



White Paper

Asset Management Services

Asset Management Solutions provide a comprehensive and systematic method for managing equipment and intelligence in complex IT infrastructure environments. Through asset management, organizations are fully equipped to manage their entire inventory of technology and physical equipment, from acquisition to disposal, using advanced technologies such as Radio Frequency Identification (RFID) to increase the visibility of assets throughout their lifecycle.

Introduction

At its core, asset management is designed to help organizations manage their entire inventory of technology and physical equipment across the lifecycle, from acquisition to disposal. Asset management incorporates leading-edge technologies such as Radio Frequency Identification (RFID) to increase the visibility of assets throughout their life. Managing equipment and intelligence in complex IT infrastructure environments demands a comprehensive and systematic method – the solid foundation on which GTSI's Asset Management Solutions are built.

An automated asset management system, possibly incorporating the capabilities of RFID, greatly increases the accuracy and efficiency of performing and managing inventory. Labor intensive aspects of managing inventory are removed and margin of error is significantly decreased. A centrally managed database, intuitive interface, and ability to integrate with any existing backend database provide the flexibility necessary to maximize the efficiency of asset management efforts. By using a technology such as RFID, organizations have a system to track assets as they move within and between facilities, as well as the freedom to take inventory with technology more robust than barcoding.

Today's asset management solutions have many features that go beyond the capabilities of legacy inventory systems. Along with accelerating current processes, an automated asset management solution has multiple reporting capabilities to assist organizations in complying with government financial reporting. Also included is automated event detection with alerting capabilities that

help meet security and safety measures. What's more, an automated asset management solution organizes vital information about the assets so users are free to focus their efforts elsewhere.

Current State – Legacy Systems

Today's organizations face many obstacles when addressing the issue of asset management. From physical inventories to managing lists of assets and users, organizations often use out of date, cumbersome, and ineffective processes that make true visibility of assets nearly impossible. Some of the tools currently in use include spreadsheets, home-grown databases written by a long-since departed employee, or even clipboards and paper. Clearly, these are inefficient, prone to error, and difficult to use. Even a state-of-the-art barcode-based system requires a user to lay hands and eyes on every single tagged asset in order to make an accurate accounting.

Radio Frequency Identification (RFID)

RFID tagging is a transformational development that will ultimately change the way businesses plan, price, distribute, and advertise products. Within government enterprises, this technology is a significant leap, creating greater efficiencies, reduced resources, and increased security.

Until recently, a barcoded item would sit on a shelf and would not generate any data until it was scanned by a barcode reader. Even then, the data was read only once.

RFID, on the other hand, is a technology that does not require human interaction to scan. A reader can extract location and product description data from hundreds

of tagged items in milliseconds. The result is a data increase of more than one thousand times above traditional scanning methods.

The U.S. Department of Defense, Wal-Mart, Target, and many leading airlines have made enormous investments in RFID because they see it as crucial to reducing costs and improving operations and service levels. A growing number of innovative organizations are using RFID to manage their assets more effectively. In fact, the more valuable the assets, the greater the benefits of adopting RFID.

What is RFID?

Radio Frequency Identification (RFID) is a generic term for technologies that use radio waves to automatically identify people or objects. There are several methods of identification, but the most common is to store a serial number that identifies a person or object – and perhaps other information – on a microchip that is attached to an antenna (the chip and the antenna together are called an RFID transponder or an RFID tag). The antenna enables the chip to transmit the identification information to a reader. The reader converts the radio waves reflected back from the RFID tag into digital information that can then be passed on to computers and put to use. RFID is a flexible technology – a strategic part of an overall asset management solution:

- RFID works as a track-and-trace technology, even under very harsh conditions.
- Other technologies, like wireless, satellite, and barcode, can be used to extend RFID capabilities for increased visibility and security.
- RFID data can support many business goals – from asset management and inventory control to “zero-gap” security – but the data must be managed appropriately with analytics and automated processes for real-time decision making.
- Infrastructure management, network maintenance, security, disaster recovery, and help desk support become mission-critical when RFID data feeds core processes.
- RFID ensures that visibility can result in action; rapid, two-way communication channels must be in place for managers.

