



## **GREEN IT AT SAP**

REDUCING SAP'S IT POWER CONSUMPTION  
AND CARBON FOOTPRINT

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## Overview

The global conscience is increasingly focused on green initiatives, corporate responsibility, and sustainability. At SAP we have a unique dual role in these matters – as an enabler, helping our customers improve their sustainability performance, and as an exemplar, demonstrating our own sustainability performance. This paper will focus on the latter – how SAP is achieving its goals to improve sustainability, specifically through green IT practices.

# EXECUTIVE SUMMARY

## HOW SAP IS IMPLEMENTING GREEN IT PRACTICES

For more than 35 years, SAP has been helping companies around the globe manage resources efficiently by optimizing and transforming their business processes. Today we have an even greater mandate to go beyond business process optimization and also support sustainability.

In 2009 we announced an increased strategic focus on sustainability, which includes both managing internal operations in a sustainable way and delivering solutions that support our customers' sustainable business practices. This paper will share some of our steps toward more sustainable operations, specifically related to green IT practices

implemented at SAP to reduce our energy consumption and carbon footprint. Areas of focus will include reducing energy consumption in SAP data centers, improving server storage, virtualizing hardware and software, and optimizing the use of IT equipment by our employees in general.

We have committed to an aggressive goal of reducing our carbon footprint to year-2000 levels by 2020, representing a nearly 50% reduction from SAP's 2007 carbon emissions.

# UPHOLDING A COMMITMENT TO SOCIAL RESPONSIBILITY AND SUSTAINABILITY

## MAKING IT GREEN AT SAP

At SAP we believe that sustainability is part of the fundamental formula of business success in today's global economy. Taking action is our way to become a role model of sustainability.



We at SAP are deeply committed to running our business in a responsible manner consistent with the principles of sustainability. The responsible use of IT at SAP is an integral part of reaching that goal. We have committed to an aggressive goal of reducing our carbon footprint to year-2000 levels by 2020, representing a nearly 50% reduction from SAP's 2007 carbon emissions (see [SAP Increases Focus on Sustainable Business](#)).

SAP focuses on decreasing energy consumption and enabling green IT practices by:

- Co-innovating with customers and partners to build solutions and services that improve sustainability and reduce IT-related energy use
- Leveraging our internal research and findings around green IT to illustrate the benefits that our customers could reap through virtualization and similar initiatives

- Collaborating with technology partners on creating a green IT benchmark for SAP® solutions to address a broader set of performance metrics
- Establishing architectural guidelines that will enable our future solution releases to be more energy efficient

### The Role of IT in Sustainability

A key aspect of SAP's corporate sustainability effort is our focus on implementing green IT initiatives. We believe IT can become a critical strategic facilitator to respond to the urgent challenge of the global sustainability movement. Green IT at SAP refers to our efforts to reduce our IT energy consumption and carbon footprint. Our key areas of focus include IT infrastructure services, data center optimization, and business application innovation.

### IT Infrastructure Services

SAP employs more than 47,000 people around the world. By instituting green IT practices for this employee base, we are able to make significant progress toward our sustainability goals. In 2009 the company reduced PC power consumption by 5%, paper consumption by 28%, and number of printers and cost by 30%.

Through SAP's IT infrastructure services department, the company is reducing IT equipment energy consumption, most notably for PCs, notebooks, screens, and printers. With new initiatives since 2008, SAP now uses less power, paper, and toner; more multifunctional devices rather than separate devices; more efficient, double-sided printing; and fewer color prints.

To reach its goals, SAP is focusing on the following key areas:

- **Printing environment:** Reduce toner, paper, and energy
- **Power management:** Use tools and services to reduce power consumption of computers and PCs without disrupting user effectiveness
- **Virtual collaboration:** Extend usage of collaboration technologies to reduce the need for in-person meetings
- **Holistic lifecycle balance:** Optimize the lifecycle of our IT products from product selection to disposal or reuse for good ecological balance
- **Optimized local back-end infrastructure:** Consolidate the back-end infrastructure of SAP offices

### Printing Environment

SAP rolled out its printing initiative during a "Printing & Paper Week," a week that the company designated to encourage awareness and advocacy for reducing paper and printer energy consumption. An e-guide promotes green printing through all internal channels, news blogs, subscriber news, and local newsletters. The guide offers tips and tricks to help the company reach its printing goals, such as promoting the company's scan-to-mail function. We also rely on electronic document formats wherever possible, like scanning receipts for expense reports instead of submitting paper copies. We have set defaults for double-sided printing on all office printers, with

single-side printing as an option that can be set manually.

