IBM service management solutions
White paper

Tivoli software

# IBM Service Management for the Intelligent Utility Network.

September 2008

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### Utility industry challenges

Today's utility companies are being driven to upgrade their aging transmission and distribution networks in the face of escalating energy generation costs, serious environmental challenges, and rising demand for cleaner distributed generation from both developing and digital economies worldwide.

The current utilities environment requires companies to drive down costs while increasing the ability to monitor and control utility assets. Yet due to aging infrastructure, many utilities operate without the benefit of real-time usage and distribution loads—while also contending with limited resources for repair and improvement. Even consumers, with climate change on their minds, are demanding that utilities find more innovative ways to help them reduce energy consumption and costs.

One of the key challenges facing the industry is how to take advantage of new technologies to better manage the delivery of service to customers today and into the future. While introducing this new technology, utilities must keep data and networks secure to be in compliance with critical infrastructure protection regulations. IBM Service Management for the Intelligent Utility Network provides a blueprint as well as key capabilities for getting started.

### The IBM Intelligent Utility Network

The IBM Intelligent Utility Network (IUN) is IBM's instantiation of the "smart grid," providing solutions that can enable new business models. The IUN provides a roadmap for processes, technology, and business partners, empowering utilities with an IP-enabled, continuous sensing network which overlays and connects a utility's equipment, devices, systems, customers, partners and employees. The IUN enables on-demand access to data and information which can be used to help better manage, automate and optimize operations and processes throughout the utility.

## Highlights

IBM Tivoli software offerings, integrated with IBM's overall Solution Architecture for Energy (SAFE), can help lay the foundation for the Intelligent Utility Network.

A utility relies on numerous systems which reside both within and outside its physical boundaries. Common internal systems include:

- Energy Trading Systems (ETS).
- Customer Information Systems (CIS).
- Supervisory Control and Data Acquisition Systems (SCADA).
- Outage Management Systems (OMS).
- Enterprise Asset Management (EAM).
- Mobile Workforce Management Systems (MWFM).
- Geospatial Information Systems (GIS).
- Enterprise Resource Planning Systems (ERP).

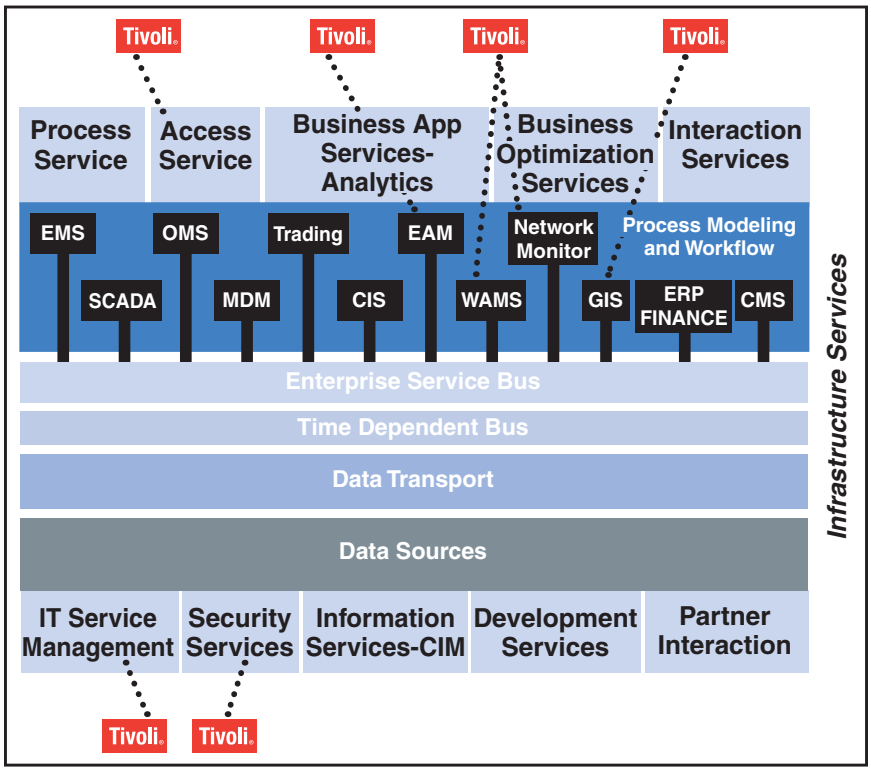
These systems are purchased from multiple vendors and often use a variety of protocols to communicate. In addition, utilities also must interface with external systems, and often integrate all of these systems using a point-to-point integration model and establish connectivity between systems on an as-needed basis. The point-to-point approach can result in numerous complex connections that need to be maintained.

