

SPECIAL EDITION

ECO RESPONSIBLE COMPUTING

INSIDE THIS ISSUE

Sustainable IT – Good for Business and the Environment

From the Gartner Files

The IT Industry Is Part of the Climate Change and Sustainability Problem

Customer Snapshot: Telco

Social Responsibility at Sun

Sustainable IT – Good for Business and the Environment

by Dave Douglas, VP of Eco Responsibility, Sun Microsystems

At Sun, we create technology so that individuals can share, interact, and solve problems. As participation grows, we are committed to building products that are dramatically smarter, safer, and eco responsible – from design, to power usage, to global take-back and recycling programs. With more than 1 billion people participating online today¹, the network consumes more than 100 billion kilowatts of electricity and costs businesses around \$7.2 billion in utility bills annually. And since the power consumption of datacenters doubled between 2000 and 2005 it's no surprise that 25% of an IT budget is consumed by energy costs alone.² Some analysts say infrastructure power usage will soon cost more than the hardware itself.³



Dave Douglas

It's clear; what's good for the environment is imperative for business. This axiom drives Sun's commitment to designing and delivering eco-friendly processors, systems, programs, and services that help businesses reduce their power consumption, environmental impact, and energy costs. In fact, Sun leads the industry in offering a portfolio of eco responsible products that deliver high-performance, sustainable computing solutions to address customer IT needs. Our goal is to design all of our products with energy efficiency and eco responsibility in mind, while continuing to deliver the industry-leading performance customers have come to expect from Sun.

- Sun servers with CoolThreads technology, featuring the UltraSPARC T1 processor, provide exceptional performance, while consuming less energy, generating less heat, and taking up less space in the datacenter.
- The Sun Ray™ thin client consumes less energy and reduces the maintenance, upgrading, and operational costs associated with typical PC client environments.
- A scalable datacenter built into a standard shipping container, Project Blackbox uses state-of-the-art cooling, monitoring, and power-distribution systems in a much smaller and more mobile form factor than ever before.

- Sun's Eco Responsibility initiative applies not only to our products, but also to our Eco services, which include our flexible, resource saving Sun Open Work Practice and energy-efficient datacenters services.

For 25 years, Sun has believed in the principle of sharing, pioneering such revolutionary ideas as open standards, interoperability, and open communities. Today, Sun shares the world's resources and the responsibility for their conservation and takes a leadership role in developing innovative, ecologically responsible technologies that benefit our customers and our planet. Learn more about Sun's Eco Responsibility program and solutions at sun.com/eco or talk to your local Sun representative.

Source: Sun Microsystems

¹http://www.useit.com/alertbox/internet_growth.html

²<http://enterprise.amd.com/Downloads/svrpwrusecompletefinal.pdf>

³http://news.com.com/Power+could+cost+more+than+servers,+Google+warns/2100-1010_3-5988090.html

The IT Industry Is Part of the Climate Change and Sustainability Problem

The IT industry and IT organizations must immediately understand the changing sociopolitical views of climate change and take immediate action to ensure that they're part of the solution, not the problem. Regardless, environmental sustainability is the key long-term challenge for the IT industry.

WHAT YOU NEED TO KNOW

Climate change is a strategic discontinuity to which enterprises, their IT organizations and IT vendors must respond. However, the issue for the IT industry – and the consumers of its products and services – will move on to improved environmental sustainability, beyond simply climate change. Today, the IT industry risks being branded as part of the environmental problems, so it must conduct a self-analysis and position itself as part of the solution – specifically in reducing carbon emissions.

IT vendors and CIOs must review their policies and practices to reflect the changing views, and focus on improving environmental sustainability. There's a small window of opportunity

– particularly for IT vendors – to grab some of the “moral high ground,” and perhaps differentiation, by moving the debate (as well as product and service design) beyond simply “green IT” and power consumption to tackle the more-challenging issue of environmentally “sustainable IT.”

STRATEGIC PLANNING ASSUMPTION(S)

By 2009, one-third of IT organizations will have “improved environmental sustainability” as a top IT management issue, and included as a priority item in the list of buying criteria (0.6 probability).

