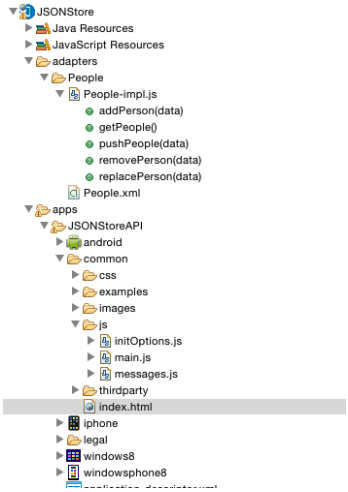
# Using JSONStore in Hybrid applications

fork and edit tutorial (https://github.ibm.com/MFPSamples/DevCenter/tree/master/tutorials/en/foundation/7.1/data/jsonstore/jsonstore-javascript-api.html) | report issue (https://github.ibm.com/MFPSamples/DevCenter/issues/new)

## Overview

This tutorial is a continuation of the JSONStore Overview tutorial.
The tutorial covers the following topics:



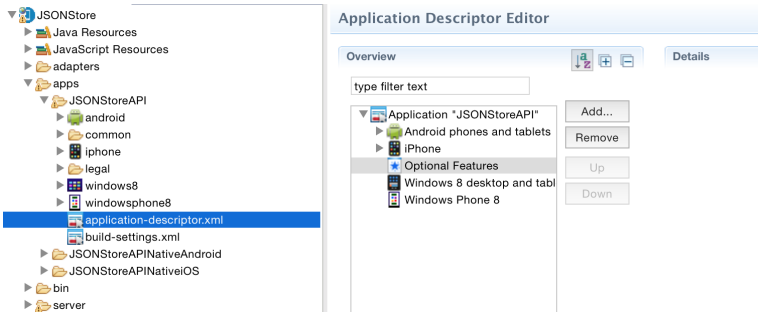

- Add JSONStore Feature
- Basic Usage
  - Initalize
  - Get
  - Add
  - Find
  - Replace
  - Remove
  - Remove Collection
  - Destroy
- Advanced Usage
  - Security
  - Multiple User Support
  - MobileFirst Adapter Integration
  - Enhance
- Sample application
- For more information

