White Paper

Ensuring a DCOI-Compliant Data Center with DCIM Software

Data Center Infrastructure Management (DCIM) Software Enables You to Quickly Achieve Data Center Optimization Initiative Goals

Overview

Cost-effective strategies for consolidation and optimization have long been challenges for federal data centers. Since 2010, the federal government has provided guidelines and requirements in attempts to reduce data center costs and better leverage new technologies without sacrificing uptime and compromising security. The Data Center Optimization Initiative (DCOI) is the most recent government mandate to focus on optimization and consolidation of federal data centers. As stated in the August 2016 Memorandum for Heads of Executive Departments and Agencies (M-16-19), the DCOI supersedes the Federal Data Center Consolidation Initiative (FDCCI) and fulfills the data center requirements of the Federal Information Technology Acquisition Reform Act (FITARA) of 2014.[1] To provide agencies with more time to ensure compliance, the FITARA Enhancement Act of 2017 extended the DCOI deadline from 2018 to 2020.

Unlike its predecessor, the DCOI restricts the development of new data centers and sets specific optimization and cost-reduction objectives. As a result, the challenges facing federal data center managers are twofold: first, they must optimize their data centers to achieve the goals set by the DCOI; and second, they must achieve DCOI compliance by the 2020 deadline. Data centers that cannot meet the Power Usage Effectiveness (PUE) optimization Key Performance Indicator (KPI) and those that pose a management or security risk due to age are prioritized for closing. A September 2017 report by the United States Government Accountability Office found that 17 of the 22 agencies were not planning to meet OMB's targets by the deadline.[2] Similarly, a February 2018 MeriTalk study found that less than 20 percent of federal IT managers said their agencies were very likely to meet the original deadline to close 25 percent of tiered data centers, and only 13 percent reported they were very likely to close 60 percent of non-tiered data centers.[3]

This white paper provides an overview of the DCOI, including goals and Key Performance Indicators (KPIs) for optimization, and how Data Center Infrastructure Management (DCIM) software can help federal data center managers optimize their data centers to quickly ensure DCOI compliance.

About the DCOI

The DCOI applies to all Chief Financial Officers (CFO) Act agencies. Data centers subject to the DCOI are divided into two groups: tiered data centers and non-tiered data centers. The DCOI defines a data center as any room with at least one server providing services. Rooms with print servers, switches, security devices or other telecommunications equipment are not considered data centers and are not subject to the DCOI. Tiered data centers are those that have a separate physical space for IT infrastructure, a UPS, dedicated cooling, and a backup generator. All other data centers are considered non-tiered data centers for the purposes of the DCOI.

In comparison with the FDCCI, the DCOI initiative has stricter goals and additional rules that were made to reduce data center inventory and maintenance costs. While the previous FDCCI mandate required agencies to conduct data center inventories and report on those facilities that could be closed or consolidated, it did not prevent the building of new data centers. Additionally, the DCOI takes the FDCCI one step further by identifying specific goals that must be achieved.

Goals of the DCOI

Government agencies are required to provide OMB with quarterly updates on progress, a data center inventory, the number of data center closures, and projected cost savings. The OMB will measure DCOI compliance based on the following metrics and performance indicators:

- Optimization: To measure compliance with the DCOI, five optimization metrics have been identified and are defined in the next section.
- Cost Savings and Avoidance: Government-wide annual costs attributable to physical data centers must be reduced by at least 25%.
- Data Center Closures: At least 25% of tiered data centers and 60% of non-tiered data centers must be closed, except for those approved as interagency shared services provider data centers.

1 Memorandum for Heads of Executive Departments and Agencies (M-16-19). 1 August 2016. https://obamawhitehouse.archives.gov/sites/default/files/omb/memoranda/2016/m_16_19_1.pdf Accessed 15 November 2017.
2 Data Center Optimization: Agencies Need to Address Challenges and Improve Progress to Achieve Cost Savings Goal (GAO-17-448). United States Government Accountability Office.
https://www.gao.gov/products/GAO-17-448 Accessed 15 November 2017.
3 "Data Center 2020: Federal Modernization in Focus." Meritalk. 5 February 2018. https://www.meritalk.com/study/data-center-2020/ Accessed 26 February 2018.

