Utilities are deploying Advanced Metering Infrastructures (AMI) and intelligent grid devices by the millions across their Transmission and Distribution (T&D) service areas. Pike Research estimates 250 million new smart meters worldwide by 2015. This estimate might be low, considering announcements like President Barack Obama’s goal of 40 million smart meters in American homes and businesses, the United Kingdom’s initiative to replace all 47 million electric and water meters with smart meters by 2020, the European Union’s energy directive calling for 80 percent smart meter penetration by 2020, and China’s plan to replace 300 million older meters.

These estimates also only focus on one device—the meter. They do not take into account the millions of new smart sensors, transformers, substation devices, relays, circuits, and in-home devices. According to the U.S. Department of Energy’s Office of Electric Delivery and Energy Reliability, “Presently, only 30 percent of all power generated uses power electronics somewhere between the point of generation and end use. By 2030, 80 percent of all electric power will flow through power electronics.” Utilities must be able to plan for—and ultimately manage—this exponential increase in network connections.

These increasingly complex infrastructures require management of multi-tier services and new technologies that span IT systems and applications and the utility’s business. The utility must first understand the end-to-end network across the value chain—from generation to the substation to the home. This is no trivial matter. A true understanding of the connections, relationships, and dependencies between the smart meters, backhaul network, AMI network, meter data management system, business applications, and the back-office IT system is vital to keeping the utility’s business highly available and running at peak performance.

To meet the challenge, utilities need a way to collect, correlate, and analyze events from multiple sources, leveraging existing tools while gaining end-to-end management of the entire network.

**SCALABLE, FLEXIBLE, EASILY INTEGRATED SOLUTION**

The EMC® Ionix™ IT Operations and Intelligence Management Suite provides a scalable solution that automates service and infrastructure monitoring, analysis, and reporting across all domains and across physical and virtual environments. It enables you to restore impacted services and business processes faster than ever before, while increasing operational efficiency. Utilities can easily understand the business impact of IT problems, unify and consolidate monitoring and management, extend root-cause analysis to all environments, and lower IT monitoring costs substantially.
IT Operations and Intelligence Management Suite offers a flexible solution that integrates easily with new domains and platforms. Monitoring new domain devices ranges from device certification to obtaining topology and connectivity data with the built-in SNMP Accessor Module to utilization of one of the many application programming interfaces (APIs) provided (Java, Perl, C, scripting, etc.) for obtaining topology and events. The Dynamic Modeling capability lets you define new devices, their attributes and components, the relationships they have with other devices, and the authentic problems these new devices may encompass.

UNMATCHED INTELLIGENCE

EMC Ionix Service Assurance Manager is the cornerstone of the EMC Ionix for IT Operations Intelligence (ITOI). It integrates and correlates topology, events, and analysis from multiple sources and works with the EMC ITOI Global Console or Business Dashboard to provide a realtime, end-to-end perspective on the utility’s network and IT environment, its health, and its impact on the overall business.

The capabilities of Service Assurance Manager reach far beyond traditional management and display consoles. Leveraging the EMC Ionix Common Information Model™ and patented EMC Ionix Codebook Correlation Technology™, Service Assurance Manager provides a host of built-in, out-of-the box integrations, including:

- Ticketing system integrations: Generate tickets (automatically and manually), get ticket information, and close tickets
- In-context, status-sensitive launch of Element Management Systems (EMS) or other applications via user interface-displayed topology and events
- Generate notifications/alarms/events from key Syslog file entries
- Generate notifications/alarms/events from incoming SNMP traps
- Send SNMP traps outbound to other management systems
- Send emails outbound with critical notification/alarm/event information
- Provide a file interface with critical notification/alarm/event information

1 SNMP traps enable an agent to notify the network management station of significant events by way of an unsolicited SNMP message.
These integrations have been applied specifically to AMI environments to perform these intelligent processing functions:

- Compiles an infrastructure topology of objects and relationships from multiple sources across IT domains; sources include:
  - AMI MDMS and AMI data collection engines via WebServices API
  - WiMax and Fibre networks via SNMP, Telnet, and EMS
  - Network device (L2, L3) auto-discovery via SNMP, SNMP traps, ICMP, and Telnet
  - SQL databases, applications, and their agents
  - Element management systems
- Builds a business topology with information obtained from provisioning systems, proprietary databases, and other sources
- Integrates infrastructure and business topologies to create a top-down view from customers and services to the infrastructure and applications that support them
- Correlates data, events, and service-affecting authentic problems with their associated topology objects
- Creates cause-and-effect relationships between events so analysis from multiple domains can be linked for end-to-end, root-cause, and impact analysis

END-TO-END AND TOP-DOWN VIEWS

The powerful Global Console and Business Dashboard provide console or Web-based displays of the results of Service Assurance Manager’s intelligent processing. These highly configurable and interactive displays provide:

- The ability to launch and configure tools—such as LSP ping tools and IP tagging—from the Service Assurance Manager console
- The ability to launch client tools from the Business Dashboard
- Secured storage of confidential information and passwords
- Graphic visualization of events, authentic problems, and their impacts across the infrastructure through the Ionix notification list, status table, map, summary, notification properties, and containment views
- Filtering, sorting, and prioritizing of problem notifications based on criteria you define
- Severity icons and personalized icons that bring graphical visualization to the next level
- An audit trail of all activities related to each event to ensure that problems get the right attention

