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Why Energy Management Is Driving Adoption of Data Center Infrastructure Management Solutions

Sponsored by **nlyte Software**

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Introduction

There was a time, just a few years ago, when nobody cared about data center costs or data center efficiency. If CEOs said the words “data center” in the boardroom, it was usually because the company needed a new one or because some huge outage had just occurred.

While data center efficiency is still not fashionable today, it is a hot topic of conversation because of all the growing costs associated with running data centers and because they have become the focus of government efforts to use power more efficiently. All of this attention has exposed the fact that most data centers can be run more effectively.

Many data centers are run by separate units, with one owner for each layer of technology. The networking, servers, storage, databases, power distribution, and cooling are all separate layers managed by different people. Various kinds of reporting and management applications help the head of each area do his or her job, but none of these tools tells the whole story. Given the challenges facing the data center, this siloed approach is no longer going to work. It cannot support the data center-wide optimizations that are needed, the rapid provisioning of virtual assets, and the necessary agility required to respond to business needs.

In today’s world, CIOs and their staff struggle with several significant issues that constrain their ability to support the business. These include rising energy costs, increasing utilization of capacity both in terms of space and computing, and a reduction of data center-wide transparency. These issues are driving CIOs to look at strategies for data center optimization.

They are also causing CIOs to reach across the aisle to facilities management. CIOs need information that resides in building automation systems and building management systems. Effective energy management requires bridging IT and facilities management.¹

¹ Kenneth Brill, “Data Center Energy Efficiency and Productivity,” The Uptime Institute, [http://www.uptimeinstitute.org/symp_pdf/\(TUI3004C\)DataCenterEnergyEfficiency.pdf](http://www.uptimeinstitute.org/symp_pdf/(TUI3004C)DataCenterEnergyEfficiency.pdf).





Top Drivers for Data Center Infrastructure Management (DCIM) Solutions

Excessive Energy Costs: Energy costs constitute 40% of data center spend today, and the proportion is increasing. Data center kilowatt-hours, and the cost per kilowatt-hour, are both rising at about 10% per year. It's no longer just the facilities manager's problem—it is rapidly becoming a key performance metric for CIOs.

Poor Overall Data Center Utilization (power, cooling, space): Data centers, while struggling to meet the demand of ever-more powerful applications, are nevertheless over-provisioned with inefficient power and cooling systems. Added by aged and inefficient IT equipment, it's easy to see why, on average, data centers operate at 50% efficiency.

Business Process Inefficiencies: Without a DCIM solution, it can take weeks to do something as simple as deploy a new asset, such as a server. Can new business processes wait that long?

Regulations: By 2013, Gartner predicts that 20% of enterprises will publicly disclose the carbon emissions of major data centers^a

^a "Data Center Infrastructure Management: The Benefits of an Integrated Energy Management Software Approach," Rakesh Kumar, 26 April 2010, ID #: G00175179

Key Energy Management Measures

Nine out of ten companies are still attempting to manage large data centers using fragmented legacy technologies such as Visio and Excel, and in many cases, companies don't measure energy consumption at all. This is despite the fact that energy management, using the Power Usage Effectiveness (PUE) metric, is set to become perhaps the most significant CIO KPI of the next decade. PUE measures the total power consumed by a data center facility and divides this number by the power consumed by the actual equipment. A PUE of 2.0 means that for every watt used to power IT equipment, an additional watt of power is required to deliver the power and keep the equipment cool. Its inverse is Data Center Infrastructure Effectiveness (DCiE), which represents the total power consumed by the IT equipment, divided by the power used by the facility, then multiplied by 100%. A DCiE value of 33% means IT equipment is consuming 33% of the facility's power.

These standards are widely accepted, but surprisingly underreported.





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According to Gartner²:

- Fewer than 50% of data center managers measure the PUE/DCiE of their data centers
- Of data center managers who measure PUE/DCiE, 27% don't know what the ratings are

Considering the forthcoming pressures, these statistics need to improve dramatically.

In this paper, CITO Research shares why many CIOs are adopting DCIM technology. In many cases, the need for better energy management—and the cost-savings it can offer—is the leading factor driving adoption. Although savings from energy management alone can make a compelling business case for DCIM adoption, the benefits are far broader.

Top Trends behind the Data Center Management Challenge

A variety of trends are driving data center management, including the need to reduce costs through migrations and consolidations, cloud computing, virtualization, and impending environmental regulation.

Migrations and Consolidations

We are emerging from the worst financial crisis since the Great Depression. Now, more than ever, there is a push from the CIO to not only “keep the lights on,” but to keep those lights on in a cost-effective or preferably cost-reducing way.

As a result, data center migration and consolidation projects are on the rise. Mergers and acquisitions also result in the need to consolidate projects. If these projects are not managed well, they will only lead to yet more ineffectively utilized data centers down the road.