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Optimization KPIs

The table below summarizes the optimization metrics. **Note**: Server Utilization & Automated Monitoring applies to non-tiered data centers only.

Table: Government-wide Optimization Targets for Tiered Data Centers

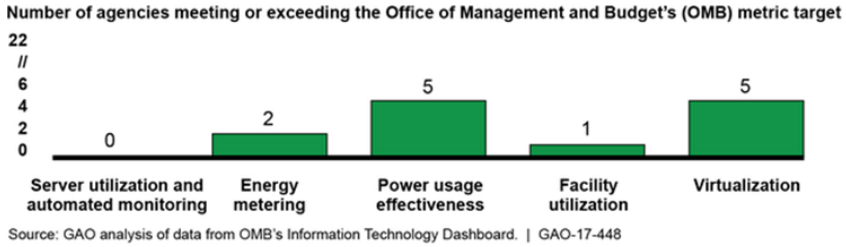
Metric	Description	Calculation	FYE 2018 Target Value
Energy Metering	(%) Percent of total gross floor area (GFA), in an agency's tiered data center inventory, located in tiered data centers that have power metering.	Total GFA of Energy, Metered Data Centers / Total GFA of All Tiered Data Centers	100%
Power Usage Effectiveness (PUE)	(Ratio) Proportion of total data center energy used by IT equipment.	Total Energy Used / Total IT Equipment Energy Used	≤ 1.5 (≤ 1.4 for new data centers)
Virtualization	(Ratio) Ratio of operating systems (OS) to physical servers.	(Total Server Count + Total Virtual OS) / Total Physical Servers	≥ 4
Server Utilization & Automated Monitoring	(%) Percent of time busy (measured as percent of time spent idle), measured directly by continuous, automated monitoring software, discounted by the fraction of data centers fully equipped with automated monitoring.	Average Server Utilization * Percent of, Data Centers Fully Equipped with Automated, Monitoring	≥ 65%
Facility Utilization	(%) Portion of total gross floor area in tiered data centers that is actively utilized for racks that contain IT equipment.	(Total Active Rack Count * 30 Sq Ft)/ Total Gross Floor Area	≥ 80%

Source: "Metric Target Values." Office of the Federal Chief Information Officer. Accessed 15 November 2017. https://policy.cio.gov/metric-target-values/

DCOI Compliance Progress

To date, limited progress has been made on DCOI requirements. A September 2017 report by the United States Government Accountability Office found that 17 of the 22 agencies were not planning to meet OMB's targets by the original deadline of September 30, 2018. The same report found that, of the 22 agencies, only five agencies or less reported that they met or exceeded each of the targets. A February 2018 study also found that less than 20% of agencies expected that they would have met the original deadline.

The IT Dashboard for DCOI Optimization Metrics tells a similar story. While the top performers for each OMB metric are likely to have met or exceeded their targets, the overall numbers are tracking behind the targets. For example, as of February 2018, the percentage achieved for tiered data center server utilization and automated monitoring was 1.6%, with a target of 65%.[4]



Source: GAO analysis of data from OMB's Information Technology Dashboard. | GAO-17-448

How DCIM Helps Federal Data Centers Achieve DCOI Compliance

The DCOI requires agencies to replace manual methods of collecting and reporting on data with automated DCIM tools for greater accuracy and efficiency. However, DCIM software is not just a DCOI requirement; it is also a critical enabling technology for federal data centers to ensure compliance. Using DCIM software can help you collect, correlate, and analyze the data center business intelligence you need to achieve the targets set forth by DCOI.

