Integrating GIS with a hosted Maximo solution: *Overcoming Challenges*

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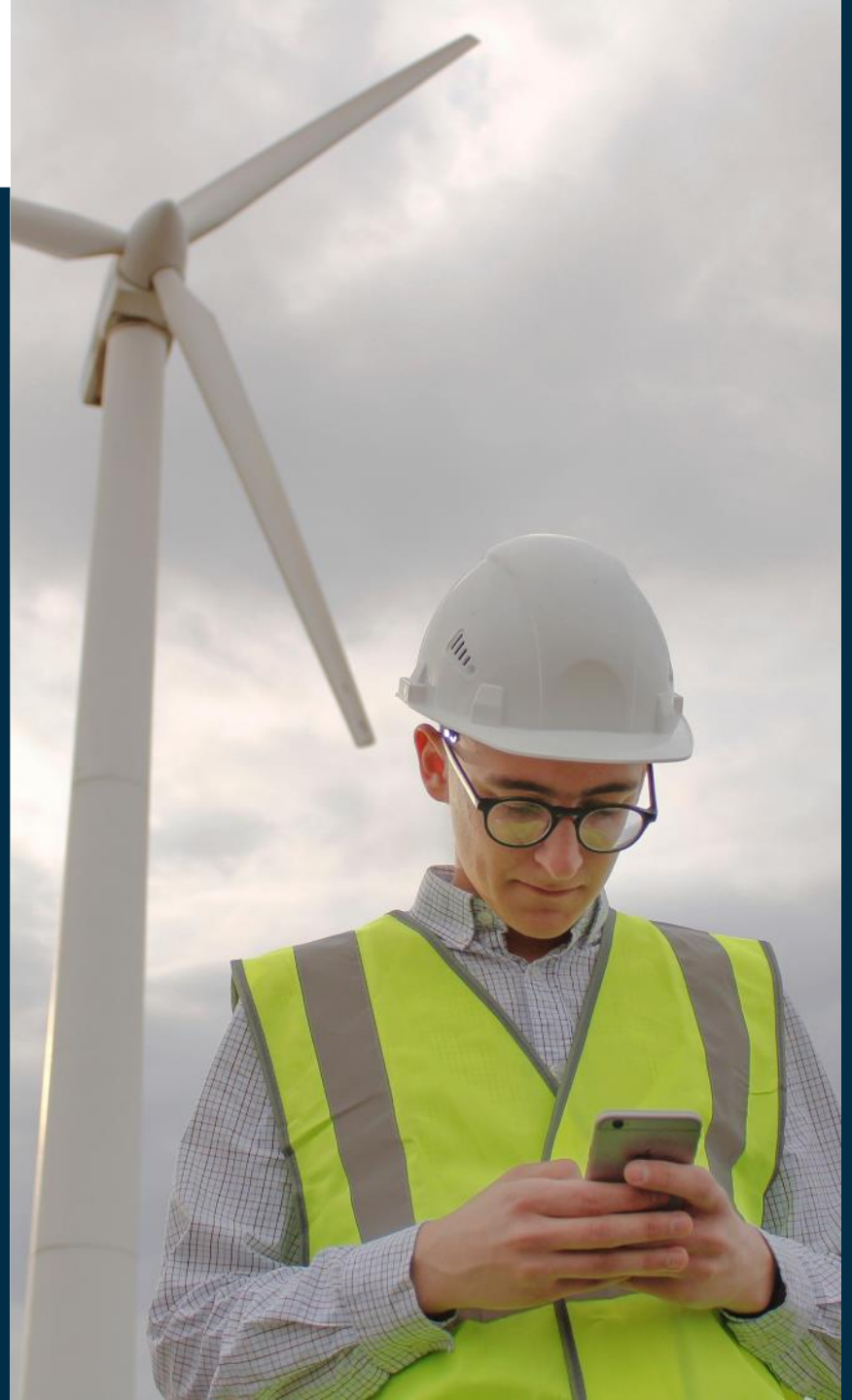
geo nexus

Doyon Utilities Overview

- **Based in Fairbanks, Alaska**
- **Operates Utilities for 3 military installations**
  - Central Heat & Power Plant, Heat Distribution System & Utilidors
  - Natural Gas Distribution System
  - Electrical Distribution System
  - Water Distribution System & Treatment
  - Wastewater Collection System & Treatment Plant
- **Awarded 50-year government contract in 2007**

DOYON UTILITIES



Geonexus Overview

- Software Company offering Productized Integration solution
- Industry focus: Utilities, Pipeline, Telecommunications, and Transportation
- International presence with customers in North America, AU, and UAE
- Founded in 2009 in Ann Arbor, MI

