Integration Examples for Tivoli IT Director: A First Look

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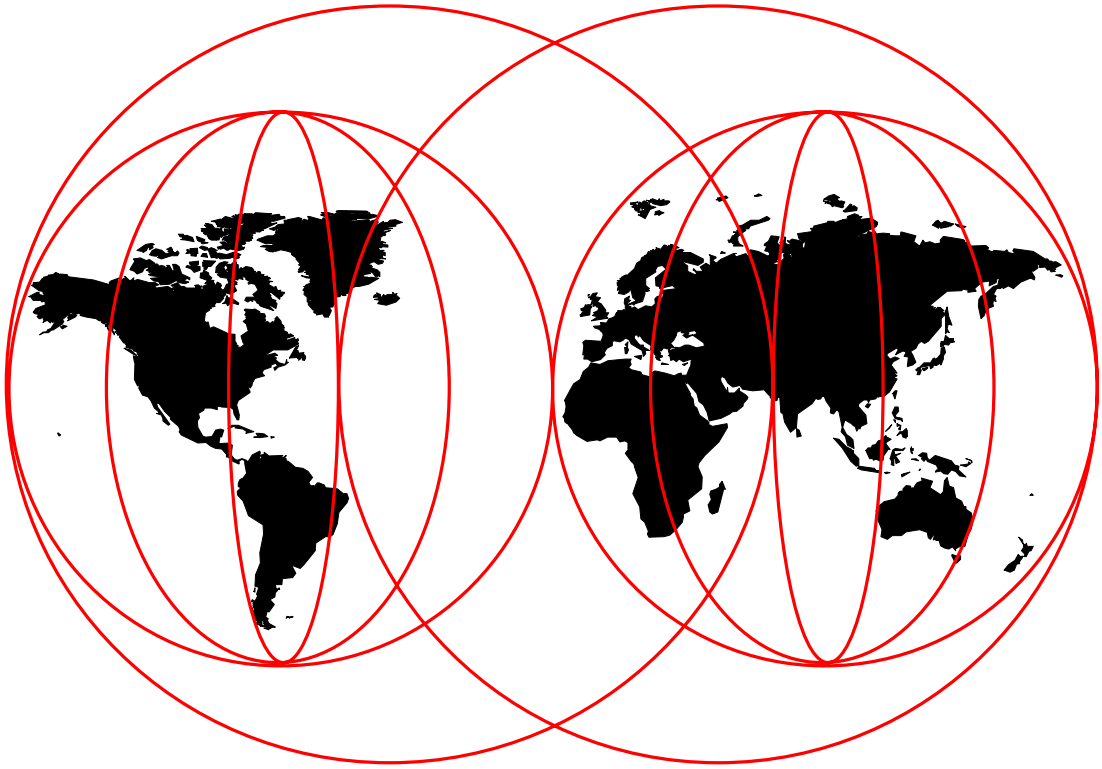

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Integration Examples for Tivoli IT Director: A First Look

August 1998

Take Note!

Before using this information and the product it supports, be sure to read the general information in Appendix C, “Special Notices” on page 251.

First Edition (August 1998)

This edition applies to V1.0 of Tivoli IT Director for use with the Windows NT 4.0 Operating System.

Note

This book is based on a pre-GA version of a product and may not apply when the product becomes generally available. We recommend that you consult the product documentation or follow-on versions of this redbook for more current information.

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Preface

This redbook provides an overview of the functions in the new Tivoli IT Director systems management product. It shows how to implement all of the functions as well as provides some examples of how to exploit the new Web interface for Webcasting systems management information. Examples are provided on how to gather monitoring information, and how to set up for event notification as well as how to gather inventory information and distribute software.

In addition to the step-by-step installation and customization examples provided in this book, there are some examples provided for integration with non-Tivoli products on the Windows NT platform.

This book helps show you the benefits of this workgroup systems manager in a small LAN environment. There are lots of examples of how to gather problem-related information and how to display the information on a Tivoli IT Director console as well as how to broadcast and display the information on a Web browser.

The Team That Wrote This Redbook

This redbook was produced by a team of specialists from around the world working at the Systems Management and Networking ITSO Center, Raleigh.

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IBM RTP

Roy Ritthaler, Greg Bryant
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Chapter 1. Overview of Tivoli IT Director and the Environment

This redbook assists with the installation and customization of Tivoli IT Director with agents using different operating systems platforms.

A working knowledge of Microsoft's Systems Management Server (SMS), Intel's LANDesk and IBM's Netfinity is important in understanding some of the management and customization that we have shown throughout this book. This publication discusses our experiences working with Tivoli IT Director V1.1 (Beta), Microsoft Systems Management Server V 1.2, Intel LANDesk V2.51, V2.52 and IBM Netfinity V4.0 and V5.0 software.

1.1 Overview of Tivoli IT Directors Functions

Tivoli IT Director is a new workgroup management product for the Webmaster and LAN administrator to use in small, but growing companies. By small, we mean 300-600 systems that are typically NT-centric. The agents can be Windows, NetWare or OS/2. Tivoli IT Director solves the problem of managing today's PC/LAN environment and addresses real system management issues, allowing users to focus on managing their primary business.

The scope of functions include management of the following computing components:

- Applications
- Internet services
- Network operating system services
- Networks
- Systems
- Hardware

Tivoli IT Director provides integrated management from the applications and the systems across the network. It also provides Internet workgroup control and management and highly automated, nearly unattended operation.

Throughout this book, you will see the following terms mentioned:

Native - Native agents or clients have the Tivoli IT Director agent code installed and communicate directly with the Tivoli IT Director Management Server.

Web - Refers to the World Wide Web (WWW) on the Internet.

AMS - Refers to Tivoli's Application Management Specification.

Tivoli IT Director is fully compatible with AMS Version 2.0.

HTML Pointers

For more information regarding AMS Version 2.0, please refer to the following HTTP addresses:

- www.redbooks.ibm.com

  Using AMS in a Tivoli Environment, SG24-2142 can be found currently in *Redpieces*.

- http://www.tivoli.com/o_products/html/body_white_paper_listing.html

  Tivoli White Papers (Managing Application Performance)

MPM - Refers to Multi-Platform Manager. This enables one management application to communicate with another management application through a standard interface, the MPM-API.

1.2 Tivoli IT Director's Main Components

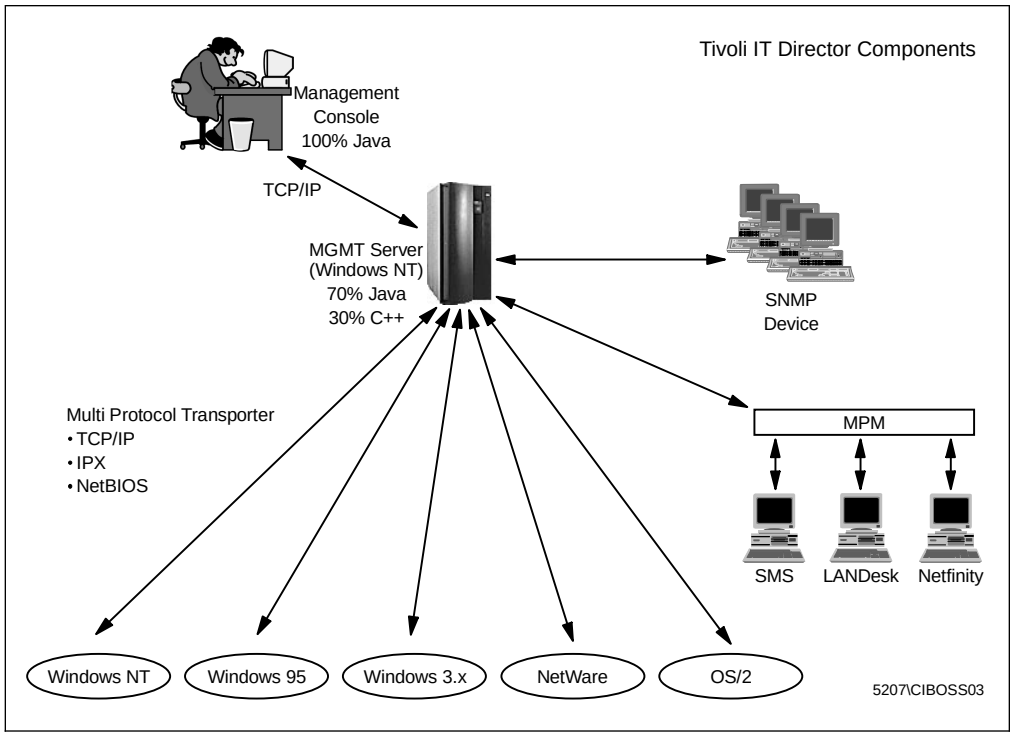


Figure 1. Tivoli IT Director Components

Tivoli IT Director is designed to operate in a client/server model and consists of the following components:

- Management console

  The Tivoli IT Director management console is the graphical user interface (GUI) from which administrative tasks are performed.

  It is the primary interface to the LAN and PC administrator.

  The management console GUI is Java-based with all state information stored on the server. It runs as a locally installed Java application in a Java Virtual

Machine (JVM). The version of code that we used included JRE 1.1.6 and SWING 1.01 as the baseline for its JVM console.

See 2.3, “Installation Prerequisites for Tivoli IT Director Management Console” on page 42 for more information.

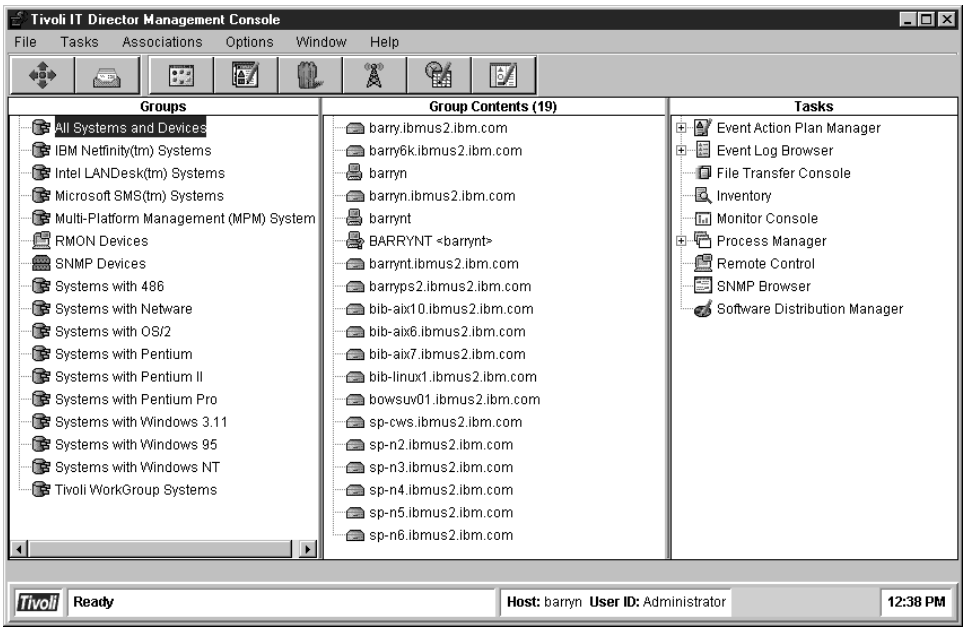


Figure 2. Tivoli IT Director Management Console GUI

- Management server

  This is the platform used for the central management server where management databases, the server engine and management application logic reside. The Tivoli IT Director management server engine resides on either Windows NT Server Version 4.0 or Windows NT Workstation Version 4.0 on an Intel-based PC. In both cases, Service Pack 3 needs to be applied to Windows NT.

  It is a Java 1.1 and native C++ application.

- Native Tivoli IT Director Agents

  The agents reside on each managed system (such as a workstation) and act as passive, non-intrusive native C++ applications.

  The Tivoli Management Agent does not have a GUI, but end users can access management data using a Web browser if the administrator has configured this feature.

  By issuing the net start command from a command line, you will be able to see what services are actually started. This is true on both the server and the agents.

```
C:\>net start

These Windows NT services are started:
   Alerter
   AppnNode
   Computer Browser
   EventLog
   FTP Publishing Service
   Gopher Publishing Service
   License Logging Service
   Messenger
   Microsoft HTTP World Wide Web Server
   MSSQLServer
   NT LM Security Support Provider
   Plug and Play
   Remote Procedure Call (RPC) Service
   Server
   Simple TCP/IP Services
   SNMP
   Spooler
   SQLExecutive
   TCP/IP NetBIOS Helper
   Tivoli WorkGroup Support Program  <=======================
   TrcBoot
   Workstation

The command completed successfully.

C:\>
```

In addition, by viewing the task manager you will be able to display the currently started processes to make sure that Tivoli IT Director is actually running. The twg* executables are for Tivoli IT Director.

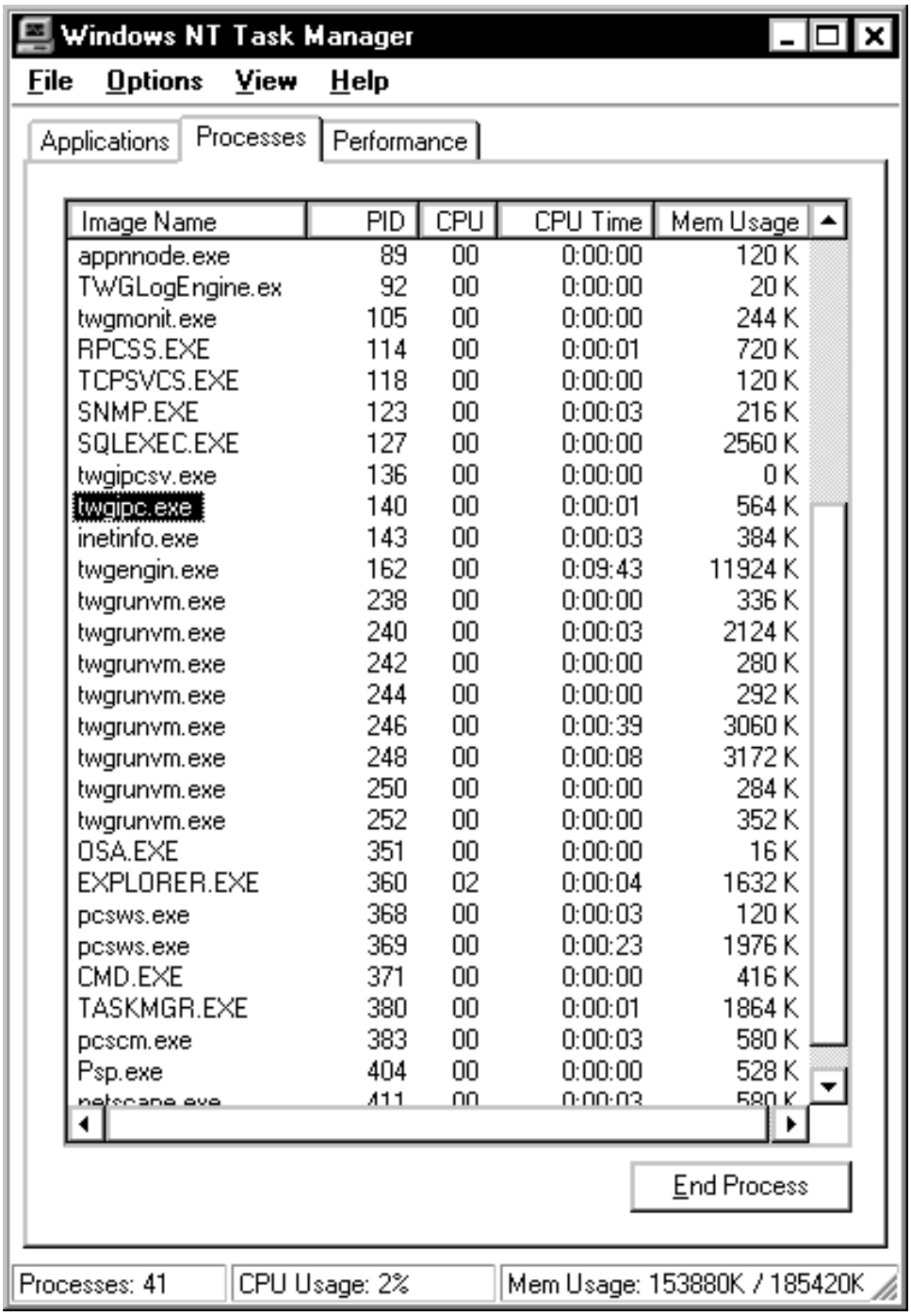


Figure 3. Windows NT Task Manager View

- Multi-Platform Manager (MPM) Providers

  MPM providers are installed on the LAN managing stations and communicate with the Tivoli IT Director management server and the LAN management applications using the MPM-API standard interface.

- SNMP Devices

  Network devices, printers, PCs or applications that have SNMP agents installed or imbedded can also be managed by Tivoli IT Director.

  Only Version 1 of SNMP is supported.

1.3 Communications Protocols

Tivoli IT Director utilizes TCP/IP to communicate between the management console and the management server.

Tivoli IT Director relies on several protocols to communicate between the management server and its native agents, including:

- TCP/IP
- NetBIOS
- IPX

Tivoli IT Director gives you the capability to define multiple protocols and have them communicate across multiple adapters. In this project we focused on the TCP/IP transport protocol for our examples.

For example, you can have your TCP/IP stack configured to communicate across an Ethernet adapter, while your NetBIOS can communicate across your token-ring adapter.

1.4 Managing Your Native Agents with Tivoli IT Director

The following figure represents a typical Tivoli IT Director environment.

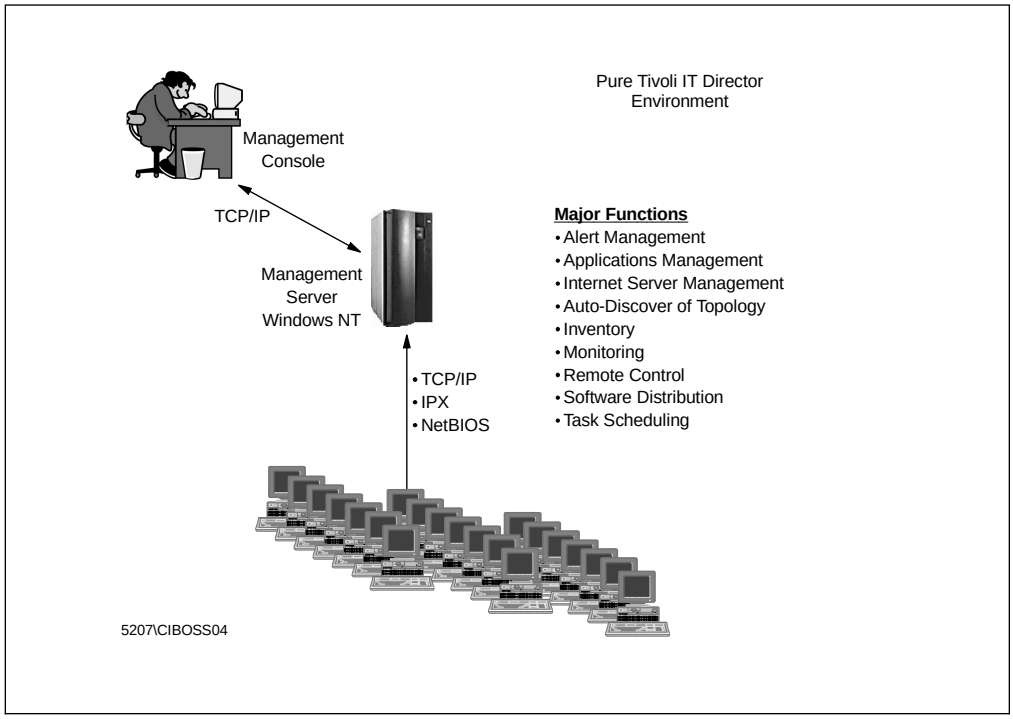


Figure 4. Pure Tivoli IT Director Environment

Tivoli IT Director supports a comprehensive set of tasks for agent nodes. These nodes will communicate directly with the Tivoli IT Director server, allowing the following tasks to be performed:

- Inventory - Tivoli IT Director discovers new managed systems, collects the appropriate information about these systems and stores it in the Inventory

database whenever you request it. This can then be viewed either through the default view or you can customize your own views.

Please see 7.1, “Introduction to Inventory Management” on page 157 for more information.

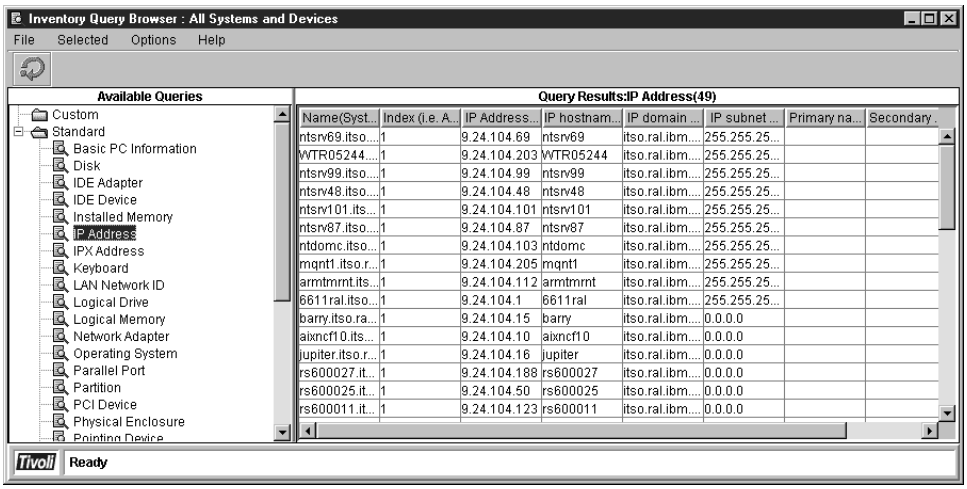


Figure 5. Tivoli IT Director Inventory Management Example

- Remote Workstation Control - Enables you to remotely control the GUI desktop of a native Tivoli IT Director agent, by sending keystrokes and mouse commands to the remote system and displaying the remote systems GUI on the management console.

  Please see Chapter 4, “Remote Control” on page 73 for more information.

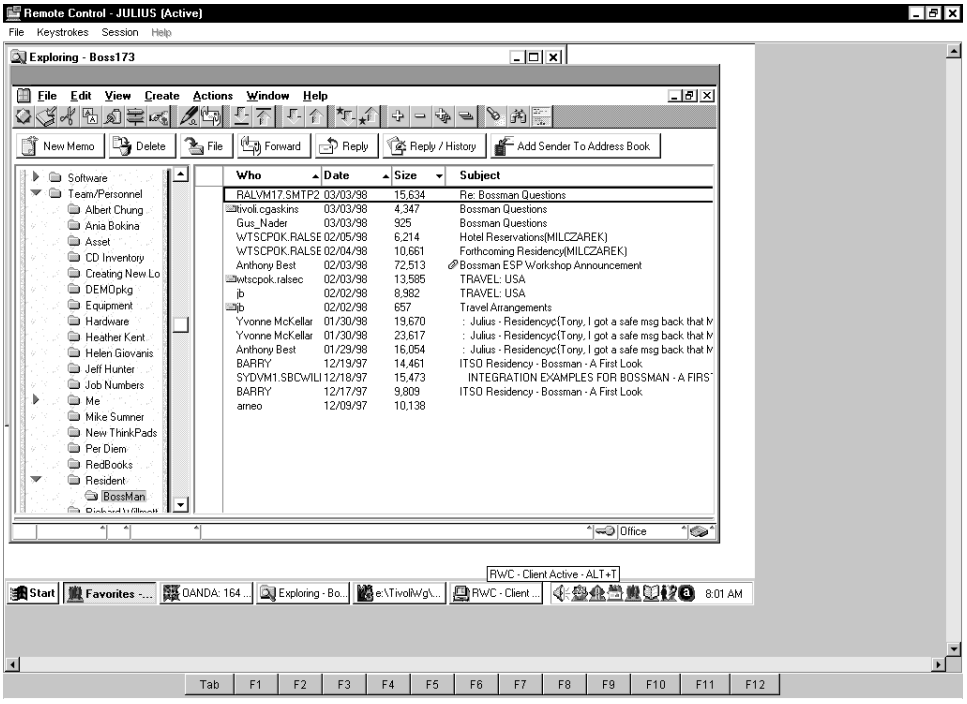


Figure 6. Tivoli IT Director Remote Control Example

- Software Distribution - Enables you to define and edit Software Distribution *packages*, which can then be applied to one or more managed systems for immediate or scheduled delivery.

  Please see 7.7, “Software Distribution” on page 172 for more information.

- Process Management - Enables you to view and manipulate all applications and processes on remote native systems. The administrator can set a flag on a particular process or application to generate an event if the application or process is started or terminated.

  Please see 5.6, “Process Manager” on page 111 for more information.

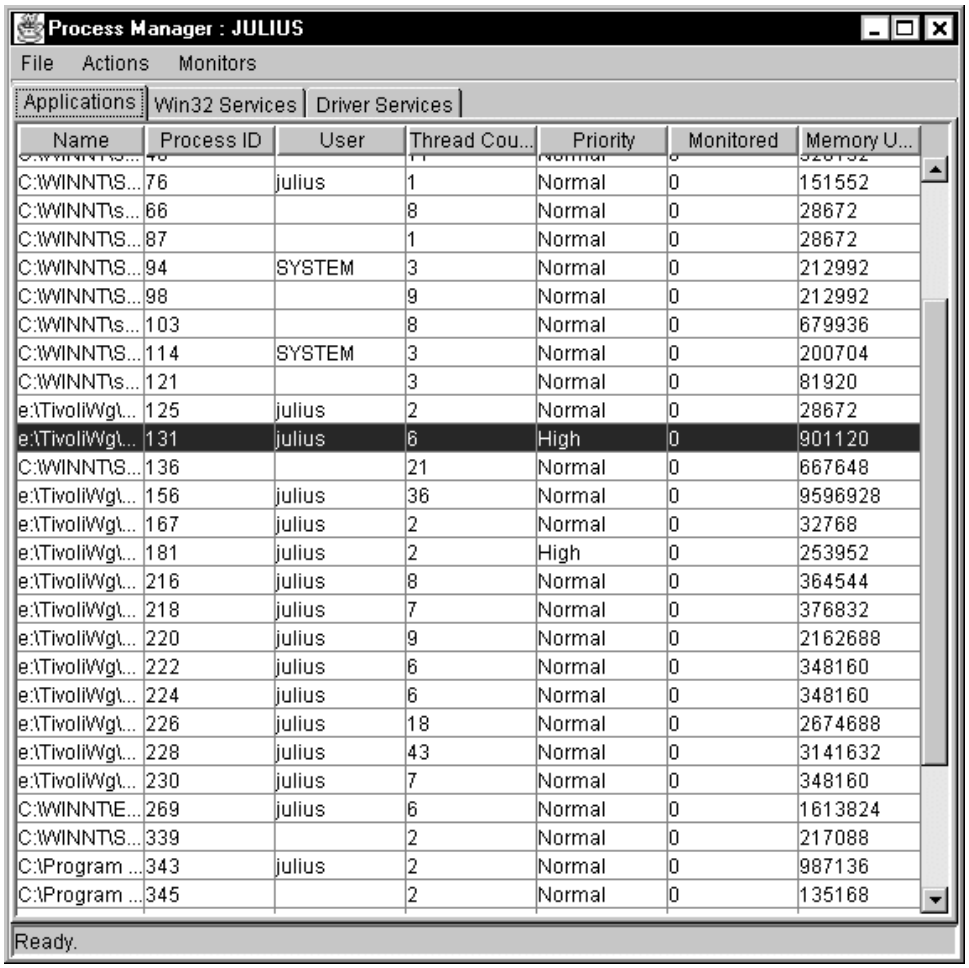


Figure 7. Tivoli IT Director Process Management Example

- Resource Monitors - Enables you to view statistics and usage of critical resources on the network. Information can be collected and monitored on attributes such as:
  - CPU
  - Disk
  - Memory
  - Network
  - Performance

Please see Chapter 5, “Resource Monitoring” on page 85 for more information as well as for a list of the different resource monitors that you can use.

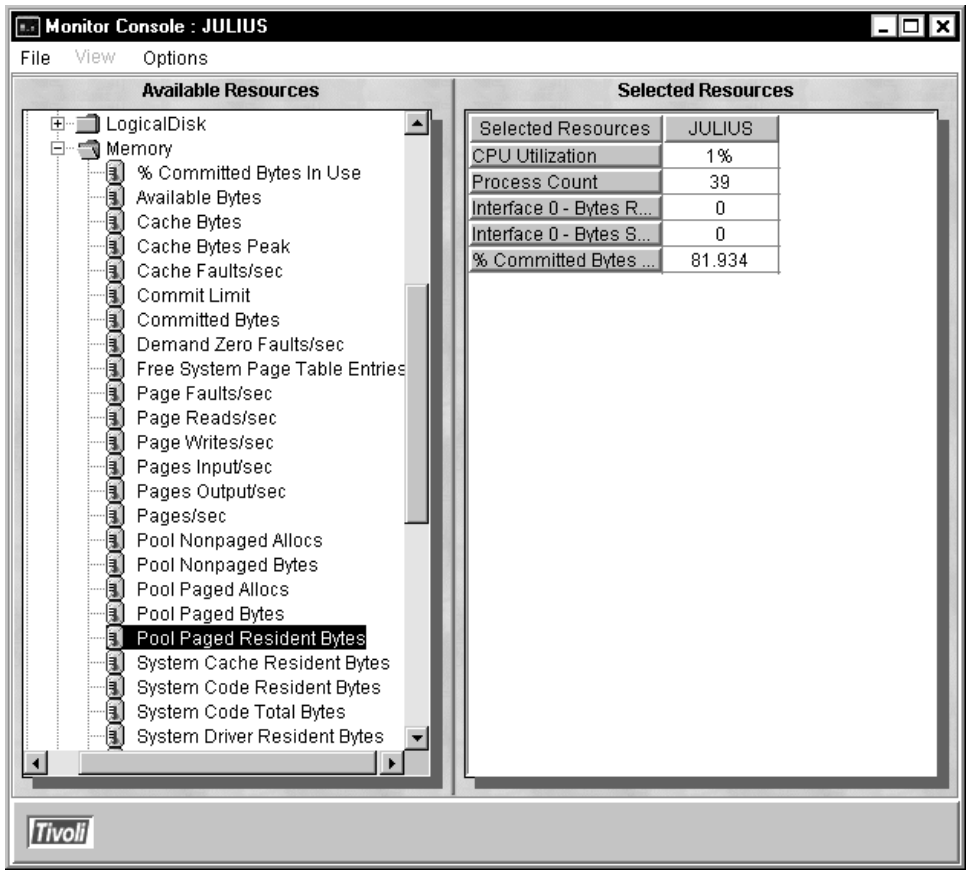


Figure 8. Tivoli IT Director Resource Monitors Example

- Event Management - Enables you to view a log of events that have occurred for a managed system or group of systems and to create *event action plans* to associate an event with a desired action, such as sending an e-mail, starting a program or logging to a file.

  Please see 6.1, “Event Manager Configuration” on page 129 for more information.

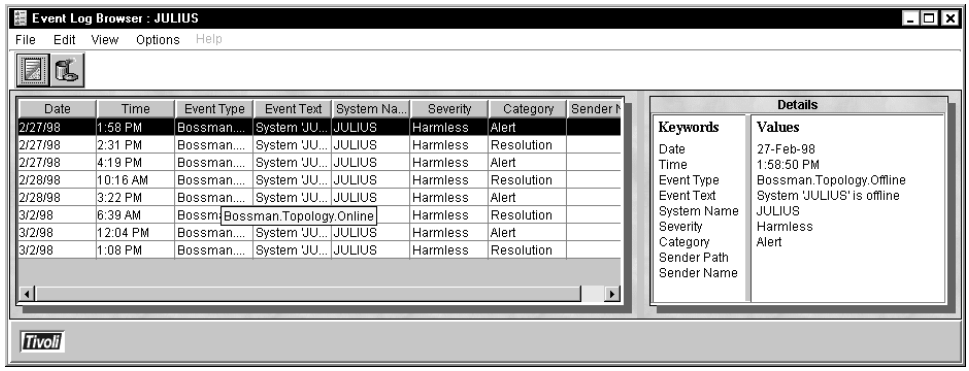


Figure 9. Tivoli IT Director Event Management Example

- File Transfer -

Enables you to perform basic help desk tasks on remote systems such as:

  - Manipulating files/directory structures
  - Updating device drivers
  - Replacing system files

  File Transfer is a simplified version of Software Distribution and is only allowable on a single managed system at a time.

  Note: You can't replace hidden files.

- Application Management - Tivoli IT Director has the ability to read and utilize AMS 2.0-compliant Application Management Packages (AMP). Importing an AMP causes certain actions to occur, such as:

  - Installing and configuring monitors or application tasks
  - Generating a Software Distribution package
  - Creating a group

  Please see 3.1, “What Is Applications Management” on page 61 for more information.

