

# Software Assets Management: A Cost Saving Factor

Samuel Okide<sup>1</sup>, Dorathy Neboh<sup>2</sup>, Caroline Ngozi Asogwa<sup>3</sup>, Chikodili Helen Ugwuishiwu<sup>4</sup>

Senior Lecturer, Department of Computer Science, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria<sup>1</sup>

PG Student, Department of Computer Science, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria<sup>2</sup>

Ph.D Student, Department of Computer Science, University of Nigeria, Nsukka, Enugu State, Nigeria<sup>3</sup>

Ph.D Student, Department of Computer Science, University of Nigeria, Nsukka, Enugu State, Nigeria<sup>4</sup>

**ABSTRACT:** Software Asset Management (SAM) is a practice which handles the management of software assets efficiently within an organization. It is a critical enabler that encompasses almost all core processes in an organization. Software licenses currently account for about 20% of typical IT costs, and the already pervasive use of software continues to rise. It is illegal to use unlicensed software and it could end up with material financial penalties if your organization falls short in terms of licensing requirements. Organizations pay heavily on software that is not yielding result or beneficial to them. However, they lack the ability to manage the whereabouts of software once it is assigned to a resource. This paper presents approaches on managing software assets. The result is a tool that eliminates software redundancy, duplicate and enhances efficient control and management of software assets.

**KEYWORDS:** Software Assets Management, Software Assets, Software Licenses, Information Technology (IT)

## I. INTRODUCTION

Software consists of abstract sets of rules that govern the creation, transfer, and transformation of data. It is a key enabler of business transformation. However the rise in use of software makes its management more complicated and costly. Many large organizations lack a comprehensive understanding of their software assets. They may not know how many licenses they own or understand the extent to which they have deployed a piece of software. That incomplete picture can lead to either under or over-utilization of software licenses, neither of which is desirable. More specifically, software is most often treated as an intangible asset whereas equipment is a tangible asset [1]. Moreover, software should be treated like any other asset in the business, such as hardware or property

In spite of this, many organizations undervalue their software assets and do not allocate enough resources on their proper management. Management is of vital importance to organizations, because they can strongly impact the success of an organization. The lack of management often brings up challenges, such as the increased IT costs or inability to identify what software is being used and where. It can even result in worldwide problems, such as the “Year 2000. The year 2000 cost organizations huge amounts of money to fix because of their lack of software asset inventory databases [2].

Software management continues to be one of the most complex problems facing many of the software industry.. SAM helps control software expenditure, capitalize on volume discounts, avoid non-compliance with licensing contracts, and deploy software more efficiently. Equally important, is the fact that an effective SAM initiative can help reduce organizational risk and help the enterprise establish a solid foundation to become secure, vigilant, and resilient.

Useful software asset management is crucial to effective security practices to help fight cyber attacks that can cost companies a huge amount of money in a year, not to mention the long-term reputational damage any leak of customer information can cause. Although many organizational processes and tools are adequate at maintaining specific information on software assets, very few offer the intelligence required to help IT professionals manage complex networks with multiple vendors and platforms across a global IT landscape. An effective SAM practice delivers intelligence on software across the enterprise, driving value by providing managers with the necessary visibility to

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make the most informed security decisions. SAM helps to reduce the attack surface of an organization by preventing unauthorized software from being installed, detecting and removing unwanted, redundant and unsupported software, reducing exposure to vulnerabilities through effective patch management processes and validating access controls [3].

This study aims to address the challenges organizations face when managing software assets. A qualitative methodology was applied to analyze the findings from researched works at different IT organizations and literature review.

The two main contributions of this paper are:

- i. Identify the challenges that organizations face when managing software assets.
- ii. Research on existing SAM tools and find out how they can help to mitigate the forthcoming challenges and improve the lifecycle management process.

The paper is organized as follows: Section I introduces the reader to the nature of SAM. Section II provides a technical background and explains the related concepts in more detail and SAM Approach. Section III describes the methodology used in this study. The results of this study are presented in section IV. Finally, section VI is the conclusions of this study.

