



INTEL® DATA CENTER MANAGER (DCM) OVERVIEW

Get Your Data Center Under Control

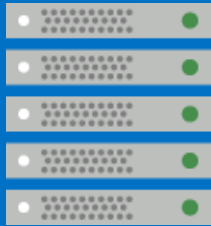
AGENDA

- **THE NEED FOR ON-DEMAND VISIBILITY INTO DATA CENTER PERFORMANCE**
- **INTEL® DATA CENTER MANAGER (DCM) OVERVIEW**
- **DCM FEATURES AND FUNCTIONALITIES**
- **USE CASES**
- **CASE STUDIES**
- **SUMMARY / CALL TO ACTION**

DATA CENTER COMPUTING PROGRESSION

Multiple computing models will persist for foreseeable future

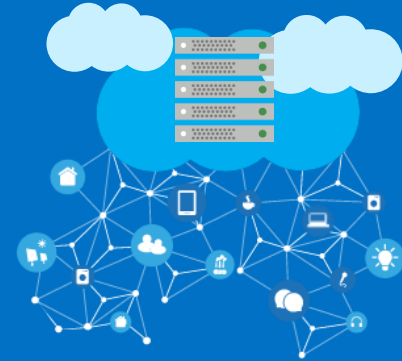
ON-PREMISE



PUBLIC



HYBRID



These data centers demand more visibility and operational control than ever

THE 6 PILLARS FOR A SUCCESSFUL DATACENTER MANAGER

REAL-TIME POWER, THERMAL, HEALTH

Monitoring & analytics
Identify systems with older firmware



HISTORICAL TRENDS AND PREDICTIONS

Improves uptime and helps identify
under-utilized devices



CROSS-PLATFORM SUPPORT

Easy to install, integrate and scale



AGGREGATED DATA

To physical groups
(e.g. room/row/rack) & logical groups



BROAD DEVICE COVERAGE

Better inventory and capacity planning
(PDUs, UPSs, SANs, NASs, etc.)



ACCURATE POWER CAPPING

Helps increase rack density,
Decreases costs and improves efficiency

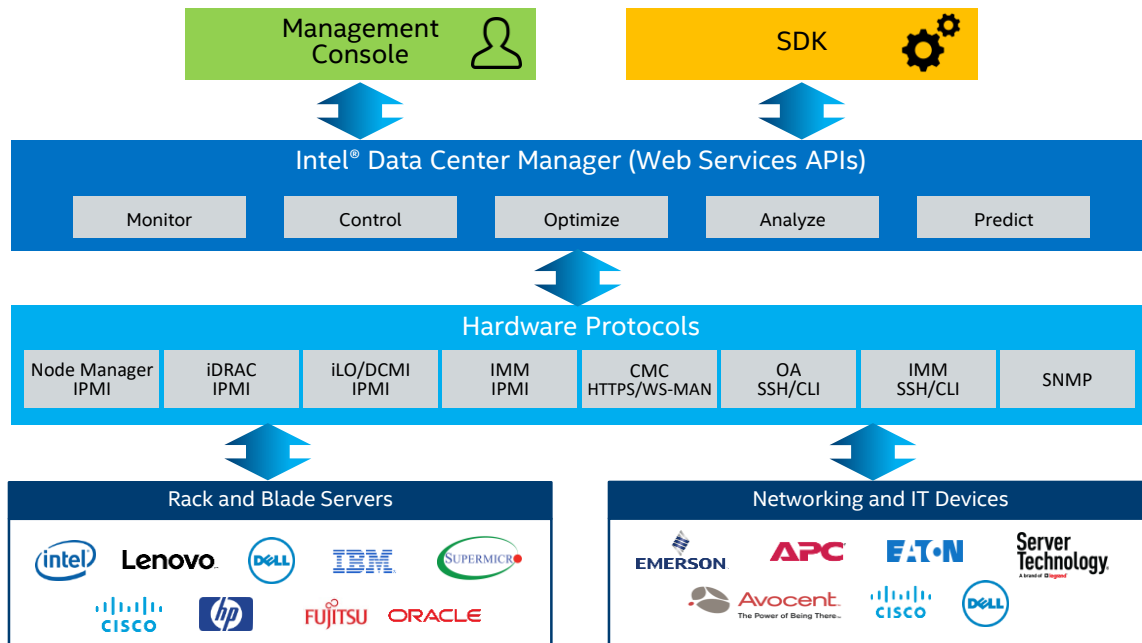


INTEL® DCM OVERVIEW

Intel DCM is a solution for monitoring and managing the health, power, and thermals of servers and a variety of other types of devices.

