` of client application which will register the realm and initialize connection with Bluemix Application.

```

; nottranslate"> IMFClient.sharedInstance().registerAuthenticationDelegate(customAuthDelegate, forRealm: &quot;customAuthRealm_3&quot;)\nIMFClient.sharedInstance().initWithBackendRoute(&quot;https://parkstore.mybluemix.net&quot;;, backendGUID : &quot;5e3ad88d-dd48-469d-b46f-2c4ad66b5345&quot;)</pre>

```

- The following is the sample code to invoke the Rest url's in client application.

```

var request: IMFResourceRequest = IMFResourceRequest(path: &quot;https://parkstore.mybluemix.net/LocalstoreAdapter/apps/5e3ad88d-dd48-469d-b46f-2c4ad66b5345/localstore/getAllItems&quot;;, method: &quot;GET&quot;)\n
request.sendWithCompletionHandler { (wResponse:IMFResponse!, err:NSError!) -> Void in</pre>

```

- Add the following code inside `didRegisterForRemoteNotificationsWithDeviceToken` function in `AppDelegate` of client application which will register pushclient and subscribe to tag in client app.

```

IMFPushClient.sharedInstance().registerDeviceToken(deviceToken, completionHandler: { (response, error) -> Void in
    if error != nil {
        println(&quot;Error during device registration \\\(error.description)&quot;)\n
    } else {
        println(&quot;Response during device registration json: \\\(response.responseJson.description)&quot;)\n
        var tags = [&quot;parkstore&quot;]\n
        IMFPushClient.sharedInstance().subscribeToTags(tags, completionHandler: { (response:IMFResponse!, err:NSError!) -> Void in
            if err != nil {
                println(&quot;There was an error while subscribing to tag&quot;)\n
            } else {
                println(&quot;Successfully subscribe to tag parkstore&quot;)\n
            }
        })
    }
}

```

- Add the following function inside `AppDelegate` which triggers when push notification arrived in client app.

```

func application(application: UIApplication, didReceiveRemoteNotification userInfo: [NSObject : AnyObject]) {
    println(&quot;Got remote Notification. Data : \\\(userInfo.description)&quot;)\n
    let info = userInfo as NSDictionary\n
    let data = info objectForKey(&quot;aps&quot;)?.objectForKey(&quot;alert&quot;) as! NSDictionary\n
    let userData = data objectForKey(&quot;body&quot;) as! String\n
    let alertView = UIAlertView(title: &quot;WishList!&quot;;, message: &quot;\\\(userData)&quot;;, delegate: nil, cancelButtonTitle: &quot;OK&quot;)\n
    alertView.show()\n
}

```

The following are the screenshots of client application.

[https://developer.ibm.com/mobilefirstplatform/wp-content/uploads/sites/32/2015/07/IMG\\_0020.jpg](https://developer.ibm.com/mobilefirstplatform/wp-content/uploads/sites/32/2015/07/IMG_0020.jpg)



[https://developer.ibm.com/mobilefirstplatform/wp-content/uploads/sites/32/2015/07/IMG\\_0021.jpg](https://developer.ibm.com/mobilefirstplatform/wp-content/uploads/sites/32/2015/07/IMG_0021.jpg)



[https://developer.ibm.com/mobilefirstplatform/wp-content/uploads/sites/32/2015/07/IMG\\_0025.jpg](https://developer.ibm.com/mobilefirstplatform/wp-content/uploads/sites/32/2015/07/IMG_0025.jpg)