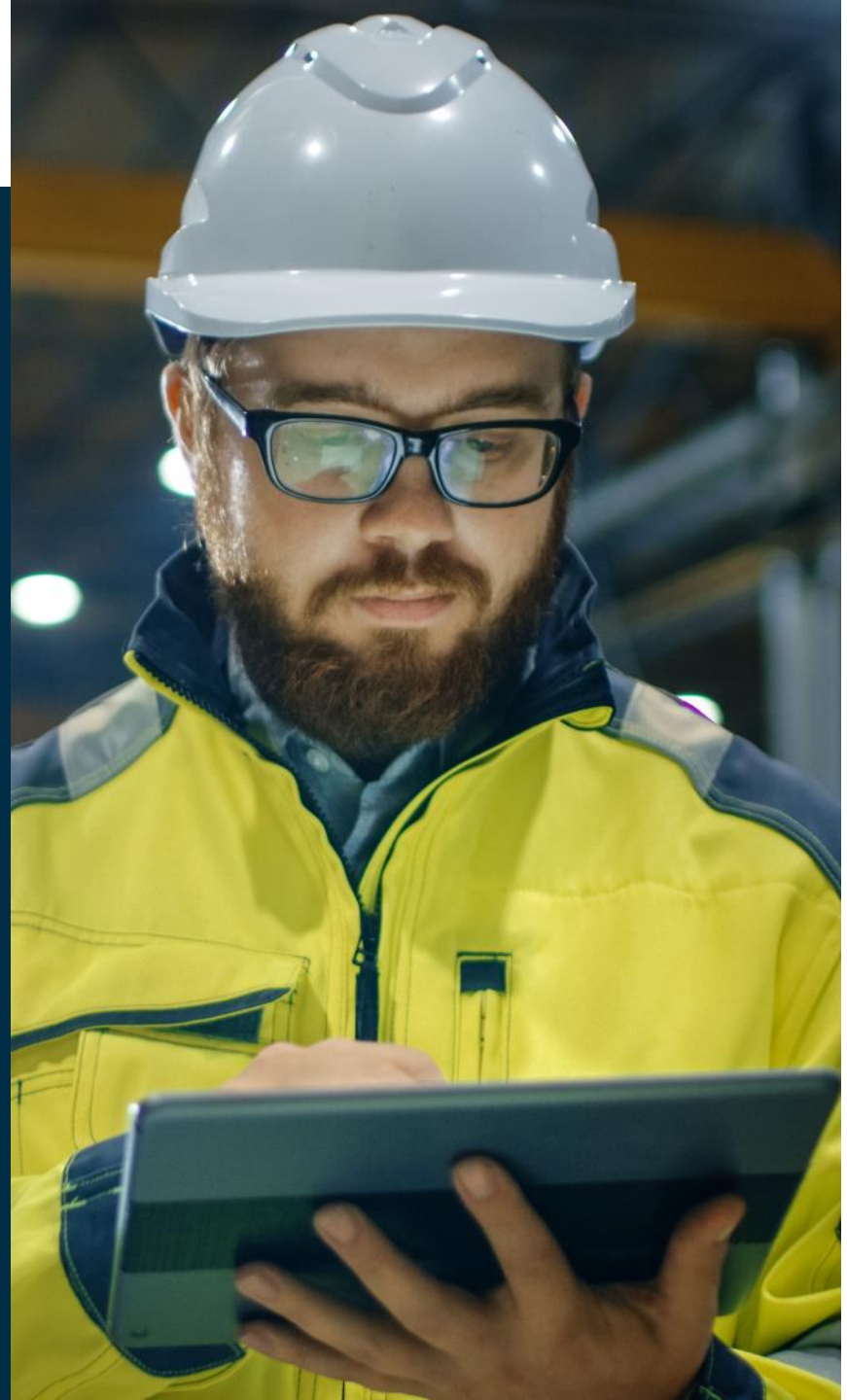
esri Partner Network
Silver

Esri Partner Conference
2017 Award Winner
Lighting Up the Entire Organization

esri Utility Network Specialty
Electric Utilities Services

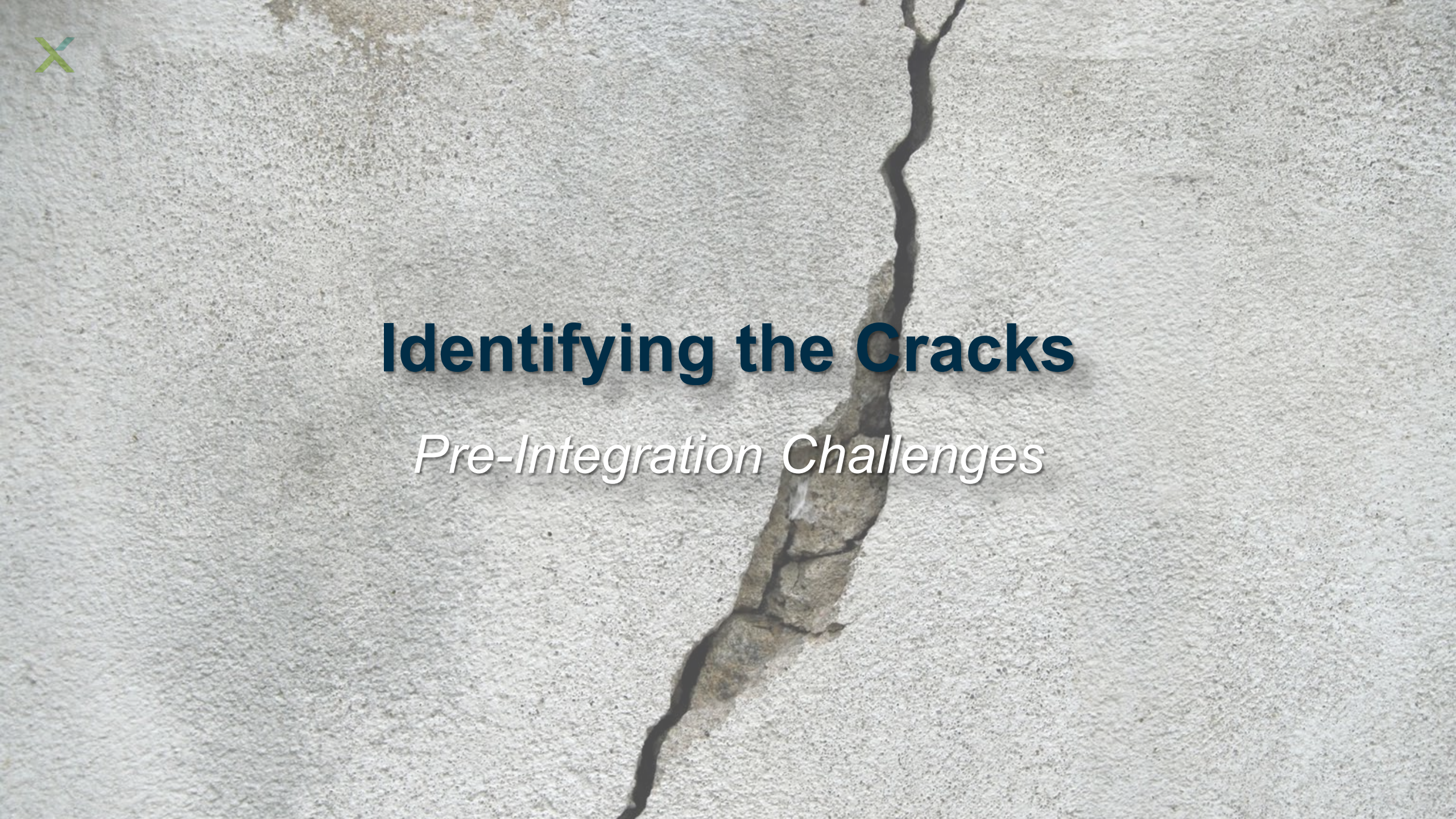
esri Utility Network Specialty
Water Utilities Services

