

ENABLING THE GREEN DATA CENTER

DRIVERS, BENEFITS, AND TECHNOLOGY ENABLERS EVERY IT EXECUTIVE NEEDS TO KNOW



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THE RAPID RISE OF GREEN IT

Corporate sustainability initiatives are growing rapidly in scope and levels of financial commitment. According to Panel Intelligence’s recent Quarterly Sustainability Tracking Study, despite the poor economy, 80% of the 65 corporate sustainability executives at Fortune 500 companies surveyed said they will be maintaining or increasing funding for green initiatives.¹ As businesses and public sector organizations incorporate sustainability into their operations through “corporate social responsibility” (CSR) initiatives, they are looking to reduce energy usage, recycle, and reduce their overall environmental impact in areas such as printing, employee commuting levels, and even IT operations—especially the data center. For example, many organizations have already embraced virtualized data centers to increase server utilization, as well as embarked on replacing old IT infrastructure with energy-efficient, recyclable infrastructures.

What is Green IT?

“The Gartner definition, within the context of an enterprise is ‘optimal use of information and communication technology (ICT) for managing the environmental sustainability of enterprise operations and the supply chain, as well as that of its products, services and resources, throughout their life cycles’.”²

But given the challenges of the current economy, the drive for “green IT” extends far beyond a desire to improve the environment. The latest report published by the U.S. EPA indicates that energy usage at data centers has doubled between 2000 and 2006, and it’s poised to double again by 2011. If left unchecked, the agency warns that consumption trends will likely cost the public and private sector \$7.4 billion in annual electricity costs by 2011.³ Given that corporate energy costs represent up to 44% of the total IT budget for most companies, this trend is alarming.

So it’s no surprise that the rise of green IT is more than just a trend—it’s increasingly a firmly entrenched part of nearly every company’s technology operations. As margins shrink, cash flows tighten, and profits fall, companies are doing whatever it takes to survive today—which means:

- Digging deeper to find new opportunities for savings
- Finding ways to differentiate products and services—and justify higher margins—by appealing to customers seeking offerings from environmentally responsible companies
- Meeting regulatory requirements to avoid financial and other penalties

The Growing Role of IT in Corporate Social Responsibility Initiatives

“The IDC-Dell Green Barometer results suggest that IT departments have a leading role to play in the successful implementation of CSR strategies. 55% of European organisations surveyed already have a CSR strategy in place or are planning to implement one in the next 24 months. 44% of those organisations also indicated that IT will either play an extremely important role or an important role in supporting their organisation’s effort to reduce its environmental impact and in supporting CSR objectives in the next three years.”⁴

GREEN IT BOOSTS THE BOTTOM LINE AND INCREASES COMPETIVENESS

Green IT supports all of these priorities and can ultimately boost the bottom line—particularly when you focus on “greening” your data centers. Historically, companies have deployed one server per application, which has driven rapid data center growth and increased data center complexity, management costs, and power demands. About 40% of total data center costs are energy related, so reducing power usage by even a small percentage can result in substantial cost savings. Power is needed to not only run data center devices, but also to cool them. According to the IDC, “Air conditioners, power converters and transmission use almost half of the electricity in the datacenter, and IDC estimates that data centre energy cost will be higher than equipment costs by 2015.”⁵

What does this mean for your business? If your company can become more energy efficient through green IT initiatives, you can cut your energy costs and achieve significant bottom-line savings. Looking ahead, every percent decrease in your

¹ Sustainability Execs Say Green Spending Increasing, Despite Economy. <http://www.environmentalleader.com/2008/12/02/sustainability-execs-say-green-spending-increasing-despite-economy/>

² Green IT: The New Industry Shock Wave. Gartner Research, Simon Mingay. December 7, 2007.

³ Report to Congress on Server and Data Center Energy Efficiency, Public Law 109-431. U.S. Environmental Protection Agency ENERGY STAR Program. August 2, 2007

⁴ IDC, Green IT Barometer

⁵ IDC, Green IT Barometer

power usage will likely result in even higher savings and competitiveness, as all evidence points to the formation of a perfect storm on the energy front that threatens the sustainability of nearly every business and public sector organization dependent on its data centers.

