splunk>

CASE STUDY

Splunk® at EnerNOC

Operational Intelligence Lowers Energy Consumption While Accelerating Application Development

ENERNOC

"Splunk Enterprise gives us both the real-time and historical intelligence we need to deliver world-class energy management services. We probably derive the greatest value from Splunk software by using its data to integrate our development and operations teams for rapid, agile releases of new solutions and functionalities."

Principal Engineer
EnerNOC

OVERVIEW

INDUSTRY
- Energy

SPLUNK USE CASES
- Application development
- Business analytics
- Internet of Things

BUSINESS IMPACT
- Able to provide customers with real-time metrics on energy usage and performance
- Accelerated application development & testing
- Improved DevOps collaboration
- Seamless execution of real-time analytics without service disruption
- Ongoing application refinement for greater customer value and insight into customer behavior

DATA SOURCES
- Application server logs
- Apache web server logs
- Custom application logs
- Linux system logs
- Cloud-based testing tools
- Databases

The Business

EnerNOC is a provider of energy intelligence software committed to enabling its customers—electric power grid operators, businesses and utilities worldwide—to optimize the use of energy by processing and analyzing large streams of data on consumption, prices and weather. The company's demand response solution maintains the delicate balance between supply and demand for electricity by reducing energy consumption at large energy consuming facilities, preventing blackouts and providing a cost-effective alternative to buying electricity at high prices when the grid is under peak load. Three global network operations centers (NOCs) monitor customers' energy consumption and production by utilities. The Boston-based company became public in 2007 and has 1,000 employees on five continents.

Challenges

EnerNOC's Energy Intelligence Software (EIS) platform monitors real-time energy data for its enterprise customers 24x7x365, including data from 30,000+ energy sensors/smart meters deployed globally—some of which send data every two seconds. The EIS platform processes and analyzes these data streams and immediately notifies customers of opportunities to conserve energy and reduce costs. From a DevOps perspective, the challenges in running this exponentially growing SaaS platform were two-fold: monitoring the machine-to-machine data flowing through the platform while concurrently providing low-level, highly detailed user analytics data.

Initially, EnerNOC developed a homegrown solution to analyze DevOps data from system logs and user analytics data from web logs. Specifically, a MySQL relational database was built and scripts developed to prepare and store the data for analysis. While this MySQL database worked well at first, the solution proved difficult to scale and experienced crashes, especially as the number of data streams and customers grew rapidly and business stakeholders' needs for better user analytics increased at a similar pace. Despite the smooth operation of the EIS platform, the product teams lacked visibility into customer software usage and DevOps was essentially "flying blind." Although EnerNOC had the internal resources to create an improved homegrown system, the company wanted to focus those resources on productizing big data for EIS. If its platform for high volume, low latency and mission-critical SaaS services was to succeed, EnerNOC needed to find a robust and scalable solution for DevOps that could analyze the torrents of systems and operational information flowing into its EIS platform.

Enter Splunk

After another MySQL crash in the homegrown system, EnerNOC's principal engineer downloaded Splunk Enterprise and began feeding in system logs from the EIS platform. He built a dashboard to visualize the data for complete operational visibility into the firm's recently released, low latency, mission-critical demand response program that reacts to grid conditions in milliseconds. "It would have taken several developers months to build that kind of DevOps functionality into our EIS platform," says the principal engineer. "Splunk software paid for itself with just that one dashboard."

EnerNOC soon added other data sources from a wide range of systems—including key latency-dependent core servers and big data / analytics servers where latency means less but the volume of data is critical—into its Splunk deployment and developed more dashboards. EnerNOC eventually placed its Splunk Enterprise platform on the Amazon Web Services (AWS) cloud in redundant regions to ensure the solution's availability, eliminate the management demanded by on-premises servers and provide the scalability demanded by the company's explosive growth.

> The true value for our customers is that they can look at their data online, turn the lights off, for example, and then see their chart drop within minutes, along with cost information to provide instant value. Splunk is a key behind the scenes player to make sure that the real-time data is getting processed quickly, analysis of big data historical data sets scales as needed and that there are no errors.
>
> *Principal Engineer, EnerNOC*

Free Download

Download Splunk for free. You'll get a Splunk Enterprise license for 60 days and you can index up to 500 megabytes of data per day. After 60 days, or anytime before then, you can convert to a perpetual Free license or purchase an Enterprise license by contacting sales@splunk.com.

Breakthroughs

Global data collection ensures operational visibility

Daily, EnerNOC's EIS platform collects millions of data points on customer energy usage as well as production by utilities. The firm monitors consumption and output for demand-response events while tracking performance of the data-collection infrastructure to meet SLAs. Splunk Enterprise provides real-time operational visibility into the flow of data through the EIS platform. With optics into the platform's public and private cloud components, administrators are able to perform workload and user analytics in real time and over large historical data sets.

DevOps staff have set up Splunk alerts for nearly 200 system operational events. Whether data is not flowing or components ranging from load balancers to Oracle databases are experiencing issues, administrators now receive immediate notification and automated or manual steps are taken to avoid disruption of mission-critical services. "Spunk monitors core platform services, ensuring data is processed, with high error-free throughput and near zero latency," says the principal engineer.

Providing greater value to customers through business analytics

"Three factors drive energy spend: how you buy it, how much you use and when you use it," explains the principal engineer. "The when factor comes into play during peak grid conditions and minutes or seconds count. Our EIS platform provides this real-time information at your fingertips. Managing all three cost drivers in an integrated fashion and understanding how they impact one another is what leads to maximum savings for our customers."

With Splunk's help, EnerNOC customers are now able to access their energy usage data with an exceptional user experience, great performance and 99.999 percent reliability, either via a mobile or web app. Replacing spreadsheets and manual input, the EIS allows customers to work with EnerNOC to exploit that data in order to optimize how much energy to buy and when to buy it—and make the best use of the energy they do use.

Improved insight into customer behavior

EnerNOC uses Splunk Enterprise to generate financial and analytic reports and distribute them to over 600 employees every month, including senior executives and the engineering and marketing teams. These reports include such metrics as the user personas of the most active customers, how they are using EnerNOC solutions and the busiest days for energy consumption.

"By performing real-time and historical analytics, we can refine our applications to better serve our customers," says the principal engineer. "Splunk Enterprise provides remarkable flexibility. Adding new fields in large, traditional databases is arduous and time consuming. With Splunk, we can extract any information whenever we want."

Creating a seamless loop between development and operations

EnerNOC's development and engineering teams work relentlessly to refine the EIS platform, build new features for greater customer service and prepare the next generation of solutions. Here, Splunk Enterprise plays a vital role in creating a dynamic DevOps environment. Using Splunk Enterprise for real-time metrics, EnerNOC's developers and QA team test code in staging environments to gauge functionality, scalability and performance under peak loads. The DevOps team then relies on the same Splunk dashboards to track new software services the moment they are placed into production to preserve reliability and customer satisfaction.

"By utilizing the Splunk system to communicate knowledge between development and operations, we're able to create a seamless loop," concludes the principal engineer. "With a continuous stream of metrics displayed in dashboards, everyone is on the same page. Development informs operations and vice versa. Splunk is our giant catcher's mitt that catches whatever is thrown at us operationally. Send us the logs and with Splunk, we'll figure it out."

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