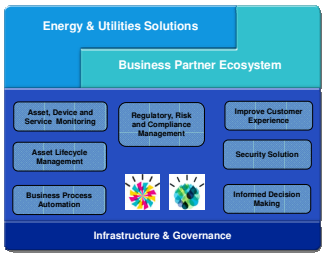
IBM Solution Architecture For Energy and Utilities Framework
Accelerating Solutions for Smarter Energy



IBM Solution Architecture For Energy and Utilities Framework

Business Agility

Integrate, manage and optimize utility systems, inclusive of assets, devices, networks, servers, applications and data, driving business agility and intelligent network transformation. Leverage a flexible software platform to reuse assets, lower total cost of ownership (TCO), improve time-to-market and deliver stronger bottom line results.

ArcGIS for Utilities

ESRI's scalable technology platform, ArcGIS, comprises an SOA-compliant set of GIS software components integrating core utility workflows.

From asset management to operations support , ArcGIS delivers predictive analytics that enables utilities to anticipate and respond to business challenges more quickly and cost-effectively

IBM Solution Architecture For Energy and Utilities Framework is an innovative, powerful software platform, uniquely positioned to provide network visibility and control, process automation and business collaboration for solutions across the energy value chain.

ESRI and IBM

Enhancing Asset Life Cycle Management with GIS

The U.S. electric system, "the supreme engineering achievement of the 20th century," is aging, inefficient, congested, and incapable of meeting future energy needs, according to a recent U.S. Department of Energy (DOE) report. Believed to be the solution to modernize utilities around the world, a smart grid adds communication and computer technology to electric networks, ensuring cleaner, more reliable, and more affordable energy. GIS is the information-management platform on which utilities rely for crucial smart grid components such as data management, analysis, vulnerability planning, risk analysis, mobile workforce support, visualization, and operations awareness.

ESRI's ArcGIS® software is widely recognized for its strong role in building and managing the digital asset management information systems for electric power and gas transmission and distribution networks as well as telecommunications systems worldwide. For most of the world's utilities, ArcGIS provides the most comprehensive inventory of the electrical distribution network components and their spatial locations. The goal of a smart utility is to have the capability to understand, manage, and predict the state of the system from the worker's dashboard to the boardroom, from the sensor to both the utility and the customers. ArcGIS extends the IBM Solution Architecture For Energy and Utilities Framework providing the tools, applications, workflows, analytics, and information-integration capabilities needed to manage the smarter utility.

IBM's SAFE Framework enables utilities to extract value from information and leverage all data sources, especially those data sources such as facility infrastructure, assets, customers, and workers that are location-based ArcGIS authors, or creates, the spatial information about utility assets (poles, pipes, wires, transformers, duct banks, customers) and serves that information to the enterprise. Within the infrastructure of SAFE, ArcGIS drives core utility business applications dynamically, combining data served from the GIS, SCADA, and customer systems with other information from outside the utility such as traffic, weather systems, or satellite imagery. Utilities use this combined information for business applications, from visualizing a common operating picture to inspection and maintenance to network analysis and planning.

"..ESRI has unique GIS capabilities which extend SAFE, not only geo-enabling operations such as asset management and mobile-workforce optimization, but also fusing data from disparate sources…" *-- Bill Meehan, Director of Utility Solutions, ESRI.*

Benefits of ESRI ArcGIS for utilities:

ArcGIS brings strong geo-analytics, information management, and workforce enablement technology to the IBM SAFE Framework.

- ArcGIS allows utilities to **visualize the electric, gas, and communications systems and the relationship that exists between them.** A smarter utility uses GIS to monitor and express the health of the energy system such as driving alerts and visualizing sensors that fail to meet service levels.

- ArcGIS **manages temporal information on the condition of utility assets** including data from sensors, instruments, field workers, and other dynamic information sources.

- ArcGIS also **helps utilities understand the relationship of networks with surroundings.** Because GIS can help identify relationships between systems and the environment, it is an essential tool for vulnerability prediction, risk assessment, restoration, storm tracking, and security monitoring.

