White Paper

The State of Data Center Infrastructure Management in the New Normal

Overview

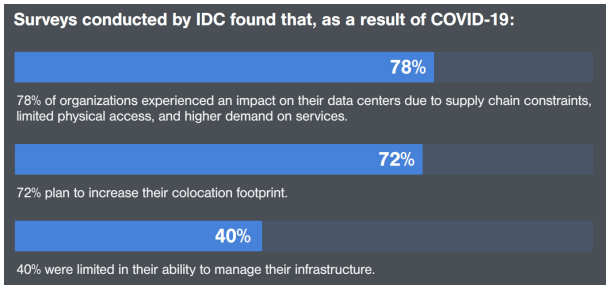
Data center management is constantly changing to keep up with the ever-increasing complexity and distributed nature of data center, edge, and lab infrastructure. Data center professionals must adapt to new trends, tools, and processes to achieve their goals of maintaining uptime, increasing the efficiency of capacity utilization, and improving the productivity of people.

We are in a "new normal" of data center infrastructure management, and it is not just about the COVID-19 pandemic. Yes, the pandemic was a catalyst for many industry changes--specifically the need to manage data centers remotely--but ultimately, it only accelerated trends that already underway.

This document will cover a wide range of important data center infrastructure management issues in three parts. We will take a close look at what specific trends are changing how data centers are managed, how a complete remote management toolkit can turn these challenges into opportunities, and why integrating tools and driving automation is no longer optional for today's data center professionals.

Part 1: The Trends Reshaping Data Center Management

Even before the COVID-19 pandemic, industry trends were pointing towards the need for data centers to be managed remotely. Increasing use of remote infrastructure models such as colocation, edge computing, and retail digitization necessitated the use of tools that enabled data center managers to monitor their power and environments and manage assets from any given location.



Then, the pandemic struck, and data center management changed overnight. According to IDC, 78% of organizations experienced an impact on their data centers due to supply chain constraints, limited physical access, and higher demand for services. 40% reported that they were limited in their ability to manage their infrastructure. Many existing trends rapidly accelerated such as increased colocation to avoid costly new constructions and increased use of third-party managed services for remote deployments.

Top Data Center Management Trends in the New Normal

Data center managers now find themselves in a new normal with unique challenges and opportunities. While many were left scrambling to maintain operations in 2020, now plans and budgets are falling into place as the top data center challenges and priorities become clear.

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Demand for digital services explodes. The pandemic drove all interaction with the outside world online, causing a dramatic spike in the utilization of server compute, storage, and network resources. Google's Hangouts Meet platform saw its daily usage reach 25 times more than typical levels, Verizon reported that online gaming traffic surged by 75% in one week, Zoom saw a 2,000% increase in daily meeting participants, and Akamai saw a 50% increase in internet traffic. Given COVID-19's impact on data centers, operators must find ways to quickly add capacity without experiencing downtime.

Work from home and minimal onsite staff. Social distancing and restrictions on the number of personnel that can be onsite at any time are now commonplace. Uptime Institute reported that 85% of data centers increased remote working and 77% reduced onsite personnel. These changes are here to stay, with 77% of data centers planning to continue remote work for years to come. With physical access to the data centers extremely limited, data center managers are increasingly leveraging intelligent infrastructure and remote management tools to oversee their data centers from anywhere.

More complex and distributed data centers. While on-premises data centers still support the majority of workloads, that piece of the pie is shrinking. Alternative workload deployments look more attractive to organizations that seek flexibility, cost-effectiveness, and increased efficiencies. 70% of data center professionals reported to Service Express that disaster recovery and business continuity are the leading drivers of moving workloads off-premises. Organizations seek to mitigate risk from potentially uncertain global environments and to maintain operations in the face of vulnerabilities caused by COVID-19. Other motivating factors for migrations include lower capital costs, improved security, rapid capacity expansion, and infrastructure consolidation. The distributed nature of modern data center environments means operators must manage the assets, connections, power, and environment across many locations without the ability to go onsite.

