

CASE STUDY

Cloud Data Center
UCloud



Cutting Energy Consumption for High-Performance Efficiency

Intel® Data Center Manager improves provisioning efficiency and energy usage to meet high-performance operational standards



专业云计算服务商

Business:

UCloud is a leading Shanghai-based cloud services provider focused on mobile Internet industries.



Challenges

- Insights into energy consumption
- Real-time cross-platform thermal and power monitoring and temperature
- Automated discovery of underutilized servers
- Server-level centralized remote access
- Server and environmental health analysis
- Capacity planning

Solution

- Detailed discovery session
- Intel® Data Center Manager

Executive Summary

UCloud, a leading Shanghai-based cloud-services provider focused on mobile Internet industries, installed Intel® Data Center Manager (Intel® DCM) in its data center for a test deployment. The company sought to monitor the health and thermals of their data center, and improve its energy efficiency. Leveraging Intel® DCM, UCloud needed granular cross-platform insights to manage server health, load balance more efficiently, analyze and remedy data center cooling issues, and gauge the Power Usage Effectiveness (PUE) of multiple server models.

The company deployed Intel® DCM and used its energy, thermal and health monitoring features across a broad spectrum of Original Equipment Manufacturer (OEM) servers and safely raised room temperature in the data center by 3°C. The industry standard of power reduction per degree raised is 3 percent. The initial test deployment indicated that if Intel® DCM was deployed across all of the company's servers, the annual cooling costs of the data center would be reduced by a stunning 9 percent.

Intel® DCM delivers device-level power and thermal data also through a feature that turns servers into wireless sensors. This eliminated the need for intelligent Power Distribution Units (PDUs) and would result in a dramatic reduction in capital expenses across the company operation.

Intel® DCM aggregated subcomponent thermal and health data across the devices in the test deployment, allowing IT managers the ability to detect, repair, and redeploy failing devices much more quickly. The cost of downtime per hour is \$500,000 USD. The solution also enabled more precise calculations for Mean Time to Repair (MTTR) for devices reaching End-of-Life (EOL) and allowed the safe

