Application Inventory

Caveat: The products and organizations that are listed in the references have not been evaluated by MMC. This white paper is not an endorsement of these products. Information is provided only for illustration. Implementing organizations are required to perform their own evaluations and due diligence.

Taking Inventory of Your Assets

In series of white papers supporting the concept of "Portfolio Management" of information technology resources, we presented the need to inventory all information resources before attempting to strap a portfolio strategy on to them and manage them actively. The topic of inventorying information resources is the subject of this paper.

To measure is to manage

How often have we heard that phrase? How many TVs have you bought and disposed off over the years? How many cell phones? How much money did you spend on gas over the last 5 months? Do you know where your home's title deed is located? Do you know approximately how many miles you are putting every day on your car? Do you know how many hours of the weekend were spent on work related activities?

If you are like the rest of us, you probably will answer, "Don't know!" and for added effect, "and don't care!". But unfortunately sticking your head in the sand is not an acceptable option for a CIO when it comes to knowing what the IT shop is using and spending on and especially when he/she is asking for ever larger sums of money to keep the show going.

What is an information resource?

An information resource, put quite simply, is any piece of information technology (hardware, software, communications, database item, software platform item) that costs you money, helps you run your applications and represents a corporate asset that must be acquired, maintained during its useful lifecycle, retired gracefully and taken off the books, once no longer useful. Information resources, in today's world have been extended to include projects, people and resources needed by these, as well.

Operationally, when not watched carefully, information resources can also wind up becoming money-pits, points of vulnerability or points of failure when they are not humming along running the enterprise's business(es).

Tracking Information Resources

Tracking information resources ranges from the very easy (read mainframe computers and applications that run on them – a few, and very very visible) to the moderately difficult (laptops) to the near-impossible – desktop applications written by Joe Sixpack to compute correlation between bar closure hours and programmer productivity. The rule of thumb is that large, complex, hardware items are fairly easy to track. Tracking applications is significantly harder as there is nothing recognizable about an application other than it is a executable file and there is nothing clear about its boundaries (what group of files comprise that application).

Once Upon a Time

In the not so distant past, inventories or hardware and software were taken by electronic questionnaires mailed out to real people. Attempts were made to standardize categories so that the information that came back was reasonably well ordered. Questions were divided into hardware and software inventory related ones.

At the back end, inventories of assets from financial systems were available so that the results of interviews were matched up to items that had been listed as bought by the organization.

The process kinda, sorta worked but the data was only good on the day it was collected, if at that. As soon as organizations began to sigh with relief, looking at the completed inventory, they soon started groaning when they realized they had to do it all over again to update the information. And as Intel, Motorola, Microsoft, Apple, the hardware manufacturers, Sybase, Oracle all got into the rapid change – rapid obsolescence cycle, the cost of taking inventory on an ongoing basis went through the roof as did the complexity.

Then came the "Sniffers"

Vendors started developing based network "sniffer" applications that would perform discovery of hardware and software on every machine connected to the network. At the same time, hardware and software items became more reflective – they started providing more information about themselves, when interrogated. The advent of bar coding and the availability of cheap bar coding labels and scanner technology allowed hardware assets and software assets to be labeled and scanned for inventorying and identification. Large databases in the back office, were able to decode each scanned item and pull information on it from pre-stored metadata. Agent technology became available and with it, the ability to post sentinels in each hardware item that would faithfully post changes to that item and keep a central monitoring system aware.

Fully automated server and network systems became a reality, once the console application had access to all the resources that were managed. The Network Management area blossomed with applications such as CA's Unicenter, HP's OpenView and IBM's XXX that could manage large networks of hardware resources seamless from a single console panel. We had gone from sending out questionnaires of what items were at people's desks to fully automated applications that knew when a specific PC on a specific network went down.

What all this did was to produce tons of data, some of it very useful, some probably not.

Inventorying Applications: A different story

But the same could not be said of software applications inventory. When we talk of software applications there are at least two, if not more, types of software applications. Software that you can buy, "Commercial - Off the shelf (COTS)" that is generally available to all and is commercial and licensed for use. The other type is custom software built by your business, for your business. These applications run the business, provide competitive advantage and keep the lights on and the phones ringing.