### IBM Service Management for the Intelligent Utility Network

Critical to the operation of the utility is the ability to manage all facets of the services being delivered. IBM Tivoli® software offerings, integrated with IBM's overall Solution Architecture for Energy (SAFE), can help lay the foundation for the IUN with robust solutions in the areas of advanced meter management (AMM), network automation and analytics, and enterprise asset management (EAM), including meter asset management (see Figure 1).

IBM's service management platform provides a way for utility companies to manage the services they deliver with their enterprise and IT assets. It provides a foundation for managing the assets, their configuration, and the interrelationships that are key to delivering services. It also provides a means of defining workflow for the instantiation and management of the services being delivered. Underlying this platform is a range of tools that IBM and other vendors can provide to assist in the management of the services.

**Figure 1: IBM Tivoli software's contribution to Solution Architecture for Energy (SAFE)**




Gathering and analyzing data from advanced meters, network components, distribution devices, and legacy SCADA systems provides a solid foundation for automating service management. When combined with the information available in their asset management systems, utility companies can streamline operations and make more efficient use of valuable resources.

***Advanced meter management***

Advanced meter management (AMM) centers on a more global view of the informational infrastructure, examining how Automatic Meter Reading (AMR) and Advanced Metering Infrastructure (AMI) integrate with other information systems to provide value-added benefits. It is important to note that for many utilities, AMM is considered to be a "green" initiative since it has the ability to influence customer usage patterns and, therefore, lower peak demand.

## Highlights

Implementing advanced meter management is the first step toward a more information-powered business model. Event management products such as IBM Tivoli Netcool/OMNIbus can be used to monitor "smart meters" as well as other network and IT devices in the utility infrastructure.

It is through AMM that the potential for true business transformation exists, and adopting advanced meter management is the first stage in a utility's transformation to a more information-powered business model. New "smart meters" are network addressable and, along with AMM, are core components of the IUN. Smart meters and AMM provide the capability to automatically collect usage data in near real time and transport meter reads at regular intervals or on demand.

AMR/AMIs that aggregate their data in collection servers or concentrators, and expose the data through an interface can be augmented with an event management product such as **IBM Tivoli Netcool®/OMNIbus™** to monitor the health and operational status of the meter. Netcool/OMNIbus, built on an industry-leading event management architecture, provides ultrascalability, more efficient correlation and broad integration. Many organizations already deploy Netcool/OMNIbus for event management within network operations center environments and for consolidated operations management as a top-level "manager of managers."

The IUN includes many devices other than meters, so Netcool/OMNIbus can also be used to monitor the health of the rest of the network and IT equipment in the utility infrastructure. Integrating meter data with operations events gives network operations center operators a much broader view of a utility's distribution system.

In addition, **IBM Tivoli Netcool/Impact** complements Netcool/OMNIbus by enriching events with contextual data from almost any source and by performing automated actions. Its dynamic real-time data access capabilities deliver a patented, highly scalable approach that can facilitate more rapid problem resolution.

These solutions can enable an end-to-end integration of data, from the meter collection server in a substation to the back-end helpdesk and billing applications. This approach can help improve the speed and accuracy of data while leveraging existing equipment and applications.

## Highlights

Tivoli software can help utilities monitor and analyze SCADA data, manage SCADA data stores, and better secure the SCADA network.

***Network automation and analytics***

Most utility companies use Supervisory Control and Data Acquisition (SCADA) systems to collect data from sensors on the energy grid and send events to applications with SCADA interfaces. These systems collect data from substations, power plants, and other control centers. They then process the data, and allow for control actions to be sent back out. Energy Management Systems and Distribution Management Systems typically provide additional features on top of SCADA, targeting either transmission or distribution grids.

SCADA systems are often distributed on several servers (anywhere from 2 to 100) connected via a redundant local area network. The SCADA system in turn communicates with remote terminal units (RTUs), other devices, or other computer networks. RTUs reside in a substation or power plant and are hardwired to other devices to bring back meaningful information such as current megawatts, amps, volts, pressure, open/closed, tripped, etc. Distribution business units within a utility company also utilize SCADA systems to track low voltage applications, such as meters and pole drops, compared to the transmission business units' larger assets, including towers, circuits and switchgear.