esri Release Ready
Specialty



Agenda

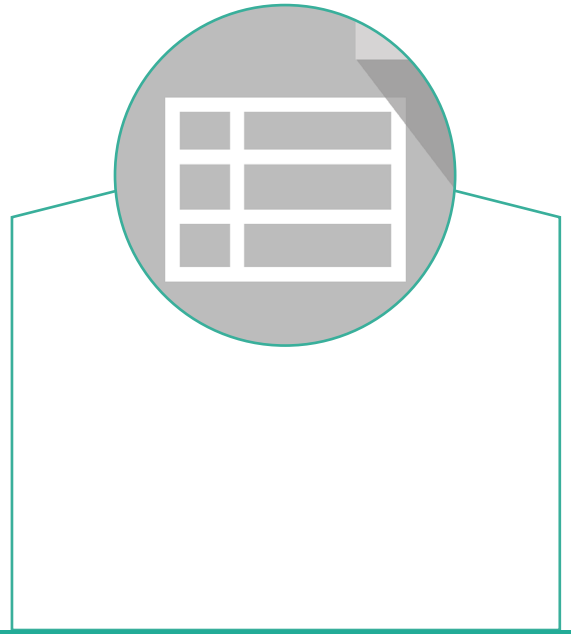
- Pre-Integration Challenges
- Integrating Esri ArcGIS and IBM Maximo
  - Technical Challenges
  - Technical Solutions
- Integration Results