Inventorying COTS software is fairly straightforward because you pay for them from some financial system that requests line items for a spending. Somewhere in the financial jungle, somebody knows you spent money buying soft ware X from Company Y on date D. They also probably know the terms of licensing, number of copies and to whom those copies were handed out. The reality may be different, but the fact of the matter is that COTS software is sold at a one time price for licensing with a one time cost for maintenance. These can either be renewed or upgraded, but both of these need a financial tracking process.

Inventorying *controlled software developments* is also easy because every action on a controlled software system involves a previously budgeted and sanctioned software project. Each software project has a task number that must be assigned to any action on any piece of controlled software. Inventorying controlled software thus involves identifying first, what the items of controlled software are, in an organization and then following up with the list of current and planned projects that are working on them.

Inventorying *uncontrolled software developments* is a black art. Defining what a software application, becomes the first order of business: What constitutes a software application for inventory purposes? Is it based on how critical it is to how many users? How critical it is to the enterprise? On the basis that it provides key data to other controlled applications? Is a Microsoft Access application a software application? Is a Microsoft Excel spreadsheet that contains key computations involving undocumented by key business rules/formulas a software application that must be inventoried?

Unfortunately as information technology became more familiar to more people, the enterprise no longer looked up to the IT organization to provide solutions from the glass house for problems that could not wait. Users from business organizations jumped in with their own solutions, sometimes hand cobbled, sometimes independently procured. Suddenly, the IT organization had to deal with controlled and uncontrolled applications in the heart of their customer base. Now the inventorying could not be done independently by the IT organization – we now had to involve *all* organizations that ran any sort of application, owned and operated any sort of hardware and purchased any sort of COTS applications.

Outsourcing: A new wrinkle

In the recent past, your enterprise, like others may be toying with outsourcing business processes, entire application development efforts or even the entire IT function itself to India, China or Russia or some other country more than 5000 miles away! How do you inventory resources that you do not control or manage? Or do you?

Projects and ITIL

As organizations start looking at their collections of information resources as portfolios that must be managed, they have tended to include all IT related projects and their costs as part of this portfolio. This means, that you have to inventory IT projects in much the same way that you did the applications. IT projects fall into two categories: Controlled projects that go through a formal cycle of proposal, presentation, advocacy, award and tracking. Uncontrolled projects that were fast tracked for some emergency but were not managed as part of a strategic direction. Each of these contributes to cost and must be inventoried.

As organizations start adopting a formal process of defining and standardizing the various infrastructure related tasks and services for running an IT shop, they are looking at the Information Technology Infrastructure Library (ITIL) framework. By using ITIL, the body of knowledge for running production IT environments is standardized as are the list of tasks performed by IT personnel and the roles that they play. This can be the basis for inventorying IT projects and tasks. One of the ITIL requirements is a Configuration Management Database (CMDB) required to store and manage the hardware resources as well as the software resources that are managed by the production IT shop.

Mappings of Applications to Infrastructure

Today's applications server infrastructure has become service oriented. When a server starts running, it starts a bunch of services. These services are available to all applications that run on the server. Services are provided by components that reside on the server. Configuration management of the components is essential to guaranteeing predictable services. Ensuring predictable services guarantees up-time for an application.

Other Mappings

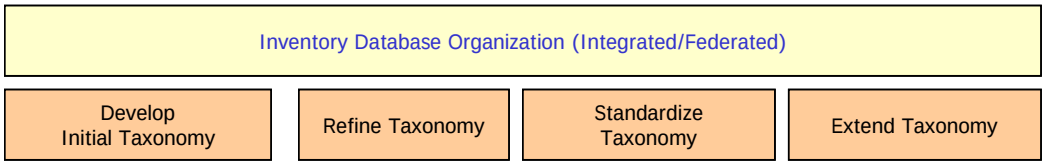
Inventorying hardware and software items is performed for many reasons, the primary reason being to get a handle on the span of resources that are required and their costs. But people take inventory for other reasons as well:

- Assessing compliance to standards or towards performing standardization and decrease in variety, increase in volume buying power.
- Assessing risks and threats and vulnerabilities across the board.
- Assigning management properties such as certification to operate, certification to "hang" off the network, certification of compliance with legislative mandates, etc.
- Determining location specific characteristics.
- Determine warranty and other maintenance related information.
- Track by vendor to determine potential for volume discounts and key customer status.

