FEATURE

Power Analytics: The Next Generation in Power Systems Resilience

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The consequence of failure in an electrical power distribution system is the major risk mission critical facilities face today. The distribution system is the life-blood that powers the IT, production and environmental infrastructure, the very heart of business operations.

Operations managers are acutely aware of the fact that it may only take a small, seemingly inconsequential failure in the electrical distribution system to cause a major incident. But a new class of power system technology, called "Power Analytics," allows business executives, IT managers, facility operators and power system experts to - for the first time - understand and determine the availability and impact of their mission-critical systems from a power system viewpoint.

Understanding Power Analytics

A good way to understand Power Analytics is to think about your automobile. Chances are, it has airbags that deploy in the event of a collision: your car may get demolished, but your bodily injuries will be far lessened than if you didn't have airbags. In the power systems world, technologies like UPSs, battery rooms and generators are like the airbags in your car, your facilities may still come crashing down, but the damages will be greatly alleviated.

In this example, Power Analytics is like a "collision avoidance" system, one that predicts and prevents electrical power problems from occurring to begin with, allowing you to avoid the bodily injuries and the collision itself. Power Analytics systems act as an on-board electrical power system expert, to intelligently filter the power system sensory data, help owner/operators understand the real-time health of their electrical power system, as well as diagnose whether that health is stable, deteriorating, or becoming overloaded. Thus, business-impacting decisions rooted in the health and reliability of electrical power can be made now, not after a problem occurs. As examples:

• How much more capacity can our existing facilities accommodate, before it becomes necessary to make arrangements for new facilities?

• What would be the operational impact of adding new equipment, changing configurations or adopting new technology?

• If we were to outsource our manufacturing - or we needed to monitor our suppliers' facilities to ensure the integrity of their systems - how could we do so?

Similar to "Business Analytics"- those complex mathematical models developed by risk analysis companies like Experian and Fair Isaac - that help financial institutions predict lending risks and prevent fraud, "Power Analytics" enable organizations to predict electrical power problems before they occur, by continually assessing the real-time health of their electrical power infrastructure.

Just as Business Analytics normalizes data and systems to provide consistent and meaningful terms to a company, Power Analytics normalizes complex power issues and concerns, from a variety of sources and equipment manufacturers to a simple, concise and consistent format.

Financial systems and comparisons would be rendered nearly unusable without standardized methods for comparing results such as EBIT, ROS, EPS and others; Power Analytics provides the same for the complexity of power.

How Power Analytics Work

Just as the human body has normal "vital signs" - and irregular signs like high temperature or elevated blood pressure, heart rate or respiration rate are indicators of potential longer-term health problems - so does electrical power infrastructure. "Normal" electrical system readings are defined by manufacturer's equipment specifications, or the day-to-day readings of equipment while in routine operation. Even negligible deviations or changes in measurements - combined with other readings in a seemingly unrelated area - could be an indication of the early stages of a power problem.

Within a Power Analytics system a detailed design database, called a designbase, stores the manufacturer's specifications and historical operating measurements for all equipment and components. Like a skilled physician, Power Analytics knows how to check, interpret and cross-reference "symptoms" in your electrical infrastructure. When it detects a reading that warrants further investigation, Power Analytics automatically knows what surrounding components to scrutinize and, based upon its findings, determine when and where problems could be in the formative stages.

As a result, Power Analytics provide a more detailed assessment of potential electrical power problems in most cases, long before they actually occur and can have a devastating effect on your company's bottom line.

