

# Asset Management Solutions for Improving Business Operational Efficiencies

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## Abstract

There is a lot of interest by customers and numerous past performances with asset management utilizing the RFID due to the ease of implementation during the start up period of the RFID market. Of the various business operations relating to asset management, the mechanisms and effects of “Inventory Taking,” “Lending Management,” “Location Management” and “Removal Management,” which have been converted into menu items, will be introduced.

## Keywords

RFID, asset management, passive tag, active tag, visualization, improved efficiency, real-time

## 1. Introduction

The RFID market has transitioned from a validation testing stage to a practical operation. In the current stage it is not only necessary to be able to resolve the issues of customers using the RFID, but it is essential to consider implementation with a variety of issues for RFID (such as costs, reading capabilities, standardization, building and installation).

In such circumstances the need to implement RFID increases, since the asset management of personal computers and instrumentation must be performed in closed systems (meaning articles are not distributed and basically relocations are possible within a specified range), articles subject to management are relatively expensive, tags are not to be disposed of while still attached to articles and management is emphasized from the perspective of information leaks. Applicable areas of RFID are shown in Fig. 1.

NEC has handled a number of systems since starting the asset management solution and the “RFID Manager,” a middleware that supports the solution, in March 2004. Utilization of the RFID in asset management, based on such experience, is introduced below.

## 2. Issues and Solutions for Asset Management

The importance of asset management has risen recently, due to a social background made up of “Information Leak Countermeasures,” “Security Countermeasures,” “Compliance” and “Enhancement of Internal Control.” Although the necessity of asset management may be recognized, however, in reality there are probably many customers who are conducting insuf-

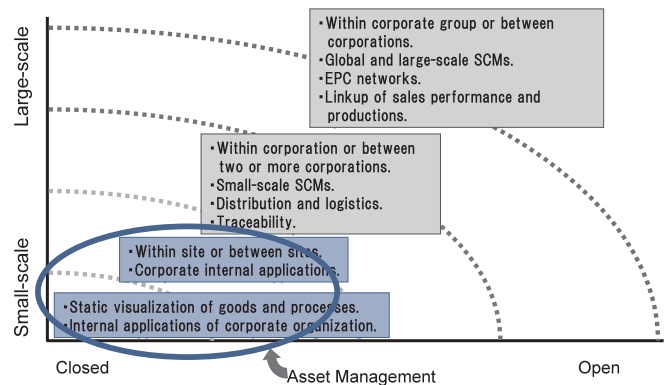


Fig. 1 Applicable areas of RFID.

ficient management or no management at all. Why would something like that happen? One of the probable reasons for this is that a large portion of asset management involves the matching of data with actual articles and any attempt to accurately manage assets results in an enormous amount of labor. We are hopeful that this problem of labor can be resolved by utilizing the RFID.

### 2.1 Management of Information that is Basis for Assets

The first issue would be when absolutely no tracking on the status of assets is being performed. Furthermore, there may also be situations when relevant information (owners, storage locations, contract information, etc.) may not be managed in a comprehensive manner or it may take an extremely long time to retrieve the necessary information, even though assets are being tracked. In such cases, it is necessary to first register the

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management information that becomes the basis for the management, before gaining a grasp on the actual status and pairing up management information with assets using asset management applications (asset management database) or equivalent software.

### 2.2 Verification Work on Management Information and Actual Status of Assets

Next, even when the status of assets is registered and a comprehension of the assets is gained, if the ongoing updating of information does not take place, there will be an issue when the management information does not match up with the actual status. More specifically, if the taking of inventories is conducted at a frequency of only once in about every half fiscal term, the asset status will change from the last verification, resulting in an enormous amount of verification work to be done through the matching of assets listed on management ledgers against the actual articles on the shelf, which would be quite a substantial task. Furthermore, there may also be duties that involve the management of articles that may be managed at a single location but are lent out as required in order to eliminate waste within a company. Some persons in charge may even omit entering the records into management ledgers as doing so may be tiresome, or human error can result in erroneous information registered on ledgers at the time of entry. If such instances exist, then it would be possible to improve efficiency and the accuracy of work by using RFID.