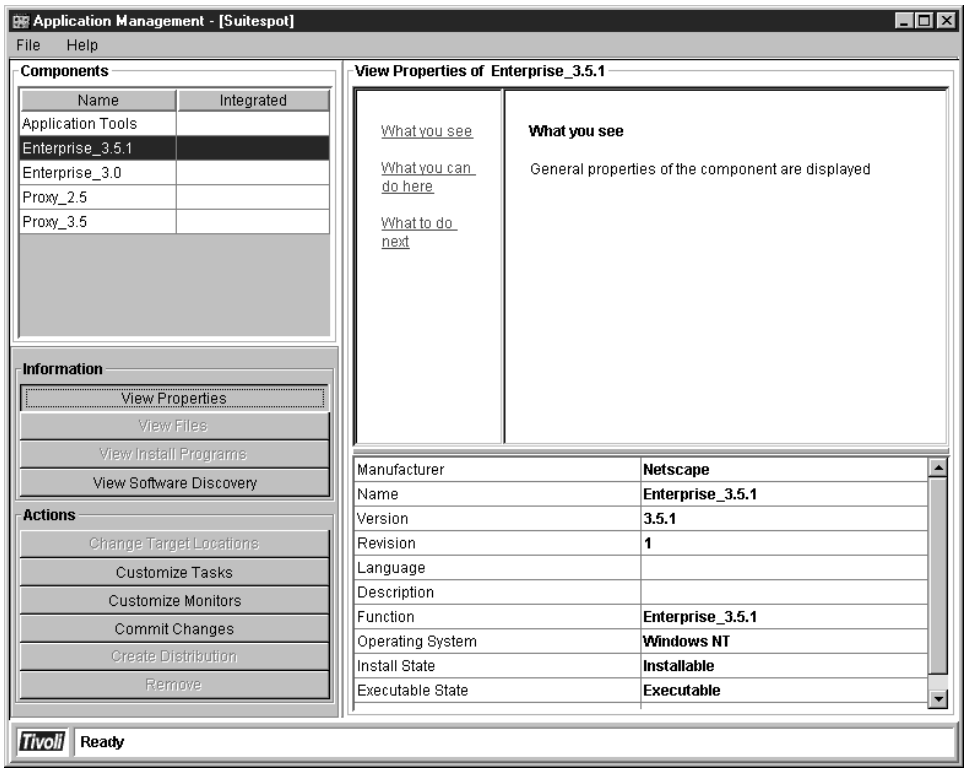


Figure 10. Application Management Console

- Internet Server Management - Tivoli IT Director provides AMPs that allow you to manage and monitor Netscape SuiteSpot and Microsoft IIS.

  See Chapter 8, “Web Publishing and Internet Technologies” on page 199 for more information on Internet Server Management, Webcasting and the Channel service.

- SNMP Management - Tivoli IT Director has several built-in SNMP functions. You can use the Server Preferences option on the Tivoli IT Director console to

set up the discovery options and you can click the right mouse button in the Group Contents frame to discover SNMP devices in those subnets. Tivoli IT Director lets you perform basic SNMP management functions and provides an SNMP MIB browser to browse MIB-2 variables.

Please see Chapter 9, “SNMP Management” on page 223 for more information.

1.5 Integrating Your LAN Management Tools with Tivoli IT Director

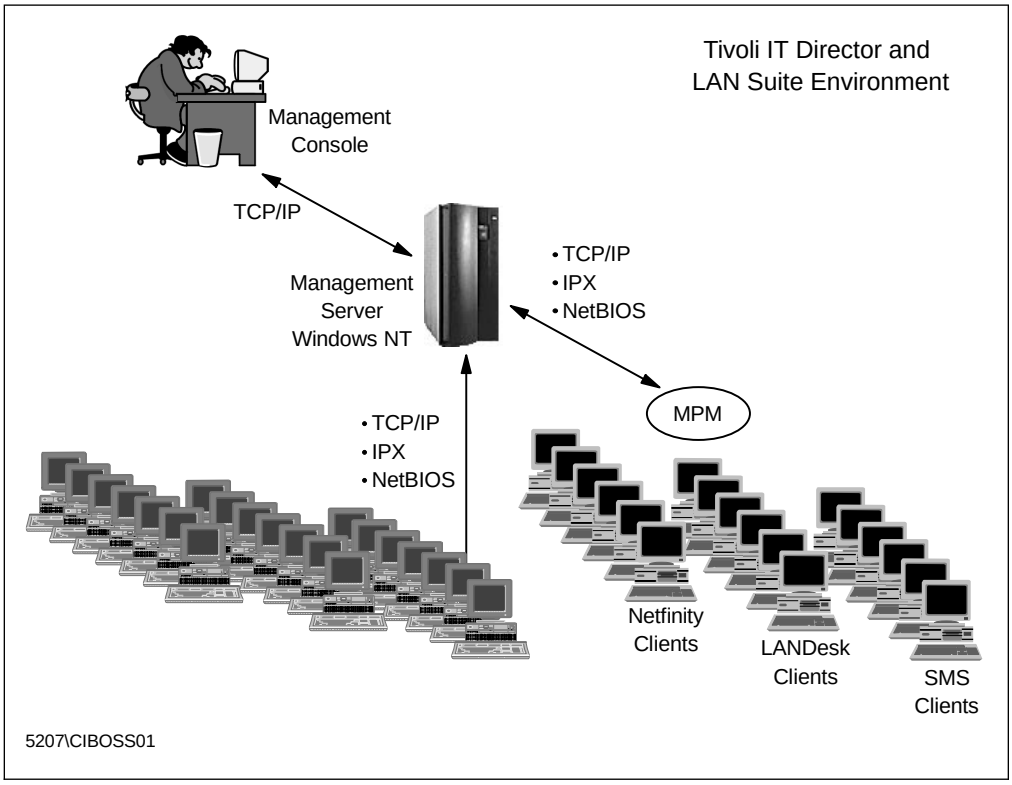


Figure 11. Tivoli IT Director and LAN Suite Environment

Tivoli IT Director integrates the network services of existing management applications, such as:

- Intel LANDesk management Suite (LDMS) V2.51 and V2.52
- Microsoft Systems management Server (SMS) V1.2
- IBM Netfinity Manager V5.0 and V5.1

It integrates these applications through the MPM-API.

The MPM-API enables one management application to communicate with another management application by presenting a common API. The MPM API is an open specification.

HTML Pointers

Additional information on the MPM-API can be found at:

- http://www.tivoli.com/o_products/html/body_LAN_wp.html

  - *Integrating LAN Management Tools with Tivoli* (White Paper)

- http://www.tivoli.com/o_download/html/mpm_overview.html

  Multi-Platform Manager API Software Developer Kit (Overview and FAQ)

Tivoli IT Director can perform the following subset of tasks on MPM agents:

- Inventory
- Software Distribution
- Event Management
- Task Scheduling

The following table shows which MPM providers and operating systems are supported:

Table 1. MPM Providers and Operating Systems

	Tivoli IT Director Server on Windows NT	**Windows NT Agent**	**Windows 95 Agent**	**Windows 3.x Agent**	**OS/2 Agent**
SMS	Yes	Yes	No	No	No
LANDesk	No	No	Yes	No	No
Netfinity	Yes	Yes	No	No	Yes

Please see 2.1.1, “Tivoli IT Director Server Installation Procedure” on page 25 for information on any restrictions that may exist.

1.6 Managing SNMP Agents with Tivoli IT Director

SNMP network devices, printers, PCs and applications that have SNMP agents installed or imbedded can also be managed by Tivoli IT Director.

Tasks that can be performed on SNMP devices are:

- Inventory Management
- Monitor Resources

  The collection of data from SNMP managed systems is performed with Remote Network Monitoring (RMON).

  Note: There is no need for a permiscuous adapter. All SNMP and RMON data is collected by using SNMP APIs. The Tivoli IT Director stack utilizes TCP/IP and IPX protocols.

  Tivoli IT Director follows the RFC for RMON and the MIB provided is RMON2.

- Event Management

- Task Scheduling
- SNMP Management

Please see Chapter 9, “SNMP Management” on page 223 for more information.

In addition to the Inventory, monitor and SNMP event trap functions already built into Tivoli IT Director tasks, Tivoli IT Director provides a MIB browser/editor to obtain more detailed information on SNMP devices.

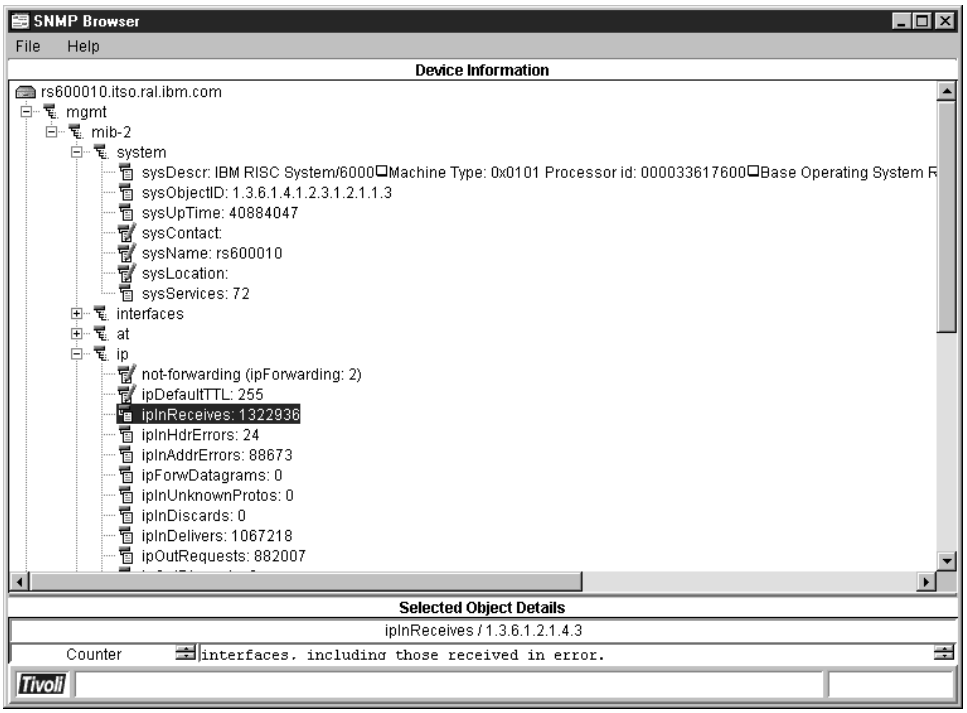


Figure 12. Tivoli IT Director SNMP MIB Browser

Specific SNMP device management is accomplished by launching Java applets or applications or by building a snap-in for Tivoli IT Director by using the Tivoli IT Director Software Development Kit, which will be available shortly after general availability of Tivoli IT Director.

1.7 Using the Power of the Internet with Tivoli IT Director

Tivoli IT Director makes use of today's Internet technologies to help you:

- Manage your Internet servers
- Enable you to communicate with the general user community

Tasks that utilize the Internet include:

- Internet Server Management

  Enables you to perform basic Internet server management functions, such as:

  – Starting and stopping the server application

  – Managing log files

  – Perform application management tasks

- Monitoring server attributes

- Communicate through the Tivoli IT Director home page

  Using your HTTP server, you are able to communicate with the general user population and other administrators by publishing information through the Tivoli IT Director home page.

  Note: Tivoli IT Director requires support of HTTP 1.0 and HTML 2.0.

  You are able to edit this page using predefined home page templates, allowing agent users or administrators to do the following all within a Web browser:

  - Query system status
  - Request configured Software Distribution packages
  - View alert conditions

  This enables you to maintain your Web pages without needing to know anything about HTML.

  Please see Chapter 8, “Web Publishing and Internet Technologies” on page 199 for more information.

- Webcast Channel Service

  If your organization has access to a Webcast Software Distribution Channel, you can subscribe your Tivoli IT Director server to this channel to receive notices from the originator or information on software updates and distribution for your network.

  Please see Chapter 8, “Web Publishing and Internet Technologies” on page 199 for more information.

1.8 Additional Features in Tivoli IT Director

The following are additional features of Tivoli IT Director:

Security - Tivoli IT Director uses the Windows NT security subsystem for validating user IDs and passwords when logging into the Tivoli IT Director server. Each user will have a unique logon profile to allow logging in to the administrative console by different users.

The following Tivoli IT Director commands can be entered from the command line:

- net stop twgipc - Stops the server and agent on Windows NT systems.
- net start twgipc - Starts the server and agent on Windows NT Systems.
- twgipc shutdown - Stops agents on Win95, OS/2 and Win16 systems.
- genevent - Java class that is executed to generate Tivoli IT Director events.

  If genevent is entered on the command line without any parameters, you will get a list of all the options. You can run genevent from either the agent or the server, to send events to the Tivoli IT Director server.

The syntax for the genevent is as follows:

```
Copyright (C) 1998 Tivoli Systems Inc., an IBM company.  All Rights Reserved
Genevent
      SYNTAX:                      Description
      Required parameters:
      -------------------------
      /TYPE:type                  Dot delimited string
                                     (UserAppName.Database.Update Record)
      /TEXT:"text"                Free-form quoted string
                                     ("User application encountered an error")
      /DEST:destination           Target destination
                                     format: protocol::name
                                     example: TCPIP::TWGSVR1
      Optional parameter:
      -------------------------
      /SEV:severity               event severity
                                     example: MINOR
```

We entered the following:

```
genevent /TYPE:database /TEXT:"from the client" /DEST:TCPIP:BARRYN /SEV:MINOR
```

We received the following event notification in the log:

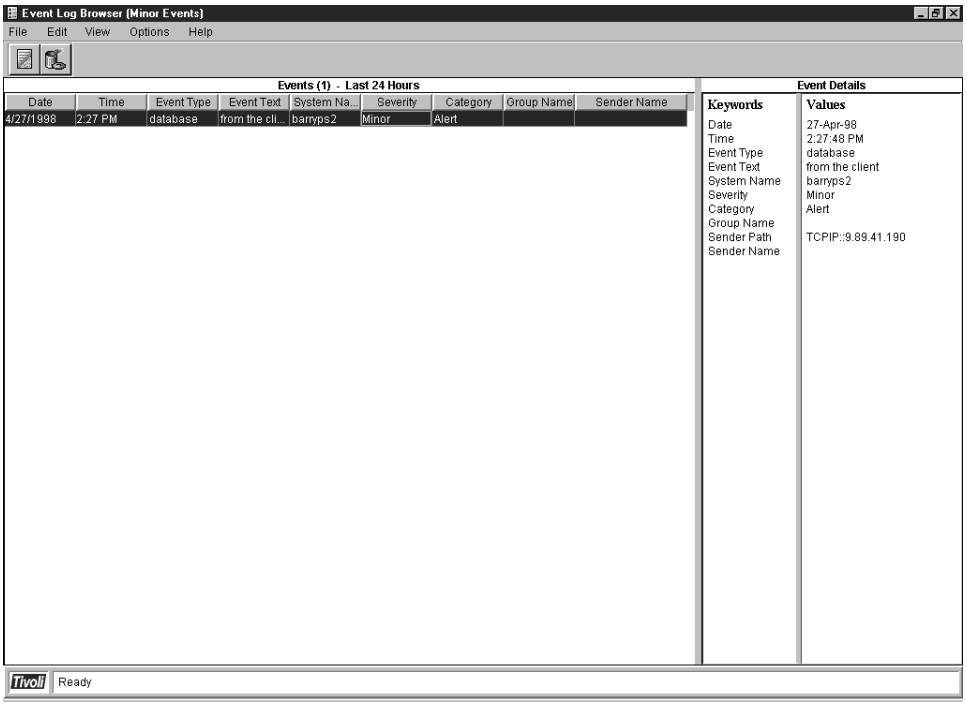


Figure 13. Tivoli IT Director Event Log Browser

Database Management - Tivoli IT Director supports the storage of the following in the JET or SQL Server databases:

- Hardware inventory
- Software inventory

For more advanced database needs, Tivoli IT Director also works with the Microsoft SQL Server. Modifications can also be made to the database structures, allowing you to store additional data in the Tivoli IT Director database.

Software Developers Kit (SDK) - The Tivoli IT Director Software Developers Kit allows you to extend the function of Tivoli IT Director by creating the following using Microsoft Visual C++ and the Sun Java Developers Kit (JDK):

- New tasks
- Monitors
- Event actions
- New managed system types
- Support for new protocols

1.9 Tivoli IT Director Tivoli Management Agents

Some Tivoli IT Director tasks do not apply to specific systems.

The table below outlines the tasks and agent systems they apply to.

Table 2. Agent and Task List Compatibility

Task	Native Agents	MPM Agents	SNMP Agents
Inventory	Yes	Yes	Yes
RWC	Yes	No	No
S/W Distribution	Yes	Yes	No
Process Management	Yes	No	No
Resource Monitors	Yes	No	Yes
Event Management	Yes	Yes	Yes
File Transfer	Yes	Yes	No
Task Scheduling	Yes	Yes	Yes
Applications Management	Yes	No	No
SNMP Management	No	No	Yes

1.10 Tivoli IT Director Transport

The Tivoli IT Director server communicates with the Tivoli IT Director management console using TCP/IP only. You cannot use the management console to communicate with the server over NetBIOS, IPX or any other network transport.

You can use TCP/IP, NetBIOS or IPX to establish communication between the server and a Tivoli IT Director management agent.

All TCP/IP communications support DHCP.

Transport protocols are *not* included as part of Tivoli IT Director. The transport protocols must already be installed. For example, if Tivoli IT Director is installed and only TCP/IP is installed, and then the NetBIOS protocol is added later on, Tivoli IT Director will not see this transport automatically. (The same would be true for any transport protocol.)

The following steps will have to be taken to ensure that the newly added transport protocol is activated and enabled in Tivoli IT Director:

1. Shut down Tivoli IT Director.
2. Activate the protocol from the Network Driver Configuration dialog.
3. Restart Tivoli IT Director or the system.

The following table lists support by protocol:

Table 3. Supported Transport Protocols

Transport Protocol	Operating Systems	Supported Versions
TCP/IP	Win 16 and Win32	All WinSock-compatible versions of TCP/IP supported by the Windows 3.x, Windows 95, Windows NT Server 4.0, Windows NT Workstation 4.0
TCP/IP	OS/2	TCP/IP versions supported by OS/2 3.x and 4.x
NetBIOS	Win16 and Win32, OS/2	NetBIOS versions supported by the Windows 3.x, Windows 95, Windows NT 4.0
IPX	NetWare	IPX versions supported by Novell NetWare 4.x

1.11 Database Support

The Tivoli IT Director server ships with and uses, by default, the JET database engine. To access JET, the JDBC and ODBC APIs are used. Depending on the requirements of your environment, you may want to use the Microsoft SQL database instead of JET. SQL has greater storage handling capability is more impervious to unwanted access attempts and is faster.

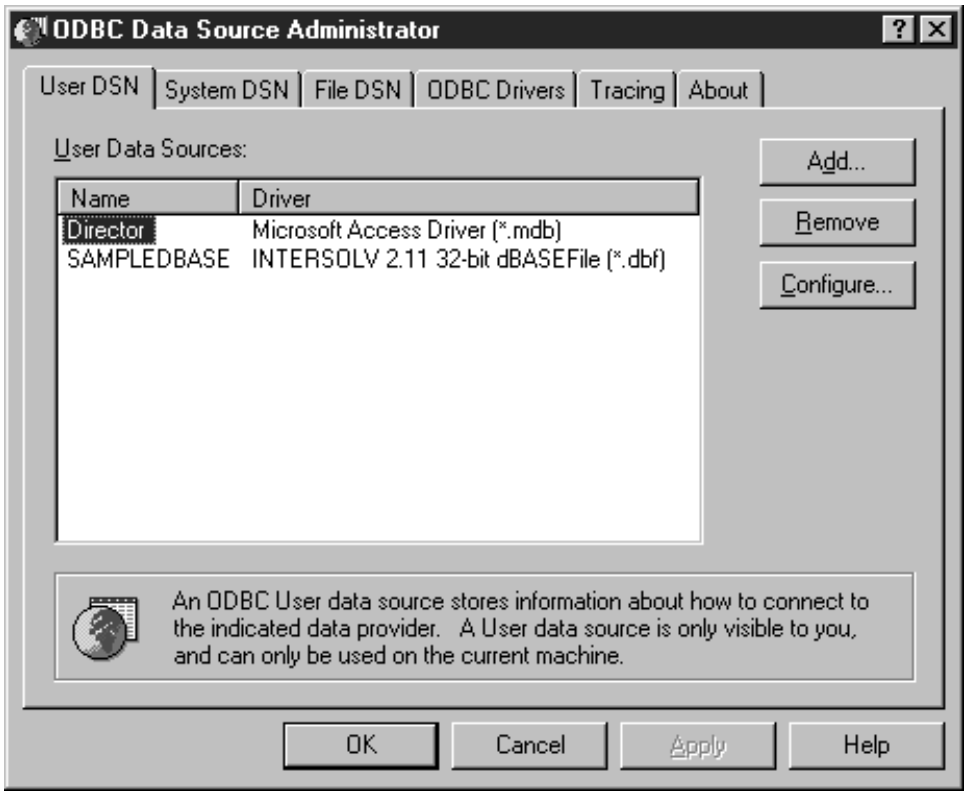


Figure 14. ODBC Data Source - Tivoli IT Director JET

1.12 Tivoli IT Director Security

When you log on to the Tivoli IT Director server through the management console, the user ID and password are validated against the Windows NT security subsystem where the Tivoli IT Director server component is installed and not on the workstation where the console is running.

The user ID and password must be a valid account on the NT system where the Tivoli IT Director server is running. This approach allows you to use the Windows NT User Manager application on a single NT system for all security administration. You can also perform user administration from the Tivoli IT Director console. If you click on the user administration icon on the Tivoli IT Director console and select **Show Unauthorized Server Users**, you will see all of the Windows NT-defined users.

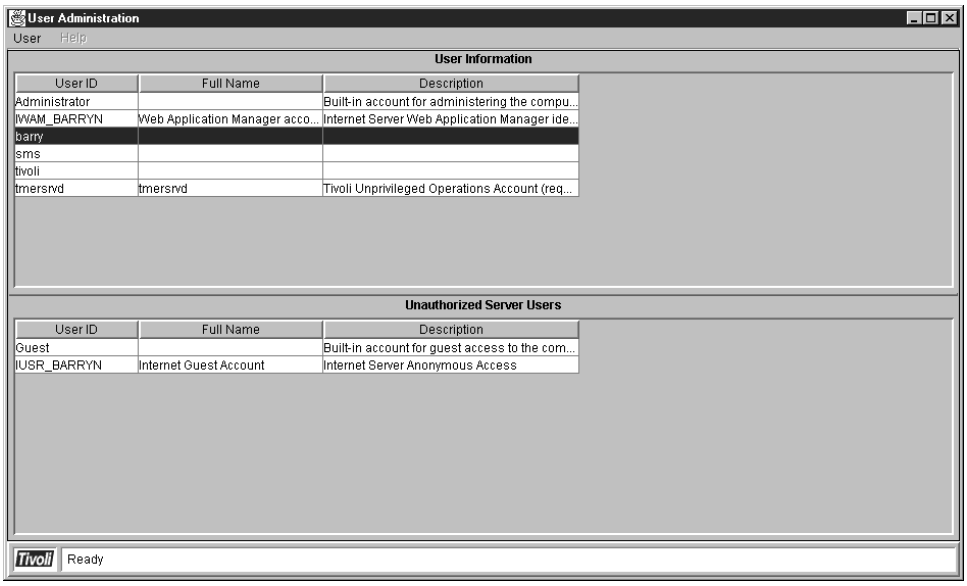


Figure 15. Tivoli IT Director User Administration

From the main User Administration window you can add or subtract privileges for individual users that are defined to the Windows NT domain. To get the user properties click on the **User** pull-down menu and then click on **Edit**.

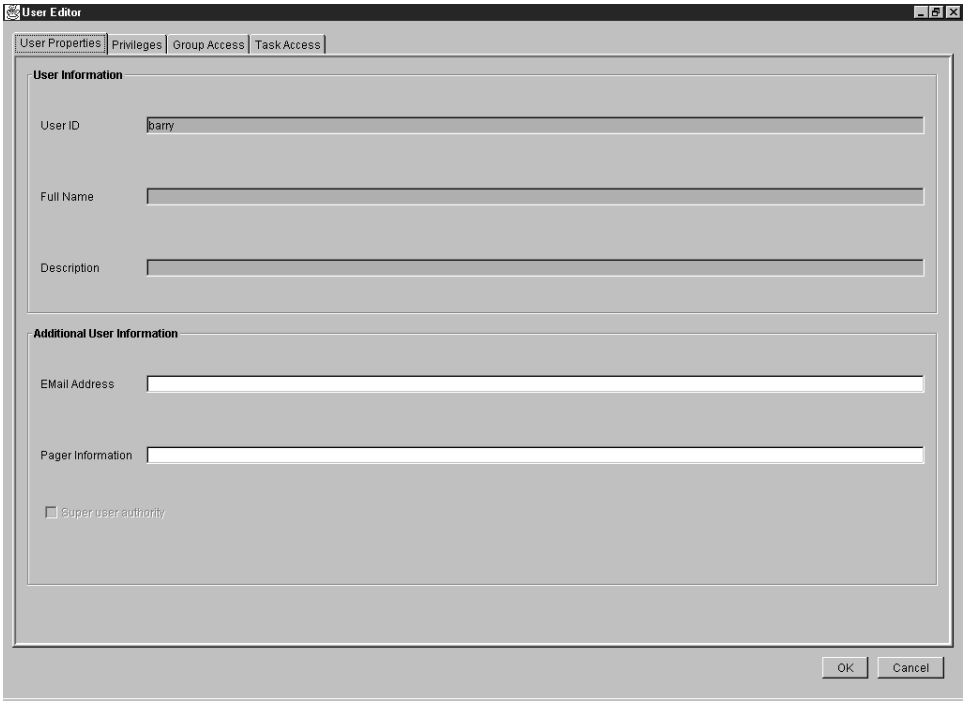


Figure 16. Tivoli IT Director User Properties

You can add or subtract privileges from the following window tab:

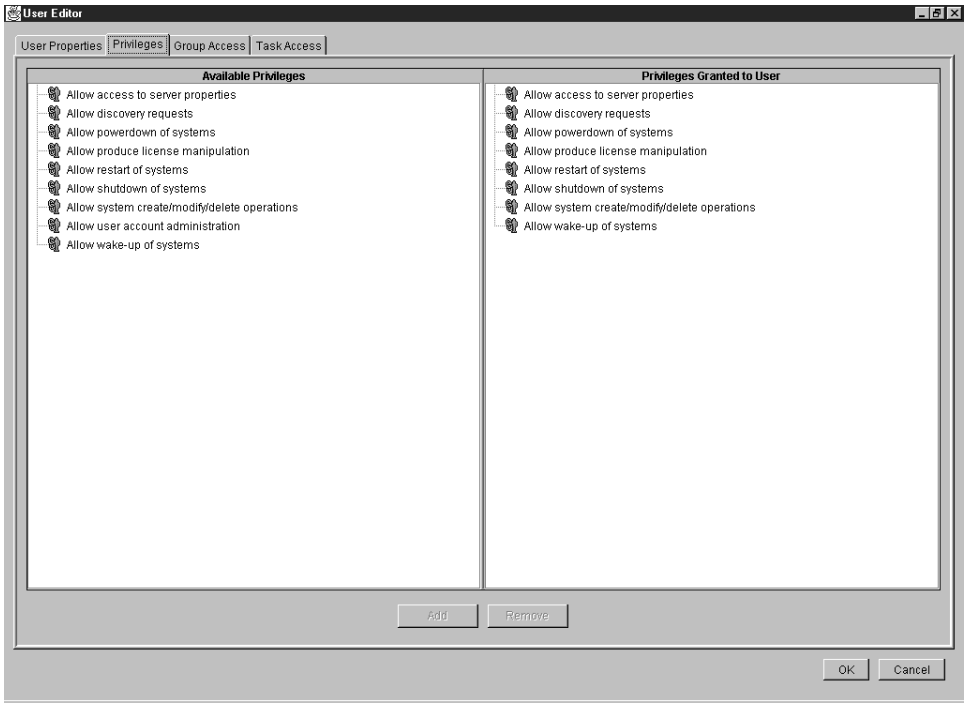


Figure 17. Tivoli IT Director User Privileges

If you click on the check box **Limit user access to the groups listed**, you will see all of the Available groups. Until you click on that field you will have a blank window pane.

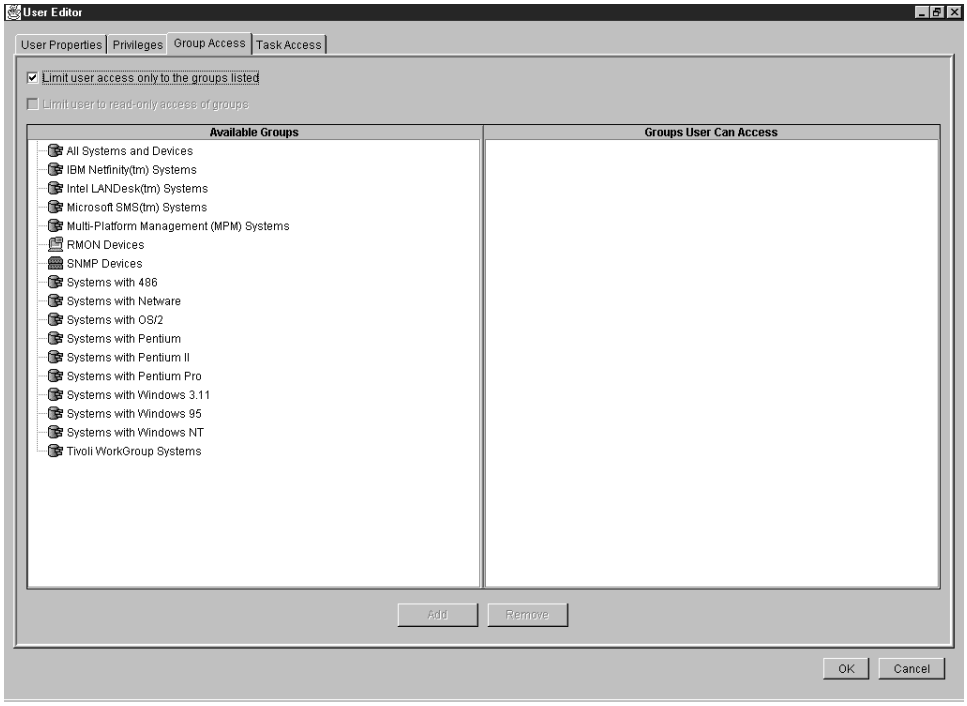


Figure 18. Tivoli IT Director Group Access

You can also limit the tasks that a user ID can access. Just like the Group Access window, the Task Access window will only show all of the options if you click on the check box, **Limit user access only to the tasks listed**.

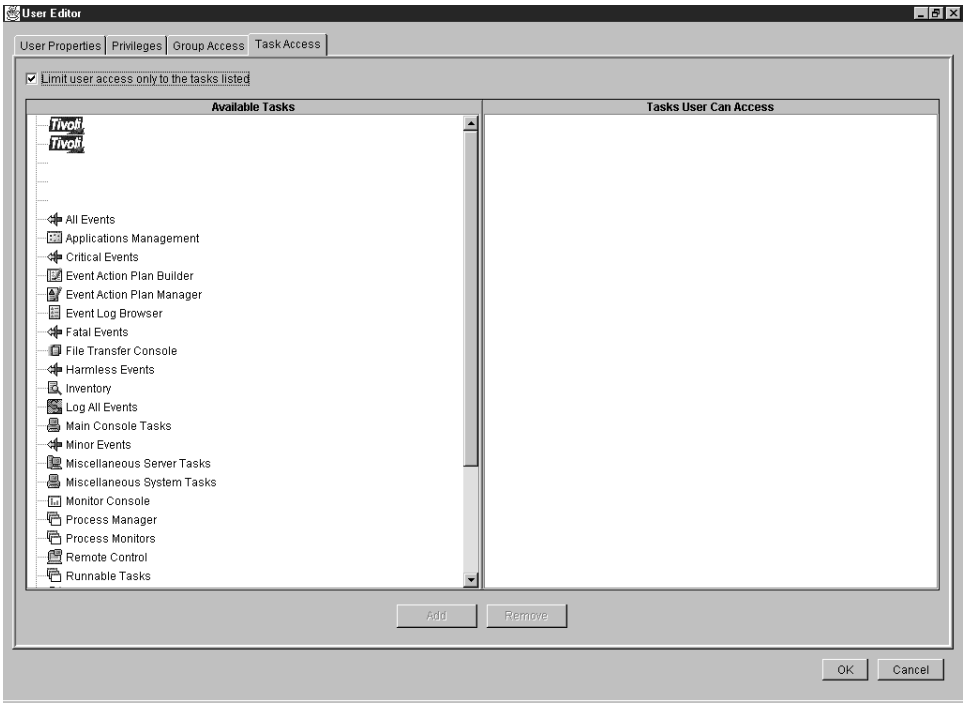


Figure 19. Tivoli IT Director Task Access

1.13 Discovery

In order to find all of the Tivoli IT Director agents (native, MPM and SNMP) Tivoli IT Director performs a discovery broadcast using:

- IP

  This is based upon the TCP/IP address (for example, 9.24.104.66), and the subnet mask (for example, 255.255.255.0). Therefore, it only does the discovery to your local subnet as well as any that were added to the Server Preferences System Discovery tab.

- NetBIOS

  A general broadcast is done to the TivoliWorkGroup group name.

- IPX

  Broadcast and diagnostic packets are sent out.

In all cases, when a native agent gets notified of the broadcast it does not reply right away. There is a random time delay built in so that there will not be a flood of traffic during each discovery process.

Note: If you have the WakeUp-On-LAN feature, it will report its presence as soon as it is online to the server.

1.14 Investment Protection and Integration

Tivoli IT Director exploits the following MPM providers:

- Intel LANDesk Management Suite (LDMS) V2.51 and V2.52
- Netfinity V5.0 and V5.1
- Microsoft Systems Management Server (SMS) V1.2

Software development kits and documentation are available to assist users in properly enabling and certifying their administration suites.

1.15 Tivoli IT Director Market Positioning

Tivoli IT Director is typically targeted at small companies that have between 300 and 600 systems, but there could be more then that. The environment is usually one to three sites (or divisions) and it has yet to grow to an enterprise. The systems are typically Intel-based Windows, NetWare and OS/2. Once they grow beyond that they are likely candidates for the Tivoli Enterprise.

The systems manager is most likely one person or a very small group responsible for the software and hardware management (including inventory). They are constantly under pressure from the user community to resolve problems (or prevent them) and they do not have a lot of time to spend on product training. They prefer a nice graphical interface that guides them through processes.

