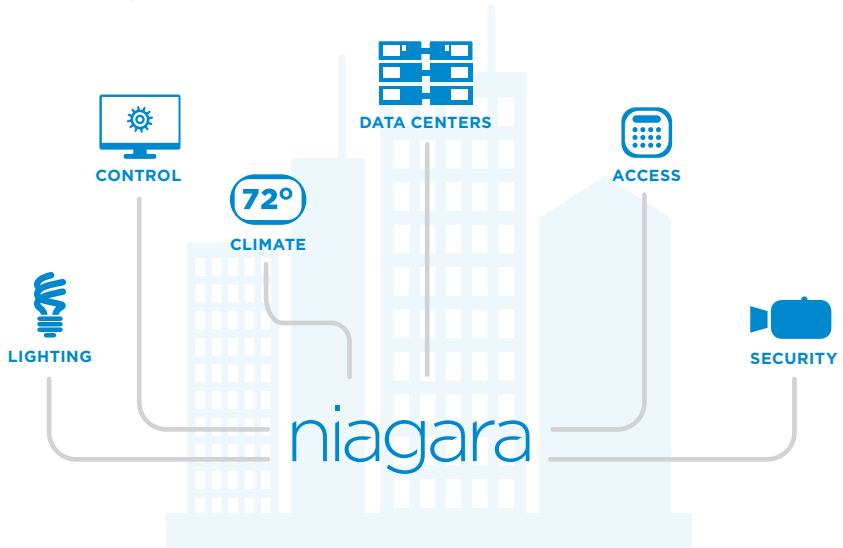

TRIDIUM
FROM INSIGHT TO EFFICIENCY:
Comprehensive Data Center
Energy Management Solutions

Since 1995, facility managers and BAS professionals have relied on the Niagara Framework® to provide full convergence of their building automation systems. Now, we're taking the Niagara platform even further into data centers to provide building-wide connectivity and help improve operational efficiencies.

According to a recent *New York Times* investigation, data centers can waste more than 90 percent of the energy they pull off the grid.[1] So it's no surprise that energy management within data centers has become a high priority for companies keen on building a long-term competitive advantage. Rapid changes in technology and growing demand have resulted in huge challenges—and new opportunities—for data centers and the energy managers and operators responsible for keeping them efficient.

Tridium offers two data center infrastructure management (DCIM) solutions aimed specifically at energy management at the enterprise and site levels. Both provide a single point of access into all data center assets, giving users the real-time visibility needed to improve power usage effectiveness (PUE) on the local/site and enterprise levels. In addition to helping to optimize efficiencies, DCIM tools also strike a balance between efficiency and availability. They give you visibility into issues before they reach a critical level, allowing you to mitigate risk and avoid the high cost associated with downtime—estimated at upwards of $7K per minute on average.[2]

And, because Niagara is an open system, you are never locked in to a single contractor or vendor when components need to be modified. With Niagara, you can harness the power of choice for a flexible, fully customized DCIM solution.



[1] "Power, Pollution and the Internet," *New York Times*, September 2012.
[2] 2013 Cost of Data Center Downtime Study, Ponemon Institute.

TRIDIUM'S ENTERPRISE DCIM SOLUTION

A single point of access for managing mission-critical hardware across your enterprise

Our enterprise solution helps your clients achieve real-time PUE on the enterprise level

With the Tridium enterprise solution, DCIM is easier than ever. This innovative software provides visibility into environmentals, energy consumption and cooling to improve PUE. Its interactive, highly visual interface delivers real-time, holistic information so users can make informed decisions and proactively manage moves, adds and changes.

With SNMP, MODBUS®, BACnet and LonWorks® capability, our enterprise solution enables communication in real time with a variety of equipment from many manufacturers. And, users can access it remotely through a Web-based interface and receive immediate notifications when an alarm condition is triggered. The end result? Better capacity planning to reduce risk of failure, better processes and workflows, better productivity and better cost savings.

Our enterprise solution delivers your entire operation, at your fingertips

REAL-TIME MONITORING

Few players in the industry capture and present data as quickly. The Tridium enterprise solution ensures users are aware of critical issues by activating alerts immediately. With a single mouse click, the details and exact location of the issue are determined so actions can be taken to address the problem. Historical data also allows users to analyze trends to better manage data center resources.