ANALYSIS

Gartner anticipates changes in enterprises' (and IT organizations')

buying and operational behaviors, which will occur as they alter their corporate responsibility policies, strategies and operational procedures in response to a reappraisal of their

environment-related strategic risks. This alteration will reflect changing public opinion and political will as they relate to climate change and greenhouse gas emissions. Most enterprises will be driven to change because they recognize that these forces will affect their brand value and present a material risk to their long-term goals. However, we also believe that the focus on climate change will evolve into a broader concern regarding sustainability. The accepted definition of “sustainable development” is “development that meets the needs of the present without compromising



Simon Mingay

and environmental sustainability. Although IT as an industry doesn't rate as one of the largest contributors to greenhouse gas emissions, pollution, contamination or consumption of nonrenewable resources, it certainly makes a significant contribution and has done relatively little to assess and minimize its impact. The IT industry also hasn't attempted to independently assess or improve the sustainability of its activities. Approximately 73% of PCs are either discarded in landfills or stored, while only 27% are recycled. As mentioned earlier, power consumption is significant and set to grow exponentially. The principles of "reduce, reuse and recycle," which are at the heart of environmental policies and practices, have been largely ignored – with, for example, very limited use of recyclable materials, a reluctance to deal with disposals, and global shipments of work-in-progress and finished goods, making "technology miles" (such as "food miles" – see Note 1) very high. The improvements that have been made were mostly driven by legislation, such as the EU's Restriction of Hazardous Substances (RoHS) Directive and the Waste Electrical and Electronic Equipment (WEEE) Directive (see Note 2).

However, all this will have to change if the IT industry is to respond to changing public and political opinions. This will be long term, with many painful lessons to learn along the way. Nevertheless, action is required now. Failure to deal with it will result in further legislation and increased demands for mandatory disclosures. Thus, enterprises must increase their understanding of carbon emissions as a result of IT activities (and, notably, as a result of power consumption), disposal, use of recyclable materials, materials from renewable resources and so on; the environmental footprint of the products and services they produce, procure and operate – which means the entire life cycle; and enterprises must also address the issue of disclosure (see the Global Reporting Initiative at www.globalreporting.org).

The IT Industry and IT Organizations Can Be Part of the Solution

However, this isn't all about risk. The IT industry and IT organizations have plenty of opportunities to be part of the solution. Technology will be a key part of resolving climate change and sustainability. Travel and transportation represents one of the single-largest

sources of carbon emissions. Enterprises will be increasingly pressured to reduce carbon emissions as a result of travel. This will pave the way for massive improvements in communications and collaboration technology.

There will also be opportunities in technologies that prolong the lives of assets (for example, through virtualization). In addition, there will undoubtedly be a heated debate regarding the net impact of IT on the environment. However, regardless of whether the results of this debate are positive or negative, the IT organization industry must demonstrate that it's acting to reduce its impact on the environment and offering potential solutions.

How Can Enterprises Respond?
Enterprises will respond in diverse ways, but they can be broadly grouped into one of three categories (see Note 3). CIOs and key decision-makers for IT vendors must assess the category into which their enterprises fit and tailor strategies accordingly. Following are some steps that enterprises should consider taking now (this includes decision makers in "passive" enterprises, for reasons described in Note 3).

What Are the Implications for IT Vendors and Service Providers?

Strategize

- Define the enterprise's response and communicate it to the staff.
- Assess current environmental policies and practices, particularly regarding greenhouse gas emissions, pollution, life cycle management and the use of renewable resources.

Note 1. Food Miles

The distance food travels from where it's grown or raised, through processing and distribution, to where it's ultimately purchased by consumers. Analyzing the equivalent for technology also would draw a lot of attention.

Note 2. Legislation

RoHS Directive: The restriction of the use of certain hazardous substances in electrical and electronic equipment.

WEEE Directive (2002/96/EC): Electrical and electronic components aren't biodegradable; thus, they pose environmental and health threats. European policymakers have reacted to this threat by tightening regulations on electronic waste management. One such initiative is the WEEE Directive, which took effect in most EU member states during 2006.

the ability of future generations to meet their own needs.” The IT industry and IT operations are a long way from achieving environmental sustainability, and will face urgent and very strong commercial and public pressure to analyze, communicate and improve.

Climate Change Is a Strategic Discontinuity to Which Enterprises and IT Vendors Must Respond

Enterprises must recognize that scientific, public and political opinions, as well as the opinions of many business leaders and the media, have the potential to massively affect their operations. Thus, regardless of where an enterprise is on the wide spectrum of views regarding climate change, it must pay very close attention to the current changes in opinion, particularly in Europe. Those changes – in terms of the science, the socioeconomic and political impacts, and the potential for regulation – will likely accelerate and spread during the next two years and beyond. In a climate-change-sensitized world, enterprises and IT vendors will have to take action, and be seen doing so, to maintain their brand values and social “licenses to trade.”

