Architecture and Administration Basics

Workshop **Day 2 – Labs**
C/C++

Ludovic Dufrenoy, Senior Manager Professional Services EMEA & APJ
https://github.com/dufrenoyl/cb-workshop-2d/

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1 Installation & Configuration SDK

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SDK C - libcouchbase Installation

Perform the following steps in order to install libcouchbase

- Add Couchbase package repository (/etc/yum.repos.d) and then installs the packages 'libcouchbase2-bin' and 'libcouchbase-devel'.

```
su root
wget http://packages.couchbase.com/releases/couchbase-release/couchbase-release-1.0-2-x86_64.rpm
rpm -iv couchbase-release-1.0-4-x86_64.rpm
yum install libcouchbase-devel libcouchbase2-bin gcc gcc-c++
```

- Make sure Couchbase Server is running on your Machine.
- Clone the source repository in your home folder.

```
git clone https://github.com/dufrenoyl/cb-workshop-2d.git
```

http://developer.couchbase.com/documentation/server/current/sdk/c/start-using-sdk.html

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Load the Project into QTCreator

Perform the following steps:

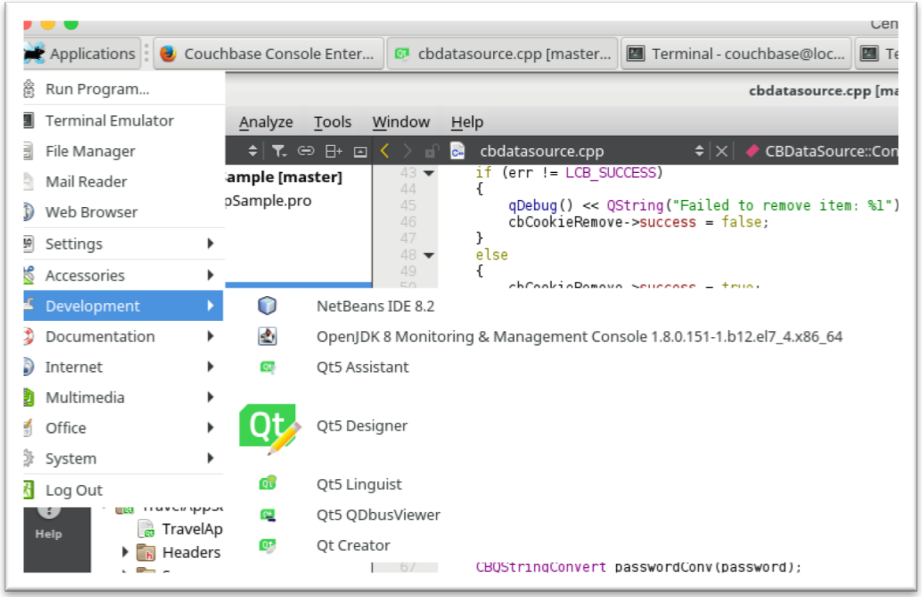
- Start a Client X on **your Oracle Virtual Box Terminal**.

```
startXFCE4
(Linux) VNC Viewer
(MacOS) vnc://<IP>:5901
```

- Start QTCreator from the Applications.

- Open an Existing project using the TravelSampleApp-Empty.pro file.

- Build & Run your application.



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Documentation & Examples

Open the documentation for libcouchbase!

- https://developer.couchbase.com/documentation/server/current/sdk/c/sample-app-backend.html
- https://developer.couchbase.com/documentation/server/current/sdk/c/start-using-sdk.html
- http://developer.couchbase.com/documentation/server/4.0/sdks/c-2.4/c-intro.html

- Open the TravelAppSample project also => This is the solution.
- Open the TravelAppSample-Empty project => This is where you start.