CAPACITY PLANNING

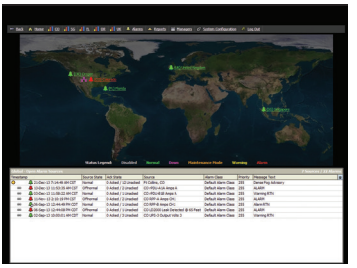
Every data center manager faces unique growth and expansion challenges. Whether it's power, cooling or physical space issues, our enterprise solution gives users the ability to visualize and simulate the requirements for a data center expansion before actually moving a single cabinet or device.

AUTOMATED CONTROL

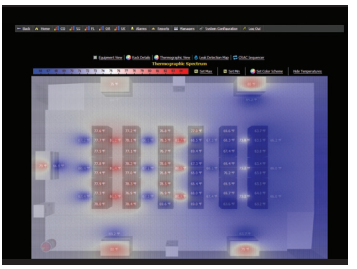
With the ability to address multiple protocols, our enterprise solution connects facility infrastructure equipment like computer room air conditioning (CRAC) units with environmental sensors to automatically respond to data center conditions. For example, multiple CRAC units linked with temperature sensors strategically placed in the data center can be programmed to adjust output when temperature readings go above or below a programmed threshold.

ASSET MANAGEMENT

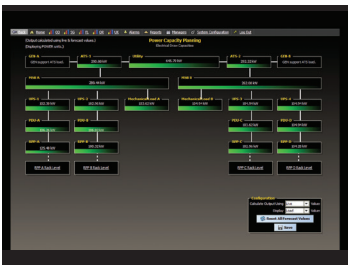
Our enterprise solution allows equipment lists and device specifications to be tracked to the exact site in the data center. And, with its Rack Viewer, users can see the specific configuration of each rack and evaluate performance metrics against manufacturers' suggested values. Drag-and-drop functionality makes assigning assets in the cabinet simple, and users can quickly calculate the impact new equipment has on power and cooling requirements.



Global View
Shows the status of facilities around the world.



Thermographic View
Displays floor plans with color-coded temperature values to highlight hot spots.



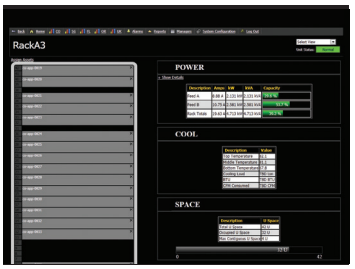
Capacity Planning
Allows assumptive loads and creates simulated views of the effects.

Dashboard View
Displays the top level of a facility. Includes alarm sources, facility layout, company branding, weather conditions and key performance indicators.

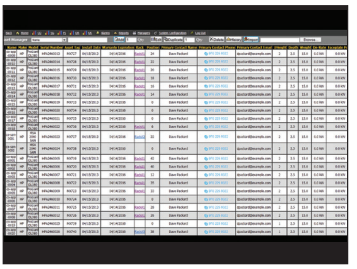
Floor Plan View
Depicts important rack details from a graphical top-level view. Information on available U space, kW and temperature is one click away.

Single Device View
Represents each device with six different status colors for at-a-glance monitoring.

Equipment Comparison
Compares information regarding capacity, load balancing and efficiencies across multiple pieces of similar equipment.



Rack-Level Graphics
Displays critical power, cooling and space data at the rack level. Asset drag-and-drop functionality makes placing assets in the rack simple. Users can immediately calculate how additions to each individual rack impact power and cooling requirements.



Asset Database
Allows quick and easy import of each individual asset for users who already track their assets. Itemized assets are added to the database and assigned to the rack and U space where they are installed.

Tridium's Enterprise Solution Integration Team

Customer satisfaction is our number one priority here at Tridium. For every enterprise solution implementation, we assign a lead project manager and a dedicated team of programmers to manage the project from initial scoping through implementation and support. This allows our team to cultivate relationships and gather a clear understanding of our client's goals and priorities throughout the build process.

Our proven implementation plan starts with a thorough site-walk to uncover all critical DCIM requirements and ends with a detailed checklist of tested functionality. Factory installation services are customized per system and may include the following deliverables:

- On-site consulting, recommendations and general topology review
- Wiring review with an electrician of customer's choice
- Communication verification, termination and troubleshooting
- Installation and setup of all Tridium DCIM provided equipment and software
- Possible installation of third-party equipment purchased through Tridium DCIM
- System quality review
- Integration with customer's email, SNMP, network and other information systems

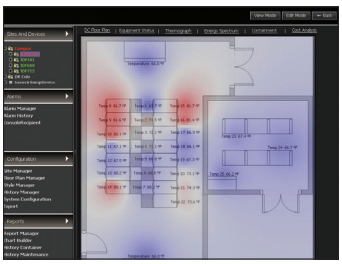
TRIDIUM SITE DCIM SOLUTIONS

Manage IT and white space with a single point of integration

Our site solutions offer vendor-neutral options for integrating and managing mission-critical equipment on the local/site level

Our family of site solutions is designed primarily to give visualization to rack-level data and white space. Shipped preinstalled on a server, the solution can be set up and configured by users or by a professional installer and is capable of being 100 percent user maintained. The site solution uses an SNMP autodiscovery tool to simplify configuration, while template devices let you easily add equipment to the system.