In addition to managing their systems, Tivoli IT Director will help them start managing their applications. There are a few built-in components that are supported (using AMS 2.0) with the product. While more can be built, the product provides management of Netscape SuiteSpot and Microsoft IIS to start.

Tivoli IT Director helps deliver control, accountability and agility to the companies that will implement it. Management of the following is the heart of Tivoli IT Director:

- Applications
- Internet
- Systems
- Networks

The small business segment is made up of a large number of independently owned and operated businesses that are typically less sophisticated in their use and management of IT and have more direct business, expense and skill pressures than experienced by larger enterprises. This market segment is usually accessed through distributors and resellers, not a direct sales force.

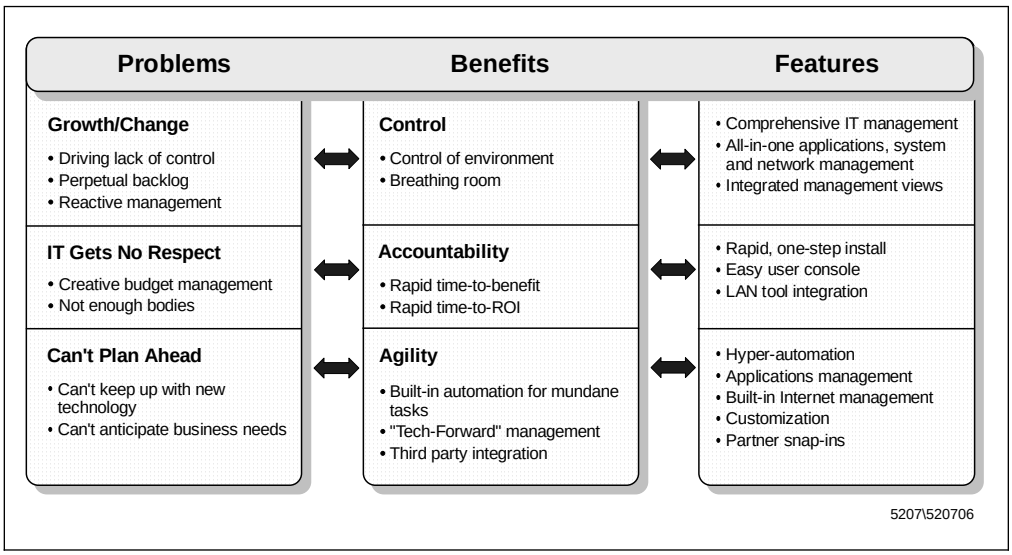


Figure 20. Tivoli IT Director Positioning

1.16 ITSO Environment

In our ITSO environment, we installed and set up the Tivoli IT Director management console, Tivoli IT Director Management server and Tivoli IT Director Management agents across many operating systems using the TCP/IP network protocol for use during this project.

The systems and applications that were installed as part of our environment are shown here in Figure 21 on page 24 and Figure 22 on page 24.

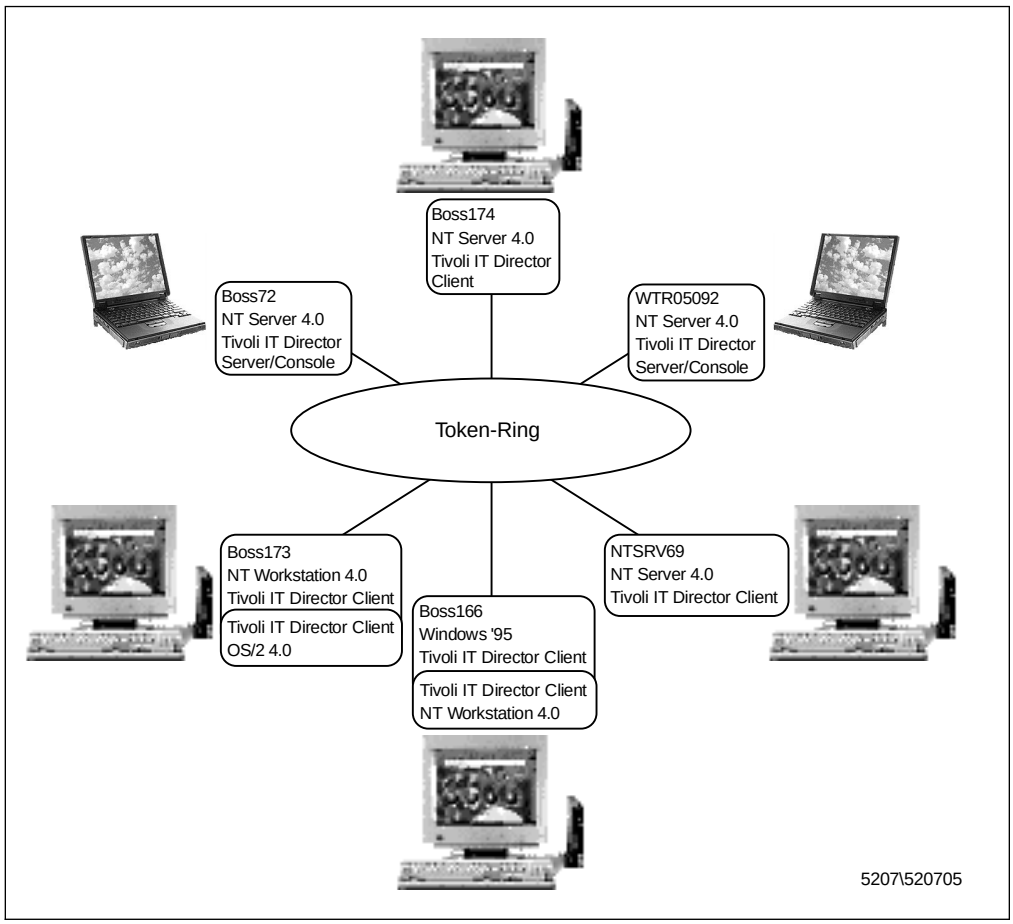


Figure 21. Our Environment - Overview

Identity	IP Address	Platform	Hardware	Patches	Tivoli IT Director
Boss72	9.24.104.72 boss72.itso.ral.ibm.com	Windows NT Server V4.0	Thinkpad 380ED 80 MB RAM 166 MHz	Service Pak 3	Server/Console
WTR05092	9.24.104.154	Windows NT Server V4.0	Thinkpad 760XL 104 MB RAM 166 MHz	Service Pak 3	Server/Console
NTSRV69	9.24.104.69 NTSRV69.itso.ral.ibm.com	Windows NT Server V4.0	PC 350 82 MB RAM 133 MHz	Service Pak 3	Client
Boss166	9.24.104.166 boss166.itso.ral.ibm.com	Windows '95	PS/VP 601D 64 MB RAM 120 MHz		Client/Console
		Windows NT Workstation 4.0		Service Pak 3	Client
Boss173	9.24.104.173 boss173.itso.ral.ibm.com	Windows NT Workstation 4.0	PS/VP 601D 32 MB RAM 60 MHz	Service Pak 3	Client
		OS/2 Warp V4.0			Client
Boss174	9.24.104.174 boss174.itso.ral.ibm.com	Windows NT Server V4.0	PC365 64 MB RAM 200 MHz	Service Pak 3	Client

5207\520707

Figure 22. Our Environment - Detailed

Chapter 2. Installation Procedures

This chapter describes the installation and configuration of the following components for the Tivoli IT Director:

- Tivoli IT Director management server
- Tivoli IT Director management console
- Tivoli IT Director native agents for Windows 95, OS/2, Windows NT Workstation 4.0 and NetWare

2.1 Prerequisites for Tivoli IT Director Management Server

The Tivoli IT Director management server requires the following hardware and software:

- Intel Pentium processor, P166 MHz or greater.
- 64 MB of RAM.

  Note: We would recommend, based upon our experiences, a P200 with 128 MB of RAM.
- 75 MB of free disk space.
- Windows NT 4.0 or Windows NT 4.0 Server with Service Pack 3.
- TCP/IP networking transport.
- SNMP Services - Optional. Only needed if you have SNMP manageable devices.
- Internet Server - Optional. Only needed if you want to use Tivoli IT Director Internet capabilities.

2.1.1 Tivoli IT Director Server Installation Procedure

Before you begin the installation ensure that you are logged on as administrator or an ID with equivalent privileges.

Note: As mentioned in Chapter 1, “Overview of Tivoli IT Director and the Environment” on page 1, Tivoli IT Director includes a server component, a console component, and native agents. Installation of the Tivoli IT Director server by default also installs the Tivoli IT Director console and a Tivoli IT Director agent.

The Tivoli IT Director server is installed by inserting the CD into the CD-ROM drive and starting the setup.exe command that is located in the x:\server\winNT or x:\server\win95 subdirectory, where x: is the drive letter of the CD drive. Setup will start an install wizard, which will guide you through the installation process.

Figure 23. Install Wizard on Windows NT

If you are on Windows NT 4.0 you will see the following choices:

- Install Server
- Install Console
- Install Agent
- View Readme

If you are on a Windows 95 system you will see the following choices:

- Install Console
- Install Agent
- View Readme

Note: Tivoli IT Director does not require NTFS for installation, but it is usually a good idea to use NTFS for performance and security reasons on the Windows NT platform. If you decide to use NTFS, you will need to either get an NTFS device driver or an application to help you with accessing NTFS drives in the event of an operating system failure since native DOS and other Windows systems can not access NTFS drives.

Before you begin your installation of Tivoli IT Director you should make sure that you have a license key.

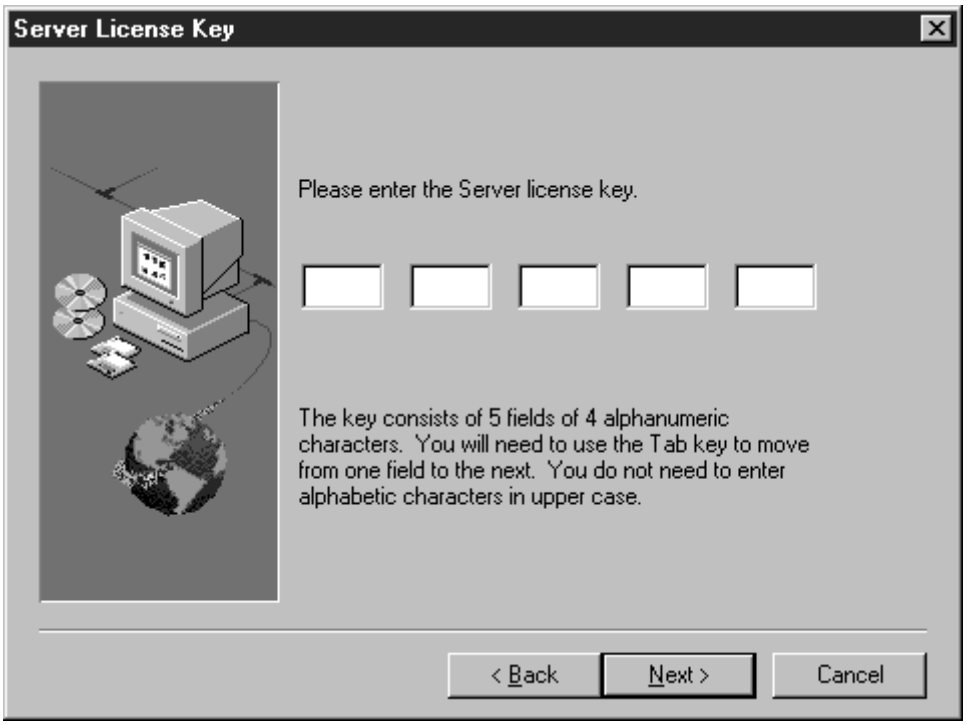


Figure 24. License Key Required

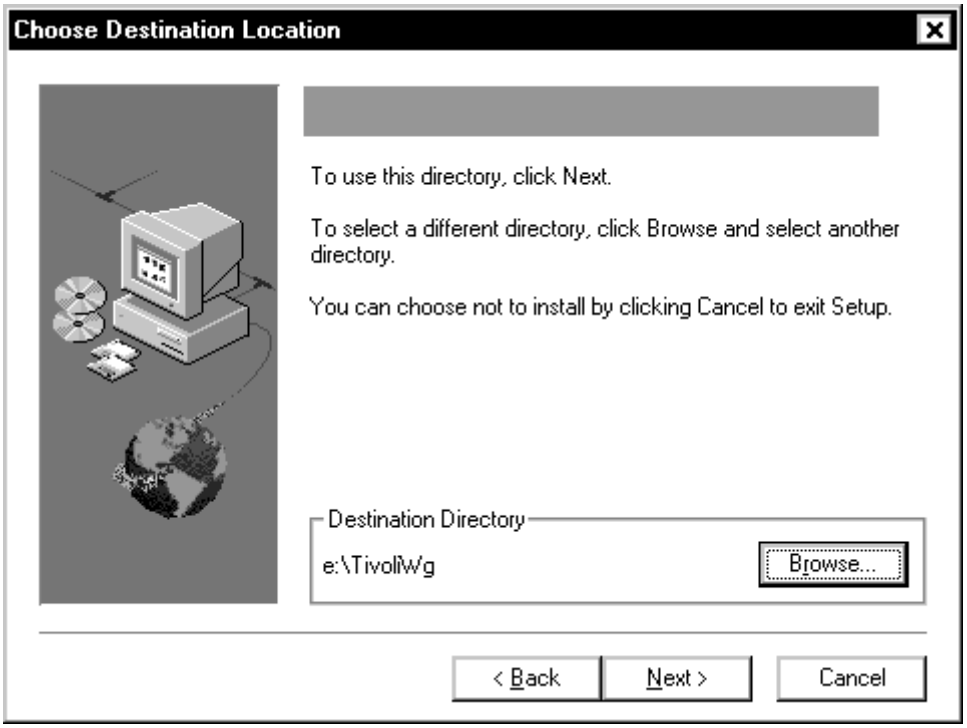


Figure 25. Destination Directory Dialog

The install wizard will first ask for the location and path where the Tivoli IT Director server files will be copied. Enter a drive and directory name and click on **Next** to continue.

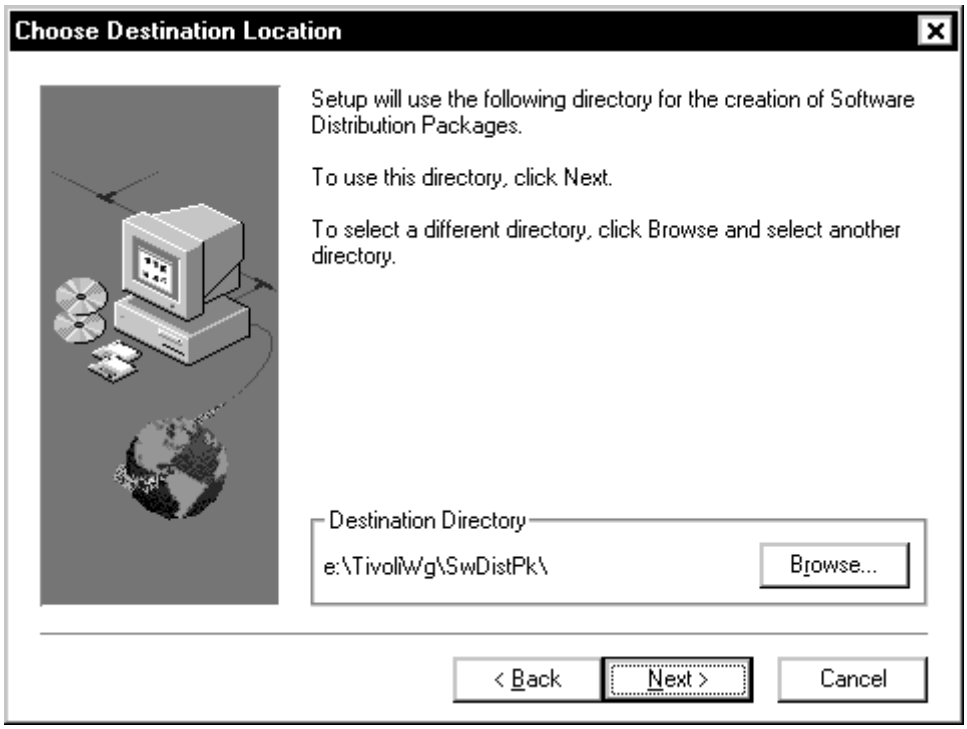


Figure 26. Destination Location Dialog

Next, you need to select a location and path that the Tivoli IT Director server will use for the creation of Software Distribution packages. Enter a drive and directory name and click on **Next** to continue.

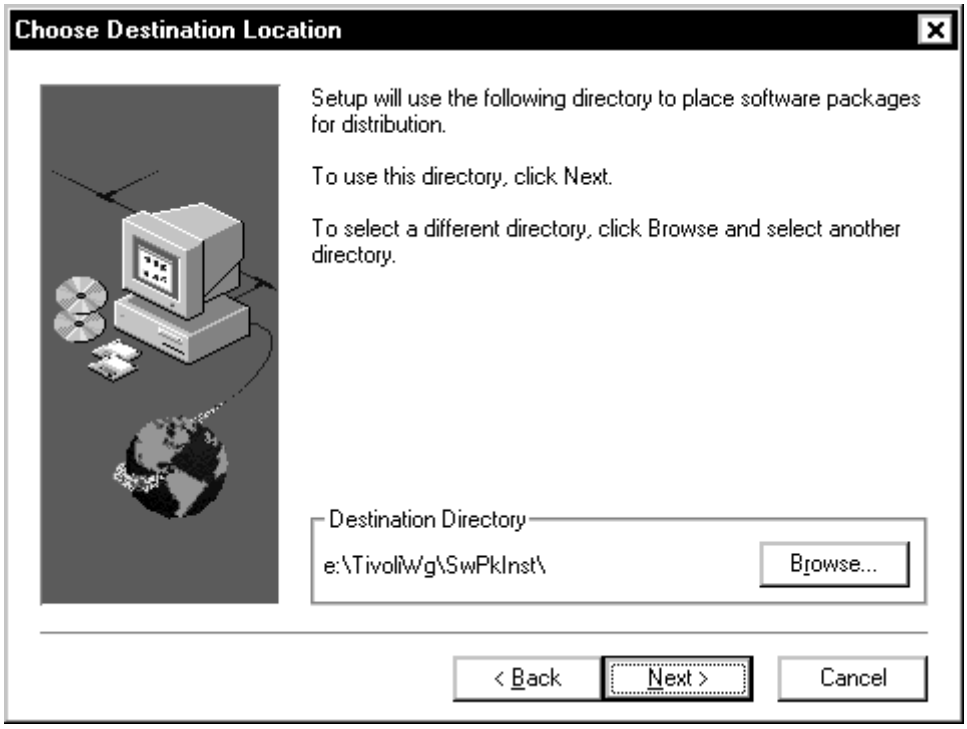


Figure 27. Destination Directory Dialog

Select the appropriate drive and path for the Tivoli IT Director server to place software packages for distribution. Enter a drive and directory name and click on **Next** to continue.

The directories that you will end up with under \TivoliWG are:

- amps - Applications Management Packages
- bin - DLLs, EXEs and JRE
- Classes - Java classes
- Data - Persistent storage
- Database - Database files
- lib - JRE
- Log - Server and subtask output
- swdagmpm - MPM-related
- SwDisPK - Location for package creation
- SwPkInst - Contains packages for distribution

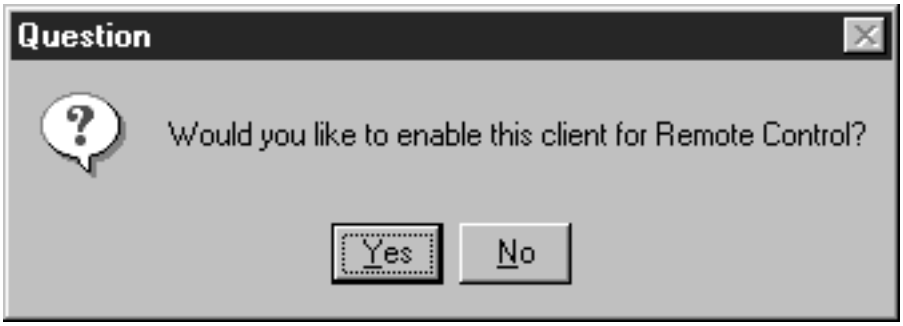


Figure 28. Remote Control

The next prompt will be to determine if you would like to enable the system for remote control. You should remember that when you install the server code you also get the console and agent code installed at the same time. We selected to enable this function in case we wanted to manage this server from another server. After that the next prompt is for LightWeight Client Gateway support.

Figure 29. Tivoli IT Director LCF Support

The installation will prompt you for a valid user account and password for that account. When you log on to the Tivoli IT Director server through the management

console, the user ID and password are validated against the Windows NT security subsystem where the Tivoli IT Director server component is installed.

Enter a valid domain and username along with the password and click on **OK** to continue.

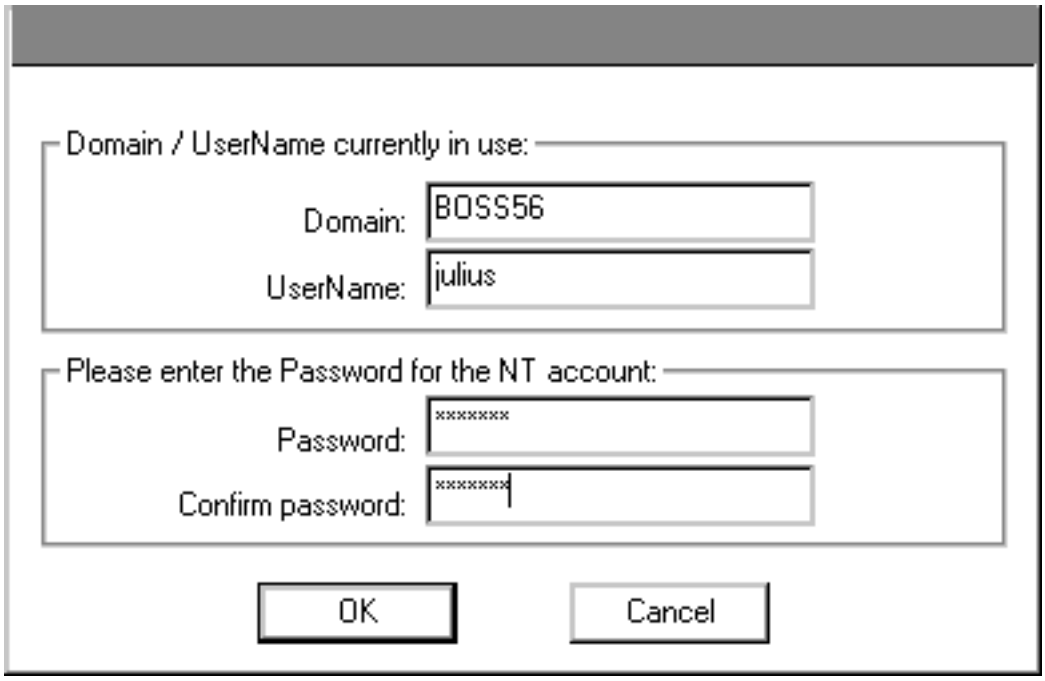


Figure 30. Tivoli IT Director Server Authentication Dialog

Tivoli IT Director will prompt you for a choice of database. If you don't have Microsoft SQL Server already installed and you are not re-installing Tivoli IT Director, you should select the default database.

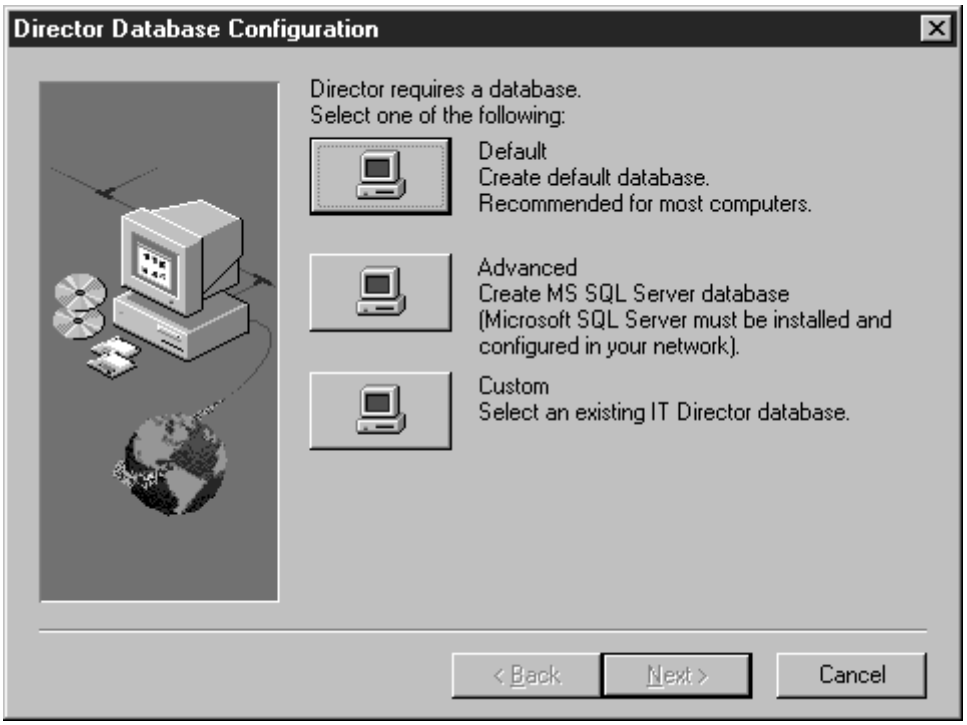


Figure 31. Database Creation

Next you need to configure the network drivers. Information must be entered regarding the communication protocols that will be supported on this system. The Network Driver Configuration window will appear.

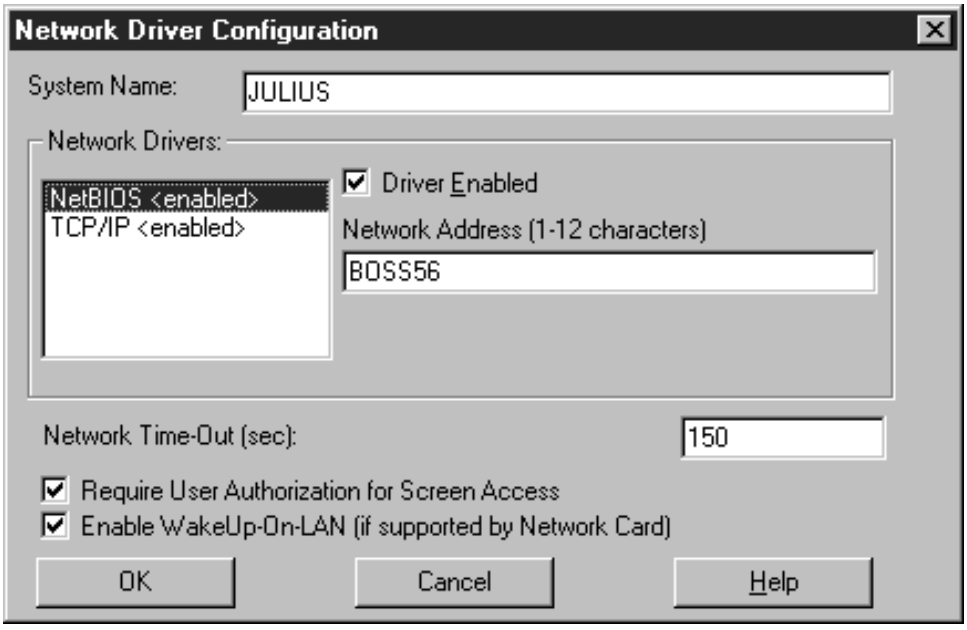


Figure 32. Network Driver Configuration Dialog

Follow these steps to configure the network drivers:

1. Enter a system name.

   Enter a name for the system in the System Name field.

2. Select a network driver.

   Select one of the available network drivers that are displayed in the Network Drivers field. Once selected, the network driver will assign a network address to the system.

   Note: If the IPX or TCP/IP Network Driver is being enabled, this name can't be altered and it will not appear on the screen.

   If the NetBIOS Network Driver is being enabled, a network address will be selected and displayed in the Network Address field.

   When changing this default name, enter any 1-8 character address. This address must be unique to the system.

3. Enable the network driver.

   When all required information has been entered, select the **Driver Enabled** check box to activate the driver on startup. If the system supports multiple network interfaces, additional network drivers can be added by repeating steps 2-3.

4. Set Network Time-Out value (optional).

   The Network Time-Out field shows the number of seconds that the Tivoli IT Director Management Server will attempt to communicate with a remote system that is not responding. If the Tivoli IT Director server does not establish contact with the remote system within this interval, it cancels the communication attempt. The Network Time-Out default setting is 15 seconds.

5. Check Require User Authorization for Screen Access (optional).

   The Tivoli IT Director installation program offers an option to install Remote Workstation Control feature. If the Remote User Authorization for Screen Access option is enabled, a remote user cannot use Remote Workstation Control on your system without your permission. When this option is enabled and a Tivoli IT Director administrator attempts to use on of these services on your system, a window will pop up on your desktop alerting you that a remote user is attempting to use Remote Workstation Control and asking whether you want to permit this user to use this service on your system. You can select Yes or No. If you do not make a selection within 15 seconds, Tivoli IT Director will automatically prevent the remote user from using the service on your system. For more information on configuring remote control services please see Chapter 4, “Remote Control” on page 73.

6. Enable WakeUp-On-LAN

   If you have the correct device drivers and adapter cards to support WakeUp-On-LAN, you should check this box.

When you have finished, click on **OK** to save your settings.

Once the installation is complete, the system must be shut down and restarted.

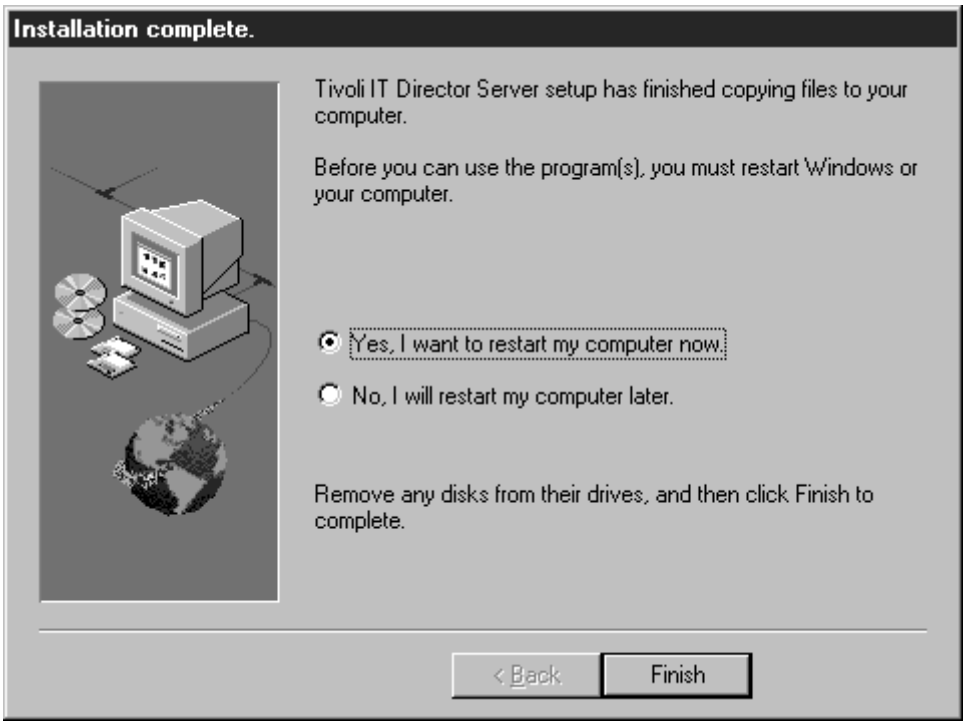


Figure 33. Tivoli IT Director Server Installation Complete Dialog

When Windows NT restarts, the Tivoli IT Director management server service is automatically started. If this is the first time that Tivoli IT Director has been started, the following will occur:

- Databases will be created.
- Database tables will be created.
- Local storage files will be created.

Tivoli IT Director server ships with and uses, by default, the JET database engine. JET is the same database engine used in Microsoft Access. The SQL database will hold all of the software and hardware inventory data collected from managed systems and devices. The Jet database should be sufficient for most installations. However, the Jet database is limited to database sizes of 1 GB. Also, Jet is a local access database only. This means that Jet must be installed on the same machine as the Tivoli IT Director server. If a more powerful database is required, Tivoli IT Director also supports Microsoft SQL Server. Microsoft SQL Server can be installed on the same system as Tivoli IT Director or on a separate system. Tivoli IT Director uses JDBC and ODBC to access the SQL database.

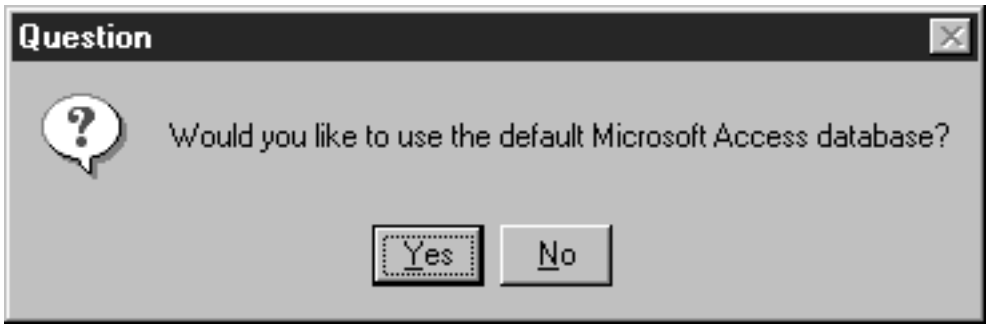


Figure 34. Microsoft Database Support

These steps occur the first time that the management server is started. These steps are very processor and disk-intensive, therefore, processor and disk utilization are highly elevated. The entire process did not take longer than a few minutes in our environment.