Within the SAP corporate portal, the IT department has established a printing tracker using SAP BusinessObjects™ Xcelsius® Enterprise software to increase awareness for paper usage among SAP employees. The tracker demonstrates in dashboard format the company's progress toward reducing its paper consumption by 20% on global, regional, and country levels (see Figure 1).

Beyond paper, SAP is looking at the number of printing devices the company owns to make sure every printer is necessary. Unneeded devices will be retired and replaced with more centralized multi-functional printers. Taking these measures benefits not only the environment but also SAP's bottom line by reducing costs associated with operating and powering these machines.

### Power Management

To achieve our goal to reduce PC power consumption by 5%, SAP has given employees computers with optimized power settings and more power-efficient IT equipment. The company determined that many employees were leaving their computers on 24 hours a day, with no overnight or vacation shutdown. Therefore, we plan to use power management software that would automatically start the computers at a certain time in the morning and go into power-saving mode at a certain point at night, for an additional 14% reduction in power consumption.

### Virtual Collaboration

SAP is pushing the boundaries of virtual collaboration to provide tools that make it easier to collaborate over distances



Figure 1: Printing Dashboard from SAP

and in “virtual” teams and home offices to reduce travel-related carbon emissions. The SAP Acrobat Connect Professional applications by Adobe are the company’s primary conferencing solution and are based on a new idea of online conferencing where every user has his or her own meeting room, which can be accessed via one click. In addition, we promote using video conferencing tools and holding virtual events. The SAPPHIRE® 2009 conference offered virtual admission for attendees who were unable to attend in person. Other events, such as the SAP Field Kick-Off Meeting, are now purely virtual, with live presentations online, electronic information booths, and chat sessions. These events are increasingly popular with hosts and attendees alike who want to reduce carbon emissions.

#### Holistic IT Equipment Lifecycle

As a software development company, SAP dedicates many of its IT hardware resources to the needs of our developers. We are now more conscious of calculating and optimizing the environmental footprint of our IT equipment – from purchasing and production to reuse and disposal of equipment. Before investing in new equipment, we will look to see what we have that can be repurposed. If we make a purchase, the item must fulfill at least ENERGY STAR 4.0 and over 80 other guidelines. In addition, we are defining new standards for all hardware, including minimal energy-efficiency requirements for any new purchases. IT equipment that is no longer functioning is sold to certified brokers for ecologically sound disassembling and disposal.

#### Optimized Local Back-End Infrastructure

SAP’s 47,000 employees work in locations around the world, connected

Through SAP’s IT infrastructure services department, the company is reducing IT equipment energy consumption, most notably for PCs, notebooks, screens, and printers. With new initiatives since 2008, SAP now uses less power, paper, and toner; more multi-functional devices rather than separate devices; more efficient, double-sided printing; and fewer color prints.

together through a centralized global corporate data center and data centers in large lab locations. For our data centers, we are employing measures to virtualize the existing environment to reduce the number of servers needed and power consumption. We are also evaluating how to best consolidate physical office space to maximize our efficiency and reduce energy consumption.

#### Data Center Optimization

SAP’s data centers are located around the world, with major computing center locations in Palo Alto, California; Rot, Germany; Vancouver, Canada; and Newtown Square, Pennsylvania. The largest encompasses more than 50,000 square feet of space and requires a substantial amount of energy not only to run the equipment but to cool it. Here are some ways that SAP is reducing energy consumption in its data centers.