ads\/sites\32\2015\07\IMG\_0025-169x300.jpg" alt="IMG\_0025" width="169" height="300" class="alignnone size-medium wp-image-14920" \></a><a href="https://developer.ibm.com/mobilefirstplatform/wp-content/uploads/sites/32/2015/07/IMG\_0024.jpg"></a><a href="https://developer.ibm.com/mobilefirstplatform/wp-content/uploads/sites/32/2015/07/IMG\_0026.jpg"></a></li></ul><h2>Migration to On-Prem</h2><h3 id="configureclient">Migration of Client Application</h3><p>Migration of Client Application includes following two steps</p><li>Configuring Cocoapods</li><li>Client App Migration</li><h3 id="cocoapods">Configuring Cocoapods</h3><p>If CocoaPods has not been installed on a specific computer:</p><ul><li>Follow the &#8220;Getting Started&#8221; guide for CocoaPods installation: <http://guides.cocoapods.org/using/getting-started.html></li><li>Open &#8220;Terminal&#8221; at the installation location and run the &#8220;pod init&#8221; command</li></ul><p>The following steps assume that the client application is working with CocoaPods. If not, follow this &#8220;Using CocoaPods&#8221; documentation : <a href="http://guides.cocoapods.org/using/using-cocoapods.html" target="\_blank">click here</a></p><p>In both cases, the instructions below explain how to edit the &#8220;Podfile&#8221; file.</p><ol><li>Open the &#8220;Podfile&#8221; file located in the root of your XCode project in a favourite text editor.</li><li>Comment out or remove the existing content.</li><li>Add the following lines:<pre class="brush: plain; title: ; notranslate">source 'https://github.rtp.raleigh.ibm.com/imflocalsdks/imf-client-sdk-specs.git'\npod 'IMFCompatibility'</pre></li><li>Open &#8220;Terminal&#8221; at the location of &#8220;Podfile&#8221;.</li><li>Verify that the XCode project is closed.</li><li>Run the &#8220;pod install&#8221; command.</li></ol><p>Open the [MyProject].xcworkspace file in XCode. This file is located side by side with [MyProject].xcodeproj.<br />An usual CocoaPods-based project is managed as a workspace containing the application (the executable) and the library (all project dependencies brought by the CocoaPods manager).</p><p>In Xcode&#8217;s Build Settings, search for &#8220;Other Linker Flags&#8221; and insert \${inherited} (if -ObjC is defined in this field, you can just delete it, since it is configured in the CocoaPod project).</p><h3>Client App Migration</h3><ol><li>Search for bluemix dependency imports like<pre class="brush: plain; title: ; notranslate">#import <IMFCore/IMFCore.h>;\n#import <IMFPush/IMFPush.h>;</pre></li><li>Replace the above imports with<pre class="brush: plain; title: ; notranslate">#import <IMFCompatibility/IMFCompatibility.h>;</pre></li><li>Look for a call to the &#8220;initWithBackendRoute&#8221; method and replace the route URL with your on-premise server URL. For example:<pre class="brush: plain; title: ; notranslate">IMFClient.sharedInstance().initWithBackendRoute(&quot;https://parkstore.mybluemix.net&quot;; , backendGUID: &quot;5e3ad88d-dd48-469d-b46f-2c4ad66b5345&quot;;</pre></li><li>should be replaced with your on-premise MFP server URL</li><li><pre class="brush: plain; title: ; notranslate">IMFClient.sharedInstance().initWithBackendRoute(&quot;http://localhost:10080/ParkStoreMFP&quot;; , backendGUID: &quot;5e3ad88d-dd48-469d-b46f-2c4ad66b5345&quot;;</pre></li><li>Note, that backendGUID parameter is ignored and can be empty. Look for all instantiations of IMFResourceRequest class and update it</li><li>Look for all instantiations of IMFResourceRequest class and update the request URL with absolute or relative path to the resource. For example:<pre class="brush: plain; title: ; notranslate">var request: IMFResourceRequest = IMFResourceRequest(path: &quot;https://parkstore.mybluemix.net/LocalstoreAdapter/apps/5e3ad88d-dd48-469d-b46f-2c4ad66b5345/localstore/getAllItems&quot;; , method: &quot;GET&quot;)</pre></li><li>should be replaced with<pre class="brush: plain; title: ; notranslate">var request: IMFResourceRequest = IMFResourceRequest(path: &quot;http://localhost:10080/ParkStoreMFP/a

dapters\LocalstoreAdapter\getAllItems";, method: &quot;GET&quot;);

```
</pre>\n</li>\n<li>Add the following code inside didRegisterForRemoteNotification  
sWithDeviceToken function in AppDelegate of Client application.\n