Each of these mappings requires additional relationships and properties to be attached to the information resource that will enable the recording of the information needed to support these kinds of decisions.

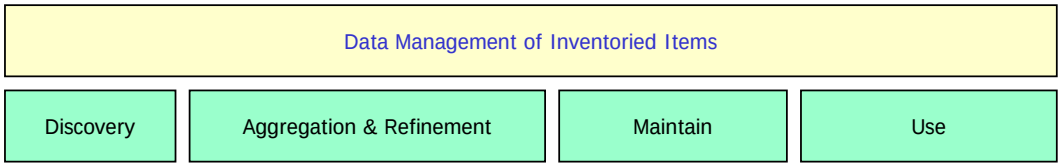
The Inventorying Process

The inventorying process can be broadly divided into two major streams of activity. The first stream is establishing the controlled vocabulary of items that must be managed i.e. the organization of the database repository that will contain the inventoried information resources. This involves defining hierarchical category structures and definitions of inclusion and exclusion criteria for the category definitions. Figure 1 below shows this stream (Stream 1: Taxonomy Management):



If one thing becomes obvious, it is that the organization structure (schema) that manages your information resources cannot be a fixed one, but must evolve as the span of items changes over time, or understanding on how to shape the categorization scheme evolves with time. In short, be prepared for a changing and evolving schema for your inventory database and deal with it as a necessary requirement.

The second stream involves the actual inventoried data itself. Figure 2 below shows this stream (Stream 2: Data Management) :



The data management stream relies on discovery techniques for initial data population. Maintenance on an ongoing basis is required to keep data quality high.

A more detailed description of the various processes follows.

Stream 0: Preparatory Tasks

Task 1: **Develop a Master Plan**. In this task, the master plan for the inventory system is developed, presented and signed off. The ingredients of the Master Plan are produced in the following subtasks:

Subtask 1: Develop benefit statements. In short, pithy statements, describe anticipated specific benefits of the inventory system and the time frame during which the benefits will be achieved. Benefit statements must directly relate to saving of money, streamlining of operations, decrease in headcount requirements, addition of new capabilities, meeting or beating the competition, or creation of new opportunities. The benefit statements are part of the sales plan for the project.

Subtask 2: Develop scope boundaries. Describe boundaries for the effort in terms of organizations involved, locations involved, types of business units, or granularity of information resources to be inventoried. Also define the purpose of the effort to bracket the properties and relationships for the data that will be collected and managed.

Subtask 3: Identify key and secondary stakeholders. These are organizations and people who will provide, consume or validate information produced by this project. Identifying them up-front will enable downstream processes to involve them and use their involvement to ensure project success. Stakeholders also include the project team itself.

Subtask 4: State project philosophy and strategy. In this task, the overall principles that the project will follow are defined. These principles relate to how the project will be run, what type of resourcing will be obtained, what type of make-vs buy decisions will be made for project related tools, and what is the type of decision making model (consensus, consultative, or vote)

Subtask 5: State measures of success. Describe up-front how you define measures of success for the project. These will ultimately be used to declare success or failure for the project. Measures of success must be quantifiable and measurable. Use benchmarks from similar projects to prevent setting unrealistic or trivial goals.

Subtask 6: Define initial Project Schedule. Describe the planned work plan for the project with timelines, milestones and deliverables. Use any classic project planning technique such as GANTT charts, PERT charts or Work Breakdown Schedule (WBS).

Stream 1: Taxonomy Management

Task 1:

Develop Initial Taxonomy. In this task, we scope the kinds of information resources, develop a list of categories and define a hierarchical structure that relates the various categories together.

