intel®

Cutting Man-Hours and Optimizing Server Operation

Intel® Data Center Manager optimizes remote access management to reduce man-hours and improve cooling, component health, and server utilization

QINGCLOUD

Business:

A cloud computing platform that provides IaaS-based flexible cloud services

Challenges

- Server-level centralized remote access capability
- Real-time cross-platform thermal and power monitoring
- Eliminating the extra costs of PDUs
- Automated discovery for underutilized servers
- Cooling analysis and better data center server utilization

Solution

- Intel® Data Center Manager

Executive Summary

QingCloud installed Intel® Data Center Manager (Intel® DCM) in its data center network. The company deployed the solution across its 4,000 servers to automate the management of its data center in terms of server utilization, component health, and thermal efficiency. QingCloud also leveraged Intel® DCM to balance loads more efficiently, analyze and remedy data center cooling issues, and gauge the Power Usage Effectiveness (PUE) of multiple server models.

Intel® DCM provided the cloud services provider's IT operations team a remote access, cross-platform view of their servers. The ability to monitor the thermal health of individual servers and components at this granularity led to a significant reduction in the man-hours associated with manual monitoring. With Intel® DCM, the company could reduce labor costs by 1,700 man-hours per year, yielding a one-year savings of $200,000 USD.

Intel® DCM's ability to deliver device-level power and thermal data also eliminated the need for intelligent Power Distribution Units (PDUs). The customer's current data center 440-rack environment was reduced to 396 due to density improvement during consolidation, with a projected savings from this optimization at $316,800 USD.

Intel® DCM's thermal and health monitoring capability identified idling servers and allowed the IT staff the remote access capability to power off/on any devices that were idle. The savings from the reduction in energy consumption in the full 4,000-server deployment indicated that the cloud provider could reduce the one-year operating costs by $118,260 USD.

Additionally, through Intel® DCM's health monitoring and utilization capabilities, IT staff optimized server workloads and increased rack density by 10 percent, and postponed the need for new rack purchases. The solution not only reduced the
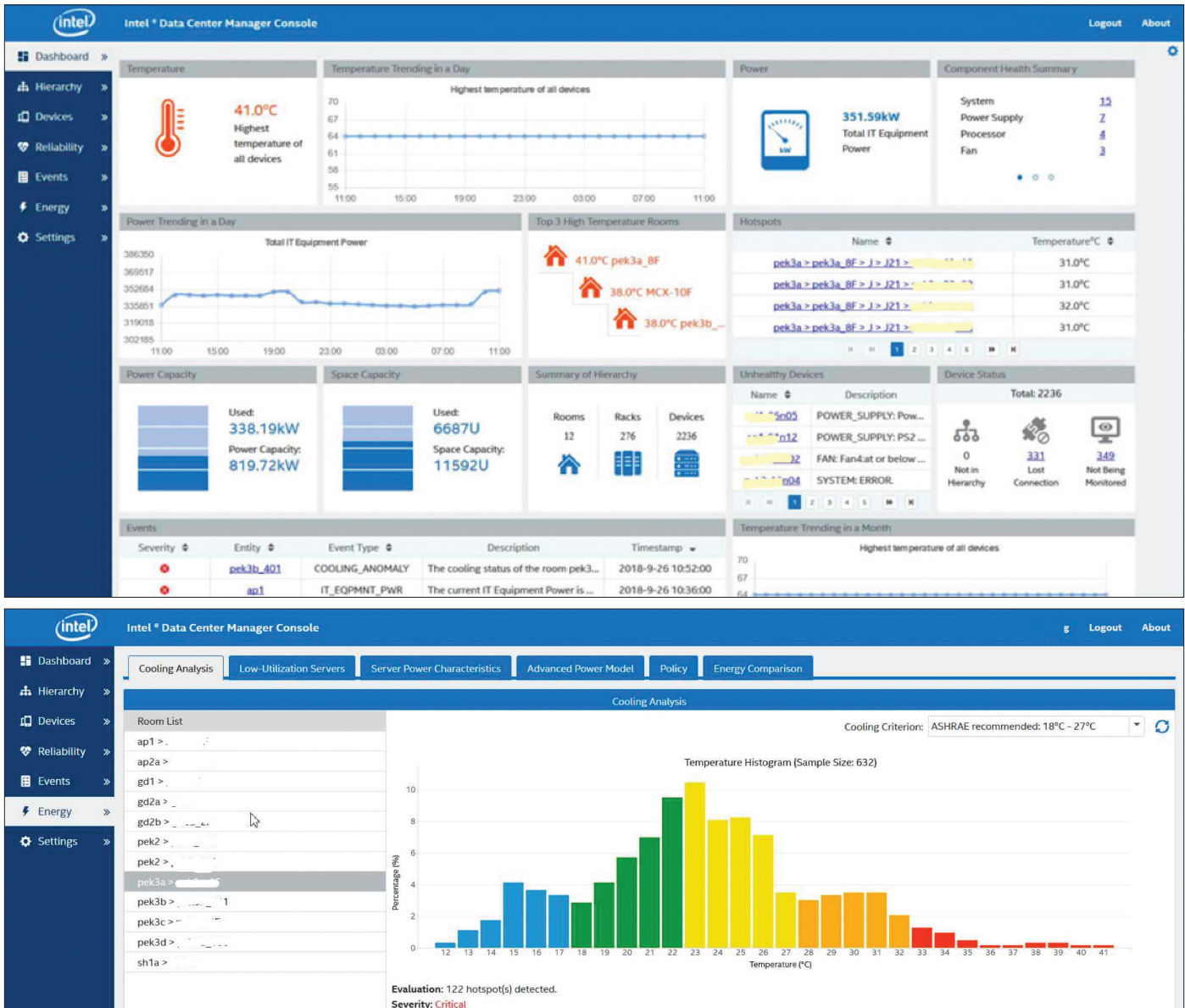
Figure 1. Intel® Data Center Manager Console