Addressing each element of your data center management can help you reduce the complexity of optimization and consolidation, thereby reducing costs, enabling the closure of unneeded data centers, and ultimately ensuring DCOI compliance. Specifically, DCIM software can address the following data center management challenges to help you rapidly ramp up your optimization efforts:

4 IT Dashboard for DCOI Optimization Metrics. https://www.itdashboard.gov/drupal/dcoi-optimization Accessed 26 February 2018.

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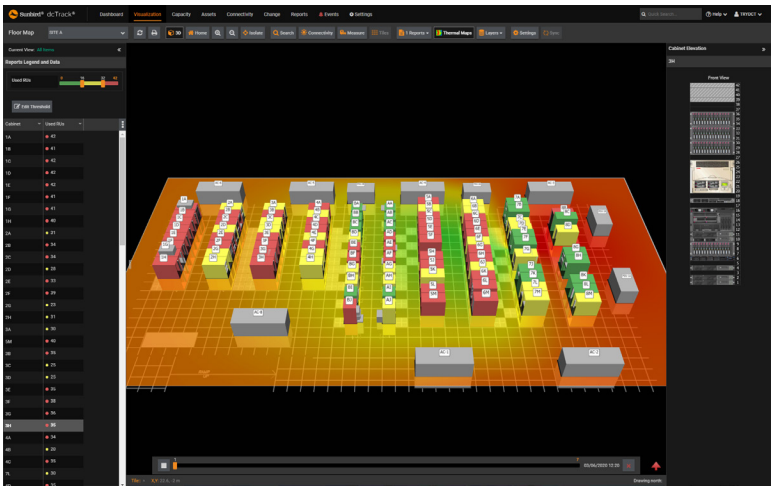
Maintaining an Accurate Asset Inventory

Knowing what you have, where it is located, and how it is connected are critical for both server utilization and facility utilization compliance. Federal data centers not only need to provide comprehensive reports on asset inventories, but they also need to ensure that what they have is being utilized. This goes for both your virtual assets as well as your physical ones.

3D floor map visualizations with the ability to drill down to the cabinet and device levels are available in DCIM software to help you get a sense for where an asset is located in your data center. Tracking information such as asset name, serial number, make, model, and asset age can help you uniquely identify and maintain your equipment so you know when to start your next refresh cycle. Tracking metrics like asset count by application, hosts per application, and asset cost by location can help you understand which applications require the most resources and how you can ensure high server utilization (i.e., availability and uptime) while decreasing costs.

Utilizing Floor Space Effectively

Capacity is one of the most challenging data center operational constraints, and it's even more so under the guidelines set forth in the DCOI. The facility utilization metric is a measure of how well the floor space is utilized and thus is directly related to space capacity.



A robust DCIM solution will provide multiple, integrated ways to plan and utilize capacity effectively. Color-coded 3D floor map reports based on cabinet weight, percentage full, and other capacity metrics can help you identify the best cabinets to safely install equipment. Tracking the fragmentation of your rack units can help you better determine how many contiguous RUs of various sizes you have available. The ability to reserve space and the associated power and data connections is invaluable to accurate capacity planning.

Additionally, what-if analysis can help you understand the future impact of not only additions but also decommissions on the capacity of your data center on a per-project basis. This type of analysis allows you to rapidly identify stranded space capacity and determine if you need to deploy additional resources to meet demand or if you can defer such capital expenditures to a later date.

Driving Power and Energy Efficiencies

PUE and energy metering are two of the most important OMB metrics, understandably so given that data centers need to be equipped with energy meters to track resource usage. Additionally, efficient energy management can dramatically reduce your data center costs.

Installation of energy meters plus the collection of power data via polling or other automated monitoring methods via DCIM software helps ensure that power and energy usage can be monitored closely in your data center to meet these goals. Tracking actual and budgeted power and identifying stranded capacity via what-if analysis can allow you to better leverage the power capacity available to you. A cabinet failover simulation report can help you ensure that you have enough power to maintain uptime and availability in a failover situation. Complete power chain management means that you can budget power at every hop the same way an electrical engineer would, but without having to do the complex calculations yourself.