TRENDS IN ENERGY COSTS: THE PERFECT STORM

The following trends and changes in the business environment are converging upon organizations in all industries, creating a perfect storm that will drive up costs and limit energy availability.

ENERGY COSTS WILL CONTINUE TO INCREASE

More countries will continue to get their energy from sources that are increasingly scarce and expensive, including oil and coal. As scarcity goes up—which it will as global demand continues to increase—prices will increase as well and cut deeply into corporate bottom lines. You can also expect that cap-and-trade regulation, if passed in the U.S., will drive up energy costs significantly. This two-part regulatory system includes a “cap,” which is a government-imposed limit on carbon emissions, and a “trade” component, which is a government-created market where companies can buy and sell a limited number of greenhouse gas credits.

ENERGY IS SCARCE IN MANY AREAS, LIMITING DATA CENTER GROWTH

Many experts worry that power limitations will ultimately create limits on the computing industry.⁶ This is more a certainty than a prediction, as some companies are already hitting the wall from a power capacity perspective.⁷

Furthermore, as more companies move toward high-density servers that concentrate and increase power usage, you can expect power demands per square foot of data center to increase even more. According to Gartner, “Traditionally, data centers were built to a design specification of about 35 watts to 70 watts per square foot. The increased adoption of high-density blade and rack servers will require substantially

greater power densities, perhaps as high as 300 watts per square foot by 2011.”⁸

Did you know that...

...over 60% of data centers will face space and energy constraints over the next 18 months?⁹

DATA CENTER EQUIPMENT AND ENERGY USE WILL BE MORE HEAVILY REGULATED

There’s growing evidence that carbon emissions are accumulating and increasing—and wreaking havoc with the global environment. Governments worldwide are responding with increasingly complex regulations. Failure to comply will likely result in fines, as well as negatively impact your corporate stock price and brand. For example, the carbon reduction commitment (CRC) initiative in the UK limits how much carbon a company can produce overall and places a high tax on emissions that exceed very strict, government-defined levels. This mandatory climate change and energy-saving scheme is due to start in April 2010. It is central to the UK’s strategy for improving energy efficiency and reducing carbon dioxide (CO₂) emissions, as set out in the Government’s Climate Change Act 2008, and it is designed to raise awareness in large organizations, especially at the senior executive level, while encouraging positive changes in behavior and IT infrastructure.

Initiatives similar to CRC are expected to come to the U.S.—for example, in the form of the new cap-and-trade legislation that would likely drive up energy costs for data centers and their customers.

MOST DATA CENTER MANAGERS LACK VISIBILITY INTO ENERGY USE AND COSTS

Many in-house data center facilities are operating at 5-10% of their computing capacity, on average—but they probably don’t even know it.¹⁰ As the saying goes, you can’t improve what you don’t measure, and data center energy costs are no exception. According to a recent IDC-Dell Green IT Barometer White Paper:

⁶ Mercury News Interview: IT Power Researcher Jonathan Koomey. By Pete Carey. The Mercury News. 10/16/09.

⁷ Mercury News Interview: IT Power Researcher Jonathan Koomey. By Pete Carey. The Mercury News. 10/16/09.

⁸ Power and Cooling Remain the Top Data Center Infrastructure Issues. Gartner Research, John R. Phelps. February 20, 2009.

⁹ Data Centers Focus on Green IT, but Many Neglect Metrics. Gartner Research. Rakesh Kumar. July 29, 2009.

¹⁰ Mercury News Interview: IT Power Researcher Jonathan Koomey. By Pete Carey. The Mercury News. 10/16/09.