Definitions

Taxonomy is a classification scheme that consists of hierarchies of categories and terms that are standardized for that taxonomy. The collection of terms that comprise a standard taxonomy is called a controlled vocabulary. Any terms that are similar in meaning but different in name (synonyms), or similar in name but different in meaning (homonyms) are considered to be uncontrolled or common terms. A common vocabulary consists of controlled and uncontrolled terms. A pure taxonomy does not have homonyms or synonyms.

Subtask 1: Fix the high level taxonomy scope in terms of major categories such as Hardware, Software, Projects, People, Locations, and Organizations that will anchor down the effort. Be careful to exclude items explicitly if scope is to be contained to a timeline and a budget.

Subtask 2: Describe taxonomy terms from each of these major categories that represent subcategories or actual items to be inventoried. One method of defining subcategories is to add adjectives or qualifiers to the nouns that represent higher categories.

Subtask 3: Draw a taxonomy chart that lays out the terms in parent child order as a tree diagram. Publish this chart to all stakeholders to get validation and incorporate changes until agreement is obtained. Write clear definitions for each of the categories/subcategories to support questionnaires or data entry personnel interpretation needs.

Subtask 4: Develop a database model that represents the taxonomy structure represented by the initial taxonomy in the previous subtask. For each category or subcategory, develop a list of properties of interest for that category that must be recorded. For this, prior knowledge of what the inventory will be used for is essential.

Task 2: **Refine Taxonomy.** In this task, we look at the data that we have uncovered and revisit the initial taxonomy that we designed. New data may reorganize the taxonomy, leave it unchanged or extend it by adding new categories and parent-child associations for new subcategories.

We also look at our scope and ask if stakeholders have come up with new requirements that require refinements to the current taxonomy.

Task 3 **Standardize Taxonomy**. In this task, we take the initial taxonomy we have refined and align it with industry standards. This will allow our controlled vocabulary to map to the industry vocabulary and allow us to exploit market forces. A list of potential taxonomy sources are presented in the references.

Task 4 **Extend Taxonomy.** In this task, we extend the taxonomy based on new data that does not appear to fit the current one or with changes in the environment or business that bring in new items to be classified for which the current classification scheme is inadequate.

Stream 1: Data Management

Task 1 **Discovery**. Discovery is the process of finding out what information resources are used by your organization. Discovery is performed when you do not have an initial inventory. Discovery can occur through interrogatories, questionnaires, search for databases and spreadsheets of previously compiled information. Discovery results in data that needs further analysis and validation. Failure of discovery may also point to the inability to perform inventory and ultimate project failure.

Subtask 1. **Appoint a Capture Manager** who will be responsible for formulating the discovery strategy and lining up the organizations and people who will participate through the discovery process.

Subtask 2. **Formulate a strategy that defines what you will try to discover from WHOM and HOW**. This may also involve determining locations (WHERE) and scheduling meetings and events (WHEN).

Subtask 3. **Perform discovery of compendiums, repositories, databases or collections of previously gathered information resource materials**. Look for people who took the initiative, formal organizational attempts and for nascent projects that are trying to perform the same inventorying task for other purposes. Examples of such projects were Y-2K related discovery of systems, Euro conversion projects, Sarbanes Oxley related discovery.

Subtask 4. **Construct a questionnaire or set of questionnaires for gathering response**. Develop questionnaire administration applications either through E-Mail or a website to collect responses. Design a strategy to collect and tabulate responses. Ensure that all taxonomy related terms have been defined and are presented as selections for the questionnaire to bound the inputs and assist with the ultimate organization of the responses. Questionnaires are frequently the only tool available to enter lists of software applications in the absence of archival information.

Subtask 5. **Use barcode/asset tracking systems to provide data**. These generally track real goods, typically items that are tangible and can be labeled with bar codes. The references contain lists of commercially available asset tracking systems. Asset Tracking systems are generally used for all hardware items as well as Commercial Off-The-Shelf (COTS) Software packages.

