CASE STUDY

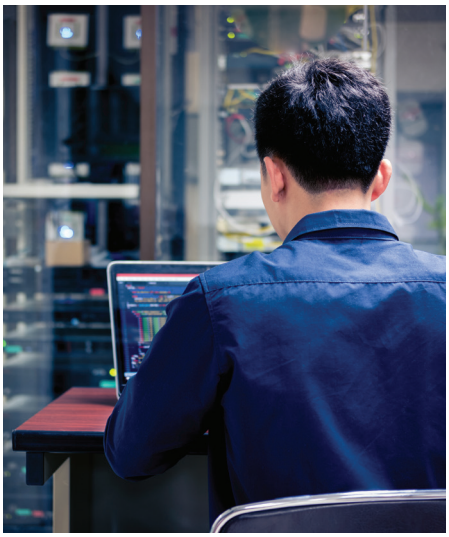
Cloud Data Center
Leading IT Networking Solutions Provider

Reducing Energy Consumption and Costs

Intel® Data Center Manager delivers significant annual savings through optimized capacity planning, thermal management, and power capping

Business:

A global IT networking solutions provider based in Europe



Challenges

- Real-time power and thermal monitoring
- Data center utilization
- Increase energy efficiency
- Efficient data center operation
- Efficient cooling management

Solution

- Intel® Data Center Manager

Executive Summary

A global IT networking solutions provider installed Intel® Data Center Manager (Intel® DCM) in its data centers, deploying the solution across 1,000 devices in a two-month test deployment to gain greater insight into power and thermal monitoring, power capping implementation, and improved capacity planning. The provider currently operates over 6,000 servers across its data center network.

Using the Intel® DCM cooling analysis, the provider's IT staff was able to drive higher temperatures in the data center, identify underutilized servers, save energy by power capping, increase rack density, and avoid a substantial investment in an expensive asset management system. They also improved their data centers' Service Level Agreements (SLAs) by identifying hotspots and server hardware component failures. Intel® DCM enabled IT staff to reduce data center operations costs and improve overall Power Usage Effectiveness (PUE), thus increasing energy efficiency. The original test deployment of 1,000 servers indicated that if Intel® DCM were deployed across all of the company's servers, the annual costs of the data center would be reduced by $230,000 USD.

Intel® DCM's real-time power monitoring and ability to control power consumption (power capping) allowed IT staff to implement a power capping strategy to save power, and thus realize a potential eight percent annual savings across 6,000 servers, amounting to $14,000 USD.

The solution also allowed them to safely raise server room temperatures. For every 1°C the temperature was raised in the data center, Intel® DCM would return an annual savings of $30,000 USD.

Intel® DCM identified hardware component failures that the IT team was able to repair or replace with little or no loss due to downtime, yielding an annual savings of $57,000 USD. It also made it possible to improve rack density, realizing an estimated savings of $23,000 USD annually. Furthermore, Intel® DCM helped the

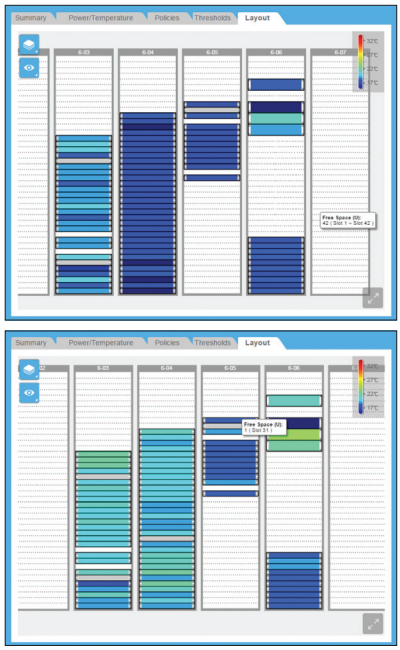


Figure 1. (Top) Before - servers are overcooled; (Bottom) After 1 degree increase of temp set-point

