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DCIM: TOTAL MANAGEMENT INSIGHT

Data center infrastructure management can streamline data center operations, enhance agility and cut costs.

Executive Summary

The pace of change in the data center continues to accelerate. At the same time, organizations are demanding more from IT. The ever-growing stores of data they collect equate to more storage requirements as well as faster and more agile servers and networking equipment to process and transmit the information.

Fortunately, new technological developments such as virtualization, automation and cloud computing can help address such demands. The challenge is that these technologies further fragment an already-complex management environment.

The need for a proactive approach to data center management, employing new strategies for dealing with the composite infrastructure in an integrated fashion, is also growing. Holistic management capabilities provide real-time visibility of all aspects of the infrastructure.

The ultimate objective of data center infrastructure management (DCIM) is to optimize the balance between capacity and availability, minimizing excess resource allocation while ensuring satisfactory uptime. The result delivers benefits in terms of efficiency, reliability and the ability to successfully match structural supply and computational demand over the long term.

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The Data Center of Today

The data center has changed dramatically over the past two decades. Enterprises that may have started out with a simple server room hosting a handful of line-of-business applications have since invested in sophisticated facilities that hold a large portion of their intellectual property and control the infrastructure of the entire organization.

The data center has become a mission-critical part of the organization. However, the growing demands on it, along with ongoing changes in technology, threaten to outpace the abilities of the IT department, which also must balance cost reductions while implementing business agility. New technologies can assist in these objectives, but they, too, require analysis and assessment.

Perhaps the most notable development has been the explosion in data growth and storage requirements. Given the limited supply of floor space and power and cooling capacity, there has been a drive toward achieving higher computing density and a focus on data center energy consumption.

A second major influence has been the adoption of virtualization technologies and cloud computing. Although true cloud computing remains in its infancy, virtualization is already paving the way, with most large data centers implementing at least some degree of resource abstraction. The effect has been a very dynamic application environment built on a static physical environment, which dramatically increases data center complexity.

It is not easy to balance increased size and intricacy with better efficiency and administration. Fortunately, there have also been improvements in the ability to monitor IT and facilities systems. For example, power and cooling systems are able to expose status information that can feed into an overall monitoring framework that optimizes their allocation and distribution.

The following sections examine these data center trends in more detail.

Data Growth

This is the decade of Big Data, with the amount of data in the world doubling every two years. According to a 2012 study, conducted by the tech research and analyst firm IDC, the digital universe will grow fiftyfold by 2020, reaching a volume of 40 zettabytes. (One zettabyte equals one sextillion — or 1,000,000,000,000,000,000,000 — bytes.) Big Data is high-volume, high-velocity (and often real-time) data that originates from a variety of sources.

Businesses are struggling to find more information that will allow them to obtain and maintain a competitive advantage. They look to analyze markets in order to understand the demographics, buying preferences and usage patterns of their customers. They want to be able to refine their internal operations and streamline their supply chain in order to reduce any unnecessary overhead.

Through sensor networks, mobile devices and social media, they have many more sources of potentially relevant information. Lower storage costs have led to a tendency to retain all data rather than summarizing or discarding anything not considered essential.

There is no question that Big Data and analytics have the potential to dramatically improve business. However, they also contribute to a need for increased capacity, not only in storage but also in computational power, networking and facilities.

The data center typically is the most expensive real estate in most organizations. At a bargain price of $1,000 per square foot, a 20,000-square-foot data center can involve an upfront investment of $20 million. With those costs in mind, it is important to calculate capacity accurately. Provisioning too much excess capacity leads directly to a waste of capital and expenses, while provisioning insufficient resources can impact service availability and business continuity through space and power shortages and fragmented resources.

Before the widespread implementation of virtualization, it was common to find servers running at less than 10 percent of their capacity and whole data centers using only 50 percent of their resources. It was a common strategy to design for growth with a significant buffer to minimize any risks in availability.

The situation has changed as economic declines have led to increased scrutiny of any discretionary costs. At the same time, heightened sensitivity to the ecological impact of computing has given rise to closer observation of carbon emissions. As a result, there is a need for improved visibility of the utilization rates and power usage effectiveness (PUE) of the data center.

Virtualization: Cloud Computing Foundation

Complexity is further compounded by virtualization and cloud technologies. Server virtualization abstracts the underlying physical resources and presents these as a set of virtual machines (VMs), each of which appears to its applications and users as though it were a physical system.