## II RELATED WORKS

Asset can be defined as anything which has value to an enterprise. The asset can be furniture, documentation, hardware, software etc. Software asset consists of programmes used to do some operations of a data processing set and it can be classified in many ways such as Operating System, Service, maintenance or administration software, Package software or standard software [7]. Software should be treated as a fixed asset. Fixed assets are assets that contribute to a company's productive capacity, directly or indirectly. It is normally regarded as an intangible asset but only if it is purchased separately from the hardware they reside in. Most organizations do not own the software they use, instead they own a license to use the software, because a license is more tangible [1]. Hence, software needs to be managed. Unfortunately, software is probably the most complex to manage because of the complexity of its lifecycle. In addition, it brings legal and financial risks associated with the following characteristics:-

- i. Using of some software without valid/purchased license can occurs if some software is simply installed or used before authorization.
- ii. Proof of purchase can be discarded after some time from the organization accounting
- iii. Externally obtained software typically has complex legal conditions that can be misunderstood.
- iv. There is a risk of incorrect reliance of resellers [5].

Software Asset Management (SAM) is based on managing software that is used by an organization. Software is always owned by its publisher License that grants the user the right to use that particular software. The Reason for introducing SAM to organization mainly is for cost savings, which enable organization to have competitive edge against competitor that lack such capability in their own organization [9]. SAM describes all of the basic facilities, services and processes necessary for the effective management, control and protection of the software assets within an organization, throughout all stages of their lifecycle [7]. SAM is a set of managed processes and functional capabilities throughout the five stages of their lifecycle such as planning, requisition, deployment, maintenance, and retirement [8]. A good SAM plan implies that an organization acquires only the software that it needs, ensuring employees only use properly licensed software.

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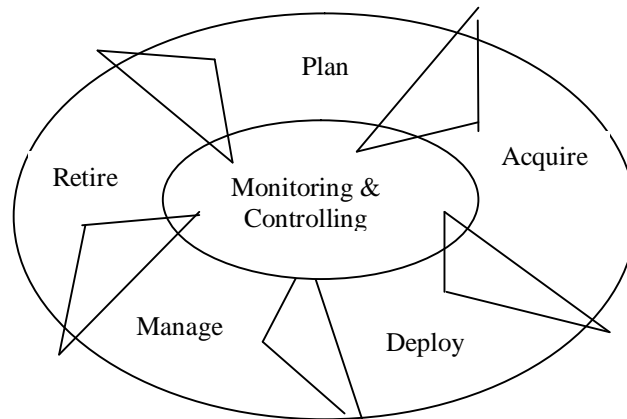


Figure 1: SAM life cycle  
Source: [9]

SAM should be able to handle the risk that emerges from the use of software assets. The Principles of SAM are managing, controlling and protecting an organization's assets. A clear vision and strategy are very vital requirement for establishing SAM [10].

Software asset management has increasingly become important for companies to understand and research. In recent years this management approach has no fundamental theory as background, but relies more on the best practice of organizations and practitioners [11].

The goals of SAM are to reduce IT costs and limit operational, financial and legal risks related to the ownership and use of software. There is no need to remember that well implemented SAM system brings a lot of benefits to any organization. These benefits should exceed implementation costs. SAM eliminates waste and duplicate purchases throughout entire organization. By optimizing software assets and arrangement of internal processes, SAM can help save time and money, improve workflow and increase competitiveness of an organization [5].

The ISO/IEC 19770-1 categorizes software assets in three (3) parts, which are as follows:

- i. Software use rights, reflected by full ownership (as for in-house developed software) and licenses (as for most externally sourced software, whether commercial or open-source).
- ii. Software for use, which contains the intellectual property value of software (including original software provided by software manufacturers and developers, software builds and software as installed and executed).
- iii. Media holding copies for software use e.g. such as software which is installed on a device [5].

In trying to help most organizations decide which framework is the best approach to manage their software assets. Studies has shown that software assets management is the best tool which brings many advantages such as saving financial resources (planning of the purchases), license overviews and so on.

[6] in his work Software Asset Management: Current state and use case, observed that there was a lot of room for improvement in software asset management. The most critical issue was the lack of proper tools for handling large number of software licenses in the company. Therefore, he created use cases that could be utilized as a communication tool, illustrating the wanted outcome from software asset management and also explained to other parties what should be done and why it was necessary to improve the performance of a company.

