

GIS Technology for SMART Utilities



★ 25 Years of Excellence

About Avineon Inc.



An ISO 9001:2008, ISO 27001:2013, ISO 14001:2004, OHSAS 18001: 2007 & SEI CMMi Level 3 Certified Company

Information Technology Firm,
Founded In 1992

Subsidiaries located in
Europe and India

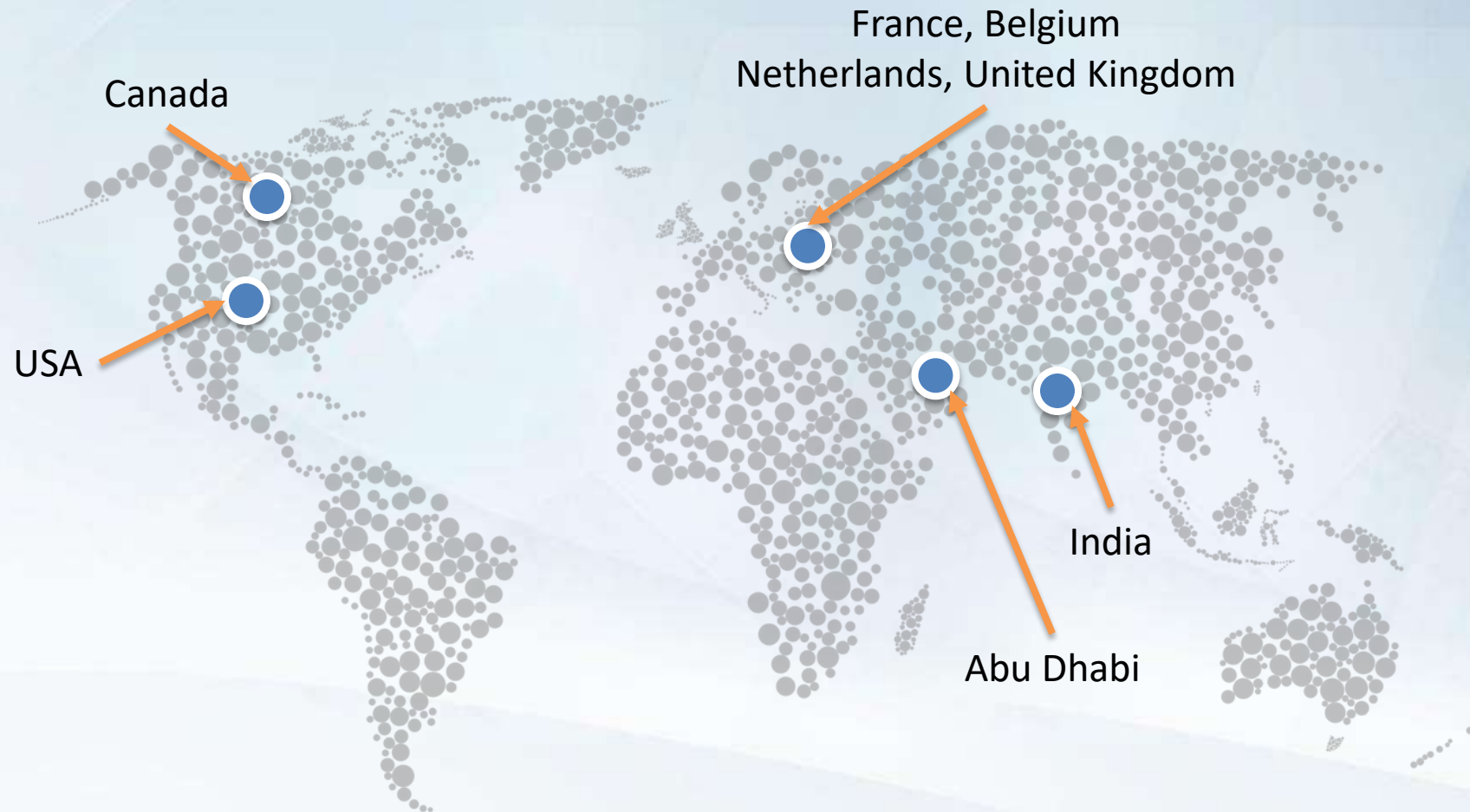
Over **1200 + employees**
Worldwide

Headquartered In **McLean, VA**
With U.S. Operating Locations In **DC, AL, & FL**

DoD Secret Facility Clearance

100% Project Success Rate

*Avineon is a **global technology company** specializing in IT, Geospatial, and Engineering Services for Government and private*



Services Overview



Geospatial Services

- Consulting
- Solutions Engineering
- Data Engineering
- Photogrammetry & 3D



Engineering Services

- Design and Detail Engineering
- Plant Design Automation



IT Services

- Geospatial Applications
- Emergency Management Solution - Avineonics®

Consulting



- Requirement understanding
- Enterprise GIS road map development
- EGIS Solution Architecture
- Technology and user application specifications
- Business process engineering
- RFP / Proof of Concept development

Solutions Engineering



- Spatial Data Infrastructure(SDI)
- Web GIS applications
- Mobile GIS Applications
- Spatial Data Analytics
- Enterprise application integration with GIS
- Software testing

Data Engineering



- Data modeling
- Data conversion/migration
- Data conflation
- Data acceptance testing
- Data maintenance/update

Photogrammetry & 3D



- Ortho Image production
- DEM/DTM/DSM creation
- Remote sensing
- LIDAR data processing
- 3D building & 3D City modeling
- Infrastructure visualization
- BIM and 3D applications