### 2.3 Real-time Management of Information

There may also be issues relating to difficulties for continuously monitoring losses, unauthorized removal and tracking the location of assets using the current systems. In the past it may have been adequate to take an inventory once every half fiscal term. In recent years, however, demand exists for a higher level of management due to a raised level of awareness regarding information leaks, including tracing the location of articles, as well as detecting removals. Such demand can be resolved by utilizing the functions of RFID, such as automatic detection and real-time features.

NEC is providing solutions by classifying various tasks relating to asset management in the manner shown in **Fig. 2**.

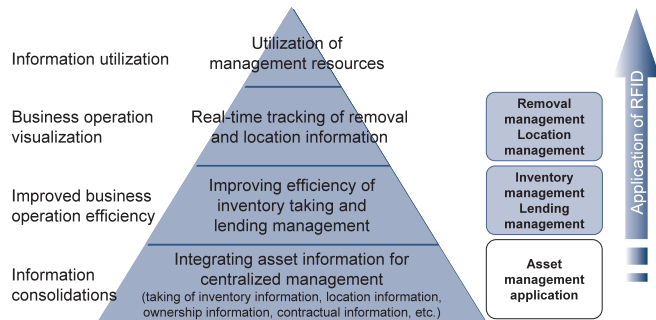


Fig. 2 Outline of asset management solution.

## 3. Benefits of Utilizing RFID and Examples of Utilization

Features of RFID include its non-contact characteristics (data can be read without attaching to the surface of articles or even if the surface of the tag is soiled), data can be read even when the distance between the tag and the reader is wide, while multiple tags can be read simultaneously. The benefits of utilizing RFID come from taking advantage of these features. Furthermore, how the issues mentioned in Section 1 (costs, reading capabilities, standardization, building, installation, etc.) will be resolved during operations would be a deciding factor for utilization as well.

Furthermore, even though RFID is a way of collecting information, it is in the form of digital data, therefore, such collected information is visible as it is and can easily be analyzed based on such visible information. The benefits increase further by utilizing such an analysis in management.

Utilization to suit the actual environment and the benefits are introduced below.

### 3.1 Inventory Taking

Taking inventories is one of the major issues of a business corporation. This is due to the fact that the items subject to management are large in number, making it difficult to accurately comprehend the status, while verification of the articles to make sure they are indeed items subject to management presents a formidable task. For example, when performing verification work to compare the records on paper ledgers with the actual articles, it is necessary to check the actual articles against the control numbers to ensure that the actual articles are indeed the items subject to management. In order to do this, a motion involving locating the control number attached

to the article and visually verifying it against a listing on the ledger must be performed. Locating a single article one at a time and finding the location where the control number is attached takes an enormous amount of man-hours and some human error can also arise through such a laborious process. Furthermore, when the information of assets is managed in digital data, the task of reflecting the results of checks made against the paper ledger must be performed on the database. Although it is possible to reduce the amount of work using bar codes, it is still necessary to locate the bar code and aim the reader at the location where the bar code is attached, thus this cannot be considered a breakthrough solution.

However, by using the RFID features, such as its non-contact characteristics (with a wide distance for reading tag information) and its simultaneous reading of tags, the verification work is made simpler.

Fig. 3 shows an example of a PDA (handheld-type reader) being utilized. An RFID tag is attached to an article and the location where the inventory is taken is entered onto the PDA (this can be done through such methods as the manual entry of information or the use of an RFID tag that indicates the location), the reader is brought close to the article and the information on the tag is read, then this information is compared with the information on the inventory ledger. Since detailed verification of an article's location and the verification of an asset number against the ledger do not have to be performed manually, it is possible to reduce man-hours and human error, as well as taking inventories in an efficient manner. Furthermore,