[11] developed SAM process that facilitated purchasing of IT related products in future by identifying processes for sourcing licenses and IT related products. He adopted a framework known as Capability Maturity Model Integration (CMMI) used for measuring maturity. It provided the organization the information that helped them to identify its process, strengths and weaknesses thereby made changes to turn weaknesses into strengths. He focused on the link between SAM and supplier, the entire IT and business strategy. Also, he conducted a Gap analysis which assisted the organization to compare its current state and actual performance, determine whether its expectations are met or not and

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effective usage of the organization's resources. This helped the organization to re-examine its goals, the gaps between supplier and SAM manager processes and the overall business IT strategy.

[12] studied Software asset management in a Large (Academic) Organization, he solved issues arising from software used in a virtual (cloud or other) environment. It was very difficult to manage software licenses in a virtual environment and also no suitable inventory tool which was able to reveal software installed within environment which is virtualized. This made the primary stage of SAM (physical inventory and monitoring) difficult. He proposed a model and prototype of a monitoring agent for clouds (or other virtual environment) interoperable with the SAM inventory system and a large common lab to test such prototypes. A centralized administration was necessary for successful planning and purchasing. This implies that only one department should not control every purchase; however the user shouldn't buy any software.

[13] worked on Non-intrusive asset monitoring framework for runtime configuration of deployable software assets, he disclosed a solution for metering, monitoring, and monetizing software assets. A software assets was registered with a monitoring service and a unique identifying key generated at either runtime or deployment time during the registration.

[14] studied Web-based system for managing software assets. This invention was based on methods for tracking, managing and controlling software assets using an interactive database on a network. A software license management system (SLMS) that utilized a web-based interactive database was used to automate a software management process (SWMP) for managing software assets, monitoring compliance to license requirements, tracking and reporting status for proper implementation of software management process. Software information was obtained and on-line up-to-date information was provided by the system on request and the system was implemented by a structured query Language (SQL) server database with a client user interface front-end for administration and a web interface for standard user input and reports.

[15] developed a method and apparatus to identify and catalogue software assets. Software packages are identified and catalogued and a master catalog file of such collected information are maintained and updated. They provided a method for identifying software packages installed on a computer in a computer network. The method comprised a searchable data base having a catalog file made up of software items attributes table and software packages attributes table; uploading at least one software item entry installed on the computer to the catalog file; mapping at least one software item entry to the software items attributes table to identify at least one software item entry; mapping the identified software item entry to the software packages attributes table; and analyzing the mapping results to identified software package entry installed on the computer based upon the identified software item entry.

[16] on his researched work Dynamic, secure software tagging for software asset management with respect to deployment, configuration, and usage. He developed an apparatus for performing software asset management using software tagging. The tags are read by applications and software tools that involved, run-time libraries, processes, and procedures, that can be initiated by a software application or installer/software deployment tool, in order to create or read tags for a deployed instance of the software.

### III SAM APPROACH

The costs and risks of mismanaged or misunderstood software assets can be reduced by a comprehensive SAM program. But policies must take into account the complexities of today's complex IT environments. The first steps to take in developing a mature SAM approach are as follows:-

- i. Conduct a comprehensive software asset inquiry that answers several key questions. Where does the organization have data? Where is it possible to have software running? How complete is IT's view of the hardware on which software runs? Determining thoroughly where all the software assets lie will enable IT to define the cyber perimeter and then fortify and defend it through regular patch management activities and proactive monitoring, for example.
- ii. Create a complete catalog of software that has been approved from a functionality perspective as well as a security perspective.
- iii. Develop a formal request process so IT can vet future software that business units might wish to acquire and add it to the software catalog. Digital transformation efforts, changing regulatory requirements, and evolving technology will require the enterprise to redefine the "fence" around software assets over time.

