Expert perspective

DCIM TO DCSO: An intelligent move for your infrastructure

From data center management to data center optimization

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This expert perspective explores the evolution to DCSO solutions in more detail and considers some of the benefits which may result for those who adopt an approach which delivers infrastructure with intelligence.

Executive summary

Data center workloads are intensifying, driven by technological trends including virtualization, the cloud, burgeoning data volumes, and exponential rises in the demand for high performance computing, networking, and storage resources.

At the same time, organizations themselves are increasingly demanding that IT delivers business advantage and business continuity, reducing cost and increasing agility.

In response, IT managers are looking for new tools that will carry their management capabilities up the technology stack and beyond the data center walls so that they have complete intelligence and control of how the data center is serving the needs of the business.

Data Center Infrastructure Management (DCIM) products emerged as an initial solution to this challenge, comparable to ERP solutions for the wider enterprise in offering the data center tools for automation, orchestration, high utilization and ease of scaling.

As the emphasis shifts to a more business-centred and service-oriented data center, the DCIM approach is evolving into a wider reaching solution that also facilitates data center business planning, cost analysis and control, energy resource management, and converged management of physical and virtual environments.

Now, an innovative new category is emerging which turns the whole data center infrastructure into a source of intelligence for IT management.

The name of this category? Data Center Service Optimization (DCSO).

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Data Center Management:
The search for an intelligent solution

Effective and timely data center infrastructure monitoring and management has never been a straightforward proposition.

Technologies age rapidly, workloads grow exponentially, and the business needs of organizations change unpredictably.

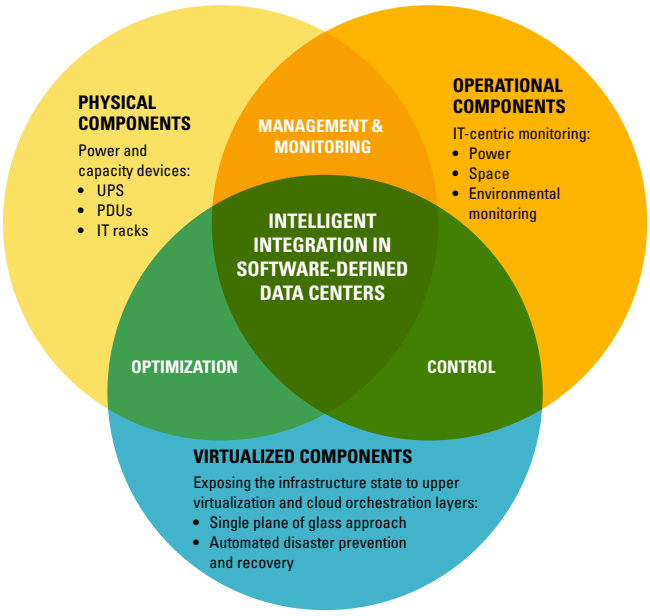
Every data center manager knows that the realities of their role demand constant and concentrated thought in order to optimize data center performance and anticipate a constant succession of challenges.

Challenges such as a mix of hardware and software from multiple vendors, the frequent lack of co-ordination between Facilities and IT management, and the tendency for data centers to evolve as a collection of siloes.

Such challenges and the risks they bring are becoming more pressing in the era of software-defined and cloud-oriented operations.

So too are the changes and challenges inherent within data workloads themselves, which require corresponding responses from the power infrastructure if tasks are to be completed successfully.

Now more than ever, there is an urgent need for a clear, holistic, single view of the whole infrastructure across: the operational, physical and virtual/cloud layers of IT applications.



Data Center Management:
One answer. Leading to more questions…

Data Center Infrastructure Management (DCIM) solutions have emerged as an answer to this need, designed to provide the data center manager with a system of information sources, applications and middleware that can optimize the technical and commercial operations of the data center.

Of course, like any innovation, the benefits these products are designed to deliver and what they deliver in practice are not necessarily the same thing.

Some off-the shelf DCIM solutions, for example, quickly developed a reputation for being difficult to integrate and – ironically – adding to administrative workloads rather than reducing them, as well as necessitating additional tasks to work effectively as a direct result of having too many proprietary points to synchronize. These additional tasks will always fall to the individuals responsible for the running of the site, a responsibility that is already highly demanding. The result? Many DCIM tools are underutilized or completely abandoned because of the extra work they create for data center staff.

Of course, the best of the DCIM vendors work in partnership with their customers to realize the full potential of the solutions they provide.

As Jennifer Koppy , Research Director, Datacentre Management at IDC, points out: "To date, the most successful DCIM vendors have been those that have worked closely with end user customers to ensure accurate and complete collection of data in the deployment phase. As DCIM deployments continue to mature, IDC expects that a competitive differentiator will be the DCIM providers' ability to automate maintenance and management processes to support remote management and lights-out datacentres. The goal of a datacentre is to deliver IT service to end customers, and datacentre managers are under increasing pressure to deliver this service quickly, wherever and whenever needed, without compromising uptime and reliability. When implemented well and supported across the enterprise, DCIM can be a critical step in delivering datacentre resources in a highly service-oriented way to customers."

Despite such encouraging examples of best practice, many DCIM solutions and the vendors who provide them can provide only a partial answer to the challenge of viewing the data center as an integrated, functioning machine through the use of real-time data and optimized analytics.

