CASE STUDY

Cloud Data Center
Bank of China

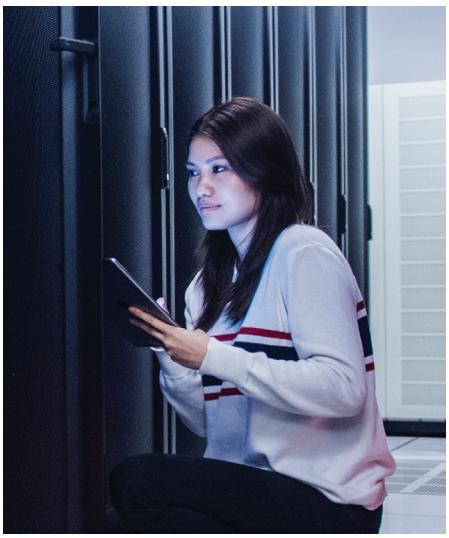
Delivering Energy Efficiency and Optimizing Server Utilization

Intel® Data Center Manager delivers significant annual savings through thermal management and server optimization without the need for additional hardware

中國銀行
BANK OF CHINA

Business:

One of the largest banks in China with over 100 years of service to its customers



Challenges

- Efficient cooling management and energy efficiency
- Real-time power and thermal monitoring
- Better data center server utilization
- Remote access control and IT device power (PDU)

Solution

- Intel® Data Center Manager

Executive Summary

The Bank of China installed Intel® Data Center Manager (Intel® DCM) in its data centers, deploying the solution across 340 devices in a test deployment to gain greater insight into power and thermal monitoring, server utilization, energy consumption, and data center temperature set point. The bank currently operates over 3,000 servers in its data center. (Note that: we will use the number of 3,000 instead of 340 to calculate all the savings and 3,000 is an estimated number.) Intel conducted a detailed discovery session of the bank's server environment to identify the specific pain points that its DCM solution would address.

The IT administrators installed Intel® DCM and immediately found it easy to use and quickly began to further analyze the thermal health of their servers. The solution enabled the remote access they needed to power servers on and off as needed. DCM allowed the team to aggregate data as well as optimize server temperature levels cross-platform.

Intel® DCM's cooling analysis also enabled the data center staff to raise air temperatures in the data center by 2°C, while simultaneously eliminating the risk of downtime or performance complications and continuously monitoring devices to correct issues in real time. This Intel® DCM solution indicated an annual savings of $27,360 USD.

Intel® DCM's ability to deliver device level power and thermal data also eliminated the need to purchase intelligent Power Distribution Units (PDUs). Intel® DCM enabled a monitoring strategy without the purchase of additional hardware infrastructure, including 600 intelligent PDU sensors to monitor a broad spectrum of types of the Original Equipment Manufacturer (OEM) servers housed in the data center server room. This capability deployed across the full network would save the data center an additional $60,000 USD.

Intel® DCM's thermal and health monitoring capability identified idling servers and allowed the IT staff the remote access capability to power on/off any devices

