



Business Service Efficiency: The Key to Green IT and Profitability

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Executive Summary

Energy costs continue to take up a significant portion of IT budgets, and it seems that there is no end in sight. According to Gartner, “The underlying consumption of energy in large data centers to power and cool hardware infrastructure is likely to increase steadily during the next 10 years. This scenario is likely because of the increase in energy consumption of processors, servers, storage devices, and network-type appliances.”¹ Many companies are already seeing their energy costs escalate. The following example conveys the magnitude of the problem:

A facilities executive of a global investment bank strode into the office of the CIO. He dropped an electricity bill on the CIO’s desk and said, “I believe this is yours.” The bill, which was the first the CIO had ever been asked to pay, was for nearly \$2 million. The facilities executive added that his department is no longer able to sustain this level of charge, noting that the IT energy cost per square foot is about 17 times that of other departments.

Much of the power that IT consumes is being wasted. Industry experts have reported that the cost of wasted server capacity is more than \$100 billion per year. Cost is not the only problem. Energy consumption has become a severe constraint on growth. In London, for example, there is now a moratorium on building new data centers because the city does not have the electrical capacity to support them.

Many IT organizations view Green IT as a major undertaking that involves replacing current equipment with new “green” equipment that has low energy consumption. Most of these organizations, however, do not have the capital budget to finance such broad and sweeping changes. Fortunately, there is a more practical way to achieve Green IT objectives. Rather than looking at greening IT as one formidable task, think of greening IT as an incremental and continuing process that you can tackle in bite-sized pieces.

You can begin with a step that requires minimal capital investment and still delivers a huge payback in energy conservation. You can use what you have in your infrastructure without having to buy new hardware. This paper presents that step as part of a holistic approach that addresses Green IT within the broader context of increasing business service efficiency. This strategy is based on Business Service Management (BSM), a comprehensive approach and unified platform for running IT, which offers an effective and proven way to manage IT based on business priorities. Business service efficiency strives to achieve a balanced set of outcomes that include financial gains and operational yields, in addition to environmental benefits.

This paper addresses, in a unified and systemic way, many of the issues — including Green IT — that IT has been grappling with in piecemeal fashion. Through this holistic approach, you can address the issues in context rather than in isolation. As a result, you’ll realize greater improvement in service and greater reduction in operations costs and capital expenses — and you’ll achieve Green IT in the process.

Business Service Efficiency and Green IT: Now a Business Necessity

We've all read analysts' reports of how servers have proliferated and are being utilized at only a small fraction of their capacity. In fact, some are not being utilized at all, as illustrated by the following example:

A company decided to move after occupying a building for several years. As part of the move, the IT staff had to move all the IT equipment. There was one server that the IT staff could see as an icon on the network display, but they could not find it physically. They finally found it, hidden behind a wall. In one of the remodels that had taken place years ago, a construction crew had inadvertently walled-in the server behind an enclosure that had no door. The services that the server had been providing had been terminated long ago, yet the server remained powered up on the network. There it remained for years, humming along, yet doing nothing but consuming electricity and network ports. When the staff found it, they turned it off. Of course, no one complained because no one was using it.

How did IT reach this point? Over the years, IT has been asked to implement a rapidly growing number of business services in very short time frames. To meet the demand, IT has continually switched on new equipment rather than take advantage of the capacity already available. In many cases, equipment is not being switched off when it is no longer used or needed. The result is a proliferation of computing and network equipment, most of which is woefully underutilized. Today's data centers are, for the most part, grossly inefficient with respect to energy consumption.

Adding to the problem is that IT has not had the tools necessary to determine what capacity is already installed and how that capacity is being used. In addition, IT has not had the tools to determine the relative business importance of the services being provided. Consequently, IT cannot prioritize service delivery based on business importance, and this failure to prioritize decreases efficiency. For example, an application providing critical business services may be competing for network bandwidth on an equal-priority basis with employees who are surfing the web during their lunch hour.

