Intel® Data Center Manager

Data center IT agility and control
The Data Center Ecosystem
Why do we care about Data Center Management?

- **Data Use Growth**: 403ZB attributed to devices connected to the Internet of Everything (up from 113ZB in 2013).\(^5\)
- **Energy Spent**: 10-50x per floor space of typical commercial office building.\(^4\)
- **Global Energy Use**: 10% will be attributed to global data centers, which comes to 91BkWh.\(^3\)
- **Use of Power**: 50% of power by servers, even while remaining idle.\(^6\)

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\(^5\)Upsite; \(^6\)Intel White Paper; \(^7\)NTT White Paper; \(^8\)Intel, Klaus
Intel® Data Center Manager
Intel® DCM Delivers

- Real Time Power and Thermal Data for Racks/Blades
- Policy Based Power Capping for Racks/Blades
- IT Device Power (PDU, UPS, Network, Storage)
- Aggregated Control
- Historical Trending
- Cross Platform Support
Intel® DCM
A middleware with web service APIs for data center power and thermal management – easy to integrate in the Management Console

**ISV Management Console**

Intel® DCM Middleware (Web Service API)

**MONITOR**

**CONTROL**

**TREND**

**SCALABILITY**

**STANDARDS**

**Hardware Protocols**

- Node Manager IPMI
- iDRAC IPMI
- iLO/DCMI IPMI
- IMM IPMI
- CMC HTTPS/WS-MAN
- OA SSH/CLI
- IMM SSH/CLI
- SNMP

**Rack Servers**

**Blade Servers**

**PDU and UPS**

**Definitions**

IPMI = Intelligent Platform Management Interface
IMM = Integrated Management Module
SNMP = Simple Network Management Protocol
WS-MAN = Web Services-Management

iDRAC = Integrated Dell Remote Access Controller
CMC = Chassis Management Controller
CLI = Command Line Interface
DCMI = Data Center Manageability Interface

iLO = Integrated Lights-out
OA = Onboard Administrator
SSH = Secure Shell
Features today

- Monitor storage and networking devices SNMP and SSH using device MIB files
- Monitor server-based storage when based on standard servers with power monitoring (IPMI)
- Support Cisco Catalyst switches with EnergyWise monitoring
- Static power profiles include peak and typical power for a number of EMC and NetApp large scale storage devices. New device profiles can be added by DCM team or by ISV/OEM
- Unmanaged devices: end users can add static power values to any unspecified or unknown device, which lack monitoring capabilities
Intel® DCM Product Features

Monitoring
- Real-time monitoring of server actual power and inlet temp data aggregated to rack, row, room.
  User-defined physical or logical groups.
- Receive alerts based on custom power and thermal events
- Power estimation engine for legacy servers lacking power monitoring
- Power Monitor Cisco Catalyst Energywise switches
- Display server asset tag and serial # for HP, IBM, Dell
- Cisco Rack and UCS Support
- Index on Server Cooling Effectiveness

Trending
- Log power & thermal data, query trend data using filters
- Saves one year of history data for capacity planning

Control
- Intelligent and patented group policy engine
- Supports multiple concurrent active power policy types at multiple hierarchy levels
- Accepts workload priority as policy directive
- Allow scheduling of policies including power capping, by time of day or/and day of week
- Maintains group power capping while dynamically adapting to changing server loads
- Intel Node Manager 2.0 support for memory power limiting and dynamic core allocation

Agent-less
- Does not require installation of any software agents on managed nodes

Easy Integration and Co-existence
- Device inventory pre-scan using IP ranges
- Exposes high level Web Services Description Language (WSDL) APIs
- Can reside on an independent server or co-exist with ISV product on same server
- Power/thermal-aware scheduling – airflow and outlet temp. modeling (OEM dependent)*
- Outlet temperature sensor (OEM dependent)*

Scalability
- Manages tens of thousands of servers

Security
- Secured APIs
- Secured communication with managed nodes
- Encryption of all sensitive data

Support
- 24/7 support for Intel® DCM is available
Intel® DCM Go-to-Market Options

**Intel® DCM Enabled via ISV**
- DCM is embedded in ISV solution and transparent to customer
- Customer buys power management solution directly from the ISV

**ISV Console**
- ISVs

**Intel® DCM Enabled via OEM**
- Educate customer IT team on OEM product versions that support monitoring via DCM

**OEM Console**
- OEMs

**Intel® DCM Direct via Customer-Developed Solution**
- DCM can be integrated to home grown console with minimal investment from customer
- Intel licenses DCM to the customer and provides support

**Home Grown Console**
- Direct
Intel® DCM Deployment Options for End User
What Can You Do with Intel® DCM?

<table>
<thead>
<tr>
<th>Power and Thermal Knobs in Data Centers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace expensive smart power strips</td>
</tr>
<tr>
<td>Capacity planning</td>
</tr>
<tr>
<td>Identify dead and under-utilized servers</td>
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<tr>
<td>Measure energy usage by device</td>
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<tr>
<td>Identify power/thermal failure situations</td>
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<td>Power-aware VM migration</td>
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<tr>
<td>Power-aware job scheduling</td>
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<td>Continued operation in the presence of power outages</td>
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<tr>
<td>Improve thermal profile in the data center</td>
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<tr>
<td>Application power optimization</td>
</tr>
</tbody>
</table>
## Intel® DCM Case Studies

<table>
<thead>
<tr>
<th>Use</th>
<th>Power Monitoring</th>
<th>Increase Rack Density</th>
<th>Ghost Server Identification</th>
<th>Identify Power/Thermal Failure</th>
<th>Improve Thermal Profile</th>
<th>Power Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large PRC IPDC</td>
<td>Reduced monthly data center electricity bill while peak power demand kept increasing</td>
<td>Allowed customers to increase rack density by 71% by implementing Intel DCM</td>
<td>Identified 10 – 15% of underutilized servers and virtualized those systems</td>
<td>UPS uptime can be extended up to 15% with limited performance impact during power outage</td>
<td>Thermal data collection allows users to see 2D heat maps of the data center</td>
<td>Decreased power by 18% of KWh with little/no impact on performance</td>
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<td>iG2 GROUP</td>
<td>Charge back system allows facilities to correctly charge colo and other service users</td>
<td>Up to 83% rack density increase within same power envelope with power management policy</td>
<td>With 13% of servers underutilized, one compute geo improved usage or terminated devices</td>
<td>Prolonging business continuity time by up to 25% during power outage</td>
<td>Dramatically improved thermal monitoring from floor level to device level</td>
<td>Saved 15% power without performance degradation</td>
</tr>
<tr>
<td>NTT DATA</td>
<td>Identifies peak electrical usage and reduces usage by 18% during peak hours</td>
<td>Monitoring capabilities and power consumption ceilings allowed up to a 60% increase in rack density.</td>
<td>$630k can be saved in 3 years for a 10k data center by consolidating low utilization servers</td>
<td>Existing alert infrastructure sped up market launch of new product</td>
<td>4°C increase expected to save 32% in power consumption for cooling</td>
<td>25% savings on power consumption with DCM and Node Manager</td>
</tr>
</tbody>
</table>

*Charge back system allows facilities to correctly charge colo and other service users.*

*Identifies peak electrical usage and reduces usage by 18% during peak hours.*

*Monitoring capabilities and power consumption ceilings allowed up to a 60% increase in rack density.*

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Power Management
Call-to-Action

Make Sure “Power Sensitive” Customers Are Aware of the Real-time Monitoring Capabilities

- Learn more:
  Intel® Data Center Manager
  www.intel.com/dcm

- Contact Us:
  dcmsales@intel.com
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