Green Computing: Using IT Automation to Achieve Energy Efficiency

An ENTERPRISE MANAGEMENT ASSOCIATES® (EMA™) White Paper
Prepared for Kaseya
March 2008

IT Management Research, Industry Analysis, and Consulting

Table of Contents

©2008 Enterprise Management Associates, Inc. All Rights Reserved.

Green Computing: Using IT Automation to Achieve Energy Efficiency

Executive Summary

The concern over the environmental impact of the increased usage of computing technology has far reaching ramifications on the sustainability of business IT operations. Already increasing energy costs and expanding power utilization needs are having a direct impact on business profitability. Add to this the social concerns over the global climate crisis and conservation efforts that have led to regulatory compliance initiatives, and businesses are increasingly pressured to find new solutions to ensuring IT business implementations are more eco-friendly. Chief among these initiatives is to develop improvements that increase energy efficiency and eliminate power wasted by inactive servers and workstations. Fortunately, solutions to this problem exist today and Enterprise Management Associates (EMA) recommends businesses implement a green computing solution not only to contribute to the global environmental movement, but also to decrease operating expenses and boost profitability.

What is Green Computing?

The reality of rising energy costs and their impact on international affairs coupled with the increased concern over the global warming climate crisis and other environmental issues have shifted the social and economic consciousness of the business community

Environmental and energy conservation issues have taken center stage in the global business arena in recent years. The reality of rising energy costs and their impact on international affairs coupled with the increased concern over the global warming climate crisis and other environmental issues have shifted the social and economic consciousness of the business community.

Green Computing, or Green IT, is the practice of implementing policies and procedures that improve the efficiency of computing resources in such a way as to reduce the environmental impact of their utilization. Green Computing is founded on the "triple bottom line" principle which defines an enterprise's success based on its economic, environmental and social performance. This philosophy follows that given that there is a finite amount of available natural resources, it is in the interest of the business community as a whole to decrease their dependence on those limited resources to ensure long-term economic viability. Just as the logging industry long ago learned that they need to plant a tree for each that they cut, today's power consumption enterprises must maximize the conservation of energy until renewable forms become more readily available. This is often referred to as "sustainability" – that is, the ability of the planet to maintain a consistent level of resources to ensure the continuance of the existing level of society and commercial enterprise.

Green Computing solutions address a broad set of environmental issues targeted at attaining sustainability. These solutions include:

- Energy Efficiency – Maximizing the power utilization of computing systems by reducing system usage during non-peak time periods.
- Reducing Electronic Waste – Physical technology components (keyboards, monitors, CPUs, etc.) are often not biodegradable and highly toxic. Several business and governmental directives have been enacted to promote the recycling of electronic components and several hardware manufacturers have developed biodegradable parts.

©2008 Enterprise Management Associates, Inc. All Rights Reserved.

- Virtualization – By utilizing a single server to provide the virtual services that would otherwise need to be provided by multiple systems, overall power consumption is reduced.
- Employing Thin Clients – These systems utilize only basic computing functionality (and are sometimes even diskless), utilizing remote systems to perform its primary processing activity. Since antiquated systems can be used to perform this function, electronic waste is reduced. Alternatively, new thin client devices are now available that are designed with low power consumption.
- Telecommuting – Providing the facilities necessary to allow employees the ability to work from home in order to reduce transportation emissions.
- Remote Administration – Allowing administrators the ability to remotely access, monitor and repair systems significantly decreases the need for physical travel to remote offices and customer sites. As with telecommuting, this reduced travel eliminates unnecessary carbon emissions.
- Green Power Generation – Many businesses have chosen to implement clean, renewable energy sources, such as solar and wind, to partially or completely power their business.

Of all these, "Energy Efficiency" provides the greatest potential for quick return on investment, ease of implementation, and financial justification. Several commercial solutions for improving computing energy efficiency have recently become available and EMA strongly recommends the adoption of such a solution not only for its environmental implications, but also for its common-sense reduction on IT infrastructure costs.

