Use Metrics To Understand Data Center Performance

Metrics & Benchmarks Can Help You Reach Your Facility-Wide Efficiency Goals

Metrics are one great way to know if your data center performance is on par and you are maximizing efficiency throughout your facility. Metrics not only give you a better understanding of your data center, but can also help you compare your facility to other data centers around the world. Here are a few of the most important metrics and some tips on how to use them.

Develop A Strategy

The first step in using metrics and benchmarks to get a better grasp on your data center's performance is to put a plan in place for how to actually use the information you gather. You need to have a system in place for how you choose metrics in the first place and then apply them to specific areas that require improvement.

"Metrics are typically not very valuable as stand-alone numbers," says Maggie Hao, manager, infrastructure research, at Info-Tech Research Group. "They need to be tracked and benchmarked against either past measurements or those of other organizations," which can be done using diagnostic and benchmarking programs, she says.

Hao recommends companies make sure their metrics are "SMART," or specific, measurable, attainable, repeatable, and timely. This process should help you find metrics that will give you actionable insights rather than just data that sits in a monitoring application, and it will also help you "avoid falling into the trap of using the metrics your neighbors are using just because they're common, regardless of the value it provides to you." You have to find the metrics that apply to your specific environment and then make sure you consistently measure them over time to make them truly useful.

Power Usage Effectiveness

Perhaps the most popular metric used today and one that almost every data center can benefit from is The Green Grid's Power Usage Effectiveness (PUE) metric.

At its core, "PUE is a ratio of the amount of power needed to operate and cool the data center vs. the amount of power drawn by the IT equipment in the data center," says Paula Alves, senior product marketing manager of software solutions at Raritan (800/724-8090; www.raritan.com). You want to get as close as possible to a 1.0 PUE rating because it means that "all of the energy is used for computing," Alves says. PUE is not only a metric for measuring data center efficiency, but it's also a tool you can use to consolidate your equipment and save money in the long-term, both of which are essentially bonus benefits that show the diversity some metrics can offer data centers.

"The goal of driving PUE down can have a big impact on the day-to-day and long-term operation of the data center," Alves says.

"Consider server consolidation and decommissioning. According to the Uptime Institute, decommissioning a single 1U rack server can save $500 in energy, $500 in operating system licenses, and $1,500 in hardware maintenance costs annually. So in short, by capturing power utilization data, you'll be able to see whether your servers

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Research New Metrics As They Emerge

The Green Grid and other organizations are constantly working on new metrics to help data centers not only measure performance, but also improve efficiency across the board. Space Usage Effectiveness, for example, is a relatively new metric that will continue to evolve, which is why it's important to research new metrics and see how they fit.

Also know that The Green Grid's metrics, in particular, are designed with the entire industry in mind, so they are certainly ones to keep an eye on as you move forward. "This was an instance where a particular contributing member of The Green Grid saw a problem that was important to them, and they wanted to rally the industry around providing some guidance on it," says John Pflueger, member of The Green Grid's board of directors.

are being used to full capacity, evaluate usage trends over time, and make informed decisions on how to conserve energy going forward."

Other Metrics

In addition to PUE, The Green Grid offers a range of other metrics that companies should consider, depending on the specifics of their facilities.

For example, Carbon Usage Effectiveness (CUE), Water Usage Effectiveness (WUE), and Space Usage Effectiveness (SUE) are all similar to PUE in that they help you determine how efficiently you are using certain resources in the data center. CUE and WUE help you focus on environment initiatives as well by helping you minimize your carbon footprint and conserve water, whereas SUE helps you maximize how you use available data center space now and in the future.

Beyond "usage effectiveness" metrics, The Green Grid also provides the Green Energy Coefficient (GEC) and Energy Reuse Factor (ERF) metrics to help companies be more environmentally conscious while also making their facilities much more efficient overall. GEC helps you understand what percentage of your current energy load is from green or renewable sources. ERF is unique in that it's for data centers that generate their own power, for instance using gas generators, and determines how much of that extra energy is actually being used by the facility for other purposes or how much of it is being sent out to other users outside of the facility.

Operations & Personnel Efficiency Metrics

You can look outside of hardware and infrastructure to find other metrics that may help your company improve efficiency in other areas.

"Operations metrics can be further broken down into personnel efficiency, incidence response effectiveness, and change management effectiveness," Hao says. "Common personnel efficiency metrics include servers per server admin, databases per database admin, data per database admin, etc. Common incidence response metrics are rate of successful incident responses, number of problems compared to incidents recorded, and problem age at closure.

Change management metrics measure how well change is handled. For example, a common metric is percentage of changes executed right the first time divided by total number of changes." P

Other Data Center Metrics To Consider

There's a virtually endless number of metrics for companies to use. In addition to the ones mentioned in the main article, Maggie Hao, manager, infrastructure research, at Info-Tech Research Group, says there are also server, storage, network, and database metrics that will "measure how available, reliable, and maintainable they are." Some of these metrics, which are often designed around outages, include mean time between failures (MTBF), mean time to repair (MTTR), and cost per unit.

There are even disaster recovery metrics that "measure your ability to meet your RPOs and RTOs, cost to serve, and percentage of IT budget spent on disaster recovery." In essence, if there is an aspect of your data center you're hoping to improve, chances are you'll be able to find a metric that will help.

BONUS TIPS:

Choose The Right Metrics

Maggie Hao, manager, infrastructure research, at Info-Tech Research Group, stresses the importance of finding metrics that will meet your specific needs rather than just going with the most popular options. "Metrics should be developed with an audience and purpose in mind," says Hao. "The best metrics are the ones that will help you make decisions, manage costs, and plan for change. Info-Tech recommends identifying the metrics that serve a real purpose and eliminating the rest."

Use Metrics Together

Another important thing to remember with metrics is to cover all of your bases by using metrics that work well together.

For example, PUE is a great metric for determining your data center's energy efficiency, and SUE is a great metric for figuring out how to better use your available space. Both can be used together to essentially redesign your data center layout and put your equipment in places where it will have the best cooling and power efficiency and give you the best possible use of space.