Intel DCM reduces data center total cost of ownership (TCO) by:

- Improving asset management
- Increasing data center reliability
- Simplifying maintenance
- Optimizing power & cooling efficiency
- Maximizing compute density
- Reducing downtime



Scales to 10Ks of nodes

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

INTEL® DCM ECOSYSTEM

OEM Partners



Lenovo



FUJITSU

ASUS
IN SEARCH OF INCREDIBLE



SUPERMICRO®

ISVs / Resellers

ABB

ACÃO
SISTEMAS DE COMPUTAÇÃO
AN INTELLECTUAL MIND COMPANY

Datavision
Connect smart de more

AMAX

Datcent
数据科技

Sugon
中科曙光

AJAD

ANIXER

Datacenter
Clarity LC

flex

HEZHONG
合众益能

RFU

JoySuccess
卓益达科技

MAGUAY

Schneider
Electric

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GRAPHICAL
NETWORKS
Get visual about IT.

NETZOOMDC
by Altium Technology, Inc.

Blumper
SOLUTIONS

ESIN

NARI
南瑞集团

IG2
GROUP

正睿

SIEMENS

TSO logic

OpSys
OPERATION MANAGEMENT

国家电网公司
STATE GRID
CHINA ELECTRIC POWER GROUP

TKME
TRANSFORMER & POWER SERVICE

Rit

ZTE

CISCO

NEC

Hitachi Data Systems

Direct Customers

SAP



Baidu 百度

intel

UCloud

ebay inc

CERN

EMC²

YAHOO!

QINGCLOUD

NIO

ICBC 工商银行

JD 京东
.COM



Tencent 腾讯

中華電信
ChungHwa Telecom

UKFAST

kt

KINGSOFT

CROWDSTRIKE

TURK TELEKOM

头条 TOUTIAO

NTT DATA

Bezeq

SAKURA Internet

京都大学
KYOTO UNIVERSITY

Alibaba.com

mandic
CLOUD SOLUTIONS



WHAT CAN YOU DO WITH INTEL® DCM?

AUTOMATE HEALTH MONITORING



CREATE POWER-AWARE JOB SCHEDULING TASKS



IMPROVE SYSTEM MANAGEABILITY



INCREASE RACK DENSITIES



SIMPLIFY CAPACITY PLANNING



SET POWER POLICIES AND CAPS



IDENTIFY UNDERUTILIZED SERVERS



IMPROVE DATA CENTER THERMAL PROFILE



MEASURE ENERGY USE BY DEVICE



OPTIMIZE APPLICATION POWER CONSUMPTION



PINPOINT POWER/THERMAL ISSUES



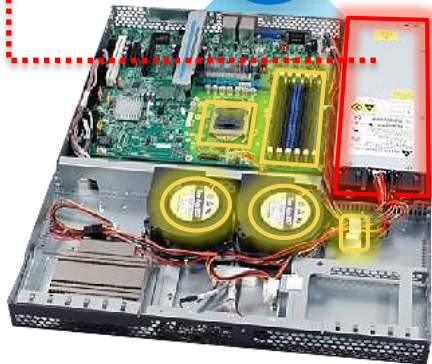
AVOID EXPENSIVE PDUS AND SMART POWER STRIPS



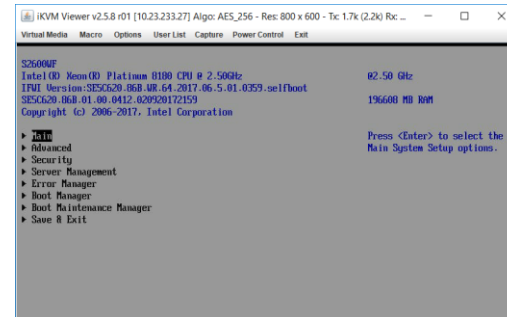
SYSTEM MANAGEABILITY

Monitor server and sub-component health in real time and get alerts

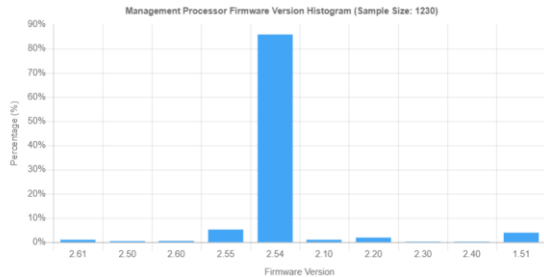
Health Status	Fault (warning)	Management Console
CPU	✓	
Memory	✓	
Fan	✓	
Power supply	⚠ [Power Supply 1] Failure detected, [Power Supplies] Redundancy Lost	
Storage	✓	[Power Supply 1] Failure detected [Power Supplies] Redundancy Lost
Temperature	✓	
Voltage	✓	
Battery	✓	



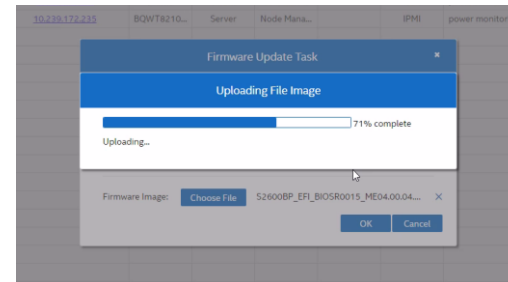
Remote connect to servers via the integrated BMC KVM