Note: Proper management of airflow and cooling is directly related to efficiency and ensuring the longevity of your equipment. While overcooling can mean a waste of both energy and money, inadequate cooling can result in unsafe operating conditions. Data from environmental sensors can be aggregated and analyzed in cooling charts and thermal or pressure time-lapse videos to help you ensure that you are operating within ASHRAE or manufacturer-recommended standards. These capabilities also can help you identify hotspot formations and take action before they become problems. Charts displaying the temperature and humidity with Delta T or H respectively can help you assess temperature differentials and make the appropriate changes.

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Ensuring Change Requests Are Made Correctly

Effective change management is critical to meeting the facility utilization target and the overall data center consolidation and closure goals. To make the most efficient use of your floor space and to respond with agility to demand for resources, changes need to be made accurately and quickly.

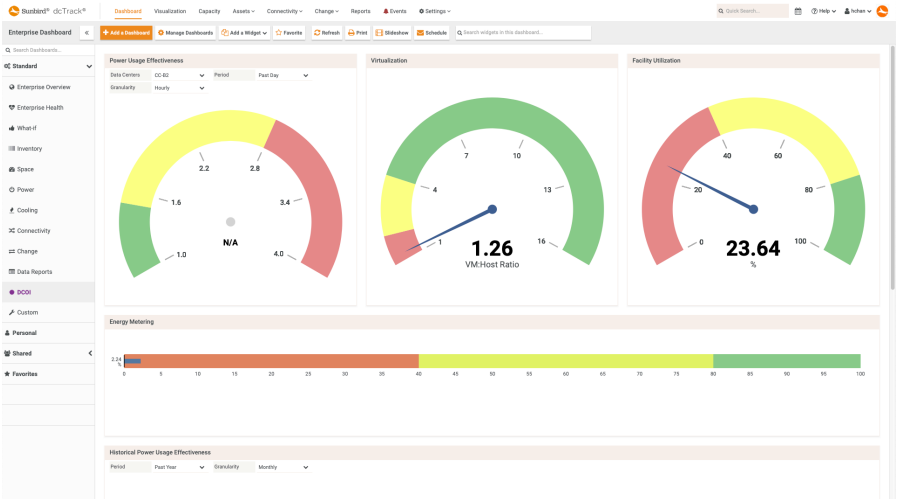
You can use DCIM software to manage your change requests and to create and populate work orders automatically with the required information to reduce the chance of human error. Add multiple change requests to a single work order to reduce trips to the data center, and physically print out and attach them to the specific hardware to reduce the risk of incorrect installations. 3D floor maps, cabinet elevation views, and device views with data and power port connections can help you identify the correct connections so you (or your technicians) can properly install the hardware. Work order histories can help you audit the work being done. Time to completion can be tracked as measure of the efficiency of your change management and can help you determine if your changes are being made within the specified timeframe. Integration with an external ticketing system can ensure that information and changes will be accurate no matter where you are tracking the ticket.

Conclusion

The deadline for DCOI compliance is fast approaching, and while some progress has been made, there is still much to be done in a short amount of time. The use of DCIM software and tools can facilitate your optimization efforts through the collection, management, and analysis of data center data. The resulting information can reduce costs while increasing energy efficiency and promoting better strategic decisions to comply with the regulations of the DCOI.

A comprehensive DCIM solution will provide the real-time data center business intelligence and visual analytics needed to ensure DCOI compliance. Sunbird's DCIM software simplifies and accelerates compliance efforts with its executive DCOI dashboard. Preloaded with five widgets that track only the DCOI optimization KPIs for focused data analysis at a glance, the DCOI dashboard works without additional user configuration and leverages real-time, accurate data that is collected and stored by our DCIM software.

To learn more about how Sunbird can help you drive DCOI compliance efforts, visit www.sunbirddcim.com.



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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