There are many reasons why virtualization has become so popular. The virtual machine can provide instruction set architectures independent of the physical machine, thereby enabling platforms on hardware for which they were not necessarily designed. It improves the level of utilization of the underlying hardware because guest applications can be deployed with independent — and, ideally, complementary — resource demands.

Probably the most important driver is the fact that virtual machines can be launched from a virtual disk independent of the system where they were configured. It is simply a matter of copying the virtual machine to a new machine that is running the same hypervisor. That encapsulation makes it very easy to balance loads and redeploy applications as usage requires. It also enforces a level of standardization in configuration among similar instances of the same application. All of that makes it very easy to provision new instances, instantly, when they are needed.

At the same time, the change of deployment and usage models leads to a lack of visibility, which means that keeping track of VMs can become a challenge, often resulting in virtual server sprawl — the uncontrolled growth of machines due to insufficient oversight. The source of the problem lies in the lack of defined ownership, with responsibilities shared ad hoc across multiple users in IT and the organization.

That issue is exacerbated by the ease with which users can create additional images and instances. It is too simple to try out a new product or a variant system configuration by copying a base image and only applying the necessary changes.

However, each system retains its own configuration and patch status, and it is difficult to determine what it contains, who owns it and what risks it represents. The sheer volume of sprawl also wastes resources, increases operational complexity and extends the exposure. After all, more systems imply a greater attack surface, and unmonitored servers holding confidential data extend the footprint of sensitive information.

Another virtualization challenge is actually an outgrowth of consolidation: Because it is possible to consolidate tens (and sometimes hundreds) of virtual machines onto very few physical units, the impact on the supporting power grid can be substantial. Massive consolidations can create hot spots requiring high-density cooling and, therefore, more advanced power and cooling management systems.

Cloud Computing

There is probably no data center technology that has received more attention over the past few years than cloud computing. Its hype serves as a continuous pressure point not only for virtualization but also for other efficiencies with potential for significant disruption.

What is cloud computing? In the simplest sense, a cloud represents a network and, more specifically, the global Internet. Cloud computing, by inference, is the use of computational resources that are hosted remotely and delivered through the Internet.

The most common definition in use today was articulated by the National Institute of Standards and Technology in 2011: "Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (i.e. networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."

Cloud computing appeals to organizations big and small primarily because of how effectively it addresses two fundamental (if conflicting) goals within IT departments. First, it can make data centers more efficient. Second, it simultaneously cuts upfront capital investments and ongoing management and maintenance costs.

IT managers can't accomplish these goals with a one-size-fits-all cloud solution, which is why cloud computing has grown — and continues to evolve — into a diverse set of architectures and service models. None is inherently better or worse than another. In fact, enterprises can mix and match cloud options to serve the needs of individual workgroups and departments.

If there is one element of cloud computing that can be considered a core concept, it is that of resource pooling. Generally, resources are shared across customers in a public environment, or across departments or cost centers in a private implementation. The increased scale allows for better allocation and utilization, which contribute to additional benefits.

In the data center, this notion is embodied in converged infrastructure. Instead of architecting each service individually and physically provisioning the resources it requires, the organization creates resource pools that can be assigned to a variety of applications. The services request the resources as they need them and relinquish each resource when it is no longer used.

This concept can extend to a variety of resources. The focus usually is on servers, storage and networks. The servers actually are aggregates of CPU, memory and local storage, but also rely on central shared storage. Networking equipment ties it all together and allows users to access the services. On top of those primary IT resources, pools of floor space, power and cooling and the physical cables that connect the equipment all can be examined for greater efficiencies.

Cloud computing provides benefits via cost savings and improved agility, or responsiveness to business needs. In some ways, it simplifies management by offering a single window for administering pools of resources collectively. However, its heavy use of virtualization and consolidated physical resources decreases the opportunity for planned downtime, making it much more difficult to schedule hardware maintenance and upgrades.

To address these challenges, it is necessary to complete the journey from a simple virtualized environment to one that is truly a private or public cloud. If the architecture successfully implements resource abstraction and workload mobility, it should be possible to redistribute applications not only proactively for routine maintenance but also reactively in the case of unforeseen problems or failures.

Journey to the Private Cloud

While the public cloud or, at least, hybrid model is the most likely endpoint for many enterprises, a realistic look at the industry today reveals that we have further to go before we achieve it. It is not uncommon today to find small startups fully committed to cloud computing for all service requirements. Large organizations, on the other hand, have been cautious, even if they recognize the values cloud computing can bring. For them, the logical starting point is a private cloud.

