




WHEN WORLDS COLLIDE: THE CONVERGENCE OF FACILITIES AND DATA CENTER MANAGEMENT

A composite image of space. In the foreground, the curved horizon of Earth is visible, showing blue oceans and white clouds. Above it, the Moon is partially illuminated by a bright, glowing light source, creating a lens flare effect. A vibrant rainbow with distinct bands of red, orange, yellow, green, and blue arcs across the upper left portion of the image. The background is a deep black space filled with numerous small, distant stars and a few larger, brighter celestial bodies.

**ONCE FAR APART, THE HISTORICAL CONFLICT BETWEEN
FACILITIES AND IT PERSONNEL IS GRADUALLY ERODING AS
TOOLS BECOME AVAILABLE THAT MAKE IT POSSIBLE TO VIEW
BOTH WORLDS FROM ONE SYSTEM.**

BY DREW ROBB

After managing facilities for Compaq, HP and Enron, AFCOM member Greg Bush, SMA (Systems Management Administrator) took over managing the data center at Sybase's headquarters in Dublin, California in 2002.

"When I first came here IT and facilities absolutely hated each other," says Bush.

This has not been an uncommon sentiment.

"Usually the IT arms and the facilities management people look at their missions as entirely separate and that leads into all types of issues," says James Baugher, an IT consultant who has built and managed a number of data centers over the past 40 years. "You spend more of your time sorting out whose toes are being stepped on than anything else."

But both Bush and Baugher have managed to get both sides working together on common goals. And that cooperation is getting easier with the increasing use of Data Center Infrastructure Management (DCIM) tools that unite those two worlds and bring everything from the utility feeds to the CPUs into a common interface.

"Collaboration becomes ever more important as IT and electrical and mechanical systems become more tightly linked, and as DCIM systems advance to span datacenter facility infrastructure, and both physical and virtual IT assets," says Rhonda Ascierio,

research manager of datacenter technologies at 451 Research in New York City.

Maturing Toolsets

For years people have been talking about bringing IT and facilities management under a common platform. While we are not there yet, we are getting closer with the increasing adoption of DCIM software which increases visibility into and control over data center assets and the power they consume. Ascierio says that so far "no more than 15% of midsized to large datacenters have deployed a commercial DCIM product," but that the market is expected to grow at a 27% CAGR over the next four years, reaching \$1.7 billion in aggregate revenue in 2018.

"After several false starts, DCIM software has matured and today is mostly considered to be robust and effective software," says Ascierio. "We ran a DCIM end-user survey (without vendor involvement, the first of its kind) that shows that most users have achieved the benefits from DCIM that they had hoped for, gotten the ROI they expected, and experienced few technical issues with the software."

The core DCIM components are asset and capacity management, monitoring, cooling optimization and environmental management. 451 Research tracks more than 60 DCIM vendors and the depth of their offerings vary widely. Some of the industry giants such as ABB, CA Technologies,

Emerson Network Power, Schneider Electric and Siemens offer complete DCIM suites including monitoring, asset management, power management, cooling optimization and computational fluid dynamics (CFD) modeling, but most vendors offer limited feature sets (Figure 1 – DCIM Suppliers Map).

"Most are small privately held pure-play suppliers of relatively simple software tools that are used to address one or two specific datacenter issues, such as gaining visibility of datacenter assets and integrating disparate sources of datacenter data," says Ascierio. "Yet most, if not all, suppliers advertise extensive functionality, which leads to significant buyer confusion and caution, slowing down sales cycles."

She says that most DCIM users have reported achieving a positive ROI in three years or less, but it can be difficult to develop a single metric that shows its value.

"Calculating a return on investment for DCIM is notoriously difficult," she says. "Even though some vendors have developed DCIM ROI calculators, the business benefits of DCIM are going to be different for different organizations and, therefore, it's tricky to quantify en masse."

So let's take a look at three very different applications of DCIM to see what benefits the users are receiving.