- Check the provided helper classes:

```
CouchbaseDocument
CBCookie*
CBQStringConvert
```

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2 | Managing Connections

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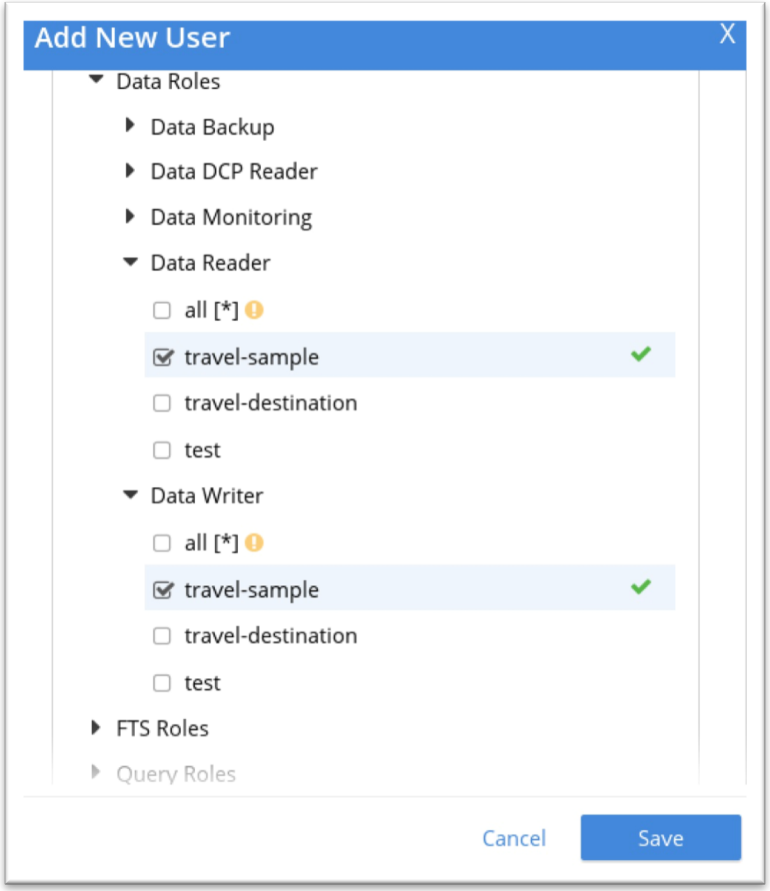
Create an applicative User via RBAC

Perform the following operations:

- Go the Security Tab in Couchbase
- Create a new User.
- Username = “application”
- Password = “couchbase”
- Roles
  - Data Reader on `travel-sample`
  - Data Writer on `travel-sample`



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Connecting to Couchbase with RBAC

Implement the following methods in CBDataSource:

- `void Connect(QString connectionString, QString password);`

Implement the following methods in CBDataSourceFactory:

- `static void Create(QString connectionString, QString password);`

Test your implementation by executing:

```
DemoCouchbaseConnect connectDemo;
connectDemo.test();
```

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3 Working with Documents

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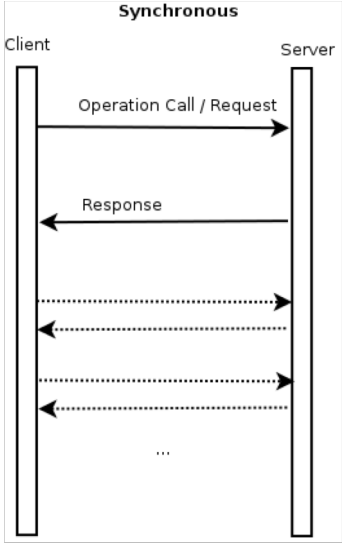
SDK APU Blocking

- Libcouchbase is designed to use non-blocking I/O
  - Scheduled operations
- But lcb_wait() blocks by default
  - Waits for pending requests
  - Used for synchronous operation execution
- Callback functions are used
  - e.g. storage_callback



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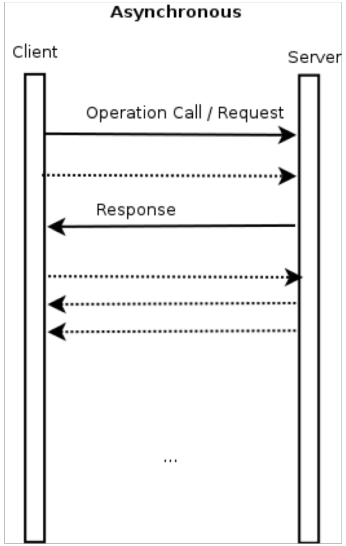
SDK API Non-Blocking

