SQL Access Using Native Geometry Types:
Tips and Tricks

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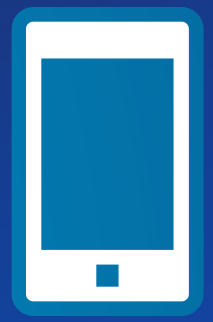
Assumptions

Target Audience

- Intermediate knowledge of SQL and relational databases.
- No knowledge of the ST_Geometry data type or functionality is necessary.
- Not covering setup and configuration of ST_Geometry environments.
- Questions at the end of the presentation.

Please silence cell phones



Agenda

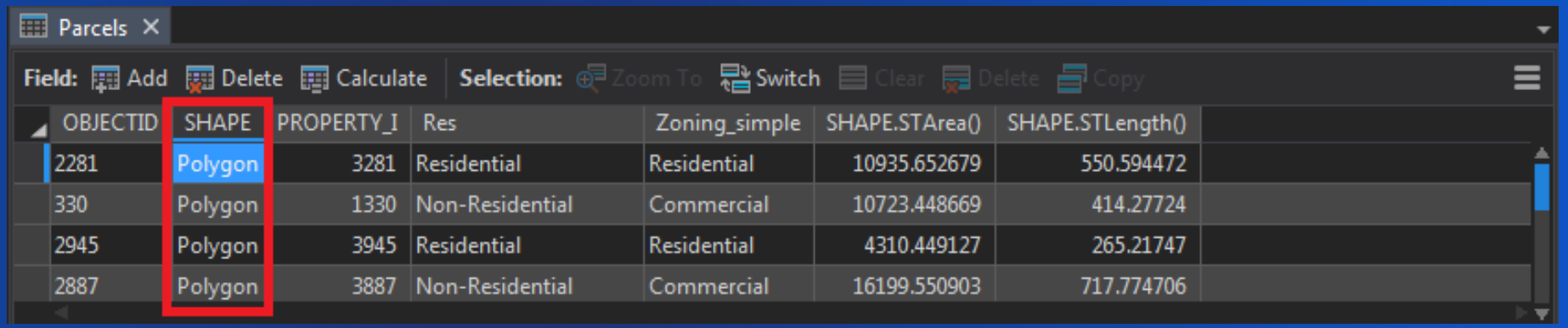
- Native Geometry Types
- What is ST_Geometry?
- Why use ST_Geometry?
- How is ST_Geometry Implemented?
- Additional Considerations
- DEMO
  - How to use ST_Geometry
  - How to use SQL Server Geometry type via SQL

Native Geometry Types *(D = Default)*

	SQL Server	Oracle	PostgreSQL	SQLite
Esri ST_Geometry		✓ D	✓ D	✓ D
Esri SDE Binary	✓	✓		
SQL Server Geometry	✓ D			
SQL Server Geography	✓			
Oracle Spatial		✓		
PostGIS Geometry			✓	
SpatiaLite				✓

What Is ST_Geometry?

- ST_Geometry is a spatial type that stores geometry data in a single spatial attribute
- Spatial Index