GSS Resource Pool

Utilities



- Electric
- Water & Waste water
- Gas

Telecom



- Mobile/Wire line Operators
- Cable Operators
- Broadband providers

Government



- State/Federal
- Transportation departments
- Land administration departments

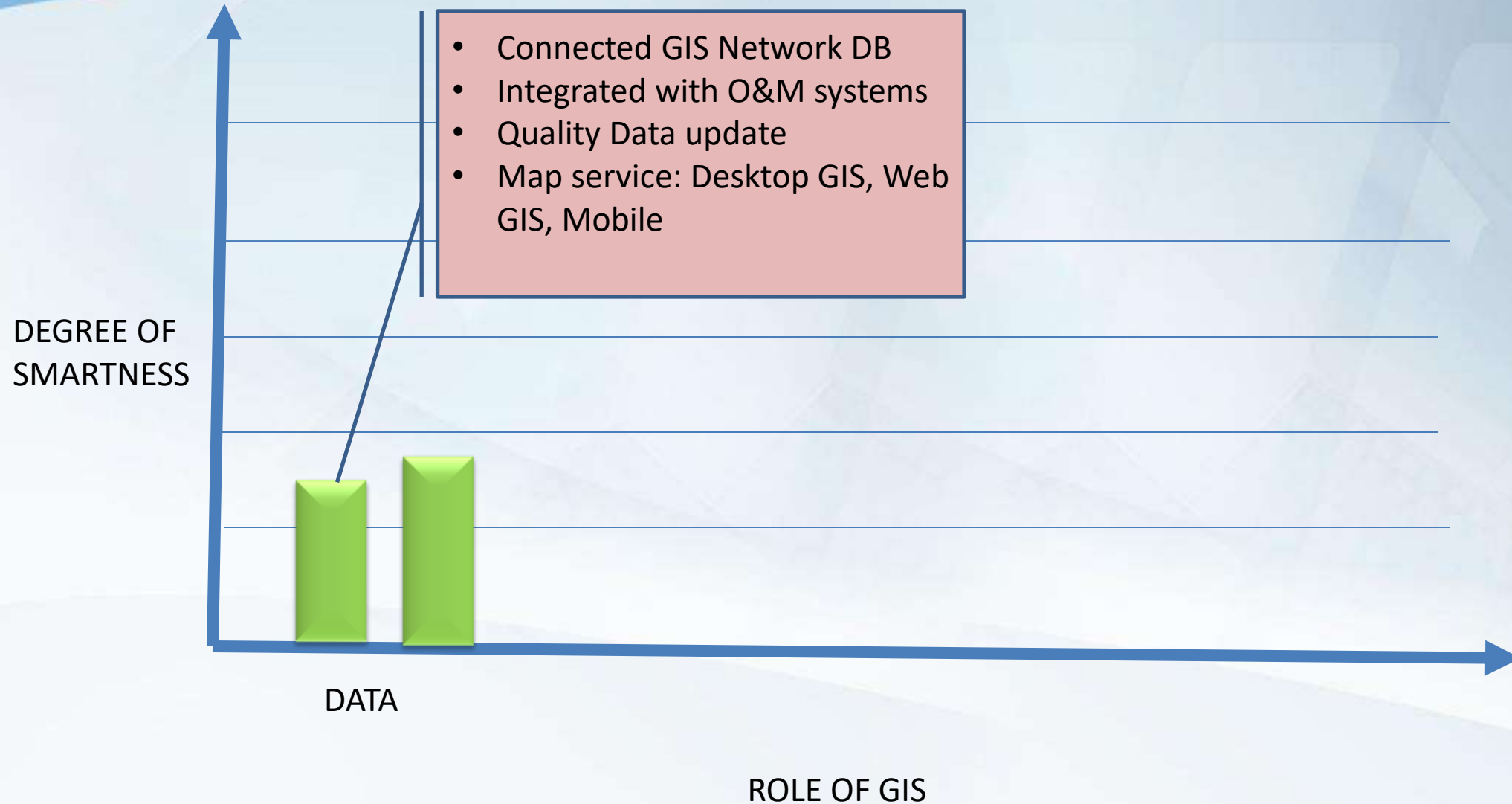
Oil & Gas



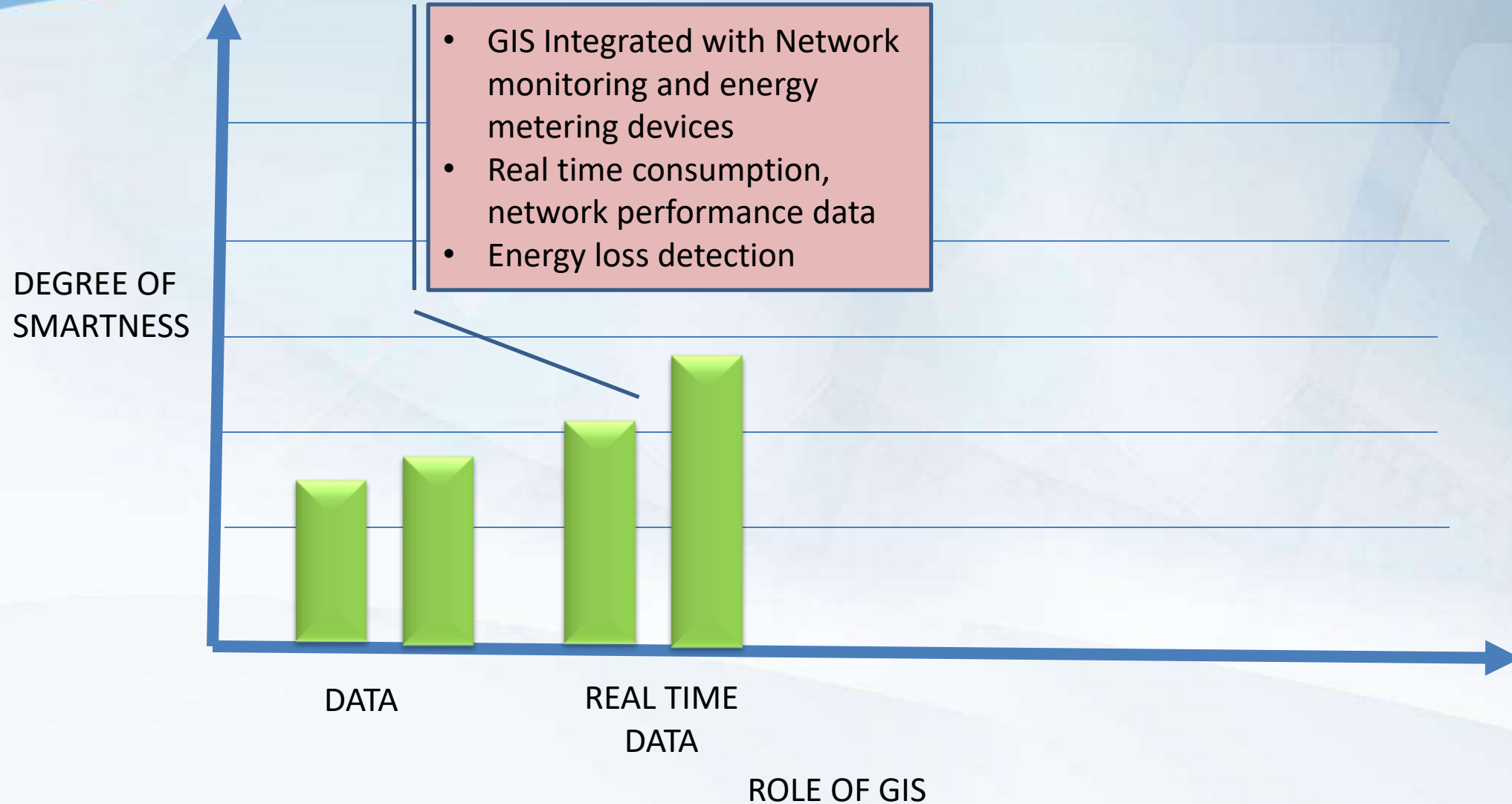
- Pipeline operators
- Exploration/ Production companies

