Data Center Dashboard Demonstration Pilot Case Study

Dashboards enable data centers to operate more efficiently and utilities to verify savings

Project Background & Scope

Data center and IT operations are significant consumers of energy in the Pacific Northwest and throughout the United States. According to the Northwest Power & Conservation Council, regional enterprise and mid-tier data center loads are over 300 Megawatts, and could double in the next decade. The desire for utilities to become more engaged with data centers and encourage higher efficiency, led to the creation of this demonstration project. Learning how data centers and utilities can best leverage dashboard technology to increase efficiency will have significant benefits for the region's power supply.

This Data Center Dashboard Demonstration was a regional project sponsored by the Bonneville Power Administration (BPA) and Seattle City Light (SCL) to fund and assist the demonstration of dashboard systems at three sites. These dashboards, also known within the sector, as Data Center Infrastructure Management (DCIM) systems,; DCIM systems track data equipment and provide actionable information. The figure below shows the broad range of information that DCIM systems can track to optimize data center operations and energy consumption. This pilot focuses on determining if dashboards could be used to optimize energy consumption.

Implementation

The three data centers involved in this pilot were The Westin Building Exchange Colocation suite, Fred Hutchinson Cancer Research Center, and King County Government Data Center.

This pilot demonstrated that dashboard systems can be effective tools for facility operators. While these systems did not directly save energy, they provided the data needed to optimize energy use, without negatively impacting data center reliability. The systems allowed operators to document and communicate operational savings while confirming that desired environmental conditions were being maintained, or improved.

Dean Collins, Projects Director at The Westin Building, said "This system has allowed us to operate smarter and with tighter controls" and they are considering using dashboards at their other locations.

Having real time information about their facility made it easier to identify and improve operations and efficiency. Dashboards also simplified tracking and reporting key operational metrics to executive management.

Finally, dashboards were useful in visualizing the impacts of energy saving measures and operational changes. The ability to quickly generate reports and trend operational parameters was reported to be a key benefit of the dashboard system.

'DCIM tools monitor, measure, manage and/or control data center utilization and energy consumption of all IT-related equipment (such as servers, storage and network switches) and facility infrastructure components (such as power distribution units [PDUs] and computer room air conditioners [CRACs]).
*Gartner Research definition

Data Center Infrastructure Management (DCIM) systems

Dashboard Costs

Dashboard system costs depend on the system type, subscription cost, number and type of points and installation. For example if the system is installed by in-house staff can be lower than vendor installation costs, but installation may take longer. The dashboard systems in this project received funding between 25% and 45% of their dashboard system cost. The table below summarizes dashboard system costs, normalized on a per square foot and per monitoring point basis. As shown, these costs vary widely.

Data Center Type	Cost per Square Foot	Cost per Monitoring Point
Colocation data center; all inclusive for hardware and software	$19.46	$596
Enterprise data center; 3yr software maintenance included	$13.29	$1,049
Enterprise data center; 3yr agreement for 125 racks- only monitors IT equipment. Cooling power & status monitored separately	$8.67	$59
Enterprise data center; leverages existing Building management system	$7.20	$1,385

Dashboard System and Cost Breakdown

While this project showed that dashboard systems can support utility incentive programs, BPA and SCL do not currently offer dashboard system incentives. However, the costs can be included with the cost of other data center efficiency custom projects, such as hot/ cold aisle separation.

Results

This pilot illustrates that dashboard systems are effective tools for facility operators. While these systems did not provide direct control of the cooling systems, they empowered facility operators to optimize energy use without negatively impacting data center reliability. The systems effectively enabled operators to document operational savings to management and provided confirmation that environmental conditions were being maintained, or improved.

Ultimately, each participant in this pilot indicated that the dashboard system enabled them to more efficiently operate their data center. These systems display centralize data and provide actionable information. They enable operators to optimize operations and utilization of their data center.

Additional Resources

- **Data Center Dashboard Demonstration (2013)**
http://www.bpa.gov/energy/n/emerging_technology/pdf/Final_DRAFT_BPA_Dashboard_%20Report_11-26-13.pdf

- **Gartner Research Online IT Glossary, from internet, accessed 10/25/2013**
http://www.gartner.com/it-glossary/data-center-infrastructure-management-dcim

- **Report to Congress on Server and Data Center Energy Efficiency - U.S. Environmental Protection Agency ENERGY STAR Program August 2, 2007**
http://www.energystar.gov/ia/partners/prod_development/downloads/EPA_Datacenter_Report_Congress_Final1.pdf

- **Northwest Power and Conservation Council Regional Update, 07/30/2013 Potential data center Loads in the Northwest Energy Efficiency Opportunities at Data Centers in the Northwest Demand Response and Distributed Generation at Data Centers**
http://www.nwcouncil.org/media/6871494/p6.pdf