Identifying the Cracks
Pre-Integration Challenges

Outdated Systems and Data Silos

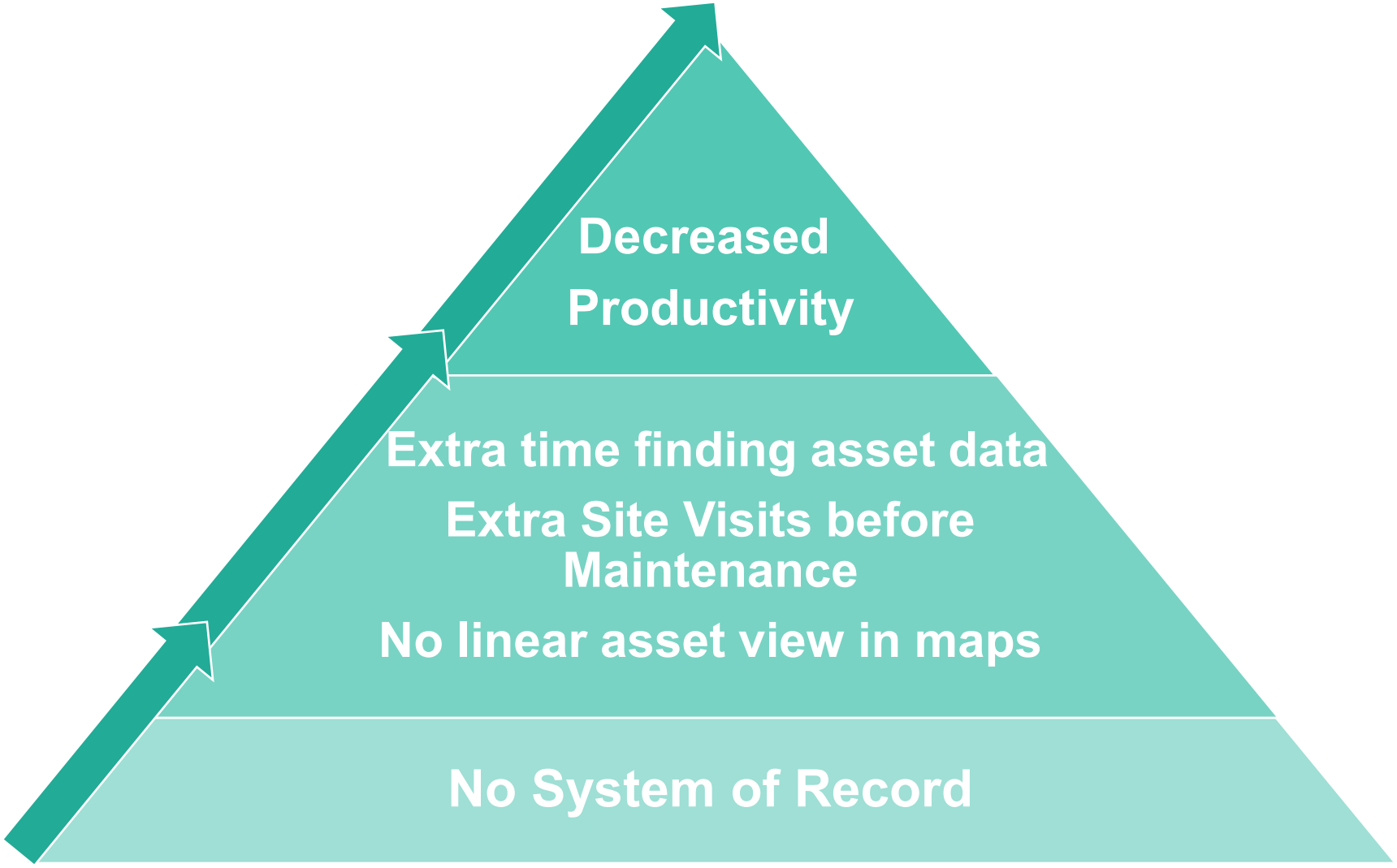
Manager Plus

Esri Geodatabases



Individual Spreadsheets

Operational Slow Downs



Repairing the Cracks

Integrating Esri ArcGIS and IBM Maximo

New Asset Management System and Integration

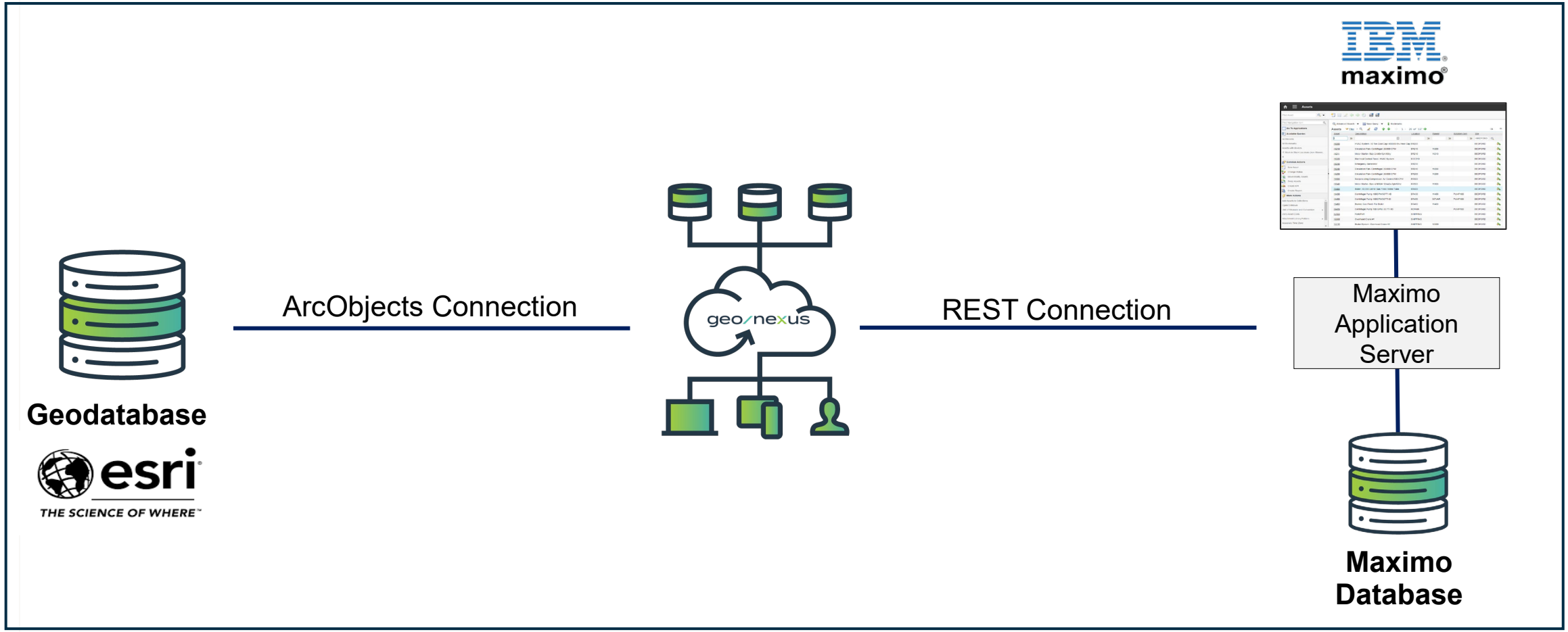
Technical Integration Challenges

- Connect Cloud Hosted Maximo to Internal Esri Enterprise
- Asset Ownership Not Consistent within Feature Classes
- Determining What Data to Sync
- Data Translation Required for Synchronization into Maximo
- Legacy GIS Schema Cluttered with Inconsistent Datatypes and Fields
- Initial Configuration of GIS Environments

Technical Solutions

Connect Cloud Hosted Maximo to Internal Esri Enterprise

Esri ArcObjects and Maximo REST API



Technical Solutions

Determining What Data to Sync

Meeting with SMEs to determine what feature classes and fields need to be synced

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	GIS Data Set	Feature Class	GIS Attribute	GIS Data Type	GIS Length	Maximo Object	Maximo Field	Spec Classstructure	Spec Attribute	Spec Sequence	Use in Desc?	Spec U	Spec Desc Prefix	GIS Domain Name	Maximo Domai	Sync Note
2	utilitiesCommunication	CommUtilityNode_Radio	commNodeType	String	20	ASSETSPEC	ALNVALUE	GIS-COM-RADIO	COMMNODE_TYP	10	Y			CommN	DU_CO	
3	utilitiesCommunication	CommUtilityNode_Radio	manufacturer	String	25	ASSETSPEC	ALNVALUE	GIS-COM-RADIO	MNF_DESC	20	Y					
4	utilitiesCommunication	CommUtilityNode_Radio	model	String	20	ASSETSPEC	ALNVALUE	co	MODEL	30	Y					Note the change in Maximo attrid from
5	utilitiesCommunication	CommUtilityNode_Radio	buildingNumber	String	20	ASSETSPEC	ALNVALUE	GIS-COM-RADIO	BLDGNUM	60	Y		BLDG			Transform value of NA to null
6	utilitiesCommunication	CommUtilityNode_Radio	narrative	String	255	ASSETSPEC	ALNVALUE	GIS-COM-RADIO	COMMENT	120	N					
7	utilitiesCommunication	CommUtilityNode_Radio	fieldNotes	String	255	ASSETSPEC	ALNVALUE	GIS-COM-RADIO	FIELDNOTE	130	N					
8	utilitiesCommunication	CommUtilityNode_Radio	ownerName	String	30	ASSETSPEC	ALNVALUE	GIS-COM-RADIO	OWNERNAME	140	N			OwnerC	DU_O	
9	utilitiesCommunication	CommUtilityNode_Radio	ownerName	ALN	141	ASSETSPEC	ALNVALUE	GIS-COM-RADIO	OWNERNAME_NOTDU	141	Y					Transform DU and Doyon Utilities to Null (Only
10	utilitiesCommunication	CommUtilityNode_Radio	jobID	String	20	ASSETSPEC	ALNVALUE	GIS-COM-RADIO	JOBID	150	N					
11	utilitiesCommunication	CommUtilityNode_Radio	projectID	String	20	ASSETSPEC	ALNVALUE	GIS-COM-RADIO	PROJECTID	160	N					
12	utilitiesCommunication	CommUtilityNode_Radio	dateInstalled	Date	8	ASSET	INSTALLDATE									
13	utilitiesCommunication	CommUtilityNode_Radio	facilityNumber	String	10	ASSET	ASSETTAG									Concatenate the following GIS attributes:
14	utilitiesCommunication	CommUtilityNode_Radio	FixedAssetNo	String	20	ASSET	DU_FIXED_ASSE									
15	utilitiesCommunication	CommUtilityNode_Radio	mapGridZone	String	8	ASSET	DU_MAPGRIDZO									
16	utilitiesCommunication	CommUtilityNode_Radio	operationalStatus	Domain	17	ASSET	STATUS							operatior	LOCASS	Need to translate GIS Values to the standard li
