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Integrated Asset Tracking Solutions

Increase Productivity, Reduce Costs,
Improve Visibility and Take Control
with Data Center Infrastructure Management
(DCIM) Tools

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Introduction

With the rapid adoption of Data Center Infrastructure Management (DCIM) solutions into data center operations worldwide, there is a growing significance of a thorough and precise approach to data center management. Specifically, information technology (IT) systems are often implemented under the assumption that the information supplied to data center managers regarding the physical infrastructure is accurate. Unfortunately, this is not always the case.

In the area of physical infrastructure asset management, few mature asset tracking tools currently exist – and those that do exist often lack visibility or are seriously compromised by a lack of integration with current-day asset management tools and techniques. This lack of visibility into the physical layer exposes data centers to significant risk, and increased operational expense.

In addition, many organizations have no specialized asset-related data center management systems in place. Stakeholders are encouraged to make use of separate operational process systems already functioning in an organization; unfortunately, these systems are not specialized to accommodate the detailed, intricate requirements of data center operations.

Other organizations often use manual asset tracking techniques such as spreadsheets to maintain a Configuration Management Database (CMDB) and ensure Information Technology Infrastructure Library (ITIL) compliance. However, the lack of relevant information and errors within these manual methods can render such databases insufficient, and can cause an organization's entire ITIL process to be ineffective. Omitting asset tracking entirely or using manual processes is an option and may reduce costs, but the resulting inaccuracy, wasted resources, and inflexibility they bring far outweigh the cost savings when the effect on the data center at large is considered.

This white paper explores how a comprehensive asset management solution for high-value, high-utilization IT assets can deliver significant benefits to the enterprise, co-location facility, or cloud provider data center. It also demonstrates how the Panduit® Physical Infrastructure Manager™ (PIM™) Software Platform can help unify asset tracking in a reliable, integrated manner to capture all physical infrastructure assets from deployment to decommission, providing an essential basis for data center infrastructure management processes. Future Panduit white papers will address further DCIM top of mind issues, such as power consumption and energy efficiency.

The Challenges of Physical Infrastructure Management

A recent survey of data center Chief Information Officers (CIOs) found that a majority of IT managers recognize a requirement for an improved method of handling both assets as well as moves, adds and changes (MACs) in the data center (see Figures 1 and 2). This recognition suggests an understanding that detail, efficiency, and accuracy in asset management is beneficial to data center management.

From a technology perspective, IT equipment power densities have steadily increased, along with pressures on data center management to extend facility lifecycles with better capacity and asset utilization. As a result, tighter restrictions are imposed on resources, and extreme value is placed on efficient data center operations. Also, an increase in colocations, cloud computing, and virtualization is driving the need to keep an accurate record of the assets within each business unit, both to provide stakeholders with the required assurances of continued uptime, and to protect proprietary information regarding these assets.

