

Optimize software deployment to increase energy efficiency in your data center.



Highlights

- Automate provisioning of resources to accommodate shifts in demand and help maximize resource utilization
- Orchestrate efficiently to consolidate workloads to an optimal number of servers
- Use load balancing and efficient workload scheduling to run workloads at optimal times on the most efficient resources
- Efficiently monitor system usage to understand energy consumption
- Track usage and allocate costs for usage across the infrastructure

Energy consumption in data centers has been steadily and dramatically increasing. Many data centers worldwide will have insufficient power and cooling capacity to meet the demands of high-density equipment. The impact of this upward spiral of energy usage is not limited to the impact on individual organizations. The environment as a whole is affected by energy consumed in the modern data center.

The reality is that energy supplies are not unlimited. Existing organizations are finding that additional power requirements may not be met for several years and, since 87 percent of data centers were constructed prior to 2001 (according to Nerner Tes research), this is a commonly recurring and difficult situation. In some cases, additional power is simply not available for purchase.

In addition, the cost of operating — and cooling — data centers has skyrocketed in part because of the advent of blade server technology. Blade servers pack their supercharged computational powers into compact footprints, thus increasing the energy consumption rate per square foot of data center space.

Power shortages are a common issue for organizations building new data centers as well. For both existing and new data centers, the cost impact to the business is undeniable. Additional expenses incurred due to power costs do not move the business forward. In fact, increases in power costs directly impact competitiveness, as these expenses siphon away investments in other areas related to new products and services.

Shifting the focus to data center accountability

Historically, most data center managers have had little insight into power expenses. Budgeting energy costs for an enterprise has been the responsibility of the facilities management team. Today, as energy costs exceed the costs of the data center equipment itself, a new dialogue has begun between facilities managers and data center managers. When combined with the increase in business operations supported by servers outside the data center, this dialogue has become extremely meaningful. Today's energy usage metrics deliver energy consumption information for operational efficiencies, planning and management. A holistic view of data center energy consumption is critical to effective planning, operations and profitability.

Project Big Green encourages active energy management

The clear directive for data center managers is to become more energy efficient. Because of this directive, IBM has committed vast resources and expertise, through Project Big Green, to establish a series of best practices to help data center operators conserve energy more effectively through active energy management. As part of this

effort, IBM has identified products within the IBM Tivoli® software portfolio — IBM energy efficiency solutions — that can help you achieve an understanding of energy consumed as well as the ability to manage it efficiently.

Take control of energy consumption

IBM energy efficiency solutions offer extensive integrated capabilities to help organizations conserve energy usage. They can be used to place a power cap on a particular server, reduce server usage via virtualization, schedule batch workloads to run during nonpeak times or move workloads to machines that consume less power. By monitoring and provisioning servers and shifting and managing workloads in a virtual environment, data center operations can realize additional cost and energy savings by removing the need to have redundant servers standing by to meet strict service level agreements.

Here are just a few capabilities that IBM energy efficiency solutions, working in tandem with power and thermal metrics collected by your IBM hardware systems, can deliver in your data center.

Track usage and manage accounting

To keep energy consumption and costs under control, usage information can be

collected in kWh and converted into dollars for allocation to users, programs and/or applications for billing purposes. Tivoli software can track costs by IT categories, such as service or application, and by business categories, such as project or division or location. This can increase business awareness of the context in which energy is being used.

Centralize change and configuration data

To get a complete perspective on hardware and software across your infrastructure, as well as changes that have taken place, Tivoli software offers a centralized change and configuration management database that provides your IT teams with the information they need to optimize — and reprovision — as business demands shift and greater (or fewer) servers are needed.

Automate provisioning

Tivoli software can help you reduce inefficient server usage. Having too much hardware can be a huge waste of energy and a critical source of unnecessary fixed costs. For instance, it is all too common for IT to overprovision servers for backup, redundancy or spikes in business activity. Using automated provisioning software, you can more easily track server usage and schedule provisioning of servers “just in time.”

IBM energy efficiency solutions offer provisioning software that enables you to automatically distribute software to any network node: data, middleware, applications, operating systems or disk-level images. You can also easily use automated provisioning software to shift provisioning to virtual environments, helping to reduce hardware costs and energy consumption at the same time.

Orchestrate efficiently

Underutilized servers are an ongoing battle in the data center. You can use Tivoli orchestration software in conjunction with provisioning software to efficiently consolidate workloads onto a smaller number of servers, while placing unused servers in standby mode — an obvious and often substantial energy saver.

Strategically schedule workloads to reduce energy demands

Just as orchestration is a powerful tool in energy efficiency, optimized workload scheduling is another method to manage energy efficiently. Tivoli software enables you to easily schedule large batch processing jobs at times when overall energy usage is lower, or during times of off-peak demand billing. You can use application performance and availability data to allocate workloads on an as-needed basis, flexibly

scaling them up to meet demand and down when demand declines.

Use best-in-class load balancing

Proper load balancing with Tivoli software enables you to distribute loads across a pool of servers based on their anticipated computational demands, so high-performance blade server clusters aren't used to handle jobs that require less power.

Monitor effectively

While maximizing server usage is important in controlling energy consumption, so is having an understanding of application resource usage. Effective systems management is essential to adapt application deployment to power constraints as needed. Tivoli monitoring software monitors performance and availability with integrated energy metrics to manage core IT services in real time through a single, customizable workspace portal. By utilizing composite application monitoring for Web services and response time, operators can support applications in the context of power constraints on a case-by-case basis.

Stay abreast of energy consumption of enterprise assets

In addition to traditional IT hardware and software energy metrics, Tivoli software

can integrate power data from non-IT assets, such as generators and pumps. Many of today's leading power monitors, such as Liebert SiteScan, Eaton and other plant information systems, can provide input to Tivoli-driven solutions to help you develop a holistic energy management strategy.

Collaboration is key to energy efficiency

By working collaboratively with the business, data center operations staff can make a positive impact on overall business operations. IBM energy efficiency solutions can help your data center operations become more efficient and use your resources more effectively.

For more information

To learn more about how Tivoli software can increase energy efficiency in your data center, please contact your IBM representative or IBM Business Partner, or visit ibm.com/tivoli

Read more about Project Big Green at ibm.com/systems/virtualization/view/071807.html

Learn more about energy efficiency solutions from Tivoli software at ibm.com/software/tivoli/features/bluegreen/



About Tivoli software from IBM

Tivoli software provides a set of offerings and capabilities in support of IBM Service Management, a scalable, modular approach used to deliver more efficient and effective services to your business. Helping meet the needs of any size business, Tivoli software enables you to deliver service excellence in support of your business objectives through integration and automation of processes, workflows and tasks. The security-rich,

open standards-based Tivoli service management platform is complemented by proactive operational management solutions that provide end-to-end visibility and control. It is also backed by world-class IBM Services, IBM Support and an active ecosystem of IBM Business Partners. Tivoli customers and business partners can also leverage each other's best practices by participating in independently run IBM Tivoli User Groups around the world — visit www.tivoli-ug.org

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U.S.A.

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December 2007
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