Configuration Management

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2.1. Introduction to Configuration Management

2.1.1. Definition

Configuration Management is the planning and definition of components located at a specific site and contained within a data processing system or network. It is through Configuration Management that diagrams and circuit layouts are created in conjunction with business user requirements.

Working closely with Facilities Planning, Capacity and Performance Management, Inventory Management and many other SMC disciplines, Configuration Management will assist in the definition, ordering, implementation planning, installation, and acceptance testing of equipment and software components needed to support business and user requirements. In response to a business requirement, Configuration Management will assist in the selection and installation planning of equipment / software that is compatible with the existing configuration, taking note of any exception that will have to be addressed by support personnel (i.e., power requirements, additional ports, floor placement, security requirements, etc.).

In addition to assisting in equipment / software planning and installation, Configuration Management is responsible for creating circuit and system diagrams that illustrate how components are connected within the overall data processing system. These diagrams are used by management and technical personnel to support a variety of functional responsibilities.

Obtaining input from Inventory Management, the Configuration Management process will validate that equipment / software connections are compatible and at corresponding version and release levels. This process is designed to avoid problems caused by incompatible version and release levels that cause mis-communications between data processing components and locations.

Configuration Management will support central host and remote network locations. It is responsible for creating and maintaining circuit diagrams for all locations supported within the overall data processing environment.

2.1.2. Scope

The Configuration Management discipline encompasses all system and data network elements to the server level throughout the enterprise.

Responsible for validating component and release level compatibility of elements contained within the data processing environment, Configuration Management will create and maintain system diagrams for all mainframe and data network assets. Should component and release level incompatibilities be recognized by the Configuration Management team, then they are responsible for generating a problem report describing the incompatibility.

System diagrams will be made available to management and technical personnel to support their functional responsibilities. These diagrams will assist in problem analysis, facilities planning, and a host of other functions performed by technical and managerial personnel.

The Configuration Management team is responsible for keeping current on vendor products and new technologies affecting Configuration Management.

2.1.3. Mission

The mission of Configuration Management is to establish and maintain a Configuration Management process that will:

- Assist in the definition and selection of hardware / software components,
- Aid in implementation / installation planning for hardware / software components,
- Ensure that Facilities Management is included in the planning and installation process and that all support requirements have been planned for and met,
- Coordinate implementation procedures with Systems and Support personnel,
- Create and maintain circuit and system diagrams.

In addition to performing the above functions, Configuration Management will be responsible for coordinating efforts associated with maintaining the data processing environment. These efforts will be in lock-step with the Inventory Management process associated with acquisition, redeployment, and termination of components.

While Inventory Management is responsible for creating and maintaining an accurate listing of all components contained within the data processing environment, Configuration Management is responsible for insuring that the components fit together properly and that accurate circuit layouts exists. You can consider the Configuration Manager as the engineer responsible for ensuring that the printed circuit board is wired correctly, while the Inventory Manager is responsible for ensuring that all required parts are available.

The Configuration Management process should be integrated within the everyday functions performed by personnel responsible for component acquisition, redeployment, and termination. No component should be added, moved, or eliminated from the data processing environment without including Configuration Management in the process. This will guaranty the accuracy of system diagrams produced through the Configuration Management process.

2.1.4. Objectives

The objectives of Configuration Management are:

- Ensure the compatibility of data processing components,
- Coordinate component installation with vendors and support personnel,
- Maintain component and release management practices,
- Inform SMC disciplines of component changes and provide them with component information necessary to the performance of their functions (i.e., floor space requirements to Facilities Management, equipment storage capacity to Capacity and Performance Management, etc.).
- Maintain accurate and current system diagrams.

These objectives are met through the following:

- Information exchanges with development personnel responsible for implementing new business functions within the data processing environment,
- Attending maintenance and planning sessions that define future system requirements associated with addition, movement and elimination of components,
- Input from the Change Management process,
- Input from the Problem Management process,
- Input from the Inventory Management process,
- Input from the Capacity and Performance Management process, and
- Technical information on vendor products and techniques associated with vendor product implementation and support.

2.1.5. SMC Discipline Interfaces

The Systems Management and Controls disciplines that will interface with the Configuration Management System are illustrated within the diagram listed below.