Certainly organizations want to be socially responsible, and that includes doing their part for energy conservation. With respect to IT, that means achieving Green IT. Adding to the impetus for achieving Green IT is that it's no longer just a nice thing to do. It has become a pressing business issue.

How do you cut back on energy consumption while at the same time continually adding new services to meet

increasing business requirements? Doesn't that require the purchase of new, more energy-efficient green machines, a purchase that you do not have the capital budget to finance? How do you address the challenge? Where do you begin?

Take a Simple but Rewarding First Step

A good first step is to understand the capacity you have, what it is costing, and what value it contributes to the business. This is a relatively simple step that requires little capital investment, yet it can have an enormous impact on greening your data center. It enables you to discover unused capacity in your network, as well as capacity that's being used for purposes that contribute no business value. With this information, you can make what you have as efficient as possible. The magnitude of the potential efficiency increases and resulting cost savings may surprise you.

How do you obtain and use the information you need? Solutions are available that can help you in this quest. With these solutions, you gain a clear picture of the capacity you have and how it is being used. How you can apply these solutions to get the information you need is described later in this paper.

Once you have a clear picture of the capacity you have and how it is being used, you can take a simple step to increase efficient use of that capacity. Identify the equipment that is consuming energy but providing no useful services, and simply turn it off.

Sound easy? It is. You may be surprised at the large number of devices that you can eliminate. What's more, many of these devices are older and, therefore, consume a disproportionate amount of energy. Retire your older devices and move applications to more energy-efficient servers in your environment. The resulting energy savings can be very significant.

Continue the Pursuit

Once you have taken the first step, eliminating devices that are consuming power but providing no useful services, you can then cull the remaining services you are delivering by eliminating those that contribute no business value or those whose cost is disproportionate to the value they contribute. Work with the business to understand what services are critical for your company's business today. For example, this might include maintaining online store availability 24x7. In this way, you ensure that your available capacity is being expended cost-effectively on services that contribute business value.

Add Cost Data

By adding cost data to the information you already have, you can pose the following question to your business users for every service you are delivering: "I'm going to charge you x amount of money to continue to provide this service. Do want me to continue it, or should I terminate it?"

Through this process, you can eliminate services that the business does not really need or is not willing to pay the costs to continue.

You can also use the cost information to maintain an ongoing dialogue with the business to be sure that the new services being requested are creating business value. This dialogue motivates the business to take a more disciplined and thoughtful approach when requesting services, by requesting only services that deliver business value.

Consolidate Servers

Once you have eliminated the servers and services that are not creating business value, you can move on to further increase the efficiency of your data centers by consolidating your workloads on a smaller number of servers. This further reduces the number of servers, and in turn, reduces energy consumption. It also increases resource utilization by taking advantage of surplus capacity.

A key success factor in server consolidation is effective planning. An important aspect of planning is to understand the server capacity you have available and how that capacity can be best utilized to deliver business services at required performance levels. The goal is to strike the optimum balance between capacity utilization and performance. Consider this simple example:

A data center has two application servers, each dedicated to a single application that is used only one week a month. Each application is used on different weeks of the month. The IT staff can place both applications on a single server with no impact on performance, cutting the number of servers and the energy consumption in half.

It's interesting to note that the quest for server consolidation is generating a resurgence of interest in mainframes. In many cases, the mainframe's highly parallel architecture provides the most efficient architecture available. A single mainframe can support hundreds of thousands of concurrent user sessions.

Virtualize

You can take advantage of virtualization to further reduce the number of physical servers. Here again, thorough planning is essential to reduce risk. Solutions are available that enable you to leverage the information you have gathered on the capacity you have and how it is being used to move forward in your consolidation and virtualization initiatives. With these solutions, you can analyze current usage profiles to determine a more efficient resource allocation, one with a smaller processing footprint that still enables you to meet the usage profile. Through virtualization, you'll not only reduce the number of servers, but also increase the utilization of the servers you retain.