“...a large number of European IT departments are in no position to improve power consumption generated by their IT infrastructure: 31% of the organizations surveyed said they didn’t know what the electricity consumed from their data center amounted to, and 89% said they were unaware of the power consumption of distributed computing environments. Discussions with end users have also pointed out that in most instances where electricity consumption is actually measured, data was available only at a data centre level, with very little insight on the consumption generated by the different devices or racks.” ¹¹

THERE IS A SHORTAGE OF SKILLED DATA CENTER RESOURCES

And finally, there aren’t enough skilled data center resources to meet current business needs, let alone proactively manage green IT initiatives. Most data center departments lack the skills and expertise, time, and clear management responsibility for green IT to actually optimize their initiatives. Companies need ways to increase the efficiency and effectiveness of their existing resources and energy management processes so that they:

- Are freed from mundane tasks to focus on green IT
- Can make better, more informed decisions that support green IT initiatives based on real-time analysis and targeted insight
- Can quickly generate management reporting to enable sufficient visibility and control, as well as drive proper management responsibility

All of these variables are converging and complicating an already challenging business environment by driving up energy costs and limiting supply in ways that—if not navigated and managed properly—can stifle business growth.

TAMING THE STORM WITH DATA CENTER INFRASTRUCTURE MANAGEMENT

The good news is that there are new approaches and technologies to help you navigate through this storm by enabling you to proactively manage energy usage and costs and optimize capacity utilization. It’s called Data Center Infrastructure Management (DCIM). When supported by the right processes and technologies, DCIM gives you the visibility and insight needed to make informed planning and

management decisions regarding data center assets, physical and virtual infrastructure, and energy use.

The concept of DCIM was conceived of by the data center professionals who founded nlyte Software to communicate their vision for optimized, end-to-end data center management. DCIM is about having the visibility, insight, and processes to drive performance throughout data centers. It enables you to collect and understand massive amounts of data so you can make informed decisions that make your data center resources as efficient, effective, and functional as possible, as well as plan ahead for future needs – including energy needs. Ideally, solutions supporting DCIM cover both physical and virtual environments.

DCIM-enabling software needs to support:

Discovery and mapping of all data center assets

DCIM software should automatically collect critical data for physical and virtual assets, such as manufacturer’s energy utilization and growth rates, from existing data stores or through agent-less network discovery.

Visualization of all assets and their relationships

The software should provide a visual model of your entire data center estate, including capacity thresholds, operational limits, and fluctuations and changes in energy usage.

Modeling and planning for migrations, consolidations, and changes

DCIM software also needs to support proactive modeling that shows, for example, the cascading effect of proposed moves, adds, and changes before you commit to making them.

¹¹ Green IT Barometer: European Organisations and the Business Imperatives of Deploying a Green and Sustainable IT Strategy. IDC EMEA. By Nathaniel Martinez and Kim Bahloul. Sept. 2008.

Controlling and management of data center assets and personnel and monitoring of key indicators

Effective DCIM solutions enable use of repeatable processes that can be easily implemented and monitored to drive measurable improvement throughout data centers, IT staff, and existing workflow solutions that you may have in place to support help desk and change management processes.

Reporting across all data center metrics

DCIM solutions collect data center information in real time and centralize it to enable real-time capacity reporting across the entire data center environment—from both the virtual layer and the physical IT layer. You can also report on data center power usage and dependencies.

Intelligent capacity planning to predict future data center needs so you can optimize all capacities:

Advanced solutions can also provide a real-time view into future data center capacity requirements, as well as corresponding data center constraints (such as space and power capacity) and budgetary impacts.

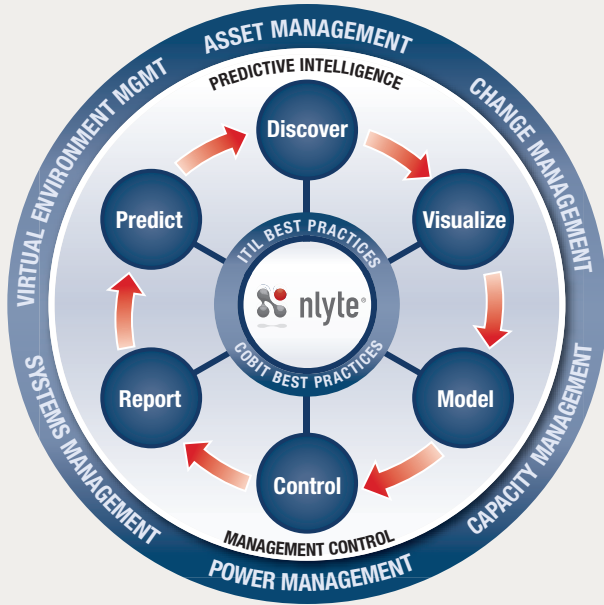


FIGURE 1.