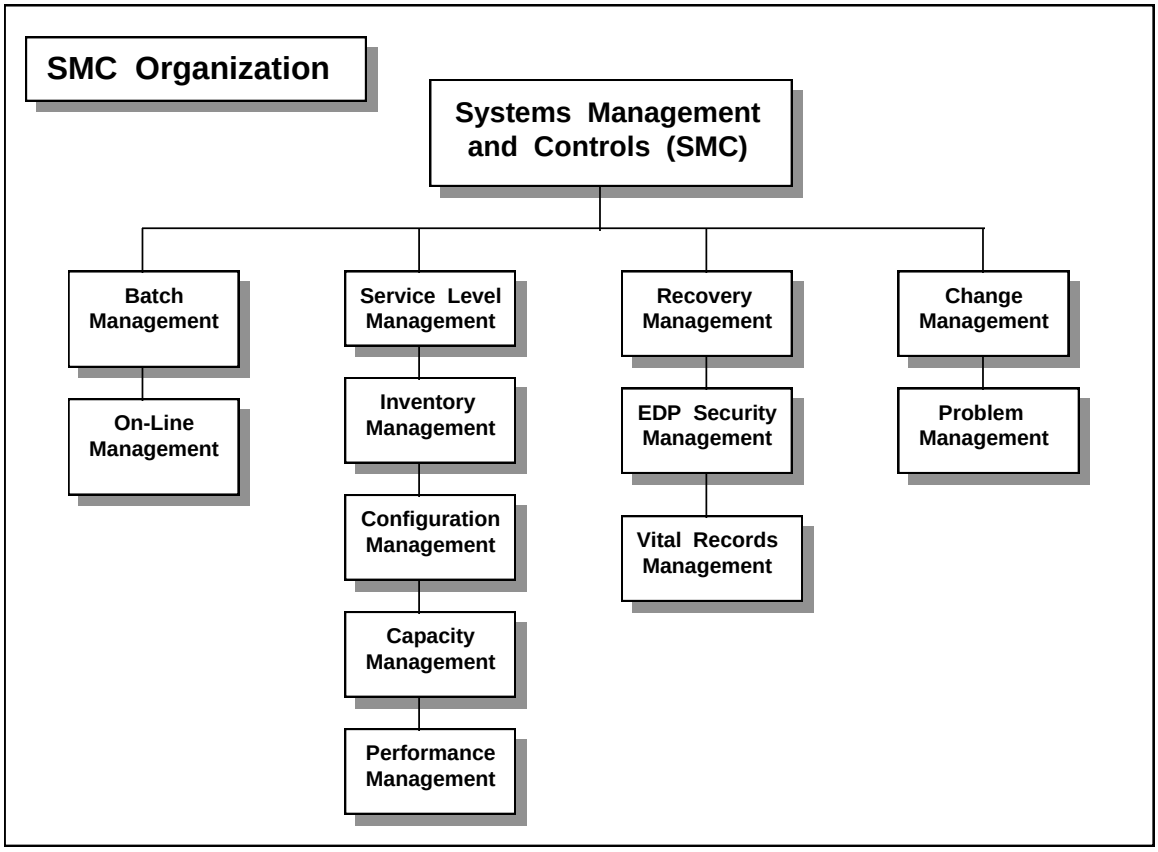

Figure 1: SMC Discipline Interfaces .

The disciplines interfacing directly with configuration Management and their functional responsibilities are:

- **Capacity Management** (i.e., PC memory and speed, DASD size, etc.).
- **Performance Management** (speed and usage information).
- **Change Management** (version and release information, benchmark, testing, etc.).

- **Recovery Management** (recovery planning for critical assets and sizing requirements for recovery facilities).

- **Service Level Management** (Service Level Definitions - SLD's and Service Level Reporting - SLR of user processing and service requirements).

- **Problem Management** (troubleshooting, pathway, version and release information, etc.).

- **Inventory Management** (hardware, software, location, HVAC requirements, power, water, floor space, etc.).

2.2. Process Description

The process of Configuration Management receives input from the other Systems Management Controls (SMC) disciplines and other functions within the I/S organization and throughout the enterprise.

The vehicle used to control the Configuration Management discipline is Change Management. Without adequate Change Management the accuracy and integrity of the Configuration Management process cannot be ensured. These SMC disciplines and functions encompass both system and data network elements and feed the Inventory Management discipline.

Configuration Management inputs can come from inventories for either the Network or System area and can include a variety of input methods:

2.2.1. Network

The Network area must account for new acquisitions installed into the configuration, as well as redeployments and terminations. Because the complexity of today's networks makes tracking component changes difficult, it is advisable that tracking be accomplished through the use of discovery type applications which monitor and interrogate asset changes automatically. This type of tracking would capture Vital Product Data (VPD), or perform product identification which is generally imbedded on PC-type products by the manufacturer.

2.2.2. System

Within the system area changes to the physical environment are systematically reported through the integrated change process. This discipline incorporates all hardware and software reconfigurations or updates. All inputs to the centralized data base will be subject to the change process.

The following page contains an overview of the Configuration Management process.

2.2.3. Configuration Management Process

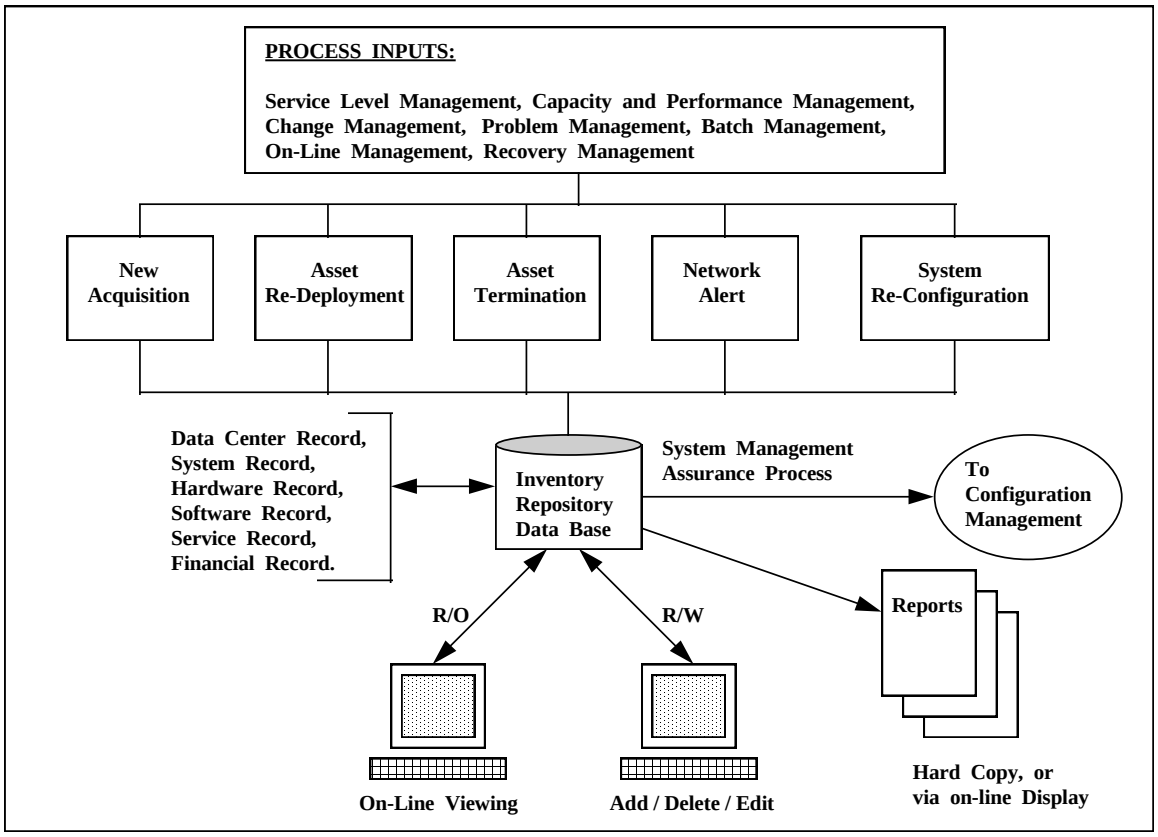

Figure 2: Configuration Management System - Overview of Process

The above provides an Overview Diagram of the Inventory and Configuration Management process, while the following illustration provides a Flow Diagram of the Inventory and Configuration Process.

