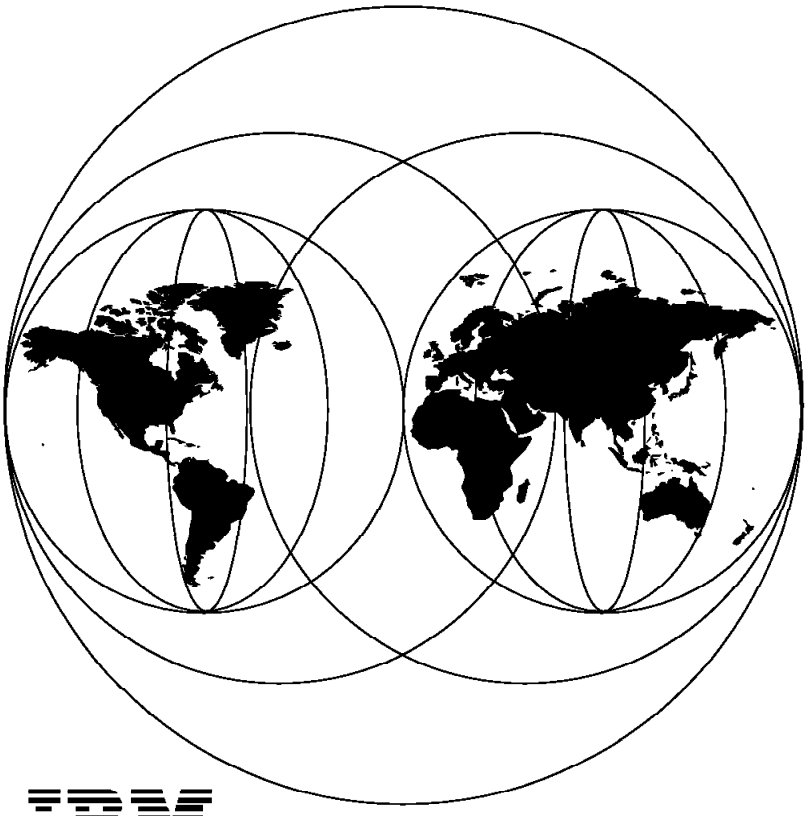
International Technical Support Organization SG24-4667-00

Getting Started With Configuration Management Using ConfigTool

April 1996



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Before using this information and the application that is described in this publication, be sure to read the general information under “Special Notices” on page xi.

First Edition (April 1996)

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Abstract

This redbook is intended for any level of management or technical personnel who have responsibility for configuration or inventory management of their local area network (LAN) environments. It discusses some of the challenges and problems being faced in many organizations today in the configuration management discipline and in the control of their inventory and assets.

This book focuses on some of the how to′s of getting started in configuration management and shows how IBM Configuration Management Tool for OS/2 (ConfigTool) can be used for this purpose. It describes what ConfigTool is and can do, and then takes you through installation and customization steps to get started with ConfigTool. This redbook package also contains both the ConfigTool application (on CD-ROM) and an additional ConfigTool Reference Guide.

This book is useful for anyone involved in trying to provide effective configuration management of their LAN environments.

(158 pages)

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Special Notices

This publication is intended to help anyone involved in the configuration and inventory management tasks of an organization to understand some of the challenges and problems being faced in this area. It will also show how IBM Configuration Management Tool for OS/2 (ConfigTool) can be used to get started in providing effective configuration management of your local area network (LAN) environments. The information in this publication is not intended as the specification of any programming interfaces that are provided by IBM Configuration Management Tool for OS/2.

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Preface

This redbook is unique in its detailed coverage of configuration management. It focuses on some of the challenges facing many organizations today dealing with the task of providing effective configuration management of their network environments. It also discusses some of the how to′s of getting started in configuration management and shows how IBM Configuration Management Tool for OS/2 can be used for this purpose.

This document provides information on some of the products that are available to collect configuration data, describes what IBM Configuration Management Tool for OS2/2 (ConfigTool) is and can do, and then takes you through the installation and implementation steps required to get started with the ConfigTool application provided with this redbook package.

This book is useful for anyone involved in trying to provide effective configuration management of their LAN environments.

How This Document is Organized

The document is organized as follows:

- Chapter 1, “Introduction”

  This chapter gives you an introduction into some of the challenges being faced in today′s environment when managing IT resources. It gives you an introduction to the configuration management discipline, and also discusses the close relationship of configuration management to the other tasks or disciplines involved in the overall management of your environment.

- Chapter 2, “What Is Configuration Management?”

  This chapter goes into more detail on what Configuration Management is all about, and some of the areas that this very broad discipline covers.

- Chapter 3, “Getting Started with Configuration Management”

  This chapter describes some of the steps involved in getting started with configuration management. This includes things such as understanding where and what data you need, looking at processes and tasks involved, and finally, the functionality required in the tools to perform configuration management.

- Chapter 4, “What Products Collect LAN Configuration Data?”

  This chapter describes some of the LAN management products available today that collect portions of the configuration data, and information that is necessary to provide a complete view of your LAN environment.

- Chapter 5, “What Is IBM Configuration Management Tool for OS/2?”

  This chapter describes an application called IBM Configuration Management Tool for OS/2 (ConfigTool) that is available to help you get started (or make your ongoing tasks easier!) in the configuration management of your LAN environments. This chapter gives you an overview of ConfigTool and describes the functions it performs.

- Chapter 6, “Getting Started with ConfigTool”

This chapter describes how to get started in configuration management using ConfigTool. It takes you through installation steps for ConfigTool, explains how to load the database with configuration data, and then how to display data and navigate through the ConfigTool graphical interface. It also gives some practical scenarios of how it can be used, and suggestions of how it can be enhanced using automation capabilities.

- Appendix A, “Installation of ConfigTool User Extractor”

  This appendix describes the installation and customization required to implement the ConfigTool User Extractor developed and described in this document.

Related Publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this document.

- *OS/2 LAN Server 3.0 Quick Reference*, S96F-8434
- *LAN Network Manager for OS/2 User's Guide, Version 2.0*, SC31-7105
- *LAN Network Manager for OS/2 Online Product Library*, SK2T-2677
- *LAN NetView Management Utility User's Guide*, SC30-3555
- *LAN Station Manager User's Guide*, SC31-7108
- *IBM NetFinity Manager for OS/2 Version 3.0*, S41H-6268
- *IBM NetFinity Services for Windows Version 3.0*, S41H-6269
- *IBM NetFinity Services for OS/2 Version 3.0*, S41H-6270
- *DB2/2 Guide*, S62G-3662

International Technical Support Organization Publications

- *LAN Network Manager V1.1, LAN Network Manager V1.0 and LAN Station Manager V1.0*, GG24-3942
- *LAN Management Processes (Alerts/Monitoring) Using NetFinity*, SG24-4517

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Chapter 1. Introduction

Information technology is the term that encompasses the rapidly expanding range of equipment (computers, data storage, network, and communications devices), applications, and services (such as end-user computing, help desk, and application development) used by organizations in support of the business to deliver data, information and knowledge to end users, and is seen as a means to provide strategic value to all parts of a business. However, information technology is not free from cost constraints and budget reductions, and any new technology must be justified by the return it provides to the business in terms of cost competitiveness, competitive leadership, and strategic advantage.

The challenge for the 90s is to address the issue of increasing user productivity with distributed hardware and software, while at the same time minimizing the costs required to manage these more complex, distributed, multivendor, multiprotocol environments.

To achieve these objectives, organizations must have the appropriate facilities in place to effectively manage their information services. This includes both processes and tools for operations management, problem management, change management, and facilities for configuration management.

Effective systems management is a critical factor for Information Systems to be able to provide more value to the business, while, at the same time, contain costs. They are also critical to those businesses trying to keep the hidden costs of distributed systems in check, and keeping their end users productive to the business. Effective and integrated management tools are acknowledged as being one of the keys to containing the rising support costs being experienced by many organizations.

1.1 Definition of Configuration Management

The definition of configuration management can be stated as:

An enterprise configuration is the set of resources (hardware and software) and connectivity that provide the electronic exchange of business information within an enterprise and with external customers. The connectivity can be physical, such as the cabling between machines, or logical, such as the connection of programs and transaction applications with databases and remote customer locations. Configuration management is the processes and functions to manage the enterprise configuration.

The recent explosive growth in distributed systems and local area networks has added to the complexity of the configuration management task. Distributed systems are often administered locally, while resources may be planned for and financed from a central enterprise control point. The reverse may also be the case; distributed systems are planned and purchased locally, and the task of managing and maintaining the environment put back to the central IT department. Both of these cases can lead to multiple types of products, and multiple protocols being in use in the LAN environment, and only increase the complexity of managing and keeping control of the environment.

Systems and networks today are also increasingly dynamic. Resources can often be moved without service interruption or notice. While this adds to configuration flexibility, it makes managing the assets of the business less predictable and more time consuming to maintain accurate inventory data.

Following are some questions that, although simple, for some enterprises may be challenging to answer.

- Do you know where your assets are?
- Do you know how many workstations your company has?
- Do you know the exact configuration of all those workstations?
- Do you know how often and where a particular piece of (standard) software is installed?
- Do you know who is using or responsible for which workstations in your company?
- Are you sure that the usage of all these expensive assets (printers, memory, disk space, processing power, software, etc.) is optimized in your company?

Configuration management can be seen as one of the most critical systems management disciplines. It spans the administration and operations of networks and systems, and must provide data to many different users and applications (such as problem, change and asset) in the enterprise. It is also one of the hardest disciplines to quantify in respect to value to the business, or return on investment.

Configuration management can also be one of the most difficult and time consuming of the management disciplines. Collection and maintenance of configuration data can be labor intensive and therefore expensive. This results in many organizations either spending a lot of money on trying to perform some configuration management functions, or by not having effective control or knowledge of what is really in their networks. Configuration management is also one area where automation is critical in order to reduce the number of personnel required to perform the tasks involved.

As the complexity of the distributed environments continues to rise, the demands on managing them will only increase unless we do something. The potential for runaway costs in managing and maintaining a large network is high unless an investment is made in both automation and in effective and integrated management tools.

1.2 Interrelationship of Management Disciplines

To provide an integrated management solution, each of the management functions should interact. For example, functions defined in the business management, performance management, and problem management disciplines need to access and use the configuration management information. Requirements may be fed to configuration processes as a result of the planning processes in the business management tasks. Processes in change management, performance management, or problem management may present specific requirements based on configuration enhancements or changes determined by their analysis.

Figure 1 on page 3 gives an overview of the close interrelationship of configuration management with the other management disciplines.

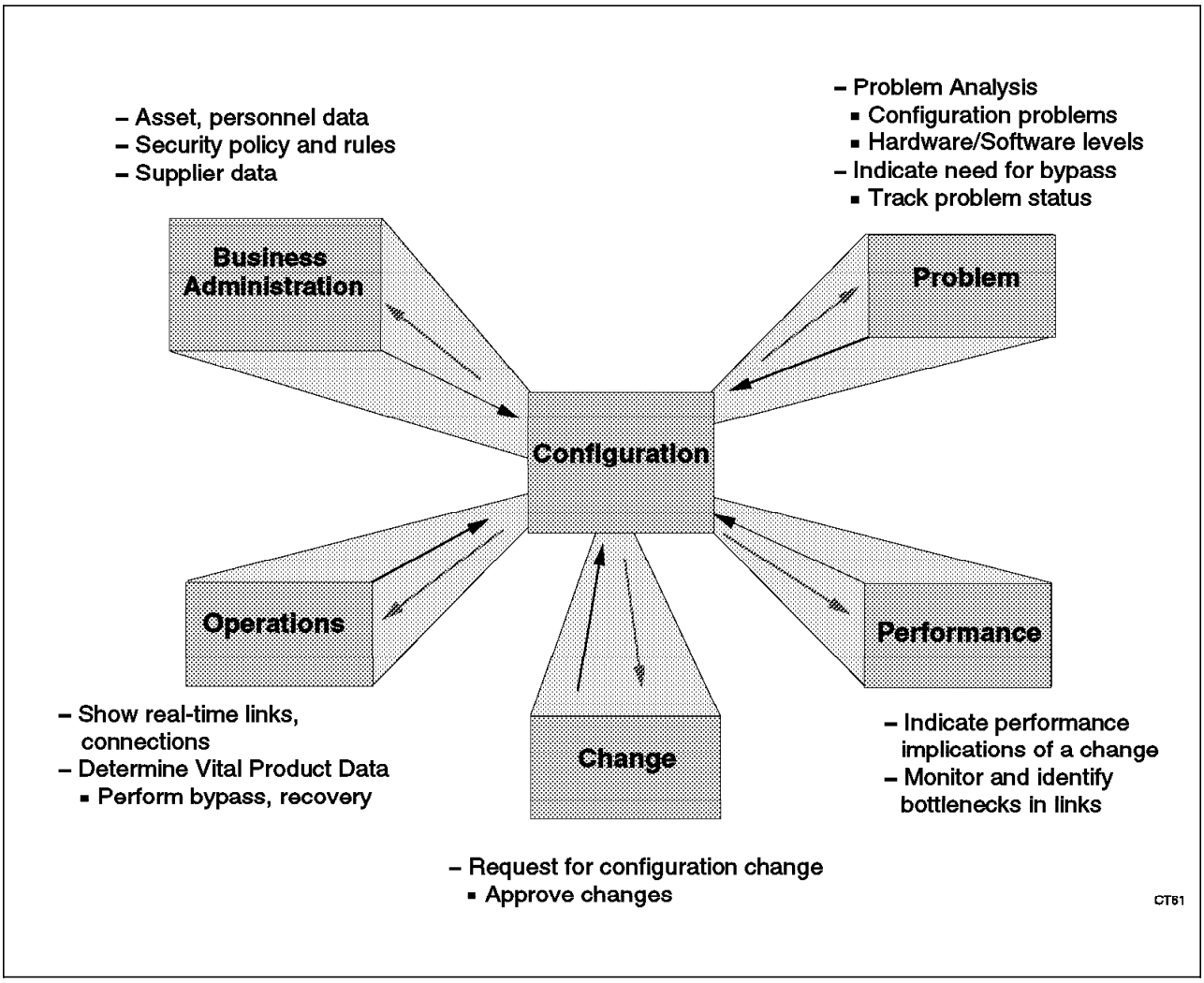


Figure 1. Configuration Management Relationships

The following few pages will take you through each of the disciplines shown above and describe them, and how they interact with configuration management.

1.2.1 Business Management

Business management covers some of the following areas:

- **Inventory Management**

  Inventory management is the application which runs against the configuration data, helping to answer such questions as ″What resources do I have?″, ″What software do I have running on the workstations″, and ″What does my configuration look like?″. Some people would also consider this a subtask of the configuration management discipline.

- **Asset Management**

  Asset management is involved with the lifecycle management of the enterprise resources and can include such topics as contract, invoice, purchase order, vendor management, and budget/financial analysis. Some

people would also consider this a subtask of the configuration management discipline.

- **Security Management**

  Security management is concerned with the administrative security tasks and should provide a single system image of the enterprise security systems. It includes the establishment and enforcement of security policy, the management of security services, and the management of security mechanisms. Configuration resources need to have security restrictions applied against them.

1.2.2 Change Management

Change management is the discipline that manages and controls the introduction of changes into an information systems environment. Change management is involved in any planned alterations to an information systems environment. It includes the planning, scheduling, distributing, synchronizing, installing, activating, and monitoring of changes to data processing resources.

Configuration management should be able to pass information on the current configuration to the change management discipline. Change management would then be responsible for coordinating and implementing configuration changes, and upon successful completion, be capable of feeding the updated data back into the configuration management process.

1.2.3 Operations Management

Operations management is the day-to-day running of the business, ensuring networks are kept operational and problems or outages are detected and resolved in the shortest possible time.

Operations management functions can change the current state of resources in the system. These changes may cause alerts to trigger processes that will alter the state of the current configuration.

1.2.4 Performance Management

Performance management tools should allow you to monitor and highlight potential problems or bottlenecks in your network. Current configuration data needs to be available to determine if alternate paths/configurations would relieve or help avoid any performance issues being experienced.

Capacity planning can also be seen as a subtask of this discipline and allows you to plan for future growth of your network and system environment. Without the knowledge of your current configuration, accurate capacity planning tasks become difficult and less effective.

1.2.5 Problem Management

Problem management is the process of managing problems and incidents from their detection through to their final resolution. This discipline includes the detection, analysis, recovery, resolution, and tracking of problems and incidents occurring in the information system. The objective of problem management is to reduce the resources required for problem determination and to provide better availability of information system resources.

Problems can often be very difficult to fix if you do not know what the resource that is having the problem is, how that resource is configured, its network connections, the software that is running on it, etc.. Access to configuration functions are also required by problem management to help determine related incidents and support impact assessment of a problem.

1.3 Why Are These Relationships Important?

Each of the management functions or disciplines (problem, change, operations, etc.) closely interact with each other. They each provide information that the other may need to be aware of, and in most cases information that may drive functions or actions in the other disciplines. For example, performance measurements may detect traffic problems within the network. These problems may result in changes (change management) being made to the configuration (configuration management) of the network to enable more reliable service (operations management) to end users.

Accurate management data is vital, and the ability to share data among the disciplines is becoming more important in the effective management of an enterprise. Effective management tools should allow you to quickly and easily obtain the information you need to manage and control the environment and resolve error conditions.

One of the key pieces in providing this type of data sharing and integration is by the use and adherance to a common data model. Management data needs to be kept in a standard format with a common way of describing the data contained within it. This is what will allow multiple management applications to obtain access to the information they need without requiring duplication of effort or of data.

Chapter 2. What Is Configuration Management?

This chapter covers in more detail what this author believes configuration management is all about. It takes you through some questions that relate to configuration management, some of the tasks included in this very broad topic, and it finally looks at some of the values and benefits of having effective configuration management present in your enterprise.

2.1 Configuration Management Questions

Configuration management is possibly the most ambiguous of all the management disciplines. The term configuration management often means different things to different people. It often depends on the role that person performs in the organization as to what their definition of configuration management is. To help understand some of the areas that this author believes configuration management can cover, the following is a list of questions that help define some of the tasks or functions that can be involved in this discipline. They are relevant and can be asked in both the local area network (LAN) and ″glass house″ environments.

- What do I have? (What are my information assets, my inventory?)
- Where is what I have? (Do I have up-to-date accountable information?)
- How much is what I have costing me? (Is the configuration financial data accurate and managed?)
- Is the configuration meeting my business needs? (Has my staff planned and designed the most cost-effective solution to the business requirements?)
- What happens to the business when a router or a bridge fails? How can we recover and bypass this failure?
- What equipment has to work to keep our new application available?
- What hardware and software is required on my users′ workstations to install a new business application, and will their current machine′s configuration handle it?
- What do I really need to track?
- How can I keep up with the moves, adds, and changes of my equipment and personnel?
- How do the information systems resources we have and the money we are spending on information systems relate to giving us a competitive advantage?
- How can I understand if users are making changes to the systems?
- How can I relate resources to their owners?
- Can I find out quickly the planned configuration additions?
- How can I validate the effect of a configuration change?
- Is there a way to model potential configuration changes?
- Can I see both physical and logical connections to understand the effect of a problem on service?
- How can I centrally change configurations or attributes of the configuration?

- Is there an easy way to determine the physical environment needed for my resources?

This is only a partial list of questions that customers ask of their configuration management systems. However, it indicates the complexity and broad scope of enterprise configuration management. If one considers the configuration as a large complex corporate object, then these and other functions are the operations or methods that are applied to the configuration to plan, control, and optimize its ability to serve the needs of the business.

2.2 The Two Sides of Configuration Management

While there are many different kinds of configuration data and users, most enterprises organize their information systems into two parts:

1. The planning or administrative part
2. The operational part

Management of the thousands of resources and connections in a configuration requires careful control and planning to achieve business objectives and avoid errors. The planned/administrative part of configuration management is an enterprise′s control of its computing equipment or assets. It includes functions for things such as inventory control, design of configurations, connectivity information, financial data, recovery procedures, and optimization functions. The chief objectives of the planned configuration are to provide cost- effective use of computing resources nd to meet the business objectives of the enterprise.

The operational configuration is the actual running configuration functioning in support of the business. The operational part is responsible for the day-to-day running and availability of the systems and networks. Actual resources (resource names) and connectivity are discovered, the status of these network resources are monitored, and states within the configuration are altered or controlled. The chief objectives of the operating configuration are the availability and performance of the configuration.

Each of these sides must be integrated so the administrative part can perform the plan and distribute functions, and then the operational part can perform the monitor, control and refresh functions. There must be data flows between each of these sides for integrated configuration management.

Figure 2 on page 9 gives an overview of these two parts to the configuration management discipline and some of the tasks involved in each.

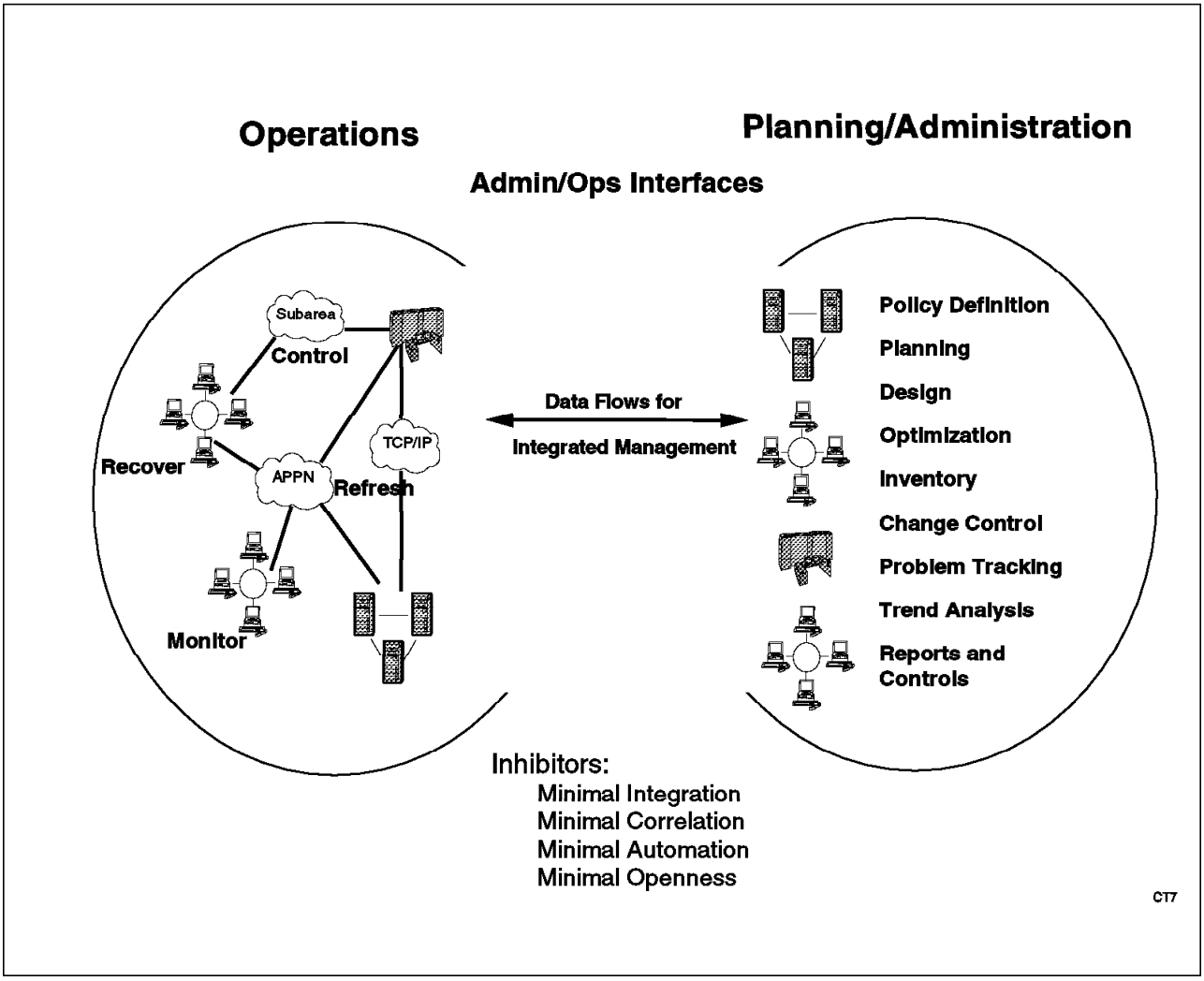


Figure 2. Data Flows within Configuration Functions

There should be specific flows of information between these two sides, as for example when planned configurations (hardware and software) are distributed to operational managed systems, or when automatically detected changes to the running systems are alerted to the administrative environment to verify and control the planned change. The flow of information and updates between the planned and operational configuration keeps the operational configuration functioning within planned objectives, and the planned configuration current with the latest information.

2.3 Configuration Management Task Overview

Following is an overview of some of these tasks involved in the configuration management discipline.

- **Policy Definition**

  The objective of this task is to define the configuration management-specific policies that the enterprise/business will use. This is one of the first steps in addressing configuration management. All of the tasks in the configuration management set should be able to be viewed in the context of the overall business and corresponding technical goals of the enterprise.

- **Plan**

  The plan task involves the actual determination of what is required in your environment. What types of hardware do you need for your different departments, what software needs to be running on them, etc., to support their specific business function.

- **Design**

  The design tasks include the design of hardware, software, and application configurations for your environment. This would also include both logical and physical connectivity designs.

- **Validate**

  The validate task is the function that looks at the design you have created and ensures that it will be a valid, running configuration. This ensures that resources are not connected in an incorrect or unintended way.

- **Optimize**

  The optimize task ensures that the performance of the operational configuration is meeting planned objectives and making the best use of system resources. Optimize functions may initiate changes to be made to the operational configuration. The change task should be fed by the performance management functions.

- **Change**

  This task interacts with the change management functions. A change can be either a physical or logical change in hardware configuration, or in the software in the environment. The configuration change tasks take the planned configuration change and prepare and pass the information to the change management functions for distribution and implementation of the actual change.

- **Distribute**

  The distribute task involves the actual distribution of change to the operational configuration and includes functions such as software distribution. The distribute task is a logical flow from the change task.

- **Monitor**

  The monitor task is for the day-to-day monitoring of the operational configuration to ensure that resources are available for the business functions required. Some people consider this a task of operations management. However, it is still monitoring of the active configuration and the interaction with configuration management data and tasks is often essential.

- **Refresh**

  The refresh task sends or receives dynamic updates from the operational, running configuration to the planned, administrative configuration.

- **Track**

  The track task includes the asset and inventory functions. This is the ability to track both the hardware and software in your environment, and to answer questions such as how many software licenses X do I have, and where is machine ABC located. This task may also include tasks to track assets for usage so that organizations/departments can be charged for what they use.

- **Recover**

The recover task is involved in the operational side of configuration management. When resources fail, recovery needs to take place to get the end user back working again. This could be to resolve the problem, or to make a change to the configuration to find alternative paths/resources so that the problem can be by-passed. Some people consider this a task of problem or operations management. However, interaction with configuration data and tasks is often essential.

- **Cost**

  This task could also be considered to be in the business management discipline. When a machine or piece of software is purchased and then installed in the configuration, the new resource must be first paid for, and then information on the ongoing support and maintenance costs for that resource maintained.

- **Billing**

  This task includes such things as charging for the use of equipment or services to different departments or organizations.

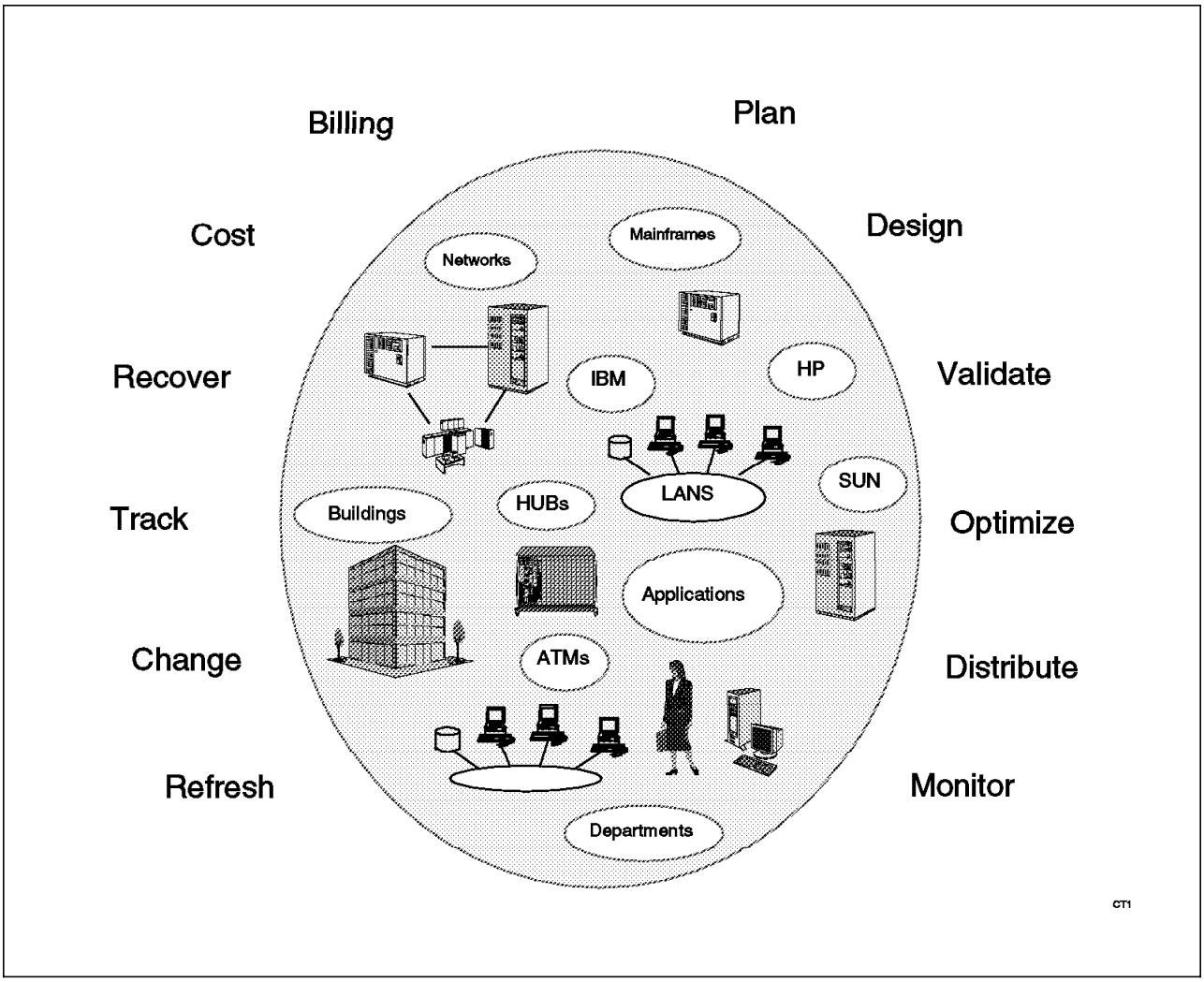


Figure 3. Configuration Management Tasks

These two sides of configuration management can include details from the entire enterprise as shown in Figure 3. Organizations need to be able to define,

display, delete, or query both system and network information, which can include information on:

- Host/CPU
- DASD, tape, printers
- External cooling equipment
- Communications equipment
- WAN routers
- LAN adapters
- LAN bridges and brouters
- LAN servers and printers
- Private Branch Exchange (PBX) equipment, etc.

The operational configuration functions must manage all kinds of resources (hardware, network, software and applications), and all their associated components (such as programs and files). It must also be capable of handling all the relationships between these resources (not only the hierarchical parent-child relationship).

The administrative configuration functions must maintain inventory information of all these enterprise resources. It involves maintaining the basic resource information such as a description of the resource and its relationship to other resources. It also must allow the tracking of what resources are in the enterprise, where they are located, and who uses, owns and supports them. The administrative side also includes all the financial details associated with resources, such as the initial cost, and the ongoing maintenance and support costs.

2.4 Configuration Management - Challenging but Vital

Keeping track of computer related assets can be labor intensive and tedious. With a large number of networked resources and an ever changing network configuration, it is frequently impossible to know exactly where installed systems, cards, printers, software applications, and other network resources are. However, to understand user queries, perform effective problem determination, control costs, and to make the most of existing resources, effective configuration management is essential.

Many studies have recognized that one of the greatest costs of ownership is associated with managing and maintaining the networked workstations, as well as the end-user support tasks. When looking at configuration management, one of the most important factors in LAN costs is the large impact of the LAN administration and physical LAN support tasks. With effective and automated tools in place, configuration management has the potential for significant reduction of expenses.

Automating the configuration management process will also help keep you up-to-date with what is installed on each workstation and provides invaluable information for technical support, software and hardware change management, and systems auditing.

Successful configuration management is also key to achieving integrated, systems management solutions that span both administration and operations.

Some of the benefits that can be realized are:

- Better efficiency

  An increase in automation applied to the task of collecting configuration management data can significantly reduce the amount of time and effort involved in keeping track of the enterprise resources.

- Improved customer service

  Effective configuration management ensures that information fed to the change and problem management processes is accurate. This will assist in the implementation of effective changes and stops any outages that may occur due to changes based on inaccurate information. It also ensures that accurate information is available where and when it is needed to help resolve problems as quickly as possible.

- Greater productivity

  Effective configuration management means that personnel should be able to easily find the information they need without physically needing to check equipment or go to multiple databases to gather the required data.

- Increased control

  The LAN environment provides significant challenges when trying to keep track of all the hardware and software components that can be installed on user workstations. Having effective configuration management in place will lead to increased control of what is really out in your LAN environments. For example:

  – Knowing what software is really installed on your user workstations and ensuring that the appropriate software licenses are in place.

  – Making sure that resources are being effectively used. For example, detection of unused disk space on a machine that can be redeployed elsewhere in the organization.

Chapter 3. Getting Started with Configuration Management

Before looking at all the different management products that are currently available to perform some form of configuration management, it is critical to take a step back and look at some of the following areas that also need to be considered when doing configuration management. This chapter goes into more detail about some of the areas where organizations need to question what it is they want and need to achieve out of configuration management, and make some decisions relevant to their business requirements. The following are these areas:

- **The Data**
  - Where is it today?
  - Who needs access to it?
  - How do I collect it?
  - Is there information missing that I need?
- **The Processes**
  - What processes are in place today?
    - Formal
    - Informal

    These processes can include configuration, change, and operational processes.
  - What works and what doesn't?
  - Is there something missing?
- **The Tools**
  - Do you have the right tools for the job?
  - Do all the tools work together?
  - Do the tools meet your needs for data and processes?

Please note!

This chapter discusses the needs and processes required in configuration management. Some of these areas can be addressed by the ConfigTool application described in this book for the LAN environment. However, this chapter is not intended to imply that all of these needs and processes are supported by ConfigTool.

3.1 The Users of Systems Management

Each of the people involved with supporting and managing or maintaining network hardware and software will have different duties or tasks that they perform. Each will also have different data requirements to perform these tasks. For example, operations personnel will want to know resource names and the connectivity relationships that exist between them. Management may want to have asset information to know how money is being spent on information system resources. Network personnel may want information necessary for problem

determination such as cable attachment locations and protocols supported by various workstations.

A process structure only becomes relevant when related to people and business needs. Most medium and large organizations will allocate distinct administrative and operational roles, dividing systems management responsibilities. One of the first things you should do is to look at the people who will be using configuration data and understand what each of their requirements are, that is, what data they need.

Figure 4 shows an example of some of the different users in an organization and the sorts of functions and requirements they may have that may need to access configuration data.

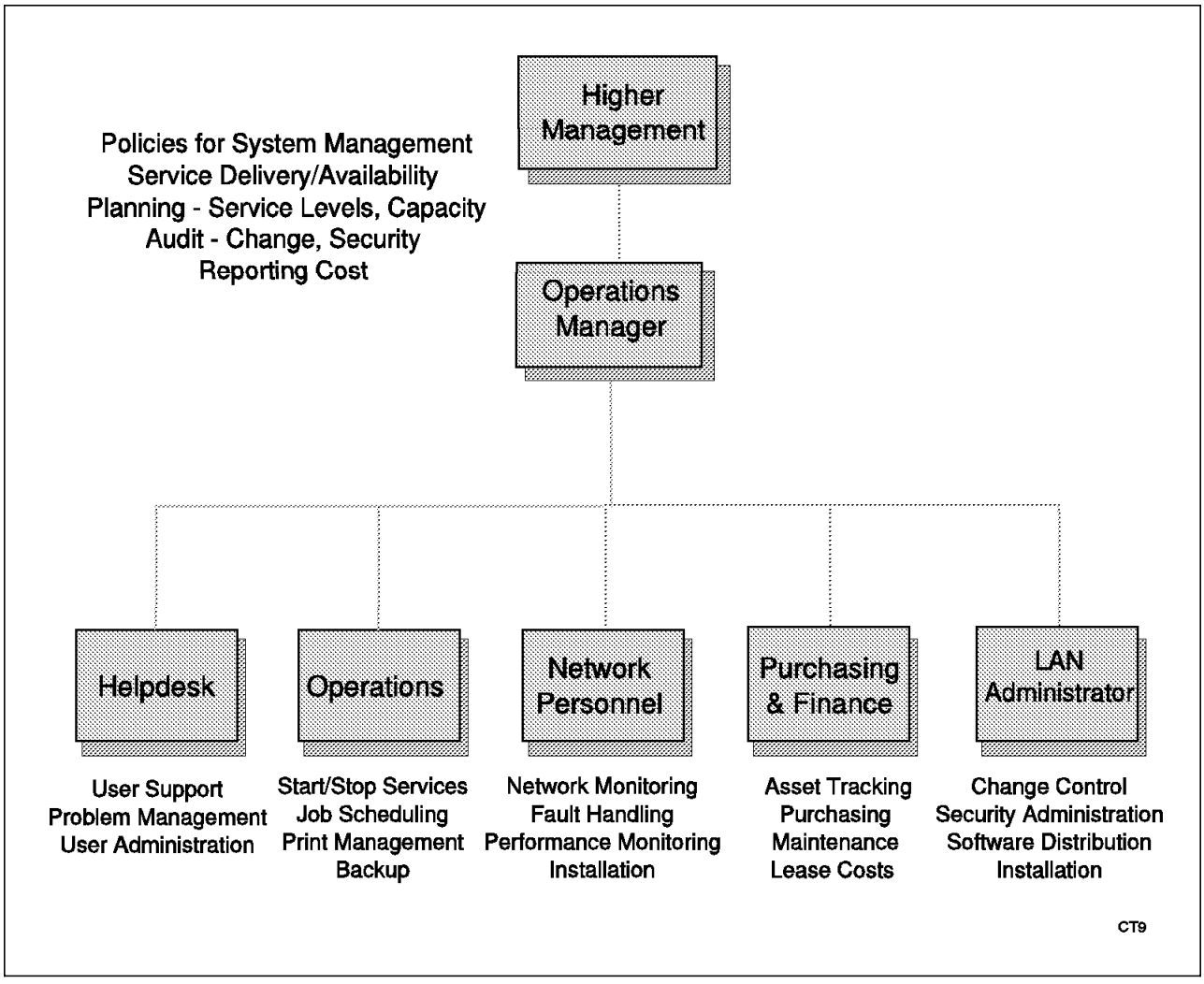


Figure 4. Operational Roles and Their Systems Management Responsibilities

Different companies may allocate the roles in different ways, but they should ensure that all of the responsibilities are covered and that the tools provide information required by each. Following are further examples and descriptions of different types of users and the data they may require:

- The higher management of a company is responsible for assuring that their information systems department is delivering the services that the rest of the business requires at a cost that is affordable. Therefore, their interest in

systems management is to assure that they get the right return for their IT investment. They are interested in seeing reports and presentations that depict this information.

- The CIO or operations manager has overall responsibility for services availability and delivery, and exercises this through setting policies and managing the processes for planning, change, implementation, auditing and reporting. All of this will also be controlled within a financial structure limiting the cost of the operation.
- The systems manager or administrator is responsible for planning, distributing, and installing changes to systems, applications or operating software, and data. This person is also responsible for managing the addition, deletion, modification, and examination of resources (administrative configuration management), as well as administering the authorized access to network resources and data (security management).
- The network manager is responsible for planning and managing the initial installation of network resources and remote systems. This will often be in conjunction with a local LAN administrator, who will have some delegated responsibilities. The network manager will also handle the day-to-day monitoring of the network and will respond to faults, performance and operational issues that arise, and handle events generated by the network. In addition, the network manager will perform the monitoring of resource usage, using tools to create data for performance analysis and to assist in determining future capacity requirements.
- The asset management personnel may be involved in both planning for new equipment, and maintaining records of what resources they currently have installed and where. They will use configuration management for retrieving accurate data about currently used information system resources, and any excess inventory/equipment.

  Financial and purchasing personnel will also be involved in tracking the assets within the organization. They will want to know information to ensure that new resources have been received and paid for, and to get information on ongoing maintenance charges for these resources.
- The operations personnel may have the responsibility for overseeing the initiation and termination of application services, batch job scheduling, and operation of utilities for backup and other housekeeping. The operator may be the point of control for tape services, and printing and distributed printers, managing output queues and monitoring printer operation. Operator functions may also overlap with some of the tasks of a network manager.
- The role of the help desk is an increasingly important role in many companies, and may be set up in a hierarchical fashion with some tasks handled at a departmental or location level. The help desk frequently performs user administration functions, such as adding, removing, and modifying user characteristics. In addition, they perform problem management, which includes reporting, tracking, and resolving problems.

  Help desk personnel will use configuration management to accurately identify the user environment without requiring a heavy question/answer mechanism. They will also use configuration management for problem determination functions.
- The configuration management personnel may be responsible for designing the logical and physical connections between all information system

resources. They will use configuration management to build up a single reference database for all relevant configuration data.

- The change management personnel are responsible for the planning and implementation of a change, once a change has been requested in an appropriate manner. Configuration management functions will be needed to have a clear understanding of the environment where the change must take place both from the logical and physical perspectives.
- The trouble shooters are the people with responsibility for the problem determination and the problem resolution/verification, once an incident has been opened. Configuration management functions will be used to assist in analyzing and resolving the problem.

Organizations may have some, all, or more of the above roles within their organization. The point to be made here though, is that each of these users will require access to the configuration data, and each will have different types of data requirements and uses for this information. Each of the users needs should be considered when planning for and implementing effective configuration management for the enterprise.

3.2 Getting Started - The Data

The next step in getting started in configuration management is to look at the data. It is important to realize that this step should be related to the previous section, the users of configuration data. You must first understand the data needed by each of your users before looking at the data you have.

Figure 5 on page 19 shows some of the steps that should be considered when looking at the data required for configuration management.

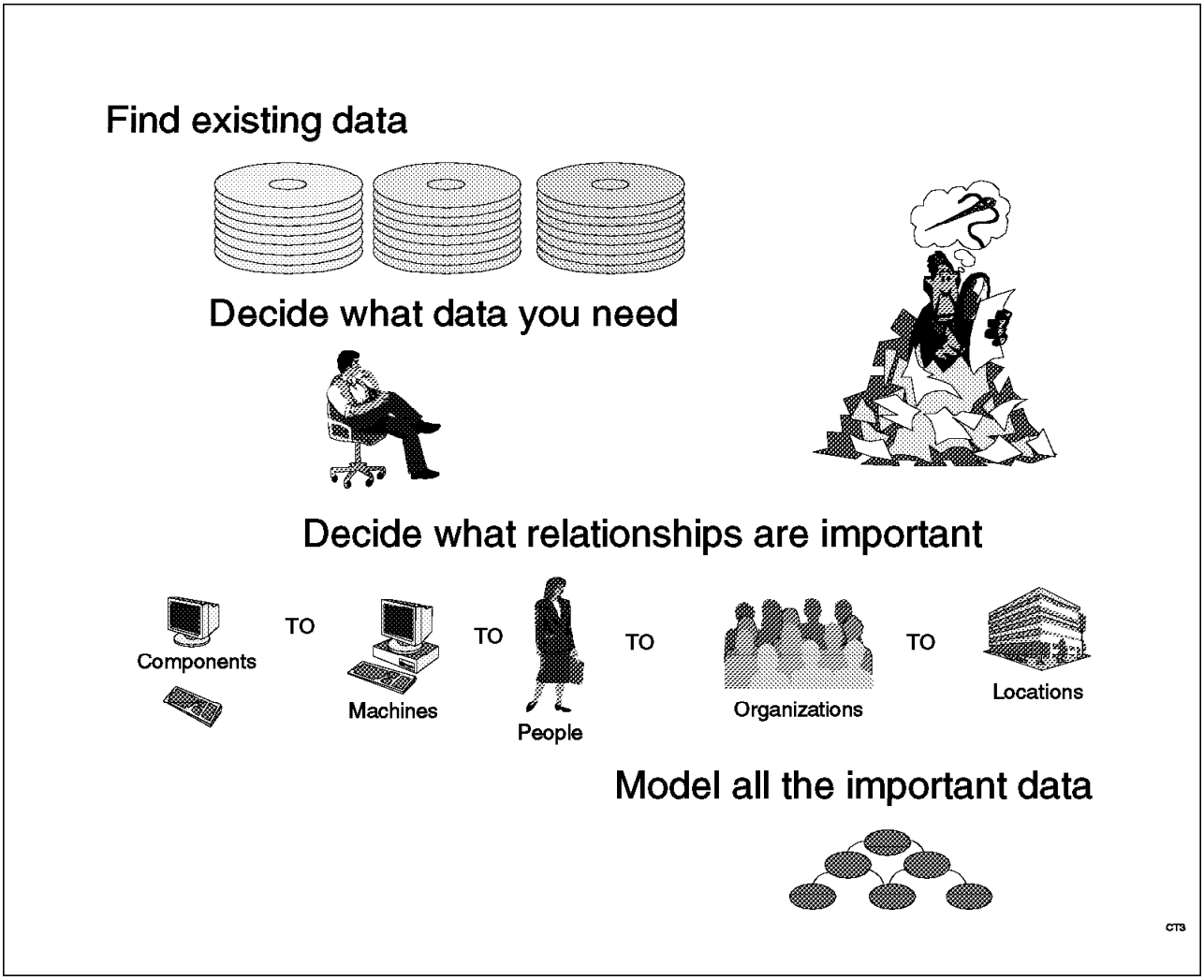


Figure 5. Looking at the Data - What It Is, Where It Is, What Is Important

Following is a description of some of these tasks and decisions shown in the previous diagram that need to be considered:

- **Find Your Existing Data**

  This task will involve finding the data that you currently have. This could be in your LAN products, your management products, purchasing or financial databases, or in filing cabinets in some cases.

- **Decide What Data You Need**

  This next step will involve the analysis of the data you have. Do I need all this data? What data is missing that I need to get? How or where can I get it? Does the data meet my user requirements? Once again during this analysis step, it is important to always relate it back to your user or business requirements. In some cases, the analysis may be:

  ″This information would be nice to have, however it is not critical, and the costs to update and maintain the data outweighs the benefit we would receive″.

- **Decide What Relationships Are Important**

  The next step is to decide what relationships are important and need to be defined between the objects or pieces of your configuration. These

relationships could be things such as matching components to machines to people to organizations to locations.

The definition of relationships is very important in the effective maintenance and control of configuration data. To try and put this into simple terms, following is an example of some relationships that might need to be defined:

- A tape drive called TD001 is attached to
- A workstation named WS134 which
- Has a user called Mary Smith who
- Works in the Networking Services Organization which
- Is located in Building 339, New York

A logical relationship should be defined between each of these components and would allow the capability for your help desk operator, for example, to type in WS134 and be displayed with all data described above. Physical, logical, people, and organizational relationships are all important, and should be considered when implementing configuration management.

- **Naming Conventions**

  Another critical area and one that is sometimes not thoroughly considered is that of naming conventions. In today's environments which can often involve thousands to millions of objects or resources, not having a carefully thought out and constructed naming convention for constructing your configuration can quickly lead to incorrect, ambiguous, or duplicate names, which can ultimately lead to error conditions and lost productivity.

- **Model All the Important Data**

  Modelling is a subtask of the design phase. It is the modelling of the physical or logical hardware, software, applications, and environmental aspects of your configuration. It involves modelling the configuration to determine the effect of changing certain parameters in the operational environment, ensuring the most efficient and cost effective use of resources in line with your business requirements.

3.3 Getting Started - The Processes

The next step in getting started is to look at your processes. These are the functions that describe what you do with the data.

For example:

- When a user calls the help desk to look at a problem, what are the steps that need to be followed to get the problem resolved? What configuration data do they need from the user? What department do they pass the problem on to?
- When a user requires a new piece of software on their workstation, what steps do they follow to get this? How do they order the new piece of software? How do they know if their workstation has enough memory or disk space for the new software, and if it doesn't, what do they do to get an upgrade to their workstation?
- When that new piece of software and the hardware upgrade required to support it needs to be installed, how does the change occur? What happens if it was unsuccessful? If it was successful, how is the configuration data updated to reflect this upgrade?

- How is the purchasing department notified that the new software is now installed and can be paid for?
- How is the new hardware upgrade reflected on the maintenance agreement for this vendor?
- How is a new router configured and installed on the backbone network?
- When that new router is installed in the environment, who is allowed to access and change configuration parameters on the resource?

The answers to these questions should be the processes that are followed within your organization. It is often helpful to not only understand these processes, but to question if they are the most productive, cost-effective and meeting the business requirements. This can involve analyzing the answers to questions such as:

- What are your current processes?
- Can processes be improved?
- Are all the right processes in place?
- How can we be efficient without being bureaucratic?

Figure 6 on page 22 shows some of the main processes involved in configuration management.

