

INTELLIGENCE UPDATE

Pulling IT power data with software



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Tracking individual server power consumption and resource utilization is critical for improving the performance, efficiency and sustainability of the data center. Average server utilization rates across the industry are estimated to be as low as 10% to 20%. Meanwhile a significant amount of IT power is wasted because servers are being over- or under-utilized, or just left idle (see [This Halloween, beware the vampire server](#)).

Capturing server power data is already a requirement in some jurisdictions: for example, operators in the EU are required to report total annual IT power consumption for facilities over a certain size as part of the updated Energy Efficiency Directive (EED). Identifying how and where IT power is being wasted also requires server utilization data, and future versions of the EED may require monitoring of IT utilization.

In a previous report, Uptime examined tracking server-level power consumption using intelligent metered-by-outlet power distribution units (iPDUs) (see [iPDUs: a critical step for next generation efficiency](#)). This report examines accessing IT power and/or utilization data via third-party software, such as IT service management (ITSM), IT operations management (ITOM), hybrid IT management, data center infrastructure management (DCIM), and server baseboard management controller (BMC) software. Third-party software can offer some key benefits in IT efficiency:

- **Reducing manual work.** By capturing and storing relevant data in a single database, operators can automate data collection while improving data quality and accessibility.
- **Supporting multi-vendor IT equipment.** Readings from IT devices produced by different vendors can be captured in a single platform via integrations, application programming interfaces (APIs) and plug-ins.
- **Gaining visibility into hybrid IT and cloud environments.** Specialized software can capture data, such as CPU, memory, disk and network utilization, in hybrid IT and cloud environments. Some software might be useful proxies for tracking IT power consumption and utilization.

Metered iPDUs and other hardware devices, which have typically been used to collect IT power consumption data, are expensive and there are several alternative methods of achieving similar results through software. Although the costs of the third-party software approach can be lower,

Uptime Institute finds that third-party software is rarely used for this purpose. This may be because of issues associated with the software-led approach, including:

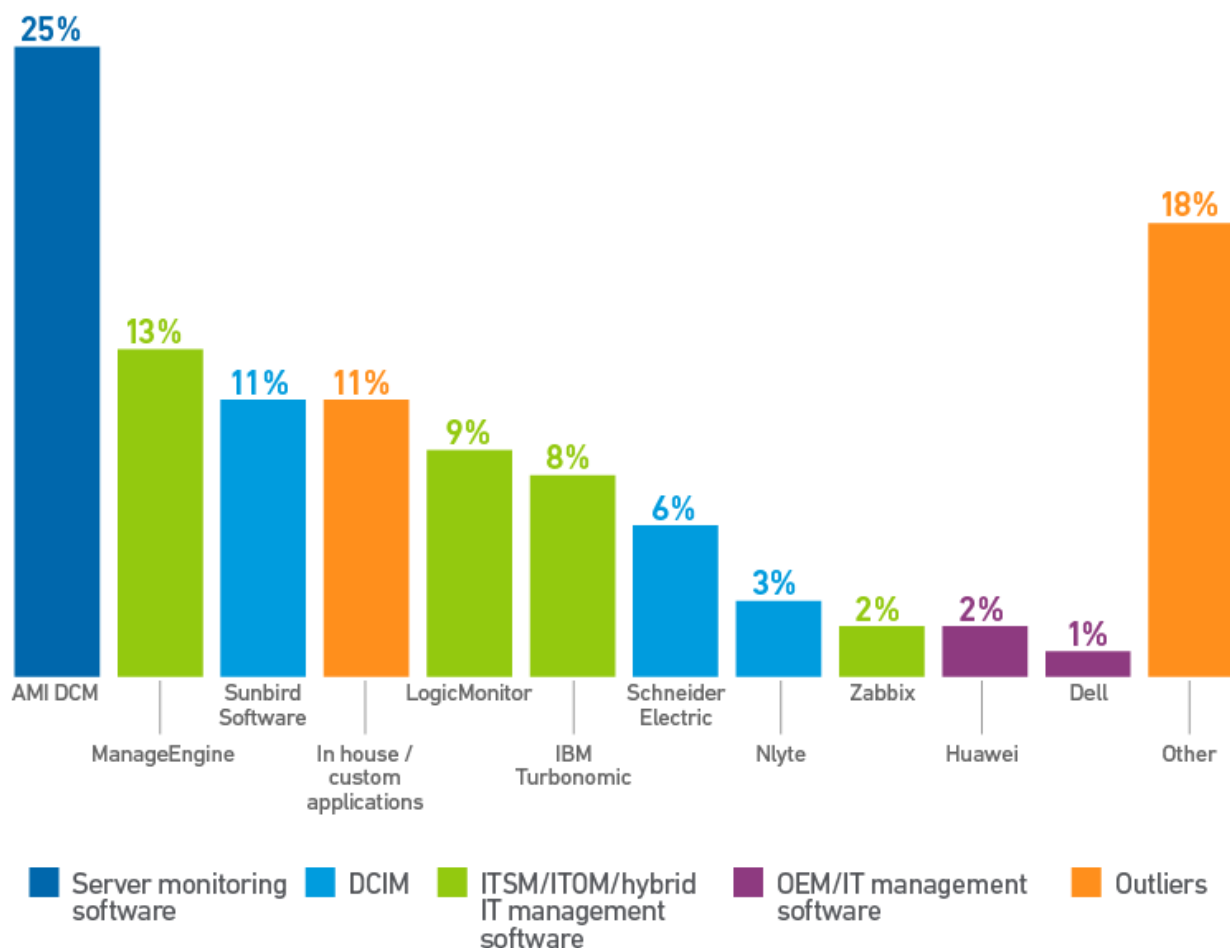
- **Systems compatibility.** Multiple network protocols and data formats are necessary to connect disparate hardware and software products. This can require costly integration if vendor plug-ins or APIs are not available. Operators are unlikely to have the desire or budget for software customization.
- **Technical complexity.** Each third-party management software suite has its own technical requirements that need a level of skill and expertise. ITOM / ITSM and hybrid IT software require installation of software agents on target devices, which may not suit some applications; data center infrastructure management (DCIM) software requires extensive manual configuration.
- **Cost and ROI.** Economically, operators are having to weigh the additional software licensing and deployment costs against the benefits of more efficient IT. Not all data center operators are involved in IT management, or benefit from better optimized IT operations.