```
: plain; title: ; nottranslate\"> WLPush.sharedInstance().tokenFromClient = deviceT  
oken.description</pre>\n</li>\n<li>All on-premise applications require the &#8220  
;worklight.plist&#8221; file to be present in the application resources. In the <co  
de>IBMMobileFirstPlatformFoundationNativeSDK</code> pod we supply a file named <st  
rong>sample.worklight.plist</strong>.\n<ul>\n<li>Locate the &#8220;sample.workligh  
t.plist&#8221; file in the â€~IBMMobileFirstPlatformFoundationNativeSDKâ€™ pod.</l  
i>\n<li>Copy this file to the parent (application) project and rename it to &#8220;  
worklight.plist&#8221;.</li>\n<li>Edit the &#8220;worklight.plist&#8221; file by s  
etting the &#8220;application id&#8221; key to the name of your application deploye  
d to the on-premise MFPF server</li>\n</ul>\n</li>\n<ol>\n<li>To migrate JAX-R  
S application to on-prem (MobileFirst Foundation) server we need to do the followin  
g steps for server:\n<p> Create MobileFirst Project &#8211;> Create native AP  
I app for iOS<br />\n â€¢<br />\n<a href=\n\"https://developer.ibm.com  
\n/mobilefirstplatform/wp-content/uploads/sites/32/2015/07/Screen-Shot-2015-0  
7-12-at-6.50.04-pm.png\"><img src=\n\"https://developer.ibm.com/mobilefirstplatfor  
m/wp-content/uploads/sites/32/2015/07/Screen-Shot-2015-07-12-at-6.50.04-pm.p  
ng\" alt=\n\"Screen Shot 2015-07-12 at 6.50.04 pm\" width=\n\"595\" height=\n\"596\" cla  
ss=\n\"alignnone size-full wp-image-14817\" /></a></p>\n<p><a href=\n\"https://dev  
eloper.ibm.com/mobilefirstplatform/wp-content/uploads/sites/32/2015/07/Scre  
en-Shot-2015-07-12-at-6.51.13-pm.png\"><img src=\n\"https://developer.ibm.com/mobi  
lefirstplatform/wp-content/uploads/sites/32/2015/07/Screen-Shot-2015-07-12-a  
t-6.51.13-pm.png\" alt=\n\"Screen Shot 2015-07-12 at 6.51.13 pm\" width=\n\"598\" heig  
ht=\n\"590\" class=\n\"alignnone size-full wp-image-14818\" /></a></p>\n<p><a href=\n\"https://developer.ibm.com/mobilefirstplatform/wp-content/uploads/sites/32/2015/07/Screen-Sho  
t-2015-07-12-at-6.52.28-pm.png\"><img src=\n\"https://developer  
.ibm.com/mobilefirstplatform/wp-content/uploads/sites/32/2015/07/Screen-Sho  
t-2015-07-12-at-6.52.28-pm.png\" alt=\n\"Screen Shot 2015-07-12 at 6.52.28 pm\" width  
=\n\"717\" height=\n\"424\" class=\n\"alignnone size-full wp-image-14819\" /></a></li  
>\n<li>Add two adapters for Custom Authentication and Localstore and migrate the JA  
X-RS code as shown in the following example.</li>\n</ol>\n<p>Copy the JAX-RS Blue  
Mix code and paste it in the newly created Localstore Java adapter JAX-RS file.</p>\n<p>Add and remove the following changes in your adapter code.</p>\n<ul>\n<li>r  
emove <code>\n/{tenantId}\n</code></li>\n<li>remove the <code>@PathParam -&gt; Pa  
thParam(\n\"tenantId\") String deviceId</code> and <code>@PathParam(\n\"realmName\") S  
tring realmName</code></li>\n<li>Add scope to the all http api resource <code>@O  
AuthSecurity (scope=\n\"customAuthRealm_3\")</code></li>\n</ul>\n<p>The code looks  
like the following</p>\nT\n\t@OAuthSecurity (scope=&quot;customAuthRealm_3&quot;)\n\t@Path(&quot;/getAllIt  
ems&quot;)\n\tpublic String getAllItems() throws MissingConfigurationException{\n\t\t\tinit();\n\t\t\tJSONArray jsonArray = new JSONArray();\n\t\t\tfor(Object key : p  
rops.keySet()){ \n\t\t\t\tjsonArray.add(parser.parse(props.getProperty((String) key)).  
getAsJsonObject());\n\t\t\t}\n\t\t\treturn jsonArray.toString();\n\t}\n\n\t@PUT\n\t@OAuthSecurity (scope=&quot;customAuthRealm_3&quot;)\n\t@Path(&quot;/addItem&quot;)\n\tpublic void addItem(String itemJson) \n\t\t\t\t\tthrows MissingConfigurationException,  
URISyntaxException, IOException{\n\t\t\t\t\ttry{\n\t\t\t\t\t\tinit();\n\t\t\t\t\t\tint newKey  
= props.keySet().size()+1;\n\t\t\t\t\t\tprops.put(String.valueOf(newKey), itemJson);\n\t\t\t\t\t\tURL url = this.getClass().getClassLoader().getResource(&quot;data.properties&quot;  
); \n\t\t\t\t\t\tFile file = new File(url.toURI().getPath());\n\t\t\t\t\t\tFileOutputStream f  
oStream = new FileOutputStream(file);\n\t\t\t\t\t\tprops.store(foStream, &quot;saving new  
item&quot;);\n\t\t\t\t\t\tfoStream.close();\n\t\t\t\t\t\t}\n\t\t\t\t\tcatch(IOException ioe){\n\t\t\t\t\t\t\tioe.pr  
intStackTrace();\n\t\t\t\t\t\t}\n\t\t\t\t\t}\n\n\t\t@POST\n\t\t@OAuthSecurity (scope=&quot;customAuth  
Realm_3&quot;)\n\t\t@Path(&quot;/addAllItems&quot;)\n\tpublic String addAllItems(Str  
ing itemsJson) \n\t\t\t\t\tthrows MissingConfigurationException, URISyntaxExcepti
```