17	utilitiesCommunication	CommUtilityNode_Radio	serialNumber	String	20	ASSET	SERIALNUM									
18	utilitiesCommunication	CommUtilityNode_Radio				ASSET	DU_INSTALL_PR									Add atribute to Maximo. To sync: Concaatenat
19	utilitiesCommunication	CommUtilityNode_Radio	SHAPE_X				DU_X_COORD									
20	utilitiesCommunication	CommUtilityNode_Radio	SHAPE_Y				DU_Y_COORD									
21	utilitiesCommunication	CommUtilityNode_Splice	commNodeType	String	20	ASSETSPEC	ALNVALUE	GIS-COM-SPLICE	COMMNODE_TYP	10	Y			CommN	DU_CO	
22	utilitiesCommunication	CommUtilityNode_Splice	spliceType	String	16	ASSETSPEC	ALNVALUE	GIS-COM-SPLICE	SPLICE_TYP	20	Y			SpliceTy	DU_SP	
23	utilitiesCommunication	CommUtilityNode_Splice	spliceCase	String	12	ASSETSPEC	ALNVALUE	GIS-COM-SPLICE	SPLICECS_TYP	30	Y			SpliceCa	DU_SP	
24	utilitiesCommunication	CommUtilityNode_Splice	terminalTypeID	String	16	ASSETSPEC	ALNVALUE	GIS-COM-SPLICE	TERMINAL_TYP	40	N			Terminal		
25	utilitiesCommunication	CommUtilityNode_Splice	narrative	String	255	ASSETSPEC	ALNVALUE	GIS-COM-SPLICE	COMMENT	120	N					
26	utilitiesCommunication	CommUtilityNode_Splice	fieldNotes	String	255	ASSETSPEC	ALNVALUE	GIS-COM-SPLICE	FIELDNOTE	130	N					
27	utilitiesCommunication	CommUtilityNode_Splice	ownerName	String	30	ASSETSPEC	ALNVALUE	GIS-COM-SPLICE	OWNERNAME	140	N			OwnerC	DU_O	
28	utilitiesCommunication	CommUtilityNode_Splice	ownerName	ALN	141	ASSETSPEC	ALNVALUE	GIS-COM-SPLICE	OWNERNAME_NOTDU	141	Y					Transform DU and Doyon Utilities to Null (Only
29	utilitiesCommunication	CommUtilityNode_Splice	jobID	String	20	ASSETSPEC	ALNVALUE	GIS-COM-SPLICE	JOBID	150	N					
30	utilitiesCommunication	CommUtilityNode_Splice	projectID	String	20	ASSETSPEC	ALNVALUE	GIS-COM-SPLICE	PROJECTID	160	N					
31	utilitiesCommunication	CommUtilityNode_Splice	dateInstalled	Date	8	ASSET	INSTALLDATE									
32	utilitiesCommunication	CommUtilityNode_Splice	facilityNumber	String	10	ASSET	ASSETTAG									Concatenate the following GIS attributes:
33	utilitiesCommunication	CommUtilityNode_Splice	FixedAssetNo	String	20	ASSET	DU_FIXED_ASSE									
34	utilitiesCommunication	CommUtilityNode_Splice	mapGridZone	String	8	ASSET	DU_MAPGRIDZO									
35	utilitiesCommunication	CommUtilityNode_Splice	operationalStatus	Domain	17	ASSET	STATUS							operatio	LOCAS	Need to translate GIS Values to the standard li
36	utilitiesCommunication	CommUtilityNode_Splice				ASSET	DU_INSTALL_PR									Add atribute to Maximo. To sync: Concaatenat
37	utilitiesCommunication	CommUtilityNode_Splice	SHAPE_X				DU_X_COORD									
38	utilitiesCommunication	CommUtilityNode_Splice	SHAPE_Y				DU_Y_COORD									
39	utilitiesCommunication	CommUtilityNode_Vault	commNodeType	String	20	ASSETSPEC	ALNVALUE	GIS-COM-VAULT	COMMNODE_TYP	10	Y			CommN	DU_CO	
40	utilitiesCommunication	CommUtilityNode_Vault	material	String	16	ASSETSPEC	ALNVALUE	GIS-COM-VAULT	GISMATERIAL	20	Y			material	DU_GI	
41	utilitiesCommunication	CommUtilityNode_Vault	crossSection	Double	4	ASSETSPEC	NUMVALUE	GIS-COM-VAULT	WIDTH_IN	30	Y	IN				