To facilitate network automation, Tivoli solutions can help utilities:

- Monitor and analyze data from SCADA systems in real time using Tivoli Netcool/Impact.
- Monitor the computer network systems used to deploy SCADA systems through a combination of **IBM Tivoli Network Manager**, Tivoli Netcool/OMNIbus and Tivoli Netcool/Impact.
- Manage SCADA data stores using the **IBM Tivoli Storage Manager** family of offerings.
- Better secure the SCADA network and applications using **IBM Tivoli Identity Manager** and **IBM Tivoli Access Manager**.

**Highlights**

In addition, Tivoli Netcool/OMNIbus offers event management that monitors all parts of the utility network with real-time, centralized monitoring of complex networks and IT domains. Netcool/OMNIbus can bridge the gap across multiple networks and IT silos to help organizations improve the end-to-end availability of their applications and services with scalability that exceeds millions of events per day.

Tivoli Netcool/Impact allows users to visualize data from many sources, perform a wide range of automated actions and automate manual tasks for improved workflow efficiency. **IBM Tivoli Business Service Manager** provides service level agreement (SLA) management capabilities giving a business context for IT, enabling greater accountability to business user needs, and improving a utility's ability to prioritize and optimize.

The IUN includes a large number of devices and meters—millions in a large utility—and these are critical to a utility's operations. A combination of Tivoli solutions can be deployed to manage events from SCADA devices as well as the IT equipment they rely on. IBM Tivoli Network Manager can filter large numbers of real-time events, while Tivoli Netcool/Impact can enrich those events with customer data or information from other sources. Tivoli Netcool/OMNIbus provides a top-level console with advanced analytics for assistance or automation in the resolution of problems.

As new requirements to integrate physical assets and IT assets arise, it becomes critical for utilities to standardize on one asset management platform.

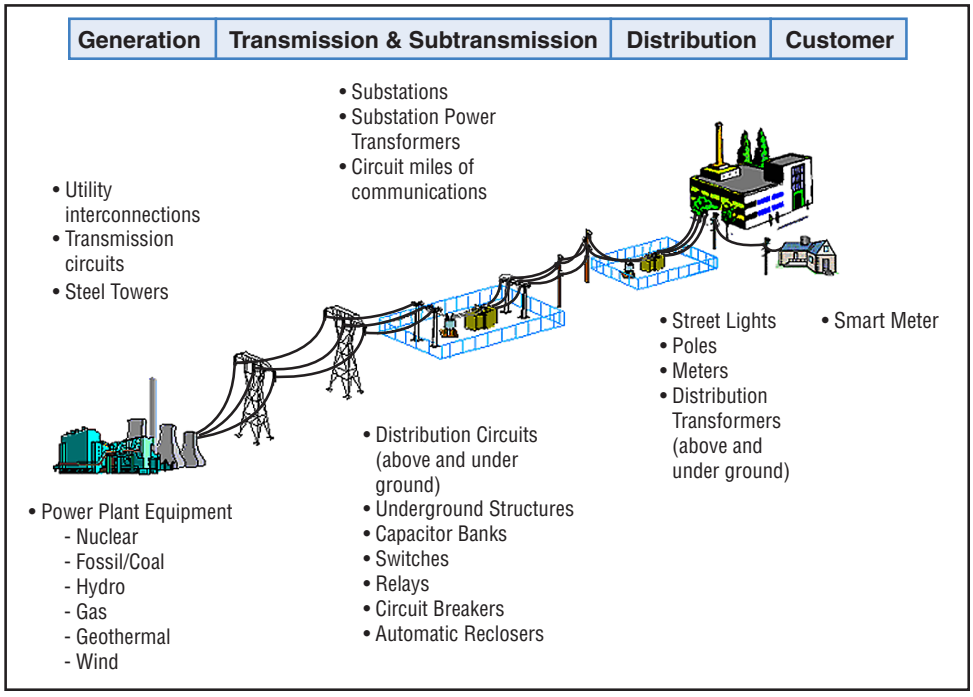
***Enterprise asset management for utilities***

Historically, many utility companies have managed their assets in silos. However, with the emergence of the smart grid and smart meters, the challenges of an aging workforce, an ever-demanding regulatory environment, and the availability of common IT architecture standards, it is becoming critical for utilities to standardize on one asset management platform as new requirements to integrate physical assets and IT assets arise.

**IBM Maximo® Asset Management** and **IBM Tivoli Asset Management for IT** provide a family of products that can be used to manage the critical assets in the enterprise (see Figure 2). These solutions offer deep industry-specific capabilities – all on a single platform.

Today, utility companies are using Maximo Asset Management to manage work in gas and electric distribution operations, including construction, inspections, leak management, vehicles and facilities. For transmission and in substations, Maximo software is used to monitor, schedule, track and document preventative and corrective maintenance and inspections.