Modeling Changes

Lakeland Community College in Kirtland, Ohio had outgrown its data center. The former one was a glorified server closet that had grown in an ad hoc fashion over the years, and lacked the space, power and cooling for future expansion. So two years ago, the college moved into a new data center, with three rows of racks connected by fiber, overhead cable trays, dual power feeds and a human-safe fire protection system.

"The new data center has all the bells and whistles," says Rick Penny, Director of Administrative Technologies.

As part of the move, the college installed ABB Decathlon for DCIM – Education Edition and uses it to monitor the UPSes, smart PDUs, air conditioning, water sensors, room temperature, airflow and other data points.



"We looked at a lot of DCIM systems and a lot of them had similar features, but this one had a complete feature set with the 3D modeling," says Penny. "Every piece of the puzzle we were looking at they had a solution for."

Previously, every time they wanted to buy a new server or server system, it would take four to six weeks of spreadsheet work to figure out whether they had the necessary power and cooling and where to place the new gear. With the Decathlon system, all of the data center racks, equipment, power and cooling are available in CFD models. He enters what type of equipment he is interested in buying and the system will pull the power, cooling and space requirements for that piece of gear from its database. Within minutes it shows the optimal location in the data center, based on the current configuration, usage and environmental data.

"There is quite a bit of efficiency gained in knowing what it is that we should buy, where we should put it and what impact it will have," he says.

He also used the modeling to determine the effect of using containment walls on the aisles and found that they could eliminate use of a 10-ton chiller. They put in the walls, tuned off the chiller and temperatures have stayed within range. The models also showed that they were losing cold air out the back of the servers, so he is putting in panels to block that flow.

The additional visibility he gets from the Decathlon system also helps him keep ahead of potential issues. For example, he monitors the chilled water temp coming into the AC unit and if the temperature goes up a degree or two, he can notify Facilities to correct the issue long before it leads to higher temperatures inside the data center.

"We were lucky because we were building a new data center, but even if you are not, you can still start using a DCIM system," says Penny. "You can start small, and when you get new equipment, get it with management built in and get them integrated so you can start seeing the benefit of having

the additional information at your fingertips."

A Second Set of Eyes

SAP bought Sybase in 2010, and Greg Bush has added a lot of duties as a result. He still manages the 16,000 square foot Sybase/SAP data center in Dublin, California, that is largely used for research and development, particularly for the SAP HANA in-memory database. Then there is the disaster recovery facility in Boulder, Colorado, a server room in Scottsdale, Arizona and a small 300 kW data center under construction at SAP's Palo Alto campus. He also serves as SAP's global operations engineer as well as the Real Estate Manager and Energy Manager for the Americas.

Bush was an early adapter of DCIM, starting to use Modius's monitoring software at the Dublin facility a decade ago.

"A building automation system tells you what happened yesterday, not what is happening now, so I overlaid it with a good quality DCIM system," says Bush.

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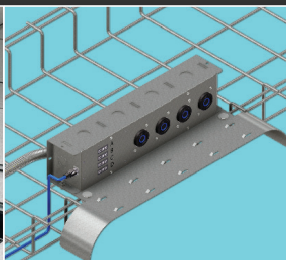
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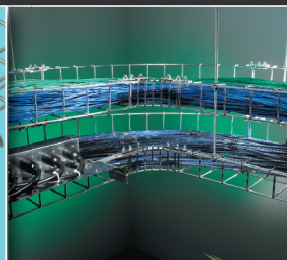
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During that time, he managed to bring the PUE down from 3.9 to 1.4 through actions such as being the first data center in the Bay Areas to use outside air economizing and heat recovery and using the DCIM to remove any inefficiencies.