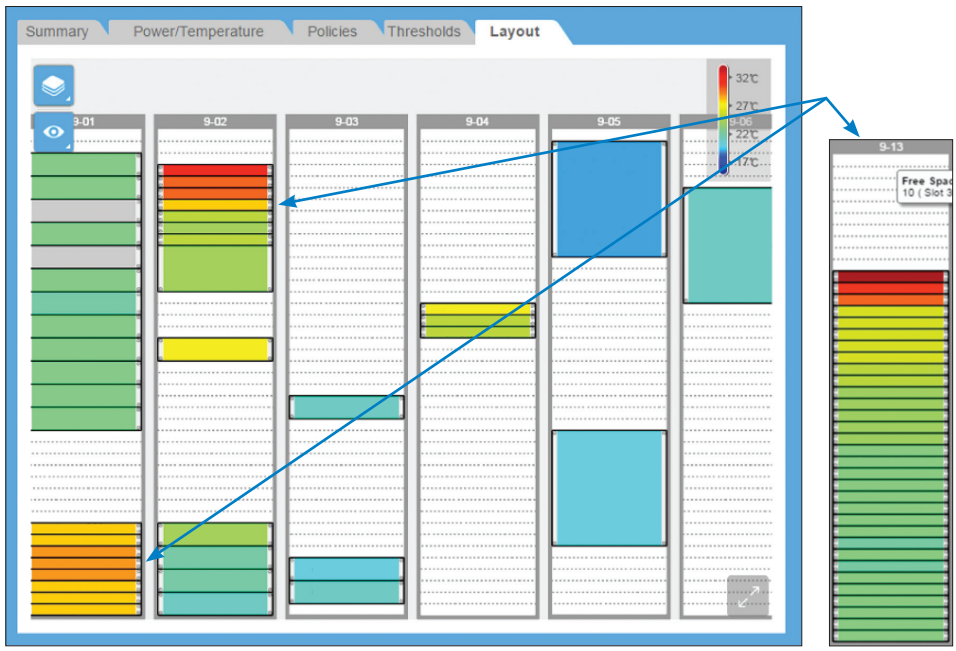


Figure 2. Row level thermal maps identified server starvation, misuse of blanking panels, and other thermal issues

IT team to identify underutilized servers. Leveraging this data, they were able to replace End-of-Life (EOL) servers, as well as consolidate and virtualize underutilized servers, yielding an annual savings of $23,000 USD. Finally, Intel® DCM also eliminated the need for a substantial investment in an asset management tool, saving the networking provider an additional $85,000 USD.

Based on Intel® DCM deployment results, the anticipated savings of deploying the Intel® DCM solution across the company's 6,000 servers is $690,000 USD over three years.

Background

A global IT networking solutions provider installed Intel® DCM in its data centers for power, thermal and health monitoring. The IT staff looked to diagnose, troubleshoot and monitor the health of the data center's hardware in real time in order to reduce overhead margins and improve efficiency.

Using the Intel® DCM single-screen console, the company's IT administrators quickly gained visibility into the 1,000-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.

Energy Cost Savings by Using Power Capping Technology

Intel® DCM provides cross-platform visibility into power consumption levels and enables IT administrators to cap consumption levels and align them with those set within organizational power capping guidelines. This capability enables IT administrators to better manage power consumption of servers in their data centers, and reduce energy usage and costs during off-peak hours without performance impact.

Intel® conducted two power capping tests on racks during off-peak to determine how much energy DCM would save the networking provider. The first test group before the DCM power capping feature was implemented read 215 Kwh/Week, and read 200 Kwh/Week after implementation - a savings of seven percent. In the second test group, the energy consumption levels before implementation of the power capping feature read 642.9 Kwh/Week, and read 582.8 Kwh/Week after the feature was enacted; the networking provider realized a savings of nine percent.

Intel® DCM provides an intelligent heuristics engine that maintains group power caps while ensuring optimal performance. Historical data for power and thermal can be compiled and aggregated to maintain and control for responsive power consumption management. This capability allowed the IT staff to implement a power capping strategy to save power, and thus realize a potential eight percent annual savings if deployed across all 6,000 servers.