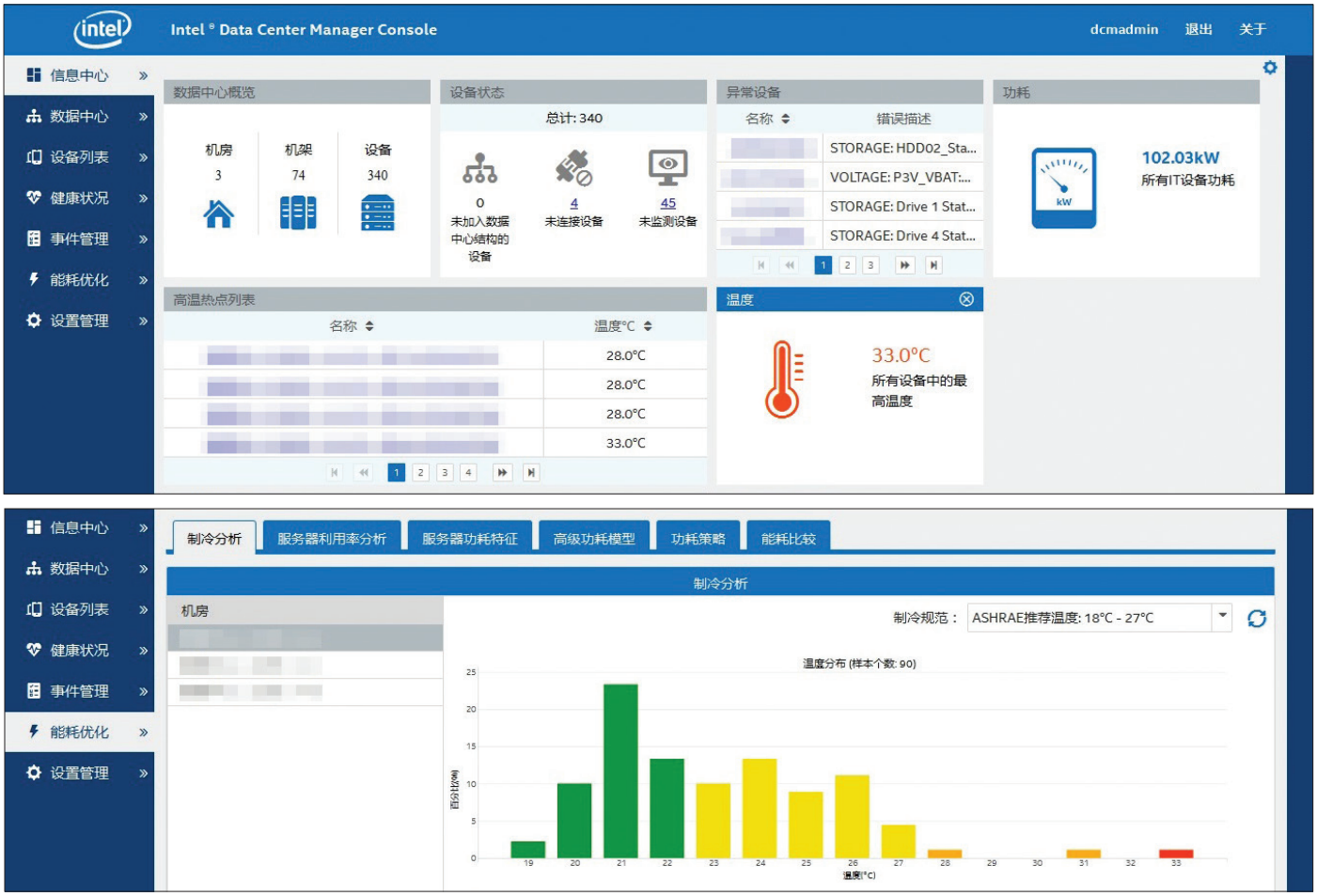


Figure 1. Intel® Data Center Manager Console

that were idle. The savings from the reduction in energy consumption in the 340-server test deployment indicated that, in a broader deployment, the bank could reduce annual operating costs by an additional $18,300 USD.

The initial test deployment of 340 servers indicated that if Intel® DCM were deployed across all of the company's 3,000 servers, the annual monitoring and cooling costs of the data center would be reduced by $105,660 USD.

Background

The Bank of China installed Intel® DCM in its data center and immediately began to access its diagnostic capabilities for power, thermal and health monitoring. Its intuitive design allowed IT administrators to monitor and troubleshoot the health of the data center's hardware in real time reducing overhead margins and gaining efficiency.

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.

Using the Intel® DCM single-screen console, the company's IT administrators quickly gained visibility into the 340-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.

Raising the Data Center Temperature Set-Point Lowered Cooling Costs

With energy costs rising fast, today's data centers are looking for where and how to reduce consumption without stressing hardware assets. Operators max out power to compensate for temperatures beyond the requirements for optimum functioning. Further, lack of visibility into actual power consumption leads to energy usage beyond the levels needed to maintain reserve margins.

Using the Intel® DCM cooling analysis, the bank IT staff found that the set-point for the server room in the test deployment was too cool. DCM provided a component list with the location and thermal health of each device within the test deployment. This granular data allowed them the needed insight to reduce cooling costs and improve Power Usage Effectiveness and energy efficiency by safely raising the temperature of the server room by 2°C, while continuously monitoring to correct temperature issues in real time. 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.

