Winning the Biggest DCIM Challenge:

How to Find the Right
Data Center Infrastructure Management (DCIM) Solution

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Because Data Center Infrastructure Management (DCIM) touches all functional areas of the data center and affects all data center groups and silos, finding the "right" DCIM solution can be a daunting task, especially for companies with medium to large data centers. This means that someone within your organization, or a trusted advisor from the outside, must impose order on the chaos of pulling together the right people and information to form consensus around what is needed. This white paper walks you through an orderly and collaborative process for determining what you need in a DCIM solution, and how to get it.

Key Assumptions

Two key assumptions in this white paper are that you know what DCIM is, and that you are convinced you need it. Therefore, not much time will be spent in defining DCIM or trying to convince you of its importance. However, it is probably worth reviewing in short form what a DCIM solution is—and perhaps equally as important--what it is not.

DCIM Defined

While definitions vary slightly among analysts, the Gartner IT Glossary* defines DCIM as:

". . . tools [that] monitor, measure, manage and/or control data center utilization and energy consumption of all IT-related equipment (such as servers, storage and network switches) and facility infrastructure components (such as power distribution units [PDUs] and computer room air conditioners [CRACs])."

DCIM Is Not A Single Product, But Core DCIM Software Is Essential

Most analysts agree that DCIM is not a single product standing alone, or even a set of complementary products or modules from a single vendor. However, it almost always includes a core DCIM-centric software package with a relational database that can integrate into the existing environment, a business intelligence component with dashboards and reports, tools to visualize and manage data center power, cooling and network infrastructure, and features that help track and manage IT equipment and connections. This is what data center folks usually mean when they refer to a "DCIM tool" and it is where we will focus most of our attention in this white paper.

Understand The Problem Before You Try To Solve It

To find and implement a core DCIM software solution that is well-suited to your specific environment, you'll first need to fully understand the current condition of your data center as it relates to DCIM across the enterprise. To accomplish this, you'll need to focus on a specific set of DCIM functional areas and evaluate your existing tools and processes to determine what's broken or missing. You will then be ready to explore available options, both internally and externally, to fill the gaps.

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Step 1: Initial Discovery

If you do not have a healthy and pervasive DCIM ecosystem today, you'll probably agree that your existing tools are not sufficient to sustain a complex and dynamic data center into the future without significant risk. But you may not know the full extent of the deficiency unless you've recently conducted a comprehensive data center tools assessment to document what you've already got, what's working well, and what isn't.

A common mistake is to start by asking a handful of the leading DCIM vendors to demo their product and explain how it might help resolve some of your own frustrating data center management issues. But a carefully orchestrated vendor presentation is usually designed more to frame your paradigm around their product than to fully understand the gaps in your existing environment and how best to fill them.

Get The Right People Involved And Committed

The more productive approach is to work with your own data center personnel across the enterprise to evaluate their existing DCIM-related tools and processes, or engage a trusted advisor with the requisite knowledge, experience and vendor neutrality to collaborate with them to get the job done. Either way, you'll need agreement from all data center groups that an honest and comprehensive assessment is needed and that they will support it.

Once you have commitment from key personnel, schedule an initial discovery meeting with the group leaders or their designated representatives to kick off the project, preferably in a conference room setting. The goal is to familiarize yourself as much as possible with the major tools each group currently uses, how they use them, how the tools are interrelated or integrated and their relative strengths and weaknesses.

Expect some push back from users who might be strongly attached to their existing tools, especially where significant time and energy have been invested in developing or learning to use them. To dampen initial resistance, let the attendees know you are not trying to solve specific problems in this meeting. Rather, you are interested in learning how the existing tools are used today and whether their output or result meets the expectations and requirements of all who use and are impacted by them.

Schedule a separate timeslot in the discovery meeting for each group to present their own toolset. You'll need to take lots of notes, or designate a neutral party to take them for you. The notes from this meeting will come into play in a big way when you write the Data Center Tools Assessment Report discussed in Step 3. Arrange the notes so that each tool (rather than each group) has its own section. Note which groups use or are impacted by each tool, and the basic differences in usage and impact. Be sure to capture the essence of any sidebar conversations in the notes as well.

