Smart Meter Analytics Solution for Power & Utilities

Optimizing power delivery and service through Big Data analytics on more than one million Smart Meters

The Challenge

- Massive amounts of data were difficult to capture, consume and analyze using conventional methods
- Disparate data sources made it problematic to provide a unified view/single view of power usage patterns by various customer attributes
- The Smart Meter data collection system was not designed for analytics, and would require significant reconfiguration and expense
- New hardware, software and training would negatively affect deployment timeline and ROI

The Solution

- Neudesic's Big Data solution aggregates massive amounts of Smart Meter data for sophisticated analytics
- Enables analysis of customer usage patterns without impacting the primary data collection system
- Seamlessly integrates Smart Meter data with existing Microsoft Enterprise Data Warehouse, and avoids "siloed" data repositories
- Utilizes Microsoft Business Intelligence to reduce talent gap for complex Oracle or SAP solutions
- Leverages existing investments in Microsoft Business Intelligence tools, saving millions in licensing expenses

The Benefit

- Unified view of Smart Meter data within the analytics platform provides powerful insights for various business units
- Massive amounts of data are analyzed effectively for long-term competitive advantage
- An overall smarter power grid reduces costs of energy production, distribution and maintenance
- Power theft is readily tracked and billed, reducing loss and ensuring profitability
- More successful energy efficiency programs are based on real customer intelligence
- Enterprise is poised for future infrastructure savings based on predictive analytics

Neudesic enabled us to effectively consume and analyze the nearly half billion records generated daily by Smart Meters across our utility customer base. Connecting this data with operational metrics gives us real business intelligence – driving continued improvements in how power is delivered, used and maintained.

The Challenge

The long-standing door-to-door meter reader has become an antiquated method for gathering customer usage data. Meter readers made their once or twice-monthly rounds, collecting power usage data, and these long intervals made it easy for malfunctions and fraudulent activities to go undetected longer. They also made it nearly impossible to formulate customer-centric decisions and improve overall operations. "We have an enormous amount of data at our fingertips, but connecting it efficiently is what provides the deeper intelligence that helps solve business problems. Tracking usage, maintenance, even output from individual solar panels – all impacts how we optimize customer options to reduce peak usage," said one utility executive.

When nearly a million Smart Meters send customer data in 15-minute intervals, generating nearly 500 million records every day, traditional data warehouses become bogged down and prove incapable of handling such data volume efficiently. For one Neudesic client, this information was housed in an Oracle-based operational data repository which was not built for analytics, further complicating the utilities' customer service and operational goals. Simultaneously, querying meters and analyzing data had critical impact on overall system performance. It was determined that meaningful analytics would require an alternative system – a specialized hardware appliance for collecting, processing and storing the data and specialized analytic tools.

The Solution

The utility company had already combined multiple data sources into a primary data warehouse, but the system was unable to transfer and load the high number of Smart Meter records quickly and effectively. The utilities' IT Team needed a system that could handle massive loading of the Smart Meter data into its data warehouse to meet its service level agreements; they began to evaluate solutions, soon discovering requirements for multi-million-dollar capital investments in new hardware, software and training. "To extend the implementation of the Oracle Business Intelligence Suite, we were facing a major commitment to new equipment and staff training which just wasn't feasible," added an IT executive. "Fortunately, Neudesic came in with a plan to use our existing Microsoft SQL Server infrastructure and utilize Neudesic's data and advanced analytics frameworks to achieve our goal. It's an innovative approach that has allowed us to capitalize on our own Microsoft skillset, reduce deployment time and complexity, and avoid the premium pricing of Oracle or SAP solutions."

Neudesic's Big Data solution was used to aggregate the Smart Meter data. The utilities' current hardware infrastructure was then able to transfer and load the data quickly into an existing Microsoft Enterprise Data Warehouse; this solution allows the company to analyze terabytes of data interactively and solve otherwise impossible business problems. "We already owned Microsoft Data and Analytics products. With Neudesic's guidance, it was fast and cost-effective to create the necessary reports and analytics."