GIS Technology – SMART UTILITIES

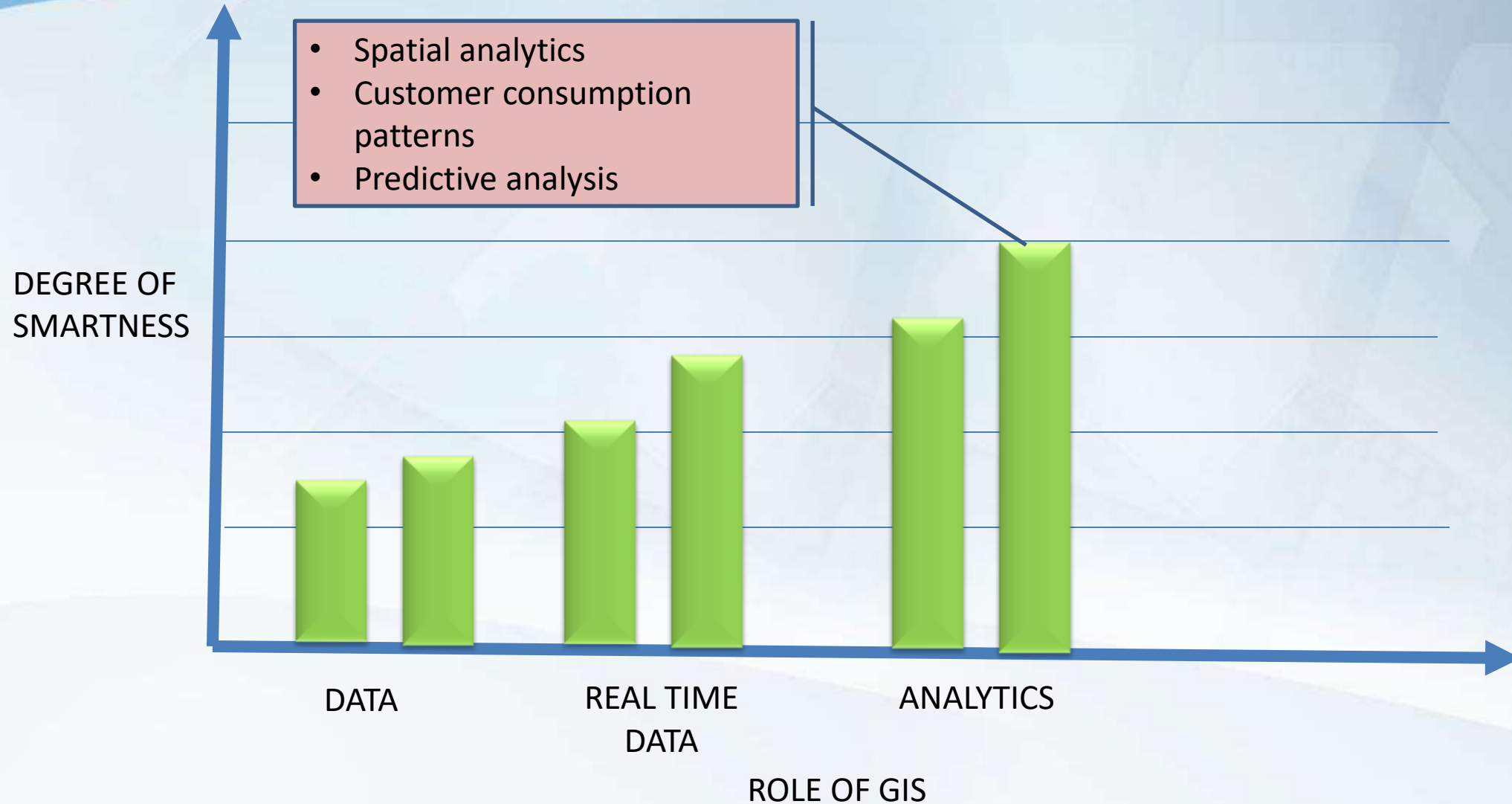
SMART UTILITY PROGRESSION



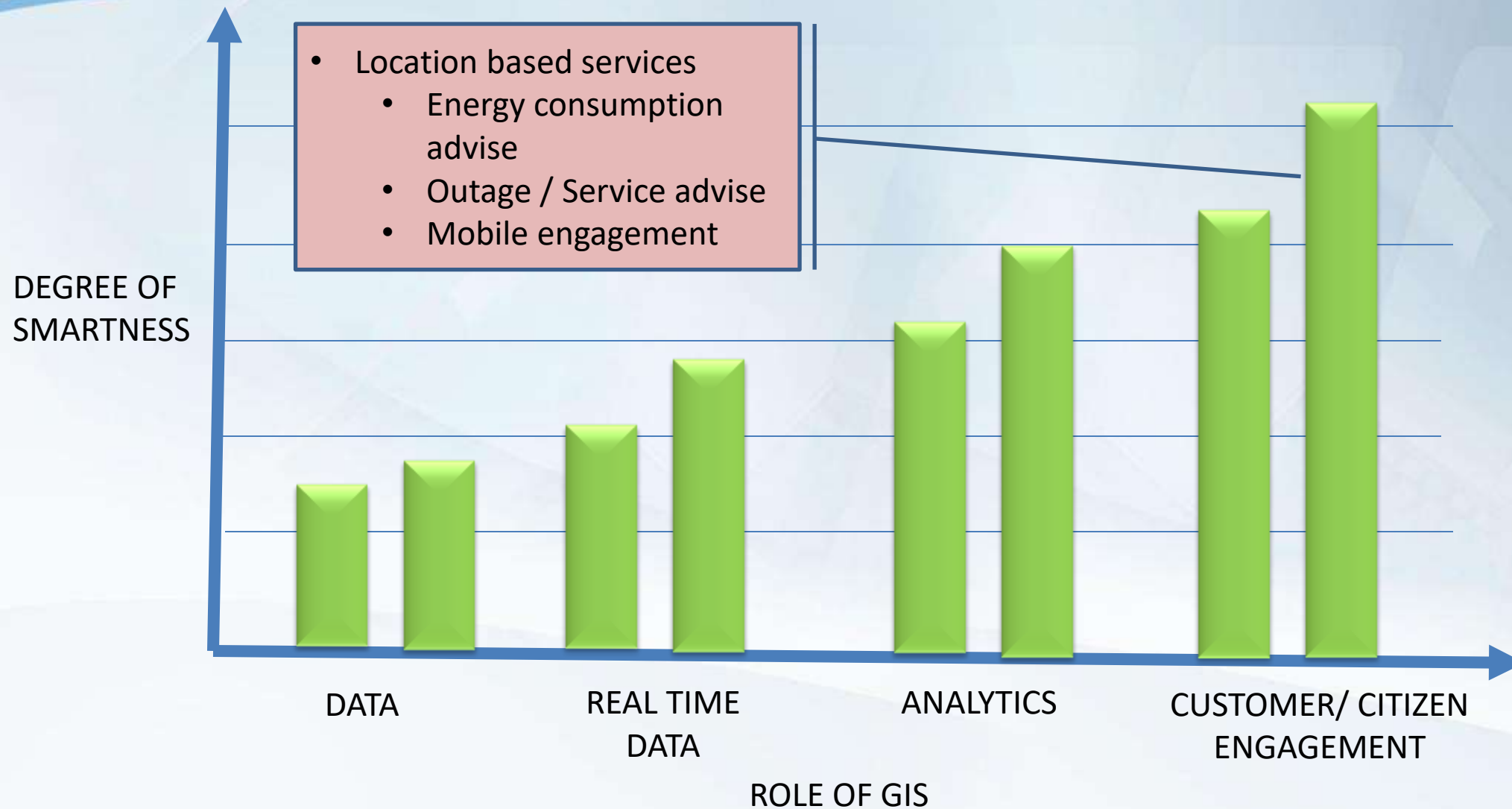
SMART UTILITY PROGRESSION



SMART UTILITY PROGRESSION

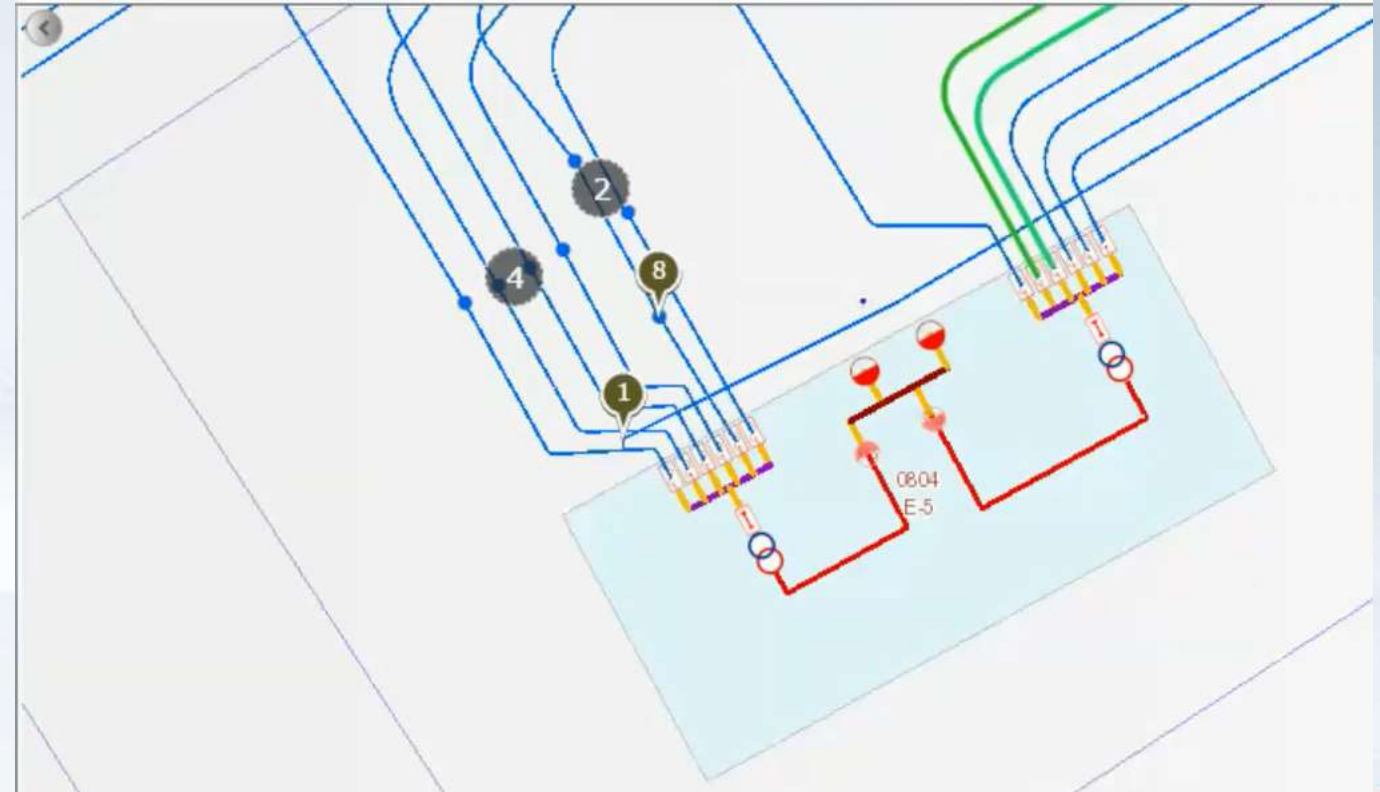


SMART UTILITY PROGRESSION



Key success factors

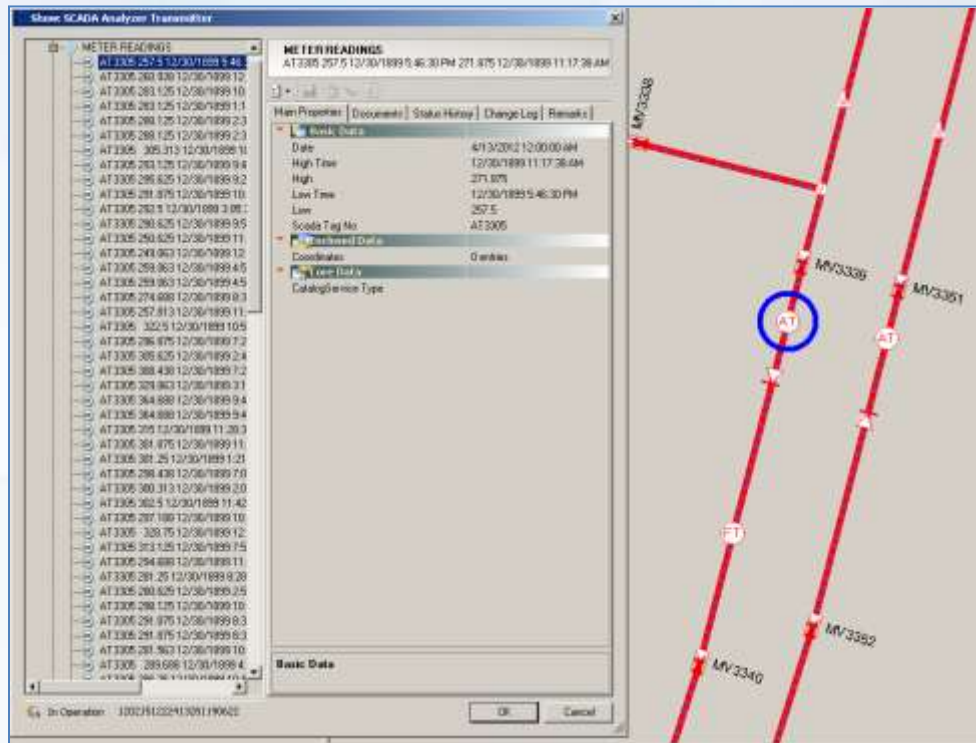
- Relevantly modeled & fully connected GIS network data is critical