Our site solution delivers:

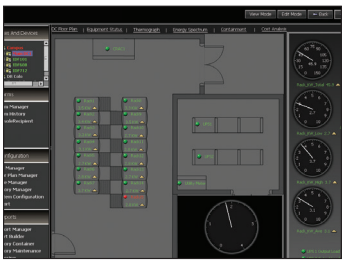


Aggregated Views of Data
Display one view of all monitored equipment with a combination of preconfigured, user-defined graphics to create a holistic view of enterprises and highlight areas to improve efficiency.

Math Functions and Collections
Generate live views such as highs, lows, averages, costs, usages, etc., and associate them with dashboards and other views.

Alarm Notification
User-defined thresholds provide quick alarm notification with three escalation levels. Recognize problems before they become catastrophic.

Single Access Point for Integration
Our site solution communicates via SNMP, BACnet and the oBIX API for seamless integration with larger management systems.



Reporting and Histories
Build and generate unique reports (e.g., customer monthly power usage, high/low/average temperatures, monthly capacities, monthly PUE/DCIE). Visually display data in various chart types for easy interpretation. Save time by automatically generating the reports.

Tridium's Site Solution Models

SITE AGGREGATOR (SITE - A)

Our Site Aggregator connects to GNET via 48 aggregation ports to collect critical data from Tridium products. Site Aggregator provides visibility to data from Tridium power strips in a centralized location. It prevents users from having to set up IP addresses on the production network and saves space on costly network switches. Site Aggregator communicates via SNMP and supports up to 1,000 devices.

SITE AGGREGATOR SERVER (SITE - A-S)

Our Site Aggregator Server includes the full-feature set of the site DCIM solution product line. It can be used with third-party equipment, has 48 aggregation ports for direct connection and offers full customization capabilities.

SITE SERVER (SITE - S)

Our Site Server gathers data from Tridium products as well as third-party equipment. It also allows users to fully customize graphics and collections. In addition, Site Server comes with the ability to derive values from monitored points to create meaningful views of data.

SITE VIRTUAL MACHINE (SITE - VM)

Our Site Virtual Machine is a virtual interface with the same features as our Site Server. Along with the current selection of site DCIM solution appliance versions, users now have the option to deploy Site Virtual Machine in their existing virtual environment.

SITE ENVIRONMENTAL (SITE - E)

Site Environmental allows users to rapidly deploy a complete environmental monitoring network solution in just hours. Site Environmental combines high-end data center management software and fully integrated environmental sensors to alert managers when heat or humidity levels threaten sensitive data center equipment. The bundled solution can be fitted with wireless or wired sensors; each preprogrammed sensor reports temperature and/or humidity readings through the Web-accessible graphical user interface.