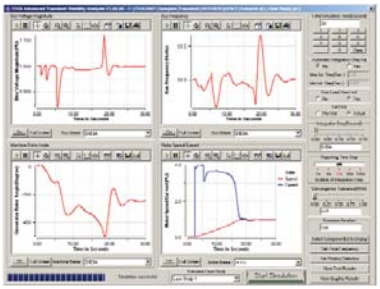
Predict, Present, Prevent

Power Analytics systems are designed to "Predict, Present, Prevent" potential threats to power systems infrastructure, in three crucial ways:

Predict - Power Analytics technologies can predict a problem based on a combination of powerful analytics and a real-time data acquisition system that continuously acquires, learns and compares data from a variety of sources that comprise your power distribution infrastructure versus a robust logical model of how your system should be performing. The system continuously adapts and learns about the electrical power system and treats your power system as a system, and not a collection of individual points of failure.

Present - Rather than thousands of detailed alarms and screens that might confuse, or worse, miss the root cause of a problem, Power Analytics systems present information in a clear, concise manner through a graphical executive dashboard. This easy-to-comprehend presentation of information is accomplished through a secure web browser interface; with the proper authorization, executives can view this information from any Web browser. Personalized levels of security allow users access to only the data that is appropriate for their level, and nothing more.

Prevent - With the insight gained, and depending on your power management and control philosophy, the system can either inform the appropriate personnel of an impending problem, or as an option, can actually take control of the electrical distribution system in order to maintain continuity of electrical power to critical loads.



With Power Analytics, mission-critical facility owners and operators are now empowered to make prompt, accurate decisions on the operation and health of their electrical system based on the best, most up-to-date information as well as immediately determine the next steps, instead of after it is too late. This includes the ability to prioritize electrical assets around processes that carry the highest business values, and not just the latest problem that comes up: revenue generating and mission critical activities, rather than nonessential internal processes, can now be intelligently prioritized in the event of a problem or outage.

How Power Analytics Work

Businesses rely on certain equipment and critical systems. At the core, these critical infrastructure components include telecommunications and energy. Such cross-infrastructure dependencies can give rise to cascading and escalating failures across multiple infrastructures unless their status, strength and health are raised to those responsible for supporting critical business processes.

Failures do not just happen - there is almost

always an identifiable, and therefore, avoidable cause. With Power Analytics systems, facilities personnel - along with executives and technical infrastructure support specialists - can for the first time ever observe even the most infinitesimal deterioration the real-time health, performance and status of the electrical infrastructure.

Power Analytics uses intelligent software agent technologies to quickly and elegantly expose vulnerabilities and the ramifications of cross-infrastructure dependencies between the electrical distribution system and the business processes it supports. This proactive approach takes into account the multi-dimensional, highly complex collections of technologies and processes that comprise today's mission critical facilities, providing a major competitive business advantage to organizations whose profitability depends on the uninterrupted operation of critical systems.

Fundamentally, the challenge of enabling cross-infrastructure visibility between electrical and telecommunications systems has been one of proper integration of critical infrastructure power system behavior models. Enterprise-level visibility into cross-infrastructure interdependencies requires the level of comprehension only Power Analytics can deliver This intuitive system is the first electric power behavioral model based approach to provide the appropriate levels of security, extensibility and scalability needed to address the challenges of exposing infrastructure interdependency and exposing the electrical infrastructure to operations managers.

This technological approach allows for the transformation of dense, real-time power system data streams into information that permits operators and managers to easily understand, and optimize the availability and performance of the electrical distribution system to support critical business plans.

Managing Power Systems Availability

Power Analytics delivers a load centric, flexible architecture that detects and predicts system level changes and intelligently reacts to such changes in order to insure continuity of electrical power to critical loads. It can help operations managers understand precisely how far they can push their existing electrical system, and what small changes can be made to extract a bit more capacity.

Power system specialists can benefit from Power Analytics' ability to help validate what specific additions need to be made to the electrical distribution system in order to address the power requirements of mission critical processes. System self status is greatly streamlined in Power Analytics system via a green/yellow/red color scheme for easy visualization of the system health and performance, with indicators overlaid on top of already recognizable diagrams allowing for instantaneous understanding of the power system status to both technical and non-technical data consumers.