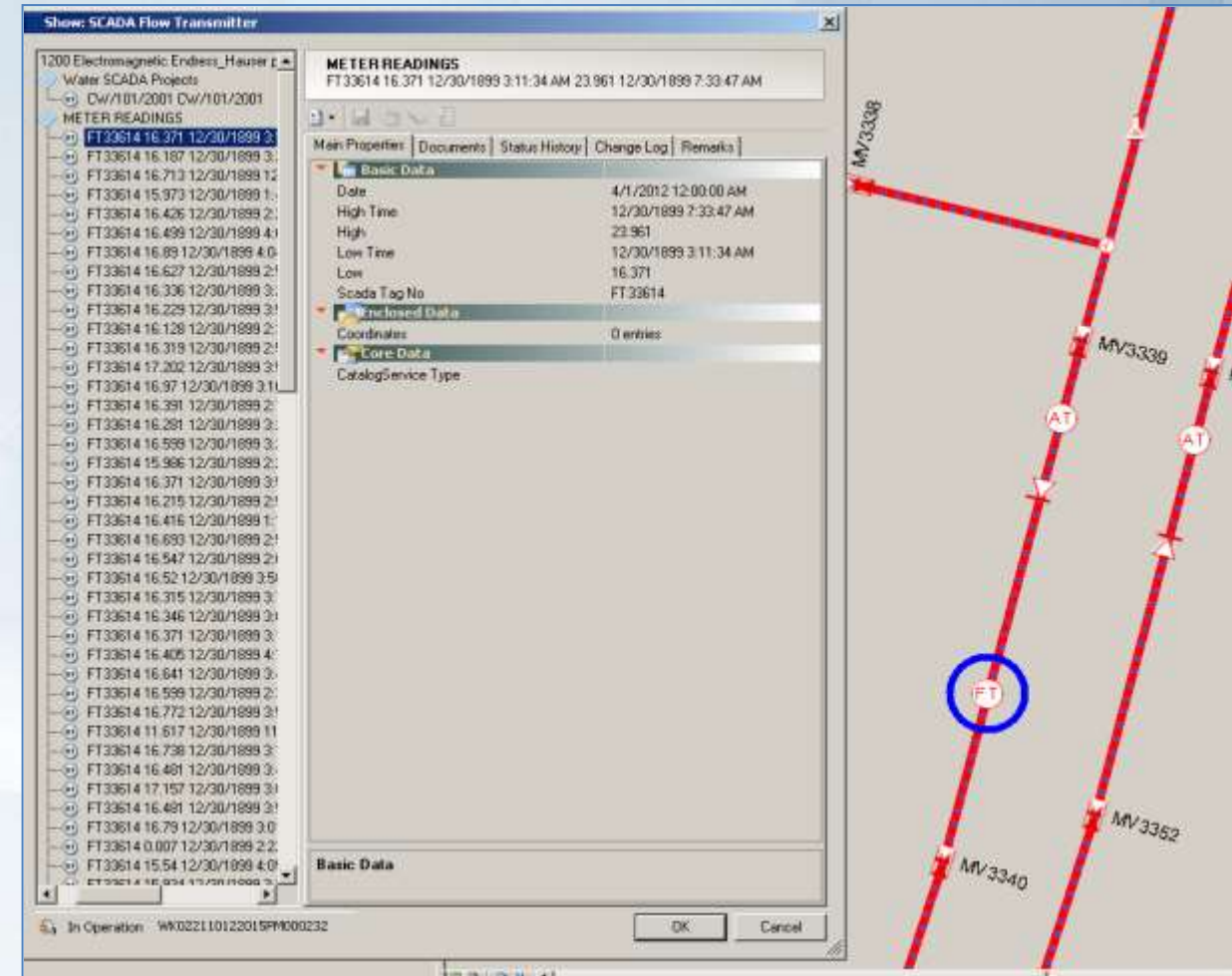
Key success factors

- Linking sensor data real time

Reading data linked with SCADA Analyzer Transmitter



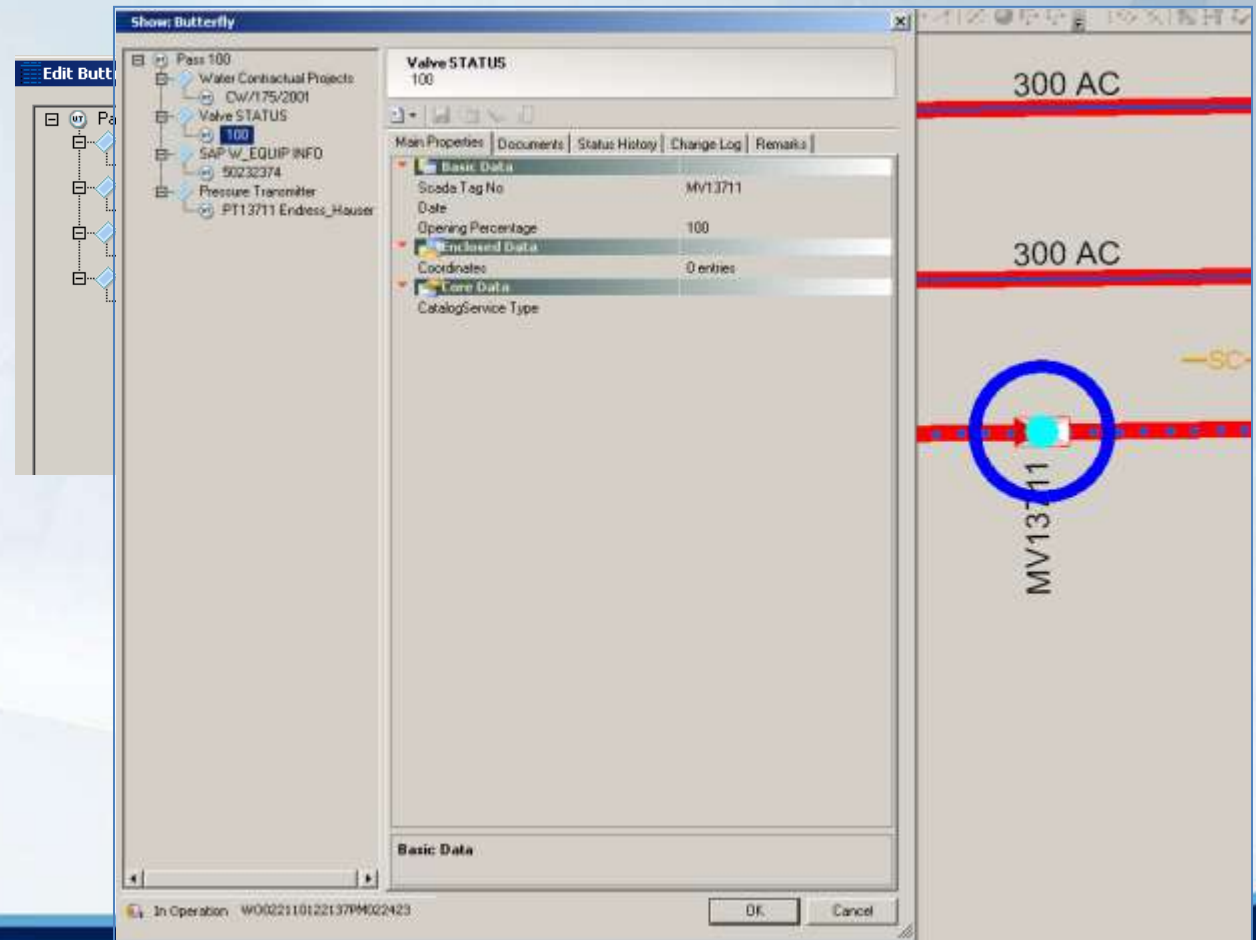
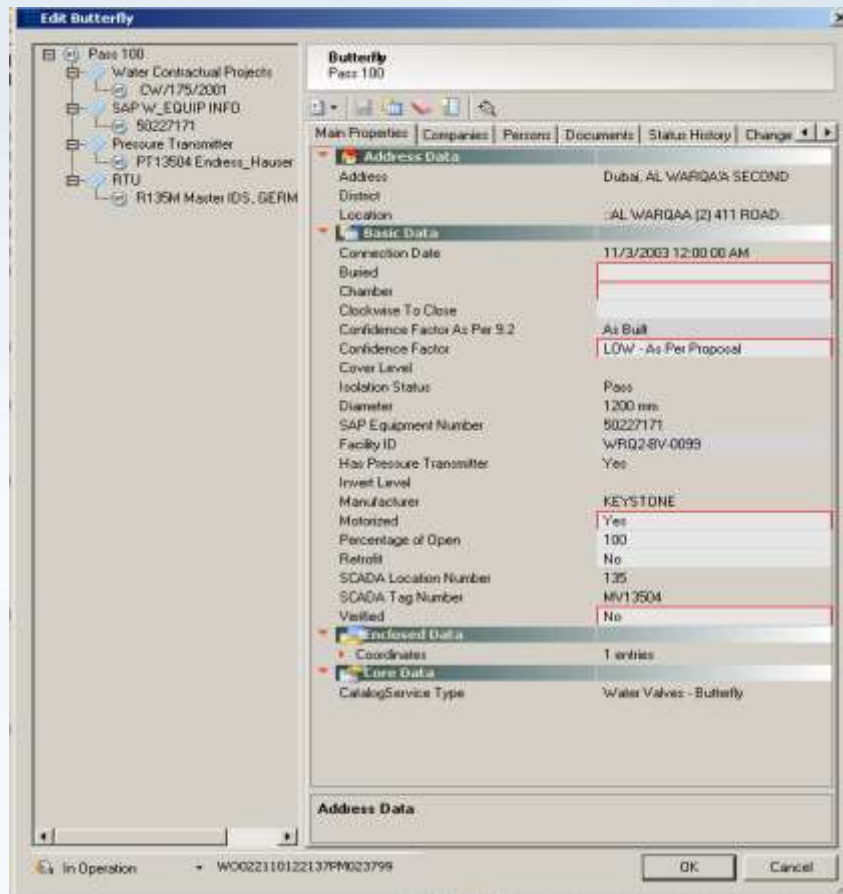
Reading linked with SCADA Flow Transmitter



Key success factors

- Linking sensor data

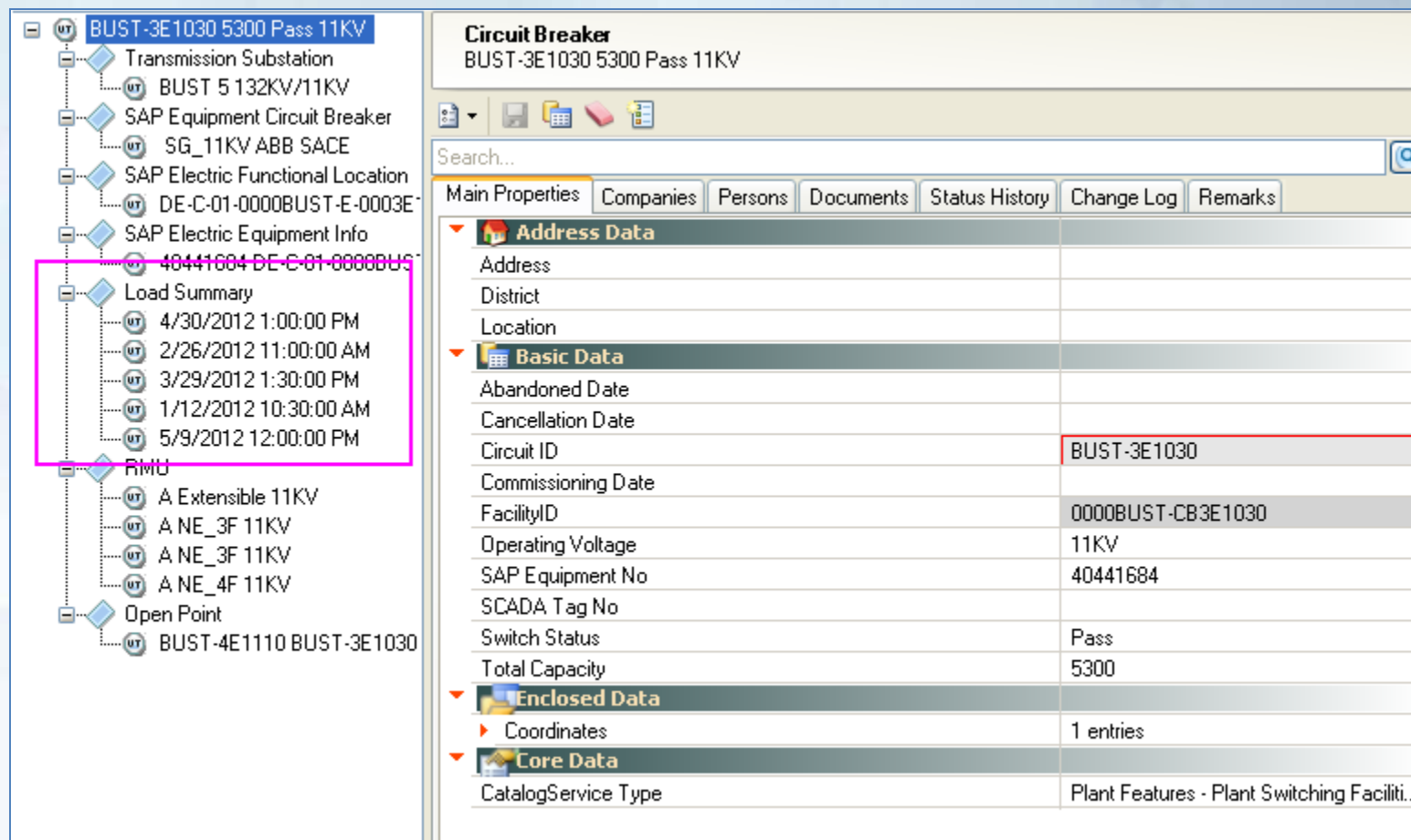
Pressure Transmitter data linked LIVE to corresponding valve



Key success factors

- Linking sensor data

Feeder load data linked to circuit breaker



The screenshot displays the AVINEON software interface. On the left, a hierarchical tree structure shows the following items:

- BUST-3E1030 5300 Pass 11KV
 - Transmission Substation
 - BUST 5 132KV/11KV
 - SAP Equipment Circuit Breaker
 - SG_11KV ABB SACE
 - SAP Electric Functional Location
 - DE-C-01-0000BUST-E-0003E
 - SAP Electric Equipment Info
 - 40441684 DE-C-01-0000BUST
 - Load Summary (highlighted with a pink box)
 - 4/30/2012 1:00:00 PM
 - 2/26/2012 11:00:00 AM
 - 3/29/2012 1:30:00 PM
 - 1/12/2012 10:30:00 AM
 - 5/9/2012 12:00:00 PM
 - RMU
 - A Extensible 11KV
 - A NE_3F 11KV
 - A NE_3F 11KV
 - A NE_4F 11KV
 - Open Point
 - BUST-4E1110 BUST-3E1030

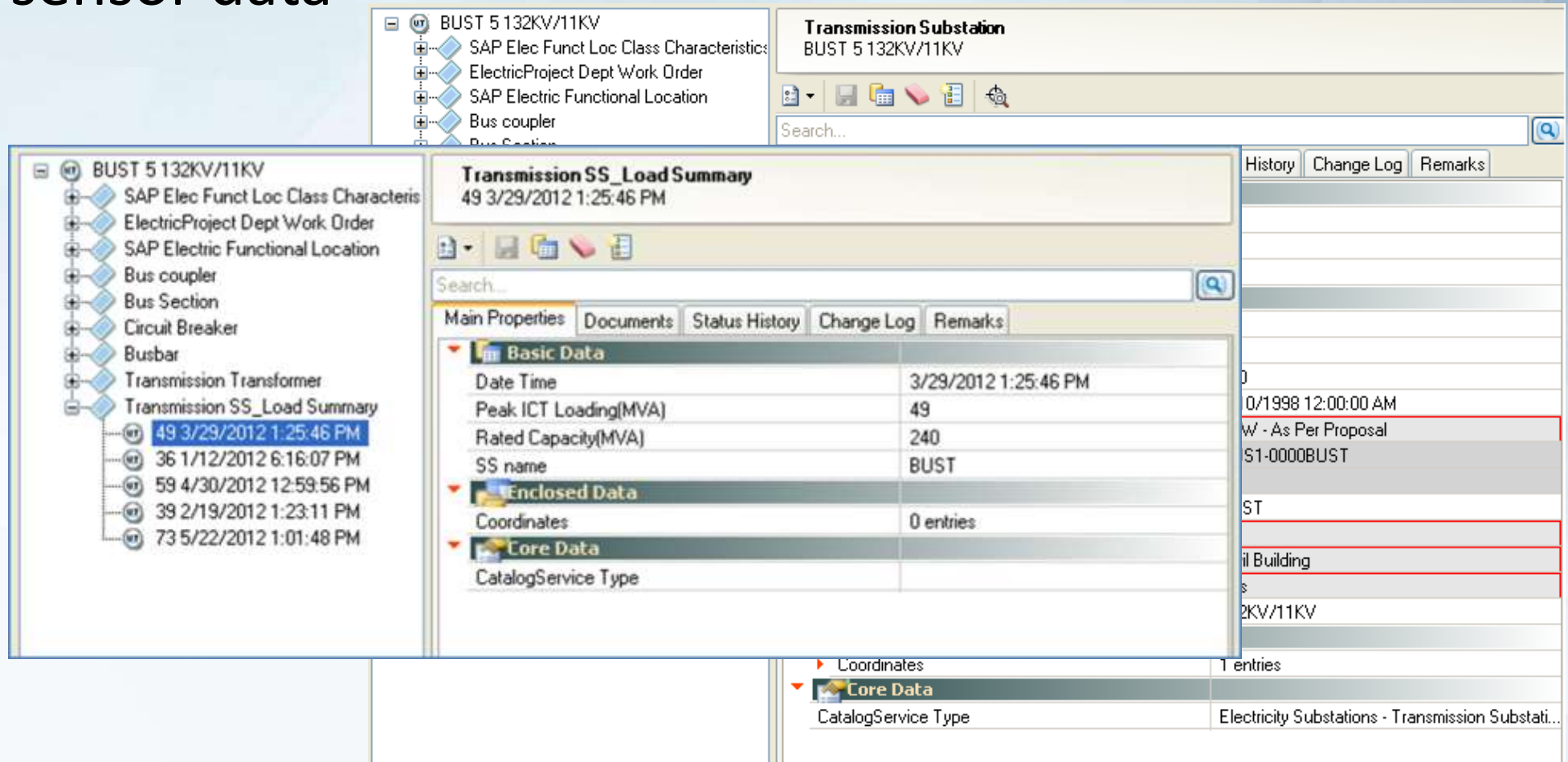
On the right, the 'Circuit Breaker' data view for 'BUST-3E1030 5300 Pass 11KV' is shown. It includes a search bar and tabs for Main Properties, Companies, Persons, Documents, Status History, Change Log, and Remarks. The data is organized into sections:

- Address Data**
 - Address
 - District
 - Location
- Basic Data**
 - Abandoned Date
 - Cancellation Date
 - Circuit ID: BUST-3E1030
 - Commissioning Date
 - FacilityID: 0000BUST-CB3E1030
 - Operating Voltage: 11KV
 - SAP Equipment No: 40441684
 - SCADA Tag No
 - Switch Status: Pass
 - Total Capacity: 5300
- Enclosed Data**
 - Coordinates: 1 entries
- Core Data**
 - CatalogService Type: Plant Features - Plant Switching Faciliti...

Key success factors

- Linking sensor data

Feeder load summary linked to circuit breaker



The screenshot displays the AVINEON software interface for managing electrical assets. The left pane shows a tree view of the project structure, including 'BUST 5 132KV/11KV' and its associated components like 'SAP Elec Funct Loc Class Characteristics', 'ElectricProject Dept Work Order', 'SAP Electric Functional Location', 'Bus coupler', 'Bus Section', 'Circuit Breaker', 'Busbar', 'Transmission Transformer', and 'Transmission SS_Load Summary'. The 'Transmission SS_Load Summary' is selected, showing a list of entries with timestamps.

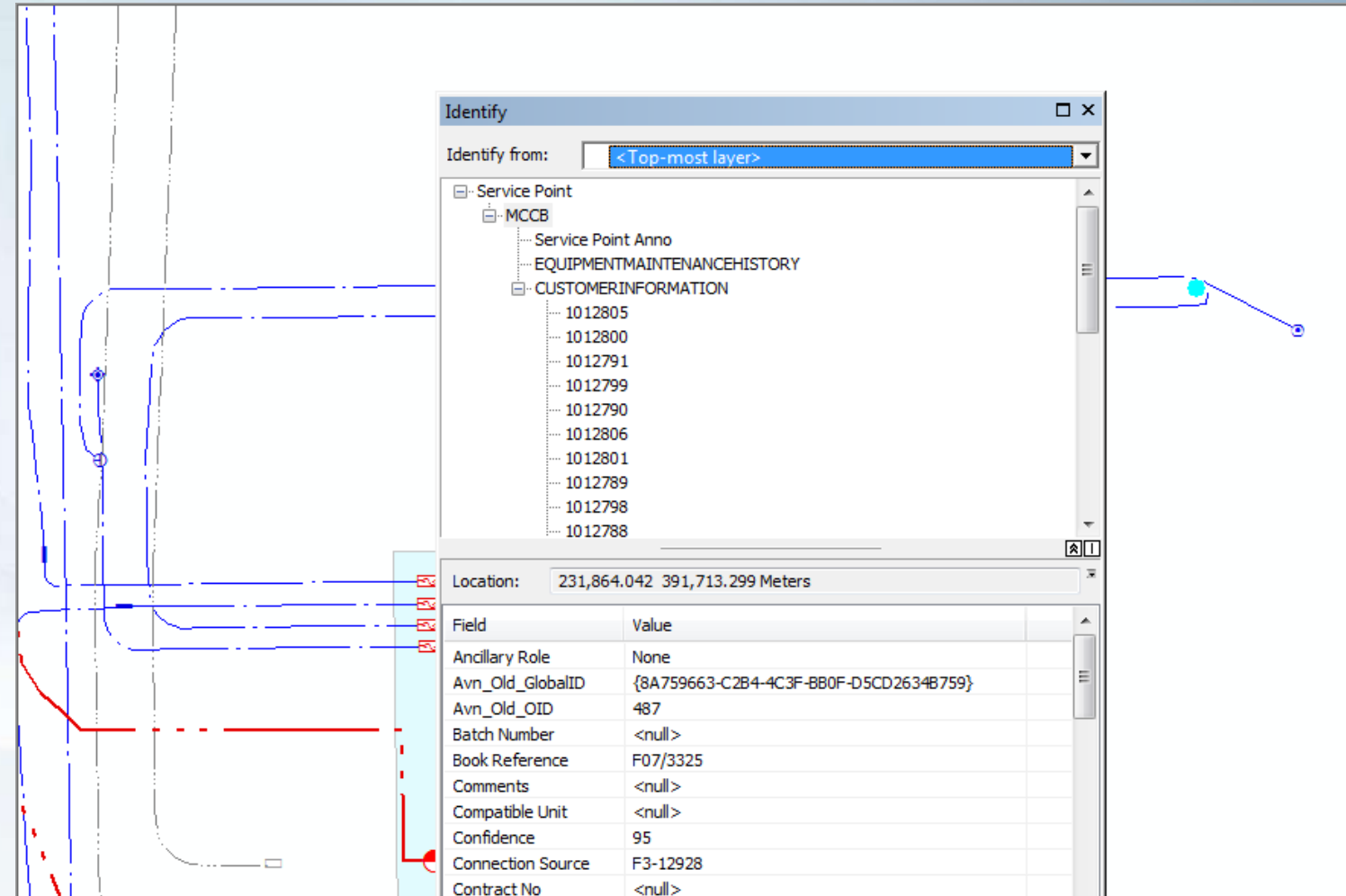
The main window displays the 'Transmission SS_Load Summary' properties for the selected entry '49 3/29/2012 1:25:46 PM'. The properties are organized into tabs: 'Main Properties', 'Documents', 'Status History', 'Change Log', and 'Remarks'. The 'Main Properties' tab is active, showing a table of data:

Transmission SS_Load Summary	
49 3/29/2012 1:25:46 PM	
Date Time	3/29/2012 1:25:46 PM
Peak ICT Loading(MVA)	49
Rated Capacity(MVA)	240
SS name	BUST
Enclosed Data	
Coordinates	0 entries
Core Data	
CatalogService Type	

The right pane shows the 'History' and 'Remarks' tabs. The 'History' tab is active, displaying a table of historical data:

History	Change Log	Remarks
0/1998 12:00:00 AM		
W - As Per Proposal		
S1-0000BUST		
ST		
il Building		
s		
2KV/11KV		

- Linking customer data



The screenshot shows a GIS application window with a map on the left and an 'Identify' window on the right. The map displays a network of blue and red lines. The 'Identify' window has a dropdown menu set to '<Top-most layer>'. Below this, a tree view shows the following structure:

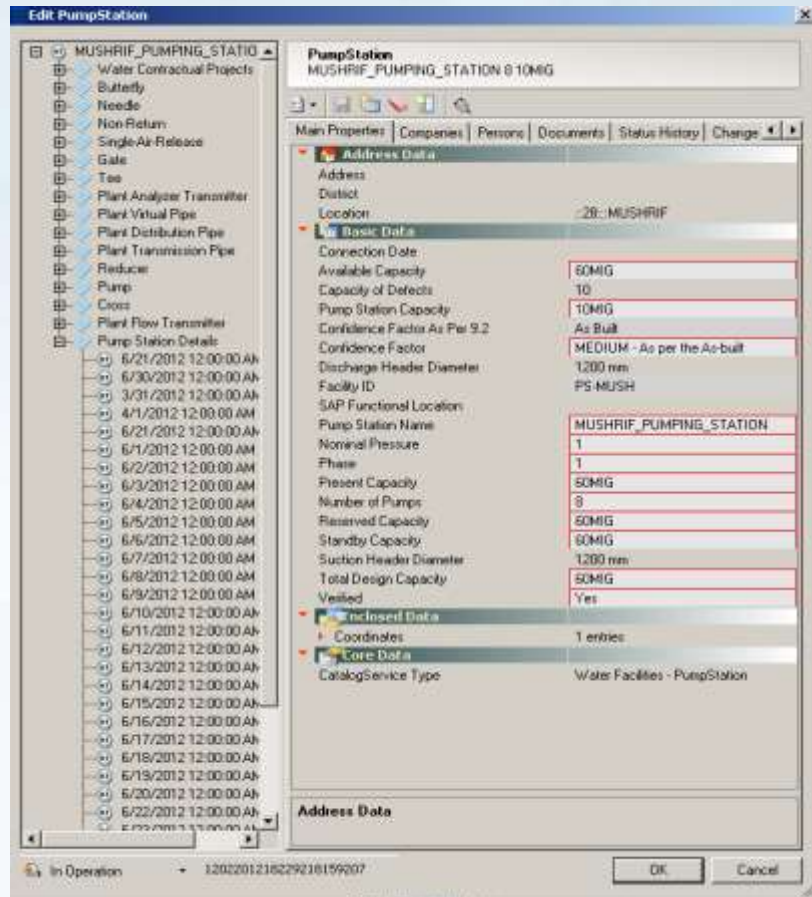
- Service Point
 - MCCB
 - Service Point Anno
 - EQUIPMENTMAINTENANCEHISTORY
 - CUSTOMERINFORMATION
 - 1012805
 - 1012800
 - 1012791
 - 1012799
 - 1012790
 - 1012806
 - 1012801
 - 1012789
 - 1012798
 - 1012788

Below the tree view, the 'Location' is displayed as '231,864.042 391,713.299 Meters'. At the bottom, a table lists the attributes of the selected feature:

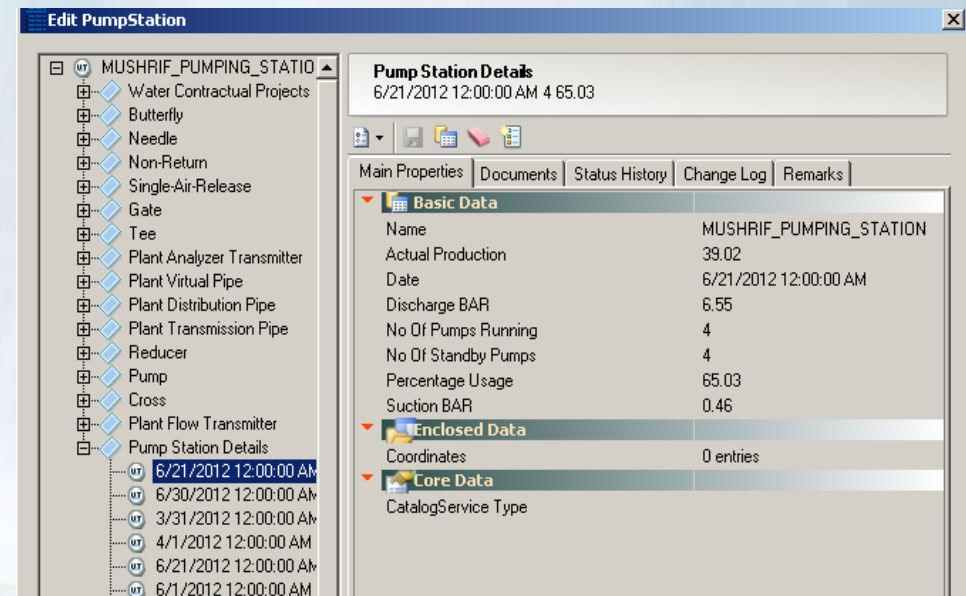
Field	Value
Ancillary Role	None
Avn_Old_GlobalID	{8A759663-C2B4-4C3F-BB0F-D5CD2634B759}
Avn_Old_OID	487
Batch Number	<null>
Book Reference	F07/3325
Comments	<null>
Compatible Unit	<null>
Confidence	95
Connection Source	F3-12928
Contract No	<null>

Key success factors

- Linking consumption data real time

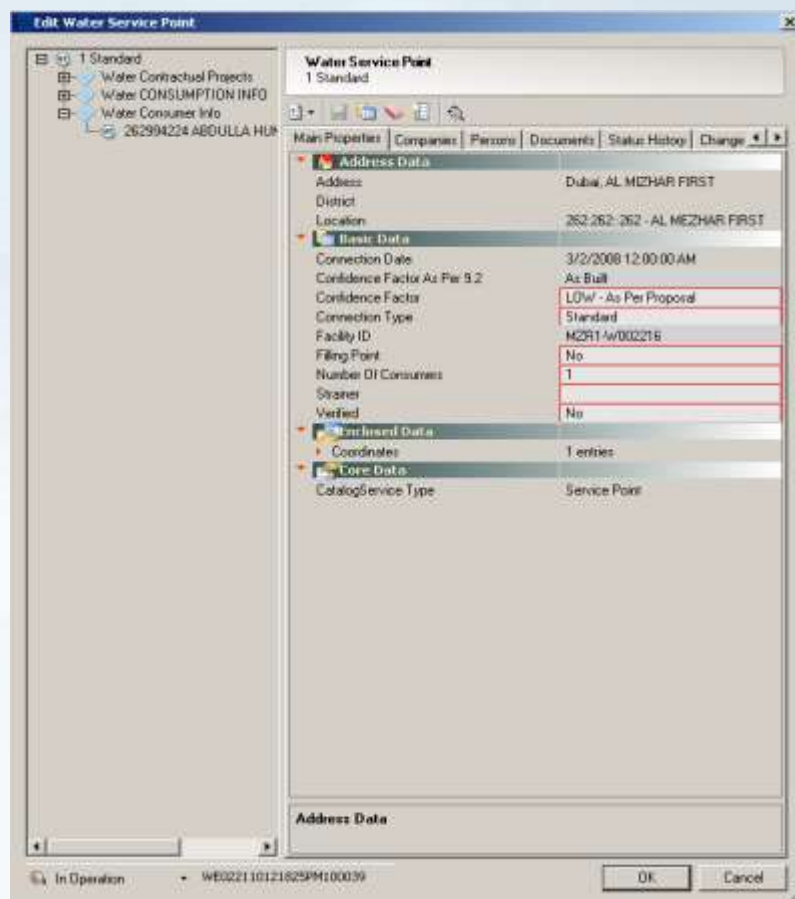


Pump Station daily usage Linked to pump



Key success factors

- Linking consumption data real time



Edit Water Service Point

Water Service Point
1 Standard

Main Properties | Companies | Persons | Documents | Status History | Change

Address Data

Address: Dubai, AL MEZHAR FIRST
District:
Location: 262.262 - 262 - AL MEZHAR FIRST

Basic Data

Connection Date: 3/2/2008 12:00:00 AM
Confidence Factor: As Built
Confidence Factor: L0W - As Per Proposal
Connection Type: Standard
Facility ID: M2R1-w/002216
Filing Point: No
Number of Consumers: 1
Syner:
Verified: No

Enclosed Data

Coordinates: 1 entries

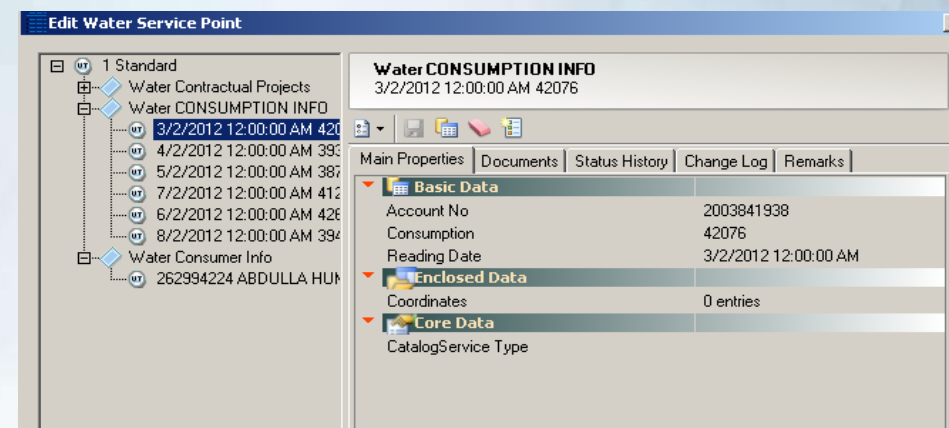
Core Data

CatalogService Type: Service Point

Address Data

In Operation WE022110121825PM100039 OK Cancel

Daily Water Consumption for each service is linked



Edit Water Service Point

Water CONSUMPTION INFO
3/2/2012 12:00:00 AM 42076

Main Properties | Documents | Status History | Change Log | Remarks

Basic Data

Account No: 2003841938
Consumption: 42076
Reading Date: 3/2/2012 12:00:00 AM

Enclosed Data

Coordinates: 0 entries

Core Data

CatalogService Type:

1 Standard
Water Contractual Projects
Water CONSUMPTION INFO
3/2/2012 12:00:00 AM 42076
4/2/2012 12:00:00 AM 398
5/2/2012 12:00:00 AM 387
7/2/2012 12:00:00 AM 412
6/2/2012 12:00:00 AM 426
8/2/2012 12:00:00 AM 394
Water Consumer Info
262994224 ABDULLA HUM

• Linking Asset Data

8 NE_4F 11KV

- SAP Elec Funct Loc Class Characteristics RMU
- Empty resultlist definition for class SAP Elec Fu
- Distribution Substation
- SAP Equipment RMU
 - LUCY DE-E-01-SS008268-B
- SAP Electric Functional Location
 - DE-E-01-SS008268-B
- SAP Electric Equipment Info
 - 40307080 DE-E-01-SS008268-B
- Circuit Breaker

RMU

8 NE_4F 11KV

Search...

Main Properties Companies Persons Documents Status History Change Log Remarks

Address Data	
Address	
District	
Location	
Basic Data	
Abandoned Date	
Cancellation Date	
Capacity	3000
Circuit Breaker ID	BUST-2E1160
Commissioning Date	10/16/2008 12:00:00 AM
Earth Fault Indicator	No
Earth Fault Indicator Towards	
FacilityID	NHD1-SS08268B
Operating Voltage	11KV
RMU Type	NE_4F
SAP Equipment No	40307080
SAP Functional Location	DE-E-01-SS008268-B
SS Name	Mohd. Abdullah Sulaiman Sudqi
Switch Status	Pass
Tag Number	B
Enclosed Data	
Coordinates	1 entries
Core Data	
CatalogService Type	Plant Features - Plant Switching Facilitie...

Switch Gear

BUST 132kv H020

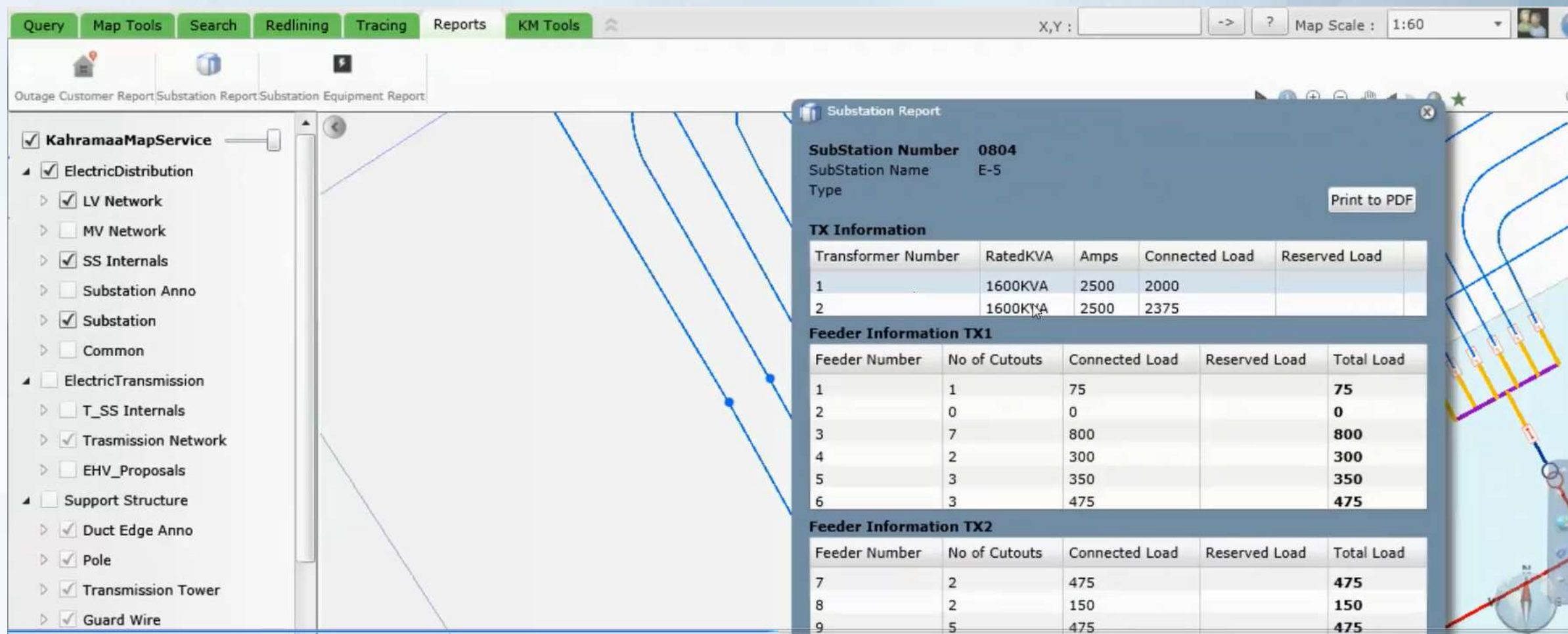
Search...