How does an RFID system work?

An RFID system consists of two parts: a tag made up of a microchip with an antenna, and an interrogator or reader with an antenna. The reader sends out electro-

magnetic waves. The tag antenna is tuned to receive these waves. Traditionally, industrial RFID has consisted of two distinct types: passive and active technology. passive RFID tag has no battery, drawing power from the field created by the reader and using it to power the microchip's circuits. The chip then modulates the waves that the tag sends back to the reader, which converts the new waves into digital data. In the past, passive technology had not matured enough to provide the read ranges, accuracy, and read rates that active tags could provide in an industrial setting. Today, however, passive tags can operate fully at a much lower price. Passive tags' read range is not as far as active tags — typically less than 20 feet vs. 100 feet or more — but they are less expensive than active tags and can be disposed of with the product packaging.

Active RFID tags have their own power source (typically a battery) and constantly transmit a signal that can be read by any reader in its range. The power source is used to run the microchip's circuitry and to broadcast a signal to a reader (the way a cell phone transmits signals to a base station). Active and semi-passive tags are useful for tracking high-value goods that need to be scanned over long ranges

What is the difference between low-, high-, and ultra-high frequencies?

Just as your radio tunes in to different frequencies to hear different channels, RFID tags and readers need to be tuned to the same frequency to communicate. RFID systems use many different frequencies, but generally the most common are low-frequency (around 125 KHz), high-frequency (13.56 MHz), and ultra-high-frequency or UHF (860-960 MHz). Microwave (2.45 GHz) is also used in some applications. Radio waves behave differently at different frequencies, so it is imperative to choose the right frequency for the right application.

How much information can an RFID tag store?

The number varies depending on the vendor and the application, but typically a tag carries no more than 2KB of data—enough to store some basic information about the item to which it is attached. Companies are now looking at using a simple “license plate” tag that contains only a 96-bit serial number. The simple tags are cheaper to manufacture and are more useful for applications where the tag will be disposed of with the product packaging.

What is the read range for a typical RFID tag?

There really is no such thing as a “typical” RFID tag, and the read range of passive tags depends on many factors: the frequency of operation, the power of the reader, interference from other RF devices, among others. In general, low-frequency tags are read from a foot (0.33 meter) or less. High-frequency tags are read from about three feet (1 meter) and UHF tags are read from 10 to 20 feet. Where longer ranges are needed, such as for tracking railway cars, active tags use batteries to boost read ranges to 300 feet (100 meters) or more.

What information is stored on RFID tags?

The tags most organizations use in the supply chain in the short term – and in consumer packaging in the long term – will contain only an Electronic Product Code. The EPC will be associated with data in online databases. Some information about the item might be accessible to anyone, such as what the product is, but other information, such as where and when it was made, will be accessible only to those to whom the manufacturer wants to make the information available. In an internal application, tags will contain a 96-bit unique identification number that will correspond to a relational listing in the middleware database containing details about the tagged asset.

Barcodes versus RFID

Both barcodes and RFID are non-contact technologies. You do not have to touch either a barcode or RFID tag to read or write it. However, there are significant differences between barcodes and RFID:

- Barcode readers require a direct line of sight to the printed barcode; RFID readers do not require a direct line of sight to either active or passive RFID tags.
- The radio signal transmitted to an RFID tag must bounce off some object to reach the tag or penetrate a material that does not absorb radio energy.
- With RFID, multiple tags within an RF transmission can be read simultaneously. In barcodes, the reader reads only the barcode at which it is pointing. When the trigger on the RFID interrogator is pulled, all the tags that can respond to the radio energy emitted by the reader are read.
- Data can be read or written to RFID tags.
- RFID tags can typically hold several times the data of a normal barcode. Popular, passive RFID tags hold between 96 and 256 bits of data. Active RFID tags can hold much more.
- RFID tags can be read at much greater distances; an RFID reader can pull information from an active

tag at distances up to 300 feet. The range to read a barcode is much less, typically no more than 15 feet.