```

[illegible]

```

</p>The post <a rel=\"nofollow\" href=\"https://developer.ibm.com/mobilefirstplatform/2015/08/19/try-on-bluemix-and-buy-mfp/\">Try on Bluemix and migrate to on-prem MobileFirst Platform</a> appeared first on <a rel=\"nofollow\" href=\"https://developer.ibm.com/mobilefirstplatform/\">IBM MobileFirst Platform</a>.</p>",
    "guid": {
        "content": "https://developer.ibm.com/mobilefirstplatform/?p=14769",
        "isPermaLink": "false"
    },
    "link": "https://developer.ibm.com/mobilefirstplatform/2015/08/19/try-on-bluemix-and-buy-mfp/",
    "pubDate": "Wed, 19 Aug 2015 10:36:51 +0000",
    "title": "Try on Bluemix and migrate to on-prem MobileFirst Platform"
}
},
"language": "en-US",
"lastBuildDate": "Tue, 08 Sep 2015 09:22:53 +0000",
"link": [
    {
        "href": "https://developer.ibm.com/mobilefirstplatform/feed/",
        "rel": "self",
        "type": "application/rss+xml"
    },
    "https://developer.ibm.com/mobilefirstplatform"
],
"title": "IBM MobileFirst Platform",
"updateFrequency": "1",
"updatePeriod": "hourly"
},
"version": "2.0"
}
}

```

## Sample

Click to download (<https://github.com/MobileFirst-Platform-Developer-Center/JavaAdapters>) the MobileFirst project.

The attached sample includes an adapter called RSSAdapter and a hybrid application called RSSReader to test the adapter inside an application.

# RSS Reader

All



## Integrating MQA into Xamarin.Android app

Tue, 01 Sep 2015 20:27:07 +0000

## MobileFirst Platform support for Android Marshmallow

Fri, 28 Aug 2015 15:34:10 +0000

## Connecting Securely to On-Premise Backends from MobileFirst on IBM Bluemix containers

Thu, 27 Aug 2015 11:09:24 +0000

## Filling in the blanks with 7.1 Analytics

Tue, 25 Aug 2015 17:11:16 +0000

## ATS and Bitcode in iOS 9

Mon, 24 Aug 2015 07:45:20 +0000

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Sun, 23 Aug 2015 22:24:20 +0000

## Integrating IBM MobileFirst on Bluemix Containers with Bluemix Services

Fri, 21 Aug 2015 07:26:27 +0000

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## Handling binary responses in native Android