# Using JSONStore in Native Android applications

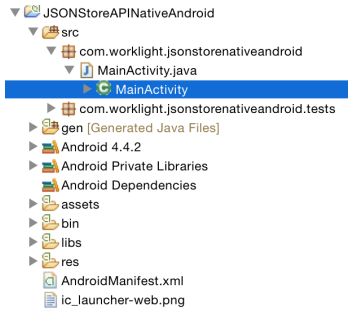
fork and edit tutorial (https://github.ibm.com/MFPSamples/DevCenter/tree/master/tutorials/en/foundation/7.1/data/jsonstore/jsonstore-java-api.html) | report issue (https://github.ibm.com/MFPSamples/DevCenter/issues/new)

## Overview

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

- Basic API Usage
- Advanced Usage
- Sample application
- Additional information

## Basic API Usage




### Open

Use `openCollections` to open 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

```
Context context = getContext();
try {
    JSONStoreCollection people = new JSONStoreCollection("people");
    people.setSearchField("name", SearchFieldType.STRING);
    people.setSearchField("age", SearchFieldType.INTEGER);
    List<JSONStoreCollection> collections = new LinkedList<JSONStoreCollection>()
;
    collections.add(people);
    WLJSONStore.getInstance(context).openCollections(collections);
    // handle success
} catch(JSONStoreException e) {
    // handle failure
}
```

### Get

Use `getCollectionByName` to create an accessor to the collection. You must call `openCollections` before you call `getCollectionByName`.

```
Context context = getContext();
try {
    String collectionName = "people";
    JSONStoreCollection collection = WLJSONStore.getInstance(context).getCollectionByName(collection
Name);
    // handle success
} catch(JSONStoreException e) {
    // handle failure
}
```

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

# Add

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

```
Context context = getContext();
try {
    String collectionName = "people";
    JSONStoreCollection collection = WLJSONStore.getInstance(context).getCollectionByName(collection
Name);</p>
    //Add options.
    JSONStoreAddOptions options = new JSONStoreAddOptions();
    options.setMarkDirty(true);
    JSONObject data = new JSONObject("{age: 23, name: 'yoel'}")
    collection.addData(data, options);
    // handle success
} catch(JSONStoreException e) {
    // handle failure
}
```

## Find

Use `findDocuments` to locate a document inside a collection by using a query. Use `findAllDocuments` to retrieve all the documents inside a collection. Use `findDocumentById` to search by the document unique identifier.

```
Context context = getContext();
try {
   String collectionName = "people";
   JSONStoreQueryPart queryPart = new JSONStoreQueryPart();
   // fuzzy search LIKE
   queryPart.addLike("name", name);
   JSONStoreQueryParts query = new JSONStoreQueryParts();
   query.addQueryPart(queryPart);
   JSONStoreFindOptions options = new JSONStoreFindOptions();
   // returns a maximum of 10 documents, default: returns every document
   options.setLimit(10);
   JSONStoreCollection collection = WLJSONStore.getInstance(context).getCollectionByName(collection
Name);
   List<JSONObject> results = collection.findDocuments(query, options);
      // handle success
} catch(JSONStoreException e) {
   // handle failure
}
```

# Replace

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

```
Context context = getContext();
try {
   String collectionName = "people";
   JSONStoreCollection collection = WLJSONStore.getInstance(context).getCollectionByName(collection
Name);
   JSONStoreReplaceOptions options = new JSONStoreReplaceOptions();
   // mark data as dirty
   options.setMarkDirty(true);
   JSONStore replacement = new JSONObject("{_id: 1, json: {age: 23, name: 'chevy'}}");
   collection.replaceDocument(replacement, options)
   // handle success
} catch(JSONStoreException e) {
   // handle failure
}
```

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

## Remove

Use `removeDocumentById` to delete a document from a collection.

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

```
Context context = getContext();
try {
    String collectionName = "people";
    JSONStoreCollection collection = WLJSONStore.getInstance(context).getCollectionByName(collection
Name);
    JSONStoreRemoveOptions options = new JSONStoreRemoveOptions();
    // Mark data as dirty
    options.setMarkDirty(true);
    collection.removeDocumentById(1, options);
    // handle success
} catch(JSONStoreException e) {
    // 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

```
Context context = getContext();
try {
    String collectionName = "people";
    JSONStoreCollection collection = WLJSONStore.getInstance(context).getCollectionByName(collection
Name);
    collection.removeCollection();
    // handle success
} catch(JSONStoreException e) {
    // 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"

```
Context context = getContext();
try {
    WLJSONStore.getInstance(context).destroy()
;
    // handle success
} catch(JSONStoreException e) {
    // handle failure
}
```

# Advanced Usage

## Security

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

Some security metadata is stored in shared preferences (Android);

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 `openCollections` again. If you think of `openCollections` as a login function you can think of `closeAll` as the corresponding logout function.

