The Full Cycle

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Rio-Águas

The Rio-Águas Foundation Institute in the city of Rio de Janeiro is the technical reference body for the management of urban stormwater in the city of Rio de Janeiro, with the skills to plan, manage and supervise preventive and corrective actions against floods. The agency operates in the management of river basins of the municipality, which covers a wide area of expertise. In addition, it is responsible for the planning, supervision and operation, directly or indirectly, of the sewage system.

http://www.rio.rj.gov.br/web/rio-aguas/quem-somos
Rio-Águas

Every new urban allotment and every utility company which performs works deeper than 0.5 meters must submit their projects for Rio-Águas to analyze their interference with the drainage system.

http://portomaravilha.com.br/test/project.aspx
Projects = DWG + Technical Data
RIO-ÁGUAS GIS

- 10,000 Utilities (DWG)
- 9,100 Drainage
- 780 Sewage
- 8,700 Survey (pictures and reports)
- 40,000 Scanned Images
- 150 Users

Setup:
- Rain Gauges
- Sisarq
- Microsoft SQL Server
The Challenge

• Ensure the correct spatial location;
• Extract;
• Save;
• Retrieve;
• View;
• Exchange
• Data in a fast and lightweight format;
• Available anywhere on any device,
The Full Cycle

ArcGIS

GIS

AutoCAD®

MS SQL Server Spatial Data
Interfacing AutoCAD and the Map Server
Interfacing AutoCAD and the Map Server

ArcGIS API for WPF

Use the map surface for drawing

Display CAD geometry on the map

Display custom maps inside AutoCAD

Perform Spatial Analysis

Query for any map service
Draw the Query Results in the AutoCAD

Query for rivers...

Query for streets...
Draw the Query Results in the AutoCAD

Query for lines, polygons or points.
1st Step - Querying ArcGIS Server

Querying

Querying using **text** as a parameter or Querying passing a **geometry** as a parameter,

Converting to CAD

1. Deserialize json response;
2. Decompose geometry;
3. Reconstruct and convert the geometry to a CAD entity;
4. Save the entity in the drawing database;
1st Step - Querying ArcGIS Server

Querying passing a **geometry** as a parameter:

```json
{"paths": [[[661513.10311484954, 7457701.4931211863], [661530.60299492208, 7457752.0447419323], [661556.77581656643, 7457794.4381640153], [661592.32252869778, 7457829.2516407054], [662272.96920341812, 7458068.5360257141]]]}
```
2nd Step – Converting CAD Geometry to MS SQL Server Spatial Data

Converting CAD Geometry

1. Read the drawing database;
2. Check the geometry’s type;
3. Decompose geometry;
4. Rebuild geometry using the SqlGeometryBuilder;
5. Make a valid geometry using the MAKEVALID() method;
6. Save spatial data into SQL Server;
Microsoft.SqlServer.Types

SqlGeometryBuilder

Geometry

Point

Curve

Surface

LineString

Polygon

MultiSurface

GeomCollection

MultiPoint

SqlGeographyBuilder

Geography

MultiCurve

MultiPolygon

MultiLineString
2nd Step – Converting CAD Geometry to MS SQL Server Spatial Data

LINESTRING (662239.88115704048 7458058.7541700574, 662226.94430760888 7458054.9296349883)
LINESTRING (662269.27964936791 7458067.4452787787, 662250.96741077013 7458062.03161148)
LINESTRING (662250.96741076955 7458062.03161148, 662239.86851587635 7458058.75008985)
LINESTRING (662272.96920341812 7458068.5360257141, 662269.27964936779 7458067.4452787787)
POINT (661513.10311789718 7457701.4931352725)
POINT (661633.76433798 7457857.081255489)
POINT (661823.67824335722 7457919.5139336763)
POINT (662014.30224470154 7457980.0641093627)
POINT (662201.99684614956 7458047.5543894321)
POINT (662272.96920343488 7458068.5360257179)
2nd Step – Saving CAD Geometry In the SQL Server
Publishing MS SQL Server Data
Completing the Cycle

The drainage networks of the Centre and Barra da Tijuca are available for consulting.
CONCLUSION

REST

AutoCAD®

GIS

ArcGIS for Server

ArcGIS for Desktop

MS SQL Server Spatial Data
Architecture Advantages:

- Independent of software version
- Lightweight file format (geometry and data as text)
- Interchangeable
- Flexible
- Unique map as a spatial reference for the development of projects in CAD;
- Centralization of data and easier maintenance;
- Updated information;
- Easy access to information from anywhere;
- Query of tables, and layers;
- Several formats to export maps, including KMZ;
- The power of spatial analysis in the three layers;
Thank you!

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