



RFID IT Asset Management in the Data Center



“In today’s headline news, yet another laptop containing sensitive personal information was reported lost.”

While virtualization has become the buzzword of the IT world, there are times when it’s critical for a company to know where their things are physically located. One missing hard drive containing sensitive information can cost a company a tremendous amount. Costs associated with investigation, notification, and remediation are accepted as \$95-\$305 per lost record, making the loss of a hard drive with as few as 100,000 records as costly as \$9.5 million or more. The loss of customer good will and company reputation may be even greater.

IT Asset Management

Security is not the only reason to maintain an accurate physical inventory. Driving an asset strategy that achieves goals for government compliance, energy conservation, accounting, and company policy begins with a physical inventory. Yet, with all of the technology in place to manage and configure high-tech components, the act of physically locating, identifying, and verifying those assets is often IT’s most low-tech operation.

Hardware asset management can be significantly improved through automation, but knowing which solutions will provide the best return on investment can be challenging. In moving away from a manual process, there are potential solutions that range from barcoding (easy but slow) to active RFID (complex and expensive).

RFID Asset Management

A barcode solution may be preferable to a manual inventory process, but it does not reach the full efficiency potential for IT asset identification and management. While barcode systems take inventory 2.5 times faster than a manual process, RFID asset management systems are over **12 times faster** than manual processes.¹ For true efficiency, one turns to RFID. But RFID is a relatively new technology for data centers, primarily because until recently, passive RFID tags suffered from interference around metal and simply didn’t work in data centers. Breakthroughs in passive UHF RFID technology have both eliminated this concern and created new and more attractive RFID options for data centers—options that data center managers may not know about or understand.

¹ IBM internal studies

Active RFID tags contain a battery and send out RFID signals using their own power. These emit strong signals and work on metal, so have been available for data center use. However, active RFID can be expensive and may be overkill in a data center environment.

The newer option, passive UHF RFID, is based on an antenna that stores identification data but does not emit a signal until powered and read by an RFID reader. In many ways, passive RFID is positioned in between the inefficiency of barcode tagging and the cost of active RFID—offering the ideal balance of responsiveness and cost. Unlike barcoding, passive UHF RFID tagging does not require line of sight or limit the simultaneous reading of multiple tags. It also offers a price point considerably less than the \$10 or more per tag of active RFID solutions.

Let's look at these options in greater detail, assessing more than just cost and efficiency. What factors are most important for data center asset management?

Performance Factors for IT Asset Management

- **Reliability** – Must respond consistently and accurately to read inquiries
- **Efficiency** – Tags must be easily deployed and read quickly
- **Cost Effectiveness** – Solution must provide a positive return on investment
- **Scalability** – Solution must work effectively with thousands of tags
- **Proactivity** – Asset movement must have Auto ID; that is, capable of being tracked without requiring direct action by the user

In this white paper, we'll take a look at each of these attributes in turn and evaluate each IT asset tracking solution against them.

Reliability of RFID Asset Management

If barcodes are essentially 100 percent reliable, RFID tags must perform equally well to be a viable option. Active tags, with their strong signal, meet this requirement well when first deployed. The reliability challenge with active tags is in the ongoing maintenance. With a battery life of 3 to 5 years, active tags require an infrastructure for battery replacement to maintain their high reliability levels.

Passive tags, on the other hand, require almost no maintenance; however, they are subject to interference if the wrong tags are chosen. Excellent read rates can be achieved if the correct tags are

chosen. Passive tags must be selected with consideration for the environment where they will be used. If tags will be placed on a mix of metal and plastic objects, or may be on carts or near doors of mixed materials, tags must be optimized to work both on and off of metal.