If you would rather not have the Tivoli IT Director service start automatically, you can set up the service to start manually. You can use the net start twgipc command at a NT command prompt to begin the Tivoli IT Director service or you can start it through the NT services GUI.

2.1.2 Server Preferences

After the product code is installed on your disk there are a few customization options you should perform. From the Tivoli IT Director console click on **Options** followed by **Server Preferences**. The tabs that you can update are shown in the following window:

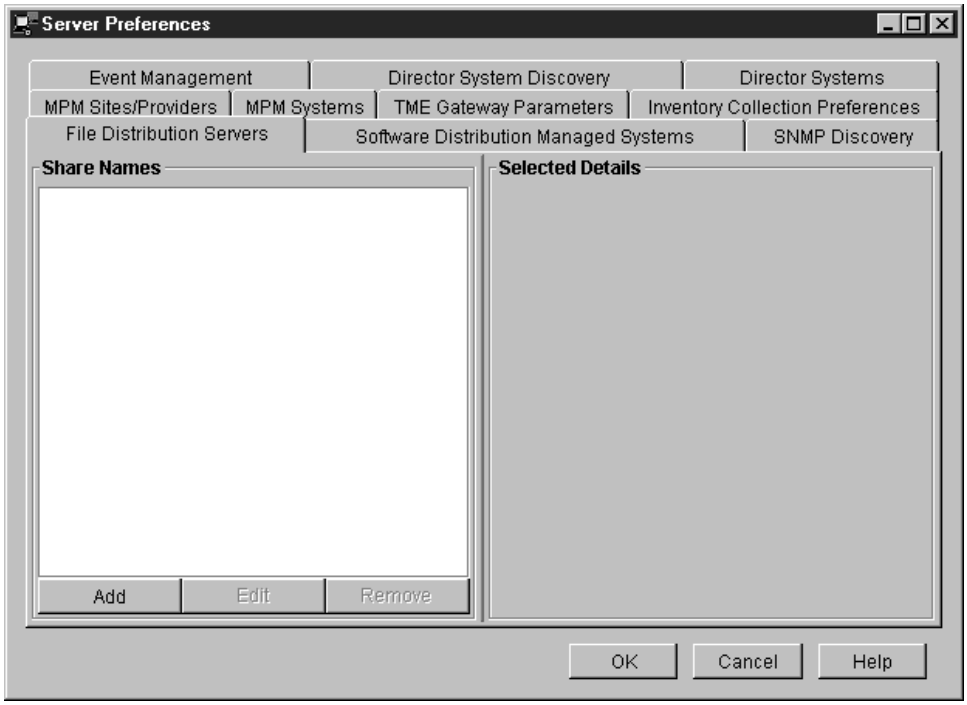


Figure 35. Tivoli IT Director Server Preferences

2.1.2.1 File Distribution Servers

If you are going to have your server as a file distribution server, there are some additional steps that need to be followed:

- Execute a Tivoli IT Director command
- Set up Windows sharing
- Define your server preference

If you haven't rebooted yet, you will need to either update your local path environment variable or point directly to the library that contains the twgshare executable. In our case we had reset the path variable so we had to enter:

```
twgshare -a director
```

Where director will correspond to the network share name that was set up.

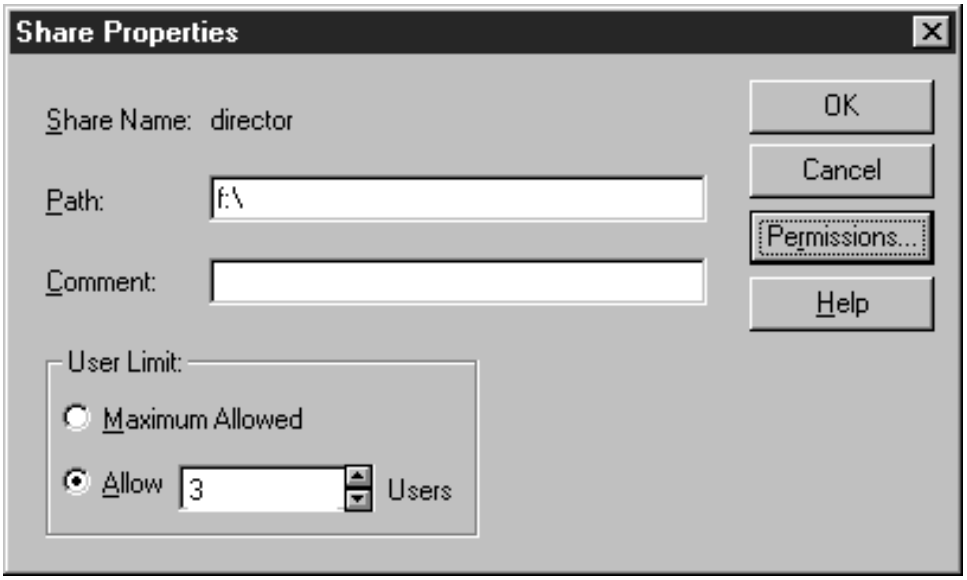


Figure 36. User IDs

After clicking on **Start, Programs, Administrative Tools**, and **Server Manager**, select the **Computer** and **Shared Directories** pull-down menus. Then click on **New Share**. In our case we are restricting the number of users who can share the directory but it is possible that you will not place any restrictions on it.

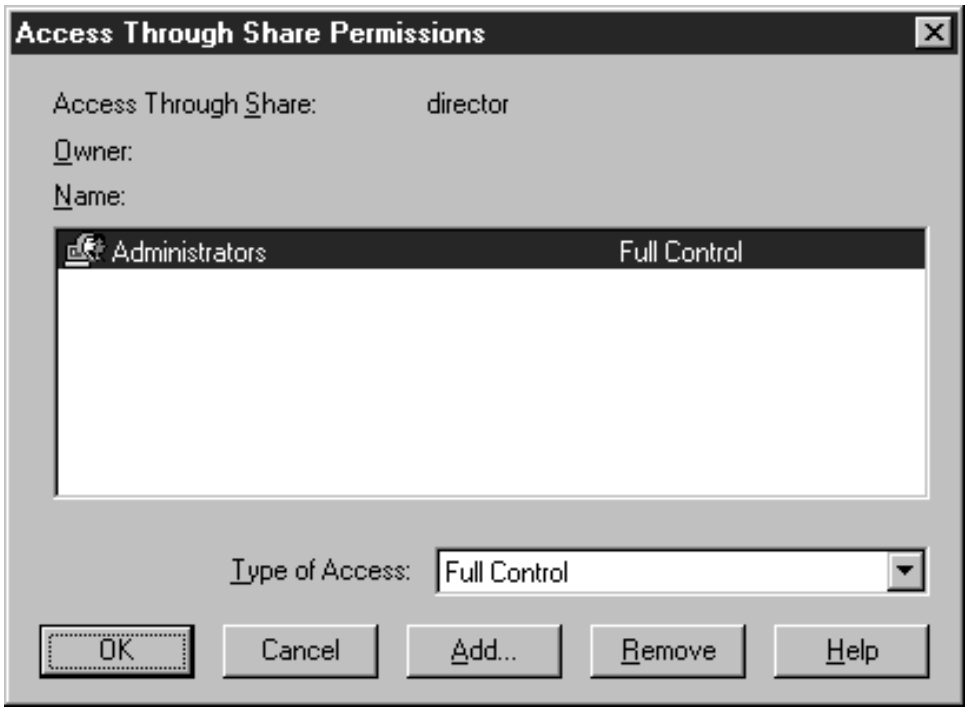


Figure 37. Registry Entry for Share

The other restriction that we have placed on the drive is which group of users can access it. This will depend upon your environment. You may choose to set up a separate share for each department or for each software package you will be distributing.

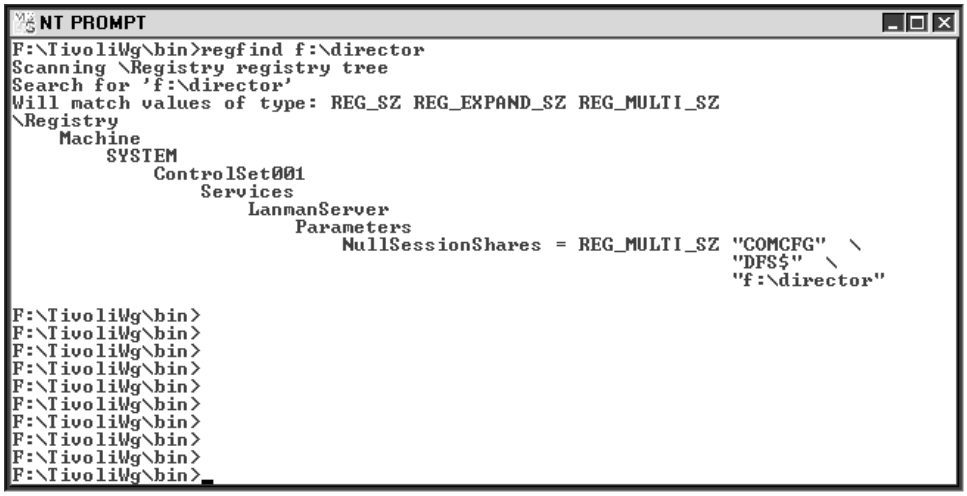


Figure 38. Registry Editor

To check if the entry was on our system we used a utility from the NT Resource Kit called regfind.

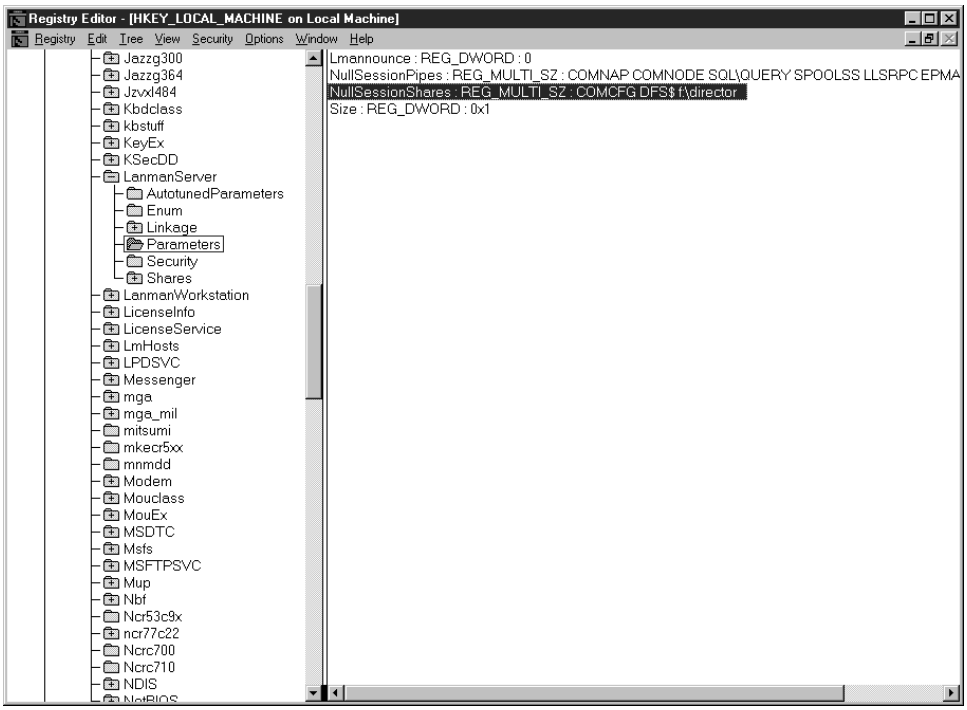


Figure 39. Registry Entry for Network Shares

If you don't have the kit you can always use the command regedt32 to view the registry and search for data or keys using pull-down menus.

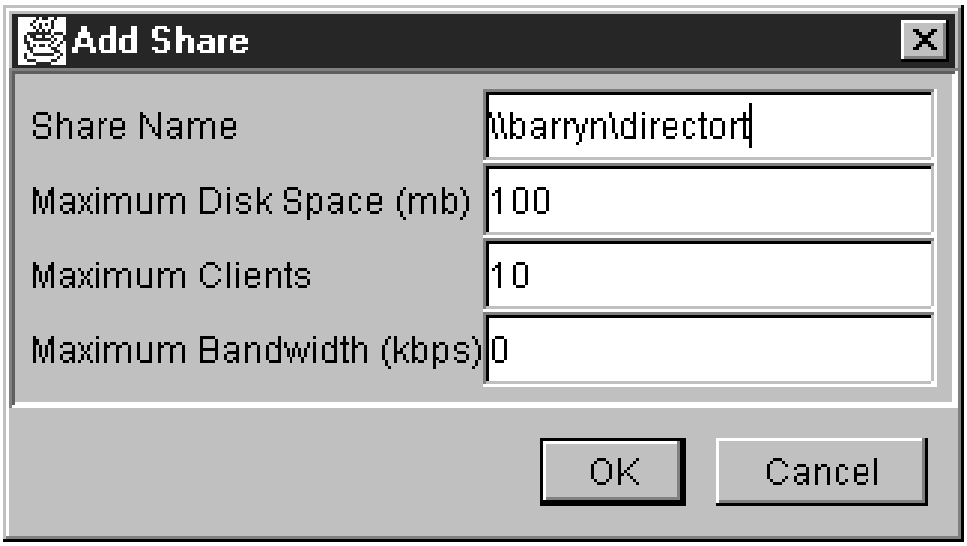


Figure 40. Network Shares

We chose the name director for our network share. You can of course use any valid name. We set a boundary of 100 MB and 10 agents and clicked on **OK**.

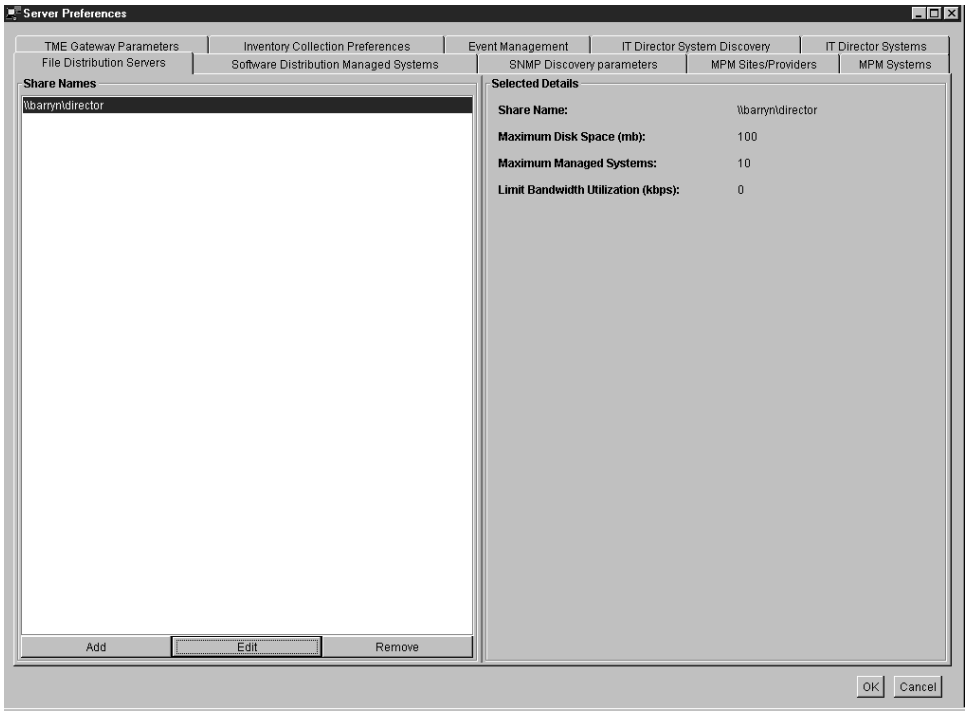


Figure 41. Updated Server Preferences

After you saved the share values you will see an update in the File Distribution Servers pane.

2.1.2.2 SNMP Discovery Parameters

By default, when you install Tivoli IT Director it will fill in your own systems IP address, community name and subnet mask. You can also get this information by using the ipconfig /all command as well as looking at the SNMP Properties from the Windows NT control panel.

In order to see what Tivoli IT Director has discovered for your values you will have to look at the SNMP Discovery Parameters in the server preferences. In the following window, the 9.89.41.xx network will automatically be discovered. We added an additional filter so that the 9.24.104.x network will also be discovered.

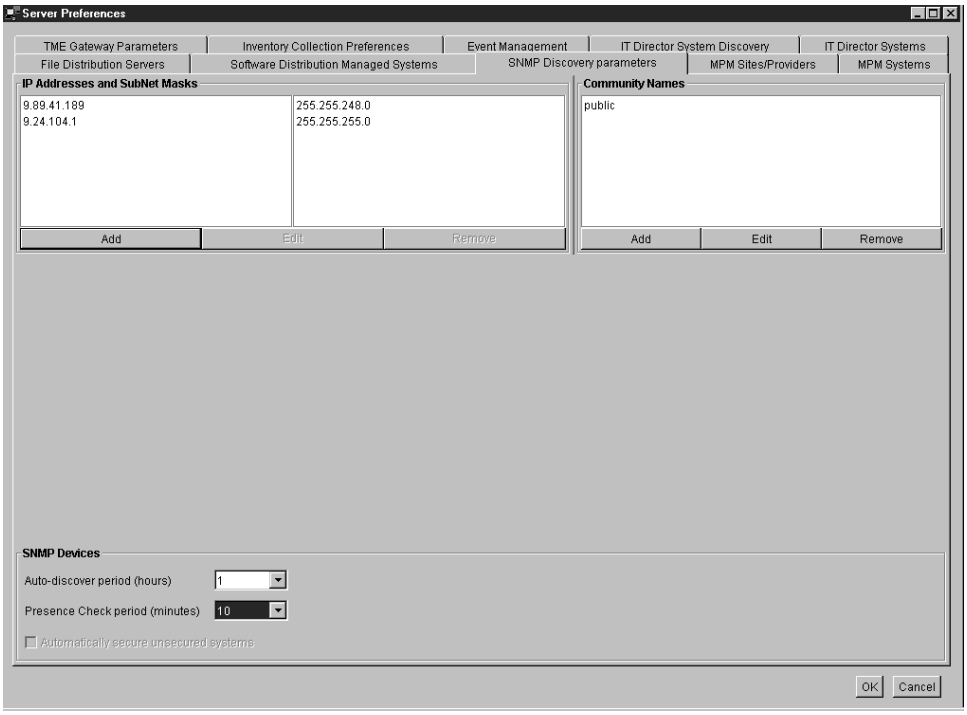


Figure 42. Server Preferences

Following is the output of the ipconfig command:

```
Windows NT IP Configuration

    Host Name . . . . . . . . . : barryn.ibmus2.ibm.com
    DNS Servers . . . . . . . . : 9.89.3.10
    Node Type . . . . . . . . . : Broadcast
    NetBIOS Scope ID. . . . . . :
    IP Routing Enabled. . . . . : No
    WINS Proxy Enabled. . . . . : No
    NetBIOS Resolution Use DNS :: No

Token Ring adapter IbmTok41:

    Description . . . . . . . . : Ibm Token Ring Network Card for PC I/O bus.
    Physical Address. . . . . . : 40-00-52-00-11-1
    DHCP Enabled. . . . . . . . : N
    IP Address. . . . . . . . . : 9.89.41.18
    Subnet Mask . . . . . . . . : 255.255.24.0
    Default Gateway . . . . . . : 9.89.4.1
```

The SNMP values can be found in the SNMP properties in the Network Control panel entry.

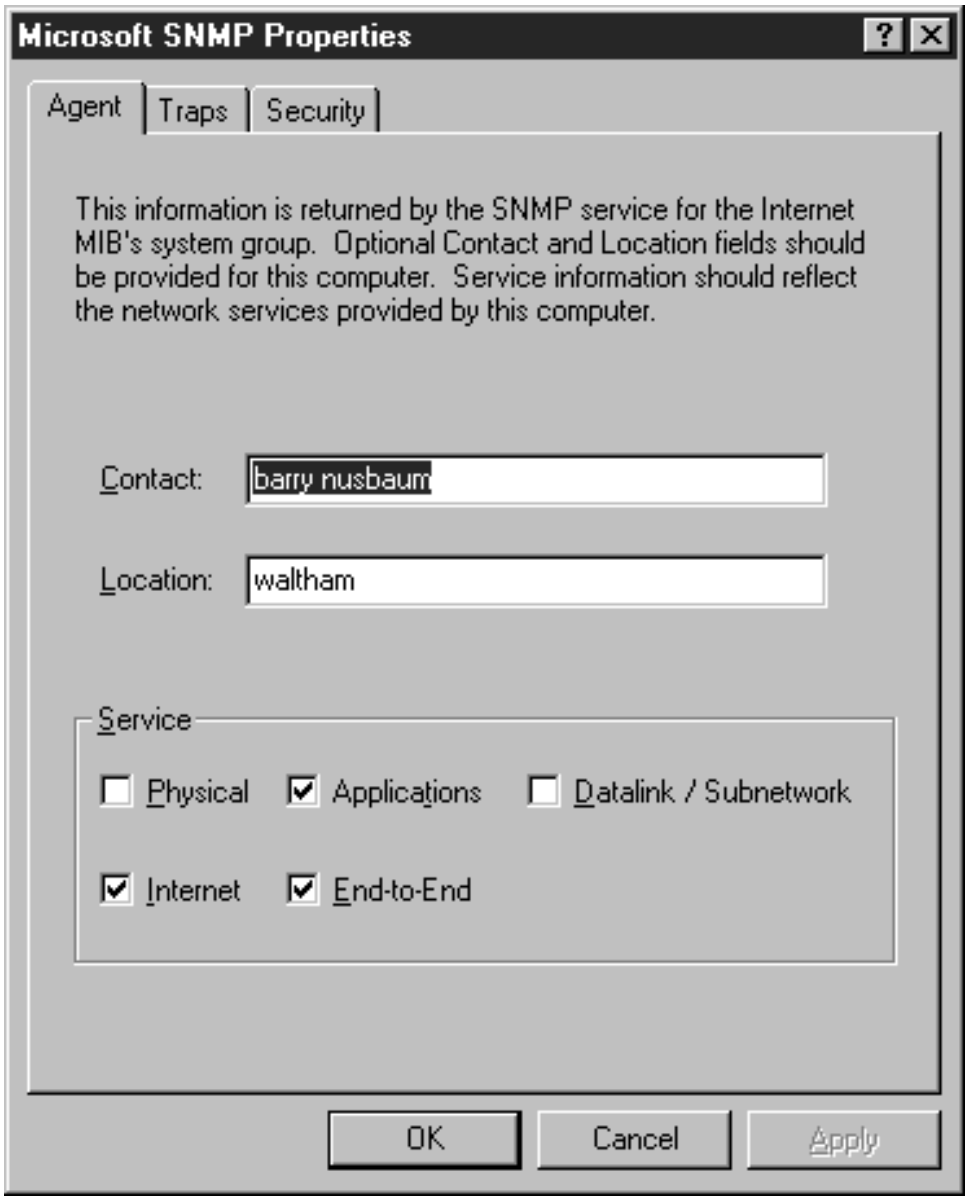


Figure 43. SNMP Community Name

2.1.2.3 Inventory Preferences

The final preference we set up is for the inventory collection period. We set our default values to gather inventory information once a day and we set a timeout value of 60 minutes. More information on the Inventory application can be found in Chapter 7, “Inventory and Software Distribution” on page 157.

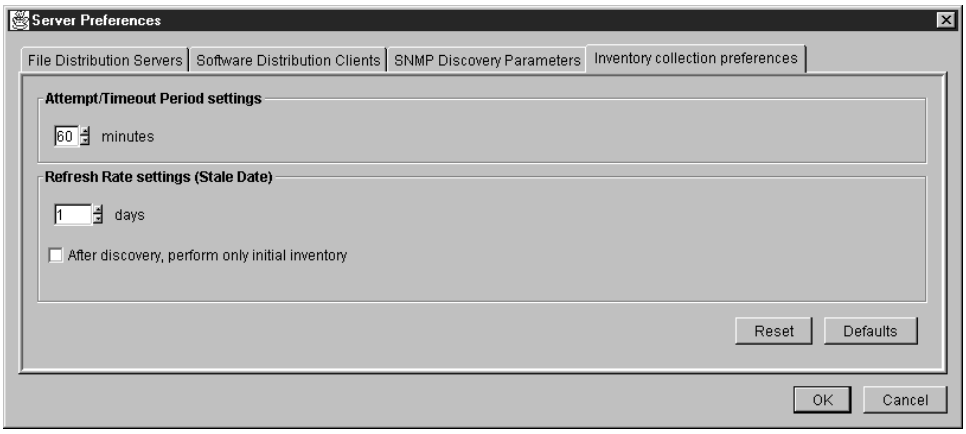


Figure 44. Server Preferences

2.2 Uninstall Procedures for Tivoli IT Director Server and Console

The procedure for uninstalling the Tivoli IT Director server is very straightforward. The same procedure to remove the server can be used to remove the Tivoli IT Director console.

To delete the Tivoli IT Director components go to the Uninstall Tivoli IT Director menu in the Program Manager and click on **Uninstall Tivoli IT Director**.

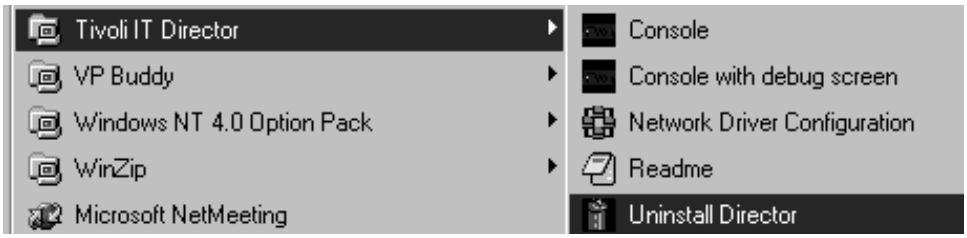


Figure 45. Tivoli IT Director Uninstall Menu

The following window will appear prompting the uninstall process to remove the existing database. Click on **Yes** to continue.

Figure 46. Delete Database Dialog

The Tivoli IT Director removal procedure will delete Tivoli IT Director from your system and you will be prompted to restart your system as shown below.

Figure 47. Restart Windows Dialog

2.3 Installation Prerequisites for Tivoli IT Director Management Console

The Tivoli IT Director management console should be installed on the administrator's system and will be used to carry out all management activities. The Tivoli IT Director management console can be installed on multiple systems. The Tivoli IT Director console requires the following hardware and software:

- Pentium class processor that can support Windows NT 3.51 or 4.0
- A network adapter that supports one of the network protocols listed below
- 10-12 MB of free disk space
- 32 MB or RAM

The Tivoli IT Director console also requires one of the following network protocols:

- TCP/IP - Winsock-compatible version for Windows
- NetBIOS
- IPX

2.4 Installation Procedure for Tivoli IT Director Management Console

The Tivoli IT Director console is installed by inserting the CD into the CD-ROM drive and starting the setup.exe command that is located in the x:\console\winNT or x:\console\win95 subdirectory, where x: is the drive letter of the CD drive. Setup will start an install wizard, which will guide you through the installation process. You can either map the drive as a network drive for the agent to install from, or move the CD to the client where the console will be and run autorun.exe from the

base directory. After Figure 23 on page 26 appears you can click on **Install Tivoli Director Console** to begin its installation.

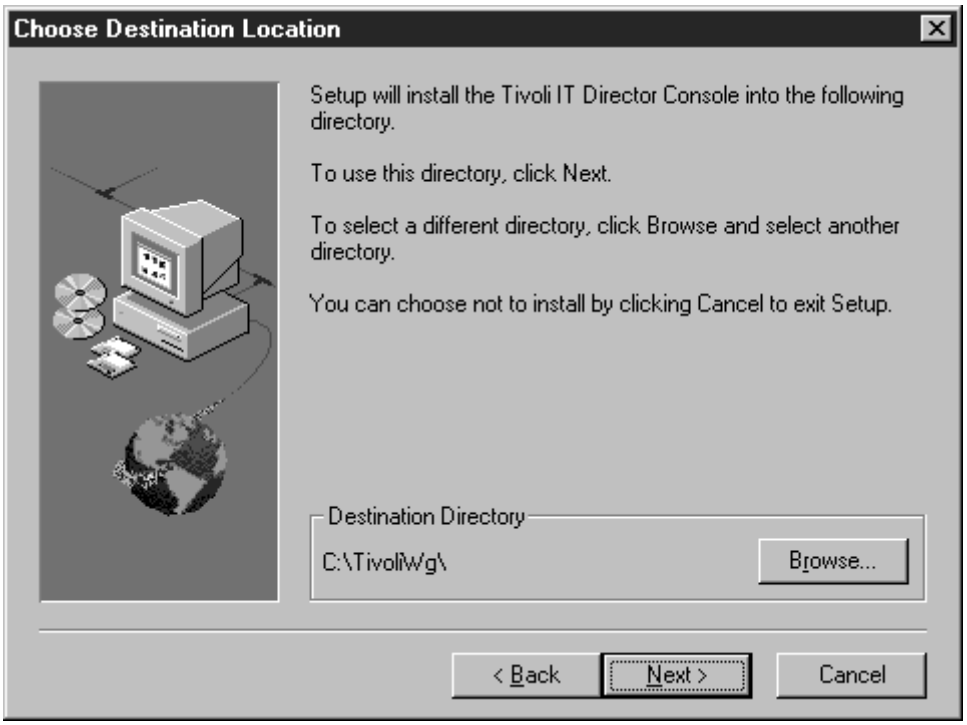


Figure 48. Tivoli IT Director Console Dialog Box

Enter a drive and directory name and click on **Next** to continue.

Setup will now copy all of the required files and create menu entries under your systems Start menu.

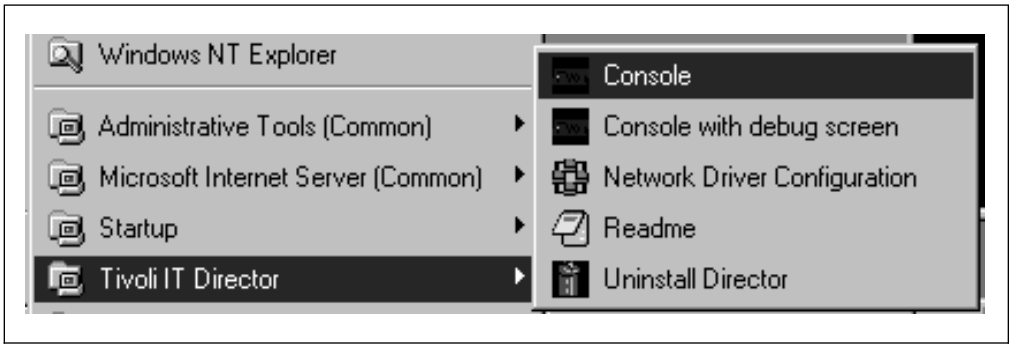


Figure 49. Tivoli IT Director Start Menu

To start the management console, simply select **Tivoli IT Director** and **Console** from the Start menu. As the console is starting, a login window will appear prompting for a server name, user ID, and password. The server name is the TCP/IP hostname or address of the Tivoli IT Director server. The user ID and password must match a user ID and password located in the Windows NT User Administration subsystem on the Tivoli IT Director management server. Once the correct information has been supplied, click on **OK** to log in and start the Management Console. Once the user ID and password are validated, the console will start. The following figure is an illustration of the Tivoli IT Director console login screen.

Note: You should also notice an icon on the task bar in the lower right-hand corner of the screen. By default, it is near the Windows time clock. If Tivoli IT Director is up and operational (running) it will show up in green.

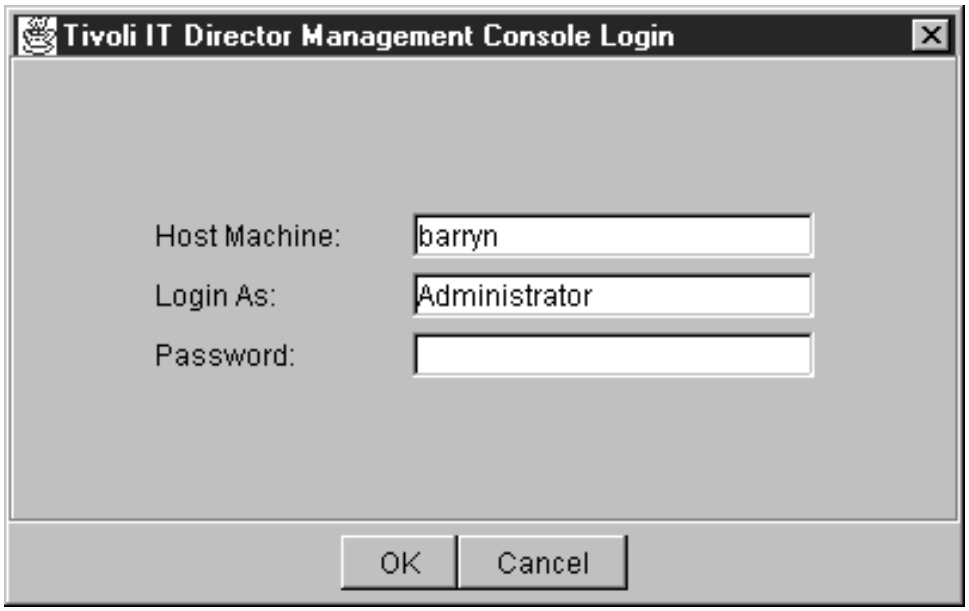


Figure 50. Tivoli IT Director Console Logon

The Tivoli IT Director installation creates guest accounts called IUSR_xxxxxxx and IWAM_xxxxxxx, where xxxxxxx is the system name. This account is an Internet server account that is used by Tivoli IT Director to connect to the management Web server. For more information on Tivoli IT Director Web Services see Chapter 8, “Web Publishing and Internet Technologies” on page 199.