Reserve some time at the end of the meeting to introduce the Data Center Tools Assessment Survey, which is described in Step 2. Ask each group leader or representative to distribute the survey to their own team members, roll up the individual responses, and return the rolled-up version of the survey to you within a couple of weeks. You should also ask for the individual responses in case some items in the rolled-up version need to be clarified, and as a record of who made certain observations and suggestions.

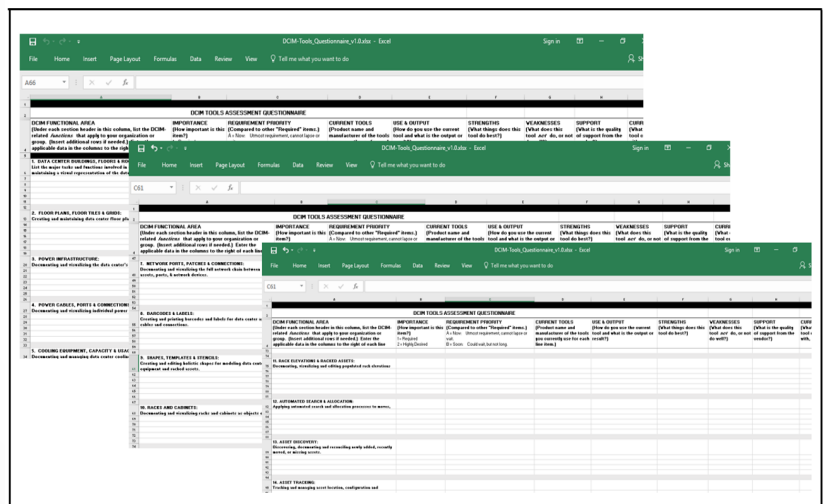DCMWORKS

Step 2: Data Center Tools Assessment Survey

The Data Center Tools Assessment Survey is designed to give individual team members an opportunity to share their own perspectives about the tools they use and the DCIM functional areas to which they apply. It also anchors key personnel and team members to the project and helps engender buy-in at all levels. To be successful, the survey must be well organized and it must be focused in such a way as to elicit brief, clear and relevant responses, while at the same time producing sufficient detail to expose noteworthy weaknesses and gaps in the existing toolsets across all functional areas.

Organizing The Survey

A simple and logical way to organize the survey is to think about how a data center is designed, laid out and connected, and how DCIM applies at each point. On the infrastructure side, start with the peripheral power and network feeds and work your way into the PDUs and switches. On the IT side, start at the floor level and move up into the racks, and then from the racked assets work your way out to the individual PDU breakers and switch ports. Consider how the power, network and cooling systems are designed, provisioned, and monitored and how the individual IT assets are physically placed, connected, tracked and managed.

In the first column of the survey, include a section for each major DCIM functional area across the entire construct, as illustrated in Figure 1 to the right.

Ask responders to describe the related tasks and functions they are involved in or responsible for within each section. This way, they only need to focus on the sections that apply specifically to them.

Figure 1: Data Center Tools Assessment Survey

Additional columns to the right ask responders to weigh the relative importance of the specific tasks and functions they enumerated in each DCIM functional area, list the tools they use for them; note the strengths and weaknesses of each tool; rate the quality of internal and external support for the tool; describe any current or desired integrations; indicate whether they see the tool as replaceable; and specify any additional features and functionalities they believe should be required in a replacement tool. And finally, a comments column is provided for elaborating on an entry, and to catch any details not captured in the other columns.

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Step 3: Data Center Tools Assessment Report

While you're waiting for the survey responses, you can start drafting a Data Center Tools Assessment Report to organize the findings. First, arrange the notes from your initial discovery meeting into a logical outline. An intuitive way to organize the outline is to imagine a single IT asset, such as a server, and track its journey through the data center from cradle to grave. Note how each tool impacts that asset throughout its lifecycle all the way to decommissioning and recycling, and use that as a linear format for your outline.

