

ECO-BRIEF

The Environmental Product Life Cycle: Eco-Conscious Use Through Efficient Power and Cooling

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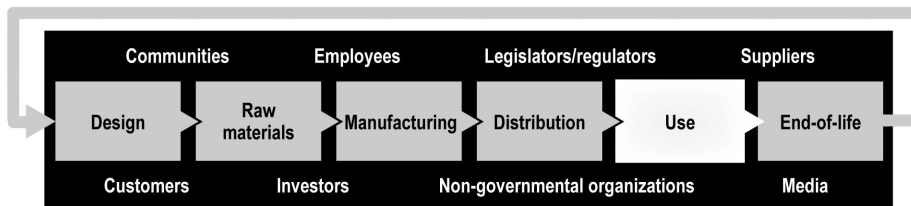
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EXECUTIVE SUMMARY

As global awareness of environmental issues continues to grow, enterprises and vendors alike are responding by building and using more ecologically friendly products. HP takes this imperative seriously and, for over 15 years, has been investing in research and development efforts to build more efficient power and cooling solutions. The resulting increase in HP products' energy efficiency provides its customers with the dual advantages of greater eco-friendly product use as well as reduced operating costs in the datacenter. Building products that are environmentally friendly to use provide just one step in HP's holistic approach to an eco-aware product life cycle (see Figure 1).

FIGURE 1

HP Approach to Reducing Environmental Impacts and Engaging Stakeholders Across the Product Life Cycle



Source: IDC, 2007, adapted from HP

BACKGROUND

In recent years, enterprises have made significant financial investments in IT consolidation. This has led to deployment of small form factor solutions such as blades and 1U rack servers, which has resulted in a substantial increase in datacenter density. As businesses continue to squeeze more compute capacity into limited datacenter footprints, they are finding that energy and thermal requirements are having a major operational impact, and IT organizations are seeking ways to reduce this impact, both for environmental and budgetary reasons. This experience is borne out by opus:interactive, a full service datacenter and HP customer interviewed for this study. "We made a strategic decision to be an eco-friendly datacenter," says Jeremy Sherwood, business solutions executive at opus:interactive, "and that has not only differentiated our offerings, but in areas like power and cooling, it has helped reduce our expenses." opus:interactive provides managed services, co-location for

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servers, shared Web and application hosting, DSL service, dial-up Internet access, ISDN Internet access, and dedicated high-speed Internet access.

This eco-brief examines HP's strategy to address these challenges by building greater energy efficiency into its power and cooling solutions.

HP Approach

Comprehensive View

HP has been focused on increasing energy efficiency in its products for more than a decade. In 1996 HP brought together experts from across the company to form the "Cool Team," with the objective of delivering comprehensive energy and thermal solutions for the datacenter. Looking to do more than just use low-power chips from AMD and Intel, or SFF drives, the HP team takes a comprehensive approach, focusing on the component level, the system level, the rack level, and the overall datacenter level.

Part of this comprehensive approach is recognizing the value of partnerships, and as a result, HP created the HP Datacenter Solution Builder Program to accelerate and drive the adoption of energy efficient solutions for datacenters. Participating partners run the gamut of the datacenter ecosystem, including architecture and engineering vendors, equipment manufacturers, utility companies, software and service vendors, and real-estate specialists.

This commitment has already begun to pay dividends in more energy-efficient HP products, such as the BladeSystem c-Class released in the summer of 2006. States opus:interactive's Sherwood, "With the c-Class, we only use half the power we would with a typical rack and stack solution, and our space requirements are 30% less."

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Power Management Solutions

One of the key innovations incorporated into the BladeSystem c-Class is HP Thermal Logic. Thermal Logic pools power and cooling resources then utilizes management and thermal design to efficiently deliver those resources based on the performance level required. Power supplies in the enclosure enter "standby" mode during periods of low demand and are then incrementally activated, balancing load requirements to ensure optimum efficiency. BladeSystem customers can achieve greater energy efficiency (as well as operational efficiency) by controlling power at the individual server blade level, eliminating the need for over-provisioning power and cooling resources.

