The Computerworld Honors Program

Honoring those who use Information Technology to benefit society

Final Copy of Case Study

Status:
Laureate

Year:
2013

Organization Name:
Aetna Innovation, Technology & Service Operations

Organization URL:
www.aetna.com

Project Name:
Sustainable Data Center and Technology Initiative

Please select the category in which you are submitting your entry:
Sustainability

Please provide an overview of the nominated project. Describe the problem it was intended to solve, the technology or approach used, how it was innovative and any technical or other challenges that had to be overcome for successful implementation and adoption. (In 300 words or less.)

Aetna was facing the risk of our data center running out of power capacity by 2011. With no end in sight to an unsustainable power consumption pattern and the enormous expense associated with a new data center, Aetna developed the Sustainable Data Center and Technology Initiative. The project was designed to drive data center and infrastructure innovation, efficiency, performance and sustainability. Additionally, it was intended for IT and Facilities to work together as a single, integrated system to develop a model that was sustainable at its very core. Our solution was something we call "a green data center within a data center." We took what Facilities perceived to be a problem (demanding power and cooling requirements of server blade technology) and turned it into a solution

that actually helped us reduce energy demand. The solution works by capturing all the heat in a small, concentrated space, using close coupled cooling (at the source instead of the raised floor) and high-voltage power distribution to reduce demand. Based on our ability to power and cool more efficiently, we increased the rate of virtualization. We fit servers from 77 standard racks, or 5,000 ft2, into 600 ft2. We went from a typical power consumption of 350W/server to about 2.2W/server, almost a 16,000% improvement. Also, we increased the x86 server utilization rate from under 5% to over 40% for an 800% improvement. Ultimately, our consumption rate went from growing at 20kW/month to a reduction of (9kW/month) even though our year-over-year deployed assets grew between 16% and 116%. Our data center energy expenses went from growing at almost 30% annually to a year-over-year reduction of almost 14%. Based on current projections, Aetna's data centers are now sustainable for at least another decade.

When was this project implemented or last updated? (Please specify month and year.) Has it incorporated new technologies and/or other innovations since its initial deployment? (In 300 words or less.)

This multi-year project was implemented and the metrics current as of December 2012. However, we see the project as ongoing, for example, with continual improvements in the server consolidation ratio through the aforementioned processes, including server consolidation, virtualization, and conversion to high voltage energy. The best part about this project is that it is self-sustaining. It has completely changed the culture of how technology is implemented in our data centers. Because of Aetna's Sustainable Data Center and Technology Initiative, the engineering teams continually look for new ways to drive efficiency, improve performance and lower power consumption with every asset that is deployed. The latest innovation is to leverage blades with a higher memory footprint to increase asset utilization and virtualization even further. For example, based on the most advanced blade servers available, we can achieve a virtualization ratio of 2X our previous capability and can fit as many as 50,000 virtual servers in a 600ft2 space with highly efficient power and cooling.

Additionally, we moved our cloud infrastructure to our green data center within a data center platform. All new/replacement technologies and servers must reduce power on a per unit basis.

Is implementation of the project complete? If no, please describe the project's phases and which phase the project is now in. (In 300 words or less.)

The implementation is complete; however, the project is a larger, ongoing Sustainability Initiative as part of the new innovation and technology culture at

Aetna. It now includes every technology deployed in our data centers, our cloud infrastructure, as well as specialty engines designed to optimize performance of compute intensive workloads by automatically offloading to the most power/cost efficient, highest performing platforms.

Please provide at least one example of how the technology project has benefited a specific individual or organization. Feel free to include personal quotes from individuals who have directly benefited from the work. (In 300 words or less.)

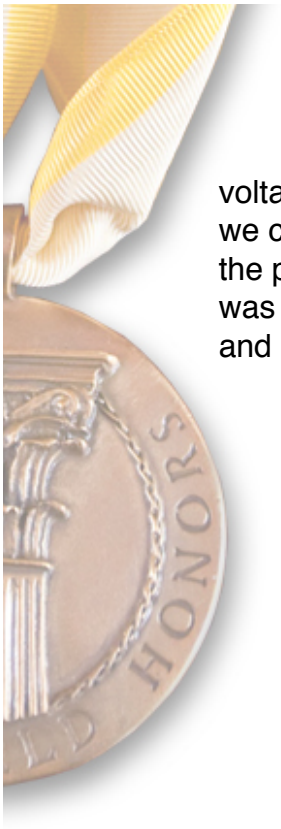
The project has benefited several organizations at Aetna, but none more directly than Facilities and Real Estate, which were constantly struggling to stay ahead of demand and spending significant time and energy on data center contingency plans. In addition, there has been significant cost avoidance in data center electric utility costs, with the costs growing at almost 30% annually to a year-over-year reduction of almost 14%. "Amazing transformation," "Highly collaborative," "Aetna is so innovative with its technology," and "You should market this" are a few of the comments made by various individuals across the company who have directly benefited from the work.

Would this project be considered an innovation, a best practice or other notable advancement that could be adopted by or tailored for other organizations and uses? If yes, please describe that here. (In 300 words or less.)

This project should be considered both innovation and best practice. The project demonstrates through its resulting metrics and measurements that, with the right level of discipline, rigor, and collaboration, an organization can achieve substantial and significant results. An organization does not have to pursue some far-off technology that may be hard to obtain or maintain long term. We are extremely proud that we have obtained sustainable results by taking advantage of basic physics and integrating our technology and facilities strategies. For Aetna, that has resulted in an immediate and sustainable improvement in how we deploy and manage technology for our business as well as a significant cost savings for the company.

If there are any other details that the judges should know about this project, please note them here. (In 300 words or less.)

The "green data center within a data center" works by capturing all the heat in a relatively small, concentrated space and uses close-coupled cooling (at the source instead of the raised floor) and high-voltage power distribution to reduce demand. *Put simply, P=EI, therefore we can get the same power with more voltage and less current. That’s important because H=I2R, so if we double the



voltage we can reduce the heat by 75% and get the same power output. Which we consider is just smart physics. Our goal was to make sure we weren't solving the problem by just adding more capacity that would also eventually run out. It was to create real and ongoing sustainability through a partnership between IT and Facilities.