The Business Case for Going Green

It is estimated that within the last five years, the total amount of energy utilized by all domestic US data centers has doubled and there is every indication that this trend is continuing into the future. The drivers for this are many. Certainly, the reliance on IT resources to support business infrastructures and drive profitability has increased proportionally to the expanded internet utilization and technological advances in automating business practices. For each new server added to an infrastructure, support systems – such as network devices, backup units, air-conditioning units, management systems, and so on – also need to be extended. What's more, advancements in IT technology have enabled the manufacturing of smaller system components allowing racks of servers to take up the same datacenter space where only a few were able to fit previously.

It is estimated that within the last five years, the total amount of energy utilized by all domestic US data centers has doubled and there is every indication that this trend is continuing into the future.

In August 2007, the U.S. Environmental Protection Agency (EPA) released a study indicating that in 2006, 1.5 percent of all U.S. electricity consumption (or 61 billion kilowatt-hours) was utilized solely for the purpose of powering servers and data centers. To put this in perspective, this is almost twice the estimated level of electricity consumed by the nation's color televisions (34 billion kWh) and more than half the electricity utilized by all U.S. household lighting (101 billion kWh).

©2008 Enterprise Management Associates, Inc. All Rights Reserved.

Further, the report estimated that national energy consumption by servers and data centers could nearly double again by 2011 to more than 100 billion kWh, resulting in a whopping $7.4 billion annual electricity cost.

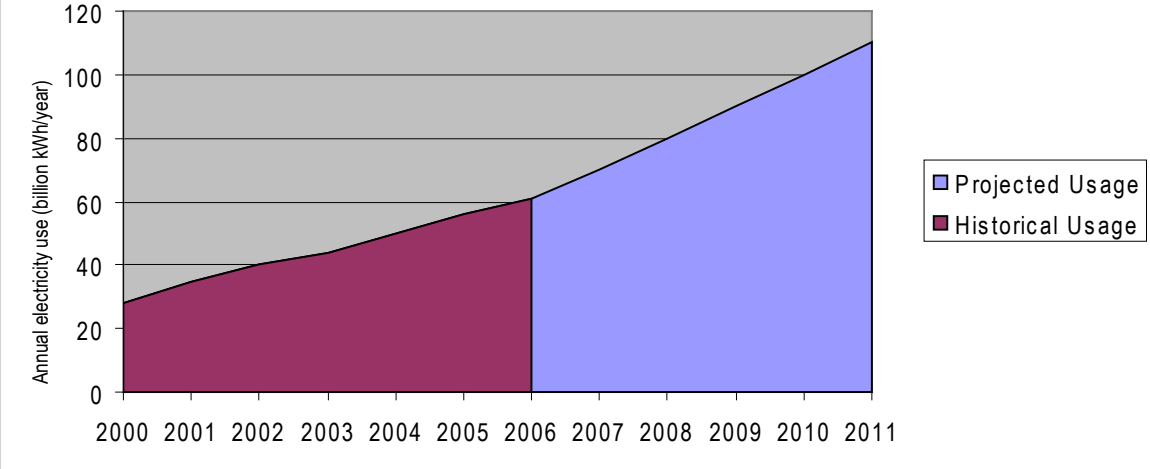

Figure 1. Estimated U.S. Datacenter Electric Power Utilization

In addition to the cost burden this increased usage places on businesses, a burden is also placed on the power industry to meet these requirements. Currently, business data center power requirements reach a peak load on the power grid of an estimated 7 gigawatts (GW), or approximately the output of 15 baseload power plants (power stations that provide a continuous, steady flow of power throughout the year). By 2011, the increased power demand in this sector could rise to 12 GW, requiring the addition of 10 new power plants. From an environmental standpoint, this represents a significant increase in greenhouse and pollutant emissions if the majority of this power is generated by traditional fossil fuel plants, as is likely. From a business economic standpoint, management of additional plants and increased fossil fuel demand will likely result in significant cost increases for electric power.

Businesses are already starting to feel the crunch and not just in their monthly electric bill. Many enterprises no longer have sufficient power in their infrastructure to support sustained IT growth. As an IT manager of a Fortune 1000 business reported, "It's crazy – we have a project that we know would immediately start generating revenue for the company, but we can't get it off the ground because facilities does not have sufficient power allocated in the data center."

