

Data Center Management Buyer's Guide

9 Questions to ask when implementing a real-time monitoring system for data center optimization



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WHY IMPLEMENT REAL-TIME MONITORING FOR THE DATA CENTER?

For years there has been an overall lack of interest and attention paid to monitoring the underlying facilities portions of the data center (e.g. power, cooling and other infrastructure equipment). These complex systems within a data center have historically simply been treated as a 'necessary evil'.

Whereas IT systems are wholly dependent on supporting facilities equipment for power and cooling supply, this infrastructure itself has been perceived as having little innovation possible and relatively mature, so therefore not usually targeted as a part of major IT upgrades or cost-cutting initiatives.

All of that is changing.

As the costs associated with supplying energy to IT have risen dramatically during the last few years, and the associated capacity constraints have also grown, the 'new-cost economics' associated with running data centers in a large enterprise are forcing the re-evaluation of role of infrastructure in lowering data center costs.

As such, many vendors that provide data center solutions are beginning to share a common mantra regarding "real time monitoring" in order for operators to get smarter about their energy consumption and associated capacity constraints, as well as implement corresponding optimizations and smarter automations.

Unfortunately for end-user customers, there are as many unique approaches and solutions for the problem of real-time monitoring as there are providers. This diversity can make the process of selecting and deploying a solution difficult and risky. Despite careful project discussions, and countless hours involved by all the right players, the resulting technology often times fails to meet the customer's original requirements.

THE 9 HARD QUESTIONS TO ASK BEFORE IMPLEMENTING A DATA CENTER MONITORING SOFTWARE PACKAGE

Given the state of the industry for real-time monitoring, it makes sense for any company considering the wide-scale deployment of real-time monitoring as a strategic differentiator and/or cost controlling mechanism, to pose a common set of requirements to each vendor that they are considering.

It cannot be stressed enough that during these solution discussions, the customer should be prepared to offer highly granular, well-articulated requirements to each vendor in consideration.

Towards the goal of creating a process where different monitoring approaches can be easily and effectively compared, it ultimately comes down to the way in which the problem is articulated. The question(s) to the vendors must reflect the desired capabilities with granular detail.

Key questions should be formulated in each of the following areas:

1) IS THE SYSTEM DISTRIBUTED AND SCALABLE FOR MULTI-SITE MONITORING?

The architecture of the solution must be able to accommodate any number of points located across any number of sites. This may range from a dozen devices in one location to ten thousand devices across the enterprise. The solution should be able to scale collection resources accordingly, and offer a single repository of all collected metrics from the entire enterprise. For true scalability, collection engines must be co-resident to the devices that will be monitored without the need to re-configure firewalls. Each collection engine must be fully autonomous and be able to perform the collection function across a specified number of devices and points. These collection engines must be able to transport the collected metric information across the Internet as needed to allow near real-time metrics to be maintained within a single aggregation point.

2) OFFER UNIVERSAL DEVICE COVERAGE & VENDOR NEUTRALITY?

The goal of monitoring is to provide visibility into the performance characteristics of a wide range of devices from many different vendors. Each target device vendor has many different choices of technologies available to enable the reporting of their unique metrics and data points. These include Serial, Mod-Bus, SNMP and BACnet to name a few of the more common. The selected solution should be able to easily communicate with ANY device using any protocol, and without requiring any professional service style programming, allow every device to be treated consistently from a monitoring perspective. The monitoring solution vendor should be able to provide a list of the equipment already profiled, including HVAC and Power distribution gear. These devices should extend from the Generators located in the yard, all the way to the CRACs, PDUs and rack-based metering located within the data center.

3) OFFER COMPREHENSIVE ALARM MANAGEMENT AND REDUCTION?

The chosen solution must be able to maintain and alarm on thresholds for any metric point being monitored. These points may be discrete points or may be complex correlations of multiple points which are treated as a single condition. Alarms must be configurable by the user, communicated via standard Email, SMS and SNMP-Trap mechanisms, and have escalation workflow built into the solution.

4) PROVIDE DATA TRANSFORMATION & NORMALIZATION?

Data must be able to be normalized in real time “on the fly”. As each device vendor makes an autonomous and independent choice when externally reporting telemetry data, a wide range of data typing and measurement unit must be aggregated. The most common (and easily understood) requirement is the need to translate Temperatures, Voltages and Currents, but may include other English and

Metric conversions such as Gallons and Liters. Any number of points and metrics should be able to be transformed in real-time as they are being stored, to assure that the repository data is formatted in a fashion to allow business analytics across the entire repository of performance data. For example, programmatically comparing power consumption requires that all power readings be stored with the same unit of measure.

5) OPEN STANDARD ACCESS TO DATA?

Within the aggregation layer, the chosen solution should offer the user the ability to gain access to the repository for any type of external business analytics. The system must be able to publish external schema and interfaces with technologies such as ODBC/JDBC and other Web compatible interfaces.

6) FLEXIBLE REPORTING & MANAGEMENT OF KEY PERFORMANCE INDICATORS (KPI)?

There are literally hundreds of IT related KPIs which can be defined in a modern IT structure. Everything from temperature differential at the racks (i.e. Delta T), to percentage of available redundant cooling capacity, all the way to The Green Grid's PUE (and beyond!). In general, each IT operations team determines their own unique KPIs and looks for ways of measuring those KPIs on a regular basis. Any deployed real time monitoring solution should be capable of creating an infinite number of KPIs, each of which can be treated as a standard metric within the data center or between data centers. The provided monitoring solution should allow these macro representations of any set of discrete points using any type of mathematical relationships. These KPI's (i.e. virtual points) should be stored for trending and time synchronized as if they were physically measured data points.

7) COMPLETELY USER EXTENSIBLE?

Device coverage, reports, and dashboards must all be extensible and maintainable by the trained user. Any real time solution being considered for enterprise-wide

deployment must be able to be maintained over the long haul by the customer themselves. The ability to add or change devices from any device vendor must be accomplished with easy to access setup screens. There must be little to no programming involved as new devices are introduced. Additionally, the representation of the point data from each device must be customizable by the user and new reporting and dashboards must be definable without vendor intervention. The chosen vendor must be available to support these extensions, but there must be no requirement by the vendor for the vendor to do so.

8) IS THE SYSTEM PRODUCTION SOFTWARE, OR A PROFESSIONAL SERVICE PROJECT IN DISGUISE?

There is a lot of confusion created in the vendor ranks between off-the-shelf software functionality versus professional services style custom programming efforts. Words like ‘Custom Integration’ and delivery times quoted in months tend to indicate that the actual functionality is not available from the vendor’s software, and instead will be created for the customer on a project-by-project basis. Monitoring solution vendors should be challenged to be very articulate about the manner in which features will be delivered. Ancillary questions regarding delivery and support are key reference points, and some insight into this criteria may be garnered by requesting existing customer reference sites that are running the same technology being proposed. Each of the major features should be treated individually to ascertain if the capability is already in existence or will be created uniquely for the specific customer.

9) BUILT WITH ENTERPRISE-CLASS SECURITY AND ENCRYPTION?

Although not widely discussed, any data that travels throughout an enterprise, and allow representation of IT operations to be viewed requires a solid security foundation. Vendors must be able to provide Internet and firewall-friendly technology that can traverse the LAN/WAN in real-time without hindrance, and without diminishing the desired monitoring results. All payload information must be able to have standard DES and MD5 (or equivalent) encryptions as well. The

selected vendor must be able to clearly define how data is being secured while in transit, as well as once aggregated and available for business analytics. User access credentials should be clearly defined, and role-based authentication (RBA) is a MUST.

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