

Spatialite + QGIS

HOW TO PACK A PUNCH FOR FREE

Contents

- Who am I?
- Intro - Databases
- SQLite
- Intro (Spatial) Databases
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- **Demo**

Jacob Mark

- Not Dr. Richard Hipp (but he's important) →
- Recent graduate
- Summer of Sparks
- Niche: Open Source tools



Database Management System (DBMS)

- Application - manipulation and interaction with DB
- Define, create, update, & administer Databases
- SQL (Structured Query Language) facilitates querying of data – **ASKING QUESTIONS**

DBMS Examples

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POSTGRES



PostgreSQL

THE UNIQUE WORLD OF...



What Sets SQLite Apart – LITE

- Serverless DB <> file-based
 - No intermediary server process (or need for connection)
- Entire SQL engine embedded within application
- Designed for storing **local data**
- Creates **single-file** databases
- Variable-length records – only stores space used; saves a lot of space!
- **Extremely Compact** (hence, the feather!)

What Sets SQLite Apart – More

- Cross-Platform compatibility (32/64 bit systems)
- No installation or configuration – **“it just works!”**
- Doesn't enforce type-checking (data type constraints)
 - “dynamic typing”
 - “type affinity” – recommended, not required
- Stable file format (across all versions)
- Source code is OPEN

Open Source Software Licensing

Licenses – give rights of use to users

Like **Free Speech**, not Free Drink

- FREE TO STUDY, CUSTOMIZE, TWEAK
- FREE TO RUN THE PROGRAM HOWEVER YOU'D LIKE
- FREE TO REDISTRIBUTE IT ORIGINAL OR MODIFIED
- One you have it, you're in **control**.
- More information: jacobsgisportfolio.wordpress.com

most widely deployed database engine in the world

Python & PHP



Every Game Console



Adobe



EVERNOTE



Digital Cameras
Skype

TVs & Cars










Every Smart Phone

Spatial Databases - Intro

- Storing & Querying Data
- Includes objects defined in geometric space
- Simple objects – points, lines, polygons
- Complex objects – 3D, networks

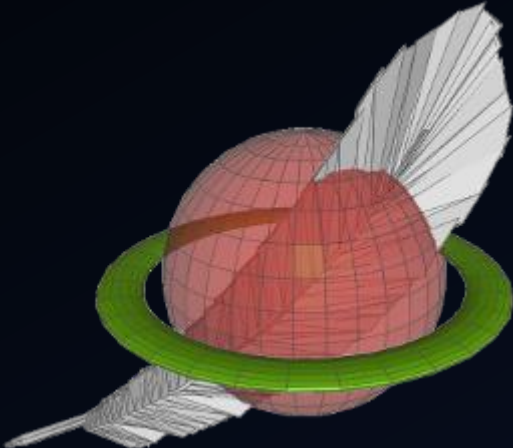
Geometry Types

Type		Type		Common Usages
POINT		MULIPOINT		Tree, Pole, Hydrant, Valve
LINestring		MULTILINestring		Road, River, Railway, Pipeline
POLYGON		MULTIPOLYGON		Cadastre, Park, Administrative Boundary
COLLECTION				Graphics, Markups

Spatial Databases - Features

- Spatial Indices – optimize spatial querying
- Spatial Functions – buffer, union, polygonize
- Predicates(true/false) – within, overlap, intersect?
- Constructors – new geometries
- Observer Functions – center of circle, 1st point of line