Address Client Computers

Don't limit your energy conservation efforts to the data center. Client computers, such as desktop PCs and laptops, are also major energy consumers. The average PC consumes much more energy than a TV set. Simply placing client computers in sleep mode doesn't help much in that these machines consume a great deal of energy even when in sleep mode. Look at ways to power them down when they are not in use, without jeopardizing your ability to manage them. Software is available to help you to do patching without keeping your computers on.

Expand Your Field of Vision to Business Service Efficiency

IT is under intense pressure to respond to senior management's mandate to improve service while holding budgets flat. IT has been striving to meet this mandate through a variety of approaches, including server consolidation, server virtualization, configuration management, energy-efficiency improvements in desktops and laptops, and IT process improvement through implementation of best-practice processes, such as those outlined in the IT Infrastructure Library® (ITIL®).

Most IT organizations have been addressing these issues separately, with varying levels of success. The key is to address all these issues under a single, holistic, systemic approach, one that strives to increase your overall efficiency in delivering business services. Toward this end, expand your field of vision from saving energy to increasing business service efficiency. Focus your resources on the things that matter to your business. Strive to achieve a set of three balanced outcomes:

- > Financial gains
- > Operational gains
- > Environmental gains

In doing so, you'll realize a number of important business benefits, and achieve Green IT in the process.

Financial Gains

For every physical server you eliminate, you can save nearly \$500 per year.² That translates to nearly \$500,000 in annual savings for every 1,000 servers you eliminate.

Turning off client computers when not in use also contributes to power savings. You can save about \$40 per desktop PC per year and about \$20 per laptop per year.² That translates to a total savings of \$90,000 per year for every 1,500 PCs and 1,500 laptops that you power down.

Power is not the only cost savings you'll realize. It's common industry knowledge that the total cost of ownership (TCO) of a server averages between eight and ten times its purchase price per year. In addition to power costs, this TCO includes such costs as backup and recovery, administration, maintenance, support, and software licenses. By using the capacity you have most efficiently, you'll reduce other cost contributors to TCO. For example, virtualization reduces administration costs because administrators can manage four times as many virtual servers as physical servers.

By tapping unused capacity and freeing up capacity being expended on services with no business value, you'll be able to defer capital expenses because you can add new services without adding new equipment. In addition, by increasing server utilization through consolidation and virtualization, you'll gain a greater return on investment (ROI) in these resources. Experience has shown that in the right operational context, server utilization levels of around 80% are achievable through optimization of virtualized environment capacity.

NOTE: BMC provides an online Green IT calculator that permits you to estimate the cost savings that you might achieve in your organization through greening your IT operations. You can access the calculator at www.bmc.com/green/calculator.

Operational Gains

You'll achieve higher operational efficiency in a variety of ways. Because you'll do more with less equipment, you can add services without increasing your data center staff or data center space. By reducing the complexity of the IT infrastructure, you'll simplify its management and support as well as increase your agility in adapting the infrastructure to changes in the business environment. By leveraging automation technologies to configure and maintain your infrastructure, you can further simplify administration and reduce support requirements. Finally, because you can

prioritize activities based on their business impact, you can focus the staff on activities that have the highest business value. That translates into higher staff efficiency and productivity.

Fewer servers also mean lower space requirements. As a result, you can accommodate growth in business services while holding the line on, or even decreasing, your data center space. More efficient space utilization provides welcome relief to those organizations that would otherwise have to build an additional data center to accommodate just one more server.

Environmental Gains

You'll free up an estimated 6,000 kilowatt hours per year for every server you eliminate. That's 6 million kilowatt hours per year for 1,000 eliminated servers, enough to provide electricity to nearly 1,500 homes for a year. Powering down desktop PCs and laptops saves additional kilowatt hours per year.

Less power means lower carbon emissions. Powering the average server contributes between 2 and 10 tons of carbon emissions annually, depending on the method of power generation in your area. That's similar to the emissions of a large car and translates to a reduction of carbon emissions by 2,000 to 10,000 metric tons per year for every 1,000 servers you eliminate. Powering down PCs and laptops further reduces emissions significantly.