Start with tools that are used in the purchasing and inventory processes, including how a bill of materials is assembled for a server that needs to be ordered and how the server is stored, secured and tracked from the time it arrives at the receiving dock until it is physically transferred to the data center.

Rack And Stack Tools

Next, focus on tools that prescribe and document the server's rack-level power and cooling requirements and U space assignment. Then deal with the tools that guide IT personnel in physically racking the server and connecting the right power and network cables to the right ports. Include things like ticketing and change management systems, workflow and service request engines, power provisioning reports, databases, spreadsheets, rack configuration plans and diagrams, and other diagrams and images.

Then move on to the tools that document the server's internal components, applications and virtual machines, and those that document and visualize the rack elevation, rack-mounted power strips, and server-side network gear. Then move out to the tools that are used for rack-level heat management, power provisioning and connectivity management; power infrastructure, cooling equipment and capacity management; and documenting and visualizing the core network gear, structured cables and cable routes.

Now list the tools for documenting, managing and visualizing the data center floor and cabinet layout, creating floor plans and drawings, and documenting the raised floor and overhead plenum. Finally, add the hardware and software components for room-level heat and airflow management, automated building management, monitoring and interfacing with SCADA systems, and managing alarms and alerts.

Strengths, Weaknesses And RFI Requirements

Be sure to include information about each tool's manufacturer, how it is supported and the quality of support, its known strengths and weaknesses, and any existing or desired integrations. Also, explicitly state which features and functionalities must be addressed in the Request for Information (RFI) for a DCIM solution, which is discussed in Step 5.
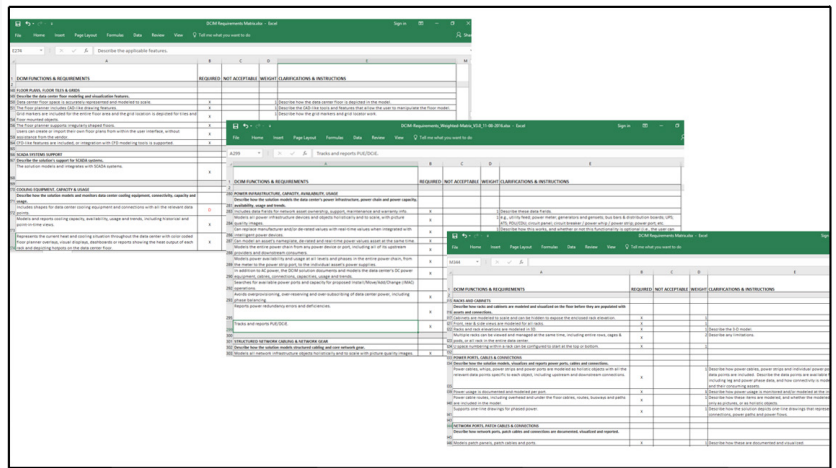
Once you have received and analyzed all the survey responses, use the data from them to fill in the gaps in your assessment report. Send the draft report to each of the group leaders and ask for their feedback on the sections that apply to them. Schedule follow-up calls with the right people to clarify and update the report as needed. The wealth of detailed information from the assessment report will naturally flow into the DCIM Requirements Matrix (discussed in Step 4 below), and ultimately into the RFI itself.

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Step 4: DCIM Requirements Matrix

Having exhaustively and collaboratively analyzed the array of existing data center tools, you are now ready to assemble the DCIM Requirements Matrix. This is where you will lay out the specific requirements for a core DCIM software product from the open market to complement, integrate with, and in some cases even replace, existing tools.

The requirements matrix follows pretty much the same pattern as the assessment survey, in that it mimics how a data center is physically designed, populated and connected. (The room has a floor; the floor has cabinets with racked IT assets; racked assets have internal components and connections; power and network equipment is eventually connected back to the IT assets; and so on.)

A comprehensive DCIM requirements matrix accounts for all aspects of the data center's physical layer, from the wall to the racked IT assets--and to some extent, the virtual machine and application layers--including how everything is documented, visualized, provisioned, connected, integrated, managed, monitored and reported. The tools assessment survey and report from steps 2 and 3, above, will be the primary sources of data for the requirements matrix.