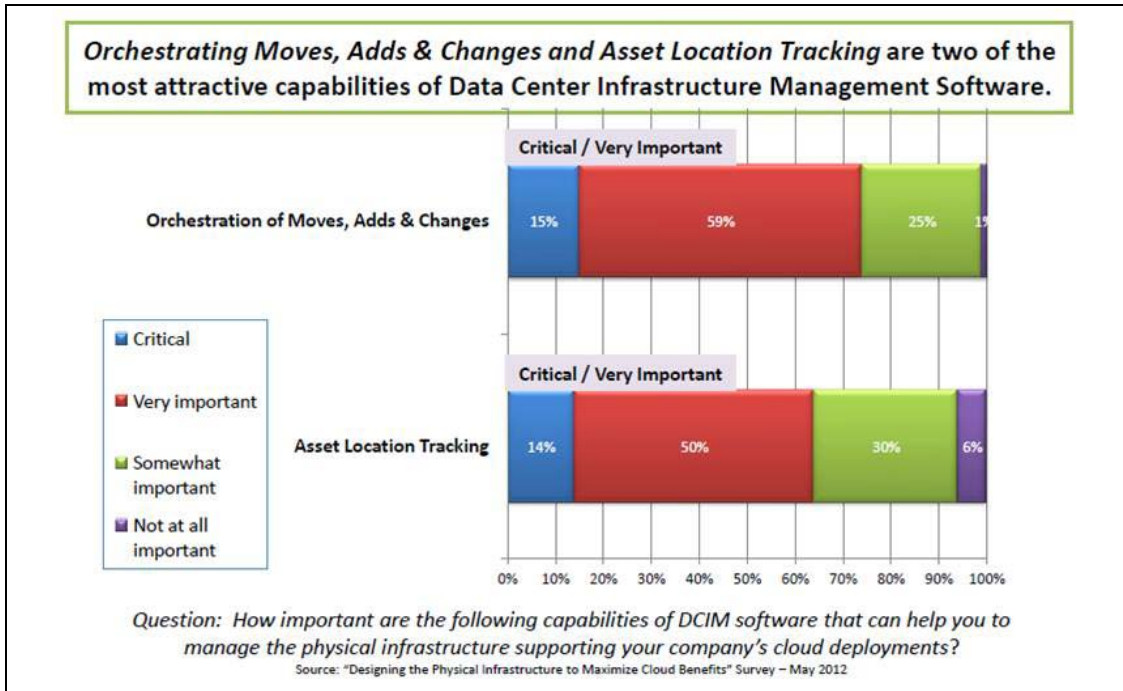


Figure 1. Data Center Infrastructure Management (DCIM) Software is critical to managing moves, adds and changes and asset location tracking according to a survey conducted of data center CIOs.

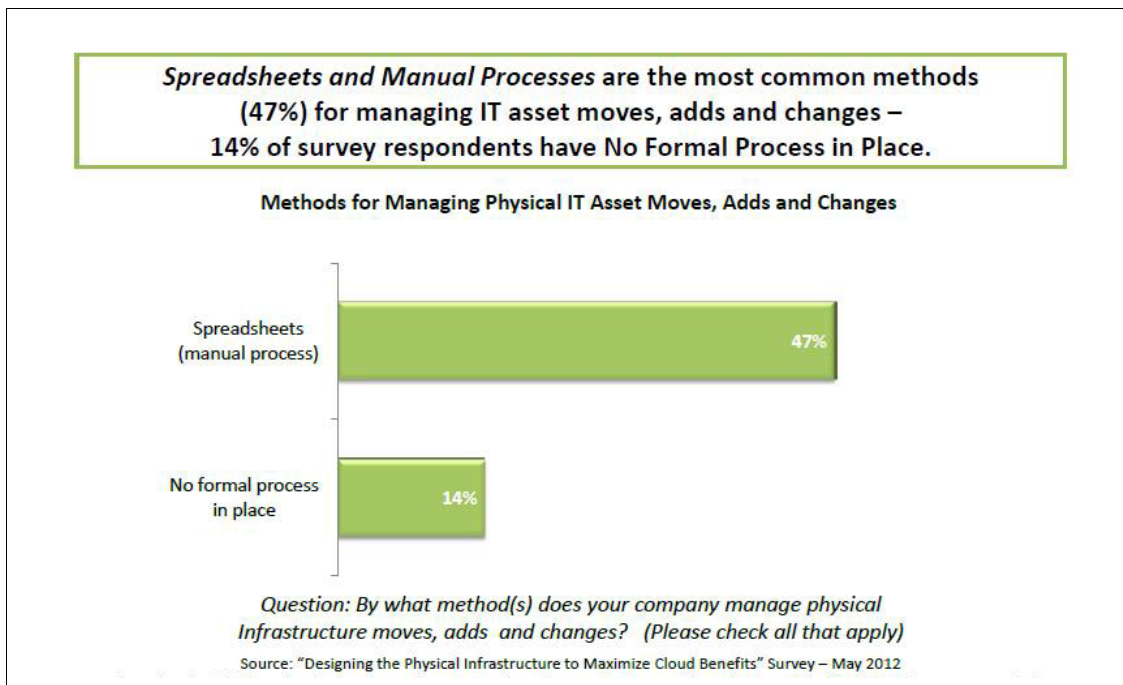


Figure 2. A majority (61%) of data center managers surveyed rely on manual spreadsheets or have no formal process in place to manage physical IT asset moves, adds, and changes.

