

CASE STUDY

Cloud Data Center
Chinese Railway & Transportation Company



Increasing Remote Server Visibility And Control

Intel® Data Center Manager delivers significant annual savings by optimizing server utilization and management, and eliminating the need for more resources



Challenges

- Server power and thermal health monitoring
- Remote access controls
- IT device power (PDU, UPS, Network, Storage)
- Aggregated control
- Historical trend analysis
- Server utilization
- Energy optimization

Solution

- Intel® Data Center Manager

Executive Summary

China Railway (CR), a state-owned and sole proprietary enterprise, installed Intel® Data Center Manager (Intel® DCM) at its Beijing, China data center. The solution was deployed across 1,500 servers to gain greater insight into the facility's server optimization and cooling efficiency.

Intel® DCM provided CR'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 reduction of additional IT staff and man-hours associated with manual monitoring. With Intel® DCM, the company could reduce labor by 500 man-hours per year, yielding a savings of \$375,000 USD over the next five years.

Additionally, Intel® DCM's ability to deliver device-level power and thermal data would eliminate the need for intelligent Power Distribution Units (PDU), another significant source of cost-savings. By not purchasing hardware sensors, the Intel® DCM deployment results across 150 of the data center racks indicated a five-year savings of \$300,000 USD. Lastly, the railway company determined Intel® DCM's remote switching capability would reduce energy costs through the redeployment of 16 percent of their servers. The resulting efficiency improvement and reduced energy consumption with Intel® DCM would save CR \$236,520 USD over five years. The combined Intel® DCM solution deployment results for the full data center operation over the next five years indicated an overall savings of \$911,520 USD.

Business:

China Railway Corporation, based in Beijing, is a state-owned and sole proprietary enterprise providing railway passenger and cargo transportation service. There are 127,000 kilometers rail track, and 25,000 kilometers of high speed track in China by the end of 2017. Also in 2017, railways in China delivered 2.852 billion passenger trips.



Figure 1. Intel® Data Center Manager Console

Background

The railway's Beijing-based IT operation team sought to gain insight into how to better deploy their servers. Intel® DCM's aggregated control and granular health monitoring provided transparency into device operation, thermal health, remote access, and capacity planning. The company deployed DCM across all 1,500 servers in the data center where they conducted the deployment.

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. The railway company sought to achieve greater access, while remotely monitoring server nodes in their data center operation. IT staff installed Intel® DCM and began to compile and aggregate data from the servers. Through its ease of use and cross-platform support, Intel®

DCM enabled the company's IT staff to visualize trend data with features like its 2D front of rack visibility and overhead mapping.

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. Intel® DCM 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 allows IT administrators a view of individual servers and components at subcomponent granularity, which led to a reduction in labor. By eliminating the need for manual oversight, Intel® DCM allowed operators to better monitor servers, while still working from the convenience of their offices — saving both time and money. This capability eliminated the need for additional labor with a 30 percent reduction in the required number of trips to the data center to manage on-site operations.

Intel® DCM Provides Thermal Monitoring & Cooling Analysis

The thermal design of older data centers can cause temperatures to reach upper limits, and lead to hot spots. Additionally, lack of visibility into actual power consumption leads to energy usage well beyond the levels needed to maintain reserve margins, making energy policy execution inefficient.

Intel® DCM 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, another significant source of cost-savings. The railway's 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.

Using the Intel® DCM cooling analysis, IT staff reduced cooling cost and improved Power Usage Effectiveness (PUE) as well as energy efficiency by safely raising the temperature of the server room, while continuously monitoring data center devices for temperature issues.

Improve Capacity Planning and Increase Rack Density

According to a research report sponsored by Intel®, 43 percent of data centers use manual methods for capacity planning and forecasting. Intel® DCM automates the collection, management, and analysis of power and temperature readings at the individual device level. Leveraging this granular information, 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 CR collected server data, the team used the data to establish cooling levels in the server rooms, while maintaining peak health for hardware in real time. This practice led to the discovery of servers that were underutilized as well as the diagnosis of servers with hardware errors. This new awareness allowed the team to optimized servers cross-platform and implement a policy-based management approach.

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 provides the foundation for high-precision capacity analysis, reliable capacity planning and accurate threshold monitoring.

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.

DEPLOYMENT DEVICES



1,500

Total servers across data center: 1,500

REDUCTION IN DATA CENTER LABOR COSTS

\$375K

Savings over five years

INTEL® DATA CENTER MANAGER SAVINGS

>\$911K

Projected savings for 5-year cycle

BETTER SERVER UTILIZATION

>\$236K

Savings over five years

AVOIDING INTELLIGENT PDUS

\$300K

Savings over five years

REDUCTION IN ON-SITE DATA CENTER VISITS

↓ 30%

With enhanced server visibility

Figure 2. Key Benefits of Intel® DCM

Intel® DCM automates the collection, management and analysis of power and temperature readings at the individual device level. Leveraging this granular information, CR's IT operation team improved capacity planning by identifying and decommissioning energy-wasting assets, and strategizing new equipment outlays using predictions based on actual energy usage.

The IT staff deployed Intel® DCM Cooling Analysis to reduce and optimize the overall energy consumption of servers during operations, while effectively decreasing the performance risks of critical company information systems. Intel® DCM is a software and technology product that receives alerts based on custom power and thermal events predetermined by the user. After deployment, IT administrators confirmed the success of the process transition in the data center.

Intel® Data Center Manager Deployment Results

Intel® DCM provided China Railway with remote access capability, control and real-time power and thermal monitoring, thus reducing annual labor costs by 30 percent over five years. The implementation of Intel® DCM helped the IT team achieve remote, cross-platform transparency and precise control of their 1,500 data center servers.

Intel® DCM enabled a monitoring strategy without the purchase of additional hardware infrastructure, including 300 intelligent PDU sensors to monitor the five types of OEM servers housed in the data center server room.

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.

- Based on this enhanced visibility into the health of their servers, Intel® DCM would allow IT staff to reduce on-site visits to their Beijing data center operation by 30 percent, while improving management of their servers. This resulting five-year reduction in labor costs would save \$375,000 USD.
- Intel® DCM wireless sensor capabilities made the purchase of additional PDU hardware unnecessary, while still achieving granular transparency cross-platform at a savings of \$300,000 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 a five-year savings of \$236,520 USD.

Based on Intel® DCM deployment results, the anticipated annual savings of deploying the Intel® DCM solution across the company's 1,500 servers is \$911,520 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:

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



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