Large need for remote planning and collaboration tools. Improving internal processes and collaboration is one of the top priorities for data center managers in 2021. Since data center professionals are unable to go onsite, whether it's because of COVID-19-driven restrictions or because the infrastructure is remote, there is a need for clear and concise visual instructions for smart hands. Work activity must be done accurately the first time to reduce the time spent in the data center, reduce the number of visits, and mitigate a leading cause of downtime: human error. To improve productivity and efficiency, remote data center teams must break down organizational domains and share a single source of truth via common views of remote data center management dashboards and reports that are updated and visible in real-time.

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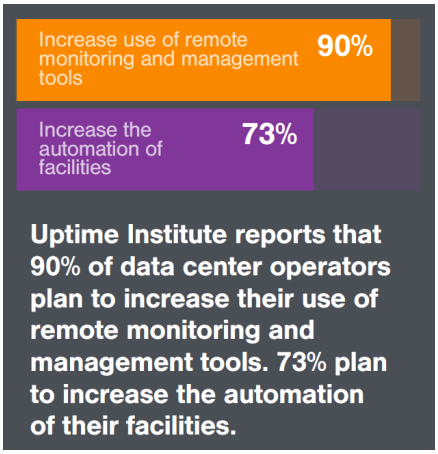
Increased focus on reducing costs and increasing efficiency. Total data center spending decreased in 2020 as economic uncertainty resulted in organizations pausing expansion plans and tightening budgets. While spending in 2021 is increasing, Service Express found that nearly half of all organizations' top priority for the next 12 months is to reduce IT costs and improve efficiencies. For many, this is not an easy task, with nearly three-quarters of respondents reporting that their top challenge relates to budget and cost reductions. Consolidating data center footprints and moving from an on-premises to a hybrid cloud model are the leading initiatives organizations will take to save money. Tools that enable intelligent capacity planning of all space, power, cooling, and connection resources will be increasingly leveraged to improve the efficiency of capacity utilization.

Security remains important. Strengthening security and privacy is the number one priority for data center professionals going into 2021, according to Service Express's survey. Organizations must remotely protect assets and data with tools that can manage and remotely control electronic door locks, watch real-time camera feeds, and provide real-time audit logs to ensure compliance with requirements and regulations.

Continued emphasis on sustainability. Global data center energy consumption is so massive, that if all the data center sites in the world were a country, they would rank as the 5th largest energy consumer. Yet, even with the incredible growth of global data centers in the past decade, actual data center energy consumption only increased by 6% because of the industry's commitment to going green. In the new normal, organizations will continue to pioneer new ways to increase energy efficiency and meet sustainability goals while decreasing operating costs.

A New Way Forward with DCIM Software

Given these trends, one thing becomes obvious: data center teams need tools that allow them to remotely manage their sites. Organizations understand this and are reallocating budgets and finding funds to implement tools like Data Center Infrastructure Management (DCIM) software. Data center professionals understand the additional efficiency and productivity DCIM software provides and are developing comprehensive remote data center management strategies to succeed in 2021 and beyond. Consider the following DCIM trends:



Rapid growth. According to Global Market Insights, the DCIM market is expected to reach $5 billion by 2026, growing at a CAGR of 23%. Data center spending is projected to rebound. Gartner projects that data center spending is projected to reach $200 billion in 2021, a 6.2% increase over 2020 spending. Remote data center management tools will account for a larger percentage than normal as organizations see the necessity.

