

Capacity Management via DCIM: Real-Time Data Center Intelligence Pays Off



CAPACITY PLANNING IS ONE OF THE MOST DIFFICULT ASPECTS OF BUILDING A DATA CENTER TODAY,

given the complexity and number of variables to consider. Proactive capacity management ensures optimal availability of four critical data center resources: rack space, power, cooling and network connectivity. All four of these must be in balance for the data center to function most efficiently in terms of operations, resources and associated costs. Putting in place a holistic capacity plan prior to building a data center is a best practice that goes far to ensure optimal operations.

Unfortunately, once the data center is in operation, it is all too common for it to fall out of balance over time due to organic growth and ad hoc decisions on factors like power, cooling or network management, or equipment selection and placement. The result is inefficiency and in the worst-case scenario, data center downtime. For example, carrying out asset moves, adds and changes (MACs) without full insight into the impact of asset power consumption, heat dissipation and network connectivity changes can create an imbalance that can seriously compromise the data center's overall resilience and, in turn, its stability and uptime.

Once the data center becomes "fragmented" and diverges from the plan set out during the initial build, power and cooling are no longer used efficiently, and space and connectivity often become limited. The inability to utilize one or more of these resources due to the lack of other resources leads to stranded capacity, which ultimately equates with stranded capital, and the premature death of the data center.

IT and facility managers face a host of infrastructure challenges, with capacity issues at the top of the list:

- Stranded/lost capacity/fragmentation
- Running out of data center resources
- Finding optimal space for critical business assets
- Requirement for CapEx spending to address capacity issues





**RACK SPACE,
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Although a host of data center issues result from stranded capacity, data center managers are often unaware of the problem. Symptoms of stranded capacity include hot spots (where there is not enough cooling) or difficulty in deploying equipment due to insufficient rack space. Another possible outcome is that data center specifications indicate there should be more than enough power capacity, but somehow there isn't. Stranded data center capacity is often not identified until resources are running low and issues have cropped up, but by then, the problem can be serious.

Without data center infrastructure management (DCIM) solutions, many data center managers cannot access data center intelligence to understand and improve capacity utilization, to determine if there is stranded capacity (and then free it up), or to proactively provision capacity when adding floor space or building a new data center.

DCIM Helps Optimize Capacity Utilization And Reduce Fragmentation

Leveraging real-time infrastructure data and analytics provided by DCIM software helps maximize capacity utilization (whether for a greenfield or existing data center) and reduce fragmentation, saving the cost of retrofitting a data center or building a new one. Automating data collection via sensors and instrumentation throughout the data center generates positive return on investment (ROI) when combined with DCIM software to yield insights for better decision making.

The power of DCIM is that it gives data center managers the visibility and intelligence they need to address challenges like fragmentation and stranded capacity. After all, you can't solve problems you don't know about.

CAPACITY MANAGEMENT: KEEPING FOUR AREAS IN BALANCE

Data center capacity management demands optimizing four areas at the same time:

- **RACK SPACE.** "When rack space runs short, it tends to be obvious," says Alexandra Bannerman, Intelligent Management Systems solutions manager for Panduit Corp., a provider of data center infrastructure management solutions. Bannerman continues, "It is a primary operational problem. Data center managers need to deploy assets but find that there just isn't space for them, due to a lack of forward planning. It could be the case that the data center is completely full, but more often than not there is available rack space that can't be used because of previous asset placements and their impact on the surroundings, and it's difficult to move these assets once they're running." Being able to plan right from the start and use the space effectively is the optimal strategy.
- **NETWORK CONNECTIVITY.** "This area is much trickier," says Bannerman. "Many, if not most, data center managers do not track connectivity in detail, so it's often unknown to them exactly which ports are taken up, and by what. Many ignore connectivity, when in fact it is just as important a consideration for overall efficiency as space, power and cooling," she says. "It is frustrating to be in the process of deploying assets only to discover they can't be placed in the available space because there is no network connectivity," Bannerman adds. The answer is to use DCIM solutions that monitor port connections and connected devices.
- **POWER.** Energy costs are continually rising. "Without granular and holistic visibility into data center power consumption, it is very difficult to ensure efficient energy utilization or to meet corporate energy-reduction goals," says Bannerman. A DCIM solution that provides detailed granular and holistic information regarding power usage is important.
- **COOLING.** "If you can monitor exactly where things are hot and where they're cold, you can work productively to utilize the available cooling more efficiently, which means not having to overcool the data center," says Bannerman. She adds, "Over time, the best way to manage cooling and avoid hot spots is to extract information regarding the data center infrastructure from DCIM software, and feed it into a computational fluid dynamics [CFD] modeling software tool to get an understanding of thermal characteristics, and how to improve them." CFD is a numerical technique that provides insight into thermal and airflow behavior by modeling what-if scenarios to optimize a data center layout and address hot spots.