#### System Landscape Optimization

Idle servers and the related cooling facilities can comprise up to 90% of data center energy consumption, while the software performing an actual business transaction may contribute as little as 10%. Most servers in data centers

are heavily underutilized; they have an average utilization of about 20% and consume most of their energy in idle mode. The reasons for this include:

- Systems that are sized for their maximum expected workload plus a “just-in-case” premium – which may be required only one day a year
- Servers that are no longer needed but have not yet been disposed of or redeployed – which can account for as much as 30% of the data center
- Systems landscapes that may have more tiers (for development, test, production, and so on) than actually needed

Consolidating the existing system landscape by rightsizing it and retiring systems that are no longer in use increases SAP’s utilization of existing hardware and significantly increases performance and decreases energy requirements. Additional consideration is being made for the consolidation of application components and the centralization or globalization of applications.

#### Virtualization

Modern virtualization technologies are the key enablers for increasing the utilization of servers and related

infrastructure. Virtualization describes the decoupling of physical and logical computer resources and can be implemented on different levels, such as network, storage, central processing unit, server, and application. This results in computing resources being assigned dynamically based on the performance requirements at a given time, rather than each component and each server being sized for its expected maximum load. The ability to optimize for utilization and hence ROI will depend critically on the availability and adoption of advanced management tools for virtualization.

SAP embraces virtualization and has improved our server utilization by up to 60%. Virtualization can greatly reduce the amount of power consumed by data centers. In 2000 SAP operated a few thousand physical servers. In 2001 that number grew by 39%. In 2002 it grew further and steadily increased until 2005 when we introduced the first virtual servers. That enabled us to slow the

growth rate, and by 2008 we stopped annual physical server growth (see Figure 2). Our goal is to reduce the number of physical servers as much as possible.

#### Storage Virtualization

As SAP optimizes its system landscape and reduces the number of physical servers and therefore power consumption, storage requirements are lessened as well. We are taking that one step further by reducing the storage needs of our servers through centralizing data storage to reduce underutilized disks. We are also implementing software options like deduplication and thin provisioning, which eliminate duplicate data blocks and reduce storage space.

#### Consolidation and Cooling

By reducing the number of physical servers and increasing the number of virtual ones, SAP's requirements for physical data center space are reduced too. We have already consolidated some

of our smaller data centers and are assessing the benefits of consolidating larger ones as well. Any future data centers will be built to maximize energy and cooling efficiency.

SAP is also introducing efficient cooling technology in its major data centers to reduce the need for air-conditioning and decrease related carbon emissions. This is an important step, as cooling can account for more than 50% of data center power usage.

By optimizing data centers, SAP can not only reach its goals for sustainability, but we also reduce the costs associated with operating and powering these centers. So it makes sense environmentally and financially.

#### Business Application Innovation

Many companies realize the imperative to act on sustainability issues but often face a gap between strategy and execution. While preliminary sustainability initiatives may be under way, customers, employees, governments, and shareholders continue to ask for greater transparency. They want well-developed, efficiently implemented, and clearly communicated sustainability strategies, programs, benchmarks, and targets. Moving from a series of ad hoc activities and a maze of reporting frameworks to a coordinated, transparent, and auditable sustainability strategy and communication program can improve performance and lower costs.

#### Solutions for Sustainability

SAP helps to bridge the strategy-to-execution gap through strategic planning, risk management, and sustainability