A well documented example of this problem can be seen with the increased use of rack-mounted blade servers. Although a great innovation in space savings, blade server arrays have turned many data centers into giant echo chambers because their energy consumption requirements exceed the original planned space allotment for the facility. Adding additional power to the facility will certainly resolve the problem, but at a significant upfront and on-going cost. A far more fiscally effective policy of managing energy efficiency should rather be employed to streamline existing power utilization and provide immediate operational cost savings.

©2008 Enterprise Management Associates, Inc. All Rights Reserved.

Data center power utilization is only the tip of the iceberg when it comes to the energy impacts on the whole of business computing. A recent EMA survey has indicated that workstations (including desktops and laptops) account for roughly 90% of total business IT utilization. By extension, we can interpolate that power consumption for workstations represents a full order of magnitude greater than just that dedicated to data centers. Although PCs and laptops have built-in utilities to assist in power management, use of these tools are usually left up to end users who are not held accountable for energy consumption or its associated costs. To regain control over IT operational expenses, businesses require tools that can regulate power usage from a centralized interface to enforce company policies and eliminate wasted energy.

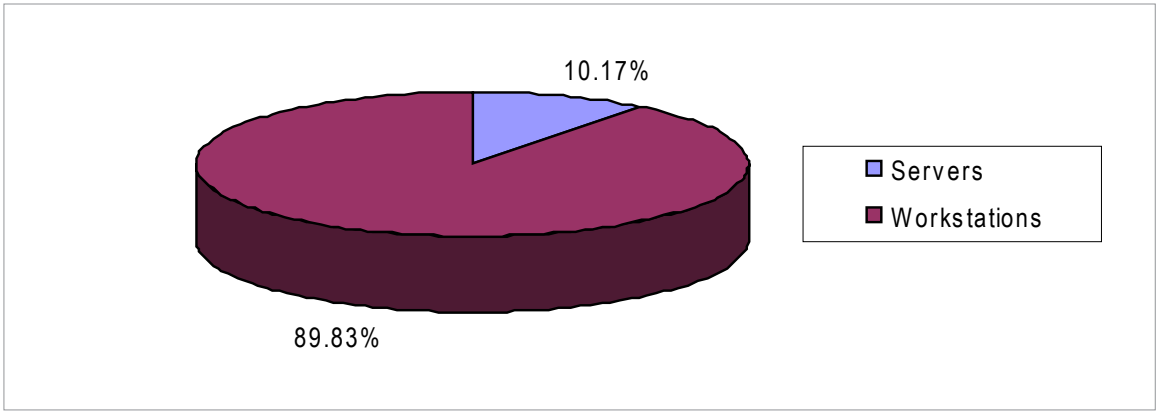

Figure 2. EMA Survey Results on Total Computing Utilization

Reducing Operational Costs with Energy Efficiency

A common-sense approach to reducing household expense is to turn off the lights whenever you leave a room. You would think this same philosophy would be adopted by business IT centers. Sadly, however, this is rarely the case – though sometimes for some very sound reasons. Servers and workstations are often left fully functional and operating 24x7x365. Sometimes this is done to provide 24 hour production support; sometimes to facilitate after hours functions like backups and maintenance; but principally this is done because the manual process of daily shutdowns is both cumbersome and impractical. True energy efficiency in IT business systems requires all these factors to be taken into consideration.

First attempts to introduce energy efficiency to computing were made in 1992 with the introduction of Energy Star, an EPA sponsored program promoting voluntary labeling of products that enhanced energy efficiency. This led to the development of automatic power downs of unused systems and "hibernating" tools that suspend system operation without the need for a full system shutdown. These tools are primarily used for desktop and client systems which do not require continuous operation and were initially developed to replace the inefficient screen savers applications commonly used at the time. Screen savers do not diminish power usage, but instead are designed to prevent burn-in on the monitor. In fact, many screen savers became so graphic intensive that they actually drew more power when the systems were not in use. Modern power management tools

©2008 Enterprise Management Associates, Inc. All Rights Reserved.

built directly into operating systems now allow users to determine a period of inactivity as a trigger for initiating either a shutdown or system hibernation. This is certainly a much more cost effective solution than footing the bill for digital fish to swim on a computer screen in an empty office.