“WHEN YOU MAKE A CHANGE AND INTRODUCE NEW SYSTEMS, OUR SOFTWARE IS INTELLIGENT ENOUGH THROUGH FEATURES LIKE AUTO-DISCOVER TO LOOK FOR RESOURCES AND FIND THE OPTIMUM INTERSECTION BETWEEN THEM TO BE ABLE TO MAKE THE BEST DEPLOYMENT DECISION.”

—Khaled Nassoura,
Director of Intelligent
Management Systems,
Panduit Corp.

Assessing and monitoring each zone of the data center independently gives you the detailed insight to reveal and address infrastructure challenges, including optimizing and reclaiming capacity; managing your space and network; monitoring and managing cooling; power and energy monitoring and efficiency; accurate and detailed reporting; and interdepartmental visibility.

Panduit SmartZone™ DCIM Software Solutions: Enabling “Best Fits”

Panduit SmartZone™ DCIM Software Solutions help data center managers determine the “Best Fits” for capacity in their facilities. As a data center manager, you need to understand where the best places are to deploy assets, answering questions such as “Where do I have sufficient power, space, cooling and connectivity to place these assets?” “Best Fit” automates the provisioning process by determining the optimal placement location based on available resources.

SmartZone™ DCIM Software leverages the automatically updated database of space, connectivity, power and environmental data provided by the DCIM software modules and hardware to aid in comprehensive capacity management. Users can easily identify capacity that can’t be used by IT loads due to a lack of one or more of the resources related to floor and rack space, power, power distribution, network, cooling and cooling distribution, and then are able to create work orders to reclaim the stranded capacity. In addition, the system identifies where contiguous cabinet space exists for placement of assets that need to be grouped in the same physical location—eliminating the need for physical inspection of cabinets.

“Determining ‘Best Fits’ speeds the asset deployment decision-making process and helps prevent stranded capacity, giving multiple placement options,” says Khaled Nassoura, director of Intelligent Management Systems, Panduit Corp. “The Best Fits Connectivity View also prevents patching errors and makes deployment clearer and even actionable by non-IT workers,” adds Nassoura.

When building a new data center, understanding capacity (and provisioning resources) are fairly straightforward tasks. “You look at the total capacity that is supplied into the data center across the four key resources of rack space, power, cooling and network connectivity,” says Nassoura. “This is what you design on day one. For the most part, that total supply is static.”

But—much more commonly—for companies that may not have started with proactive capacity planning, the mission is to identify and free up stranded resources. First, you determine the total capacity per the design documents and then subtract out the used capacity. This is very difficult without using a DCIM tool like SmartZone™ DCIM Software. “Based on data collected within SmartZone™ Solutions, we can come up with the recommendations for how the data center can be reconfigured to maximize capacity utilization.”

Nassoura cautions that reconfiguration is not necessarily an easy exercise as there is some manual effort required to move things around to remove the capacity blockages. “The important thing is to document resource utilization and track it in a DCIM application like SmartZone™ DCIM Software,” he says.

With SmartZone™ Solutions in place, “when you make a change and introduce new systems, our DCIM Software is intelligent enough through features like auto-discover to look for resources and find the optimum intersection between them to be able to make the best deployment decision,” says Nassoura.