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- iv. Don't forget virtual data centers. Make sure IT understands the number of virtual machines and software stacks in play so that it can place security protocols at each virtual machine that is added.
- v. Create a cloud readiness strategy. If the organization will be moving existing software applications to the cloud, IT will need to understand what those licenses entail. Many software vendors have restrictions on whether a license can be used off premises. Moving to the cloud thus increases the potential for violations and penalties. If, for example, a cloud provider scales up infrastructure from eight servers to 16 servers to meet growing demand, that could trigger additional fees.
- vi. Consider the impact of outsourcing on SAM. Data center outsourcing service providers are more focused on meeting their service-level agreements—keeping hardware up and running to meet customer needs—than in tracking the potential software license issues that might emerge when they make hardware changes.
- vii. Approach subscription models with care. A flexible, consumption-based software model may make the most sense, but it's important to understand actual software needs and consumption before signing on the dotted line.

Most importantly, more effective management of these digital assets can deliver value and improve performance, not just for IT, but for the enterprise as a whole [17].

### IV SOFTWARE COSTS CONTROL

Companies can expect to achieve 30% savings in the first year and between 5-10% annually with an effective Software Asset Management (SAM) program. Understanding the inventory of all the software assets in your organization is a critical first step in controlling software costs. But, it is not just from a cost saving perspective that optimised SAM makes sense. It resounds as a common sense approach across the entire organization that also increases operational efficiency and reduces risk.

The active inventory is a SAM term that identifies the software assets currently in use. Here are seven ways that SAM can be an ideal tool for controlling software costs:

1. **Leverage vendor contract negotiations:** Your detailed knowledge of actual inventory and software usage combined with a thorough analysis of your organization's contract data pave the way for successful negotiations.
2. **Reduce contract compliance and audit risk:** SAM users can match software contract usage rights with what's actually deployed and used, so they can proactively manage contract compliance risk. SAM is a powerful tool to prove compliance; it can be successfully used to:
  - i. Ensure software is installed only on licensed equipment
  - ii. Ensure unlicensed software isn't installed and can't be used
  - iii. Certify that software de-installed is, in fact, no longer resident
  - iv. Provide independent, third-party reports that show inventory and usage in an accurate, repeatable way.
3. **Reduce software fees through competitive replacement** SAM provides the clearest understanding of the usage of all software that has similar functionality.
4. **Efficient server consolidations:** In today's environment of mergers, acquisitions, and facility consolidations, server or data center consolidations with redundant, underused or out-of-compliance software are often in the critical path to real financial savings.
5. **Cost-effective hardware and software upgrades:** With actual inventory and usage data, your data center team can now manage the upgrade process more efficiently. Optimized hardware planning that will drive real savings can only start with the software inventory, usage, and upgrade fee map fully detailed.
6. **Invoice validation:** Successful SAM users have achieved significant savings by correcting invalid invoices. Even for simpler licenses, changes in deployment and use that are communicated to the vendor don't always find their way to the vendor's billing system. Don't make the mistake of relying solely on the vendor's billing system when you can have the facts in your own hands.

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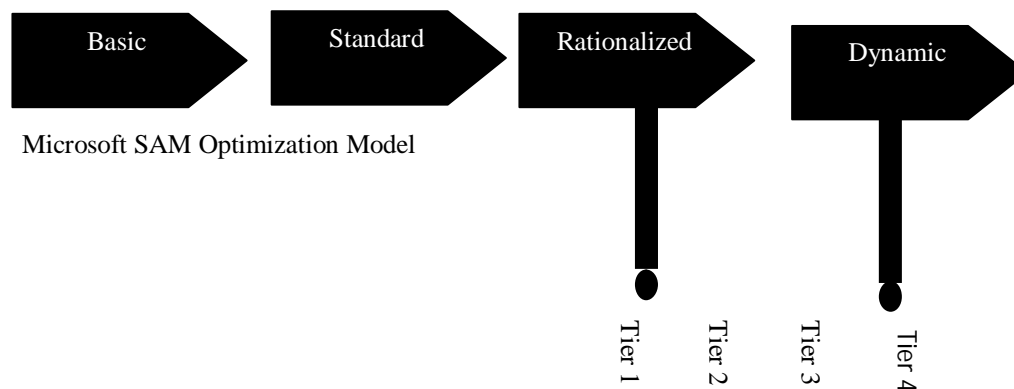
7. **Effective charge-back:** The key to a successful charge-back process requires allocating software costs based on actual software usage patterns. With SAM tools and reports, customers can now understand how servicing their needs resulted in specific charges to them [18].