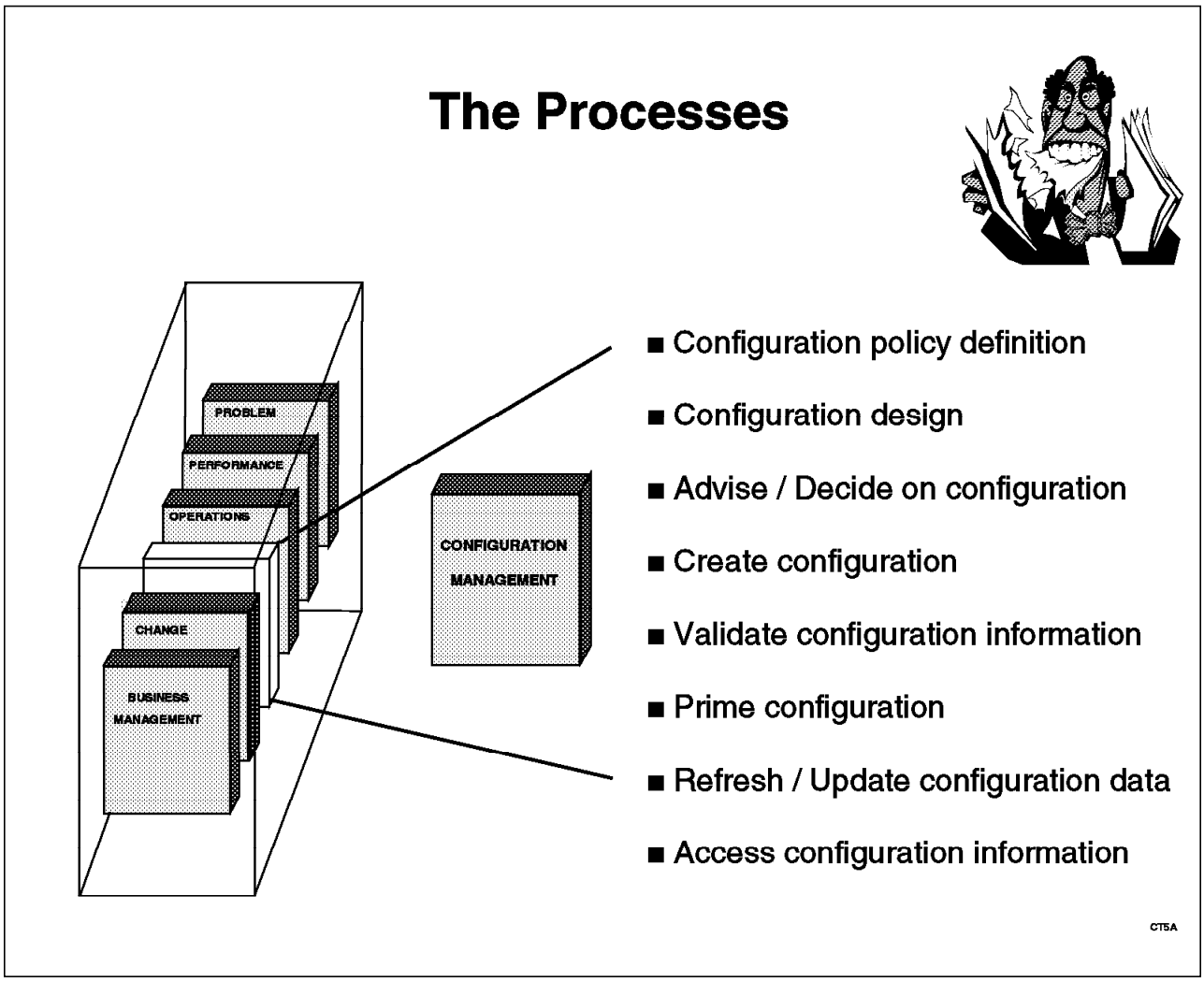


Figure 6. Looking at the Processes - What Steps Need to Be Followed

Following is a description of each of these processes:

- **Configuration Policy Definition**

  The objective of this task is to define the configuration management-specific policies that the enterprise/business will use. This is one of the first steps in addressing configuration management. All of the tasks in the configuration management set should be able to be viewed in the context of the overall business and corresponding technical goals of the enterprise. All of the tasks and operations associated with the enterprise resources (and their connectivity) should be able to be governed by the enterprise′s policies.

- **Configuration Design**

  Configuration design includes the design of hardware, software, and application configurations. The objective of this task is to produce a validated configuration model that consists of the resources described in the design process, required support resources and features, and the relationships of resources to one another.

- **Advise/Decide on Configuration**

  The objective of the advise task is to proactively analyze configuration and business requirements and make specific recommendations for optimization

of expense, throughput, or other business objectives (for example, ensuring that the planned configuration meets performance objectives).

The objective of the decide task is to make configuration decisions about the running network or system based on real-time events. These events might include a performance degradation or an unplanned outage for which a recovery plan is in place. The recovery plan is what would be done when operations personnel are alerted to an error condition.

- **Create Configuration**

  The objective of this task is to build and manage a configuration description that is resource-specific, allowing differences among various resources to be incorporated into the overall configuration plan. The configuration may be a section of a network, a system (such as a host), programmable workstations, or the entire enterprise.

- **Validate Configuration**

  The objective of the validate task is to ensure that configuration resources are described accurately and correctly, ensuring that resources are not connected with one another in an incorrect or unintended way.

  Validation can confirm that an isolated resource is described properly (for example a LAN adapter), or it can confirm that the interconnection between multiple resources is accurate (for example the transmit/receive buffer sizes used between a workstation and host).

- **Prime Configuration**

  No large configuration is randomly assembled, even if resources and connectivity can be identified automatically either now or in the future. An enterprise configuration should be a carefully planned structure, using financial, performance, capacity, and reliability parameters in its construction and maintenance. The planned configuration should be the controlling management tool for the maintenance of the operational configuration.

  Ideally, the planned changes to the operational configuration are distributed to the managed environments from a validated, optimized planned configuration. The objective of the priming task is to send configuration data from the planned configuration database to the operational configuration database.

- **Refresh/Update Configuration**

  The objective of the refresh/update task is to send or receive dynamic updates from the operational, running configuration to the planned, administrative configuration. Refresh is the inverse configuration data flow of priming and provides information regarding the actual running configuration. This includes hardware and software alerts, hardware and software component self-identification, and configuration changes without service interruption. It also includes refresh updates made as a result of a query and changes that may have been made outside the change management process.

- **Access Configuration Information**

  Other disciplines require access to configuration information. Requests for configuration information can vary. The objective of the access configuration information task is to allow access to the configuration information by other users and applications/disciplines.

There should be a logical flow of information between each of these processes as shown in Figure 7 on page 24.

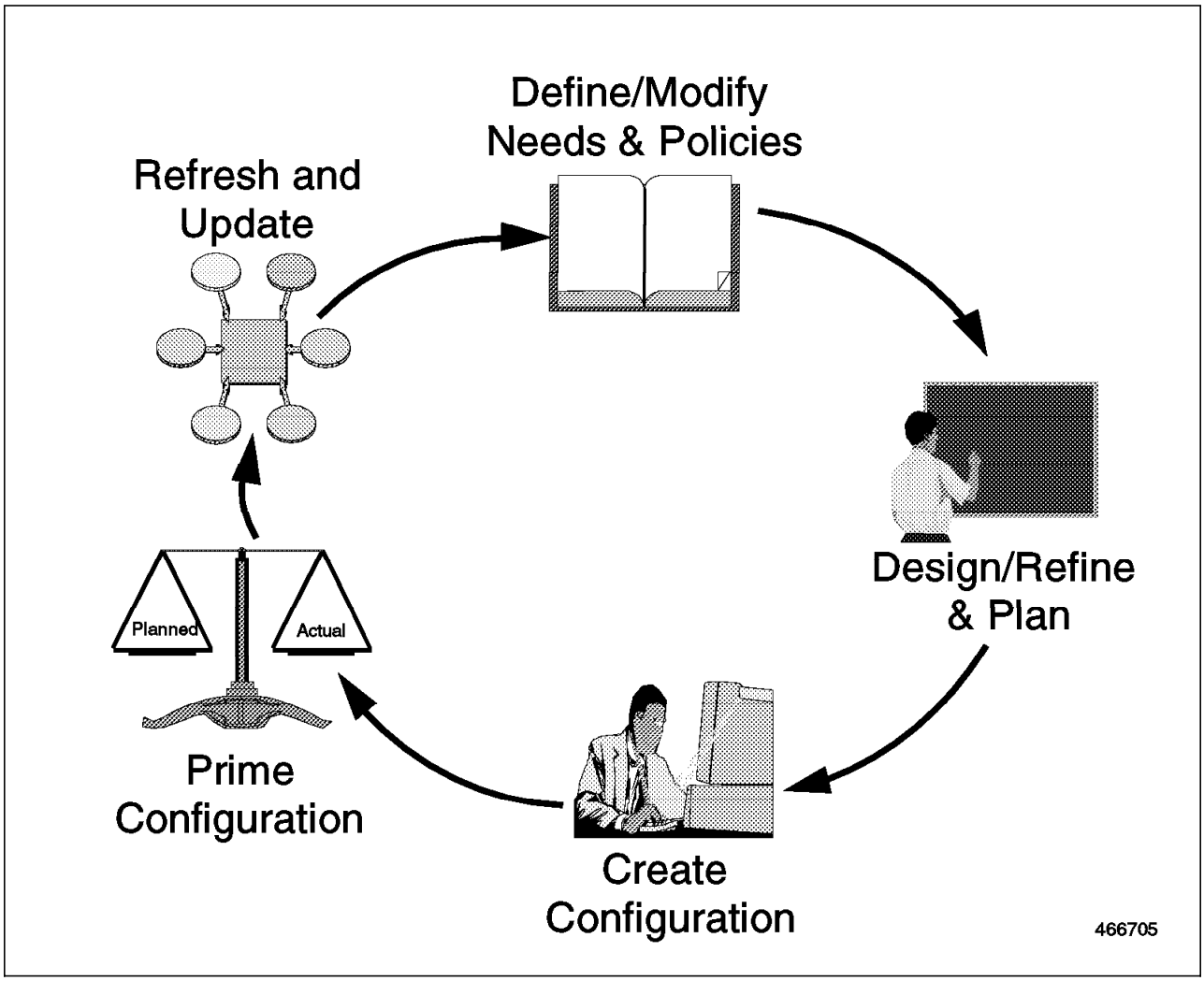


Figure 7. Configuration Management Processes

Once again, it is important to remember the two sides of configuration management discussed in Chapter 2, “What Is Configuration Management?” on page 7; ensure that the planned/administrative configuration is in synchronization with the operational/running configuration.

To enforce these two sides of configuration it is essential that data flows from the inventory repository to the running systems and networks be specified and automated, so that changes to the configuration are controlled through a planned change process. It is also true that in large configurations, the sheer number of resources requires an automated feedback loop to verify the consistency between the planned and running configuration.

3.4 What Tools Do You Need?

All of the users discussed previously need access to data. They need processes to follow, which have been previously described, and then tools to perform their roles effectively. The tools provide information to them for decision-making, and a way of taking actions. Each user will typically be accessing different tools or systems management applications which are specialized for their tasks. However, the same type of systems management information could be needed by several systems management applications, and utilized by several users. This is especially true for configuration data, inventory and status information, and problem records.

Therefore, it is highly desirable that applications be based upon common data to ensure that all users are accessing consistent and accurate data, with which they are able to make consistent and accurate decisions.

A systems management solution that meets these requirements would help organizations to reduce the cost of management, improve service availability, and provide greater speed and accuracy of response to users. In addition, this solution could be implemented to distribute, control and enforce company policy and standards.

Configuration management requirements include the capability to collect, distribute, monitor levels, and update hardware and software configurations nondisruptively through the network.

The primary function required by a configuration management system is the ability to manipulate configuration and inventory data in a consistent manner across an enterprise. This includes the ability to create, retrieve, update, delete, and inquire about configuration and inventory data. Some examples of tasks are:

- User adds workstation ABC to the inventory.
- User assigns person X as the technical contact for workstation ABC.
- User requests a list of the workstations with 32 MB of memory.
- After a report of a power loss in building XYZ, user requests the number of workstations that have been affected by the loss.
- User requests a list of the installed software on workstation ABC.
- User bulk loads the inventory from location XYZ into the central system.

The ability to manipulate configuration and inventory data in a consistent manner across an enterprise also includes the need to extract configuration and inventory data from other sources and load it into the configuration management database. The other sources of configuration and inventory data across an enterprise typically include existing network management products (for example, NetFinity) or ″home grown″ sources such as a Lotus 1-2-3 spreadsheet.

The application that is described in this book provides each of the above capabilities. IBM Configuration Management Tool for OS/2 (ConfigTool) defines and implements a LAN configuration management database and implements a subset of the full SystemView Administrative data model. It automatically takes hardware and software configuration data from managed client workstations, LAN servers, and LAN management products within your network.

Please refer to Chapter 5, “What Is IBM Configuration Management Tool for OS/2?” on page 55 and Chapter 6, “Getting Started with ConfigTool” on page 101 for more details on ConfigTool.

3.5 Configuration Management Tasks in Detail

This next section will take you through in detail each of the tasks and subtasks that can be involved in the configuration management discipline. *How* and *What* is done in these tasks are the *processes* which are followed within an organization.

Please Note!

This redbook does not attempt to lay out a complete systems management solution. It does show that many things need to be considered when implementing configuration management, and not just the functions of a single product. No single product can solve underlying faults with incorrect or incomplete processes.

3.5.1 Configuration Policy Definition Task

The objective of the configuration policy definition task is to define the configuration management specific policies that the enterprise/business will use. This is one of the first steps in addressing configuration management. All of the tasks in the configuration management set should be able to be viewed in the context of the overall business and corresponding technical goals of the enterprise. All of the tasks and operations associated with the enterprise resources (and their connectivity) should be able to be governed by the enterprise′s policies. All of the policies defined for the configuration management application should be able to be mapped back to the overall organization′s business processes and goals.

Examples of these policies could be:

- 25% of port capacity must be left open on a hub for expansion.
- For security requirements, a certain system must be dedicated to a single application.
- Provide dual physical paths to all DASD units.
- Connect all workstations via LAN.
- Certain applications require backup support.
- Availability of the enterprise′s information systems.
- Legal regulations (for example, fire regulations require certain unused floor space).
- Priorities (for example, use as little cabling as possible).
- Requirement for some/all of a set of devices to be physically together (for example, a printer pool).

3.5.1.1 Authority

The authority subtask defines a formal organizational structure of staff and procedures (who can perform certain functions, who needs to give approval for certain things to be done, etc.). It includes things such as defining activities which may require special authorization or controls. Some examples of activities which may require special authorization or controls are:

- Physical access to the data processing center
- Access to the configuration design information
- Access to the change database (read vs. update)

3.5.1.2 Roles and Responsibilities

The roles and responsibilities subtask provides the detailed functional description of the organization. Some examples of items that can be included in this description are:

- Job descriptions
- Skill requirements
- Team/department duties
- Accountability

3.5.1.3 Rules and Guidelines

The rules subtask documents the standards and procedures for configuration management activities. These standards and procedures include specific criteria which must be met prior to an activity taking place or being considered completed. Rules can establish a required sequence of events and escalation processing. Rules can include hardware, licensed internal code, software, and environmental planning. Examples of rules are:

- Physical interconnection rules
- Corequisites and prerequisites for installing certain hardware or software
- Mandatory program features/operating system features
- Element identification (that is, part number, device type/model, etc.)
- Memory use factors
- Any use restrictions because of state or country laws or policies
- Physical space and separation requirements
- Electrical requirements
- Air and liquid cooling requirements
- Access restrictions
- Backup and recovery needs and policies

Guidelines can also be considered in this task. The difference between the two is that rules are *mandatory*, whereas guidelines are *optional* or *recommended* standards and procedures.

3.5.2 Configuration Design Task

Configuration design includes the design of hardware, software, and application configurations. The objective of the configuration design task is to produce a validated configuration model that consists of the resources described in the design process, required support resources and features, and the relationships of resources to one another.

Configuration design intersects with the validate function to ensure that the configurations will function properly. The configurations may be physical or logical. The configuration design task includes the application of such rules as hardware, software, and microcode (including licensed internal code) prerequisites and corequisites, physical interconnection rules, and installation specific or policy constraints.

An example design flow might be as follows:

- Identify required resources (objects)
- Identify required resource features (attributes)
- Identify optional resource features (attributes)
- Identify interconnection requirements
- Apply policy constraints (defined in configuration policy definition task)
- Design/modify configuration
- Determine validity (will it work correctly) and redesign if necessary
- Review backup or disaster recovery configurations

3.5.2.1 Environmental Planning/Physical Planning

This subtask determines the physical specifications that are required to support a configuration. Environmental planning steps include modelling and planning sites to provide the most efficient and economical cabling, access to physical units, power, temperature controls, etc.

3.5.2.2 Modelling

Modelling physical or logical hardware, software, applications, and environmental aspects is also part of the configuration design process. This subtask involves modelling the configuration to determine the effect of changing certain parameters in the operational environment.

3.5.2.3 Design Configuration Profiles

This subtask involves the design of configuration profiles to support repetitive definitions of configured resources. Two examples might be a network template for adding workstations to a LAN, or workstation software profiles for use with software distribution.

3.5.2.4 Design Hardware, Software, and Application Configuration

Network and system resources within the enterprise can be designed individually, or by implementing configuration profiles which allow grouping of commonly defined resources. For example, groups of LAN workstations can be set up similarly (that is, default hardware, applications, communication or operating systems software).

3.5.2.5 Logical Design

Logical design is the process of arriving at the appropriate grouping of software, hardware, applications, or a combination of these, to meet business objectives. For example, a group of physical network resources may be aggregated in a logical network to support an organization, business function, geography, etc.

3.5.3 Advise/Decide Task

The objective of the advise task is to proactively analyze configuration and business requirements and make specific recommendations for optimization of expense, throughput, or other business objectives. For example, ensuring that the planned configuration is meeting performance objectives (performance optimization).

The objective of the decide task is to make configuration decisions about the running network or system based on real-time events. These events might include a performance degradation or an unplanned outage for which a recovery plan is in place. The recovery plan is what would be done when operations personnel are alerted to an error condition. These decision functions can be performed by either end-users, or preferably, by automated procedures driven by pre-established policies in a recovery plan.

3.5.3.1 Analyze Model/Described Configuration (Optimize)

This subtask provides the analysis required to produce optimization advice for a particular configuration. Careful analysis of the configuration may result in more effective use of the resources which would increase throughput, or reduce cost (as in the case of a more effective use of the tariff structure in establishing an enterprise-wide network). This resulting analysis can produce a configuration that is optimized to the user′s business needs, or one that has been constructed cost-effectively.

Part of making configuration decisions also involves the recommendation of primary and alternate resources and connectivities in a real-time environment. The recovery or backup plans are made in the design task, and real-time recommendations to implement them should be made.

3.5.4 Create Configuration Task

The objective of this task is to build and manage a configuration description that is resource-specific, allowing differences among various resources to be incorporated into the overall configuration plan. The configuration may be a section of a network, a system (such as a host), programmable workstations, or the entire enterprise.

Creation of one section of the enterprise′s configuration may require changes in other sections. For example, adding a host system to an already present network may involve creating a configuration for the host (configuring the system), as well as planning the changes necessary to the overall system and network configuration to create the connectivity from other systems to this host system.

3.5.4.1 Describe People/Personnel

Current personnel and support organizations are needed for managing all aspects of a configuration, as well as user information. It is important to recognize that human resources and organizations are part of the overall management of the enterprise configuration.

3.5.4.2 Describe Financial Information

Another important part of the management information required is financial information such as contracts, leases, and service agreements for specific resources that are part of the configuration description.

3.5.4.3 Describe Location Information

Location information correlates a resource to its physical location. In a dynamic environment where resources may move often, it becomes even more important to keep this information current.

3.5.4.4 Defining Resources and Attributes

Resources to be defined and managed include physical resources (for example, modems, computers), and logical resources (for example, timers, virtual circuits). The management system must provide mechanisms to permit the definition of resource objects and the attributes associated with those objects.

The means by which resources and their attributes are defined include:

- Manual entry - using a keyboard.
- Discovery - tools and facilities perform an automatic survey of the network/system to work out the presence or absence of a particular resource. If the resource is discovered, an object based on its profile is defined and the discovered attributes filled in.
- Default profiles (templates) - certain attributes prespecified as default values to eliminate repetitive typing.
- Import tools and facilities that permit resource attribute information to be imported from existing management systems. This could include:
  - initial load of all information from the external management system
  - import and define changes made to the external system since the last import
  - dynamic interface with the external management system to define changes as they occur, dynamically in real-time.
- Augment - fill in object attribute data that cannot be automatically discovered, or extend (user-defined) data. An example of these types of attributes could be the physical location of a resource. This method is similar to methods previously described, however would use both the automatic load from external systems, and manual data entry for those attributes not held by these systems.

Physical Inventory/Connectivity: The physical cabling and connectivity of a configuration must be described at the port and cable level with accompanying physical location attributes in order to correctly manage cable connections.

Logical Inventory/Connectivity: Logical resources and connectivity of a configuration must also be described in order to define your logical networks and systems as a manageable entity.

3.5.4.5 Defining (& Modifying) Relationships

Management system users must have the ability to specify relationships among network/system resources. A relationship usually describes an association, connection, dependency, or condition that exists between resources or components of a resource. These relationships can take the form of a topology, a hierarchy, a physical or logical connection or a management domain. Mechanisms are needed to allow both the configuration management system to automatically discover these relationships, and for the management system users to be able to add, delete, and modify the relationships among resources.

Describing physical and logical resource correlations, as well as connectivity relationships links the logical and physical configurations.

3.5.4.6 Build Configuration

Building the configuration is the end product of the interaction between the configuration management and change management disciplines. It is the end result of an add, move, update, or delete, and generates a new or updated resource description.

These resource descriptions should contain information about hardware, licensed internal code, and software within the enterprise. Ideally, they are built and maintained using data collected from the operational systems, but may be created by manual input or selection, or by input from another process (an order, for example).

3.5.5 Manage Configuration Task

The objective of the manage configuration task is to manage the configurations as they are built and identify any potential impacts on an existing configuration. For example, changing the speed of a token-ring adapter may require changes to workstation parameters.

3.5.6 Validate Configuration Task

The objective of the validate task is to ensure that configuration resources are described accurately and correctly, ensuring that resources are not connected with one another in an incorrect or unintended way. Validity constraints and consistency checking are essential in today′s complex LAN and WAN environments.

Validation can confirm that an isolated resource is described properly (for example, a LAN adapter), or it can confirm that the interconnection between multiple resources is accurate (for example, the transmit/receive buffer sizes used between a workstation and host).

Another type of validation involves comparing actual or operational configurations with the planned configurations. This aspect of validation intersects with change management when a discrepancy is discovered.

3.5.6.1 Verify Proposed Change

To verify that proposed changes to a configuration are completed requires ongoing monitoring of the change management status (to verify the proposed changes) and it requires access to the change database, schedules, and plan information.

3.5.7 Prime Configuration Task

No large configuration is randomly assembled, even if resources and connectivity can be identified automatically either now or in the future. An enterprise configuration should be a carefully planned structure, using financial, performance, capacity, and reliability parameters in its construction and maintenance. The planned configuration is, therefore, a controlling management tool for the maintenance of the operational configuration.

Ideally, the planned changes to the operational configuration are distributed to the managed environments from a validated, optimized planned configuration. The objective of the priming task is to send configuration data from the planned configuration database to the operational configuration database.

Some priming examples include: the definitions of the S/390 channel subsystem used to Initial Microcode Load (IML) S/390 processors, Network Control Program (NCP) definitions to load communication controllers, initial loading of the Resource Object Data Manager (RODM) cache data store for maintaining status information of a running network, and the electronic distribution of workstation software to distributed systems.

Data priming can also be used to avoid manual entry of large amounts of data; for example, loading configuration information from pre-existing sources to a database to avoid manual entry of large amounts of data.

3.5.7.1 Extract Parameters from Definition/Description

This subtask involves identifying and extracting those pieces of a resource description which are necessary for operational installation, activation, or functional change. This might include such processes as an NCP gen, or response file generation for automated workstation software installation.

3.5.7.2 Send Resource Configuration Parameters to Resources

Once the required operational parameters are selected and changed into the appropriate format, they can be sent to the resource as part of a change process. For instance, an assembled/linked NCP load module can be loaded onto a 37xx hard drive for later activation.

3.5.8 Refresh/Update Configuration Task

The objective of the refresh/update task is to send or receive dynamic updates from the operational, running configuration to the planned, administrative configuration. Refresh is the inverse configuration data flow of priming and provides information regarding the actual running configuration. This includes hardware and software alerts, hardware and software component self-identification, and configuration changes without service interruption. It also includes refresh updates made as a result of a query and changes that may have been made outside the change management process.

When configuration changes are identified in the running configuration, configuration users typically follow a pre-established process to deal with the change. If the change is anticipated, it will be compared to the planned configuration for validation. If the change is not anticipated, as in the case of a temporary outage, it will be referred to the recovery plan which normally has a backup plan to recover from the failure. In either case, configuration change alerts received from the running system are typically filtered through a change

management process before being reflected in the planned configuration repository.

Examples include:

- Validate actual versus planned configuration
- Update/maintain configuration description in configuration databases
- Update/maintain physical information (auto-discovered or entered manually) in configuration databases

3.5.8.1 Refresh Information from Resources

Configuration databases can be refreshed either by information received dynamically from a resource (or agent) or from queries to a resource (or agent). The configuration information comes directly from the configured resource or agent.

3.5.8.2 Refresh Topology from Topology Managers

Topology managers monitor a dynamically changing environment and report the changes to the operational view. In addition to the resource attribute/status changes, the topology managers dynamically build connectivity and relationship views of the resources.

3.5.8.3 Pass Information to Administrative Processes

In this step, configuration information that has been refreshed in the operational databases is passed to the administrative applications (change management and other processes) for update of the administrative configuration database. This step also includes the update of the inventory status.

3.5.8.4 Defining and Modifying Relationships

The management system should allow its users to expand the network/system or change existing relationships without causing any outage. For example, relationships may be modified online during operations. Mechanisms are also needed to dynamically modify relationships among resources based on current operational conditions (for example, lease cost routing, disaster recovery priorities). This would also work in conjunction with the Advise/Decide task described earlier.

3.5.9 Access Configuration Information Task

Other disciplines require access to configuration information. Requests for configuration information can vary. The objective of the access configuration information task is to allow access to the configuration information by other users and applications/disciplines.

3.5.9.1 Request Configuration Information

Requesters can ask for information about:

- Active or inactive configurations
- Specific object attributes; for example by name, resource type, or device class, location, etc.
- A path to or from a target resource
- Alternatives for a given system or path

- Software or microcode (including licensed internal code) version or resource information
- Policy information (type of hardware and software required by a specific department user)
- Configuration status of a specific resource

The function to examine resources requires the ability to see both the attributes associated with the resources and the current values of these resources. In addition, a function is needed to be able to examine the existing relationships between resources.

Configuration management also needs the following accessibility to be achieved:

- Data grouping by attribute - expressed explicitly, in wild cards, or generic substitution forms. Configuration management access functions should be able to scan a set of objects and collect a subset based on combinations of attributes, including ″and″, ″or″, and ″not″ relationships.
- Cross-referencing of versions - for example, different versions of modeled and/or actual configurations, backup configurations, planned configurations, etc.
- Link access - the ability to build upward and downward links from an object. For example:
  - Given a specific device, be able to trace through paths to determine all systems with access to that device.
  - Given a specific system and device, determine all possible paths from one to the other.
  - Identify all primary and alternate connections from one network node to another.
  - Given a switch device, identify all routes in and out of it.

3.5.9.2 Pass Information

This step includes the process of passing requested configuration status to business, operations, storage, output, change and other processes, primarily through application interfaces or database imports. It also encompasses the graphical interface for user requests for the same information. Users must also have the ability to selectively distribute configuration information to other managers and/or users. Such information can include notification of when certain components will become available or unavailable.

3.5.9.3 Report Configuration

Mechanisms are needed to allow management system users to request and obtain configuration reports. These reports may focus on such things as network connectivity, network topology, and resources, attributes and values. The configuration reports may produce snapshots of the current configuration and the status of the components. Reports requested could also be administrative in nature, such as inventory or asset status, maintenance/lease costs, availability reports, etc.

Information requested can be organized in different ways, for example by:

- A system or subsystem - for example all devices on a LAN

- A hierarchical layer with link connections - for example, network nodes or I/O devices on a certain system
- An organization - for example, all hardware or software resources within an organization
- A perspective - for example, device routing to or from a switch

Chapter 4. What Products Collect LAN Configuration Data?

The application that is be described in this redbook, called IBM Configuration Management Tool for OS/2 (ConfigTool) provides configuration management functions for the LAN environment. Before going into detail about ConfigTool, it will first be helpful to understand some of the products (both management and networking products) that provide different configuration functions, and collect portions of configuration data that is essential for a complete view of your LAN environment (resources and user information).

This chapter first discusses some of the challenges in LAN configuration management today when trying to understand where and how you can obtain all of your LAN configuration data. It then describes some of the LAN management and networking products that are available that provide portions of the required data, and that can be integrated into a ConfigTool configuration management solution.

4.1 The Configuration Management Problem

One of the problems in today's environments is that no longer is a workstation just a workstation. In today's distributed world a workstation can be running multiple protocols, with multiple LAN adapters, performing multiple business functions, and possibly supporting multiple users. One resource or workstation could also be managed by multiple LAN management products, each of them giving a specific subset or view of the status and configuration of that machine. One physical resource could now be one or many of the following:

- LAN server
- Network resource
- Lotus Notes server
- Business application
- Communications gateway
- End user file server
- Internet gateway
- Management server
- Print server

Figure 8 on page 38 depicts the overlap of configuration data that could easily occur in today's distributed, multiprotocol environments, where multiple products will be managing and controlling some portion of your total network. In many cases there will be an overlap of the data collected, and each product may have their own way of describing the same thing, making integration and correlation difficult.

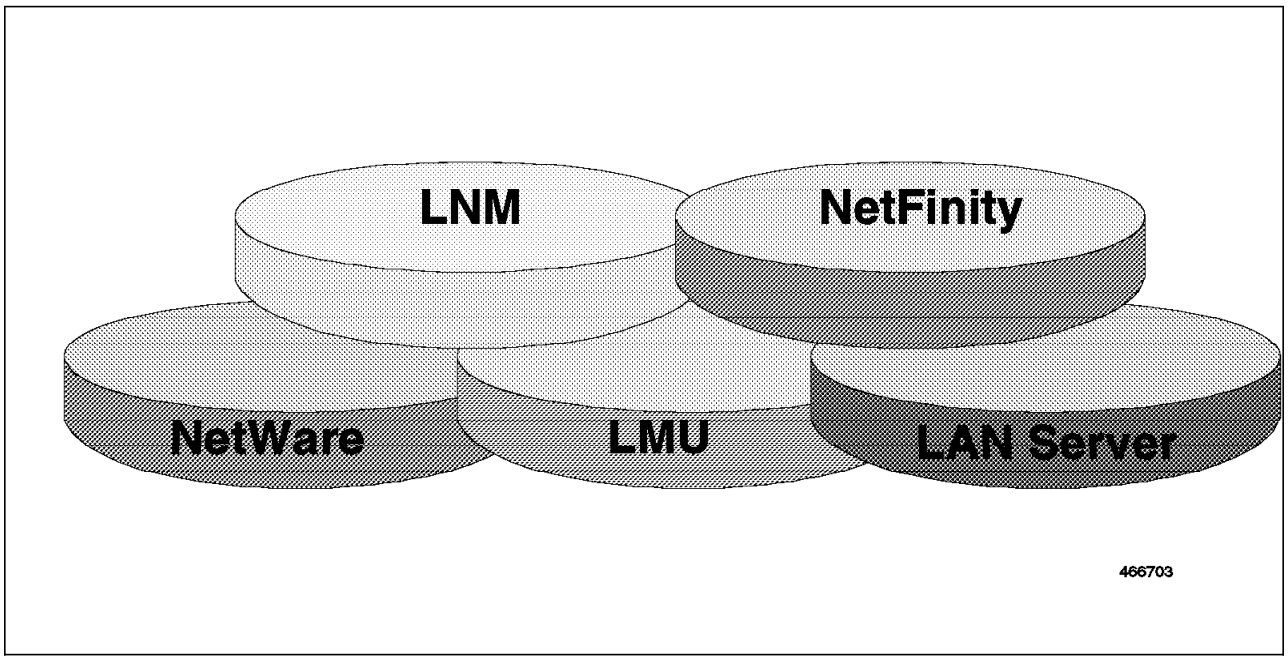


Figure 8. LAN Management Products that Contain Configuration Data

The challenge in today's environment is to be able to gather all of this data from multiple products and to correlate the data to get an overall picture of that one resource.

4.1.1 Sources of Configuration Data

One of the biggest concerns or irritations many organizations are facing is having to enter management data into a database manually, or worse still, reentering it into multiple databases. Entry or collection of software and hardware data needs to be as automatic and dynamic as possible with a goal of entering the data once into a shared database.

The inherent flexibility, along with the wide range of hardware, software and communication resources that are available today for configuring a computer network, often present an organization with an extraordinary amount of configuration and inventory data. All of this data is sometimes very difficult to manage at the enterprise level.

Configuration and inventory data is often tracked by each owning organization or location within an enterprise, in a format (for example, relational database, flat file, spreadsheet) that is often determined by the owner, if it is tracked at all. The sources for configuration and inventory data, within an enterprise, also includes today's network management products, which have the ability to dynamically discover configuration and inventory data. These multiple sources of configuration and inventory data within an enterprise present a problem in that each owning organization may have its own way to store and manage the data, and the data may not always agree across databases. Therefore, there is often no consistent process for the administrative configuration management across an enterprise.

Configuration data needed for effective configuration management to be put in place can be found in some of the following places, and as shown in Figure 9 on page 39:

- User-defined databases
- System level managers (products such as NetView for MVS and NetView for AIX)
- Vendor data
- Purchasing
- Mid-level managers (products such as NetFinity and LAN Network Manager)
- Operations
- Change (management/control)

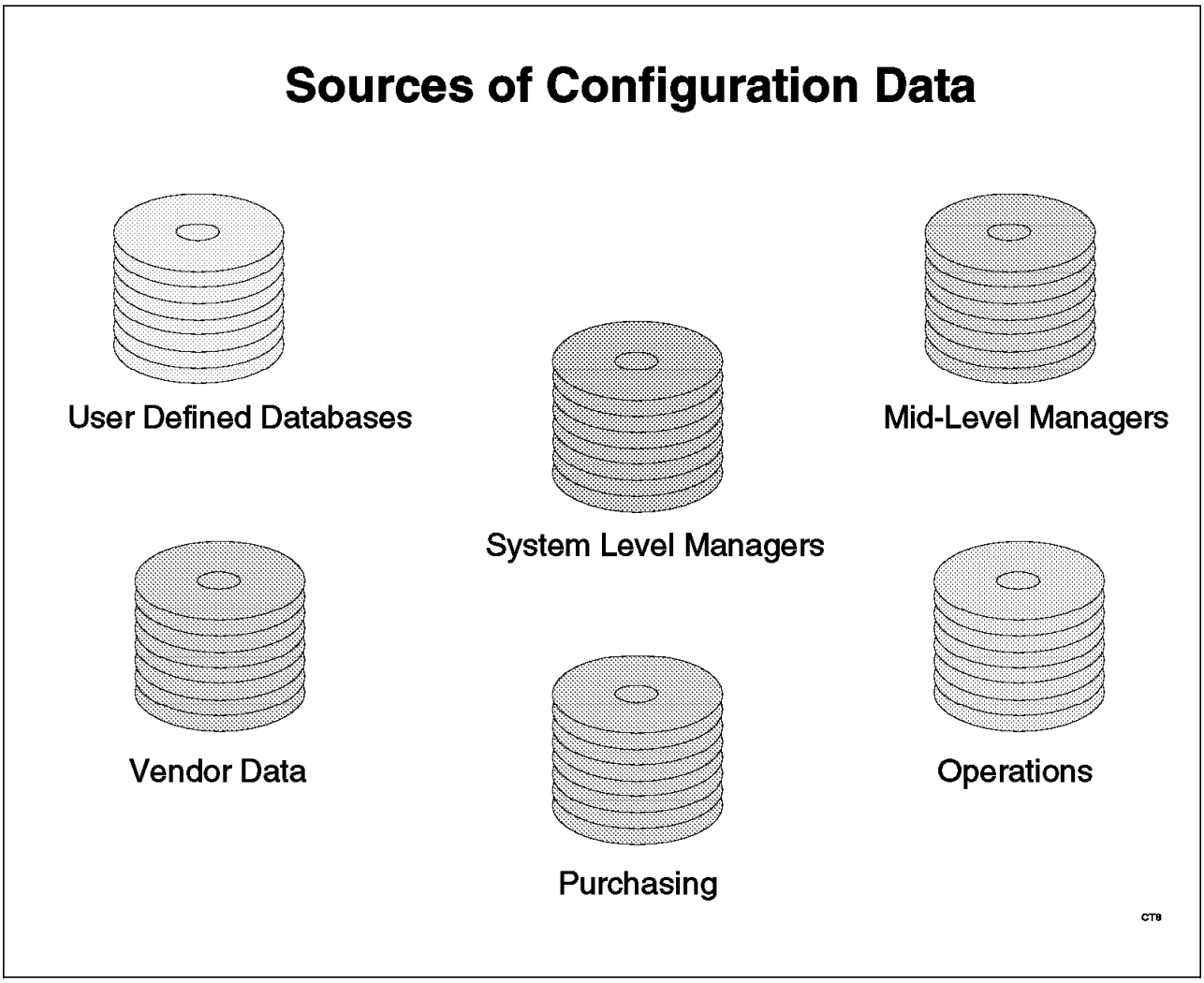


Figure 9. Sources of Configuration Data

To put this into simple terms - if a user calls up with a workstation problem, the information you may need can include:

- How is their resource connected to the network and is it working? (Information obtained from mid-level manager.)
- Is the application they are trying to use available? (Information may need to be obtained from the system level manager.)
- Who is the person responsible for this machine and what is their phone number? (Information obtained from possibly a user-defined database.)

- Is the machine still under warranty? (Information obtained possibly from a purchasing database.)
- If it is not under warranty, is there a maintenance agreement and what is the name and address of the vendor who supports it? (Information obtained possibly from a vendor database.)

Chances are that the above scenario would not happen often. However, it does point out that there could potentially be multiple places where the configuration data necessary to resolve a user's problem resides in multiple data stores.

Many organizations are looking for a way to gather all of their configuration data centrally from these different management components or databases. This requires the ability to query the management applications and request information about their managed devices. However, current products in enterprise management will often implement their own local or proprietary databases.

Even more importantly, these databases often implement their own data model. There is a certain overlap in the scope of these models, but in principle, they are often too different to enable a simple way of accessing and/or consolidating the underlying data. Figure 10 on page 41 depicts some of these management products, but you can also add many others such as Microsoft's SMS.

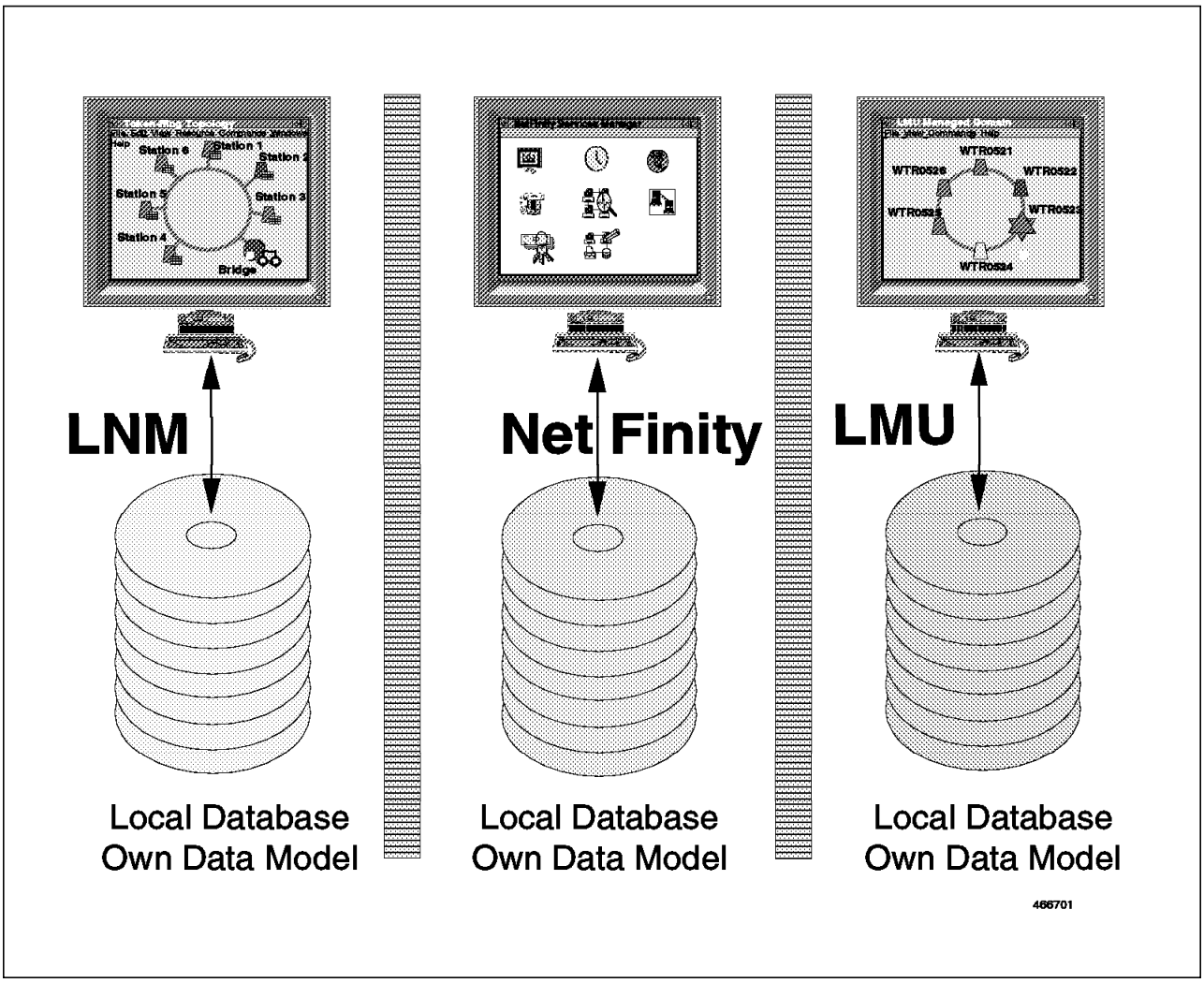


Figure 10. LAN Management Products

LAN network operating systems can also be included in the above diagram and include IBM's LAN Server, Novell's NetWare and Microsoft's NT. Each of the different management or networking products available will probably have their own type of database and even more importantly, their own way of describing the configuration data.

Many organizations are looking for a central configuration database that could be the common data store on which solutions aimed at the execution of the other management processes can be built upon for managing/configuring the LAN environment, such as monitoring, registration, asset management, software distribution, etc. This central configuration store should be the point of integration for various products and tools.

4.2 LAN Management Products in Detail

The local area network environment can be made up of bridges, routers, hubs, switches, gateways and workstations. Each of these devices will also have different components and features associated with them such as adapters, drives, and software.

The following section takes you through some of the different LAN management (mid-level managers) and networking products currently available, which provide management applications and contain portions of the required configuration data. It gives an overview of the functions they perform, and more importantly describes some of the configuration data that they collect and store about their managed environment.

4.2.1 LAN Network Manager

The LAN Network Manager product enables the management of multisegment IBM token-ring networks, broadband and baseband IBM PC networks, hubs (CAUs), and the LAN bridges that connect a token-ring segment and an Ethernet segment. It provides facilities to manage the LAN media and the LAN adapters in the token-ring environment.

LAN Network Manager provides functions to support the following:

- Access control, which allows the detection and removal of unauthorized adapters and bridges.
- Asset management, by keeping track of adapter locations.
- Workstation configuration, which relies on the information maintained by the LAN Station Manager product.
- IBM bridges, including automatic link, status, and performance data.
- IBM 8230 and follow-on hubs, providing their status, configuration, and the possibility of enabling or disabling their lobe receptacles.

LAN Network Manager also allows you to build a configuration table of resources in the network together with a detailed set of station identifying information. LAN Network Manager stores all the information it knows about the network in DB2/2 tables. These tables of LAN configuration data make up the LAN Network Manager database.

The following is a list of some of the tables which LAN Network Manager provides:

- Bridge Definition table
- Bridge Performance table
- Controlled Access Unit table
- CAU Lobe Location table
- Configuration table
- Event Log table
- Location Definition table
- PC Information table
- Station Definition table
- Token-Ring Attachment Data table

Please note:

Some of this information will only be available if the LAN Station Manager product is running on the workstatations being managed by the LNM.

Figure 11 on page 43 shows an example of the information that can be collected for all LAN adapters being managed by the LAN Network Manager.

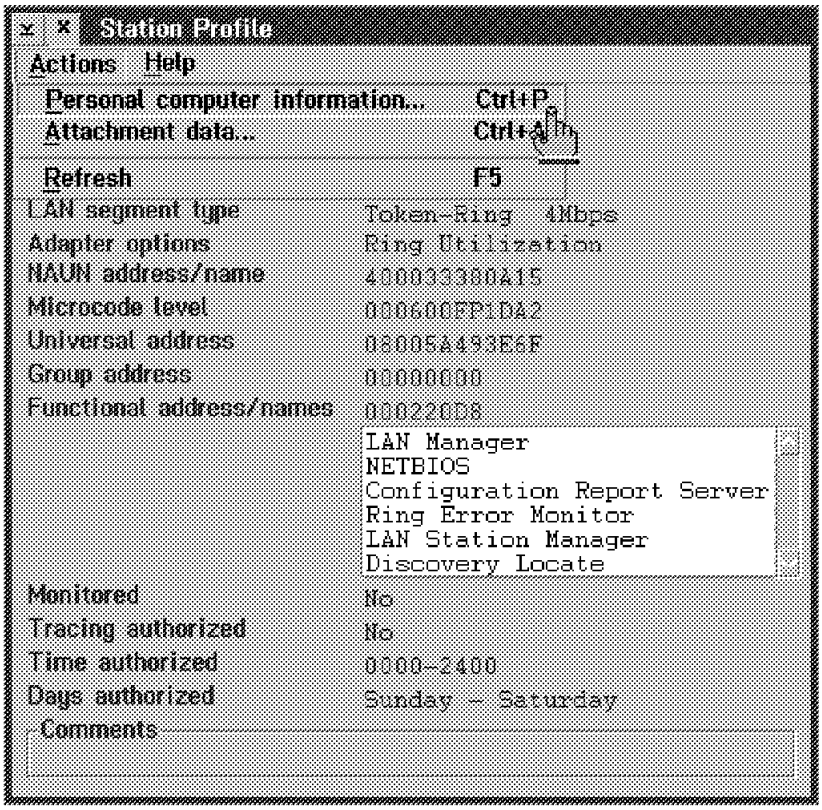


Figure 11. LAN Adapter Information

Figure 12 on page 44 shows the additional information that can be obtained from those workstations with the LAN Station Manager product installed. This information is obtained by selecting **Personal computer information** from the Actions pull-down menu as shown in the previous figure.

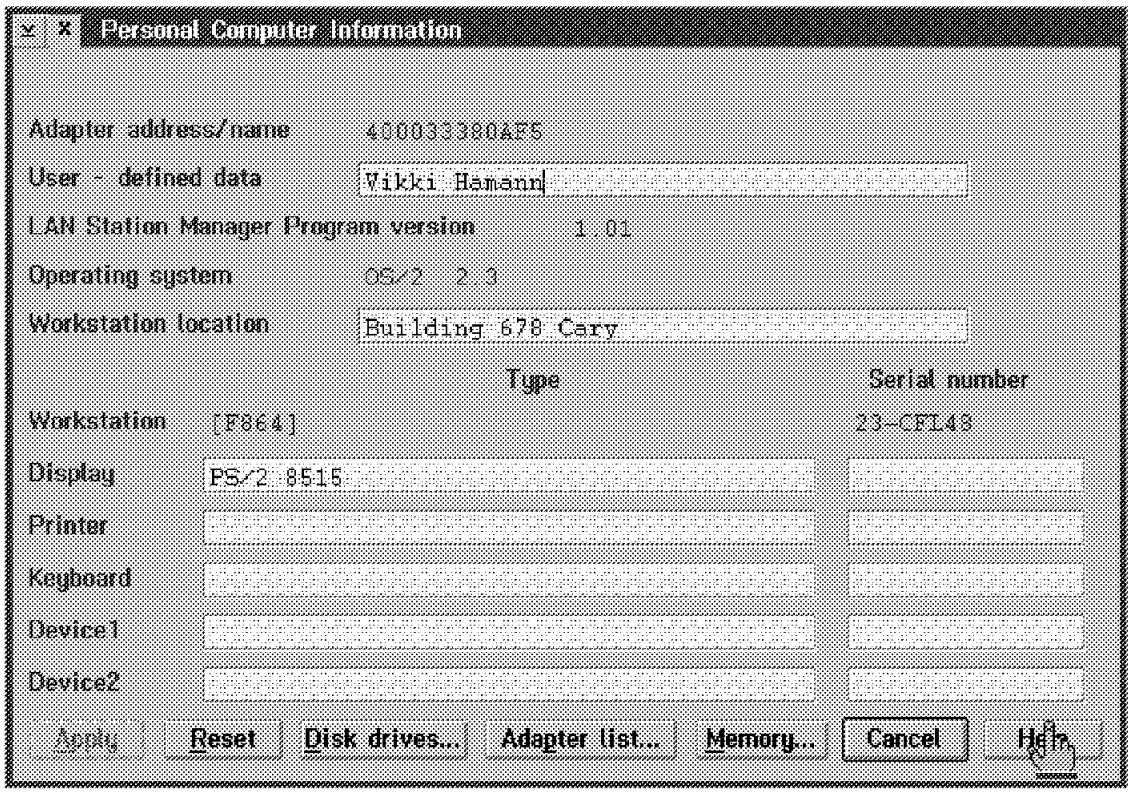


Figure 12. LAN Station Manager Information

From this window you can select additional information that is collected by LAN Station Manager such as, disk drives and the adapters and memory installed on the resource.

Figure 13 on page 45 shows the LAN Station Manager setup interface which allows you to define this additional configuration and inventory data for the workstation. This setup is executed on the actual machine running the LAN Station Manager product.

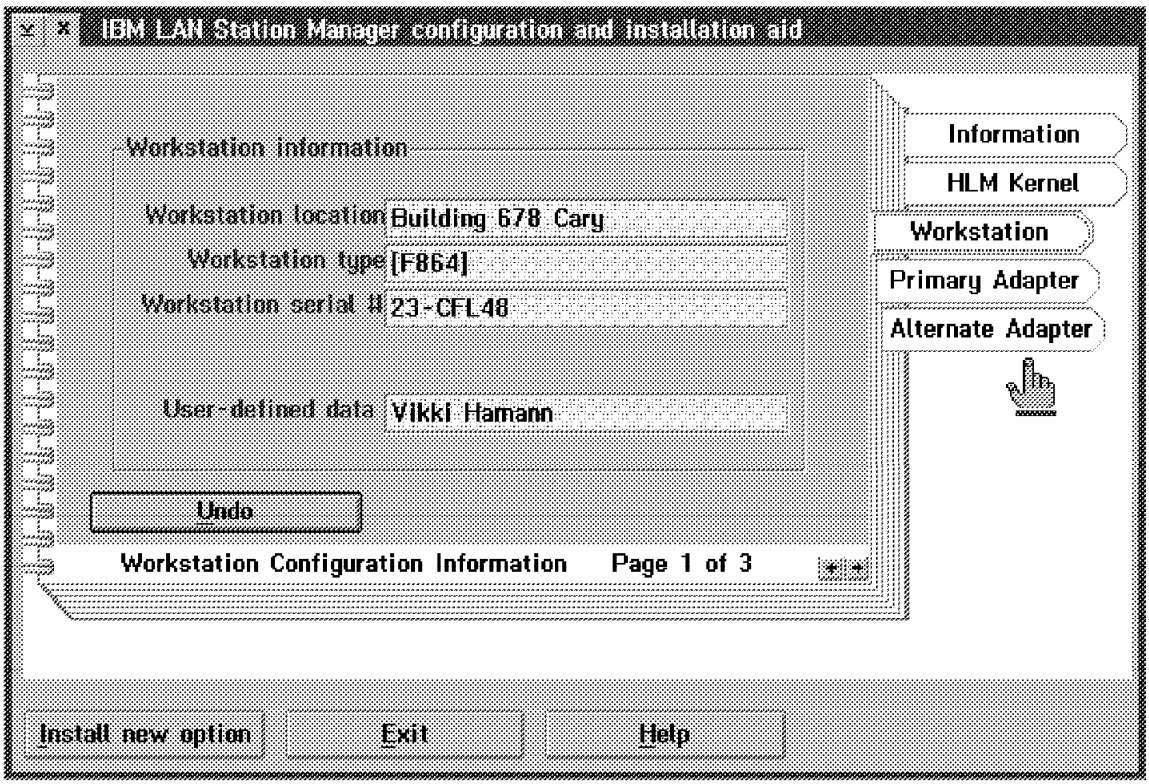


Figure 13. LAN Station Manager Setup

4.2.2 LAN NetView Management Utilities

IBM LAN NetView Management Utilities is an OS/2-based product to assist with and automate the management of systems in local or bridged, local area networks. It will manage devices on token-ring and Ethernet networks and can see across bridges to give you management capability for an entire logical local area network. It will manage OS/2 clients and servers and NetWare servers, with a subset of its function also available to DOS, Windows and Macintosh clients.