2.2.4. Configuration Management Flow

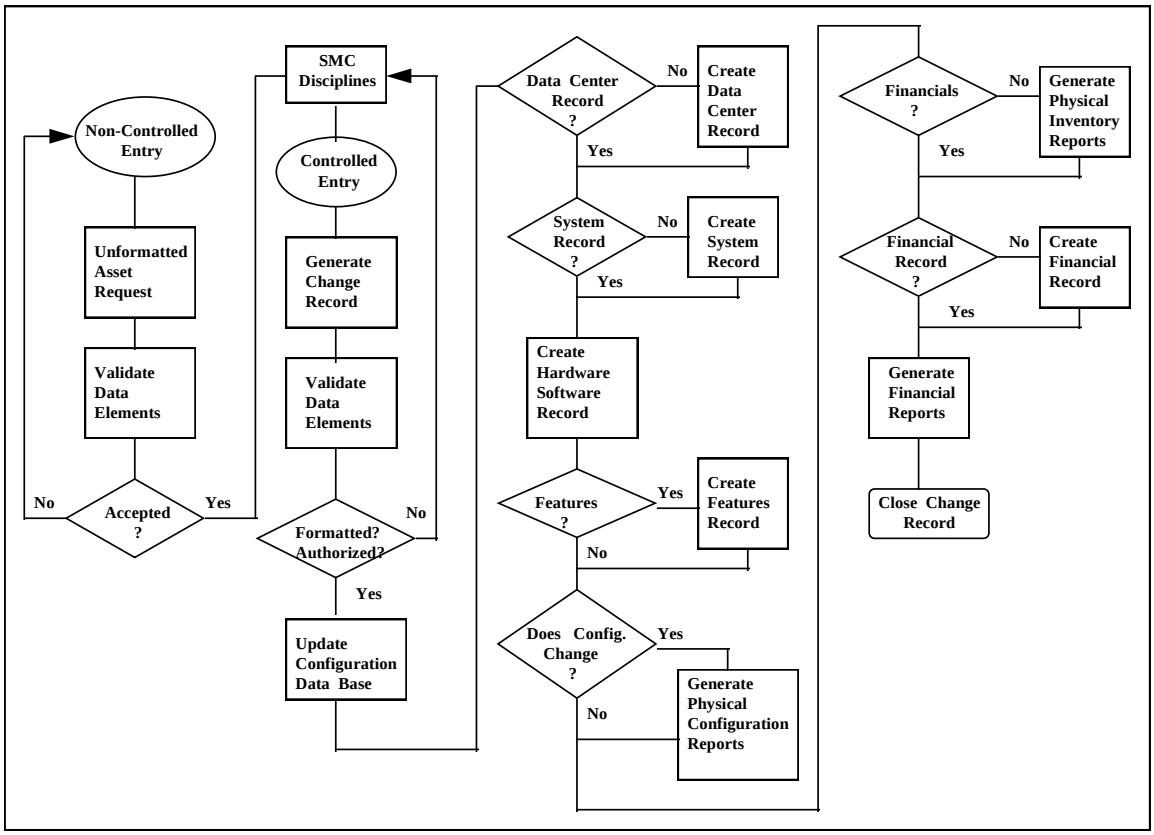

Figure 3: Configuration System Flow Diagram

2.3. Process Flow.

The process is entered as a Controlled or Non-Controlled Asset Change Request (ACR) as follows:

2.3.1. 1. Non-Controlled ACR Entry:

- ACR received by any method other than the Change Control process.

  - Confirm all necessary information is available about the asset.
  - Request is reviewed locally for acceptance.
  - Problems documented and returned for resolution.
  - ACR accepted and authorized.
  - Request forwarded to Change Control process for input as a Controlled ACR.

2.3.2. 2. Controlled ACR Entry:

- Validate all data elements are present in the Change Record.
- Review by all I/S organizations accountable for asset control.
- Problems documented and returned for resolution.
- ACR accepted and authorized.
- Update Inventory Repository data base.
- Create data center record associated with the asset.
- Create system record associated with the asset.
- Create component record associated with the asset.
- Create feature records associated with the asset.
- Generate physical configuration reports and distribute.
- Create financial records if appropriate.
- Generate financial reports if appropriate.
- Generate physical inventory reports and distribute.
- Close the change record.

2.3.3. Implementation of Configuration Management

Efficient processing and operations management start with an integrated approach that links all facets of system management together. Inventory and Configuration Management are just two of the disciplines. Each augments the other, and provides the ability to effectively manage a large systems environment.

Accurate inventory and configuration data is vital. A lack of such data affects the other disciplines ability to function. The automated element of Inventory and Configuration Management monitors the enterprise-wide data network processing environment for change, while the system environment relies on the change process (which may or may not be fully automated) for accurate input.

The products and tools that comprise the Inventory and Configuration Management System use data network definition information, Vital Product Data, local configuration definitions and in some cases, discovery applications to arrive at inventory and configuration information.

This process must embrace the following areas to be effective:

2.3.4. System Environment

Today the system programmer can define hardware configurations for multiple MVS/ESA operating systems through Hardware Configuration Definition (HCD). HCD reduces complexity and shortens the time required to successfully define an I/O configuration by providing a panel-driven interface, panel defaults, and data entry validity checking.

Dynamic reconfiguration management allows the support organization to implement system configuration changes without interrupting system service. System availability is increased by eliminating the need for an IPL to change the hardware configuration, and an IPL to change the software definition for devices, control units, and channel paths. This ability to dynamically reconfigure works in conjunction with HCD and allows the new system configuration to be implemented without interruption.