- External event loop integration
  - Provides mechanism to execute a callback function when a specific event occurs
  - e.g. libevent
- Asynchronous operation execution
- No need for lcb_wait()



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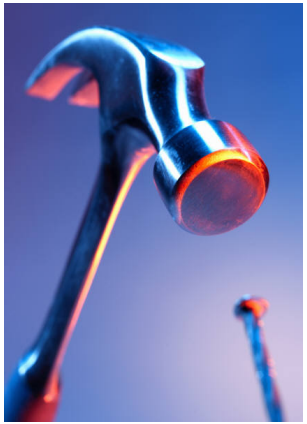
Get a Document

Make sure that the travel-sample data is installed!
Implement the following methods in CBDataSource:

- `CouchbaseDocument Get (QString key);`

Test your implementation by executing:

```
DemoCouchbaseGet getDemo;
getDemo.test();
```



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Perform a Multi-Get

Implement the following methods in CBDataSource:

- `CouchbaseDocumentMap MultiGet(QStringList keys);`

Test your implementation by executing:

```
DemoCouchbaseMultiGet multiGetDemo;
multiGetDemo.test();
```

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Create/Update a Document

Implement the following methods in CBDataSource:

- `bool Upsert( QString key, QString document)`

Test your implementation by executing:

```
DemoCouchbaseUpsert upsertDemo;
upsertDemo.test();
```

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Delete a Document

Implement the following methods in CBDataSource:

- `bool Delete(QString key);`

Test your implementation by executing:

```
DemoCouchbaseDelete deleteDemo;
deleteDemo.test();
```

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4 | Indexes using VIEWS

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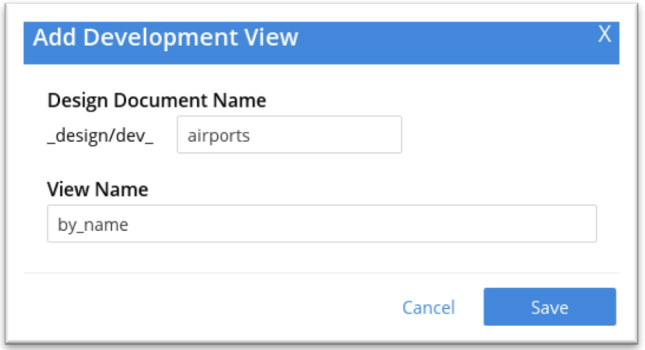
Query a View

Perform the following steps:



- Create a new View in the UI "Indexes" tab:
  - Design Document Name = airports
  - View name = by_name
- Edit the view with default code, showing the results.
- Publish the view to Production.
- Implement the following methods in CBDataSource:

```
CBQueryResult QueryView(QString designDocName, QString viewName, int
limit=0, int skip=0);
```

- **Test your implementation by executing:**

```
DemoCouchbaseView viewDemo;
viewDemo.test();
```

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4 | Indexes using GSI (Plasma)

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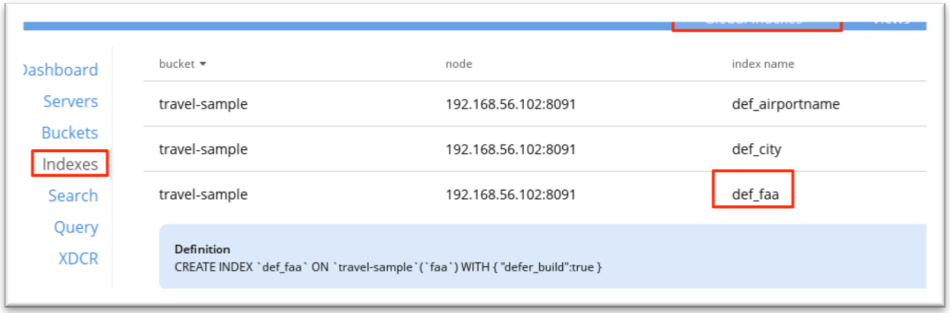
Query via N1QL

Make sure that at least a Primary Index is created!
Also Double check that the Secondary Index on 'faa' is there!

