Presentation shared with the

St. Louis Unix Users Group

2021-06-09

Welcome
Introduction

Volunteer presenters:


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Employment: McAuto, CINCOM, Miles, Bayer, IBM

Duties: User Support, Program Product Support, MVS

- Education, Mathematics BA, MS Illinois State, Ph.D MU
- Interests: Op/Sys, Linux configuration, various pgm lang.
- Linux level – experienced but not expert
Overview

This will be an introduction to learning about SQLite 3 Database.

- More of a road map than a rigid check list.
- Covers where to start.
- Then, maybe, where to go next.
A database is a set of data store in a computer. This data is usually structured in a way that makes the data easily accessible.

A relational database is a type of database. It uses a structure that allows us to identify and access data in relation to another piece of data in the database. Often, data in a relational database is organized into tables.
<table>
<thead>
<tr>
<th>tuple</th>
<th>attribute</th>
<th>column</th>
</tr>
</thead>
<tbody>
<tr>
<td>row</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A relational database management system (RDBMS) is a program that allows you to create, update and administer a relational database. Most RDBMSs use the SQL language to access the data.

E. F. Codds's rules for RDBMS

0. Foundation Rule
1. The Information Rule
2. Guaranteed Access Rule
3. Systematic Treatment of NULL values
4. Dynamic online catalog based on relational model
5. Comprehensive data sub-language
6. View of updating Rule
7. Set level insert, delete, and update rule
8. Physical data independence
9. Logical data independence
10. Integrity Independence
11. Distribution independence
12. Non-suversion rule
SQL (Structured Query Language) is a programming Language used to communicate with data stored in a RDBMS. SQL syntax is usually similar to the English Language in order to make it ‘easy’ to read, write and Interpret data.

Some Common SQL terms:

**Data Definition language**
- CREATE
- DROP
- ALTER

**Data Manipulation language**
- Insert
- Update
- Delete

**Data Query language**
- SELECT

**SELECT WHERE BETWEEN AND/OR/NOT MIN/MAX OFFSET/LIMIT**
What is SQLite?

SQLite is a popular open source SQL database. It can store an entire database in a single file. One of the most significant advantages this provides is that all of the data can be locally stored without having to connect your DB to a server.

Executive summary of SQLite

- Full feature SQL
- Billion of deployments
- Single file database
- Source in one file (sqlite3.c)
- Small footprint
- Max DB size 281 tera bytes
- Max row size 1 gigabyte

- Fast, extensive, detailed doc.
- Faster than direct file I/O
- Aviation quality
- Zero-configuration
- Stable, enduring format
- Extensive long term support

Small, fast, reliable choose any three.

www.sqlite.org/about.html
SQLite Overview

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Diagrams

Db
Data

Db software

Server

SQLite database

sqlite code

sqlite code
Where is SQLite found?

Every Android, Iphone, Mac, Windows 10, Firefox, Chrome, Safari, Skype Itunes, Dropbox, TurboTax

How can SQLite be used

SQLite access written in C but APIs for C, C++, Tk/Tcl, Perl, PHP, Python, Ruby, Java (originally written as Tk extension)
SQLite is public domain (discuss free)
SQLite is open-source NOT open contribute
  www.sqlite.org
  www.sqlitetutorial.org
  www.sqlitebrowser.org
SQLite architecture

- **CORE**
  - Interface
  - SQL cmd processor
  - Virtual Machine

- **Back End**
  - B-tree
  - Pager
  - OS interface

- **API**

- **SQL compiler**
  - Tokenizer
  - Parser
  - Code Generator

- **Accessories**
  - Utilities
  - Test Code

- **DB-file**
When to use SQLite

Embedded applications
  Portable and read only
  Local single user
  Disk Access
  Testing

When NOT to use SQLite

  Large or multi-volume db-s
  Network communication required
  Multi Updaters
Simple CLI example

$ sqlite3
sqlite3> CREATE TABLE test (fn TEXT, age INTEGER, ht integer);
sqlite3> INSERT INTO test VALUES('Herman', 35, 73);
sqlite3> INSERT INTO test VALUES('George', 44, 68);
sqlite3> SELECT * from test;
sqlite3> Select rowid, fn, ht, age FROM test;
sqlite3> .quit

other(s)
.table
.export
.import
.header on
.columns on
...  
.timer on/off
and more.
Ed’s weather data example

- Install sqlite3
- Obtain some data via curl
- Show use of sqlite3 command line
- Import some data – clean up bad rows
- Export back out to combine data
- Script to import files to separate tables
- Show use of SQL schema and query examples
- Show how to use gnuplot with SQLite data via bash

Q & A
Weather Info URLs


https://www.visualcrossing.com/resources/blog/how-to-import-weather-data-into-mysql/
import sqlite3
# conn = sqlite3.connect(':memory:)
conn = sqlite3.connect('test.db')
c = conn.cursor()
c.execute("""CREATE TABLE cust
    first_name TEXT,
    last_name TEXT,
    email TEXT"")
#INTEGER, REAL, TEXT, NULL, BLOB
"""Insert code""
conn.commit()
conn.close()

my_insert = """INSERT INTO cust
    (first_name, last_name, email) VALUES
    ('Al', 'Smith', 'Asmith@cindians.com')"
    c.execute(my_insert)
SQLite and python

CRUD
Create
Read
Update
(Insert)
Delete
Internet References

Works cited.

http://www.sqlite.org

http://www.sqlitetutorial.net

The Definitve Guide to SQLite (ver1 and ver2)

Using SQLite

Talks/Interviews with Richard Hipp

Multiple utube episodes

DB Browser for SQLite (sqlitebrowser.org info)

Samples provide to SLUUG.
Feedback is always welcome on our mail lists!

Subscribe to our mail lists:
https://www.sluug.org/mailman/info

View our Presentation Archives:
https://www.sluug.org/resources/presentations/

We strive to be free, friendly, and fun!
Questions at the End

What are your Questions?

Presentation shared with the
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Questions?