Technical Solutions

Legacy GIS Schema Cluttered with Inconsistent and Unnecessary Datatypes and Fields

Reviewed schemas for three installations

Table

DOMAINS

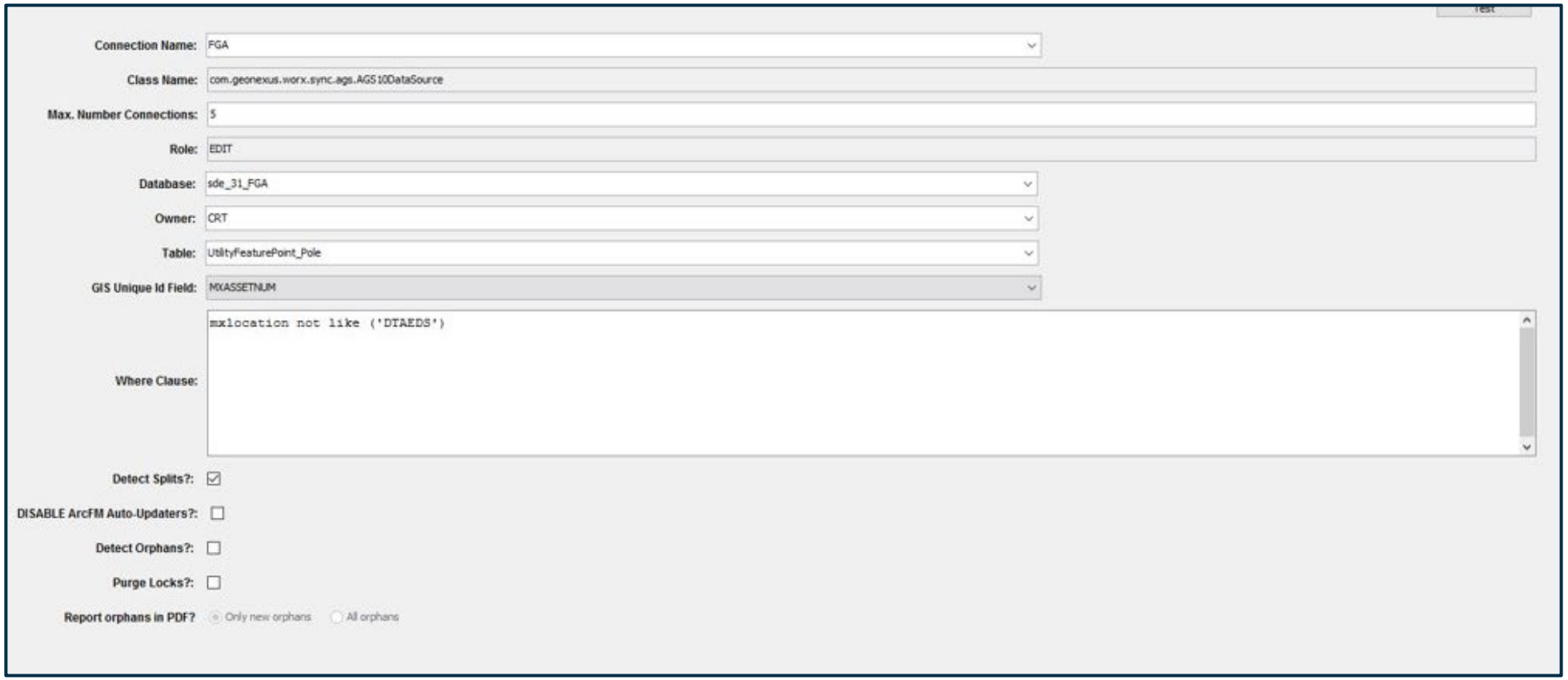
OBJECTID *	name	type	fieldType	domainType	owner	codedValue	codedDescription	range
1008	StructuralCondition	Structural condition and state of repair of a building/structure.	Text	CodedValue		quarantined	quarantined	
1009	StructuralCondition	Structural condition and state of repair of a building/structure.	Text	CodedValue		cracked	cracked	
1010	StructuralCondition	Structural condition and state of repair of a building/structure.	Text	CodedValue		useable	useable	
1011	StructuralCondition	Structural condition and state of repair of a building/structure.	Text	CodedValue		radioactive	radioactive	
1012	StructuralCondition	Structural condition and state of repair of a building/structure.	Text	CodedValue		newlyBuiltButNo	newly built, but not yet finished	
1013	StructuralCondition	Structural condition and state of repair of a building/structure.	Text	CodedValue		minorUse	minor use	
1014	StructuralCondition	Structural condition and state of repair of a building/structure.	Text	CodedValue		heavilyDamageB	heavily damage, but useable	
1015	StructuralCondition	Structural condition and state of repair of a building/structure.	Text	CodedValue		lightDamageButU	light damage, but useable	
1016	StructuralCondition	Structural condition and state of repair of a building/structure.	Text	CodedValue		fairOrMediumCo	Fair or medium condition.	
1017	StructuralCondition	Structural condition and state of repair of a building/structure.	Text	CodedValue		moderateDamag	moderate damage, but useable	
1018	StructuralCondition	Structural condition and state of repair of a building/structure.	Text	CodedValue		TBD	To Be Determined: A value is required but the value has yet to be determined.	
1019	StructuralCondition	Structural condition and state of repair of a building/structure.	Text	CodedValue		burntAndNotUse	burnt and not useable	
1020	BarricadeMode	Determines if the barricade an active or passive type as defined in AFH10-222V14 Civil Engineer Gui	Text	CodedValue		passivePortable	Passive-Portable	
1021	BarricadeMode	Determines if the barricade an active or passive type as defined in AFH10-222V14 Civil Engineer Gui	Text	CodedValue		NA	Not Applicable: No value exists.	
1022	BarricadeMode	Determines if the barricade an active or passive type as defined in AFH10-222V14 Civil Engineer Gui	Text	CodedValue		passiveFixed	Passive-Fixed	
1023	BarricadeMode	Determines if the barricade an active or passive type as defined in AFH10-222V14 Civil Engineer Gui	Text	CodedValue		other	Other. Must be described in the sdsFeatureDescription attribute.	
1024	BarricadeMode	Determines if the barricade an active or passive type as defined in AFH10-222V14 Civil Engineer Gui	Text	CodedValue		activeFixed	Active-Fixed	
1025	BarricadeMode	Determines if the barricade an active or passive type as defined in AFH10-222V14 Civil Engineer Gui	Text	CodedValue		activePortable	Active-Portable	
1026	BarricadeMode	Determines if the barricade an active or passive type as defined in AFH10-222V14 Civil Engineer Gui	Text	CodedValue		TBD	To Be Determined: A value is required but the value has yet to be determined.	
1027	NoiseStatus	The status of the noise zone contours.	Text	CodedValue		current	Most current noise contours pertaining to the installation.	
1028	NoiseStatus	The status of the noise zone contours.	Text	CodedValue		planning	Noise contours which have been created as predictive measures of future noise contours around the installatio	
1029	NoiseStatus	The status of the noise zone contours.	Text	CodedValue		historical	Projected noise contours of earlier study dates (prior to current).	
1030	ValvePosition	Position of Valve	Text	CodedValue		unknown	Unknown position	
1031	ValvePosition	Position of Valve	Text	CodedValue		open	Open valve	
1032	ValvePosition	Position of Valve	Text	CodedValue		TBD	To Be Determined	
1033	ValvePosition	Position of Valve	Text	CodedValue		closed	Closed valve	
1034	Storm_CoverCondit	Storm_CoverCondition	Text	CodedValue		misaligned/notSe	Misaligned and/or not sealed	
1035	Storm_CoverCondit	Storm_CoverCondition	Text	CodedValue		excellent/good_	Excellent to good, bolted/gasketed	
1036	Storm_CoverCondit	Storm_CoverCondition	Text	CodedValue		damaged_cover	Damaged cover	
1037	Storm_CoverCondit	Storm_CoverCondition	Text	CodedValue		damaged_cover	Damaged cover in drainage	
1038	Storm_CoverCondit	Storm_CoverCondition	Text	CodedValue		missing_cover	Missing cover	
1039	CondRatingValue	The condition rating value of the utility.	Text	CodedValue		amber	Moderate deterioration. Functionality definitely impaired. Improvements needed. Moderate level of repair required	
1040	CondRatingValue	The condition rating value of the utility.	Text	CodedValue		amberPlus	Moderate deterioration. Functionality adequate, but somewhat impaired. Moderate level of repair required.	
1041	CondRatingValue	The condition rating value of the utility.	Text	CodedValue		greenMinus	Minor deterioration. Complete functionality largely met. Minor repair required.	
1042	CondRatingValue	The condition rating value of the utility.	Text	CodedValue		redMinus	Total deterioration resulting in complete loss of functionality. Total replacement or renewal warranted.	
1043	CondRatingValue	The condition rating value of the utility.	Text	CodedValue		amberMinus	Moderate deterioration. Adversely affects other components. Functionality definitely impaired. Moderate repair r	
1044	CondRatingValue	The condition rating value of the utility.	Text	CodedValue		redPlus	Significant deterioration resulting in major impact on functionality. Major repair or rehabilitation required.	
1045	CondRatingValue	The condition rating value of the utility.	Text	CodedValue		other	Other. Must be described in the sdsFeatureDescription attribute.	
1046	CondRatingValue	The condition rating value of the utility.	Text	CodedValue		greenPlus	Free of observation or known distress	
1047	CondRatingValue	The condition rating value of the utility.	Text	CodedValue		NA	Not Applicable: No value exists.	
1048	CondRatingValue	The condition rating value of the utility.	Text	CodedValue		green	Slight deterioration, but functionality totally intact. Routine maintenance or minor repair could be accomplished.	
1049	CondRatingValue	The condition rating value of the utility.	Text	CodedValue		TBD	To Be Determined: A value is required but the value has yet to be determined.	
1050	CondRatingValue	The condition rating value of the utility.	Text	CodedValue		red	Significant deterioration resulting in little functionality remaining. Major rehabilitation or replacement required.	
1051	SmallArmsRangeTy	Indicates the type of range environment. Contained/non-contained, indoor/outdoor, etc.	Text	CodedValue		outdoorFullyCont	Outdoor-Fully Contained Range	
1052	SmallArmsRangeTy	Indicates the type of range environment. Contained/non-contained, indoor/outdoor, etc.	Text	CodedValue		NA	Not Applicable: No value exists.	
1053	SmallArmsRangeTy	Indicates the type of range environment. Contained/non-contained, indoor/outdoor, etc.	Text	CodedValue		indoorFullyConta	Indoor-Fully Contained Range	