Check the FW version of servers and identify outliers



Perform FW updates on Intel Server Systems in batches remotely

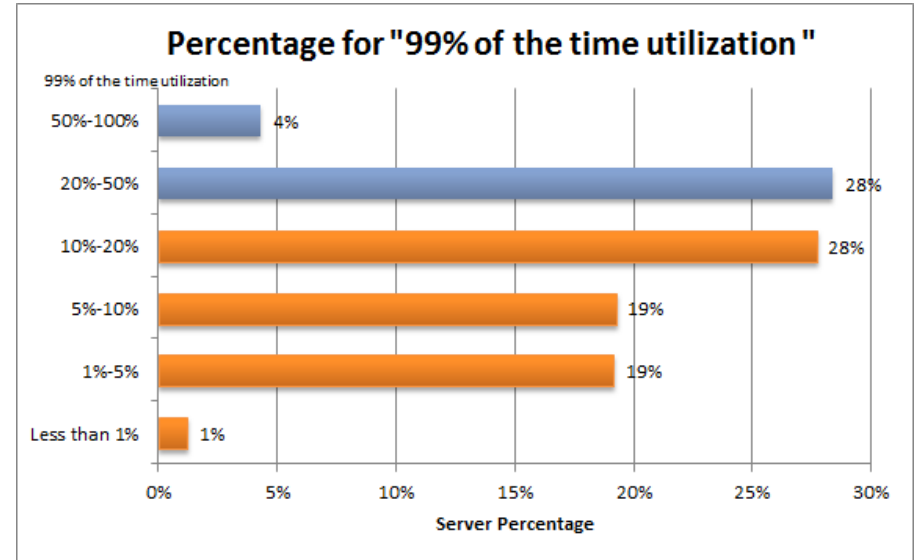


IDENTIFYING UNDERUTILIZED SERVERS

Identifying underutilized or “ghost” servers can be tricky, but can save significant costs

DCM uses historical utilization and power data to determine if servers have not been utilized for a long time

That way you can decide to decide to shut down remotely



PoC report

POWER OFF LOW-UTILIZED SERVER SAVING \$25,200 PER YEAR

Note: $0.1\text{kw} \times 0.08/\text{kwh} \times 1.8 \times 24 \times 365 \times 1000 \times 20\% = 25200$

RACK PROVISIONING AND CAPACITY PLANNING

Use case: Provision rack with 4 KW available power

Goal: Fit as many servers as possible within 4,000 W envelope

Traditional method: static provisioning

- 650 watt power supply rating
- Use 400 watts as safe bet from lab measurements for expected configuration
- Install 4,000 W/400 watt per server = 10 servers



Before



After

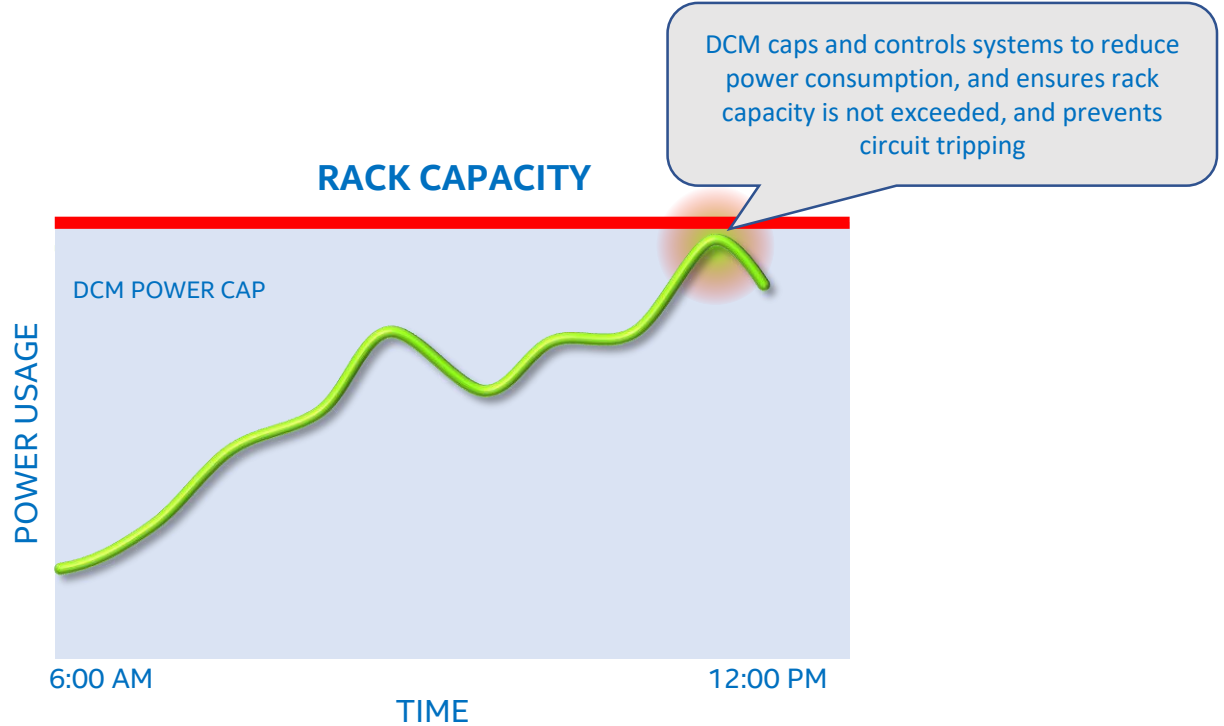
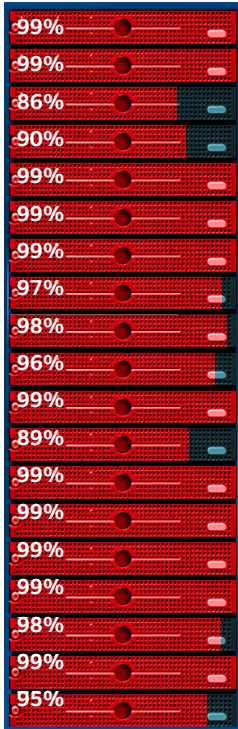
Real time monitoring with power budget enforcement*