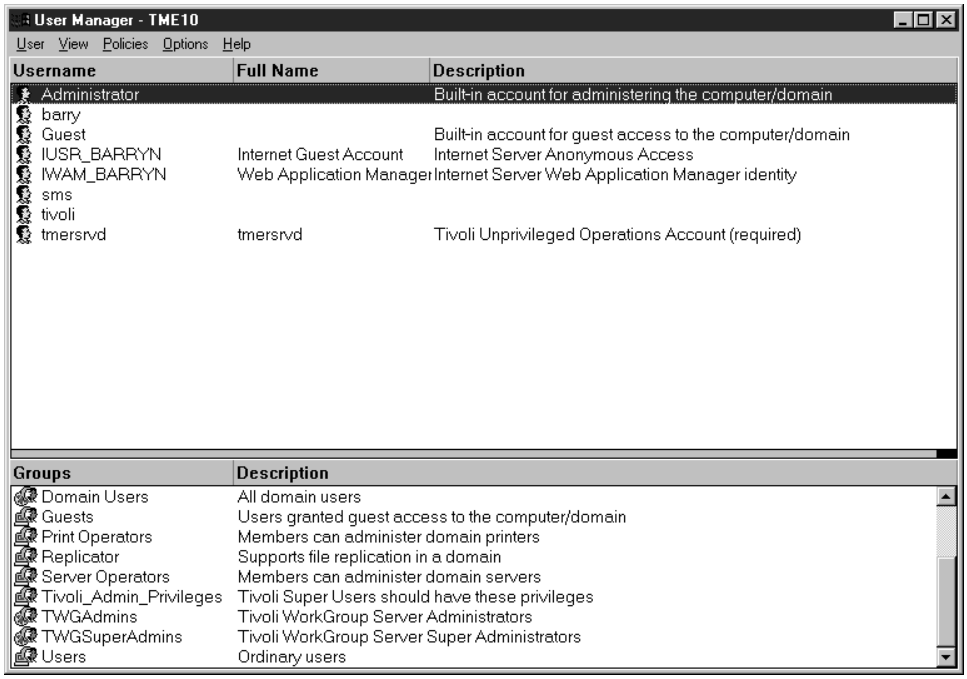


Figure 51. IUSR_XXXXXXX in User Manager

The Tivoli IT Director installation also creates two NT groups, TWGAdmins and TWGSuperAdmins, and places the Administrator into these groups.

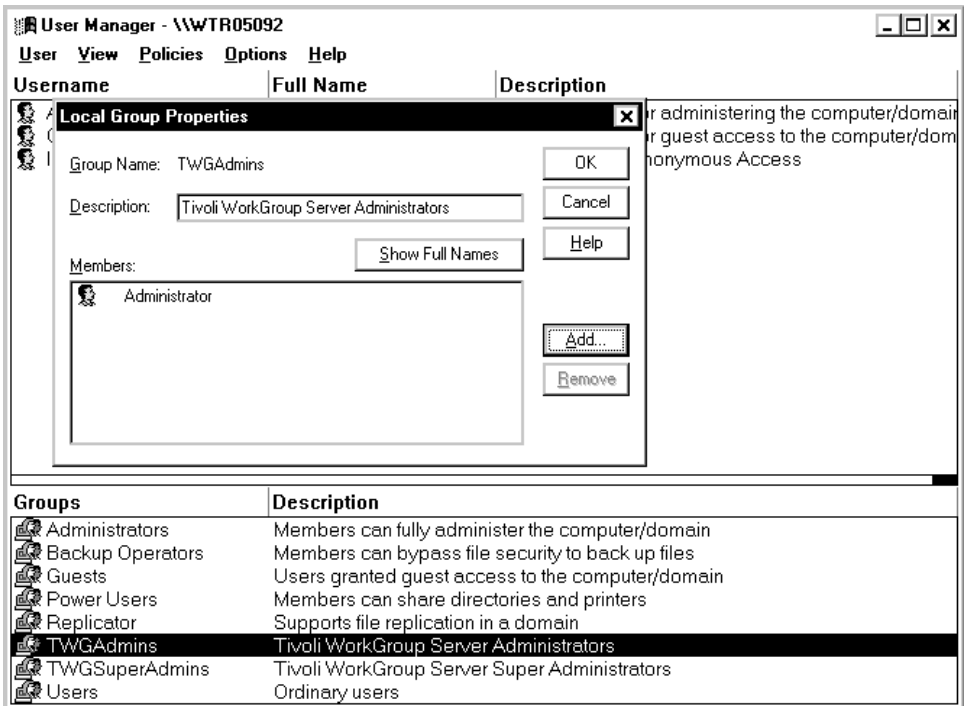


Figure 52. Tivoli IT Director NT Groups

The management console GUI is a Java-based application with all state information stored on the server. The Tivoli IT Director management console can be installed as a local application that runs independently.

Setup will now copy all of the required files and create menu entries under the Start menu.

2.5 Installation Prerequisites for Tivoli IT Director Native Agents

The Tivoli IT Director agent contains the executable files required to perform tasks on systems managed by the Tivoli IT Director Server.

The following hardware and software is required for each agent.

- Pentium class processor
- Network adapter that supports one of the supported network transports
- 10-12 MB of free disk space
- 32 MB RAM
- Win32 platforms - Windows 95, Windows NT 3.51 and Windows NT 4.0
- Win16 platforms - Windows 3.x and Windows for Workgroups
- OS/2 3.x and 4.x
- Novell NetWare 3.12, NetWare 4.1, and NetWare 4.11

To enable communication with the Tivoli IT Director server, the agent system must have one of the following network transports installed:

- TCP/IP, an IBM version for OS/2 or Windows, or a WinSock-compatible version for Windows
- NetBIOS
- IPX

2.6 Tivoli IT Director Native Agent Installation Procedure

The Tivoli IT Director agent is installed by inserting the Tivoli IT Director CD either on the server or the client. That will launch an install wizard, which will guide you through the installation process. You can either map the drive as a network drive for the client to install from, or move the CD to the client where the agent will be and run autorun.exe from the base directory. After Figure 23 on page 26 appears you can click on **Install Tivoli Director Agent** to begin its installation program, which is located in the x:\agent\w32 subdirectory, where x: is the drive letter of the CD drive.

If you are installing on a Win16 system, change the directory to the x:\agent\w16 subdirectory, where x: is the drive letter of the CD-ROM drive.

The install wizard will first ask for the location and path where the agent will be installed. Select the appropriate drive and path for your configuration and click on **Next** to continue.

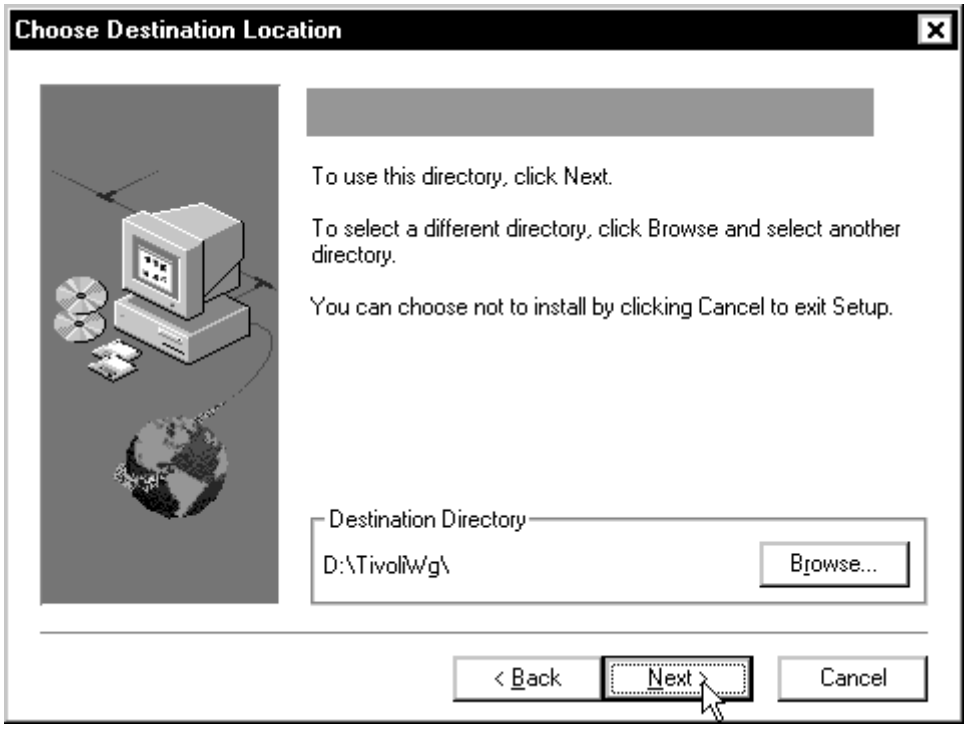


Figure 53. Select Drive and Path

Next select the directory where Software Distribution packages will be placed. Click on **Next** to continue.

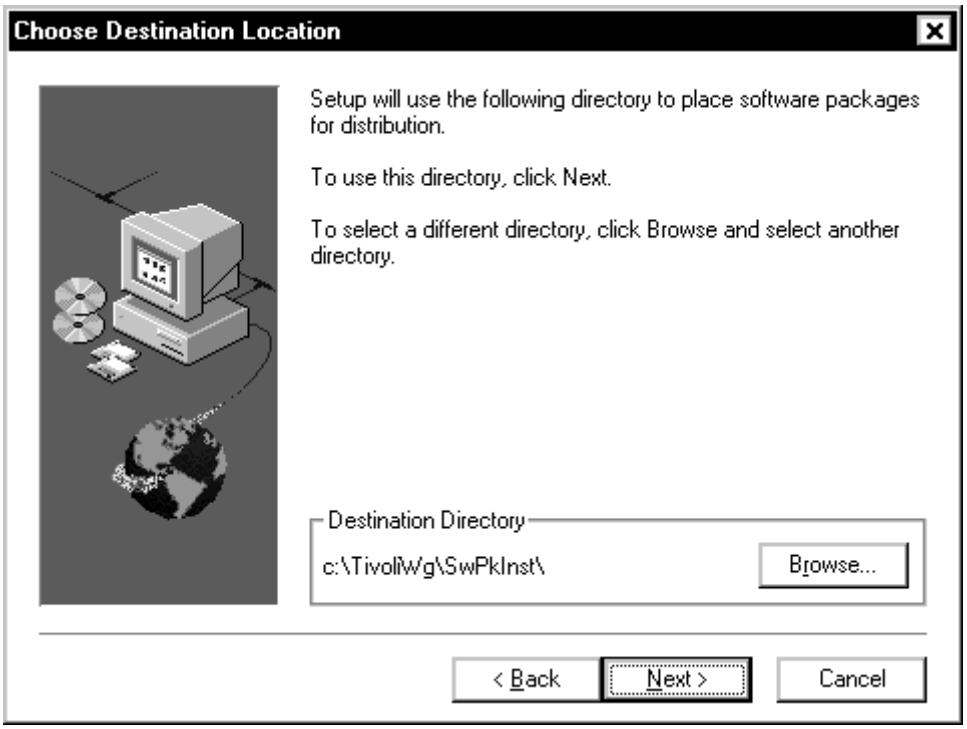


Figure 54. Drive Path for Software Distribution Packages

Information must be entered for the Network Driver Configuration as shown in the following window:

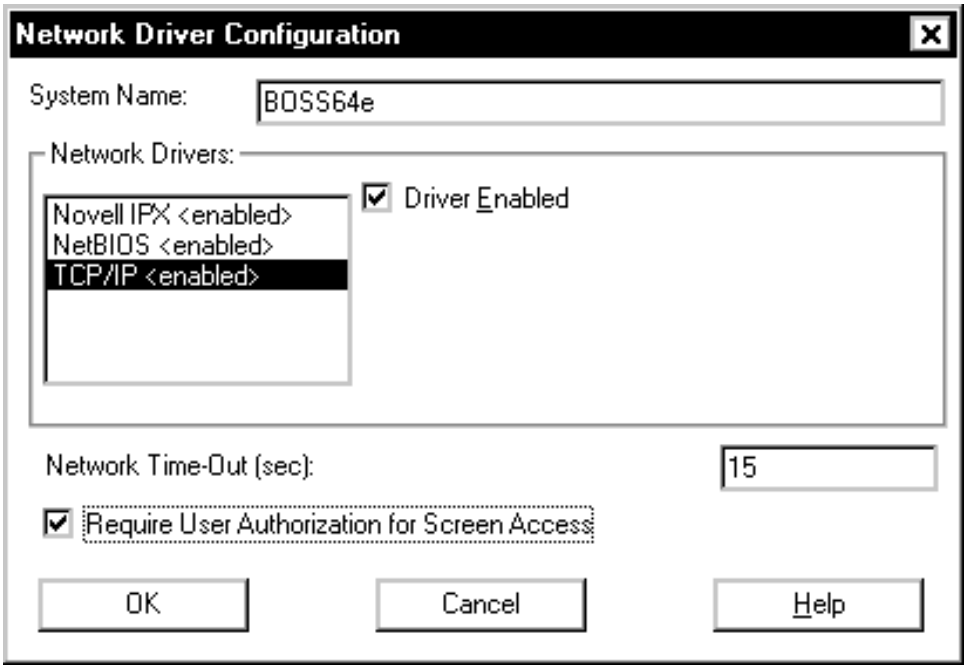


Figure 55. Tivoli IT Director Server Installation Complete Dialog

Follow these steps to configure the network drivers.

1. Enter a system name.

Enter a name for the system in the System Name field. This name will help the Tivoli IT Director administrator identify the system on the network.

2. Select a network driver.

   Select one of the available network drivers that are displayed in the Network Drivers field. Once selected, the network driver will assign a network address to the system.

   Note: If the IPX or TCP/IP network driver is enabled, this name cannot be altered and it will not appear on the screen.

   If the NetBIOS network driver is enabled, a network address will be selected and displayed in the Network Address field.

   When changing this default name, enter any 1-8 character address. This address must be unique to the system. If this NetBIOS address is identical to the NetBIOS address of another system on the network, it will prevent the Tivoli IT Director agent from starting properly.

3. Enable the network driver.

   When all required information has been entered, select the **Driver Enabled** check box to activate the driver on startup. If the system supports multiple network interfaces, additional network drivers can be added by repeating the above steps.

4. Set Network Time-Out value (optional).

   The Network Time-Out field shows the number of seconds that the Tivoli IT Director Server will attempt to communicate with a remote system that is not responding. If the Tivoli IT Director Server does not establish contact with the remote system within this interval, it cancels the communication attempt.

   The Network Time-Out default setting is 15 seconds.

5. Set Remote User Authorization for Screen Access (optional).

   The Remote User Authorization for Screen Access option enables you to specify whether a remote user can access the local system without permission. If this option is enabled and a Tivoli IT Director administrator attempts to use Remote Workstation Control (RWC) to access the local system, a message window is displayed on the local system indicating that a remote user is attempting RWC access. You can then allow or disallow access.

   Refer to Chapter 4, “Remote Control” on page 73 for more information on using the RWC service.

6. Save the configuration and continue.

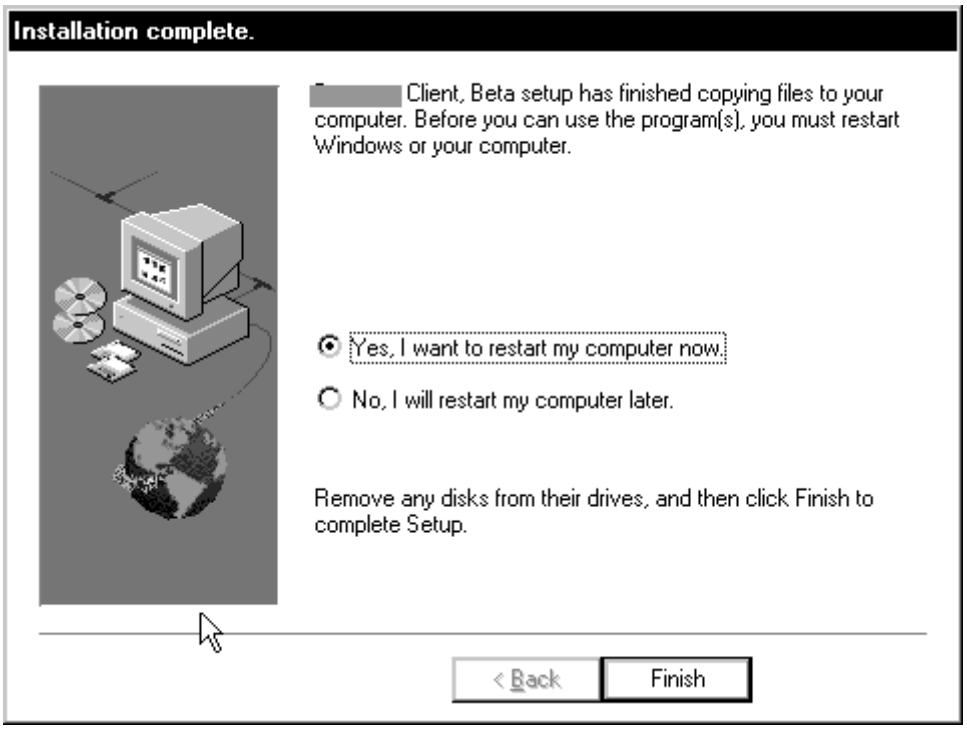


Figure 56. Tivoli IT Director Installation Complete Dialog

You must restart your system before Tivoli IT Director will function correctly. Click on **Finish** to complete the installation and reboot your system.

Finally, after reboot the installation will create a Tivoli IT Director Program Group with Program items as shown below.

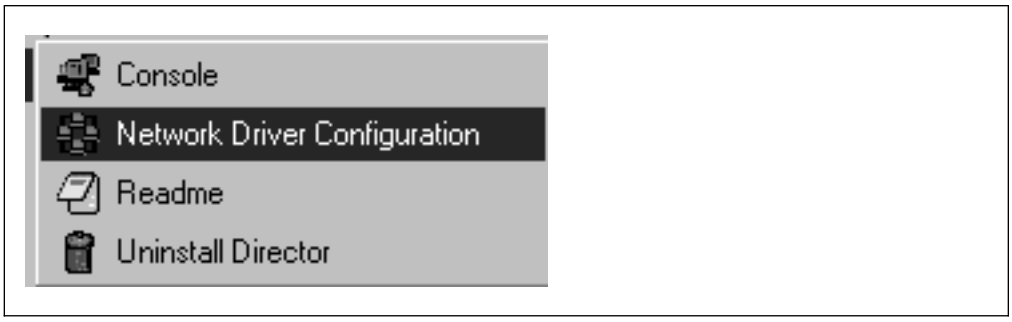


Figure 57. Network Driver Configuration

2.7 Agent Installation Procedure for OS/2

The OS/2 native agent is installed by inserting the Tivoli IT Director CD and starting the install.cmd command file, which is located in the x:\agent\OS2 subdirectory, where x: is the drive letter of the CD drive.

The first screen will ask you to select a drive and directory from which the Tivoli IT Director agent files will be copied. The default is the drive and directory from which the Tivoli IT Director installation program was started. Then, choose a drive and directory in which to install the Tivoli IT Director agent files. Enter the drive and

directory name to which the Tivoli IT Director agent files will be copied. The default is C:\TivoliWG. When you have finished click on **OK** to continue.

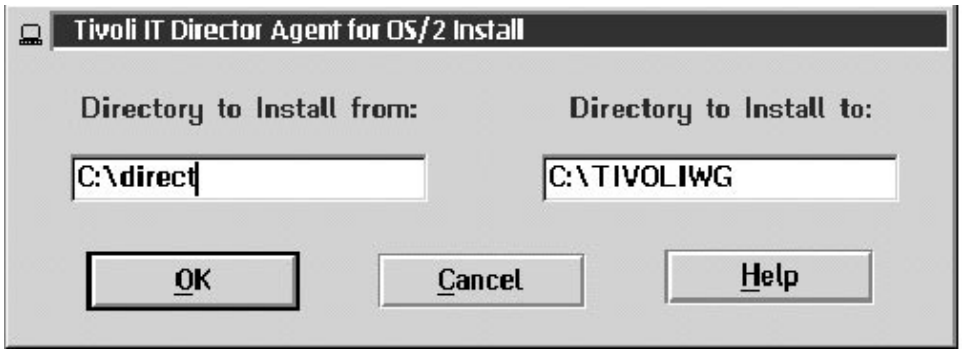


Figure 58. Tivoli IT Director Install Screen

Next, you need to select your installation options.

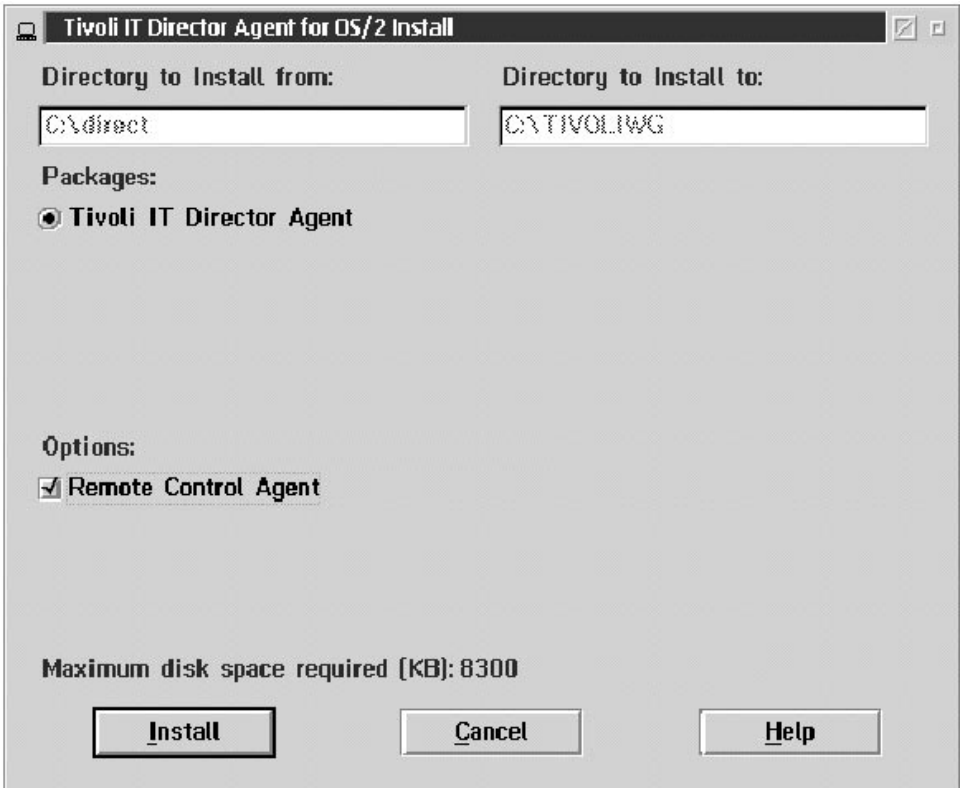


Figure 59. Tivoli IT Director Agent Options Screen

The Tivoli IT Director installation program offers an option to install the Remote Workstation Control feature. Also, if the Remote User Authorization for Screen Access option is enabled, a remote user cannot use Remote Workstation Control on your system without your permission. When this option is enabled and a Tivoli IT Director administrator attempts to use one of these services on your system, a window will pop up on your desktop alerting you that a remote user is attempting to use Remote Workstation Control and asking whether you want to permit this user to use this service on your system. You can select Yes or No. If you do not make a selection within 15 seconds, Tivoli IT Director will automatically prevent the remote user from using the service on your system.

After choosing the installation options, select **Install**.

The installation program copies all program files required by the installation configuration. A window appears, displaying the name of the files currently being copied, as well as the percentage of the installation that is complete. Select **Cancel** if you wish to halt the installation process.

Figure 60. Tivoli IT Director OS/2 Agent Installation Dialog

Next configure the network drivers. Information must be entered regarding the communication protocols that are supported by the system. The Network Driver Configuration window will appear.

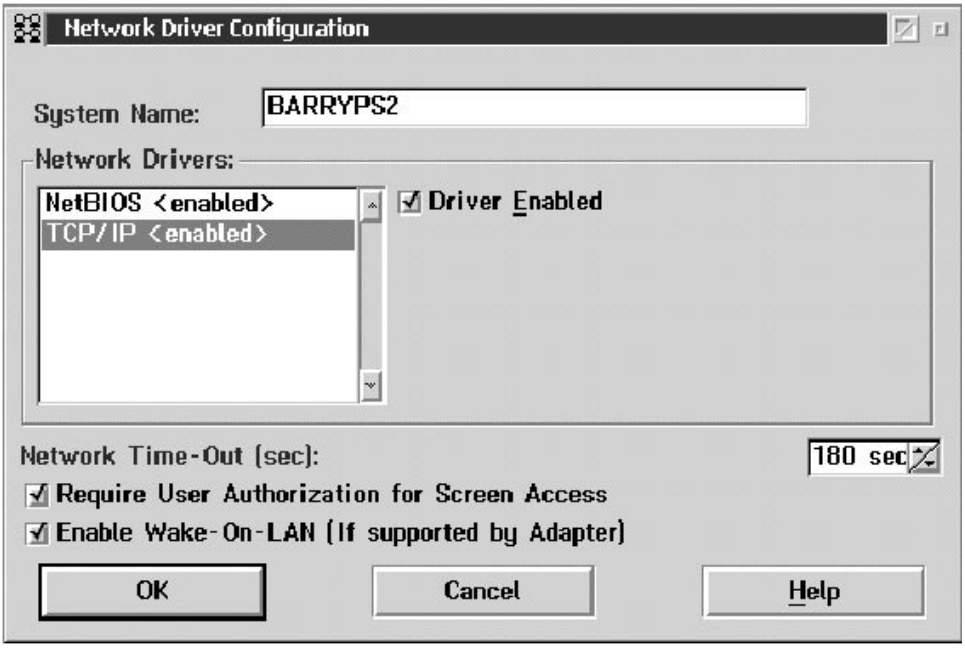


Figure 61. Configure Network Driver Configuration

It is now time to configure the network drivers. Information must be entered for the communication protocols that are supported by the system. Follow these steps to configure the network drivers:

1. Enter a system name.

   Enter a name for the system in the System Name field. This name will help the Tivoli IT Director administrator identify the system on the network.

2. Select a network driver.

   Select one of the available network drivers that are displayed in the Network Drivers field. Once selected, the network driver will assign a network address to the system.

   Notes: .

   - If the IPX or TCP/IP network driver is enabled, this name cannot be altered and it will appear on the screen.
   - If the NetBIOS network driver is enabled, a network address will be selected and displayed in the Network Address field. When changing this default name, enter any 1-8 character address. However, this address must be unique to the system.

     If this NetBIOS address is identical to the NetBIOS address of another system on the network, it will prevent the Tivoli IT Director agent from starting properly.

3. Enable the network driver.

   When all required information has been entered, select the **Driver Enabled** check box to activate the driver on startup. If the system supports multiple network interfaces, additional network drivers can be added by repeating steps 2 and 3.

   The Network Time-Out field shows the number of seconds that the Tivoli IT Director server will attempt to communicate with a remote system that is not responding. If the Tivoli IT Director server does not establish contact with the remote system within this interval, it cancels the communication attempt.

4. Save the configuration and continue.

After configuring the system for network access, the installation program displays a list of changes that must be made to the system configuration files, and gives the option of having the installation program make the changes.

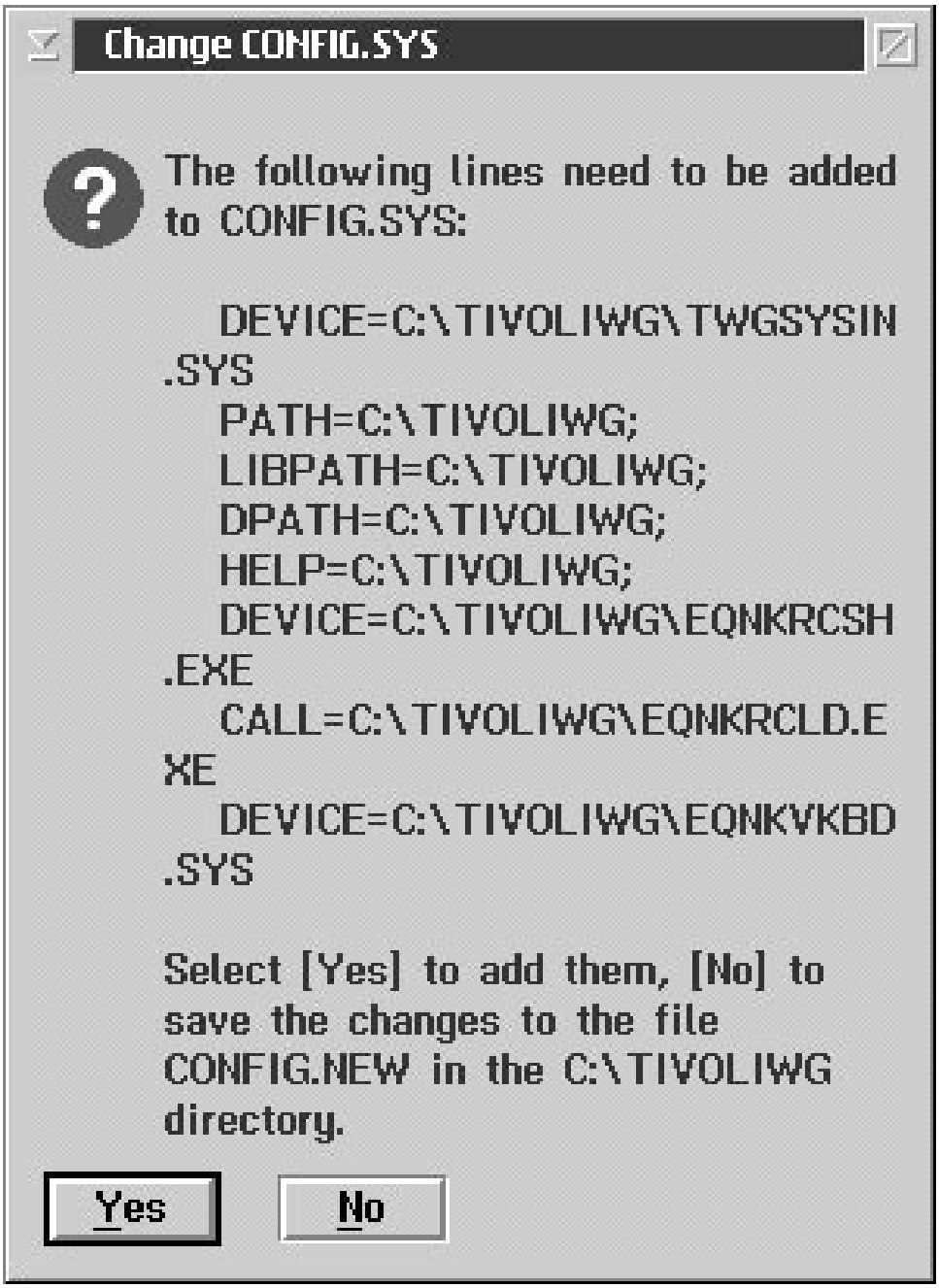


Figure 62. Change CONFIG.SYS Dialog

The installation program will display a list of changes that must be made to the CONFIG.SYS and STARTUP.CMD files. Select **Yes** or **No**.

Note: These changes must be made to the system configuration for the Tivoli IT Director agent to run correctly. If Yes is selected, the changes are automatically made to the system configuration. If No is selected, the commands are saved to files named CONFIG.NEW and STARTUP.NEW in the destination directory so that they can be manually added later.

The installation is now complete. Restart the system in order for the configuration changes to take effect.

2.8 Uninstall Procedures for Tivoli IT Director Agents

To uninstall the Tivoli IT Director agent code on Windows systems, locate the Uninstall Tivoli IT Director program item as shown below. Click on **Uninstall Tivoli IT Director**.

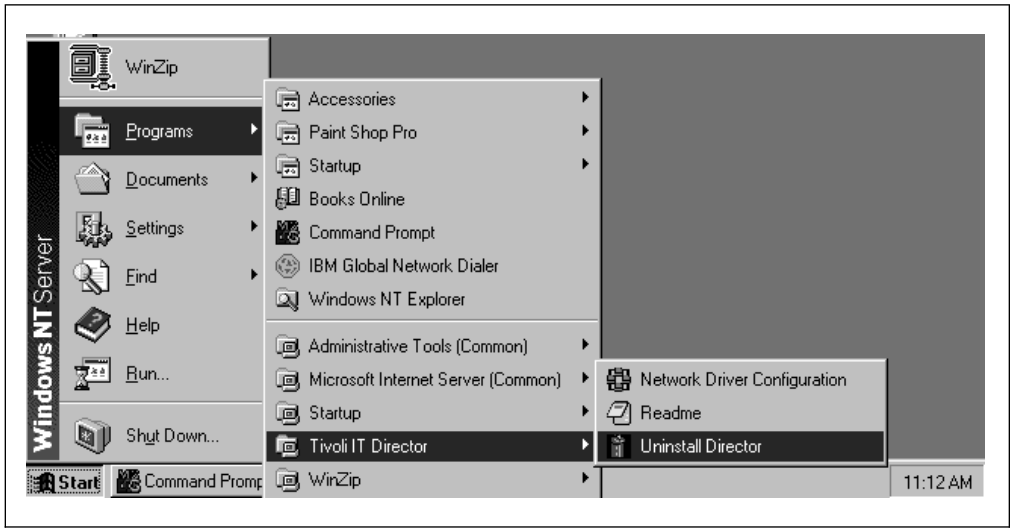


Figure 63. Agent Uninstall Menu

A confirmation dialog will ask if you want to continue. Click on **Yes** to confirm the uninstall procedure.