In the short- to midterm, IT organizations, external service organizations and hardware vendors must pay more attention to the consumption of electricity – particularly the operation and cooling of new-generation servers – and factor that into technological, operational, location and data center infrastructural choices. The key problem is that the huge increase in power needed for the new systems (compared with the old ones) is creating an exponential demand for power. More important, an equal or greater amount of energy is needed to eliminate the excessive heat generated from these units.

Based on a broad set of assumptions regarding the number of PCs and servers in operation, duty cycles, average power consumption per unit, average carbon dioxide emissions per kilowatt hour (kWh) and so on, Gartner roughly estimates that during operation, today’s servers and PCs account for about 0.75% of global carbon dioxide emissions (based on direct power consumption, not including cooling). This is a surprisingly high figure. It will grow and come under increasing scrutiny, driven internally by concerns about costs (of the electricity and potential carbon certificates), or a goal to reduce carbon emissions, driven externally by potential requirements related to environmental disclosures.

Enterprises must determine their own views as to the extent of climate change, its causes and the extent of any changes that are occurring or will occur. Gartner doesn’t advise clients on this subject because it’s not our area of expertise. However, clients must at least recognize the changing opinions of their broad stakeholders, as well as the environmentally unsustainable trends in the power consumption of IT equipment.

The Issue for the IT Industry and Enterprises Using IT Will Move to Improved Environmental Sustainability

Although immediate attention will focus on greenhouse gas emissions (particularly carbon dioxide) and, hence, power consumption, climate change will act as a key catalyst for broader and increased environmental awareness at the consumer and enterprise levels (and possibly include the broader social and ethical issues). This increased awareness will introduce a broad range of environmental issues that will influence investment and

buying decisions for IT-related products and services – not the least of which is the recycling and appropriate disposal of potential pollutants. By 2009, one-third of IT organizations will have “improved environmental sustainability” as a top IT management issue, and included as a priority item in the list of buying criteria (0.6 probability).

As public and political interest grows, the mainstream media will delight in highlighting the upstream and downstream effects of environmentally poor operational policies and practices. The use of nonrenewable resources that aren’t being proactively reduced, reused or recycled will face particular scrutiny. Software companies may, for example, feel that they’re “above” such issues. However, if their product, service, support or licensing practices force enterprises to prematurely dispose of equipment, or restrict reuse or recycling, then they, too, will increasingly come under scrutiny.

Enterprise environmental decision-making is highly complex, requiring sophisticated analysis to provide information to balance the inevitable trade-offs, such as energy requirements in production vs. operational energy requirements. Similarly, buying decisions based on the relative sustainability of competing products or services will be nontrivial and replete with misinformation – through which enterprises will have to find their way.

The IT Industry and IT Organizations Are Viewed as Part of the Problem

The IT industry that produces, and the enterprises that consume, IT-related products and services have a significant role to play in responding to the perceived threats and opportunities of climate change

Note 3. Enterprise Profiles

Aggressive environmentalists: They want to be environmentally sound and are proactive and potentially outspoken about it. Consider the impact and risk of one of your major customers taking this route. If a major retailer, such as Wal-Mart or Tesco, were to fall into this category, the impact would be huge. Aggressive environmentalist enterprises will focus on the broader issues of sustainability, and investigate reducing the environmental footprint of their operations and supply chains. Responsibility for environmental policies would fall to the CEO and the leadership team. In addition, the IT organization must be passionate about environmental issues and create a visionary, environmentally sustainable IT strategy that demonstrates innovation in addressing these issues.

Measured environmentalists: Their goal is to react only in a measured way when issues become important from an economic, regulatory, risk or brand perspective. Most enterprises are likely to move into this category, unless they believe it's expedient to be more aggressive. Any activity deemed necessary at this stage will be limited to greenhouse gas emissions, disposal and recycling. Responsibility for environmental issues may fall to those responsible for corporate social responsibility, legal, marketing and public relations. CIOs must ensure that the IT strategy supports the specific initiatives undertaken – for example, if the enterprise is building an environmentally aware brand, then the IT organization must consider how its actions may adversely affect this strategy (for example, dumping old PCs in landfills).

