



KoçSistem Helps Customers Improve Data Center Power and Cooling Efficiency with Intel® Data Center Manager



Executive Summary

Big data, cloud services, and virtualization have all accelerated both the growth and the complexity of data centers. This makes data center infrastructure management more important than ever.

Analysts continue to forecast significant growth in the number of connected users, or netizens, to more than three billion by 2015, along with tremendous growth in structured, semi-structured, and unstructured data such as transactions and financial data to emails, system-generated activity logs, videos, and photos.¹ In fact, there are forecasts of the amount of information doubling every two years, and an 11 times increase in mobile data traffic by 2015.² Intel projects there will be 15 billion connected devices including notebooks and desktops, smartphones, tablets, cars, and more.³ According to Pike Research, a market research and consulting firm, data centers worldwide consumed 201.8 terawatt hours (TWh) in 2010 and energy spending reached USD23.3 billion. This is enough electricity to power 19 million average homes in the U.S.⁴

The fastest-growing data center concerns for CIOs and CxOs are energy costs, heat generation, and carbon footprint. Servers, owned by a company's IT organization, consume most of the energy. This puts IT under pressure to invest heavily in innovative technologies to keep up with the tremendous growth in users, data, devices, and traffic.

Data center infrastructure management (DCIM) is a way to do this. The concept of DCIM is defined by Gartner as the integration of information technology and facility management disciplines to centralize monitoring, management, and intelligent capacity planning of a data center's critical systems.⁵ It is achieved by deploying specialized software, hardware, and related sensors. DCIM technologies give IT organizations the ability monitor and manage all interdependent systems across entire IT and facility infrastructures in real time, avoiding interruptions and unexpected service downtimes caused by the infrastructure itself.

Meeting Demands

IT must find new ways to improve both power and density to build an IT infrastructure that can meet the efficiency and agility requirements of today's businesses. Not being able to monitor and manage the interdependencies of data

center equipment can lead to unexpected problems and failures of both the power and cooling infrastructure and the servers. Issues can include overheating, overloads, and loss of redundancy. This is why it is essential to measure and predict power use and temperature at the rack enclosure level

H. Bora Taser
Cloud Solutions
Lead Architect
Intel Corporation

Contents

Executive Summary1
Meeting Demands1
KoçSistem Maximus* and Intel®
DCM Integration2
Discovery of Servers and Subnets ..3
Advanced Analysis and Reporting
Capabilities3
Server Power Consumption
Results4
Conclusions4

to ensure efficiency and optimized use of the physical infrastructure resources.

KoçSistem is well aware of these needs. It hosts one of the largest public cloud data centers in Turkey, with many business-critical customer workloads. To help identify underutilized and ghost servers, possible hot spots, and likely failure points, and to improve overall data center efficiency, KoçSistem implemented Intel® Data Center Manager (Intel® DCM), which helps it collect and manage data about a data center's IT hardware infrastructure including related assets, resource use, and operation status throughout the data center lifecycle. KoçSistem can distribute, integrate, and apply this information to help managers optimize the data center's performance and meet IT, business, and service goals. For IT assets including servers, racks, rows, rooms, and buildings, KoçSistem is using Intel DCM to proactively deliver power and thermal information to users before any power related outage or failure occurs.

KoçSistem Maximus* and Intel® DCM Integration

Although most virtualization software solutions have their own management interfaces, Maximus*, KoçSistem's in-house developed cloud management platform, has a management interface that provides

multi-hypervisor management capabilities in a centralized and vendor-agnostic way. Maximus also helps increase the operational efficiency of KoçSistem's cloud and bring its cloud customers both the flexibility and functionality of managing their own cloud operations.

With one of the region's largest Tier III+ compatible data centers, KoçSistem decided to integrate Intel DCM with its Maximus cloud management portal to centralize the cloud hardware infrastructure power and thermal management functions onto a single Maximus console.

KoçSistem designed the integration model to call the Intel DCM monitoring and reporting APIs into the Maximus interface and let managers view the output data from the Maximus management console. KoçSistem created an administrator profile, called the Energy Efficiency Manager*, that encompasses the user and admin rights to see all Intel DCM monitoring data fed into Maximus from all discovered servers and proactively deploy capping rules based on corporate energy efficiency policies (Figure 1).

DCIM solutions available today, deployed by facility teams, can measure and manage power at the rack and protocol data unit (PDU) levels but have very little visibility at the server level with an aggregated approach. Achieving critical service levels at all layers requires an integrated approach between facility and server infrastructure.

There are also challenges in managing power at the appropriate times. Intel DCM, integrated into the Maximus cloud management platform, provides real-time, server-level data on power and thermal conditions within the data center. This delivers comprehensive power and thermal consumption information for the entire data center. Based on this data, KoçSistem can save on energy consumption, maximize its business performance, and run a greener data center infrastructure.

Intel DCM provides insights into the Maximus cloud management console, the IT

About KoçSistem

Established in 1945, KoçSistem is a member company of Koç Group and a pioneering organization in the information and communication technologies sector in Turkey. KoçSistem offers special technological solutions to meet the specific needs of its customers, a consultant company vision, human resources, and technological infrastructure.