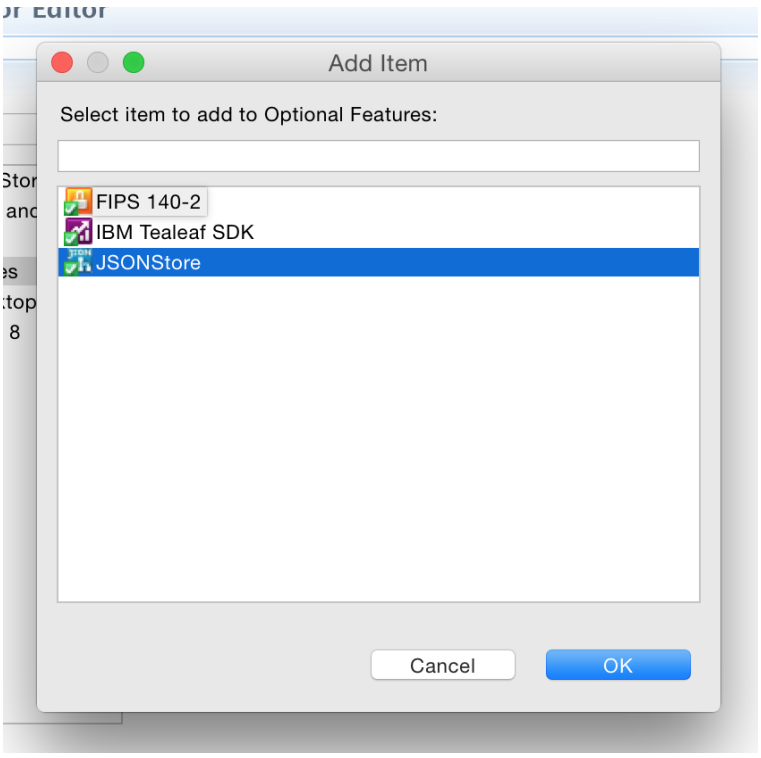
## Add JSONStore Feature

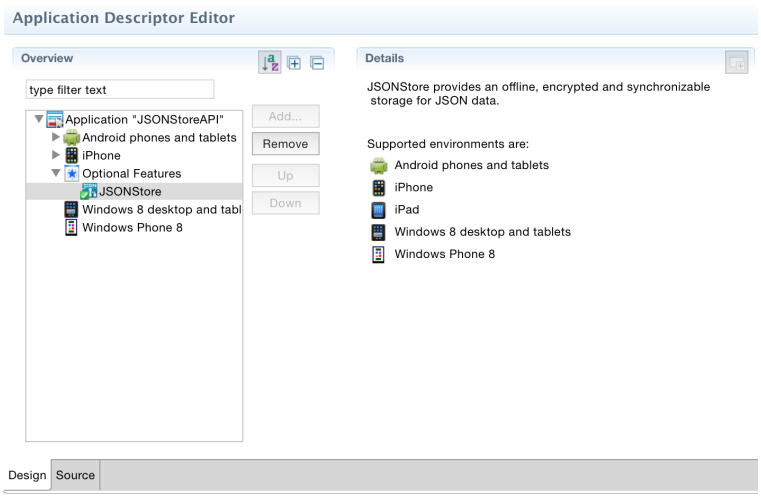
To add JSONStore to your hybrid environment open the `application-descriptor.xml` simply add under the element.

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<application xmlns="http://www.worklight.com/application-descriptor" id="JSONStoreAPI" platformVersion="7.0.0.00.20150312-0731">
    <displayName>JSONStoreAPI</displayName>
    <description>JSONStoreAPI</description>
    <author>
        <name>application's author</name>
        <email>application author's e-mail</email>
        <homepage>http://mycompany.com</homepage>
        <copyright>Copyright My Company</copyright>
    </author>
    <mainFile>index.html</mainFile>
    <features>
        <JSONStore/>
    </features>
    <thumbnailImage>common/images/thumbnail.png</thumbnailImage>
    <iphone bundleId="com.JSONStoreAPI" version="1.0">
        <worklightSettings include="false"/>
        <security>
            <encryptWebResources enabled="false"/>
            <testWebResourcesChecksum enabled="false" ignoreFileExtensions="png, jpg, jpeg, gif, mp4, mp3"/>
        </security>
    </iphone>
    <android version="1.0">
        <worklightSettings include="false"/>
        <security>
            <encryptWebResources enabled="false"/>
            <testWebResourcesChecksum enabled="false" ignoreFileExtensions="png, jpg, jpeg, gif, mp4, mp3"/>
            <publicSigningKey>Replace this text with the actual public signing key of the certificate used to sign the APK, available by using the 'Extract public signing key' wizard.</publicSigningKey>
            <packageName>Replace this text with the actual package name of the application, which is the value of the 'package' attribute in the 'manifest' element in AndroidManifest.xml file.</packageName>
        </security>
    </android>
    <windowsPhone8 version="1.0">
        <uuid>e5eeea5c-4c80-40d4-b250-c8f2e8698138</uuid>
    </windowsPhone8>
    <windows8 version="1.0">
        <uuid>802f8287-a3f7-4dc5-ac17-1da638074763</uuid>
    </windows8>
</application>
```

Alternatively, you can use the **Application Descriptor Editor** click **Optional Features > Add > JSONStore > OK**




# Initialize

Use `init` to start one or more JSONStore collections

Starting or provisioning a collections means creating the persistent storage that contains the collection and documents, if it does not exists.

If the persistent storage is encrypted and a correct password is passed, the necessary security procedures to make the data accessible are run.

For optional features that you can enable at initialization time, see **Security, Multiple User Support,** and **MobileFirst Adapter Integration** in the second part of this module

```
var collections = {
    people : {
        searchFields: {name: 'string', age: 'integer'}
    }
};

WL.JSONStore.init(collections).then(function (collections) {
    // handle success - collection.people (people's collection)
}).fail(function (error) {
    // handle failure
});
```

# Get

Use `get` to create an accessor to the collection. You must call `init` before you call get otherwise the result of get is undefined