LMU was designed around a hierarchical concept with a managing system and a managed system. The managed system is the client workstation. These are the actual end users on the network. Managed systems report into a managing system that holds the database for the network. This database can contain extensive configuration data about the managed workstations.

LMU provides you with some of the following functions:

- A transport method by which system management applications can be invoked remotely and system management data sent to a collection point.
- A set of LAN system management applications. These applications collect and report information necessary to access and manage the LAN environment, and respond to certain user-specified fault conditions. These applications include configuration (hardware and software), performance, operations, and fault management.
- Software to maintain a DB2/2 database that contains the response information from the management applications.

- A graphical user interface (GUI) to provide visual representation of the workstations managed by LMU. The GUI also provides an easy-to-use interface for submitting commands to the local workstation or to remotely monitored workstations.
- A job scheduler which can perform regular tasks like file purges and backups to run at the appropriate time without operator intervention. The scheduler includes options for daily, weekly, and monthly executions. With the group edit, these selected commands can be sent to a single machine, or to a predefined group of machines.

LMU′s configuration application will collect vital product data about the OS/2, DOS, Windows, and NetWare server workstations in which an LMU client (managed workstation) is running. LMU can either display this data on the workstation screen, or place the data in a central DB2/2 database. The information that can be collected includes the following:

- Machine type
- CPU type
- Keyboard type
- Monitor adapter and display type
- Fixed disk type and size
- Diskette type and size
- Logical drive characteristics
- Installed Micro Channel adapter types and slot numbers
- Local and universal token-ring addresses
- Operating system
- SYSLEVEL information for installed software (OS/2)
- Date, time and size of user-specified files
- User-defined data

Figure 14 on page 47 shows an example of displaying the configuration information of our workstation through the LMU GUI. Most of this information is automatically collected from workstations that are running the LMU client application.

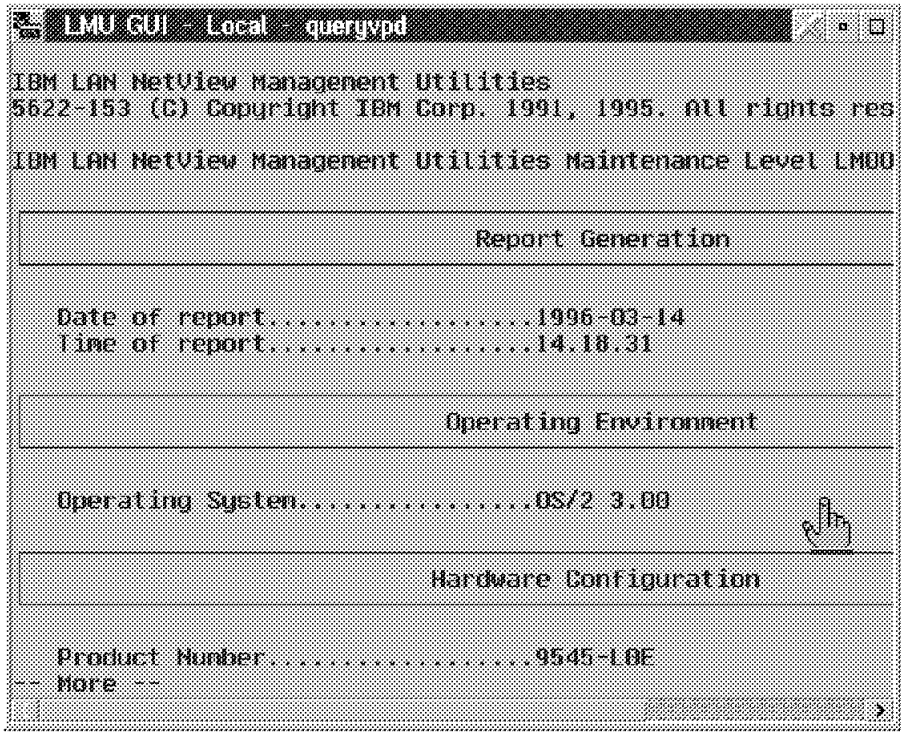


Figure 14. Collected LMU Configuration Data

The command to collect and display configuration data can also be executed via command line input. The following is the complete output from the LMU QUERYVPD command:

```
IBM LAN NetView Management Utilities
5622-153 (C) Copyright IBM Corp. 1991, 1995. All rights reserved.

IBM LAN NetView Management Utilities Maintenance Level LM00230


                          Report Generation

   Date of report.................1996-03-14
   Time of report.................14.30.36


                       Operating Environment

   Operating System...............OS/2 3.00


                       Hardware Configuration

   Product Number.................9545-L0E
     System Serial Number          23CFL43
   Processor......................486 DX4
     Processor Speed               75 MHz
   CoProcessor....................80486
   Bus Type.......................AT 16-Bit

   Total Memory...................36480 KB = 35.6 MB
```

```
   Equipment List..................1 Parallel Port(s)
                                   1 Serial Port(s)
                                   1 Diskette Drive(s)
                                   1 Fixed Disk(s)
                                   Math CoProcessor

   Serial Port 1..................COM1
     Baud rate                      1200 bps
     Data bits                     7
     Parity                        Even
     Stop bits                     1

   Diskette Drive 1...............3.50"  - 1474K - 80 Tracks - Type 4

   Fixed Disk 1...................771.0 MB = 790272 KB = 809238528 bytes

   Keyboard Type..................84 Key Enhanced

   Current Display................PS/2 Color 6312/6314/6319

   Primary Node Address...........08005AA648C3
   Primary Universal..............08005AA648C3


   Total Slots....................0


                              Logical Drives

   FAT     Drive C.................   9.1 of   10.8 MB free ==>  15% full
   FAT     Drive D.................  37.3 of  100.1 MB free ==>  62% full
   FAT     Drive E.................  67.4 of  100.1 MB free ==>  32% full
   FAT     Drive F................. 256.5 of  557.9 MB free ==>  54% full


                                 User Data

USERVPD.DAT was not found. No data exists.


                           Critical File Information

CRITFILE.DEF was not found. No data exists.
```

LMU provides two files called USERVPD and CRITFILE which allow you to add information on the workstation on which an LMU client is running. The information in these files would be collected and displayed with the QUERYVPD command shown above.

The USERVPD file allows you to enter user information such as owner and location of the workstation. The CRITFILE file allows you to define critical files running on the workstation.

4.2.3 NetWare

NetWare is a LAN operating system, written by Novell, Inc. Its strengths are file and print sharing. It can also be used as an application or database server. NetWare has about 60% of the marketplace for LAN operating systems. In other words, three in every five LANs have NetWare in some form or another running on them.

The NetWare network operating system contains all the key elements needed to support server-based applications:

- Connection services
- Data services
- Directory services (NetWare 4.x)
- Reliability services
- Integrated management services

NetWare supports many communication protocols. However, the most widely used protocol used to transport network traffic among NetWare servers and DOS, Windows and OS/2 workstations is the NetWare IPX/SPX protocol.

NetWare provides some of the following functions:

- **Network Services**

  File and print capabilities are the primary services offered. In addition, it provides services such as network management, communications, messaging, database, directory, software distribution, etc.

- **NetWare Directory Services (NDS)**

  NetWare Directory Services is a network-wide distributed database that helps to manage and administer the file server or file servers in the network.

  This is simply a directory like a phone or address book that helps you locate information. The NDS organizes objects in a hierarchical tree structure. The basic unit of the directory tree is an object. Objects can be users, printers, servers, etc.. Each resource or object can be assigned properties and assigned values. For example, a user object can be assigned properties such as an address, user ID and phone number.

- **Integration**

  NetWare 4.0 provides integration of DOS, OS/2, Windows, Macintosh and UNIX desktop operating systems. This includes the ability for files to be shared among multiple operating systems by saving files on the server both in the native desktop language of the workstation creating the file, and a copy of the file created in each of the other desktop languages supported by the network.

- **Network Management**

  NetWare management agents allow you to monitor, control and troubleshoot network hardware and software. These agents can do things such as trigger a process within a server when it encounters one or more predefined conditions, such as available cache buffers are low, there is not enough memory for cache, or there is an error writing the directory tables to disk.

4.2.4 NetFinity

NetFinity is designed to manage clients and servers attached to a LAN in the DOS/Windows, OS/2 and NetWare environments. It works with both IBM and non-IBM hardware to provide a comprehensive LAN management system.

NetFinity is distributed in the form of NetFinity Services and the NetFinity Manager. NetFinity Services is the base or agent code that is placed on all of the systems to be managed. NetFinity Manager is the management application that controls all NetFinity services. NetFinity Manager requires NetFinity Services to be installed, and will automatically discover workstations on the LAN that also have NetFinity Services installed. The NetFinity Manager currently supports NetBIOS, IPX and TCP/IP protocols, and runs under DOS/Windows and OS/2.

The following is a list of some of the NetFinity functions available:

- **System Monitor Service**

  System Monitor Service allows you to monitor vital system resources such as CPU, memory and disk usage, and disk read-write errors.

- **Alert Manager Service**

  Alert Manager Service allows you to receive alerts generated by other NetFinity utilities and applications.

- **File Transfer Service**

  File Transfer Service allows you to move files between a local and remote PC.

- **Event Scheduler Service**

  Event Scheduler Service enables you to automate a range of systems management tasks. You can schedule a task for execution at a predetermined time, such as during the night, for either one PC or a whole group of PCs. You can also log the results of those scheduled events so that you know if there has been a problem.

- **Remote Session Service**

  Remote Session Service allows you to execute remote commands on PCs running NetFinity Services.

- **Screen View Service**

  Screen View Service allows you to see exactly what is displayed on an agent′s screen at any moment in time.

There are two additional functions of NetFinity that are particularly relevant when looking at configuration management which are the System Profile Service and the System Information Tool.

- **System Profile Service**

  The System Profile Service allows you to store a variety of system and user specific information such as the user′s name, department, and location, the system type, serial number and other relevant notes. It provides a quick overview of who owns the system and what functions the system is usually used for. This data can be exported as both ASCII files and SQL database files.

- **System Information Tool**

The System Information Tool enables you to access detailed information on the hardware and software configuration of your system. All of this information can be saved in SQL database file format.

Figure 15 shows the main window of the NetFinity Services Manager. From here all the functions described above can be selected.

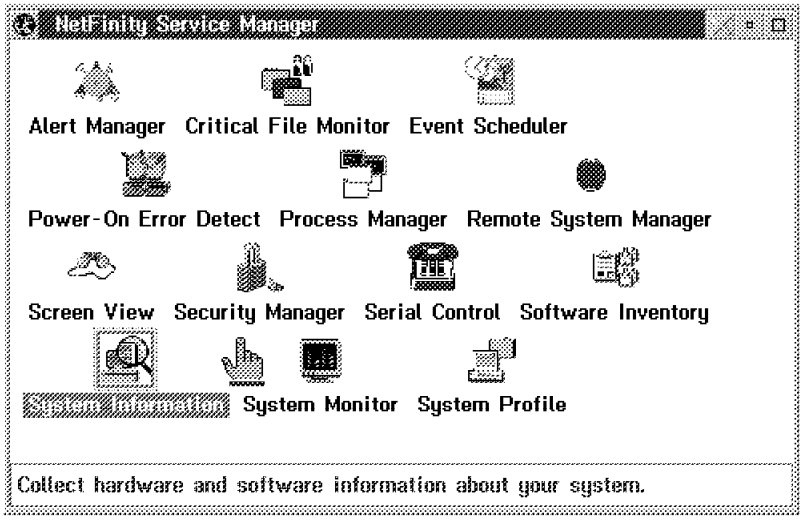


Figure 15. NetFinity Services Manager Main Selection Window

The System Information icon can be selected from the above window, and will take you to the System Information graphical interface (shown in Figure 16 on page 52) from where you can select from the following types of configuration data:

- Adapter Information
- Disk Information
- Keyboard Information
- Memory Information
- Mouse Information
- Operating System Information
- Model and Processor Information
- Printer Information
- Parallel and Serial Port Information
- Video Subsystem Information
- Vital Product Data

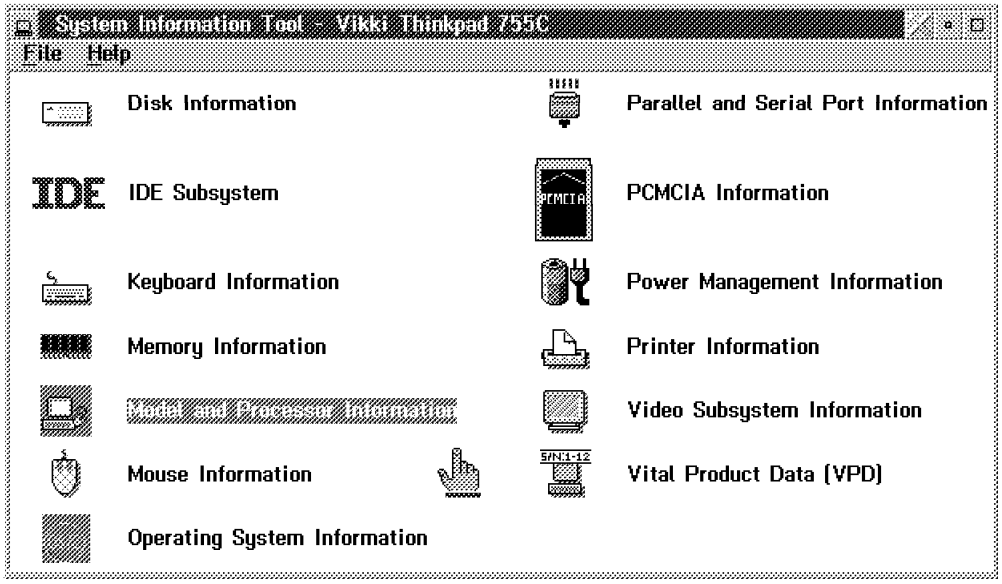


Figure 16. System Information Tool Main Window

Figure 17 shows one example of the information that can be collected and displayed. This example is a list of the currently installed hardware features of the machine we are using.

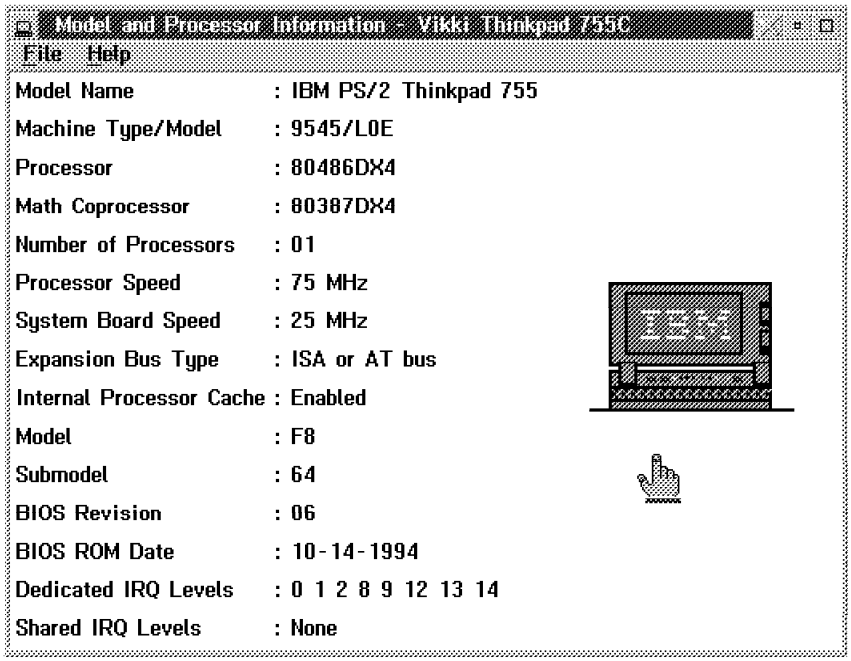


Figure 17. Display of Installed Hardware

NetFinity also provides the System Profile tool which allows users to add personal information such as name, address, phone number, etc.. Figure 18 on page 53 and Figure 19 on page 53 show examples of the types of information that can be entered into the NetFinity System Profile tool.

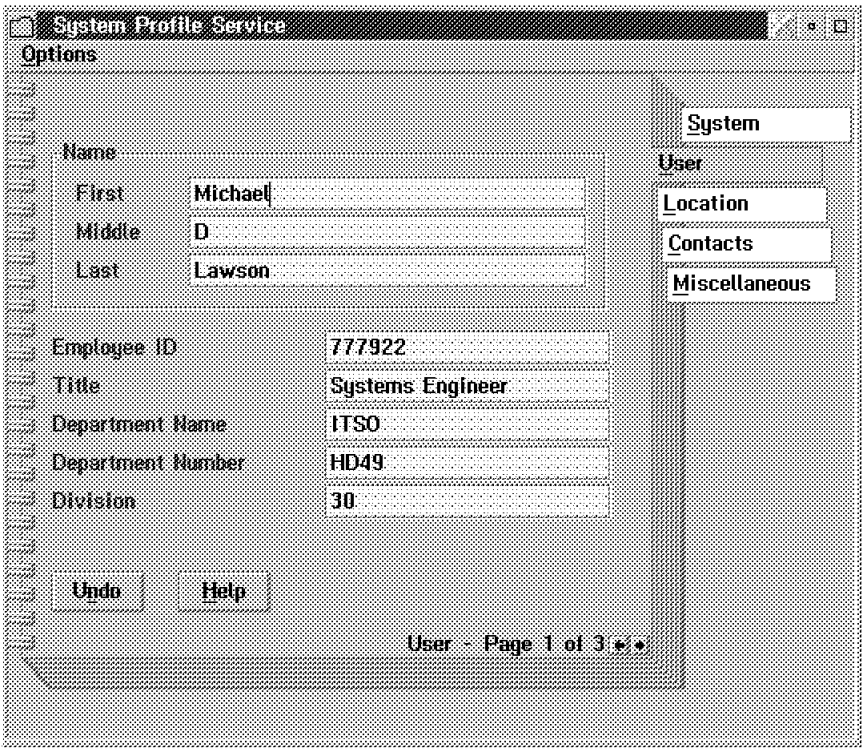


Figure 18. User Personal Information

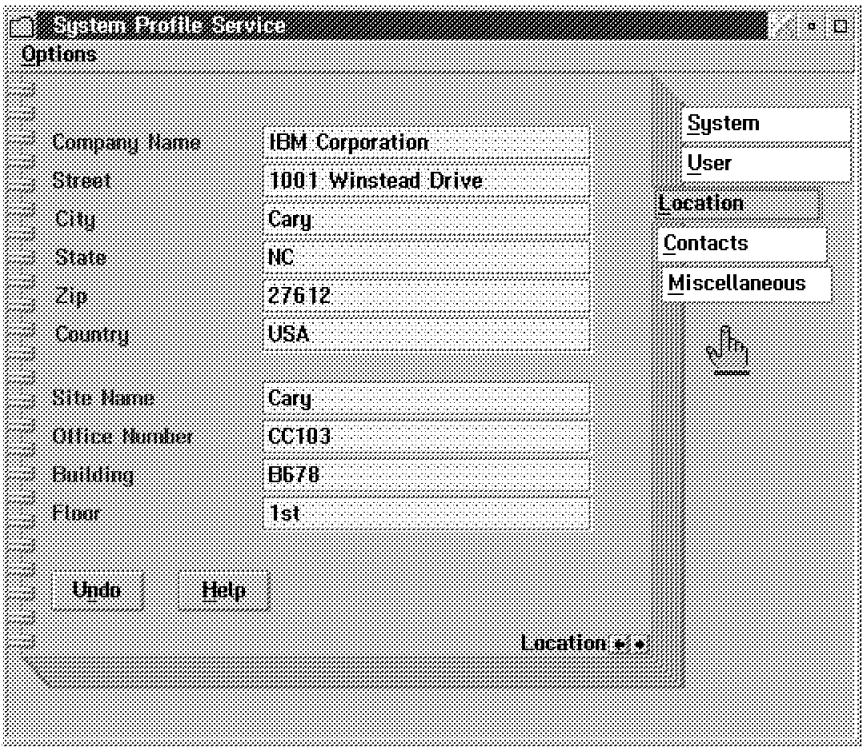


Figure 19. Address and Location Information

Chapter 5. What Is IBM Configuration Management Tool for OS/2?

This chapter describes an application called IBM Configuration Management Tool for OS/2 (ConfigTool) which is available to get started in the configuration management of your LAN environments. This chapter takes you through:

- What ConfigTool Is and What It Does
- The Components of ConfigTool
- An Overview of the Data Extracting and Importing Processes
- Examples of Using the ConfigTool Graphical Interface

5.1 What Is ConfigTool?

ConfigTool is a LAN configuration management application running on OS/2 that allows tracking of workstation hardware and software configuration data (retrieved from OS/2, DOS, and/or Windows workstations), physical and logical network information, as well as administrative information (users, locations, organizations, etc.). ConfigTool collects and stores configuration data from workstations as well as LAN devices (for example, bridges, CAUs, MAUs) and logical and physical network data (LAN Server and NetWare data such as LAN user IDs and authorizations, segment and segment connection data, etc.).

ConfigTool provides some of the following capabilities:

- Collects and updates hardware, software, and configuration data from workstations throughout the network without the need to install any data extractor or agent code on the client workstations.
- Collects and updates hardware configuration and organizational data from NetFinity-enabled workstations.
- Provides the capability to collect data from non-LAN-connected machines by using diskettes.
- Collects and updates domain data from IBM LAN Server and NetWare server domains.
- Collects and updates data from the databases of other LAN management products such as LAN Network Manager and LAN NetView Management Utilities.
- Provides a graphical user interface that enables users to view, alter, add, and list the configuration data.
- Provides the ability to associate organizational data with the system data, such as owners or room numbers with workstations.
- Provides a manual data entry facility for building and updating configuration data.
- Provides extensive customizable reporting features which can also be used to print reports.
- Uses a subset of the SystemView Administrative Data Model for defining the LAN resources.

Some of the most powerful facilities in ConfigTool are its extract and import capabilities. ConfigTool will extract data from existing sources and then import and/or update the data in the ConfigTool database.

ConfigTool can also extract and import workstation hardware, software, and software definitions (for example, CM/2, DB2/2, TCP/IP for OS/2). The software extractor reads SYSLEVEL information and searches for software on hard disks according to a reference list that can be customized by you.

One of the major goals of ConfigTool is to extract a maximum amount of data automatically from the managed workstations and the network and leave only a minimum amount of data to be entered manually. Examples of things that may need to be entered manually are the relationships between administrative and configuration data, such as the ownership of a workstation by a person. ConfigTool integrates configuration data coming from various sources in a single DB2/2 database and allows the user to access all the data in a common way.

Figure 20 gives an overview of ConfigTool and the LAN environments it currently supports.

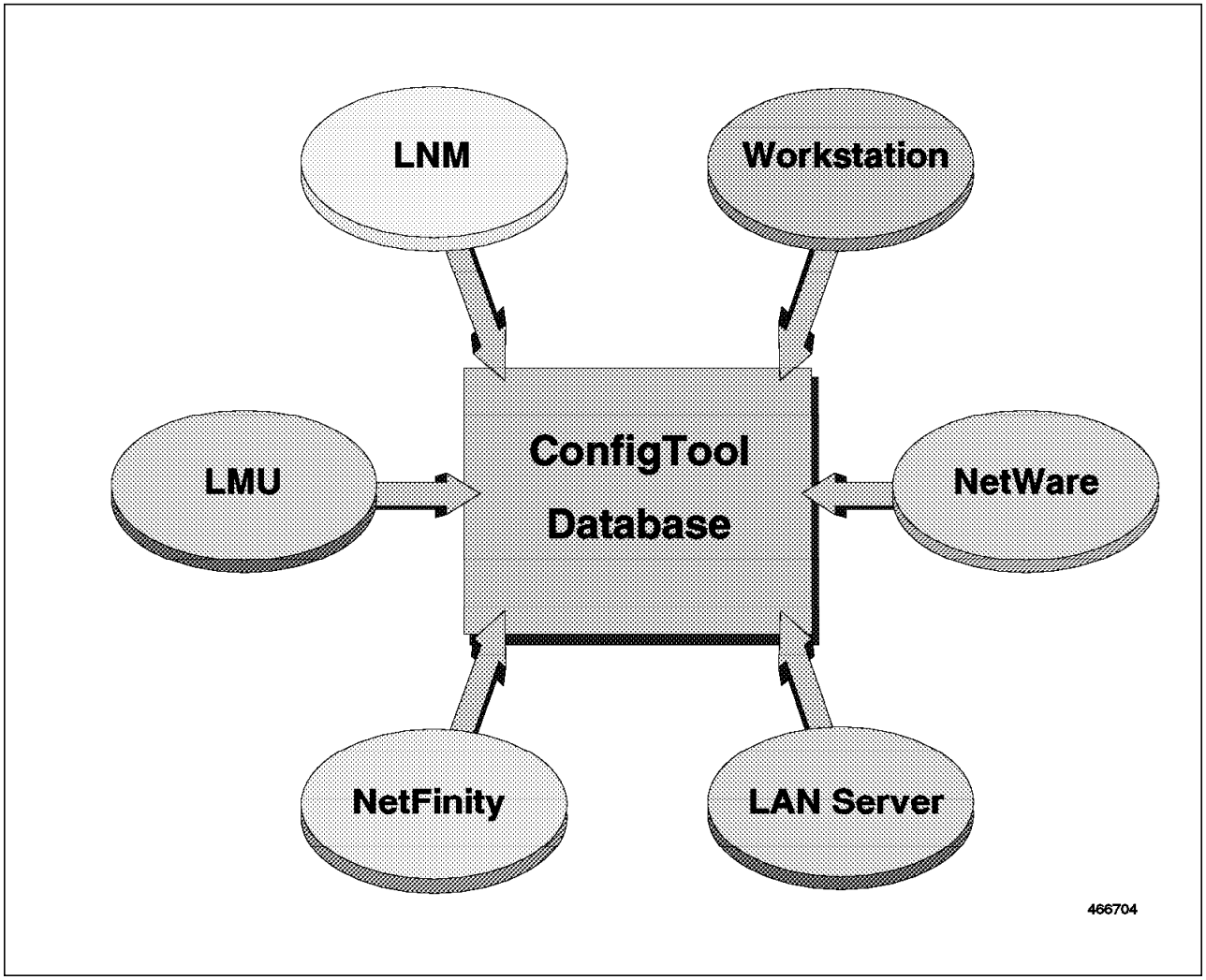


Figure 20. Extract the Data from Where It Is Stored

ConfigTool provides an object-oriented graphical user interface (GUI). The GUI also includes a Query Editor that allows you to define different Query Objects for the different types of configuration data you need to retrieve. You can also optionally hide specific objects and/or specific groups of attributes from the graphical user interface. For example, if you do not have the IBM LAN Server or LAN Network Manager products installed, you may want to remove these objects (icons) from the GUI. This feature allows ConfigTool to be effectively used by small customers requiring just workstation data, as well as larger customers who require all types of LAN data including objects such as bridges, gateways, and SNA definitions.

ConfigTool also provides a user exit that allows you to register user-defined functions to an object in the graphical user interface which can be triggered from ConfigTool.

5.1.1 The Data that Can Be Extracted

ConfigTool collects and stores the following types of configuration data from each of the different environments:

- **LAN Domain/Server Data**
  - Network resources
  - Alias names
  - Groups/user IDs
  - Authorizations
- **LAN Network Manager Data**
  - Segments
  - Bridges
  - Controlled access units
  - Adapters
  - LAN Station Manager data
- **LAN Workstation Data**

  This can be collected from either LAN-connected or non-LAN-connected workstation.
  - Vital product data/hardware data
  - Software data
  - Software configuration parameters (CM/2, TCP/IP for OS/2, DB2/2, LAN Server requester, Novell NetWare requester)
  - Protocol configuration parameters (TCP/IP, SNA)
- **LAN NetView Management Utilities Data**
  - Vital product data
  - Software data
  - System data
- **NetWare Data (3.12 and 4.10)**
  - Vital product data
  - Software data
  - Groups/users
  - Organizational data (person, organization, location, address)
  - Printer queues
  - File resources
- **NetFinity Data (3.0 to 3.5)**

- Vital product data
- Software data
- Organizational data (person, organization, location, address)

- **SNA Data**

  This is collected via workstation utilities from definitions in the CM/2 product.

  - Network node, peer and host links
  - PUs and XIDs
  - Local and partner LU 6.2 definitions

- **TCP/IP Data**

  This is collected via workstation utilities from definitions in the TCP/IP for OS/2 product.

  - Host name and IP address
  - Subnet mask and domain name

5.2 ConfigTool Components

ConfigTool consists of the following components:

- **Database**

  This is the central component of ConfigTool and holds all of the collected and manually entered data.

  Please refer to the *ConfigTool Reference Guide* supplied with this redbook for complete details on the data model used by ConfigTool.

- **The Data Extractors**

  The Data Extractors will extract data from various sources such as workstations, servers, and the databases of other management products and puts it into intermediate flat files.

- **Data Importer**

  The generic or common Data Importer reads the intermediate flat files that are created by the data extractors and imports this data into the ConfigTool database.

- **User Interface**

  The graphical user interface enables the user to view, alter, and add data in the ConfigTool database.

- **Reporting Facilities**

  These facilities enable the user to list and print data contained in the ConfigTool database.

Figure 21 on page 59 gives an overview of the extract and import processes that ConfigTool uses.

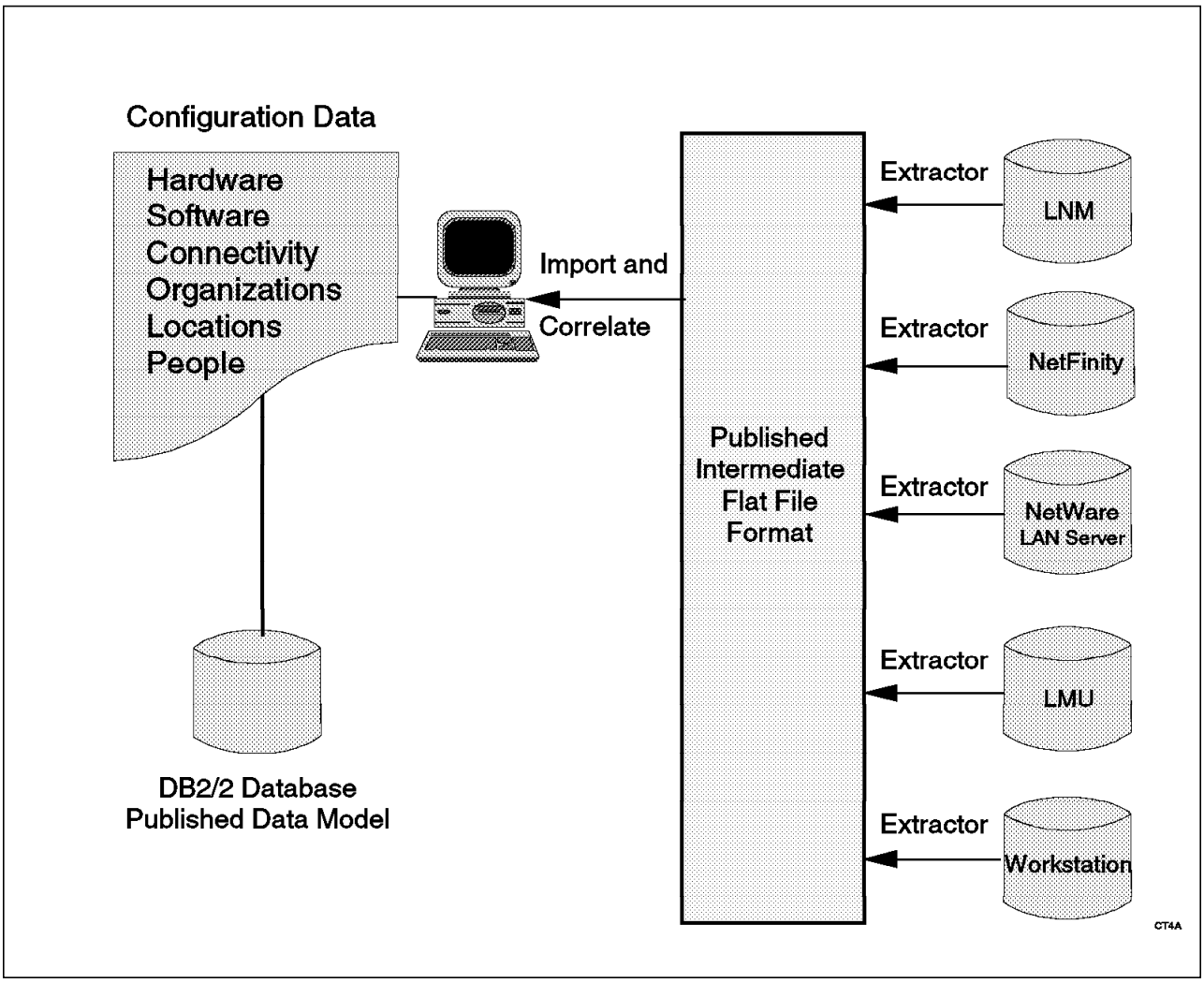


Figure 21. Extract and Import Process

5.2.1 The Data Extractors

The ConfigTool Data Extractors take data from existing configuration and inventory data sources and create a flat file that can be loaded by the common/generic Data Importer.

ConfigTool is shipped with the following set of LAN configuration data extractors:

- Workstation hardware configuration data extractor (DOS, Windows 3.1, and OS/2)
- Workstation software configuration data extractor (DOS, Windows 3.1, and OS/2)
- Workstation software definition extractor (CM/2 including SNA data, TCP/IP for OS/2, DB2/2, OS/2 printer queues)
- IBM LAN Server extractor
- IBM LAN Network Manager (LNM) extractor
- IBM LAN NetView Management Utilities (LMU) extractor
- IBM NetFinity extractor
- Novell NetWare extractor

The extractors produce the intermediate flat files that contain the extracted objects and relationships from the workstations and different management products.

The extractors do not have to be running on a ConfigTool workstation. They can be located on the machines throughout your network where extraction will take place. The intermediate flat files can then be transported over the network to a central site where they are processed by the Data Importer to load the configuration data into the ConfigTool database.

5.2.2 The Data Importer

The ConfigTool Data Importer is a utility that processes the flat files which are created by the Data Extractors and loads the ConfigTool database. The Data Importer allows you to load objects of any class supported by ConfigTool.

The importer reads the flat files produced by the extractors and loads all of the objects and their attributes and relationships into the ConfigTool database. The import of the objects consists of the following steps:

- Identify an object in the database using the rules defined in an object identification file.
- If the object could be identified as an object in the database, update the object.
- If the object could not be identified as an object in the database:
  - Provide default values for specific attributes that have not been set by the extractor
  - Insert the object into the database
- After the objects have been imported from the intermediate flat file, delete outdated objects and relationships from the ConfigTool database according to the rules specified in the object identification file.

All changes that occur in the database during import are logged in a file. These log files can be used to track the changes of objects over time.

The object identification file (OID) is used by the importer to provide rules for every object class to both uniquely identify objects in the database to determine if an existing object needs to be updated or a new object created, and to delete outdated objects and relationships in the database. The purpose of the identification task during the import process is to correlate the objects supplied by the extractors and identified by the criteria in the object identification file to the objects in the database.

You could also write your own data extractors (for example, to supply administrative data from your organizational database). By adhering to the format of the flat file it is possible to create your own extractors if you wanted to. The extractors would need to produce intermediate flat files in the appropriate syntax, and you must ensure that the object identification file provides the appropriate rules for the objects in your flat file. 6.7, “Keeping Your User Data Up-to-Date” on page 138 shows an example of writing an extractor to automate the collection of user data and create an intermediate flat file automatically, ready for use by the ConfigTool generic importer.

The format of the flat file that is created by the extractors is published in the Reference Guide supplied when ordering this redbook.

For complete details on the OID and the rules used for identifying objects, updating and deleting objects and relationships, please refer to the *ConfigTool Reference Guide* supplied with this redbook package.

Please note!

The ConfigTool data model is not extendable at this time.

5.3 Understanding ConfigTool Terminology

The rest of this chapter takes you through the ConfigTool graphical user interface and shows you some examples of navigating through it. It also shows you some of the reporting facilities available within ConfigTool.

It is first helpful though, to understand some of the terminology that is used in the rest of this book and in the *ConfigTool Reference Guide* when using the ConfigTool GUI.

- **Query Objects**

  Query Objects represent database queries. The icon that is displayed is simply a representation of a query for a specific object class.

- **Query Object Container**

  A Query Object Container simply contains a collection of Query Objects. Containers will look like an OS/2 window with icons in them that can be selected.

- **Query Result Container**

  Query Result Containers display the results of a query. Each icon that is displayed represents a real instance of an object for a specific query that is in the configuration database, for example, a workstation named ABC. Once again, the Query Result Container is just an OS/2 window with icons in it.

- **Database Objects**

  A Database Object represents a real object in the ConfigTool database. The attributes of these objects can be viewed when you select or open one of the icons.

- **Database Object Notebooks**

  A Database Object Notebook appears when a Database Object is opened. These notebooks contain input fields and static text fields that explain the attributes, and also relationship pages.

- **Folders**

  In ConfigTool you will see the term *Create folder* used. Creating a folder allows you to create your own Query Object Container represented by an icon. Within this Query Object Container (folder) you can then customize individual queries for your specific data retrieval requirements.

- **Template Window**

  The Template window holds standard Query Objects that can be used to create new Query Objects.

- **Drop Hole**

The drop hole is the mechanism used to define relationships between different objects. The drop hole will appear in notebook containers, along with the Open view selection push button. Open view selection will allow you to display a list of queries, one for each class that you are allowed to drop into the drop hole. You can further restrict these Query Objects before selecting.

For example, if you were displaying a workstation notebook and had the Locations page active, you could check the **Open view selection** push button, which would display an unrestricted query location object. Upon selecting this object, it will display all location objects currently defined in the database. If you wanted to establish a relationship between one of the location objects and this workstation, you would drag the location object to the drop hole that is displayed on this workstation notebook page. All attributes belonging to the location object would then be linked to the workstation object; the relationship would be defined.

5.4 Navigating through ConfigTool

Once you have loaded data into the ConfigTool database either through the extractors or through manual input, you can then display this data through the ConfigTool GUI. This section gives you an overview of the ConfigTool Graphical User Interface and the functions that can be performed from it.

Installation of ConfigTool will create a ConfigTool icon on your desktop which you can select to start the ConfigTool application. Figure 22 on page 63 shows the window that will be displayed with each of the available functions within ConfigTool, such as importing data from different environments, creating reports, and selecting the ConfigTool GUI.

Please note!

The screen captures shown in this redbook contain an X in the right-hand corner. This is from a utility called NPS Workplace Shell Enhancer. It was written by Team OS/2 Japan member Shinji ″N.P.S.″ Takasugi. It offers many utilities to enhance your OS/2 desktop including the X close button and full-window drag. This is a freeware utility that you should look for on your local BBS or FTP site.

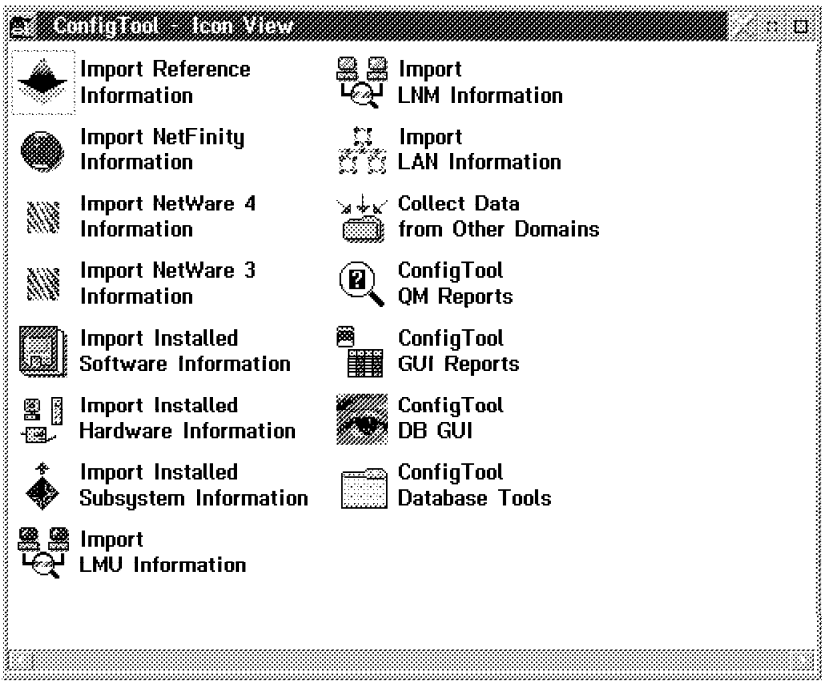


Figure 22. Main Icon Selection for ConfigTool

Figure 23 shows the main view selection window of ConfigTool that will be displayed after selecting the **ConfigTool DB GUI** icon from the previous window. Each of the objects in this window represents a default query for every class of object in the database.

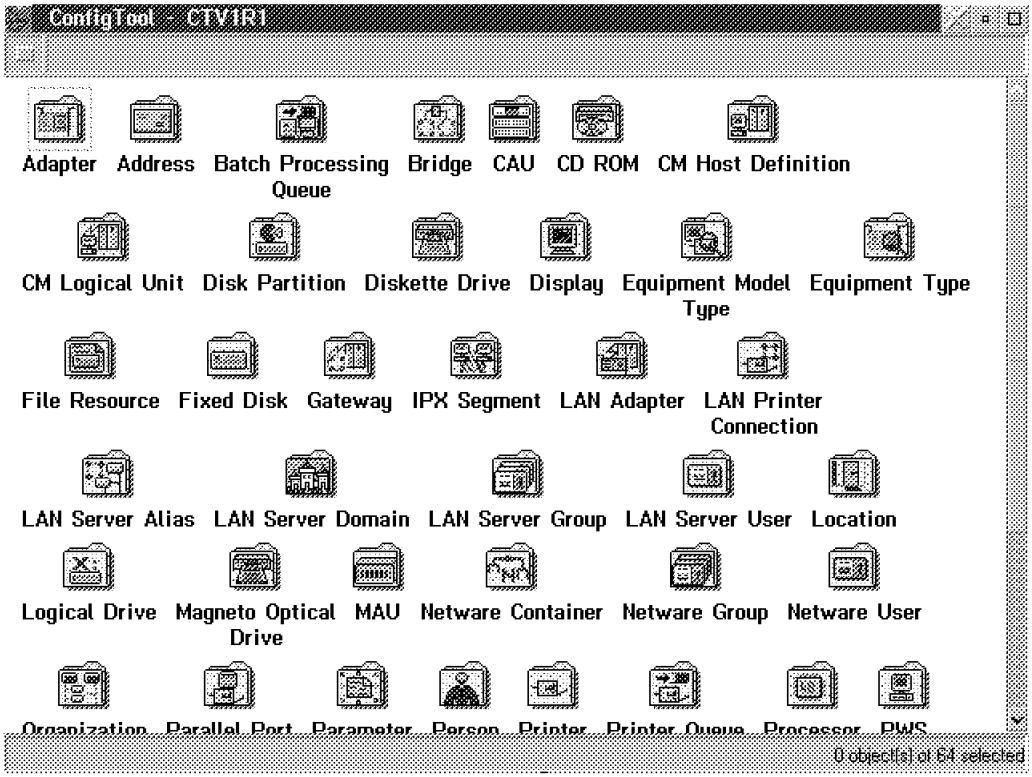


Figure 23. ConfigTool Main View Selection Window

The default queries provided on the main view selection window are for all objects in the database. If you double-click on one of these objects, you are shown the query result container with all objects of that class in the database.

Figure 24 shows an example of the window that is displayed to you after selecting the printer queue icon from the main ConfigTool window. This window displays every printer queue object currently defined in ConfigTool.

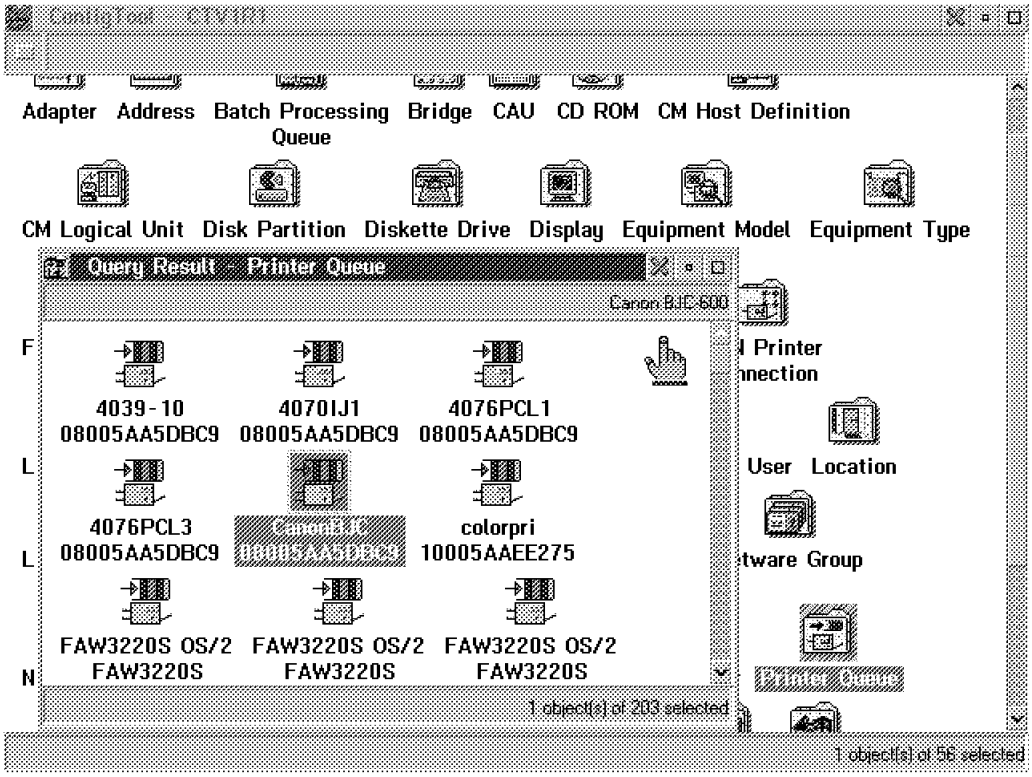


Figure 24. Result of Printer Queue Query

In the above window you see a field in the bottom right-hand corner that tells you how many objects the query result produced. At the top right of the window you can see a description of the object that is currently selected.

One very helpful feature of ConfigTool that is available from this main screen is the Database Progress Indicator. This is a control indicator located below the title bar icon that will blink red during database access.

The main components of the ConfigTool graphical user interface are containers and notebooks. As previously described, containers are used to show either Query Objects or real objects, and notebooks are used to present object details (attributes and relationships). Details within each of the notebooks can be manually changed and then saved to the database.

The graphical user interface is fully object oriented and provides drag and drop capabilities. The GUI provides a a common way of presenting objects for all supported classes. You can directly navigate from one object to a related one from the notebook, showing the details of the related object, without requiring you to close the notebook window and search for the related object. For example, if we open a workstation object, we would be shown a window similar to Figure 25 on page 65.

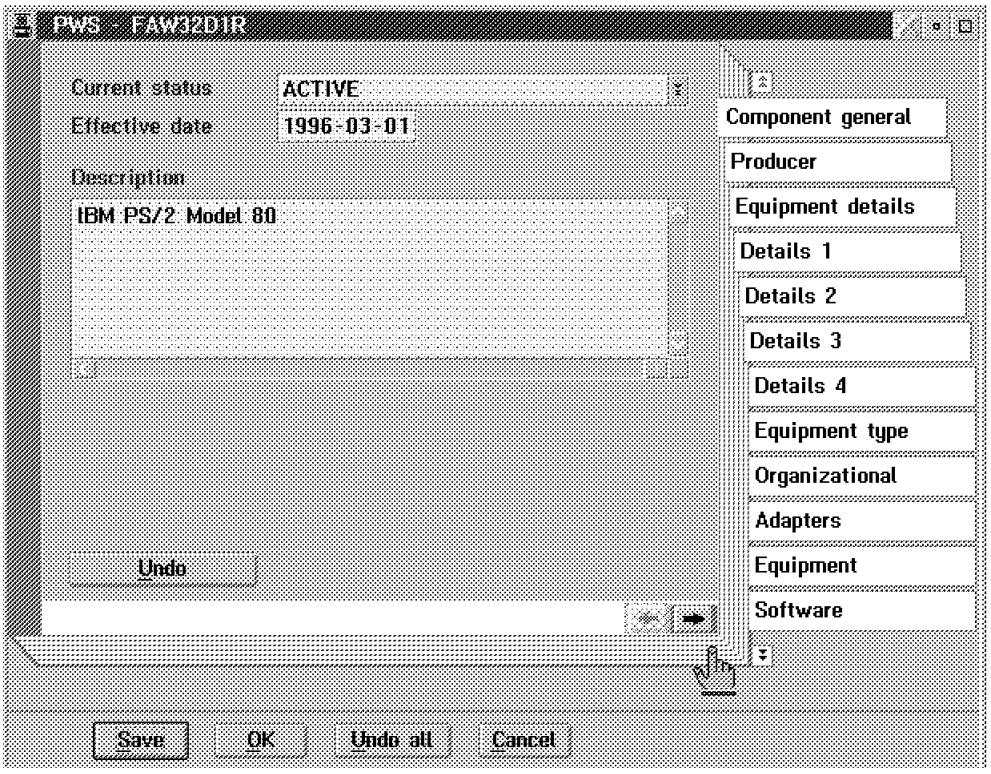


Figure 25. Notebook for Workstation

We can move through each of the pages in the notebook by selecting the arrows at the bottom of the notebook which will display additional pages that are available for the object type that has been selected.

From the above window, if we wanted to display a list of all the equipment attached to this workstation for example, we would select the equipment notebook tab which would display that notebook page, as shown in Figure 26 on page 66. Each of these pieces of equipment are linked (a relationship defined) to the workstation.