Implement the following methods in CBDataSource:

- CBN1qlResult QueryN1ql(QString query);



Test your implementation by executing:

```
DemoCouchbaseN1ql n1qlDemo;
n1qlDemo.test();
```

Update the SELECT Query with more clauses and check the results!

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5 | Error Management & Logging

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Handling errors

- Operations return lcb_error_t status code
- Check for
  - err == LCB_SUCCESS
- Error Codes
  - <libcouchbase/error.h>
- Examples
  - LCB_KEY_EEXISTS: Key already exists
  - LCB_KEY_ENOENT: Key does not already exist if replacing it
  - LCB_ETIMEDOUT: Transient error which indicates that something took too long
  - LCB_ETMPFAIL: Transient error which indicates that the server was too busy
  - LCB_AUTH_ERROR: Authentication error
  - LCB_BUCKET_ENOENT: Bucket does not exist

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Logging

- LCB_LOGLEVEL environment variable
  - 1 – basic
  - 5 – verbose
- Programmatically
  - LCB_CNTL_CONLOGGER_LEVEL setting
  - console_log_level option in the connection string
- Log entry format

```
1ms [I0] {14780} [DEBUG] (lcbio_mgr - L:383) <localhost:11210>
(HE=0xe56760)
Creating new connection because none are available in the pool
```

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6 | Travel Sample Application

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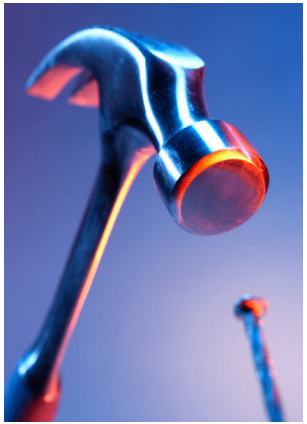
A Sample Application

Inspect the full source code of the Travel-Sample application!
Run the Qt application!

- Search for a flight from 'LAX' to 'LHR'



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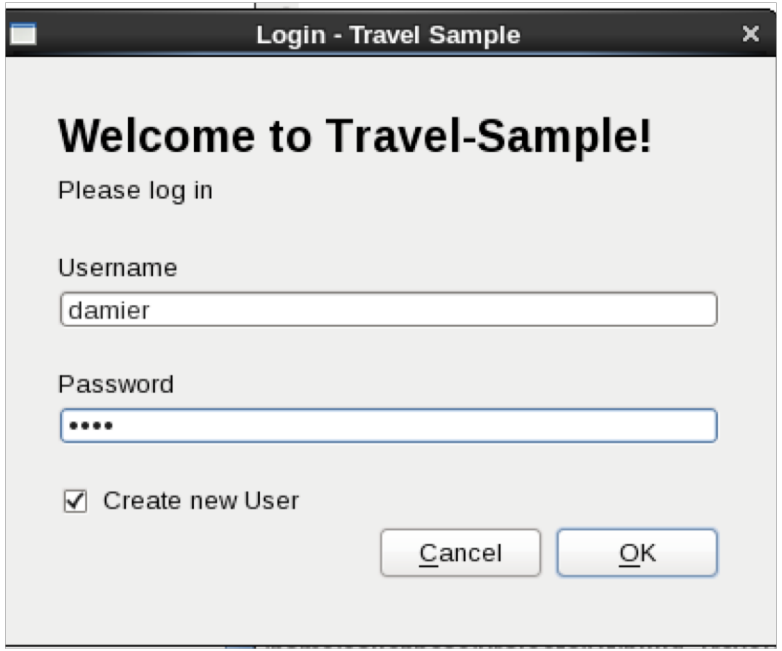