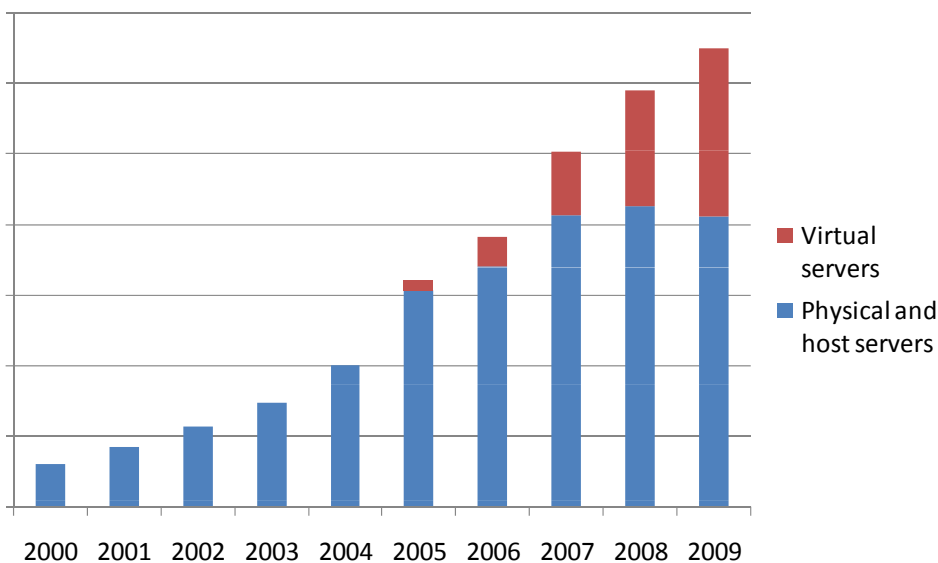


Figure 2: Physical Versus Virtual Servers at SAP

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monitoring and reporting software. Customers today are leveraging the SAP BusinessObjects Strategy Management application; the SAP BusinessObjects Risk Management application; SAP BusinessObjects Xcelsius Enterprise software; and other governance, risk, and compliance solutions to help manage and measure their business. SAP BusinessObjects Xcelsius Enterprise allows customers to create dashboards to access and monitor performance data. SAP BusinessObjects Strategy Management enables organizations to define and cascade goals and initiatives and tie them to key performance indicators for sustainability. The combination of these solutions with SAP BusinessObjects Risk Management supports sustainability performance management. The solutions help enable organizations to drive increased profitability by holistically managing economic, social, and environmental risks and opportunities.

Our customers can also make use of an interactive sustainability map for

the SAP EcoHub solution marketplace, providing a clear view of the ecosystem of sustainability and green IT solutions and services available from SAP and our partners. The sustainability area of the SAP EcoHub site is a natural outgrowth of our strategic focus on sustainability.

#### Sustainability Solutions in Practice at SAP

To measure, help manage, and report on SAP's carbon footprint, we have implemented the SAP Carbon Impact on-demand solution. SAP Carbon Impact helps us more clearly measure, mitigate, and monetize greenhouse gas emissions and other environmental impacts across our internal operations and supply chain. We are in the process of gathering data to measure our carbon footprint, with the first report planned for 2010.

SAP is also implementing the SAP BusinessObjects Sustainability Performance Management application to use as a foundation for our sustainability reporting. We upload data from three different pillars – environmental data

from SAP Carbon Impact, economic data from financial statements, and social data on the impact of SAP's work to generate growth and contribute to the economy across neighborhoods, industries, and nations. All three types of data will be used to build a dashboard with reporting functionality to publish results online.

#### Planning for a Sustainable Future

As one of the market leaders in business process automation, SAP is in a unique position to help businesses worldwide operate in a more sustainable way. Like the rest of the software industry, we still have more to learn about this topic. However, here are lessons learned that we believe have contributed to our success.

#### Focus on Low-Hanging Fruit First

We looked at our operations to identify small changes we could make that would have an immediate impact. Some areas we have focused on are printer usage, travel time, and standards on equipment purchases.

#### Involve Employees

The success of any technology initiative is dependent on user adoption. The same is true for green IT practices. It's imperative to have employees on board, or the program will not succeed.

#### Ensure Executive Support

SAP has a dedicated sustainability organization. It oversees strategic development, implementation, and integration of sustainability across our entire business. Our sustainability scoping includes solutions development, environmental performance, economic impact,

and social performance including issues such as product responsibility, human rights, labor practices, and our relationship with society. Having dedicated executive-level support gives credence to our green IT initiative. This support demonstrates to employees, customers, and shareholders that our commitment to sustainability is real and lasting.

#### Increase Transparency of the Results

No one likes to operate in a void. We've identified goals for our green IT initiatives and then published the results in easy-to-read dashboards, accessible to all within our corporate portal. Doing

this not only provides information that all involved can share with external audiences, it also helps to keep motivation strong within our enterprise.

At SAP we believe that sustainability is part of the fundamental formula of business success in today's global economy. Taking action is our way to become a role model of sustainability.

#### For More Information

To learn more about SAP's sustainability initiatives and offerings, visit [www.sap.com](http://www.sap.com).

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