```
var collectionName = 'people';
var people = WL.JSONStore.get(collectionName);
```

The variable `people` can now be used to perform operations on the `people` collection such as `add`, `find`, and `replace`

# Add

Use `add` to store data as documents inside a collection

```
var collectionName = 'people';
var options = {};
var data = {name: 'yoel', age: 23};
WL.JSONStore.get(collectionName).add(data, options).then(function () {
    // handle success
}).fail(function (error) {
    // handle failure
});
```

# Find

Use `find` to locate a document inside a collection by using a query. Use `findAll` to retrieve all the documents inside a collection. Use `findById` to search by the document unique identifier. The default behavior for find is to do a "fuzzy" search

```
var query = {name: 'yoel'};
var collectionName = 'people';
var options = {
   exact: false, //default
   limit: 10 // returns a maximum of 10 documents, default: return every document
};

WL.JSONStore.get(collectionName).find(query, options).then(function (results) {
   // handle success - results (array of documents found)
}).fail(function (error) {
   // handle failure
});
<p>
```

# Replace

Use `replace` to modify documents inside a collection. The field that you use to perform the replacement is `_id,` the document unique identifier.

```
var document = {
   _id: 1, json: {name: 'chevy', age: 23}
};
var collectionName = 'people';
var options = {};
WL.JSONStore.get(collectionName).replace(document, options).then(function (numberOfDocsReplaced
) {
   // handle success
}).fail(function (error) {
   // handle failure
});
<p>
```

This examples assumes that the document `{_id: 1, json: {name: 'yoel', age: 23} }` is in the collection

# Remove

Use `remove` to delete a document from a collection

Documents are not erased from the collection until you call push. For more information, see the **MobileFirst Adapter Integration** section later in this tutorial

```
var query = {_id: 1};
var collectionName = 'people';
var options = {exact: true};
WL.JSONStore.get(collectionName).remove(query, options).then(function (numberOfDocsRemoved) {
   // handle success
}).fail(function (error) {
   // handle failure
});
```

# Remove Collection

Use `removeCollection` to delete all the documents that are stored inside a collection. This operation is similar to dropping a table in database terms

```
var collectionName = 'people';
WL.JSONStore.get(collectionName).removeCollection().then(function (removeCollectionReturnCode) {
    // handle success
}).fail(function (error) {
    // handle failure
});
```

# Destroy

Use `destroy` to remove the following data:

- All documents
- All collections
- All Stores (see "**Multiple User Support**" later in this tutorial)
- All JSONStore metadata and security artifacts (see "**Security**" later in this tutorial)

```
var collectionName = 'people';
WL.JSONStore.destroy().then(function () {
    // handle success
}).fail(function (error) {
    // handle failure
});
```

# Security

You can secure all the collections in a store by passing a password to the `init` function. If no password is passed, the documents of all the collections in the store are not encrypted.

Data encryption is only available on Android, iOS, Windows Phone 8, and Windows 8 environments.

Some security metadata are stored in the keychain (iOS), shared preferences (Android), isolated storage (Windows 8 Phone), or the credential locker (Windows 8).

The store is encrypted with a 256-bit Advanced Encryption Standard (AES) key. All keys are strengthened with Password-Based Key Derivation Function 2 (PBKDF2).

Use `closeAll` to lock access to all the collections until you call `init` again. If you think of `init` as a login function you can think of `closeAll` as the corresponding logout function.

Use `changePassword` to change the password.

```
var collections = {
    people: {
        searchFields: {name: 'string'}
    }
};

var options = {password: '123'};
WL.JSONStore.init(collections, options).then(function () {
    // handle success
}).fail(function (error) {
    // handle failure
});
```

# Multiple User Support

You can create multiple stores that contain different collections in a single MobileFirst application. The `init` function can take an options object with a username. If no username is given, the default username is **jsonstore**

```
var collections = {
    people: {
        searchFields: {name: 'string'}
    }
};

var options = {username: 'yoel'};
WL.JSONStore.init(collections, options).then(function () {
    // handle success
}).fail(function (error) {
    // handle failure
});
```

# MobileFirst Adapter Integration

This section assumes that you are familiar with MobileFirst adapters. MobileFirst Adapter Integration is optional and provides ways to send data from a collection to an adapter and get data from an adapter into a collection.

You can achieve these goals by using functions such as `WL.Client.invokeProcedure` or `jQuery.ajax` if you need more flexibility.

## Adapter Implementation

Create a MobileFirst adapter and name it "**People**". Define it's procedures `addPerson`, `getPeople`, `pushPeople`, `removePerson`, and `replacePerson`.