Leverage BSM Solutions to Make IT More Efficient and Green

BSM provides a natural process framework to address business service efficiency across all IT areas, including service design, service operation, and service support. BSM captures IT as a service delivery function, focusing on managing the IT infrastructure by business service rather than by device. You approach service management from the business user's perspective, determining what services are important to the business and finding ways to deliver those services most efficiently.

A wide variety of BSM solutions and services is available to help you gather the information you need to determine what capacity you have and how it is being used. In addition, these solutions provide a number of capabilities that help you analyze and act on the information to achieve substantial gains in business service efficiency.

You may want to consider enlisting consulting services to help you in the implementation and use of BSM solutions. These services help ensure that you get the most from your investment in these solutions.

The following sections describe how you can leverage available BSM solutions to help you in your quest for business service efficiency and Green IT.

Determine What Infrastructure You Have Deployed and How Effectively It's Being Used

The first step on the road to Green IT and business service efficiency is to determine what infrastructure capacity you already have and how effectively you are using it. Here's where a configuration management database (CMDB) can help. A well-architected CMDB automatically gathers and maintains a wealth of information that indicates what components are in your IT infrastructure, what their configurations are, and what services the components support.

In addition, a CMDB with automated discovery helps increase the efficiency of your IT staff by eliminating the need for the staff to spend time manually gathering and maintaining IT infrastructure data.

Gauge Device Utilization and Performance

Once you have determined what capacity you have, you can determine how much of that capacity is actually being utilized through the use of infrastructure monitoring solutions. Among other things, these solutions track usage (workload) on each component and maintain historical data. By analyzing the usage information, you can determine the amount of capacity being used in each device, giving you a handle on server utilization.

Monitoring solutions are available that track performance from the end-user perspective, such as tracking end-to-end transaction response times. You can use this information to determine whether you are delivering service performance that is acceptable to business users.

Optimize Capacity Allocation

The next step is to optimize the use of the capacity you have as well as to plan for the capacity you will need in the future to meet growing business requirements. Capacity planning solutions are available that analyze the information you gather and maintain, such as workload profiles, to determine current usage patterns as well as trends. Through this analysis, you can strike the optimum balance between device utilization and performance.

Capacity planning is especially important in server consolidation and virtualization. It enables you to optimize server consolidation by determining which services can be consolidated on which physical servers. It also enables you to determine which services are candidates to be moved to virtual servers. Some capacity planning solutions permit you to test drive combinations of physical and virtual servers

to determine the optimum mix of virtual servers on physical server hosts. In addition, you can use capacity planning solutions to determine future capacity requirements and ensure that you have sufficient capacity to meet future needs.

Maximize Business Impact

One of the key objectives of BSM is to integrate IT with the business and ensure that IT is in close alignment with your organization's business goals and objectives. To do so, you have to know the relationships between the components of the IT infrastructure and the business services they support. Only in this way can you determine how your capacity is being used to support the business. Service impact modeling solutions are available that provide this information.

With service impact information, you can allot capacity — such as allocating processing power on servers and allocating network bandwidth — based on the business importance of the supported services. You can also use service impact information to prioritize IT staff activities, focusing on those activities that have the highest business impact. Prioritization increases the efficiency of the IT staff in delivering and supporting business services.

Understand and Minimize Service Delivery Costs

To optimize the efficiency of your IT infrastructure, you have to deliver the highest return for every dollar you spend. That requires you to understand the cost of service delivery. To do so, you need to understand the TCO of the assets that support the services. This is an area where available asset management solutions can help. An asset management solution maintains the cost information you need — such as purchase, maintenance, and support costs — in the CMDB.

Keep Client Computers in Mind

As discussed previously, client computers account for a significant amount of power consumption. BSM solutions are available that enable you to power down clients when not in use, without affecting your ability to manage them effectively.

