

The Importance of Automating IT Asset Inventory and Management in the Data Center

Continuous Processes and Real-time Visibility Enhance
Productivity and Security

Introduction

The modern data center is an increasingly complex environment. Knowing what assets are on hand and where they are located is vital. Periodic inventories and fixed asset audits are a mandatory and laborious element for any IT department. In large data centers, these time-consuming endeavors are both rigorous and agonizing. Asset inventories and audits need to be complete and accurate. For those with a hundred or more racks full of critical corporate servers and related computers, storage devices, network hardware and test equipment, it's no longer possible to maintain an up-to-date inventory with manual processes. Not with a pencil and paper. Not with bar codes. Not with passive RFID (Radio Frequency Identification).

With the mobility of today's IT assets and frequency of those moves, software discovery tools and manual data collection methods simply cannot provide 100% accurate inventories. The automation of inventory and reconciliation processes, and the ability to account for every critical asset in real time throughout the data center is a tremendous leap forward for any enterprise change control, audit or security strategy.¹

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Systems management, network management and application management processes are likely to be automated to a large degree in the modern data center. As more processes become automated, the availability of real-time information allows managers to dynamically monitor, record and study performance metrics and live statistical data. Unfortunately, these operational performance upgrades have never meshed easily with asset location and inventory information, which are collected by manual means.

Inventory data that is manually entered into server

¹ RF Code Announces Real Time Tracking of Rack-Level Assets, RF Code news release. January 29, 2008. <http://www.rfcode.com/news/press-releases/rf-code-announces-real-time-tracking-of-rack-level-assets.html>

mapping or management applications introduces a less-than-valid component whose accuracy diminishes daily. Moves, changes and additions that are unauthorized or undocumented compromise the integrity of projects that might ordinarily benefit from automation. Outdated or incorrect inventories can contribute to long audit cycles and divert resources from more important projects. The linkage of the automated with the antiquated diminishes the value delivered by new data center management and control solutions.

This is changing however. The advent of continuous inventory solutions, powered by secure wireless data collection technologies, is propelling corporate IT toward a future where IT asset tracking processes will be automated. In fact, today, the inventory process can practically be eliminated with a closed-loop, wireless solution that produces accurate asset inventory and location information every 10 seconds.

This development is significant because the migration to data center automation is always about improving operational efficiency and effectiveness. This paper looks at the drivers pushing behind that move toward greater automation.

Reclaiming Stolen Resources

The pressure is on to add new corporate applications and cut infrastructure costs at the same time. In exchange for hard-won server and software upgrades, data center managers are consistently being asked to more with less. The tradeoff with the finance department usually means a lower headcount for IT administration staff. This is where the sidetracking of critical data center personnel to perform equipment inventories can really impact service integration and server maintenance operations.

IT managers are likely to be burdened with any number of requests for accurate counts of the equipment under their watch. More importantly, they may be required to prove that they have gone to the proper lengths to protect the sensitive data that resides on those assets. The demand for the

timely reporting of onsite equipment and protection practices can take the form of:

- an annual inventory
- a security audit
- a tangible asset appraisal for corporate valuation purposes
- an end-of-lease equipment collection
- a retired asset count, or
- a compliance mandate concerning taxation, regulatory or accounting governance

The ability to quickly respond to audit requests and inventory demands is even more vital to large publicly-traded organizations who are governed by strict accounting and financial compliance mandates.

In a large data center, new equipment is provisioned frequently if not continuously. Existing gear is being maintained on an ongoing basis. Outdated servers are pulled from service and prepared for disposition. New networking hardware and storage devices are being integrated week after week.

In the new compliance era ushered in by Sarbanes-Oxley, Basel II, HIPAA and the like, companies must be able to certify that they have protected critical business information and personal data. Hardware audits are time-consuming and pressure-filled. Stories of IT administrators being assigned to accompany auditors for days or weeks are not unheard of. In some cases, highly-paid IT administrators are asked to sit in a room full of auditors in case one of them has a question or a request for clarification. In best practices mode, any IT organization would prefer to pre-populate detailed reports with the data that auditors might require in advance of their arrival—freeing their skilled technicians to work on more critical projects.

Of course, turning over incomplete, dated or otherwise inaccurate reports might only serve to spotlight the flaws in security policy or asset management.

The information technology sector as a whole has struggled to find the best way to track and manage computing assets. Enterprise managers have long suffered through the physical inventory process while experimenting with marginal upgrades to improve accuracy and reduce the burden on their department's human resources.