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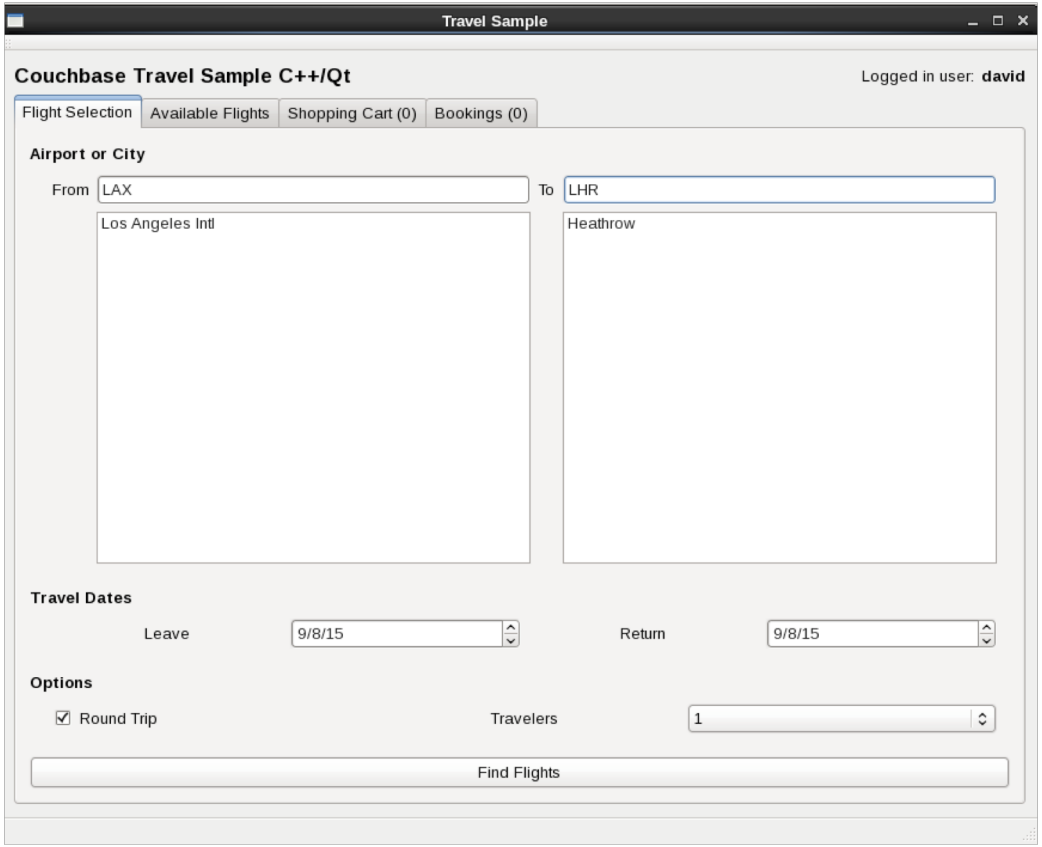

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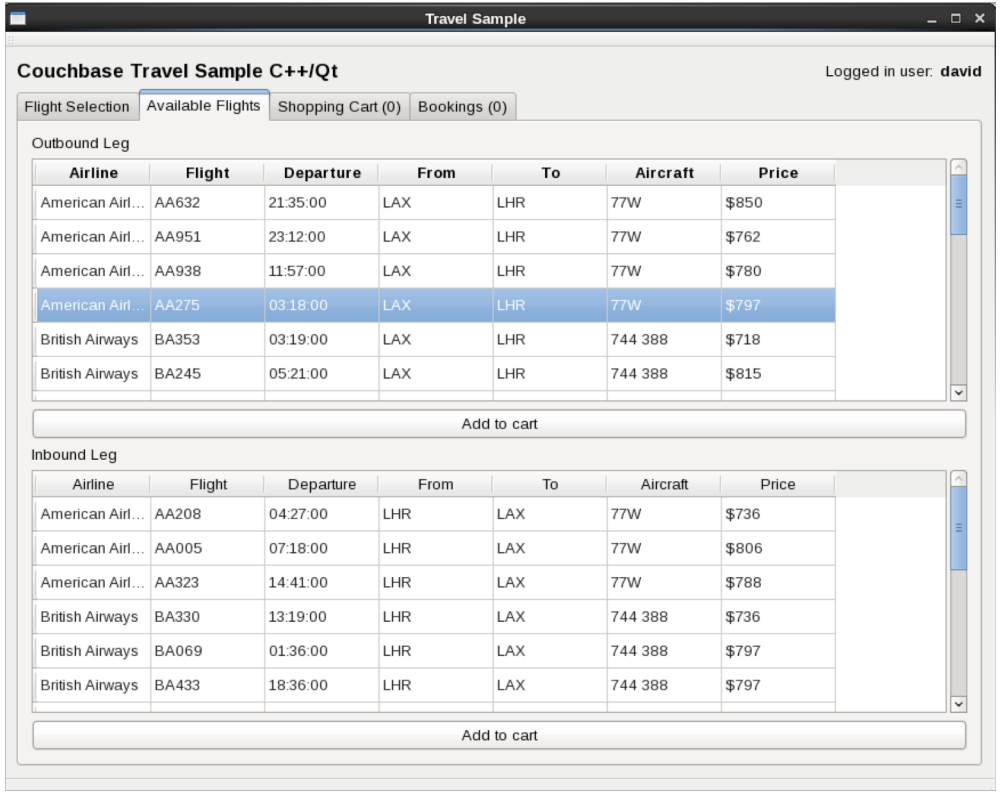
A Sample Application