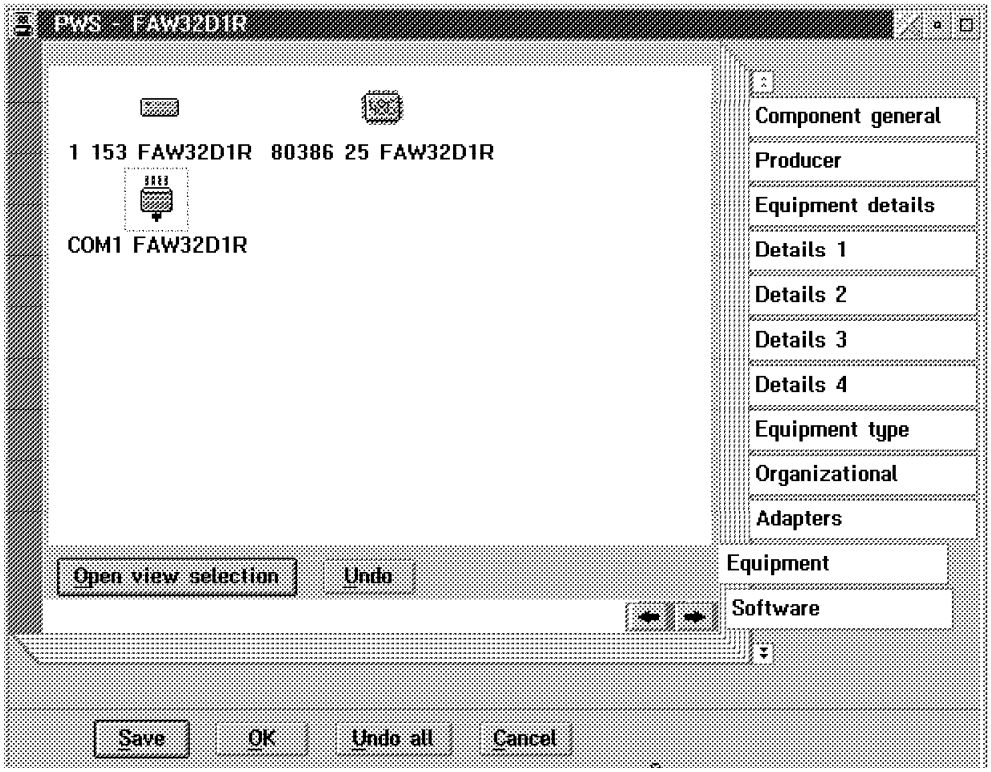


Figure 26. Equipment Attached to Workstation

To display details of any of the attached equipment, we would double-click on the object which would open its notebook.

We can also change characteristics or relationships defined for this workstation. For example, if we received a call from the owner of this workstation to advise that they had moved their location, we would move to the location page to update the workstation with the new location as shown in Figure 27 on page 67.

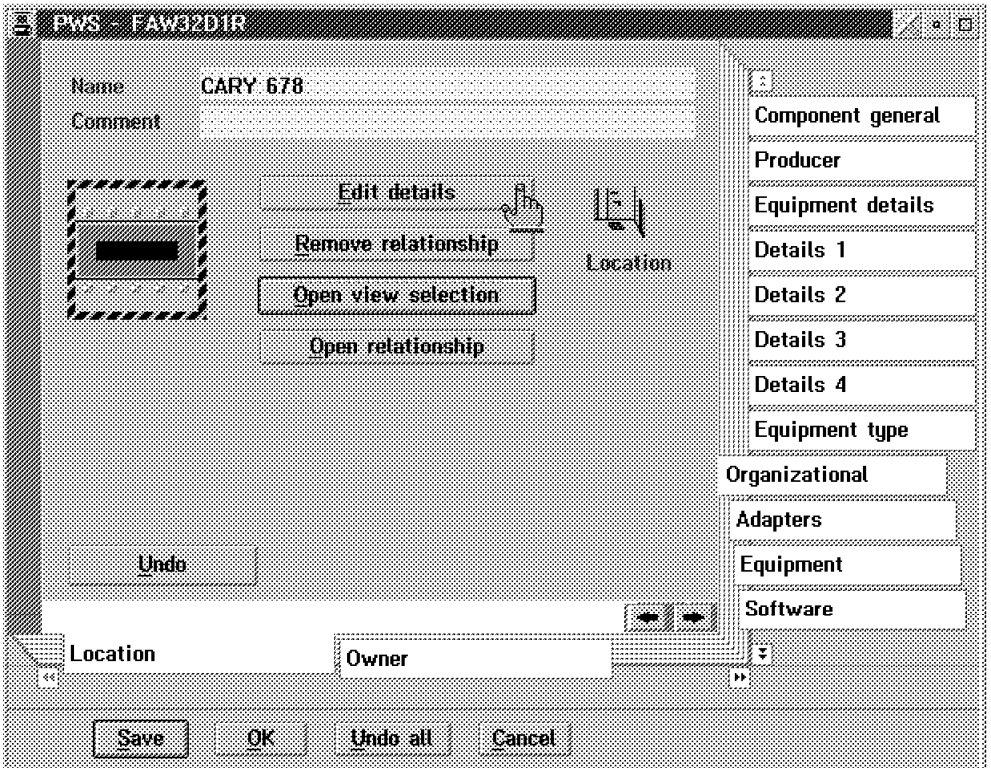


Figure 27. Select Edit to Open Notebook Page for Defined Location

From this page, we could select the **Edit** push button which will take us directly into the notebook for this location object as shown in Figure 28.

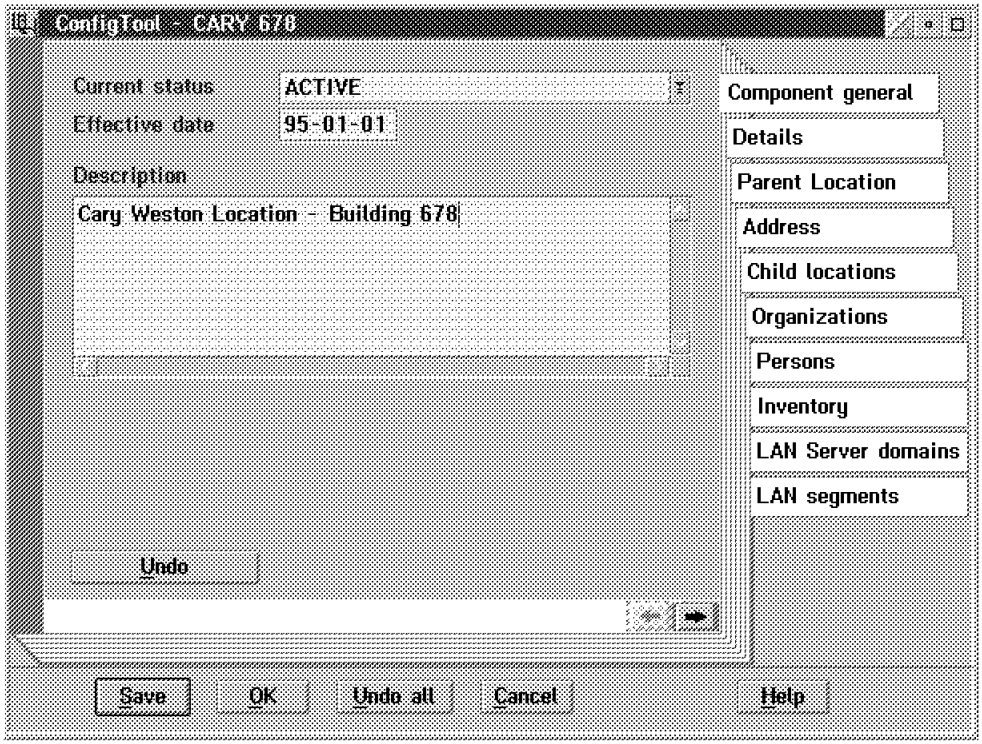


Figure 28. Location Notebook Page

We may now want to change the currently defined Cary location to the Research Triangle Park location. To do this we will return to the workstation notebook, and then select the **Open view selection** push button as shown in Figure 29 on page 68.

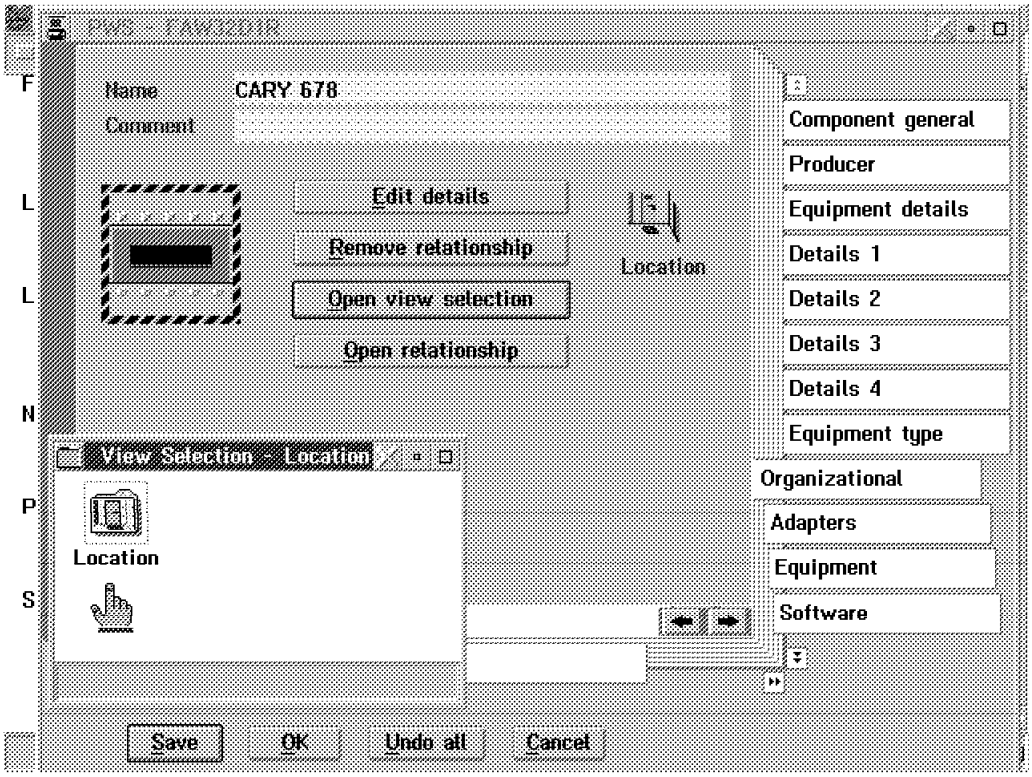


Figure 29. Open View Selection to Change Location Relationship

Choosing **Open view selection** opens a window that contains an unrestricted query of each object defined in the class you have selected and are allowed to drop to the notebook page. You could select this object to display all objects, or you can restrict the query further before selecting, for example, to restrict the query to only those locations defined to the state of North Carolina.

Figure 30 on page 69 shows each of the locations defined within the ConfigTool database.

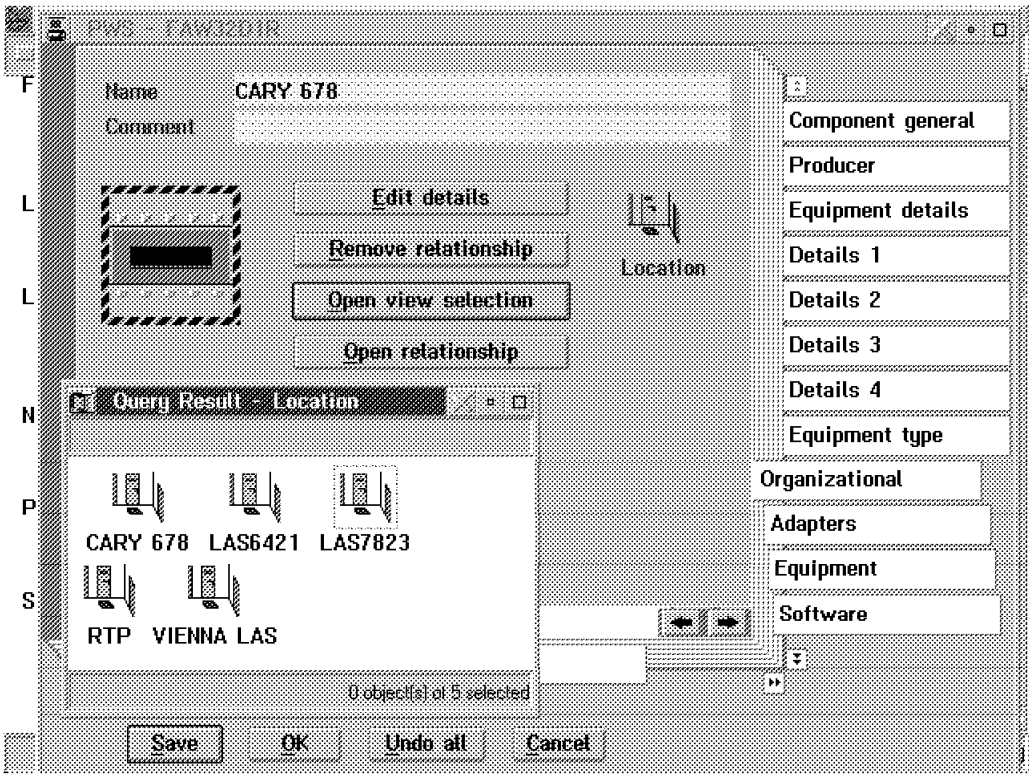


Figure 30. Open View Selection for Locations

You could also directly select one of these location objects to look at all the details of it. If we then wanted to change the location for the workstation we would simply drag the new location icon to the ″drop hole″ as shown in Figure 31 on page 70.

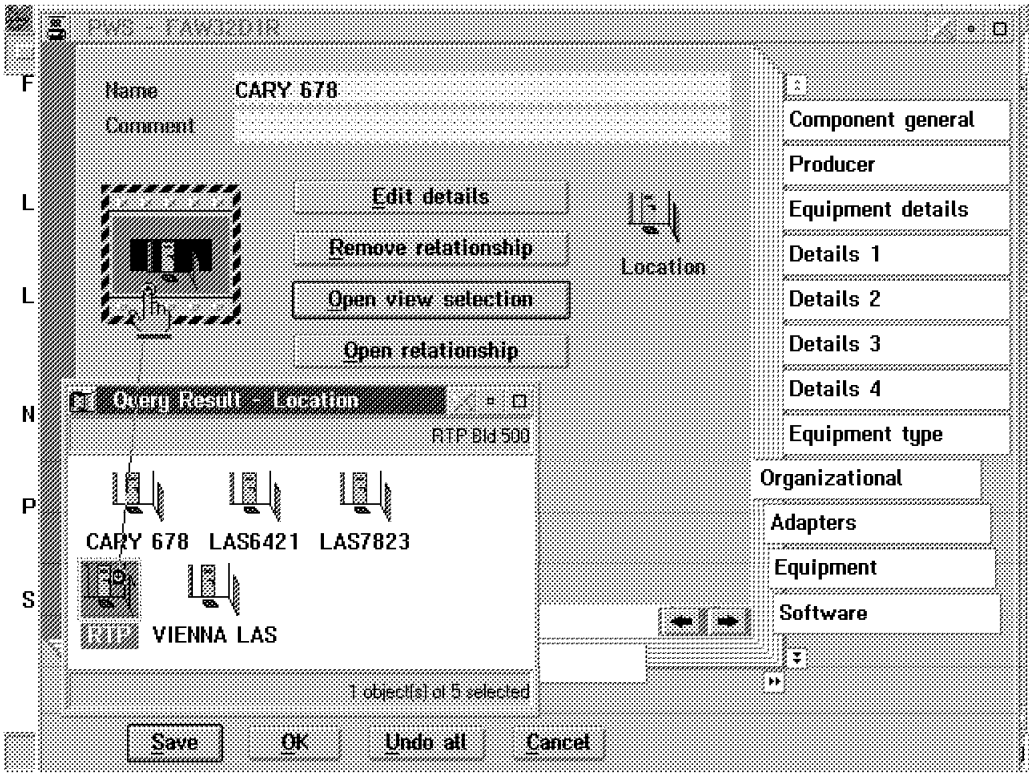


Figure 31. Changing the Location for the Workstation Using Drag Mechanism

Figure 32 shows the changed location relationship.

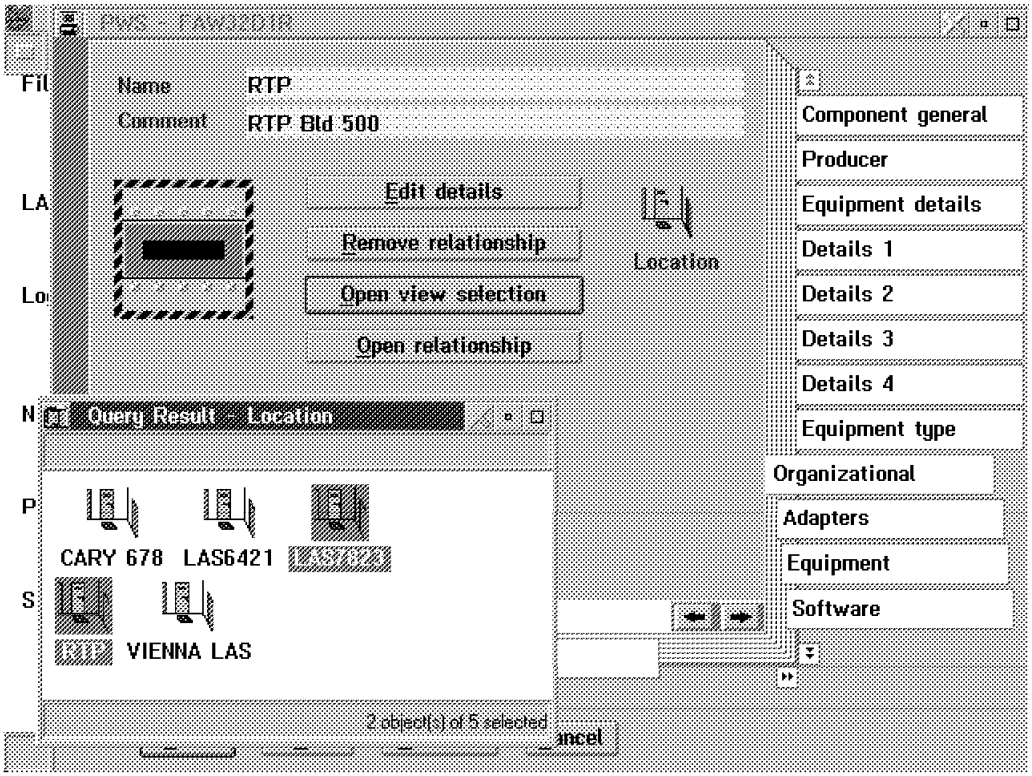


Figure 32. Changed Location

Understanding Relationships

The drop hole is used if only one relationship of this type can be established from/to the object, for example from a workstation to a location or contact person object. For those objects that can have multiple relationships, for example the relationship between a workstation and the software installed on it, a container page will be displayed. You can then drag multiple objects to this container page to define the relationship.

You can also manually create new objects of any type defined in ConfigTool, by selecting the appropriate icon, clicking with the right mouse button to open a menu, and then selecting **New** as shown in Figure 33.

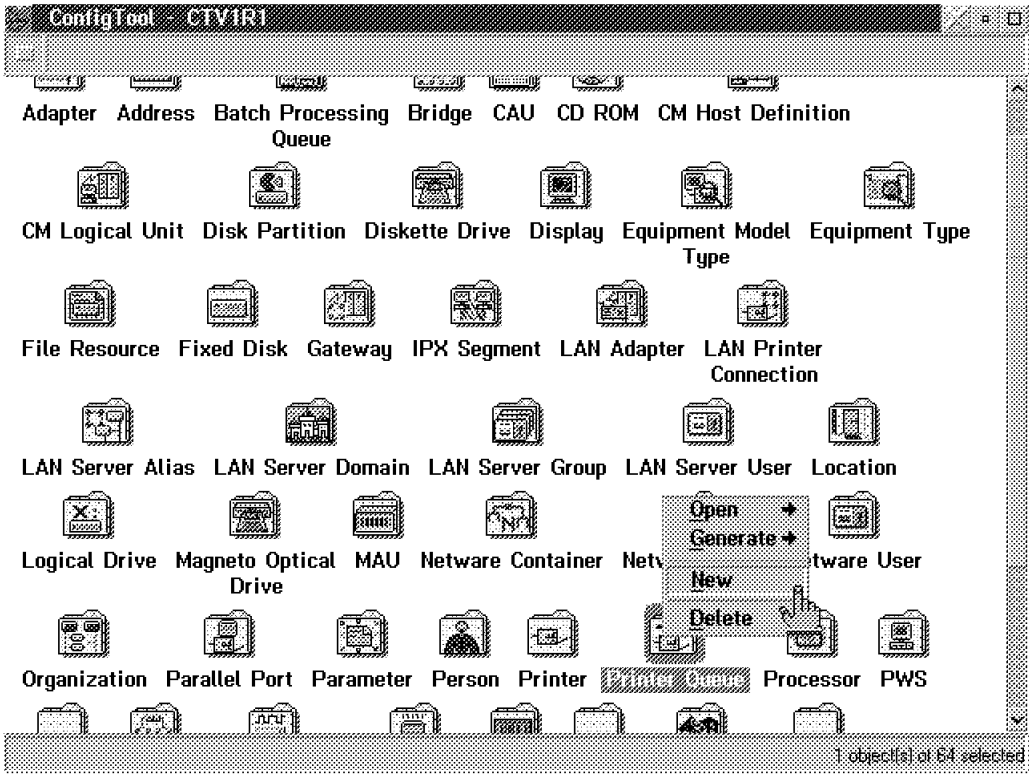


Figure 33. Creating a New Printer Queue Object

Figure 34 on page 72 shows the notebook that would then be displayed which will allow you to enter all relevant details of the object. In our example, the notebook contains attributes about a new printer queue.

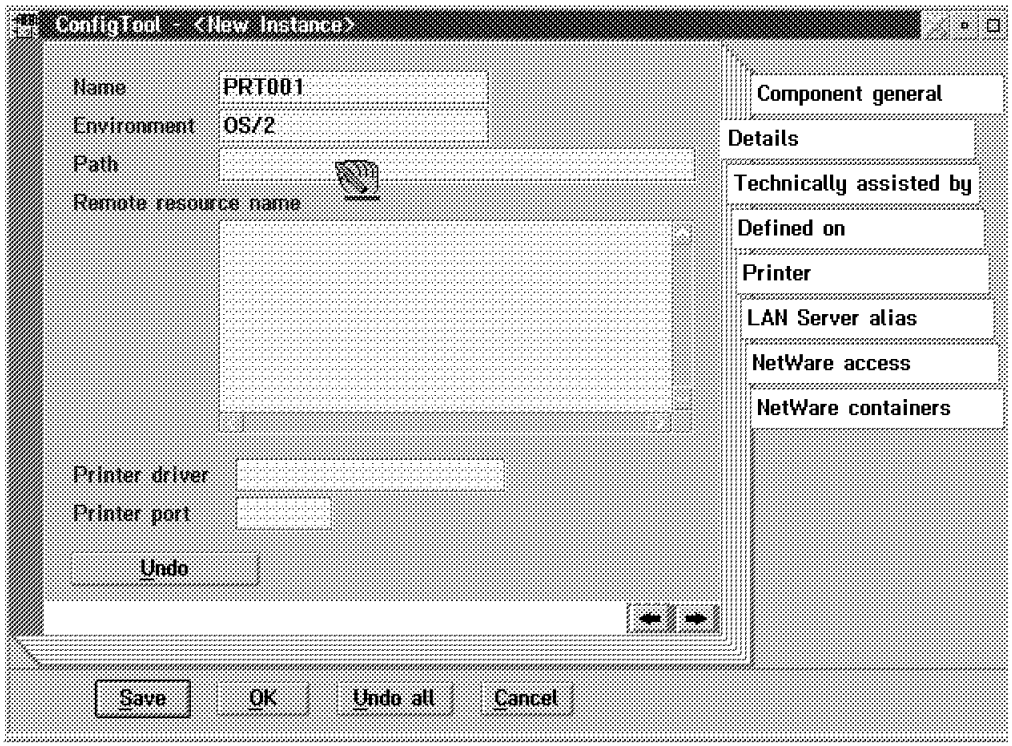


Figure 34. Printer Queue Notebook Pages

From this window we can directly input details into the notebook, and also use drag and drop mechanisms for defining relationships. Figure 35 on page 73 shows the notebook page you see when choosing **Technically assisted by**. On this notebook page, we have selected the **Open view selection** push button to display a container with each of the Person objects currently defined in ConfigTool. From this container we will drag the person who has responsibility for this new printer.

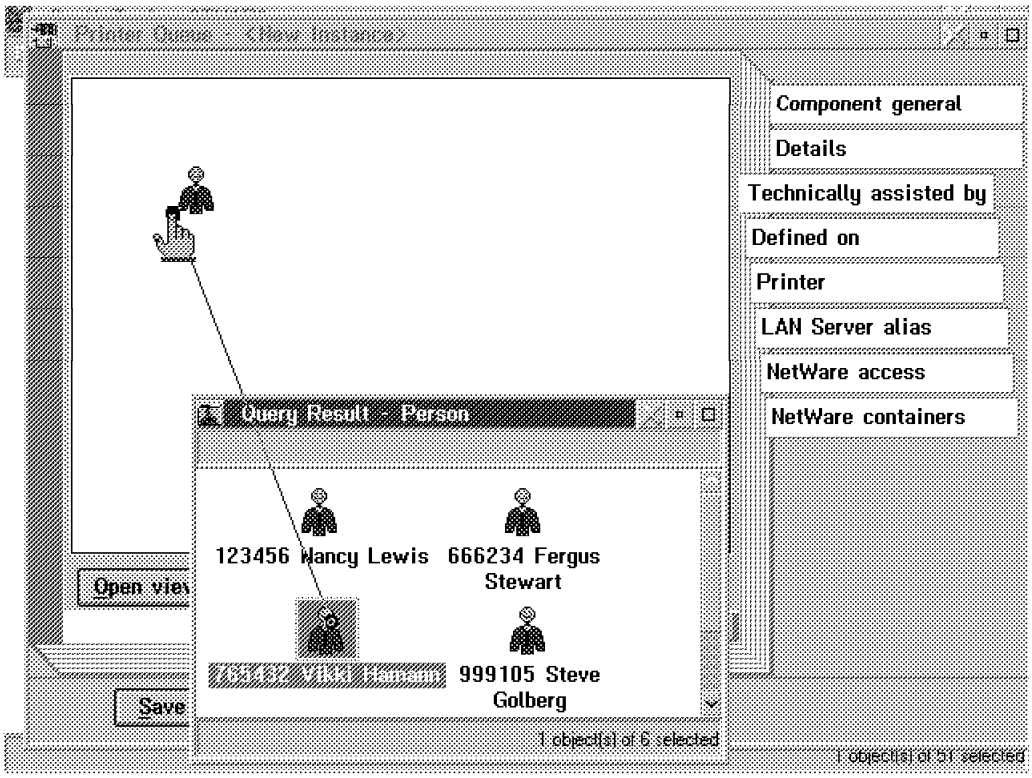


Figure 35. Dragging and Dropping Technical Contact For New Printer

By selecting the appropriate person, we can then drag that person object to the notebook page. By doing this action a relationship will then be established between the printer and the person object. The ″dropped″ person will now be linked to the printer object. Figure 36 on page 74 shows the new person object defined to the printer.

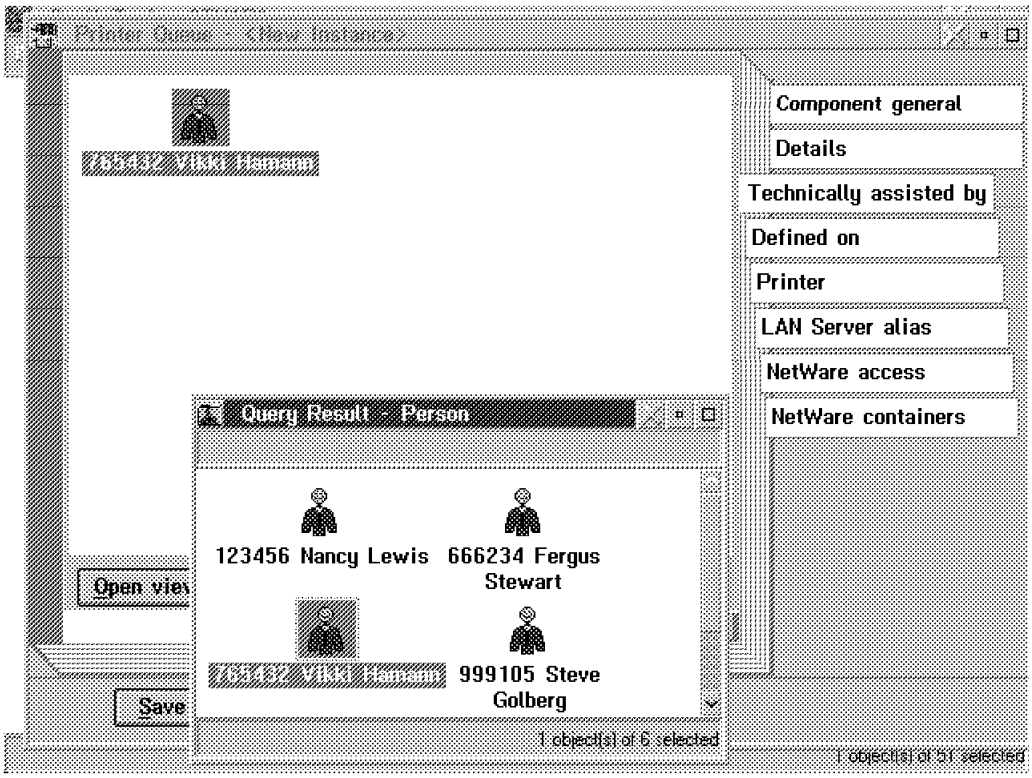


Figure 36. Technical Assistant Defined to Printer

5.5 The ConfigTool Query Editor

ConfigTool has a very easy-to-use query editor that does not require any SQL knowledge to use. The query editor allows you to quickly create customized queries and save them as objects in ConfigTool.

Queries are handled in the same way as other objects in ConfigTool. Queries are shown in view selection containers, and properties or attributes of the query are shown in notebooks. Query criteria can be combined by logical AND as well as OR capabilities. Again, OS/2 drag-and-drop facilities are used to define relationships to be used in the queries.

ConfigTool is shipped with predefined queries for every object class in the ConfigTool database. These template selections can be copied or moved between folders. You can define any number of additional queries in the main window or in user-created folders that can be nested. You can move, copy, create, delete, recreate and arrange the objects.

We have defined a folder called Raleigh Queries on the main window that can be selected to display each of our individual queries as shown in Figure 37 on page 75.

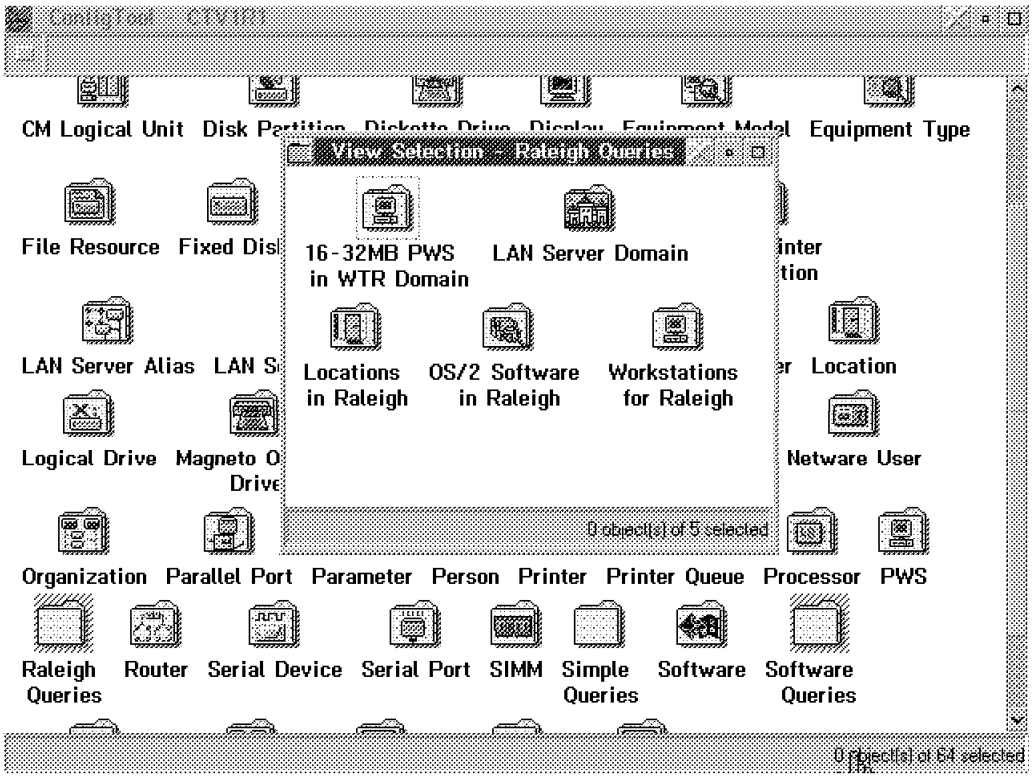


Figure 37. Queries for Raleigh Query Object Container

We then select the **OS/2 Software in Raleigh** Query Object to display the objects within it, as shown in Figure 38.

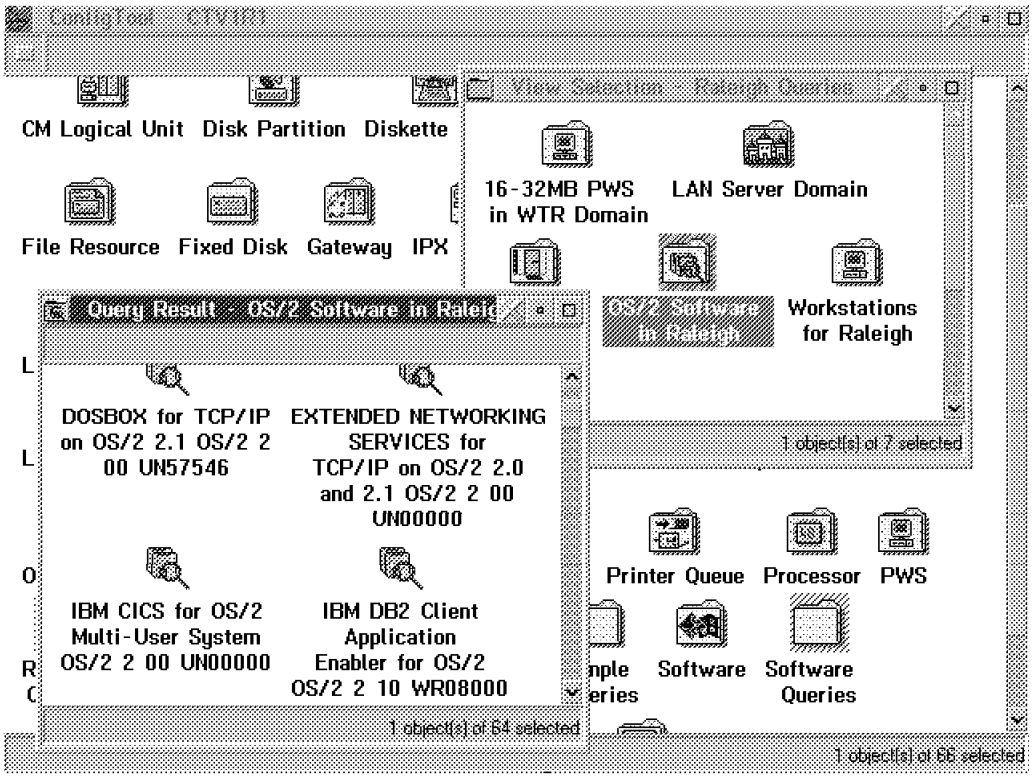


Figure 38. Result of Selecting OS/2 Software in Raleigh Query

We can then select any of these software objects to display their notebook with specific values and attributes of the software object.

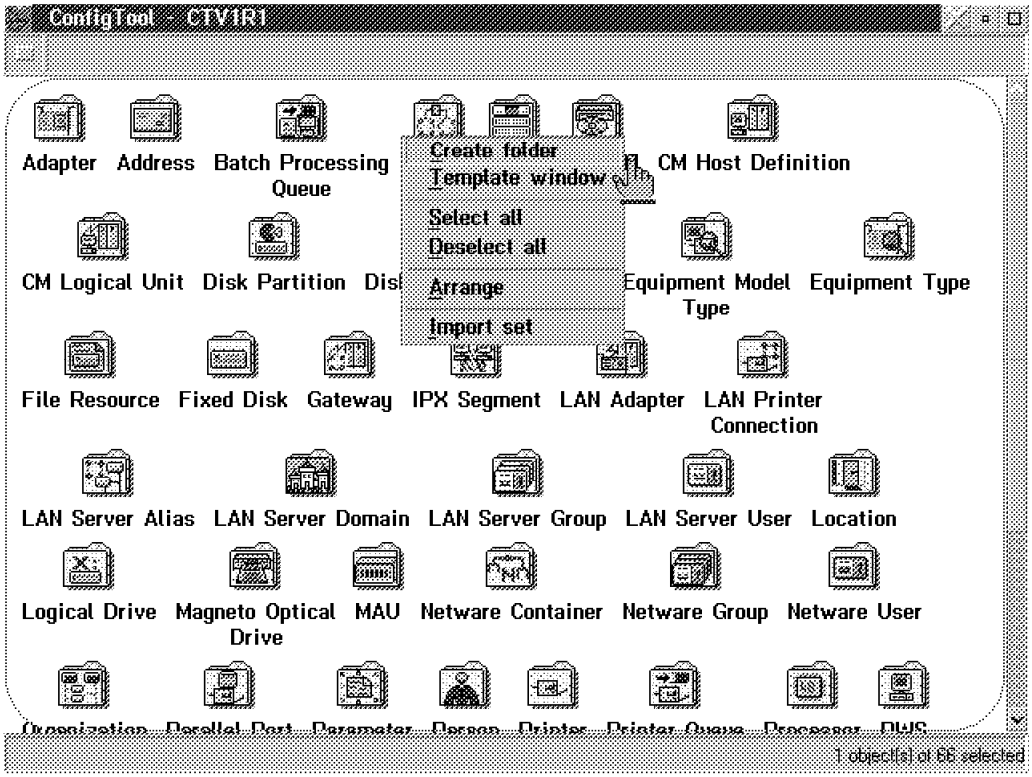
5.5.1 A Query Example

The following section steps you through a query example to show how you define values and relationships within a query.

We may find that we need to install a new business application on user workstations in a Raleigh department. The new application requires a minimum of 16 MB. The steps that we may go through could be:

1. First we want to find out each of the people that currently have workstations that are running between 16 - 32 MB of memory.
2. Next, we want to find out each of these workstations that are located in a specific LAN Server domain, in this example, the WTR LAN Server Domain in the Raleigh location.

The first step is to create a new folder on the main view selection window. This is done by clicking the right mouse button in the window (not over an object), and then selecting the **Create folder** option, as shown in Figure 39.



.

Figure 39. Creating a New Folder

We can then rename this folder to the text that we want. In this example, we renamed it to ″Software Upgrades″ by using the Alt key and mouse button one over the current text, as shown in Figure 40 on page 77.

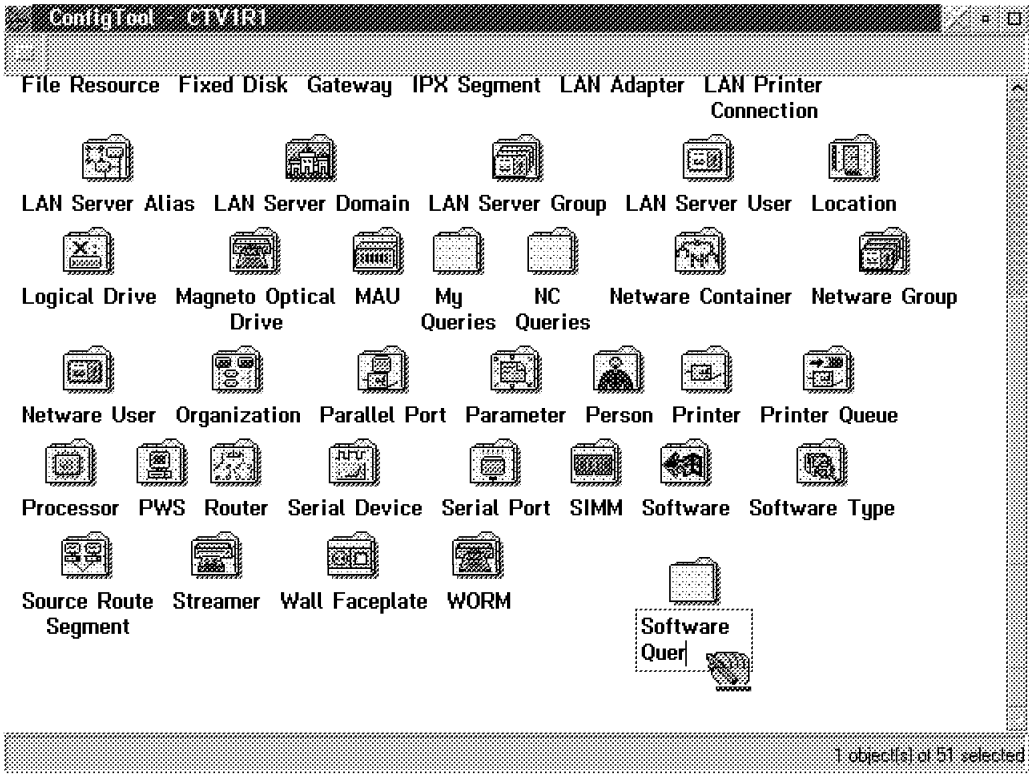


Figure 40. Renaming the Newly Created Folder

Next, we double-click on this new workstation Query Object, which takes us to an empty screen where we can begin creating our query. By clicking on the right mouse button in this window, we open up a menu that allows us to select the **Template window** option as shown in Figure 41 on page 78.

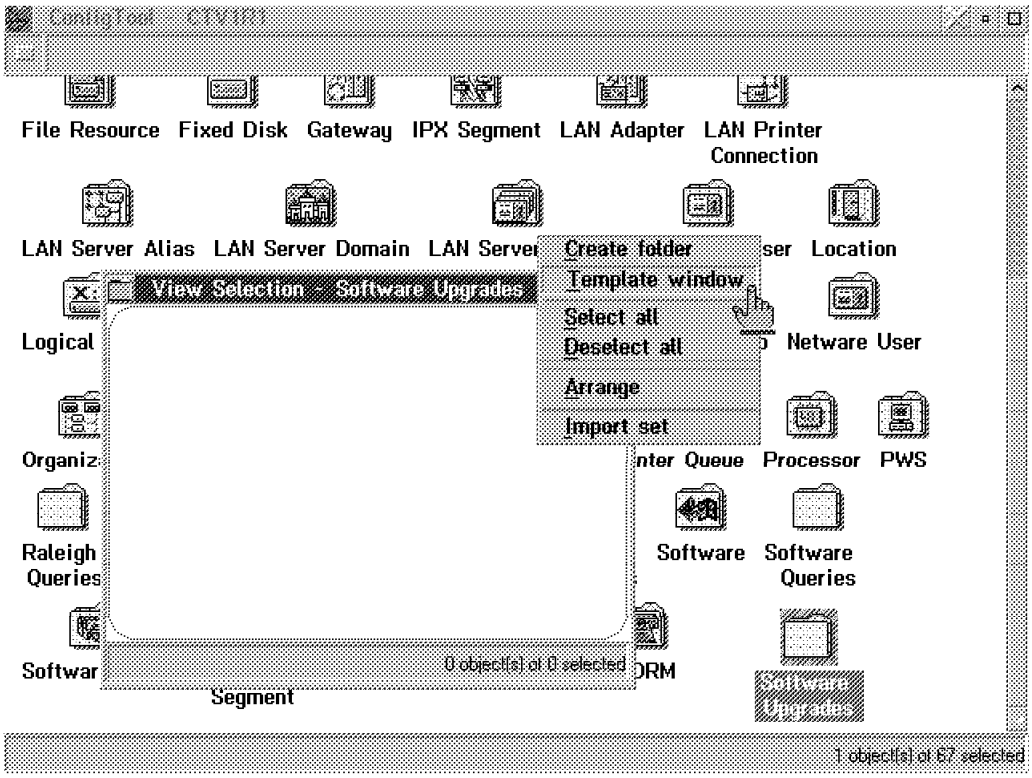


Figure 41. Selecting Template Window to Create Our New Queries

A new Query Object can be copied from an existing query or from a template. Figure 42 on page 79 shows the template window where we can drag the template objects to our Software Upgrade queries folder. To create our query we need to drag both a PWS template and a LAN Server Domain template.

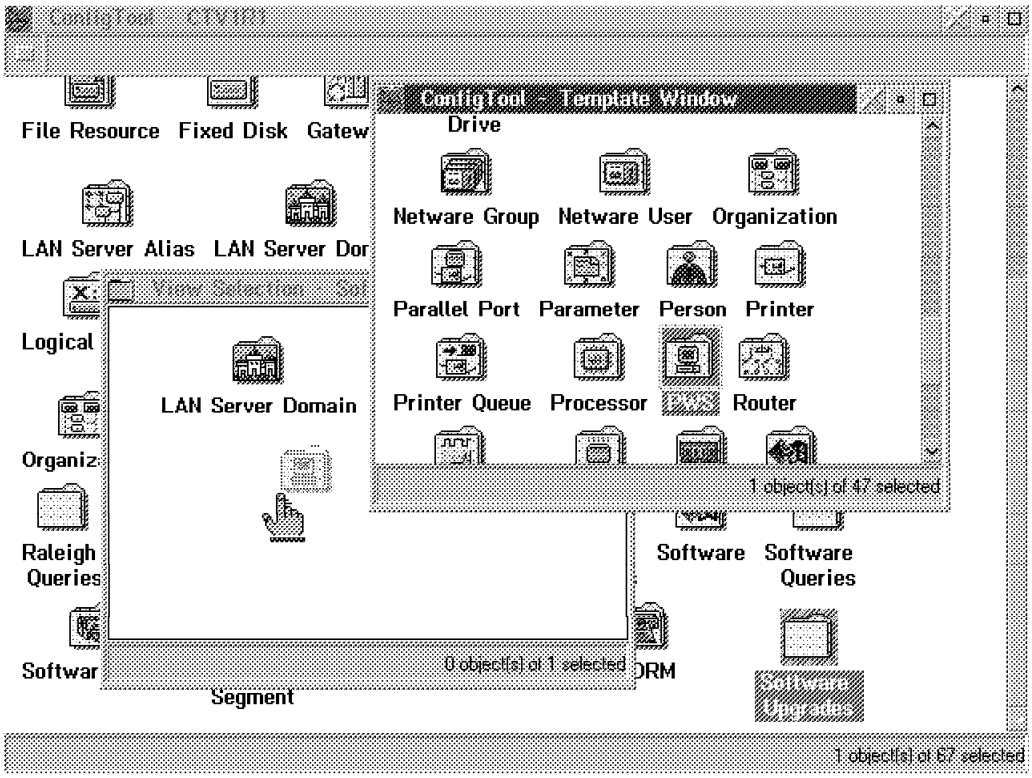


Figure 42. Dragging Template Query to our Workstations Queries Folder

We can once again rename the template query to the name we want. In this example we name it ″16-32MB PWS in WTR Domain″.

Next, we need to define our query criteria, which is done by opening the settings notebook for our Query Object. This is done by selecting the Query Object, then the right mouse button which will pop up a menu, and then choosing **Settings** as shown in Figure 43 on page 80.

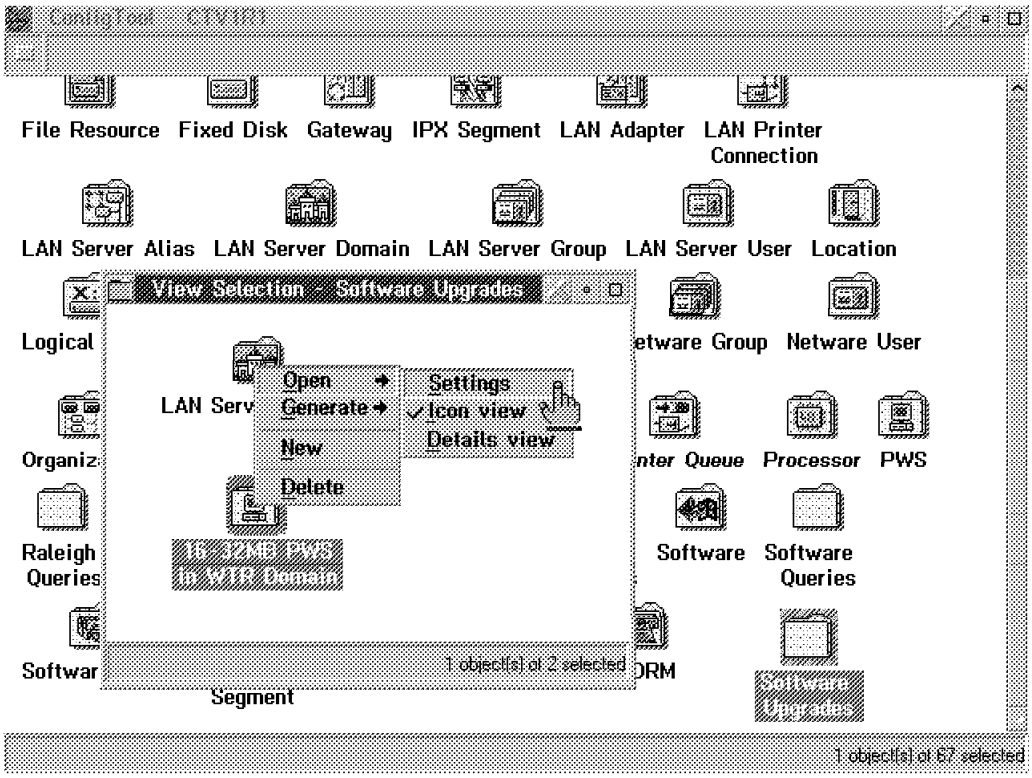


Figure 43. Opening Settings for Query

Figure 44 on page 81 shows the Query Editor settings window. This is where we can define the scope of the actual query we want to create. For our example, we defined the query so that only the Total Memory of a workstation is searched for.

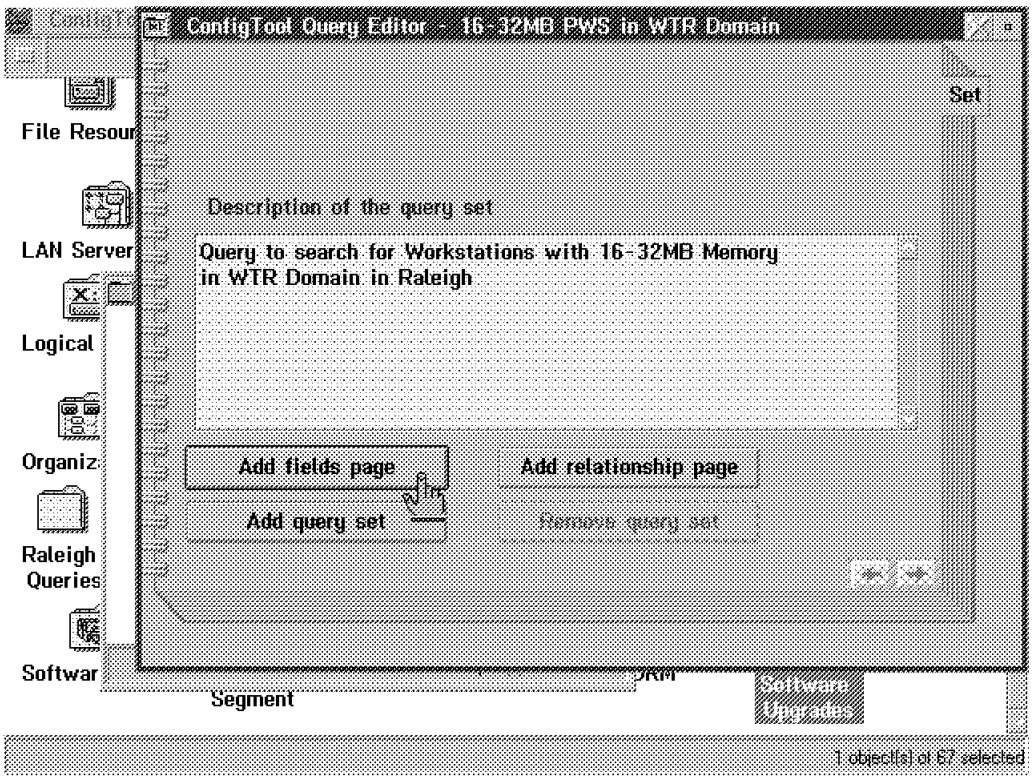


Figure 44. The Query Editor Settings

After entering a description for our query, we select the **Add field page** option. This allows us to define our query for the 16 to 32 MB definition. Figure 45 shows the Query Definition window that is displayed.