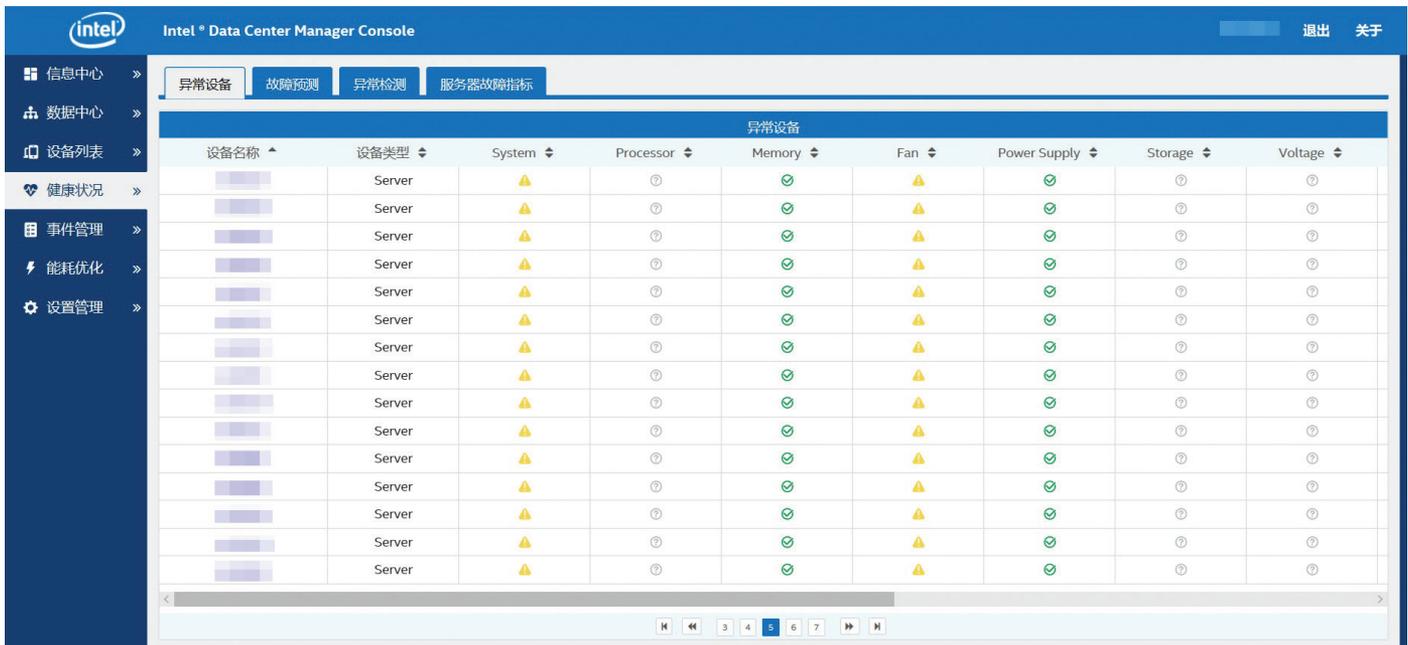


Figure 1. Intel® Data Center Manager Console

redeployment of robust units. Intel® DCM reduced downtime an average of 2 hours and would save an average of \$1,000,000 USD per incident if deployed across the network.

Finally, through Intel® DCM's health monitoring and utilization capabilities, IT staff optimized server workloads and increased rack density by 10% during the test deployment. The added visibility and operational efficiency enabled by DCM would not only allow UCloud to postpone the purchase of additional server racks, but also delay further expenditures including data center construction and increased space rent.

Background

UCloud installed Intel® DCM in a test deployment to gain greater insights into the environmental thermal efficiency, server utilization, and component health across its servers. Intel conducted a detailed discovery session of the company server environment to diagnose the specific pain points that its DCM solution would address. The cloud services company provides data center support for mobile Internet industries.

UCloud mobile Internet customers require features such as 4k resolution and virtual reality. These extras added to existing robust video streaming demands mean that ultra-reliability and scalability are a must. The bandwidth-intensive requirements combined with the need for high scalability necessitated the optimization of server health for enhanced distribution of workloads. Intel® DCM allowed UCloud's IT staff to safely raise room temperatures across multiple network environments receiving alerts and to correct issues in real time.

The simple, easy-to-use design allowed the data center operators a cross-platform view of their operation using the single-screen Intel® DCM Console. After installation, the solution quickly began to aggregate and display data, allowing the team to assess workloads to determine the root cause of inefficiencies across the environment.

Intel® DCM's API allowed UCloud to integrate the existing management system to monitor and automate the management of the energy consumption and thermal health of data center servers.

Intel® DCM Reduces Cooling Costs by Increasing the Data Center Temperature Set-points

Energy is one of the fastest-rising expenses for today's data center operation. The days of maxing out power to compensate for temperature hot spots beyond the requirements to achieve proper functioning have drawn to a close. IT staff require tools that provide greater efficiency and visibility while eliminating manual processes.

Intel® DCM sends alerts, identifies failures at the subcomponent level and recommends fixes based upon aggregated historical and real-time data.

Using the Intel® DCM cooling analysis, the IT staff found that the set-point for the server room in the test deployment was too cold. This awareness allowed them to reduce cooling costs and improve Power Usage Effectiveness and energy efficiency by safely raising the temperature of the server room by 3°C while continuously monitoring data center devices for temperature issues. The solution provided the required data to raise the overall set-point temperatures, which would significantly lower annual cooling costs if deployed across the network.

Intel® DCM Eliminates the Need for Hardware Purchases

By leveraging Intel® DCM's wireless sensor feature, the company aggregated data from its servers and eliminated the need to purchase two intelligent PDUs per rack. Intel® DCM's deep thermal and health monitoring capabilities made additional hardware devices such as PDUs 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.