From Door-Pull to Automation

The days of pencil and paper were replaced by bar code scanners, which, in turn, began to give way to passive RFID interrogators in the largest facilities. What might have taken two weeks to accomplish with a bar code scanner can now be completed in a matter of days with a passive RFID reader. While these hunt-and-gather collection tools produce data that is batch integrated with back office systems upon collection, each inventory method still requires a significant time investment from staff members. Racks need to be unlocked. Doors need to be opened. Handheld collection devices need to be engaged.

None of these door-pull approaches, which require technicians to physically open an equipment rack door or enter a room to collect asset data, will survive in the automated data center.

Why not? Because at the point of completion, even the accurate data from a manually derived inventory program begins to deteriorate as server locations change and computing gear is added or taken out of service. And change dominates in the modern data center. According to industry estimates, assets can change as much as 20 to 30 percent each year. In contrast to facility automation data such as power consumption or server performance which are monitored and updated continually, physical inventories culled from bar codes or passive RFID tags can only be updated by repeating the collection process or through new (manual) data entry.

And who is qualified to conduct a manual inventory in a data center? Only those who are allowed to be there in the first place. Due to the secure nature of data center operations and the prevalence of access control hierarchies, it is likely that highly paid and highly skilled members of the IT team will be doing

the data collection. Opening the process to outsiders would violate the basic tenets of any enterprise security strategy.

Moreover, in many data centers, racks are locked and require a change control request for a technician to gain access.

So, several times per year, a facility's key employees are being redirected to conduct asset inventories. In the largest facilities, asset management and data collection can become part of the job description. Generally, the time and effort required to complete inventories and audits removes key IT personnel from the critical day-to-day activities for which they were hired. With the average fully loaded cost of data center managers, architects and storage administrators at or above \$100,000 annually², it isn't difficult to calculate how much a week's worth of inventory really costs. A cost-per-audit or cost-per-inventory calculation will reveal the need for more automated processes considering the accuracy of a manual inventory begins to erode immediately.

An automated asset tracking system can help by freeing IT personnel from the drudgery of scanning assets throughout the year and recovering their time for strategic projects. A successful automation program also will enhance key performance areas such as server consolidation and new application provisioning.

Physical Security

The off-network vulnerability of physical assets can be reduced or eliminated when their whereabouts are dynamically monitored with a wireless tracking system.

Servers and networked storage devices spend most of their useful lives mounted in a rack. While these semi-permanent locales house the greatest collection of sensitive corporate data, they are also likely to be protected by the most elaborate security measures in any given company. And yet, assets still get lost, misplaced or stolen. Especially, it seems, during the periods of time when they are outside of a server

² Symantec State of the Data Center Report, (2007), Symantec Corporation, pg. 17

facility for maintenance, overhauls, lease returns, data backup storage or end-of-life disposal.

A continually updated inventory, complete with documented changes to location and notifications of authorized and unauthorized movements, is the only way to guarantee that computing hardware is where it is supposed to be. Security audits are becoming more commonplace and are yet another strain on the resources of today's data center manager.

An automated asset tracking system can help organizations implement end-to-end IT Asset Management (ITAM) programs to account for servers, storage devices, laptop computers, and other sensitive items. The degree to which asset visibility measures are incorporated into an enterprise security scheme will have a direct correlation to their overall effectiveness; and to reduction of long term information technology expenditures.

Change Management

The leading causes of unplanned downtime in the data center today are change and human error.³

These factors outrank hardware failure, which might not be a surprise. But resolving hardware failure can be complicated by the inability of service personnel to quickly locate underperforming equipment and replace it in a timely fashion. This "find and fix" problem is often compounded by the inaccuracy of the data in a change control system. Even if we assume an accuracy rate as high as 97 percent, the number of incorrectly documented assets becomes unmanageable quickly.

Total # of Assets	Total # of Incorrectly Documented Assets
3000	90
5000	150
10000	300

³ "Your Earnings," Salary Survey 2007, Network World magazine www.networkworld.com/salary/2007/092407-total-job-title.html

The chances of misplacing and misdocumenting assets are increasing. With server consolidation on the rise and storage demands increasing, there is a pull-push battle to save money while moving towards more efficient hardware. This means that older equipment will be pulled in exchange for higher-capacity products. In some cases, serviceable surplus assets will sit in storage while virtualization strategies mature. Or perhaps they will be returned, removed or relocated by well-meaning and overworked administrators. In either case, these devices may escape the detection of manual inventory procedures and turn up missing on a routine audit, which could throw the IT organization into panic mode if any unsecured personal data was onboard.