```
function getPeople() {
    var data = { peopleList : [{name: 'chevy', age: 23}, {name: 'yoel', age: 23}] }
;
    WL.Logger.debug('Adapter: people, procedure: getPeople called.');
    WL.Logger.debug('Sending data: ' + JSON.stringify(data));
    return data;
}

function pushPeople(data) {
    WL.Logger.debug('Adapter: people, procedure: pushPeople called.');
    WL.Logger.debug('Got data from JSONStore to ADD: ' + data);
    return;
}

function addPerson(data) {
 WL.Logger.debug('Adapter: people, procedure: addPerson called.');
 WL.Logger.debug('Got data from JSONStore to ADD: ' + data);
 return;
}

function removePerson(data) {
 WL.Logger.debug('Adapter: people, procedure: removePerson called.');
 WL.Logger.debug('Got data from JSONStore to REMOVE: ' + data);
 return;
}
function replacePerson(data) {
 WL.Logger.debug('Adapter: people, procedure: replacePerson called.');
 WL.Logger.debug('Got data from JSONStore to REPLACE: ' + data);
 return;
}
```

## Initialize a collection linked to a MobileFirst adapter

```
var collections = {
    people : {
        searchFields : {name: 'string', age: 'integer'},
        adapter : {
            name: 'People',
            add: 'addPerson',
            remove: 'removePerson',
            replace: 'replacePerson',
            load: {
                procedure: 'getPeople',
                params: [],
                key: 'peopleList'
            }
        }
    }
}</p>
<p>var options = {};</p>
<p>WL.JSONStore.init(collections, options).then(function () {
    // handle success
}).fail(function (error) {
    // handle failure
});
```

## Load data from MobileFirst Adapter

When `load` is called, JSONStore uses some metadata about the adapter (**name** and **procedure**), which you previously passed to `init`, to determine what data to get from the adapter and eventually store it.

```
var collectionName = 'people';
<p>WL.JSONStore.get(collectionName).load().then(function (loadedDocuments) {
    // handle success
}).fail(function (error) {
    // handle failure
});
```

## Get Push Required (Dirty Documents)

Calling `getPushRequired` returns and array of so called "dirty documents", which are documents that have local modifications that do not exist on the back-end system. These documents are sent to the MobileFirst adapter when `push` is called.

```
    var collectionName = 'people';
<p>WL.JSONStore.get(collectionName).getPushRequired().then(function (dirtyDocuments) {
    // handle success
}).fail(function (error) {
    // handle failure
});
```

To prevent JSONStore from marking the documents as "dirty", pass the option `{markDirty:false}` to `add`, `replace`, and `remove`

### Push

`push` sends the documents that changed to the correct MobileFirst adapter procedure (i.e., `addPerson` is called with a document that was added locally). This mechanism is based on the last operation that is associated with the document that changed and the adapter metadata that is passed to `init`.