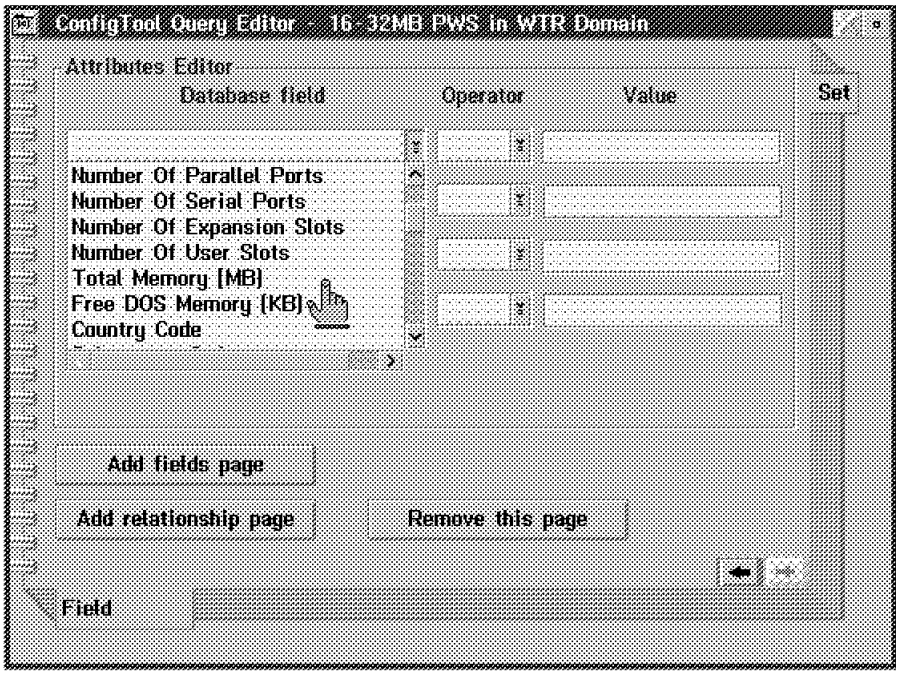


Figure 45. The Query Definition Window

Each settings window will have a pull-down menu option that enables you to select the criteria for the query definition. The window above shows the pull-down menu with the different fields that are available to be queried for a Workstation object. We will select the Total memory field.

The next step is to define the Operator field which contains the operators (=, <, >, etc.) that will be used with the query. In our example, we want to define two operators. Queries that have 16 MB or greater, and then equal to or less than 32 MB. The Operator pull-down menu is shown in Figure 46.

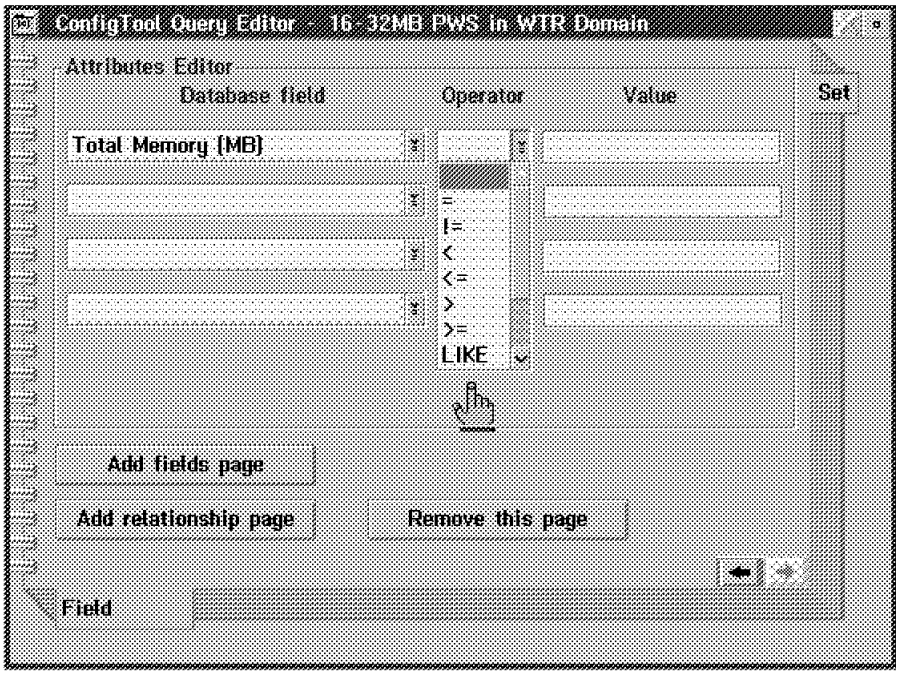


Figure 46. The Operator Field

Operators and Sets:

Queries are restricted by combining terms (for example "total memory >=16") that are specified on one or more field pages using a logical AND within a set of terms. The logical OR can be expressed by combining sets. Within sets all terms are always combined by logical AND. All attribute and relationship criteria specified in one set are combined by AND. All different SETs are combined by OR. Therefore, you need two sets to get an OR.

Finally, we define the memory values for our query which is for 16 MB. Figure 47 on page 83 shows the completed field for the 16 MB definition.

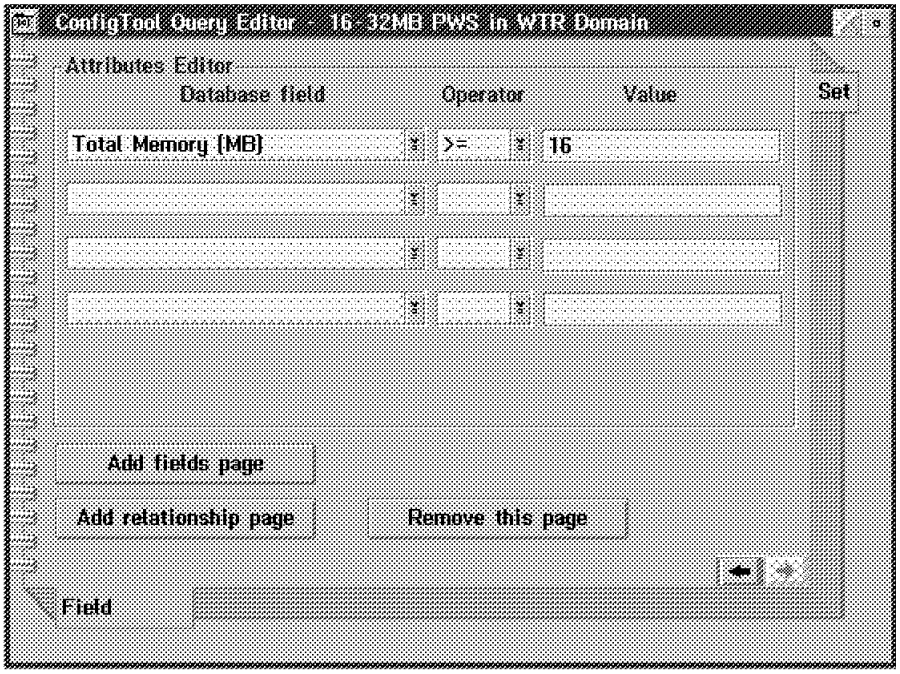


Figure 47. Query Definition for Memory Installed on Workstations

We next define the 32 MB value to our query. Figure 48 shows our completed fields definition page.

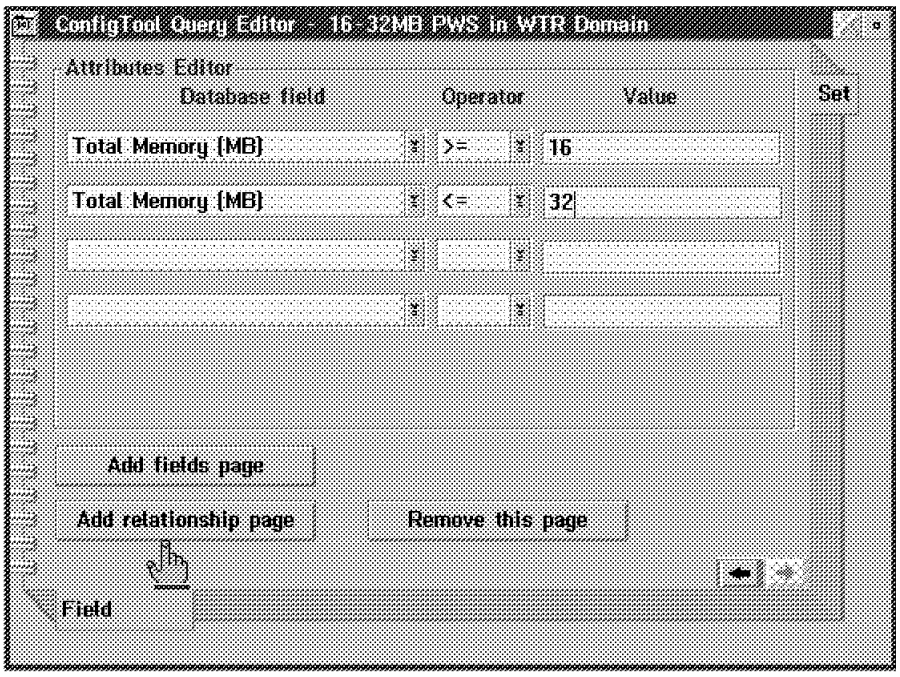


Figure 48. Completed Query Definition Fields Page

If we wanted to check first, for all workstations with from 16 - 32 MB of memory we simply close our query settings pages, return to the Software Upgrades folder and select our query object. Figure 49 on page 84 shows the result of our current query.

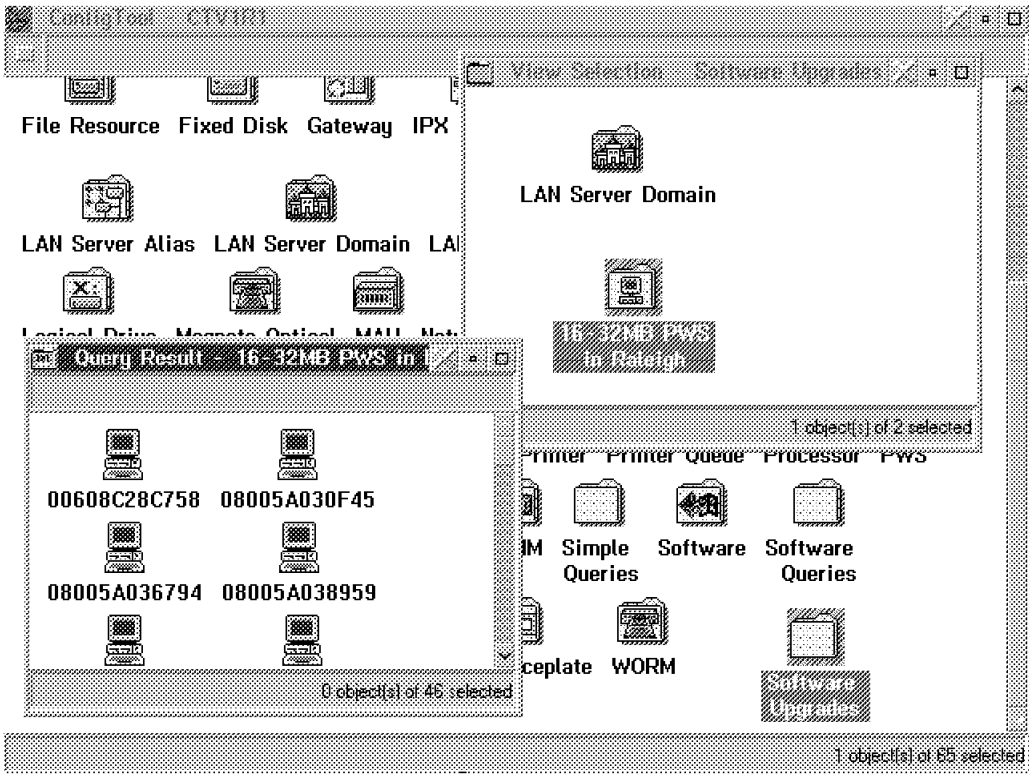


Figure 49. Results of Query for 16-32 MB Memory Workstations

We could also define specific relationships to our query. In our example we next limit our query to only those workstations belonging in the WTRDOM IBM LAN Server domain. This can be done through the Add relations page option.

We first limit our LAN Server Query Object to the WTRDOM domain. This is shown in Figure 50 on page 85.

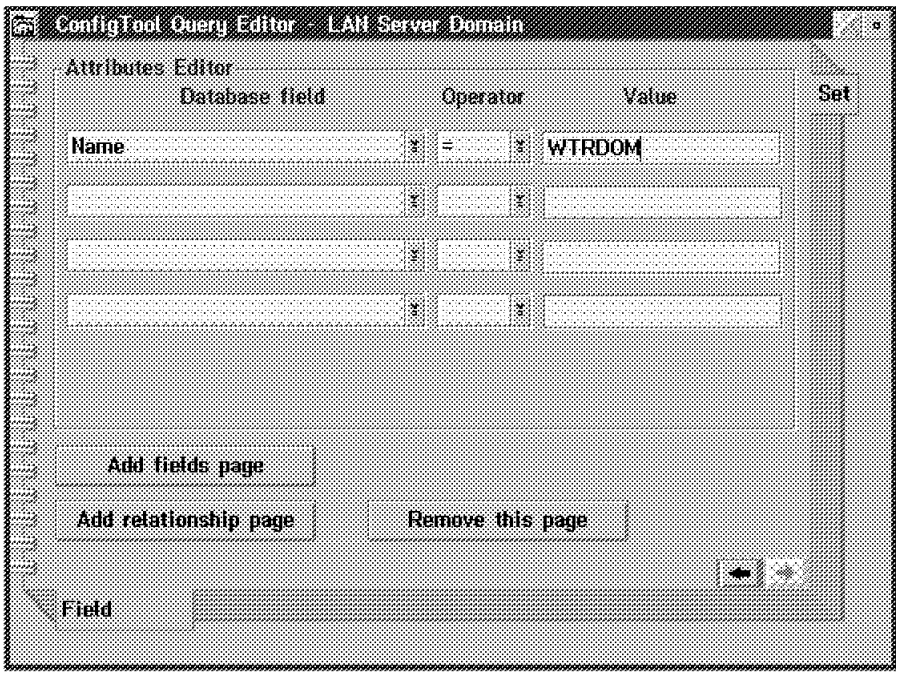


Figure 50. Defining Our LAN Server Query

Figure 51 shows us now dragging our LAN Server domain Query Object to the ″drop hole″ to add the relationship to the query we have just defined. This means that our query will search for all workstations with from 16 to 32 MB of memory that are located in the WTRDOM LAN Server domain.

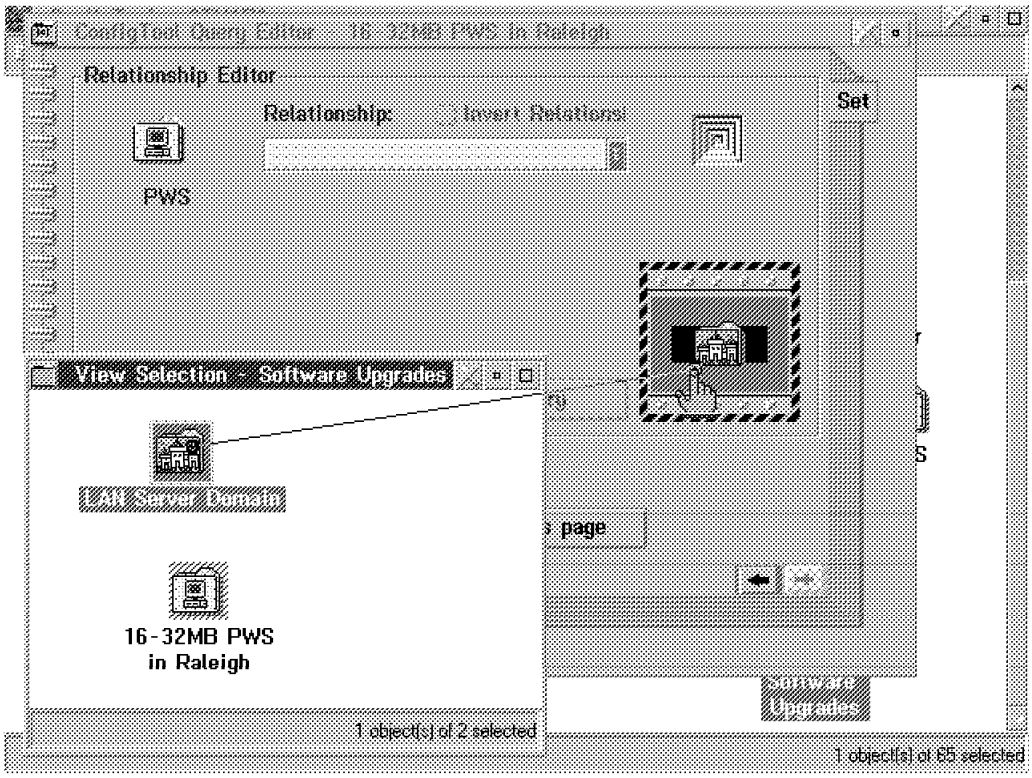


Figure 51. Adding a Relationship to this Query

Figure 52 on page 86 shows the relationship added to our query.

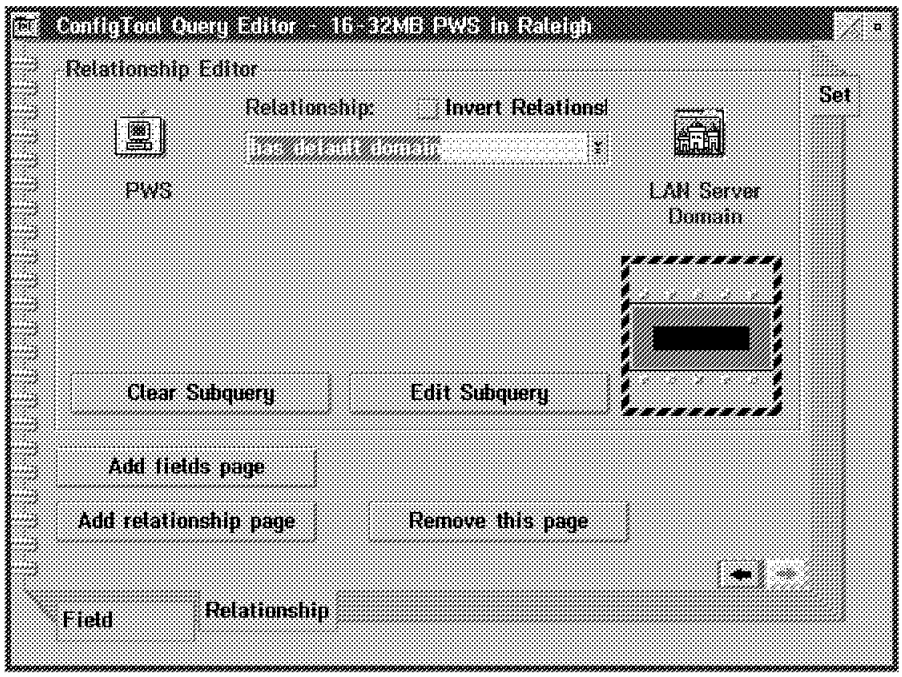


Figure 52. Relationship to LAN Server Domain Added to Query

We can now close our query notebook pages, and select the Query Object to run. Figure 53 shows the results of our query.

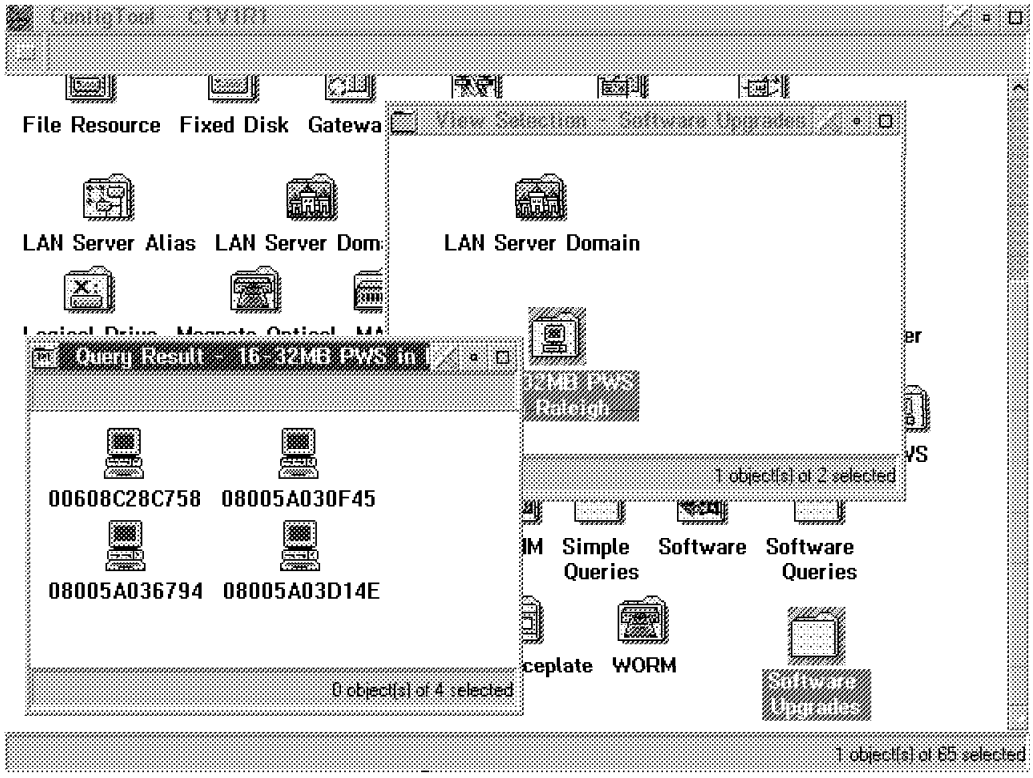


Figure 53. Result of Our Query

5.5.2 Export and Import Sets

The Export and Import set functions in ConfigTool allow you to customize folders containing Query Objects, and then to export and import these sets to other ConfigTool workstations.

For example, we have defined a Query Object container (folder) called Queries for Raleigh. We would like these queries to be available on several ConfigTool workstations without redoing the queries on each of the workstations. So, we select our Query Object container, click the right mouse button, and then select the **Export Set** option, as shown in Figure 54.

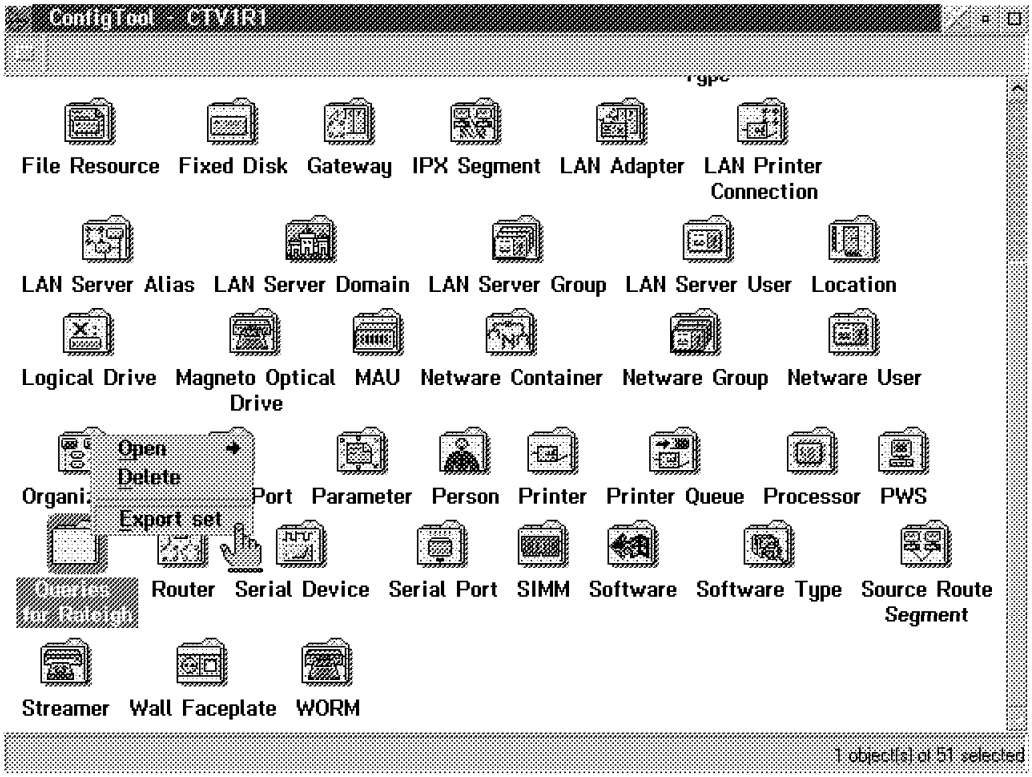


Figure 54. Exporting the Queries for Raleigh Folder

Upon selection, an OS/2 file dialog box will be displayed, where we can enter the file name to export the query definition set as. In our example shown in Figure 55 on page 88, our set is called RALEIGH.SET. We then select **OK** to execute the export. All the objects in this folder, including subfolders, are exported to this single file.

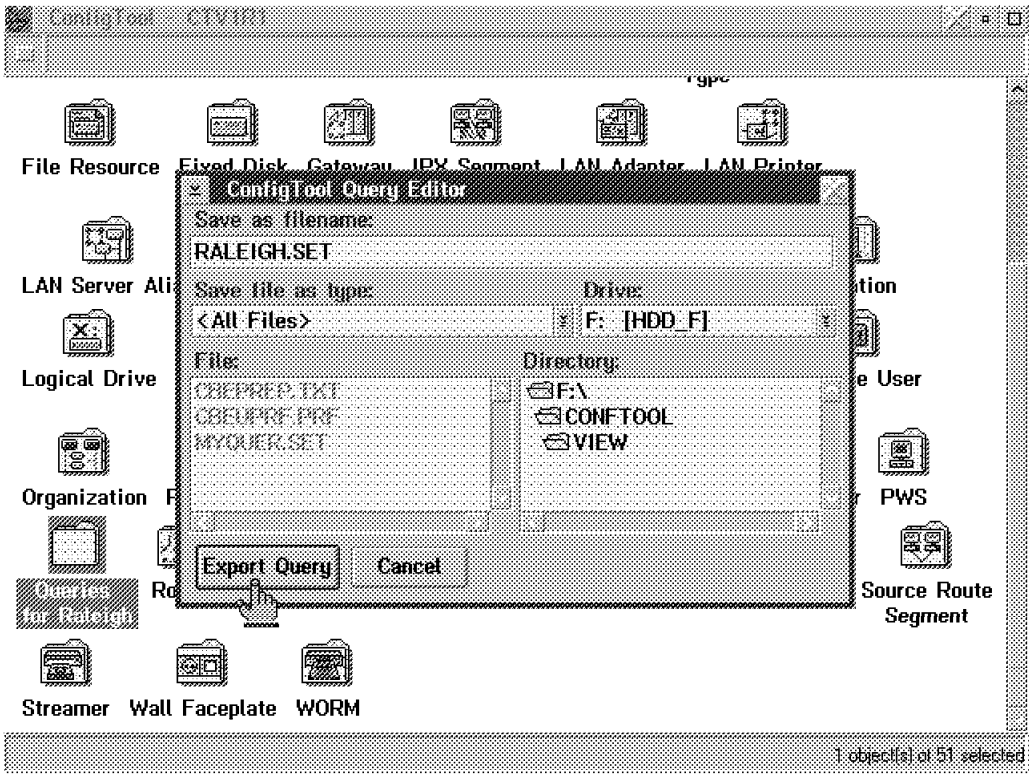


Figure 55. Executing the Export of Our Raleigh.Set

Figure 56 shows the Import set function available by pulling up the menu with the right mouse button.

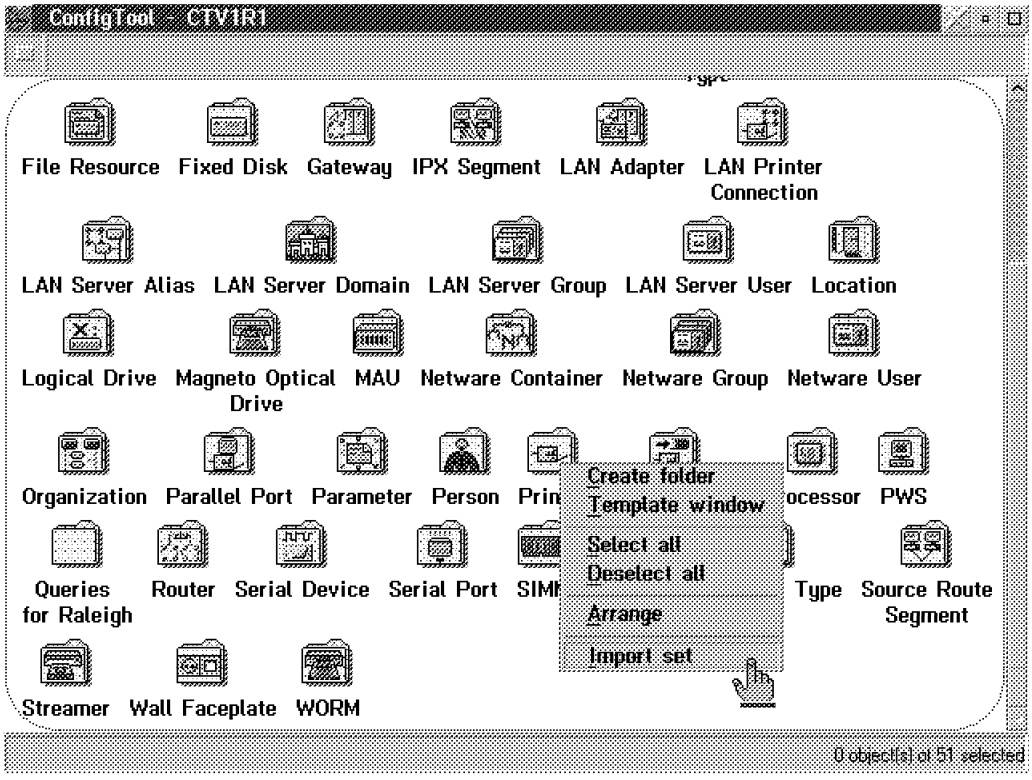


Figure 56. Selecting the Import Set Function from Menu

Figure 57 on page 89 shows the dialog that is presented on selecting the **Import Set** function, and shows the Raleigh.Set that we just create that we can select to import. This set can set copied to multiple workstations, and then imported through this function.

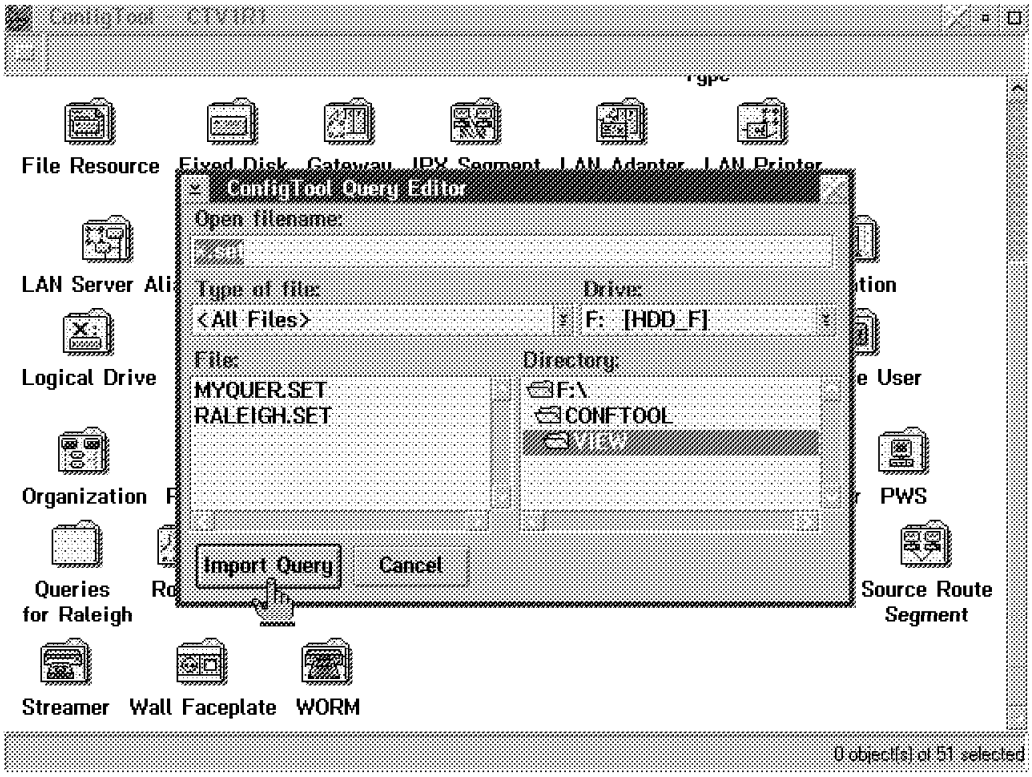


Figure 57. Import Set Dialog with Our Raleigh.Set

These functions allow you to easily save and/or share your query definition sets with other users or ConfigTool installations.

Note: The ConfigTool View Selection folder is automatically imported/exported as CBEPVIEW.PRF during startup/shutdown of ConfigTool.

5.5.3 Getting Further Information

This section has stepped you through some simple examples of using the ConfigTool user interface and some of the functions that are available from it. Please refer to Chapter 6, “Getting Started with ConfigTool” on page 101 for information on installation and extraction processes, and to the *ConfigTool Reference Guide* for further information on the graphical user interface and the query editor.

5.6 Reporting Features

One very important feature when looking at configuration management products is the ability to provide reporting mechanisms. Most organizations will run regular reports for each of the management functions and tasks such as problem and changes, and of course for configuration management.

You can also either customize the predefined queries to your specific needs or you can create more complex queries using products such as DB2/2 or Visualizer Flight for DB2 which is available in the OS/2 Warp environment.

ConfigTool provides two functions for requesting reports:

- The GUI ConfigTool reporting interface which provides predefined reports.
- Pre-defined Query Manager (QM) queries to produce reports. Specific queries are provided for the different groups of objects in the database. These queries can be changed and extended by you. This option actually takes you into DB2/2 Query Manager.

Both of the above functions can be selected from the main icon view as shown in Figure 58.

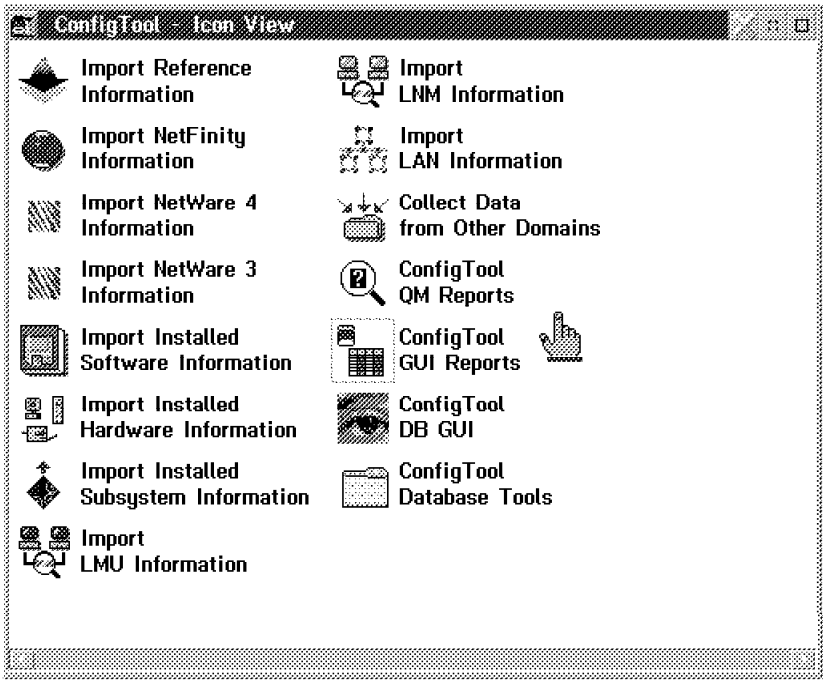


Figure 58. Selecting ConfigTool Reporting Functions

Figure 59 on page 91 shows the ConfigTool-supplied reports that are available. It was opened by double-clicking on the **ConfigTool Reports** icon shown in the previous figure. Different reports are provided for the different query groups listed on the left-hand side of the following window.

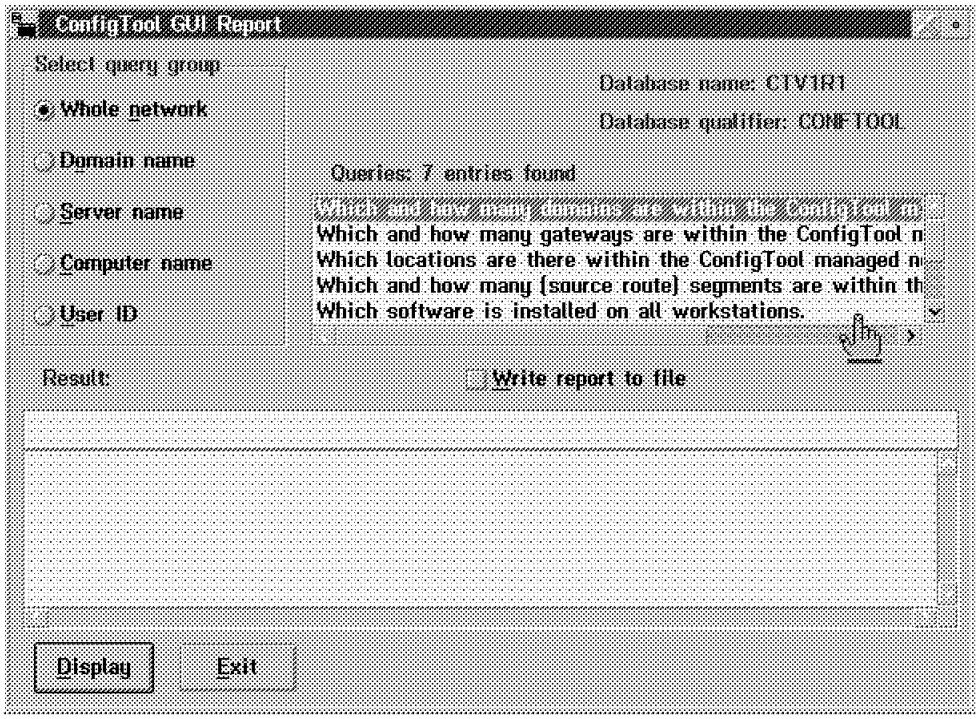


Figure 59. ConfigTool Supplied Reports

Figure 60 shows the results of selecting the query to display the types of software installed on the workstations defined.

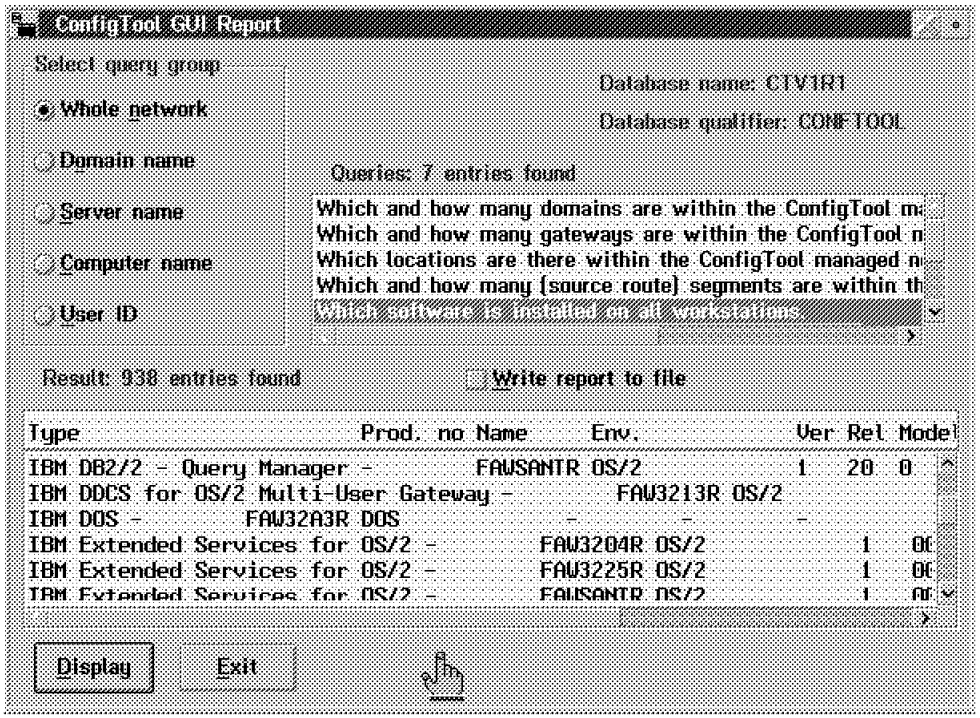


Figure 60. Result of GUI Report

Figure 61 on page 92 shows a list of the supplied QM reports. Each of these types of reports can be selected, which will then take you to a list of the

individual reports. Figure 62 on page 92 shows you a list of the predefined types of reports which are available.

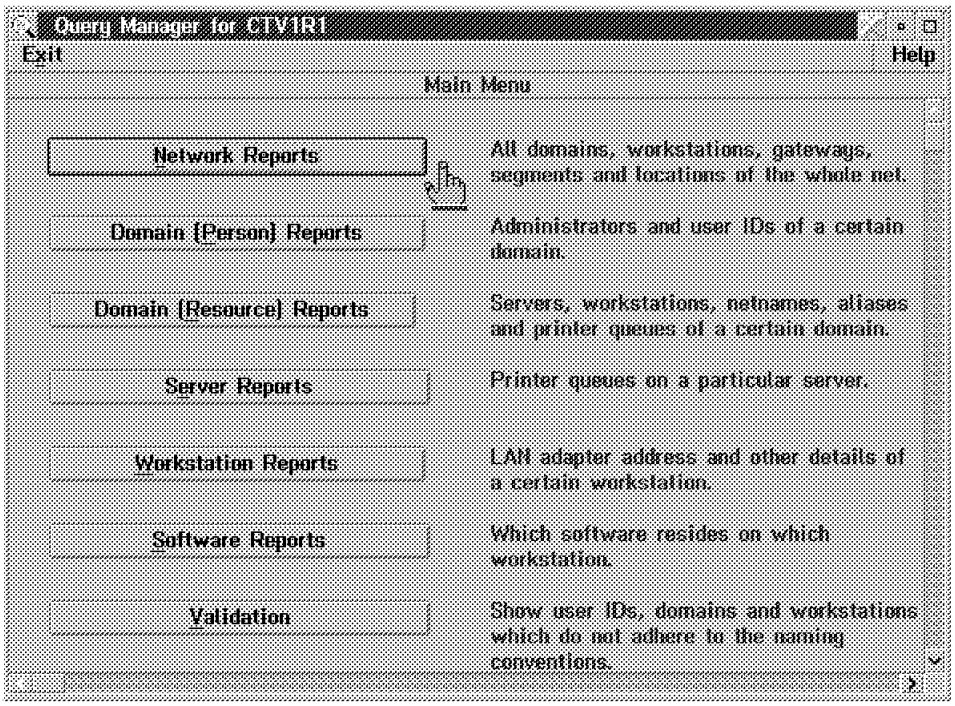


Figure 61. Pre-Defined Query Manager Reports in ConfigTool

Figure 62 shows you the individual network reports which are available.

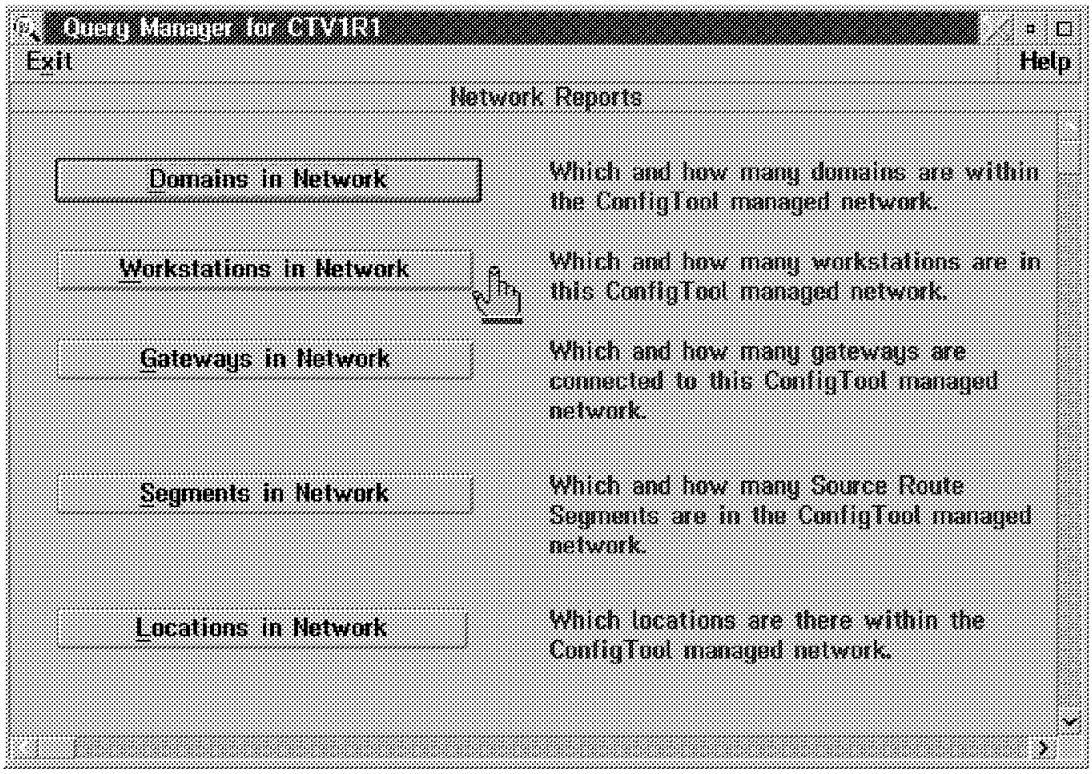


Figure 62. Pre-Defined Network Reports

Figure 63 on page 93 shows the output from selecting the **Workstations in Network** query.

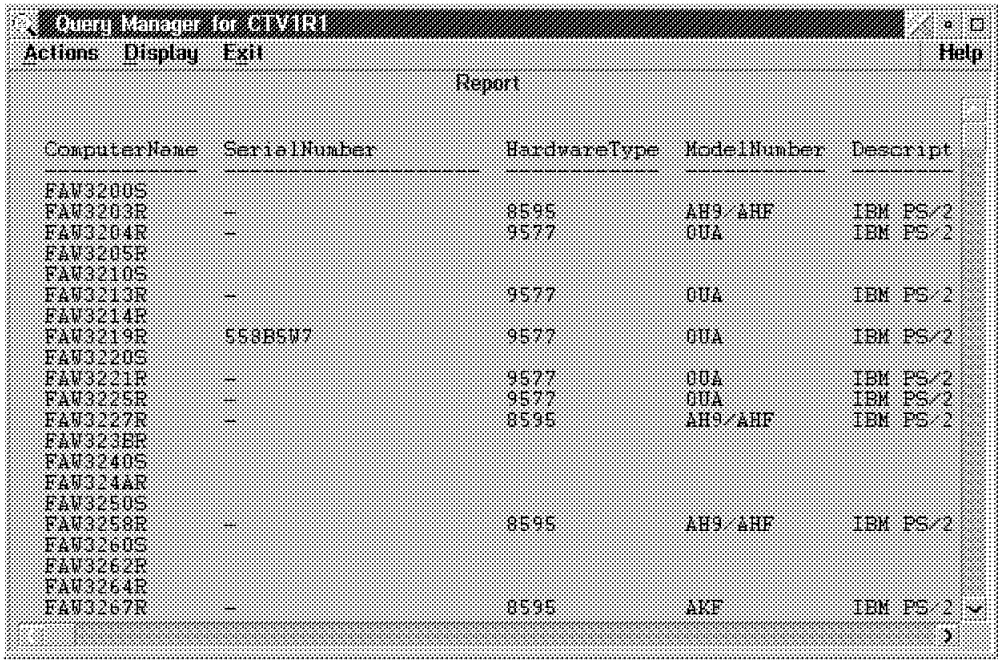


Figure 63. Workstations in Network Report

Another very helpful facility available within ConfigTool is the Generate-SQL Query function which is available in the ConfigTool GUI.

5.6.1 Generate SQL Query Function

The Generate SQL query function is available to be used for any Query Object defined in ConfigTool. This example steps you through a very simple example. However, it shows you that the process is easy to use and is particularly helpful for those people who do not have in-depth SQL knowledge. You could create much more complex Query Objects using ConfigTool, and then generate your SQL queries to run regular reports in DB2/2 on your configuration or organizational data.

Figure 64 on page 94 shows the main ConfigTool query view where we have selected the workstation Query Object, and then with the right mouse button opened a menu where we select the **Generate, SQL query** option.

