Foreseer's flexibility enhances Bluegrass mission

Location:
Louisville, Kentucky

Segment:
Data Center

Solution:
Foreseer® software

Problem:
Maximize the value of a comprehensive monitoring solution for centralized management of two data center facilities to help reduce energy consumption and avoid unplanned downtime.

Results:
Highly scalable and customizable management of all critical electrical and facility systems within a single platform to enable proactive and predictive response to changing data center conditions.

"With the Foreseer platform, we have found the perfect complement to Project Bluegrass' flexible, modular, and scalable design, creating data centers capable of supporting its business over the next 20 years and beyond."

Robert Rich, facilities engineer

Background

In 2005 Eaton launched a program known as Project Bluegrass to plan, design, and construct two 102,000-square foot next generation data centers in Louisville, Kentucky, to support its current and future global business needs.

Given the mission critical nature of the data centers, Eaton determined it was critical to implement a technical solution that extended beyond the simple alarm notification process. The company recognized that the key to ensuring the data centers' health and service availability was an Electrical Power Management Software (EPMS) that not only addressed issues proactively, but also predictively.

To achieve its goals, Eaton chose two primary monitoring and management systems to run the Project Bluegrass data centers. A building management system (BMS) was chosen to monitor and manage the mechanical components in both of the buildings. Eaton's Foreseer electrical power monitoring software was applied to monitor all of the electrical elements in the building's power distribution system from the utility grid down to the IT equipment that it services and supports.

Eaton integrated the BMS system into the Foreseer platform using a parent—child relationship with Foreseer positioned as the parent, initially passing more than 500 data points every second from the BMS system to Foreseer. This process, in conjunction with a dashboard capability, allowed Eaton to display a defined set of critical metrics on a single screen—remotely and on monitors distributed in key areas of the facility—enabling staff to see the 'real time' state of the facility at any point in time.

Challenge

In order to maximize the value of its Foreseer electrical power monitoring software over time, it was important that Eaton continued updating the system as new power management, infrastructure and IT components were added.

Additionally, staying on top of electrical consumption and demand in a critical data center facility is a difficult job. It became vital that Eaton's facility management teams could proactively address necessary infrastructure changes and optimizations as site loads increased and usage patterns changed.

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Following the initial installation, Eaton also needed to continually analyze the data provided through Foreseer to perform gradual improvements that would improve energy consumption and stability.

Further, Eaton's facility management team fine-tuned the in-depth alarm system provided through Foreseer to ensure emergency power systems and disaster recovery protocols could be carried out during unexpected outages to preserve uptime.

Solution

Because Foreseer can monitor equipment from nearly any manufacturer, it enables the constant integration of new critical facility systems. At its Bluegrass data centers, Eaton has built on the initial BMS integration to include elements of its physical security systems - such as security cameras - directly into Foreseer to provide even more insight within a single pane.

The team has also expanded upon the initial 500+ data points to include more than 800, with the addition of many new Webviews graphical interfaces to enhance the efficiency of the platform.

The systems monitoring and running Eaton's data centers are making decisions based upon the conditions inside and outside of the buildings. Foreseer continues to play an integral role in that automation, enabling Eaton to receive warnings (through trending reports) in terms of changes occurring in the buildings in advance and can proactively manage repairs before failure.

For example, after implementing the system, a member of the facility management team was immediately notified of threatening conditions when a tornado struck the area. By remotely logging into the Foreseer platform from a safe location, he was able to watch in real-time as all emergency power equipment went online—providing instant peace-of-mind that downtime was successfully averted.

Additionally, each individual channel in Foreseer continues to trend down to a resolution of one-minute. So the team always has data at their fingertips for every single channel dating back to each site's original commissioning in 2011. This data is active and ready to be plotted at any time—for over 35,000 channels at each site.

Eaton used this in-depth data to perform an analysis of chiller plant power trends, discovering a more efficient method of operation using the same equipment and piping. This reduced the two sites' overall electrical loads by over 12 percent.

By utilizing the forward trending capabilities of Foreseer, Eaton can also predict when future large capital expenditures will likely occur, such as the need for additional UPS capacity or generators.

Further, Eaton was able to compare historic Power Usage Efficiency (PUE) levels against the present instantaneous values calculated by Foreseer to immediately analyze the reactions of tuning actions made in the field. Using this capability, Eaton recently monitored the PUE while making changes to the sites' lighting designs. This led to improvements that reduced each site's peak demand by over 12 kW, earning rebates from the electrical utility companies for shedding energy-intensive loads when demand is typically highest.

Results

Since the Foreseer electrical power monitoring software was put into place, Eaton's facility management team has maximized the value of its innovative enterprise monitoring software by reaping the following benefits:

Simplified scalability
Building on the original 20,000 Foreseer channels at each site, Eaton has added over 15,000 channels and many new graphical interfaces using Foreseer's Custom Web Views Editor to enhance the efficiency of the platform. The user-friendly customization and growth capabilities of Foreseer has helped Eaton adapt the system to meet the needs of its growing, changing data center technology.

Robust monitoring for continuous uptime
With the ability to monitor all of the electrical components within the building and trend critical metrics over time, Foreseer ensures high IT service availability through proactive management. With preset thresholds, analytics and trending, this tool allows the team to anticipate failures before they actually happen.

Real-time and predictive alarms
The Foreseer electrical power monitoring software allows Eaton's facility management team to proactively monitor and support the electrical infrastructure of both Project Bluegrass buildings with a team of only six resident engineers, who are on site for 8 hours, five days per week. Foreseer detects electrical system failures and sends alerts to Eaton's central alerting system, which will notify the staff members on call.

In-depth trend analysis
High performance analysis and forecasting tools allow Eaton to constantly assess equipment performance specifications in visual formats. Cause analysis, impact analysis, capacity planning, preventive maintenance assessments and trending can now be achieved with ease.

Foreseer gives Eaton the ability to proactively and predictively detect changes before service is compromised, thus ensuring optimal data center health. Since its implementation, Eaton has leveraged the platform's feature set, scalability, and built-in customization capabilities to significantly reduce energy consumption, minimize the risk of unplanned downtime and add more than 15,000 channels with visual representation.

With the Foreseer platform, Eaton has found the perfect complement to Project Bluegrass' flexible, modular, and scalable design, creating data centers capable of supporting its business over the next 20 years and beyond.

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