Subtask 6. **Discover application related projects**. These are projects where money is being currently spent or will be spent in the future, on designing, developing, maintaining or enhancing applications that are used by the enterprise. The project is the unit of allocation of labor money and task related materials. For each project collect relevant details as defined by the scope of the data gathering effort.

Subtask 7. **Discover application related personnel**. Some of these are detailed in projects, (where they appear as resources). Others may be obtained from telephone directories or LDAP directories on servers.

Task 2

Aggregation and Refinement.

In this task, we take the outputs of the discovery task and start trying to make sense out of the mountains of data that we have uncovered. Through the taxonomy efforts we have been able to define a vocabulary for categorizing the items inside this mountain of data. We have also established a database for managing all this data.

Aggregation involves collecting items of the same category and then bubbling items up to support reports with different levels of granularity.

Refinement of data is the process of improving data quality by detecting and removing data redundancies, resolving homonyms and synonyms and setting up rules and constraints that guide future data entry.

Task 3

Maintenance
This is one of the hardest parts of inventory management. Maintenance involves maintaining the truth of the inventory – i.e. keeping the data up-to-date. Remember, during the discovery process, that the data came from many sources. The aggregation and refinement task then took these diverse sources of information and combined them to produce the composite inventory. During this phase, we decompose the combined inventory back to items that can be assigned to various sources of truth. If these sources change, the inventory data also needs to change.

The use of agent technology, and some of the asset tracking systems do use them, simplifies the detection and propagation of change from sources back to the inventory database. For others, manual surveys may become necessary or someone with detection software may have to run it periodically to assess whether any changes have occurred that require changing the inventory.

Task 4

Use. We come to the reason why we collected a list of information resources in the first place: to use it to enhance the effectiveness, efficiency or increase opportunities for the business. How are the ways in which the inventory can be used to enhance the business? There are ways in which cost management can be affected; there are others in which revenue generation can be affected; other that can create new opportunity that has the potential for affecting costs and revenues in the future. The use of information resource inventories is the subject of another MMC White Paper: Portfolio Management

Stream 3: Post Project Activities

Task 1

Assessment of initially supplied measures of success against the actual project delivery.

Task 2

Dissemination of inventory through a web portal, project website or an internal website.

Task 3 Post mortem assessment to improve tasks that are potentially labor intensive, ongoing such as maintenance of data, increased automation of discovery tasks, increased automation of aggregation and resolution of data.

Asset Inventorying Systems [Ref 1]

Hardware and Software Tracking Systems

UniCenter from Computer Associates

HP OpenView

Managed Objects: will use the multitude of connectors it has developed to provide the ability to closely link IT business process monitoring capabilities dynamically to the underlying IT infrastructure via a virtual CMDB. [REF 1]

BMC Software and IDS Scheer: have launched a pre-configured ITIL Reference Model for IT service management that ships with an out-of-the-box integration for BMC's Remedy. Users can design processes with IDS Scheer's ARIS Toolset; the package includes best practices from BMC.

Mercury and Peregrine: have announced a partnership that's primarily targeted at creating a scalable and federated CMDB solution for big customers based on Mercury's application mapping capability plus Peregrine's ServiceCenter and CMDB.

IBM: Has announced a partnership program aimed at creating an infrastructure discovery library and a change and configuration management database (CMDB). Application-to-infrastructure component mapping vendors such as Cendura, nLayers and Relicore have announced their support for IBM programs.

Questionnaire Providers

Formsite.com http://www.formsite.com/

KeySurvey http://www.keysurvey.com

InfoSurv http://www.infosurv.com

WebSurveyor http://www.websurveyor.com

Caspio Bridge Online http://www.caspio.com/l/cbo/default0200lklkGH.asp

FormDesk http://www.formdesk.com/?id_aff=22&keyword=_building_questionnaire

ChumpSoft http://www.chumpsoft.com/products/phpq/

Asset Tracking Systems

NetSimplicity Visual Asset Manager
http://www.netsimplicity.com/vam/index.asp?mtcPromotion=LCG>041T05

Techtrack AssetManager http://www.techtrack.com/Products/sw-assetmanager.html

IntelliTrack Fixed Assets
http://www.intellitrack.net/fixed_assets_target.asp?gclid=CJ668eHh44ICFRfcSgodOz4wjA