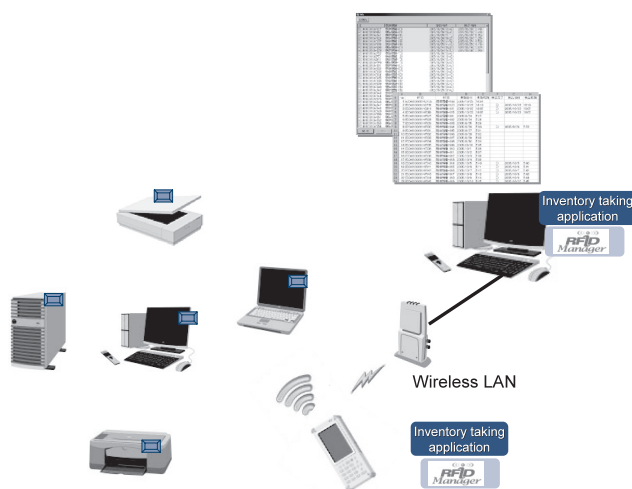


Fig. 3 An example of taking inventory using a PDA (handheld-type reader).

it is also possible to use a fixed-type reader rather than a PDA (handheld-type reader). In an actual task, a fixed-type reader was used to take inventory of media. Although it is necessary to take the media off the shelf, efficiency is still improved by utilizing the multiple reading feature (reading information off multiple tags simultaneously).

### 3.2 Lending Management

The task of lending equipment to other corporate organizations or managing equipment at one location and lending it whenever required, is not an infrequent occurrence in corporations. This type of corporate activity in the past would have been managed by entering the details manually into ledgers. Because details were entered by hand entry errors and omissions occurred (also abbreviating entries when the task became too tiresome), leading to a management that was not thorough. On the other hand by attaching RFID to the equipment for lending it is possible to improve the efficiency and accuracy of the work and enhance convenience by utilizing the information contained in the digitized data on those tags.

Fig. 4 shows an example of lending management. Lending information is registered or updated by reading the information on RFID tags, attaching RFID tags to articles and holding the reader against the tag at the time an article is lent out or returned. Since registration work is not performed through manual entry it is possible to prevent entry errors and omissions. Furthermore, it is also possible to automatically pair up articles with users if the RFID tags for specifying particular

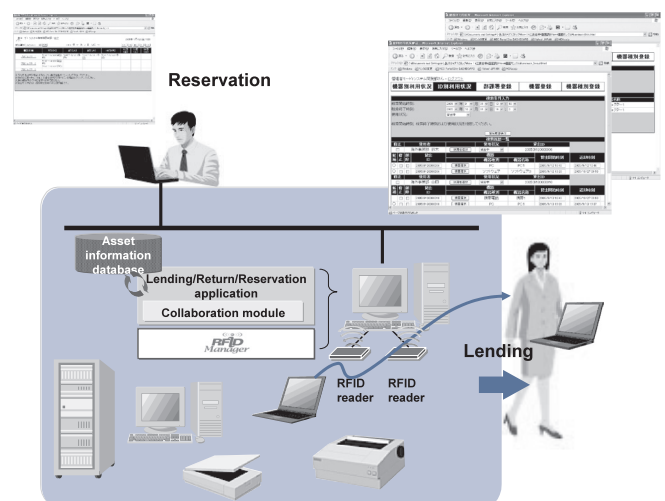


Fig. 4 An example of lending management.

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persons are also used for the purpose of user management. Also, since the operation is simple, it is possible to carry out the lending work without allocating personnel for that purpose. Moreover, it is also possible to make reservations for using articles, search for lent articles that are overdue to raise an alarm or verify the frequency of use of articles based on the accumulated lending information to effectively use the assets (for making decisions on purchases and the disposal of articles in the next fiscal term) by looking at the lending ledger.

In the actual task it is used for lending equipment, such as personal computers and servers. It is also contributing to a reduction in personnel costs, since it is not necessary to allocate personnel for the lending work.