Main Properties Documents Status History Change Log Remarks

Basic Data	
Commission Year	1998
Installation Date	
Manufacturer Name	H020
Maximo Equipment No	MCC2GHSSWHVC01
Number of Busbar Isolators	2
Number of Bus Section Isolators	4
Number of Cable Circuit	
Rated Voltage (KV)	132kv
SS Name	BUST
Enclosed Data	
Coordinates	0 entries
Core Data	
CatalogService Type	

Avineon Custom toolkit for utilities

Load Summary Tool: Real time load summary by circuit, SS, Transformer



The screenshot displays the Avineon Load Summary Tool interface. The top navigation bar includes tabs for Query, Map Tools, Search, Redlining, Tracing, Reports, and KM Tools. The main map area shows a network of blue lines representing electrical circuits. A left sidebar contains a tree view for 'KahramaaMapService' with various layers like ElectricDistribution, LV Network, MV Network, SS Internals, Substation Anno, Substation, Common, ElectricTransmission, T_SS Internals, Transmission Network, EHV_Proposals, Support Structure, Duct Edge Anno, Pole, Transmission Tower, and Guard Wire. A 'Substation Report' window is open on the right, displaying details for SubStation Number 0804 and SubStation Name E-5. It includes a 'Print to PDF' button and three tables: TX Information, Feeder Information TX1, and Feeder Information TX2.

Substation Report

SubStation Number 0804
SubStation Name E-5
Type

Print to PDF

TX Information

Transformer Number	RatedKVA	Amps	Connected Load	Reserved Load
1	1600KVA	2500	2000	
2	1600KVA	2500	2375	

Feeder Information TX1

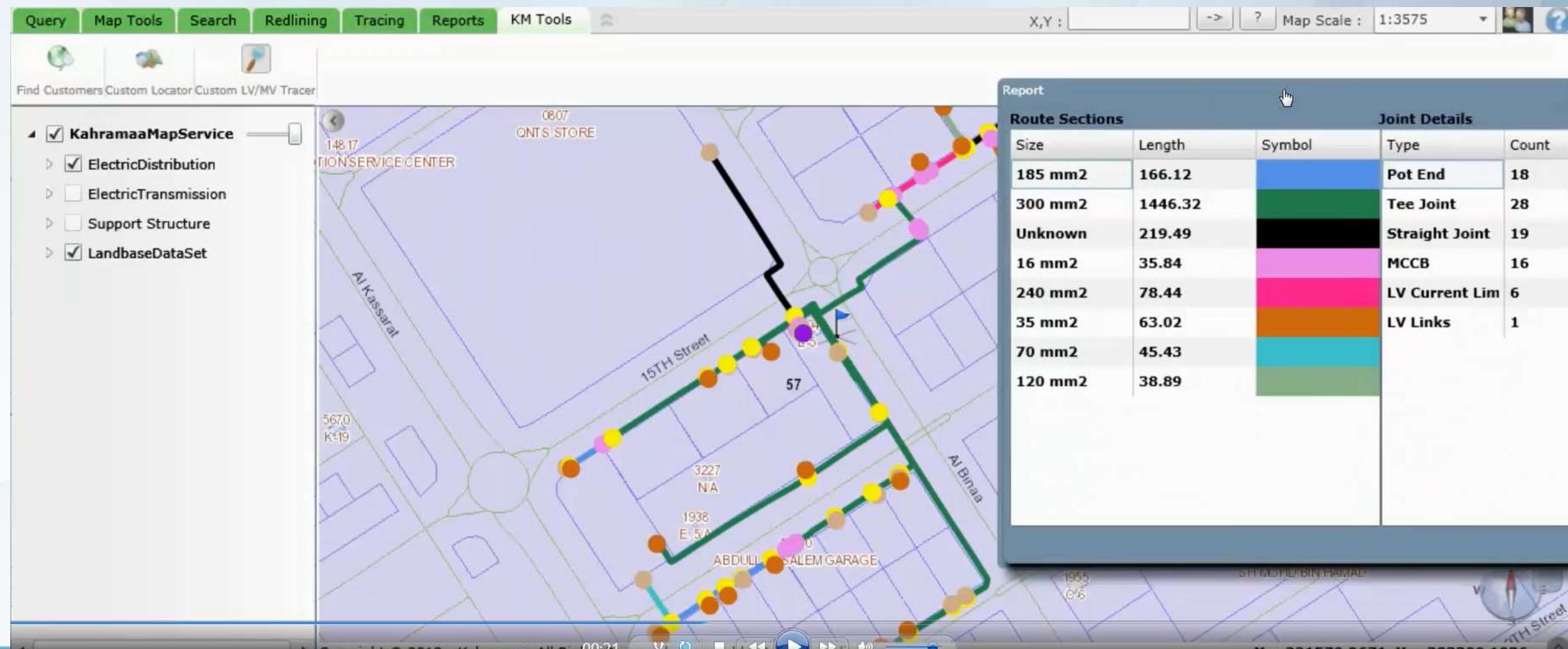
Feeder Number	No of Cutouts	Connected Load	Reserved Load	Total Load
1	1	75		75
2	0	0		0
3	7	800		800
4	2	300		300
5	3	350		350
6	3	475		475

Feeder Information TX2

Feeder Number	No of Cutouts	Connected Load	Reserved Load	Total Load
7	2	475		475
8	2	150		150
9	5	475		475

Avineon Custom toolkit for utilities

Asset summary tool: Summarizes connected cables by size, material and associated connection points by selecting any asset in the map.

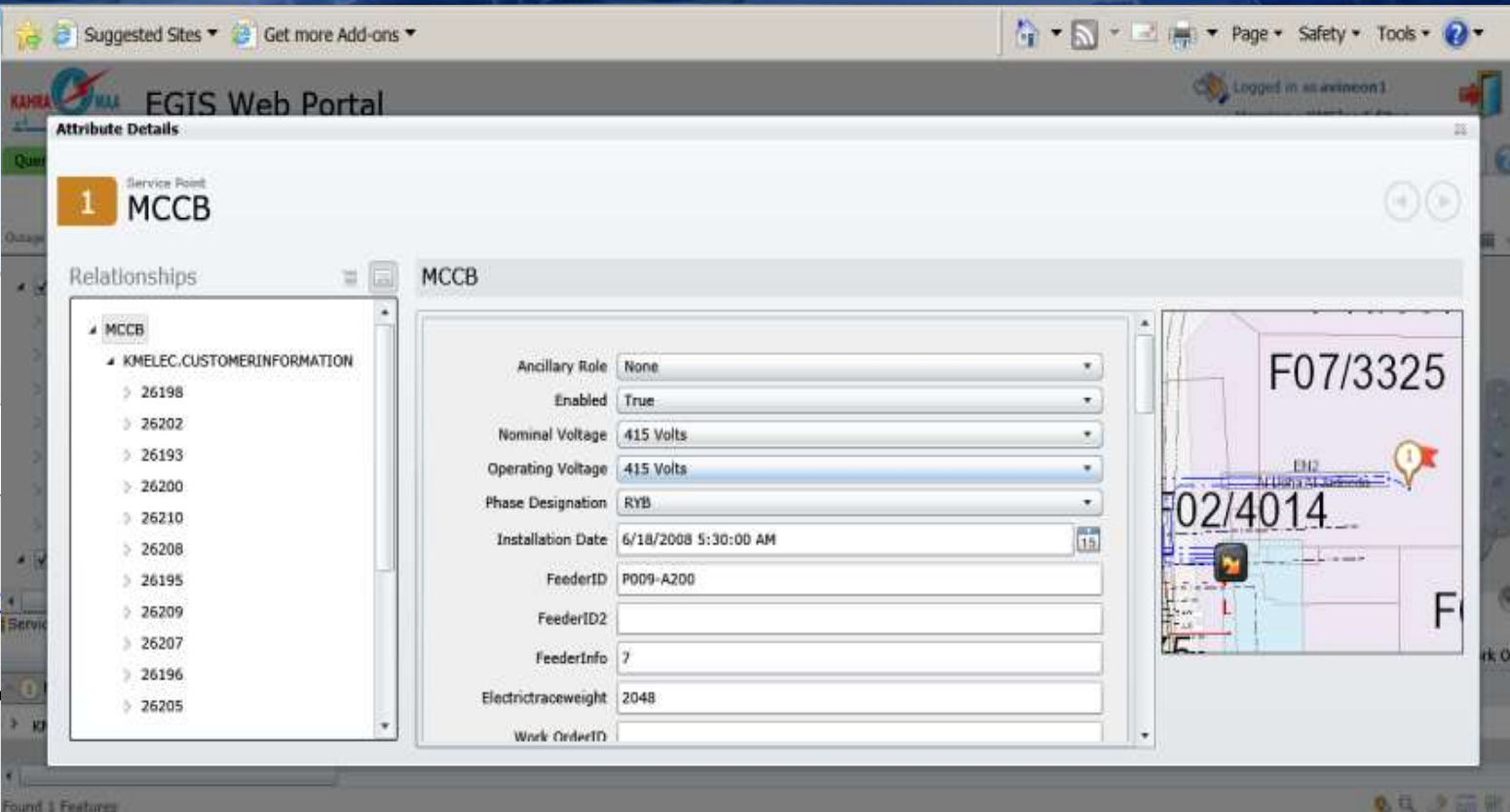
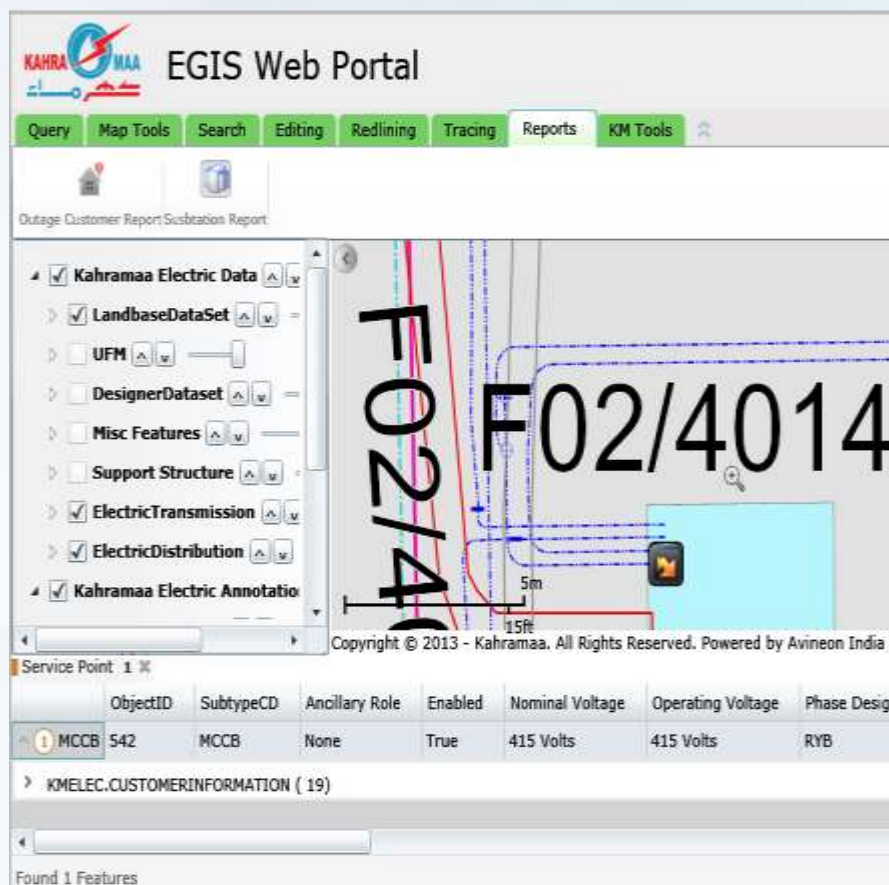