Enterprise Systems Connection (ESCON) Manager enhances user control and manageability in an ESCON architecture environment when changing ESCON Director (ESCD) configurations. The changes are entered at a host processor rather than at the local ESCD consoles in the mainframe environment.

HCD and ESCON are highly dynamic tools which can effect configuration changes easily and swiftly. However, there are no automation techniques currently in use which update the inventory data base. Updates to the inventory data base require manual intervention, therefore, it is important that these interfaces to HCD and ESCON be constantly monitored and proper change control exercised to maintain asset integrity.

2.3.5. Network Environment

The complexity of the network environment requires an integrated set of facilities to store and display network configuration data for all network resources. This includes OSI, TCP/IP, SNA, Ethernet, and any other network resources. These facilities are tailored for network operational use and contain information that is pertinent to hardware and software inventories (e.g., Vital Product Information).

When dealing with large networks the immediate problems associated with the collection of asset information is enormous and therefore, subject to significant errors. If the configurations are too complex, they become impossible to manage or understand. The typical network is composed of many nodes extending to many different topologies. The technique commonly used to manage networks is to break up the larger networks into smaller, manageable units. Once the management of these clusters is underway, you can proceed to manage several clusters from a higher node in the configuration hierarchy. This allows for greater control and accuracy.

On the other hand, if the configurations are too granular, the system can become a collection of small configurations with no relationships established between each other. For example, when defining a large 3745 network, we first define the lines, along with their drops, as separate configurations, then connect these lines to the 3745 in another configuration. This logic can be applied to other layouts as well, including the client/server arena.

Although the industry direction is to automate network asset control as much as possible, managing the entire configuration does not necessarily have to be automated from the start; especially within the enterprise. It is our primary purpose to reduce the amount of manual work and the possible human errors typically found in current network configuration and asset management processes. Therefore, the technique presented here does not provide the Company with the complete automation process for the entire enterprise configuration. Rather, we recommend that you begin the initial steps for replacing much of the tedious work of entering and updating configuration data manually.

2.3.6. Data Requirements for Configuration Management

To ensure a consistent, centralized and integrated control, as described in the previous section, a common data model must be built. This will ensure a consistent reporting process to the inventory data base regardless of where the data is stored.

In the event of incomplete record information, the inventory management area must re-solicit, or advise the responsible asset area of the missing data elements. This reentrant approach provides a disciplined strategy to build a reliable inventory.

The structure illustrated in the next diagram allows the description of hierarchical relationships among data centers, systems, components, service organizations, and financial data. By entering descriptions of the hardware and software system components, along with information about their status and support data, a data base can be built which supports parent/child relationships.

The figure on the next page shows the interrelationship between component records:

2.3.7. Inventory Management Data Model

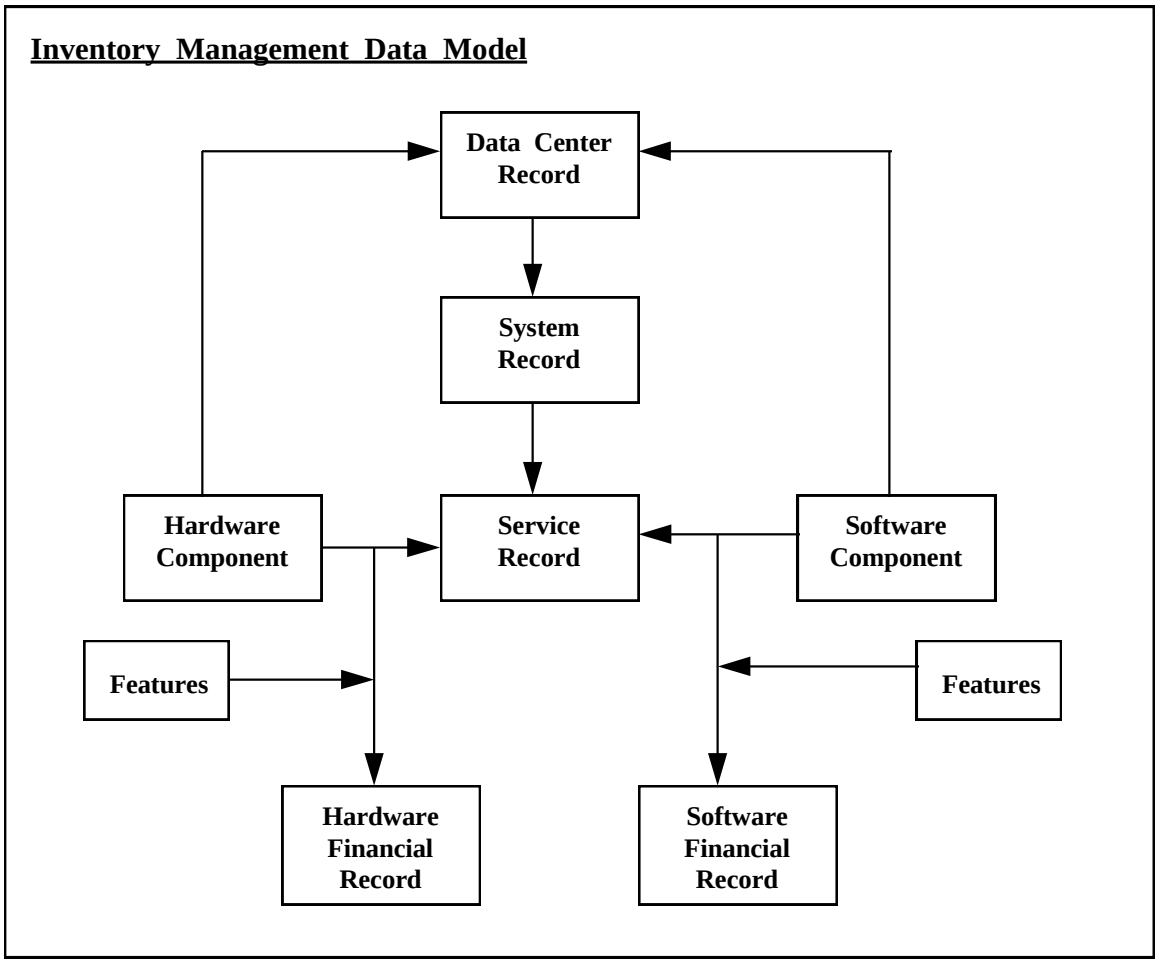

Figure 4: Inventory Management Data Model

The following items are required from asset sources to support an integrated Configuration Management approach.

