

Case Study



Global Health Research Center
Institute for Health Metrics and Evaluation (IHME) at the University of Washington

Improving Data Center Uptime and Capacity Planning

Intel® DCM delivers real-time power, thermal, and utilization analysis in high-performance computing environment, improving server utilization and uptime

Business

The Institute for Health Metrics and Evaluation (IHME) is an independent global health research center at the University of Washington. The IHME tracks data and reports forecasts concerning COVID-19, among other challenges affecting policy makers focused on improving population health.



Institute for
Health Metrics
and Evaluation



Challenges

- Monitoring server power and thermals in real-time
- Automated discovery and optimization for underutilized servers
- Optimizing rack capacity and setting power policies
- Capacity planning

Solution

- Intel® Data Center Manager

Executive Summary

The Institute for Health Metrics and Evaluation (IHME), an independent global health research center at the University of Washington, deployed Intel® Data Center Manager (Intel® DCM) to monitor more than 600 servers in its High Performance Computing (HPC) data center environment at the University's colocation facility. Intel® Data Center Manager is a software solution that collects and analyzes the real-time health, power, and thermals of a variety of devices in data centers, providing the clarity needed to improve data center reliability and efficiency. IHME IT staff was able to use Intel® DCM to create the needed power statistics for every rack and server model, with no additional hardware or software. This enabled IT staff to better plan and manage capacity and utilization in racks, and safely increase their rack densities. Intel® DCM also enabled IHME IT staff to implement a power consumption policy, and the solution's health monitoring feature allows the team to receive alerts based on custom power and thermal events, which will further ensure uptime.

Background

The IHME provides rigorous and comparable measurement of the world's most important health problems and evaluates the strategies used to address them. IHME makes this information freely available so that policymakers have the evidence they need to make informed decisions about how to allocate resources to best improve population health.

IHME's COVID-19 projections were developed in response to requests from the University of Washington School of Medicine and other U.S. hospital systems and state governments working to determine when COVID-19 would overwhelm their ability to care for patients. The forecasts show rates of infection, mortality and testing, in addition to the demand for hospital services and the impact of social distancing, organized by country and state for select locations.

IHME's HPC cluster is used for real-time data analytics, data acquisition and storage, and distribution. In the wake of COVID-19, the power and capacity demands on this HPC environment increased exponentially. However, IHME IT staff lacked real-time visibility into the power and thermal consumption data needed to optimally manage data center power usage. Lack of visibility into actual power consumption requires significant overprovisioning to maintain reserve margins. Moreover, IT staff members at IHME were relying on manual methods for capacity planning and forecasting.

Installing Intel® DCM

IHME IT staff installed Intel® DCM to gain greater insight into power demand, thermal efficiency, server utilization, and capacity planning in the HPC environment of the University of Washington's colocation facility. Intel® DCM does not require the installation of any software agents on managed nodes, and therefore does not impact performance. The IHME IT team was impressed by Intel® DCM's short learning curve, ease of use, and simplicity of deployment. Within hours, they were able to compile and aggregate actionable, real-time data from its collection of servers. Intel DCM eliminates the need for complex, device-specific configuration, setup or customization.

"We learned a lot from other products about realistic maximum power consumption, but it was only relevant for historical data, it couldn't provide us real-time alerting. If something goes wrong in the data center, right now, other products couldn't tell us that. Intel DCM was easy to plug in, and easy to get the data and analysis from our machines immediately. The alerts and power limitations were set up within a day."

- Vern Harbers
Technical Project Manager, Infrastructure
IHME, University of Washington

Identifying Underutilized Servers

The lack of sufficient workload performance monitoring typically leads IT administrators to purchase more hardware. With Intel® DCM, IHME IT staff were able to quickly detect and analyze underutilized systems by monitoring their CPU utilization and power consumption over time.

Improved Capacity Planning and Utilization

Efficient space and power capacity management is an essential part of operating data centers. However, this becomes increasingly difficult when data centers grow in density and complexity, and with no easy way to get granular power consumption details. Intel® DCM offers a single solution for power management across all devices in the data center, supporting the multiple proprietary power measurement and control protocols required by different OEMs.

IHME IT staff was able to use Intel® DCM to create the needed power statistics for every rack and server model, with no additional hardware or software. Hence, they were able to better plan and manage capacity and utilization in racks, safely increase rack densities, and delay adding new racks. Additionally, Intel® DCM enabled IHME IT staff to maintain group power capping while dynamically adapting to changing server loads.

Enhancing Server Visibility and Control

A recent study sponsored by Intel® revealed that 43 percent of data centers rely on manual research. Incomplete data sets offer limited visibility at best. Furthermore, without the control and insight provided by Intel® DCM, it is difficult to gain an integrated view of a server pool. Intel® DCM analysis allowed IHME to identify and redeploy long-term, low utilization servers.

Intel® DCM also identifies cooling efficiencies, detects underutilized systems, visualizes power consumption in maps and graphs, and models power consumption changes and their impact to infrastructure. Because Intel® DCM provides power

Improved capacity management

With power consumption statistics



Increased rack densities

Delaying rack purchases



Saved server power

By using a power-capping strategy



Balanced servers

With insight from Intel® DCM



Increased uptime

With server health monitoring



Eliminated additional PDU hardware purchases

By managing power consumption



and thermal monitoring and management for servers, racks and server clusters, IHME IT administrators were able to track and manage servers efficiently, while restructuring data center racks.

Improved Server Optimization

Intel® DCM provides an intuitive IT asset management interface to display essential Key Performance Indicator (KPI) information for the data center. The interface enables integrated viewing of server asset information as a basis for optimization. Based on the information and data obtained from the deployment of Intel® DCM, IHME IT staff efficiently optimized its data center operation from multiple perspectives.

Intel® DCM's health monitoring feature reduces the demand on data center cooling infrastructure. The solution provides IT administrators accurate, real-time power and thermal consumption data to deliver needed insights to manage power and address hotspots throughout the facility.

Additionally, Intel® DCM's functionality in a heterogeneous server environment allows servers to be discovered and managed efficiently. Because locating servers becomes easy, IHME IT staff can track asset information, including real-time temperature, real-time power consumption, server name, model number, serial number, and management address, among other data.

Intel® Data Center Manager Deployment Results

- Creating power consumption statistics for every rack and server model helped IHME IT staff to improve capacity management, increase rack densities, and delay the purchase of new racks.
- Using Intel® DCM, IHME IT staff could apply a power-capping strategy to save server power, while having no impact on the overall data center workload.
- Intel® DCM provided IHME IT staff the necessary insight to better balance workloads and rack loading for 600 servers.
- Server health monitoring allowed IHME IT staff to gain deeper insights into hardware component failures, which ultimately leads to increased uptime.
- By monitoring and managing the power consumption of each device, the purchase of additional PDU hardware becomes unnecessary.

Where to Get More Information

For more information on Intel® Data Center Manager, visit intel.com/dcm or contact dcmsales@intel.com

About Intel® Data Center Manager

Intel® Data Center Manager (Intel® DCM) provides accurate, real-time power, thermal and health monitoring and management for individual servers, group of servers, racks and IT equipment in the data center. It's a capability that is useful for both IT and facility administrators, which allows them to work jointly to increase data center efficiency and uptime.

PUE is an indicator defined by Green Grid, a global consortium working to improve power efficiency in the data center system. PUE is a metric for the efficiency of electricity use, defined as:

$$PUE = \frac{\text{Total power dissipation in a target facility}}{\text{Total power consumption for the IT equipment}}$$



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