Intel® DCM delivers significant annual savings, reducing hardware management complexity and wear through power, thermal, and health monitoring

Business:
A Chinese multinational banking company and one of the largest commercial banks in China

Challenges
- Real-time cross-platform thermal and power monitoring, energy consumption and temperature control
- Automated server discovery
- Centralized policy management of server energy consumption
- Increase energy efficiency
- Server-level centralized remote access

Solution
- Intel® Data Center Manager

Executive Summary
A multinational financial institution installed the Intel® Data Center Manager (Intel® DCM) in its Zhuhai, China data center, deploying the solution across 3,000 devices to gain greater insight into power and thermal monitoring, implement power capping, and deploy KVM dashboard. The institution currently operates over 10,000 servers across its data center network.

Using the Intel® DCM cooling analysis, the IT staff was able to raise room temperature in the data center, while continually monitoring devices to anticipate and correct issues in real time. Their efforts reduced cooling cost and improved Power Usage Effectiveness (PUE), thus increasing energy efficiency. The original test deployment of 49 servers indicated that if Intel® DCM were deployed across the full 3,000 servers, the annual cooling costs of the data center would be reduced by $275,400 USD. Intel® DCM’s ability to deliver device-level power and thermal data eliminated the need for intelligent Power Distribution Units (PDUs). Based on the customer’s current data center environment of 300 racks, the projected savings would be $60,000 USD. Additionally, through Intel® DCM’s ability to measure power usage at the device level, IT staff would be able to implement a power-capping strategy to save power, and thus realize a potential yearly savings of $118,200 USD.

The IT administrators also installed the Intel® DCM cross-platform KVM solution, a virtual keyboard-video-mouse, used to troubleshoot, diagnose, and monitor the health of data center hardware, and to gain remote server visibility and control. Because Intel® DCM delivers middleware KVM for device management, the need for hardware KVM devices is eliminated.
Case Study | Intel® Data Center Manager Simplifies Execution of Energy Capping Policy

**Background**

The multinational financial institution purchased and installed the Intel® DCM Console 3.2 in their data center for power, thermal and health monitoring. Additionally, the IT staff needed to be able to diagnose, troubleshoot and monitor the health of the data center’s hardware in real time.

Intel® DCM enabled IT staff to assess its value in a broader deployment. The middleware, web-service API integrates easily into existing management systems to monitor, manage and optimize the energy consumption and temperature of data center servers.

**Intel® DCM Provides Thermal Monitoring, Improving Energy Efficiency**

Today, many data centers max-out power consumption, yet, poor thermal design and energy policy execution leads to hot spots and inefficient use of energy. Moreover, a lack of visibility into actual power consumption leads to significant overprovisioning to maintain reserve margins.

Establishing a power monitoring strategy could mean additional hardware infrastructure including the purchase of 300 intelligent PDU sensors. An additional challenge IT administrators must address in order to have a single solution for power management across all devices in the data center is the multiple proprietary power measurement and control protocols supported by different Original Equipment Manufacturers (OEMs).

IT administrators at the multinational financial institution installed Intel® DCM and saw an immediate benefits with the solution’s intuitive, easy-to-use console. With Intel® DCM, complex, device-specific configurations and customized setup are not needed.

A key feature of Intel® DCM is its functionality within a heterogeneous server environment, which unified the thermal management and energy efficiency of the customer’s three server types.

The Intel® DCM Management Console identifies cooling efficiencies, detects underutilized systems, visualizes power consumption in maps and graphs, and models power consumption changes and their impact to infrastructure.

The IT staff utilized the Intel® DCM’s health monitoring and to obtain granular sub-component real-time power usage data, and analyze for all three server models. Because Intel® DCM provides power and thermal monitoring and management for servers, racks and groups of servers, IT administrators were able to aggregate real-time, accurate power and thermal consumption data, and manage data center power consumption.

Intel® DCM’s health monitoring also reduces the demands on data center cooling infrastructure, while ensuring the thermal environment protects IT equipment, especially the servers. This approach enables uniform temperature distribution and ensures that recirculation is sufficiently granular between hot and cold aisles.

Intel® DCM monitoring provided IT staff of the multinational financial institution with server number, accurate real-time power and thermal consumption data. It also provided data to derive insights needed to adapt to changes as they happened. This management capability included real-time monitoring of actual power and inlet temperature data aggregated to servers, racks, and groups of servers, as well as server health component monitoring at a granular level.

Using the Intel® DCM cooling analysis, the IT staff reduced cooling cost and improved PUE as well as energy efficiency by safely raising the temperature of the server room while continuously monitoring data center devices for temperature issues. The test deployment indicated that if Intel® DCM were deployed across the data center’s 3,000 servers, the annual cost savings would reach $641,100 USD.
Intel® DCM Automated Server Discovery

Using Intel® DCM pinpoints server temperature fluctuations in real time using the wireless sensor feature. It allows users to implement the same power strategies regardless of server model. Additionally, the multinational financial institution's data center houses 300 racks, requiring two intelligent PDUs per rack. Intel® DCM made additional hardware devices unnecessary while still receiving alerts from specific servers and racks as required.