Figure 2: Sample DCIM Requirements Matrix

For the initial build-out, simply transfer the applicable line items from the survey into the matching sections of the requirements matrix.

Layout Of The Matrix

The sample requirements matrix in Figure 2 has five columns: The first column lists all the major DCIM functional areas in logical order, each in its own section with a label and a brief description, just like the tools assessment survey. Specific DCIM features, functionalities and characteristics are listed in separate rows under each heading.

Weighting The Requirements

The next two columns indicate that an item is either REQUIRED or NOT ACCEPTABLE. The WEIGHT column is next. In this column, a 1 means the item has a very high priority; a 2 means that the item is required, but less urgently; and a 3 means it has a somewhat lower priority and perhaps could wait a while. A "D" means the item is highly desired but not explicitly required. The last column in the matrix is for putting together the clarifications and instructions you'll need to include in the RFI for vendors to answer each line item.

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Step 5: Request For Information (RFI)

Before you begin crafting the RFI, you'll need to vet the final version of the requirements matrix with the same group leaders you've been working with throughout this project, preferably in a face-to face-meeting. The DCIM requirements matrix will serve as the primary source of content for the RFI. Figure 3, below, shows a sample RFI for DCIM.

Figure 3: Sample RFI For A DCIM Solution

What is not displayed in the sample RFI in figure 3 is the rather lengthy set of instructions and legalese that precedes the table of DCIM functional requirements. That's because our focus is on the functional requirements themselves. The General Information and Technical Requirements section is also not depicted, but we will briefly describe it before discussing the DCIM Requirements Table.

The general and technical requirements section can be positioned either above or below the functional DCIM requirements table, and includes things like physical and virtual platforms that must be supported by a DCIM product; the product's installable components and their minimum hardware and software requirements; database access and security requirements; high availability and disaster recovery; software licensing options and pricing; maintenance and support options; and so on.

The DCIM requirements table in the RFI should include all the sections from the DCIM Requirements Matrix, and in the same order, with their applicable line items. The label for each section of the requirements table in Figure 3 is prepended with a unique section code consisting of two uppercase letters, and each line item is tagged with the section code and a segmented line item number. Each line item is explicitly called out as either REQUIRED, DESIRED or NOT ACCEPTABLE. The remaining columns are self-explanatory.

How to publish the RFI, and to whom, is outside the scope of this white paper, but you should consider nondisclosure agreements (NDAs) before you publish it. Current reports from the leading information technology analysts are excellent sources of information about the major DCIM players, with the caveat that a product's relative ranking in an analyst report may or may not have much bearing on its suitability to your specific needs.

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Step 6: Down-Selection Process

Once you have received all the RFI responses you'll need to evaluate and compare them to decide which vendors warrant further consideration. An expedient way to compare the responses is to use the requirements table from your RFI template (as it appeared before you published it). Insert a separate column into the table for each of the responding vendors, and then rate their responses to each line item on a scale of 1 to 5, with 5 being the better score. Rename the ANSWER column as EVALATOR COMMENTS.

Enter a score of 5 in the vendor column to indicate that a product fully meets the specified requirement, and scores from 4 to 1 to reflect decreasing levels of your satisfaction with the vendor's answer. A score of 1 means the product fails the requirement altogether. As you evaluate each line item, be sure to consider the vendor's entries regarding scheduled product releases and roadmap items, details and comments in the ANSWER column, and any attachments. Finally, consider all aspects of the vendor's response against the weight you assigned that item in the DCIM Requirements Matrix.

Deciding On A Shortlist

When you are finished with this exercise, tally the numbers in each vendor column and see how the totals compare. Assuming you've applied ample diligence in your evaluation of each response, the higher a vendor's total score the better their product meets your requirements. To arrive at a short list, toss out responses with the lowest scores until you are left with four or five of the top scoring vendors, and then update the RFI template by deleting the rejected vendor columns. (Notifying non-shortlisted vendors and processing their appeals is beyond the scope of this white paper.)