- Actual measurements indicates power/server rarely exceeds 250 W
- Use 250 W as aggressive power/server budget
- Enforce 4,000 W global cap for rare cases
- Install 4,000 watt/250 watt per server = 16 servers

PAYOFF: INCREASING RACK DENSITY BY UP TO 60%

*Calculations are based on lab measurements and typical specifications of dual-socket servers provisioned with Intel® Xeon® 5500 or 5600-series processors. Results may vary depending on actual conditions.

POWER MONITORING AND CONTROL



PREDICTIVE DETECTION OF COOLING ANOMALIES

A patented algorithm builds
a model of the temperature patterns

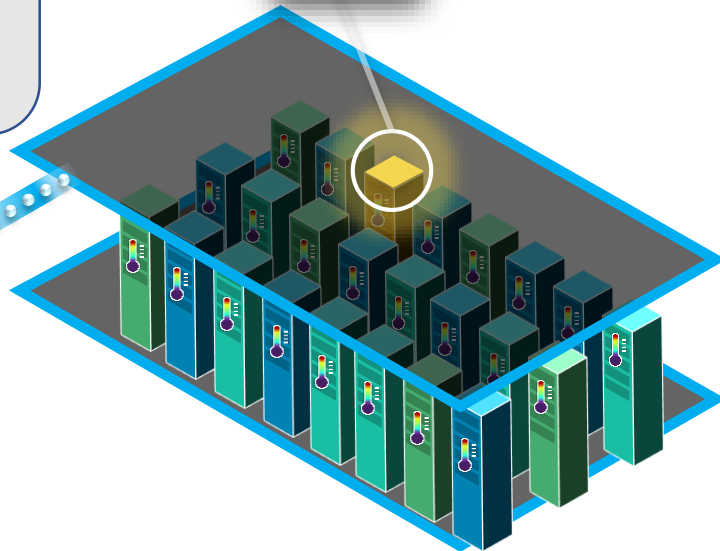
and detects anomalies in time...

... to be resolved before a thermal issue
occurs.