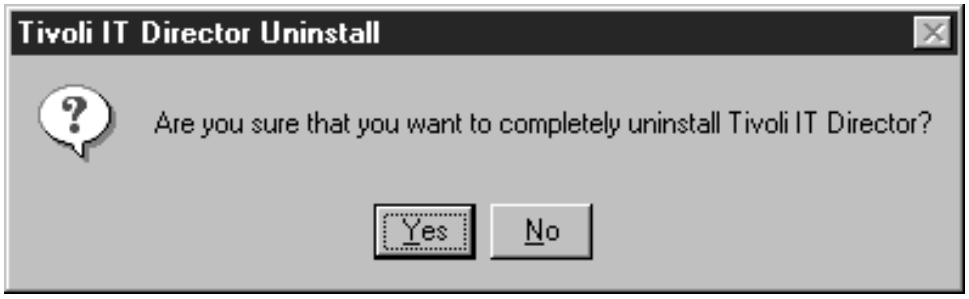


Figure 64. Confirmation Dialog

Note: The uninstall log will be placed in your systems directory on Windows systems. In our case it was named \WINNT\system32\TwgInst.log.

The uninstall procedure will remove the Tivoli IT Director agent from your system and you will be prompted to restart your computer.

2.9 Uninstall Procedure for OS/2

To uninstall the Tivoli IT Director OS/2 agent, open a command prompt and run bmuninst.

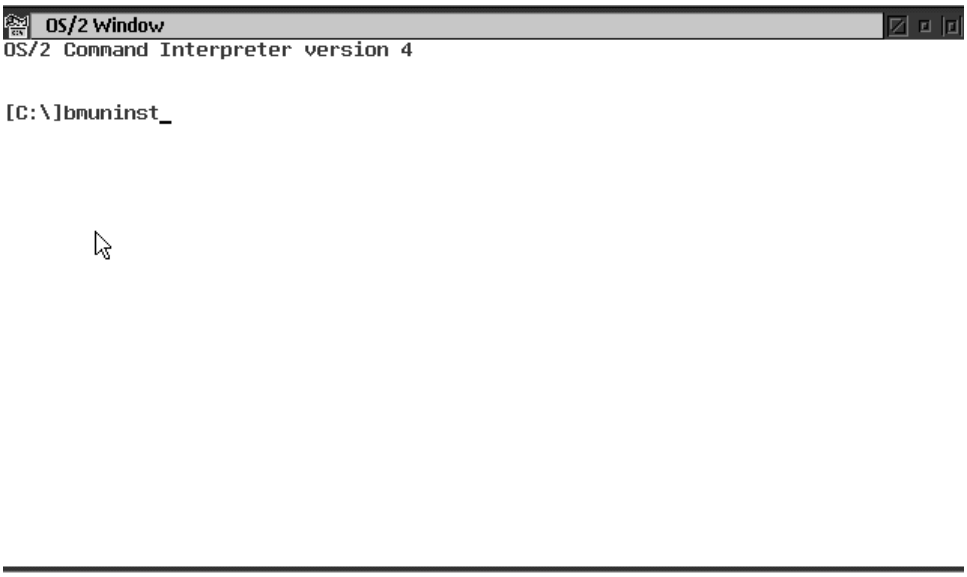


Figure 65. OS/2 Command Prompt

A confirmation dialog will appear to confirm the uninstall. Click on **Yes** to continue.

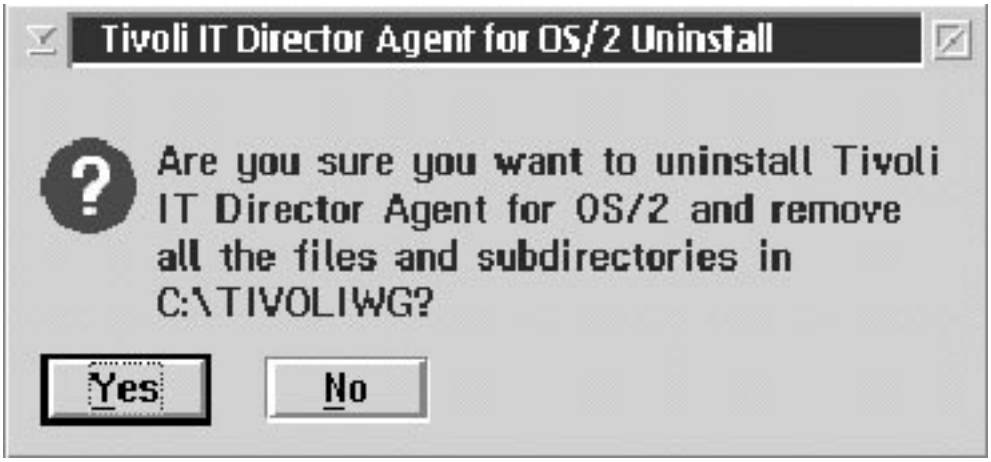


Figure 66. Confirmation Dialog

The uninstall will begin uninstalling the OS/2 agent.

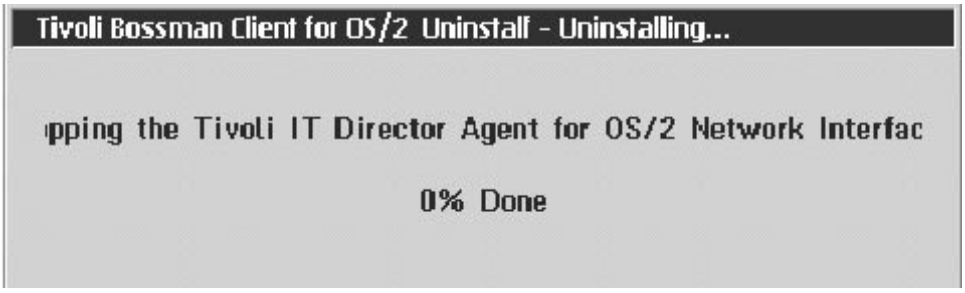


Figure 67. Uninstalling

A window will pop up asking to remove CONFIG.SYS and update CONFIG.RPS. Click on **Yes** and **OK** to continue.

Figure 68. CONFIG.SYS Dialog

After the Tivoli IT Director OS/2 agent has been uninstalled you will need to restart your system.

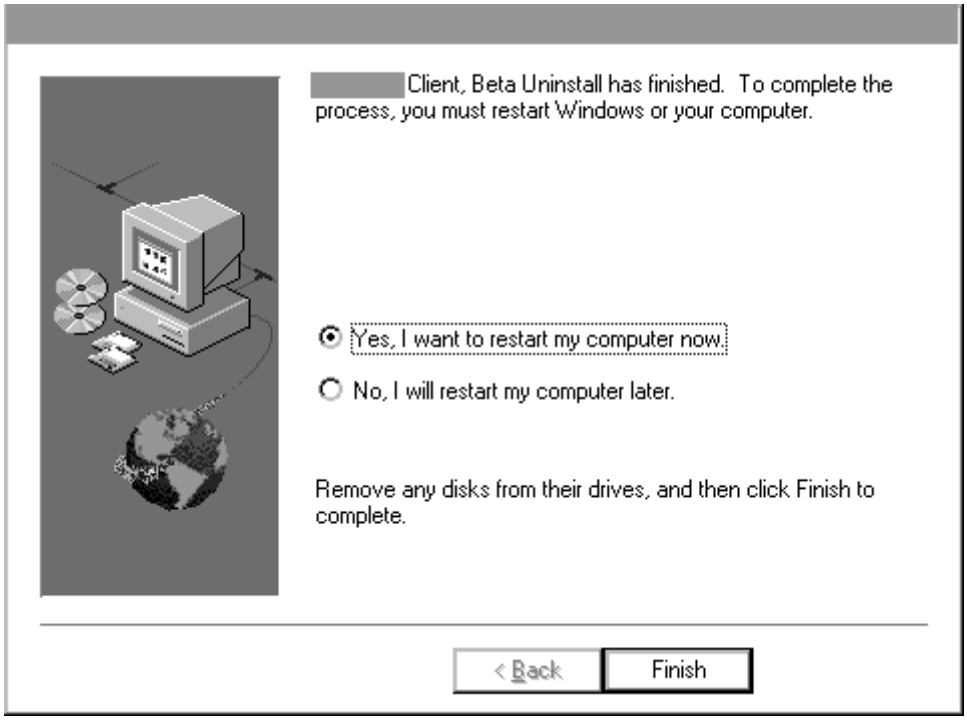


Figure 69. OS/2 Restart System Dialog

2.10 Debugging Information

The following registry keys, under HKEY_Local_Machine\Software\Tivoli\Director\CurrentVersion may be useful for debugging purposes:

- LogServerOutput - Enables output logging when set to a 1
- NoJIT - Disables the just-in-time Java compiler, which allows error messages to have line numbers, but will slow down the management server
- Server - Date/time server installed

- Log - Install log
- Root - Install directory

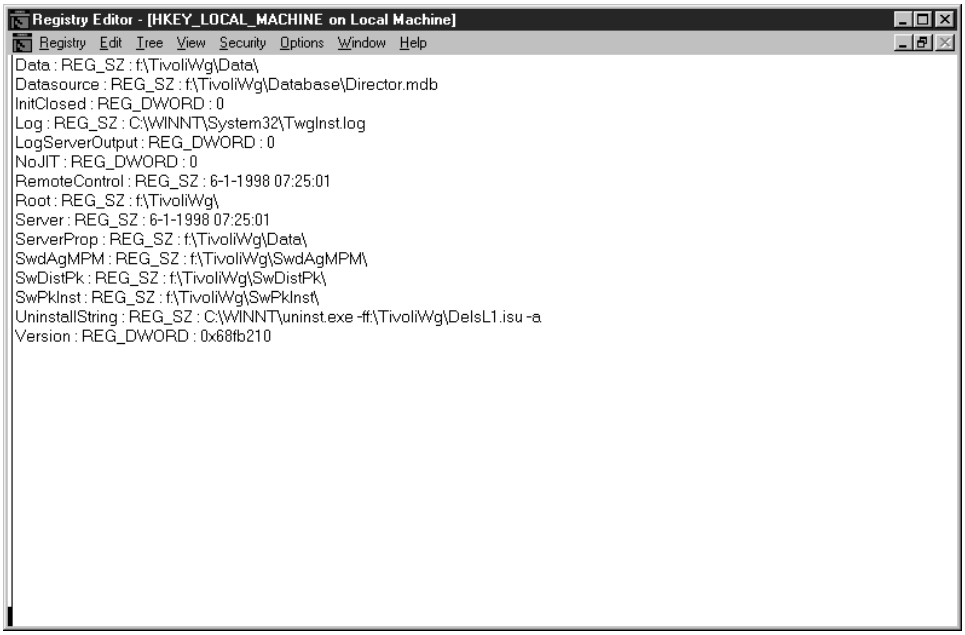


Figure 70. Registry Key for Debugging

There is a command that you can enter called raswatch, which can help you with debugging. The options are shown in the following figure.

```
Syntax is:  RasWatch [-log fileName] [-high] [-component]
   where:  -log fileName  specifies the name of the log to watch.
                          If not specified, the default is "TWGRas"

           -high          turns on the high use logging flag.

           -component     is one or more components to enable logging
                          for.  The list of component names follows.
                          Only the first three letters of the name are
                          significant.  Component choices are:

       install       engine        database      console
       alerts        transporter   process_mgr   inventory
       scheduler     remote_ctl    monitors      file_xfer
       mpm_prov      app_mgmt      task          snmp
       utility       sw_dist       sdk           internet
       log           user_admin    lcf

By default all components are enabled and the high flag is off.
"-none" is a special parameter that starts RasWatch without
affecting the logging setting, in case the Java GUI is being used
to enable components.

As an example, to turn on logging for the engine, console and
database, the command would be:  raswatch -eng -con -dat
```

Figure 71. Raswatch Debugging Command

To read the data you need to use the rasdump command.

```
Syntax:  RasDump [-l] [-c] [filename]
where:  -d    = display full datestamp (default is just time)
                (i.e. YYYY-MM-DD hh:mm:ss.ttt)
        -c    = display component identifier
        -high = display "high use" log messages

If filename is not specified, it defaults to TWGRas.log
```

Figure 72. Rasdump Debug Format Command

Some sample output follows:

```
1998-05-01 07.29.24.828 INTERNET    !! Thread-1 IO Exception.
1998-05-01 07.29.24.858 INTERNET    !! Thread-1 java.io.FileNotFoundException: ../data/SMCChans.ini
1998-05-01 07.29.24.868 INTERNET    !! Thread-1          at java.lang.Throwable.<init>(Compiled Code)
1998-05-01 07.29.24.878 INTERNET    !! Thread-1          at java.io.IOException.<init>(Compiled Code)
1998-05-01 07.29.24.878 INTERNET    !! Thread-1          at java.io.FileNotFoundException.<init>(FileNotFoundException.java:50)
1998-05-01 07.29.24.878 INTERNET    !! Thread-1          at java.io.FileInputStream.<init>(FileInputStream.java:64)
1998-05-01 07.29.24.878 INTERNET    !! Thread-1          at com.tivoli.twg.itech.TWGSMCClient.loadChanStore(TWGSMCClient.java:520)
1998-05-01 07.29.24.878 INTERNET    !! Thread-1          at com.tivoli.twg.itech.TWGSMCClient.<init>(TWGSMCClient.java:161)
1998-05-01 07.29.24.878 INTERNET    !! Thread-1          at com.tivoli.twg.itech.TWGSMCClient$1.run(TWGSMCClient.java:2562)
1998-05-01 07.29.24.878 INTERNET    !! Thread-1          at java.lang.Thread.run(Thread.java:474)
1998-05-01 07.29.59.888 ENGINE      !! TWGServerMain TWGConfigProperties.get  Property not found for key:
(twg.gateway.link.1.initparam)
1998-05-01 07.29.59.969 ENGINE      !! TWGServerMain TWGConfigProperties.get  Property not found for key: (twg.gateway.link.2)
1998-05-04 14.20.47.679 INTERNET    !! Thread-1 IO Exception.
1998-05-04 14.20.47.709 INTERNET    !! Thread-1 java.io.FileNotFoundException: ../data/SMCChans.ini
1998-05-04 14.20.47.709 INTERNET    !! Thread-1          at java.lang.Throwable.<init>(Compiled Code)
1998-05-04 14.20.47.719 INTERNET    !! Thread-1          at java.io.IOException.<init>(Compiled Code)
1998-05-04 14.20.47.719 INTERNET    !! Thread-1          at java.io.FileNotFoundException.<init>(FileNotFoundException.java:50)
1998-05-04 14.20.47.719 INTERNET    !! Thread-1          at java.io.FileInputStream.<init>(FileInputStream.java:64)
1998-05-04 14.20.47.719 INTERNET    !! Thread-1          at com.tivoli.twg.itech.TWGSMCClient.loadChanStore(TWGSMCClient.java:520)
1998-05-04 14.20.47.729 INTERNET    !! Thread-1          at com.tivoli.twg.itech.TWGSMCClient.<init>(TWGSMCClient.java:161)
1998-05-04 14.20.47.729 INTERNET    !! Thread-1          at com.tivoli.twg.itech.TWGSMCClient$1.run(TWGSMCClient.java:2562)
1998-05-04 14.20.47.729 INTERNET    !! Thread-1          at java.lang.Thread.run(Thread.java:474)
```

Figure 73. Sample Debugging Output

To verify if all of the Tivoli IT Director subtasks are running on the server you can issue the command:

```
twgengin list
```

The output should be similar to the following:

```
JVM for 'com.tivoli.twg.ams.server.AMSServer' is running (pid=254)
JVM for 'com.tivoli.twg.alertmgr.TWGEventServer' is running (pid=270)
JVM for 'com.tivoli.twg.itech.TWGSMCClient' is running (pid=268)
JVM for 'com.tivoli.twg.itech.TWGWebMgrServer' is running (pid=266)
JVM for 'com.tivoli.twg.inventory.StartInv' is running (pid=264)
JVM for 'com.tivoli.twg.monitor.TWGMonMain' is running (pid=262)
JVM for 'com.tivoli.twg.fsclient.FSClient' is running (pid=260)
JVM for 'com.tivoli.twg.filetransfer.server.TWGStartFtServer' is running (pid=258)
JVM for 'com.tivoli.twg.itech.TWGWRSDServer' is running (pid=256)
JVM for 'Tivoli IT Director Log Engine' is running (pid=188)
JVM for 'TWGLogEngine' is running (pid=188)
Main server JVM (com.tivoli.twg.engine.TWGServerMain) is running (pid=174)
```

Figure 74. Task List

Within the \TivoliWg\Classes\extensions directory are files that are needed for the subtasks to start within Tivoli IT Director. If you want to disable a function, just rename the file. The tasks are:

```
 Directory of F:\TivoliWg\Classes\extensions
AMSTask.TWGExt               BaseExt.TWGExt
EventExt.TWGExt              FSClient.TWGExt
FtransServerExt.TWGExt       InvExt.TWGExt
LCFGateway.TWGExt            MPMExt.TWGExt
NNTP.ALTExt                  ProcMan.TWGExt
RCConsole.TWGExt             RMONExt.TWGExt
Scheduler.TWGExt             SMCExt.twgext
SMTP.ALTExt                  SNMPEventHandler.ALTExt
SNMPExt.TWGExt               SwDistServerExt.TWGExt
SwPackage.TWGExt             TWGMonTaskExtension.TWGExt
TWGUserAdmin.TWGExt          WebCast.ALTExt
WebMgrExt.twgext             WRSDExt.twgext
```

The contents of these files is similar to the following:

```
# Event extension definition file
#
# Required: class name variable
twg.extension.classname=com.tivoli.twg.alertmgr.TWGEventExtension
# Optional: name of NLS resource class for extension strings
# twg.extension.nlsclassname=com.tivoli.twg.alertmgr.TWGEventExtensionNLS
# Optional: extension version (either NLS string ID, or literal value)
twg.extension.version=0.01
# Optional: extension name (either NLS string ID, or literal value)
twg.extension.name=Event Support
# Optional: extension vendor name (either NLS string ID, or literal value)
twg.extension.vendor=Tivoli Systems
# Other twg.extension.* names are reserved for future
# standard variables.  Extension is free to define
# other variables with names other than twg.*
#
```

Chapter 3. Applications Management

This chapter provides an introduction to application management in Tivoli IT Director and an introduction to the Applications Management Specification (AMS).

The AMS support that is provided with Tivoli IT Director is all managed using the GUI. The AMS component of Tivoli IT Director is 100 percent Java. Using the GUI you can:

- List all known AMPs
- Display the contents of an AMP
- Import a new AMP

3.1 What Is Applications Management

Historically, companies have managed their applications through traditional monitoring and management tools that are focused on systems and network resources such as network devices (for example, routers and hubs), desktop systems (UNIX, Windows and OS/2) and databases (DB2, Sybase and Oracle). Today, however, applications are increasingly complex. They are comprised of multiple application components that may span various systems, and run in a client/server environment. These complex applications have created a whole set of new management and administration challenges. Monitoring these applications or simply keeping track of where the pieces are deployed can often be difficult.

While a wealth of tools exist for building client/server applications, relatively little exists in the market today to assist with the deployment and on-going management of the applications built using these tools. Client/server technology evolved to address the critical business need of creating new business applications quickly in order to adapt to rapid change in the business environment. The advantage gained by the development tools is quickly lost if the applications cannot be quickly and efficiently deployed and supported. The client/server applications management problem is characterized by the following situations in client/server application environment:

- Little or no information on how to deploy and manage an application is passed from application developers to application administrators.
- Deployed applications stop running without warning.
- Application administrators do not know how to recover from application failures.
- Application administrators do not know the state of their deployed applications.
- Application administrators do not know how to efficiently upgrade a deployed application.

3.2 The Tivoli Application Management Specification (AMS)

Tivoli's Application Management Specification (AMS) provides a way to specify information about an application that is required to manage that application. AMS defines a standard data structure and format for this information. The format is machine-readable, so that a management tool can access the data and use it to

provide management services for the application. This information enables an application to become management ready.

This does not mean that the application itself must be modified in any way. It simply means that a set of management systems has been defined, in accordance with the AMS standard, and associated with the application.

3.3 Understanding Application Management Packages (AMP)

A software package created using AMS is called an application management package (AMP). An AMP must first be imported into Tivoli IT Director before it can be used. Importing an AMP installs the packaged files on the Tivoli IT Director server and updates the Tivoli IT Director environment to recognize the specified application components, tasks, and monitors. The specific tasks and monitors defined depend on the contents of the AMP. For example, the Internet server management service contains monitors and tasks designed specifically for managing Web server applications.

3.4 AMPs Supplied by Tivoli IT Director

Tivoli IT Director supplies two AMS-compliant AMPs: ms.amp and netscape.amp. These two AMPs enable the management of Microsoft and Netscape Internet Web servers. These AMPs are already imported for you. But, new ones would have to be imported.

The Tivoli IT Director-supplied AMPs allow for the following:

- Starting/stopping the application
- Monitoring the application
- Logfile management

3.5 Performing Application Management Tasks

You can perform the following tasks from the Tivoli IT Director Application Management window:

- Import an AMP into Tivoli IT Director, which may include:
  - Configuring monitors included in the AMP
  - Configuring application tasks included in the AMP
  - Creating Software Distribution packages to distribute components and monitor files
- List imported AMPs
- Display the contents of an AMP

3.6 Importing AMPs

Tivoli IT Director provides an interactive interface for importing and working with AMPs. This interface is primarily oriented towards managing the AMP components installed on the Tivoli IT Director server.

When an AMP is imported, its files are unpacked and copied to the Tivoli IT Director server and a group with associations is created and displayed on the Tivoli IT Director management console. The procedures required to set up and use the files depend on the contents and purpose of the AMP. The following section describes typical procedures for setting up application management files.

To activate applications management from the Tivoli IT Director main console locate the **Applications Management** task icon on the main console and click on it.

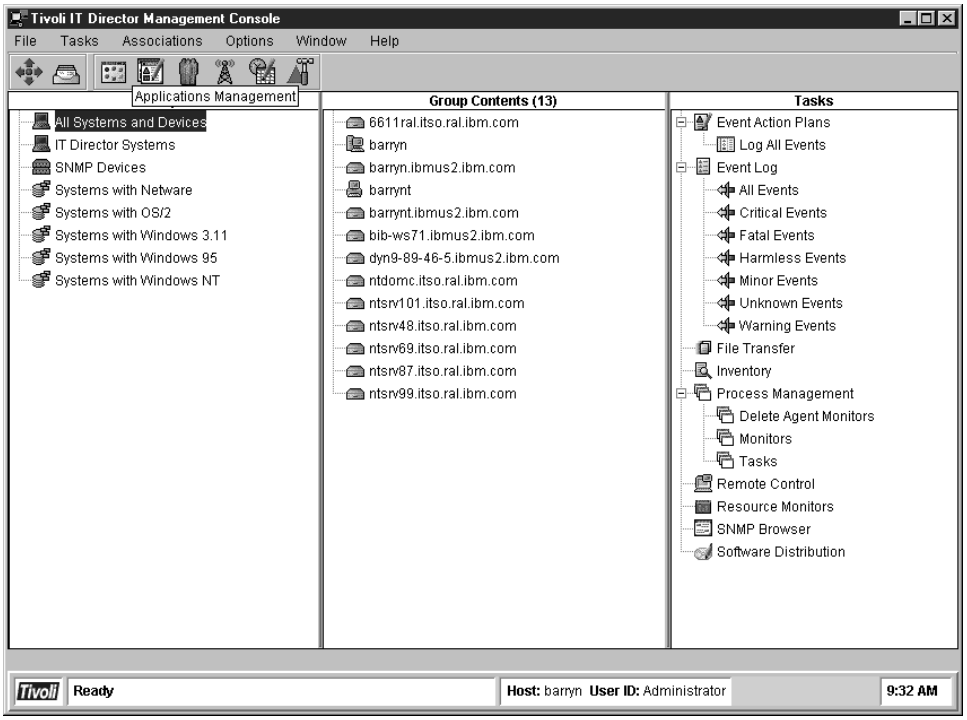


Figure 75. Application Management Task

This action brings up the Applications Management window as shown in Figure 76 on page 64. The window will let you look at existing application management packages or to add new ones. Since this is the first time we are using it the only two that are defined are Netscape and Microsoft AMPs (since they are pre-loaded with the product). We unloaded them and re-installed them so you could see how to load any AMP since for this project we did not have any other AMPs.

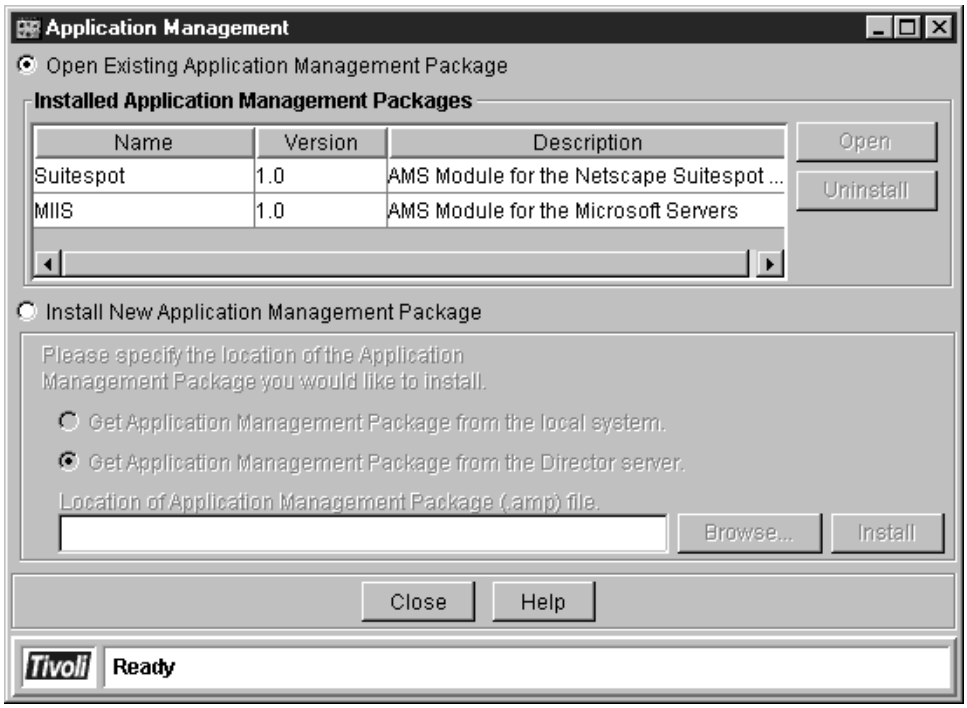


Figure 76. Application Manager Main Console

After clicking on **Install** the following window popped up:

Figure 77. Install AMP

After the AMP is finished loading, configuration and property values are viewable for Netscape SuiteSpot server. The applications management console provides the following management functions:

- Integration of components
- Creation of file packages (tasks and monitors)
- Creation of management file packages (distributable files)
- Removal of components

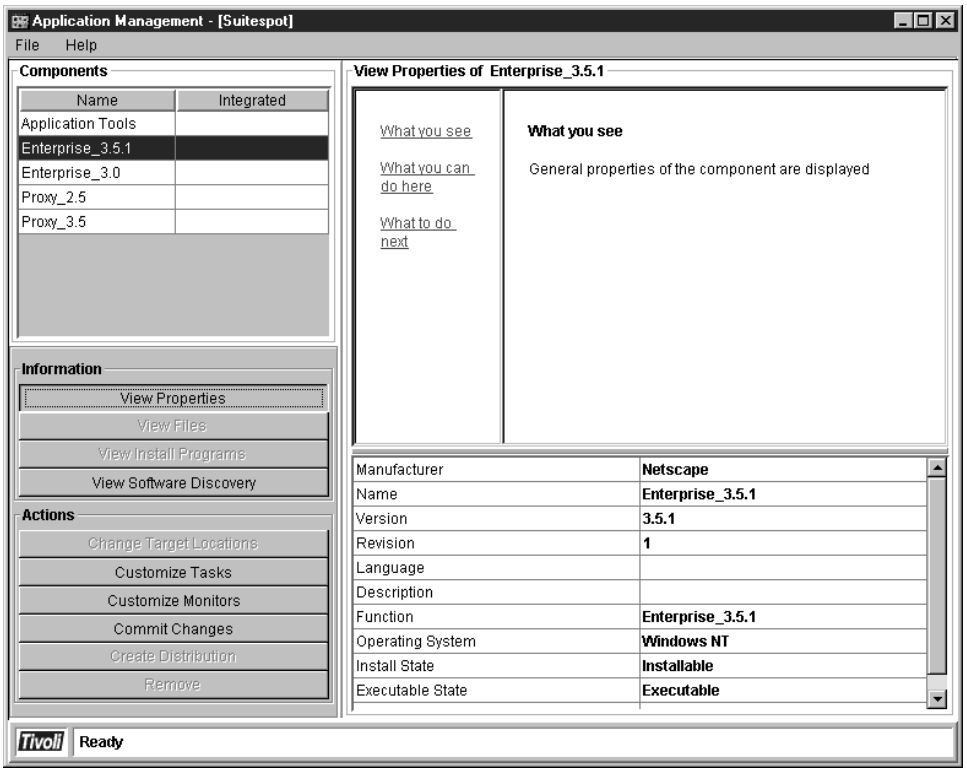


Figure 78. SuiteSpot Values

Clicking on **Customize Tasks** shows you which predefined tasks are available. If you use the right mouse button on one of the tasks you will see the option Create New Task Instance.

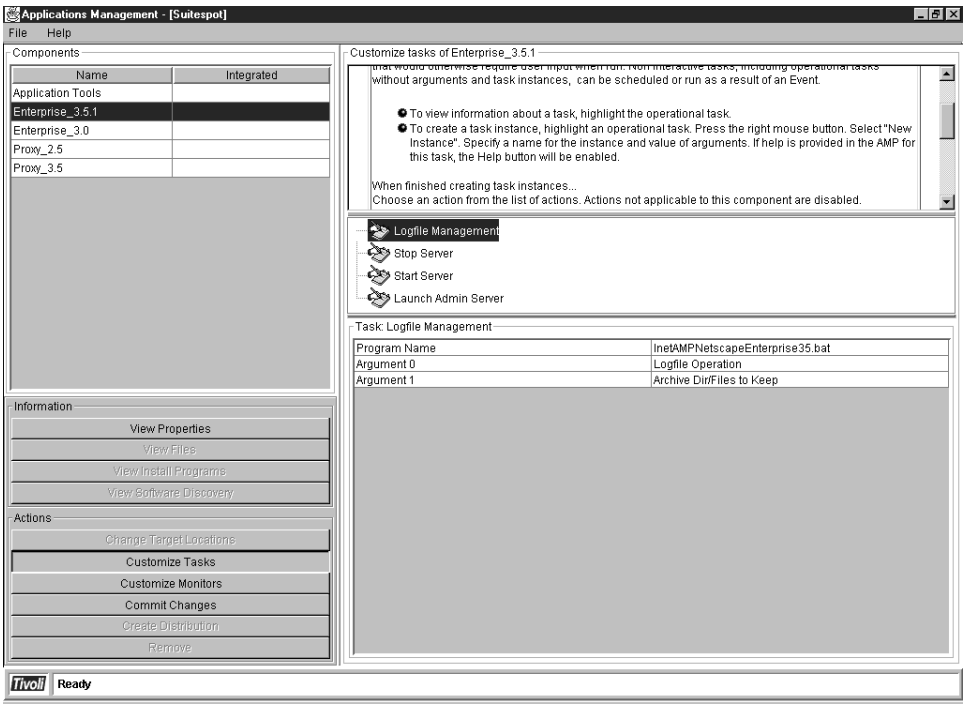


Figure 79. Customize Tasks

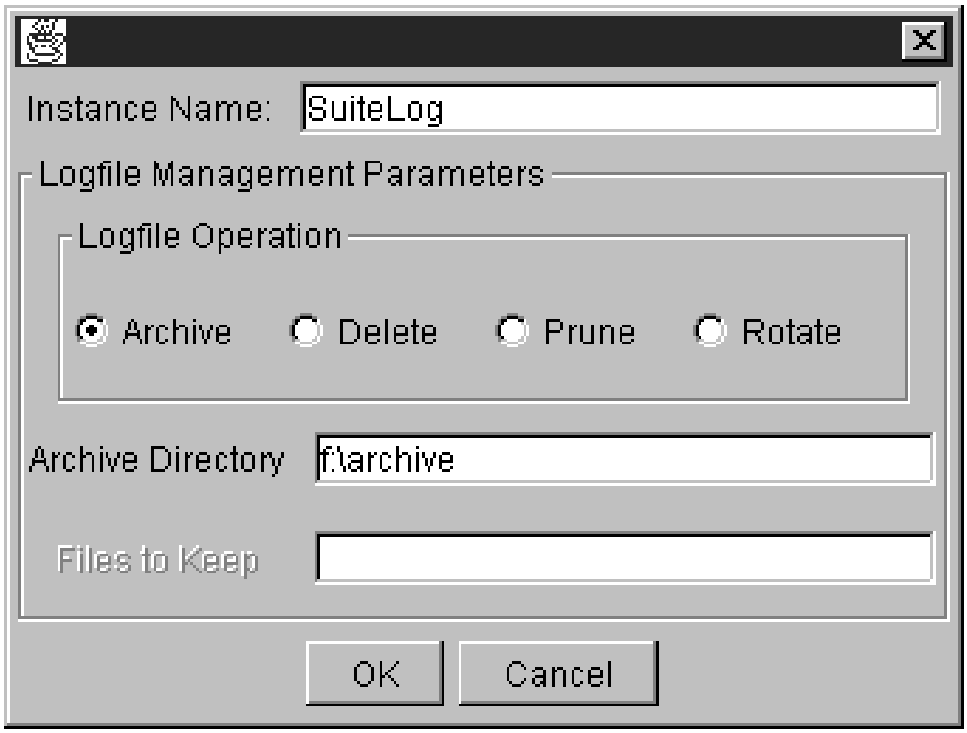


Figure 80. Logfile Management - Archive Files

After you update the file name you will see that the Logfile Management entry has been updated with the new instance:

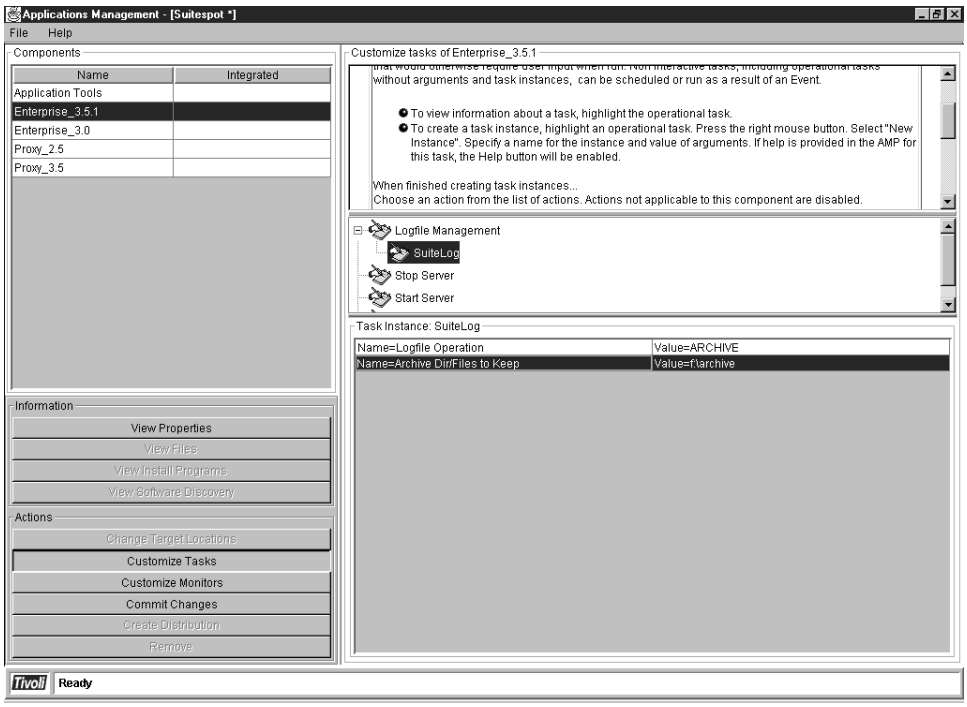


Figure 81. New Instance

There are also some monitors that will come with the AMP for each of the products. In the following window you will see the template for the Windows NT performance objects and counters. These are the same metrics that you would get from the NT

performance monitor. If you right-click on an instance counter, you will see that you can set thresholds.