This increased pressure places demands on data center managers to optimize their existing assets by conducting resourceful IT system expansions while working within budgeting constraints. Facility managers also are being challenged to optimize resource utilization, which includes provisioning room resources carefully. These activities necessitate knowledge of utilization data for all assets housed within the facility, as well as a confidence that the facility environment is capable of maintaining and protecting critical assets to ensure support of Service Level Agreements (SLAs).

Current Asset Tracking Systems

Today, many DCIM approaches are available, including standalone asset-tracking techniques. Most of these approaches only monitor power and cooling, and leave asset management on the side lines. Some organizations choose a combination of these tracking systems, and in doing so, run the risk of experiencing process conflicts and overlaps which can slow down overall business operations. It is important to understand why, despite their increase in use, these approaches are generally not capable of providing an end-to-end asset tracking solution which optimizes all aspects of asset management.

- **Data center mapping** involves documenting/modeling the data center by asset name and location. Assets are often grouped according to the division/department utilizing them. Grouping can be useful in the case of colocation facilities and providers of cloud computing services, but little information is recorded regarding resource utilization, which can leave facility managers stranded when they need crucial information. Under this method, assets are not recorded from deployment through decommissioning and disposal. There is no tracking of MACs and most solutions have very limited or no connectivity.
- **Utilization mapping** focuses on the resources consumed by each asset, and groups them accordingly. Priority is given to power and thermal characteristics over location data, and little thought is given to connectivity or networking. This approach is useful for many facility managers who must undertake resource provisioning activities. However, this technique lacks detail and precision, which would be required to give users the necessary guarantees of the whereabouts, port connections, and port capacity of their assets. Specifically, information about asset acquirement, setup, location and decommissioning is lacking within a utilization mapping system. MACs are not recorded, giving data center operators no information about the past or future actions surrounding their assets.
- **Operational process mapping** comes in many forms. *Big asset processes* are typically utilized for asset acquisition and management within an entire organization and allow management of general paperwork such as invoices, leases, chargeback schemes, licensing, renewals and dispositions. Most big asset procurement systems offer little monitoring capabilities and have no provision for utilization data.

Small asset systems often rely on the use of manual spreadsheets, the accuracy of which can never be guaranteed due to the unpredictable nature of human error. While the use of spreadsheets can give data center staff the freedom to record the level of detail they choose, the manual spreadsheet is difficult to keep up to date – especially when visibility is required for more than one person. Often, multiple copies of the spreadsheet are made, with different changes applied to each copy by different people.

There is added risk of the eventual loss of one or more versions with this approach. It is highly unlikely that asset information managed through a spreadsheet will allow collection of accurate and timely information that will keep a CMDB up to date to the standard required for ITIL compliance. In order for finance departments to ensure regulatory compliance regarding fixed assets and renewals, databases maintained in this error-prone fashion require reconciliation with regular asset audits which can cost over \$40,000 per instance.

Finally, *change management processes*, such as the use of work order requests, form an established stage of the Information Technology Service Management (ITSM) process that contributes to ITIL compliance. Change management is intended to keep the necessary parties up to date with MACs in the data center, while reducing the risk of unsuitable changes. However without automated records, the level of detail offered on change requests can be sparse, and there is no means to check whether a work order request will fully match the actual work that is completed. This method provides no tracking to assure that MACs have been carried out correctly. The effect is a poor flow of available information that is not conducive to the maintenance of the CMDB or ITIL practices with which change management systems are intended to comply. Any CMDB utilized will not be effectively updated, undermining its accuracy as well as the effectiveness of (and compliance with) ITSM and ITIL processes.

Table 1 highlights the main disadvantages of the use of these asset management systems within the data center.