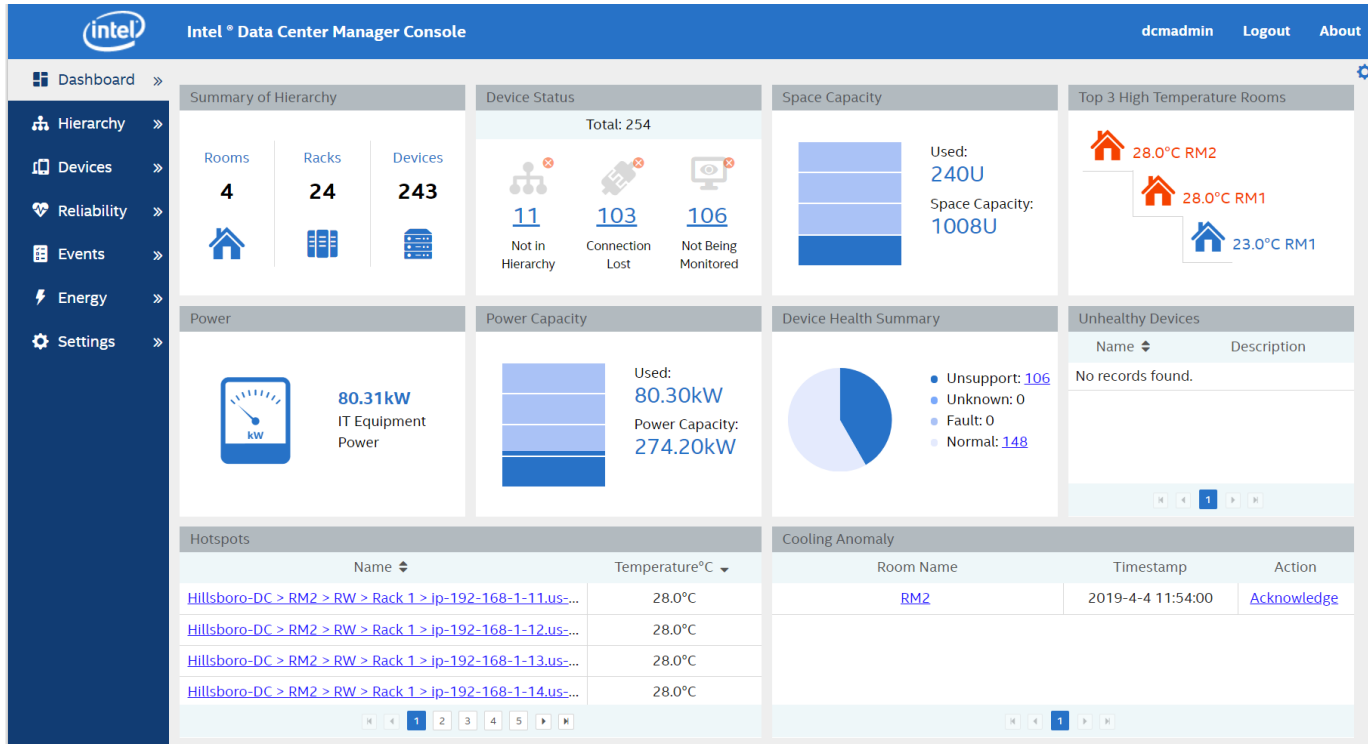


DCM Algorithm

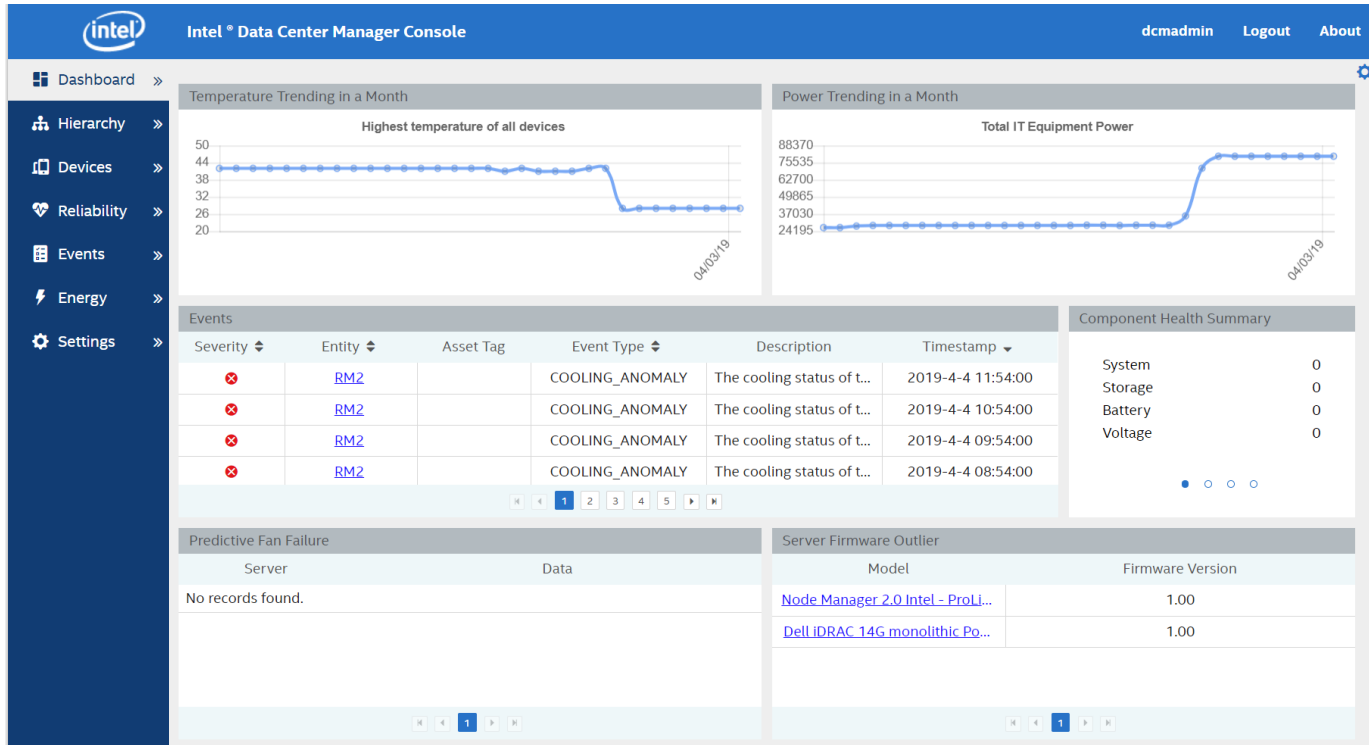
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111100100100100010  
001001001001010101  
100101010101010101  
010010101010111011
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INTEL[®] DCM CONSOLE DASHBOARD



DASHBOARD CONT'D



DEVICE HEALTH MONITORING

Intel Data Center Manager Console

dcmvie Logout About

Dashboard » Hierarchy » Devices » Reliability » Events » Energy » Settings »