It is difficult to quantify the costs associated with these undocumented or unauthorized changes. Even with seemingly airtight controls, equipment that is removed or relocated without the proper documentation may be seen as misplaced or stolen when an annual inventory is conducted. In today's environment, a server pulled for maintenance without universally available change management detail can have serious repercussions.

The provisioning of new applications and the maintenance of existing hardware have one common element: they need to be accomplished while ensuring minimum disruption to enterprise operations. Server-to-admin ratios are a key metric that any well-funded IT department keeps tabs on. But in any competitive endeavor, there is pressure to do more with less. The reassignment of headcount budget dollars to pay for new services or equipment is a common theme, and this has a direct relation to the human resources available for scheduled maintenance. Any unscheduled maintenance or downtime only complicates matters. Even as quarterly or monthly scheduled maintenance programs become automated, they are still force-fed asset data that is gathered by manual means.

An automated asset tracking system can help by feeding real-time asset location data into data center automation, inventory management and financial accounting systems to optimize change management programs and provide a redundant audit trail for an organization's activities.

Power and Energy

Advanced planning tools are now available to assist data center personnel as they administer moves, adds and changes to data center assets. With these upgrades, managers can specify the types of equipment that should populate a rack based on criteria such as power availability, space availability, heat and weight loads.

Since data centers are also under pressure to reduce their power consumption and heat output, these new modeling tools empower organizations by offering real-time data points which summarize their potential energy positions and temperatures. But again, real-time energy data is linked to manually collected asset data. In other words, incorrect assumptions about which assets are in which rack can lead to inaccurate planning.

Network discovery applications are often used to reflect an asset's location, but do not provide rack level granularity. Further, they are rendered useless when servers are off-network for maintenance or otherwise powered off.

The evolving nature of computing technology leads to a complex series of events when new hardware is deployed. As servers have become more powerful, their heat output and cooling requirements have risen dramatically. Blade architectures save space but draw more power to a concentrated area of a rack. Virtualization schemes result in formerly active servers being powered down to conserve energy—causing them to disappear from network discovery applications. The criteria used to populate data center racks and provide safe backup power while conserving energy leads to a virtual juggling act where servers are relocated to accommodate new systems.

An automated asset tracking system can help by marrying the actual asset data to planning data, which can be used to trigger change events whenever assets need to be moved. This level of real-time awareness boosts the value of data center modeling software and the potential contribution of any enterprise network power strategy to energy conservation efforts.

Lifecycle Oversight

For data center managers, the useful life of a server may be five years at best. For a services organization, an outsourced data center management contract might last four years. For a business, a typical lease on a piece of computing hardware might last three years. Advances in technology and the demand for new enterprise applications create an environment where servers and networking hardware are being provisioned, retired, serviced and moved among facilities in a frenetic fashion.

There have been cases where organizations were paying for extended maintenance on servers that were no longer in service. Without an automated asset tracking mechanism, an asset removed from a rack one day might be buried in a storage room or maintenance shop for months to come.

When the time comes to prepare leased assets for return or exchange, an orderly transition process is a requirement. When new hardware or virtual machines are deployed to replace outgoing servers, the opportunity for items to be miscataloged by manual processes is greatly increased.

In this environment, a bulletproof strategy for change management is continually challenged by the physical movement of owned and leased inventory. Even the most concrete IT security practices are put to the test when servers move outside the confines of the data center. In these circumstances, an organization's computing devices are also most vulnerable to loss, theft or misappropriation.

An automated asset tracking system can help provide a continuous stream of data to track and monitor assets from the day they are provisioned to the day they are retired. Moves, additions and changes are linked to continuous data generated from each device.

Summary

In large data centers, manually conducted inventories and audits share the distinction of being among the worst projects in IT. As a consequence, job satisfaction and employee retention can be adversely affected. Manual inventory processes divert precious (human) resources from critical maintenance projects and application provisioning. In addition, they introduce tainted or expired information into a world of increasing automation and real-time decision making. They pollute asset lifecycle management programs and lease-return programs with erroneous information. They introduce vulnerabilities into security programs and have the potential to undermine service level agreements.

An automated tracking system eliminates tedious inventory tasks, ensures that the location of devices is always accurate, enhances data integrity of data center automation, and improves security. Manual asset tracking and inventory processes are doomed to extinction as they are supplanted by continuous automated asset tracking systems, a prerequisite for true automation in the modern data center.



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