Table 1. Existing Asset Tracking Systems – Main Disadvantages

Data Center Mapping	Utilization Mapping	Operational Process Mapping		
		Big Asset Systems	Small Asset Systems – Manual Spreadsheets	Change Mgmt. Systems
No utilization data	Minimal (if any) location data	Minimal location data	Error prone	No resource utilization data
No planning / tracking of asset MACs	No planning / tracking of asset MACs	No planning / tracking of asset MACs	No planning / tracking of asset MACs	No tracking of asset MACs
No connectivity / network data	No connectivity / network data	No connectivity / network data	No lease, deployment, or decommissioning information	Lacking in detail
No data on asset deployment / decommissioning	No data on asset deployment / decommissioning	No resource utilization data	Requires costly additional audits	No connectivity data

The Intelligent Solution – Physical Infrastructure Manager™ (PIM™) Software Platform

Many organizations maintain unsuitable asset management systems to avoid disruptions associated with transferring operations to a new solution. However, a solution exists which provides high-level asset tracking capabilities, as well as the opportunity to integrate seamlessly with existing management systems to encourage a free flow of actionable information between departments, while minimizing disruption to well-established, successful operational processes.

The Panduit® Physical Infrastructure Manager™ (PIM™) Software Platform is a DCIM solution that provides detailed information on asset tracking and utilization, connectivity, power and space. The PIM™ platform features real-time reporting and documenting of items such as patch field configuration changes and asset movements at all times. It automatically updates database information which, along with detailed reports on power utilization, environmental conditions, and space utilization, allows IT managers to automate and generate standard and customizable reports. These reports may be used to assist in the compliance with corporate and industry regulations as well as support energy conservation goals and other sustainable IT initiatives. Support for ITIL and related ITSM initiatives as well as integration with a CMDB completely removes the requirement for manual asset tracking processes.

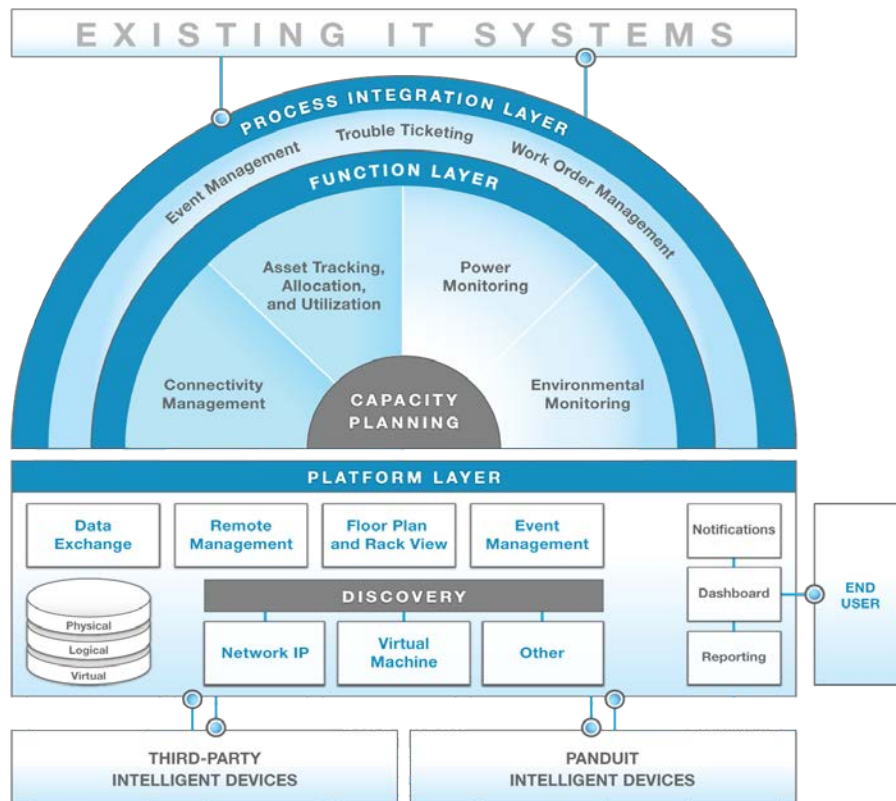


Figure 3. The three layers (process integration, function, and platform) that comprise the Panduit® PIM™ Software Platform function and architecture.

