

# Using JSONStore in Hybrid applications

## Overview

This tutorial is a continuation of the JSONStore Overview tutorial.

The tutorial covers the following topics:

- Add JSONStore Feature
  - Initialize
  - 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 `JSONStore` under the `features` 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
});

```

## 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
});

```

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 its 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'
      }
    }
  }
}
}

```

var options = {};

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';
WL.JSONStore.get(collectionName).load().then(function (loadedDocuments) {
    // handle success
}).fail(function (error) {
    // handle failure
});

```

## Get Push Required (Dirty Documents)

Calling `getPushRequired` returns an 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';
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';
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 add 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>) 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.