## V. IMPLEMENTING SAM

To implement a programme that manages controls and protects the organisation's software assets, it is necessary to understand the maturity and effectiveness or otherwise of existing SAM processes. By reviewing the policies and processes already in place, you will be able to identify areas of failure or missing resource. This in turn will facilitate corrective action to reduce the risks associated with the management of IT assets and adoption of methodologies for improvement.

Microsoft designed the Software Asset Management (SAM) Optimization Model to give directive for proper implementation of a SAM program aligned with the ISO 19770-1 standard. Microsoft SAM optimization model is a tactical framework that helps an organization to evaluate its SAM policies without having to interpret and adapt ISO 19770-1 [19]. It helps an organization to measure its performance and permits it to chart its progress in optimizing software assets in the organization along an established set of criteria. It also allows for a clear roadmap for an organization to envisage its benefits and return on investment. An Organizational maturity is measured and ranked into four levels, they are

1. Basic SAM – Management of software is ad-hoc and inconsistent
2. Standardized SAM – Assets are tracked but perhaps data collected are not properly used.
3. Rationalized SAM – Assets are being managed throughout their lifecycle
4. Dynamic SAM – We are leveraging SAM for competitive advantage.



SAM STANDARD ISO/IEC 19770-1:2012

Figure 2: SAM Optimization Model vs. ISO/IEC 19770-1(Source: [19] )

The figure above lay emphasis on the 4-tiered model, the explanation is given below:-

- a. Tier 1: Trustworthy Data - To achieve this tier means knowing what you have so that you can manage it.
- b. Tier 2: Practical Management - Achieving this means improving management controls and driving immediate benefits.
- c. Tier 3: Operational Integration- Achieving this means improving efficiency and effectiveness.
- d. Tier 4: Full ISO/IEC Software Asset Management conformance- Achieving this means achieving best-in-class strategic Software Asset Management.

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## Process Adopted

A four-step process to achieve proper software management includes the following:-

Step One: Develop Policies and Procedures

An organization must have a clear statement of policy. The statement should express the company's goals to manage software for maximum benefit, deal only in authorized software and spell out the procedure for acquiring authorized software. An effective software purchase procedure consists of the following elements:

1. Centralize all software purchases, including services, through a purchasing department/individual or other designated company authority.
2. Require all software purchase requests including services be made available to the purchasing department/individual or another agreed upon department.

Manager approval;

1. Ensure that software being requested is on the company's list of supported software.
2. Do not permit employees to directly purchase software
3. Ensure that software cannot be downloaded from the Internet by employees without special approval.

Step Two: Software Audit

Once a policy and set of procedures are in place, the next step is to take inventory of all software assets in an organization. The following information such as title, product ID, size, date, path, version and serial number for each copy of the software installed on each computer.

Step Three: Determine Authorized or Unauthorized software

Once unauthorized software copies or improperly utilized account registrations have been identified, delete these or cease the account sharing.

Step Four: Routine Audit

Periodically, it's a good idea to perform spot checks on individual computers to ensure illegal software has not been inadvertently or deliberately installed.

## VI. METHODOLOGY APPLIED

Data used in this study consists of both primary and secondary data. The primary source of information employed was through face to face interview with few IT experts of different organizations due to their experience in software. The secondary data comprised of reviewing the available literature, necessary for the creation of a theoretical background in SAM. This data was used to identify the possible challenges in managing software assets, which would be reflected in the study.