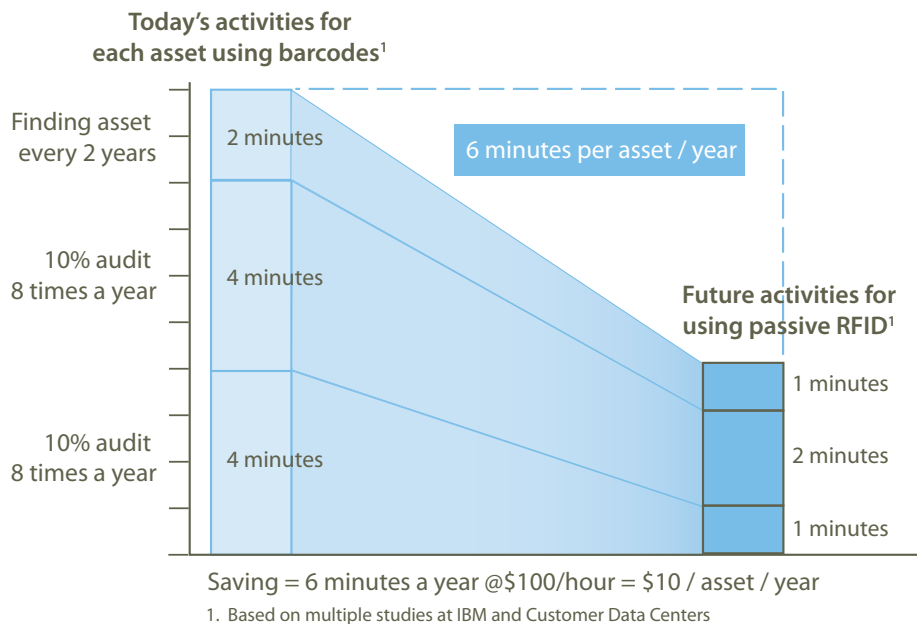
IT Asset Tracking Efficiency

In usability and efficiency, RFID IT asset tracking outshines barcode. Cables, awkward mounting, and distance from the floor can block line-of-sight, making it difficult and slow to read barcode labels. In contrast, RFID systems do not require line-of-sight contact to be read, so taking inventory using RFID systems is much faster than with a barcode system.

IBM tests in their own data centers have shown that a physical inventory can be performed twelve times faster with an RFID reader than by hand count, and four to five times faster than with a barcode reader². In other applications, passive RFID has been demonstrated to work 25 times faster than a barcode inventory³.

This testing means that a data center inventory can be completed significantly faster than before. The results IBM documented in their own data centers and at customer data centers was that 6 minutes per year, per each asset, is saved on inventory time; the equivalent of \$10 per asset per year. That's a significant savings when you have thousands of assets. As an added benefit, the resulting inventory count is likely to be more accurate than before.

Dollars Saved Annually by Replacing Barcode with RFID



2 IBM internal studies

3 Item-Level RFID for Apparel: The Dillard's RFID Initiative, by Dr. Bill C. Hardgrave — Univ. of Arkansas, May 2009

Cost Effectiveness

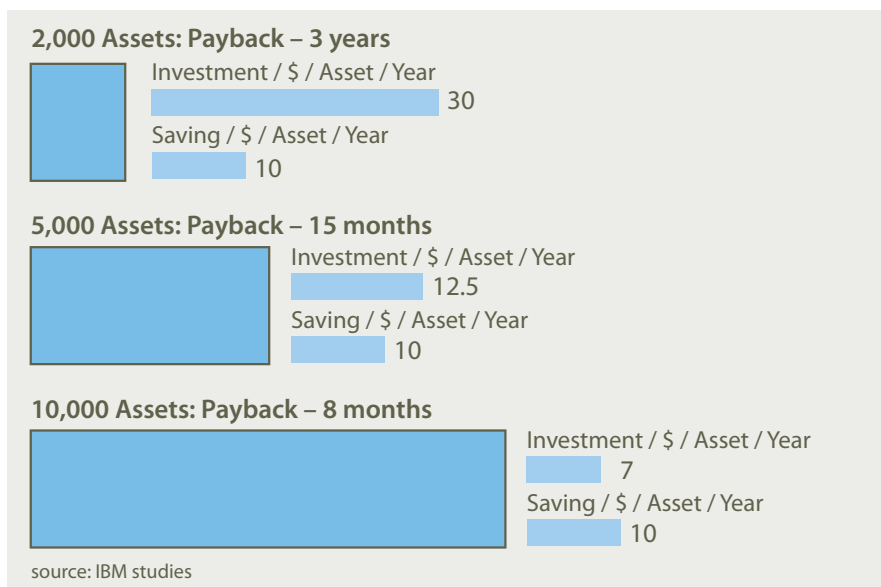
Calculating return on investment (ROI) on an RFID implementation is highly dependent on the application and the environment where it's being installed, so it can be difficult to make broad generalizations about how quickly an ROI will be reached. However, ABI Research conducted an End User Survey in 2008 with interesting results. 75% of respondents expected to reach a positive ROI in less than 24 months, with the greatest concentration—45%—expecting to reach a positive ROI in 9 to 18 months⁴.

In addition, IBM's data center studies calculate a return on investment in 8 months to 3 years, depending on the size of the data center. Based on a savings of \$10 per asset per year, a 10,000 asset data center can see a payback in just 8 months.

These ROI calculations typically consider the labor savings for taking inventory. RFID tags save money in other ways as well—RFID can help you manage maintenance schedules, authenticate product, track returned products or failure analysis, prevent loss or theft, and prove compliance with government regulations such as Sarbanes-Oxley. When all of these factors are taken into account, the return on investment for a robust asset tracking system is even higher.

The ABI Research study does not compare ROI for active vs. passive tag implementations, but we know that fewer than 5% of RFID implementations use active tags, and the average cost of active tags is 4 to 10 times higher than passive tags, with that differential likely to grow in the next few years⁵. Because the cost of an active tag system is significantly higher, active tags are typically deployed only when there is a need for constant, real-time data.

Data Center ROI for Passive UHF RFID Tags



4 ABI Research: RFID Survey (SU-RFID-101), June 2008

5 RFID Forecasts, Players, and Opportunities, 2007 to 2017, Raghu Das and Peter Harrop, IDTech Ex Ltd., pp. 65–66

Scalability of IT Asset Tracking Systems

For implementation purposes, barcodes are completely scalable. Because each one is read individually, there's no limit to how many can be placed in the data center. However, the larger the data center, the longer it will take for thousands of barcodes to be read, and the more time savings realized through implementation of RFID.

