February 08, 2023
OCS-02: Migrate Esri Enterprise from SQL 2008 to SQL 2016

1. Introduction:

1.1. Point of Contacts:

Spatial Engineering, Inc.	Effingham County, GA
Paula Edwards, PMP, GISP Project Manager 613 Towne Park Dr West, Suite 202 Rincon, GA 31326 pedwards@spateng.com O: 912-826-7380 C: 404-394-5509	Pamela Melser GIS Coordinator Effingham County Board of Commissioners Development Services 804 South Laurel Street Springfield, GA 31329 (912)754-8050 x4509 PMelser@effinghamcounty.org

1.2. Description:

As a part of Effingham County contract under project number 22012, they are requesting On Call Support from Spatial Engineering (SPATIAL) for assistance in migrating their existing geospatial database from SQL Server 2008 to SQL Server 2016 and upgrading the SDE portion to 10.8.x. The County currently uses ArcGIS Server 10.0 for the SDE portion to their geodatabase.

The purpose is to provide a high-level approach and estimate for SPATIAL's assistance to Effingham County's GIS team to migrate their geospatial database from SQL 2008 to SQL 2016 and to upgrade the ArcGIS Server (SDE component) with the database. Part of this process requires ensuring their ArcGIS Desktop software is in sync with the geodatabase upgrade and all connectivity to the new geodatabase has been tested. In this proposal is also an option for an approach and estimate to install the County's ArcGIS Image Server which will provide more efficient access to County imagery than the current file-based access.

1.3. Reference:

1.3.1. February 25, 2022, Meeting Minutes from MS Teams discussion on Esri Enterprise migration from SQL 2008 to 20016. See APPENDIX A for meeting minutes.

1.3.2. February 1, 2023 Meeting Minutes from onsite visit to Effingham County GIS office. See APPENDIX B for meeting minutes.

2. **Scope of Work Option 1: Geospatial Data Migration to SQL 2016**

The County would like upgrade their SQL Server Instance from 2008 to 2016, and in doing so they need assistance in migrating their geospatial data to the new Database. With the new SQL Server 2016, the County wants to update their Enterprise GIS from ArcGIS Server 10.0 to 10.8.1.   Below are the preparational steps the County must complete before SPATIAL can assist with any upgrades.

2.1. **Effingham County Preparations for upgrade:**

2.1.1. Install new 2016 SQL Server instance (while keeping the existing 2008 version live and separate from migration).

2.1.2. Upgrade ArcGIS Desktop Software on one GIS workstation (ArcGIS Desktop 10.8.x), while keeping at least one workstation with existing software (ArcGIS Desktop10.7.x) connected to existing 2008 SQL geodatabase.

2.1.2.1. County to ensure the latest version of all needed Esri extensions or add-ins (i.e., Attribute Assistant) are installed on updated desktop software.

2.1.2.2. County to ensure the latest version of patching, extensions, and all add-ins for the Esri desktop software have been applied.

2.1.3. To create a baseline, the County needs to:

2.1.3.1. First, freeze all geodatabase editing while migration is in process.

2.1.3.2. Second, merge and reconcile all versioning in geospatial database to create source baseline.

2.1.3.3. Third, after reconciling data, make a backup copy of SQL geodatabase, as well an export of the newly created baseline in a File geodatabase (FGDB) format.

2.1.3.3.1.   Approximately 27 Feature Datasets

2.1.3.3.2.   Approximately 297 Feature Classes

2.1.3.4. Document any related or joined tables before they disconnect all joined or related tables.

2.1.3.5. Document any existing topology rules for the GIS data.

2.2. **SPATIAL Geodatabase Upgrade Preparation Tasks**:

Confirm that the County's following GIS data links will not be impacted with upgrade:

2.2.1. WinGAP – The WinGAP tax database is linked in ArcGIS Desktop through a join to a separate database connection called "AY2023" (named after the year it represents). This connection has to be updated each year as WinGAP data is moved to the current year. WinGAP is linked to the parcel feature class via the PARCEL_NO, using a one-to-one relationship.

