

CASE STUDY

Cloud Data Center
China Mobile Communications Corporation



Increasing Server Efficiency and Eliminating Costly Hardware

Intel® Data Center Manager delivers significant savings by optimizing server utilization, and lowering annual server replacement percentages



Business:

China Mobile Communications Corporation is the largest mobile telecom provider in China.



Challenges

- Server power and thermal health monitoring
- Real time and historical data aggregation
- Low utilization server detection
- Energy optimization

Solutions

- Intel® Data Center Manager

Executive Summary

China Mobile Communications Corporation (CMCC), headquartered in Hong Kong, is the largest mobile telecom provider in China. The company installed Intel® Data Center Manager (Intel® DCM) and quickly deployed it across 50 servers to gain greater insight into energy consumption, server utilization, and component analysis across its server room environment. Additionally, Intel conducted a detailed discovery session of the company's server environment to identify the specific pain points that DCM would address. The company currently operates over 1,000 servers in its test center.

Leveraging Intel® DCM, CMCC wanted to better manage server health, balance loads more efficiently, analyze and remedy data center cooling issues, and gauge the Power Usage Effectiveness (PUE) of multiple server models. The DCM solution provided CMCC's IT operations team a cross-platform view of their four Original Equipment Manufacturer (OEM) server types with an enhanced ability to monitor the thermal health of each individual server component at the subcomponent level.

Intel® DCM's ability to deliver device-level power and thermal data eliminated the need to purchase intelligent Power Distribution Units (PDU), a significant source of cost savings. By not purchasing hardware sensors, the Intel® DCM deployment results across the full network of 100 data center racks indicated a five-year savings of \$20,000 USD.

The Intel® DCM console with real-time power monitoring capability provided the team with a list of idle or underutilized servers. Its remote management capability then allowed the team to power off underutilized servers from the convenience of their computer screens. This reduction in energy consumption over five years would yield an additional savings of \$24,000 USD.

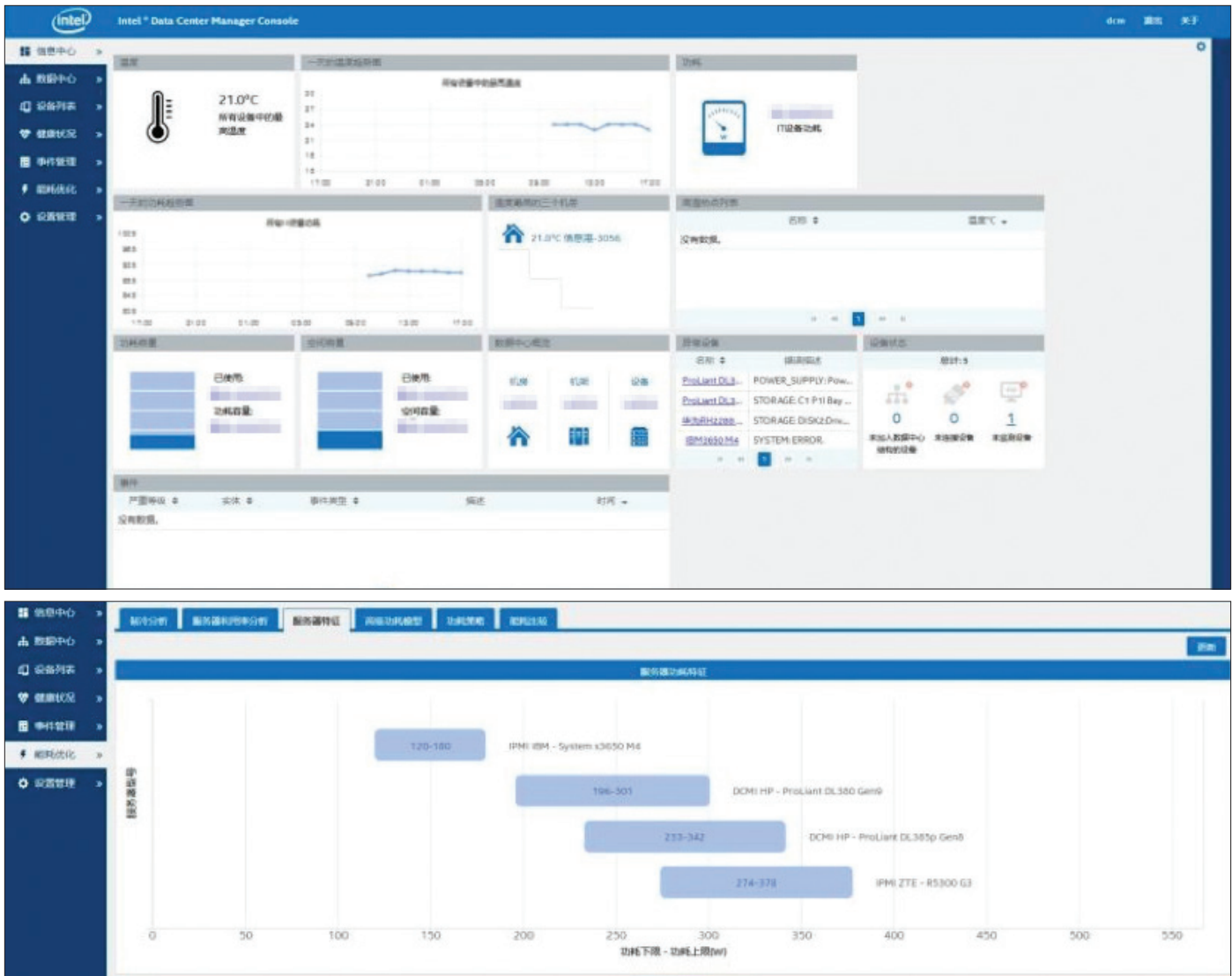


Figure 1. Intel® Data Center Manager Console

Identifying underutilized servers also allowed them to replace EOL servers, as well as consolidate and virtualize underutilized servers, and would decrease 20 percent of their annual replacement costs over five years, yielding a savings of \$120,000 USD.

