

# Architecture and Administration Basics

Workshop Day 2 – Labs  
C/C++

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<https://github.com/dufrenoy/cb-workshop-2d/>



# 1

## Installation & Configuration SDK

## 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-1.0-2-x86_64.rpm
```

```
yum install libcouchbase-devel libcouchbase2-bin
```

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

```
git clone https://github.com/dufrenoy1/cb-workshop-2d.git
```

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

# Load the Project into QtCreator

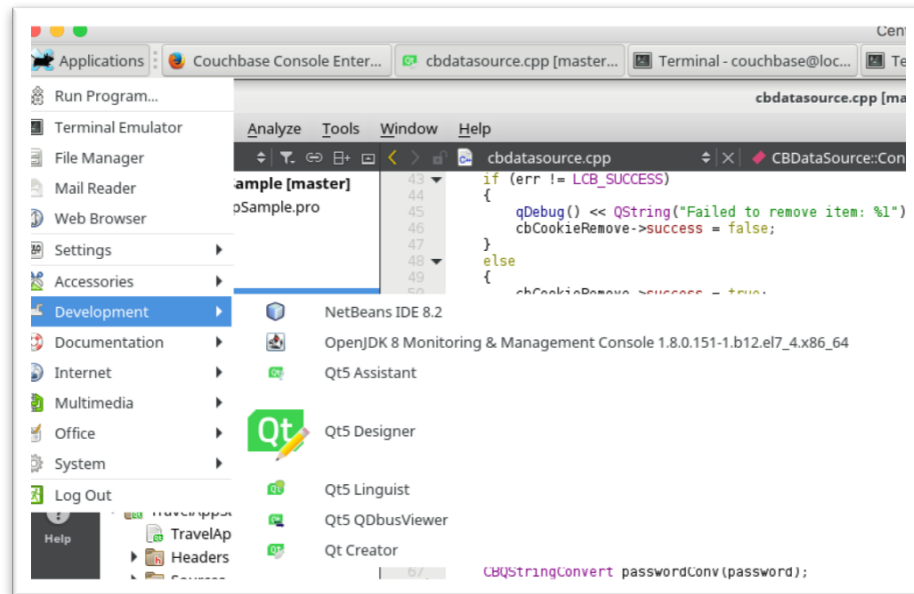


## Perform the following steps:

- Start a Server X on your Oracle Virtual Box from a Terminal.

## startXFCE4

- Start QTCreator from the Applications.
- Open an Existing project using the TravelSampleApp-Empty.pro file.
- Build & Run your application.
- You should see an empty window.





## 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



# 2

## Managing Connections

# 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`

**Add New User** X

- ▼ Data Roles
  - ▶ Data Backup
  - ▶ Data DCP Reader
  - ▶ Data Monitoring
  - ▼ Data Reader
    - ☐ all [\*] ⓘ
    - ☒ travel-sample ✓
    - ☐ travel-destination
    - ☐ test
  - ▼ Data Writer
    - ☐ all [\*] ⓘ
    - ☒ travel-sample ✓
    - ☐ travel-destination
    - ☐ test
  - ▶ FTS Roles
  - ▶ Query Roles

Cancel Save



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();
```