Intel® DCM Improves Data Center SLA and Uptime by Identifying Hardware Component Failures

Service level agreements (SLA) are hard to implement when visibility into server health is limited. Intel® DCM's wireless sensor capability harnesses servers to act as wireless sensors to precisely track health and send alerts.

Intel® DCM allowed the IT team a clear view rack-by-rack through the overhead mapping feature and enabled them to identify failures in 1 percent of their servers. The cost per hour of downtime is \$500,000 USD. The solution sends alerts and can have them forwarded whenever performance falls outside of predetermined ranges.

Intel® DCM provides timely insights into subcomponent health data for each server, diagnosing the root cause of server failure in real time and helping IT admins to determine whether to repair or replace, making redeployment much faster.

Intel® DCM Reduces Data Center Footprint and Costs through Increased Rack Density

Current data center designs are inefficient at low loading levels. Additionally, the inability to access real-time aggregated thermal health data makes repositioning servers difficult.

Intel® DCM can pinpoint server temperature fluctuations in real time, allowing IT administrators visibility into energy consumption and thermal health of servers. IT administrators can also remotely manage servers while having needed insight into the state of servers based on the rack and row within the data center environment. Identification of hotspots and the capacity to manage inlet temperatures of the data center space give operators the data they need to load racks with higher density while protecting hardware.

Using Intel® DCM, the company compiled server data, which the team used to establish cooling levels in the server rooms. This data provided the foundation for high-precision capacity analysis, planning, and accurate threshold monitoring. Intel® DCM facilitated server redeployment, which also led to a reduction in the required data center space, delayed a construction project to expand the room, and lowered space rent costs.

TEST DEPLOYMENT OPERATION

Total deployment 100% across multisite network



HIGHER TEMPERATURE IN DATA CENTER

Potential annual cooling costs



AVOIDED PURCHASE OF INTELLIGENT PDUS

Intel® DCM wireless sensor capability



REDUCTION IN MTTR FOR END-OF-LIFE DEVICES

Identified, repaired, and redeployed



REDUCTION IN DOWNTIME OF 2 HOURS

Average \$1,000,000 saving per incident



INCREASED RACK DENSITY

Capacity planning savings



SUSTAINABLE AND OPTIMIZED

Potential scalability of customer networks



CLEAR AND SPECIFIC PERFORMANCE INSIGHT

With Intel® Data Center Manager



Figure 2. Key Benefits of Intel® DCM

Intel® Data Center Manager Deployment Results

Using Intel® DCM, UCloud captured a significant reduction in power spend across all six of its OEM server models. The solution simplifies the monitoring process of identifying server health issues. It provided the basis for a new temperature set point, allowing IT administrators to raise temperatures throughout critical areas of the data center operation.

- Intel® DCM allowed UCloud staff to safely raise the server room temperatures by 3°C, a potential 9 percent savings of the annual energy spend for cooling server rooms. This strategy would allow them to save server power while having no impact on the health and scalability of the regular company workload.
- Intel® DCM's wireless sensor capability made the purchase of additional intelligent PDU hardware unnecessary, while still achieving granular, cross-platform transparency by harnessing each server as its own wireless sensor. Applied across the entire network, Intel® DCM would yield substantial savings.
- Intel® DCM improved MTTR through alerts and real-time thermal health monitoring. This feature allowed the IT team to quickly identify, diagnose, repair, and redeploy devices, reducing the average downtime of failing servers by an average of 2 hours. A full network deployment would not only improve the overall health of the UCloud server operation but would boost potential scalability of customer networks.
- Finally, Intel® DCM provided necessary insight into the better balance of workloads and rack loading for the 6 percent server test deployment. The organization was able to increase rack density by 10 percent in this test case. These efforts indicated additional expenses could be delayed by not beginning new constructions to expand server room capacity and by not paying additional space rent.

Based on Intel® DCM deployment results, UCloud would capture dramatic reductions in their overall annual expenses by deploying Intel® DCM across the company's multisite server network.

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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