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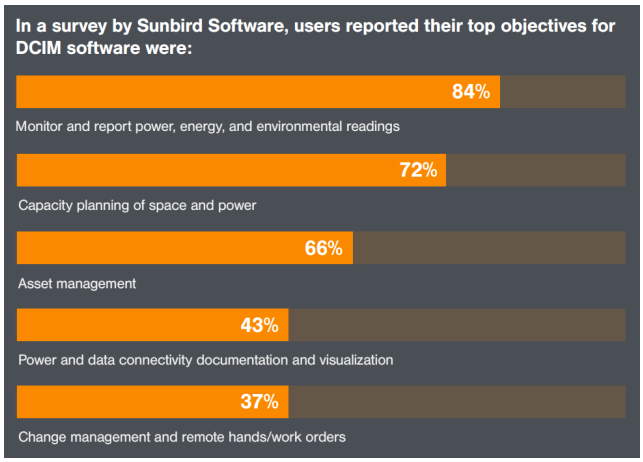
Capacity planning is more important than ever. Intelligent capacity planning is a must-have to keep up with increased demand. According to 451 Research, capacity planning is the number one feature driving DCIM adoption for half of all data center managers.

Remote management tools are no longer optional. Uptime Institute reports that 90% of data center operators plan to increase their use of remote monitoring and management tools. 73% plan to increase the automation of their facilities.

DCIM users have clear top objectives. In a survey by Sunbird Software, users reported that their top objectives for using DCIM software were to monitor and report power, energy, and environmental readings, plan capacity of space and power, and manage assets.



Bringing It All Together

In the new normal, data center teams must maintain uptime, increase efficiency, and improve productivity with minimal personnel onsite and no visibility into what is happening in their environments. They face challenges that have made data center management more difficult than ever. However, the trends show that the industry is pivoting to a remote data center management model in which teams can plan capacity, track assets and connections, visualize sites in 3D, complete tasks without physical access, and collaborate around shared KPIs and dashboards regardless of where they or their sites are.

Part 2: Remote is King

While COVID-19 certainly caused a dramatic shift in how data centers must be managed, the pandemic only accelerated the trends in digital transformation that were already driving data center professionals to manage their data centers remotely.

Based on many sources of survey data as well as our own conversations with hundreds of customers in our global user group program, the top priorities and challenges for data center managers in the new normal have become clear. They need to keep up with significantly increased demand for digital services, manage more complex and distributed infrastructure, increase efficiencies, boost people productivity, and reduce costs—all while keeping onsite staff to a minimum with no visibility into the physical sites.

To successfully navigate these challenges, cutting-edge data center managers have been able to seamlessly transition to a remote management model. In fact, many of them were already there.

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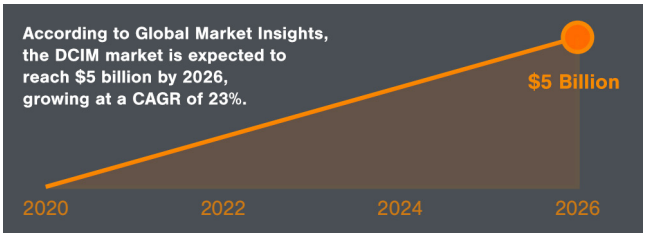
Further, remote management is not just a trend until COVID restrictions relax, but a permanent change for the industry. According to Uptime Institute, 9 in 10 data center operators plan to increase their use of remote monitoring and management tools. Uptime Institute also found that 77% of data centers plan to continue remote work for years to come, long after the brunt of the pandemic has passed.



Organizations are developing comprehensive remote data center management strategies and reallocating budgets and finding funds to deploy a complete remote data center management toolkit. They are racing to be able to efficiently manage the complexity of modern edge, colocation, and retail infrastructure, to be able to provide clear and visual instructions to smart hands to get work done quickly and accurately, and to drive automation, data sharing, and collaboration across all remote teams.

While some are struggling to gain visibility into all their data center sites today, early movers have paved the way for others to find success. Data center and edge site managers with the experience and willingness to adopt technology have told us what tools they rely on to maintain uptime, increase efficiency, and improve productivity no matter where they or their infrastructure is located.