Reluctance comes as no surprise to anyone who has followed the adoption path of emerging technologies over the past few years. Legacy applications, infrastructural investment, regulatory concerns and rigid business processes represent tremendous obstacles to change.

That doesn't mean that enterprises are completely stationary. In their own way, most of them began the journey to a private cloud years ago. We can break down the path by identifying three steps, each associated with an increasing level of efficiency.

1. Resource efficiencies usually are the first objective of a private-cloud implementation. Standardization of components sets the scene for data center consolidation and optimization. Each level of resource abstraction — from server virtualization to full multitenancy — increases the opportunity to share physical capacity, and thereby reduces the overall infrastructural needs.
2. Operational efficiencies target human labor, one of the highest cost factors related to information technology. Ideally, all systems should be self-healing and self-managing. That implies a high degree of automation and end-user self-service. In addition to a reduction of administration costs, such optimization also enables rapid deployment of new services and functionality.
3. Sourcing efficiencies are the final step, and represent the flexibility to provision services and allocate resources, from multiple internal and external providers, without modifying the enterprise architecture. This agility can be attained only if all systems adhere to rigorous principles of service orientation and service management.

At this point, the majority of organizations are still working on the first step, but many have at least started analysis, and some pilot programs are tackling the second. It will take some time before the third step sees widespread adoption, but it, too, is inevitable.

Technological Advances

Fortunately, as demands on the data center have grown, so have the mechanisms to accommodate them. Early efforts focused on reducing costs associated with data center cooling, which accounts for about a third of data center energy consumption.

A simple but very popular mechanism to reduce cooling costs is use of ambient air cooling. Another simple technique is to avoid cooling beyond what is necessary for equipment to run safely. Raising the thermostat to a level consistent with manufacturer recommendations can reduce cooling requirements considerably.

Warm and cold-aisle containment offers further benefits. Chimneys over racks can remove hot exhaust from servers more efficiently by reducing its mixing with chilled air. Similarly, by integrating the cold-aisle containment with the cooling system and leveraging intelligent controls to closely monitor the contained environment, systems can adjust the temperature and airflow automatically to match server requirements.

Intelligent controls have uses in other advances too. Digital scroll compressors allow the capacity of room air conditioners to be matched dynamically to room conditions. Variable-speed drives can match fan speed with the load to provide a more regulated cooling output, increasing efficiency. Originally designed to address hot spots or zones within the data center, high-density cooling brings cool air closer to the heat source through high-efficiency cooling units located near the rack to complement the base room air conditioning.

More fine-grained control and automation also are now possible within the data center. Many servers, power distribution units (PDUs) and air-conditioning systems can be adjusted to accommodate changes in workload; outside temperature and inside temperature; equipment failures; or other aspects of data center dynamics.

This makes it possible to manage and monitor facilities infrastructure in the same ways that IT systems are administered. Infrastructure monitoring uses the existing network to collect and consolidate alarm and status information from power and cooling systems. Rather than relying on spreadsheets for data input and reporting, intelligent and efficient capacity management has enormous benefits because of the relationships that capacity has to physical space, power distribution, electrical cabling, air conditioning and network equipment.

Data Center Infrastructure Management Capabilities

In the past few years, the data center has evolved into a highly dynamic entity. Workloads may scale up or down according to the time of day, the day of the week or based on monthly or yearly patterns. With advances in cloud computing and virtualization, new business services can grow dramatically in just a short period of time. And, given the abstraction of physical resources, the actual processing and storage can be difficult to pinpoint as it moves around the data center.

It has not been easy for the infrastructure to keep up with those changes. A simple decision such as determining the optimal thermostat setting becomes a complex exercise that is likely to either waste energy or put equipment at risk.

DATA CENTER OPERATIONAL LAYERS	
Layer:	Examples:
Process	Provisioning, Approvals
Software	Virtualization, Cloud
Hardware	Servers, Storage, Network
Infrastructural	Power, Cooling

Data centers operate at multiple layers. At the highest level, service management describes the processes, which are typically defined as the application of an Information Technology Infrastructure Library (ITIL) framework. In the past, these were tightly coupled with the management of hardware and infrastructural resources. However, the growth in importance of a logical software layer has changed the picture. In the past, this layer represented only operating systems and applications — entities that needed to be managed. Virtualization has made the task more complex, but it also has opened up an opportunity to coordinate administration of the entire stack.

A new strategy for dealing with infrastructure gaps is emerging, with a focus on holistic management capabilities that recognize interdependencies between logical and physical layers. The strategy takes advantage of visibility into the IT components based on real-time data, and uses it to optimize the configuration of the facility infrastructure.