The Process Steps Supported by the nlyte DCIM Suite

nlyte DATA CENTER INFRASTRUCTURE MANAGEMENT SUITE

nlyte Software provides the world’s leading DCIM solution that gives companies unprecedented visibility and control over their data center performance, energy usage, and costs. The nlyte Software Suite is a fully integrated solution for data center infrastructure management, combining next-generation software, proven best practices, and unsurpassed expertise in data center management so you can optimally plan and manage all current and future data center assets.

Designed from the ground up to address real-world data center problems and drive continuous performance improvements, the nlyte DCIM Suite delivers sophisticated functionality that supports all DCIM best-practice process steps (see Figure 1):

- Discover
- Visualize
- Model
- Control
- Report
- Predict

All of these activities are supported using a single platform,

giving you instant access to the information and visibility you need to make informed planning decisions while optimizing data center capacities and reducing operational costs.

To help you proactively manage energy use and costs, the nlyte DCIM Suite enables you to:

- Run reports to predict future needs and optimize capacities
- Proactively manage the effects of virtualization and its links to physical power
- Increase data center power efficiency by setting and managing heat and power limits for each cabinet
- Model and plan physical moves of hardware to optimize space, power, and cooling to understand what helps or hurts “green IT” metrics



FIGURE 2.

Power Capacity Report available through the nlyte DCIM Suite

RUN REPORTS TO PREDICT FUTURE NEEDS AND OPTIMIZE CAPACITIES

When it comes to data center capacity, predicting the future can be the difference between “open for business” or “out of business.” That’s why nlyte’s DCIM Suite provides intelligent capacity planning, enabling you to plan for future requirements and understand their impact on overall data center capacity and costs. The software provides analytical tools and a library of standard reports that help you leverage historical data to track trends and forecast future requirements for power, cooling, and space (see Figure 2). These standard capacity reports include the following:

- Cabinet Capacity Real-time, Trending and Forecasting Reports
- Data Center Capacity Real-time, Trending and Forecasting Reports
- PDU Power Reports
- Data Center Phase Balance Reports
- UPS/PDU Load (Amperage) Reports
- Carbon Allowance Reports

For example, tracking and trending reports enable you to instantly see accurate, real-time metrics on current energy usage as well as future energy and cooling requirements. And purpose-built capacity reports give you immediate insight into the status of your resources, such as network connections, power usage, cooling, and space within specific rooms and cabinets.

The nlyte DCIM solution also enables you to instantly report on Power Usage Effectiveness (PUE) and Data Center Infrastructure Efficiency (DCIE) so you can take actions that align key metrics with targets determined by The Green Grid and other industry bodies.

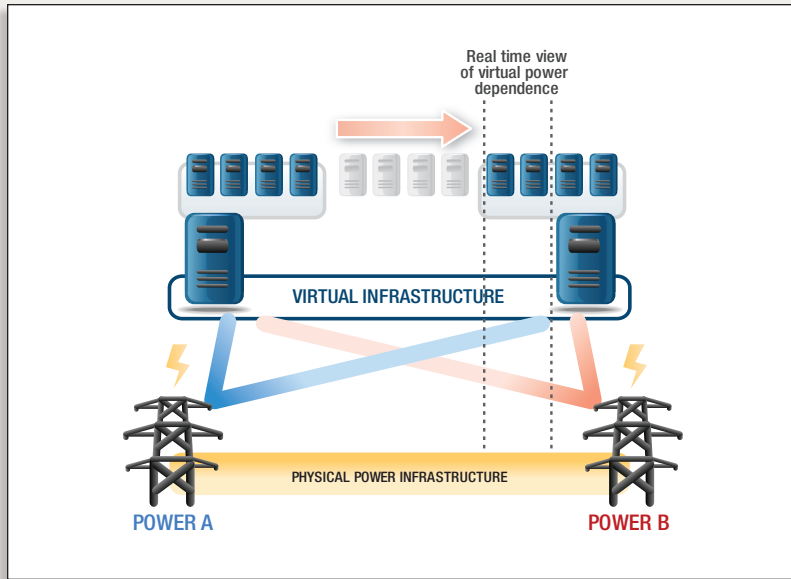


FIGURE 3.

