



HP and Intel Dynamic Power Capping

A Joint HP and Intel Innovation on Power Management for Data Centers Optimization

Manage Power to Extend Datacenters Lifecycle

One of the main challenges facing datacenter managers is the ever increasing power and cooling needs coupled with the constraints of an ever decreasing availability. Approximately 40% of them report that their datacenters are projected to run out of power or cooling capacity in the next 12-24 months.¹ As Power & Cooling is one of the key drivers for successful datacenter transformation, datacenter managers need more efficient servers that use less energy and take up less space.

The lack of precise dynamic power consumption values at the server level generates a misuse in existing power capacity and datacenter space.

The current strategy they adopt to populate their racks consists in reading the servers nameplates, estimating their maximum power consumption, and then deciding how many servers can be placed in the same rack to avoid unforeseeable consumption peaks that would trigger circuit breakers. Because no dynamic consumption values are provided, they significantly misuse existing power capacity and datacenter space.

Some innovative technologies tackle the issue of lowering power consumption: memory that reports its temperature or fans that adapt their rotation frequency to the actual air flow requirements.

However, none actually deals with dynamic power measurement, to make better use of power, cooling, and floor space, that would in turn lower the costs and extend current datacenters lifecycle.²

HP and Intel Power Management offer

Intel® Intelligent Power Technology featured in Intel® Xeon® processor 5500 series offers several degrees of power management where all platform components are managed: processor, chipset, and memory. This enables power consumption for processor and memory to adjust on real-time load without reducing performance,³ and idle cores to go to near zero power independently.

Based on Intel Intelligent Power Technology, HP Dynamic Power Capping is part of both HP Thermal Logic Technology and HP Insight Control environment for ProLiant servers, and is delivered through the HP Power Management functionality. It has been developed in a unique joint development agreement with Intel. HP is the first server manufacturer on the market whose products matched the response time for such a solution.

The power caps adjust before the circuit breakers trigger, protecting servers while keeping the performance unchanged.

HP Dynamic Power Capping allows the datacenter manager to set a threshold of maximum consumption for the server, enclosure or datacenter through a convenient user interface. At the enclosure or datacenter level, HP Dynamic Power Capping adjusts the caps in real time, raising the caps on busy blades and lowering the caps on idle blades, keeping the overall cap value unchanged, while keeping the performance unchanged.

¹ InfoWorld, 2008. "Datacenters heading for cash crunch."

² Castro-Leon, Enrique, 2009. "Actively managing power in Nehalem-based servers: How it works". The Intel Server Room Blog

³ Intel Technology Brief, 2009. "Automated Energy Efficiency for the Intelligent Business"

This solution is activated at the firmware level, running on any operating system, and on servers that are already on the market.

As a result, when the workload rises, the solution activates before the circuit breakers trigger to limit the server power consumption level. The rack runs with more safety and reliability while performance is maximized.

Since power consumption is monitored, more servers can be added into the racks.⁴ For example, in a typical tier 3 datacenter, power allocation per cabinet is 8 kW. This allows to power on 10 HP ProLiant DL380 servers. Using Intel Intelligent Power Technology and HP Dynamic Power Capping in the same configuration, 15 similar servers could be powered on with no impact on performances.

This solution can be activated at the firmware level and is compliant with any operating system (OS). While Nehalem micro architecture allows for more advanced functionalities such as the disablement of idle cores, Dynamic Power Capping can also be activated on Intel previous Core™ micro architecture (such as Intel Xeon processors 51xx, 52xx, 53xx, and 54xx series).

Power Capping on a Solaris OS at the HP Intel CME Solution Center

Dynamic Power Capping, a feature resulting from the unique collaboration between Intel processors and HP hardware and software, powerfully demonstrates that RISC-based SPARC systems cannot compare to x86 Xeon-based systems when it comes to efficiency.

HP & Intel Key hardware components

HP Blade System c7000 Enclosure



The BladeSystem c7000 enclosure provides all the power, cooling, and I/O infrastructure needed to support modular server, interconnect, and storage components today and throughout the next several years. The enclosure is 10U high and holds up to 32 servers and/or 16 storage blades plus optional redundant network and storage interconnect modules.



The HP Intel Solution Centers provide complete telecom infrastructures for demonstrating the Communications Media and Entertainment Solution Portfolio to HP customers and partners. The centers are located all around the world: EMEA (Grenoble, France); Americas (Plano, Texas, USA), and Asia/Pacific (Shanghai, China). These unrivalled technical facilities offer our customers and partners, the unique opportunity to evaluate new services in real-world environments, test new technologies and select the solutions most likely to succeed.



Fig.: HP Insight Control Power Management functionality for Dynamic Power Capping.

If power consumption is one of your major concerns and if you want to try what Intel and HP technology can do for your data center and your applications, come and visit the HP Intel CME Solution Center.

The HP Intel CME Solution Center's team and facilities are at your disposal to help you speed up your adoption of innovative solutions for your data center. It offers dedicated and secure benchmarks and proof-of-concepts spaces to help you assess whether a solution is adapted to your situation.

Loading your critical applications on our hardware, you will be able to monitor the impact of Dynamic Power Capping on your performance level in various racking configurations.

⁴ www.hp.com/go/DynamicPowerCapping

Intel® Xeon® processors

The Intel Xeon processor 5500 series are built with 45nm new Nehalem micro architecture with up to eight cores in a two-processor configuration. This new micro architecture delivers more performance in the same platforms and at the same power consumption, giving customers the flexibility to match performance, power and cost requirements with your unique requirements and delivering advantages beyond just pure performance.



Technology for better business outcomes

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