The Remote Data Center Management Toolkit

Modern infrastructure management professionals need to leverage a wide range of technologies spanning hardware, software, meters, sensors, and more, plus a comprehensive integration strategy to pull it all together. The remote data center management toolkit to succeed in the new normal and beyond includes:

Remote power control. Intelligent rack PDUs with outlet control allow you to remotely power on, power off, and power cycle outlets across multiple PDUs.

Remote power monitoring. Intelligent power infrastructure such as rack PDUs with inlet- or outlet-level meters, branch circuit meters, busway meters, inline meters, and SNMP management cards for UPSs enable you to increase uptime, improve capacity planning and utilization existing power capacity, report on Power Usage Effectiveness (PUE), and reduce energy consumption and costs.

Remote environment monitoring. Temperature, humidity, airflow, pressure, water, and vibration sensors provide data that helps ensure the overall health of your sites, mitigate against threats of downtime, and improve efficiency. Sensors can be deployed as plug-and-play devices that connect to intelligent rack PDUs, rack controllers, inline meters, branch circuit monitors, and gateway devices.

Remote cabinet security. RFID and biometric door lock controls for racks and cabinets, cabinet door access audits, remote door lock controls, door contact sensors, and IP cameras are must-haves to protect your assets and data from physical security threats.

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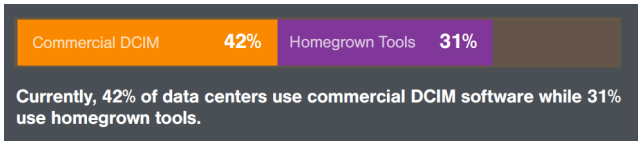
Remote out-of-band console management. KVM-over-IP switches allow you to remotely access and control multiple servers from one keyboard, mouse, and monitor and are used to perform functions like rebooting devices. Serial console servers can connect to "headless" devices like routers, LAN switches, firewalls, PDUs, UPSs, and storage systems and are used to complete tasks like updating firmware.

DCIM Software: The Central Piece of the Remote Management Toolkit

Data Center Infrastructure Management (DCIM) software provides the remote monitoring and remote operations management that is required to complete the toolkit and bridge information across all organizational domains. DCIM software enables data center and edge site managers to centrally manage all their infrastructure resources in a single pane of glass to maintain uptime, improve efficiency of capacity utilization, and increase the productivity of people—all from any location in the world.



Currently, 42% of data centers use commercial DCIM software while 31% use homegrown tools.

In the new normal, leading data center experts are leveraging second-generation DCIM software to:

Track all assets. Maintain an accurate inventory of infrastructure assets and real-time rack elevation views across all data center and edge sites, including equipment in racks like servers, storage, networking equipment, rack PDUs, patch panels and even applications.

Trend temperature and humidity. Real-time data from environment sensors can be collected, retained, and trended over time in easy-to-understand, flexible charts and visual reports. This enables actionable insights such as identifying hot spots, overcooling, or extreme humidity conditions that can be remediated to improve uptime, increase efficiency, and reduce energy costs.

Monitor rack-level power utilization. Live measured readings from rack PDUs, busway tap boxes, and other intelligent infrastructure can be monitored to ensure power capacity is not exceeded and to discover and utilize stranded capacity.

Perform rack-level failover scenarios. Power redundancy can be tracked for each cabinet to ensure power is always available to IT equipment and maintain uptime even if there is a failure on a single power supply or power path.

Perform power path impact analysis. Live data from power meters can be used to model your power path so you can easily understand exactly how potential moves, adds, and changes will affect power utilization and capacity and know that work done in the data center will not cause downtime by overloading circuits.

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Balance three-phase power. Percent imbalance on all three phases can be automatically calculated and you can be alerted to any imbalance in your power path based on thresholds you set to improve uptime and energy efficiency.