Planning a data center migration or consolidation requires knowing exactly what assets you have, where they are located, and how they are configured and connected. It also requires the ability to model, report, and communicate future plans to the appropriate individuals and departments for approval and implementation. A successful data center migration or consolidation project is predicated upon effectively and efficiently managing and reporting on the status of the project throughout

² “Power for the Data Center Is More Than a Facilities Department Concern,” John R. Phelps, 5 February 2010, ID#: G00173986





its duration. A DCIM solution provides a single model that eases management of such projects and reduces the time to complete them, and the risks and headaches associated with them.

Virtualization

One of the most popular approaches for seeing dramatic improvements in data center power consumption involves server consolidation using virtualization. The real gains in power reduction based on virtualization technologies are found in the decommissioning of older, less energy-efficient servers that are consuming power and not doing useful work. Older, energy-inefficient servers need to be identified and viewed in the context of the entire IT resource universe, which now includes virtual assets. The risks include greater complexity from an infrastructure management perspective and increased heat emitted by servers, as they are constantly being provisioned and re-provisioned for new tasks. Even after inefficient servers are eliminated, there is the matter of managing virtual machines across the landscape, which still requires a comprehensive physical model of the data center. Such a comprehensive model can rationalize the cost savings of a virtualization program.

Impending Global Regulatory Pressure

In the name of reducing carbon emissions, governments around the world are taking an aggressive stance to limit power usage by major consumers, and data centers are considered chief culprits because of their geographically concentrated power consumption. According to the US EPA³, "In 2006 data centers accounted for 1.5% of total US electricity consumption. By 2011, consumption is expected to reach 2.5%." For example, in the UK, if a data center is consuming more than 6,000 MWh/year, which is typical for data centers of more than 50,000 square feet or 2,000 racks, the companies that own those data centers will be affected by the UK's Carbon Reduction Commitment legislation. This type of government legislation is certain to find its way to the US (through cap-and-trade and other vehicles) and around the world. The data center manager, and the CIO who reports to the board, must measure consumption accurately for reporting purposes and be able to respond quickly to changing government directives.

All of these trends both drive and cost-justify more frequent hardware refreshes. This in turn results in a greater need for tracking physical assets as they more rapidly churn in the data center. A model that effectively shows you everything in the data center, from assets to power usage to cooling to virtual machines, is a growing requirement.

3 EPA Report on Server and Data Center Energy Efficiency, August 2007





The Need for Operational Intelligence in the Data Center

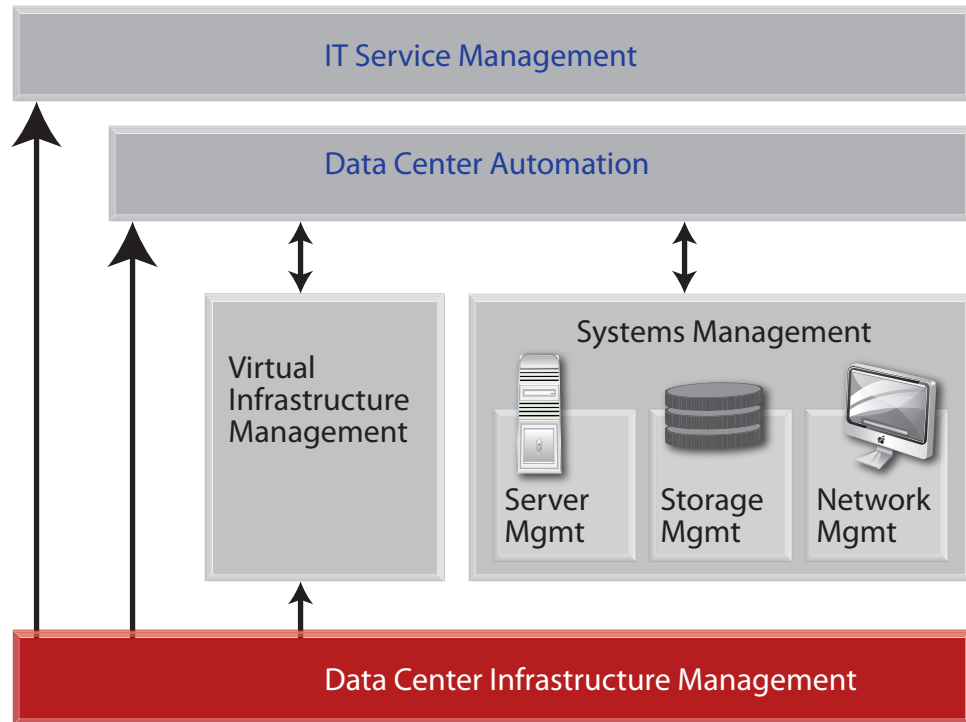
How can you optimize what you don't measure? You can't. CIOs must master the discipline of data-center management—now, in their current job. If not, they may have no choice but to do so at their next job. Having a rich model and deep understanding of what is happening in the data center affords a wide range of benefits.