As stated previously, the ultimate objective of DCIM is to optimize the balance between capacity and availability, minimizing excess resource allocation while ensuring satisfactory uptime. To do so, tools that can optimize data center utilization at the infrastructural layer (power, cooling and the physical space) as well as the hardware layer (servers, storage and networking equipment) are required.

This implies a single system with a complete view of asset management (including location, ownership responsibilities and configuration), as well as the environmental state (such as power usage and heat dissipation). It also requires details on the component requirements for temperature and electricity, so that dependencies between power, network and servers can be mapped, ensuring all services have access to sufficient resources.

The DCIM solution can then identify hot spots in real time, as processing is distributed in and around the data center. But it also can be used for risk analysis and planning. For example, the impact of an uninterruptible power supply (UPS) failure can be calculated, future space needs for expansion can be projected, and capacity around cooling and electricity can be planned. As the workload grows, IT managers can determine whether the current infrastructure can support future needs, or if the data center racks must be realigned to handle new equipment. They might even decide that it's time to invest in a new data center.

DCIM Benefits

Data center infrastructure management increases the reliability of the data center infrastructure, which in turn boosts the availability of IT and, ultimately, its business services. There is less likelihood of a power outage, or of cooling not being able to contain a hot spot. These tools can save IT and the organization money by controlling energy costs. An immediate effect is lower utility bills. But by being able to estimate and verify electricity needs in real time, DCIM also opens up the possibility of automating energy sourcing to minimize total unit costs.

A clear picture of power requirements matched to the carbon requirements of the energy providers makes it possible to report on and reduce the associated carbon footprint — a great benefit in demonstrating environmental responsibility. At the same time, detailed logging and reporting can be used to offer proof of legal compliance and adherence to corporate reporting policies.

Other benefits are less obvious. Personnel shifts required to consolidate operations across former technology silos could represent long-term net gains for the organization. DCIM also makes it easier to embrace new technologies, such as virtualization, cloud and modular computing, which are dependent on IT and facilities availability. Technology advantages also require IT to think about the data center more strategically.

Integration with Solutions, People and Processes

The basic function of DCIM is to provide a holistic system for management. The software collects information about resource use and operational status from a variety of sources. The data is then integrated, analyzed and distributed to optimize performance. It should be no surprise that this implies the integration of a range of tools, people and processes into a single framework. At the highest level, the technologies fall into two categories — facilities and IT.

Integration with building management systems can provide real-time data collection and direct interfaces to the monitoring systems that record energy use of the individual subsystems and hot-spot localization through temperature sensors. It can redirect airflow and reallocate power distribution to minimize overall energy consumption without putting equipment at risk. It also can interface with other domains of building management beyond ventilation and electricity, such as lighting and security.

The DCIM system also needs to be able to integrate with IT management tools. Capacity planning tools will have an impact on the upcoming requirements for floor space, power and cooling. Similarly, asset management tools track assets as well as their configuration details and interdependencies. A connection to the enterprise directory also is essential to support trustworthy authentication and role-based access controls.

To meet the need to hook into the business processes, a DCIM system can send triggers and alerts to incident and problem management to diagnose configuration errors and capacity bottlenecks. It also should be tightly linked with change management tools to ensure accurate moves, adds and changes are validated with workflow-based escalation procedures, which involves sharing a single repository for configuration management. One central database should store all data from across all data centers, with detailed information on power cabling, connections, cooling equipment and air flows, as well as the logical architecture and end-to-end network and security user administration.

DCIM software also can provide extensive analytical capabilities such as what-if analyses and modeling. Graphic visualizations can help to track and manage data center assets as well as their physical and logical configurations. Because data can be collected and analyzed in real time, it is possible to optimize capacity management and provide immediate insights using simplified reporting tied to operational goals.

Current Roadblocks to DCIM Integration

An ideal data center infrastructure infrastructure management (DCIM) system would immediately integrate with all other hardware and software in the data center. Unfortunately, there are still some obstacles that can delay this comprehensive unification of the data center.

One of the most fundamental issues is vendor diversity. If all data center equipment is manufactured by the same company — servers, storage, and networking; power distribution units (PDUs); uninterruptible power supplies (UPSs); and heating, ventilation and air conditioning systems — it will be a much simpler task to manage the environment uniformly. Most data centers procure components from many different vendors, however, so it becomes necessary to look for integration points using a range of techniques, including application programming interfaces, appliances and sensors.