The nlyte DCIM Suite Aligns Virtual Application Dependencies with Physical Power Infrastructure

PROACTIVELY MANAGE THE EFFECTS OF VIRTUALIZATION AND ITS LINKS TO PHYSICAL POWER

Widespread adoption of virtualization is creating a highly dynamic environment within data centers; server utilization rates are rising rapidly as virtualization enables companies to reduce the physical number of servers they need to support the business. Fewer servers deployed results in reduced energy use—a key objective for most businesses.

But without the right management tools in place, virtualization can also make it nearly impossible to identify the relationships between virtual application instances and their corresponding power source (see Figure 3). Lack of visibility and control over where instances of applications are running can cause a host of problems—for example, ineffective planning of critical infrastructure maintenance within the data center and difficulty identifying which applications are impacted by unplanned power outages and server failures.

The nlyte DCIM Suite gives you real-time views into application instances and power relationships within both virtual and traditional server environments. As a result, you can instantly see the effects of planned or unplanned power server outages on your business, as well as quickly identify problematic servers so you can accelerate time to recovery and minimize service quality impacts. In addition, because you can map the power usage of a server to its virtual instance, you can accurately charge back power costs to users and control virtual server sprawl.

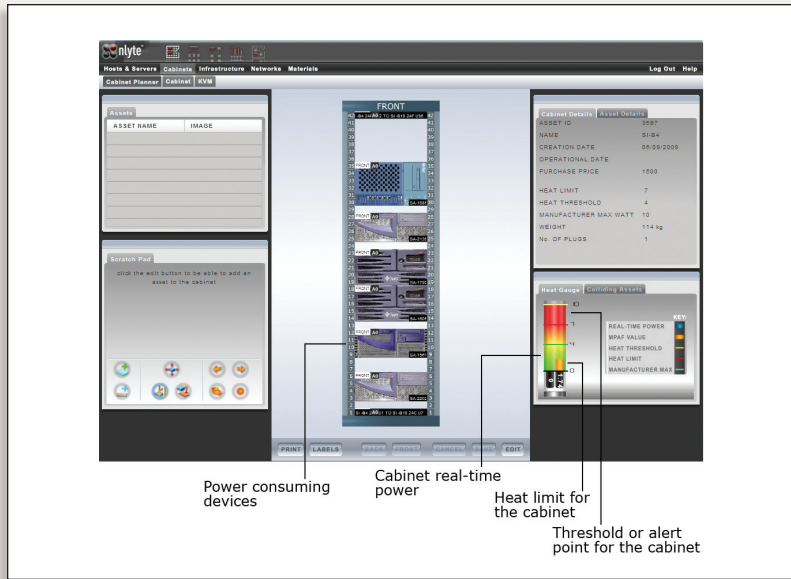


FIGURE 4.

System Limits Configured in nlyte to Align with Data Center Capacity Constraints.

INCREASE DATA CENTER POWER EFFICIENCY BY SETTING AND MANAGING HEAT AND POWER LIMITS FOR CABINETS

Given the growing pressures to reduce costs and energy use and improve application service delivery, optimizing corporate data centers is at the forefront of every organization today. Add to this the challenges of keeping up with equipment changes enabling ever-higher densities while still working within the constraints and limitations of your data center’s design, and you will likely find that traditional methods of measurement and management start to fail.

The nlyte DCIM Suite enables you to create an accurate, visual representation of your data center that is linked to your physical data center assets; this linkage enables you to control physical assets remotely so that you don’t exceed your power and cooling specifications—right down to the cabinet level. For example, when you recreate your data center environment within nlyte, you can set the individual power and cooling limits for each cabinet and leverage vendor

catalog data associated with each device under management. This allows you to instantly see the capacity impacts of new or planned devices on individual cabinets, as well as the data center as a whole.