2.2.2. <u>Eagleview / Pictometry links</u> – The County's Eagleview imagery is not connected through DB links, they are not displayed in ArcGIS Desktop. Instead Eagleview provides a web viewer external to Effingham County. The GIS manager uploads county GIS data to Pictometry severs via a Pictometry Convert Uploader plugin available inside of ArcGIS Desktop.

2.2.3. <u>QPublic links</u> – Per the County, QPublic data is not used in ArcGIS Desktop.

2.2.4. Confirmed Esri Attribute Assistant is compatible with ArcGIS Desktop Advanced 10.6-10.8.2.

2.3. **SPATIAL Geodatabase Upgrade Onsite Tasks**

2.3.1. Install ArcGIS Server 10.8.1 (must have SQL Server 2016 instance complete before this can be done).

2.3.1.1. SPATIAL will identify the version of ArcGIS Server software and patches needed.

2.3.1.2. Depending on the County's preferences, SPATIAL will then bring software/patches with them on removeable media, or will identify and ask the County to download the specified ArcGIS Server software and patches.

2.3.2. SPATIAL will demonstrate the migration process for the first batch of data from current SQL 2008 DB instance to the new SQL 2016 DB instance via the upgraded ArcGIS Desktop 10.8.2 software.

2.3.3. Restart Versioning in new geodatabase SQL 2016. No edits or reconciliation needed because source baseline was created prior to migration and all editing stopped.

2.3.4. Rejoin and or connect all tables as they were before migration.

2.3.5. SPATIAL to document the steps completed for County's geodatabase migration.

2.4. **Effingham County Post SPATIAL onsite Tasks:**

2.4.1. The County to complete data migration of the remaining batches at a later date, based off of their network demand.

2.4.2. Restart Versioning in new geodatabase SQL 2016. No edits or reconciliation needed because source baseline was created prior to migration and all editing stopped.

2.4.3. Rejoin and/or connect all tables as they were before migration.

2.4.4. Reapply any related or joined tables.

2.4.5. Verify any previous topology rules for the GIS data.

3. <u>Scope of Work: Option 2 – Install ArcGIS Image Server And Provide Training</u>

The County would like to implement an ArcGIS Image Server to provide faster rendering of large raster files of County imagery that are used by the County when working with parcel data.

3.1. Effingham County Preparation Tasks:

    3.1.1. The County will prepare a separate VM Windows 2019 server for the ArcGIS Image Server. This cannot be the SQL DB server.

    3.1.2. The County will identify which imagery they want to render on the image server.

    3.1.3. The County will have needed ports open for software connectivity to desktops.

    3.1.4. If needed, the County will create certificates for web-based Image server access.

3.2. SPATIAL To Set-Up OFFSITE Prototype

To confirm the best Image Server capability for the County, Spatial will create a prototype using a sample set of Effingham County imagery. Install and configure ArcGIS Image Server **offsite**.

    3.2.1. SPATIAL will prepare a sample set of County Imagery to be published via ArcGIS Image Server. The following will be determined from prototype:

        3.2.1.1. How County imagery can be published with ArcGIS Image Server: Compressed MrSID, uncompressed Cached tiled version?

        3.2.1.2. Which format works best for speed and/or space? (WMTS, MrSID, Tif, etc.).

3.3. SPATIAL to Install ArcGIS Image Server Onsite at County

    3.3.1. Install ArcGIS Image Server 10.8.1 on the County's newly setup Windows 2019 VM Server. County has existing licenses for Esri ArcGIS Enterprise – (WebAdapter, Image Server, etc.). SPATIAL is specifically installing ArcGIS Image Server component of the ArcGIS Enterprise package.

    3.3.2. SPATIAL to work with County GIS Manager to demonstrate publishing an identified set of County's Imagery (train the trainer approach).

