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Software Asset Management (SAM) and Tools: A Comprehensive Research Study

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Abstract
Software asset management (SAM) is the process whereby organizations manage software assets during their lifecycle from procurement to deployment and compliance and even optimization and retirement of the assets. The software has been a crucial organizational asset, especially in the current times when it continues to grow complex with time because of the introduction of new technologies such as cloud computing and subscription-based licensing. There have been significant changes in the way SAM is conducted (from simple processes such as the use of on-premise Excel sheets in SAM practices of procurement, deployment, entitlements, and re-harvesting). These changes indicate the rapid pace at which technology is evolving and regulatory compliance issues faced by firms worldwide are also evolving. Therefore, organizations looking to optimize the software, save costs, and ensure adherence to regulations in increasingly dynamic IT ecosystems require SAM solutions. Improper software management could lead to loss of money, fines, risks, and operational inefficiency. This research paper provides an analysis of the idea, lifecycle, and significance of SAM, followed by the increasing significance of SAM tools for the management of hybrid and cloud computing IT infrastructure. This paper also includes a comparison analysis of some popular SAM tools including Flexera One, ServiceNow SAM, Snow License Manager, ManageEngine Asset Explorer, and Microsoft Endpoint Manager. Major obstacles faced during the implementation of SAM have been covered. Future perspectives such as AI-enabled SAM, continuous compliance management, and SaaS governance have also been discussed.

Keywords: *Software Asset Management; Cloud Computing; SAM Tools; Flexera; ServiceNow; Snow Software*

1. Introduction

In modern enterprises, the use of software plays a crucial role since it helps in storing data, processing transactions, handling customer interactions, conducting business through the supply chain management process, and communication. Almost any sphere including education, medicine, manufacturing, banking, and governmental agencies uses software in their activities. Businesses spend much money buying licenses, subscriptions, and maintenance for them due to the increased use of software. Nowadays, the management of software assets becomes increasingly difficult due to changes in license agreements and complicated IT infrastructure. Software companies such as Microsoft, Oracle, IBM, SAP, Adobe, and VMware usually have strict requirements concerning the terms of licenses. Non-compliance may result in fines and other unpleasant things. According to statistics, the risk of non-compliance with software licenses is one of the most frequent reasons for extra costs of IT departments in large companies having numerous devices and many users. Meanwhile, it happens quite frequently when businesses purchase too many software licenses. They do it because they cannot evaluate the number of licensed employees. Such excessive investments complicate and make business operations costly and inefficient. According to industry sources, a significant share of software licenses remains unused annually. Thus, proper asset management can result in considerable savings. The practice of organizing and managing the assets in a manner suitable for effective software asset management allows ensuring that the use of software solutions is both legal and economical. It becomes