That is why, even with DCIM solutions in place, IT managers still find themselves with questions to answer as data workloads and business expectations continue to rise.

Questions like:

- "Where is the best place to execute this particular data workload?"
- "What are the implications of this workload for our overal power requirements?"
- "How can I accurately cost the tasks this data center is required to perform?"
- "Can I monitor my data center beyond the physical level?"
- "How can I best manage this data center to maximize the gains we make from virtualization and cloud computing?"

Uniting Operational, Physical and Virtual layers together

Integrating DCIM data up to the IT stack is a relatively new approach to data center management that 451 Research describes as data centre service optimization (DCSO): "DCSO is inclusive of DCIM, yet extends beyond it…"

DCSO is a core tenet of the future "software-defined" data center, which requires holistic and automated management tools.

Where DCIM systems focus on managing physical assets to optimize day-to-day operation, DCSO solutions integrate multiple systems and embrace physical and virtual assets inside the data center and beyond to optimize the service a data center delivers to the organization.

There is a clear need for DCSO systems that can easily integrate into the data center infrastructure, gathering information from multiple sources along the data center powerchain, and from the environmental systems supporting the site. Ideally, these systems would use intuitive tools to show only what matters most to make power, cooling and capacity management simple. With IT centric monitoring and control, they would deliver the policy-based business continuity and simplified infrastructure monitoring required for today's high intensity workloads.

The focus should be on simplicity, with an intuitive user interface and drill down navigation capability and capacity management tools to:

- **Expose the infrastructure state to upper orchestration layers**
- **Enable consistent policy enforcement across silos**
- **Create peace of mind by delivering better monitoring without information overload**

The trend for the modern data center is to become an integrated whole. It's a trend that extends beyond manufacturers' current offerings and on to their ecosystem of complementary products. Some offer industry-leading partnerships which allow easy and effective monitoring of infrastructure solutions (gensets, CRAC, sensors) from different vendors through the integrated DCSO system.

It's a more intelligent approach that allows customers to make the most of every opportunity and develop their individual data center systems to become the best they can possibly be.

Advanced physical infrastructure solutions coupled with a simplified DCSO help optimize overall management of the data center even further:

- Intelligent power distribution units (PDUs) provide visibility of the current state of power consumption within the rack
- Environmental sensors attached to the front of each rack reveal temperature and humidity levels within the site.
- The relationship between IT and the supporting infrastructure (the environmental status and power consumption) can be visualized
- Operational capabilities and limitations of the data center site can be measured. The cooling infrastructure can be optimized

Adopters gain the understanding of the relationship between IT and supporting infrastructure systems, and by doing so can come to understand the overall operational capabilities and limitations of their site, enabling data center operators and managers to make better informed decisions on how to further develop their data centers. Having clear visibility of environmental status and power consumption could help data center managers identify the need for the introduction of airflow management systems to maximise the current cooling infrastructure.

In summary, by knowing the present status of their data center, managers can decide on changes and calculate the resulting cost savings and increase in efficiencies.

In addition, the trend toward virtualized and cloud architectures in data centers of all sizes adds further complexity with respect to managing power and environmental events that occur all too often.

While virtualization and cloud orchestration may make it much easier to decouple IT loads from the underlying infrastructure, the DCSO platform must still be able to integrate with power management software capable of automating processes to protect the load in the event of a power or environmental event.

This key "software defined power" feature that isn't available in all offerings and can be a life saver as the costs of downtime are overwhelming. It enables automation of disaster prevention and recovery policies to remove the potential for manual error when the data center team is performing under the time pressure of a power event. The leading solutions are also starting to implement advanced placement mechanisms that can dynamically move the IT load in order to dynamically remediate and optimize cooling costs.

Co-ordinating physical infrastructure (including power, environmental conditions and space capacity), with an operational monitoring layer and putting it within the context of a virtual/ cloud layer, the DCSO system will give the data center manager the intelligence required to plan and optimize every aspect of operations for availability, agility, and energy efficiency.

At its best, the benefits of such a solution will extend throughout the organization and earn the data center fresh recognition as a focal point for organizational intelligence and enhanced competitive advantage.

This not only helps with proper management of day-to-day functions (the raison d'être of the previous generation of DCIM technology), it also enables operators to plan change, anticipate challenges, and make intelligent decisions that ensure business continuity and optimize the IT equipment life span.

Further flexibility can be gained by choosing a DCSO solution based on open source development. Organizations can then plug into extended ecosystems that allow them to customize intelligent infrastructures based on their own individual needs – rather than simply buying what a proprietary vendor wishes to sell them.

This makes the transition from legacy to state-of-the art systems much more painless, avoiding the need for a rip-and-replace solution that disrupts day-to-day business and typically involves a steep learning curve before it delivers to its their potential.

Conclusion

Virtualization, cloud computing, and related technology trends mean that now more than ever the data center is a focal point for the effectiveness of organizations across almost every industry sector. Increasingly, if the data center fails the business fails.

DCSO solutions visualize this situation by providing the holistic and integrated information that managers need in order to see their data center within the context of the organization it serves, and help them perform their role more effectively.

About the expert

Dennis has over 15 years of experience in the data center industry. He joined Eaton's data center automation development team in 2014 and, as Data Center Solutions Operations Specialist, is responsible for providing insight into the day-to-day challenges of data center operators and managers to aid in the development of new products.

Before joining Eaton, Dennis worked for Yahoo! and BT Ireland.

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