The PIM™ Software Platform is modular, allowing a customized and relevant solution to be built according to the needs of any organization. It also enables easy deployment of additional functionality. The PIM™ Software function and architecture consists of three layers that are key to its operation (see Figure 3):

- The **Process Integration Layer** enables the PIM™ software to interact and interoperate with an existing IT system's infrastructure to enable such activities as event management, trouble ticketing, and work order.
- The **Function Layer** supports business processes that manage various elements of the physical infrastructure.
- The **Platform Layer** incorporates key technologies and subsystems to support the applications in the function layer that include network discovery, event management, remote management, and general visualization at the floor level and cabinet level.

PIM™ Modules

The **PIM™ Base** module is the software's central hub - the required foundation upon which further modules can be added. Its range of features allow users to organize location hierarchy, search and locate devices quickly, and automatically locate information such as device name, Internet Protocol (IP) address, MAC address, location and port name. The PIM™ Base Module must be deployed to utilize other PIM™ modules; however, extra modules are not required to use the software. Real-time reporting is built into all PIM™ modules as standard.

The **PIM™ Asset Tracker** module transforms the software into a highly detailed asset tracking solution, providing real-time notifications of MACs, and allowing IT managers to track and monitor all authorized and unauthorized modifications to any asset (see Figure 4).

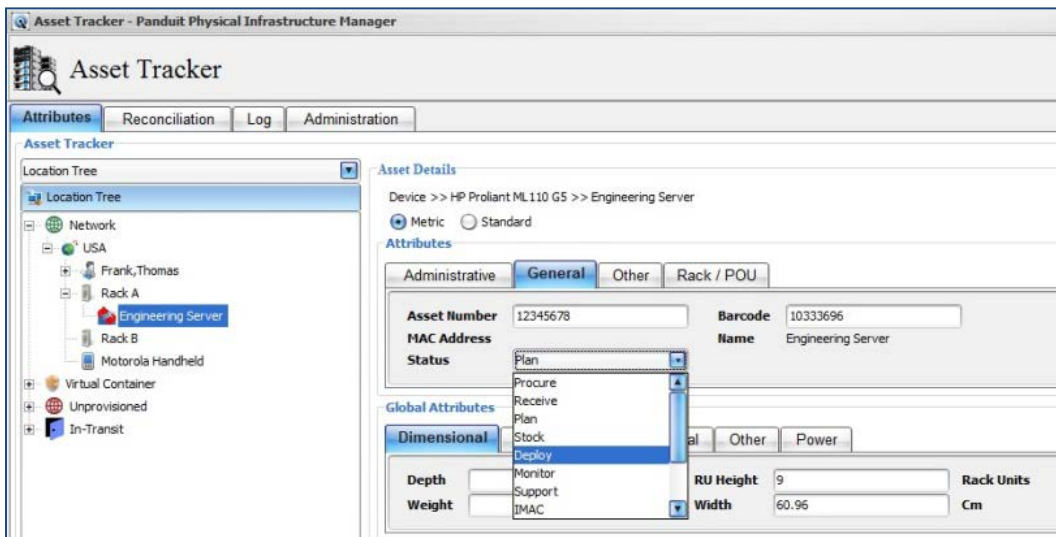


Figure 4. The PIM™ Asset Tracker module allows users to create a repository of asset details such as serial number, bar code, and the actual status of a specific asset. This module also allows users to define custom asset attributes.

The **PIM™ Connectivity** module supplements PIM™ software by showing the entire asset network and connectivity details. The user interface allows customization of views, to focus on specific assets or areas of the data center. It manages both the data center and the extended enterprise with real-time connectivity updates (see Figure 5). It also provides an asset-ready time stamp for SLAs and maps active and passive end-to-end connectivity, allowing users to trace patch cord ends and view port-level connectivity.

The **PIM™ Dashboard and Reporting** module provides summaries of all the information collected within the software. Any data held by the PIM™ software can be detailed in reports which can be automatically generated for distribution to relevant departments or enterprise stakeholders. The PIM™ Software Platform also allows for visual representations of operational metrics in a variety of formats, such as dials, charts, and gauges. This capability provides an immediate insight into the vital signs of the facility regarding asset data and connectivity, as well as space and power (see Figure 6). The dashboard and reporting functionality can be customized, swiftly filtering data to focus on information relevant to a specific topic or department.

