Exploration and Practice of Accurate Asset Management in Data Center

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Abstract

Recent years have witnessed a spurt of progress in information technology, the asset management of university data center extends from hardware equipment to virtual resources, with a wide number of resources, diverse categories and complex structure. Based on the current data center asset management, this paper analyzes the problems in asset management, uses information technology to accurately describe all kinds of assets in the data center, and uses convenient two-dimensional code technology to better solve the asset management problems such as information sharing, maintenance and change, important asset inspection and account inventory, so as to realize the life cycle management of data center assets.

Keywords

Asset Management; Virtual Assets; QR Code.

1. Introduction

In recent years, with the rapid development of big data, Internet of things and artificial intelligence technology, the pace of informatization in colleges and universities has gradually entered the stage of smart campus construction, the rapid implementation of new technologies and new architecture applications, the blowout growth of data center computing and storage resources, accompanied by new resource delivery methods such as virtualization and cloud platform,Data center assets have gradually changed from traditional hardware assets to mixed assets including hardware and virtual assets. The difficulty and complexity of management are increasing day by day. Therefore, the daily operation of data center has a more in-depth demand for combing and scheduling information assets. It is imperative to build an efficient and convenient asset management mode by using information means.Based on the data center of Southwest Petroleum University, this paper uses information means to build a set of asset management and operation guarantee mechanism to achieve the management objectives of accurate management, rapid positioning and convenient maintenance of information assets.

2. Current Situation of University Data Center Asset Management

Data center assets are important information infrastructure in colleges and universities. Their contents include physical equipment of data center, virtual assets derived from the operation of information business, etc.In the early days, data centers mainly relied on manual document registration, electronic account management and other modes to manage hardware assets.With the continuous evolution of data center from traditional data center to virtualization and Cloud Architecture, the connotation of asset management has changed fundamentally. At the same time, the extension of asset scope makes the asset scheduling of data center more complex.In daily management, due to the untimely updating of asset information, imperfect information sharing mechanism, changes in managers and non-standard handover, asset management has gradually become a management dilemma.The traditional paper-based or electronic account

management can no longer meet the needs of data center management and business operation.Unclear assets will not only cause confusion in asset management itself, but also have a far-reaching impact on the daily operation of data center business.

At present, in the industry, asset management technologies based on data center mainly include RFID technology management, information system management, traditional electronic account and other management modes. RFID technology can quickly identify equipment identification, information system can digitize asset information, and hardware equipment modularization can make management independent.These technologies can better solve the management of physical assets and some virtual assets from different dimensions and management perspectives.However, it cannot fully meet the complex management requirements of the data center, nor can it accurately describe the association relationship of assets.At the same time, because the actual application scenario of RFID is relatively single, the latter two modes also lead to asset data distortion due to poor timeliness of data collection and complex user participation process, which increases the difficulty of later management.[1][2]

3. Current Situation and Existing Problems in the Early Stage of Asset Management of Our Data Center

During the construction of the data center of Southwest Petroleum University for more than 10 years, management measures such as electronic account, labeled identification and asset related account description have been taken in the early stage of asset management.These measures have achieved some management effects in a certain stage. Combined with the actual needs of operation and maintenance, they have been continuously improved and improved. The following will elaborate the problems and improvement measures faced by the early asset management of our data center from four aspects.

3.1. Hardware Asset Labeling Management

Equipment identification is an important management measure for rapid positioning equipment. In the early stage of management, the data center of Southwest Petroleum University identified the equipment assets one by one by printing text labels in batch.Then the two-dimensional code technology is used to replace the text tag, which increases the amount of asset tag information.Whether text tags or two-dimensional code tags are adopted, although the requirements of equipment positioning and information query are solved to a certain extent, the two management methods themselves use solidified information to realize query. However, with the frequent resource scheduling, this solidified tag mode does not identify assets in time, and the problem of inaccurate information description is highlighted.[3]

3.2. Ledger Asset Management

The purpose of establishing the account is to clarify the assets. The school's equipment management system can not accurately describe the virtual assets and asset relationships. Therefore, in the early stage, the data center still used electronic account means to gradually establish equipment account, classified equipment account, virtual machine account, operating system account and other accounts,All kinds of assets in the data center have been effectively managed for a period of time.Although this management method is simple and low-cost, it also fully exposes the inherent weakness of its document management mode. The most obvious pain point is that the consistency of various account data cannot be guaranteed. Its closeness further affects the timeliness and sharing of account maintenance, resulting in cumbersome and inefficient account proofreading,Seriously affect the normal progress of asset management.[4]

3.3.   Weak Correlation of Asset Information

Asset information association management is a new requirement in the operation of data center.Because of the traditional electronic document management of assets, the association management between asset information is relatively weak. With the increase of the number of accounts and data, the workload and management difficulty of Information Association and comparison are further exacerbated. The inaccurate and unclosed information of various asset accounts is called a major difficulty of asset management.