## VII. RESULTS

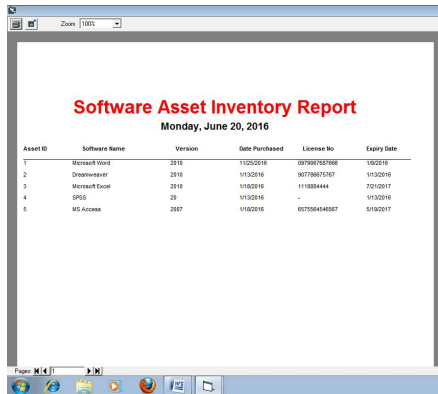
Figures a-e shows the results after the use of SAM application to control and manage use of software assets within an organization. Figure a shows the record of software assets purchased, figure b gives record of software deployed in the organization, figure c and d gives report of unlicensed software and date of software expiration. Figure e gives report of breakdown of total amount spent on software assets on any given period, this will help in decision making on how to make software purchases. Figure displays summary on software usage and this will help to identify redundant software.

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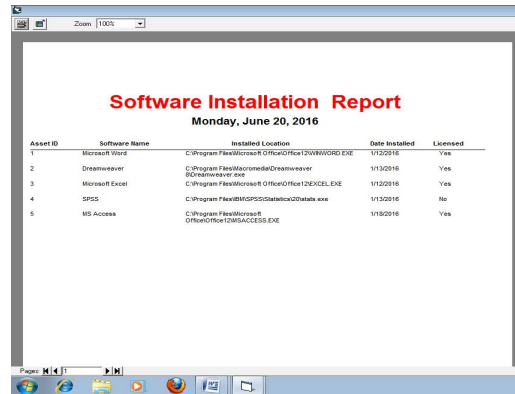
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**Software Asset Inventory Report**  
Monday, June 20, 2016

| Asset ID | Software Name   | Version | Date Purchased | License No    | Expiry Date |
|----------|-----------------|---------|----------------|---------------|-------------|
| 1        | Microsoft Word  | 2010    | 1/15/2016      | 90798675797   | 1/15/2016   |
| 2        | Dreamweaver     | 2016    | 1/15/2016      | 1118884444    | 7/21/2017   |
| 3        | Microsoft Excel | 2010    | 1/15/2016      | 1118884444    | 1/15/2016   |
| 4        | SPSS            | 20      | 1/15/2016      | -             | 1/15/2016   |
| 5        | MS Access       | 2007    | 1/15/2016      | 6575584545567 | 5/19/2017   |

(a)



**Software Installation Report**  
Monday, June 20, 2016

| Asset ID | Software Name   | Installed Location                                                       | Date Installed | Licensed |
|----------|-----------------|--------------------------------------------------------------------------|----------------|----------|
| 1        | Microsoft Word  | C:\Program Files\Microsoft Office\Office12\MSWORD.EXE                    | 1/15/2016      | Yes      |
| 2        | Dreamweaver     | C:\Program Files\Adobe\Adobe Media Creative\Dreamweaver\SDreamweaver.exe | 1/15/2016      | Yes      |
| 3        | Microsoft Excel | C:\Program Files\Microsoft Office\Office12\EXCEL.EXE                     | 1/15/2016      | Yes      |
| 4        | SPSS            | C:\Program Files\SPSS\SPSSDataCollection\SPSS.exe                        | 1/15/2016      | No       |
| 5        | MS Access       | C:\Program Files\Microsoft Office\Office12\MSACCESS.EXE                  | 1/15/2016      | Yes      |

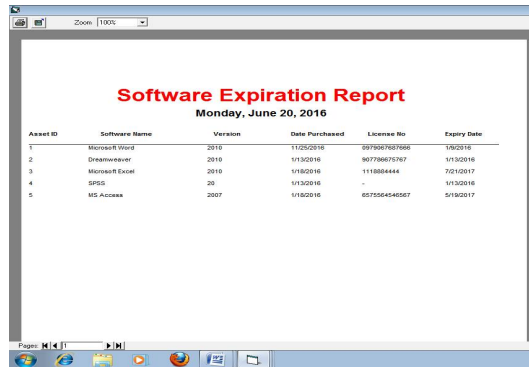
(b)



**Software License Report**  
Un - Licensed

| Asset ID | Software Name | Installed Location                                | Date Installed | Licensed |
|----------|---------------|---------------------------------------------------|----------------|----------|
| 4        | SPSS          | C:\Program Files\SPSS\SPSSDataCollection\SPSS.exe | 1/15/2016      | No       |