"After Modius allowed me to see succinctly what I was doing, and I could control the air management, we went from 147 kW of fan shaft horsepower down to 12 kW, even though we are moving the same amount of heat," he says. "I am able to deliver just what I need to at the temperature I can get away with and no more; and I am not having a runaway over in the corner because IT added a bunch of new boxes and I didn't know about it." In fact, if they do install something overnight, he will know about it, because he will see the change in the power draw and heat load.

Bush's strategy is to operate the DCIM separate from both the data center operations and the BAS. The Modius DCIM software runs on its own server, on its own UPS, in a separate building.

He uses Modius at Dublin, at the Boulder DR site and will be using it at the Palo Alto site when it comes on line, but not at the Scottsdale facility because of its size. SAP will also be installing a DCIM in all 14 of its major data centers worldwide. Bush prepared the spec for the DCIM, but the selection is being handled through global purchasing in Germany and he doesn't know what product will be chosen. When installed, the DCIM will feed to the NOC in Germany as well as to Bush's cell phone.

Bush is feeding 7000 data points into Modius and says that having a DCIM gives him far greater control to granularly control the environment for greater efficiency than the BAS, especially since he can set the setpoints and triggers without having to go through the equipment manufacturer or bring in a contractor.

"We have had some near misses here," he says, "and out of the seven near misses due to malfunction, the BAS never once brought it to my attention, it was always the DCIM."

modeling, together with ABB's Decathlon platform for monitoring the physical side. The company has also started using RF Code sensors and software, where RFID tags are placed on all the equipment and the system tracks the physical location of each piece of gear.

"Large organizations have difficulty because things grow legs and walk around," says Baugher. "Instead of having manual walkarounds and scanning barcodes to do asset inventories, RF Code always knows within 10 seconds where something is so Inventory now is running a report."

With the Decathlon/Nlyte system, they can monitor power usage down to the individual circuit, as well as all the components involved in supplying the power to the racks. And, coupled with the RF Code inventory, they can see exactly what pieces of equipment in the racks are consuming the power. A further step will be to start using Intel server chips with an Intelligent Platform Management Interface (IPMI) so that Decathlon can query the server chips

"We thought that the storage industry was pretty tame, but it's come back with a roar. The thing that stands out for me is how dynamic the entire environment is."

*-Peter Quirk, Director of
Product Management Sepaton*

"I made it freestanding so I never go blind," says Bush. "How can I see the health of UPS D-1 if I am powered off UPS D-1 and UPS D-1 crashes? I have to be outside with my own eyes watching."

He uses a mix of sensors to manage the status of generators, the CRAHs, room temperatures, individual PDUs, air flow, UPSes, batteries, chillers, pumps, cooling tower status, VFD speeds, energy consumption, status of the water treatment systems and other elements. If a device such as a chiller has two card slots, he will connect one to the BAS and the other to the Modius DCIM, but he will still install his own sensors to get an independent view of what is happening.

"The DCIM and BAS don't share information," says Bush. "They are two sets of eyes, completely separate."

Changing Established Procedures

James Baugher is an independent contractor in the data center management space, currently working on installing a DCIM at the 200,000 square foot data center belonging to an east coast financial services company.

"I started reviewing tools a year and a half ago and it looked to me like there was enough maturity there to have a value to large institutions," says Baugher. "That is why we have a pilot we are doing, to sort out exactly what the value is to it, what is good, what is bad, what kind of KPIs do we really need to manage this."

After looking at more than 30 DCIM products, he selected Nlyte's Software Ltd.'s DCIM suite for the IT analytics, planning and

and pull back inlet and outlet temperatures, fan speeds, CPU utilization and other data.

Baugher is about nine months into the pilot and says that setting up the software connections is the easy part. The hard part is the people connections, getting everyone to see the need for an integrated management system and give up their long-established procedures.

"In large institutions like the one I am sitting in you sometimes run into teams that have been in existence for 50 years," says Baugher. "That's the tough part of deploying integrated management anywhere. The larger the organization and the longer it has been in existence, and the tougher it will be."

Drew Robb is a freelance writer based in Florida.