Spatial Databases - Examples



MAPD



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mongoDB®



H2 GIS

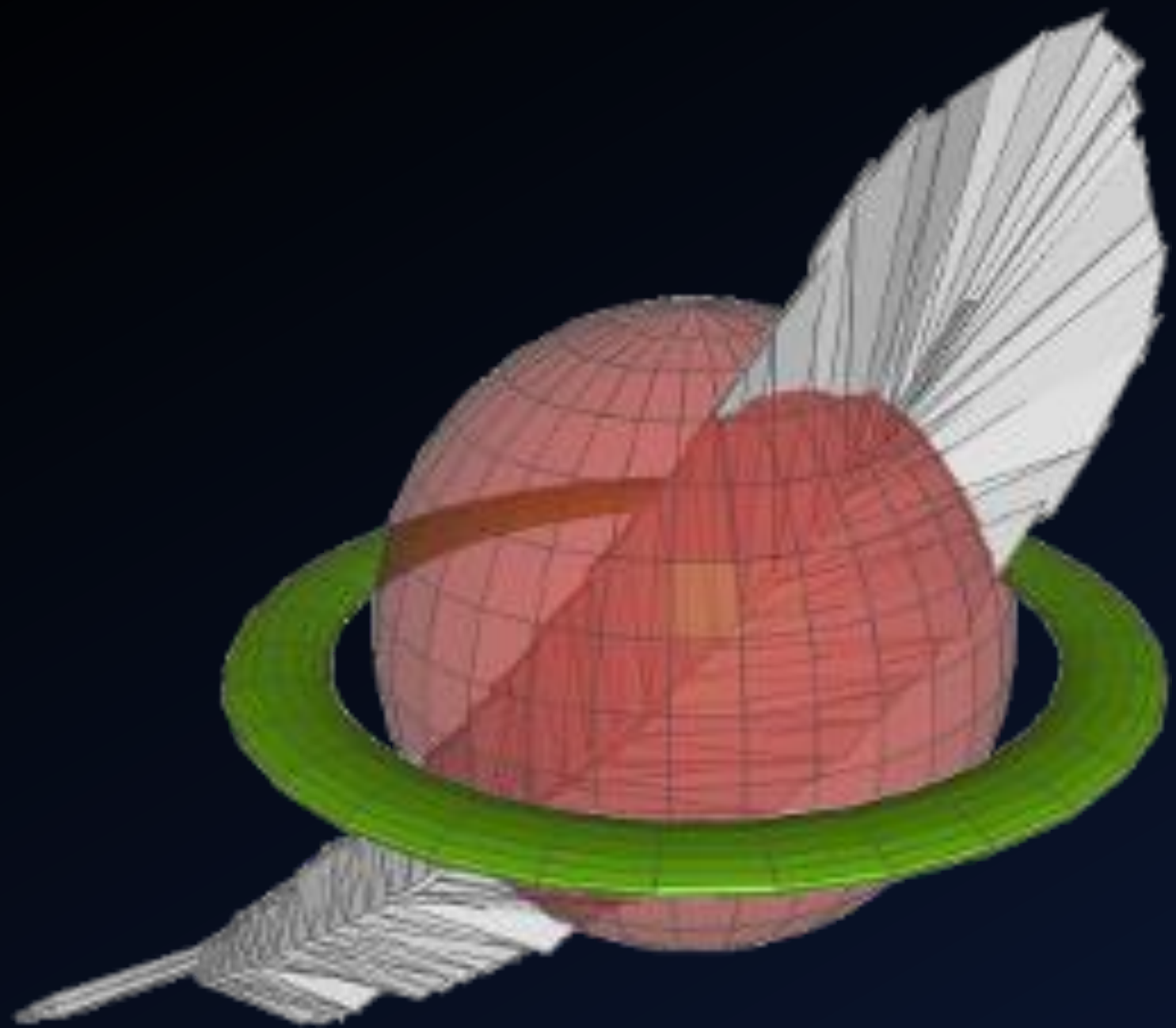


MySQL®



CouchDB





Spatialite Intro

- SQLite extension – but runs with complete SQLite package
- Simple geometry types
- Many spatial functions
- Employable by many GIS applications (ex: QGIS, ArcGIS)
- File importing (shapefiles, csv, + more)
- Extras: networks & routing, rasterlite, R-tree indexing, etc)

Geometry Components

- Type (point, string, polygon, collection)
- SRID (Spatial Reference Identifier)
- Coordinates
- Spatial Extent
- Dimensions (-1 to 2)
- XYZ (height)
- XYM (measure)

Advantages of Spatialite

- Simple installation
- **FREE AND OPEN SOURCE**
- No DBMS administration – nice where support not available
- Low system footprint
- Thrives at the “EDGES of networks” – less connected scenarios
- Great education tool – manage, query, GIS analysis
- **ELEMENTARY COMPLEXITY + GOOD PERFORMANCE**

Why Spatialite table over a Shapefile?

- From 3+ files to JUST ONE
- **VIEWS!** – glorified query, a read-only table, has no data of its own
 - Allows you to save numerous vantage points or filters of a layer without duplicating (or multiplying) the data used
- **TRIGGERS!** – triggers a series of tasks/operations upon the execution of a command/event
 - Event – delete, insert, update
- Spatial Indices (rapid search/filtering)
- No Max field name length
- Shapefile max size – 2 gigabytes

Disadvantages of Spatialite

- Single user / single application / standalone workstation
 - Any one time: one writer, many readers; **no concurrent editing**
- Millions & millions of entities is pushing it
- Not a full-fledged spatial DBMS – 80/20 rule
- not a Client/Server DB engine (for a shared repository of enterprise data)

If...

- Your data is separated from your application by a network
- You need concurrent data writing / high-frequency versioning
- You have BIG Data (in the multi-millions)

Then...

Spatialite isn't for you.

Otherwise...

It's a great choice!

A Note on SQL

- Structure Query Language
- Not so bad!
- Regular predictable syntax
- Query Statements resemble plain English
- Works cross-platform



DEMO TIME!