number of racks from 440 to 396, but it also significantly lowered the cost of data center space rental. The added visibility and operational efficiency yielded for their 4,000 server operation would realize a potential one-year savings of $704,000 USD. The overall estimated savings that the company would realize in deploying Intel® DCM would be $1,339,060 USD.

Background

QingCloud was looking for an automated way to increase efficiency, extend server life and save energy within its data center operation. The company's IT administrators quickly gained visibility into the 4,000-server test deployment and began aggregating and comparing data in real time as well as assessing workloads to determine the cause of inefficiencies across their environment. The thermal and power data collected clearly identified areas for improvement and simplified the diagnostic process for the company's IT department.

Intel® DCM is a middleware, web-service API that integrates easily into existing management systems to monitor, manage, and optimize the energy consumption and temperature of data center servers.

Intel® DCM Provides Remote Access and Real-Time Power and Thermal Data Collection

Using Intel® DCM with its cross-platform support and easy access limits the amount of staff required to achieve greater accuracy and control at the device level. The solution allows remote operators the capability to access and monitor server power and thermal readings across platforms from the convenience of their computer screen.

Intel® DCM allowed IT administrators to view servers at the subcomponent level, which led to a dramatic reduction in labor costs. By eliminating the need for manual oversight, Intel® DCM enabled operators to better monitor servers, saving both time and money. This capability would lead to the reduction of 500 man-hours annually.

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Intel® DCM Automated Server Discovery Presents Targeted Data For Thermal Strategies

Intel® DCM pinpoints server energy consumption and temperature fluctuations in real time. With Intel® DCM, QingCloud was able to identify problematic devices, leading to a restructuring of server loads and better rack utilization.

The company's data center housed 440 racks (later reduced to 396), requiring two intelligent PDUs per rack. Intel® DCM's deep thermal and health monitoring capability made additional hardware devices unnecessary, while still receiving alerts from specific servers and racks as required. The solution allows users the ability to evenly implement the same power strategies regardless of the server model.

With Intel® DCM, servers become wireless sensors, alerting staff when temperature and power extremes occur. It provides device-level power and thermal data, eliminating the need for hardware sensors altogether. While this granular visibility works across all OEM servers, the data center deployed devices with additional manufacturer Baseboard Management Controller (BMC) sensing capabilities. Intel® DCM automates the management of all server models across the network.

