

# Using JSONStore in Hybrid applications

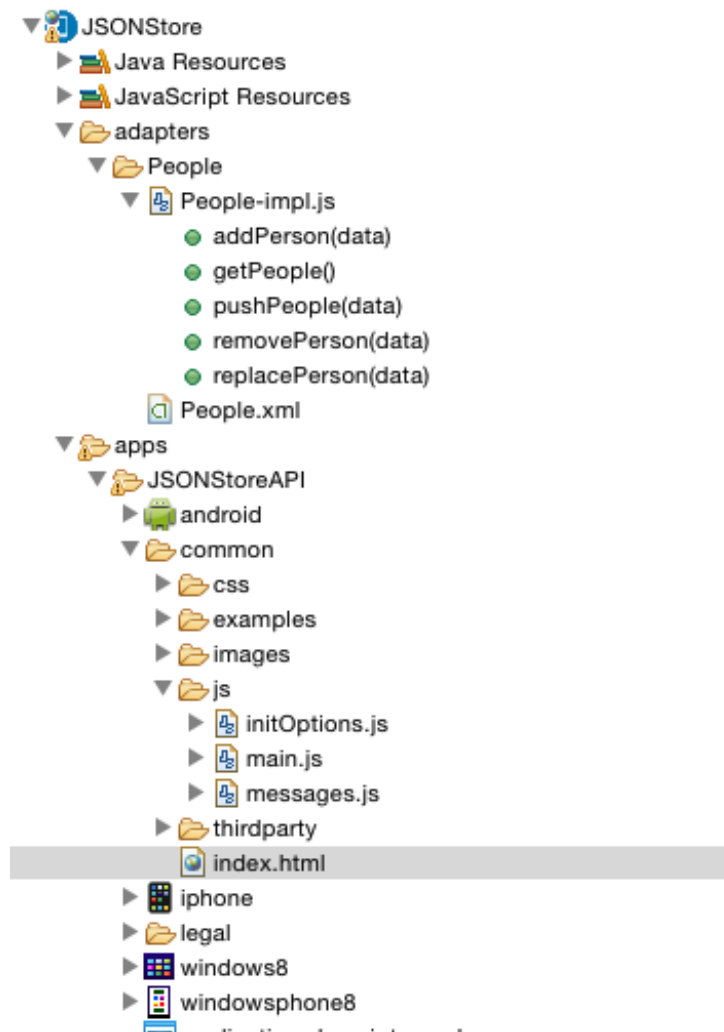
Relevant to:

- Hybrid
- Download MobileFirst project (<https://github.com/MobileFirst-Platform-Developer-Center/JSONStore>)

## Overview

This tutorial is a continuation of the JSONStore Overview tutorial.

The tutorial covers the following topics:



- Add JSONStore Feature
- Basic Usage
  - 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></features>` element.

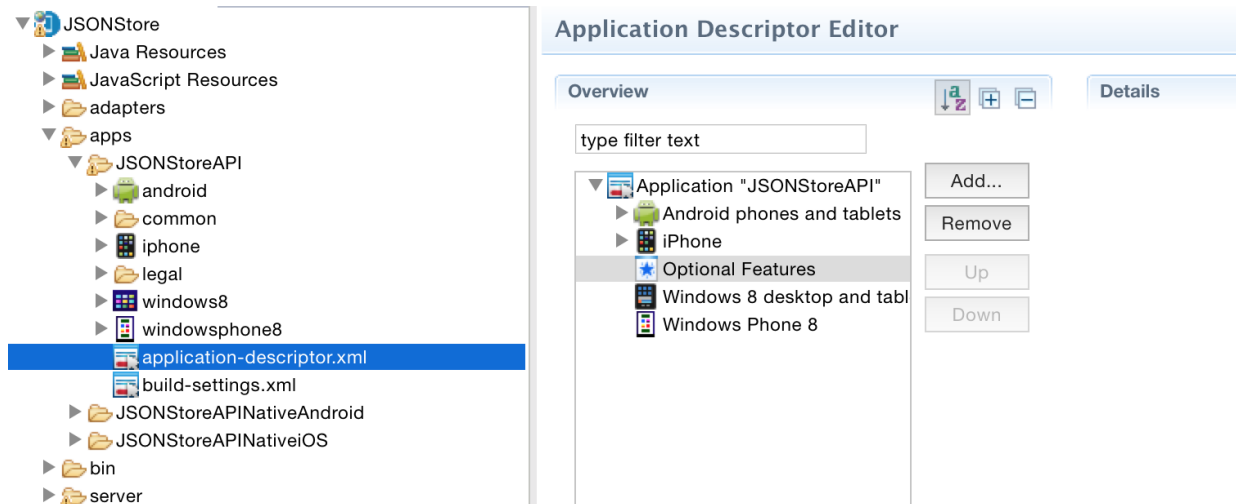
```
[code lang="xml" highlight="24"]
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<application xmlns="http://www.worklight.com/application-descriptor" id="JSONStoreAPI"
platformVersion="7.0.0.00.20150312-0731">
<displayName>JSONStoreAPI</displayName>
<description>JSONStoreAPI</description>
<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>
[/code]

```

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



## Application Descriptor Editor



## 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

```
[code lang="javascript"]
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
});
[/code]
```

## 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

```
[code language="javascript"]
var collectionName = 'people';
```

```
var people = WL.JSONStore.get(collectionName);  
[/code]
```

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

```
[code language="javascript"]  
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  
});  
[/code]
```

## 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

```
[code language="javascript"]  
  
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  
});  
[/code]
```

## Replace

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

```
[code language="javascript"]  
  
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
});

[/code]

```

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

```

[code language="javascript"]
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
});

[/code]

```

## 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

```

[code language="javascript"]
var collectionName = 'people';
WL.JSONStore.get(collectionName).removeCollection().then(function (removeCollectionReturnCode) {
// handle success
}).fail(function (error) {
// handle failure
});

[/code]

```

## 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)

```
[code language="javascript"]
var collectionName = 'people';
WL.JSONStore.destroy().then(function () {
// handle success
}).fail(function (error) {
// handle failure
});
[/code]
```

## 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.

```
[code language="javascript"]
var collections = {
people: {
searchFields: {name: 'string'}
}
};

var options = {password: '123'};

WL.JSONStore.init(collections, options).then(function () {
// handle success
}).fail(function (error) {
// handle failure
});
[/code]
```

## 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**

```
[code language="javascript"]
var collections = {
people: {
searchFields: {name: 'string'}
}
};

var options = {username: 'yoel'};

WL.JSONStore.init(collections, options).then(function () {
```

```
// handle success
}).fail(function (error) {
// handle failure
});
[/code]
```

## 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`.

```
[code language="javascript"]
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;
}
[/code]
```



## Initialize a collection linked to a MobileFirst adapter

```
[code language="javascript"]
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
});
[/code]
```

## 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.

```
[code language="javascript"]
var collectionName = 'people';

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

## 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.

```
[code language="javascript"]
var collectionName = 'people';

WL.JSONStore.get(collectionName).getPushRequired().then(function (dirtyDocuments) {
  // handle success
}).fail(function (error) {
```

```
// handle failure
});
[/code]
```

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`.

```
[code language="javascript"]
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
});
[/code]
```

## 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 its only parameter and returns a single result.

```
[code language="javascript"]
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
});
[/code]
```



## 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.