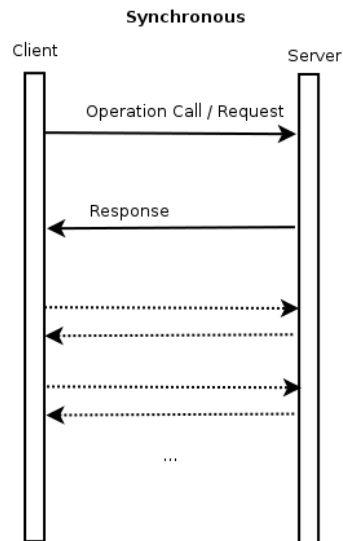




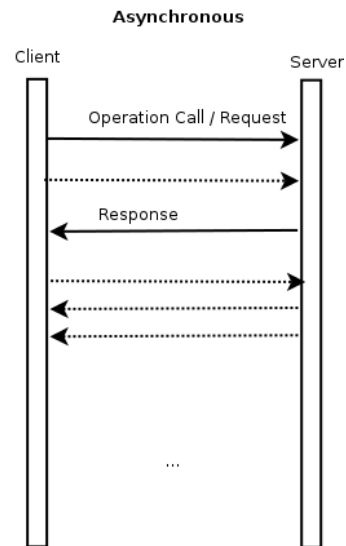
# 3

## Working with Documents

- 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`



- 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()`



**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();
```



# Perform a Multi-Get



Implement the following methods in `CBDataSource`:

- `CouchbaseDocumentMap MultiGet(QStringList keys);`

Test your implementation by executing:

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

Implement the following methods in `CBDataSource`:

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

Test your implementation by executing:

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

# Delete a Document



Implement the following methods in `CBDataSource`:

- `bool Delete(QString key);`

Test your implementation by executing:

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



# 4

## Indexes using VIEWS



# 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();
```

The screenshot shows a dialog box titled "Add Development View". It has two input fields: "Design Document Name" with the text "\_design/dev\_" and "airports", and "View Name" with the text "by\_name". At the bottom right, there are "Cancel" and "Save" buttons.



# 4

## Indexes using GSI (Plasma)

Make sure that at least a Primary Index is created!

Also Double check that the Secondary Index on 'faa' is there!

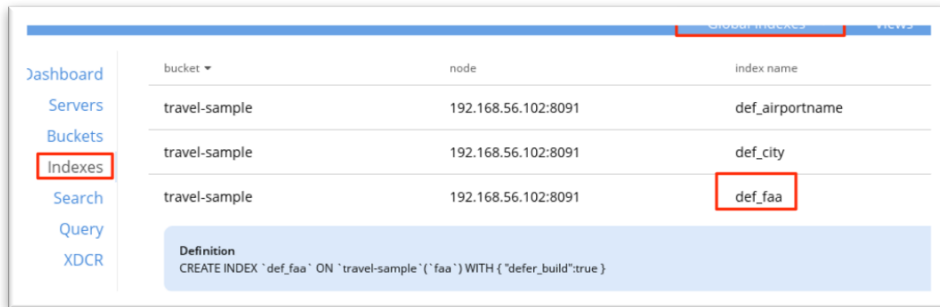
Implement the following methods in CBDataSource:

- CBN1qlResult QueryN1ql(QString query);

Test your implementation by executing:

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

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



bucket	node	index name
travel-sample	192.168.56.102:8091	def_airportname
travel-sample	192.168.56.102:8091	def_city
travel-sample	192.168.56.102:8091	def_faa