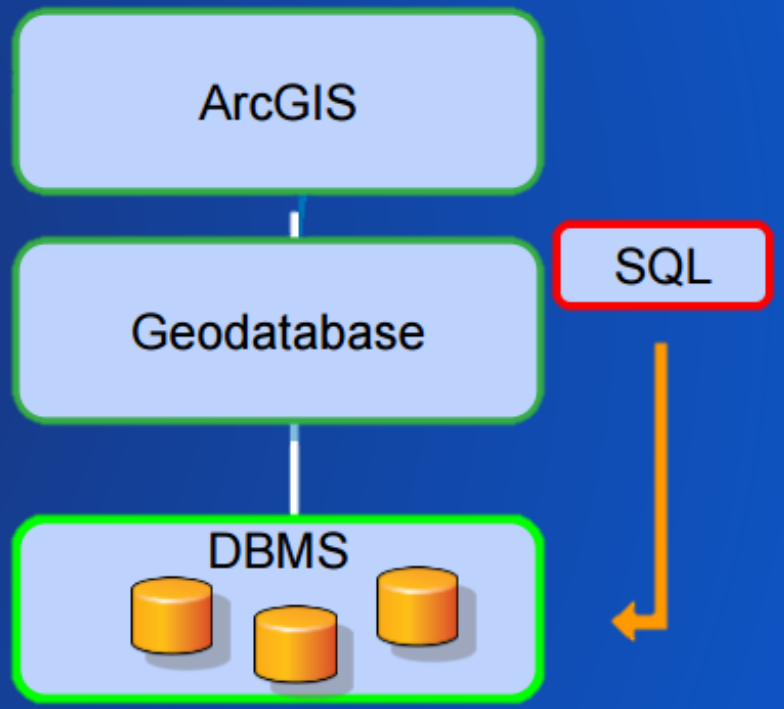
OBJECTID	SHAPE	PROPERTY_I	Res	Zoning_simple	SHAPE.STArea()	SHAPE.STLength()
2281	Polygon	3281	Residential	Residential	10935.652679	550.594472
330	Polygon	1330	Non-Residential	Commercial	10723.448669	414.27724
2945	Polygon	3945	Residential	Residential	4310.449127	265.21747
2887	Polygon	3887	Non-Residential	Commercial	16199.550903	717.774706

- Relational and geometry operators and functions
  - Constructors
  - Accessors
  - Relationship and Operators

Why use ST_Geometry?

Benefits of ST_Geometry

- Enhances Efficiency
- Sometimes you want a single result, and not a map
- Interact with data on the SQL level
- Bridge the gap between GIS and non-GIS users
- Accessed using common API's and SQL



How is ST_Geometry Implemented? *(D = Default)*

	SQL Server	Oracle	PostgreSQL	SQLite
Esri ST_Geometry		✓ D	✓ D	✓ D
Esri SDE Binary	✓	✓		
SQL Server Geometry	✓ D			
SQL Server Geography	✓			
Oracle Spatial		✓		
PostGIS Geometry			✓	
SpatiaLite				✓

Editing Geodatabase Feature Classes using SQL

Additional considerations

Minimal validation of the objects will be performed

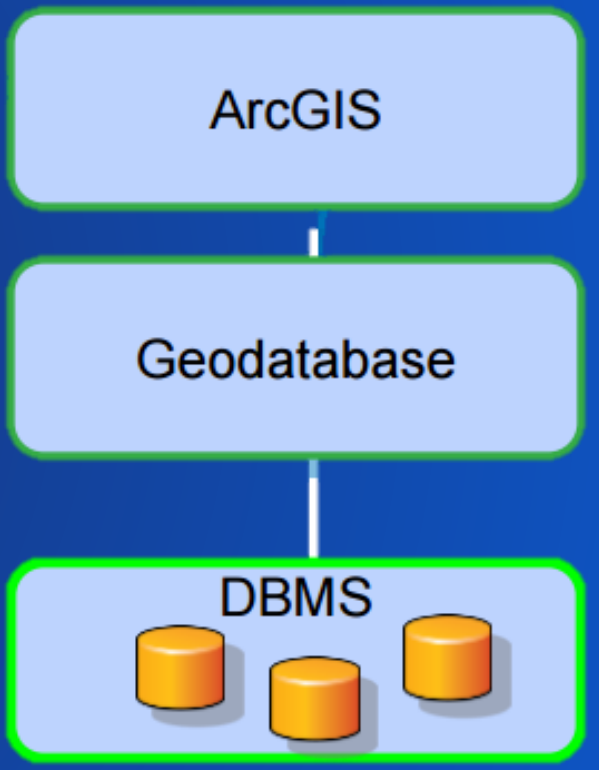
When working outside of ArcGIS, keep in mind:

- Only edit simple features (*Is_Simple*)
- Editing versioned tables (*versioned view*)
- Must maintain next ObjectID and GlobalID values (*Next_RowID/Next_GlobalID*)

Rules for creating spatial tables to be used with ArcGIS

Prerequisites

- Unique identifier.
- One geometry column in the table.
- One spatial reference in the table.
- Do not use mixed-case object names.
- Entity type matches the type defined for the spatial column.