    3.3.3. SPATIAL will demonstrate how it can be accessed via the desktop ArcGIS software.

    3.3.4. SPATIAL to document steps done for installation of ArcGIS Image Server.

4. <u>Future Considerations</u>

Possible options for expanded use of Esri products that already fall under the existing licenses the County has in their ELA.

4.1.1. Utilize more components of ArcGIS Enterprise such as ArcGIS Portal, WebAdapter, or additional ArcGIS Servers/Image Servers) in their ArcGIS Enterprise configuration, or connecting/federating it to their SQL DB.

4.1.2. Implement a new Parcel Fabric using ArcGIS Pro and ArcGIS Enterprise.

5. Cost Estimate:

Item	Task	Estimate
1	SOW Option 1 – Geodatabase Migration – Section 2	$3,647.00
2	SOW Option 2 – Install ArcGIS Image Server and Provide Training – Section 3	$8,076.00
	Total for both Options	$11,723.00

Notes:

1. This is an estimate of Firm Fixed price based on SPATIAL's commercial rate schedule.
2. The cost quote is valid for 60 days.

6. Schedule:

Task	Milestone	Start	Duration (1)
0	Notice to Proceed (NTP)	NTP	0
1	Kickoff	NTP	1D
2	Esri Data SQL Migration and ArcGIS Server Upgrade	NTP + Task 1	3D
3	ArcGIS Image Server Install and Setup	Task 2 + 5	5D

Notes:

(1) Duration presented as work days.
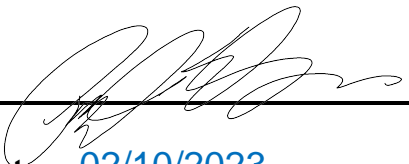
(2) NTP = Notice to proceed.

7. Assumptions:

7.1. County will create and setup new Server environment(s) (VM Windows 2019 Server).

7.2. County will provide all hardware (servers and desktops).

7.3. County will provide all needed Esri software licenses, authorization and or provision files.

7.4. County will have SQL Server DB instance installed on a separate server from any ArcGIS Image instance.

7.5. County will have one ArcGIS Desktop Software v. 10.8.2 already upgraded before migration (and if needed ArcGIS Pro (Standard, or Advanced) v. 2.9.5).

7.6. County will have installed all updates, and/or patches to all updated software prior to data migration (SQL Server 2016 and ArcGIS Desktop 10.8.2, and ArcPro 2.9.5).

7.7. The 2008 SQL Enterprise Geodatabase will be accessible while new 2016 SQL Enterprise Geodatabase is up and running during migration.

7.8. The SPATIAL team will have full administrative access to servers and data while on-site

8. Task Acceptance

If the tasks, schedule, and cost are acceptable, please sign, date, and return a copy to Spatial Engineering. Please Mark Yes or No on the Option 1 and 2 executions.

For: Spatial Engineering, Inc.	For: Effingham County, GA	Options Yes/No
		==Option 1 only==
Date: 02/10/2023	Date: _____	<mark style="background-color:cyan">Options 1&2</mark>
Paula J Edwards, PMP, GISP Vice President O: 912-826-6688 pedwards@spateng.com	Name: _____ Title: _____	

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APPENDIX A: February 25, 2022 Meeting Minutes

Communication/Meeting Record		Date:	2022-02-25	
Caller/Host:	Ricky Truluck Spatial Engineering, Inc.	**Calling:**	See Attendees below.	
Contact Info:	912-826-6688	**Contact Info:**	See Attendees below.	
Project Name:	Effingham County RightSpot	**PID:**	21010	
Subject:	Migrate Esri Enterprise from SQL 2008 to SQL 2016	**Relation:**	X Prime	Sub-contractor

Discussion Focus:							
x	Scope		Budget		Schedule		Performance
	Bus Dev		Follow-up	x	Project Kickoff		% Project Review