- RFID readers can interrogate, or read, RFID tags much faster. Read rates of 40 or more tags per second are possible. Reading barcodes is much more time-consuming; because a direct line of sight is required. Barcode readers usually take a half-second or more to successfully complete a read. If the items are not properly oriented to the reader it may take seconds to read an individual tag.
- RFID tags are typically more rugged, since the electronic components are better protected in a plastic cover. RFID tags can also be implanted within the product itself, guaranteeing greater ruggedness and reusability.

Unique Item Identification

Use of Unique Item Identification (UID) has been mandatory at Department of Defense (DoD) since 2004, but it has not been enforced until recently. All DoD agencies are now required to implement UID technology. The Army’s ITES 2H contract, along with others, have UID requirements – this technology must accompany all orders for equipment of \$5,000 or more, or as dictated by the contracting officer.

DoD DFARS policy requires RFID to be placed on packages, cases, and pallets. Similarly, UID data elements with 2-D data matrix are required to be physically located directly on the item by label or Direct Part Mark. The UID data on the items is required to be associated with the RFID label data:

- On the item packages
- On the case containing these item packages
- On the pallet

Some important elements of UID include:

- Ability to distinguish one item from another
- Data integrity is maintained throughout the life of an item
- Unlike barcodes, UID tags implement a single standard based upon DoD requirements
- Contains a set of data elements for tangible assets
- Assigned by an enterprise

Benefits of Unique Item Identification

- Establishes a common key for data sharing and communication between suppliers and customers
- Increases efficiency and improves the tracking of items by requiring serialization
- Human and machine readable
- Provides an audit trail for entered items

- Enables easy access to information about possessions that will make acquisition, repair, and deployment of items faster and more efficient
- Radial form factor provides for the most data in the smallest area
- Item visibility regardless of platform or “owner”
- Lower item management costs
- Improved access to historical data for use during systems design and throughout the life of an item
- Improved inventory accuracy
- Reduced workforce burden through increased productivity

Real Time Location System

A Real Time Location System (RTLS) is a fully automated system used to track and identify the current locations of objects in real time using wireless signals. RTLS delivers information to authorized users via a wireless network through application software or application programming interfaces. Adding a location-tracking application to existing wireless networks gives organizations a simple, efficient means of staying up-to-date on the location of any tracked item.

RTLS typically consists of tags, reference devices for locating tags, data network, server software, and end-user application software. RTLS uses existing Wi-Fi (802.11a/b/g/n) standard access points as the reference devices for tag location and as the data network. Using standard Wi-Fi access points lowers the total cost of ownership of a GTSI RTLS solution and makes deployment straightforward compared to competing solutions that require proprietary reference devices and data networks. Wireless networks that are today used for data and voice provide an excellent platform for building accurate location-tracking systems. Because the GTSI solution uses the existing wireless network infrastructure, deployment is not only more cost effective, but does not interrupt network activities or affect other network communications.

With RTLS, the position of equipment and people is automatically updated and can also be delivered to other systems and personnel requiring the same information. This enhanced information flow ensures that assets are utilized more efficiently and workflow is optimized – all at significant cost savings. Moreover, the system enables additional automated functions, such as directing security personnel to the location where a tag alarm button has been pressed or a tamper switch activated.

Benefits of RTLS

- Delivers savings by allowing businesses to lower their equipment inventory through better asset utilization, as well as saving time lost searching for items and losses due to theft. Historical location information also can produce savings by allowing businesses to analyze data and optimize their business processes.
- Improves asset utilization in healthcare and manufacturing by showing where critical assets are at any moment. When the exact location of equipment is known, an organization can deliver the same results with a lower equipment inventory.
- Removes the bottlenecks in business processes, giving improved visibility, whether tracking a patient in a hospital, manufacturing parts in a factory, or overseeing the complete supply chain.
- Optimizes employee productivity by automatically locating mobile assets and personnel with speed and accuracy.
- Reduces theft by enabling accurate tracking of assets. The safety of key personnel is also ensured in such working environments as mines, hospitals, and corporate offices. In times of crisis, risk is immediately minimized by providing mobile call buttons and automatic location tracking via RTLS tags.