Intel® DCM's insight into component health revealed hardware errors, which allowed operators to diagnose and either replace or repair devices as needed.

Identifies Underutilized Servers

Without actual server data to support decisions, data center policy measures have limited success, and finding unhealthy and underutilized devices can be inefficient, especially in large operations. Another costly challenge is energy consumed by these idle servers. An idle server doing zero work still consumes 50 percent of peak power.

Intel® DCM's remote console capability enabled the data center operators the ability to quickly detect and analyze underutilized systems through the maps and graphs provided in the console dashboard. This added insight allows data center staff the ability to diagnose and fix thermal and power consumption issues in real time and automatically power off servers when required.

Intel® DCM stores server-related measurement data such as current power consumption, and its historical trending feature maintains this data for a year. This data then becomes the foundation for high-precision capacity analysis, reliable capacity planning, and accurate threshold monitoring.

Improves Capacity Planning and Increases Rack Density

Intel® DCM automates the management and analysis of power and temperature readings at the individual device level. Leveraging this granularity, data center managers can improve capacity planning, identify and decommission energy-wasting assets, and strategize new equipment outlays using predictions based on actual energy usage.

Once QingCloud collected server data, it used these measurements to establish cooling levels in the server rooms. Intel® DCM's remote capabilities allowed them to maintain peak health for their servers in real time. This practice further led to the discovery of servers that were underutilized as well as the diagnosis of servers with hardware errors.

Intel® DCM stores current and historical power consumption trends, maintaining this data for a year. This data gives IT managers the foundation needed to perform high-precision capacity analysis, to plan consolidations, and to monitor thresholds with accuracy.

TEST DEPLOYMENT DEVICES **4,000**
Total servers across data center: 4,000

REDUCTION IN DATA CENTER LABOR COSTS **$200K**
Annual savings

INTEL® DATA CENTER MANAGER SAVINGS **>$1.3M**
Projected annual savings

POWERING OFF IDLE SERVERS **>$118K**
Annual savings

AVOIDING INTELLIGENT PDU PURCHASES **>$316K**
Potential savings

CAPACITY PLANNING SAVINGS **$704K**
Over one year

Figure 2. Key Benefits of Intel® DCM

Intel® Data Center Manager Deployment Results

Using Intel® DCM, QingCloud implemented automated monitoring and captured a significant reduction in labor costs while maintaining peak health and uniformity of process across its five OEM server models. Intel® DCM simplified the process of identifying underutilized servers, improved server density, reduced rental costs, and achieved optimized performance throughout the data center.

Intel® DCM enabled a monitoring strategy without the purchase of additional hardware infrastructure, including intelligent PDU sensors to monitor the servers housed in the data center server room.

Intel® DCM simplified the thermal management of a heterogeneous server environment such as QingCloud's, which improved overall energy efficiency.

Using Intel® DCM, IT administrators experienced a significant reduction in energy costs.

- Based on this enhanced visibility into the health of their servers, the cloud service provider's deployment of Intel® DCM would reduce the need for manual monitoring and reduce IT man-hours, while improving management of their servers. This resulting reduction in labor costs would save $200,000 USD over one year.

- Intel® DCM's wireless sensor capability made the purchase of additional intelligent PDU hardware unnecessary, while still achieving granular, cross-platform transparency at a savings of $316,800 USD.

- Intel® DCM provided insights into server power consumption and utilization and, by powering down idle servers (sixteen percent) during low utilization, would yield one-year savings of $118,260 USD.

- Finally, Intel® DCM provided the necessary insights to balance the workloads on the 4,000 servers more efficiently. The organization was able to increase rack density by 10 percent and significantly reduce space rent in the data center. These efforts also indicated additional server and rack purchases could be delayed significantly at a savings of $704,000 USD over a single year.

Based on Intel® DCM deployment results, the anticipated one-year savings of deploying the Intel® DCM solution across the company's 4,000 servers is $1,339,060 USD.

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:

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