Using JSONStore in Native Android applications

Relevant to:

- Native Android

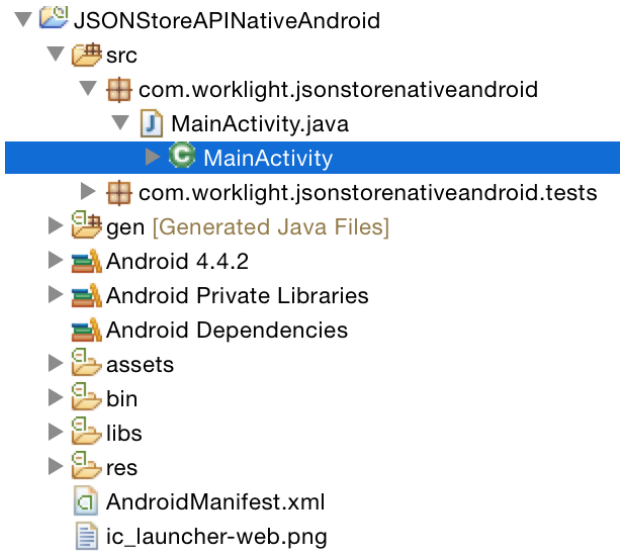
- Download MobileFirst project (https://github.com/MobileFirst-Platform-Developer-Center/JSONStore)
- Download Native project (https://github.com/MobileFirst-Platform-Developer-Center/JSONStoreAndroid)

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

[code language="java"]
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
}
[/code]

Get

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

[code language="java"]
Context context = getContext();

try {
String collectionName = "people";
JSONStoreCollection collection =
WLJSONStore.getInstance(context).getCollectionByName(collectionName);
// handle success
} catch(JSONStoreException e) {
// handle failure
}
[/code]

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

[code language="java"]
Context context = getContext();

try {
String collectionName = "people";

JSONStoreCollection collection =
WLJSONStore.getInstance(context).getCollectionByName(collectionName);

//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
}
[/code]

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.

[code language="java"]
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(collectionName);

List<JSONObject> results = collection.findDocuments(query, options);
// handle success
} catch(JSONStoreException e) {
// handle failure
}
[/code]

Replace

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

[code language="java"]
Context context = getContext();

try {
String collectionName = "people";
JSONStoreCollection collection =
WLJSONStore.getInstance(context).getCollectionByName(collectionName);

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
}
[/code]

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

[code language="java"]
Context context = getContext();

try {

String collectionName = "people";
JSONStoreCollection collection =
WLJSONStore.getInstance(context).getCollectionByName(collectionName);

JSONStoreRemoveOptions options = new JSONStoreRemoveOptions();
// Mark data as dirty
options.setMarkDirty(true);

collection.removeDocumentById(1, options);
// handle success
} catch(JSONStoreException e) {
// 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="java"]
Context context = getContext();

try {
String collectionName = "people";
JSONStoreCollection collection =
WLJSONStore.getInstance(context).getCollectionByName(collectionName);

collection.removeCollection();
// handle success
} catch(JSONStoreException e) {
// 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="java"]
Context context = getContext();

try {
WLJSONStore.getInstance(context).destroy();
// handle success
} catch(JSONStoreException e) {
// handle failure
}
[/code]

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.

[code language="java"]
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
}
[/code]

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**

[code language="java"]
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
}
[/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 `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`.

[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]

Load data from MobileFirst Adapter

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

[code language="java"]
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);
[/code]

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.

[code language="java"]
Context context = getContext();

try {
String collectionName = "people";
JSONStoreCollection collection =
WLJSONStore.getInstance(context).getCollectionByName(collectionName);

List<JSONObject> dirtyDocs = collection.findAllDirtyDocuments();

// handle success
} catch(JSONStoreException e) {
// handle failure
}
[/code]

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`.

[code language="java"]
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);

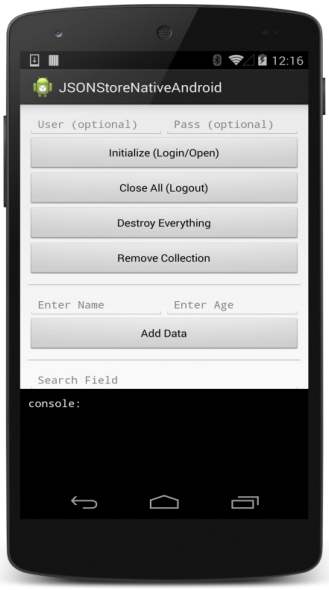
try {
String collectionName = "people";
JSONStoreCollection collection =
WLJSONStore.getInstance(context).getCollectionByName(collectionName);

List<JSONObject> dirtyDocuments = people.findAllDirtyDocuments();

WLProcedureInvocationData invocationData = new WLProcedureInvocationData("People", "pushPeople");

invocationData.setParameters(new Object[]{dirtyDocuments});
client.invokeProcedure(invocationData, responseListener);

} catch(JSONStoreException e) {
// handle failure
}
[/code]



Sample application

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

Click to download (https://github.com/MobileFirst-Platform-Developer-Center/JSONStoreAndroid) 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.