

UC



Leveraging SQLite and ArcGIS

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Introduction

- What is SQLite?
- What SQLite options are available in ArcGIS?
- Strengths and Weaknesses of each option.
- Esri Support.
- How can you leverage SQLite Databases?

What is SQLite?



What is SQLite?

- Created in 2000 by D Richard Hipp as part of a project for the U.S. Navy.
- May be the most installed RDBMS.
- SQLite is a public domain relational database management system contained in a C programming library.
- It is not a client–server database engine.
- It is meant to be embedded in an application.

What SQLite options are
available in ArcGIS?



What SQLite options are available in ArcGIS?

- SQLite
- ST_Geometry
- SpatiaLite
- GeoPackage

What SQLite options are available in ArcGIS?

SQLite

- Read SQLite data files as tabular data.
- Version 3.16.2
- Must have “.sqlite” as an extension
- Limited Type System

What SQLite options are available in ArcGIS?

ST_Geometry

- SQL/MM Part 3 (ISO/IEC 13249-3:2006) and OGC Simple Feature Access – Part2: SQL option (ISO 19125-2:2004)
- Must have “.sqlite” as an extension
- Enforces the ESRI type system.

What SQLite options are available in ArcGIS?

Spatialite

- Version 4.0.
- Must have “.sqlite” as an extension.
- Uses the SQLite native type system.

What SQLite options are available in ArcGIS?

GeoPackage

- OGC Standard
- Version 1.0 (1.0.1), 1.1 and 1.2 supported at 10.5.1/2.0
- Shares the same geometry type definition with ST_Geometry.
- Must have “.gpkg” as an extension.
- Type system defined in the standard.
- Includes Tiled Raster Support.

Strengths and Weaknesses
of each option.



Strengths and Weaknesses

Strengths

- SQLite
 - Shareware.
 - Light weight.
 - Portable.

Strengths and Weaknesses

Strengths

- ST_Geometry
 - Strong implementation based on standards.
 - Esri type system.
 - Compact geometry type.

Strengths and Weaknesses

Strengths

- SpatiaLite
 - Popular implementation.
 - Shareware.

Strengths and Weaknesses

Strengths

- GeoPackage
 - OGC Standard
 - Tiled Raster

Strengths and Weaknesses

Weaknesses

- SQLite
 - No spatial type.
 - No raster support.
 - Limited type system.

Strengths and Weaknesses

Weaknesses

- ST_Geometry
 - Esri product, not shareware or open source.
 - Vector only.

Strengths and Weaknesses

Weaknesses

- SpatiaLite
 - Shareware, but not a standard.
 - Geometry type is not compact.
 - Compressed geometry uses lossy compression
 - SQLite native type system.
 - No time type.
 - No empty shape types.

Strengths and Weaknesses

Weaknesses

- GeoPackage
 - Relatively new standard. Limited acceptance.

Esri Support



Esri Support

Software

- ArcMap, ArcCatalog (10.2.1)
- ArcGIS Pro (1.2)
- Runtime (10.2.4 java, 10.2.8 Android)

Esri Support

General

- Create
 - CreateSQLiteDatabase Geoprocessing Tool

Esri Support

Vector

- Draw
- Import/Export
 - Copy/Paste, FeatureClass2FeatureClass, Table2Table
- Query
- Edit only through code. No edit session.
- ST_Geometry functions

Esri Support

Vector – ST_Geometry

- The OGC standard that defines ST_Geometry includes a set of functions that allow you to create, insert, update and query the ST_Geometries via SQL.
- Using the SQLite3.exe command line tool you can open a ST_Geometry database, import the ST_Geometry dll and then execute the ST_Geometry functions.

- Select the buildings that are not completely contained within one lot.:

```
SELECT DISTINCT (building_id) FROM bfp, lots WHERE st_intersects (lot, footprint) = 1 AND  
st_contains (lot, footprint) = 0;
```