Implementing passive tags as a scalable solution in a data center is a matter of using a good system design that takes into account the appropriate distances for the data center layout. Choosing tags with too great a read range can create density and duplication issues, so that it can be difficult to determine which tags are in which racks. The right choice may be a shorter, not longer distance, such as the width of one aisle in the data center. Many implementations use mobile carts moving down one aisle at a time. With such a layout, passive tags can be extremely scalable and can result in very fast inventory capabilities for large data centers.

Often, active RFID asset tracking solutions are limited by the number of tags that can be in use at any one time. An active tag solution limited to 256 or 1024 tags will easily become overwhelmed in a densely packed data center. There are active RFID beacon options that can accommodate large tag volumes, but the number of active tags has a direct effect on the broadcast interval of the system, creating other limitations.

Proactivity and RFID Asset Tracking

Inventory errors are often created in non-routine situations. Personnel replacing failed equipment, and moving quickly to restore service to customers, may not take the time to immediately record which servers or disks were removed. Follow-up doesn't always happen, and the solution to an uptime problem turns into an inventory problem.

Unintentional transaction errors can be difficult to eliminate and can cause material issues with inventory management. One of the significant advantages of RFID over barcode systems is the capability of RFID to proactively log movement without direct user interaction. Laptop check-out and check-in procedures do not require removal of the laptop from briefcases; tool and equipment movement is tracked without relying on personnel to fill out forms. Because identification happens automatically, inventory is kept more accurate, theft and loss are minimized, and less time is spent on paperwork.

PASSIVE UHF TAGS IN THE DATA CENTER

Some industries, such as apparel, are beginning to use passive RFID tags. However, RFID has not been adopted in many industries because of the inability of passive RFID tags to work on or around metals and liquids. In particular, passive RFID has been wholly unsuitable for a data center environment, where metal and plastic are intermingled on racks. Omni-ID's RFID tag technology was designed specifically to address the need for passive UHF RFID tags to work on a variety of surfaces, including metal and liquids.

By capturing incoming RF waves and isolating them from their surrounding materials, Omni-ID's technology creates complete immunity from the material on which it is placed. Traditional dipole RFID tags were extremely unreliable in environments such as the data center; however, with its new technology, an Omni-ID RFID tag operates efficiently when attached to any item, regardless of its manufacturing material and contents. In a data center, electronics are often a mix of metal and plastic—in many cases, hard plastics that are difficult to distinguish from metal. Omni-ID tags work equally well on both surfaces, so can be used for all assets.

As demonstrated here, passive RFID is an excellent choice for IT asset management, providing much greater efficiency than barcode systems without the high cost of active RFID. With its new technology, Omni-ID now provides this option for data centers and other work environments where passive RFID was previously unreliable. Omni-ID has essentially opened up a new IT asset management tool for data centers.

CONCLUSION

After evaluating these 5 categories, we find that passive RFID offers a compromise between barcoding and active RFID. It provides the reliability and scalability of barcoding, with much greater efficiency and proactivity, yet without the high costs of an active RFID system. Passive RFID is the only solution that performs well in every category assessed.

Performance of Passive RFID:

- **Reliability** – Excellent read rates, low maintenance
- **Efficiency** – Read thousands of assets very quickly
- **Cost Effectiveness** – Lower implementation cost than active tags; lower cost to use than barcode
- **Scalability** – Scalable to meet the needs of very large data centers
- **Proactivity** – Asset movement tracked without manual intervention

Because passive RFID is now available in a format that works effectively on IT assets, data centers can now achieve the efficiency and accuracy gains of RFID with lower costs than active tagging solutions. IT managers now have another cost-effective choice besides barcoding; one that offers a scalable solution and proactive inventory tracking. Passive RFID can create significant reductions in the time and labor required to take inventory, delivering both cost savings and increased accuracy. Perhaps even more important, the reliable and efficient asset management system enabled by passive RFID creates security for sensitive data, so that the company is in full control of the location of critical and confidential information. For cost effectiveness combined with peace of mind—the best choice is passive RFID.

ABOUT OMNI-ID

Omni-ID is the leading supplier of passive, low-profile UHF RFID solutions. Through its patent-pending technology, Omni-ID “cracked the code” to overcome the problems traditionally associated with RFID, enabling a broad range of new applications that improve accuracy and efficiency in asset tracking, supply chain management and work-in-process. The company’s family of versatile RFID tags works reliably in the harshest environments—including on, off, and near metal and liquids—and excels in solving tracking and identification challenges with unprecedented accuracy. With major offices in Foster City, Calif. and in the UK, Omni-ID’s mission is to drive the widespread adoption of RFID technology as the optimal tracking and identification solution. For more information on [RFID Solutions](#), visit www.Omni-ID.com.

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