**Definition**  
CREATE INDEX `def\_faa` ON `travel-sample` (`faa`) WITH { `defer\_build`:true }



# 5

## Error Management & Logging

- 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

- 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
```



# 6

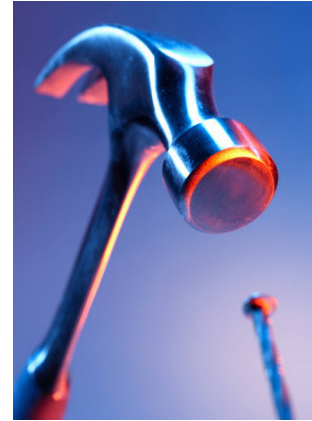
## Travel Sample Application

# A Sample Application



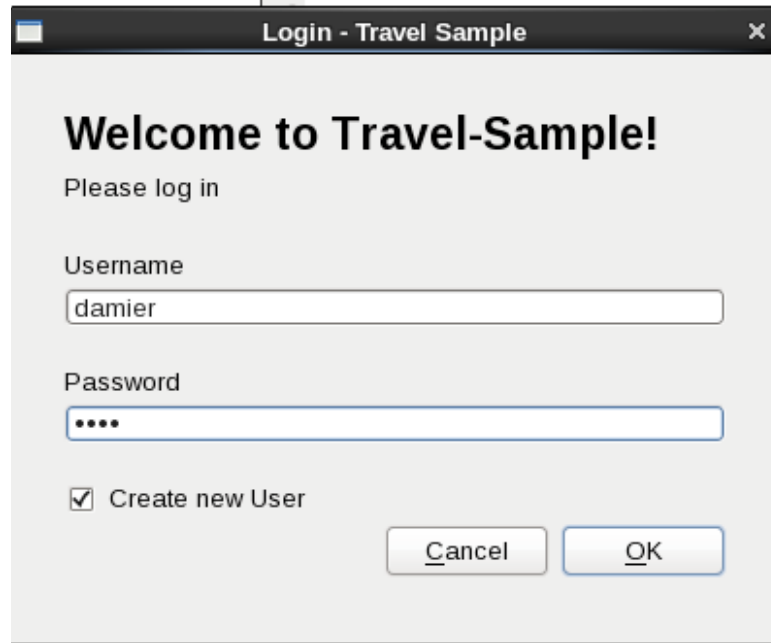
Inspect the full source code of the Travel-Sample application!  
Run the Qt application!

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





# A Sample Application

A screenshot of a login dialog box titled "Login - Travel Sample". The dialog has a light gray background and a dark gray title bar with a close button (X). The main content area contains the text "Welcome to Travel-Sample!" in bold, followed by "Please log in". Below this are two input fields: "Username" with the text "damier" and "Password" with four dots. At the bottom left is a checkbox labeled "Create new User" which is checked. At the bottom right are two buttons: "Cancel" and "OK".

Login - Travel Sample

**Welcome to Travel-Sample!**

Please log in

Username  
damier

Password  
....

☒ Create new User

Cancel OK

# A Sample Application



Travel Sample

Couchbase Travel Sample C++/Qt

Logged in user: david

Flight Selection Available Flights Shopping Cart (0) Bookings (0)

**Airport or City**

From  To

Los Angeles Intl

Heathrow

**Travel Dates**

Leave  Return

**Options**

☒ Round Trip Travelers

Find Flights

# A Sample Application



Travel Sample

Couchbase Travel Sample C++/Qt Logged in user: david

Flight Selection Available Flights Shopping Cart (0) Bookings (0)

Outbound Leg

Airline	Flight	Departure	From	To	Aircraft	Price
American Airl...	AA632	21:35:00	LAX	LHR	77W	\$850
American Airl...	AA951	23:12:00	LAX	LHR	77W	\$762
American Airl...	AA938	11:57:00	LAX	LHR	77W	\$780
American Airl...	AA275	03:18:00	LAX	LHR	77W	\$797
British Airways	BA353	03:19:00	LAX	LHR	744 388	\$718
British Airways	BA245	05:21:00	LAX	LHR	744 388	\$815

Add to cart

Inbound Leg

Airline	Flight	Departure	From	To	Aircraft	Price
American Airl...	AA208	04:27:00	LHR	LAX	77W	\$736
American Airl...	AA005	07:18:00	LHR	LAX	77W	\$806
American Airl...	AA323	14:41:00	LHR	LAX	77W	\$788
British Airways	BA330	13:19:00	LHR	LAX	744 388	\$736
British Airways	BA069	01:36:00	LHR	LAX	744 388	\$797
British Airways	BA433	18:36:00	LHR	LAX	744 388	\$797

Add to cart

# A Sample Application



Travel Sample

Couchbase Travel Sample C++/Qt

Logged in user: david

Flight Selection Available Flights Shopping Cart (2) Bookings (0)

Airline	Flight	Departure	From	To	Aircraft	Price
American Airl...	AA275	03:18:00	LAX	LHR	77W	\$797
American Airl...	AA005	07:18:00	LHR	LAX	77W	\$806

remove selected item

Total Price: **\$1603**

**Book now**

# Thank you