The combined efficiency improvement and savings from the deployment of Intel® DCM over the next five years indicated an overall savings of \$164,400 USD.

Background

China Mobile Communications Corporation (CMCC) installed Intel® Data Center Manager (Intel® DCM) in a 50-server test deployment to gain greater insight into the facility’s thermal efficiency, server utilization, and component health across its server room environment. Intel conducted a detailed discovery session of the company’s server environment to identify the specific pain points that its DCM solution would address. The company currently operates over 1,000 servers in its test center.

The Intel® DCM middleware web-service API integrates easily into existing management systems to monitor, manage and optimize the energy consumption and thermal health of its server operations. CMCC sought to take advantage of these features in DCM while remotely monitoring server nodes in its data center. IT staff installed Intel® DCM and began to compile and aggregate data from the servers. Through ease of use and cross-platform support, Intel® DCM enabled company IT staff to aggregate and visualize trend data using its 2D front-of-rack visibility and overhead mapping features.

Intel® DCM Power and Cooling Analysis

A reliable power monitoring strategy traditionally requires the purchase of a separate infrastructure of IP-based intelligent power hardware. The CMCC data center houses 100 racks and would require two intelligent PDUs per rack. Intel® DCM turns servers into wireless sensors, which makes additional hardware devices unnecessary. The solution sends alerts as they happen from specific servers and racks according to user specification.

Intel® DCM pinpoints server temperature fluctuations in real time, allowing users to implement the same power strategies regardless of server model. The dashboard works intuitively using the sensor feature to identify server room hotspots, and allows operators to respond quickly with targeted power adjustments to the affected servers. IT staff could monitor the overall cooling environment of the equipment room while identifying the root cause of problems at a granular level to implement solutions efficiently.

The IT staff deployed Intel® DCM Cooling Analysis, then took data aggregated through the sensor capability to optimize the overall energy consumption of servers, effectively decreasing the performance risks of critical company information systems.

Intel® DCM Identifies Underutilized Servers to Strategically Power Them On or Off

Manual processes make precise visibility into uptime and cross-platform power consumption levels difficult. An idling server consumes 50 percent of peak power without producing any work. Intel® DCM 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 power off underutilized devices, reducing the thermal impact on the environment and power consumption issues as they happen.

Intel® DCM helped the IT networking provider team identify underutilized servers and formulate a precise optimization strategy. The IT teams enacted energy policies efficiently across multiple OEM servers and set alerts to maintain the lowest possible energy consumption levels.

Intel® DCM Server Health and Thermal Optimization

Lack of sufficient workload performance data can lead IT administrators to make unnecessary hardware purchases. Intel® DCM's health monitoring reduces the demand on data center cooling infrastructure. Remote console displays ensure the thermal environment protects servers by monitoring the uniformity of temperature distribution and recirculation between hot and cold aisles.

Intel® DCM's precise, subcomponent server data enabled CMCC to replace EOL servers, as well as consolidate and virtualize underutilized servers in the test deployment. The team could reposition existing servers because they had the added visibility to deploy existing devices with greater efficiency.

Additionally, Intel® DCM's functionality in a heterogeneous server environment allows servers to be discovered and managed efficiently. Because locating servers becomes easy, IT staff can track asset information, including real-time temperature, real-time power consumption, server name, model number, serial number, and management address. Because of the success of their efforts, the company's IT administrators delayed the purchase of 20 percent of their annual replacement servers and captured significant savings.

TEST DEPLOYMENT DEVICES

 **50**

Total servers across data center: 1,000

REDEPLOYMENT OF EXISTING SERVERS

\$120K

Potential five-year savings

INTEL® DATA CENTER MANAGER SAVINGS

>\$164K

Projected annual savings

BETTER SERVER UTILIZATION

>\$24K

Annual savings

AVOIDING INTELLIGENT PDU PURCHASES

\$20K

Potential five-year savings

INCREASED ENERGY EFFICIENCY

Simplified thermal management



Figure 2. Key Benefits of Intel® DCM

Intel® Data Center Manager Deployment Results

Intel® DCM provided China Mobile with a monitoring strategy without the purchase of additional hardware infrastructure, including 200 intelligent PDU sensors to monitor the four types of OEM servers housed in the data center server room. The solution also gave IT administrators granular insight into the health of individual servers. This allowed the team to safely redeploy existing devices rather than purchase new equipment.

Intel® DCM simplified the thermal management functionality within a heterogeneous server environment, which unified the thermal management and energy efficiency and provided a list of servers that could be remotely powered off when dormant.

Using Intel® DCM significantly lowered power consumption across different platforms and led to a reduction in spending. Additionally, the solution eliminated the need for PDUs which would significantly reduce the company's annual spending for replacement servers.

- Intel® DCM wireless sensor capabilities made the purchase of additional PDU hardware unnecessary, while still achieving granular transparency cross-platform at a five-year savings of \$20,000 USD.
- Intel® DCM on-off switching capability would allow operators to save power by shutting down idle servers when not needed. This power conservation would result in an annual savings of \$24,400 USD.
- Intel® DCM's ability to monitor power consumption and server health, allowed the redeployment of existing servers and eliminated the need for additional server purchases. When deployed across the entire network, the resulting five-year savings would be \$120,000 USD.

Based on Intel® DCM deployment results, the anticipated annual savings of deploying the Intel® DCM solution across the company's 1,000 servers is \$164,400 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:

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