1. Data Center Record.

This record contains on-line information about the data processing centers, the system name, location codes, emergency phone numbers, managers, and contact names. The software and hardware components, and system records will refer to this record.

2. System Record

This record contains information relative to each processing system within the processing center. This record should contain the system names by LPAR, location codes, operator names, support numbers. Software and hardware components can refer to this record.

3. Service Record

This record contains the service organization's data. Maintaining service organization records is advantageous when a user is displaying a record of a failing component. This record should contain the name, location, prime-shift phone number, off-shift phone number, hardware and software representative's name, and contact phone numbers, and a description of the service organization. Hardware and software components can refer to this record.

4. Financial Record

Helpful information in this record assists in warranty and service incidents. Hardware financial records contain a user financial id, a financial type, and a description. For software records the same information is required in addition to a license type record entry.

5. Hardware Components

For hardware component records a consensus must be reached on the hardware types to be managed. A hardware model record for each hardware type will be created and all common hardware components will be entered using this template. This record should contain the following information:

- Component ID,
- Serial Number,
- Generic device type,
- Model,
- Manufacturer,
- Owner,
- Install Date,
- Location,

- Maintenance Vendor,
- Contract type,
- Component status,
- Component description.

In some instances a hardware subcomponent record must be entered. A subcomponent can be thought of as a feature that can be a stand-alone component and has mobility in the inventory (for example, 3726, 3727, external hard disks). This will allow subcomponents to be removed or moved from their hardware component or attached to another component. This record should contain a subcomponent status code and a description.

6. Software Components

For software component records a consensus must be reached as to what level of installed software will be within the scope of the asset data base. For example, is the workstation (PC-based) software to be managed? If so, are we to account for all application software or just operating system software?

The answers to these questions are linked to what kind of information the user support groups require to provide service to the client. In a centralized Help Desk environment, all user application software, including maintenance levels, are maintained. This provides up-to-date information to the Help Desk personnel about the user environment and adds greatly to their productivity.

A software model record for each component contains an ID, maintenance level, program type, status and a description. A typical software record should contain the following information:

- System (application runs on),
- Name,
- Model,
- Vendor,
- Serial Number,
- Renewal Date,
- License Type,
- Contract Type,
- Maintenance Level,
- Description.

7. Feature Components Record

This record identifies associated features and relates these features back to other records.

8. Model Component Record

The industry uses this type record as a productivity tool to greatly enhance the ability to build large data bases quickly with minimum data entry errors.

Model records themselves do not hold configuration data, but they make the entry of data easier by allowing the creation of component records from models that hold information common to a number of components (or subcomponents) of the same type.

The model capability also provides the ability to build one or many relationships between model features and hardware or software components. Features that are common to many components can be contained in a single model feature record that is referred to by many component records.

2.3.8. Collecting, Monitoring and Reporting Data

1. Monitoring and Reporting Data

Once the inventory data base has been built it will be used to satisfy the following requirements

- Provide Configuration Management with component listings, by location and component type.

- Determine bypass and recovery procedures when a failing component has been identified.

- Determine the level of a component, and also other components that are affected when a problem occurs.

- Establish relationships between a component and any problem or change record in the data base.

- Search for any components meeting specific characteristics, such as all terminals in a network and the locations to which they are assigned.
- Generate reports on specific configuration information, including but not limited to the following:

    - Hardware or software components with related features,
    - Physical inventory by location,
    - Hardware and software configuration maps, and
    - Service reporting for maintenance contracts, warranty, and invoice tracking.

2. Collecting Data

The Record Hierarchy in the following diagram indicates that component records refer t data center, system, service, and financial records. These four records are informational components. This means they must be created prior to creating the component records (hardware, software). It saves time because these records must be defined before they can be referenced in component records. This allows you to establish connections as you create the records.