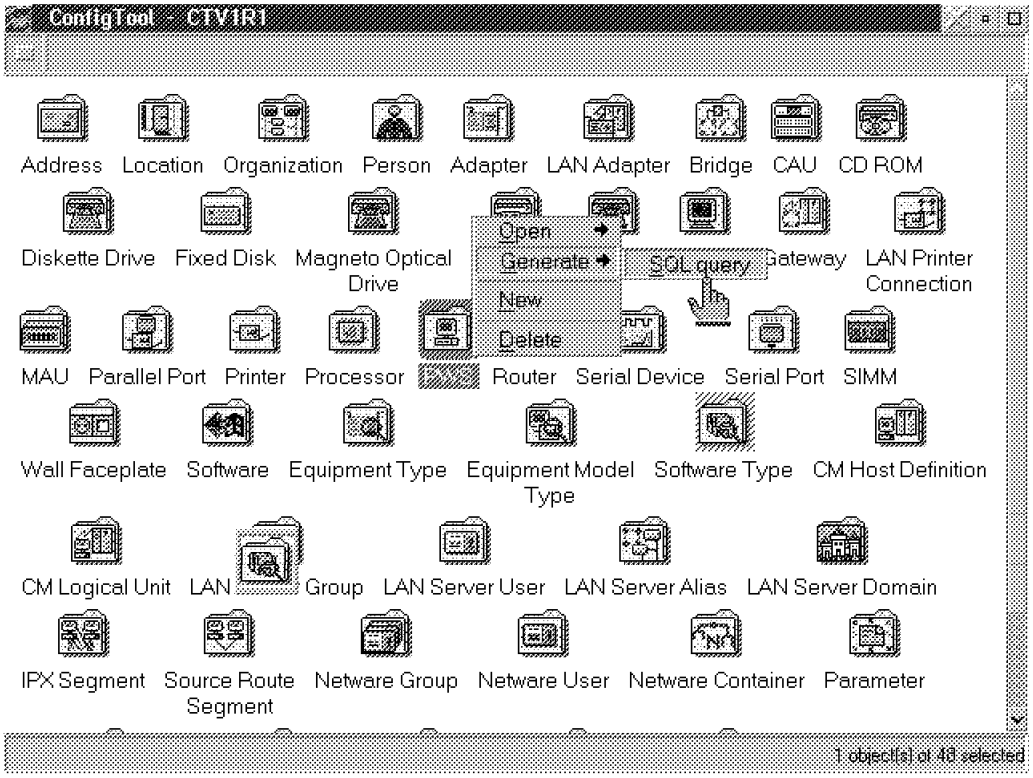


Figure 64. Generating an SQL Query from Query Object

Upon successful creation of the SQL query into the OS/2 clipboard, the message shown in Figure 65 should be displayed.

Figure 65. Successful Creation of SQL Query to Clipboard

Next, we go into Query Manager to create our new query. Figure 66 on page 95 shows the new query window where we have clicked with the right mouse button to display the menu where we can select the paste function.

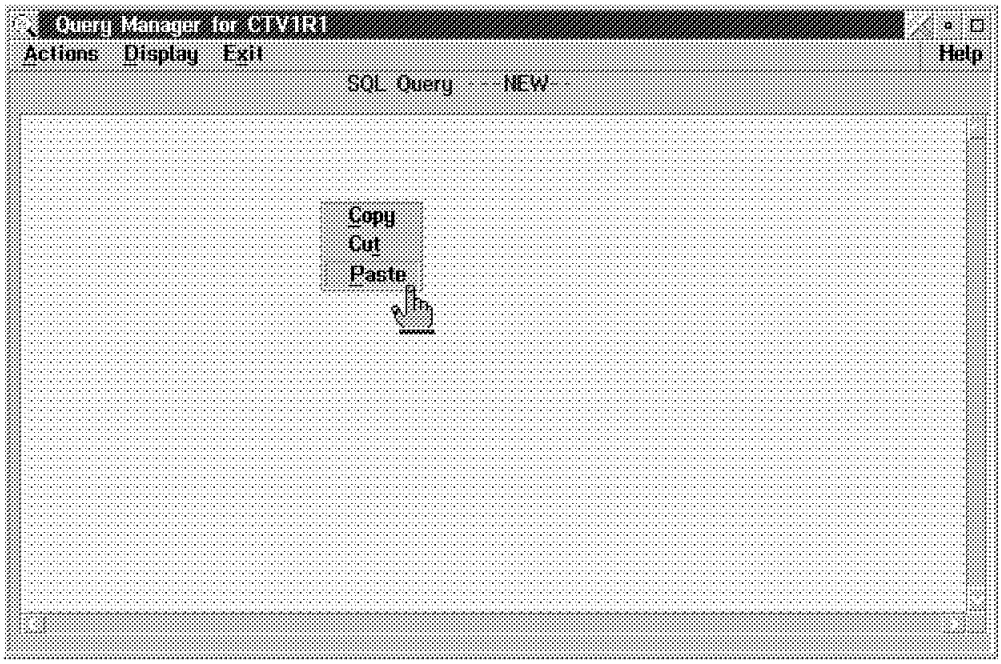


Figure 66. Performing a Paste Function in Query Manager for New Query

Figure 67 shows the query that has been successfully created in Query Manager. We can now run this query by choosing the **Actions**, and then **Run** pull-down menu options.

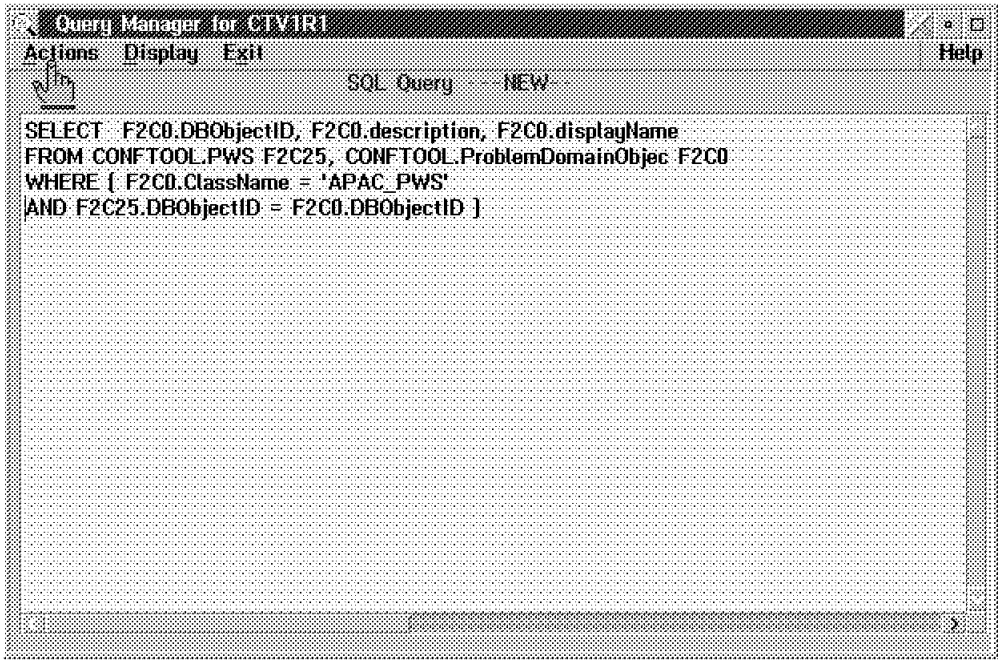


Figure 67. Query for All Workstations in ConfigTool

Figure 68 on page 96 shows the report created from our SQL query for all workstations currently defined in ConfigTool.

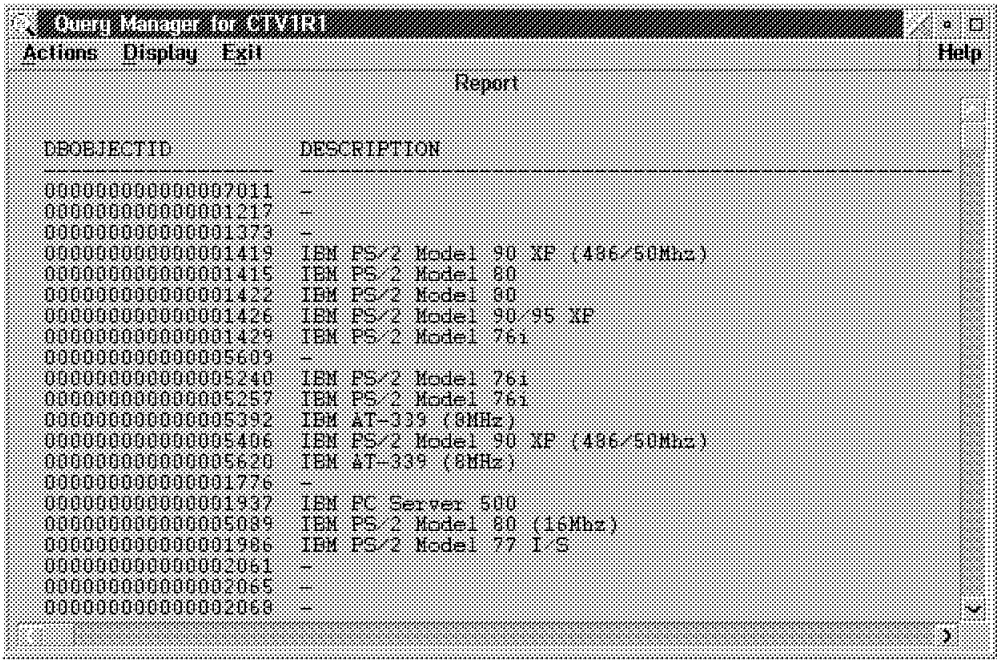


Figure 68. Successful Run of Our ConfigTool Query

5.6.2 Using Visualizer Flight for DB2

As previously shown, the data within ConfigTool can also be accessed using the standard Query Manager functions of DB2/2 where different queries and reporting functions can be implemented. In OS/2 Version 3.0 (Warp) a product called IBM Visualizer Flight for Warp (Program Product 5622-557) became available which is a replacement for Query Manager in the OS/2 Warp environment. This next section takes you through a simple example of using Visualizer Flight for accessing the ConfigTool data. Reports that you will require frequently can be created and saved for executing on a regular basis.

Figure 69 on page 97 shows the Visualizer Flight for DB2 graphical interface that is displayed when starting the program.

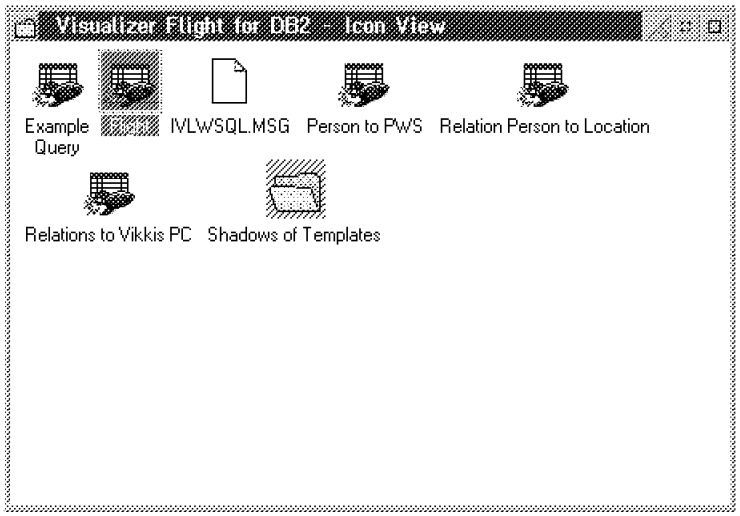


Figure 69. Visualizer Flight for DB2 Interface

The first step in creating a new query in Visualizer Flight to access data in the ConfigTool database is to open the Shadow of Templates folder (shown in the above figure) and to drag a Flight icon to the Visualizer Flight main window.

We then open this new query (flight), which takes us to a screen as shown in Figure 70 which allows us to begin creating our query. In this example, we create a query to show us all controlled access units in our database and the different modules and microcode level that they have installed.

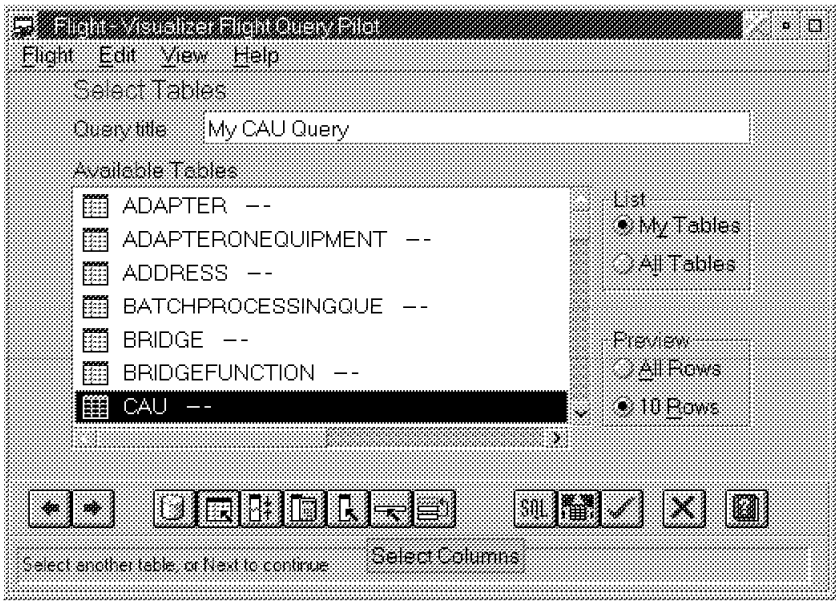


Figure 70. Using Query Pilot to Create Our CAU Query

From this screen we can enter a name for our query and then select the table that we want to perform the query against which is the CAU table.

At the bottom on the Visualizer Flight window you see a tool bar. Each of these icons in the tool bar represents a different function that can be performed. By moving the cursor over these boxes, you see a pop-up text displayed with the function it represents. We select the **Select Columns** function as shown in the

above window. Figure 71 on page 98 shows the window that is displayed to us from where we can select the different columns that we would like to use in our query.

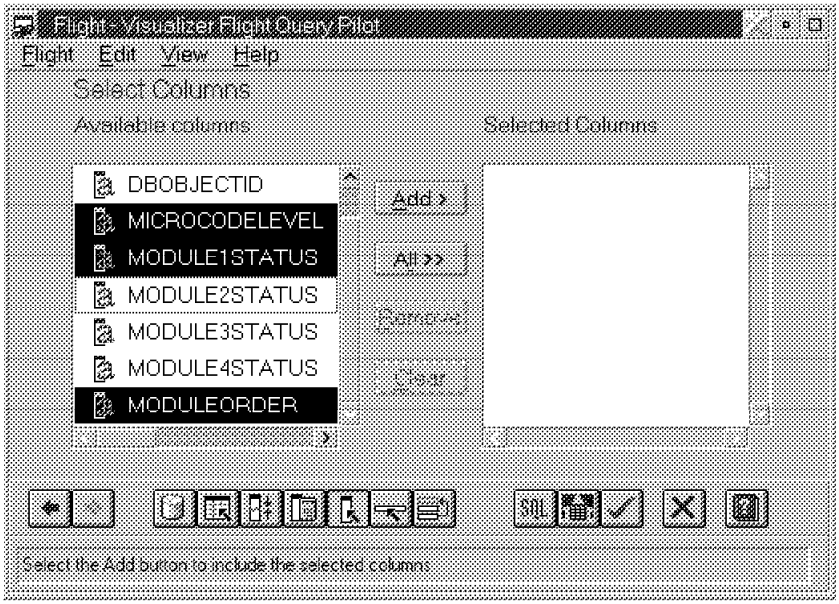


Figure 71. Window to Select Columns to Be Included in Query

This window allows us to select individual columns by using the Add option, or we can select all columns by using the All option. Figure 72 shows us the window with the selected columns for our query.

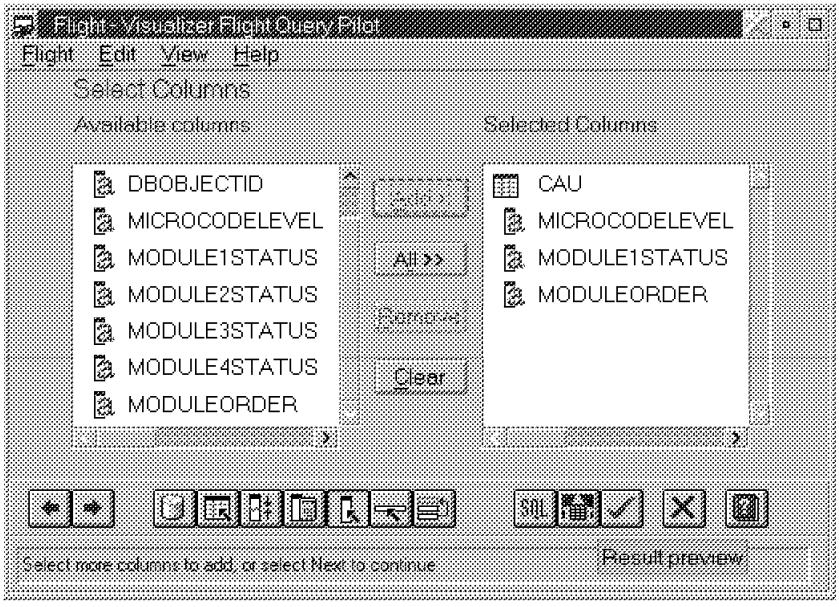


Figure 72. List of Selected Columns to Be Used for Query

Finally we can run our query by selecting the Result preview icon in the bottom of the previous window. Figure 73 on page 99 shows us the result of our query.

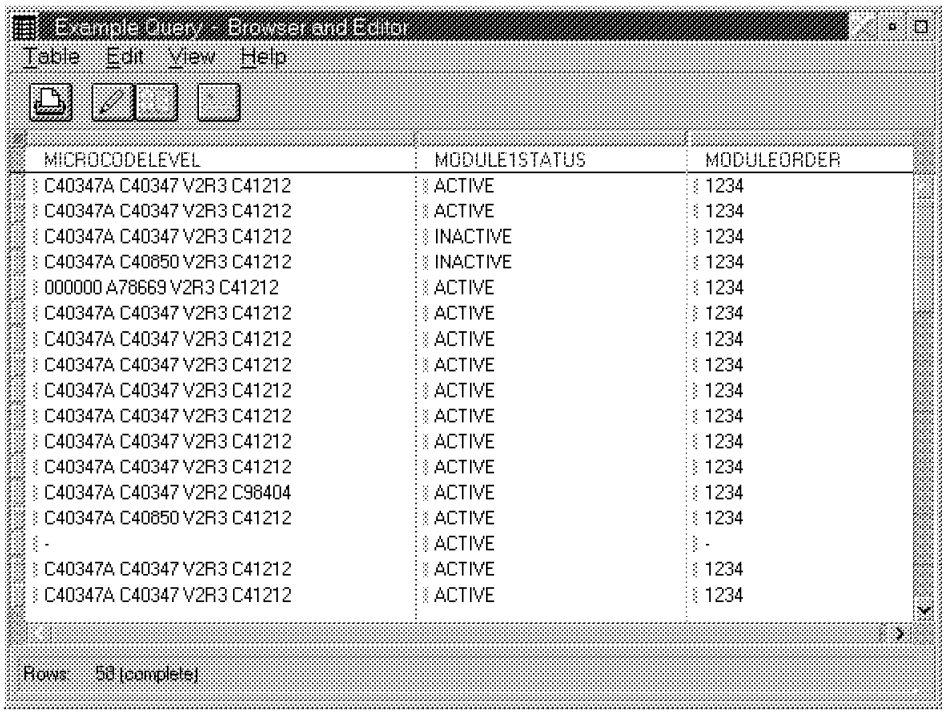


Figure 73. Result of Query

5.7 ConfigTool Operating Requirements

The ConfigTool GUI can be implemented both on stand-alone machines as well as in client/server environments where the program is placed on a shared resource (independent from the ConfigTool database) and can be used by any number of users. All the data from client workstations, servers and various products are collected into the central ConfigTool database. You then only need to install the user interface component to the various workstations that you want to access the central ConfigTool database from.

The ConfigTool client hardware and software information retrieval tools for DOS/Windows and OS/2 workstations need not be installed on managed end user workstations, but can be set up as shared tools by making use of, for example, IBM LAN Server features. This saves you from the task of distributing code to thousands of managed workstations. This is described in more detail in 6.4, “Automating the Collection of Data” on page 135. It describes how to do this with IBM LAN Server. However, the principles of how this is done can be used to establish the same sort of automation with other products, such as NetWare.

5.7.1 Hardware Requirements for the Managing System

The hardware required for the managing system and the importer is:

- An IBM or IBM-compatible 80486 75 MHz processor workstation or better
- A workstation with at least 16 MB memory. Memory of 24 MB or more is recommended for better performance.
- A workstation with at least 30 MB free hard disk space. In addition to that you need 4 MB temporarily during the installation.

Please note that you will also need to consider hard disk space of the configuration database itself (including the DB2/2 product) and how many objects it will be supporting for your environment in addition to the 30 MB above.

5.7.2 Hardware Requirements for Extractors

The hardware required for the extractors is:

- An IBM or IBM-compatible 80386 processor workstation or better.
- 4 MB free disk space on your hard disk. In addition to that you need 2 MB temporarily during the installation.

5.7.3 Software Requirements for the Managing System

The software required for the managing system and the importer is:

- OS/2 Warp Version 3.0
- IBM DB2/2 1.2 or higher or DB2/2 2.1 (with a minimum fix pack of 8080)

5.7.4 Software Requirements for Extractors

The software required for the extractor programs is OS/2 2.0 or above, except for the Workstation Extractor which runs under DOS 3.3 and above, Windows 3.1, and OS/2 1.3 as well.

Chapter 6. Getting Started with ConfigTool

This chapter describes how to get started in configuration management using ConfigTool. It takes you through the following areas:

- Installation of ConfigTool
- Getting the Data into ConfigTool through the Extractors
- Automating the Collection of Data
- An Example of Writing Your Own Extractor

Please note!

This chapter takes you through an installation of ConfigTool plus examples of extracting and importing data from each of the supported environments. For complete details on each of the commands and parameters used, please refer to the *ConfigTool Reference Guide* provided with this redbook.

6.1 Disclaimer

This document, and any code provided with it, is provided to you as is, without express or implied warranty of any kind, including warranties of merchantability and fitness for a particular purpose.

While IBM intends to distribute a commercial release of this product, IBM reserves the right at any time not to release a commercial release of the demonstration software or, if released, to alter prices, features, specifications, capabilities, functions, licensing terms, release dates, general availability or other characteristics of the commercial release.

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This demonstration software is intended for demonstration purposes only, and is not intended for use in a production environment. The entire risk as to the quality and performance of the product is borne by you. IBM makes no guarantee that the demonstration software will perform in any given environment.

6.2 Installation of ConfigTool

All components of ConfigTool are installable by IBM Software Installer for OS/2 and are also CID (Configuration, Installation, Distribution) enabled. We do not take you through a CID installation in this document. However, details on the CID installation method can be found in the *ConfigTool Reference Guide* provided with this redbook.

The ConfigTool application consists of the following components:

- **Managing System**

  The managing system contains both the database for ConfigTool, the Importer, and all of the graphical user interface components.

- **ConfigTool Utilities**

- Extractor Utilities
  - LNM Extractor
  - LMU Extractor
  - NetWare Extractor
  - NetFinity Extractor
  - IBM LAN Server Extractor
  - Workstation Extractor
  - Workstation Extractor diskette (for non-LAN attached workstations)
  - Delta Processing Tool
  - Reference File Converter
  - Database Binding Tool
  - Database Granting Tool
- Importer and the ConfigTool Profile Generation Tool

6.2.1 Installation Process

This next section takes you through the installation steps that we performed to install ConfigTool on a Model 755C ThinkPad (80486 75 MHz).

To install and use the ConfigTool application, you must be logged on with a local user ID of CONFTOOL which has at least local administrator privileges. This is required for creating and binding the ConfigTool application to the database. To create a local user ID, you should use the User Profile Management facility of DB2/2. The following few pages take you through how to create a new user ID.

Figure 74 shows the User Profile Management main window. From here, select the **User Profile Management** icon. The default local logon initially defined in OS/2 is USERID and PASSWORD.

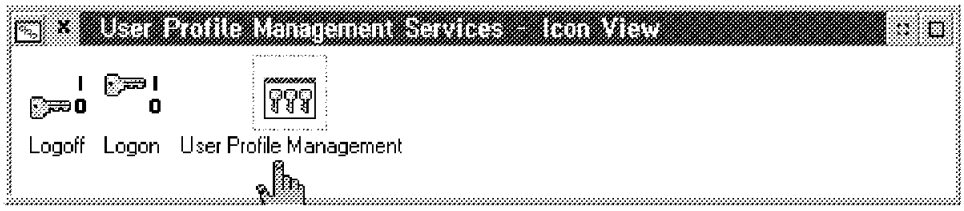

Figure 74. Main Window for User Profile Management

After selecting the User Profile Management icon, the User Profile screen is displayed. From this screen, select **Manage**, and then **Manage Users**, as shown in Figure 75 on page 103.

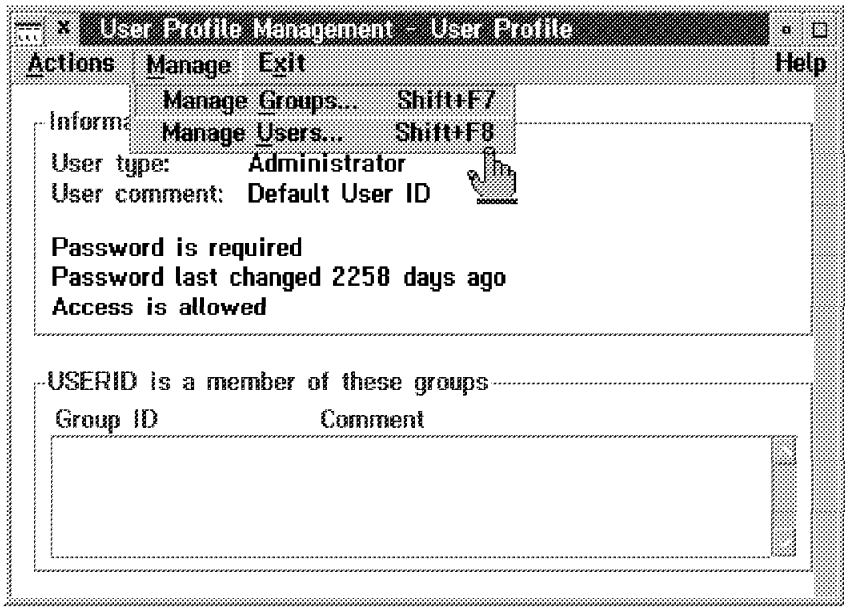

Figure 75. User Profile Window

The next User Management screen is where you select **Actions**, and then **Add a new user ID** (as shown in Figure 76), which takes you to the screen that allows you to create the new user ID for ConfigTool.

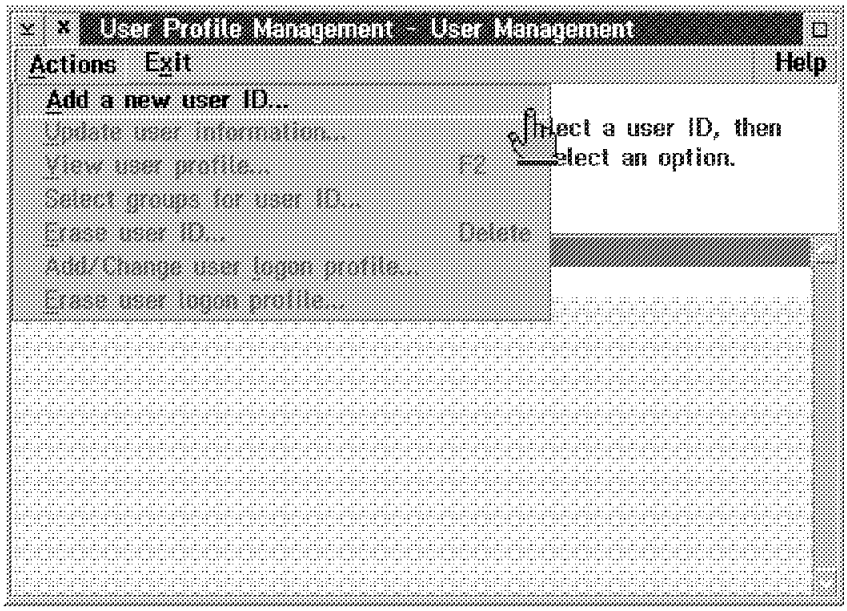

Figure 76. User Management Window and Selection for Add User

From the next displayed window you are now able to create a new user ID of CONFTOOL for the ConfigTool application. Figure 77 on page 104 shows the Add a New User window and the parameters that we used.

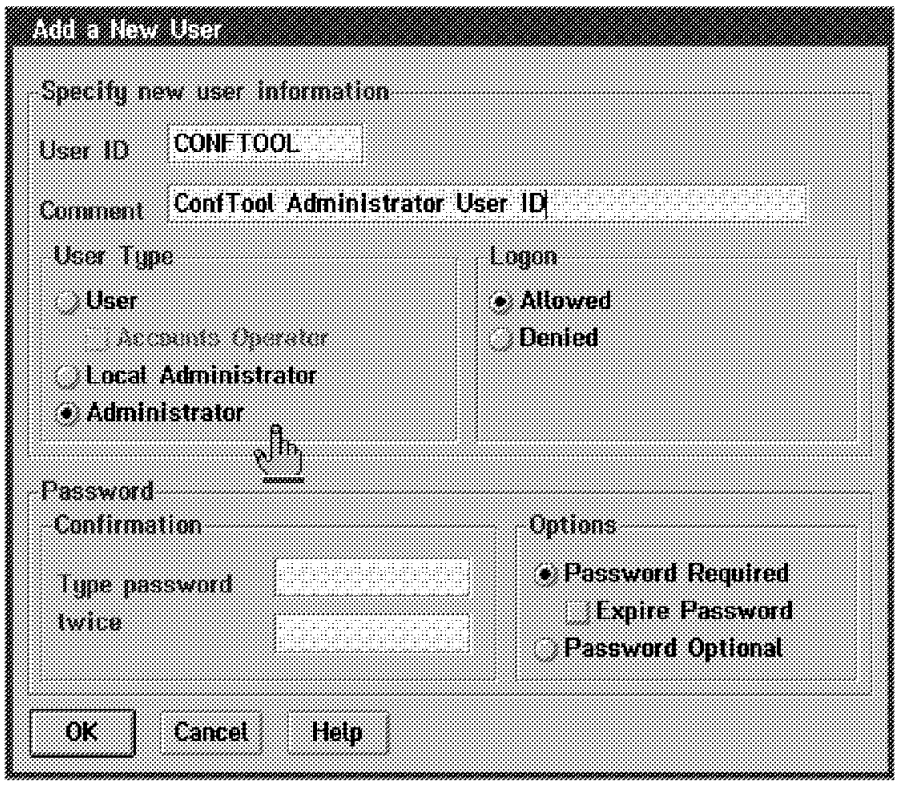

Figure 77. Creation of CONFTOOL User ID

The next step before starting the ConfigTool installation is to log on with the newly created CONFTOOL user ID. This can be done by choosing the **Logoff** and then **Logon** options, which can be selected from the main User Profile Management window shown in Figure 74 on page 102.

We are now ready to begin the ConfigTool installation. At the OS/2 command prompt where the ConfigTool code is installed we enter the command `INSTALL` to invoke the IBM Software Installer for OS/2.

The Installation window should appear, followed by an instructions window as shown in Figure 78 on page 105.

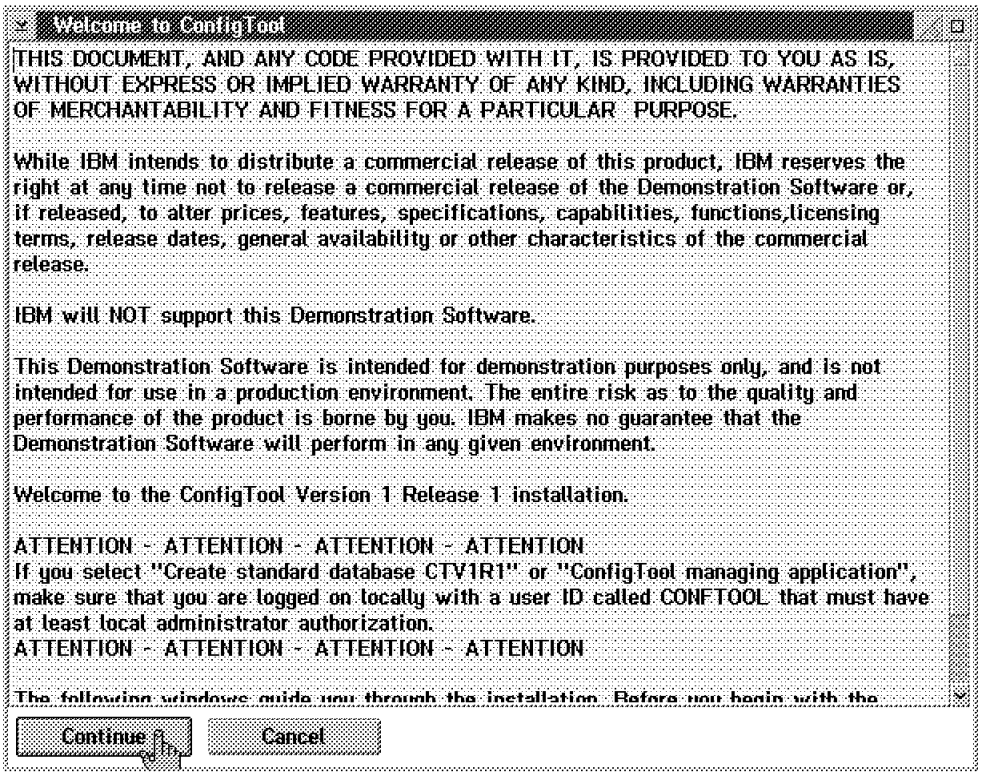

Figure 78. Installation Instructions Window

From this window, we select **Continue**, which displays a window as shown in Figure 79. This window displays information about ConfigTool such as name, number, version, etc.

From this window, select **OK** to continue the installation.

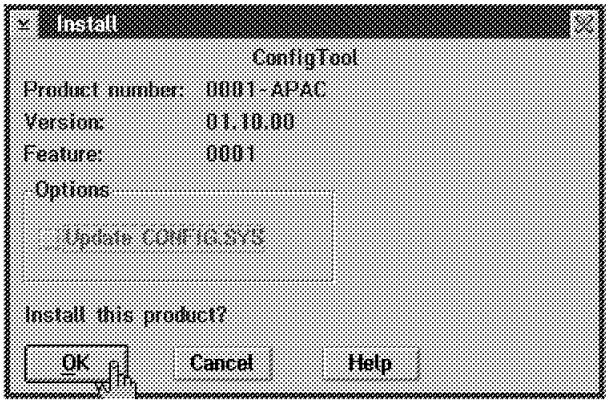

Figure 79. Select OK to Install ConfigTool

The next window that is displayed is the Install Directories window, as shown in Figure 80 on page 106. This window contains a list of the different components of ConfigTool that can be installed. If this is your first installation you should use the **Select All** option.

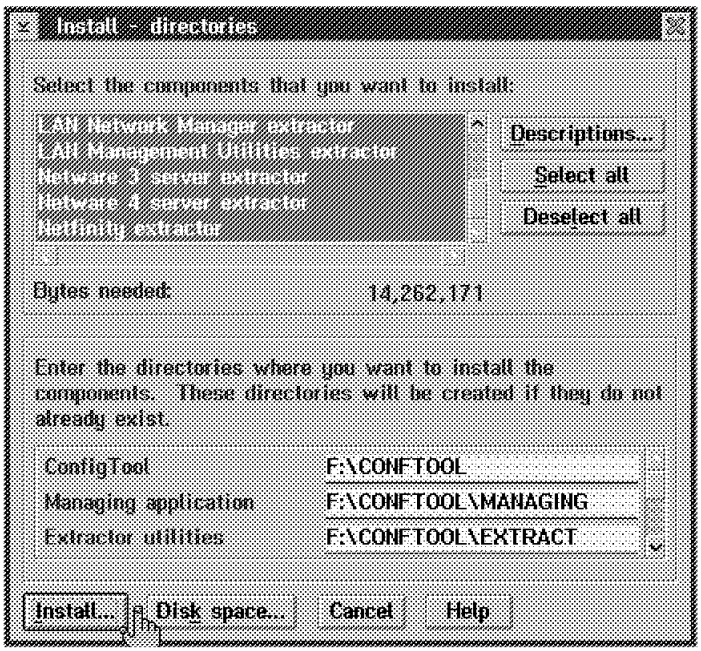

Figure 80. Installation Directories Window

If you wanted to get details about any of the ConfigTool components shown in the above figure, you could also select the **Descriptions...** push button to display details on each of the components before installation. You can also check to see whether you have sufficient disk space to install the ConfigTool components that you have selected by pressing the **Disk space...** push button, which takes you to the disk space available window. From this window, you are able to change the drive where ConfigTool will be installed. However, it is recommended that you keep the directory names for the different components the same.

You can now select the **Install...** push button to start the installation process.

The Install Progress window is continuously displayed throughout the installation, while the files are being transferred and unpacked. Figure 81 shows an example of the installation progress window.

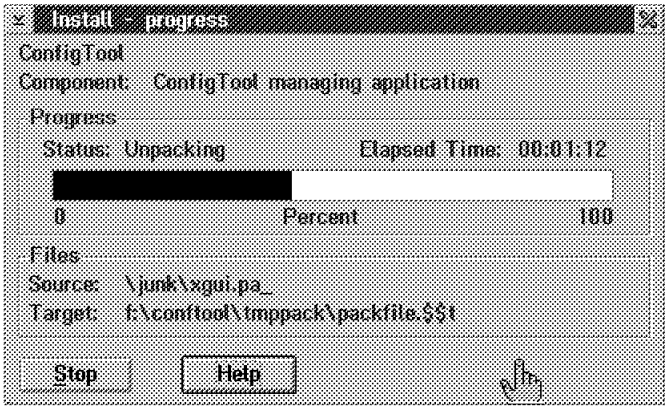

Figure 81. Installation Progress Window

Upon successful installation, a message showing the elapsed time and status of the installation is displayed, as shown in Figure 82 on page 107.

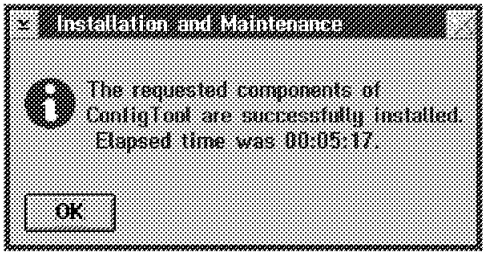

Figure 82. Successful ConfigTool Installation

6.2.1.1 ConfigTool Tools Folder

On successful installation of ConfigTool, a ConfigTool icon is created on your OS/2 desktop to start the application. Figure 83 shows the ConfigTool main icon view where all functions of ConfigTool can be selected.

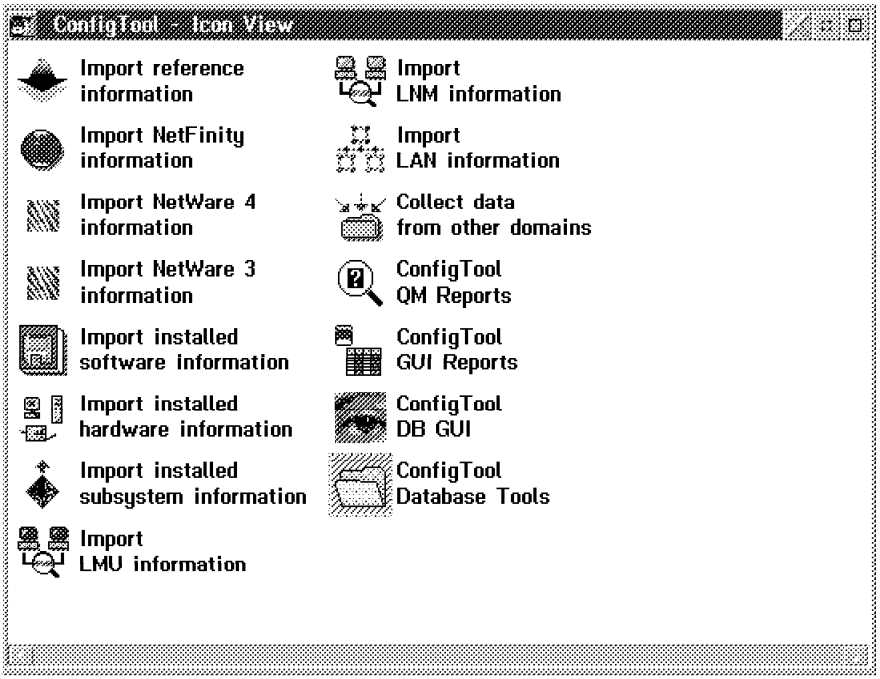

Figure 83. ConfigTool Main Icon View

Some of the required database functions that we go through next can be selected through the ConfigTool Database Tools folder shown in Figure 84 on page 108.

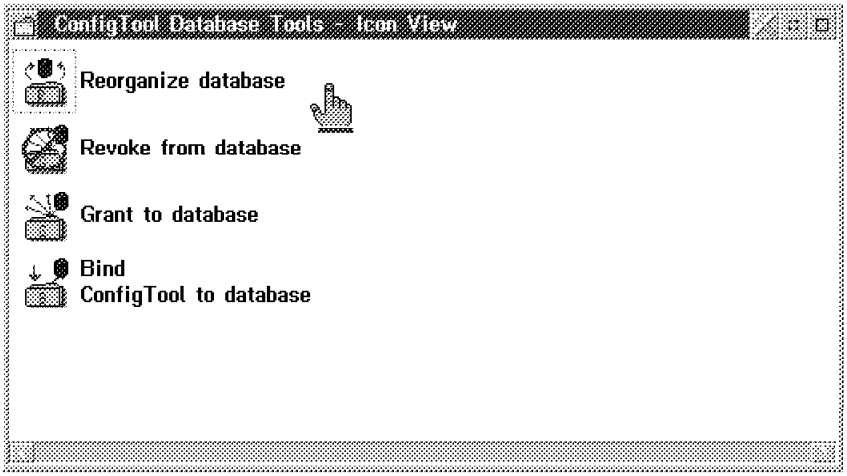

Figure 84. ConfigTool Database Tools

6.2.1.2 Binding the Database

During the install process, the ConfigTool application performs the binding of the ConfigTool managing application to the DB2/2 database.

If you used the default installation procedure that uses the CREATE STANDARD DATABASE CTV1R1 command, then both the creation and binding of the application to the database is done automatically for you during installation, as shown in Figure 85.

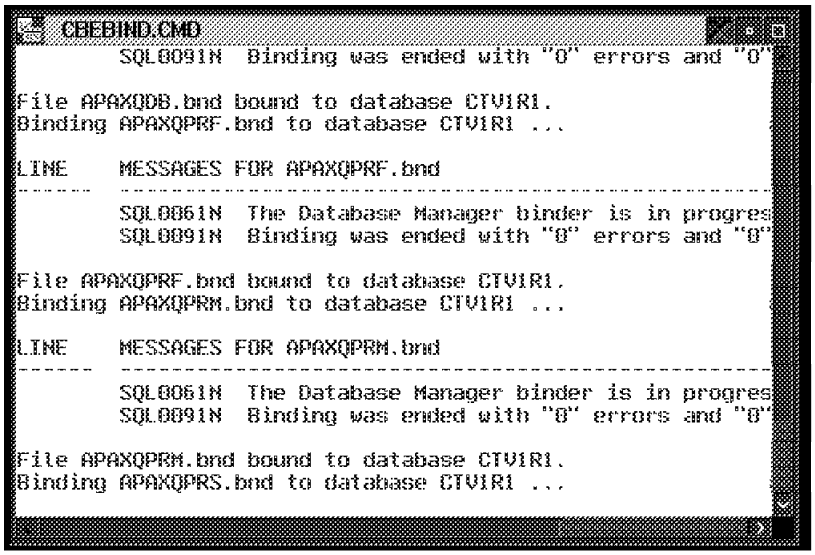

Figure 85. Binding to Database During Installation

If you choose to use different values for the directory name, or database name, then you have to perform the bind either from the Database Tools icon or manually as described below. You must make sure once again that you are logged on with the local user ID of CONFTOOL.

Use the following command at the command prompt to execute the bind process for a database named CONFTOOL:

```
CBEBIND CONFTOOL
```

6.2.1.3 Granting Users to the Database

The next step is to grant users who will be using the ConfigTool managing application access to this database. You need to use this utility each time you add new users to ConfigTool. The utility can be invoked either from the Database Tools folder, or manually as described below. It can also be used to revoke access to the database.

The following is the command that we used to invoke the Grant Access utility:

```
CBEGRANT CTV1R1 VIKKI
```

The following is the output from the above command:

```
GRANT EXECUTE ON PACKAGE APAXQDB TO VIKKI
GRANT EXECUTE ON PACKAGE APAXQPRF TO VIKKI
GRANT EXECUTE ON PACKAGE APAXQPRM TO VIKKI
GRANT EXECUTE ON PACKAGE APAXQPRS TO VIKKI
GRANT EXECUTE ON PACKAGE CBEUDSQL TO VIKKI
GRANT EXECUTE ON PACKAGE APAXQP10 TO VIKKI
GRANT EXECUTE ON PACKAGE APAXQP11 TO VIKKI
GRANT EXECUTE ON PACKAGE APAXQP12 TO VIKKI
GRANT EXECUTE ON PACKAGE APAXQP13 TO VIKKI
GRANT EXECUTE ON PACKAGE APAXQP14 TO VIKKI
GRANT SELECT ON TABLE SysVars TO VIKKI
GRANT SELECT ON TABLE ProblemDomainObjec TO VIKKI
GRANT SELECT ON TABLE AdminSupport TO VIKKI
GRANT SELECT ON TABLE Location TO VIKKI
GRANT SELECT ON TABLE Organization TO VIKKI
  . . . . .
  . . . . .
  . . . . .
GRANT SELECT ON TABLE SoftwareOnEquipmen TO VIKKI
GRANT SELECT ON TABLE SWTypeOnSoftware TO VIKKI
GRANT SELECT ON TABLE WallFaceplateToCAU TO VIKKI
GRANT SELECT ON TABLE WallFaceplateToMAU TO VIKKI

Permissions for database CTV1R1 granted to VIKKI.

All required authorizations successfully granted.
```

The above command is giving the user ID VIKKI access to all tables in the CTV1R1 database. If you want to revoke access for a certain user, the following command should be issued:

```
CBEGRANT CTV1R1 VIKKI (REVOKE
```

Please note that you can also use the short form of (R for the revoke option.

6.2.2 The ConfigTool Profile

The ConfigTool initialization profile called APACI.INI contains default directory names and file names used by both the Importer and managing application. It also contains the database name and the OS/2 database prefix.

Profile generation is performed during your installation process where it will create the APACI.INI file for you. The following is an example of the APACI.INI file which was created during our installation process.

```
#
#APACI.INI file
#Init profile for ConfigTool
#
[Directory]
#Directory for the flat files
DEF_FLAT_FILE_DIR   F:\CONFTOOL\DATA\
#Directory for the logfiles
DEF_LOG_DIR         F:\CONFTOOL\LOG\
#Directory for QueryEditor profiles
DEF_PRF_DIR         F:\CONFTOOL\VIEW\

[Filename]
DEF_DFV_NAME        .\APACIDFV.DFV
DEF_OID_NAME        .\APACIOID.OID
DEF_MSG_NAME        .\APACEH.MSG

[Database]
DB_NAME             CTV1R1
DB_PREFIX           CONFTOOL
```

If you wanted to change any of the information in the profile, you can also invoke the ConfigTool Profile generator program from the command line using the following command:

```
APACIPGE APACI.INI
```

6.2.2.1 Finding Where Things Are

The following is a list of each of the directories used in ConfigTool and what they contain. It will be helpful if trying to understand where things are in ConfigTool and where things should be executed from.

These directories also relate to the contents of the APACI.INI file described above.

- **The Extract Directory**

  This directory contains all files for the supplied extractors and the reference files. It also includes the bind, grant, and delta processing tools.

- **The Managing Directory**

  This directory contains all DLLs, all files necessary for the data import functions, and additional command files.

- **The View Directory**

  The View directory contains query profiles and sets for the GUI component of ConfigTool (including GUI reports).

- **The Data Directory**

  This is the default directory where all intermediate flat files are stored. The Data Importer will search for files to import here if no directory is specified on the import command.

- **The Log Directory**

  This directory contains all log files created after an import of any file.

- **The DISKIMG Directory**

This directory contains all files necessary to create a diskette to extract workstation data from non-LAN attached workstations.

6.2.3 Reference File Converter

The next step in the installation process is to import the different reference files that are used by the Importer to load different types of data into the ConfigTool database.

Please note!

This step is only required if you would like to have different software and hardware object types in the database to be able to manually define to workstations from within the ConfigTool GUI. If the Importer does not find the different types when loading extracted files, they will be automatically created during the import process.

This utility converts a machine type reference file, an adapter reference file, or a software type reference file into a file ready to import. ConfigTool supplies these three files that can be edited to suit your individual requirements, for example, to add your specific business software that you would like ConfigTool to import information about.

The following is a description of each of the supplied files:

- **Machine type reference file (*.MTR)**

  This file contains a list of machine types that can be imported into the ConfigTool database. It is used by the Importer to find type, model, and description information for a given model in order to load this data into the database.

- **Adapter reference file (*.ADR)**

  This file contains a list of adapter types to be searched for on workstations. It is used by the Importer to find the name and network type of a given adapter in order to load the data into the database.

- **Software type reference file (*.SWR)**

  This file contains a list of standard software products. It is used by the workstation extractor tool to find which software products are installed on a particular workstation. The software search utility steps through this file and checks for the presence of each package on the workstation.

The purpose of the reference file converter is to process each of these different files and create an intermediate flat file (with an extension of .IFF) that can be read by the Data Importer and the objects loaded into the ConfigTool database.

The utility can be invoked either from the ConfigTool Icon View window (shown in Figure 83 on page 107), or manually using the following command:

```
APACIREF referencefile
```

Where `referencefile` is the name of the reference file you want to process, for example, APACEADA.ADR.

Please note:

When selecting the **Import Reference Information** from the main icon view, both the creation of the intermediate flat files and import of *all* reference files will be done.

The following is a portion of the APACEADA.ADR file supplied with ConfigTool.

```
001D     DR-one SC306 Video Standards Converter
0024     ACCTON RingPair 4/16 Token-Ring Adapter                TR
002D     Madge 16/4 Ringnode                                    TR
0038     YARC u785+ Coprocessor
0041     EtherLink 32                                           ET
004E     NCR SCSI Host Adapter
0050     Cabletron 4/16 Mbps Token Ring Adapter                 TR
0051     Thomas-Conrad TC4046                                   ET
0063     RAC/M IX
006C     Thomas-Conrad TC5046 16/32 bit Ethernet Adapter        ET
0700     Proteon p1892 4/16 Mbps Token Ring Adapter             TR
07F4     NCR SCSI Host Adapter
0803     Madge Ringnode                                         TR
0818     12-Bit 16-Channel Analog to Digital Converter Board
0EFF     Northern Telecom Lanstar Card                          ET
```

The following is a portion of the APACEMOD.MTR file which is supplied with ConfigTool listing the machine model types.

```
FC 0B 00      2011                      IBM PS/1 286 (10 MHz)
F8 0E 00      2133          144         IBM PS/1 486SX
FC 02 00      5162                      IBM PC XT Model 286
FC 00 01      5170          239         IBM AT-239 (6 MHz)
FC 01 00      5170          339         IBM AT-339 (8 MHz)
FC 00 00      5273                      IBM PC3270/AT (6 MHz)
F8 49 00      6384          C           IBM PS/ValuePoint 325T
FC 06 01      7552          540         IBM PC 7552-540
F8 07 00      7561                      IBM PC 7561/2
F8 34 00      8525          386         IBM PS/2 Model 25 386
F8 33 00      8530          386/30      IBM PS/2 Model 30/386
F8 24 00      8540          /2          IBM PS/2 35SX/40SX
F8 51 00      8543          486         IBM PS/2 L40 486
FC 04 04      8550          50Z         IBM PS/2 Model 50Z
FC 8B 00      8555          286/2       IBM PS/55 Model 55xx 286
FC 42 00      xFC4200                   Olivetti M280
FC 45 00      xFC4500                   Olivetti M380 (XP 1, 3 or 5)
FC 81 01      xFC8101                   OEM Machine
fc 01 ff      xFFFFFF                   ASUSTect 486 SP3G
```

The following is a portion of the APACELSW.SWR file supplied with ConfigTool containing a significant amount of DOS, Windows and OS/2 software:

```
    NAME                    IBMDOS.COM
    TITLE                   IBM DOS
    TYPE                    DOS
    ASSOC_FILE              AUTOEXEC.BAT
    DEF_DIR                 NULL

    NAME                    AMIPRO.EXE
```

```
TITLE                   Ami Professional
TYPE                    Windows
ASSOC_FILE              AMIPROUI.DLL
DEF_DIR                 \AMIPRO

NAME                    CORELDRW.EXE
TITLE                   CorelDRAW!
TYPE                    Windows
ASSOC_FILE              CORELWIN.INI
DEF_DIR                 \OS2\MDOS\WINOS2\COREL

NAME                    123G.EXE
TITLE                   1-2-3 for OS/2
TYPE                    OS/2
ASSOC_FILE              123G.SET
DEF_DIR                 \LOTUS\123G
```

6.2.4 Invoking the Importer

To invoke the Importer manually you can use the APACIIMP.EXE which has the following command syntax:

```
APACIIMP name.IFF
```

The name.IFF is the intermediate flat file name that you want to import. The file name may include a path but if omitted, the default path defined in your APACI.INI file is be used. You can also use the '*' and '?' wildcard characters in the file specification.

