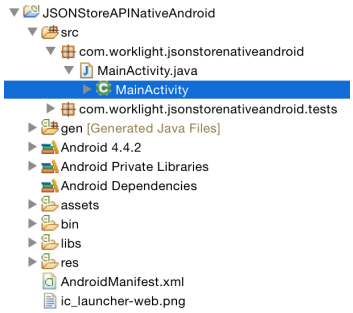
JSONStore - Java API

fork and edit tutorial (https://github.ibm.com/MFPSamples/DevCenter/tree/master/tutorials/en/foundation/7.0/data/jsonstore/jsonstore-java-api.html) | report issue (https://github.ibm.com/MFPSamples/DevCenter/issues/new)

This tutorial covers the following topics



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What is JSONStore?

JSONStore is a lightweight, document-oriented storage system that is included as a feature of IBM® MobileFirst Platform Foundation, and enables persistent storage of JSON documents. Documents in an application are available in JSONStore even when the device that is running the application is offline. This persistent, always-available storage can be useful to access documents when, for example, there is no network connection to the device.

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

```
<br />
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(collectionName)
;
  // 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";</p>
  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
}
```

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(collectionName);</p
>
  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(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
}
```

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(collectionName)
;
  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(collectionName)
;
  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
}
```

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(collectionName)
;
  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`

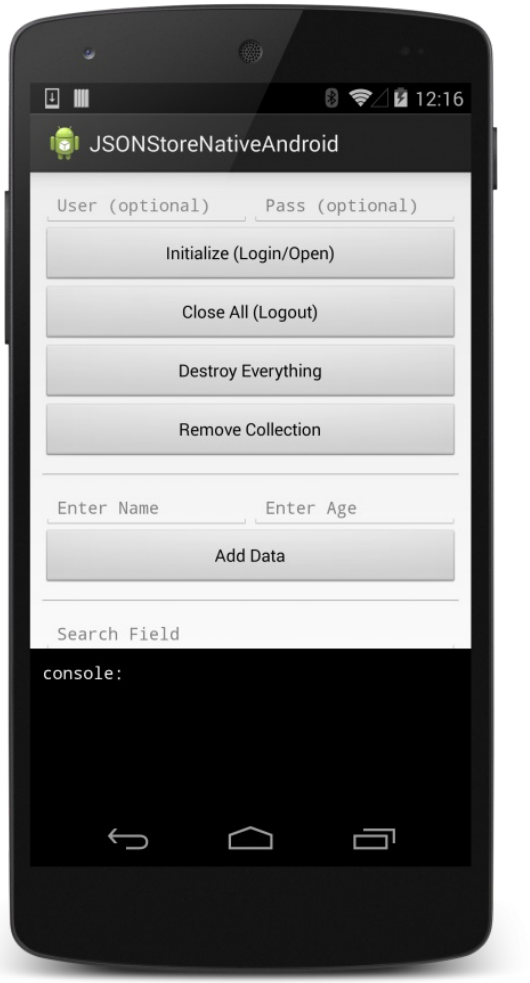
Push

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(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
}
```



Sample application

Click to download the Studio project (http://public.dhe.ibm.com/software/products/en/MobileFirstPlatform/docs/v700/JSONStoreAPIBasicsProject.zip) and Native Android project (http://public.dhe.ibm.com/software/products/en/MobileFirstPlatform/docs/v700/JSONStoreAPINativeAndroidNativeProject.zip)

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

For more information

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