3.4.   Human Factors in Asset Management

In management, we find that human factors have a far-reaching impact on asset management.On the one hand, it is the problem of management awareness. Most asset managers and users are in a passive situation in the process of asset information management. The standards of asset information management are difficult to unify, supervise and control. From the perspective of people, it is also easy to cause problems such as unsealed and untimely asset data.On the other hand, with the deepening of fine management and under the high pressure of operation and maintenance, the traditional asset management methods have formally exacerbated the difficulty and complexity of asset management, which intensifies and weakens the enthusiasm and initiative of asset management. [5]

4.   Accurate Management Mode and Practice of Information Assets

Combined with the actual operation and maintenance work, based on the hardware asset information management and taking into account the virtual assets, a comprehensive information system is used to realize the whole life cycle management of hardware and virtual assets, as shown in Figure 1. Realize the accounting and accurate sharing of hardware asset information, the in-depth application of rapid asset identification, asset layout and maintenance diagram, and realize the inventory and asset related management of various assets.The two-dimensional code link technology is used to integrate and unify the three functions of equipment information identification query, equipment information management, equipment inspection and equipment inventory, and completely solve the pain point of "the last 50 meters" of data center asset management.The following will be described in detail from three aspects.
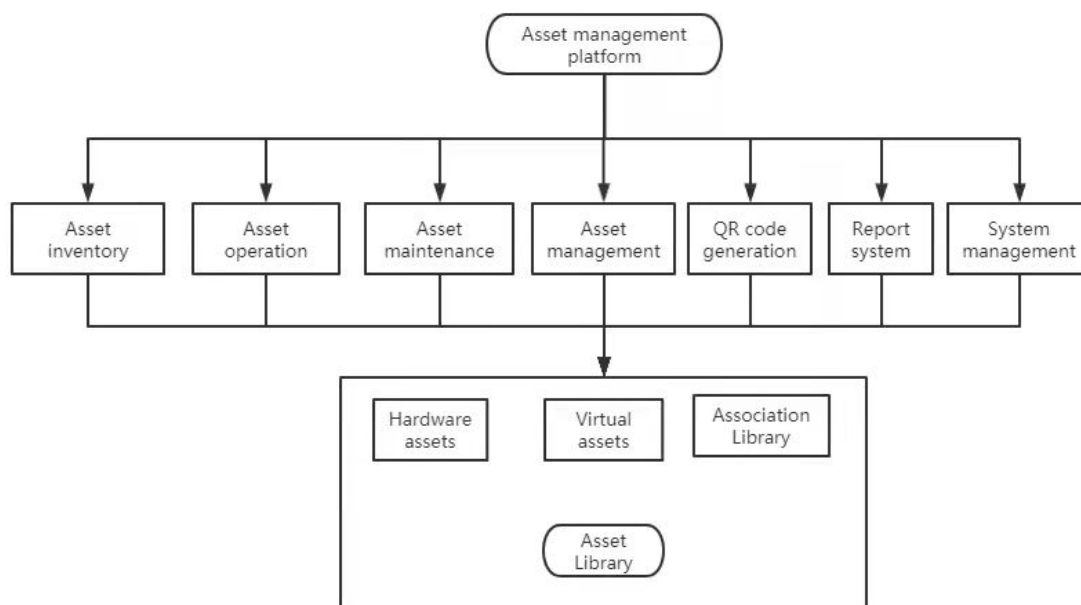

Figure 1. System architecture diagram of asset management platform

4.1. Accounting of Software and Hardware Asset Management

With the help of self-developed information system, the traditional paper and spreadsheet management mode is transferred to the information system to realize the accurate description of assets and the management of asset operation process.

Hardware assets take the basic information such as equipment number and equipment factory number as the core data source, and the data comes from the interface provided by the school equipment management system to ensure the consistency of key information of hardware assets. According to the operation and maintenance requirements, the multi-layer equipment layout description model based on cabinet, chassis and equipment and the extended information description model such as configuration and maintenance are established. It basically realizes the dynamic management of the life cycle of equipment on-line, operation and off-line.

Virtual assets are described in multiple dimensions. The vertical hierarchical description of virtual machines and physical clusters is established to realize the fine description and definition of virtual assets.

4.2. Asset Relevance Management

(1) Rich asset tag identification

The system provides three ways to describe assets.The first is to describe the fixed information such as asset number and purchase time as the main information. The second is to maintain the frequently changing extended information such as operating system, IP and web services by linking two-dimensional code to the maintenance interface.Third, map and describe the correlation of various assets, establish weak correlation, and ensure the logical consistency of associated data through algorithms.[6]

(2) Asset graphical output management

The sorted asset ownership list can flexibly present the ownership list and arrangement diagram documents of cabinet and chassis, chassis and equipment, and can be directly pasted on the cabinet and chassis after printing, which is convenient for personnel to quickly locate the assets after entering the site.

(3) Multi dimensional asset query

Multidimensional asset visualization enables accurate classification and rapid query statistics of asset information.The system provides multi-dimensional asset statistics query from the perspective of hardware, application, database and storage.For example, if you need to query an asset based on the application perspective, you can obtain the virtualization host, database and network switch it uses, and further drill down the information to obtain valuable operation and maintenance statistics such as the physical host and storage used by the virtual machine.

Multi dimensional statistical query provides an efficient model for data center resource statistics. Instead of the traditional Account Comparison and sorting, you can obtain the quantitative data of computing resources and storage resources based on various classification statistics by making statistics according to classification.

(4) Asset convenient management

The system provides rich asset management operation modes to meet the daily needs of asset management.The first is the asset maintenance mode. In this mode, the extended information of resources can be maintained in time, the computer terminal and mobile terminal can work at the same time, and the QR code scanning link can be used to navigate to the maintenance module to realize the zero distance maintenance of asset information;The other is the asset operation mode. In this mode, the QR code is linked to the asset inspection module to realize the code scanning and inspection function of important assets such as storage, virtualization cluster and other important equipment and facilities. This inspection function supports the

filling of inspection records.The third mode is the asset counting mode, which is mainly for the counting of hardware assets. The QR code is linked to the asset counting module to realize the function of regular and accurate counting of assets by scanning the asset code.[7].

5. Conclusion

To sum up, this paper proposes to take the accurate description of assets as the core, integrate the QR code scanning function to realize a variety of application scenarios of asset system management, effectively solve the practical problems faced by the asset management of our data center, and build a set of feasible and cost-effective asset operation and management mechanism, which provides a certain reference value for asset operation and management in the data of other brother universities.

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