

MAKING YOUR DATA CENTER MORE EFFICIENT

Data Center Infrastructure Management Enables You to Maximize IT Infrastructure Value

Information Technology has never been more strategic to businesses of all kinds. The cloud, big data, social media and mobile technologies are creating new opportunities to serve customers, enable workforce collaboration and keep costs under control. IT's high strategic profile, thanks to these new business initiatives, is placing new pressures on servers, storage and networks – as well as the data center infrastructure on which they rely.

*IT executives must respond in several ways. This white paper, the first in a series of three, addresses maximizing the efficiency of physical data center infrastructure. Look for these additional papers sponsored by Panduit: **Optimizing Infrastructure for Hybrid Data Center Strategies** and **Efficient Infrastructure Enables Virtualization Strategies**.*

A physical data center that is well designed and intelligently monitored not only enables today's initiatives in a flexible manner, but frees up resources for tomorrow's efforts. Every time data center equipment is moved, or a device is added, the balance of power, cooling, space and connectivity is altered. As a result, changes are needed, but what is the right action? To make the correct decisions, information is required. A robust Data Center Infrastructure Management (DCIM) system provides the information to not only keep track of changes, but also to draw up a blueprint for a data center that delivers maximum value. It's an intelligent edge that can spell the difference between success and failure to an organization.

THE IMPORTANCE OF ACTIONABLE INFORMATION

A DCIM system provides detailed, real-time and actionable information about assets, power usage, cooling, connectivity, rack security, cabling, bandwidth and power delivery. A comprehensive plan encompassing these factors can maximize the efficiency of data center infrastructure and ensure ongoing monitoring, so that administrators can make adjustments as needed to utilize resources efficiently as needs change.

DCIM systems vary widely. Available as software or as an appliance, the best collect standardized information from data center resources and deliver a comprehensive range of information to administrators via a graphical user interface. A DCIM that is modular can be acquired as a series of software components and added to as data center resources expand. In practice, DCIM systems deliver different levels of detail, which can best be understood as levels of maturity (see "Panduit DCIM Maturity Model" sidebar).



Among the essential elements on which a DCIM should provide information are:



Space and cabinet utilization. The cabinets that contain switches, servers and storage devices must be populated not only for maximum utilization, but also for electrical power and cooling that can be managed effectively. The DCIM system should indicate the power and cooling load per cabinet, as well as the space utilized in the cabinet.



Stranded capacity recovery. Only by understanding the capacity that you have can you arrange for it to be used most effectively. Oftentimes, space, power, cooling, and connectivity are not utilized to full effectiveness, but a data center administrator may be unaware of the inefficiencies. For example, you may have used up your power, but still have available cooling, space and connectivity ports. When you know what you have, you can make better use of it. Sometimes inefficiencies are suspected, but action is not taken to recover unused resources because it is believed that the payback will not justify the effort. An accurate ROI calculator can demonstrate the cost and benefit of an improvement, such as a new containment system.



Future planning. As business needs change, the data center must also change. A DCIM system that provides complete and accurate information on power, cooling and connectivity needs can indicate where it is possible to add data center equipment in the future and how the supporting infrastructure should be changed to accommodate it.



Virtual machines. By indicating levels of power, space and cooling utilization, a DCIM system can specify the server location on which a virtual machine can most efficiently be run – so that the VM can be moved to that location.



Cabinet security. A robust DCIM system allows clients to remotely monitor and control access to cabinets to allow technicians to install and/or conduct routine software service upgrades on network, server and storage equipment.

AVOIDING UNNECESSARY EXPENSES

When insufficient information is available, mistakes in future planning are likely. The result is wasted money in the form of both capital expenses for new data centers and equipment, and operational expenses for the cost of running the data center.

Here's how one technology company avoided an unneeded capital expense: Upon building a new data center, the company found itself pressed to meet power and cooling demands, and faced the prospect of adding yet another data center to meet growing needs. But analyzing its data center utilization with a DCIM system, it discovered that cooling capacity was being wasted, and that by reorganizing perforated tiles, it was able to reduce the cooling requirement of one pod so that enough cooling capacity was available for all systems. As a result, the company extended the life of its data center by two and a half years. Postponing the need to build an additional data center enabled the company to reap the full benefit of its existing asset and avoid a major capital expense, since construction of a new data center costs approximately \$10 million per megawatt of electrical capacity.¹

In another example, a financial institution sidestepped unnecessary operational expenses. The firm knew its operational expenses were too high, but did not know the reason and was skeptical that the time and trouble needed to conserve energy would deliver a payback. The organization was surprised to learn the results of an ROI calculation, which showed that a new containment system pod of about 24 to 28 cabinets (two rows of 12 to 14 each) would save the company more than \$12,000 per year, with a complete return on investment of around 18 months. If replicated across multiple containment pods, the cost savings after payback had the potential to achieve significant savings for this organization.