GTSI's RTLS solution is:

- A turnkey RTLS solution for real-time asset and people tracking over any existing Wi-Fi network
- 802.11 standards-based, “pure play” software solution that requires no readers; relies on patented location algorithms to deliver the most accurate Wi-Fi tracking in the industry
- Uses 2-way Wi-Fi tags for the greatest accuracy and functionality
- Offers open API support to integrate XML that plays well with ERP, CMM, and other systems
- Enables full visibility across geographically dispersed campuses without the need to install any software or hardware at remote sites

Enterprise Asset Management

Enterprise Asset Management serves as the foundation for an IT organization to measure and communicate the value it provides to the businesses it supports. Because of compliance and security issues and an ever-changing environment, IT demands a thorough understanding of the financial, operational, and contractual relationships of assets to allow the organization to increase return on its IT investment.

Modular Components

Enterprise Asset Management is made up of modular components enabling flexibility of the solution.

Inventory: The inventory module simplifies asset tracking by consolidating assets and each configuration item into a central repository. This repository allows users of all modules to view and utilize the information and see relationships to other assets. As servers and applications are consolidated, business units can share utilization and allocate costs correctly.

The inventory module is at the heart of every Enterprise Asset Management implementation. It defines and manages the complex relationships between assets, contracts, and costs, providing consistent and accurate inventory information.

Software: A Software Asset Management module provides a simple, standardized, and proactive way to manage software license compliance. Using a central repository of existing contracts, Software Asset Management associates software purchase invoices with each software license agreement. Contractual and expense data are also collected to provide reconciliation reports from the physical inventory stored in the Inventory Management module. Software Asset Management also manages entitlement to help control software usage costs and promote internal compliance. This level of control allows for greater software optimization, as the usage of assets can be attributed and tracked to enforce standard rules and policies.

Procurement: The Procurement/Purchasing module automates and streamlines the entire request lifecycle. It verifies each request against corporate approval standards by checking against a catalog of approved assets, provides comprehensive control over processes through visualization of approval workflow, and monitors existing stocks and budgets so that requests are filled through available inventory whenever possible. Users generate and reconcile purchase orders against assets received from the vendor. The Procurement module institutes controls over all procurement processes and enforces company standards, easily integrates with asset, service, and supplier catalogs, and enables out-of-the-box ERP integration.

Financial Management: The Financial Management module captures, monitors, and manages all costs associated with an asset, from acquisition through retirement, enabling comprehensive budget management. Depreciation of fixed assets may be calculated. Financial Management makes it easy to track costs associated with every asset at every stage in its lifecycle, including expenses related to capital and operations. IT organizations can easily report on these costs by budget, cost center, or total cost of ownership. Financial Management also associates and reconciles fixed assets with assets in the Inventory module, so management can fully understand the financial impact of asset service and disposition.

Chargebacks: The Enterprise Chargebacks module institutes invoicing and chargeback programs for specific business units. This automated cost-allocation process enables charges to be made consistently and in accordance with business rules. The Chargebacks module provides maximum visibility into the financial impact of IT support and services. Departments are empowered—and encouraged—to make informed decisions about the service and availability levels they request. Chargebacks' flexible design allows IT organization to issue chargebacks based on multiple events, such as a move, service, or asset. Calculations can be based on fixed cost, a percentage of the total cost, or usage, and can be easily applied to any entity.

Contract Management: The Contracts module simplifies, automates, and improves the business processes related to contract management. It tracks contract terms and conditions and sends automatic notifications of important dates, such as contract expirations. This module also provides critical data that helps your organization manage vendor relationships, and it forms the basis for future planning and negotiations. The result: lower total cost of asset ownership.