Synergy InfoSys Coherent http://www.synergyinfosys.com/

OpsWare Inc Opsware Asset Tracking Edition
http://www.opsware.com/products/assetmgmt/

Software License Managers

Diskeeper Corporation SiteKeeper http://www.execsoft.com/sitekeeper/sitekeeper.asp

Remote PC Tools PC Tracking Software Pro http://www.remotepctools.com/

IT Related Taxonomies [Ref 2]

- **ACM Computing Classification System (Association for Computing Machinery, Inc.)**
  A classification system covering concepts and terminology pertinent to the computing and information technology. It is primarily used to provide proper indexing and retrieval for publications by the ACM press, ACM's Digital Library and other on...
- **Aerospace & High Technology Database Index Terms (Cambridge Scientific Abstracts (CSA))**
  The index supports access to the Aerospace & High Technology Database, which covers such topics as aeronautics, astronautics, and space sciences, as well as technology development and applications in complementary and supporting fields such as ...

- **Free On-line Dictionary of Computing (FOLDOC) (Denis Howe)**
  The Free On-line Dictionary of Computing (FOLDOC) is a searchable dictionary of acronyms, jargon, programming languages, tools, architectures, operating systems, networking, theory, mathematics, telecoms, institutions, companies, projects, produ...

- **Gale Computing Thesaurus (Gale Group, Inc.)**
  The Gale Computing thesaurus is a subset of the master Gale Technology thesaurus in the narrower domain of personal and industrial computing. The subdivisions below were created to draw a distinction between computing and electronics: Computing...

- **GlobalSpec (GlobalSpec, Inc.)**
  The scope of this taxonomy spans mechanical, electro-mechanical, and electronic components. It is intended to be used for classifying standard components within a manufacturing company by design engineering or purchasing.

- **IEEE Web Thesaurus Keywords (Institute of Electrical and Electronics Engineers)**
  IEEE Web Thesaurus Keywords contains vocabulary associated with electrical and electronic engineering. The terminology can be used to assist in indexing and retrieval of information.

- **Inspec Classification (Institution of Electrical Engineers)**
  The Inspec Classification is an alphanumeric coding system. It covers the areas of physics, electrical & electronic engineering, computers & control and information technology. It is used for searching and retrieval of information on the Inspe...

- **Inspec Thesaurus (Institution of Electrical Engineers)**
  The Inspec thesaurus is used to index and provide access to scientific and technical literature in physics, electrical engineering, electronics, communications, control engineering, computers and computing, and information technology. As well a...

- **Lexicon of Semiconductor Terms (Intersil Corporation)**
  Intersil has assembled this Lexicon of Semiconductor Terms, Abbreviations and Acronyms to improve understanding of semiconductors. Along with definitions of each term, there is also a detailed page describing the manufacturing processes for sem...

- **MISQ Keyword Classification Scheme (Management Information Systems Research Center)**
  The scheme is intended to provide a description of the IS field, introduce a common language, and enable the researching of the field's development. It has been used to index and retrieve information from the various publications and databases ...

- **NetLingo (NetLingo)**
  Glossary of Internet terminology.

- **Technology Glossary (Robert E. Jensen, PhD, CPA)**
  A glossary of terms with definitions for technology terminology related to computers, communications and other high-tech fields.

- **WAND Computers and Information Technology Thesaurus (WAND, Inc.)**
  The WAND Computers and Information Technology thesaurus is a subset of the WAND thesaurus and covers all forms of computer-assisted technologies, software and the basic computer equipment itself. Technology specific to the collection and use of...

References

[REF 1]: Trends June 22, 2005 “Raising the Bar for ITIL and CMDB Implementations” Thomas Mendel, Jean-Pierre Garbani, with Laura Koetzle and Thomas Powell. Forrester Headquarters – White Paper. Forrester Research Inc., 400 Technology Square Cambridge MA 02139 USA.

[REF 2]: Taxonomy Warehouse. http://www.taxonomywarehouse.com/