

REPORT REPRINT

Siemens fires up a partnership with Vigilent to help datacenters cool down

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The company is expanding its thermal optimization offering into datacenter white space by strengthening its partnership with and investing in dynamic cooling specialist Vigilent. Its new offering – White Space Cooling Optimization – uses machine learning, automation and controls to generate energy savings and more reliable infrastructure.

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Electrification and automation giant Siemens has strengthened its partnership with and made an investment in dynamic cooling optimization specialist Vigilent to broaden its thermal optimization offerings for datacenter operators. The addition of Vigilent's software should enable Siemens to extend its Building Performance & Sustainability offering into addressing cooling inefficiencies in the white space. Its latest offering – White Space Cooling Optimization – uses machine learning, automation and controls to generate energy savings and more reliable infrastructure.

The datacenter sector is at the early stages of broader adoption of artificial intelligence (AI) technology to improve facility efficiency, availability, management and capacity planning. Vigilent provides the machine-learning software to dynamically manage datacenter cooling equipment, enabling cooling systems to be flexed in real time based on the IT load and environmental conditions – and generating significant energy savings. When integrated with other facility improvement measures from Siemens such as Demand Flow, datacenter operators can further optimize operational performance spanning from the cooling tower to the server rack and ensure greater reliability of facilities.

THE 451 TAKE

Datacenter operators are working against a continuous mandate to increase as well as discover new operating efficiencies as they compete with modern datacenter builds that incorporate innovative, more efficient technologies. Because cooling can account for roughly 40% of traditional datacenter energy costs, thermal optimization tools have become increasingly important for operators to exploit. Energy savings are compelling benefits promised by Siemens' offering, but risk reduction is also a key element that should not be overlooked – for example, identifying and automatically eliminating hot spots. Datacenter operators can manually raise the temperature in a data hall to generate savings on cooling, but by utilizing Siemens' thermal optimization services and Vigilent's software, this can be done with significantly less risk to availability. We believe this offering will also be particularly attractive to colocation providers as it could be used to ensure that rack temperatures stay within the bounds of customer SLAs, determine actual cooling capacity required to meet customer demand, and avoid overprovisioning.

CONTEXT

Founded in 1847, Munich-based Siemens is a global leader in electrification, automation and digitalization, as well as medical imaging and diagnostics. Its organizational structure consists of seven divisions – Building Technologies, Digital Factory, Energy Management, Financial Services, Mobility, Power and Gas, and Process Industries and Drives – as well as two separately managed businesses: Siemens Healthineers and Siemens Gamesa Renewable Energy (Wind Power). The company has over 375,000 employees worldwide spanning more than 200 countries.

In fiscal 2017 (September year-end), Siemens generated over \$100bn in total revenue, and we estimate that its datacenter-related revenue is \$1.2-1.5bn (less than 2% of total revenue). Its Datacenter Solutions & Services group sits across the Building Technologies and Energy Management divisions. The company says sales into the datacenter end market grew year over year in fiscal 2017 and management expects it to post growth again in fiscal 2018.

Siemens is strong in power generation and transmission and we expect smart grids and micro-grids to become an increasingly important topic in datacenter technologies. The company is competitive in datacenter infrastructure management (DCIM) software with its Datacenter Clarity LC DCIM platform and offers an integrated datacenter management suite (IDCMS) that includes modules for DCIM, building management systems (BMS), energy-efficiency services, power management, fire safety and security, among others. In the datacenter segment, Siemens also provides busways and power distribution units, security, fire detection and suppression, cooling and environmental management, BMS, and datacenter lifecycle and efficiency services supported by over 10,000 service technicians.

STRATEGY

With this partnership, Siemens' thermal optimization for datacenters can now address both chiller plant and white-space cooling optimization. The goal is to improve datacenter energy efficiency and reliability by optimizing the performance of the cooling systems. The offering set also encompasses various facility improvement measures such as airflow management, containment systems, hot-spot analysis and adjusted supply water temperature setpoints. Siemens did not disclose the amount of its investment in Vigilent.

These offerings fall under Siemens' Building Performance and Sustainability (BPS) group, which consists of 800 employees across 30 countries. BPS's strategy is to improve building (including datacenters) performance through energy and sustainability advisory services using a total energy management approach (supply- and demand-side) and technical asset (e.g. chiller, pumps, etc.) performance optimization. The company says its BPS unit guaranteed customers total savings of €147m (\$168m) globally in 2017 and exceeded this guarantee by 23% on average.

BPS services also include supply-side power generation (e.g., cogeneration, photovoltaics, energy storage) where the company says customer demand is high for off-grid resiliency offerings, particularly from datacenter operators. Other datacenter-specific macro-level trends that the company considers demand drivers for its BPS offerings include more software-driven/data-driven datacenters, the Internet of Things (IoT) and edge computing, and the convergence of IT and facility management, among others.

