

Advanced SQLite

Paul Lefebvre
Developer Evangelist
Xojo, Inc.

About SQLite



- Open-source database
- Lightweight
- Embedded
- Most widely deployed DB in the world
- https://www.sqlite.org
- In Xojo:
  - SQLiteDatabase
  - iOSSQLiteDatabase

Advanced Features



- WAL - Write-Ahead Logging
- In-Memory DB
- Triggers
- Pragma statement
- Foreign Keys
- Full Text Searching
- Indexing
- BLOB

Write-Ahead Logging



- Improves read/write performance to disk
- Normal: Writes twice — once to DB file, once to rollback file
- WAL: Writes once — to wal file
- More Information
  - http://developer.xojo.com/userguide/sqlite-write-ahead-logging

```
PRAGMA journal_mode=WAL;
DB.SQLExecute("PRAGMA journal_mode=WAL;")
DB.MultiUser = True
```

In-Memory Database



- A SQLite DB without a corresponding file
- Can be a useful way to have temporary, high-speed data lookup

```
Dim db As New SQLiteDatabase
If db.Connect Then
  // db is in-memory DB
End If
```

Triggers



- SQL code that runs when table data is modified
- INSERT, UPDATE, DELETE
- Useful for:
  - logging, auditing
  - updating related tables or columns
- https://sqlite.org/lang_createtrigger.html

```
CREATE TRIGGER CustomersFullNameTrigger UPDATE OF LastName ON Customers
BEGIN
    UPDATE customers SET FullName = new.FirstName || ' ' || new.LastName
    WHERE ID = new.ID;
END;
```

Pragma Statement



- Changes how SQLite works
- https://www.sqlite.org/pragma.html
  - user_version
  - foreign_keys

```
PRAGMA user_version = 4;
PRAGMA foreign_keys = True;
```

Foreign Keys



- Requires related keys to match keys in another table
- Not enabled by default
- https://www.sqlite.org/foreignkeys.html

```
CREATE TABLE Team (
  ID INTEGER NOT NULL,
  Name TEXT,
  Coach TEXT,
  PRIMARY KEY ([ID])
)

CREATE TABLE Player
(ID INTEGER PRIMARY KEY,
 TeamID INTEGER,
 Name TEXT,
 Position TEXT,
 FOREIGN KEY(TeamID) REFERENCES Team(ID));
```

Full Text Searching (FTS)

- FTS5 is included with 2016 Release 3
  - Adds ranking
  - Highlighting of search results
- http://developer.xojo.com/userguide/sqlite-full-text-search

```
CREATE VIRTUAL TABLE BookSearch USING fts5(ID, Title, Desc);
INSERT INTO BookSearch SELECT ID, Title, Desc FROM Book;
SELECT Title FROM BookSearch WHERE BookSearch MATCH 'cat' ORDER BY rank;
SELECT Title, highlight(BookSearch, 2, '<', '>') AS HighlightDesc FROM BookSearch WHERE
BookSearch MATCH 'cat';
```

Indexing



- Improve performance when looking for data in tables
- Index columns (or groups) that are commonly used in WHERE clause
- Do not over-index!

```
CREATE INDEX CustomersLastName ON Customers (LastName)
```

BLOB



- Incrementally read/write BLOB data
- SQLiteBLOB class
- http://developer.xojo.com/sqliteblob



Demo

Q & A



Paul Lefebvre

paul@xojo.com