What To Focus On In The Deep-Dive Demo

Schedule each of the remaining candidates for a product demo and deep-dive session with your team, preferably onsite. First, distribute the updated RFI template to the group leaders for use as a Product Evaluation Guide. Meetings should be scheduled for three to four hours with each vendor. They will typically want to show their "standard" demo, albeit tailored to some extent around the RFI, and it's best to allow them to do that up front. Allot an hour at the beginning of the meeting for the vendor to walk you through their product their way, and reserve some time at the end for follow-up questions, discussions about the vendor's company and customers, product pricing, etc.

You can avoid unnecessary interruptions during the vendor's initial demo by jotting down key questions and holding them until the end of each segment, as they may be addressed at some point during the segment. However, the technical deep-dive that follows should be driven by you and your team, not the vendor. The deep-dive should focus sharply on a handful of the top-weighted requirements in the matrix (eight or ten at the most), and they should be the same for all vendors. Ask as many questions as you need during this part of the meeting, even if it means frequently interrupting the vendor.

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Be sure your folks keep an eye on the product evaluation guide throughout these meetings, adjust the existing scores in each line item accordingly, and note key observations in the comments section. After all the vendor meetings are done, update the master copy of the evaluation guide to roll up the adjusted scores, then distribute the updated version back to the group leaders and ask them to recommend three or four finalists to participate in a Proof of Concept (POC), which is discussed in Step 7.

Step 7: Proof of Concept (POC)

Once you decide on which vendors to down-select, you'll need to present them with a set of specific requirements from the RFI that they must demonstrate in the POC. Again, the objectives must be identical for all participants. Ask each vendor for a POC plan that encompasses the stated requirements and spells out exactly how they plan to demonstrate their product's ability to meet them. It may take a couple of revisions before a vendor's POC plan is satisfactory to you, and you may have to play a round or two of tug of war, but agreeing on exactly what is to be accomplished in the POC is paramount.

The POC Requirements Document should focus first on the RFI line items that you emphasized in the deep-dive, and then on any other major items of interest. You'll also need to include some stuff that could not be covered in the deep-dive session, such as ingesting and assimilating data from intelligent devices, exchanging data with other databases, and integrating with LDAP. Installing and configuring the vendor's product in real time was likely not included in the deep-dive either, but it should be a mandatory part of the POC even if a prepopulated database is used for some exercises. A prepopulated database will likely be needed since a new database--even if fully populated--will not have adequate historical data for trending and predictive analytics, for example.

A well-rounded POC for DCIM usually takes three to five days, and each vendor should be scheduled onsite during a different week. (Longer-term evaluation periods, such as live trials and extended bake-offs, are outside the scope of this white paper.)

It may be a good idea to start scheduling the POC dates even before the vendors' POC plans are finalized, to allow extra time for reshuffling around their schedules if needed.   Figure 4 shows a general schedule for a 5-day POC. Details will follow each vendor's POC plan.

POC Schedule	Activities	Hours
Day 1	Product Installation and Setup	6
Day 1	Product Demo (Refresher)	2
Day 2	POC Use Cases	8
Day 3	POC Use Cases	8
Day 4	POC Use Cases (Extra day)	8
Day 5	Clean Up and Take Down	4

Figure 4:   Sample POC Schedule for a DCIM Solution

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Evaluating The POC Exercises

You'll need to schedule specific team members to be available for the POC exercises that pertain to their areas of responsibility, adjust the existing scores in each line item of the evaluation guide, and update the comments.   Especially close scrutiny should be applied to items from the POC requirements document and the vendor's POC plan. When the POC process is completed for all vendors, gather the individual scorecards from your team, roll them up and distribute the master copy back to the group leaders.

Selecting A Winner

Now that you have the final scores, arrange a meeting or conference call with your team to form consensus around the DCIM solution that best fits the needs and requirements of all data center groups across the enterprise.   Then you'll be ready to notify the winner and move into the procurement process.