Passive environmentalists: They essentially ignore the issue or judge it to have little or no impact on their operations or strategies. This is where most enterprises are today. None see it as their responsibility – at best, their lawyers and PR are dealing with it. However, CIOs mustn't assume that they can't do anything. These enterprises are often "passive" because their activities aren't viewed as "environmentally damaging." However, in such companies, the IT organization is likely to be one of the major areas of environmental impact (due to the large amount of computing equipment they typically use). Thus, if a company shifts its focus and becomes more environmentally aware, then the IT organization will immediately be affected. CIOs must therefore be ready for any such shift by at least undertaking their own environmental impact analysis, and by identifying areas where policy changes can be made that will deliver sustainability improvements, in case this is raised higher on the management agenda.

- Conduct a risk assessment associated with taking no action.
- Develop a plan for the enterprise to be viewed as part of the solution, not part of the problem.

Analyze

- Immediately investigate how you can reduce your carbon and greenhouse gas emissions.

- Analyze the embodied energy in products, as well as the energy consumption during operation.
- In addition to getting your enterprise in order, analyze the supply chain. Just as the retail food industry now looks at food miles (see Note 1), IT vendors should look at technology miles. If they don't, then someone else will (which is what happened in the retail food industry).
- Consider how licensing restrictions may encourage or discourage reuse and recycling.
- Survey clients to assess current opinions, and to monitor changes in buying criteria.
- Identify the market opportunities for new or adapted products and services.
- Consider using ISO 14000 as a catalyst for change, and as a marketing tool.
- Conduct a gap analysis among policies, practices and capabilities against the direction in which the market is moving.

Act

- Within the context of the chosen strategic response, and based on the analysis, develop an action plan.
- Adapt media and client communications appropriately.
- Train the staff in the languages and concepts of climate change and environmental sustainability so they understand the questions and issues.
- If environmental issues are viewed as a marketing or legal responsibility, then get them moved to the head of operations.

What Are the Implications for Enterprises and IT Organizations?

Strategize

- CIOs must identify their enterprises' current or evolving positions, and develop an IT environmental policy and strategy within that context. However, they must also remember that the IT organization, along with travel, might actually be the largest area of environmental impact, so the IT organization may have to take the lead here.
- Conduct a risk assessment associated with taking no action.

Analyze

- Audit and document the environmental efficiency of your data centers.
- Calculate carbon emissions from IT-related operations inside and outside the data center.
- CIOs should immediately investigate the short-term and long-term options of reducing power consumption and carbon emissions beyond the data center, looking particularly at PCs, monitors, printers and so on.

- If not already in hand, analyze how electrical and electronic waste is being disposed.

Act

- When deploying new technologies, pure computing power criteria must be balanced against environmental issues, such as power, cooling and carbon emissions. Specifically, companies should take a holistic approach by considering the location of the data center, its layout, rack spacing, specialist cooling (below 15 kilowatts per rack) and rack liquid cooling (above 15 kilowatts per rack), and the fuel source used for generation (that is, coal vs. gas vs. hydroelectric and so on).
- Companies should embrace vendor programs for environmental issues so they can share information and develop new programs.
- New data center building designs should consider environmental efficiency as well as pure computing needs.
- Start asking suppliers and service providers about their activities in reducing greenhouse gas emissions, as well as their broader environmental policies.

- Consider adjusting buying criteria to reflect the environmental strategy.
- Engage the enterprise and those responsible for corporate social responsibility policies in a discussion, because this issue goes far beyond the IT organization.

Regardless of their assessment of the merits of arguments regarding climate change, and the broader questions of environmental sustainability, enterprises must act now and at least reassess their strategic risks in the face of changing consumer, political, media and enterprise opinions.

Gartner RAS Core Research Note
G0014619, Simon Mingay,
29 November 2006

Customer Snapshot: Telco Strato AG

Lowering Power Requirements While Increasing Capacity

With more than two million customer domains in Germany and six other countries, Strato is Europe's second largest Internet service provider, offering a full range of tailor-made products and services for day-to-day online communication - from complete Web hosting packages and servers to online shops and DSL access.

Business Issues

- Deploy high-performance servers
- Reduce server power consumption and heat emission
- Simplify administration and porting of applications

Solution

Strato deployed Sun Fire T2000 servers for applications requiring high data throughput, and Sun Fire X4200 servers for calculation-intensive applications with frequent floating-point calculations, all running Solaris 10.