Cable Management: A Cable and Circuit module manages physical network connectivity inside and outside an organization's infrastructure, including local area network (LAN), wide area network (WAN), and technology for voice and data services. The Cable and Circuit module extends the repository in the Enterprise Asset Management system by collecting, managing, and reporting on information obtained about cable and

circuit data throughout the IT asset lifecycle, resulting in a reduction of costs and more effective management of the flow of work orders.

Web Services: A Web Services capability provides interoperability between software applications running on disparate platforms. Establishing a standard messaging framework, Web Services makes it easy for developers to naturally access objects within multiple and customized datafields. The open architecture allows for real-time integration and the simple exposure of objects to external applications. Web Services introduces enterprise applications as modular business services that can be easily integrated from different locations and reused. This helps establish truly flexible applications for an adaptable IT infrastructure.

Key benefits of employing a system of modular components with Enterprise Asset Management are:

- Enhanced management of the asset lifecycle
- Administration and prioritization of IT projects and associated costs
- Enabled management of complex business services
- Powerful and customizable workflow engine
- Management of asset lifecycle from request and procurement through retirement
- Powerful, centralized configuration management database (CMDB) to consolidate assets
- Works in conjunction with accounting and ERP systems to enable governmental compliance and reduce auditing costs, penalties, and over-purchasing

Enterprise Asset Management drives IT operations and decision making by:

- Aligning IT with business objectives, measuring total cost of ownership, and tying IT costs to business unit or department consumption
- Enhancing service and reducing asset costs by effectively managing contracts, leases, license agreements, and warranties, while avoiding potential penalties
- Extending hardware lifecycles and enabling fixed asset and invoice reconciliation
- Mitigating security and compliance risks by preparing for software audits and enabling system security and automated processes while also allowing for physical security planning and integration
- Providing advanced, scalable architecture
- Powerful customization and administrative tools with out of the box functionality

Conclusion

As mentioned at the beginning of this document, a comprehensive asset management solution is designed to help organizations manage their entire inventory of technology and physical equipment across the lifecycle, from acquisition to disposal. It requires an automated system that integrates with the backbone of an enterprise network and a software package that meets the needs of an organization based on sound environment assessments and business requirements, along with consideration of government security and compliance.

Costs of implementing a solution depend on the application, size of the installation, type of system, and many other factors. In addition to tag and reader costs, consideration must be given to middleware to filter RFID data. A systems integrator may be necessary to upgrade enterprise applications, such as warehouse management systems or to upgrade networks within facilities.

The costs of an automated asset management system, however, are offset by the tremendous increases in the efficiency and accuracy of performing and managing inventory. Processes are accelerated and no longer labor intensive, and the margin of error is significantly reduced. As a result, item management costs are decreased and workforce productivity is increased. What's more, through a centralized database, intuitive interface, and seamless backend integration, organizations gain the flexibility necessary to maximize the effectiveness of asset management efforts. Plus, by automatically organizing vital information about assets, a comprehensive system frees organizations to focus on what's most important – their mission.



GTSI Corp. is the first information technology solutions provider offering a Technology Lifecycle Management (TLM) approach to IT infrastructure solutions delivered through industry-leading professional and financial services. GTSI employs a proactive, strategic methodology that streamlines technology lifecycle management, from initial assessment to acquisition, implementation, refresh, and disposal. TLM allows government agencies to implement solutions of national and local significance quickly and cost-effectively. GTSI's certified engineers and project managers leverage strategic partnerships with technology innovators. These experts use proven, repeatable processes to design, deploy, manage, and support simple to complex solutions, to meet governments' current and future requirements and business objectives. GTSI is headquartered in Northern Virginia, outside of Washington, D.C.

©2008 GTSI Corp. All rights reserved. GTSI and GTSI.com are registered trademarks of GTSI Corp. in the United States and other countries. (APR08)