Adoption of third-party software tools

Uptime Institute's IT and Power Efficiency Survey 2023 found that less than half of operators (48%) track average power demand for IT equipment, and an even smaller number will use third-party software to capture this data.

In the same survey, Uptime asked operators which third-party software tools they use to capture IT utilization and power data. **Figure 1** shows the range of software products (including DCIM, ITSM/ITOM, BMC-based server management software, and hybrid IT monitoring software). More than one in ten use in-house/custom applications. Almost one in five (18%) selected "Other", which suggests a wider number of software products are in use. **Figure 1** shows the relative shares of software products used to capture IT utilization and power data and is a useful indicator of where operators are deploying their resources.

Figure 1. Third-party and in-house software tools used to collect IT utilization and power data (n=213)



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The three most widely used third-party software tools for capturing IT power consumption and utilization data are:

1. **AMI DCM (formerly Intel DCM).** This vendor-agnostic server management software can collect data from the BMC, a dedicated processor integrated into server motherboards to provide basic remote control, management and monitoring functions. The software can track individual server power usage across large fleets, including those with CPUs from multiple vendors (see **Vendor-agnostic server management software** below).
2. **ManageEngine.** This is an ITSM/ITOM product, whose OpManager server monitoring tool captures CPU, memory and disk utilization. Monitoring is performed across all major equipment vendors, as well as VMware virtual machines (VMs) and open-source operating systems such as Linux.
3. **Sunbird Software.** This DCIM software suite works with any networked power metering equipment used in the data center. Integration with other software (such as Splunk, ServiceNow or Jira) is achieved through APIs: every data entry field has a standard API, and any custom field has a configurable API.

Table 1 shows four categories of third-party software that Uptime has identified to collect IT power or utilization metrics in the data center.

Table 1. Third-party software options for accessing IT power and/or utilization data