2.3.9. Inventory Management Record Hierarchy

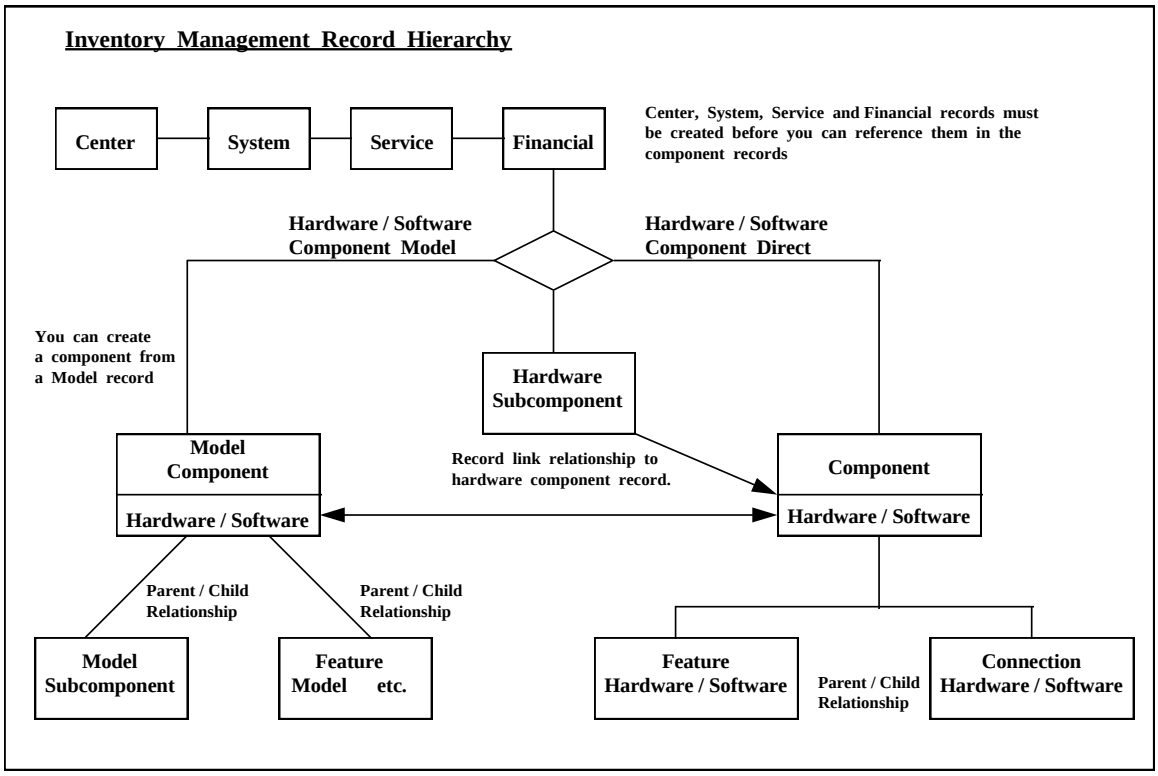

Figure 5: Inventory Management Record Hierarchy

Inventory Management record hierarchies are used to connect components to systems and locations. This information is vital to the Configuration Management process, which is why Inventory Management and Configuration Management are tied so closely together.

2.4. Discipline Relationships

To ensure the integrity of the process, Configuration Management must interface with multiple business and I/S system management functions. The interface to these functions provides the foundation for strong Inventory and Configuration Management practices.

2.4.1. Business Function Interfaces

Some of the more common business functions that interface with Inventory and Configuration Management include:

- **Purchasing**

This resource manages all information systems requirement identification through the procurement process. Inventory and Configuration Management provides input to Purchasing in terms of system and network standard asset information.

- **Accounts Receivable / Payable Department**

This function collects usage data and bills information System (I/S) expenses to the appropriate users. It supports accounting, budget planning, tracking of project costs, and other activities. Inventory Management provides financial records as input to the Accounts Receivable / Payable process and vice versa, while Configuration Management provides system diagrams. This two-way interface occurs with the approval and submittal of billings for payment.

- **I/S Management Committees**

These groups investigate tools and services to provide policy information and translate that data into recommendations for I/S productivity improvements and services. Inventory and Configuration Management will provide input to these groups in terms of product standards and technology strategies.

- **Strategic Planning Committees**

These groups deal with long-range planning and the integration of I/S objectives with the business objectives of the enterprise. Inventory Management provides an interface to Strategic Planning by providing insight into device migration patterns, trends, and direction, and the Strategic Planning Committees provide information back to the disciplines as well. Configuration Management provides system diagrams and vendor technical information relevant to the planning and installation process.

- **Security Department**

This function manages the registration or enrollment of people and programs to access controlled I/S resources. Inventory and Configuration Management provides input about device configurations and security interfaces to this functional area. Configuration Management provides system diagrams detailing the access paths to locations and equipment throughout the enterprise.

- **User Support Groups**

Since these groups are responsible for their equipment acquisition and movement, they must be compliant with the inventory and configuration process. Tracking the acquisition of network and computer equipment at the local level can be difficult without their full participation. To ensure accountability of such purchases, provisions should be made for a periodic physical inventory of such groups to ensure a level of inventory integrity. Afterwards, configuration diagrams are validated and updated to reflect current component layouts.

- **Client Support Services**

These groups define the services that will be needed to support the I/S clients within the enterprise. Within Services Management are two key areas:

1. **Help Desk** - This area provides a single point of contact for clients to request services and obtain resolutions for problems.

2. **Service Level Planning** - this area identifies the agreement between the I/S organization ad the user community that defines the level of service. The service level agreement is also used to define policies for operations and performance management.

2.4.2. System Management Interfaces

The Configuration Management discipline is dependent upon various disciplines and functions within the enterprise in achieving its objectives. These disciplines and functions and the assumptions related to their tasks are listed below:

- **Change Management**

Coordinates the various tasks performed in configuration change and testing across the data processing environment. Any changes to the I/S environment that affect Inventory Management are input from this discipline.

- **Problem Management**

Assists the I/S organization in locating, identifying, and resolving inventory problems. The Problem Management discipline will provide input to Inventory Management as problems arise that require changes to resolve conflicts.

- **Facilities Planning**

Required to participate in the Problem or Change process as they pertain to the physical environment and is accountable for any actions required to comply with the inventory management process. It is essential that this group provide input to Inventory Management and vice versa, to ensure changes in physical asset configurations are noted.

2.5. Configuration Management Tools

Inventory and Configuration Management uses network definition information, Vital Product Data (VPD), local configuration data bases and, in some cases, discovery applications in order to arrive at inventory information.

The following list of Inventory and Configuration Management tools was accumulated after conducting a general survey of large corporations in the area. The participants represented large corporations with an annual I/S budget of over $100M. The survey solicited information about how they performed Problem, Change, Configuration, and Inventory Management and what techniques and tools were used to accomplish tasks in the two areas that follow.

Those products which are specifically mentioned were approved by the vast majority of participants. We also list major Inventory and Configuration Management functions that can be fulfilled by any number of products, but do not specifically mention a product by name.

2.5.1. Asset Management at the System to Server Level

The major components that provide the collection and reporting vehicles for Inventory and Configuration Management, from the system level out to the network server level, include:

- **VTAM and NetView**

  VTAM and some specialized features of NetView are responsible for maintaining the necessary linkages to the physical asset, whether it is within the system complex or out to the server level on the network.

- **Centralized Data Bases**

  All assets and their associated information are stored in a centralized data base. Editing and browsing capability are available through an on-line menu driven, front-end that provides restricted security access, if necessary. This security is provided through any number of host-based security packages.

