GEIST DCIM

“Real-Time” Monitoring:
Understanding the Commonly (Mis)Used Phrase

White Paper

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Executive Summary

Matt Lane, Geist DCIM President, discusses real-time monitoring and how monitoring critical devices in the data center is not always delivered as real-time. Once monitoring options are understood, a decision can be made as to what type of monitoring is best for the data center. Is real-time monitoring and management really necessary or is it just as beneficial to have near-time or extended interval monitoring options? Matt answers this question by explaining the difference between the three monitoring types and how each can enhance or be detrimental to the data center.

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A key component of today’s Data Center Infrastructure Management (DCIM) systems is gathering and analyzing live data associated with the data center. This can represent thousands of points of information such as temperature, power, capacity or status of any number of devices, meters or sensors throughout the data center. The collected DCIM information can easily venture into the “big data” realm with not only collection of information, but also storage of millions of samples of historical values.

As an industry term, “DCIM” has been convoluted over the years with multiple vendors using the same term to define significantly different feature sets. While DCIM is taking a more defined shape, the term real-time, in regards to data collection, is in danger of falling into that same confusing realm for an end user.

“DCIM” has been convoluted over the years with multiple vendors using the same term to define significantly different feature sets. The term real-time, in regards to data collection, is in danger of falling into that same confusing realm for an end user.

Our team spoke with an end user who explained that their DCIM provider offered real-time information as one sample each day. There were hundreds of thousands of data points and the software could only accommodate a single poll of each data point every day. Naturally, that end user was disappointed and discouraged as their expectations of real-time data were far from what the vendor actually produced.

Real-Time	Near-Time	Extended Interval
Refresh cycle of seconds	More than a minute but less than one hour	Less frequently than once per hour

Another term beginning to trend across the industry is near-time, which is a more accurate description of what most DCIM systems provide. Another popular term, with a separate meaning, is extended interval. At Geist, we have defined and developed these three terms in the following way:

- **Real-Time:** a continuous sampling of data sets with a refresh cycle of *seconds*
- **Near-Time:** a sampling of data sets separated by *more than a minute but less than one hour*
- **Extended Interval:** any sampling of data that is delivered *less frequently than once per hour*

These three rates of refreshed information have their own distinct use cases, along with pros and cons for each. There is not a one-size-fits-all approach to collecting live data. The user’s need is the key driver to determine what data needs to be collected and at what rate.

The Benefits of Real-Time Data

A real-life case is the best means to illustrate the benefits of real-time data. Prior to installing a DCIM system, a colocation provider had been manually logging their tenants' power usage in extended intervals. Approximately four times per day physical readings were retrieved, recorded in a spreadsheet and evaluated monthly to ensure that the tenants were all staying within their power SLA's.

After deployment of a non-Geist DCIM system, data was captured on a real-time basis and stored for historical review. At the end of the first month, the reports derived from their real-time system were eye-opening. The original extended interval logging had gaps large enough to reveal significant differences in the data reported the prior month against the data reported using the new system. This led to a realization that the colocation provider had several customers over-utilizing their prescribed capacities for power. As a result, they were able to renegotiate their service agreements and recoup the cost of the DCIM implementation in a matter of months.

Who says DCIM does not have a tangible ROI?

Beyond this short illustration, real-time data collection has many benefits:

- **Precise Warnings and Alarms:** With data refreshed within seconds, users can be alerted to threatening situations and react quickly. Real-time information may help uncover issues before they become problematic, allowing the operator to move from reactive into a more predictive management state.
- **Highest Accuracy of Data:** With frequent polling comes the opportunity to store additional detailed historical information for use in data analysis. A high sample rate ensures that quick spikes and sags in readings are captured.
- **Reporting and Trend Analysis:** Real-time information provides an increased level of detail when it comes to reporting and identifying trends. The data center environment can change quickly, so having a higher data refresh rate ensures that the user sees the entire picture.
- **Validation of Capacities:** A database of devices -and their anticipated power draw- is included in most DCIM systems today. Real-time data allows users to utilize the most precise data to validate their nameplate or de-rated assumptions to ensure maximum usage to their full capacities.
- **Increased Operational Awareness:** Data center operators can frequently be seen entering the critical environment to take readings, assess an audible alarm, or to just generally evaluate the status of the site. Enabling real-time information through a DCIM system allows access to specific information in a more convenient and holistic way, giving greater understanding into many aspects of their operations.

Real-Time Data Collection

Benefits

-Precise Warnings and Alarms
-Highest Accuracy of Data
-Reporting and Trend Analysis
-Validation of Capacities
-Operational Awareness

Drawbacks

-Cost of Implementation
-Data Overload
-Extended Network and Processing Resources

The Drawbacks to Real-Time Data

- **Cost of Implementation:** It takes a significant amount of processing to collect and manage all the real-time information, translating into higher implementation and system costs.
- **Data Overload:** It is important that a real-time data collection tool has intelligent yet simple ways to make sense of collected information in its entirety. Quality user interfaces, graphical representations and analytics engines are a must to avoid information overload.
- **Extended Network and Processing Resources:** Big data brings with it the challenge of passing vast amounts of information across LANs and WANs, as well as processing and storing all the data collected. An efficient tool needs to be harnessed to ensure performance of the application remains high without degrading other systems in the process.