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obvious that besides its primary function of an IT support tool, software asset management plays a vital strategic role. In the contemporary environment, the modernization of SAM implies extensive use of automation tools since the conventional spreadsheet-based approach is ineffective in case of complex cloud and SaaS deployments [1]. As per the general definition, software asset management comprises the systematic monitoring and management of an organization's software assets throughout their entire life cycle. Such processes include asset acquisition, licensing, deployment, use, monitoring, renewal, and disposal. Effective SAM ensures the rational use of software resources in compliance with the vendor agreements. According to the ISO/IEC 19770-1 standard, SAM is a collection of practices aimed at managing software assets within an organization while adhering to relevant regulatory compliance requirements and minimizing expenses [1]. The ISO/IEC 19770-1 standard provides you with the opportunity to adopt SAM strategically, including planning, developing policies, monitoring your inventory, conducting compliance reviews, and implementing improvements. SAM is comparable to IT Asset Management (ITAM), yet it involves managing only software assets and not hardware. SAM involves licensing tracking, subscription management, application management, management of cloud-based services and databases, and management of enterprise software systems. Modern SAM also covers SaaS management since its licensing model depends on subscriptions that change regularly (ITIL v4, 2019) [2]. Businesses' reliance on SAM continues to grow because of increased complexity in the usage and licensing of software. Compliance management is one of the critical reasons why companies adopt SAM practices. License compliance becomes mandatory, and any non-compliance may result in legal penalties and fines. According to Gartner reports, businesses without adequate SAM frameworks will experience more frequent audits and face financial losses [8]. Saving money is yet another crucial consideration for SAM. Organizations ends up spending unnecessary money due to purchasing unused licenses, unnecessary subscription renewal, or failure to recover licenses from departed personnel. Software Asset Management is recommended in order to minimize the financial losses caused by software waste as reported by Flexera's ITAM report [3]. Furthermore, SAM increases the level of cybersecurity within an organization. Lack of SAM might result in malware attacks and cybercrimes since unmonitored software might act as a gate to such malicious activities. Shadow IT is another huge cybersecurity risk. Some benefits mentioned in relation to the latest version of ITIL (Version 4) include proper risk management owing to identification of unauthorized assets and timely updating of the software (ITIL v4, 2019) [2]. Efficiency in performing various tasks constitutes yet another key benefit of SAM. Manual software license and use management entails laborious and cumbersome activities as well as being prone to errors. SAM allows an organization to achieve efficiency in its operations by minimizing time-consuming activities. Finally, SAM allows creating software usage reports easily and effectively [4].

2. Software Asset Management Lifecycle

The Software Asset Management process involves lifecycle management, which provides for effective asset management throughout its entire lifecycle. The lifecycle begins with planning and requirement analysis. In this stage, an organization considers its business requirements and defines what software it requires. Effective planning will ensure that there is no wastage in the purchase of software and that the software is in line with the goals of the organization [1]. The second stage is procurement. In this stage, software licenses and subscriptions are purchased and procurement documents kept [8]. Installation comes next after acquisition. The software is deployed on the end-user device, server, or cloud environment. Controlling installation becomes crucial as it prevents any unauthorized installations. Automated deployment tracking features are available within many SAM tools to verify whether the software is used as per its license purchase [7]. Monitoring and usage tracking is the most vital part of the entire lifecycle process. This stage guarantees that the deployed software is utilized. Enterprises discover that a considerable number of installed software are not actively used. SAM tools help identifies how frequently the software is used and propose

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optimization measures [5]. The next activity involves maintenance and renewal management. This entails applying software patches and updates as well as managing subscriptions. Renewal should be done depending on software usage. Finally, there is software retirement. Retirement involves uninstallation of software, cancellation of subscription, and record updating for accurate compliance reporting purposes. Under some conditions, the licenses can be re-harvested and reassigned [3].

3. Literature review and Role of SAM tools

Literature studies consistently prove the significance of SAM in decreasing IT costs and risks. Literature proves that organizations usually face challenges with keeping track of their IT inventories owing to distributed IT architecture and remote workers. As a result, there is usually an absence of proper tracking of licenses leading to higher vulnerability to audits [8]. According to Flexera's annual survey related to ITAM, companies spend a considerable part of their software budget on unused licenses. It proves that automated processes are important to prevent overspending and usage inefficiencies [3]. There is another research topic worth mentioning: SAM and its relation to cybersecurity. ITIL documentation suggests that asset management is useful in minimizing vulnerabilities by detecting outdated or unauthorized installations (ITIL v4, 2019) [2]. Moreover, according to Snow Software reports, the rise of subscriptions to SaaS applications presents additional challenges for organizations in terms of license control as SaaS subscriptions are constantly changing [5]. According to literature sources, licensing models are becoming increasingly complicated. The reason for this statement is Oracle and IBM licensing practices which are usually based on processor and virtualization calculation. This complexity makes compliance management hard without specialized SAM tools [1]. SAM solutions represent automation instruments to help users deal with software assets. These solutions make use of network discovery and scanning of the endpoints, servers, and cloud infrastructure to detect software installed on computers. SAM keeps the information about the installed software, such as its name, version, publishing company, installation date, and location within a computer's structure. Moreover, SAM tracks the data about entitlements; they include licensing agreements, subscription data, expiry dates, and purchase documentation. Entitlements are compared with installations to find cases of under-licensing or over-licensing. According to ServiceNow, one of the key capabilities of SAM solutions is the possibility to create reports to ensure compliance; compliance reports can be created in case an organization is going to pass through a vendor audit [4]. The third task related to SAM is optimization. Reports generated by SAM solutions can indicate which licenses are underused or not used at all. Such licenses can be taken back and redistributed among other users to reduce procurement expenses. According to Flexera, license optimization is one of the key areas where money can be saved with regard to enterprise IT [3].

