Transforming the GIS Landscape to Empower Utilities

Abstract

Geographic Information Systems (GIS) offer the ability to capture and process large amounts of spatial data, integral to the success of utility companies. Rising competition due to privatization and globalization, as well as the increasing pace of digitization and technology adoption, have driven utility providers to focus on low-cost uninterrupted customer service. A holistic revamp of the GIS landscape will ensure the realization of its potential, enabling companies to improve operational performance, enhance customer experience, and meet regulatory requirements.

Key Components of a Traditional GIS Landscape

Traditional GIS implementations comprise the following:

- A GIS database that stores reference land base maps and network asset maps, which were initially in the form of paper drawings
- Logical network asset models created in the GIS, using the company's specific business rules
- Core GIS desktop applications comprising custom utility objects to handle network data
- Interfaces with enterprise databases and systems to communicate with outage management system (OMS), supervisory control and data acquisition (SCADA), and enterprise resource planning (ERP)

Closing the Gap through GIS Transformation

In today's complex organizational setups, GIS teams responsible for administering data for specific requirements are geographically dispersed. Such a scenario creates gaps due to data redundancy and unavailability of the right information at the right time, in an efficient manner. To effectively address these issues, GIS transformation initiatives need to tackle several key challenges:

3Cs of GIS

Visual tracking and management of enterprise assets and resources are essential to reduce risks and achieve safety and regulatory compliance goals. Traditional GIS landscapes rely on legacy data and equipment that are unable to meet today's stringent regulations. For comprehensive regulatory compliance and better operational performance, utility companies need to establish the 3Cs of GIS data–completeness, consistency, and correctness.

Integrating mobile and web-based applications

Disjointed, repetitive sub-processes that use multiple discrete applications or methods lead to several process inefficiencies. Activities such as sharing information across multiple agencies, updating maps, and incorporating changes in the enterprise GIS database can result in significant manual effort. An

A UK-based water utility transformed their limited mobile GIS application to a platform-agnostic GIS workforce management system. This allowed field personnel to access data through a desktop or a mobile device and displayed over 226,000 field plans.

integrated web-based GIS application, rendered on mobile devices, significantly boosts workforce performance by enabling field personnel to act on the right information at the right time.

Addressing integration complexities

Typical GIS implementations comprise different enterprise systems, brought into the environment at different times and connected together to facilitate the flow of information, which makes the overall landscape considerably heterogeneous and complex over time. Driving process efficiencies needs a complete overhaul of GIS systems to unify them under the enterprise architecture umbrella, and ensure sustainable operations in the future.

Seven Critical Elements of a Successful GIS Transformation

GIS transformation provides a centralized database, and a data model that is scalable to match changing business priorities. It incorporates missing assets, ensures compliance with regulations, and enables seamless creation, analysis, and sharing of geospatial data.

The seven essential elements of a GIS transformation include:

1. Data

All GIS data needs to be complete, correct, and consistent. The system should facilitate real-time data updates to ensure business-critical decisions are made accurately, and on time.

2. Data model

Aligning the data model with current business processes and regulatory requirements is needed to improve system outcomes with regard to process efficiency, inventory management, and network behavior.

3. Database

The database should be centralized and based on the latest relational database management system (RDBMS) technologies that allow easy entry, retrieval, consumption, and sharing of data.

One of the world's most densely populated city-states undertook a GIS transformation. All inventory databases were migrated to an advanced geo-enabled database with better positional accuracy. Today, an integrated web platform provides a superior view of inventory data and allows for advanced analytics, while enabling real-time data updates. The system, which is seamlessly integrated with other enterprise applications such as OMS and SAP, enables the complete life cycle management of connected assets.

4. Address base

An updated address base is an integral part of the GIS landscape that makes various functions seamlessly available through desktop, web, and mobile applications. This is especially important for locating customers' addresses, in case of processes such as disconnection, maintenance, customer complaints, and to trigger the right follow-up action and subsequent closure. The address base also helps utilities analyze customer churn as well as the effectiveness of product development and marketing strategies.

5. Systems

Utility companies need to implement advanced geospatial systems and adopt robust platforms for workflow management as well as information distribution and sharing. They must also deploy GIS based business applications that are platform agnostic and can work seamlessly on iOS, Android, and Windows devices.

6. System integration

All individual point-to-point integrations with one-to-many related applications should form a part of the enterprise integration architecture through middleware platforms. For instance, an Enterprise Service Bus (ESB) enabling SOAP interface implementation among participating discrete enterprise systems such as SCADA, OMS, EAM, CRM, and workforce management systems.

7. Smart enablement or sensor integration

IT-OT integration is gaining acceptance through widespread deployment of smart sensors to create a more intelligent network for self measurement, preventive maintenance alerts, and timely fault detection. Utilities can gain greater transparency through the visualization and spatial analysis of live data with the help of GIS maps.

Conclusion

Updating the GIS landscape entails running new software on multiple platforms, seamless integration and interaction across asymmetric systems, and incorporation of regulation data and data models. A comprehensive GIS architecture may also require the support of system integrators who bring in the required expertise across multiple disciplines such as ERP, OMS, SCADA, and workforce management systems on a single

platform. Having all the critical pieces of the GIS transformation puzzle in place will help utilities improve service delivery and responsiveness, optimize resource utilization, and increase cost efficiencies.

Enterprise GIS needs to be a part of the core enterprise architecture that comprises systems such as billing, supply chain management, finances, customer service, and workforce management. Electric, gas, and water utility providers across the globe are realizing that enterprise-wide GIS transformation is the key to improving critical business processes and enhancing customer experience.

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