The screenshot displays the Avineon Custom toolkit interface. The top menu bar includes Query, Map Tools, Search, Redlining, Tracing, Reports, and KM Tools. The main map area shows a street layout with utility assets represented by colored lines and dots. A left sidebar lists layers: KahramaaMapService (checked), ElectricDistribution (checked), ElectricTransmission (unchecked), Support Structure (unchecked), and LandbaseDataSet (checked). A right sidebar shows a report window with the following data:

Route Sections			Joint Details	
Size	Length	Symbol	Type	Count
185 mm2	166.12	[Blue Symbol]	Pot End	18
300 mm2	1446.32	[Green Symbol]	Tee Joint	28
Unknown	219.49	[Black Symbol]	Straight Joint	19
16 mm2	35.84	[Pink Symbol]	MCCB	16
240 mm2	78.44	[Magenta Symbol]	LV Current Lim	6
35 mm2	63.02	[Orange Symbol]	LV Links	1
70 mm2	45.43	[Cyan Symbol]		
120 mm2	38.89	[Green Symbol]		

Avineon Custom toolkit for utilities

Outage notice tool



Finds customers Impacted by Switching Operations and communicate

- Designer gets connection request locations
- Request locations (Address/XY/Latlong) are input to the tool
- Tool automatically geocode the locations

EBU GIS WEBPORTAL UNIFIED MAP VIEWER

Welcome achilukurt [Logout](#) [Help](#)

[Navigation](#) [Map Tools](#) [Search](#) [Redlining](#) [Custom](#)

Bulk Order

Bulk order Processing

CSV File Path: C:\Mapdata\Coords.csv [Browse](#)

Equipment: WireLess Trace: Google Directions

Buffer Distance: 500 Parcel Distance: 50

S.No	X	Y	Customer	Find Route	Cost Model
1	46.689376	24.774470	Rashed		
2	46.690572	24.772164	Akram		
3	46.693085	24.773403	Iqbal		

[Process](#)

SMART Design for Fiber

- Tool locates nearest equipment for each connection request
- Shows the civil network and fiber network route and length
- Provides cost estimate as well for the proposed route

CostModel2015

Cost_Model_Summary | CivelCostTable | CableCostTable | FOC_term_conditions | Copper_Termination | Cluster_FDTs | OSP_Secondary_Cost | Olt_Cost_Table


ACCESS PLANNING - COST SUMMARY

[Financial Analysis Summary](#)

Total Capex
NPV
IRR
Payback Period
Financial Year **2015 / 2016**

Capex

Plant Category	Total SR
OSP	
Primary Civil	SR
Primary Cables (Cu & FOC)	SR
Primary Fibre Term Bldg's	SR
Primary Copper Terminations	SR
Secondary (Single FDT)	SR
Secondary (Cluster)	SR
Sub-Total	0 SR
ISP	
OLT	SR
OLT Expansion	SR
OLT Spares	SR
ISP	SR
Sub-Total	0 SR
CPE	
	SR
Miscellaneous	
	SR
Transmission	
Total	0 SR



DISCOVERING DATA TRENDS FROM GIS: Avineon Metrics



Metrics Extension to ArcGIS for Server

Analytics for GIS

DEFINE › SCHEDULE › COMPUTE › SHARE

- **Founded 1992**
- **900+ employees**
- **Privately held**
- **Headquartered in McLean, Virginia with office in Florida.**
- **Subsidiaries in Canada, France, Belgium, Netherlands, United Kingdom, and India.**



An ISO 9001:2008 Registered
CMMI Maturity Level 3 Company



GIS Manager, Supervisor, Administrator, Analyst

- Data Trends
- Quality Trends
- Editing Trends

- ☐ What is updated in the last week, month, quarter, year?
- ☐ Is the data quality getting better?
- ☐ What are the unposted changes?



Executives, Managers, Supervisors, Consultants

INDUSTRY: Electric, Gas, Water, Telecom, Transportation, Oil, Insurance

- Inspection Trends
- Installation Trends
- Aging Trends
- Reliability Trends
- Customer Trends


- ☐ What, Where, When and Outcomes?
-By Circuit/Route | Asset Type | By Region

GOVERNMENT: City, County, State, Federal

- Land Use Trends
- Demographic Trends
- Public Safety and Security Trends
- Health Trends
- Human Services Trends
- Citizen Services Trends

- ☐ Property Type | Surface Type | Structure Type
- ☐ Traffic Violations | 911 calls
-By Zip Code | Subdivision | Tax Districts | Zone
-By School | Counsel | Congressional Districts

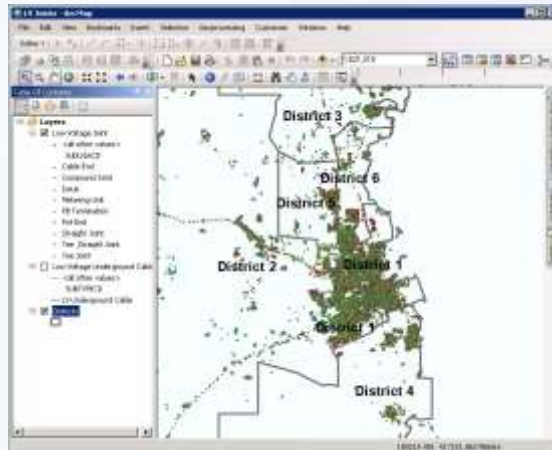
← → ↺ oxford/electric.html ☆

 **Electric**
Asset Type | Inspections | Installation | Reliability | Customers

By [LV Joints By Joint Type*](#) | [LV Cable By Material and Size*](#) | [Customer Count By Cutout Size*](#) By [Pole Inspections](#) | [Joint Use](#) | [Streetlight Maintenance](#) By [District and LV Joints](#) | [Xfmr Count By Mfr Year and District*](#) | [Joint Use](#) | [Line Clearance](#) | [Abandoned](#) | [Meter Type](#) By [Circuit and Cutout Type](#) | [Transformer KVA](#) |

Metrics Extension

ArcGIS
for Server



Electric LV Joints By Type

Category	Current
	17-Mar-16
PB Termination.XLPE	249
PB Termination.PILC	1
PB Termination.Transition	2
PB Termination.Not Applicable	1646
Straight Joint.XLPE	41925
Straight Joint.PILC	31772
Straight Joint.Transition	19020
Straight Joint.Not Applicable	25
Pot End.XLPE	126
Pot End.PILC	4
Pot End.Transition	1
Pot End.Not Applicable	97141
Tee & Straight Joint.XLPE	367
Tee & Straight Joint.PILC	1931

Metric	Fieldvalue	District 1	District 2	District 3	District 4	District 5	District 6	District 7	Metricvalue
1000KVA	12052	12140	1740	2340	1085	1900	480		
100KVA	60	400	235	70	60	50	116		
10MVA				10					
1250KVA	545	200							
1250KVA		8							
1400KVA		20							
1500KVA				1067	District 1				
151KVA		3		1974	District 1				
1600KVA	16270	10560		1975	District 1				
2000KVA	40	30			District 2				
2000KVA	5	2366			District 3				
2500KVA	70	85		1976	District 1				
2500KVA		9		1977	District 1				
25KVA					District 2				
3000KVA				1976	District 1				
3000KVA	5	20			District 2				
30MVA		10			District 4				
3150KVA		20			District 1				
3150KVA	20	75			District 2				
3200KVA		15			District 4				
3500KVA					District 1				
36KVA	5				District 2				
3750KVA		140			District 3				
4000KVA	5	5			District 4				
6000KVA	15	70			District 5				
					District 1				
					District 2				

- By Type
- By Joint Type
- By District
- By Contractor
- By Install Year

Data Quality and Governance

Feature Counts

What do we have ?

Feature Class	Apr 1, 2016	Nov 1, 2015
Parcels . Single Family	23,100	22,928
Streets . Alleys	1,624	1,624
Street Lights . Customer Owned	782	1321
Work Orders . In Progress	45	23

Field Density

How complete is the data?

Feature Class	Apr 1, 2016	Nov 1, 2015
Street Light . Owner	23%	21%
Street Light . Bulb Type	89%	75%
Street Light . Year Installed	5%	0%
Street Light . Manufacturer	8%	7%

Versions By Depth and Age

Feature Class	Apr 1, 2016	Nov 1, 2015
Depth 1 . 30 to 90 Days	16	3
Depth 1 . 180 to 360 Days	4	2
Depth 2 . 30 to 90 Days	45	19
Depth 2 . 180 to 360 Days	87	52
Depth 3 . 30 to 90 Days	132	245

Unposted Changes in Versions

Feature Class	Apr 1, 2016	Nov 1, 2015
Parcels . Add	4	24
Parcels . Update	65	3
Parcels . Delete	15	9
Manholes . Add	1	0
Manholes . Update	23	2
Manholes . Delete	300	15

Metrics Extension

ArcGIS
for Server



Summary

- GIS has become a key technology that makes an impact in utility industry operations
- Integration of GIS technology into the back-office systems is helping operators gain new knowledge about their systems and operations
- Enabling utility operations to move from a static environment to a real-time environment
- Key role in network analysis (to know where things are) and asset management
- Helps to do better spatial based analytics, and improve maintenance and hence reliability
- Information is made available to remote field staff, repair crew, operations centers, and dispatchers is helping in better decision making

What can Avineon bring in!

- Bringing global experience multiple domains
- Successful execution of Software Development projects & Enterprise GIS projects.
- Excellent customer references in India, ME, USA, Europe
- Expertise in leading geospatial technologies on Web/Mobile
- Quality Management and Project management tools/processes
- Experienced resources (specific to consultancy/data/web/mobile application implementation).

 25 Years of Excellence

Thank you