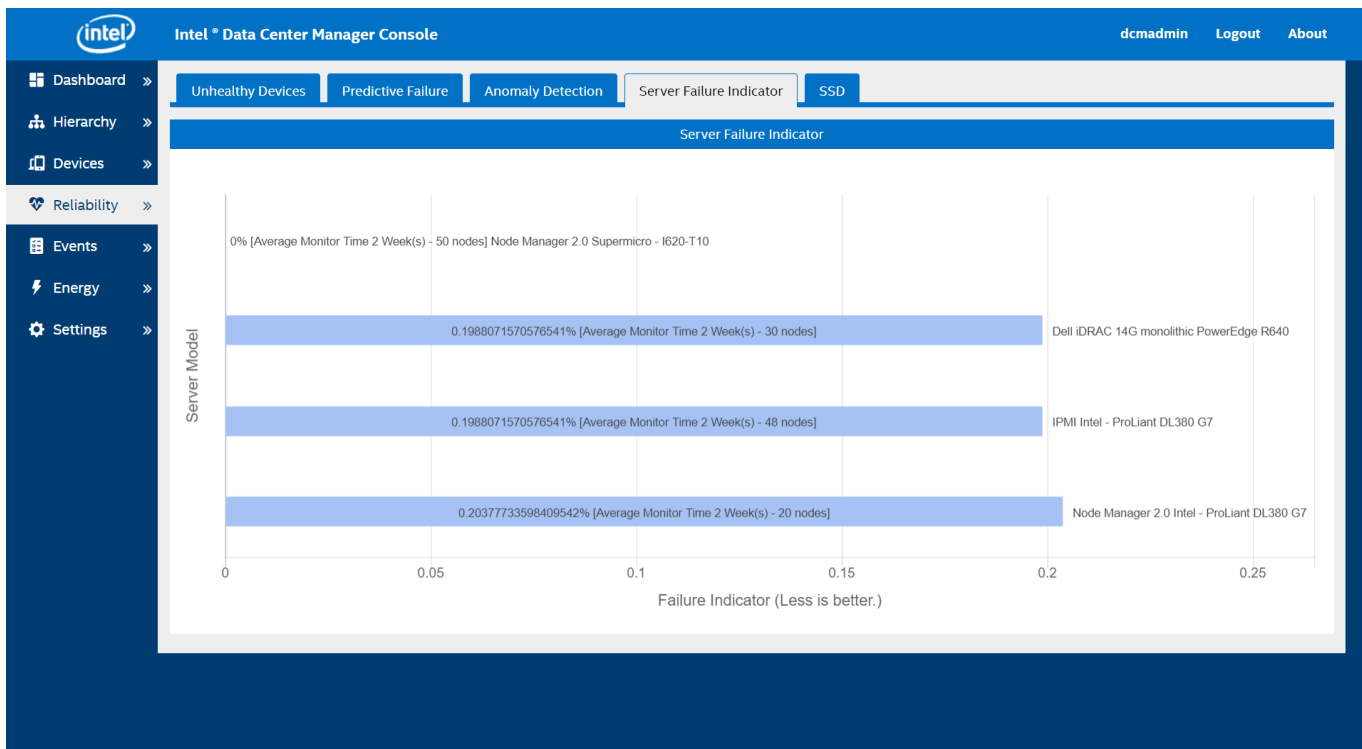
Unhealthy Devices Predictive Failure Anomaly Detection Server Failure Indicator

Unhealthy Devices

Name	Device Type	System	Processor	Memory	Fan	Power Supply	Storage	Voltage
icsl5151	Server	⚠	🔍	✅	✅	⚠	✅	🔍
icsl5152	Server	⚠	🔍	✅	✅	⚠	✅	🔍
icsl5153	Server	⚠	🔍	✅	✅	⚠	✅	🔍
icsl5154	Server	⚠	🔍	✅	✅	⚠	✅	🔍
icsl5155	Server	⚠	🔍	✅	✅	⚠	✅	🔍
icsl5156	Server	⚠	🔍	✅	✅	⚠	✅	🔍
icsl5157	Server	⚠	🔍	✅	✅	⚠	✅	🔍
icsl5158	Server	⚠	🔍	✅	✅	⚠	✅	🔍
icsl5159	Server	⚠	🔍	✅	✅	⚠	✅	🔍
icsl5160	Server	⚠	🔍	✅	✅	⚠	✅	🔍
icsl5161	Server	⚠	🔍	✅	✅	⚠	✅	🔍
icsl5162	Server	⚠	🔍	✅	✅	⚠	✅	🔍
icsl5163	Server	⚠	🔍	✅	✅	⚠	✅	🔍
icsl5164	Server	⚠	🔍	✅	✅	⚠	✅	🔍
icsl5165	Server	⚠	🔍	✅	✅	⚠	✅	🔍

« 13 14 15 16 17 »