Use `changePassword` to change the password.

```
Context context = getContext();
try {
    JSONStoreCollection people = new JSONStoreCollection("people");
    people.setSearchField("name", SearchFieldType.STRING);
    people.setSearchField("age", SearchFieldType.INTEGER);
    List<JSONStoreCollection> collections = new LinkedList<JSONStoreCollection>()
;
    collections.add(people);
    JSONStoreInitOptions options = new JSONStoreInitOptions();
    options.setPassword("123");
    WLJSONStore.getInstance(context).openCollections(collections, options);
    // handle success
} catch(JSONStoreException e) {
    // handle failure
}
```

# Multiple User Support

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

```
Context context = getContext();
try {
    JSONStoreCollection people = new JSONStoreCollection("people");
    people.setSearchField("name", SearchFieldType.STRING);
    people.setSearchField("age", SearchFieldType.INTEGER);
    List<JSONStoreCollection> collections = new LinkedList<JSONStoreCollection>()
;
    collections.add(people);
    JSONStoreInitOptions options = new JSONStoreInitOptions();
    options.setUsername("yoel");
    WLJSONStore.getInstance(context).openCollections(collections, options);
    // handle success
} catch(JSONStoreException e) {
    // 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 `WLClient.invokeProcedure` or your own instance of an `HttpClient` 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;
}
```

## Load data from MobileFirst Adapter

To load data from a MobileFirst Adapter use `WLClient.invokeProcedure`.

```
WLResponseListener responseListener = new WLResponseListener() {
    @Override
    public void onFailure(final WLFailResponse response) {
        // handle failure
    }

    @Override
    public void onSuccess(WLResponse response) {
        try {
            JSONArray loadedDocuments = response.getResponseJSON().getJSONArray("peopleList");
        } catch(Exception e) {
            // error decoding JSON data
        }
    }
};

WLProcedureInvocationData invocationData = new WLProcedureInvocationData("People", "getPeople");
Context context = getContext();
WLClient client = WLClient.createInstance(context);
client.invokeProcedure(invocationData, responseListener);
```

## Get Push Required (Dirty Documents)

Calling `findAllDirtyDocuments` returns and array of so called "dirty documents", which are documents that have local modifications that do not exist on the back-end system.

```
Context  context = getContext();
try {
    String collectionName = "people";
    JSONStoreCollection collection = WLJSONStore.getInstance(context).getCollectionByName(collection
Name);
    List<JSONObject> dirtyDocs = collection.findAllDirtyDocuments();
    // handle success
} catch(JSONStoreException e) {
    // handle failure
}
```

To prevent JSONStore from marking the documents as "dirty", pass the option `options.setMarkDirty(false)` to `add`, `replace`, and `remove`

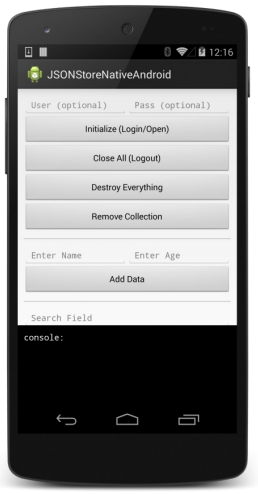
## Push changes

To push changes to a MobileFirst adapter, call the `findAllDirtyDocuments` to get a list of documents with modifications and then use `WLClient.invokeProcedure`. After the data is sent and a successful response is received make sure you call `markDocumentsClean`.

```
WLResponseListener responseListener = new WLResponseListener() {
    @Override
    public void onFailure(final WLFailResponse response) {
        // handle failure
    }

    @Override
    public void onSuccess(WLResponse response) {
        // handle success
    }
};

Context context = getContext();
WLClient client = WLClient.createInstance(context);
try {
    String collectionName = "people";
    JSONStoreCollection collection = WLJSONStore.getInstance(context).getCollectionByName(collection
Name);
    List<JSONObject> dirtyDocuments = people.findAllDirtyDocuments();
    WLProcedureInvocationData invocationData = new WLProcedureInvocationData("People", "pushPeo
ple");
    invocationData.setParameters(new Object[]{dirtyDocuments});
    client.invokeProcedure(invocationData, responseListener);
} catch(JSONStoreException e) {
    // handle failure
}
```




## Sample application

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

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

The Native Android project contains an application that demonstrates the use of JSONStore.

## Additional information

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