Thermal Health Monitoring Across a Broad Spectrum of OEM Servers

Monitoring server health levels, while eliminating the risk of downtime and performance complications, has been difficult for the bank due to lack of visibility into actual power consumption. Intel® DCM automates the collection, management and analysis of power and temperature readings at the individual device level. Additionally, the solution uses existing servers as wireless sensors, harnessing that ability to deliver device-level power and thermal data in real time, and eliminating the need for intelligent PDUs.

The server data reported the actual power and venting temperatures aggregated to servers, racks, and groups of servers, as well as specific server health component monitoring. The DCM on-screen dashboard not only displayed power usage by server model but also provided onscreen diagnosis and fix recommendations based on data aggregated and displayed in its power consumption graphs and maps.

Identifying Underutilized Servers

Lack of visibility into uptime and cross-platform power consumption levels makes efficient server deployment difficult. Additionally, lack of sufficient workload performance leads IT administrators to purchase more hardware. Intel® DCM remote console capability enables 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 operators the ability to diagnose and fix thermal and power consumption issues as they happen.

Intel® DCM helped the bank identify underutilized servers and formulate a precise optimization strategy based upon long-term low utilization trends. Leveraging this data, they were able to consolidate and virtualize underutilized servers in the test deployment. The team was able to reposition and balance workloads for existing servers because they had the added visibility to deploy existing devices with greater efficiency.

Strategically Powering Servers On-Off To Save Power

Energy is becoming one of the fastest-growing costs in a data center. Scheduling time to power off servers can significantly reduce operating costs. Intel® DCM's real-time energy consumption data improves the operator's ability to strategically lower power usage while maintaining workload scalability.

Intel® DCM automated the collection, management, and power and temperature analysis, which allowed administrators the ability to identify the rack, row, and room where servers could be powered off.

Leveraging this granular information, the bank's IT operation team improved capacity planning, powering off assets during off-peak hours, and strategizing new equipment outlays using predictions based on actual energy usage. Additionally, the solution reduced complexity in managing device-specific standards of different OEM servers and unified the process through the scheduling and power-capping capabilities provided by DCM.

The IT staff deployed Intel® DCM Cooling Analysis to reduce and optimize the overall energy consumption of servers during their normal operation, while effectively decreasing the performance risks of critical company information systems.

TEST DEPLOYMENT DEVICES 340
Total servers across data center: 3,000

RAISING SERVER ROOM TEMPERATURE >$27K
Reduce cooling costs

INTEL® DATA CENTER MANAGER SAVINGS >$105K
Projected savings for the year

BETTER SERVER UTILIZATION >$18K
Projected annual savings

AVOIDING INTELLIGENT PDU PURCHASES $60K
Annual savings

INCREASED ENERGY EFFICIENCY
Simplified thermal management

Figure 2. Key Benefits of Intel® DCM

Intel® Data Center Manager Deployment Results

Intel® DCM provided Bank of China with a monitoring strategy without the purchase of additional hardware infrastructure, including 600 intelligent PDU sensors to monitor various types of OEM servers housed in the data center server room.

The implementation of Intel® DCM helped the IT team achieve remote, cross-platform transparency and precise control of the test deployment of 340 data center servers. The ability to power off servers during off-peak times lowered operational costs.

Intel® DCM simplified the thermal management functionality within a heterogeneous server environment, which unified the thermal management and energy efficiency.

Using Intel® DCM, IT administrators captured a significant reduction in power spending.

- Intel® DCM simplified the process of raising server room temperatures by 2°C and, if deployed across the network, would return an annual savings of $27,360 USD.
- Intel® DCM eliminated the need to purchase additional hardware infrastructure, including 600 intelligent PDU sensors. The ability to precisely monitor the types of OEM servers housed in the data center server room would save the bank $60,000 USD.
- Intel® DCM optimized server utilization resulting from cross-platform transparency, and the capability to identify and power off low-utilization servers would return an additional annual savings of $18,300 USD.

Based on Intel® DCM deployment results, the anticipated annual savings of deploying the Intel® DCM solution across the full network of 3,000 servers would be $105,660 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:

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