Helping its customers respond to changes and transformation in the IT market segment, KoçSistem's average annual growth rate has been 25 percent for the last five years, well above the average for its line of business. KoçSistem ranks as a leader, with a 9.4 percent market segment share in Turkey's IT services market segment.⁶

KoçSistem provides a range of information technologies solutions and services to its customers with the aim of reducing investment and other costs by increasing the effectiveness and efficiency of their information systems processes.

Learn more at www.kocsistem.com.tr

layer of the data center, through integration with external IT systems. The integration is handled through:

- Secure Shell (SSH) (discoveries on Linux*)
- Simple Network Management Protocol (SNMP) (discoveries on Linux)
- Windows Management Instrumentation* (WMI*) (discoveries on Windows*)

- VMware* (discoveries on ESXi*/VMware guest)

KoçSistem now can identify any servers in the data center that are running but not really being used. This saves unnecessary power consumption by letting KoçSistem consolidate or retire under-used or unused servers. The system uses the actual power draw rather than nameplate values to obtain much better accuracy.

Discovery of Servers and Subnets

When the Intel DCM server communication has been configured, it is possible to configure discovery of the servers on various network subnets.⁷ The discovery enables the

system to agentlessly scan the defined IP ranges and enables the IT administrator to create asset inventory classification at the data center, room, row, rack, or server level. IT administrators can also add multiple physical nodes using a default Excel* import template. Once classification and import tasks are completed, the system immediately starts monitoring changes in power and CPU utilization on the servers.

Advanced Analysis and Reporting Capabilities

Users can generate an underutilized servers report to identify non-utilized and

underutilized servers, also known as ghost servers. Users can reach utilization reports through the console. A portlet can be configured to show the server utilization data on the data center operation dashboard.

The utilization report includes:

- Filter selections
- Time period
- Peak and average utilization thresholds
- Rooms and tags



Figure 1. KoçSistem Maximus and Intel DCM Integration.



Figure 2. Server Utilization Report

Server Power Consumption Reports

Businesses need to right-size their data centers to keep capital and operating expenses under control.

With proper power and cooling capacity monitoring and management, today's typical data center could hold up to 30 percent more IT equipment. Capacity management tools can help IT organizations better utilize their power and cooling resources and reduce electricity consumption.

Server power consumption rate is one of the key inputs to server consolidation, rack footprint improvements, and total cost of ownership calculations. Having sufficiently granular power consumption information can provide both infrastructure managers and CIOs with an accurate and convincing justification for server refresh. With the support of Intel DCM, users can generate IT optimizer power consumption reports to identify the servers with the highest average power usage and use them to evaluate likely server candidates for upgrades, load sharing, or retirement.

The report includes:

- Filter selections
- Data range
- Average power threshold
- Room selection

Conclusions

Many IT organizations view a server rack as a black box generating heat and consuming power—without knowing the quantity, type, or even the location of the servers in the rack. When an IT organization understands the power consumption of each server, it can estimate cooling requirements with better accuracy to better meet service level requirements.

Some key advantages of having the right information about the IT devices in the rack include:

- Understanding power consumption characteristics of individual servers
- Awareness of varying power characteristics of the servers
- Recognition of unusual fan operating modes

- Ability to more accurately assess server behavior

Intel DCM real-time power and thermal monitoring, user-defined reports and graphs, and instant fault notification and escalation can enable quick assessment and resolution of crucial server infrastructure events that can adversely affect IT system availability.

Multiple users can access this centralized repository of critical information from anywhere on the network, getting a consolidated view of the physical data center infrastructure. Integrated with KoçSistem's Maximus cloud management platform, Intel DCM provides an efficient way for KoçSistem to monitor its company-wide, multi-vendor physical server infrastructure to identify both key IT components and possible failure points. This helps it to avoid unexpected downtime and outages and increases overall data center efficiency and power usage effectiveness (PUE).

[Learn more about Intel Data Center Manager at www.datacentermanager.intel.com.](http://www.datacentermanager.intel.com)

¹IDC, "Server Workloads Forecast and Analysis Study, 2009–2014," August 2010.

²IDC, "Extracting Value from Chaos," June 2011.

³Worldwide Device Estimates Year 2020: Intel One Smart Network" forecast.

⁴Pike Research (Navigant Research), "Cloud Computing Energy Efficiency," December 2010.

⁵Gartner, "Data Center Infrastructure Management (DCIM)," <http://www.gartner.com/it-glossary/data-center-infrastructure-management-dcim>, accessed 3/27/14.

⁶IDC, "Market Analysis: Turkey IT Services Market 2012 - 2016 Forecast and 2011 Vendor Shares," December 2011.

⁷DCIM Support, "Configuring IT Asset Discovery," <http://dcimsupport.apc.com/display/UAOps72/Configuring+IT+asset+discovery>. Accessed 3/27/14.

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