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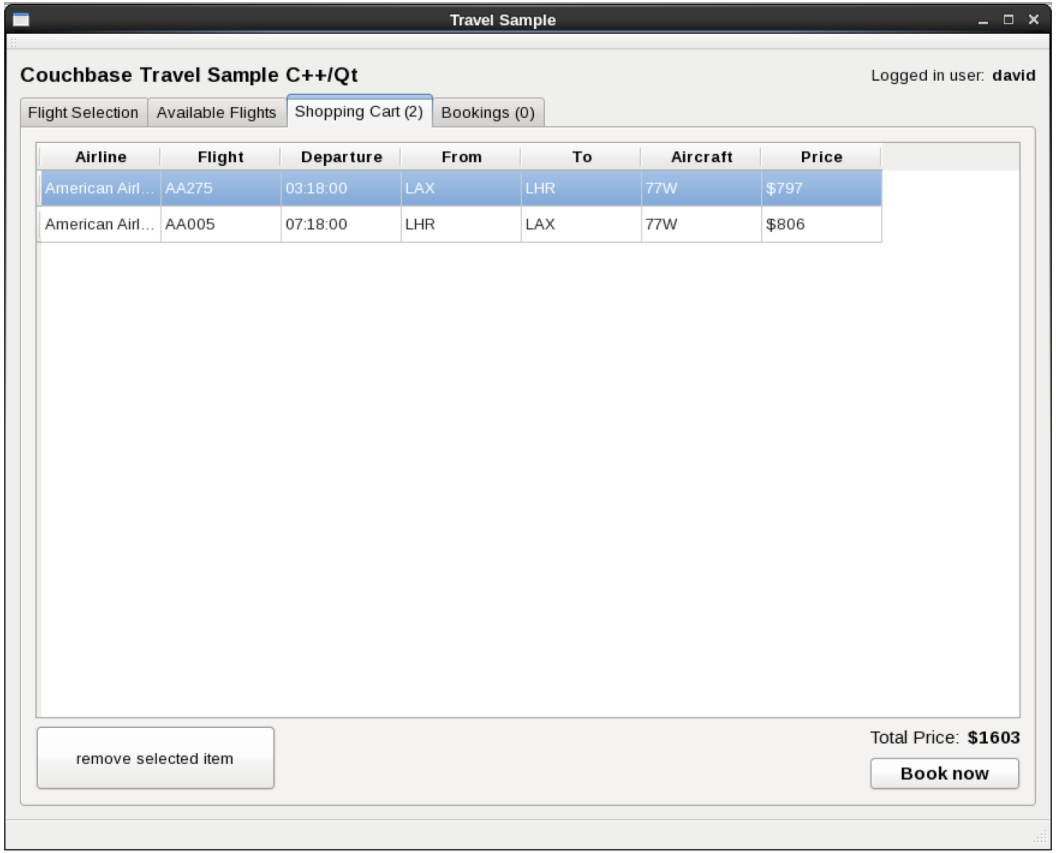
A Sample Application



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Thank you

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