Integrating facilities and IT with DCIM is particularly challenging. Not all facilities' tools or IT management software expose standard interfaces that a DCIM system can use. Even when they do offer hooks, someone must configure and validate the integration.

Beyond the basic challenges, there are a number of limitations with many of the DCIM products on the market today:

- **Cooling**: Some DCIM software products are limited to controlling power and cannot monitor, manage or control cooling systems, which are often based on outdated protocols. This significantly limits the solution's value because there is still a need to monitor the air-conditioning and ventilation systems separately.
- **Cross-vendor visibility**: There is limited standardization in this area, which leads to a lack of compatibility. Some DCIM products can integrate with a wide variety of systems. However, others support a certain list of hardware vendors and are not flexible to configure or integrate with other vendors.
- **Platform support**: The best DCIM software can see across a range of platforms — from commodity x86 systems to hardware appliances and mainframe systems. Legacy equipment is a particular area of concern because older systems may lack the newer management and monitoring interfaces, which would allow easy integration with DCIM.

In summary, DCIM is a fractured and evolving technology. Therefore, it is vital to check which monitoring systems are in use and which interfaces they expose in order to make sure that any DCIM system chosen will be able to accommodate them.

Challenges and Implementation Guidance

In addition to the technical challenges of integration, it is important to consider the human element, which is pivotal when rolling out any new technology. The additional expertise required may mean some employees will need substantial training. Redistribution of operational tasks can shift responsibilities, which may have an impact on departmental organization. If those changes are very disruptive, organizational inertia may become a problem, so it is important to find an internal sponsor who can drive the implementation forward and remove any political roadblocks.

The mere deployment of new software also may require significant efforts, such as data center audits or installation of appliances and sensors. Keeping those considerations in mind, it is advisable to introduce new technologies in phases.

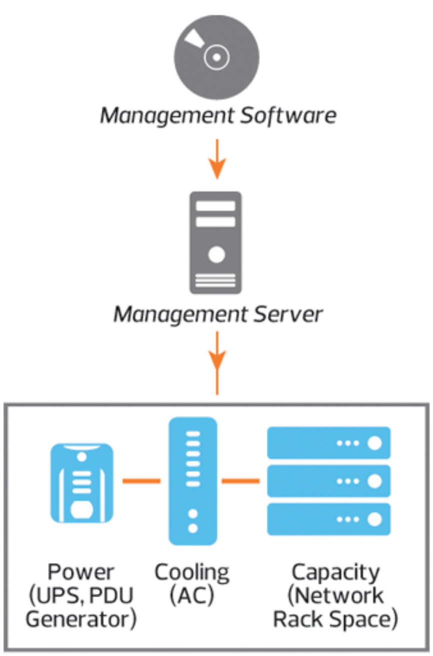
An appropriate place to begin is with an assessment of the current state of the data center, which will provide insight into opportunities for improvement as well as areas where the new system may encounter some challenges, such as integration with legacy and heterogeneous infrastructure. A snapshot before implementation can ensure the design is based on an accurate picture of what assets are located where and how they are interconnected. It also will serve as a useful baseline to which planned changes can be compared.

The first stage of implementation might be limited to centralized data capture and monitoring. For example, a sensor network might collect power, temperature and equipment status for critical devices. The system then could offer visibility into equipment operating status, and could receive real-time alerts to notify personnel of potential equipment operating problems such as fluid leaks. Real-time control, alarm notifications and event escalations will provide significant benefits to the data center, and consolidated reports will make it possible to assess performance against service-level agreements (SLAs) more accurately and thoroughly.

The next step is to use the reporting data to address planning issues, such as ensuring there is enough space, power and cooling to meet future needs. Historical performance trending is critical at this stage because extrapolations of past usage trends not only will improve forecasts but also prove essential in managing future resource supply and service demand.

Optimization and automation represent the final stage. Careful planning can maximize levels of efficiency and availability. By managing the different components centrally, it should be possible to synchronize infrastructure changes with software updates and automate deployment of both. The system could then anticipate potential failures and shift computational and physical resources proactively to eliminate downtime while increasing resource utilization.