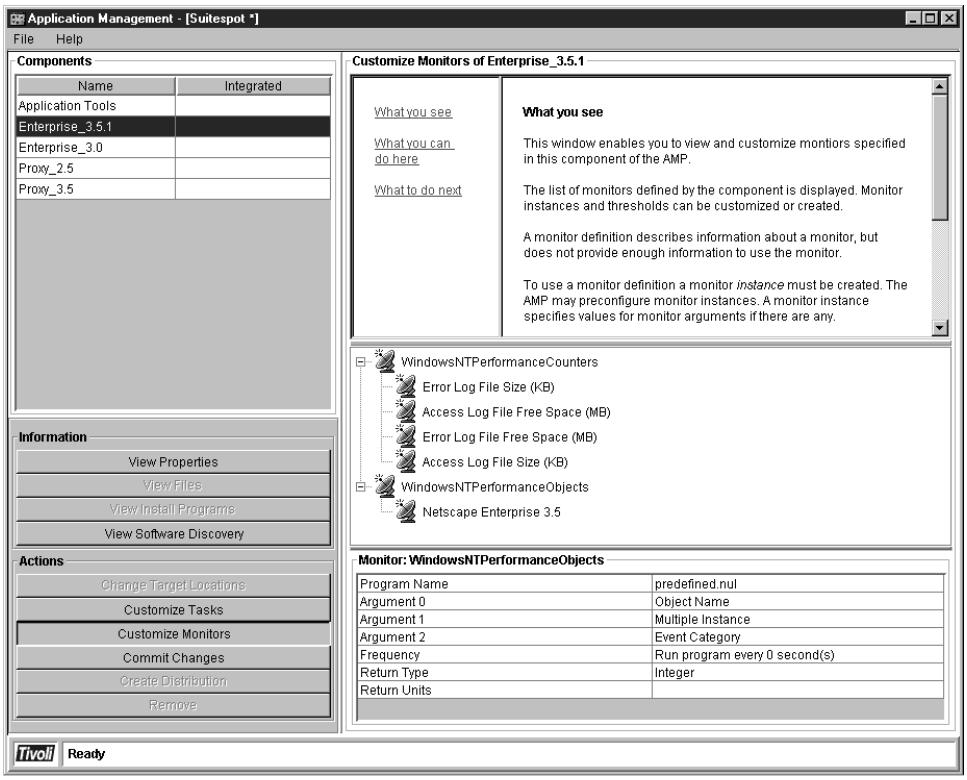


Figure 82. Performance Monitors

The default instance counters that we had available to use were:

- Error log file size
- Access log file size
- Error log free space
- Access log file free space

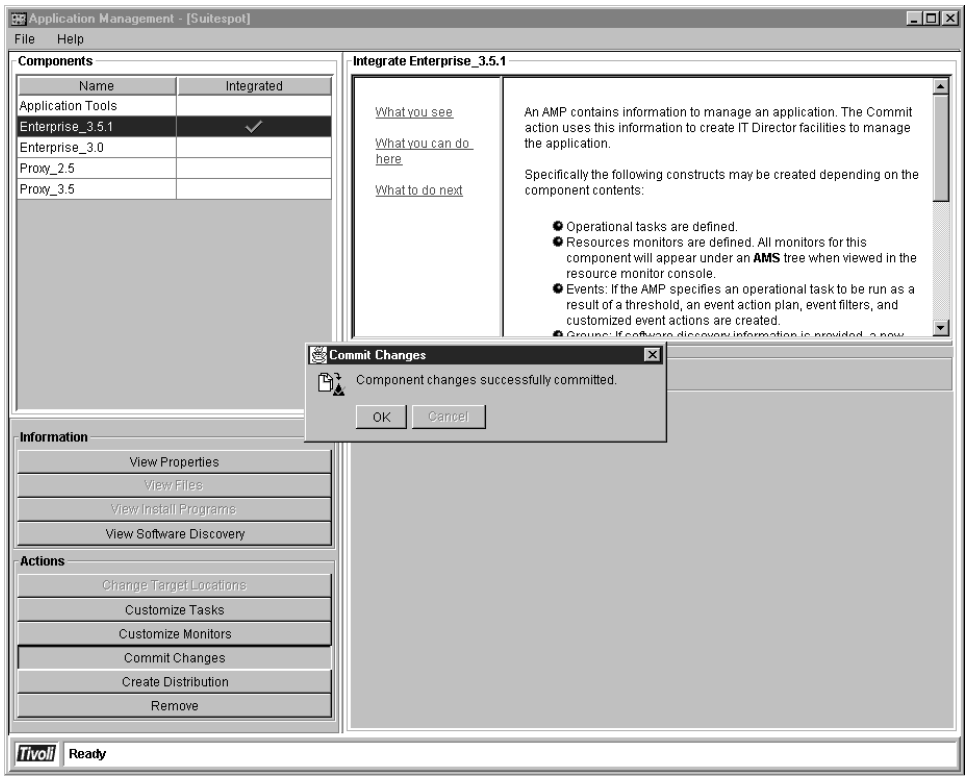


Figure 83. New Thresholds

After you have customized your monitors you can click on **Commit Changes** and then click on the button in the bottom right panel also marked **Commit Changes**. That will enable the Create Distribution button so that you can create and send the package.

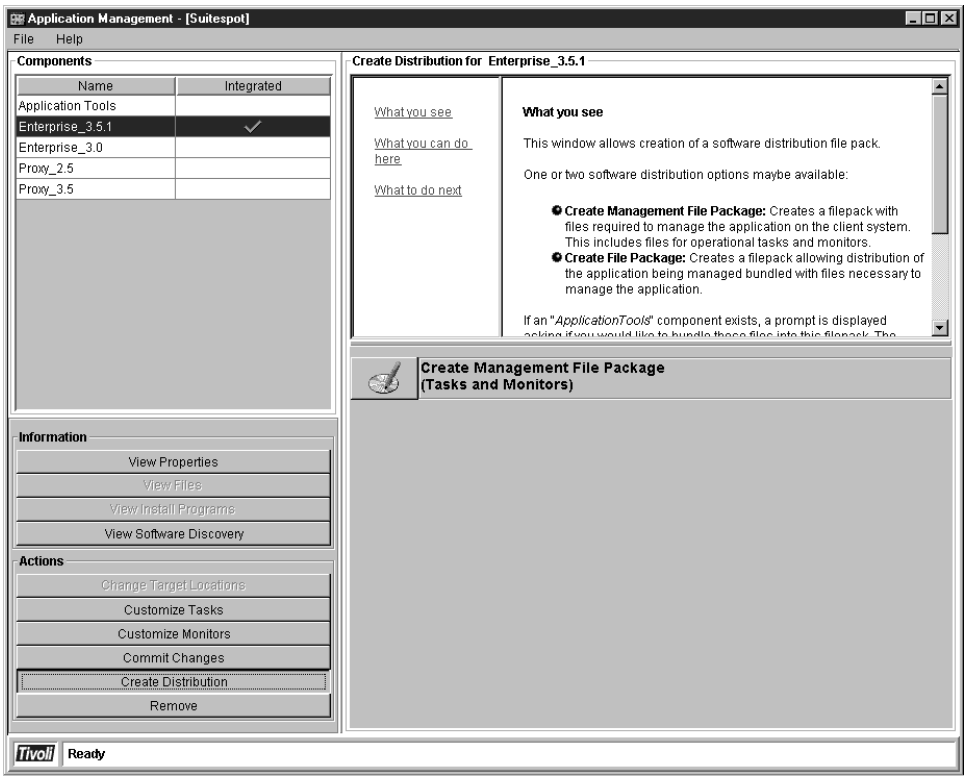


Figure 84. Create Management File Package

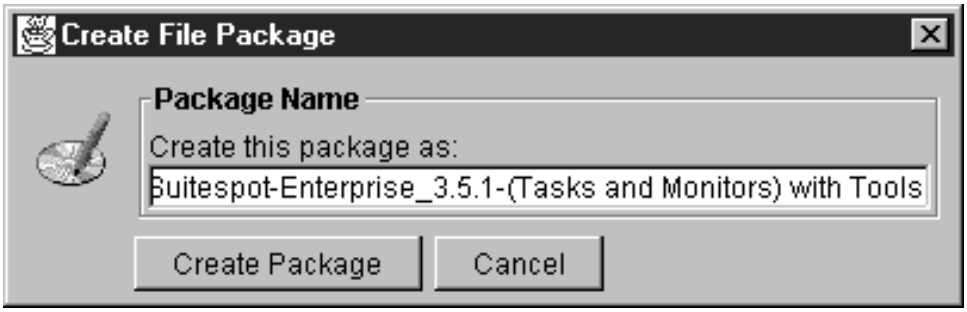


Figure 85. Create the File Package

The button Create Management File Package (Tasks and Monitors) will appear after you click on OK. You can select it and also decide if you want tools included. The new AMPs will be located in \tivoliwg\amsdata. You will also see Java classes automatically created in \tivoliwg\amsdata\beans\com\tivoli\twg\InetAMP. In addition, it's worth looking in \tivoliwg\amsdata\NetscapeSuitespot11.0\staging for the bat files and the ini files that were created to perform the tasks you specified. The following figure shows an example.

```
@echo off
rem ****************************************************************************
rem  (C) COPYRIGHT TIVOLI Systems, Inc. 1998
rem  Unpublished Work
rem  All Rights Reserved
rem  Licensed Material - Property of Tivoli Systems, Inc.
rem ****************************************************************************

call %SystemRoot%\iampcfgns.cmd

jre -cp %INETAMPCLASSPATH% com.tivoli.twg.InetAMP.InetAMPNetscapeEnterprise35 %1 %2
@echo on
```

Figure 86. AMP Bat File

```
[info]
drivername=InetAMPAMSNSENT35
symbolfile=InetAMPamsnsent35.h

; Translation Note:
; The correct 3-digit hexadecimal language identifier must be substituted for all occurences
; of 009 below. For example, if the new language code is 123, change PERFMON_OBJ_009_NAME
; to PERFMON_OBJ_123_NAME
[languages]
009=English

[text]
PERFMON_OBJ_009_NAME=AMS Netscape Enterprise 3.5.1
PERFMON_OBJ_009_HELP=Monitors log file size and free space for the Netscape Enterprise 3.5.1 server.
ERRLOGSZ_009_NAME=Error Log File Size (KB)
ERRLOGSZ_009_HELP=Size of the Error log file in KB
ACCLOGSZ_009_NAME=Access Log File Size (KB)
ACCLOGSZ_009_HELP=Size of the Accessr log file in KB
ERRLOGFREESPACE_009_NAME=Error Log File Free Space (MB)
ERRLOGFREESPACE_009_HELP=Amount of free space in MB of the directory the Error Log file resides in.
ACCLOGFREESPACE_009_NAME=Access Log File Free Space (MB)
ACCLOGFREESPACE_009_HELP=Amount of free space in MB of the directory the Access Log file resides in.
```

Figure 87. AMP INI File

When an AMP is successfully integrated into Tivoli IT Director the components will register themselves with the Tivoli IT Director server and create monitors, tasks, or file distribution packages depending on the specific AMP. The new functions provided by the AMP will appear as regular Tivoli IT Director services.

In addition to the Netscape family of products, there is an AMP provided for the Microsoft Internet servers. The basic functions are the same.

Note: A client system becomes manageable when the file package has been successfully distributed to it. A task will appear in the context menu and AMS monitors will appear if the monitor console is opened on that client.

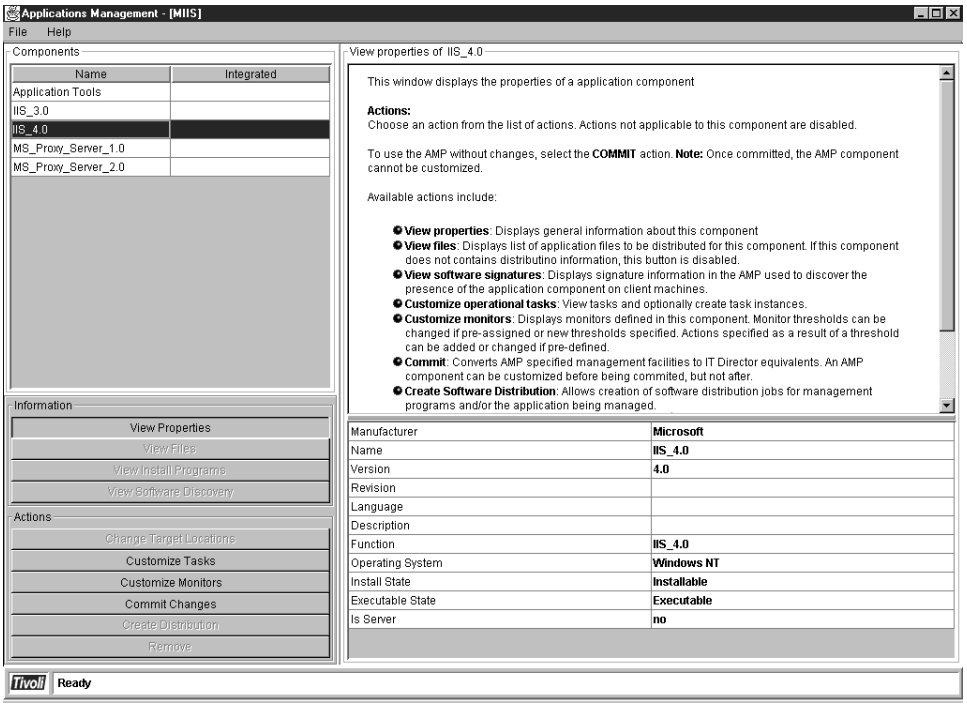


Figure 88. Microsoft IIS Properties

If you go back to the console and expand the Event Log Browser icon by clicking on the **+**, you should see a window similar to the following:

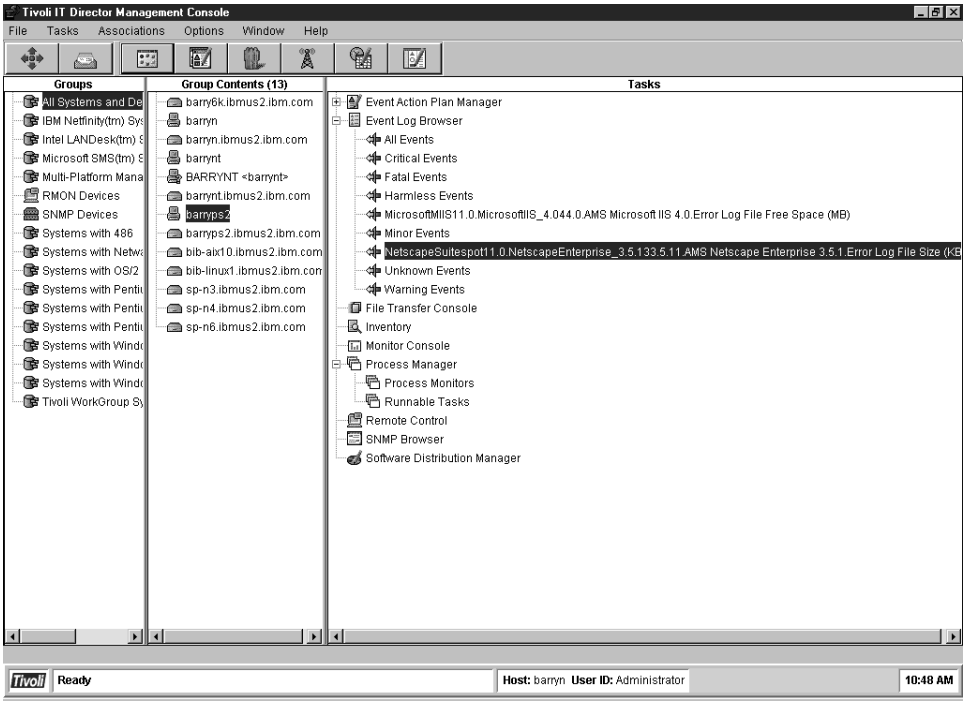


Figure 89. Netscape and Microsoft Server Events

If you open the Netscape (or Microsoft) Internet server events, you will get a list of all the events that met the threshold conditions you set earlier. You can also drag the item onto a specific system to create a filter of the log, to only show you items for that particular system (or group).

3.7 Creating User-Defined AMPs

The Tivoli Developer Kit provides an easy-to-use tool for creating management-ready applications that conform to the AMS. The developer kit defines the following management objects for application components:

- Directory Names - Where is the code now and where does it get installed?

  Directory names define symbolic references to the source and destination for application components for use during software distribution. The symbolic names can then be altered to point to different physical locations when the application is transferred into a production environment.

- File Lists - What files make up this application component?

  The file list defines the set of files that make up application components. These file lists are used to build file packages used by a Software Distribution tool when the application is deployed.

- Dependencies - What will it take for this component to work properly?

  Dependencies are the environmental requirements for an application component to successfully install and run on a target system. Dependencies can include such things as required physical memory or required operating system version for a component.

- Installation Programs - How do you activate or remove this component?

  Installation programs are run as part of the component installation process, including before and after operations for activities such as backing up a file or removing temporary files.

- Tasks - How do you operate this component on a day-to-day basis?

  Tasks are programs or scripts that the application administrator use to manage the application and respond to application events. Operational tasks can include things such as trimming log files or restarting failed application processes.

- Monitors - Is the application working properly?

  Monitors are programs or scripts that run at defined intervals to monitor the health of the application. If a monitor's threshold is exceeded, an event is generated, which can then invoke an operational task to correct the problem or to notify someone about the problem.

To learn more about the purpose of AMS and to obtain the Tivoli Developer Kit, visit the following Web page:

- http://www.tivoli.com/o_partners/html/body_apps_man.html

Chapter 4. Remote Control

Remote Control allows the system administrator to remotely control the GUI desktop of a PC. This PC must have the Tivoli IT Director agent code installed on it. Remote Control works by sending keystroke and mouse commands to the remote system and displaying the remote system's GUI on the management console.

Please see 4.4, “RC Usage Restrictions” on page 76 for more information on restrictions.

When you try to take control of an agent, assuming you had specified you wanted the agent to be notified of remote control actions, you will get the following window on the agent:

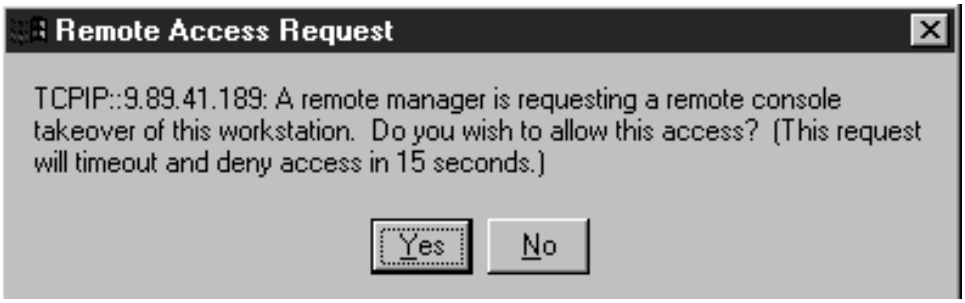


Figure 90. System Takeover Attempt

There are three types of session modes the Tivoli IT Director console can have with a remote system:

1. Active
2. Monitor
3. Suspend

The current mode of a Remote Control session is displayed on the task bar of the Remote Agent screen. In this case it was Active.

Figure 91. Current Mode of Session

On the management console, the following screen will show the status of the remote agent.

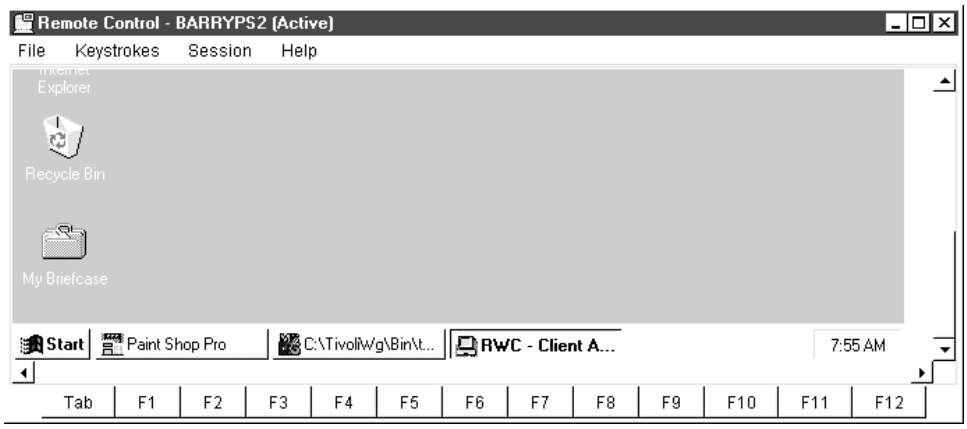


Figure 92. Remote Control (RC) Status from Management Console

The administrator can change the mode by using the Session pull-down menu and selecting the desired mode.

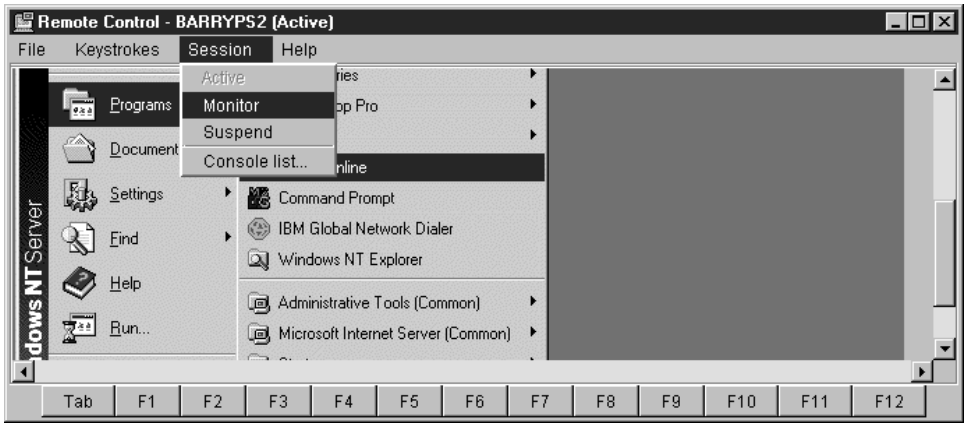


Figure 93. Changing Session Mode

Another prominent feature of Remote Control is the button selection (TAB, F1, F2.....F12) at the bottom of the window. These buttons are for convenience.

Figure 94. RC Function Keys

4.1 Active Mode

The Remote Control task is launched on a single system by dragging and dropping either the Remote Control task to the target system or the target system to the Remote Control task on the main console.

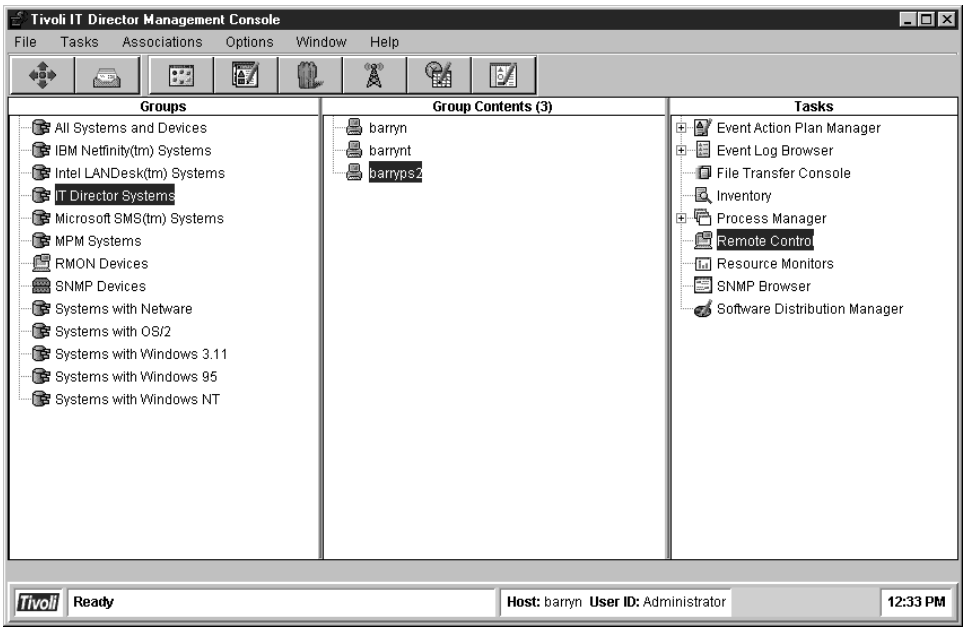


Figure 95. Selecting RC for Agent

Note: You cannot launch Remote Control on a group of systems.

The first Remote Control console to connect to a remote system will establish an active mode session. This means that commands and keystrokes will be passed to the remote system. Any other Remote Control consoles that connect to that remote system afterwards will establish a monitor mode session.

Note: If the target workstation has yet to log on and the option was set to verify takeover of the workstation, you will not be able to take control. You will get a screen access authorization timeout.

4.2 Monitor Mode

If you are the second or subsequent console to launch on the same system, you will automatically be brought up in monitor mode.

In this mode you will be able to view the remote system real time, but will not be able to take any actions against this system unless you change to active mode. You can also get to monitor mode by selecting it from the Session menu on the menu bar.

4.2.1 Suspend Mode

You may *freeze* your view of the remote system by taking a snapshot of it. You do this by putting your session in suspend mode. While in this mode you will see the remote system you are monitoring as it was when you put it in this mode. You will not get real time updates occurring on the system until you change to either active or monitor mode.

4.2.2 Multiple Consoles to Single Agent

The remote workstation control task will allow multiple consoles to connect to a remote system. However, only one of the management consoles will be in active mode controlling the remote system. All other consoles will be in monitor mode.

4.2.3 Multiple Consoles to Multiple Agents

Multiple Remote Control consoles can be opened, each pointing to a different agent. There would be separate windows for each agent being remotely controlled.

4.3 Control State Scenarios

The following sections describe three different scenarios for controlling a remote workstation:

1. Scenario 1 - Single Agent (Active Mode)/Multiple Consoles
2. Scenario 2 - Single Agent (Monitor Mode)/Multiple Consoles
3. Scenario 3 - Single Agent (Active Mode)/Multiple Consoles (End user changes to suspend mode.)

4.3.1 Scenario 1

Assume that a Tivoli IT Director agent is in an active mode and multiple consoles have Remote Control (RC) sessions with the agent. In this scenario, only one console can be in a controlling active state with the agent and all other consoles must be in either monitor or suspend state with the agent. If the console in an active state changes to monitor state, the agent's state automatically changes to monitor state. At this point, any attached console can assume control of the agent by changing the session state to active.

4.3.2 Scenario 2

Assume that an agent is in monitor state and multiple consoles have RC sessions with the agent in either monitor or suspend states. The agent can change its state to active, which would force the state of the first console that is notified into a controlling active state. All other attached consoles would remain in either monitor or suspend state.

4.3.3 Scenario 3

Assume that an agent is in active state and multiple consoles have RC sessions with the agent. If the agent's user changes the agent's state to suspend, all attached consoles automatically change to the suspend state. However, any of the attached consoles can then change the session state to active or monitor.

4.4 RC Usage Restrictions

The RC task can be performed only on Tivoli IT Director agents running under the following operating systems:

- Windows 3.x
- Windows NT 3.51 or 4.0
- Windows 95

  - OS.2 3.x and 4.x

  You cannot perform the RC task on the following network nodes:

  - Tivoli IT Director agents running NetWare or DOS
  - SNMP agents
  - Workstations accessed through an MPM provider

- You can concurrently monitor or control two or more remote consoles from a single management console.

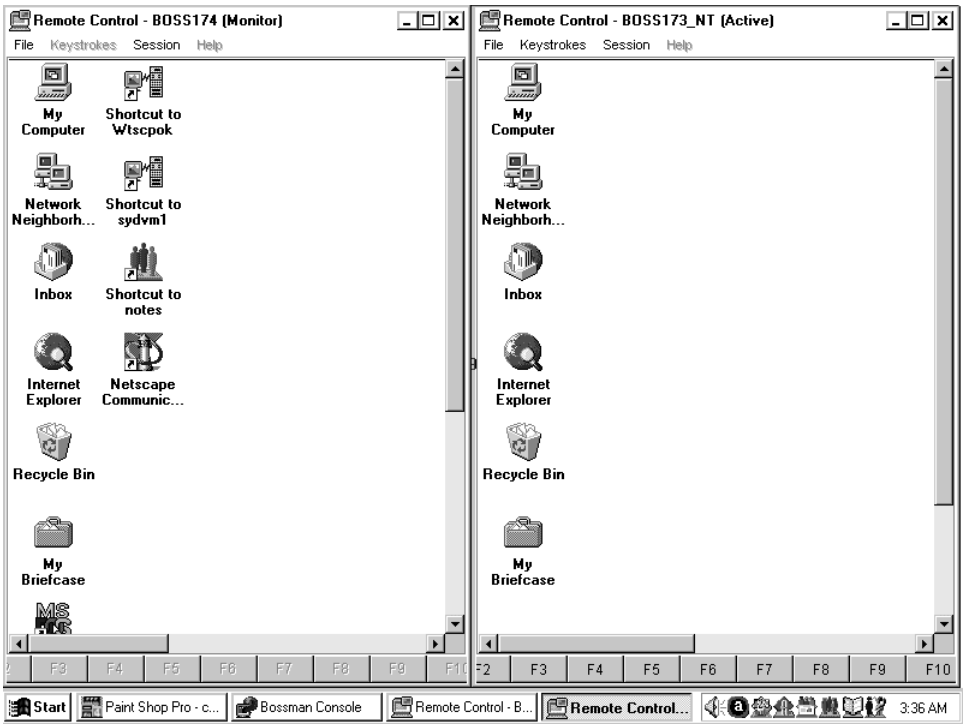


Figure 96. Multiple Agent Control

- If multiple management consoles are connected to the same remote agent, only one console can send keyboard and mouse information to the agent. All other connected consoles must be in the monitor or suspend state.
- Within the overall network, multiple management consoles can remotely control multiple Tivoli IT Director agents concurrently. However, the overhead load generated can cause system response to degrade significantly.
- A Tivoli IT Director agent cannot be controlled concurrently by two servers, therefore, only one server can communicate with an agent through RC.

  If more than one server attempts RC communication, the communication is rejected and an error message is displayed on the console from which the communication was initiated.
- Do not use RC over a slow connection. When large amounts of data are transferred, they require greater network throughput than slow connections can accommodate.
- To reduce the amount of data transferred from a remote system, RC reduces the display information of all images to 16 colors.

Remote agents with higher resolutions can still be managed, but you may have to scroll around to see the entire desktop.

As a result, the image displayed on the management console can differ from the image displayed on the remote system's desktop.

- RC does not support full-screen graphic modes.
- Certain keyboard restrictions apply. Please refer to 4.6.1, “Restrictions on Sending Keystrokes” on page 80 for more information.
- Tivoli IT Director and Tivoli Remote Control cannot be installed on the same system.
- Tivoli IT Director and Netfinity Remote Control can be installed on the same system, however, only one Remote Control service at a time can have an active RC session.

4.5 Remote Access Security

When you start an RC session for a remote agent from the management console, the same security parameters that apply to the local agent are enforced for the session.