Monitor warning and critical events. Thresholds can be configured for polled power and environment sensor data so you can receive automatic email notifications of warning and critical events like overloaded circuits, high or low temperature or humidity, or three-phase deviations.

Manage all spares for break/fix. Inventory and assign all your hard drives, cards, memory modules, power supplies, patch cables, and any other component, even boxes of screws. Know the exact count of your in-stock and in-use parts and get automatic emails when you need to resupply.

Manage parts and bills of material (BOM). When provisioning new equipment for projects in the data center, you can track all the necessary parts and quickly draft a BOM.

Manage all infrastructure projects. Plan, implement, and report on any type of infrastructure project. Know the status, costs, start/end dates, and requirements of space, power, and cooling in one tool.

Bringing It All Together

In the new normal, being unable to physically go on site may be an adjustment for some, but ultimately the objectives remain the same: maintain uptime, increase efficiency of capacity utilization, and improve the productivity of people. Given the complex and distributed nature of modern data center and edge environments, the only way to achieve these objectives is remotely.

This should not be seen as a challenge or obstacle. Rather, the opportunity for improved management of all global sites is enormous for those who deploy second-generation DCIM for remote data center management. Industry experts have spoken, and they report 40% more usage out of facilities and power resources, 50% improved asset tracking efficiency, 25% less time managing assets, locations, and connectivity, and dramatically reduced potential for human error.

Part 3: Digitization and Integration

Digital transformation has changed how nearly all modern businesses operate. According to IDC, 89% of all organizations have either already adopted a digital-first business strategy or plan to do so.

The benefits of digitization include improved operational efficiency, faster time to market, and an increased ability to meet customer expectations. The digitization of products and services will only continue to expand, and organizations must be highly focused on the data center—improving IT operations, service delivery, and asset management—in order to continue to innovate and facilitate growth.

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Data center teams must provide a solid foundation upon which businesses can extract value and insight from their data. However, modern data centers are highly complex and distributed, and data center teams often struggle with unintegrated management platforms that block them from accurately tracking and managing all their physical infrastructure, IT assets, software, and applications. Common pain points of unintegrated systems include:

Disparate data sources that impede analytics and data-driven decision-making.

Information silos that lead to functional blockages that prevent each team from making the most informed decisions.

Security and compliance issues stemming from user permissions needing to be managed separately for each database leading to users having incorrect privileges and increasing the chance of security breaches.

According to PwC, 45% of executives don't think their company has the right technology to implement a digital transformation. Without the proper tools that integrate and drive automation, the data center will fail to support the business and the business will, in turn, fail to compete.

Configuration Management Database (CMDB) integration is one critical example of what leading data center teams are doing to help modern businesses successfully navigate a digital transformation.

What is a Traditional IT CMDB?

Most organizations leverage a CMDB to help them more efficiently deliver IT services and make better business decisions. A traditional IT CMDB stores information on the hardware, software, systems, facilities, and personnel within an organization to help IT professionals understand and manage these assets (typically referred to as Configuration Items or CIs) and their relationships.

Traditional IT CMDBs are used for change management and ticketing, impact analysis, root cause analysis, legal compliance, and incident management. Traditional IT CMDBs have their uses, but they are not the complete solution required by today's businesses.

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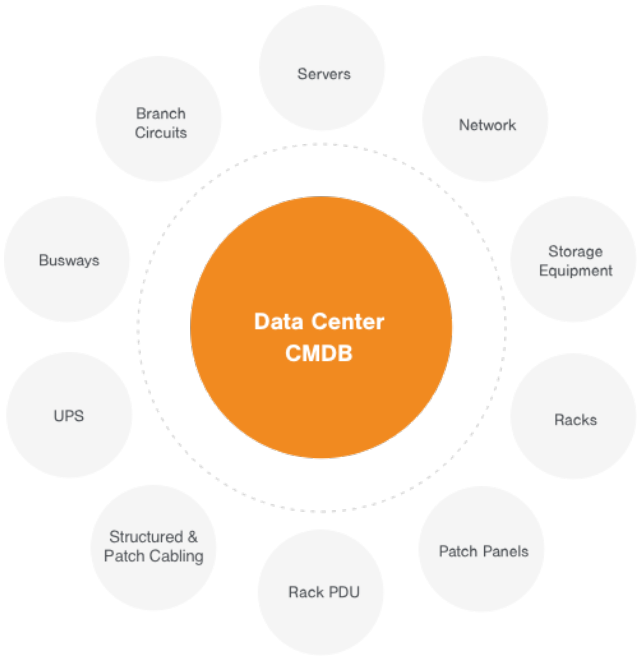
What is a Data Center CMDB?