SERVER RELIABILITY INDICATOR



LAYOUT MANAGEMENT

Intel Data Center Manager Console | dcmadmin | Logout | About

Dashboard » Hierarchy » Devices » Reliability » Events » Energy » Settings »

Hierarchy


Data Center	Room	Row	Rack
Hillsboro-DC	RM1	RW	CP-A1
SantaClara-DC	RM2		CP-A2
Tokyo-DC			CP-B1
			CP-B2
			Rack 1
			Rack 2
			Rack 3

Layout

Temperature Scale: 32°C, 27°C, 22°C, 17°C

Server ID	Server ID	Server ID
p-192-168-1-62.us-west-3	p-192-168-1-206.us-west-3	p-192-168-1-19.us-west-3
p-192-168-1-61.us-west-3	p-192-168-1-205.us-west-3	p-192-168-1-18.us-west-3
p-192-168-1-60.us-west-3	p-192-168-1-204.us-west-3	p-192-168-1-17.us-west-3
p-192-168-1-84.us-west-3	p-192-168-1-203.us-west-3	p-192-168-1-16.us-west-3
p-192-168-1-83.us-west-3	p-192-168-1-202.us-west-3	p-192-168-1-15.us-west-3
p-192-168-1-69.us-west-3	p-192-168-1-201.us-west-3	p-192-168-1-14.us-west-3
p-192-168-1-68.us-west-3	p-192-168-1-82.us-west-3	p-192-168-1-13.us-west-3
p-192-168-1-67.us-west-3	p-192-168-1-81.us-west-3	p-192-168-1-12.us-west-3
p-192-168-1-66.us-west-3	p-192-168-1-80.us-west-3	p-192-168-1-11.us-west-3
p-192-168-1-65.us-west-3	p-192-168-1-209.us-west-3	p-192-168-1-10.us-west-3
p-192-168-1-64.us-west-3	p-192-168-1-208.us-west-3	p-192-168-1-9.us-west-3
p-192-168-1-63.us-west-3	p-192-168-1-207.us-west-3	p-192-168-1-8.us-west-3

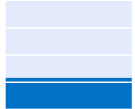
CAPACITY MANAGEMENT

 Intel® Data Center Manager Console
dcmadmin Logout About

Dashboard »
Hierarchy »
Layout »
Capacity

Hierarchy »
Devices »
Reliability »
Events »
Energy »
Settings »

Power Capacity

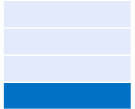


All: 274.20kW

Used: 80.35kW

Unused: 193.85kW

Space Capacity



All: 1008U

Used: 240U

Unused: 768U

Racks

You may specify the device information to search for racks to install it

Size (U)

Derated Power (W)