Reducing Cooling Costs by Increasing the Data Center Temperature Set-Point

Intel® DCM provides granular thermal monitoring by reading the internal temperature sensors of the devices in the data centers, and provides real-time thermal maps and cooling analysis that can help increase the data center thermal efficiency.

Using the Intel® DCM cooling analysis, the IT staff found that the set-point for the server room in the test deployment was too low. 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 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 data centers.

Improving 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 allows the data center operation team to monitor in real time the health status of all sub-components in every monitored server.

Intel® DCM allowed the IT team to identify failures in four percent of their servers. This insight into subcomponent health data for each of its servers provided the ability to diagnose the root cause of server failure. This ability to monitor health of each server allowed IT operators to reduce downtime while maintaining peak efficiency for servers and addressing server issues in real time.

Reducing Data Center Footprint and Costs by Increasing Rack Density

Many data center operation teams are using nameplate/de-rated power values when designing their infrastructure and provisioning new hardware for new projects. This methodology can cause over provisioning of data center infrastructure resulting in unnecessary capital costs. Intel® DCM provides real-time and historical trending for power consumption and analyzes it per server model. This information helps IT and facility organizations to right size their infrastructure and provision new hardware in an efficient way.

Using Intel® DCM, the company found a big difference between planned power consumption for their racks and their actual power consumption. By using data collected during the test installation, the company was able to increase their rack density and reduce their data center footprint.

Identifying Underutilized Servers

According to analysts, ~5% of the servers in a typical data center are "ghost" servers that are consuming power and are not doing any real work. In addition, there are additional servers that are very underutilized and can be consolidated or virtualized. 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 operation teams the ability to End-of-Life, consolidate, or virtualize the underutilized servers.

Intel® DCM helped the IT networking provider team identify underutilized servers and formulate a precise optimization strategy. Leveraging this data, they were able to replace End-of-Life servers, as well as consolidate and virtualize underutilized servers in the test deployment. The team was able to reposition existing servers because they had the added visibility to deploy existing devices with greater efficiency.