- **Network Configuration Application (NCA) / MVS**

NCA/MVS is a useful tool for migrating existing stand-alone (PC-based) inventory control data bases to host-based formats. It should be noted that in some cases conversion utilities have been written to convert these stand-alone environments into a data base file structure.

- **Enterprise Physical Connection Tool (EPCT)**

EPCT is a useful product for building configuration data bases and producing physical and logical diagrams. The figure below illustrates the usage of these tools within the process.

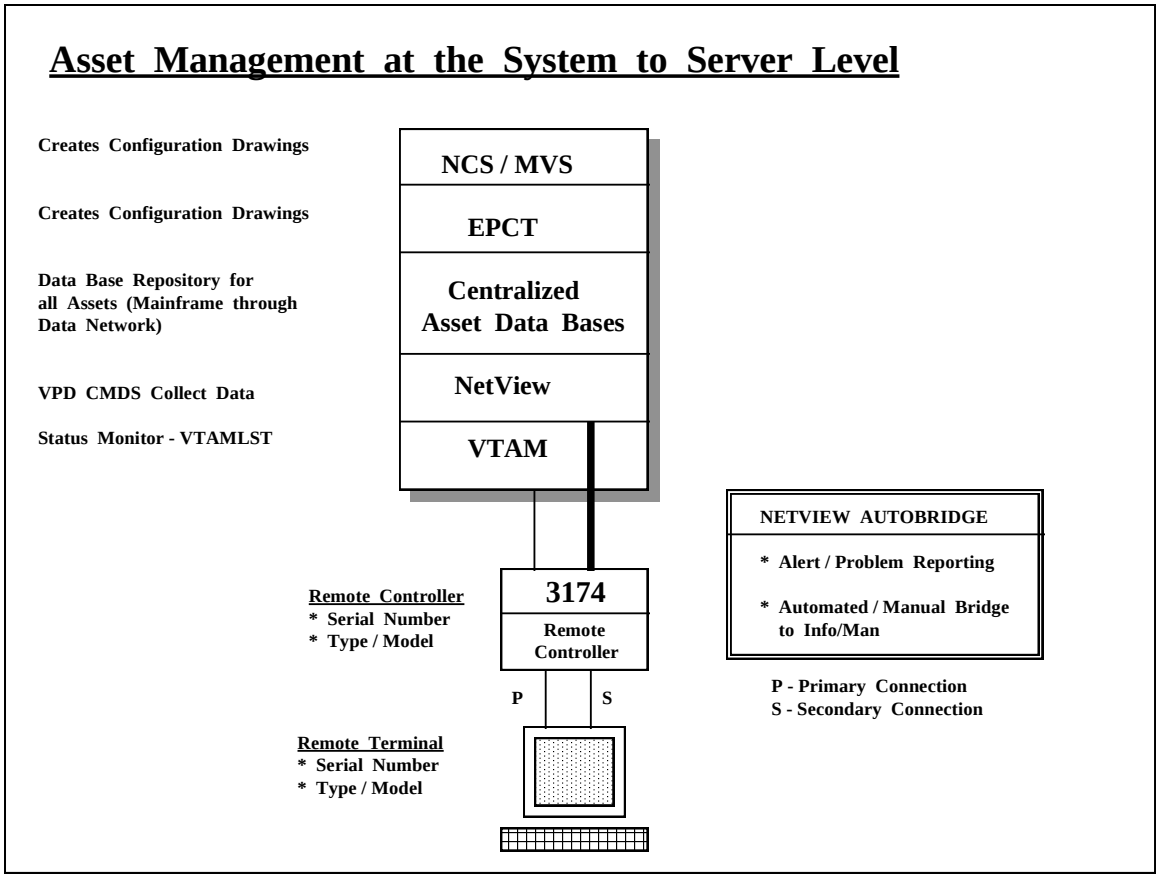

Figure 6: Asset Management at the System to Server Level

2.5.2. Industry Standards

- **Centralized Inventory Data Base Repository**

The industry uses any number of system management products which integrate the entry of Problem, Change, and Inventory Management into a common, centralized data base repository. However, these integrated products must interface to the tools listed below to facilitate the automation ad centralization of an asset management data base repository.

- **VTAM Version 3.4 (Planning and Reference Guide - SC31-6124)**

VTAM Version 3.4 is a telecommunication access method that works in conjunction with MVS/ESA Version 4 to support non-disruptive addition of channel-connected communications controllers and SNA cluster controllers.

- **NetView Ver. 2 Rel. 3 (User's Customization Guide - SC34-4336)**

Network Manager which will provide:

1. **NetView Bridge Adapter** (NetView Bridge Adapter Reference - SC34-4336)

A component that provides a set of application-to-application interfaces that will provide an effective means of connecting NetView to external data bases.

2. **Status Monitor Function**

Collects status information about SNA resources such as hardware data (from VTAMLST) and reports to a centralized data base.

3. **NetView Autobridge Version 1** (User's Guide - SC34-4318)

NetView Autobridge will allow the flow of configuration and change data from NetView to a centralized Data Base Repository.

4. **RODM - Resource Object Data Manager**

The Resource Object Data Manager will provide services that enable systems and network management. The facility is used by NetView's multi-vendor graphic enhancement and automation platform. These services will be used to create configuration drawings of the asset data base.

5. **Network Configuration Application/MVS (NCA/MVS) Version 1** (User's Guide - SC31-6149)

Network Configuration Application/MVS is a configuration application for use on an MVS platform. It provides for collection of information about equipment, circuits and software; has the ability to create configuration representations for components in all types of network topologies; and allows for creation of abstracts to represent relationships of components. A utility function transforms this data into the format required by the Resource Object Data Manager Facility in NetView Version 2 Release 3 for graphic views.

6. **Enterprise Physical Connection Tool (EPCT)** (User's Guide - SC23-0546)

This DB2-based asset collection and physical drawing product will provide the capability to draw physical and logical topologies of system and network complexes. EPCT is a locally developed application written by the ISSC Corporation in C Language and provides browsing an editing capability on-line. This product can be ordered as an PRPQ through the IBM Corporation.