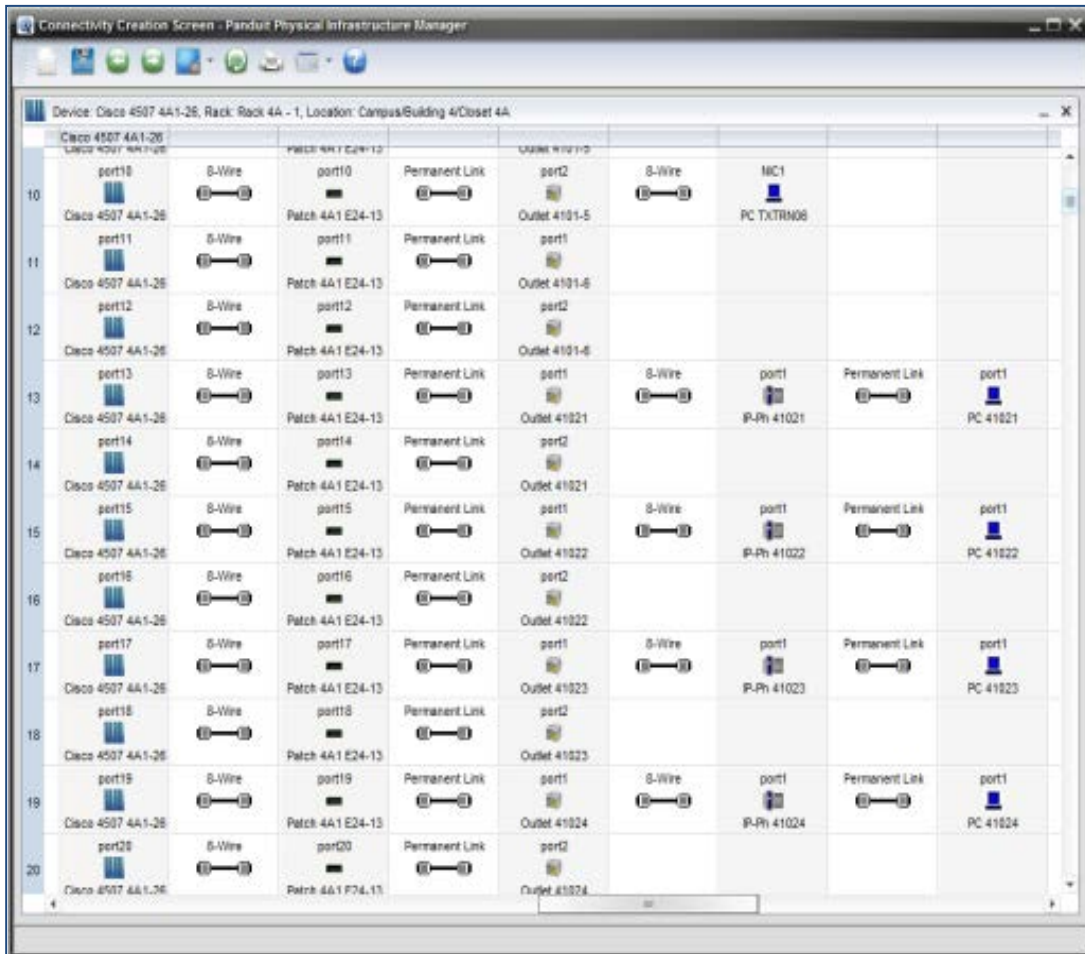


Figure 5. The PIM™ Connectivity module documents passive connectivity using PIM™ software. In a single screen users can view which ports are in use, the type of connection, the status of the connection, and the end-to-end connection path.