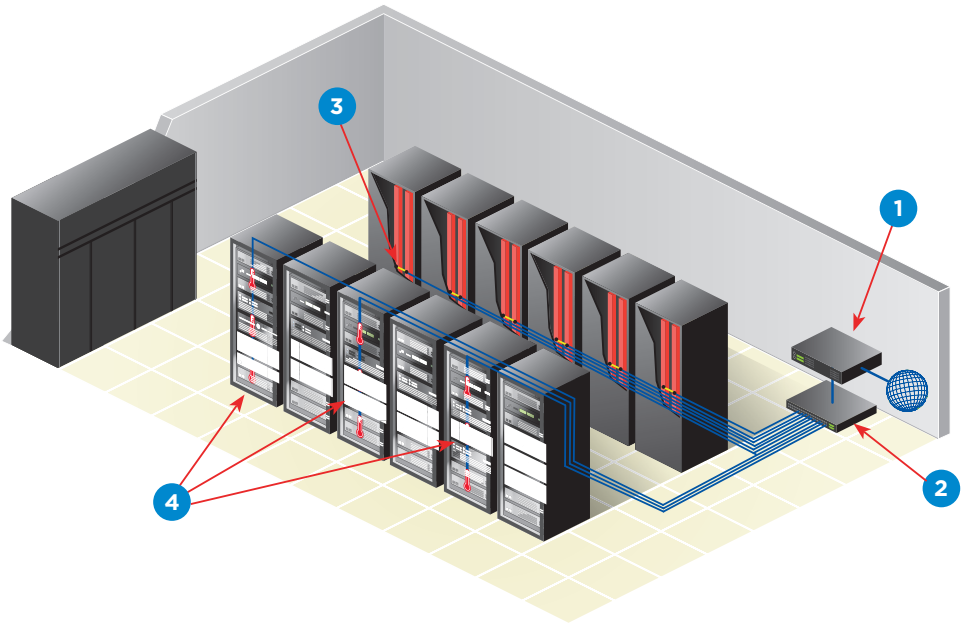
Site Aggregator

Site Server

Site Solution Features and Benefits

Features and Benefits	Site - A	Site - A-S	Site - S Site - VM	Site - E
Support for all Tridium hardware	x	x	x	upgrade
Support for all third-party power strips		x	x	upgrade
Support for all third-party SNMP devices		x	x	upgrade
48 aggregation ports for GNET connections	x	x		
Bundled with environmental hardware				x
Auto configuration of IP address for connected equipment (DHCP server)	x	x		
SNMP and BACnet output of all collected data	x	x	x	x
Support for up to 1,000 devices and 15,000 data points	x	x	x	x
Tridium equipment global firmware updates	x	x	x	x
Alarm, trend, report on all collected data	x	x	x	x
User-defined graphical views		x	x	x
User-defined collection objects for associations of data		x	x	x
HTTP pass-through of all GNET devices	x	x		
Appliance form factor	x	x	x	x
Virtual machine option			x	

Site DCIM Solution Application Diagram



1. **Site Aggregator**: Collects data from specified equipment, then stores, aggregates, reports and displays the data on a secure Internet connection for multiple-user remote access. Captures data from up to 48 unique Ethernet connections. Allows users to create an independent network to collect intelligent power distribution unit (PDU) and environmental sensor data without connecting to the data center network.

2. **Concentrator**: Combines up to 48 unique Ethernet lines to deliver a single data line to the Site Aggregator. By utilizing multiple concentrators, users can target thousands of unique points to create a sophisticated monitoring network for large data centers.

3. **Intelligent PDUs**: Supply power to critical data center equipment and send performance metrics and data captured from environmental sensors to our DCIM solution for collection.

4. **Temperature/Humidity/Dewpoint Sensors (GBB15/GTH3D)**: Measure critical environmental elements and send data through intelligent PDU ports. The Tridium sensors shown can daisy-chain similar units to create a sensor network.

Product Comparison

	Enterprise	Site
Capacity		
Number of Points	unlimited	up to 15,000
Scalability	enterprise	multidevice
Communication		
SNMP	x	x
BACnet	x	with converter
MODBUS®	x	with converter
LonWorks®	x	with converter
Hardwired I/O	x	with converter
oBIX API	x	x
Design & Configuration		
System Configuration	turnkey	user capable
Vendor Neutral	x	x
Consulting Services	x	additional
Professional Installation	x	additional
Support Contract	x	additional
Custom-Built Features	x	n/a
Features		
Chart Builder	x	x
Notification & Alarms	x	x
Report Manager	x	x
Energy Cost Analysis	x	capable
Power One Line	x	capable
PUE/DCIE	x	capable
Unique Floor Plans & Views	x	capable
Key Performance Indicators	x	capable
Power Capacity Planning	x	capable
Asset Management	x	capable
Integration		
Raised Floor/White Space	x	x
Electrical/Mechanical Rooms	x	capable
Fire Suppression Systems	x	capable
Building Management Systems	x	capable
Network Management Systems	x	capable
Security Systems	x	capable
Other Custom Systems	x	capable

With our enterprise and site DCIM solutions, users gain the visibility they need to identify problems within the data center assets and make the necessary changes with one single access point. The end result? More energy efficiency, more productivity, more cost savings and more confidence when planning for future growth.

TRIDIUM

connecting minds and machines™

For more than 15 years, Tridium has led the world in business application frameworks—advancing truly open environments that harness the power of the Internet of Things.

Our innovations have fundamentally changed the way devices and systems connect to people—and the ways people can control and optimize those machines.

Our products allow diverse monitoring, control and automation systems to communicate and collaborate like never before. From buildings and data centers to manufacturing systems and smart cities, Tridium is changing the rules for automation technology.

We are committed to creating smarter, safer and more efficient enterprises and communities—bringing intelligence and connectivity to the network edge and back.

TRIDIUM **804.747.4771** Corporate HQ / **877.305.1745** Customer Support

2015-0016