2.5.3. Downstream Network Server Configuration and Inventory Management

The following figure illustrates a downstream view of Network Configuration and Inventory Management.

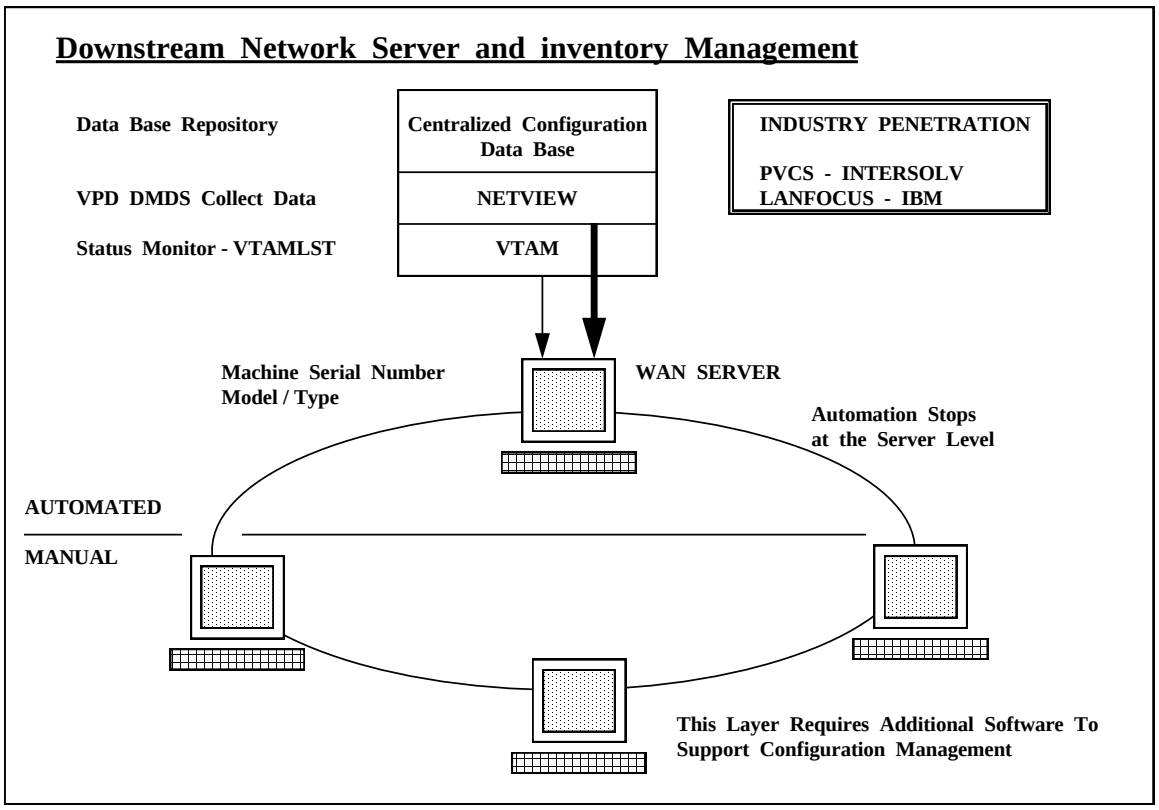

Figure 7: Downstream Network Server and Inventory Management

Asset management below the server level has not been widely implemented throughout the industry today. WAN environments have their own unique challenges. Most host-based products require an additional layer to bridge beyond the server level. The products listed below are seeing some industry penetration and promise to be viable tools in the coming months ahead.

- **PVCS Configuration Builder Series** (Product of INTERSOLV Corporation)

The PVCS series covers all key functional areas for configuration management:

- Version Management,
- Build Management,
- release Management, and
- Report Generation.

These functional areas are available across all types of files including source code, text, or documentation files, graphic or binary files. With PVCS Series development teams can:

- Recreate a system, or component of a system at any time and prevent inadvertent errors and code changes with version management.

- Rebuild an entire system when any component is changed without having to remember complete relationships about elements of the system.

- **LANFocus Management / 2** (Product of the IBM Corporation)

This family of products provides System Management principles to LAN attached workstations having OS/2 and DOS installed. The products provide a platform which includes a programming interface for the creation of system management applications. This includes applications which address the disciplines of problem management, performance management, and configuration management.

2.6. Roles and Responsibilities

2.6.1. Configuration Manager

Responsible for maintaining the configuration diagrams in a current and accurate state. Role is responsible for both mainframe and network resident devices and software components. Interfaces with Systems Management disciplines and product vendors.

2.6.2. Configuration Clerks

Responsible for maintaining the configuration diagrams and for guarantying the information contained within the diagrams is accurate and in a current state. Information is data entered, or entered via automated tools. If automated tools are used, then clerks must be knowledgeable in program products used as a tool.

2.7. Process Evaluation

2.7.1. Present System Weaknesses

There is presently no Centralized Repository for asset information, because Inventory Management is performed by many various groups (i.e., mainframe, communications, data network, etc.). A consolidation of these data bases into a centralized Inventory Repository should be planned. Once implemented, the Configuration Management process can be better accomplished.

When migrating to a centralized repository, automated tools and interfaces should be developed, so that any acquisition, redeployment, or termination of assets will have to accomplished through the automated system. This will reduce the effort presently performed by personnel and guaranty the accuracy of the Inventory repository.

2.7.2. Recommendations for Improvement

Create a Centralized Repository of Inventory information.

Integrate Inventory Management and Configuration Management processes.

Utilize Automated Tools and Front-end to the Inventory Repository.

Integrate the Inventory Repository with the everyday asset functions performed by personnel, such as:

- Asset Acquisition,
- Asset Redeployment,
- Asset Termination,
- Lease and Contract Maintenance,
- Volume Purchase Agreements, etc.

Utilize a “Criticality” indicator to relate assets and their criticality for disaster recovery purposes. This will allow for reports that list all most critical resources for a specific location, by type and costs.

Formulate a committee to investigate methods for improving Inventory Management and implement the most rewarding suggestions from the committee.