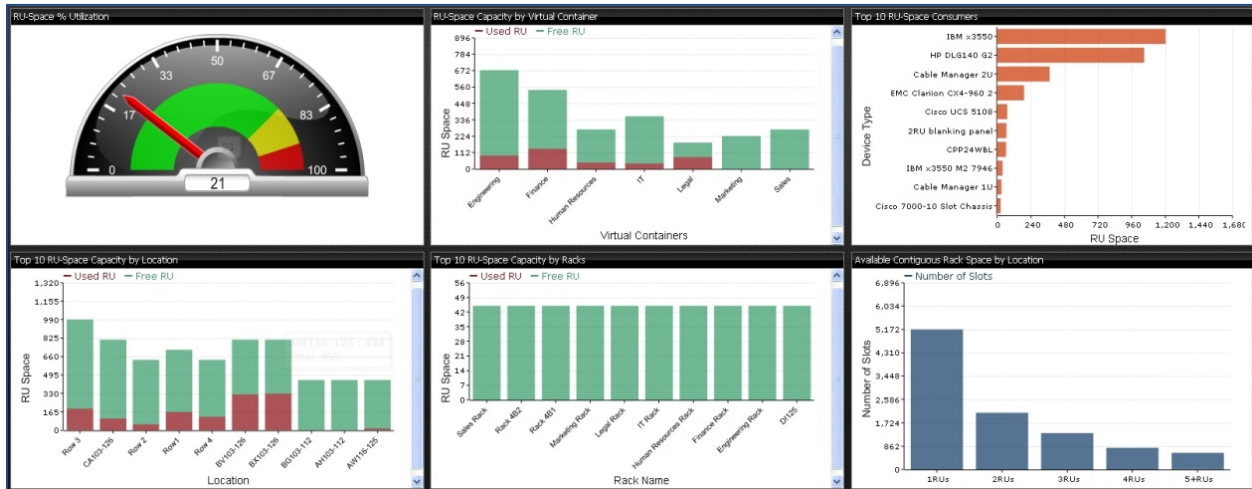


Figure 6. The PIM™ Dashboard and Reporting module allows visibility into essential operational data such as space utilization, asset data, connectivity, and power. It also enables users to create custom reports and dashboards to accommodate their specific business needs.

Separate Supporting Intelligent Hardware

Panduit® PanView iQ™ (PViQ™) System Hardware includes intelligent patch panels, patch cords, and intelligence modules, which provide continuous real-time patch field monitoring and visibility of physical infrastructure connectivity. PViQ™ hardware actively and automatically monitors a variety of variables in the data center (i.e., patch field connectivity, environmental conditions), issuing alerts when a condition is discovered that is at variance with baseline operating conditions. Operators who do not have such a system in place would need to manually monitor data center conditions, and may not as easily correlate abnormal variances with potential outage threats.

The PViQ™ hardware solution seamlessly feeds information directly into the PIM™ Software Platform, acting as a supporting Intelligent Physical Layer Management (IPLM) tool. All asset connectivity information registers automatically with the PViQ™ system, and passes to PIM™ software without any need for manual assistance and is part of asset location guidance for all deployments.

The PIM™ Software Platform can also be integrated with existing management systems through the use of Application Programming Interfaces. Essentially, PIM™ software can function alone as a complete solution, or can augment third-party solutions to provide a comprehensive system for management of the entire infrastructure.

Why PIM™ Solutions?

Panduit® PIM™ and PViQ™ solutions form an important part of the Panduit Unified Physical InfrastructureSM (UPI) approach. The UPI approach provides the conceptual basis for DCIM by presenting the data center as a dynamic entity in which physical and logical infrastructures are fully integrated and optimized. This comprehensive, holistic view of the facility encourages the tracking of assets, producing extensive details of the asset lifecycle which can be used by all departments and stakeholder teams.

The accurate tracking functions provided within Panduit® PIM™ and PViQ™ solutions make it possible to pinpoint the physical location of any asset in the system. This greatly reduces the number of lost assets, which improves resource and asset provisioning, reduces wasted resources and operational expenses, and improves client confidence in data center operations. Table 2 illustrates the PIM™ Software Platform functionality in contrast with other asset tracking solutions discussed in this white paper.

