Intel® Data Center Manager
Data center IT agility and control
The Data Center Ecosystem
Why Data Center Management Is Key to An Efficient Data Center Ecosystem

50% of large data centers in North America will deploy some form of Data Center Infrastructure Management Software.¹

10% of global energy use will be attributed to global data centers, which comes to 91B KWH.³

70% of all workloads will be processed in cloud data centers this year.²

10-50X energy spent on data center per floor space of typical commercial office building.⁴

¹Gartner DCI Magic Quadrant, 2014; ²Cisco Cloud Index Report; ³NRDC, 2014; ⁴Energy.gov, 2009
Why Data Center Management Is Key to An Efficient Data Center Ecosystem

- **Data Use Growth**: 403ZB attributed to devices connected to the Internet of Everything (up from 113ZB in 2013).\(^5\)

- **Potential Reduction**: 18% reduction in peak electrical power usage by capping performance of high load server at 90 percent.\(^6\)

- **Reduction in Electrical Power Consumption of Servers**: 20% with high loads with Intel Data Center Manager.\(^7\)

- **Use of Power by Servers, Even While Idle**: 50% even while remaining idle.\(^8\)

\(^5\)Upsite; \(^6\)Intel White Paper; \(^7\)NTT White Paper; \(^8\)Intel, Klaus
The Forces Driving the Cycle

19B
Connected devices by 2016

$200B
Cloud services in 2016

2X
Annual growth in supercomputing FLOPS

300M
Facebook* photos per day

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1Cisco® Visual Networking Index (VNI) Forecast (2011-2016)
2Gartner Worldwide IT Spending Forecast, 2Q12 Update
3Top 500 list: Top 10 change from November 2007 to November 2012
4Facebook public statements

*Other names and brands may be claimed as the property of others.
Increases in Data Center Power Consumption

2012-2013

Source: DCD Intelligence 2013 Census Report: Global Data Center Power 2013
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)

<table>
<thead>
<tr>
<th>MONITOR</th>
<th>CONTROL</th>
<th>TREND</th>
<th>SCALABILITY</th>
<th>STANDARDS</th>
</tr>
</thead>
</table>

Hardware Protocols

<table>
<thead>
<tr>
<th>Node Manager</th>
<th>iDRAC</th>
<th>iLO/DCMI</th>
<th>IMM</th>
<th>CMC</th>
<th>OA</th>
<th>IMM</th>
<th>SNMP</th>
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</thead>
<tbody>
<tr>
<td>IPMI</td>
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<td>IPMI</td>
<td>HTTPS/WS-MAN</td>
<td>SSH/CLI</td>
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<table>
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<tr>
<th>Rack Servers</th>
<th>Blade Servers</th>
<th>PDU and UPS</th>
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<tbody>
<tr>
<td><img src="image1" alt="Rack Servers" /></td>
<td><img src="image2" alt="Blade Servers" /></td>
<td><img src="image3" alt="PDU and UPS" /></td>
</tr>
</tbody>
</table>

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
Storage and networking support today

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

SSD Feature support

- SSD SMART includes: Wear and tear statistics incl. Power On Hours, Power cycle, SSD Temperature sensor
- SSD Usage: Total LBA Written and read, endurance Analyzer – Remaining SSD drive life
- Retrieve and control selected devices power governor mode settings
- ATA and NVMe max power settings
- Configuration en masse of SSDs

NetApp FAS220
Cisco Catalyst
Storage and networking support future potential

SSD Compliance:
Update SSD firmware, patching capabilities, wear and tear – proactive notification

Manageability:
Configuration options: Intel NVMe for encryption, RAID, caching

- Show capacity across a group of server
- Identify open PCIe – slots
- Power Capping of SSD drive subsystem
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

<table>
<thead>
<tr>
<th>Intel® DCM Enabled via ISV</th>
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<td>- DCM is embedded in ISV solution and transparent to customer</td>
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<tr>
<td>- Customer buys power management solution directly from the ISV</td>
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<table>
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<tr>
<th>Intel® DCM Enabled via OEM</th>
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<td>- Educate customer IT team on OEM product versions that support monitoring via DCM</td>
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<th>Intel® DCM Direct via Customer-Developed Solution</th>
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<td>- DCM can be integrated to home grown console with minimal investment from customer</td>
</tr>
<tr>
<td>- Intel licenses DCM to the customer and provides support</td>
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</tbody>
</table>

**ISV Console**

- Schneider Electric
- iTRACS
- nlyte.Software

**OEM Console**

- DELL
- lenovo
- SUPERMICRO
- sgi

**Home Grown Console**

- Direct

**ISVs**

- OEMs
Intel® DCM Deployment Options for End User
## What Can You Do with Intel® DCM?

### Power and Thermal Knobs in Data Centers

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<td>Replace expensive smart power strips</td>
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<tr>
<td>Capacity planning</td>
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<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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<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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<td>Application power optimization</td>
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## Intel® DCM Case Studies

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<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>
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<td>cloud dynamics</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>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>
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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/datacentermanager

- Contact Us:
  dcmsales@intel.com
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