4. Comparative Study of Major SAM Tools

4.1. Flexera One

Flexera One is considered among the best SAM solutions. The reason why large corporations extensively use Flexera One is that it has the capability to handle intricate license management processes and provides insights into compliance. Flexera has excellent discovery tools and supports hybrid IT environments, such as on-premise, cloud, and SaaS solutions. The solution by Flexera also comes with comprehensive reporting dashboards that provide information regarding compliance levels, licensing usage, and optimization opportunities. Moreover, Flexera is highly effective when it comes to handling intricate licensing processes for particular vendors, such as Oracle processor licensing and IBM PVU licensing. According to Flexera documentation, the tool is designed to reduce audits and optimize licenses [3]. Nevertheless, the high cost and need for skilled staff makes it complicated to utilize.

4.2. ServiceNow Software Asset Management

ServiceNow SAM is one of the components of the ServiceNow ITAM solution. It is most efficient due to its seamless integration with ITSM processes and the CMDB database. ServiceNow SAM automates the approval process, license distribution, compliance management, and notifications for renewals. According to ServiceNow, the SAM module is a

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platform providing end-to-end management of service operations and software assets in one platform [4]. Hence, it is most effective for companies using ServiceNow ITSM processes. The biggest drawback of this solution is its high price and integration with the ServiceNow environment.

4.3. Snow License Manager

The Snow License Manager is noted for its high-quality software usage analysis and reporting capabilities. The product provides thorough information regarding the consumption of the software, enabling businesses to identify unutilized licenses. According to Snow, its solution includes features for managing subscriptions within SaaS applications, an area that has become very relevant in current IT systems [5]. The product works well for mid-sized and large enterprises but requires proper configuration during implementation.

4.4. ManageEngine AssetExplorer

ManageEngine AssetExplorer provides a cost-effective way for Small and Medium Enterprises (SMEs) to implement a SAM solution. This tool possesses some important SAM functionalities, including managing software inventories, managing licenses, managing purchase orders, and generating reports. As indicated in ManageEngine documentation, AssetExplorer can be used for the management of both hardware and software assets, which makes this product ideal for organizations with tight IT budgets [6]. Nevertheless, this software cannot perform sophisticated optimizations or handle vendor-specific licensing information.

4.5. Microsoft Endpoint Manager (SCCM and Intune)

While Microsoft Endpoint Manager (SCCM and Intune) is predominantly a product used in endpoint management, it can offer inventory, deployment, patching, and monitoring features. The Microsoft website mentions that Enterprise Management with Microsoft Endpoint Manager will enable organizations to manage devices and applications, which is helpful when managing software installations on Windows [7]. Nonetheless, SCCM alone cannot be considered a full SAM tool, owing to its lack of license compliance intelligence capabilities. Companies use other products such as Flexera and ServiceNow alongside SCCM to get SAM functionality.