1. Attendees:

1. Effingham County (County):
    1.1. Chris Reed, IT Director, creed@effinghamcounty.org, 912-754-8100
    1.2. Pamela Melser, GIS Coordinator, pmelser@effinghamcounty.org, 912-754-8050 x4509
    1.3. Danny Frazier, GIS Technician, dfrazier@effinghamcounty.org, 912-854-8050 x4510
2. Spatial Engineering (SEI):
    2.1. Paula Edwards, PM, pedwards@spateng.com, 404-394-5509
    2.2. Zsolt Boros, Sn Developer, zboros@spateng.com, 912-826-6688
    2.3. Govi Hines, GIS Analyst, ghines@spateng.com, 912-826-6688
    2.4. Ricky Truluck, PM, rtruluck@spateng.com, 912-826-6688

2. Agenda/Purpose:

1. County to share requirements and goals for migrating to SQL 2016.
2. SEI to ask questions and gain clarification to assist the County in the migration.

3. Review of Open Action Items:

NA

4. Design/Development Verification and Validation per SOW:

NA

5. Items to Validate on customer site:

NA

6. Discussion:

1. References:
    1.1. Email from Pamela Melser to Ricky Truluck asking if SEI could help them migrate their SQL 2008 Esri Enterprise geodatabase to SQL 2016. 20220211_1636_pmelser.
2. Requirements:
    2.1. Esri Versioning: The county uses Esri versioning for parcel updates. Only Pamela Melser and Danny Frazier edit the data.

6. Discussion:

    2.2. Pictometry: The county uses Pictometry Digital Ortho and Oblique imagery via links to Pictometery's website.

    2.3. WinGAP: The county has real time links to the WinGAP SQL database.

    2.4. They would like to use more of the capabilities in the new ArcGIS Server.

    2.5. Target SQL Server 2016 on Windows Server 2016.

    2.6. Esri recommended migrating to the ArcGIS Server (latest version) minus one version. Today that is ArcGIS Server 10.8.

    2.7. They would like to use ArcGIS Portal on-premise if possible. The County will verify what licenses (components) their ELA provides.

    2.8. Migrating the database is first priority.

3. Currently Using:

    3.1. Software:

        3.1.1. ArcGIS Desktop 10.7

        3.1.2. Tried ArcPro, but have experienced problems.

        3.1.3. ArcGIS Server 10.0

        3.1.4. SQL Server 2008

    3.2. Data:

        3.2.1. The county has about 300 feature classes.

        3.2.2. The links between GIS and WinGAP allow for two-way editing between the GIS Department and the Tax Assessor.

        3.2.3. Have 2005, 2008, 2010, 2013, 2018, and 2021 digital ortho imagery in MrSID format. They are not using an imager server to publish the imagery. It is accessed directory either from a share or on the local drive. One of the older web servers may have been an image server, but it is no longer used.

        3.2.4.

    3.3. Use:

        3.3.1. The on-premise GIS Servers and Web Servers are shut down. Currently ArcGIS Desktop direct connects to GDB.

        3.3.2. The county uses Esri Arc Online to publish some of the data.

        3.3.3. The county is ok moving all versions of data into the base version so that only one version of data is migrated. Then the versioning process can restart in the new database.

        3.3.4. They try to compress the version DB weekly.

        3.3.5. They use a tool called Attribute Assistant which is an extension to ArcGIS Desktop. It helps them to populate the attribute data faster. They want to keep this tool if at all possible.

            3.3.5.1. https://solutions.arcgis.com/shared/help/attribute-assistant/

            3.3.5.2. https://solutions.arcgis.com/shared/help/attribute-assistant/get-started/

        3.3.6. QPublic pulls data from the Tax Assessor. That process will have to be evaluated.

4. Approach:

    4.1. The County can set up a test environment with the target OS and SQL.

    4.2. SEI suggested they use Esri to migrate the data versus trying to migrate in the database. Esri will make adjustments to the GDB as needed.

    4.3. Using Esri may bring over the joins to WinGAP. If not, they will have to be recreated.

    4.4. We need to coordinate the GIS SQL version with the WinGAP SQL version.

    4.5. Evaluate QPublic connection.

    4.6. Evaluate Pictometry connection.

    4.7. The County will verify what Esri software they have access to. Specifically, what image server software (if any).

    4.8. SEI suggested using Web Map Tile Service (WMTS) for publishing imagery.

    4.9. SEI recommended using SQL 2019 if supported by Esri and WinGAP. The County will look into it, but the County is ok going to SQL 2016.