A patch management solution, for example, can update and patch clients without them having to be continuously connected to the network, or even continuously powered up. If a machine is powered down or temporarily disconnected from the network, the solution automatically suspends installation of the patch or update, and then pushes it to the client as soon as it is reconnected to the network. This capability permits you to power down desktop and laptop computers every night to save power and still ensure that the computers are kept up to date with patches and updates. In addition, automated patch management eliminates

a substantial amount of manual work on the part of the IT staff, increasing efficiency.

An asset management solution can also be of considerable help here. The solution permits you to manage the full life-cycle of assets — from acquisition, through useful life, to retirement. You can use the asset management solution to practice aggressive retirement management, retiring older machines when they are fully depreciated and replacing them with more energy-efficient machines.

Automate Wherever Possible

BSM solutions are available that automate many of those routine, repetitive, and time-consuming manual tasks that take up so much IT staff time and effort. Service request management solutions provide an example. A service request management solution permits users to request services from an online service catalog. The service catalog indicates what services are available and what they cost.

By seeing the costs of services in the service catalog, business users are more apt to request only services that deliver business value. What's more, through the service request management solution, you can track the requests that come into IT. By tracking service requests, you gain better control of the services you implement, providing only services that are properly requested and that indeed deliver business value. You'll see what services are being requested and by whom, and you can use this information to identify services that are no longer being requested and may be candidates for termination.

The Momentum Is Building

Many organizations have already embarked on business service efficiency initiatives. A survey of customers and partners recently conducted by BMC validates that momentum. The survey reveals the following:

- > Sixty-four percent of the respondents are already in production with server virtualization, and 45 percent are in production with storage virtualization.
- > More than half are in the process of implementing ITIL.
- > Nearly half are in the process of implementing a CMDB.

BMC Software itself is pursuing a business service efficiency initiative and has already realized considerable progress with respect to Green IT. BMC has achieved the following:

- > Reclaimed three years of data center capacity
- > Deferred significant capital expenses
- > Achieved a reduction of 25 percent fewer servers within 12 months, while at the same time gaining 20 percent additional capacity, and expects to have 50 percent fewer servers within 24 months

- > Has packed an average of 17 virtual servers onto each physical host server, without negatively impacting performance
- > Increased average server utilization from five percent to 80 percent
- > Is already saving \$370,000 annually in power and cooling, and will emit 5,300 tons less CO₂ each year as a direct result

Conclusion

The days of simply adding hardware to meet the growing demands of business for IT services are over. IT can no longer afford to pay the resulting energy bill. That's why Green IT has emerged as a major issue.

You can't simply throw out your current hardware and replace it with green hardware. Very few, if any, IT organizations can afford such wholesale replacement. There is a far more practical and effective approach. Begin with a simple step that requires *a fraction* of the capital outlay, and then progress incrementally to continually improve efficiency. Don't limit your vision to just improving energy efficiency. Take a broader view of improving overall business service efficiency. Take advantage of the BSM solutions that are available to help you in this endeavor.

You'll be happily surprised by the magnitude of the cost savings you will achieve. In addition, you'll position IT as a socially-responsible corporate citizen that is doing its part for energy conservation.

End Notes

- 1 John Phelps, "Greening the Data Center," Gartner Infrastructure & Operations Management Summit, June 2008.
- 2 Based on the assumption that the average older model server consumes 6,233 kilowatt hours (kWh) per year at an estimated cost of 8 cents per kWh.
- 3 Based on the assumption that you save 500 kWh per desktop PC per year and 250 kWh per laptop per year, both at an estimated cost of 8 cents per kWh.



Business runs on IT. IT runs on BMC Software.

Business thrives when IT runs smarter, faster, and stronger. That's why the most demanding IT organizations in the world rely on BMC Software across both distributed and mainframe environments. Recognized as the leader in Business Service Management, BMC offers a comprehensive approach and unified platform that helps IT organizations cut cost, reduce risk, and drive business profit. For the four fiscal quarters ended September 30, 2008, BMC revenue was approximately \$1.83 billion. Visit www.bmc.com for more information.

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