Table 2. Panduit® PIM™ Software Platform Functionality versus Other Asset Tracking Solutions

Asset Tracking Systems - Feature Comparisons	Data Center Mapping	Utilization Mapping	Operational Process Mapping			PIM™ Software Platform
			Big Asset Systems	Small Asset Systems – Manual Spreadsheets	Change Management systems	
Asset names	✓	✓	✓	✓	✓	✓
Asset location data (Rack, Rack Unit [RU] slot)	✓	✗	✗	✓	✓	✓
Asset owner information	✓	✗	✓	✓	✓	✓
Visual asset representation	✗	✓	✗	✗	✗	✓
MAC planning	✗	✗	✗	✗	✓	✓
MAC tracking	✗	✗	✗	✗	✗	✓
Automatically updated resource utilization data	✗	✓	✗	✗	✗	✓
Full asset network view	✗	✗	✗	✗	✗	✓
Real-time connectivity data	✗	✗	✗	✗	✗	✓
Notification of unauthorized MACs	✗	✗	✗	✗	✗	✓
Detailed IT asset deployment/decommissioning data	✗	✗	✗	✗	✗	✓
Asset lease information	✗	✗	✓	✗	✗	✓
Automated reports	✗	✓	✓	✗	✗	✓
Integration with other tracking systems	✗	✗	✓	✗	✗	✓
Integration with intelligent tracking hardware	✗	✗	✗	✗	✗	✓
Optimized for data center asset tracking	✗	✗	✗	✗	✗	✓

PIM™ software monitoring capabilities address common data center challenges by transforming collected physical layer data into actionable information that has a direct impact on:

- Availability – resolve network connectivity issues up to 80% faster than non-managed systems
- Agility – in transitioning a system from a “managed-ready” state to fully managed, the PViQ™ Intelligent Hardware System can be deployed 50-70% faster than other intelligent panel competitors, with no network downtime during deployment
- Security – identify the exact physical location of an unauthorized network access (e.g., rogue laptop) up to 90% faster than systems without IPLM
- Space – zero-RU PViQ™ management modules can reduce space requirements by 50-100 RU (5-10%, based on 100 cabinets)
- Interoperability – consolidate physical layer, power, and environmental management solutions onto one PIM™ software platform
- Productivity – perform accurate MACs more than 75% faster than non-managed systems
- Asset Calculations – eliminate asset inventory audits and reconciliations, which can exceed \$40,000 per instance

Conclusion

Physical infrastructure management tools, in conjunction with existing system software management tools are critical to support the changing needs of your data center. The Panduit® PIM™ Software Platform provides that support with accurate, timely, and actionable information on physical assets, improved visibility into asset MACs, and process-driven integration with applicable management systems.

The software is flexible, offering a common ground for data communication by integrating with disparate asset tracking systems. The PIM™ platform is the solution to the daily asset tracking trials faced within the data center and the extended enterprise, and provides “tight integration with the infrastructure side of the data center and offers very high-capacity data collection capabilities” (Forrester, 2012). Together with Panduit® PViQ™ intelligent hardware, the Panduit® PIM™ Software Platform is a uniquely thorough DCIM solution that covers all aspects of asset tracking and connectivity, improving visibility of operations.

Panduit® PIM™ and PViQ™ solutions encourage aggregation of data concerning the entire data center infrastructure, providing a central repository which facilitates accuracy and visibility within asset tracking and other data center infrastructure management tasks and applications. Panduit is also working on DCIM-related solutions to help customers gain more granular and real-time visibility into data center power consumption and energy efficiency. These and other topics will be explored further in upcoming Panduit white papers.

Reference

2012. Forrester Research, Inc. “Market Overview: Data Center Infrastructure Management Solutions.”

About Panduit

Panduit is a world-class developer and provider of leading-edge solutions that help customers optimize the physical infrastructure through simplification, increased agility and operational efficiency. Panduit's Unified Physical Infrastructure™ (UPI) based solutions give enterprises the capabilities to connect, manage and automate communications, computing, power, control and security systems for a smarter, unified business foundation. Panduit provides flexible, end-to-end solutions tailored by application and industry to drive performance, operational and financial advantages. Panduit's global manufacturing, logistics, and e-commerce capabilities along with a global network of distribution partners help customers reduce supply chain risk. Strong technology relationships with industry leading systems vendors and an engaged partner ecosystem of consultants, integrators and contractors together with its global staff and unmatched service and support make Panduit a valuable and trusted partner.

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