The APACIIMP command is used for importing all types of data manually.

After successful completion of APACIREF, we copied the created .IFF files to the data directory specified in our ConfigTool Profile. The next figure shows the command that we used to import the model file into the ConfigTool database:

```
[F:\CONFTOOL\MANAGING]APACIIMP APACEMOD.IFF

APA1027I: APACIIMP started

APA1030I: Processing input file F:\CONFTOOL\DATA\APACEMOD.IF
(0312)
APA1032I: Importing 312 APAC_PWSType object
(0312)
APA1028I: APACIIMP finished
```

On successful completion of the imported file, we can go to the workstation type icon in the ConfigTool graphical interface to see the imported workstation types as shown in Figure 86 on page 114.

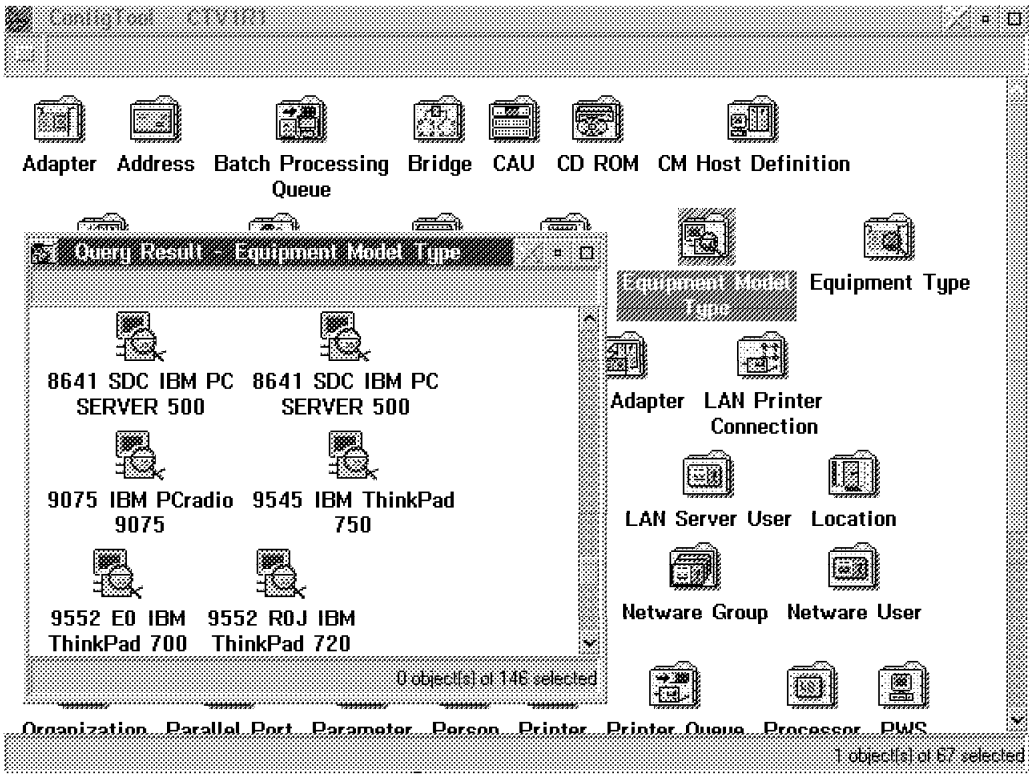

Figure 86. Imported Workstation Types

6.2.5 The Default Value File

The Importer's job is to load all the data into the database that the extractor tools make available. Unfortunately, extractor tools may not be able to supply values for all attributes that have been defined to the data model. This is simply because they are not available to them. In these cases, the Importer uses default values to insert into the database, if available. The default value file (.DFV) is the way that these default values are supplied.

The other very important thing that the default value file provides is the update authorities. These update authorities define that certain feeder tools are allowed to create an object or update object attributes.

Default values for all attributes as well as update authorizations for the specific extractor tools have been defined in the default value file (.DFV) provided. The Importer reads the .DFV file during the import process and use these default values and authorizations when updating the database.

You can edit this default value file and change the values and update authorizations. You must make sure, however, that the data types and the field lengths for character files match. Update authorities are defined per object and per attribute. The update authority per object defines that a certain feeder tool is allowed to create such an object, whereas the update authority per attribute defines that a feeder is allowed to update the corresponding attribute.

Please Note!

The default value file and update authorizations are extremely important if you are creating your own extractors. Not only do you need to understand the object identification file, but you also need to understand and update this default value file. Please refer to 6.7, “Keeping Your User Data Up-to-Date” on page 138 and A.1, “OS/2 Installation of User Information Program” on page 145 for an example of creating an extractor tool and the updates that were needed to both the object identification and the default value files for successful import of the objects.

The default value file uses the following three different record types to define an object entry:

- The first record denotes the beginning of an object entry (BEGOBJDEF).
- The following records define the attributes of an object.
- The last record denotes the end of an object entry (ENDOBJDEF).

Only tools listed in this default value field are authorized to set default values.

The following is a portion of the APACIDFV.DFV default file supplied with ConfigTool. This file can be edited and customized to suit individual requirements.

```
#-------------------------------------------------------------------------------
BEGOBJDEF ALL: APAC_Location
ALL: currentStatus           = ACTIVE
ENDOBJDEF
#-------------------------------------------------------------------------------
BEGOBJDEF ALL: APAC_Organization
ALL: currentStatus           = ACTIVE
ENDOBJDEF
#-------------------------------------------------------------------------------
BEGOBJDEF ALL: APAC_Person
ALL: currentStatus           = PERMANENT
ENDOBJDEF
#-------------------------------------------------------------------------------
BEGOBJDEF ALL: APAC_Adapter
ALL: currentStatus           = INSTALLED
ENDOBJDEF
#-------------------------------------------------------------------------------
BEGOBJDEF ALL: APAC_Bridge
ALL: currentStatus           = INSTALLED
ENDOBJDEF
#-------------------------------------------------------------------------------
BEGOBJDEF ALL: APAC_CAU
ALL: currentStatus           = INSTALLED
ENDOBJDEF
#-------------------------------------------------------------------------------
BEGOBJDEF ALL: APAC_CDROM
ALL: currentStatus           = INSTALLED
ENDOBJDEF
#-------------------------------------------------------------------------------
BEGOBJDEF ALL: APAC_DisketteDrive
ALL: currentStatus           = INSTALLED
ENDOBJDEF
#-------------------------------------------------------------------------------
```

```
BEGOBJDEF ALL: APAC_LANSrvUser
ALL: currentStatus           = INSTALLED
ALL: type                    = USER
ALL: accessStatus            = ALLOWED
ENDOBJDEF
#-------------------------------------------------------------------------------
BEGOBJDEF ALL: APAC_LANSrvAlias
ALL: currentStatus           = INSTALLED
ALL: type                    = FILE
ALL: source                  = INTERNAL
ALL: whenShared              = AT_SERVER_STARTUP
ALL: usedOn                  = OS/2
ALL: auditTrail              = NONE
ENDOBJDEF
#-------------------------------------------------------------------------------
```

For further information on the syntax of the default value file, please refer to the *ConfigTool Reference Guide* supplied with this redbook package.

6.3 The Extractor Utilities

This section takes you through examples of running each of the extractor utilities supplied with ConfigTool. It shows you examples of both the flat files that are created, and of the displays of some of the imported data through the ConfigTool GUI.

ConfigTool provides a set of extractor utilities which are used to extract the configuration data from each of the supported environments.

The ConfigTool extractors perform the following functions:

- Retrieve data from another source, for example a network management database
- Map the retrieved data to objects, attributes, and relationships defined in the data model used by ConfigTool
- Write the objects, attributes, and relationships to an intermediate flat file following the defined format that is understandable by the Data Importer

In some cases your Data Importer may not be able to get access to where the intermediate flat files are located. For example, you may have a central site that cannot directly access the branch location. In this case you could transfer the files from these locations to a target platform at the central site.

A sample command procedure is included in ConfigTool that helps you collect intermediate flat files from various LAN servers to a central server. This program is based on the facilities provided by the IBM OS/2 LAN Server product. However, the principals of how this is done can be used to develop the same procedures by other networking products, such as Novell NetWare. Please refer to 6.4, “Automating the Collection of Data” on page 135 for details on these collection procedures.

6.3.1 LAN Network Manager Extractor

The LNM Extractor retrieves data from an LAN Network Manager database and writes the data to an intermediate flat file ready for import. The following LNM releases are supported by ConfigTool:

- IBM LAN Network Manager V1.1
- IBM LAN Network Manager V2.0
- IBM LAN Network Manager Entry

  Please note that LNM Entry only supports single segment environments. Therefore, it will not contain any bridge information.

The following information is extracted from the LNM database:

- Segments
- Workstations
- Displays
- Diskette drives
- Fixed disk
- Adapters
- LAN adapters
- Operating system
- Printer (provided by LAN Station Manager)
- Bridge
- Controlled access units
- Wall faceplate (provided by LAN Station Manager)
- Location (provided by LAN Station Manager)

Please note:

Some of the above information will only be available in the LNM database if the LAN Station Manager product is also running on the workstations being managed by LNM.

The first thing that you must do before running the extractor is to bind the LNM database. This APACEBND utility must also be used for the LMU database.

The following is the command that we used to bind an LNM Version 2.0 database.

```
APACEBND LNM LNM

LINE    MESSAGES FOR APACELNM.BND
------  ------------------------------------------------------------------------
SQL0061N  The Database Manager binder is in progress.
SQL0091N  Binding was ended with "0" errors and "0" warnings.

File APACELNM.BND bound to database LNM.

LINE    MESSAGES FOR APACEM20.BND
-----  -------------------------------------------------------------------
SQL0061N  The Database Manager binder is in progress.
SQL0091N  Binding was ended with "0" errors and "0" warnings.

File APACEM20.BND bound to database LNM.
```

The following is the command that we used to perform the extract of the LNM database and the resulting output.

```
APACELNM /DB=LNM /FN=F:\CONFTOOL\DATA\LNMDATA

APA2400I: Extracting LNM database by APACELNM.EXE.

APA2402I: Database identified as LNM V2.0 database.
(-)

APA2404I: Database extracted successfully.
```

This command is extracting data from an LNM database called *LNM* and placing the output file in the DATA directory in a file called *LNMDATA.LNM*.

The following is an extract of the flat file created by the LNM extractor and some of the data it contains:

```
TOOL LNM
VERSION X0101
OBJECT APAC_SourceRouteSegment 1
className = APAC_SourceRouteSegment
displayName = LANNAME  D05
universalName = LANNAME  D05
lanName = LANNAME
segmentNo = D05
END OBJECT;
OBJECT APAC_LANAdapter 2
className = APAC_LANAdapter
displayName = 0004AC233433
universalName = 0004AC233433
adapterAddress = 0004AC233433
univAdminAddress = 0004AC233433
type = TOKEN_RING
END OBJECT;
OBJECT APAC_CAU 276
className = APAC_CAU
displayName = 5A984FF0
universalName = 5A984FF0
equipmentName = 5A984FF0
microcodeLevel = C40347A C40347  V2R3    C41212
module1Status = ACTIVE
module2Status = ACTIVE
module3Status = ACTIVE
module4Status = ACTIVE
moduleOrder = 1234
END OBJECT;
```

After extracting the LNM data, we can now import this flat file into the ConfigTool database. This can be performed from the graphical interface of ConfigTool by selecting the *Import LNM Information* icon as shown in Figure 87 on page 119. This option will import all files located in the DATA directory with a file extension of .LNM.

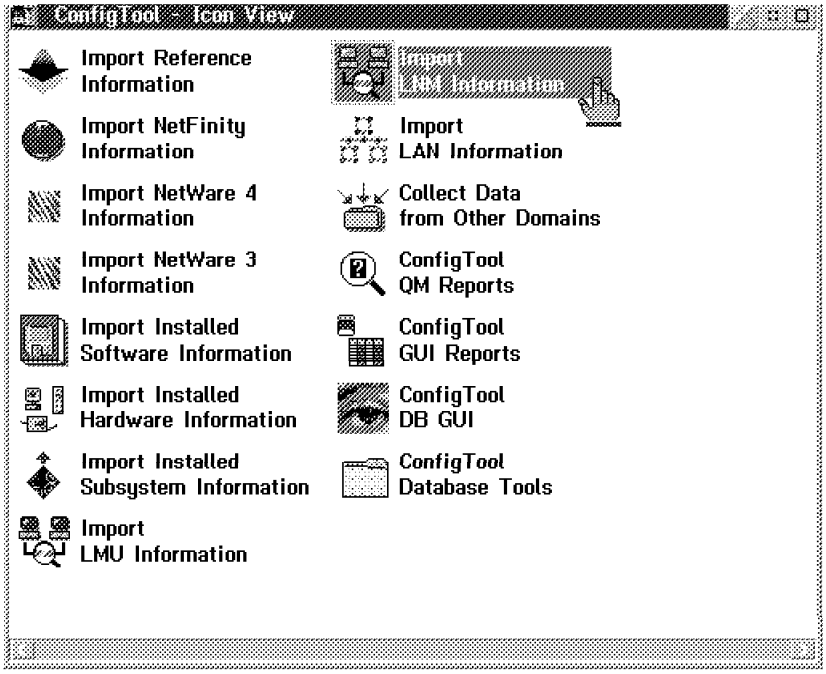

Figure 87. Option to Import LNM Data

During the import process you will see a window similar to that shown in Figure 88, which shows you the progress of the Importer and what LNM data is being imported into ConfigTool.

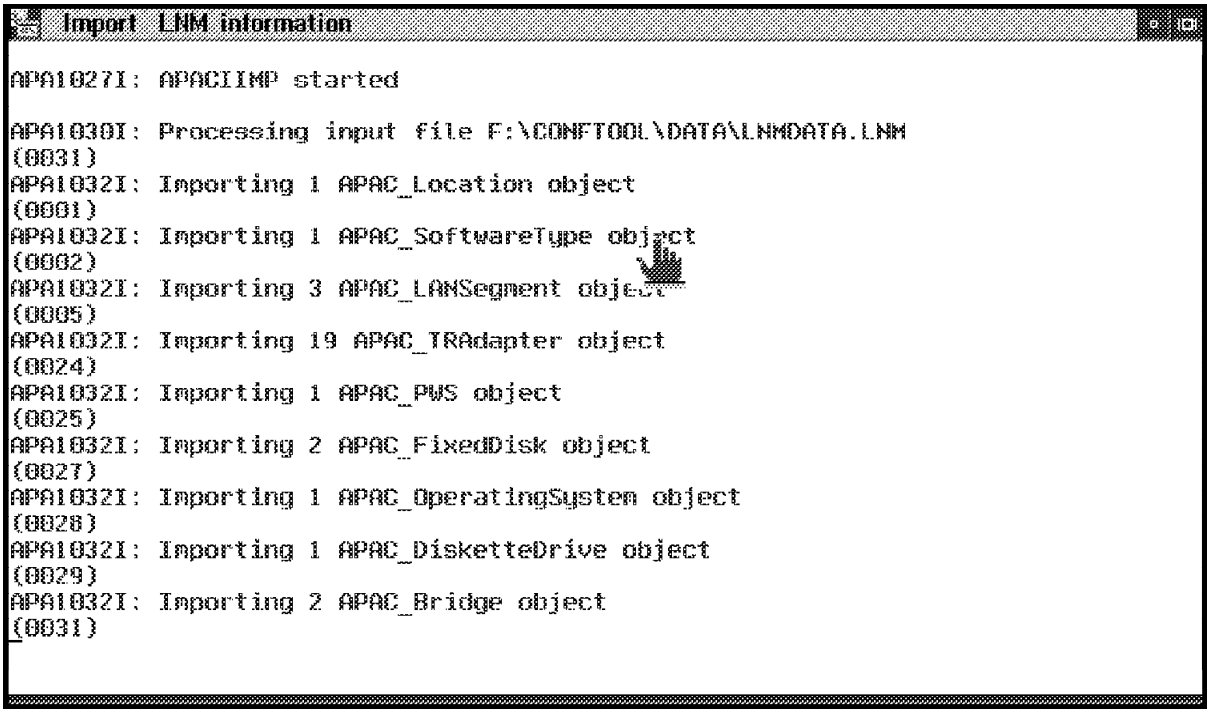

Figure 88. Import of LNM Data to ConfigTool

The following is an example of a notebook page for one of the controlled access units and the data imported from the LNM database.

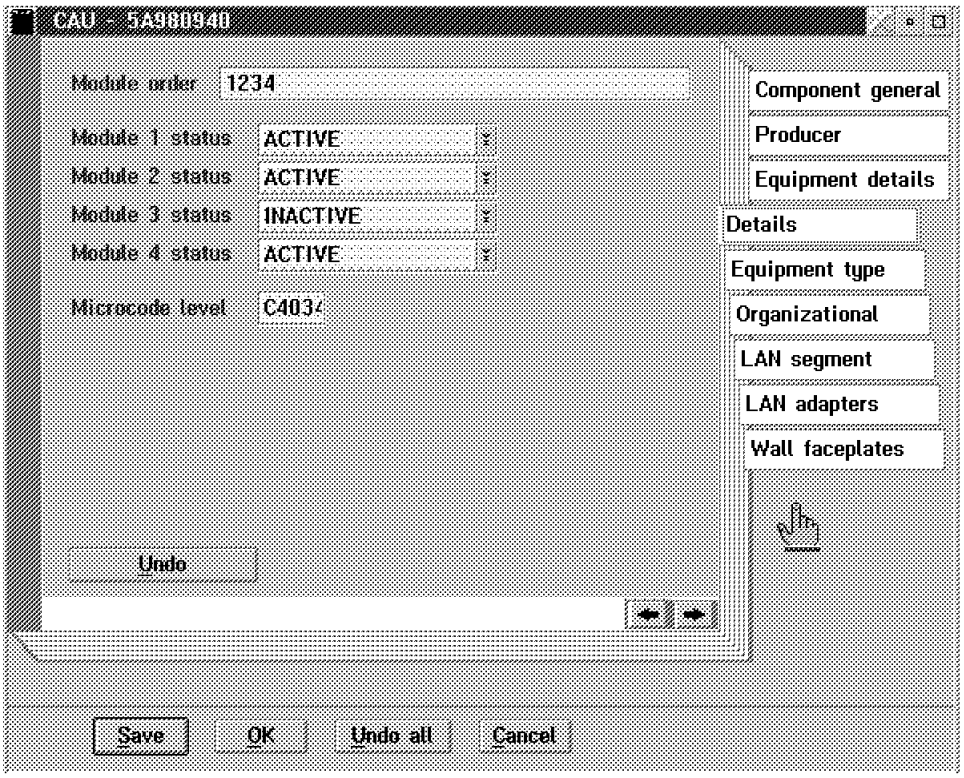

Figure 89. Notebook for Controlled Access Unit

Most of the time you will want to run your extraction processes for the different environments in batch mode, using things such as command procedures and scheduling packages for running your extraction procedures during off peak periods. You may also have your extractors located on different machines throughout your network and not on the ConfigTool workstation. This is the reason that you will not see any icons for the extract processes on the main ConfigTool icon view of functions.

Through the facilities of OS/2, it is also possible, however, to create a graphical icon on the ConfigTool interface to perform the extraction process from the various environments if you wanted to.

6.3.2 LAN NetView Management Utilities (LMU) Extractor

The LMU extractor retrieves data from the LMU database and write it into an intermediate flat file. The following versions of LMU are supported:

- IBM LAN Management Utilities/2 V2.0
- IBM LAN NetView Management Utilities for OS/2 V1.1

The following information is extracted about the LMU database:

- Workstations
- Displays
- Diskette drives
- Fixed disk
- Logical disks
- Adapters
- LAN adapters
- Serial port

- Software
- IBM LAN Server Requester
- NetWare Server

The following is the syntax of the command that we used to extract data from our LMU database:

```
APACELMU /DB=LMU /QF=CONFTOOL /FN=F:CONFTOOLDATALMUDATA
```

The above command is executing the LMU extractor (APACELMU) against a database named LMU, that has a table qualifier of CONFTOOL, and places the data in the F:CONFTOOLDATA directory in a file named LMUDATA.LMU.

The following is an extract from an LMU intermediate flat file created by the extractor:

```
TOOL LMU
VERSION X0101
OBJECT APAC_PWS 1
className = APAC_PWS
description = IBM PS/2 Model 80
displayName = APACTEST
universalName = APACTEST
biosDate = 1987-10-07
busType = Micro Channel 32-Bit
keybType = 101/102 Key Enhanced (ID AB41)
totalMemoryMB = 7
numberOfParallelPorts = 1
numberOfSerialPorts = 1
numberOfExpansionSlots = 8
numberOfUserSlots = 7
END OBJECT;
OBJECT APAC_EquipmentModelType 2
className = APAC_EquipmentModelType
description = IBM PS/2 Model 80
displayName = 8580 311 F80100
universalName = 8580 311 F80100
equipmentClass = APAC_PWS
productId = F80100
hardwareType = 8580
modelNumber = 311
END OBJECT;
OBJECT APAC_Processor 4
className = APAC_Processor
universalName = 80386
processorType = 80386
coProcessorInstalledFlag = N
internalProcessorSpeedMHz = 20
END OBJECT;
OBJECT APAC_Display 7
className = APAC_Display
displayName = PS/2 Color 8514 APACTEST
universalName = PS/2 Color 8514 APACTEST
equipmentName = PS/2 Color 8514 APACTEST
END OBJECT;
```

The intermediate flat file can now be imported into ConfigTool by using the *Import LMU Information* icon from the ConfigTool graphical interface. This

function will import all files located in the DATA directory which have a file extension of .LMU.

The following is an example of a notebook page for one of the LMU imported workstations.

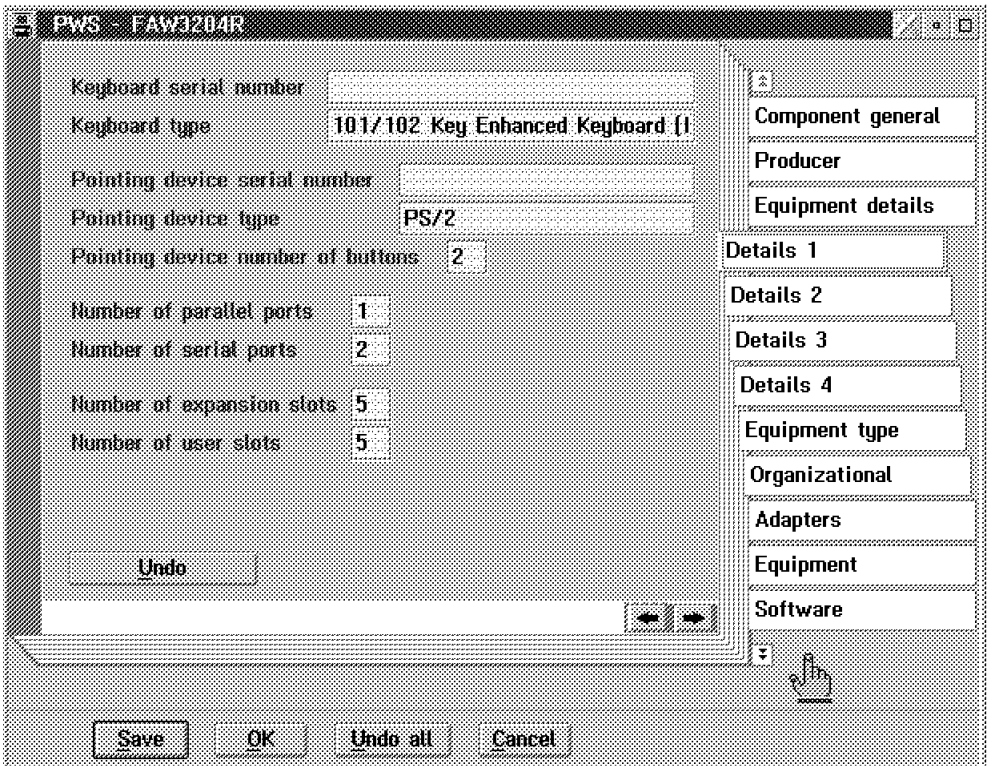

Figure 90. Workstation Imported through LMU

6.3.3 IBM OS/2 LAN Server Extractor

The LAN Server extractor retrieves data from the IBM LAN Server database and write it to an intermediate flat file. Please note, that in order to get all information, the extractor must be executed on the domain controller and you must be logged on as an administrator. The following information is collected from the LAN Server database:

- LAN Server machine name
- LAN Server functions (domain controller, file server, print server, device server, RIPL server)
- Token-ring adapter addresses
- LAN user IDs
- LAN user descriptions (names)
- LAN user types (user, administrator)
- LAN user password information (required/not required)
- LAN user group information
- Alias information (sharing, server name, description, directories)

The syntax of the command that we used to extract data from our LAN Server database was:

```
APACELS /OP=F:CONFTOOLDATA
```

The /OP= is the parameter used to specify the output path to place to extracted file.

Please note that there are two extractor utilities for LAN Server and it depends on the level of LAN Server that you are extracting from. You should use APACELS if you want to extract the data from LAN Server 3.0, or LAN Server 4.0. Or use APACELS2 for extracting the data from LAN Server 2.0.

The following is a portion of a LAN Server intermediate flat file showing some of the extracted data that can now be imported into ConfigTool:

```
TOOL LS
VERSION X0101
OBJECT APAC_LANSrvDomain 1
className = APAC_LANSrvDomain
displayName = FAW3200D
universalName = FAW3200D
name = FAW3200D
END OBJECT;
OBJECT APAC_LANSrvRequester 2
className = APAC_LANSrvRequester
displayName = FAW3292S
universalName = FAW3292S
computerName = FAW3292S
lastDomain = FAW3200D
END OBJECT;
OBJECT APAC_PWS 3
className = APAC_PWS
displayName = FAW3292S
universalName = FAW3292S
END OBJECT;
OBJECT APAC_LANAdapter 6
className = APAC_LANAdapter
displayName = 10005AAF6578 FAW3200D
universalName = 10005AAF6578 FAW3200D
adapterAddress = 10005AAF6578
univAdminAddress = 10005AAF6578
type = TOKEN_RING
END OBJECT;
OBJECT APAC_LANSrvServer 18
className = APAC_LANSrvServer
displayName = FAW3240S
universalName = FAW3240S
domainController = N
backupDomainCtrl = N
fileServer = Y
printServer = Y
serialDevServer = Y
riplServer = N
END OBJECT;
OBJECT APAC_LANSrvUser 174
className = APAC_LANSrvUser
displayName = AT22987 FAW3200D
universalName = AT22987 FAW3200D
id = AT22987
idDescription = Marcus ERBER
type = USER
passwRequ = Y
```

```
accessStatus = ALLOWED
END OBJECT;
```

We can now import this flat file into the ConfigTool database. The *Import LAN Information* icon will import all files located in the DATA directory with a file extension of .LS.

The following screen is an example of a notebook page for a LAN Server user with an example of the imported data.

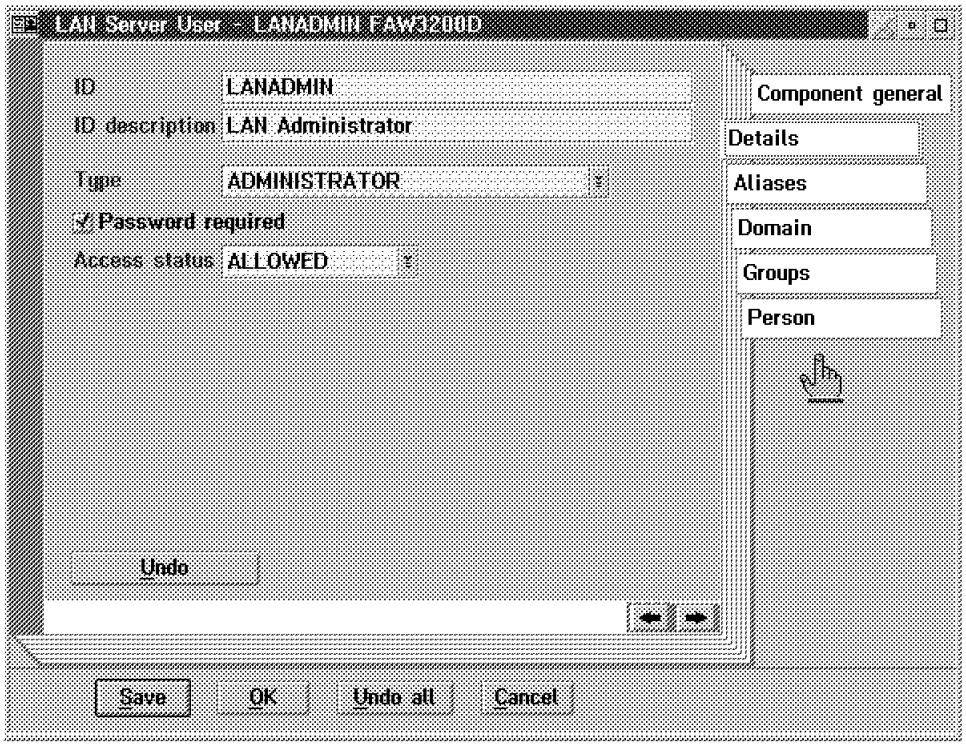

Figure 91. LAN Server User Notebook

6.3.4 NetFinity Extractor

The NetFinity Extractor runs on machines which have OS/2 Version 2.0 or above installed and NetFinity Version 3.00 to 3.05. The extractor retrieves NetFinity workstation data and writes it to an intermediate flat file.

Information about the following is extracted from NetFinity:

- Workstation
- Operating system
- Adapters (including LAN adapters)
- Displays
- SIMMs
- Diskette drives
- Fixed disks
- Logical disks

In addition, if the System Profile information has been entered into NetFinity at the workstation, and this module of NetFinity is operational when the extraction

process takes place, then information about the following objects is also extracted:

- Location
- Address
- Organization
- Person

The following is the syntax of the command that we used to perform the extract from our workstation.

```
APACENF /EP=F:CONFTOOLEXTRACT /DP=F:CONFTOOLDATA
```

The command executes the NetFinity extractor (APACENF) which is located in the EXTRACT directory path, and places the extracted files in the DATA directory path.

The following is a portion of a NetFinity intermediate flat file and the data that has been collected by the extractor.

```
TOOL NF
VERSION X0101
OBJECT APAC_PWS 1
className = APAC_PWS
description = IBM PS/2 Model 77 I/S
displayName = FAW32A4R
universalName = FAW32A4R
biosModelNumber = F8
biosSubmodelNumber = B0
biosRevision = 04
biosDate = 1994-08-23
busType = Micro Channel Architecture
keybType = 101/102 Key Enhanced Keyboard
countryCode = US
subcountryCode = 103
primaryCodePage = 850
totalMemoryMB = 65.152
freeDOSMemorykB = 630
pointDevType = PS/2 Mouse
pointDevNumberOfButtons = 2
planarSerialNumber =  B14DHSAL5T3
planarSpeedMHz = 33
processorCardSerialNo = 00000000
numberOfParallelPorts = 1
numberOfSerialPorts = 2
numberOfProcessors = 1
END OBJECT;
```

The intermediate flat file can now be imported into the ConfigTool database. The *Import NetFinity Information* icon will import all files located in the DATA directory that have a file extension of .*NF.

The following is an example of a notebook page for a workstation that has been imported through the NetFinity extractor.

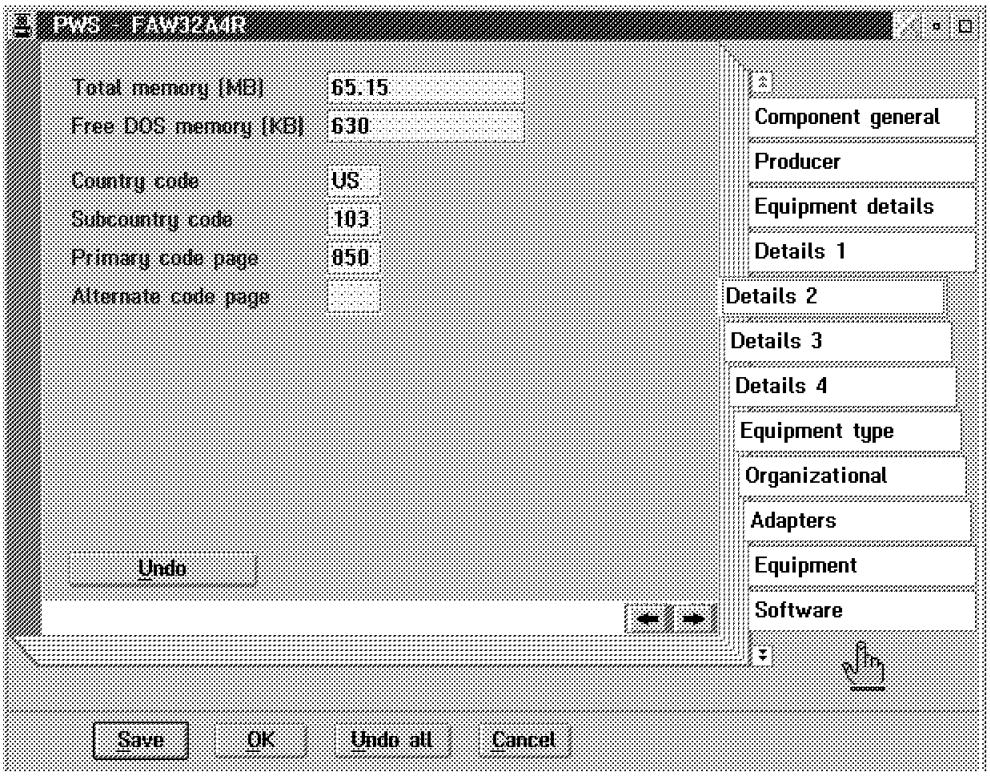

Figure 92. Notebook for NetFinity Imported Workstation

6.3.5 NetWare Extractor

The NetWare Extractor utility extracts data from NetWare 3.12 and 4.10 servers and writes the data to an intermediate flat file.

Information about the following can be extracted from the NetWare servers:

- Workstation
- Fixed disk
- Logical disk
- LAN adapter
- Operating system
- Subsystems
- Software
- Groups (NetWare 3.12 only)
- Users (NetWare 3.12 only)
- Printer queues (NetWare 3.12 only)
- File resources (NetWare 3.12 only)

The following is the syntax of the command that we used to extract data from a NetWare server:

```
LOAD SYS:EXTRACTAPACENW4 SYS:EXTRACT
```

This command will load the APACENW4 program located in the SYS:EXTRACT directory and then place the extracted data also into the SYS:EXTRACT directory.

The APACENW4.NLM should be used for NetWare 4.0 servers and the APACENW3.NLM for NetWare 3.0 servers.

The following is a portion of a NetWare intermediate flat file showing some of the data that can be extracted.

```
TOOL NW4
VERSION X0101
OBJECT APAC_PWS 1
className = APAC_PWS
universalName = FAW55_KARLI
busType = MCA
totalMemoryMB = 31
END OBJECT;
OBJECT APAC_Processor 2
className = APAC_Processor
displayName = FAW55_KARLI
universalName = FAW55_KARLI
processorType = 80386
coProcessorInstalledFlag = Y
END OBJECT;
OBJECT APAC_NWServer 4
className = APAC_NWServer
displayName = FAW55_KARLI
universalName = FAW55_KARLI
nwServerName = FAW55_KARLI
ipxInternalNetNumber = 27808E80
usesIPX = Y
END OBJECT;
OBJECT APAC_NWContainer 6
className = APAC_NWContainer
displayName = [Root]
universalName = [Root]
organizationName = [Root]
organizationType = Top
END OBJECT;
OBJECT APAC_NWUser 15
className = APAC_NWUser
displayName = CN=atgoci.OU=DEVELOP.O=ADM
universalName = CN=atgoci.OU=DEVELOP.O=ADM
name = CN=atgoci.OU=DEVELOP.O=ADM
END OBJECT;
OBJECT APAC_FixedDisk 24
className = APAC_FixedDisk
description = IBM     WDS-3200      !J
displayName = 0 203 FAW55_KARLI
universalName = 0 203 FAW55_KARLI
capacity = 203
capacityUOM = MB
driveNumber = 0
cylinders = 203
heads = 64
sectorsPerCylinder = 32
totalSectors = 415744
END OBJECT;
OBJECT APAC_DiskPartition 26
className = APAC_DiskPartition
displayName = NetWare Partition  153
universalName = NetWare Partition  153
partitionName = NetWare Partition
totalCapacityMB = 153
fileSystem = NWFS
END OBJECT;
```

The following two options are available from the ConfigTool GUI for import of NetWare data:

- NetWare 4 Information which will import all files in the DATA directory with a file extension of .*NW4.
- NetWare 3 Information which will import all files in the DATA directory with a file extension of .*NW3.

The following screen is an example of a notebook for a NetWare user showing some of the imported data.

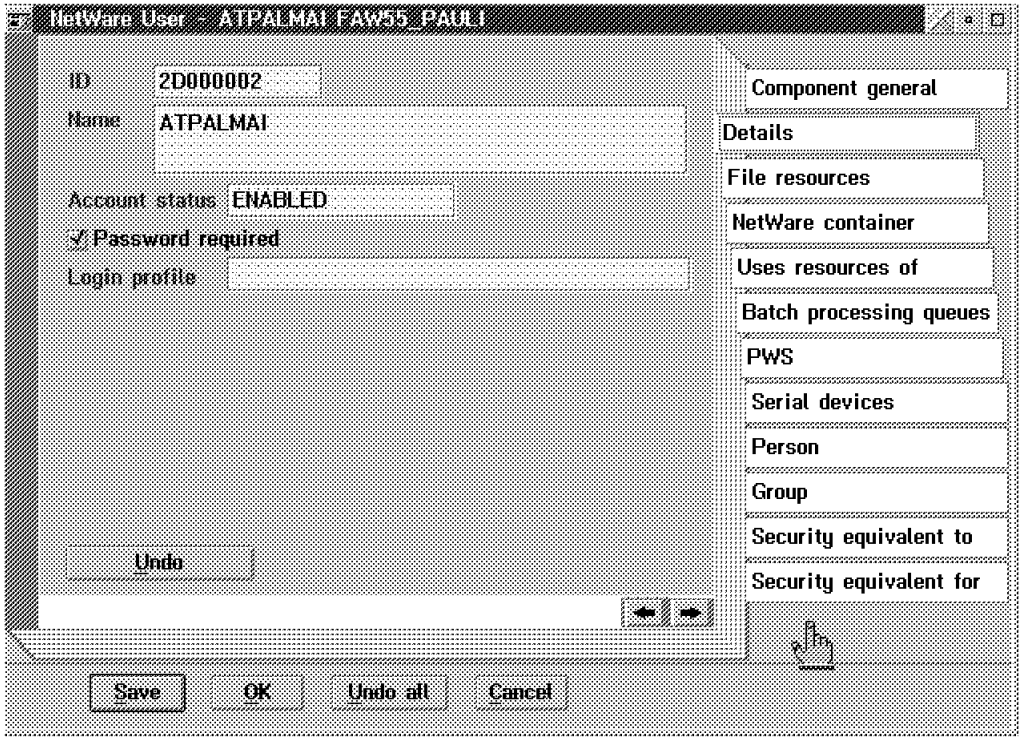

Figure 93. NetWare User Notebook

6.3.6 Workstation Extractor

The workstation extractor runs on machines that have DOS, Windows or the OS/2 operating systems. It retrieves workstation-specific data and writes it to an intermediate flat file, which can then be imported.

The workstation extractor creates files containing information about hardware, software, and OS/2 software definitions.

The intermediate flat files created by the extractor follow a specific naming convention of

`nnnnnnnn.ntt`

Where:

- `nnnnnnnn.n` is taken from the workstation parameter if it was supplied (normally for non-LAN attached workstations), or from the encoded LAN adapter address.
- `tt` is the type of the intermediate flat file which can be:

- HW, which contains installed hardware information
- SW, which contains installed software information
- OS, which contains OS/2 software definitions (retrieved from Communications Manager/2, TCP/IP for OS/2, DB2/2, and OS/2 printer queues)
- TM, which contains the time stamp indicating when the Workstation Extractor was successfully executed the last time.

This specific naming convention is used to ensure that the delta processing mechanism compares both old and new extracted files. This allows you to only import those files that have changed since the last extraction. Please refer to 6.6, “Delta Processing” on page 137 for details on the Delta Processing utility.

The following is the syntax of the command that we used to perform a workstation extraction:

```
APACEPWS /EP=F:CONFTOOLEXTRACT /DP=F:CONFTOOLDATA /HW /SW /OS2
```

This command is executing the workstation extractor (APACEPWS) which is located in the EXTRACT directory path, and will place the output files in the DATA directory path.

You can also specify the individual types of information that you would like to extract from the workstation such as hardware, or software. However, if you invoke the command with no parameters, all data is collected.

Please note!

The following conditions must be met for hardware extraction process to run successfully.

- Under OS/2 1.x the IOPL=YES statement must exist in the CONFIG.SYS file.
- Under OS/2 2.x the IOPL=NO statement may not exist in the CONFIG.SYS file.
- It must run in a full-screen session for extracting accurate video information.

The following is an extract from an intermediate flat file created containing OS/2 definitions from our workstation:

```
TOOL WS_OS2
VERSION X0101
OBJECT APAC_PWSSNAInfo 14
className = APAC_PWSSNAInfo
displayName = END_NODE_NO_NW_NODE_SERVERVIKKI
universalName = END_NODE_NO_NW_NODE_SERVERVIKKI
appnNodeType = END_NODE_NO_NW_NODE_SERVER
dftAdapter = N
dftPrtSessNo = 0
dftSessNo = 0
emul3270 = Y
nonDFTPrtSessNo = 0
nonDFTSessNo = 3
sdlcAdapter = N
```

```
sdlcAdSwitched = N
snaIdBlock = 05D
snaLocalNodeId = PF2RU7M0
snaNetworkId = FRIBM990
snaNodeAlias = PF2RU7M0
snaNodeId = 80AF5
END OBJECT;
OBJECT APAC_CmHostDefinition 16
className = APAC_CmHostDefinition
displayName = HOST0001 VIKKI
universalName = HOST0001 VIKKI
linkName = HOST0001
lanDestAddr = 400013380005
localPuName = PF2RU7M0
nodeIdBlock = 05D
nodeId = 80AF5
focalPointSupport = Y
appnSupport = Y
END OBJECT;
OBJECT APAC_CmLogicalUnit 18
className = APAC_CmLogicalUnit
displayName = FRIBM990 PF2RU7M0 VIKKI
universalName = FRIBM990 PF2RU7M0 VIKKI
networkId = FRIBM990
luName = PF2RU7M0
luType = LOCAL
luAlias = PF2RU7M0
END OBJECT;
OBJECT APAC_PWSDB2Info 22
className = APAC_PWSDB2Info
displayName = VIKKI
universalName = VIKKI
db2Function = DB_CLIENT_AND_SERVER
db2WsName = VIKKI
END OBJECT;
OBJECT APAC_PWS 24
className = APAC_PWS
END OBJECT;
OBJECT APAC_PWSDB2Info 25
className = APAC_PWSDB2Info
displayName = CTV1R1
universalName = CTV1R1
db2Function = DB_CLIENT_AND_SERVER
db2WsName = CTV1R1
END OBJECT;
```

The *Import Installed Subsystem Information* icon can be selected from the GUI which will import all files in the DATA directory with a file extension of .*OS.

After successfully importing this file with the Data Importer, Figure 94 on page 131 shows some of the imported SNA definitions for our workstation.

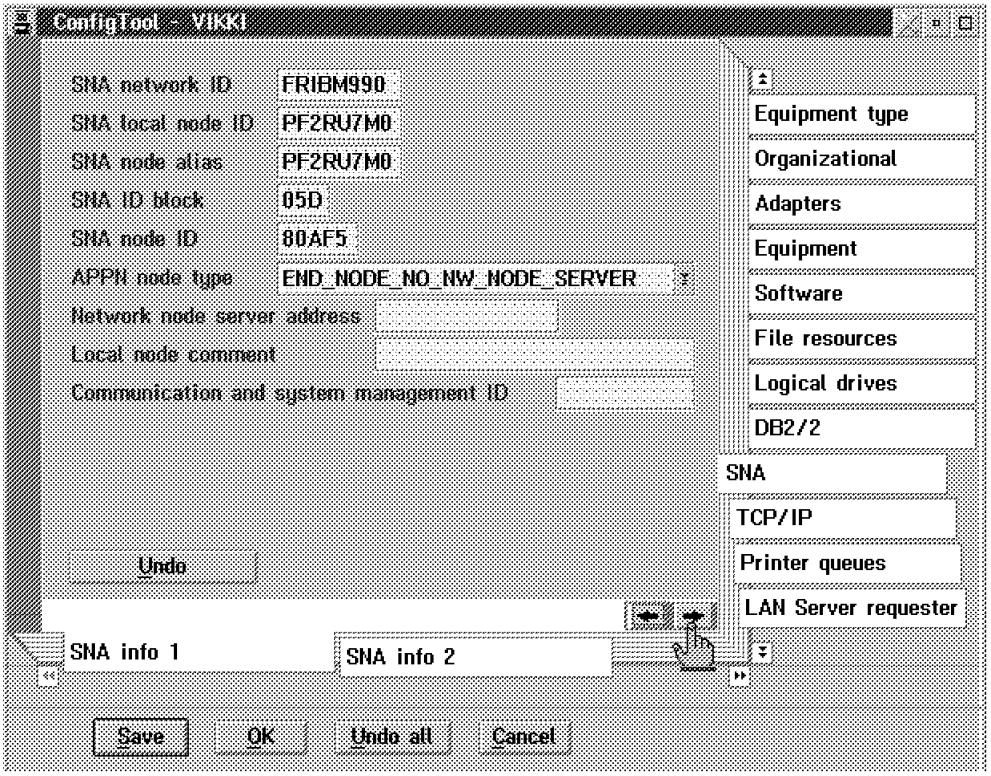

Figure 94. Imported SNA Definitions for Workstation

The following is an extract from the intermediate flat file created by the hardware extractor for our workstation.

```
WS_HW
IBMLANREQUESTER INFO:
ComputerName : VIKKI
Userid :
Addr TOK Adap 0 : 08005A493E6F NOLAA
NONOVELLREQUESTER INFO:
Operating System: IBM OS/2 Base Operating System Version 2.30 CSD Level XR03003
Date & Time     : 04-11-1996  09:46:41am
ROM Copyright   :         COPR  IBM 1981  1993
Model ID        : F8            Sub-Model ID    : 64
BIOS Revision   : 06            BIOS Date       : 10/14/94
Machine Type    : IBM ThinkPad 755
Features        : Cascaded IRQ2 Controller
                : Real Time Clock
                : Extended BIOS Data Area
                : Extended Keyboard Detail
                : ABIOS not supported
Processor       : Intel 486DX2
Estimated Speed : 75 MHz
CoProcessor     : Integrated
Bus Type        : PCMCIA Bus
Keyboard Type   : 101/102 Key Enhanced Keyboard (ID AB83)
Pointer Type    : PS/2 Mouse  Buttons: 2
Pointer Version : 2.00
Equipment       : 1 Parallel Port(s)
                : 1 Serial Port(s)
                : 2 Fixed Disk(s)
                : Memory Cache
```

```
                : Flash ROM
                : Pointing Device
                : Math CoProcessor
Serial Port 1   : COM1: 03F8
Serial Port 2   : COM2: 02F8
Parallel Port 1 : LPT1: 03BC
Token Ring      : 1 Adapter(s)
Primary Token   : Port A20-A23  ROM: CC00  Int Level:  2  Address: 08005A493E6F
Primary Video   : SVGA  Video Memory: 1,024 K
Primary Display : Super VGA Display
Fixed Disk 1    :    771MB (   790,272KB) (   809,238,528 bytes)
                : Cylinders     784  Heads/Cyl   32  Sectors/Head   63
Fixed Disk 2    :    164MB (   167,960KB) (   171,991,040 bytes)
                : Cylinders     988  Heads/Cyl   10  Sectors/Head   34
Logical Drive C : Size    11,060KB (    10.8MB)  Avail     9,160KB (     8.9MB)
                : Total Units      2,765  Sectors/Unit   8  Bytes/Sector    512
                : Avail Units      2,290  Total Sectors      22,120
                : Local Drive - File System is FAT
                : Volume Label is DOS_70

Logical Drive D : Size   102,566KB (   100.1MB)  Avail    28,256KB (    27.5MB)
                : Total Units     51,283  Sectors/Unit   4  Bytes/Sector    512
                : Avail Units     14,128  Total Sectors     205,132
                : Local Drive - File System is FAT
                : Volume Label is OS2
Logical Drive E : Size   102,566KB (   100.1MB)  Avail    69,086KB (    67.4MB)
                : Total Units     51,283  Sectors/Unit   4  Bytes/Sector    512
                : Avail Units     34,543  Total Sectors     205,132
                : Local Drive - File System is FAT
                : Volume Label is HDD_E
Logical Drive F : Size   571,344KB (   557.9MB)  Avail   225,392KB (   220.1MB)
                : Total Units     35,709  Sectors/Unit  32  Bytes/Sector    512
                : Avail Units     14,087  Total Sectors   1,142,688
                : Local Drive - File System is FAT
                : Volume Label is HDD_F
```

The *Import Installed Hardware Information* icon can be selected from the GUI and will import all files in the DATA directory with a file extension of .*HW.

After successfully importing this file with the Data Importer, Figure 95 on page 133 shows the the notebook page of the workstation with different imported details.