With Intel® DCM, servers become sensors alerting staff when temperature extremes occur. The intuitive dashboard worked in tandem with sensors to identify server hotspots that appeared in the data center, allowing quick response and targeted power adjustments to those servers. IT staff were also able to monitor the overall cooling environment of the equipment room in the data center, while identifying the cause of problems and implementing solutions for improvement more efficiently.

Energy Consumption Monitoring and Optimization

Intel® DCM provides an intuitive IT asset management interface to display key KPI information for the data center. The interface enables integrated viewing of server asset information as a basis for optimization. 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 are able to track asset information like real-time temperature, real-time power consumption, server name, model number, serial number, and management address among other data.

Monitoring and adjusting power consumption during peak times and lower usage windows enabled IT staff to comply with minimum power and efficient power policies in tandem with their business priorities.

Based on the information and data obtained from the deployment of Intel® DCM, the multinational financial institution reduced energy consumption and efficiency optimized the operation from multiple perspectives.

Intel® DCM KVM Access Remote Server Visibility and Control From Anywhere

Intel® DCM middleware web service replaces legacy KVM (keyboard-video-mouse) hardware with an easy to integrate API. Supporting multiple OEM server vendors, Intel® DCM is an easily installed console. The middleware solution reduces complexity and adds new capabilities beyond the limits of hardware switches, making complicated and expensive KVM infrastructure unnecessary. Intel® DCM console delivers KVM capability to control and manage servers over a centralized dashboard for remote access, subsystem monitoring, automated health alerts, and remote on/off control.

Because Intel® DCM KVM for device management, the need of hardware KVM devices was eliminated. The test deployment indicated that if Intel® DCM was deployed across the data center’s 3,000 servers, the annual cost savings would be $187,500 USD.

Intel® Data Center Manager Deployment Results

One of the challenges of having a single solution for power management across all devices in data centers is that there are multiple proprietary power measurement and control protocols supported by different OEMs. Using Intel® DCM, the IT administrators applied power policies and captured significant reduction in power spend for all three OEM models of servers: 11.3% for the efficient power policy and 7.7% for the minimum power policy on the first server model, 29% on the second, and 17% on the third.

**Figure 1. Key Benefits of Intel® DCM**

<table>
<thead>
<tr>
<th>TEST DEPLOYMENT DEVICES</th>
<th>INTEL® DATA CENTER MANAGER SAVINGS</th>
<th>HIGHER TEMP IN DATA CENTER</th>
<th>ELIMINATED NEED FOR HARDWARE KVM</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000</td>
<td>$641k</td>
<td>$275k</td>
<td>$187k</td>
</tr>
<tr>
<td>Total servers across data centers: 10,000</td>
<td>Projected annual savings</td>
<td>Reduce cooling costs</td>
<td>Projected annual savings</td>
</tr>
<tr>
<td>INTEL® DATA CENTER MANAGER SAVINGS</td>
<td>$118k</td>
<td>TOTAL POWER CAPPING SAVINGS</td>
<td>&gt;$118K</td>
</tr>
<tr>
<td>Projected annual savings</td>
<td>&gt;$60k</td>
<td>When deployed across all</td>
<td></td>
</tr>
<tr>
<td>AVOIDING INTELLIGENT PDUS</td>
<td>$60k</td>
<td>ELIMINATED NEED FOR HARDWARE KVM</td>
<td>&gt;$187k</td>
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The multinational financial institution deployed Intel® DCM to identify server health and significantly cap power to high workload 4U servers with an overall power saving of 10%.

- Based on this enhanced visibility into the health of their servers, IT staff was able to raise room temperatures in their server rooms by 5°C. The industry standard savings per degree of temperature in a power bill is 3%. Intel® DCM made possible a 15% overall savings for the year on air conditioning amounting to $275,400 USD.

- Intel® DCM wireless sensor capability made the purchase of additional PDU hardware unnecessary while still achieving granular transparency cross-platform at a savings of $60,000 USD.

- Intel® DCM could apply power-capping strategy to save server power while having no impact on regular workload. The power saved at a 10% reduction for 3,000 servers amounts to $118,200 USD.

- Finally, Intel® DCM middleware KVM for device management averted the need for purchase of expensive KVM, $10,000 USD per 32 servers, totaling $187,500 USD when deployed on 3,000 servers.

Based on Intel® DCM deployment results, the anticipated annual savings of deploying the Intel® DCM solution across the 3,000 servers is $641,100 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:

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