The nlyte DCIM Suite complements these manufacturer figures with a de-rated Mean Power Adjusted Factored (MPAF), which provides the typical power consumption for each device at start up, and real-time power usage data. By placing all three sets of data at your fingertips, the nlyte DCIM Suite provides an instant, accurate view of energy consumption throughout your data center (see Figure 4).

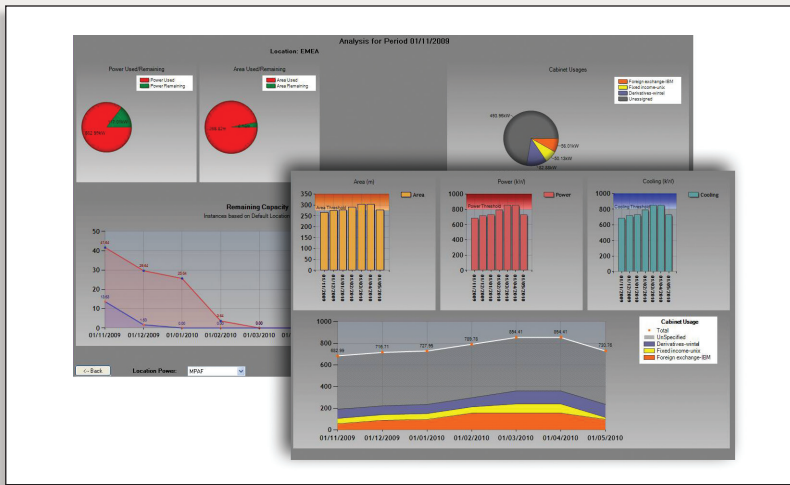


FIGURE 5.

Using nlyte to Predict Tomorrow’s IT Demands and Budgetary Impacts

MODEL AND PLAN PHYSICAL MOVES OF HARDWARE AND UNDERSTAND WHAT HELPS OR HURTS “GREEN IT” METRICS

Gut-based decisions and IMAC plans based on potentially outdated data in spreadsheets essentially leaves your power and cooling use and costs to chance. To achieve significant improvements in energy reduction and PUE, you need a repeatable, controlled process for planning and executing all physical hardware changes within the data center, as well as tools to measure the effects of IMAC on energy and cooling changes before and after you make changes.

The nlyte DCIM Suite makes it easy to model and plan for moves and changes and predict the immediate effects of these changes on power capacity and your PUE—all before you make actual changes in the data center (see Figure 5). By modeling these moves in nlyte first, you can know for certain if the proposed changes will help or hurt your PUE and other “green IT” metrics. In addition, nlyte provides instant visibility into your current power availability and facilitates the physical move by providing functionality for coordinating resources, recognizing dependencies, and enforcing best-practice processes as people carry out changes.

GETTING STARTED

It's true that the vision of proactively managing data center energy usage and costs is, for most companies and public sector organizations, a forward-looking vision. Most organizations just aren't there yet.

But the fact is, as the "perfect storm" of energy-related trends converges upon your organization, any steps you take to reign in energy use, costs, and CO2 emissions today will lead to greater long-term competitiveness and sustainability. By investing in an innovative DCIM solution, you can leap-frog ahead of your competitors in terms of your ability to realize the significant cost savings that green IT can deliver. Adoption of technologies that support DCIM is inevitable and is the life raft that can lead you to safety. By investing in DCIM, you can realize these benefits incredibly quickly and identify capacity and energy savings opportunities that directly benefit the bottom line.

For more information about nlyte's DCIM Suite, download our white paper titled, "Moving the Data Center from Chaos to Control: Best Practices in Data Center Infrastructure Management with Integrated Processes and Technologies," which is available at <http://www.nlyte.com/general-content/downloads.html>. This paper explains how DCIM addresses the complex challenges data center managers face today and explains how the nlyte DCIM Suite provides an integrated, complete solution that helps companies move from data center chaos to data center control, quickly and efficiently.



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