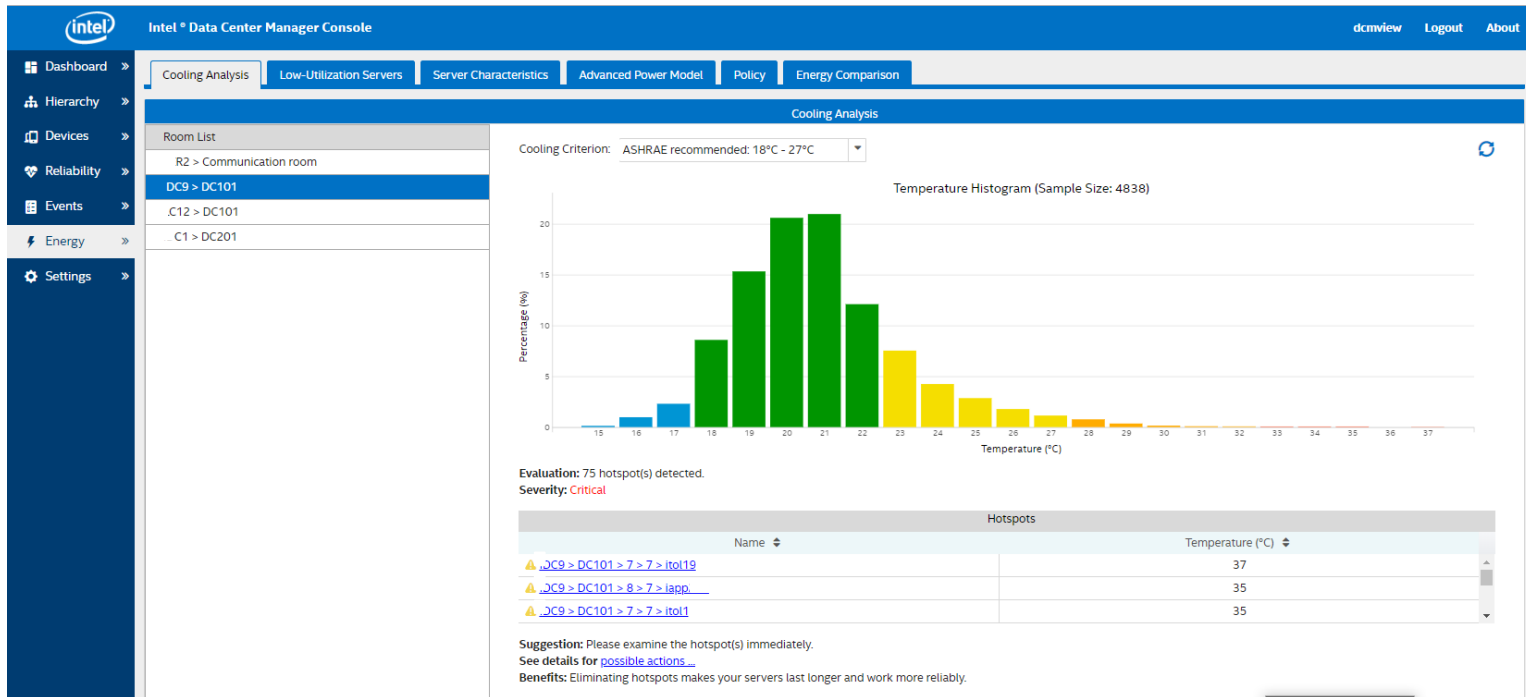
Consider Space Continuity

[Export rack capacity data](#)

























Rack Name	Space			Power			
	Total (U)	Available (U)	Continuous (U)	Utilization	Total (W)	Available (W)	Utilization
Firmware-update-r...	42	42	42	0%	4200	4200	0%
Rack_1 (/Hillsboro...	42	33	32	21.43%	10000	7717	22.83%
Rack_1 (/SantaClar...	42	35	19	16.67%	10000	7905	20.95%
Rack_1-1 (/Hillsbor...	42	27	26	35.71%	10000	5973	40.27%
Rack_1-2 (/Hillsbor...	42	16	N/A	61.9%	10000	1846	81.54%
Rack_1-3(cups) (/HI...	42	15	18	64.29%	10000	1932	80.68%
...



COOLING ANALYSIS



RECENT CUSTOMER WHITEPAPERS

	Power Monitoring	Increase Rack Density	Ghost Server Identification	Identify Power/Thermal Failure	Improve Thermal Profile	Power Management	Reducing Labor and HW Costs	Remote Access
Use Customers	 <p>Reduced monthly datacenter electricity bill while peak power demand kept increasing</p>	 <p>Allowed customers to increase rack density by 71% by implementing Intel DCM</p>	 <p>Identified 10 – 15% of underutilized servers and virtualized those systems</p>	 <p>UPS uptime can be extended up to 15% with limited performance impact during power outage</p>	 <p>Thermal data collection allows users to see 2D heat maps of the datacenter</p>	 <p>Decreased power by 18% of KWh with little/no impact on performance</p>	 <p>Reduced the costs of manually managing server health by \$200K per year</p>	 <p>Remotely turning off idle servers saved Sohu.com \$94K per year</p>
	 <p>Charge back system allows facilities to correctly charge colo and other service users</p>	 <p>Up to 83% rack density increase within same power envelope with power management policy users</p>	 <p>With 13% of servers underutilized, one compute geo improved usage or terminated devices</p>	 <p>Prolonging business continuity time by up to 25% during power outage</p>	 <p>Raised server room temp by 3°C, a potential 9% savings of annual energy</p>	 <p>Saved 15% power without performance degradation</p>	 <p>Eliminated the need to purchase 600 intelligent PDUs saving \$60K</p>	 <p>Remote diagnosis and remediation of 150K servers</p>
	 <p>Identifies peak electrical usage and reduces usage by 18% during peak hours</p>	 <p>Monitoring capabilities and power consumption ceilings allowed up to a 60% increase in rack density.</p>	 <p>\$630k can be saved in 3 years for a 10k datacenter by consolidating low utilization servers</p>	 <p>Existing alert infrastructure sped up market launch of new product</p>	 <p>4°C increase expected to save 32% in power consumption for cooling</p>	 <p>25% savings on power consumption with DCM ED and Node Manager</p>	 <p>Significantly improved PUE due to reliability of interoperable health monitoring</p>	 <p>Remotely switching servers on/off helped conserve power resulting in \$24K annually</p>

AGENDA

Whatever your infrastructure is, make sure you are taking advantage of platform telemetry to optimize your datacenter and cloud operations

Make sure you have real-time insights into their power consumption, performance, thermals, utilization, and health

Learn more about Intel® DCM and download the unrestricted 30-day evaluation version of the DCM Console @ www.intel.com/dcm

Check all the latest Intel® DCM customer testimonials and whitepapers too

Reach out to us: dcmsales@intel.com

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No computer system can be absolutely secure.

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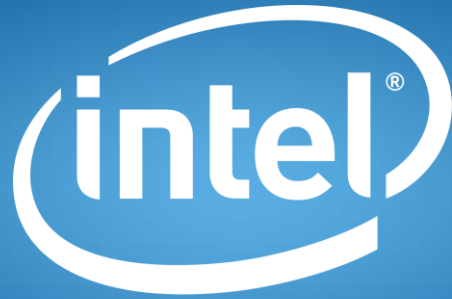
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experience
what's inside™