6.	Discussion:

5. Conclusion:
- 5.1. SEI will provide a plan and quote to support the migration going forward.
- 5.2. The County will provide a list/count of feature classes to migrate.
- 5.3. The County will look for any special rules or joins in the DB. This includes the WinGAP joins.
- 5.4. The County will provide the WinGAP point of contact for SEI to contact if needed.
- 5.5. The County will build the test environment. The test environment will be configured such that if the migration goes well, the test environment can become production.
- 5.6. Once migration begins, all production changes must be stopped so nothing is lost in migration.

7.	Reallocation of Resources:

1. Paula Edwards will be the Project Manager.
2. Zsolt Boros will be the technical lead.

8.	Action Items:	Assigned To:	Due Date:	Comments:
1.	Provide county plan and quote	P Edwards	3/15/2022	
2.	Provide SEI list/count of feature classes to migrate	P Melser	3/8/2022	
3.	Identify special DB rules and joins	P Melser	3/8/2022	
4.	Provide WinGAP point of contact to SEI	P Melser	3/8/2022	
5.	Build test environment	C Reed	4/15/2022	

Notes:

(1) Track Action Items to closure or transfer.

(2) Format Action Item comments using "YYYYMMDD – Comment".

(3) Format the last comment using "YYYYMMDD – COMPLETE".

(4) Format Action Item comments transferred to another form using "YYYYMMDD – TRANSFER <location>".

Next Meeting Date: TBD

Reported By: R Truluck

APPENDIX B: Meeting Minutes from 2/1/2023 Onsite Visit at Effingham County for Esri Data Migration

Communication/Meeting Record		Date:	2023-02-01	
Caller/Host:	Effingham County GIS	**Calling:**	Spatial Engineering	
Contact Info:	Pamela Melser pmelser@effinghamcounty.org Effingham County GIS	**Contact Info:**	Zsolt Boros, zboros@spateng.com Govi Hines, ghines@spateng.com Spatial Engineering	
`Project Name:	Effingham Co. GIS	**PID:**	22012	
Subject:	ArcGIS Server and Desktop upgrade maintenance	**Relation:**	Prime	Sub-contractor

Discussion Focus:							
x	Scope		Budget		Schedule		Performance
	Bus Dev		Follow-up		Project Kickoff		% Project Review

9. Attendees:

Zsolt Boros – Spatial Engineering, Systems Architect

Govi Hines – Spatial Engineering, GIS Analyst

Pam Melser – Effingham Co., GIS Manager

Danny Frazier – Effingham Co., GIS Technician

Chris Reed – Effingham Co., IT Director

Matthew Cruikshank – Effingham Co., Deputy Director of IT

10. Agenda/Purpose:
Information gathering for upgrading SQL Server based ArcGIS Server and ArcGIS Desktop.

11. Review of Open Action Items:

12. Design/Development Verification and Validation per SOW:

13. Items to Validate on customer site:

14. Discussion:
Discussion with GIS staff: Govi and Zsolt sat with GIS Staff (Pam and Danny) at workstation to review current settings and workflows with ArcGIS Desktop.
1. GIS data that is stored in SQL Server are accessed via user logins to each GIS data editor. The County currently has two GIS editors and two viewers.
2. An additional login exists for managing data but users do not use this for editing GIS data.