Energy management is important but does not tell the whole story. CIOs must also have the operational intelligence to optimize other critical resources such as space and cooling capacity and to link the information presented in KPIs to actionable strategies that drive improvement. This includes:

- Identifying and removing orphaned servers
- Reconfiguring IT and built assets for optimal use of power, space, and cooling
- Making decisions that equally evaluate data-processing capacity increases with energy-consumption decreases
- Supporting cost effective implementation of system refreshes as well as data center consolidations
- Using advanced predictive analytical capabilities to optimize the current infrastructure and to forecast future capacity requirements
- Helping the CIO and the VP of Facilities work from a single version of the truth. The facilities department typically pays the energy bills. To have a credible conversation about energy consumption and optimization, the CIO needs to be able to walk into a facilities management meeting with an accurate projection of power consumption. DCIM can pave the way for a meaningful dialogue

Gaining such a capability doesn't mean throwing out all of the tools that have been used to manage each layer. As the following figure illustrates, a DCIM solution acts as an aggregator of information collected from many different systems.





DCIM as an Aggregator of Operational Intelligence

With such a system in place, it is possible to manage the data center as an integrated whole, not just one layer at a time. This big picture view is crucial to managing capacity and reducing energy costs.

Why DCIM?

The data center can either promote or stifle innovation and strategic use of IT, depending on the approach of the CIO. Companies are increasingly meeting their challenges using DCIM technology to effectively model, optimize, and manage the data center. Incorporating energy management, and looking at the complete picture of the data center, helps establish the right operational management processes for the future.





Core CIO Problems DCIM Solves

A DCIM solution addresses many of the challenges CIOs face:

- **Rapid and accurate deployment of data center assets (especially for data center migrations & consolidations):** A DCIM solution allows CIOs to clearly and rapidly understand and design new data center configurations, decide about whether to reallocate existing servers or purchase new servers, and pinpoint problem areas and resolve them, based on the confidence that comes with real-time, accurate data
- **Loss of institutional knowledge from staff turnover:** The fact that current staff knows the data center like the back of their hand is of no help when they move on to their next job
- **Accurate prediction of future capacity requirements:** The predictive capabilities of a DCIM solution allow IT investments to align with strategic planning assumptions. With a DCIM solution, CIOs can balance computational workload predictions against modeled energy costs. Key among these assumptions is the Gartner estimate that 30% of large organizations will deploy energy-based chargeback mechanisms for data center services by 2015. CIOs need to understand the complete energy picture as well as the data-capacity picture of their data center in order to make decisions that help achieve the goals of the enterprise
- **Optimization of critical data center resources (power, cooling, and space):** From a single location, CIOs can manage the optimal size, configuration, and location of IT assets. A DCIM solution enables the visualization and reconfiguration of these assets in context with power load requirements and mechanical, electrical, and other building systems. From a single view, CIOs can evaluate capital costs, workload balance, energy efficiency, and space utilization
- **Meeting regulatory requirements as they come online:** Regulations mandating energy efficiency will come; it's a question of time. In the meantime, green initiatives are worthy efforts in their own right and can win the approval of customers. Energy savings can fund other initiatives





Benefits of DCIM Software

DCIM software takes back-of-the-napkin style diagrams, spreadsheets, Word documents, and Visio diagrams and replaces them with a comprehensive and integrated system that offers a complete model of the data center. With a model in place, the risks involved in migrations, consolidations, and mergers and acquisitions are greatly reduced. Further, CIOs can model future requirements, showing what capacity they have now and how long that will last given the current trends. In this way, the tradeoff between over-provisioning and running out of capacity is balanced and the CIO can take a long-range view of needs rather than building out capacity when it's not necessary.

DCIM software provides the data needed to assess energy usage and energy savings. This data can be provided to governments such as the state government of California, where rebates are given for energy-saving technology investments.

DCIM software also helps manage the sprawl of virtual machines, informing IT staff where applications are running and where power is being drawn. As new machines are brought into the data center, they can be added to the model and any variations in power noted.

DCIM Investments Are Self-Funding

Cost savings can help pay for investments in DCIM solutions. Here are some details:

- Reduced planning time for a data center migration/consolidation (40 to 45% less)
- Ability to show that upgrades or expansions are not needed yet. If CIOs can prove the percentage of capacity being used and the rate at which demand is growing, they can track the need for expansion up to five years out
- Join forces with facilities management to get more savings. If facilities management realizes energy savings of 20 to 30% and IT realizes savings of 6 to 15%, the aggregated savings can be used to justify a DCIM solutions investment with a demonstrated payback time of less than one year





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Conclusion

DCIM solutions are evolving rapidly and will become mainstream features in data centers over the next several years. These solutions provide the valuable data needed to report on and improve energy efficiency, identify potential infrastructure trouble spots, and increase the effectiveness of capacity planning. Savings from energy management alone can pay for DCIM investments, but the model DCIM provides of the data center will prove its utility, time and again in many different situations.

About nlyte Software

nlyte Software is a leading provider of [data center infrastructure management \(DCIM\)](#) solutions for intelligent capacity planning. Its performance-based solution enables the world's largest companies to optimally place data center assets to make the most efficient use of power, cooling and space, enabling a reduction in operating expenses by as much as 20% annually. Founded by data center professionals in 2003, nlyte Software is headquartered in Menlo Park, California and can be found online at <http://www.nlyte.com>.

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