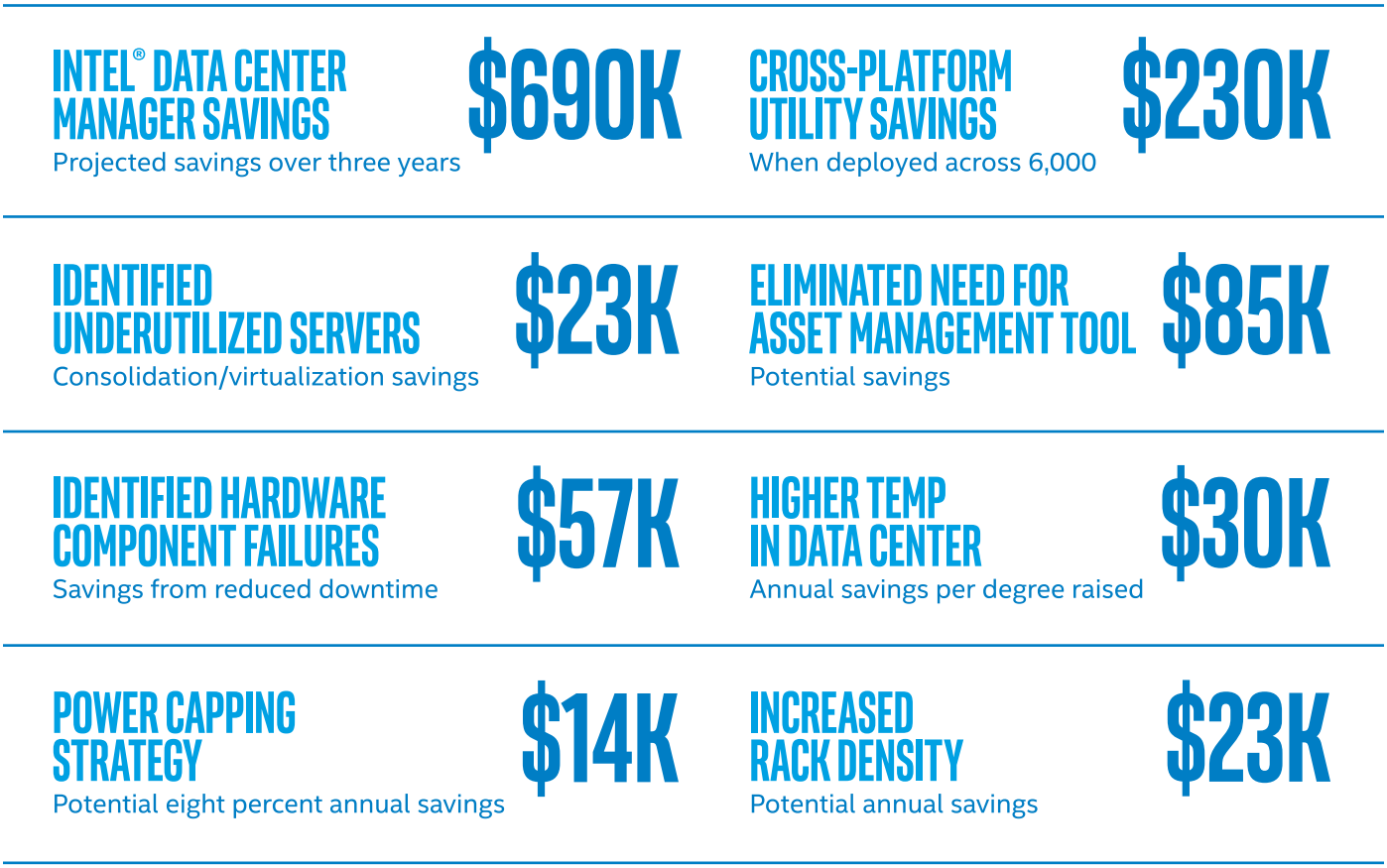


Figure 3. Key Benefits of Intel® DCM

Cost Avoidance for Asset Management Solution

Asset management solutions are often hard to integrate into existing systems, pricey, and hard to manage. Data center operations teams need tools to manage assets with greater efficiency to ensure workload resources are balanced and not being wasted.

The networking provider had planned to invest in additional process management tools to provide rack and server visibility. The Intel® DCM console eliminated the need for the additional investments at a considerable cost savings.

Intel® Data Center Manager Deployment Results

One challenge a multi-site data center faces is cross-platform power policy execution based on network requirements and hierarchical distinctions. Intel® DCM enabled IT staff to reduce data center operations costs and improve overall Power Usage Effectiveness, thus increasing energy efficiency. DCM supports multiple concurrent power policy types, allowing scheduling by the time of day or day of the week. Based on this enhanced control and visibility into the thermal health of its servers and facility cooling, the company increased server density. Additionally, IT staff was able to safely raise room temperatures in their server rooms, saving a total of 15 percent in cooling power costs.

- The original test deployment of 1,000 servers indicated that if Intel® DCM were deployed across all of the company's servers, the annual costs of the data center would be reduced by $230,000 USD.
- Intel® DCM's real-time power monitoring and ability to control power consumption allowed IT staff to implement a power capping strategy to save power, and thus realize a potential eight percent annual savings across 6,000 servers, amounting to $14,000 USD.
- The solution also allowed them to safely raise server room temperatures. For every 1°C the temperature was raised in the data center, Intel® DCM would return an annual savings of $30,000 USD.
- Intel® DCM identified hardware component failures that the IT team was able to repair or replace with little or no loss due to downtime, yielding a savings of $57,000 USD.
- Intel® DCM power and space monitoring made it possible to improve rack density with a savings of $23,000 USD annually.
- Intel® DCM helped the company end-of-life, consolidate and virtualize servers, yielding a cost saving of $23,000 USD.
- Intel® DCM eliminated the need for the company to invest in an asset management tool, saving an additional $85,000 USD.

Based on Intel® DCM deployment results, the anticipated savings of deploying the Intel® DCM solution across the full 6,000 servers for three years is $690,000 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:

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