Data Center Infrastructure Management Software (DCIM)



DCIM Solutions

Each organization has its own set of unique requirements based on business needs and the infrastructure in operation. No single solution will be best in every scenario. A wide range of systems on the market can cover a variety of different needs. Among them:

- **Schneider Electric's StruxureWare Data Center Operation** – This DCIM framework offers interfaces to virtualization systems (such as VMware vSphere or Microsoft System Center Virtual Machine Manager) to ensure virtual loads always have healthy host environments. It predicts the optimal location for physical infrastructure and rack-based IT equipment based on the availability and requirements of physical infrastructure capacity and user-defined requirements such as redundancy, network and business use grouping. It also includes a PUE calculator, which supplies information on daily energy use to help monitor and streamline consumption. StruxureWare's tenant management tool, of particular interest to service providers, provides detailed power draw and total energy footprint figures, including an in-depth analysis of tenant impact in the event of downtime.
- **IBM Maximo Data Center Infrastructure Management**– It provides real-time monitoring of the IT and facilities within the data center. It can create a data center map with hot spots, air-conditioning zones and 3D environmental monitoring, and is especially suitable for Tivoli customers because it integrates well with Tivoli Monitoring for Energy Management and Tivoli Asset Management. Together, these products also include reporting on energy consumption, financial cost of energy, carbon footprint driven by the data center, real-time PUE calculations and analytics for making better decisions on everyday tasks, such as where to place virtual machines for optimal energy efficiency.
- **CA ecoMeter** – This solution is able to monitor UPS systems, air-conditioning units, power distribution units, IT equipment and generators in real time. Unlike most other systems, it can change the data center environment based on information collected and calculated by its software, and it is able to pass on energy data to virtualization software for use at the orchestration layer.
- **Raritan dcTrack** – This is a software-only solution that offers capability as an asset manager, visualization tool and the means for capacity and change management. dcTrack reads power use and distribution in real time and has an auto-discover function for mapping the data center in terms of servers and network devices as well as environmental conditions, power consumption and floor load.
- **Emerson Network Power's Trellis** – The platform monitors everything in the data center, providing an understanding of system dependencies to help IT and facilities organizations keep the data center running at peak performance. It also maps out the data center so that all changes can have their effects predicted — from shifting virtual machines among servers to adding loaded racks into a corner of the room. Advanced event processing detects user-defined events and can automate device management.

DCIM remains an emerging technology, so keep in mind that solutions are evolving constantly, generally improving functionality and integration capability with each release. The pace of change makes it important to keep an eye on the competitive landscape, but also presents an opportunity for larger organizations to influence vendor product roadmaps and the direction of the technology.

CDW: A Data Center Optimization Partner That Gets IT

When it comes to DCIM, CDW is a one-stop shop offering a combination of solutions, including the underlying technologies as well as the expertise to implement them effectively and efficiently, alongside ongoing support once they are operational.

Our solutions and services range from IT components such as servers, storage and networking equipment to the underlying infrastructure for power and cooling. With DCIM, CDW also provides the glue to bring these two layers together seamlessly.

CDW network support services include:

- Assessment
- Planning and design
- Planning and contract management
- Configuration to ensure all settings and operating systems are retained
- Onsite software installation and lifecycle support

Projects begin with either an assessment or planning and design session, during which architects review system requirements and perform an evaluation of the existing environment to develop a comprehensive solution to meet specific project objectives. Configuration settings are then validated, and can assist with software deployments and support.

Your CDW account manager and solution architects are ready to assist with every phase of choosing and leveraging the right IT environment solution. Our approach includes:

- An initial discovery session to understand your goals, requirements and budget
- An assessment review of your existing environment and definition of project requirements
- Detailed vendor evaluations, recommendations, future design and proof of concept
- Procurement, configuration and deployment of the final solution
- Ongoing product lifecycle support

To learn more about CDW's data center optimization solutions, contact your CDW account manager, call 800.800.4239 or visit CDW.com/datacenter

APC by Schneider Electric

APC® provides end-to-end data center infrastructure management (DCIM) software for monitoring, control of power, cooling, security and energy usage from the building through IT systems. StruxureWare™ provides an instant overview of data center operations through inventory management, PUE calculator, real-time device alarms, and location-based drill-down.

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Raritan. Know more. Manage smarter.™

Raritan® Power IQ™ energy management software provides a centralized user-configurable dashboard, capacity forecasting and utilization information, monitoring, and powerful thermal and energy analytics. Trending reports and cumulative totals can be displayed at the data center, floor, room, rack and IT-device level.

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EMERSON. Network Power

Manage critical equipment activity involving data center power and data center cooling at multiple sites and conduct site monitoring around the clock. Emerson Network Power provides 24/7 data center management and network monitoring software, systems and services to provide continuous oversight of data centers, computer rooms and network closets, as well as wireless, wireline and enterprise telecom applications.

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