ST_Geometry Functions

Relational and Geometry Operators and Functions

- Constructors – Creates new geometry
  - Example: ST_Point, ST_Line, ST_Polygon
- Accessor – Return property of a geometry
  - Example: ST_Area, ST_SRID
- Relationship and Operators – Perform spatial operations
  - Example: ST_Intersects, ST_Buffer

Demo:

1. How to use ST_Geometry Functions

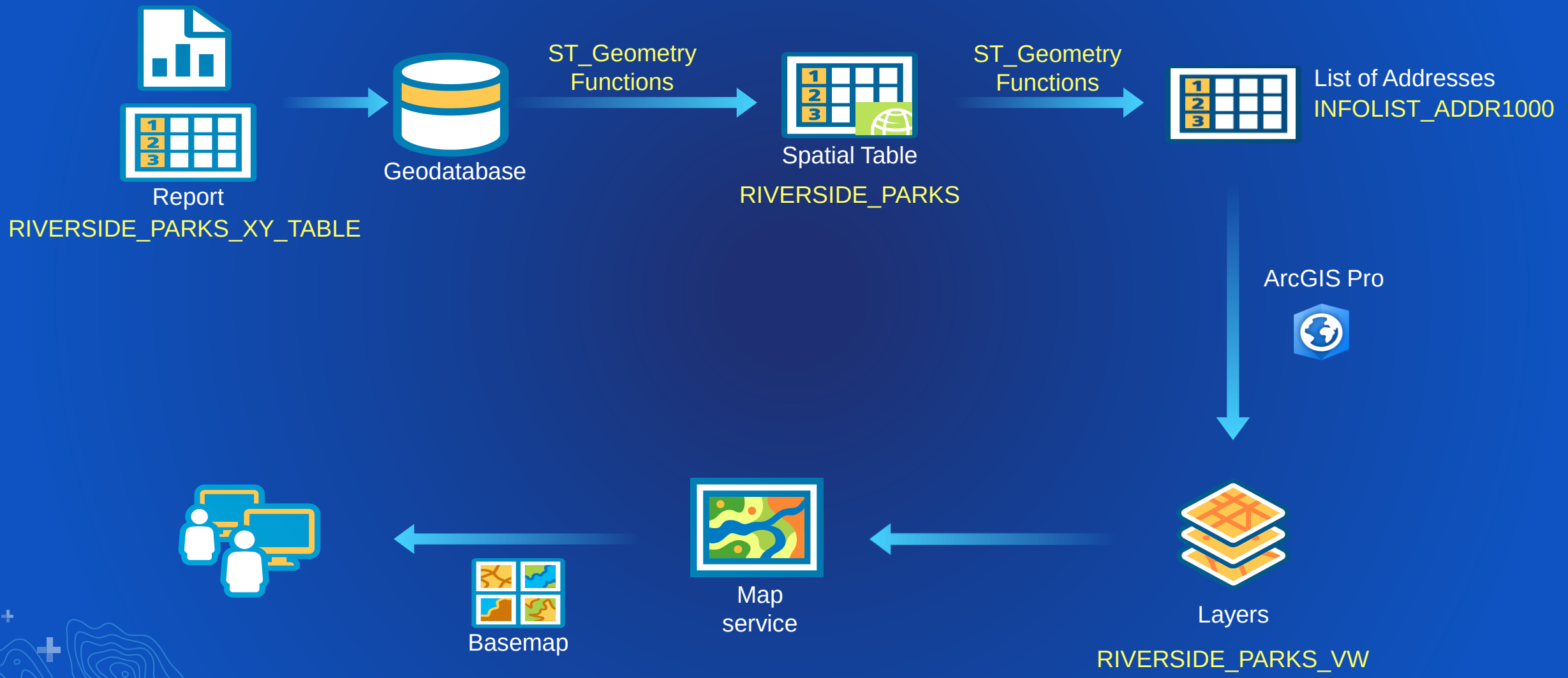
2. How to use SQL Server Geometry type

Connor Friese

Scenario

- City needs to renovate parks based on a report, listing locations that need facility improvements
- Community outreach program including sending out surveys and organizing an Open House
- Identify potential park users