INTELLIGENT HARDWARE, OPTIMAL PERFORMANCE

Information is essential, but the purpose of the information is to enable effective action. Thus, a DCIM solution should be paired with intelligent hardware so that the data center infrastructure can be monitored and controlled to deliver optimal performance. The interaction between a DCIM solution and a thermal management system, in particular, can yield significant dividends. Because cooling is one of the largest costs, it is likely to generate a significant return on investment when optimized.

¹ 2013 Data Center Industry Survey, Uptime Institute, p. 8.

Different pieces of equipment have different thermal characteristics. So it's important that a thermal management system and corresponding DCIM solution understand those traits – for example, the way that Cisco switches breathe. With information at such a level of detail, data center administrators can optimally place equipment, such as in-cabinet ducting, blanking panels and shades, as well as cool boots, to contain and direct airflow.

In another example, the ability of a DCIM solution to track connectivity ports and whether or not they are in use can pay significant dividends in terms of data center flexibility and expandability. Knowledge of port location and availability enables a data center administrator to quickly and efficiently deploy assets such as servers and storage devices.

THE PANDUIT DCIM MATURITY MODEL

ONE



A Data Center Infrastructure Management (DCIM) system encompasses a wide range of actionable information, starting with the most basic and advancing up to highly detailed data that enables a high degree of control. An excellent way to understand your infrastructure – and your ability to manage it – is the Panduit DCIM Maturity Model. It consists of three levels:

Maturity Level 1: Basic information about the amount of resources you have available, such as the amount of cooling capacity you have and how much you're using. With basic information, you are able to set alarm thresholds and alert notifications to reduce the risk of unplanned downtime.

TWO



Maturity Level 2: More detailed information, in context. For example, you are able to monitor power loads to quickly find underutilized rack power and determine the optimal placement of equipment. At this level, you utilize:

- Live color imaging depicting data points such as temperature, humidity and sub-floor pressure, overlaid on a floor plan. This enables managers to spot problems quickly.
- Monitoring, which provides you the information needed to adjust and react to utilization trends, as well as to plan for the future. For example, poor placement of blanking panels may create hotspots. If you are able to monitor conditions, you will be able to take steps to avoid failure due to overheating before it occurs. You may also compare the performance of your own data center to ASHRAE guidelines.

THREE



Maturity Level 3: Still more detailed information, with a focus on enabling immediate action often with the aid of automation. You are able to see the location of each piece of equipment on the map, and to see specific information about different vendors' gear. You are also able to closely monitor and automatically control infrastructure components to enable the highest level of efficiency.

- Cooling – Automatically increase or decrease fan speed to reach a desired temperature.
- Assets and connectivity – Integrate work order management to automate operational moves, adds and changes, as well as the resulting documentation.
- Power – Perform comprehensive power chain monitoring across facilities.

Understanding your DCIM Maturity Level is important. It's possible you may be at one maturity level for electrical power, and at another level for thermal management. When you understand what you know – and what you don't know – you are in a better position to optimally manage your data center. Panduit SmartZone Solutions enable you to implement DCIM in a highly effective manner, in a way that is consistent with your DCIM Maturity Level.



CONCLUSION

Strategic IT initiatives such as the cloud, big data, social media and mobility are enabling new ways of doing business. But they are also placing unprecedented demands on data centers.

Every change to the data center must be met with corresponding changes to the four most important capacity management resources of the data center to ensure a high level of performance and uptime:



Cooling: Stranded cooling capacity leads to hotspots and thermally induced downtime. Overcooling, intended to ensure equipment safety, is expensive and wasteful.



Power: Underutilized power/stranded power capacity is due to lack of consumption visibility. Without visibility, it is difficult to provide accurate evidence of carbon footprint and energy consumption for “green” credentials.



Space: Inefficient utilization and even asset loss due to poor asset tracking can slow deployment and hamper the effective utilization of rack space.



Connectivity: Lack of connectivity tracking can affect equipment deployment. Disconnections and unauthorized changes cause risk to operations.

A DCIM system that will provide the information you need and allows you to do more with your existing data center investments is essential – at a maturity level that’s appropriate to your organization – to maximize your data center’s performance and avoid unnecessary costs. Also essential is intelligent hardware that can provide the DCIM system with detailed real-time information and that can respond to the controls that the DCIM system recommends. In particular, a DCIM solution working hand-in-hand with a thermal management system enables you to seal, direct, contain and monitor your systems for highly efficient cooling.

A full-featured DCIM system enables your IT organization to support your business more efficiently so it can move more quickly to embrace new opportunities. An organization that does not have to spend as much to merely keep the lights on will be able to spend more on innovation to move faster, embrace new ways of doing business and gain a competitive edge.



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