Understanding that green computing requires 24 hour power management, Kaseya has divided its solution into two distinct energy management process sets – working hours power management and after hours power management.

In July of 2007, the EPA established more stringent requirements for Energy Star, calling for an 80% or greater power supply efficiency. Other industry and governmental regulatory compliance mandates have been introduced worldwide calling for improved power management solutions. This has challenged business IT groups to find innovative methods for performing power management on a large number of client systems. Fortunately, recent advances in automated systems management tools have also become available to assist in this process.

As indicated earlier, however, data centers require a more sophisticated solution to power management than desktops. They need to regulate power utilization without impacting day-to-day IT production requirements and business needs. Here again, automation is the key to success. Once a comprehensive policy has been established, triggers and schedules can be set to automatically power down unused systems and power up prior to production use on a maintenance activity.

Implementing a Power Management Solution

In most modern enterprises, the decision to standardize on a power management solution needs to be directed at the executive level. This is due to the common practice of separating computing support services from building facilities services. The former manages computer resources and the latter manages power consumption. They often have separate budgets and differing priorities. Worse yet, some larger enterprises further subdivide budgets and resources based on project or business department. It is unlikely that IT or department managers, burdened with a variety of project related challenges, will voluntarily take the time and effort to implement policies to reduce energy costs when those expenditures do not come directly out of their budgets. A facilities manager, on the other hand, does not have the ability to implement system level policy changes and will more likely simply deny power access to new projects if the available quota has already been met. It is the executive (most likely a COO or CFO) that is in the best position to enforce policy change.

Once a power management directive has been established, appropriate tools need to be identified to ensure compliance with the corporate energy policy. Preferably, the solution will provide a centralized interface to automate the power utilization of all systems in an IT infrastructure. The solution should also provide the flexibility to account for business and IT specific activities so as to not hinder business performance. Although cost will certainly play a role in choosing a solution, this should be balanced against the cost savings expected to be achieved once the product is implemented. In most cases, a power management solution will provide rapid and justifiable return on investment.

As an example, in February 2008, Kaseya has announced a User State Management add-on module to its popular IT Automation Framework software. Understanding that green

©2008 Enterprise Management Associates, Inc. All Rights Reserved.

computing requires 24 hour power management, Kaseya has divided its solution into two distinct energy management process sets – working hours power management and after hours power management. During working hours, power policies are created to determine under what conditions (principally length of idle time) systems should have screens powered down, disks powered down, or the system placed in hibernation mode. Since these policies can be applied to groups of systems, implementation and maintenance of the policies is greatly simplified and can be performed by a single administrator from a single interface. A side benefit of this solution is that security is enhanced since systems become inaccessible when not in use and require a password authentication to be re-enabled.

Kaseya has also provided functionality to deal with complex after hour IT requirements. Naturally, system power-downs can be scheduled or manually initiated from the central interface just as they can during working hours, but by also enabling scheduled power-up events, some very sophisticated policies can be developed to work around system backups, virus scans, patch installations, and other maintenance requirements. This ability is enabled by leveraging features available in today's new chips, such as the Intel© Core™2 Processor with vPro™ which supports Intel's Active Management Technology to allow remote out-of-band management of workstations. The vPro technology also provides a wealth of information about processor activity and status that can be accessed and reported by Kaseya's interface.

The environmental issues addressed by Kaseya's solution do not stop with energy efficiency, it should be noted. By enabling remote administration, problem diagnosis and remediation, Kaseya IT automation software significantly reduces the number of physical "house calls" IT administrators need to make to customer sites and remote offices. Less transportation use translates into increased savings on the total "carbon footprint" of the IT implementation and business utilization. What's more, Kaseya fully supports a virtualized environment. Since virtualization both reduces electronic waste and consolidates critical processing to only one or a few servers, eliminating redundant operating services, promotion of its use further contributes to environmental sustainability.