5. Challenges in SAM Implementation

While there are several benefits, SAM deployment comes with many obstacles. First, there is an issue with licensing. Vendors have different ways of establishing their licensing requirements. There are complicated calculations for certain licensing models such as the one used by Oracle, which is processor-based; IBM, which is PVU; and Microsoft, which is user-based and subscription [8]. The rise of cloud computing services and SaaS has created other difficulties. SaaS subscriptions have dynamic user permissions, while cloud resources have auto-scaling capabilities. In the absence of constant monitoring, companies can waste money on unutilized SaaS subscriptions or incur compliance violations due to unlicensed user accounts [5]. Shadow IT represents another problem. Employees might purchase unlicensed software, leading to security concerns. According to ITIL documentation, illegal software raises the probability of data breaches and malware attacks [2]. Data quality is another challenge. SAM tools rely on accurate discovery data. Endpoint scanning can be hindered by firewalls or remote devices. As a result, inventories will lack proper information, which will generate inaccurate compliance reports. Skills shortages have an impact on SAM's adoption too. SAM necessitates the ability to understand licensing policies, vendor agreements, IT systems, and auditing. The deficiency of qualified SAM staff results in poor SAM performance.

6. Benefits of Effective SAM

Proper SAM implementation could result in considerable cost savings. Optimization of licensing allows for cutting back on unnecessary spending since unused licenses would be identified, and the process of reclaiming licenses could begin. Flexera claims that companies could reduce their software expenditure by a huge percent by optimizing licensing processes effectively [3]. Compliance will be increased by implementing SAM. Preparation for audits helps avoid any penalties and facilitates good relations with vendors. According to Gartner, companies with well-developed SAM systems have fewer problems in audits and get better outcomes during negotiations [8]. SAM also contributes to improving cybersecurity. By eliminating

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unauthorized software and making sure that the system gets updated, SAM decreases potential risks. ITIL stresses that asset management is an important part of IT security governance [2]. Operational efficiency will also be positively affected by SAM.

7. SAM in Cloud and Hybrid IT Environments

Cloud computing technology has drastically changed how software licensing is used. In traditional software licensing, the use of the software was always fixed, while cloud computing uses subscription-based and pay-per-use methods. The hybrid approach of IT systems consists of on-premises infrastructure and cloud-based services; hence, there is a need for asset visibility across both environments. The modern-day SAM software integrates with cloud computing service providers such as AWS and Azure to track the utilization of cloud resources [4]. There is also a need to manage SaaS applications. An organization may have several SaaS applications; however, managing them individually can cause an organization to incur excess costs. Snow states that SaaS subscription waste has become one of the major problems in IT expenses, and therefore, there is a need for SaaS governance in SAM [5].

8. Future Trends in SAM

The future of SAM is bound to be centered around AI and automation. AI-driven technology will help predict software demands, detect abnormal behavior and patterns in software usage, and provide recommendations for improvements. Compliance checks are also bound to become a major focus. Organizations should be ready to have their real-time dashboards rather than preparing for occasional audits. SaaS governance tools will keep growing. The new generation of tools will concentrate on identifying unused SaaS subscriptions and implementing the necessary access controls. Linkage with cybersecurity tools will also continue developing in the near future. SAM tools are expected to work closely with vulnerability management systems in order to ensure software asset security and regular updates. Blockchain-driven software license management will probably emerge as well.

Conclusion

SAM has become an essential part of every organization because of increased licensing complexities, cloud computing, and subscription to software-as-a-service (SaaS). It offers a systematic way of managing software assets during their entire lifecycle. SAM results in enhanced compliance, improved costs efficiency, strengthened security, and improved IT governance. SAM solutions are necessary for automation since manual asset management is not efficient in today's world. There are various software asset management applications available in the market. They include Flexera One, ServiceNow SAM, Snow License Manager, ManageEngine AssetExplorer, and Microsoft Endpoint Manager. Each of them has different features that are suitable for different needs. Advanced SAM tools such as Flexera and ServiceNow are recommended for large organizations due to the increased complexity of licensing. Meanwhile, ManageEngine is perfect for small to medium-sized organizations. Despite having some challenges such as licensing complexities, shadow IT, and increased cloud subscriptions, the advantages of SAM are more than its disadvantages. Future advancements in technology, including AI-driven analytics and compliance management, will make SAM even more effective.

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