Esri Support

Vector – ST_Geometry: Loading the extension

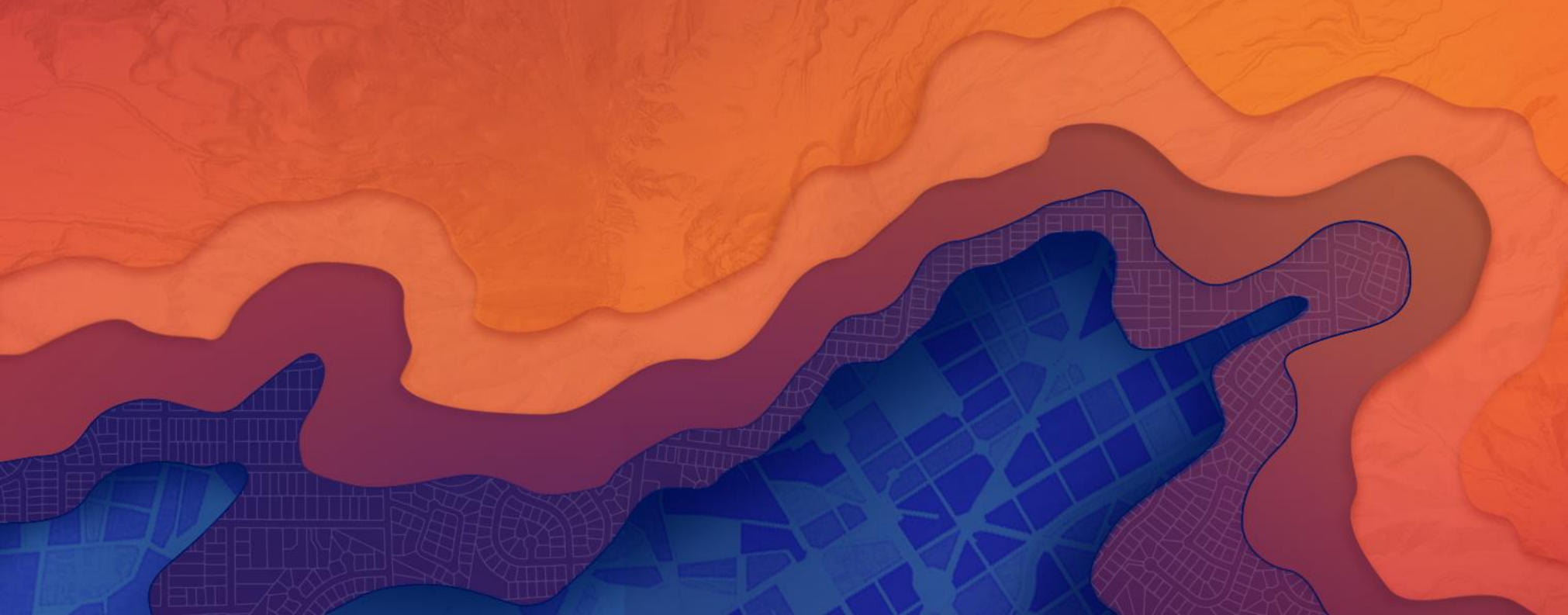
- In ArcGIS Desktop the ST_Geometry libraries can be found in Desktop10.5\DatabaseSupport\SQLite\Windows32 or from my.esri.com
- To load bring up SQLite3.exe.
SQLite3 MyData.sqlite
> SELECT load_extension('c:\Program Files\ESRI\Desktop10.5\DatabaseSupport\SQLite\Windows32\stgeometry_sqlite.dll','SDE_SQL_funcs_init');

Esri Support

Raster – GeoPackage Only

- Draw
 - 10.4.1, 1.5 and before: Use Add Raster Layer.
 - 10.5, 2.0: Add like any other supported raster.
- Import
 - 10.4.1, 1.5 and before: Raster2GPKG
 - <https://github.com/Esri/raster2gpkg>
 - 10.5, 2.0: AddRasterToGeoPackage Geoprocessing Tool.

How can you leverage
SQLite Databases?



How can you leverage SQLite Databases?

- Data exchange between internal or external sites
- Data exchange where shareware is a requirement.
- Data exchange where a standard is required.

Conclusion



Conclusion

- What is SQLite!
- What SQLite options are available in ArcGIS
- Strengths and Weaknesses of each option.
- Esri Support
- How can you leverage SQLite Databases?

Please Take Our Survey on the Esri Events App!

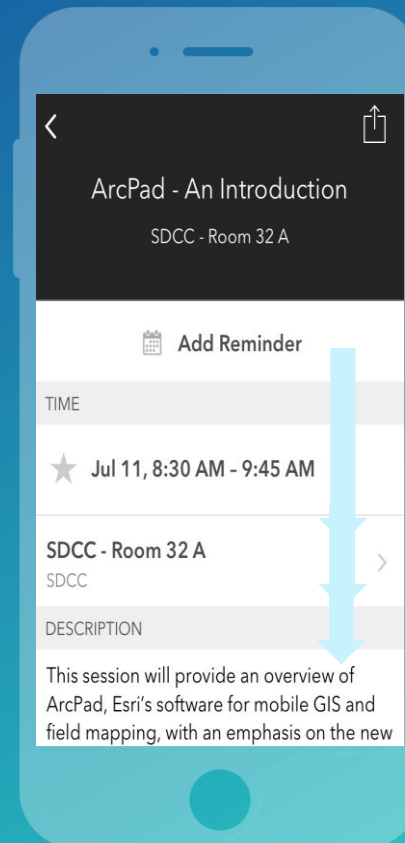
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Complete Answers and Select "Submit"





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