**Figure 2: Assets in a utility network infrastructure**



## Highlights

Maximo Asset Management and Tivoli Asset Management for IT can be used to manage critical utility assets, including meters.

Maximo Asset Management also helps track asset financials such as purchasing, depreciation, asset valuation and replacement costs. This solution helps integrate this data with enterprise resource planning (ERP) systems and stores the history of asset testing and maintenance management. It integrates with ESRI GIS or other mapping tools to create geographic and spatial views of all distribution and smart grid assets.

Meter asset management is another area of increasing interest, as meters have an asset lifecycle similar to most other assets in a utility. Meter asset management is simply the managing of the meter as an asset—tracking the meter from receipt to storeroom, to truck, to final location—as compared to managing the data the meter produces.

Tivoli Asset Management for IT provides the capability to manage meters as part of the IT network. This solution can be used to provision the meter, track configurations, and provide service desk functionality. **IBM Tivoli Change and Configuration Management Database (CCMDB)** serves as the master asset repository and enables best practices for the change management process. The CCMDB includes integrated configuration management that can help validate compliance with internal and external policies and a process integration platform that easily integrates additional IT service management processes.

Additional Tivoli offerings that related to asset management are **IBM Tivoli Provisioning Manager** and **IBM Tivoli Service Request Manager**. Tivoli Provisioning Manager has the ability to update meter firmware and to easily move and track the location and status of the assets over time in conjunction with CCMDB. Tivoli Service Request Manager helps track problems identified in the network or with meters using IT Infrastructure Library® (ITIL®) best practices.

**Highlights**

Reducing the number of truck rolls is another key focus area for utility companies. Using a combination of Maximo Asset Management, Tivoli Asset Management for IT and Tivoli Service Request Manager, companies can:

- Better manage the lifecycles of physical assets such as meters, meter cell relays, and BPL devices to improve preventive maintenance.
- Reconcile deployed asset information with information collected by meter data management systems.
- Correlate the knowledge of physical assets with problems experienced with the IT infrastructure to better analyze a problem for root cause.
- Establish more efficient business process workflows and strengthen governance across a company.

Maximo for Utilities provides key asset management capabilities for the utilities industry.

Maximo Asset Management has several industry-specific extensions, including one focused on the transmission and distribution business units. **IBM Maximo for Utilities** adds key capabilities to help manage each asset's lifecycle, including acquisition, compatible unit estimating, work management, crew management, spatial enablement, inventory control, purchasing, preventive maintenance, and safety and regulatory compliance.

### Getting started

IBM has defined a roadmap for companies in the utilities industry based on IBM's Solution Architecture for Energy (SAFE). This roadmap allows for cross-silo integration of business processes, and centralization and collaboration of data for analytics supporting better and quicker decision making. IBM Tivoli software has a number of offerings that will improve the management of these services for better reliability, event handling, and protection of critical data and assets.

## Highlights

IBM offers the integration skills, leading-edge technology, and proven products to support every stage of an IUN initiative.

The IUN is a significant initiative that will be driving utilities for the next ten years. But the roadmap does not need to be tackled all at once. The roadmap for each company will depend on your specific priorities. However, IBM's experience suggests that the greatest initial value can be derived from implementing IBM Maximo Asset Management for meter asset management, and Tivoli Asset Management for IT and Tivoli Netcool technologies for managing advanced meters and SCADA equipment.

IBM has successfully delivered IUN infrastructures around the world that provide superior reliability and end-to-end network data in near real time. We bring to the table the integration skills, leading-edge technology, and proven products to support every stage of an IUN initiative.

### For more information

To learn more about IBM's service management solutions for the Intelligent Utility Network, contact your IBM representative or IBM Business Partner, or visit **ibm.com**/tivoli

### About Tivoli software from IBM

Tivoli software offers a service management platform for organizations to deliver quality service by providing visibility, control and automation—visibility to see and understand the workings of their business; control to effectively manage their business, minimize risk, and protect their brand; and automation to optimize their business, reduce the cost of operations and deliver new services more rapidly. Unlike IT-centric service management, Tivoli software delivers a common foundation for managing, integrating and aligning both business and technology requirements. Tivoli software is designed to quickly address an organization's most pressing service management needs and help proactively respond to changing business demands. The Tivoli portfolio is backed by world-class IBM Services, IBM Support and an active ecosystem of IBM Business Partners. Tivoli clients and Business Partners can also leverage each other's best practices by participating in independently run IBM Tivoli User Groups around the world—visit www.tivoli-ug.org



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