(0 out of 16202 Selected)

Technical Solutions

Asset Ownership Not Consistent within Feature Classes

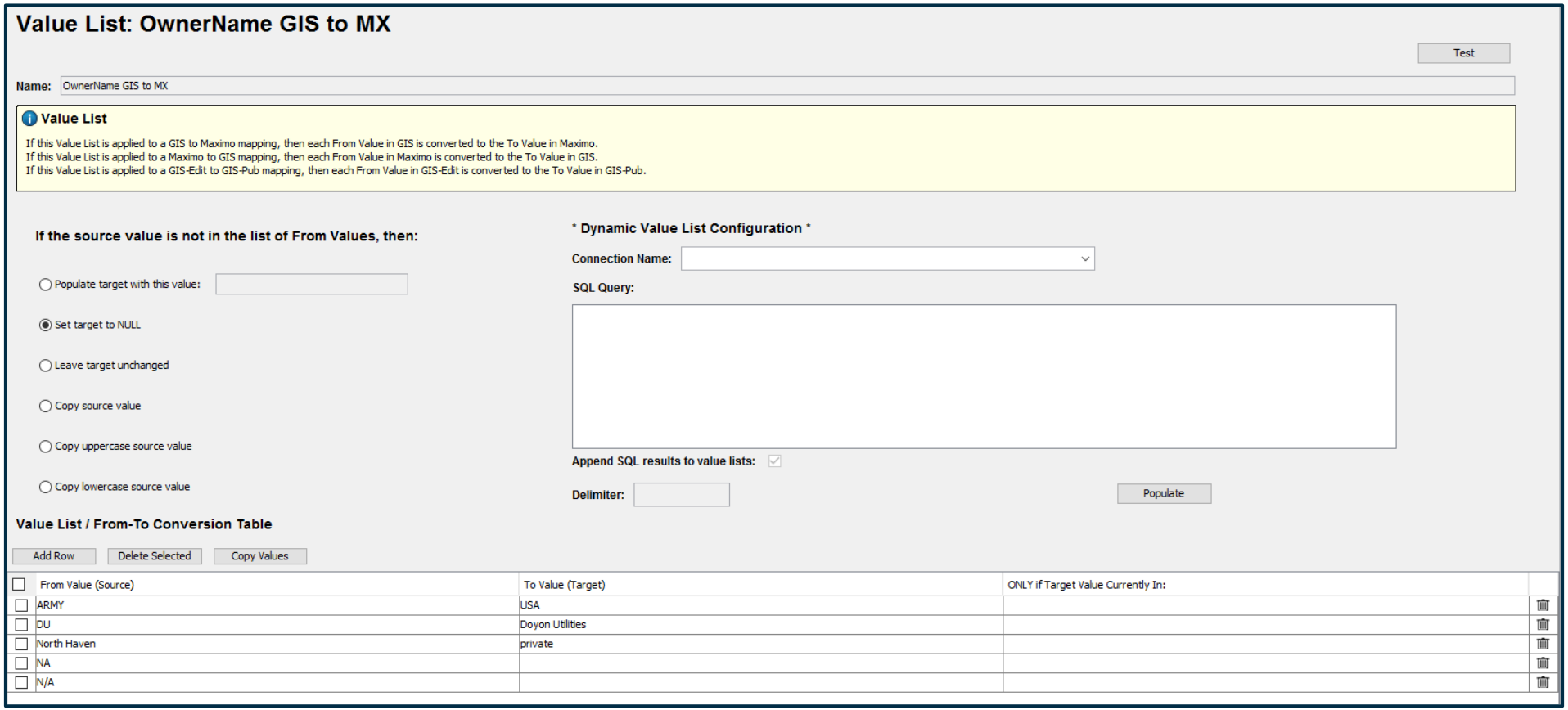
Doyon Spatial Queries and Attribute Rules to assign ownership