ITSM / ITOM / hybrid IT management software	DCIM software	Vendor OEM / IT management software	Vendor-agnostic server management software
Some vendor (product) examples (listed alphabetically)			
Cisco (Splunk), Dynatrace, IBM Turbonomic, LogicMonitor, ManageEngine, SolarWinds, VMware (Tanzu)	Eaton (Brightlayer Data Centers suite), FNT Software, Nlyte (Energy Optimizer), Panduit (SmartZone Cloud Software), Hyperview, RiT Tech (XpediTe), Schneider Electric (Ecostruxure Power Operation), Sunbird (Power IQ)	Dell (OpenManage), HPE (OneView), IBM (Z Service Management Suite), VMware (vSphere)	AMI DCM, QiO (ServerOptix)
How the software collects data			
Monitors both physical and virtual servers on premises and in the cloud. Provides metrics on power consumption, CPU, network and storage load. Requires installation of a software agent.	Nearly all DCIM products can collect IT power consumption data from PDUs, busway tap boxes and branch circuit meters. Power management sometimes comes as an additional software module and might require integration.	Monitors fan speeds, system health, temperatures, CPU, memory and disk utilization. If the software system utilizes BMC functionality (e.g., HPE iLO, Dell iDRAC), software agent installation on target systems is not required.	Collects data from the server BMC, CPU and fans. Provides metrics on CPU, memory and system health. Can provide server firmware updates.
Benefits			
High level visibility into server utilization and energy consumption data across hybrid and cloud environments.	Integration into DCIM brings power data into a single database for consolidated reporting, alarm management, and remote power control. Supports broader trending and analytics or ML-based predictions.	Suitable for reporting on specific IT devices.	Suitable for managing different server OEM devices, running different vendor CPUs.
Drawbacks			
Potentially complex integrations with other software, which may require specialist skills or additional costs. Some of the metrics are based on estimates and abstractions. Less granular data may not be suitable for reporting purposes.	Dependent on available connections and plug-ins provided by the DCIM vendor for any given power equipment. Potentially complex integrations with other software which may require specialist skills, or additional costs.	Requires specialist skills in IT management systems. Not always scalable across large multi-vendor environments. BMC power tracking sometimes omits fan power (the number will be lower than actual IT power consumption).	Potentially complex integrations with other software which may require specialist skills, or additional costs.

(The list of suppliers included in this table is not exhaustive.)

ITSM / ITOM and hybrid IT management

ITSM / ITOM and hybrid IT management software is used by 32% of the respondents to the Uptime Institute IT and Power Efficiency Survey 2023 (Manage Engine, Logic Monitor, IBM Turbonomic), making it the most widely used software category for capturing device-level power and utilization data. Rather than pulling power measurements directly from the hardware, these software tools collect data from different subsystems and software. They can be used for virtualized environments, and provide an estimate of critical metrics, such as CPU and memory utilization, and network and operating system performance.

Some tools can translate estimates of individual VMs or Kubernetes container power consumption into their CO2 equivalents (CO2e) for sustainability reporting. Once implemented, this category of software may have practical applications in operational analysis and efficiency-related initiatives.

DCIM software

DCIM software accounts for 20% of those surveyed (Sunbird Software, Nlyte and Schneider Electric). With the right configurations and/or integrations it is possible for DCIM to access IT power and utilization data via connections to power metering equipment and ITSM / ITOM / hybrid IT management software (see **Table 1**).

DCIM is predominantly used as an IT asset management and infrastructure monitoring platform. This is beneficial for collecting IT power data across the facility to create a single repository of data on all network-enabled devices, with information on connections, thresholds, alerts, and maintenance schedules, as well as power usage and power availability. DCIM can support additional applications including:

- Identifying stranded power and zombie (idle) servers.
- Identifying power failure risks across all power devices and circuits.
- Remote power monitoring across third parties, to validate pricing and SLAs.

Although many DCIM products do not currently combine power data with other critical facility data, there could be broader applications for operational efficiency through the application of analytics and AI. This could include identifying the impact of changes to IT capacity, cooling and space on power consumption in the data halls.

Vendor OEM / IT management software

Vendor IT management software (Dell, Huawei) is used by the smallest proportion of operators surveyed (3%). This software often connects directly to the server BMC, providing a user interface to manage and monitor servers remotely — even when the system is powered off. While OEM / IT management software can provide accurate power data readings for a specific line of servers, it lacks the ability to capture and report on IT power across devices from multiple vendors. This makes it impractical for use at data center scale, where there are likely to be thousands of servers across multiple brands and generations.

Vendor-agnostic server management software

This is the most used third-party server management software. AMI DCM uses out of band communications, such as Redfish, to avoid installing an agent on servers. It then uses access management credentials to collect CPU performance and power use data. It can also support a number of other uses, including device level energy monitoring, thermal mapping, power alerts and power capping; as well as identifying zombie servers. Several DCIM vendors and hardware OEMs have integrated AMI DCM (formerly Intel DCIM) into their products.

The Uptime Intelligence View

The use of software to collect IT power consumption and utilization data is not well understood among data center operators. The unfamiliar nature of IT management software products, lack of incentives for facilities operations, and questions about ROI continue to act as roadblocks. Software will only be determined to be more cost effective than hardware if it can be trusted to provide accurate and meaningful data at the scale required. Currently, operators are unclear whether third-party software products can fulfil this goal entirely.

ABOUT THE AUTHOR



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About Uptime Institute

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With its data center Tier Standard & Certifications, Management & Operations reviews, broad range of related risk and performance assessments, and accredited educational curriculum completed by over 10,000 data center professionals, Uptime Institute has helped thousands of companies, in over 100 countries to optimize critical IT assets while managing costs, resources, and efficiency.