

Course Code: 303

Database Handling using PYTHON

Unit-1: Introduction to SQLite

SQLite is an in-process library that implements a **self-contained, serverless, zero-configuration, transactional SQL database engine**.

The code for SQLite is in the public domain and thus free for commercial or private use. SQLite is the most widely deployed database in the world with more applications than we can count, including several high-profile projects.

- SQLite is an **embedded** SQL database engine. Unlike most other SQL databases,
- SQLite has **no separate server process**. SQLite reads and writes directly to ordinary disk files.
- A complete SQL database with multiple tables, indices, triggers, and views, is contained in a single disk file.
- The database file format is cross-platform - you can freely copy a database between 32-bit and 64-bit systems or between big-endian and little-endian architectures.
- These features make SQLite a popular choice as an Application File Format. SQLite database files are a recommended storage format by the US Library of Congress.
- **Think of SQLite not as a replacement for Oracle or SSMS but as a replacement for fopen()**

<https://www.sqlite.org/about.html>

SQLite Features/ Why to use SQLite

- **SQLite is totally free:** SQLite is open-source. So, no license is required to work with it.
- **SQLite is serverless:** SQLite doesn't require a different server process or system to operate.
- **SQLite is very flexible:** It facilitates you to work on multiple databases on the same session on the same time.
- **Configuration Not Required:** SQLite doesn't require configuration. No setup or administration required.
- **SQLite is a cross-platform DBMS:** You don't need a large range of different platforms like Windows, Mac OS, Linux, and Unix. It can also be used on a lot of embedded operating systems like Symbian, and Windows CE.
- **Storing data is easy:** SQLite provides an efficient way to store data.
- **Variable length of columns:** The length of the columns is variable and is not fixed. It facilitates you to allocate only the space a field needs. For example, if you have a varchar(200) column, and you put a 10 characters' length value on it, then SQLite will allocate only 20 characters' space for that value not the whole 200 space.
- **Provide a large number of API's:** SQLite provides API for a large range of programming languages. **For example:** .Net languages (Visual Basic, C#), PHP, Java, Objective C, Python and a lot of other programming languages.
- **SQLite** is written in **ANSI-C** and provides simple and easy-to-use API.

- **SQLite** is available on UNIX (Linux, Mac OS-X, Android, iOS) and Windows (Win32, WinCE, WinRT).

SQLite Advantages

SQLite is a very popular database that has been successfully used with an on-disk file format for desktop applications like version control systems, financial analysis tools, media cataloging and editing suites, CAD packages, record-keeping programs, etc.

There are a lot of advantages to using SQLite as an application file format:

1) Lightweight

- SQLite is a very light weighted database so, it is easy to use it as an embedded software with devices like televisions, Mobile phones, cameras, home electronic devices, etc.

2) Better Performance

- Reading and writing operations are very fast for SQLite databases. It is almost 35% faster than the File system.
- It only loads the data which is needed, rather than reading the entire file and holding it in memory.
- If you edit small parts, it only overwrites the parts of the file which was changed.

3) No Installation Needed

- SQLite is very easy to learn. You don't need to install and configure it. Just download SQLite libraries on your computer and it is ready to create the database.

4) Reliable

- It updates your content continuously so, little or no work is lost in a case of power failure or crash.
- SQLite is less bug prone rather than custom-written file I/O codes.
- SQLite queries are smaller than equivalent procedural codes so, the chances of bugs are minimal.


5) Portable

- SQLite is portable across all 32-bit and 64-bit operating systems and big- and little-endian architectures.
- Multiple processes can be attached with same application file and can read and write without interfering each other.
- It can be used with all programming languages without any compatibility issue.

6) Accessible

- SQLite database is accessible through a wide variety of third-party tools.
- SQLite database's content is more likely to be recoverable if it has been lost. Data lives longer than code.

7) Reduce Cost and Complexity

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- It reduces application cost because content can be accessed and updated using concise SQL queries instead of lengthy and error-prone procedural queries.
 - SQLite can be easily extended in in future releases just by adding new tables and/or columns. It also preserve the backwards compatibility.

SQLite Disadvantages

- SQLite is used to handle low to medium traffic HTTP requests.
- Database size is restricted to 2GB in most cases.