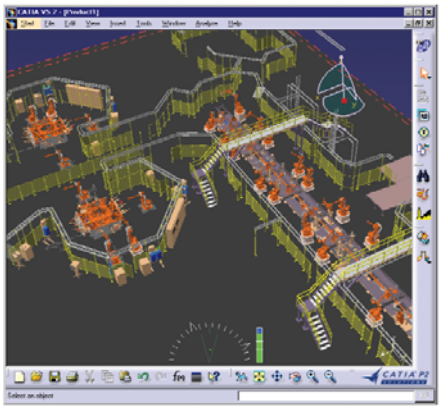
Many if not most data acquisition systems and management systems claim some form of predictive capability; the offerings vary from simple best-fit curve treading (least squares regression) to more sophisticated algorithms. For the majority of systems, the prediction is "general" and typically point or device specific and if the prediction is on a system level it is usually so vague as to be of limited or no value to management.

Power Analytics, however, approaches this need from a systems modeling perspective. Within the system resides a hyper-accurate virtual model agent; as the configuration and topology of the physical power system changes the agent insures that the virtual system changes and mirrors the physical system. The flexibility of agent based technology provides automated predictive capabilities and analysis based on a decision hierarchy that is formed logically, not physically.

Management of Energy, Power Quality and Reliability

Today's mission critical environments are interconnected, complex and often include hardware from multiple vendors and platforms. To understand the status of a particular electrical component is to comprehend only a small part of the picture. To truly maximize the value of an electrical power system investment, organizations must also see how each component affects the distribution system and the business processes it supports.

Equipment in mission-critical businesses, such as data centers, telecommunication centers and production facilities, require 100 percent uptime to guarantee the quality of their products and services. These organizations are acutely aware of the need to focus on the cost of energy, and energy management, as the backbone of a robust business strategy.



Power Analytics treats energy as a business-critical commodity that must be managed in real- time, and provides the tools facility owners and operators need to manage the cost, quality and reliability of energy. Intelligent software agents assist users in implementation of power quality, energy efficiency and load curtailment programs focused on the preservation of revenue generating and mission critical activities and shedding of non-essential processes.

Power Analytics technology also includes a highly sophisticated Power Security Agent (PSA) which communicates, in real time, to managers, operators and business decision makers the exact strength and resiliency of the power distribution system - in an easy visual presentation. This PSA can be engaged to assist facility support engineers, based on the PSA's embedded knowledge of the investment and operation subproblems, on how to minimize system losses and load shedding, perform or recommend economic dispatch, plan and recommend reactive power resources, and advise on how to optimize system voltage profiles with minimum control setting adjustments. The PSA can also recommend optimized switching strategies to minimize the effect of overloaded cables and any sudden increases or surges in load conditions.

Through exclusive and secure communication agents, Power Analytics systems directly link to all major power quality meters and is able to capture and display vendor proprietary waveform data - delivering the only standardized real-time interface to waveform enabled power quality meters.

Many mission critical facilities deploy a variety of Intelligent Electronic Device (IED) technologies, some old, some new and each with vastly varying capabilities. Power Analytics fully leverages existing infrastructure investments, and seamlessly integrates data from multiple vendors and systems via best-of-breed agent technology and delivers the first truly ubiquitous Power Analytics platform.

Adib Nasle joined EDSA in 1992, and learned the business "from the ground up" -- for years, having served as manager of the Company's Quality Assurance, product management, and marketing functions. He was named President of EDSA in 2000. Because of his varied roles, he possesses an extremely detailed, hands-on knowledge of the electrical power marketplace, as well as EDSA's software applications and underlying technology. Nasle received his BA from Michigan State University, along with post-graduated studies at Wayne State University and University of California San Diego.

EDSA is a privately-held developer of Power Analytics software solutions for the design, simulation, deployment and preventative maintenance of complex electrical power systems. Founded in 1983, the Company's Paladin software products are used by thousands of commercial, industrial, governmental and military customers worldwide, to protect more than $100 billion in customer assets. For more information visit: www.edsa.com.