A Data Center CMDB—part of Data Center Infrastructure Management (DCIM) software—expands upon what is typically tracked in a traditional IT CMDB to include other important information about physical data center infrastructure. A Data Center CMDB maintains an accurate representation of all IT equipment residing in the data center (i.e., servers, network, and storage equipment) and supporting infrastructure assets (i.e., racks, rack PDUs, patch panels, structured cabling, patch cabling, UPSs, busways, and branch circuits) with relationship mapping down to the physical port level and up to the virtual machine and application levels.



A Data Center CMDB provides a holistic view of all data center resources and capacity, and its information can be shared across organizational functions in a single pane of glass. The data tracked in a Data Center CMDB supports a wide range of use cases including asset management, power and environment monitoring, space capacity planning, connectivity and port management, and 2D/3D visualization and modeling.

How Does a Traditional IT CMDB Compare to a Data Center CMDB?

Traditional IT CMDBs allow IT teams to track all corporate IT assets and their configurations as logical objects to align IT with the business throughout the product or service delivery lifecycle. In comparison, Data Center CMDBs track the physical infrastructure relied upon by IT systems and enable agility through real-time capacity and change management to optimize the availability, utilization, and efficiency of the data center infrastructure to meet the demands of IT.

Further, a Data Center CMDB allows you to visually track and manage information in a manner that is simply not possible with a traditional IT CMDB. A Data Center CMDB can be leveraged to provide rich 3D models of the physical infrastructure with detailed asset information such as cabinet and U position, port information, and dimensions, while a traditional IT CMDB is just a database of fields. With a traditional IT CMDB, it is impossible to remotely visualize your devices and their physically connections and relationships.

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Key Benefits of Integrating Traditional IT and Data Center CMDBs

Both traditional IT CMDBs and Data Center CMDBs are important and necessary in the age of digitization, but technologies used in a data center are interdependent and as such they must be integrated to extract the most value from them.

Cutting-edge data center teams have realized the enormous benefit of leveraging and integrating both types of CMDBs to drive automation that saves time and improves data accuracy. With a vendor-agnostic data center management platform that is open and interoperable, integration is fast and easy to accomplish.

A modern Data Center CMDB will work with what you have and come out of the box with open APIs and user-configurable connectors that simplify integration. Through one seamless portal, you can integrate CMDBs and facilitate flow-through operations that enable you to create, read, update, and delete assets or attributes through other systems. For example, if you add a new server in your IT CMDB such as ServiceNow, Cherwell, Jira, or BMC, that server will automatically be created in your Data Center CMDB, and vice versa.

What is Typically Tracked	IT CMDB	Data Center CMDB
Asset identification and description	✓	✓
All corporate IT assets (Configuration Items)	✓	
Configuration Item relationships	✓	
Hardware/software configurations (e.g., server, memory, disk space)	✓	
Asset lifecycle (e.g., in service, out of service)	✓	
Hardware/software that resides in the data center, along with their configuration and asset lifecycle		✓
All physical data center infrastructure (racks, rack PDU, patch panels, structured and patch cabling, UPS, busways, branch circuits) along with their physical relationships/connections		✓
Detailed physical location of data center assets (e.g., site location, cabinet location, and U position)		✓
Rack elevation views with high-fidelity front and back images		✓
Measured power and temperature readings, trending, and alerting		✓
Dimensional, weight, and physical data/power port information of assets		✓
Physical relationships and connectivity for power supply and network interface cards along with capacity of all physical port types		✓
Utilization and capacity of data center infrastructure resources (e.g., power, space, and cooling)		✓
3D visualization of assets and logical connectivity between equipment		✓