Cooling Innovations

Thermal Logic also incorporates cooling innovations through its Parallel Redundant Scalable Enclosure Cooling (PARSEC) architecture and HP Active Cool Fans. The PARSEC architecture divides each blade enclosure into multiple zones. Sensors in each zone direct fans to control temperature in their specific zone, as well as to

provide backup cooling for the entire enclosure. Leveraging radio aircraft electric-ducted fan technology, HP Active Cool Fans generate high-pressure differential airflow and provide dynamic levels of airflow to match heat loads.

One of the earliest cooling innovations HP brought to market is the Modular Cooling System (MCS), a self-contained cooling rack for high-density datacenter deployments. The MCS utilizes the datacenter's chilled water supply to uniformly distribute cool air across the entire front of the rack. The system is capable of handling 30kW — three times the amount of heat generated by a standard server rack — and enables the datacenter to realize greater energy efficiency.

HP Dynamic Smart Cooling (DSC), the company's latest innovation, is expected to be deployed by the second half of 2007. HP estimates that most datacenters overprovision their cooling capacity, with 50–60% of a typical datacenter's operational spend on cooling. To address this, DSC utilizes a network of sensors deployed on racks to feed real-time thermal data to management software. The datacenter's cooling resources are dynamically controlled with the intent of providing significant improvements in cooling efficiency.

IDC ANALYSIS

Enterprises are becoming more aware of the impact their operations have on the environment, with eco-responsibility and energy efficiency becoming increasingly significant considerations. Since the mid 1990s, HP has been researching energy efficiency in IT infrastructure, and today HP continues to build on this heritage by developing innovative solutions to energy problems and providing eco-friendly products. Customers like opus:interactive appreciate this commitment. "We see HP as being at the leading edge of bringing eco-aware products to market," notes Sherwood, "and as a result we are very loyal to HP."

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HP understands the issue of power and cooling in the datacenter is complex and cannot be solved by a single "magic bullet." As IT managers confront challenges from a multitude of angles, HP offers solutions at multiple levels: component, system, rack, and room. Some innovations have originated from HP Labs and the Cool Team; where issues could not be addressed internally, HP has sought best-of-breed partners to build an ecosystem for the eco-friendly datacenter.

In IDC surveys, power and cooling consistently ranks as one of the top issues for IT executives. While price may always be a significant factor when considering new IT solutions, companies are now giving greater consideration to the total operation cost of running their IT infrastructure. Designing IT products that run more energy efficiently and offering solutions that dynamically match power and cooling resources to actual datacenter demands enable enterprises to reduce their energy usage. The resulting benefit is both economical and ecological, as companies are able to minimize their impact on the environment while lowering operating expenses.

CONCLUSION

Historically, enterprises' primary purchasing criteria for IT equipment were price and performance with power consumption usually an afterthought, but recent changes in the economic and social environment have altered this picture. Eco-friendliness and energy efficiency are becoming significant factors enterprises consider when they purchase and deploy IT equipment. A growing number of companies are adopting a "green IT" methodology and are seeking out and selecting IT partners with similar visions. This provides the further benefit that products offering greater energy efficiency in their use also result in reduced operating costs. As energy consciousness continues to gain traction, companies will turn to IT vendors for eco-friendly products and energy solutions. HP is dedicated to providing energy efficient products, and has mobilized a variety of resources to realize this vision, from internal research and development efforts to developing an ecosystem of partners focused on providing energy efficiency.

HP Products and the Environmental Document Series

This eco-brief is part of a series of IDC documents commissioned by HP to discuss its environmentally aware policies and practices. This series includes a core white paper, *HP Products Built to Protect the Environment*, as well as standalone eco-briefs focusing on specific product areas: product design, manufacturing, power and cooling, and product end of life.

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