```
var collectionName = 'people';
<p>WL.JSONStore.get(collectionName).push().then(function (response) {
    // handle success
    // response is an empty array if all documents reached the server
    // response is an array of error responses if some documents failed to reach the server
}).fail(function (error) {
    // handle failure
});
```

## Enhance

Use `enhance` to extend the core API to fit your needs, by adding functions to a collection prototype.

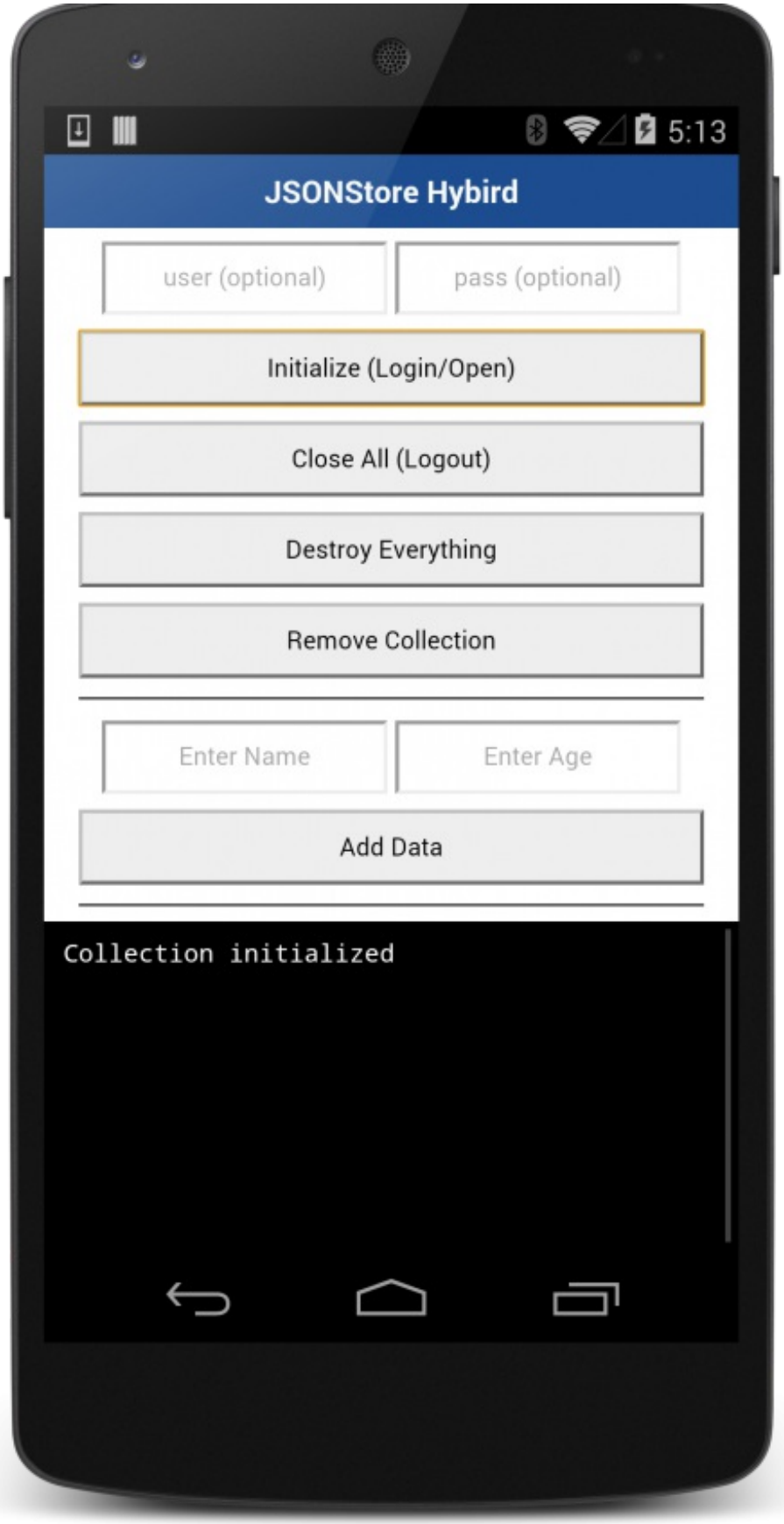
This example shows how to use `enhance` to adde the function `getValue` that works on the `keyvalue` collection. It takes a `key` (string) as it's only parameter and returns a single result.

```
var collectionName = 'keyvalue';

WL.JSONStore.get(collectionName).enhance('getValue', function (key) {
    var deferred = $.Deferred();
    var collection = this;

    //Do an exact search for the key
    collection.find({key: key}, {exact:true, limit: 1}).then(deferred.resolve, deferred.reject)
;
    return deferred.promise();
});

//Usage:
var key = 'myKey';
WL.JSONStore.get(collectionName).getValue(key).then(function (result) {
  // handle success
  // result contains an array of documents with the results from the find
}).fail(function () {
  // handle failure
});
```




## Sample application

Click to download (https://github.com/MobileFirst-Platform-Developer-Center/JSONStore/tree/release71) the MobileFirst project.

The MobileFirst project contains an application that demonstrates the use of JSONStore in a hybrid environment.

## For more information

For more information about JSONStore, see the product user documentation.