Workflow:


Report
RIVERSIDE_PARKS_XY_TABLE
Geodatabase
ST_Geometry Functions
Spatial Table
RIVERSIDE_PARKS
ST_Geometry Functions
List of Addresses
INFOLIST_ADDR1000
ArcGIS Pro
Layers
RIVERSIDE_PARKS_VW
Map service
Basemap

ST_Geometry functions that will be used and the result

Constructor functions:

ST_Geometry

Accessor functions:

ST_X and ST_Y

Relational functions:

ST_Buffer, ST_Intersects and ST_Transform

Result:

List of addresses

Documentation

Constructor functions for ST_Geometry:

http://desktop.arcgis.com/en/arcmap/latest/manage-data/using-sql-with-gdbs/constructor-functions.htm

Accessor functions for ST_Geometry:

http://desktop.arcgis.com/en/arcmap/latest/manage-data/using-sql-with-gdbs/spatial-accessor-functions.htm

Relational and geometry functions for ST_Geometry:

http://desktop.arcgis.com/en/arcmap/10.3/manage-data/using-sql-with-gdbs/a-quick-tour-of-sql-functions-used-with-st-geometry.htm

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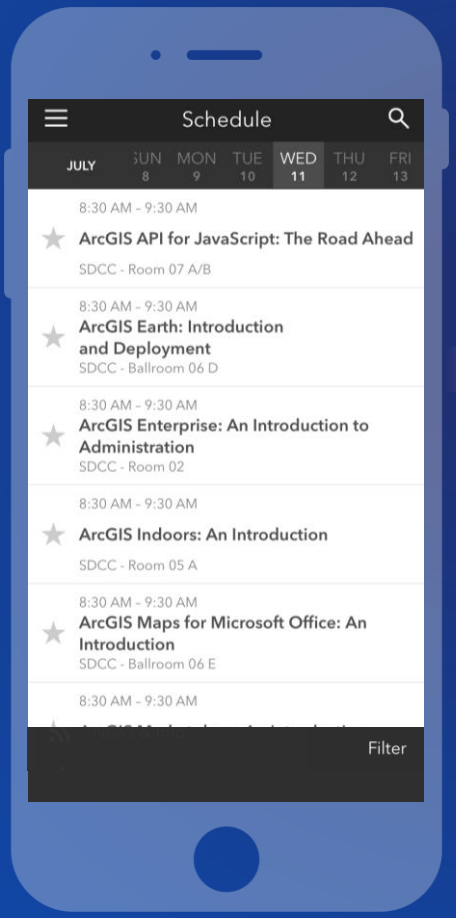
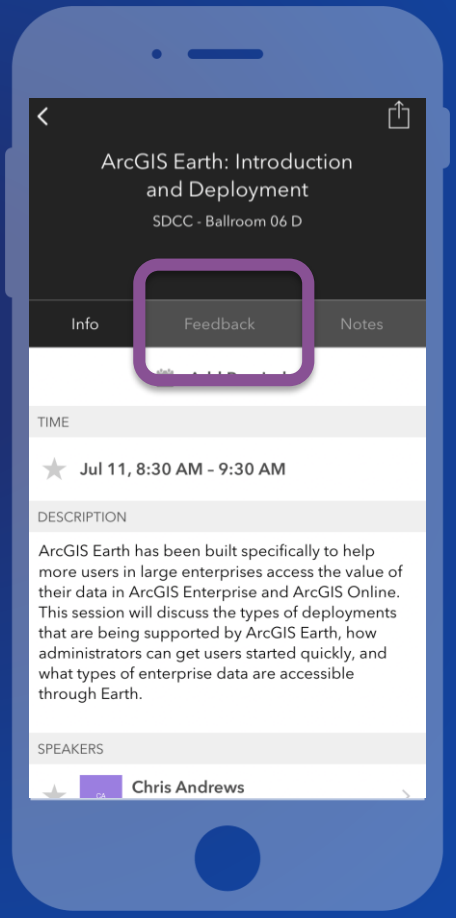


Scroll down to find the feedback section



Complete answers and select “Submit”