### 3.3 Location Management

The raised level of awareness regarding information leaks in recent years created a demand for continuously keeping track of where articles are. Although it was technically possible to keep track of individual articles using conventional technologies, such as by attaching transmitters (GPS or wireless LAN devices), by utilizing the RFID, it becomes possible to keep track of the location of articles in a simpler manner and at a lower cost in comparison with conventional means.

**Fig. 5** is an example of taking advantage of the characteristics of active tags (tags have built-in batteries and emit information on their own) for utilization in location management. Active tags are attached to articles and readers are allocated to the locations where management work should be performed. It is possible to determine the location of an article by keeping track of which readers are detecting the information that is uploaded periodically from active tags. Since active tags eliminate the need for holding up a reader to a tag, it is possible to maintain real-time tracking of article locations without any operations. Furthermore, by adjusting the strength of the radio

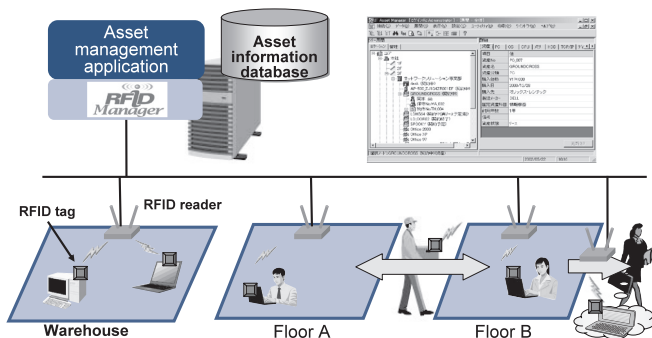


Fig. 5 Examples of locations where active tags are used.

waves emitted by these tags it is possible to vary the density for specifying locations. By matching the storage location or usage location, registered on the asset information database against the actual location of the article, it is possible to keep track of whether important assets are being stored or used at appropriate locations or to trace the movement history of articles and use the information to prevent information leaks.

In the example of an actual application it is used to manage expensive instruments.

**Fig. 6** is an example of taking advantage of the characteristics of the passive tags (tags that do not emit any information on their own) for utilization in location management. Passive tags are attached to articles and readers are allocated at locations (doorways) where management work should be performed. The person moving the article holds the article (tag) against the reader when the article is being relocated, to upload information of the tag to the system. Although utilization is similar to that of active tags, the action of holding the tag against the reader is necessary, unlike management with active tags. On the other hand, since the cost of passive tags are lower than that of active tags in general and as no batteries are built into passive tags, presenting a less bulky form, the system is relatively easier to implement.

### 3.4 Lending Management

Advancing the location management a step further, there is demand for detecting the unauthorized removal of articles. This is a means by which an alarm is triggered when an article with an attached tag is removed beyond a prescribed range. With this system, detection and inhibiting effects of unauthorized removal are anticipated.

Various combinations are possible as methods for sounding the alarms. Screen displays, beep sounds, lamps and telephone call notifications to managers can all be considered.

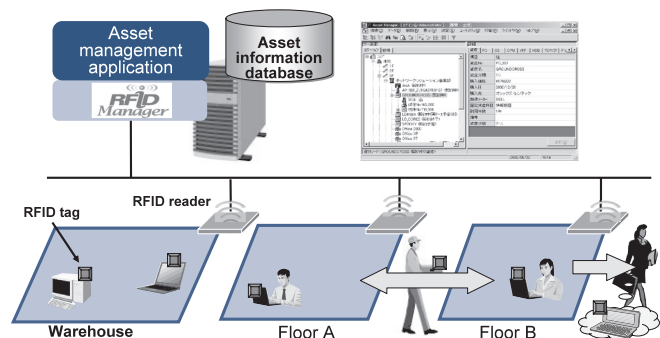


Fig. 6 Examples of locations where passive tags are used.

## 4. Conclusion

It is important at the moment for proposals to provide the necessary effects, within the possible range, with an understanding regarding the problems inherent to RFID, as an RFID market is about to emerge. An asset management solution is a menu itemization in such undertakings and we hope to continually respond to customer requirements in the future, while keeping track of the market and technology trends.

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