The scope of the data significantly complicates the process. Simultaneously querying meters and analyzing data would have critical impact on overall system performance. Meaningful analytics require an alternative system – one that capitalizes on the wealth of Smart Meter data without any potential for system slowdown.
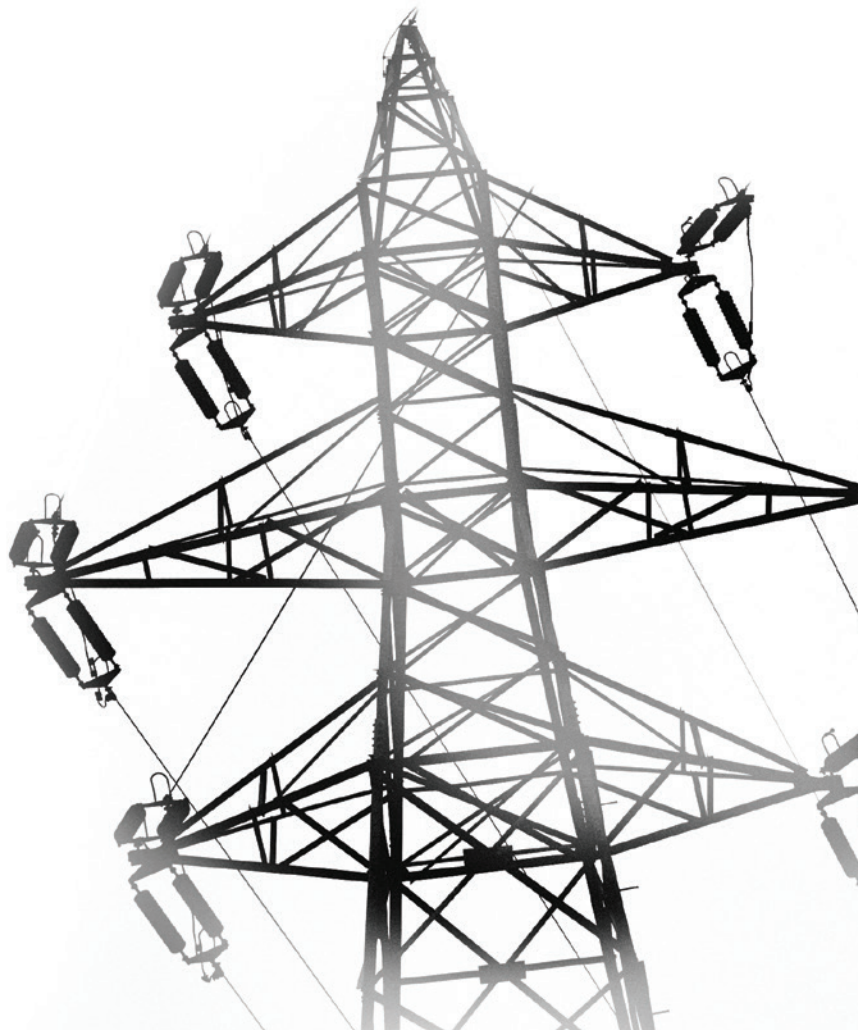
The Benefit

Visiongain pegged the value of the global Smart Meter market at $7 billion in 2012, with 400 percent growth anticipated by 2022. Yet up to 77 percent of utilities nationwide aren't capable of executing full analytics on Smart Meter data, lacking analytics expertise or a unified data set. "We have a distinct advantage based on a more complete understanding of our customers – who they are, how they consume power and what drives their decisions," said a company executive. "More sophisticated data structures allow us to analyze the efficiency of rate plans and how offers affect customer behavior. Based on Smart Meter analytics, we are uniquely able to predict customer behavior and positively alter the way they consume power. The data is essential to this process, and increases the probability of successful customer campaigns."

The utilities' in-depth data analysis has significant potential beyond current customers, and is used to create predictive models for new users. Smart Meter data can be blended with demographics and usage trends to determine future infrastructure requirements. With Neudesic's help, the utility is poised to achieve long-term cost savings and offer ideal service by optimizing generation, transmission and distribution plans for new developments across the region.

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Utilizing Smart Meter data adds performance value through analytics and blending with additional data stores, such as work management systems, maintenance calendars, even the anticipated output of a single solar panel. According to one IT executive, "Implementing a Microsoft-based system has been a long-term strategic move, enabling us to identify trends and issues quickly and be more responsive to our customers' needs. We are capitalizing on our data stores like never before and that's the real strength of the solution – our ability to solve problems and make decisions based on authentic customer intelligence."