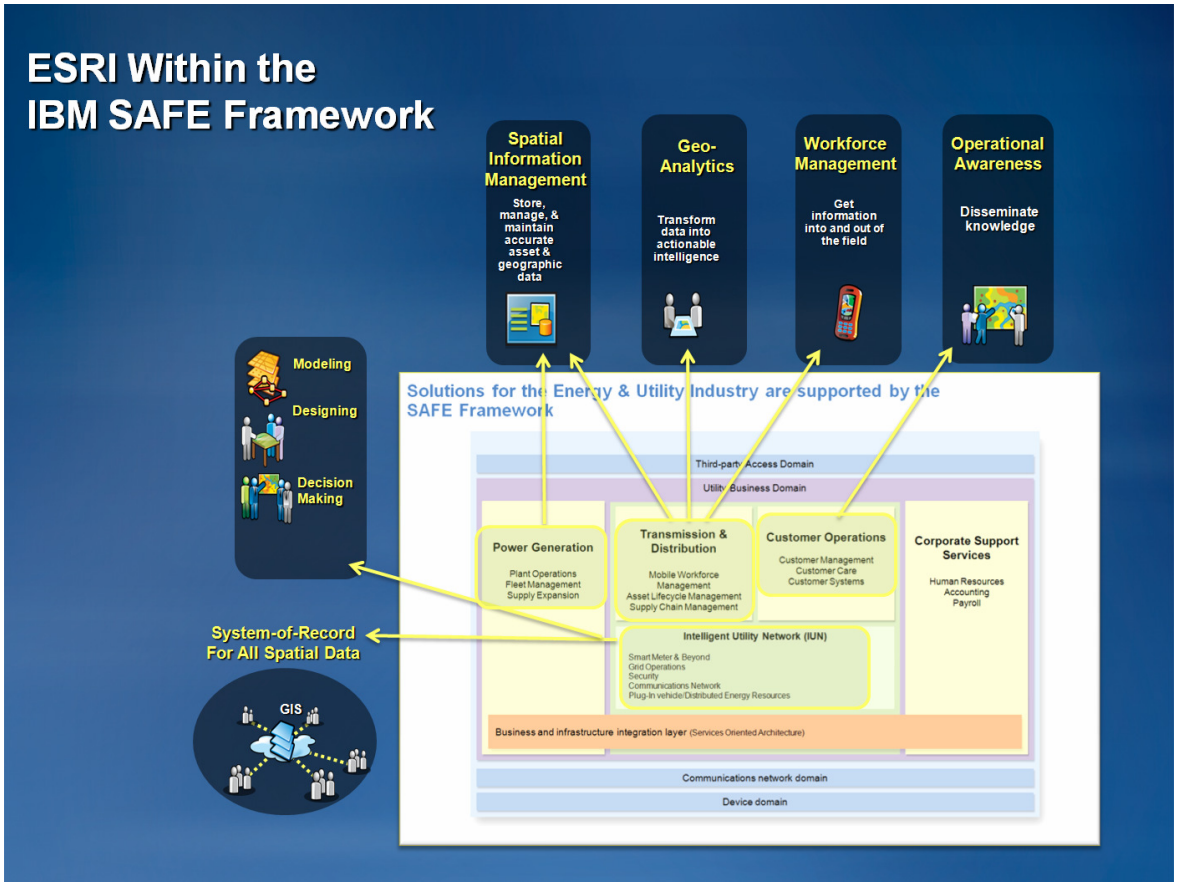
- ArcGIS **provides a spatial context to the analytics and metrics of a smart grid.** With GIS, utilities can track performance over time and provide a convenient means of visualizing trends. A smart grid , with GIS is capable of providing advanced grid performance analytics, tracking trends in equipment performance and customer behavior, and recording key performance indicators.

- ArcGIS **communicates the condition of the network to customers,** management, and the utility workforce, providing a dynamic, real-time common operational picture anytime, via multiple delivery models.

ESRI and IBM: A Closer Look

Within the IBM SAFE Framework, specifically the services-oriented architecture built upon IBM WebSphere software, ESRI technology addresses four of the core functional needs of modern utilities.

- **Spatial Information Management .** The digital 'system-of-record' of any utility information system is the geodatabase, comprised of all location-dependent information, whether the assets are fixed, move, or change condition. IBM Maximo ® EAM software relies on ArcGIS Server for dynamic data management and visualization. ESRI supports the management of geodatabases in IBM DB2® and Informix®



• **Geo-Analytics and Analysis.** Intelligent utility network operations rely on the connectedness of all assets in the network. They require an understanding of the relationships of assets to their surroundings. ArcGIS builds and maintains digital networks on IBM information management infrastructure and delivers predictive analytics , designing, and modeling of these networks via server-based applications and web services supporting IBM service management.

• **Workforce Management.** Utilities rely heavily on accurate information from the field**.** Leveraging the intelligent, connected, digital asset management system-of -ecord built with ArcGIS, and the WebSphere-based, SAFE reference architecture, ArcGIS provides a rich set of tools and templates for field work management, logistics support, and real-time as well as disconnected information management.

• **Operational Awareness .** ArcGIS visualizes the entire network and workforce, enabling dynamic, system-wide views and support for real-time management of utility operations. Utilizing the WebSphere Enterprise Services Bus in SAFE, rich, thin-client visualization is delivered to thin clients via web services using ArcGIS's server-based API's, that support industry standard technologies including REST, SOAP, Javascript, Silverlight® and Adobe Flex ®.

Rely on ESRI and IBM

ESRI and IBM bring un-matched information management, predictive analytics, and operational responsiveness to Smarter Energy organizations:

ESRI

- **The worlds' foremost GIS software** for designing, building, modeling, and maintaining the digital utility infrastructure, the intelligent utility network.
- **Deep network and workforce analytics** that can predict asset and grid vulnerability, fuse environmental data and assess risk, and know the location and status of a utility workforce at all times.
- **More than 20 years of IBM partnership**, which has ensured tight technology integration, close customer-care support, and well-delivered, collaborative services engagements with utility organizations around the world.

IBM

- IBM has the industry-leading experience, comprehensive technology, and cost-effective methodologies to drive more business value from the utility value chain..
- IBM's Solution Architecture For Energy and Utilities (SAFE) allows utilities to accelerate the development and delivery of new capabilities and offerings.
- IBM supports the adoption of smart grids around the world by driving standards, working with policy makers, helping define the future of the industry, and innovating on first of a kind technologies.
- IBM Centers of Excellence, Proofs of Concept and Research First of a Kind projects demonstrate innovation and competence in solution implementation.

Rely on ESRI and IBM

To learn more about ESRI and IBM, please contact your business representative or visit

http://www.esri.com/industries/electric/index.html

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