Regardless of which systems management solution is ultimately chosen to achieve company green computing goals, it is important to establish an environmental policy that supports both business and social community objectives. This may require a restructuring of organizational responsibilities with respect to who is accountable for power usage. Policy change is never easy to implement, but the benefits clearly outweigh the difficulties in establishing an eco-friendly IT policy that provides good public relations, helps achieve long-term business environment sustainability, and significantly reduces existing overhead costs associated with rising power expenses and needs.

EMA's Perspective

It's not very often that political, social and business concerns converge on a single issue. The current global warming climate crisis which has been universally accepted by nearly every credited climatologist and supported by hundreds of peer-reviewed studies has the potential of having a devastating impact on the economic stability of the business community. But even if the "doomsday scenario" is dismissed along with the social sense of responsibility to prevent it, the reality of reducing operational cost associated with power

©2008 Enterprise Management Associates, Inc. All Rights Reserved.

utilization is just good business. This message is clearly getting through, and 2007 saw a significant increase in interest related to green computing and green energy solutions.

The larger the business, the greater the impact of implementing green computing solutions, but even mid- and small-sized businesses can reap benefits given the relatively small up-front investment and almost immediate returns achieved in cost savings. Expect to see more and more systems management vendors developing and enhancing green computing solutions into their packages in the coming year. As with all system management products, it is incumbent on the business consumer to determine which solution best fits its goals, company size and budget. IBM, for example, has recently launched "Project Green" to develop new products and services that increase energy efficiency in the data center. Although IBM's solution may be appropriate for businesses with very large IT infrastructures, some aspects of it appear beyond the scope of more traditional data center implementations. Businesses would be well advised to carefully define green computing goals and policies prior to committing to any particular solution.

The larger the business, the greater the impact of implementing green computing solutions, but even mid- and small-sized businesses can reap benefits given the relatively small up-front investment and almost immediate returns achieved in cost savings.

EMA enthusiastically supports green computing initiatives for the business financial advantages they provide, the IT technology being developed for an emerging market space, and the common environmental concerns they address. EMA encourages businesses to adopt green computing solutions, like Kaseya's IT automation software, to enhance both profitability and long term business sustainability.

About Kaseya

Kaseya is a global provider of IT automation software for IT Solution Providers and Public and Private Sector IT organizations. Kaseya's IT Automation Framework allows IT Professionals to proactively monitor, manage and maintain distributed IT infrastructure remotely, easily and efficiently with one integrated Web based platform. Kaseya's technology is licensed on over three million machines in over 25 countries around the world.

For more information please visit www.kaseya.com.

©2008 Enterprise Management Associates, Inc. All Rights Reserved.

About Enterprise Management Associates, Inc.

Founded in 1996, Enterprise Management Associates (EMA) is a leading industry analyst and consulting firm dedicated to the IT management market. The firm provides IT vendors and enterprise IT professionals with objective insight into the real-world business value of long-established and emerging technologies, ranging from security, storage and IT Service Management (ITSM) to the Configuration Management Database (CMDB), virtualization and service-oriented architecture (SOA). Even with its rapid growth, EMA has never lost sight of the client, and continues to offer personalized support and convenient access to its analysts. For more information on the firm's extensive library of IT management research, free online IT Management Solutions Center and IT consulting offerings, visit www.enterprisemanagement.com.

This report in whole or in part may not be duplicated, reproduced, stored in a retrieval system or retransmitted without prior written permission of Enterprise Management Associates, Inc. All opinions and estimates herein constitute our judgement as of this date and are subject to change without notice. Product names mentioned herein may be trademarks and/or registered trademarks of their respective companies. "EMA" and "Enterprise Management Associates" are trademarks of Enterprise Management Associates, Inc. in the United States and other countries.

©2008 Enterprise Management Associates, Inc. All Rights Reserved. EMA™, ENTERPRISE MANAGEMENT ASSOCIATES®, and the mobius symbol are registered trademarks or common-law trademarks of Enterprise Management Associates, Inc.

Corporate Headquarters:
5777 Central Avenue, Suite 105
Boulder, CO 80301
Phone: +1 303.543.9500
Fax: +1 303.543.7687
www.enterprisemanagement.com

1562.022708