Success at a Glance

Strato provides all its services at two powerful computer centers in Berlin and Karlsruhe, which have capacity for up to 43,000 servers. The majority of its customers use shared Web hosting, where various customers' Web content is hosted in logically delimited areas of the same server. Strato processes impressive volumes of data, with 1,700

terabytes (1.7 million gigabytes) flowing through its wires every month. The Strato Web hosting platform holds enough memory for up to eight million domains. Strato needed to expand its server capacities to cover the constantly growing demand for these services.

All the alternative solutions considered by René Wienholtz, Strato's Technical Director, were aimed at giving the platform a complete overhaul. The objective was to deploy servers with low power consumption, low levels of heat emission, maximum performance, easy administration, up-to-date operating system support, simplicity when porting applications, and high cost-effectiveness. The company compared various systems with AMD Opteron processors from different manufacturers, and Sun servers quickly emerged as the favorite. The decision was made just as Sun completed development of the Niagara generation of servers, and Strato was one of the first companies to test the beta version of the Sun Fire T2000 server.

“Sun has developed the perfect chip for high data throughputs with the T1 processor.”

— René Wienholtz, Technical Director,
Strato Rechenzentrum AG

As a result, Strato replaced the majority of its servers used for shared Web hosting with Sun Fire T2000 servers running Solaris 10. Each pair of servers—with expanded 16-gigabyte primary storage and the second server as a redundant system—replace on average 36 servers from the older infrastructure. Strato reduced the power requirements for the servers by 90% and the amount of space required in the computer center by 20%. Cooling costs were also reduced accordingly. The server replacements eliminated the need to completely relocate the computer center to other premises and also created extra space for future expansion. In addition, the use of Solaris 10 on all Sun servers results in substantial cost savings in administration.

The transition to the new Sun servers took very little time due to the compatibility of the T1 architecture with the SPARC architecture. Applications developers at Strato, who gained their first experiences with UltraSPARC II and III-equipped systems with Solaris 7 and Solaris 8, needed only to put in one extra person-month to complete the entire transition.

While the T2000 systems are best suited to applications with high data throughput, for calculation-intensive applications Strato uses Sun Fire X4200 servers. These servers, which are based on AMD Opteron processors, are particularly well-suited to applications with large numbers of floating-point operations. Sun Fire X4200 servers also operate using Solaris 10, saving costs by enabling the same operating system across all servers.

Source: Sun Microsystems

Business Results	Products/Services/Solutions
<ul style="list-style-type: none"> Lowers power requirements by 90% Reduces space occupied in the computer center by 20% Simplifies administration to save operational costs Provides space for future expansion 	<ul style="list-style-type: none"> Sun Fire T2000 Server Sun Fire X4200 Server Solaris 10 Operating System

Social Responsibility at Sun

Sun's corporate social responsibility strategy can be defined in three words: Innovate, Act, and Share. Through our strength in product innovation, our goal is to bring more responsible products and services to market. We strive to act in a way that promotes responsible company operations, for example, by maintaining the highest level of transparency in our business

practices. And through our philosophy of open sourcing, we share our ideas, technologies, and expertise through our people, products, and know how. Our commitment to openness and transparency has led directly to our decision to publish an annual corporate social responsibility report. This kind of reporting allows our stakeholders to understand what we are doing to drive

economic and social progress around the world, and to hold us accountable for continuous improvement of our social and environmental performance throughout the value chain.

We invite you to view this information at: www.sun.com/aboutsun/csr

Business Trends is published by Sun Microsystems. Editorial supplied by Sun Microsystems is independent of Gartner analysis. All Gartner research is © 2007 by Gartner, Inc. and/or its Affiliates. All rights reserved. All Gartner materials are used with Gartner's permission and in no way does the use or publication of Gartner research indicate Gartner's endorsement of Sun Microsystems' products and/or strategies. Reproduction and distribution of this publication in any form without prior written permission is forbidden. The information contained herein has been obtained from sources believed to be reliable. Gartner disclaims all warranties as to the accuracy, completeness or adequacy of such information. Gartner shall have no liability for errors, omissions or inadequacies in the information contained herein or for interpretations thereof. The reader assumes sole responsibility for the selection of these materials to achieve its intended results. The opinions expressed herein are subject to change without notice.
CN02012008