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When Near-Time Data is Helpful

Near-time data can be somewhat less taxing for a system to collect and manage, along with providing a number of benefits to DCIM users.

- **Validation of Capacities:** It differs in terms of number of samples provided by real-time data, so when collected at reasonable near-time intervals, data can provide valuable insight into actual readings. Its associated trends can be used to validate assumptions made in modeling capacities.
- **Replacement of "Sneaker Reports":** Many organizations still use technicians to walk the data center floor and take manual readings at defined intervals. Because those types of reports are completed on a somewhat infrequent basis, near-time data can provide at least a one-for-one replacement. It can free up an employee's time to work on more productive tasks.
- **General Planning and Architecture:** Near-time data can prove adequate when high frequency operational awareness is not required, but when general planning and visibility is sought. Large portions of data can still be gleaned from a poll rate of 15 minutes to provide substantial information to aid planning and data center growth decisions.

Near-Time Data Collection

Benefits	Drawbacks
-Validation of Capacities	-Delayed Warnings and Alarms
-Replacement of "Sneaker Reports"	-Failure to Capture Data Fluctuation
-General Planning and Architecture	-Limited Detail for Event Analysis

The Difference Between Real-Time and Near-Time

Real-time data collection and near-time data collection have many of the same benefits but there are certain operational elements that are not available when using a near-time rate.

Some of those could include:

- Delayed warnings and alarms
- Failure to capture short bursts or periodic changes in-between polling cycles
- Not enough detail to fully examine an event

The main difference between the two polling rates is the effect on operational awareness. As an example, on a poll cycle of every 15 minutes, when a 10 minute power outage occurs, the ability to collect information about (1) how the load transferred and returned to normal, (2) how the temperatures were affected and (3) general review of the entire event, is simply not possible. When monitoring power, a near-time polling cycle can easily miss spikes, sags or simple deviations in workloads that can change rapidly.

If operational awareness and greater in-depth analysis of events is a critical factor to the success of the DCIM system, near-time data collection is not the ideal solution. Real-time polling provides the granularity of information needed for those technicians that are responsible for continuous equipment operation.

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When is Extended Interval Right for Me?

Extended interval polling is a very sporadic collection of information. This type of data would be more useful at a macro level. For instance, having a daily sample can produce good information into rounded readings like max megawatts utilized. However, during the course of a normal day, there is too much variation in power readings to place ample stock in a single time sample.

An example use case for extended interval would be for global capacity planning. An executive level user could be tasked with determining when to build a new data center or when to consider collocating. A small number of infrequent samples could provide a sufficient picture of the power footprint across an organization for the executive to start planning conversations. Technicians, 24/7 staff, and even managers will be left wanting additional information as they attend to their daily duties in an extended interval rate. In summary, extended interval is really only effective for high level planning.

Extended Interval Data Collection

Benefits

-High Level Planning

-Lowest Cost of Implementation

Drawbacks

-No Event or Trend Analysis

-Limited Alerts and Alarms

-Poor Operational Awareness

Conclusion:
Your Time is the Right Time

There is no single live data-polling rate that is best for everyone, however, there is a right polling rate for each job title group within the data center.

Technicians, operators, NOC staff, and those responsible for the daily operations of a data center, will likely find a real-time data collection system most beneficial. It provides the highest degree of operational awareness and the ability to complete post-mortem analysis on past events. The other polling rates are not able to provide the level of information required by this group as real-time.

Near-time polling rates are great for data professionals responsible for detailed planning and reporting. Generally, this responsibility resides with data center, IT, or facility managers who have a continuing need to analyze capacities when deploying new equipment and planning for future equipment. These managers may not need the same level of operational awareness, such as the instantaneous alarming or power quality capture that comes with real-time levels. However, near-time provides a clear picture to how power flows throughout the day and its effects on their working environment.

Data center operators will not have a great deal of use for extended interval polling. There simply is not enough granularity to be of benefit to the reactive decisions and actions they dispatch. Extended interval is a reasonable fit for the executive level group who are more interested in generalities or data across multiple sites. Having infrequent measurements still provides ample data to make high level decisions that can then be passed to managers for greater evaluation.

In the end, establishing the business needs is the first step. Who is using the system? What are they using it for? What are the goals of the system? What data needs to be collected to accomplish those goals? If the right scope of work is defined at the origination of the project, obtaining a system with appropriate levels of data polling will be simplified. There is a right choice for data frequency, dependent on who is using the DCIM. At Geist, we partner with our customers to ensure they will receive solutions that enbale them to achieve their data center goals.

About the Author

Matt Lane has over 14 years of experience working in data center monitoring and product development. He brings a wide range of experience as an entrepreneur, business owner, and manager. He is currently the president of Geist's DCIM division which provides customized solutions for data center monitoring.

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