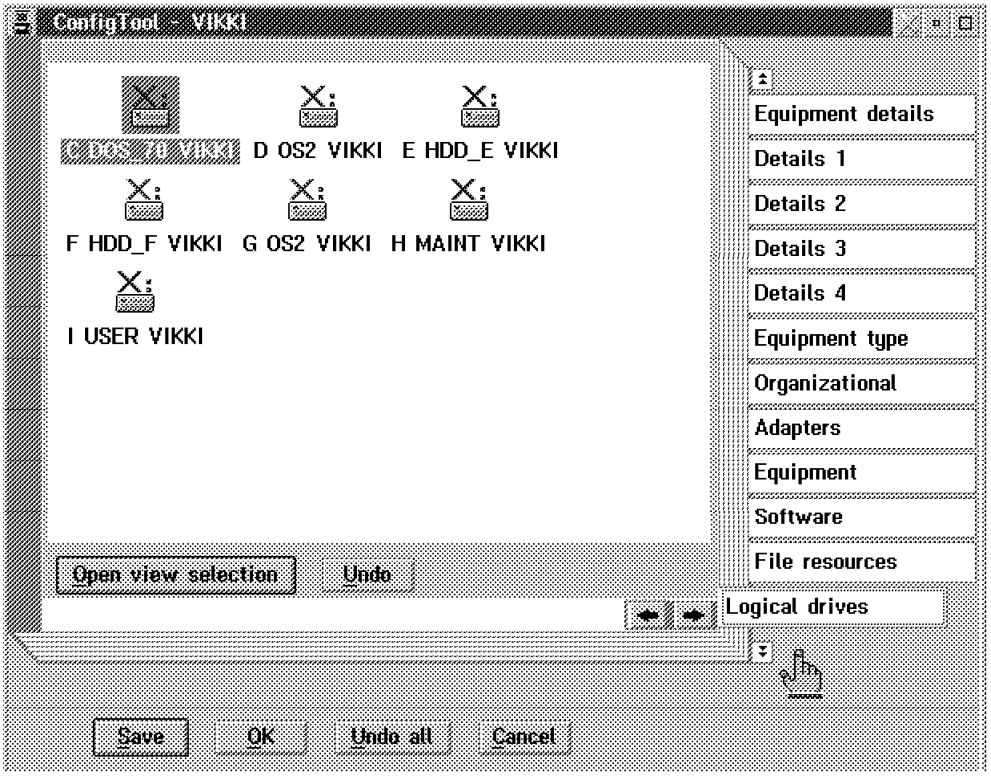

Figure 95. Imported Hardware Definitions for Workstation

The following is a portion of the extracted software file from our machine.

```
WS_SW
IBMLANREQUESTER INFO:
ComputerName : VIKKI
Userid :
Addr TOK Adap 0 : 08005A493E6F NOLAA
TITLE   IBM OS/2 LAN Adapter and Protocol Support
TYPE    OS/2
OPSYS   NO
LOC     D:\IBMCOM\SYSLEVEL.TRP
VER     2
REL     60
MOD     5
CSD     WR08000
PREVCSD WR08000

TITLE   IBM OS/2 Socket/Multi-Protocol Transport Services
TYPE    OS/2
OPSYS   NO
LOC     D:\MPTN\SYSLEVEL.MPT
VER     2
REL     00
MOD     1
CSD     WR08000
PREVCSD WR08000

TITLE   IBM OS/2 Base Operating System
TYPE    OS/2
OPSYS   YES
LOC     D:\OS2\INSTALL\SYSLEVEL.OS2
```

```
VER     3
REL     00
MOD     0
CSD     XR03003
PREVCSD XR03003

TITLE   IBM DB2/2 - Query Manager
TYPE    OS/2
OPSYS   NO
LOC     F:\SQLLIB\SYSLEVEL.QRW
VER     1
REL     20
MOD     1
CSD     WR07035
PREVCSD WR07000

TITLE   IBM LAN Network Manager for OS/2
TYPE    OS/2
OPSYS   NO
LOC     F:\LM20\SYSLEVEL.LNM
VER     2
REL     00
MOD     0
CSD     LM00000
PREVCSD LM00000

TITLE   IBM Heterogeneous LAN Management (HLM) Kernel
TYPE    OS/2
OPSYS   NO
LOC     F:\TMPLSM\SYSLEVEL.HLM
VER     1
REL     01
MOD     0
CSD     HM03000
PREVCSD HM02000

TITLE   IBM LAN Station Manager MIB
TYPE    OS/2
OPSYS   NO
LOC     F:\TMPLSM\SYSLEVEL.MIB
VER     1
REL     01
MOD     0
CSD     MB03000
PREVCSD MB02000

TITLE   IBM LAN NetView Management Utilities for OS/2
TYPE    OS/2
OPSYS   NO
LOC     F:\LMU2\SYSLEVEL.LMU
VER     1
REL     00
MOD     0
CSD     LM00200
PREVCSD LM00200
```

The *Import Installed Software Information* icon can be selected from the GUI which will import all files in the DATA directory with a file extension of .*SW.

After successfully importing this file with the Data Importer, Figure 96 on page 135 shows the the notebook pages of the workstation with different software installed.

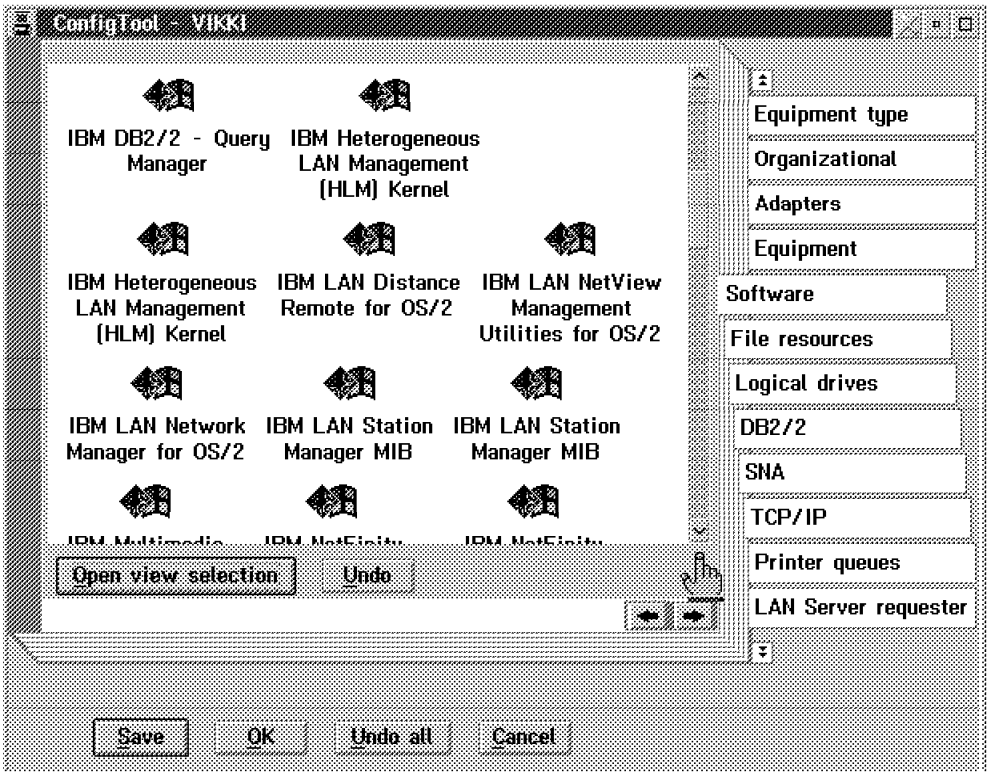

Figure 96. Imported Software Installed on Workstation

6.3.6.1 The Workstation Extractor Diskette

On stand-alone workstations without any LAN connections, the workstation extractor can be started from the workstation extractor diskette. The output files are then written to the diskette. Later the files can be manually moved to the managing system's data directory. You need to copy all files located in the DISKIMG directory to a diskette.

To boot the workstation extractor diskette, insert it into the diskette drive and enter:

```
SYS A:
```

from the command line of a native DOS system (not from an OS/2 DOS session).

This diskette can even check the hardware configuration of new machines with hard disks that have not been partitioned yet.

6.4 Automating the Collection of Data

This next section describes how to run the workstation extractor in LAN-connected environments using the IBM LAN Server facilities. This means that you do not have to install any agent code on the workstations from which you want to extract data.

6.4.1 Running the Workstation Extractor

As previously described, the workstation extractor creates files containing information about hardware, software, and OS/2 software definitions.

The workstation extractor control program (APACEPWS.EXE) consists of several components, mainly .EXE and .DLL files. Its purpose is to launch the different components depending on the start conditions used with the APACEPWS command.

You can start the workstation extractor from the command line as shown in the following example:

```
START /C /B /FS /MIN  x:UTILAPACEPWS.EXE x:\UTIL\ x:\DATA\ /hw /sw /os2
```

This START command will start the utilities in the background. In this example drive X: is a remote drive, which has been assigned by NET USE. Net names (starting with) can also be used.

6.5 Starting the Workstation Extractor in a LAN Environment

You could put the command to start the workstation extractor into the command file X:IBMLANDCDBUSERSuseridPROFILE.CMD and/or PROFILE.BAT, which is located on a domain controller. Depending on whether a user boots in OS/2 or DOS, either PROFILE.CMD or PROFILE.BAT is executed by the requester at the end of each logon.

By using this method, you can add the command for starting the workstation extractor in the PROFILE.CMD/.BAT files for all users on a server. This means that there is no installation process needed on the end-user workstations.

In addition, the workstation extractor programs and output files are all available on a shared server resource, so that files do not need to be installed or modified on end-user workstations.

An even better method is to create a command file called, for example, APACECLI.CMD, and then add only the command CALL APACECLI.CMD to each user′s PROFILE.CMD/.BAT. This allows for future changes to the calling of the workstation extractor to be done at only one place, rather than in each user′s PROFILE.CMD/.BAT file.

6.5.1 Scheduling the Workstation Extractor

The workstation extractor first checks to verify if the interval file APACFRQ.RUN exists in the directory specified in APACI.INI. It contains the number of days between two successive executions of the workstation extractor. If the interval file does not exist, an interval of seven days is assumed. The contents of the interval file, the time stamp in the time-stamp file, and the current date are taken by the workstation extractor to determine whether to run the extraction.

It is recommended that you run the workstation extractor regularly on all managed workstations. As an example, you could schedule its invocation on any managed workstation monthly, which is a fair compromise between the effort and the need to be informed about configuration changes. In a more dynamic environment, weekly scheduling might be appropriate.

6.5.2 Collecting Extracted Data from Domains

To distribute the administrative overhead, the workstation extractor can be installed on each domain. As shown in Figure 97, the APACECOL.CMD can bring the workstation data from various domains together to the central domain.

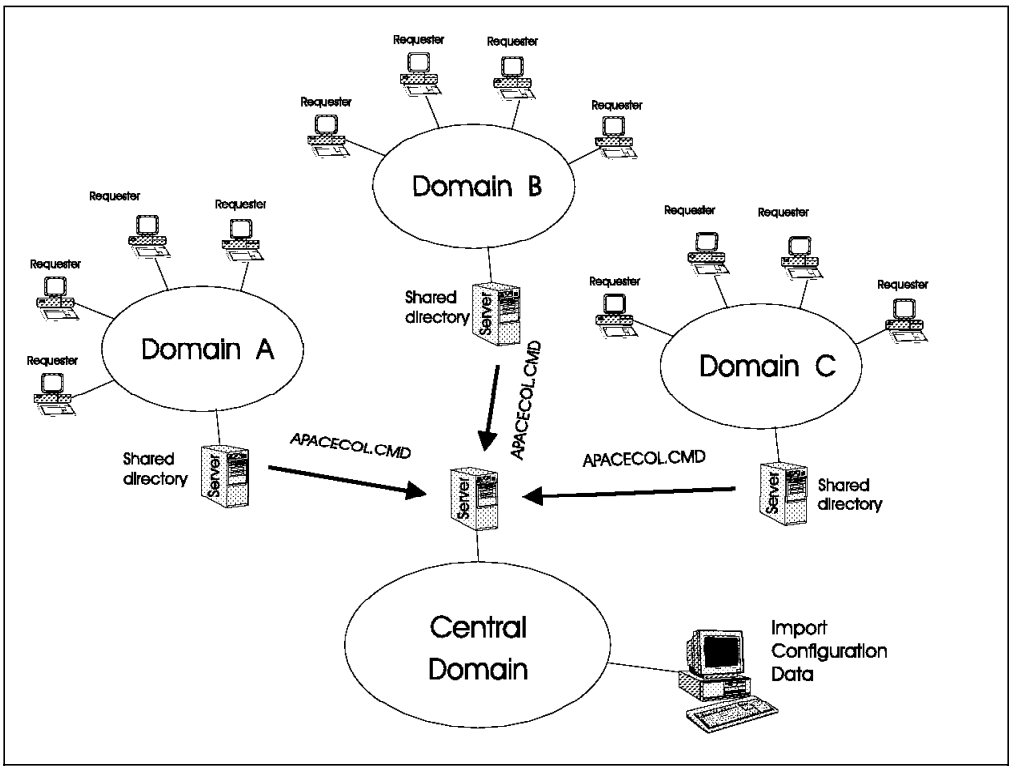

Figure 97. Collecting Workstation Extractor Data from Different Domains

You can customize the sample APACECOL.CMD file supplied with ConfigTool to suit your environment.

6.6 Delta Processing

In most environments, you may want to periodically extract information from your environment to verify that it is still current. The problem with this, however, is that you may often be transporting and processing information that has not changed. To minimize the transferring and importing of unchanged data, a delta processing utility is provided which allows you to check the data previously extracted, and then only transfer the information that has been modified since that last data extraction. This mechanism avoids transporting unchanged data and can significantly reduce the network traffic loads that may occur. The delta processing mechanism is available for the OS/2, DOS, and Windows workstation utilities and NetFinity extractors.

The delta processing is performed by a program which can be run either:

- Before transmitting the data to the ConfigTool database, or
- Before importing into the ConfigTool database.

Delta processing can only be done if the data of the previous extraction run is still available in a certain directory. The difference is detected using an

intelligent compare of the two files (not a simple compare of time, date, or pointer addresses).

- If a difference is found, the save file is deleted and the new extract is copied to the name of the save file.
- If a difference is not found, the new file is deleted because the files are the same. The save file is not touched and is kept as the data used in the last transmitted or imported file.
- If the delta processing is being used for the first time, no save file exists, so the extracted file is copied to the save file.

For complete details on running the delta processing utility, please refer to the *ConfigTool Reference Guide* provided with this redbook.

6.7 Keeping Your User Data Up-to-Date

One of the most difficult and manual types of data to try and keep up to date is that of User/Administrative data. This is information such as:

- User Names and Addresses
- User Job Descriptions
- Locations and Buildings
- Organizational data such as departments

This is the information that usually needs to be collected via paper mechanisms and then manually input and continually tracked by human administrators.

Through the use of functions in products such as NetFinity, which provides a tool that allows your user to graphically input this sort of information, the task is becoming easier. However, there may be cases where you either do not want agent code such as NetFinity Services installed on all your workstations, or you have some non-LAN attached workstations where it can not be installed.

This next section shows you an example program supplied with this redbook that allows you to:

- Collect User data from LAN and non-LAN attached workstations
- Keep the information updated (as much as possible!) through an automatic checking process on the user workstations
- Automatically creates an intermediate flat file that can be collected and imported directly into the ConfigTool database.

Please Note!

This program is not part of the ConfigTool application but is simply an example developed for and supplied with this redbook.

The purpose of this program is to be able to obtain administrative information on the user of a specific workstation and to try and keep this information up-to-date with some automation.

The ConfigTool User Information program provides the following functions:

- On installation, it pops up a window on the startup of the workstation requesting the user to supply personal data.
- On selecting OK, the program creates an .IFF file and stores it on the user workstation.
- On the next startup of the workstation it checks the previous time the program was executed, and if older than the date specified on installation, pops the window up to the user again requesting them to confirm if the currently stored data is correct.
- Can only be deleted by running the installation program again. The reason for this is that many administrators find that users can remove components from startup files, etc., that they do not want to be bothered with.
- Provides a prompt help for each of the fields and functions that can be selected.
- Provides a file of job titles, or descriptions, that are used to create a pull-down menu for user selection. This file can be edited to suite individual requirements.

Figure 98 shows the icon that is placed in the user's startup file upon installation of the program. When installing this program you will be asked to supply a number between 1 to 31, which is the number of days between execution of the program.

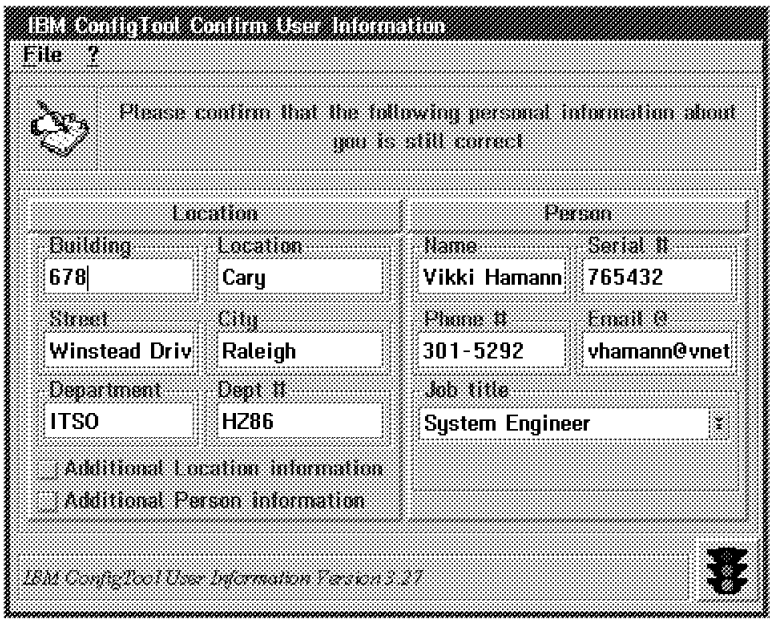

Figure 98. ConfigTool Automatic Execution on Startup

Figure 99 on page 140 shows the User Information panel that allows various types of personal information to be input by the user. Each of these fields maps back to the data model used by ConfigTool and each field is the length of the corresponding data model field.

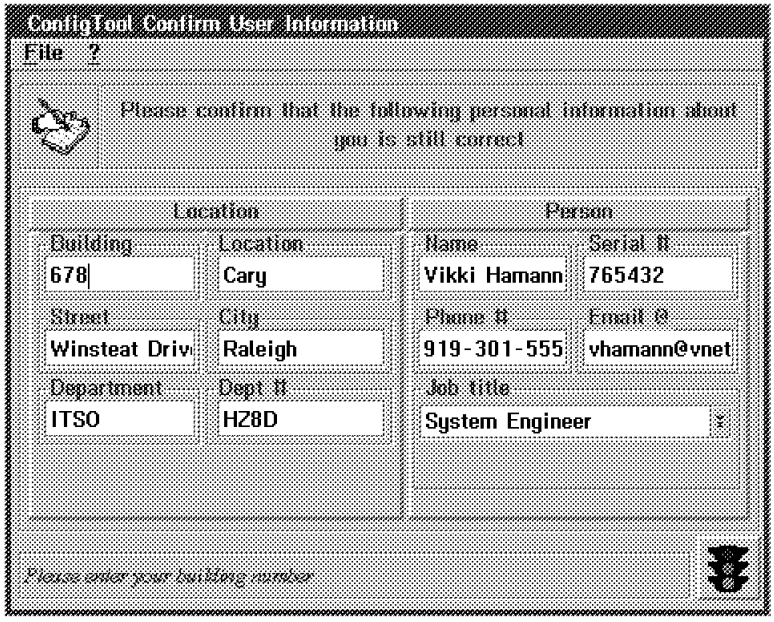

Figure 99. ConfigTool User Information Panel for Entry/Confirmation

If the user should choose to only enter some of the information, the program displays the empty field red, and prompts the user to enter the appropriate information, as shown in Figure 100. Upon moving the cursor over any field in the panel, text appears at the bottom of the screen indicating the type of data to enter.

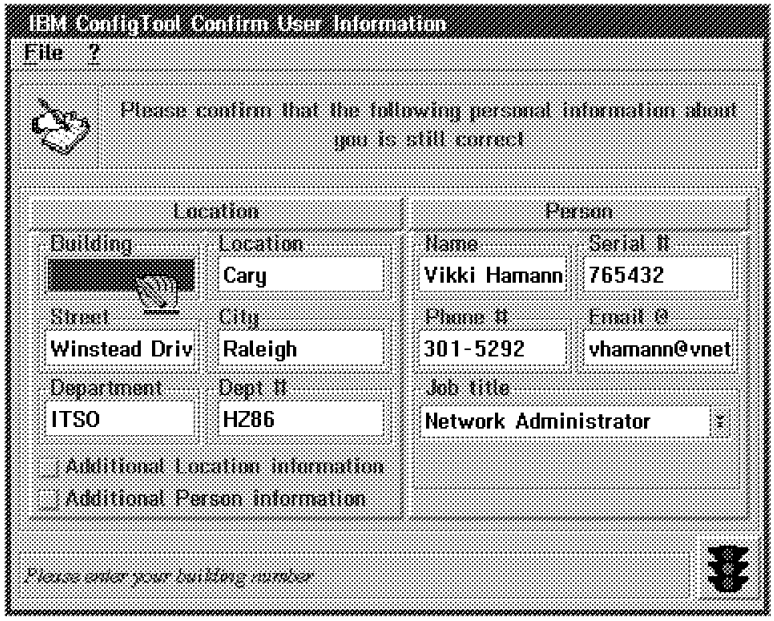

Figure 100. Automatic Detection on Null Entry

Upon entering all information, the user can select **OK** (the stoplight icon), which creates an intermediate flat file with a unique name and stores it on the workstation. The program also updates the OS2.INI or WIN.INI file to indicate when the next invocation should occur.

There are two additional options on the user panel where additional data can be entered:

- **Additional Location Information**

  This is a pop-up window where the user can enter room, floor and fax numbers as shown in Figure 101.

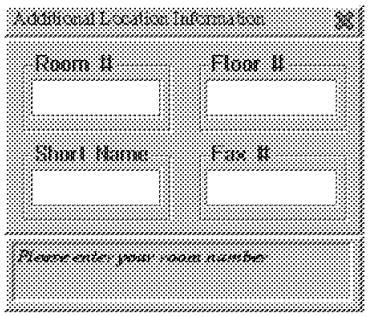

Figure 101. Additional Location Information

- **Additional Person Information**

  This is a pop-up window where the user can enter alternate mail and phone, and mail drop address as shown in Figure 102.

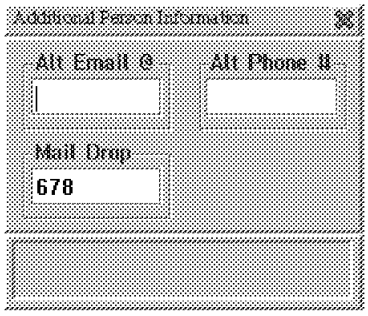

Figure 102. Additional Person Information

Both of these windows are optional. The user does not need to complete before closing the User Information window.

The following is an example of the intermediate flat file that is created by the program. This file has a file extension of .IFF and is in a format readable by the Importer. The .IFF user files can be collected to a central point accessible by the Importer and directly loaded into the ConfigTool database.

```
TOOL CNFTUSRD
VERSION X0101
OBJECT APAC_Person 000001
employeeNumber = 999105
firstName = Steve
lastName = Golberg
externalPhoneNumber = (919)-355-5555
emailAddress = sgolberg@vnet.ibm.com
typeOfEmail = INTERNET
alternateEmailAddress = SGOLBERG at RALVM14
alternateTypeOfEmail = VNET
faxNumber = 352-5544
title = Mgmt Consultant
```

```
displayName = Steve Golberg
universalName = Steve Golberg
END OBJECT;
OBJECT APAC_Location 000002
siteName = RTP
building = 500
floor = 3
room = CC302
displayName = RTP500
universalName = RTP500
END OBJECT;
OBJECT APAC_Address 000003
city = Raleigh
street1 = Davis Drive
displayName = Raleigh
universalName = Raleigh
END OBJECT;
OBJECT APAC_Organization 000004
auxPhoneNumber = (919) 333-3249
mailDrop = RTP500
organizationName = Systems & Network Management
shortName = SNMGMT
organizationNumber = 2345
organizationType = DEPARTMENT
displayName = SNMGMT Systems & Network Management
universalName = SYNW/MGMT Systems & Network Management
END OBJECT;
RELATION APAC_RelationshipManager 000100
fromId = 000004
toId = 000002
type = isAt
END RELATION;
RELATION APAC_RelationshipManager 000101
fromId = 000001
toId = 000002
type = isAt
END RELATION;
RELATION APAC_RelationshipManager 000102
fromId = 000001
toId = 000004
type = isIn
END RELATION;
RELATION APAC_RelationshipManager 000103
fromId = 000002
toId = 000003
type = has
END RELATION;
RELATION APAC_RelationshipManager 000104
fromId = 000004
toId = 000003
type = has
END RELATION;
RELATION APAC_RelationshipManager 000105
fromId = 000001
toId = 000003
type = hasBusinessAddress
END RELATION;
END TOOL;
```

Figure 103 on page 143 shows the person notebook page with the imported details.

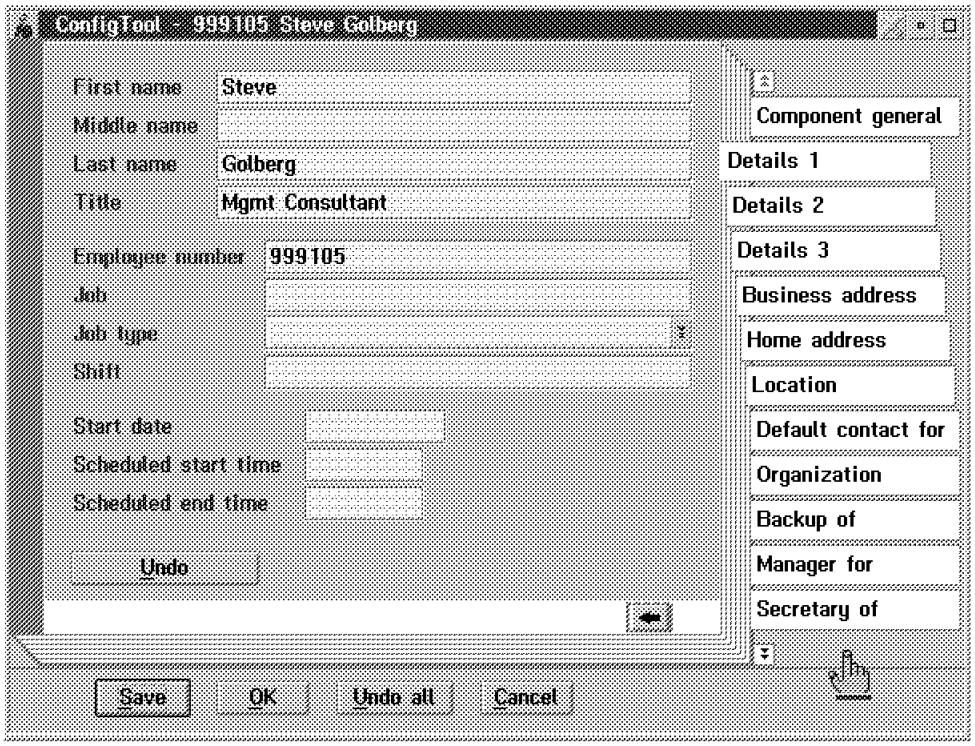

Figure 103. Imported Person Details

Please refer to Appendix A, “Installation of ConfigTool User Extractor” on page 145 for installation steps for the ConfigTool User Information program.

6.8 Maintenance of the ConfigTool Database

Database services can be configured either in a stand-alone mode or as a network Database Server machine. Maintenance services provided by DB2/2 include import and export of bulk data, backup and restore, table reorganization and optimization statistics.

ConfigTool provides a reorganize database function available from the ConfigTool Database Tools folder as shown in Figure 104 on page 144.

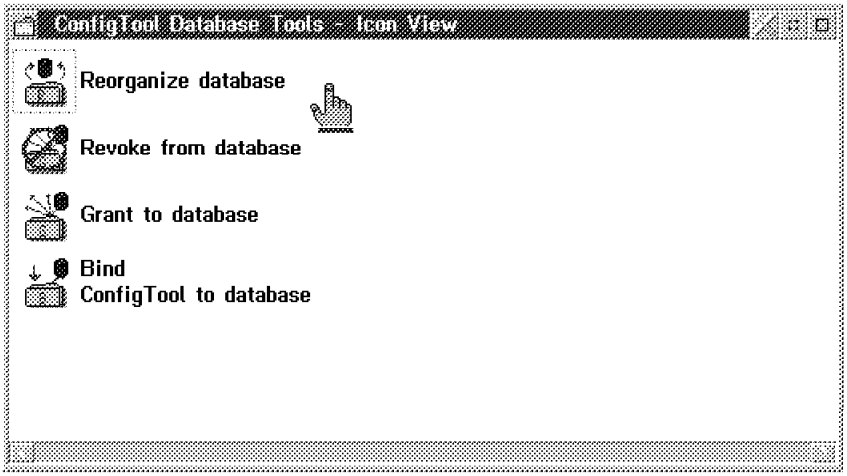

Figure 104. ConfigTool Data Tools Functions

You should consider the normal procedures for backing up your DB2/2 Database for ConfigTool. This is done through the normal DB2/2 database facilities of query manager to backup local databases.

For further details on maintenance tasks such as reorganizations and backup of the ConfigTool database please refer to the appropriate product publications for DB2/2.

Appendix A. Installation of ConfigTool User Extractor

This appendix describes how to install the ConfigTool User Information program described in this document and included in this redbook package. It takes you through the following:

- Installation of the OS/2 version of the program
- Installation of the Windows (3.1 and '95) version of the program
- Example of the object identification file and default value files created by the program
- Example of command used to import the intermediate flat files created by the program

A.1 OS/2 Installation of User Information Program

There are two files contained on the diskette included in this redbook package:

1. CNFTINST.EXE which contains all programs for the OS/2 version.
2. CNFTINSW.EXE which contains all programs for the windows version.

To install the OS/2 version you should copy the files from the diskette onto a temporary directory, and then perform the following steps:

- To extract the program, enter the following at the directory where CNFTINST.EXE is:

  ```
  [C:TEMP]CNFTINST
  ```

  This command will unpack all files for the program including the INSTALL.EXE.

- You should next enter the INSTALL command to invoke the Software Installer for OS/2 program. The window shown in Figure 105 should be displayed to you.

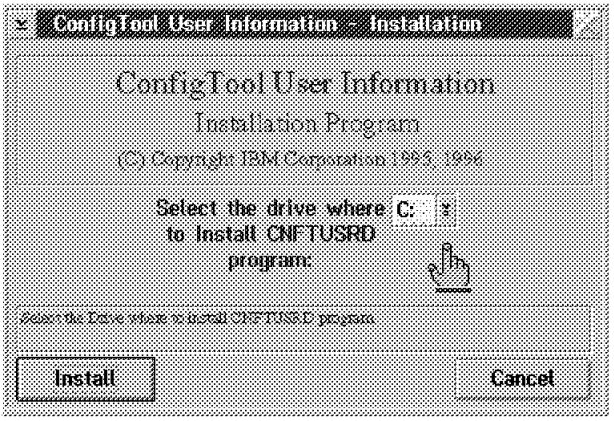

Figure 105. ConfigTool User Information Installation

From this window, you should select the drive where you would like all program files to be placed, and then select the **Install** push button.

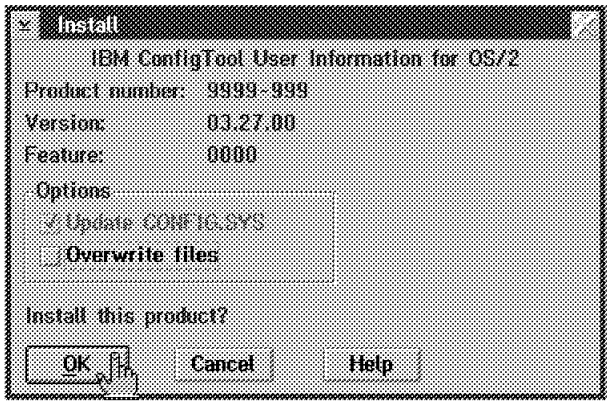

Figure 106. Select OK to Continue Installation

Figure 106 shows the Install Window where you should select **OK** to continue to the installation.

The Install - directories window shown in Figure 107 should be displayed to you next where you have the option to check the **Disk space** push button to check available disk space. You should then select **Install** to continue the installation.

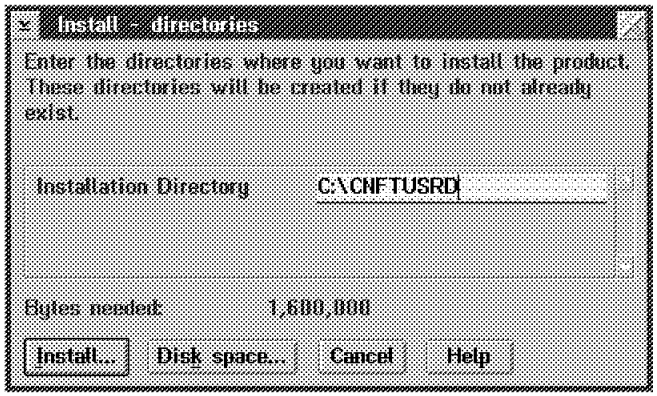

Figure 107. Select Install

Throughout the installation, you will be displayed with the progress window as shown in Figure 108.

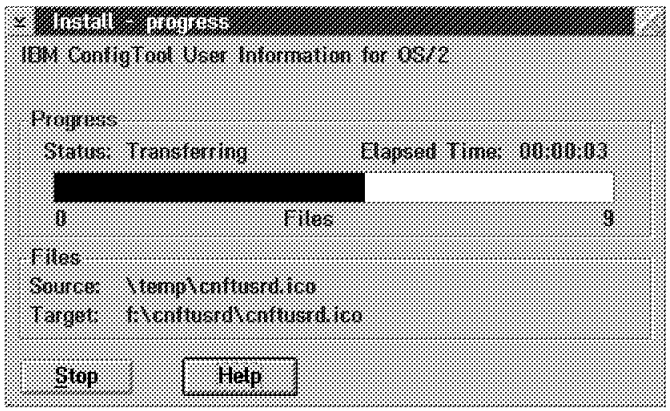

Figure 108. Installation Progress Window

On successful installation, you will see the window shown in Figure 109 on page 147.

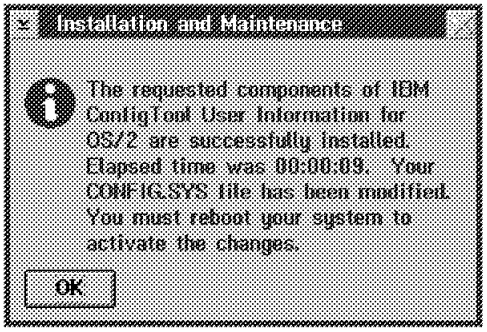

Figure 109. Successful Installation

You must reboot your workstation after successfully installing the User program.

The window shown in Figure 110 should be displayed after rebooting the workstation.

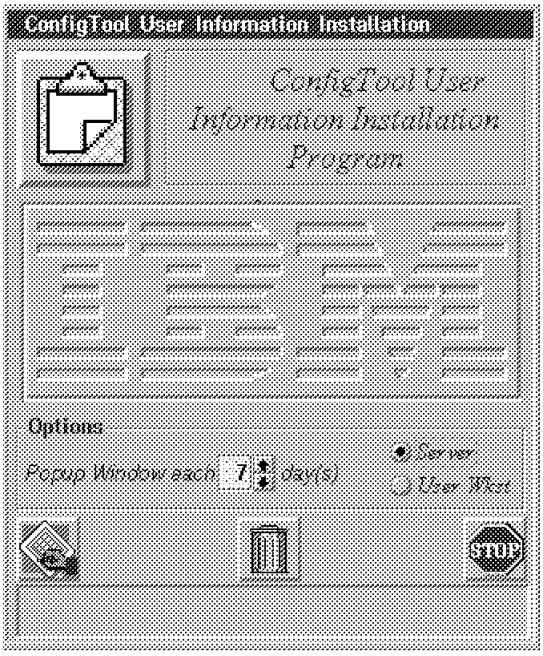

Figure 110. Installation of Type of ConfigTool User Program

The following is a description of each of the options available to you on this window:

- The Popup Window each option allows you to specify a number from 1 to 31 which is the number of days between each execution of the pop-up window. For example, if you leave the default as 7, the program will execute each 7 days asking the user to confirm that the information is still current.
- You can select either **Server** or **User** options. Server should only be selected if the ConfigTool application is running on the workstation and will create the following:

- A ConfigTool User Information icon in the main icon view window of ConfigTool
- A Default Value File
- An Object Identification File
- A Job Title file to be used on the User Information panel

- The icon on the left-hand side will install the program.
- The icon in the middle will remove the ConfigTool User Information program. The password required to remove it is CNFTUSRD.
- The Stop icon on the right-hand side will stop the installation process.

Figure 111 shows the window that will be displayed to you on successful installation.

Figure 111. Successful Installation

A.2 Windows Installation

The CNFTINSW.EXE file contains all programs necessary for the windows version of the User Information program. You should install this file on a temporary directory and then issue the following command to unpack them:

```
[C:WINTEMP]CNFTINSW
```

This command will unpack the following three programs which are required:

- THREED.VBX
- VBRUN300.DLL
- CNFTUSRD.EXE

You then need to copy the .VBX and .DLL files to the Windows System directory, which should be located in one of the following places:

- For native Windows 3.1 it should be in the WINDOWS\SYSTEM directory.
- For Windows 95 it should be in the WIN95\SYSTEM directory.
- For WIN/OS2 it should be on the OS/2 boot drive in the OS2\MDOS\WINOS2\SYSTEM.

You should place the CNFTUSRD.EXE file in another directory, for example CNFTUSRW. Please note that this cannot be the same directory as the OS/2 version of the program!

You then need to edit the WIN.INI file located in one of the following places:

- WINDOWS for native 3.1
- WIN95 for Windows 95
- OS2\MDOS\WINOS2 for WIN\OS2

On the top of the file you should see a RUN= entry where you should enter RUN=F:\CNFTUSRW\CNFTUSRD.EXE as shown below. If the run entry is already in use by another program, just add this new entry after that one.

```
[windows]
load=
run=F:\CNFTUSRW\CNFTUSRD.EXE
Beep=yes
Spooler=no
NullPort=None
device=PostScript Printer,pscript,LPT1.OS2
BorderWidth=3
CursorBlinkRate=530
DoubleClickSpeed=452
Programs=com exe bat pif
Documents=
DeviceNotSelectedTimeout=15
TransmissionRetryTimeout=45
KeyboardDelay=2
KeyboardSpeed=31
ScreenSaveActive=0
ScreenSaveTimeOut=120
```

You should then be able to launch Windows, and the CNFTUSRD welcome window should appear. Figure 112 on page 150 shows an example of the Windows 3.1 User Information pop-up.

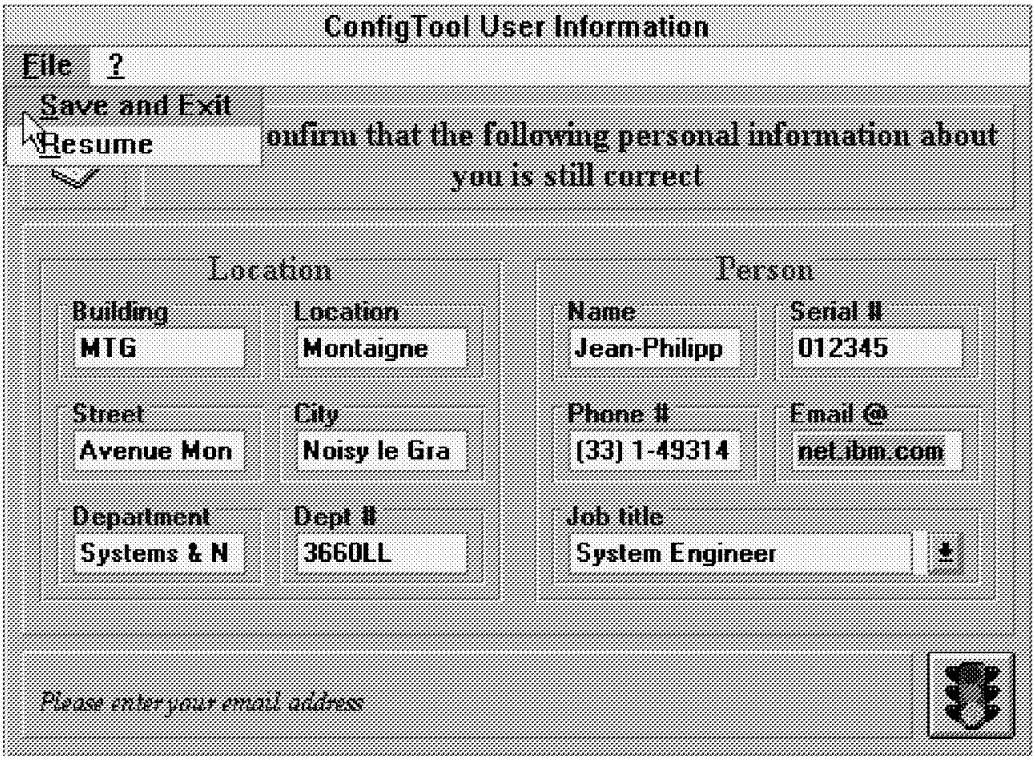

Figure 112. Windows 3.1 ConfigTool User Program

Figure 113 shows an example of the Windows95 User Information pop-up.

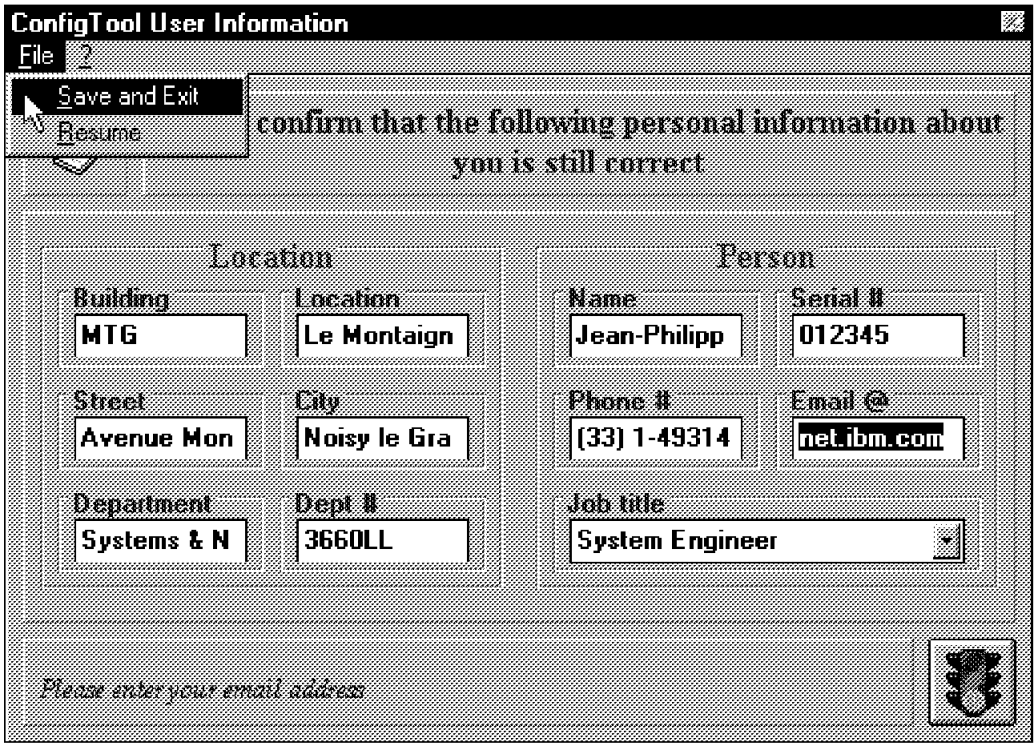

Figure 113. Windows 95 ConfigTool User Program

A.3 Additional Files Created

The User program also allows you to specify a file of job descriptions used within your organization. This file will be used to create a pull-down menu option on the Job title field in the User Information panel as shown in Figure 114.

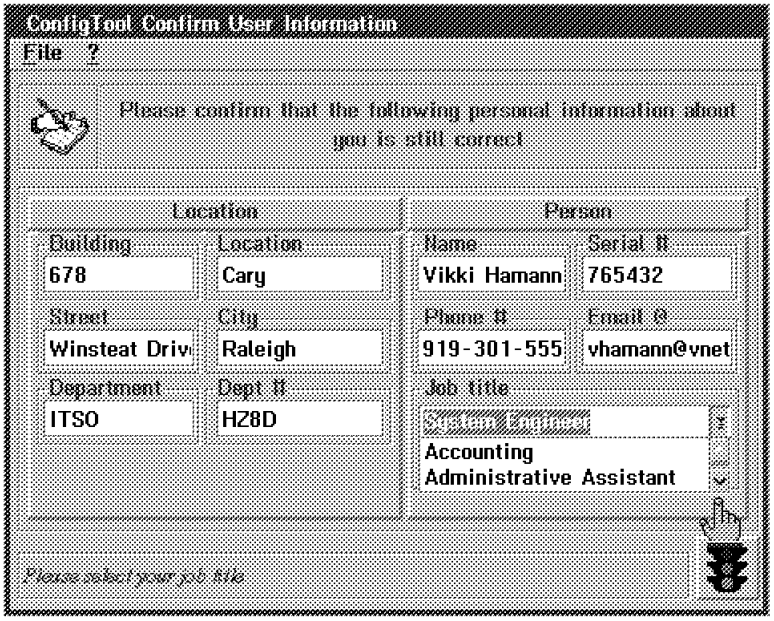

Figure 114. Pull-Down Menu of Available Job Descriptions

The following is the CNFTUSRD.JOB file which is used to create the pull-down menu option of Job Titles that can be chosen by the user. This file can be edited to include the job descriptions that you would like your users to choose from.

```
*-------------------------------------------------------------------------------*
* (C) Copyright IBM Corporation 1995, 1996                                      *
*-------------------------------------------------------------------------------*
* This file is designed to be used by the ConfigTool User Information Program *
*-------------------------------------------------------------------------------*
*                                      Maximum
*                                         V
System Engineer
System Programmer
Programmer
Engineer
Designer
Helpdesk
Manager
Network Administrator
Accounting
Security
Administrative Assistant
*-------------------------------------------------------------------------------*
```

A.3.1 The OID and Default Value File

As previously described, the object identification file and the default value file are used by the importer both to identify objects in the database, and to check update authorizations for the different extractor tools.

Unique identification of an object is necessary on import to decide whether an object is to be updated if it is already in the database, or inserted if it is not already in the database. The rules used by the importer to identify an object uniquely is based upon the attributes and/or relationships supplied as criteria by the extractors as previously described.

The User program developed will automatically create a default value file and an object identification file when installing the program with the Server option selected.

A.3.1.1 Default Value File

The following is the default value file that will be created:

```
#-------------------------------------------------------------------------
BEGOBJDEF CNFTUSRD: APAC_Location
CNFTUSRD: currentStatus           = ACTIVE
CNFTUSRD: siteName                =
CNFTUSRD: building                =
ENDOBJDEF
#-------------------------------------------------------------------------
BEGOBJDEF CNFTUSRD: APAC_Address
CNFTUSRD: currentStatus           = ACTIVE
CNFTUSRD: city                    =
CNFTUSRD: street1                 =
ENDOBJDEF
#-------------------------------------------------------------------------
BEGOBJDEF CNFTUSRD: APAC_Person
CNFTUSRD: currentStatus           = PERMANENT
CNFTUSRD: employeeNumber          =
CNFTUSRD: firstName               =
CNFTUSRD: lastName                =
CNFTUSRD: externalPhoneNumber     =
CNFTUSRD: emailAddress            =
CNFTUSRD: title                   =
ENDOBJDEF
#-------------------------------------------------------------------------
BEGOBJDEF CNFTUSRD: APAC_Organization
CNFTUSRD: currentStatus           = ACTIVE
CNFTUSRD: organizationName        =
CNFTUSRD: organizationNumber      =
ENDOBJDEF
#-------------------------------------------------------------------------
```

A.3.1.2 Object Identification File

The following is the object identification file that will be created.

```
#************************** APAC_ORGANIZATION *************************
OBJIDENT "APAC_Organization"
   GROUP CNFTUSRD
      ETEST OBJ "APAC_Organization" ATTR "organizationNumber" MANDATORY
      QUERY OBJ "APAC_Organization"
         RESTRICT (OBJ "APAC_Organization" ATTR "organizationNumber")
         TO OBJ "APAC_Organization" %ORG%
```

```
      RESULT %ORG%
   ENDGROUP

ENDOBJIDENT
#************************** APAC_Person ************************************
OBJIDENT "APAC_Person"

   GROUP CNFTUSRD
      ETEST OBJ "APAC_Person" ATTR "firstName" MANDATORY
      ETEST OBJ "APAC_Person" ATTR "lastName" MANDATORY
      QUERY OBJ "APAC_Person"
         RESTRICT (OBJ "APAC_Person" ATTR "firstName" AND
                   OBJ "APAC_Person" ATTR "lastName")
         TO OBJ "APAC_Person" %PER%
      RESULT %PER%
   ENDGROUP

   GROUP CNFTUSRD
      ETEST OBJ "APAC_Person" ATTR "employeeNumber" MANDATORY
      QUERY OBJ "APAC_Person"
         RESTRICT (OBJ "APAC_Person" ATTR "employeeNumber")
         TO OBJ "APAC_Person" %PER%
      RESULT %PER%
   ENDGROUP
ENDOBJIDENT

#************************** APAC_Address ******************************
OBJIDENT "APAC_Address"
   GROUP CNFTUSRD
      ETEST OBJ "APAC_Address" ATTR "city" MANDATORY
      ETEST OBJ "APAC_Address" ATTR "street1" MANDATORY
      QUERY OBJ "APAC_Address"
         RESTRICT (OBJ "APAC_Address" ATTR "city" AND
                   OBJ "APAC_Address" ATTR "street1")
         TO OBJ "APAC_Address" %ADD%
      RESULT %ADD%
   ENDGROUP
ENDOBJIDENT

#************************** APAC_Location *********************************
OBJIDENT "APAC_Location"
   GROUP CNFTUSRD
      ETEST OBJ "APAC_Location" ATTR "room" MANDATORY
      ETEST OBJ "APAC_Location" ATTR "building" MANDATORY
      QUERY OBJ "APAC_Location"
         RESTRICT (OBJ "APAC_Location" ATTR "room" AND
                   OBJ "APAC_Location" ATTR "building" AND
                   OBJ "APAC_Location" ATTR "siteName" OPTIONAL AND
                   OBJ "APAC_Location" ATTR "floor" OPTIONAL)
         TO OBJ "APAC_Location" %LOC%
      RESULT %LOC%
   ENDGROUP

ENDOBJIDENT
```

A.3.1.3 Importing the User Flat Files

When importing the intermediate flat files that have been created by the User extractor program, you must specify both of the above files to be used by the Importer. The following command was used to import the intermediate flat files:

```
APACIIMP *.IFF /OID=CNFTUSRD.OID /DFV=CNFTUSRD.DFV
```

The * wildcard character can be used to import multiple files.

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International Technical Support Organization
Getting Started With Configuration Management
Using ConfigTool
April 1996

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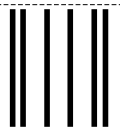

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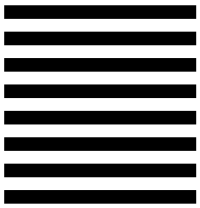

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