14.	**Discussion:**

3. Currently using ArcGIS Desktop 10.7
4. Images are displayed as a layer in ArcGIS Desktop which are attached from file share. Image formats are ECW, MrSID, and GeoTiff. There may be lidar data but not currently used. These are very slow to load and have to be turned off during load and zoom operations.
5. The WinGAP tax database is linked in ArcGIS Desktop through a join to a separate database connection called "AY2023" (named after the year it represents). This connection has to be updated each year as WinGAP data is moved to the current year. WinGAP is linked to parcel feature class through via the PARCEL_NO, using a one-to-one relationship. Primarily only Pam uses this join relationship.
6. Qpublic data is not used in ArcGIS Desktop.
7. Pictometry images are not displayed in ArcGIS Desktop. Instead Pictometry provides a web viewer external to Effingham County. Pam uploads county GIS data to Pictometry severs via a Pictometry Convert Uploader plugin available inside of ArcGIS Desktop.
8. Some of the data is versioned that have several versions in a hierarchy. Zsolt said it is best to roll all versions up to root and compress before the update to provide a clean migration.
9. All the staff agreed that going to the latest version of ArcGIS Desktop, ArcGIS Server, and possibly even ArcGIS Pro would be beneficial so as to avoid having to upgrade again soon. So, this will be the target for this update. Zsolt will provide proper ESRI compatibility list for software for the update.
10. The GIS staff also uses the Google Street View plugin, which is also available for ArcGIS Pro, both of which are freeware.
11. Pam and Chris have admin abilities in "My Esri" portal to manage county ESRI licensing and Pam will check to make sure the ArcGIS Server license is available. Zsolt: ArcGIS Enterprise included ArcGIS Server, Image Server, and Portal for ArcGIS. Need to ensure license is active.
12. Due to slower access at times to the database, Pam may complete migration of data after hours (with instruction help from Spatial Engineering).
13. Zsolt will need to verify connection of SQL 2008 to ArcGIS Desktop (latest) for migration.
14. ArcGIS online is used to share data with public (approximately 500-1000) daily users. This requires credits and Pam would like to bring this capability inhouse through Portal if possible.
15. Data updates for utilities provided by Spatial Engineering is received via FTP. If a portal is setup internally with access to Spatial Engineering this may be a more seamless process. Both Pam and Chris agreed that this is a request for future after this update.

Discussion with IT staff: (Met in conference room with GIS and IT staff together)

1. All GIS data is in a single SQL Server 2008 database. SDE configuration is loaded in the same database called "effgis".
2. Chris said the table structure that is in the GIS database is hard to understand as ESRI does not use traditional database relationships.
3. Target SQL Server version is 2016 due to licensing complication with higher versions of SQL Server.
4. Target Windows Server OS is 2019.
5. New SQL Server database will be stood up leaving existing database in use during the migration.
6. WinGAP server is on a separate Windows server where WinGAP maintains update of the database with latest version. This is the data Pam connects to from ArcGIS Desktop.
7. Network connection between SQL Server and users is a 1Gb fiber optic, however data access during peak time is slow.
8. The image server should be stood up separately from SQL Server. For the setup a server will be ready with admin access for Spatial Engineering to install the software. The current file server where images are stored is about 1.2 TB. Not all images will be ported over to the new server as many are obsolete.
9. Need to ensure ports if required can be opened during setup. Also need to create certificate for web-based Image server access. Zsolt will verify if ArcGIS Web Adapter is required for Image Server which will need the certificate in place.
10. Chris and Pam would like to see the upgrade/migration steps documented. Zsolt asked if it would be ok to document during the install so configurations would be specific to the county and Chris and Pam agreed.

14. Discussion:

15. Reallocation of Resources:

16. Action Items:	Assigned To:	Due Date:	Comments:
6. Provide list of versioned feature classes	Pam Melser		
7. Provide latest software compatibilities for ArcGIS Server, Image Server, Desktop, and Pro	Zsolt Boros		
8. Provide active ArcGIS Server license available in My Portal	Pam Melser		
9. Check if Image Server requires the ArcGIS Web adapter	Zsolt Boros		
10.			

Notes:
(5) Track Action Items to closure or transfer.
(6) Format Action Item comments using "YYYYMMDD – Comment".
(7) Format the last comment using "YYYYMMDD – COMPLETE".
(8) Format Action Item comments transferred to another form using "YYYYMMDD – TRANSFER <location>".