Technical Solutions

Data Translation Required for Synchronization into Maximo

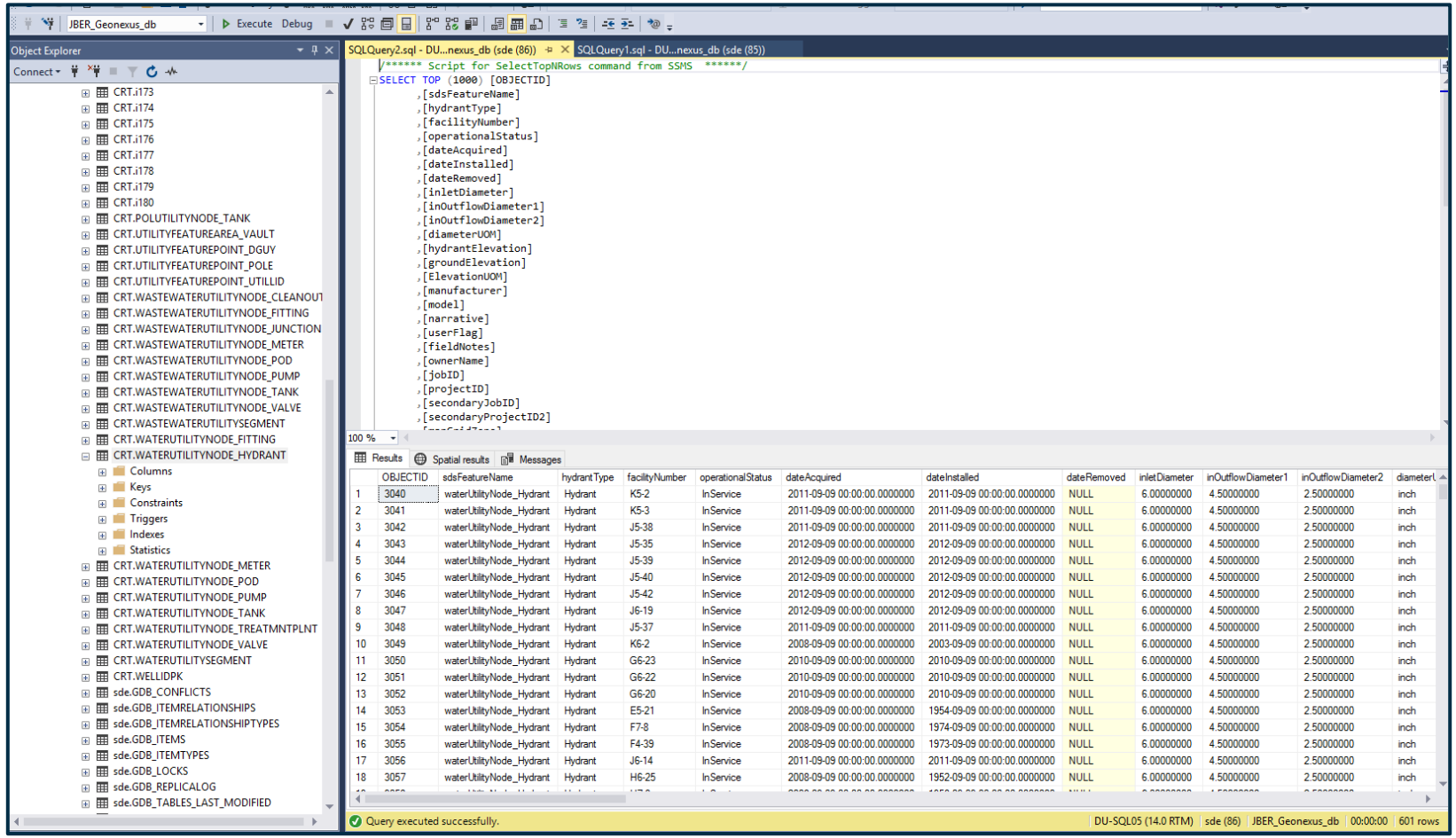
Value List to convert Values



Technical Solutions

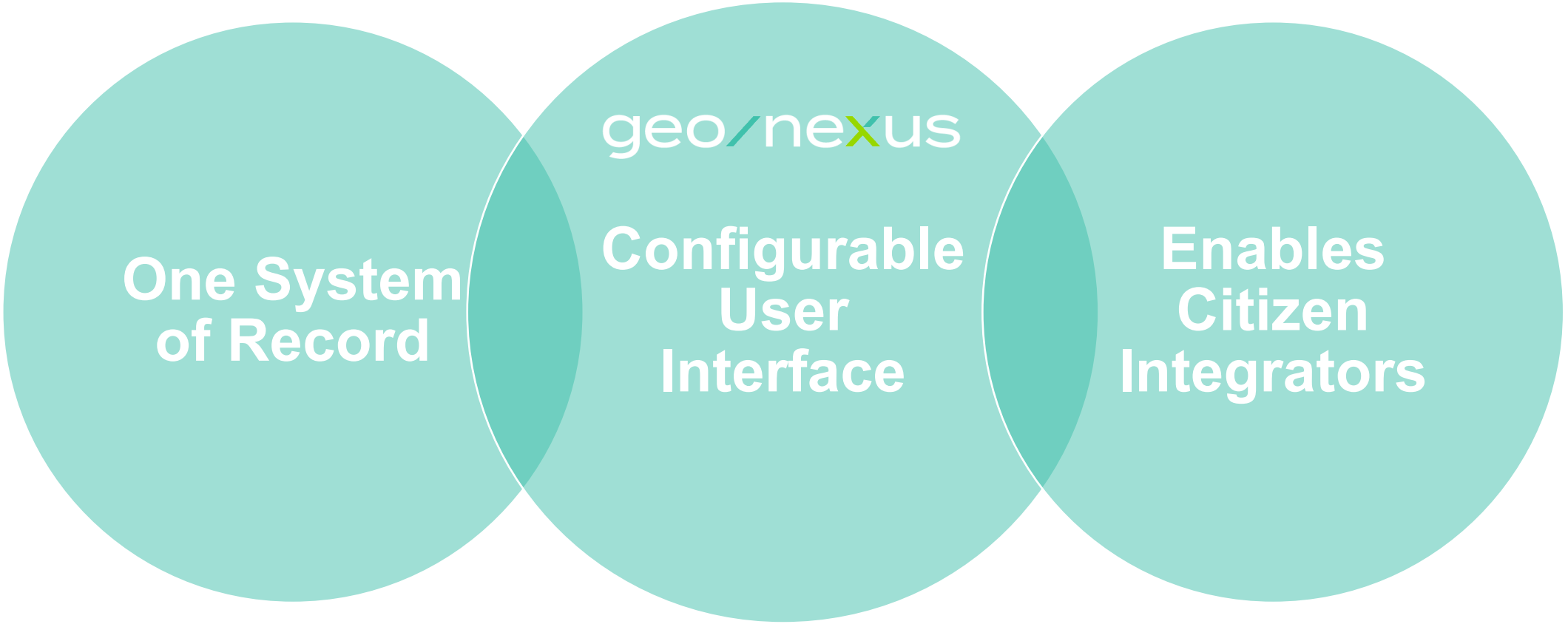
Initial Configuration of GIS Environments

Created SQL scripts to refresh the Test & Dev Environments



Integration Results

Ongoing Maintenance & Configuration Support



Operational Improvements

Improved Data Quality:

-Eliminate data silos and increased enterprise data integrity

-Geonexus data quality reports lead to quick issue resolution

Increased Operational Efficiency:

-Reduced manual data entry

-Ability to view linear asset data in maps

-Faster work order and maintenance response

Business Improvements:

-Management has better view of asset data across all 3 Doyon sites

Thank you.

Learn more about Doyon Utilities: www.DoyonUtilities.com

Learn more about Geonexus: www.geo-nexus.com

geo/nexus

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