Proven Benefits of Reclaiming Stranded Capacity

Reclaiming stranded capacity allows you to reduce OpEx and/or prevent CapEx spending on new facilities by extending the life of your data center. Reclaiming capacity gives you the flexibility of further equipment deployments, increased loading, reduced power consumption and increased cooling efficiency. Companies of different sizes across a variety of industries have realized the benefits of proactive capacity management.

PROACTIVE CAPACITY PLANNING HELPS ZEN INTERNET REDUCE ENERGY CONSUMPTION

For example, Zen Internet of Rochdale, United Kingdom, implemented Panduit SmartZone™ DCIM Solutions to realize energy and operational efficiencies in its new, state-of-the-art data center as well as its existing data centers. Zen Internet needed proactive capacity management to control costs by ensuring the most efficient use of power and cooling to support the ever-increasing demands of its cloud and hosting services.



Visit www.panduit.com/dcim for more information.

SmartZone™ DCIM Solutions were deployed within Zen Internet's racks and freestanding equipment. The intelligent hardware provided granular data regarding a broad range of metrics from power usage, humidity, temperature and emissions, to leak detection, security and rack-level assets.

The information gathered by the SmartZone™ Solutions in Zen Internet's racks and cabinets enabled the company to measure and control power usage and infrastructure efficiency. Zen Internet was then able to see its capacity, power, environmental and connectivity status for each data center, allowing more informed decision making regarding energy/power, cooling and capacity planning.

Deploying SmartZone™ power and environmental monitoring hardware within its racks enabled Zen Internet to monitor capacity and determine whether it was under- or overprovisioning power and space for its customers. Leveraging SmartZone™ Sensors to monitor temperature and humidity levels allowed Zen Internet to take measurements and trending information to identify opportunities for cooling cost reductions, and accurately advise new co-location customers coming into the data center.

Zen Internet achieved these hard benefits as a result of the deployment:

- Increased energy efficiency across Zen Internet's data centers, achieving a PUE rating of 1.6 (with 1 being the optimum)
- Exceeded annual 5% energy-reduction target goal by achieving an 8% reduction in energy consumption and carbon emissions
- Deployed additional SmartZone™ Power Distribution Units (PDUs), Gateways and Sensors on a modular basis, resulting in improved capacity management, cost savings and improved energy efficiency

The Panduit SmartZone™ DCIM Solutions helped address the fast-growing company's power and energy usage challenges, capacity constraints and environmental issues (temperature, humidity and carbon footprint) to provide the tools and information needed to make intelligent decisions for its data operations.

FINANCIAL COMPANY MEETS 20% ENERGY-REDUCTION GOAL

A financial giant was targeting double-digit reductions in energy usage and greenhouse gas emissions from its European-based real estate footprint and data centers. With such aggressive energy-reduction targets, it was important for the financial institution to upgrade its technology, including deployment of Panduit SmartZone™ DCIM Solutions for data center visibility and intelligence. At the same time, the company also needed to improve data center operational efficiency as nearly 80% of its servers were operating at 5% of capacity.

With integrated threshold monitoring and early warning alerting on power, humidity, temperature and other variables at both cabinet and room level, Panduit was able to help the organization understand the interdependencies between power, rack space and cooling within its data center environment, including past trends, to improve capacity.

Most notably, the company has achieved its goal of a nearly 20% reduction in energy consumption across its data center and facilities footprint within a six-year period, four years ahead of schedule. SmartZone™ DCIM Solutions played a key role in its development of industry-leading energy-efficiency programs. Energy-efficiency projects completed in the past year are projected to save more than 50,000 megawatt hours of electricity annually. In less than a decade, the organization has realized an estimated \$200 million reduction in energy costs from energy-efficient projects.

Capacity Management: Optimize Resources

Over time, dynamic, virtualized workloads together with the need to provision new applications quickly and the lack of insight into available power and cooling resources have resulted in underutilized capacity, decreased energy efficiency and the need to build new data center space.

Panduit SmartZone™ data center infrastructure management solutions provide granular data center information and comprehensive capacity management capabilities in order to help you avoid stranded capacity, through efficient utilization of the resources you build into your data center plans on day one. The end result is improved data center operations and efficiency, reduced operational expenditure and, ultimately, the ability to avoid unnecessary capital expenditure by extending the life of your data center. ■