By integrating CMDBs and enabling automation, your teams will:

Enable a single source of truth. Integration breaks down information silos and increases the accuracy of all data so users of either system can trust that the additional data they have access to is accurate and up to date.

Improve workflow and productivity. Integration allows information entered in one system to be automatically pushed to the other, saving you time by not having to update multiple systems or cross-check data against other sources.

Enhance collaboration across functional teams. One holistic picture of all available data enables data-driven collaboration and decision-making across all data center, facilities, and IT teams.

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Simplify data center security management. Maintenance of user permissions is simplified to ensure that security policies are adhered to. As some users may only need to access one CMDB, they can still see all the relevant data they need.

Bringing It All Together

According to Forrester, 93% of companies agree that innovative technologies are necessary to reach their digital transformation goals. The state of data center infrastructure management today is one in which automation via integration is required to be successful. Leading data center teams have found that deploying and integrating both traditional IT CMDBs and Data Center CMDBs have allowed them to maximize the value of their data by enabling data-driven collaboration and decision-making to provide the foundation modern businesses need to be agile, innovate, and thrive.

Simplify Modern Data Center Management with 2nd Generation DCIM

The facts are clear that data center infrastructure management today is not the same as it was even one year ago. New trends and obstacles will continue to arise quickly, and data center professionals need to put themselves in the best position to overcome them.

Data center managers need second-generation DCIM software to simplify data center management in the new normal and future-proof their operations. Second-generation DCIM is the must-have solution to ease the pain points of modern data center management and includes:

Zero-configuration analytics. Pre-built dashboards, charts, reports, and visual analytics come out of the box, requiring no tedious configuration effort.

Data-driven collaboration. Shared dashboards and team views break down organizational silos and encourage information sharing.

Automation via integration. A complete set of free APIs and connectors enable automation to save time, improve data accuracy, and simplify data sharing.

Multi-vendor compatibility. Manage all 3rd-party equipment with standards-based plugins and without being locked into specific vendors.

Super-fast deployments. Deployment takes half the time of first-generation tools, requires far fewer resources, and provides fast ROI.

Extreme scalability. Enterprise-class scalability that can handle millions of assets, billions of data points per day, and thousands of users.

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Completeness of capabilities. Depth of functionality covers asset, capacity, change, energy, power, environment, security, connectivity, visualization, and business intelligence and analytics.

Ease of use. Elegant design that requires fewer clicks and mouse movement and is intuitive to use.

Compatibility with what you have. Standard protocols provide broad compatibility with virtually all 3rd-party meters, sensors, and software.

AI and machine learning. Machine learning enables automatic power capacity planning to increase utilization of existing resources.

Call 732.993.4476 or visit SunbirdDCIM.com

Sunbird Software is changing the way data centers are being managed. With a focus on real user scenarios for real customer problems, we help data center operators manage tasks and processes faster and more efficiently than ever before, while saving costs and improving availability. We strive to eliminate the complexity they have been forced to accept from point tools and home grown applications, removing the dependency on emails and spreadsheets to transform the delivery of data center services. Sunbird delivers on this commitment with unexpected simplicity through products that are easy to find, buy, deploy, use, and maintain. Our solutions are rooted in our deep connections with our customers who share best practices and participate in our user groups and product development process.

Based in Piscataway, NJ, Sunbird serves over 1,850 DCIM customers worldwide. For more information, please visit SunbirdDCIM.com.

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WP010 July 2022

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