The Computerworld Honors Program

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Final Copy of Case Study

Status:
Winner

Year:
2013

Organization Name:
The Green Grid

Organization URL:
http://www.thegreengrid.org/

Project Name:
Improving Universal Data Center Resource Efficiency with Metrics and Benchmarking Models

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.)

The demand for new and updated data centers continues to expand, as companies and organizations try to keep up with billions of existing internet users, and the billions more who are expected to join the online community in the next decade. Enabling IT to capitalize on this new digital economy in a very sustainable way has become an increasingly important issue, and the use of energy and elements by the data center is now common discourse among the IT community, governments and end-user companies alike. The Green Grid (TGG), the global authority for resource efficient data centers, has made significant advancements in the area of data center sustainability using metrics, models,

and education resources that the organization has developed and made available. Throughout our entry, we will present the overlaying problem, explore specific examples of TGG metrics and models that have addressed and advanced issues around data center sustainability, and explore companies (including Facebook and eBay) who have implemented these resources successfully in 2012. The Problem: No agreed metrics or methods for quantifying data center efficiency and lack of discourse among IT and government sustainability officials. The Solution: The Green Grid has grown and adapted with the industry, and has influenced data center efficiency in 2011/2012 more than ever before. IT and data center managers are using TGG tools, and attention to metrics has helped the industry reduce power and cooling energy overhead by 20% over the past five years. Using its PUE (Power Usage Effectiveness), which as both a metric and method were formally adopted by the U.S., EU and Japanese governments, as the baseline method for quantifying energy, as well as its Data Center Maturity Model, the Green Grid models and metrics are leading to real energy and cost saving solutions across the globe.

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.)

The projects for consideration are The Green Grid's Data Center Maturity Model (DCMM) and the WUE metric. Although many other TGG methods have been universally adopted, these are two recent examples along with the industry-leading TGG member companies who are alongside TGG on the front lines of efficiency: A) In February 2012, The Green Grid created a case study to highlight eBay's implementation of DCMM, a benchmarking model that touches upon major components of the data center, including power, cooling, compute, network and storage, and considers all areas of operation in its new data center facility in Phoenix, Arizona. The model offers a 360-degree analysis of how well a current data center is performing in terms of meeting standards for an efficiency operation, and how well positioned it is for future growth. For eBay, the tool was an ideal solution to help track progress and identify opportunities to become more efficient in its operations. The Green Grid's case study about eBay's implementation of the DCMM was an ideal proof point, offering further industry validation and clearly outlining how a company the size of eBay rolled out a new facility using the model. Today, there are more than 200 data centers globally using the online DCMM tool and offering their performance publicly. You can view the full case study using the link provided below, which discusses how eBay was able to use the DCMM to significantly lower its power usage effectiveness (PUE), and create one of the most efficient data centers in the world. Along with the DCMM, eBay's new alignment of facilities and IT, as outlined in the case study, has cut capital and operating costs for eBay's data centers by a whopping 50%.

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.)

B) The second example for consideration is Facebook's adoption of The Green Grid's Water Usage Effectiveness (WUE) metric, which the company publicly announced in August 2012. Facebook was the first major company to announce its measurement of water usage, and it initially reported a WUE of 0.22 liters per kilowatt-hour (L/kWh) at their Prineville, Oregon facility. According to Daniel Lee, a Data Center Design Engineer at Facebook, the company will continue to report the measurement on a quarterly basis. The adoption of WUE by Facebook illustrates how the measurements and metrics of The Green Grid are impacting some of the largest companies in the world, and helping lead many other companies to follow in their eco-footsteps. The initial adoption of the DCMM by eBay and WUE by Facebook are both complete and both companies are reporting these as well as their PUE performance as a part of their annual Corporate Sustainability Reports (in the fact that they have been used and adopted) but they are also ongoing implementations that will continue to be utilized by both companies. 2012 was certainly a turning point year for the models and metrics of The Green Grid, and both member companies have helped to propel TGG's efficiency methods even further into the spotlight.

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.)

Below are some of the results eBay experienced using the DCMM and PUE targets to consolidate its data center portfolio in the face of growing demand for data center capacity: Free year-round cooling for computing equipment even at desert temperatures reaching 119F; equipment purchases based on lowest total lifetime energy consumption with eBay-type workload; innovative "rack and roll" process that cuts the amount of time it takes for server equipment to come online from months to minutes; modular design that anticipates and enables future growth and technology changes; and alignment of facilities and IT that has cut capital and operating costs by 50%. Other results include an innovative server rollout to support rapid scaling, dense rack deployments, and a consolidated set of server designs that balance space, power, cooling, cabling, and weight configurations for maximum speed, workload agility and efficiency. The modular, scalable design is ready to handle up to five generations of future technologies and provides a data center space that places servers in the appropriately resilient space, slashing cost in half for hosting 80 percent of eBay's applications. For Facebook, adoption of WUE has led to more awareness of the method and,

according to Daniel Lee, a Data Center Design Engineer at Facebook, the hope is for other companies to soon start measuring and reporting WUE. This would help the industry begin setting benchmarks for the metric and working together to find new ways to improve.

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.)

The metrics and methods developed by The Green Grid are best practices that can be both tailored and adopted by many other organizations and users. The adoption of DCMM and WUE by eBay and Facebook are just two examples of the impact and future-forward thinking that The Green Grid has brought to the data center community. TGG will continue to drive awareness and momentum around efficiency issues in the future through its tools and metrics.

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

EBay Case Study: http://www.thegreengrid.org/~/media/Case%20Studies/CS3-Breaking_New_Ground_on_Data_Center_Efficiency.pdf?lang=en. Videos of Dean Nelson, VP of Global Foundation Services at eBay discussing Project Mercury, eBay's data center initiative:
http://www.youtube.com/watch?v=fI6LTU0NniU
http://www.youtube.com/watch?v=gxaPhCJlq3U. Video of the eBay case study presented at TGG's 2012 Forum:
http://www.youtube.com/watch?v=wtXoIRTQCZY. Facebook's adoption of WUE metric: http://opencompute.org/2012/08/09/water-efficiency-at-facebooks-prineville-data-center/.