As part of the wider IDCMS offering, the Vigilent system will be integrated into Siemens' Desigo CC building management platform and leverage the automation capabilities of the BMS. Data generated by the Vigilent system is expected to be available soon on its Clarity LC DCIM via the BMS platform. In the meantime, alarms from Desigo CC can be pushed to Clarity LC using existing integration.

From a go-to-market perspective, Siemens intends to reach beyond datacenters into verticals such as airports. The company reports that it already has 80,000 buildings (including datacenters) connected to its IoT cloud platform that can potentially be addressed. One option available for datacenter owners and operators is Siemens' off-balance sheet financing option called Building Efficiency as a Service. This delivery model leverages its Financial Services division to finance an upgrade project, for instance, and the customer would pay a portion of the realized energy savings back to Siemens on a quarterly or otherwise basis.

TECHNOLOGY

For more than eight years, Siemens has provided Demand Flow (chiller plant optimization), which is available globally. This offering focuses on simplifying chiller system operations and ensuring environmental quality (e.g., controlling humidity) and more efficient runtime, which should extend the lifetime of the equipment. The company claims that its Demand Flow services have resulted in 20-50% energy savings on average for its customers.

Historically, projected variations in IT loads led to the design of datacenter cooling systems that were overprovisioned for the white space and were susceptible to hot spots. As part of its White Space Cooling Optimization offering, Siemens can now address these inefficiencies by using Vigilent's system to automate and control cooling in the white space.

The Vigilent system provides continuous monitoring by collecting environmental and power data from sensors at the IT rack level and on the cooling units. This data is transmitted wirelessly to a network manager unit, which forwards it to Vigilent's AI engine. There, the software aggregates the collected data, employs machine learning to determine the influence of each cooling unit across the white-space floor, and develops a predictive model to determine the optimum settings. The control commands are then sent through the network manager to modules on the cooling equipment.

This approach replaces fan setpoints on the air-handling units with dynamically optimized fan speeds based on workload demand and in real time. The Vigilent machine-learning algorithms then learn from the effects of previously transmitted control actions and improve over time. Essentially, the cooling capacity is converted from fixed to variable to match variations in IT loads at the rack level.

The key benefits of white-space cooling optimization include lower energy costs, improved IT capacity utilization (e.g., identifying stranding capacity), real-time insights into operational and asset performance, predicting equipment issues before they occur, and more reliable environmental conditions. The effect is greater datacenter reliability and availability. Vigilent notes that across over 500 installations of its system, customers have experienced a 38% savings on cooling energy on average.

Siemens measures the simple energy savings payback for its thermal optimization offering set at two to three years. In addition, thermal risk can be reduced and maintenance decisions can be more informed.

COMPETITION

Siemens has a wide variety of products and services that compete with a large number of datacenter technology suppliers. In power distribution, it vies with equipment giants such as ABB, Eaton, Schneider Electric and Vertiv for critical low-voltage infrastructure for datacenters. For medium-voltage distribution, it competes with ABB. In the building technologies space, Siemens encounters Honeywell, Johnson Controls and United Technologies.

In the DCIM space, Siemens vies with about 70 suppliers that range considerably in size and scope, and with DCIM products that vary in function and application. It contends at the high end of the market and is well-positioned with existing large customers. Increasingly, a greater portion of DCIM sales is being won by a relatively small group of the larger providers that include leaders Schneider Electric, Nlyte Software and Vertiv. There are several other DCIM specialists that have strong technology and the resources to remain competitive, including ABB, Baselayar, Eaton, FNT, Panduit, Sunbird Software and Tuangru. Others are pursuing more niche strategies.

A growing number of DCIM suppliers are integrating their DCIM software with ITSM and other management tools. Like Siemens, they have a mix of formal integrations with third-party vendors as well as API environments (including some based on open source code). Several providers are applying machine-learning tools to enable more accurate and broader predictive analysis, including Nlyte and Siemens via its Clarity LC DCIM partnership with Maya HTT. Others are planning to. Some – notably Schneider Electric and Eaton – also offer remote, cloud-based analysis, or datacenter management as a service (DMaaS). We believe Vertiv is planning to launch a DMaaS offering.

SWOT ANALYSIS

STRENGTHS

Siemens is an established player in building technologies, power generation and transmission, and IT with deep engineering, software and datacenter resources. It has comprehensive services and a strong legacy in BMS, as well as broad datacenter management software capabilities, including computational fluid dynamics.

WEAKNESSES

The company's datacenter strategy has historically been somewhat fragmented. It lacks some key datacenter products, including cooling equipment and three-phase uninterruptible power supply.

OPPORTUNITIES

Siemens' background in process capabilities and industrial automation and its large services organization combined with Vigilent's intellectual property in datacenter cooling optimization makes it well-positioned to address cooling inefficiencies. Demand is being generated by more software-driven facilities and increasingly variable IT loads.

THREATS

Deployments of air-side economizer cooling systems and prefabricated cooling modules or entire modular datacenters are already extremely efficient and may not require optimization. A growing number of large datacenter suppliers are integrating software automation and control systems.