EMC Ionix has been applied specifically to utility networks.
• Drill-down from the high-level global view maintained by Service Assurance Manager to detailed information maintained by other Ionix solutions
• Summary view charts that provide high-level information on the health of the infrastructure, applications, and supported business services
• Status tables that present at-a-glance status of key groups, such as customers and services
• Graphical configuration of console administration including creation of users, profiles, and role-based access
• Graphical configuration of tools that run scripts, launch reports, open trouble tickets, or take automated corrective actions through escalation policies

**AMI AND NETWORK AVAILABILITY**

EMC Ionix IP Availability Manager automates realtime root-cause analysis of Layer 2 and Layer 3 network faults and determines the impact of these problems on the rest of the infrastructure. EMC Ionix AMI Availability Manager automates realtime root-cause analysis of AMI Smart Meter/Base Station/Relay Device network faults. These two domains working together enable realtime root-cause analysis, pinpointing the authentic problems to the data center network, AMI network, and edge backhaul networks. Instant, accurate, and totally automated diagnosis of service-affecting authentic problems lets you act based on fact to protect business-critical services.

**BUSINESS IMPACT MANAGER**

EMC Ionix Business Impact Manager automatically calculates the impact of infrastructure and application issues on business services and is the only solution that can model business processes and tie them to underlying infrastructure. With this precise impact analysis, utilities can take swift action to protect the services and processes most critical to the business such as billing and call center.

Business Impact Manager calculates the impact of network, system, and application problems by totaling the values of all affected customer, service, and infrastructure components. Administrators assign these values, or “weights,” according to business importance and can also customize the impact analysis to leverage external data, such as importing penalty rates from service contracts to automatically calculate business value. In addition, Business Impact Manager is the only solution that can determine business impact based on non-IT notifications. The administrator adds the notification—such as loss of a major supplier or delivery channel—and assigns a severity level. Business Impact Manager automatically includes that factor in its business impact calculation.
The EMC Ionix Common Information Model supports mapping of business processes. It can represent an extended set of business entities—customers, lines of business, business units, and more. Based on this model, Business Impact Manager can calculate how problems in one business process impact a related process.

Business Impact Manager represents the impact of different services on the infrastructure supporting utility business applications and an example graphical representation of the Business View.

**AMI, IT NETWORK AND SERVER PERFORMANCE**

EMC Ionix AMI Performance Manager and IP Performance Manager proactively warn utilities of potential problems across the network. It analyzes the characteristics of network performance issues in real time. Instant, accurate, and totally automated notification of performance problems tells you exactly what to fix to keep your infrastructure operating at peak performance.

EMC Ionix Server Performance Manager can discover and monitor host disks and file systems as well as performance characteristics of host processors and memory. It warns utilities proactively of potential problems in business-critical servers, analyzing the root cause of server performance issues in real time. Instant, accurate, and totally automated diagnosis of service-affecting, authentic problems tells utilities exactly what to fix to keep servers operating at peak performance.

IT Performance Reporter (ITPR) graphically represents performance metrics across the environment in one consolidated view, enabling better business decisions.

**APPLICATION AVAILABILITY**

Maximizing the availability of business-critical applications, like billing, call center, MDMS, and outage management is a utility’s top priority—without it, productivity suffers, business operations are affected, and revenue is lost. EMC Ionix Application Connectivity Monitor helps ensure reliable access to business-critical applications by pinpointing the root cause of distributed application problems. This intelligence simplifies incident triage, which accelerates mean-time-to-resolution.

Application Connectivity Monitor now directly leverages the correlation power of EMC Ionix IP Availability Manager to identify if distributed application problems stem from a failed host, application process, network component, or other infrastructure failure. Application Connectivity Monitor harnesses the analysis power of EMC Ionix Service Assurance Manager to distill the myriad of event data and pinpoint the root cause of distributed application problems.
TROUBLE TICKET INTEGRATION

With a deep capability in automated root-cause analysis, the ability to open up trouble tickets based on the Ionix IT Operations model-based, control Codebook Correlation Technology provides a tremendous boost for incident and problem management processes. If the service desk team can learn about the problem in advance of a customer call, they can eliminate delays in service restoration and also be much more effective at pulling in the appropriate subject matter expert. Eighty percent of problem resolution time is spent finding the problem, so getting the right team on the problem immediately is very important.

Did you know?
- 80 percent of problem resolution time is spent finding the problem
- Solution: send the right team at the right time with EMC Ionix

Seamless trouble-ticket integration from within EMC Ionix to minimize delays in service restoration.

EMC IONIX HELPS UTILITY MEET ITS GOAL

A large utility in the northeast United States with approximately 700,000 meters in its service area embarked on a massive AMI project. The smart meter communications infrastructure was at the core, and the design and operations of cost-effective and reliable network architecture was deemed crucial for overall success of the implementation.

To meet the goal of a high-availability and high-performance communications network, the customer chose the EMC Ionix IT Operations and Intelligence Management Suite, which addressed a number of business challenges, including the following:

- Unplanned outage management
- Planned outage management
- Network model management
- AMI communications network incident
- AMI device registration
- AMI device model management
- Realtime AMI meter interactions
- AMI meter data collection
- Device model reporting
- AMI network communications performance management (via a native element management system)

The system interfaces with the customer’s MDMS, outage, and IT trouble ticketing systems.
EMC Ionix IT Operations and Intelligence Management Suite components included:

- Service Assurance Manager
- Business Impact Manager
- IP Availability Manager
- IP and Server Performance Manager
- Application Connectivity Monitor
- Open Integration/Adapter Platform Server

CONTACT US

To learn more about EMC solutions for the utility industry, contact your local EMC representative or visit our website at www.EMC.com/smartgrid.