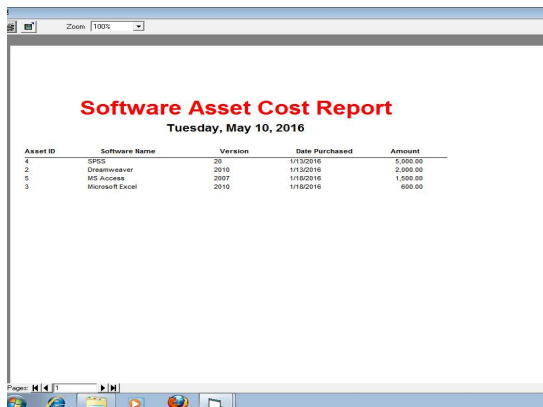
(c)



**Software Expiration Report**  
Monday, June 20, 2016

| Asset ID | Software Name   | Version | Date Purchased | License No    | Expiry Date |
|----------|-----------------|---------|----------------|---------------|-------------|
| 1        | Microsoft Word  | 2010    | 1/15/2016      | 90798675797   | 1/15/2016   |
| 2        | Dreamweaver     | 2016    | 1/15/2016      | 1118884444    | 1/15/2016   |
| 3        | Microsoft Excel | 2010    | 1/15/2016      | 1118884444    | 7/21/2017   |
| 4        | SPSS            | 20      | 1/15/2016      | -             | 1/15/2016   |
| 5        | MS Access       | 2007    | 1/15/2016      | 6575584545567 | 5/19/2017   |

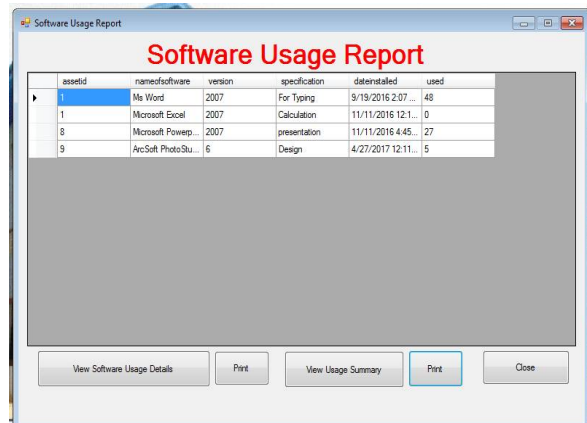
(d)



**Software Asset Cost Report**  
Tuesday, May 10, 2016

| Asset ID | Software Name   | Version | Date Purchased | Amount   |
|----------|-----------------|---------|----------------|----------|
| 4        | SPSS            | 20      | 1/15/2016      | 5,000.00 |
| 2        | Dreamweaver     | 2016    | 1/15/2016      | 2,000.00 |
| 5        | MS Access       | 2007    | 1/15/2016      | 1,500.00 |
| 3        | Microsoft Excel | 2010    | 1/15/2016      | 600.00   |

(e)



**Software Usage Report**

| assetid | nameofsoftware      | version | specification | dateinstalled      | used |
|---------|---------------------|---------|---------------|--------------------|------|
| 1       | Ms Word             | 2007    | For Typing    | 9/19/2016 2:07...  | 48   |
| 1       | Microsoft Excel     | 2007    | Calculation   | 11/11/2016 12:1... | 0    |
| 8       | Microsoft Powerp... | 2007    | presentation  | 11/11/2016 4:45... | 27   |
| 9       | AcSoft PhotoShu...  | 6       | Design        | 4/27/2017 12:11... | 5    |

Buttons: View Software Usage Details, Print, View Usage Summary, Print, Close

(f)



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## VIII CONCLUSION

SAM is becoming more important to organisations, and is a vital aspect towards organisation's successes. Any member of the organisation that uses software asset is a customer of SAM. They are using an application that falls under the management of the SAM discipline, so organizations need to have a clear, defined and dynamic SAM processes. SAM eliminates waste and duplicate purchases throughout entire organization. By optimizing software assets and internal processes, SAM can help save time and money, improve workflow and increase competitiveness of an organization. However, by implementing a Software Asset Management (SAM) programme, organizations can manage their software in the simplest and most economically efficient way.

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