During the installation of the Tivoli IT Director agent, the Remote User Authorization for Screen Access option can be enabled. If you attempt RC access to a remote agent that has this option enabled, the user of the remote system can accept or reject the access attempt.

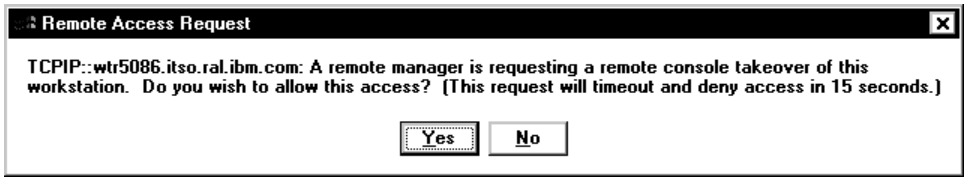


Figure 97. Remote Access Request Dialog

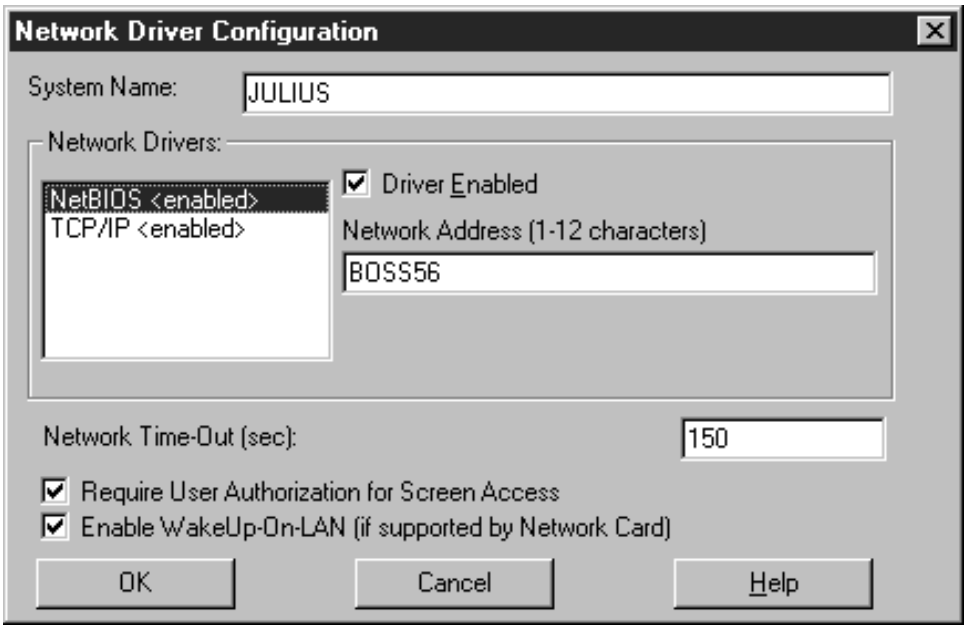


Figure 98. Remote Access Security

If the user does not respond to the request, your attempt is rejected after the interval expires.

The default interval is 15 seconds.

4.6 Sending Keyboard Information to a Remote Agent

When RC is in an active state, nearly all key and key combinations are automatically passed through to the remote system. However, operating system requirements restrict the use of certain key combinations, for example Ctrl+Alt+Del, which typically generates an interrupt that is intercepted and processed by the operating system of the local system.

To bypass certain key restrictions, select the desired key combination from the menu bar at the top of the window.

The following selections are available:

- Alt+Esc
- Alt+Tab
- Ctrl+Esc
- Ctrl+Alt+Del

Ctrl+Alt+Del

Note: Do not attempt to send a Ctrl+Alt+Del to a Tivoli IT Director client running under Windows 95 or Windows 3.1x. The targeted agent will lock up as a result.

4.6.1 Restrictions on Sending Keystrokes

The following restrictions exist when sending keystrokes:

- The Tab key cannot be passed through to a remote agent. Use the menu on the bottom of the screen.
- Numeric keys sent from the numeric key pad (typically on the right-hand side of the keyboard) are not differentiated from the numeric keys at the top of the keyboard.
- During an RC session, restricted keys such as the Tab key and the F1-F12 function keys are displayed at the bottom of the screen for you to select as needed.

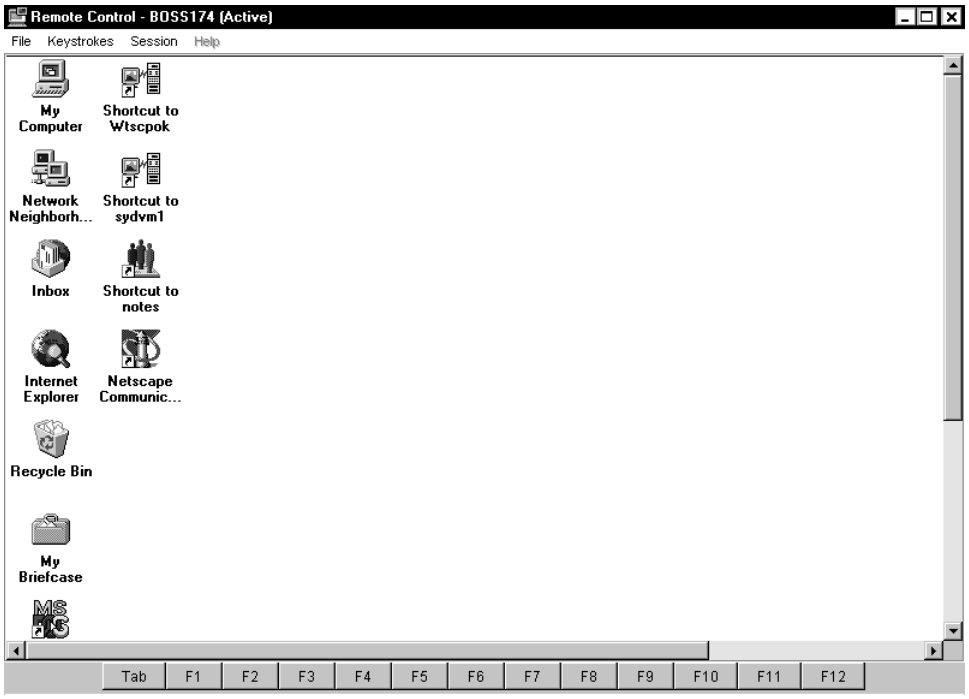


Figure 99. Remote Agent/Function Keys

Clicking on one of these keys performs the same function as pressing the key on the keyboard.

4.7 Restrictions on the Mouse Pointer and Cursor Support

When using Java the mouse pointer changes on the agent may not be displayed on the controlling console. For example, the agent may change the mouse pointer to the up/down sizing arrows when it is over the border of a window, but the controlling console will continue to show the mouse pointer in its normal state.

4.8 Starting and Stopping an RC Session

To start an RC session with a remote agent, drag and drop the icon for the relevant agent to the Remote Control icon in the tasks column, or drag and drop the Remote Control icon across to the agent.

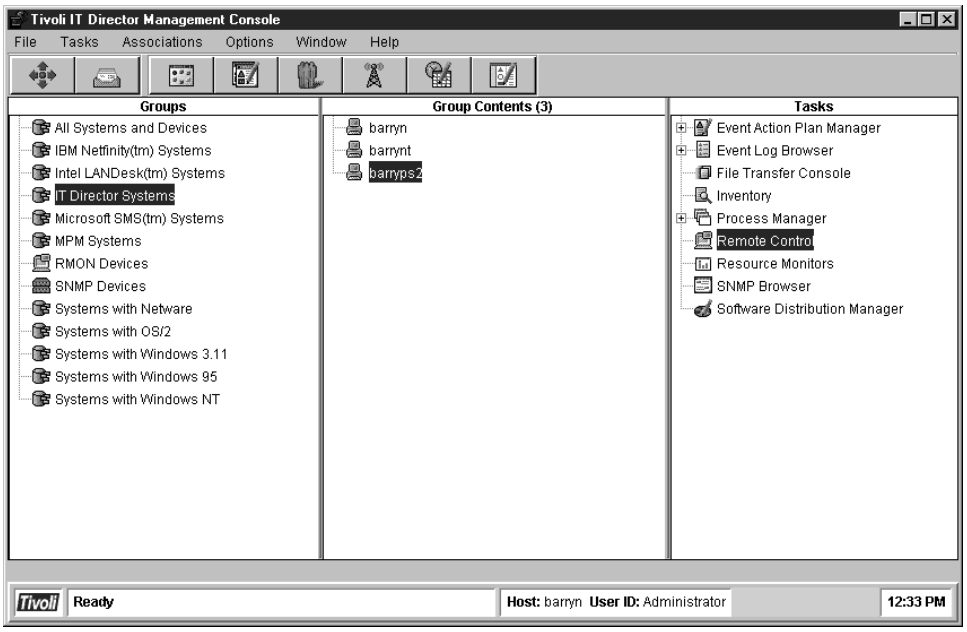


Figure 100. Starting a Remote Agent

To stop an RC session with a remote agent, you can do one of the following:

- From the task bar menu on the Tivoli IT Director server, click with the right mouse button on the agent you wish to close and select **Close**. This will end the session.
- While displaying the remote session on the Tivoli IT Director console, click **File** then select **Exit** to end the session.

Figure 101. Stopping a Remote Agent - Exit

- From the remote agent you can use ALT+T and then select **Terminate**. This will end the session.

4.9 Changing the Control State of a Session

From the Tivoli IT Director server to change the control state of a remote session, select **Session** from the action bar and then select the desired state.

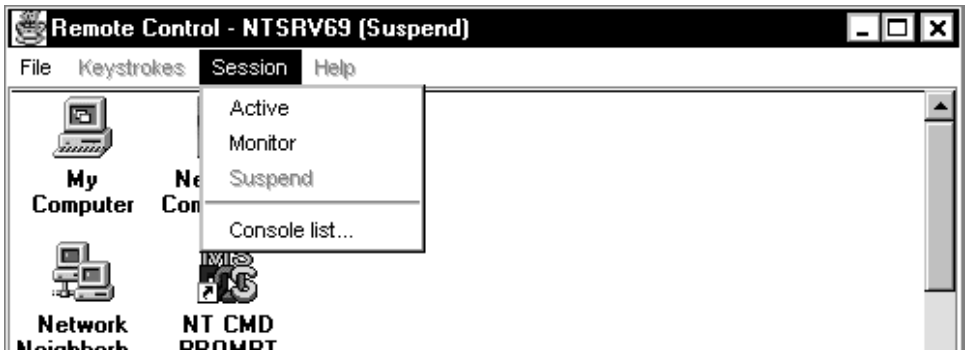


Figure 102. Changing a Remote Agent Status

A local client's user can change the state of the agent by pressing Alt+T and then selecting a new state.

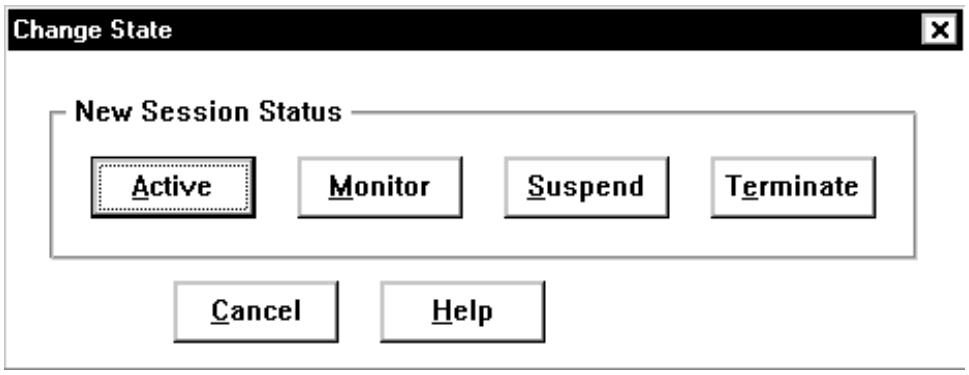


Figure 103. Remote Agent State Change

Select the desired option. For example, select **Terminate**.

On some platforms you will then be prompted to make sure that you wish to terminate the session. Reply by clicking on **Yes**.

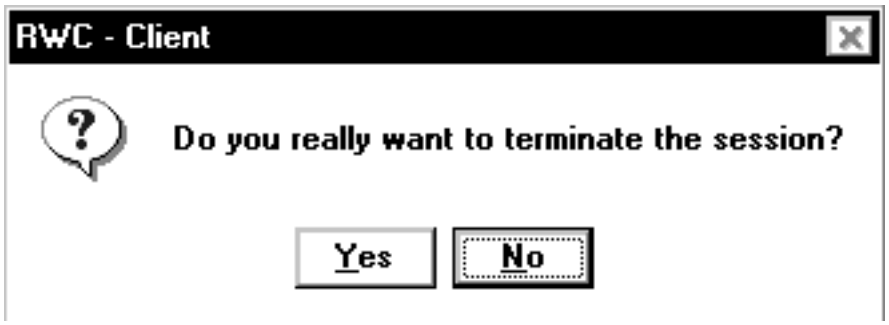


Figure 104. Remote Agent State Change

The Tivoli IT Director console will receive the following dialog box informing of the termination.

Figure 105. Remote Agent Termination

4.10 Viewing a Listing of Current RC Sessions

To obtain a listing of current RC agents that are being managed, select the **Window** option from the action bar on the Tivoli IT Director console as shown in Figure 106. This will provide the following drop-down listing of current RC sessions that this Tivoli IT Director console has with remote agents.

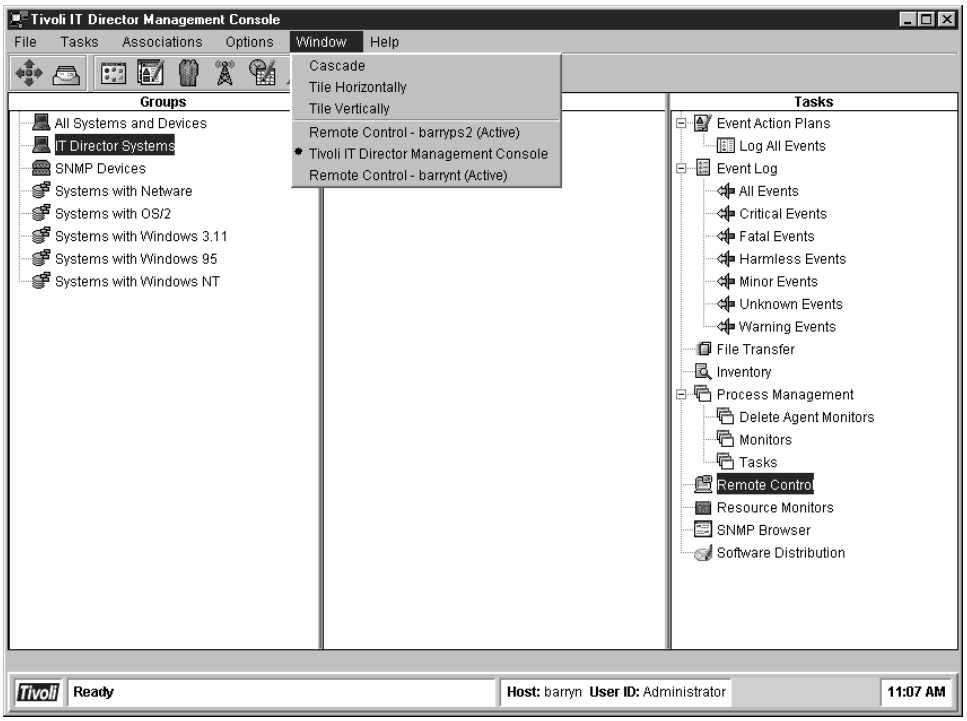


Figure 106. Viewing Current Agents

Chapter 5. Resource Monitoring

This chapter describes the resource monitor service in Tivoli IT Director.

Distributed availability is the process of ensuring predictable, reliable user access to key applications and computing resources. Maintaining distributed availability in client/server environments plays a critical role in managing a system.

Tivoli IT Director utilizes a monitor service that enables an organization to provide distributed availability and give administrators an efficient, automated way to ensure high availability of key computing resources. It allows organizations or individual business units to minimize lost revenue due to applications and computing resources not being available or running efficiently.

5.1 Supported Agent Systems

The Tivoli IT Director server can monitor data from native Tivoli IT Director agents, AMS agents, and SNMP agents. Tivoli IT Director supports the monitoring of data for Tivoli IT Director agents running on remote machines using the following systems:

- Windows NT 4.0
- Windows 95
- Windows 3.x
- OS/2 3.0 and 4.0
- NetWare 4.x

  Note: NetWare agent refers to the NetWare server in this case and not NetWare agents.

Note: In order to monitor data for an AMS agent, the monitor agents included in the AMP must first be distributed to and running on the remote system.

In order to monitor data for an SNMP agent, the monitor agents must be running on the remote machine and the remote machine must be using either the IP or IPX transport protocols to communicate with the Tivoli IT Director server.

5.2 Understanding Monitors

Tivoli IT Director employs the use of distributed monitoring agents that can be distributed to all network machines to enable the gathering of data at the Tivoli IT Director server. These monitoring agents gather and forward sample data to the Tivoli IT Director server where it is stored for viewing. An example of this might be a set of monitors that monitor CPU, disk, and memory usage on a given device.

The resource monitoring task will allow you to monitor Tivoli IT Director agents and SNMP devices that contain remote monitoring (RMON) agents. The number of attributes you can monitor from native agents depends upon the operating system that the machine is running. The following monitors are generally present on all of the agents regardless of which operating system is being run:

- CPU utilization

- Memory utilization
- Locked memory utilization
- Disk workload
- Disk space used
- Disk space remaining

Monitoring categories are called *attributes*. For example, the performance monitor function is an expandable attribute with subcategories and CPU utilization is a single attribute with associated data.

Most attribute data is displayed in numerical format to indicate percentages, numbers or occurrences. Some attribute data is displayed in text format, for example, online or offline, to indicate the status of the machine or application.

Navigation is done by expanding a tree in the left panel of the resource monitors. The discovery of items in the subtree is dynamic. Each time you expand a branch on the console by clicking on the + sign it will send a command to the Tivoli IT Director monitor service to retrieve information describing the next level of the tree.

The screen capture below displays a sample of available resource monitors for a particular managed system.

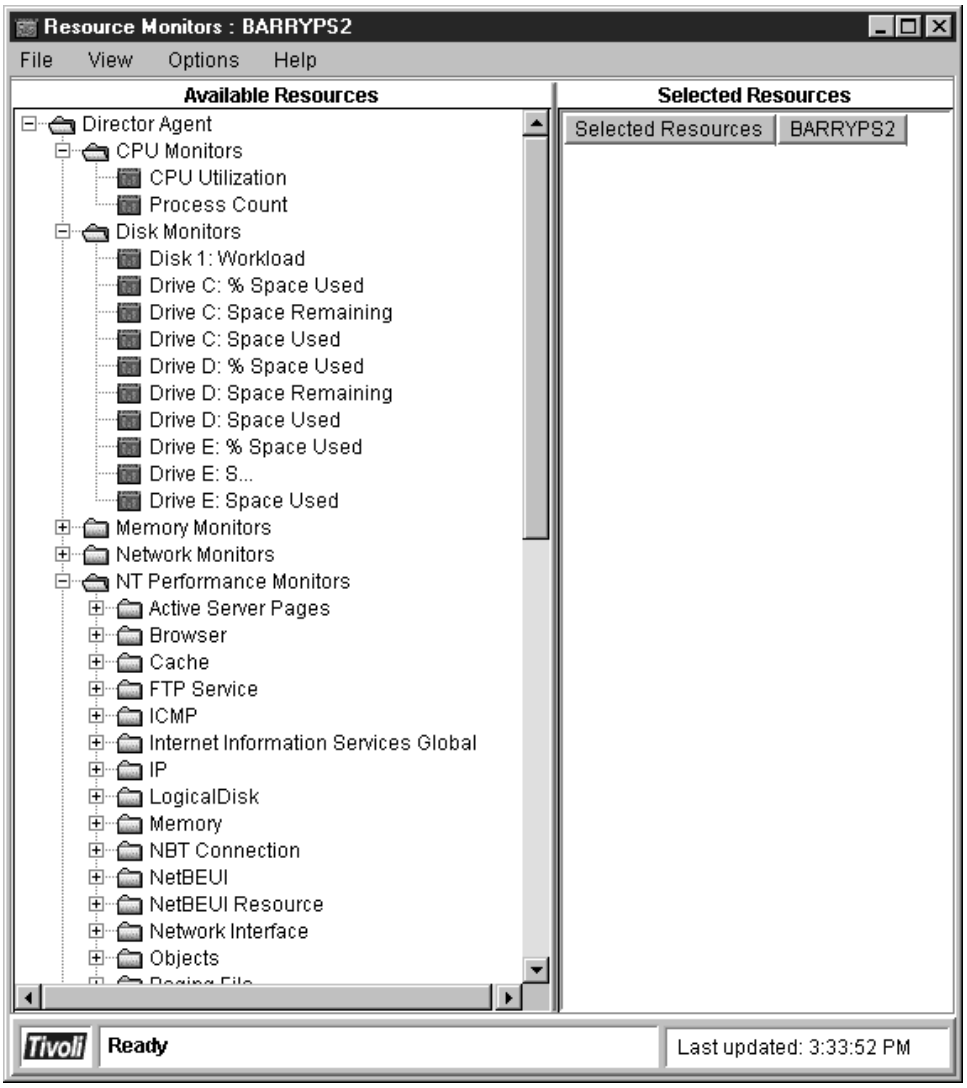


Figure 107. Driver Services Window

Shown below is a screen capture of NT Task Manager with twgmonit.exe highlighted.

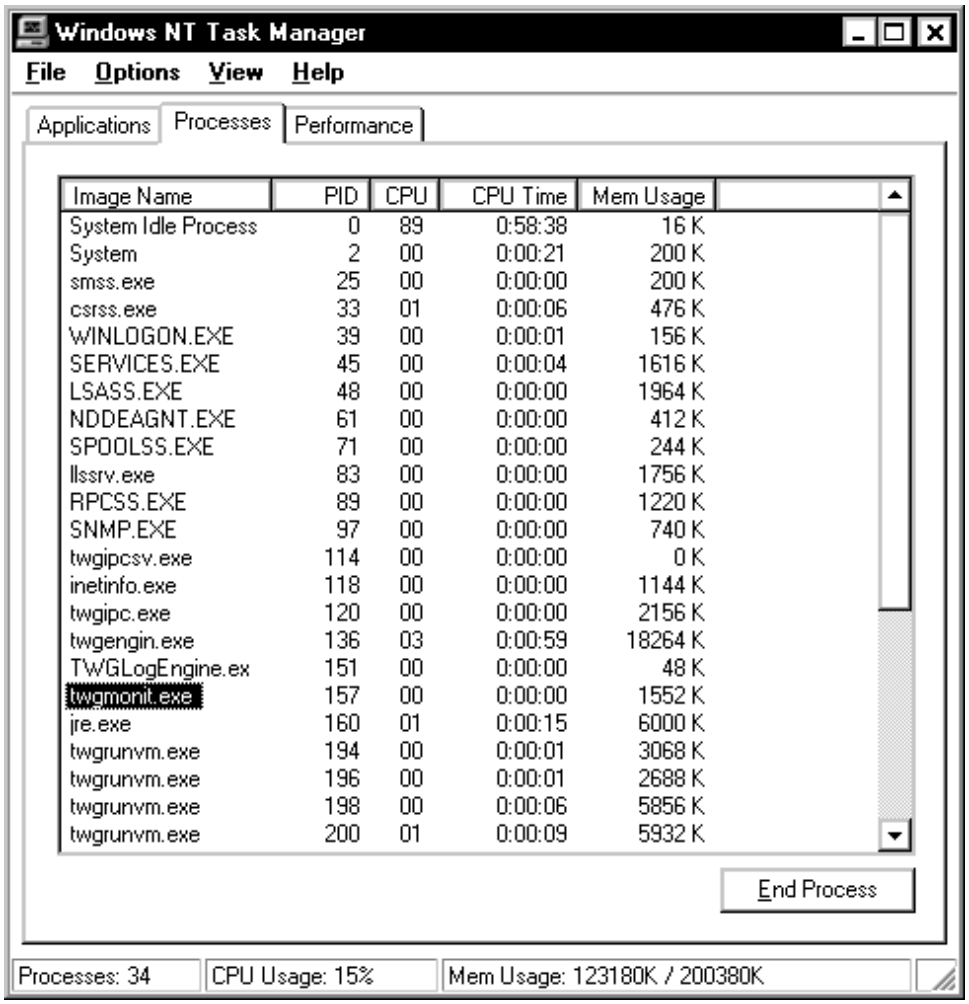


Figure 108. Active Monitor Task

twgmonit.exe is the Tivoli IT Director agent that performs monitoring and thresholding and is started automatically when a native agent boots. When a threshold or resource is enabled, twgmonit.exe monitors the value and wakes up to check on the value. If the value or threshold has been exceeded, then twgmonit.exe will attempt to take some action if one has been configured. The frequency that twgmonit.exe checks the values or thresholds is configurable (refer to 5.5.1, “Setting Monitor Thresholds” on page 103).

Note: You can also get the list of processes with the `twgenin list` command.

5.3 Monitoring Tivoli IT Director Native Agents

This section provides examples of resource monitoring on Tivoli IT Director native agents.

5.3.1 Monitoring a Managed System

To activate the resource monitor console from the Tivoli IT Director main console:

1. Locate the Resource Monitors task icon in the right panel of the window and the managed system you want to monitor in the left panel.
2. Drag the task icon to the managed system for which you want to view data or drag the managed system to the task icon.

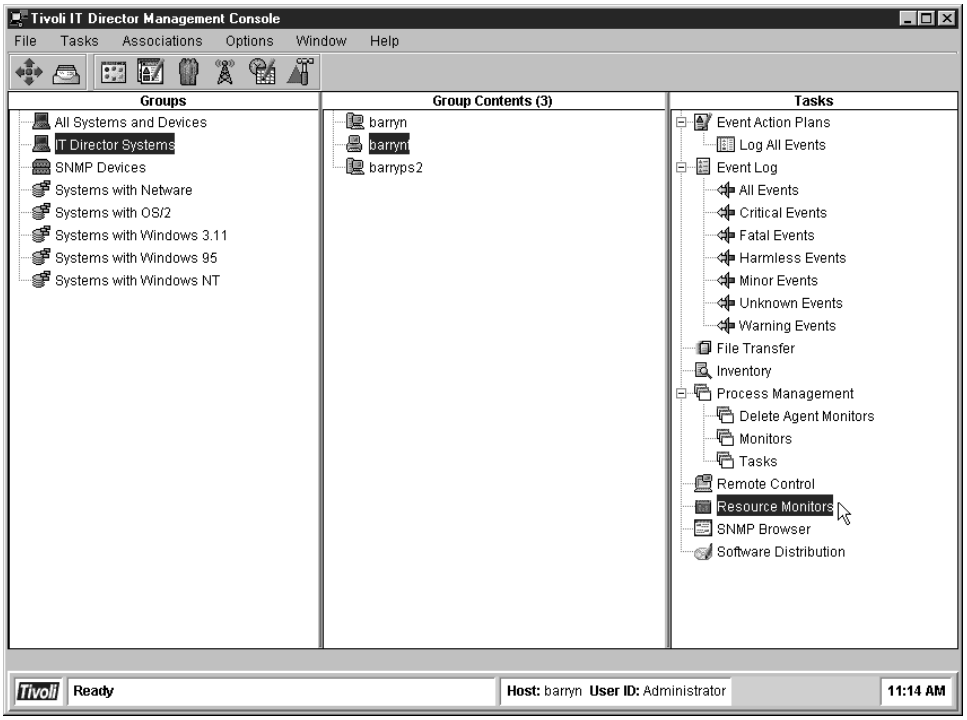


Figure 109. Dragging Task Icon to Managed System

3. The action brings up the Resource Monitors window. The left panel, under available resources, displays the root node of a tree view of the attributes that are associated for the managed system or system group. The following window is for a Tivoli IT Director Windows NT agent.

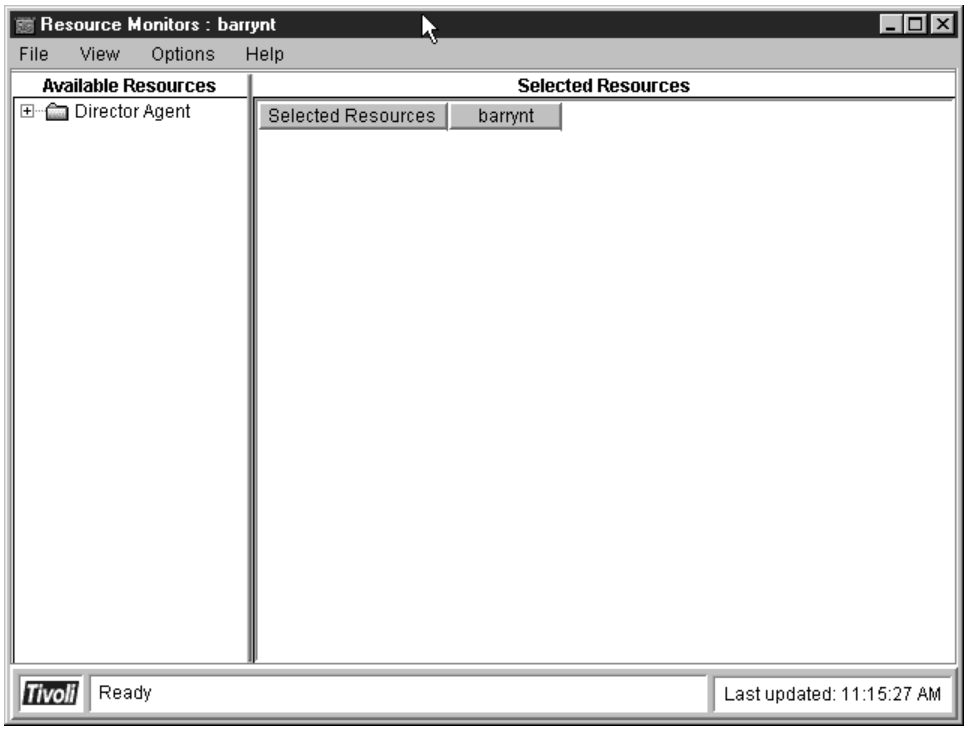


Figure 110. Available Resource View

The following window is for a Windows NT SNMP agent:

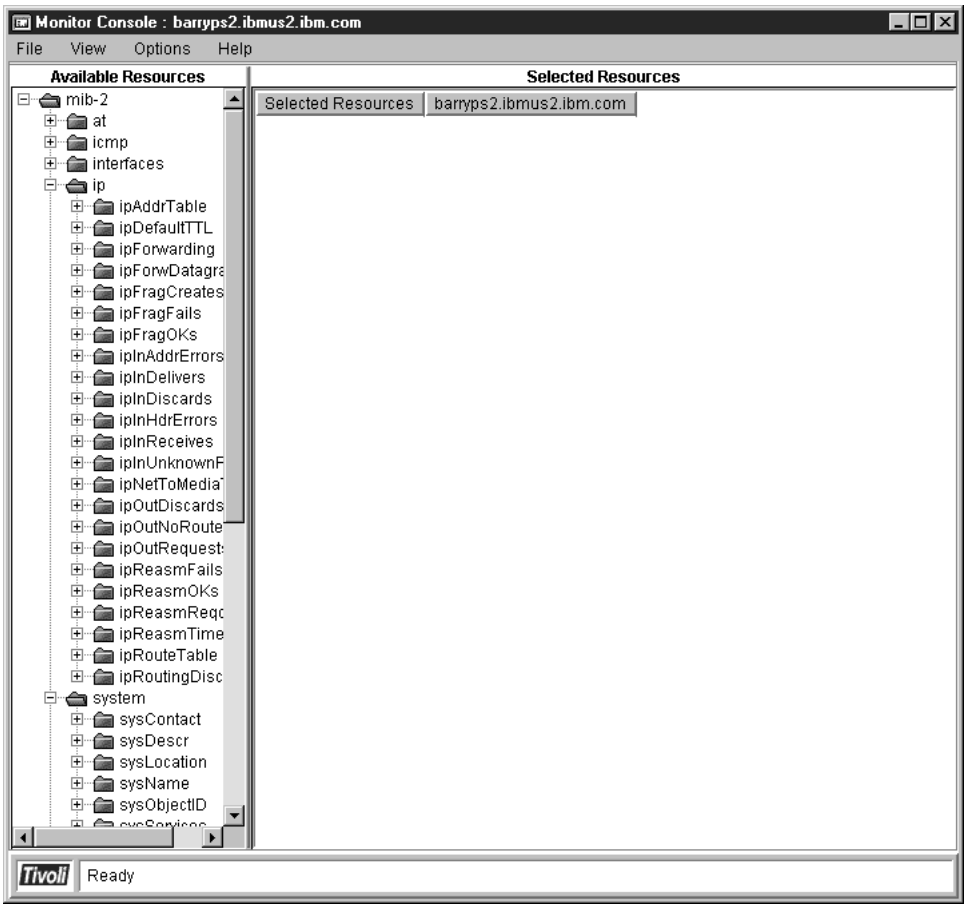


Figure 111. SNMP Monitor View

4. Click on the root node to expand the tree and view the attribute list.

   Note: If certain attributes do not display, the monitor agent may not be running on the network machine or the machine may not be reachable on the network.

   Each time you collapse and re-open an attribute category in the left panel the data associated with that attribute is refreshed.

5. The right panel of the window displays a table identifying the managed system names on the top row and the corresponding attributes in the left-hand column. To add an attribute to the right panel for viewing, drag the attributes icon from the left panel to the right panel.

   When you first drag your specific monitor to the managed system right panel, the monitor will collect monitor data and initialize the attribute on the managed system. In our example, we have dragged the CPU attribute on to the right panel of the managed system barrynt.

   The monitor begins monitoring the managed system. The results should appear similar to the illustration below.

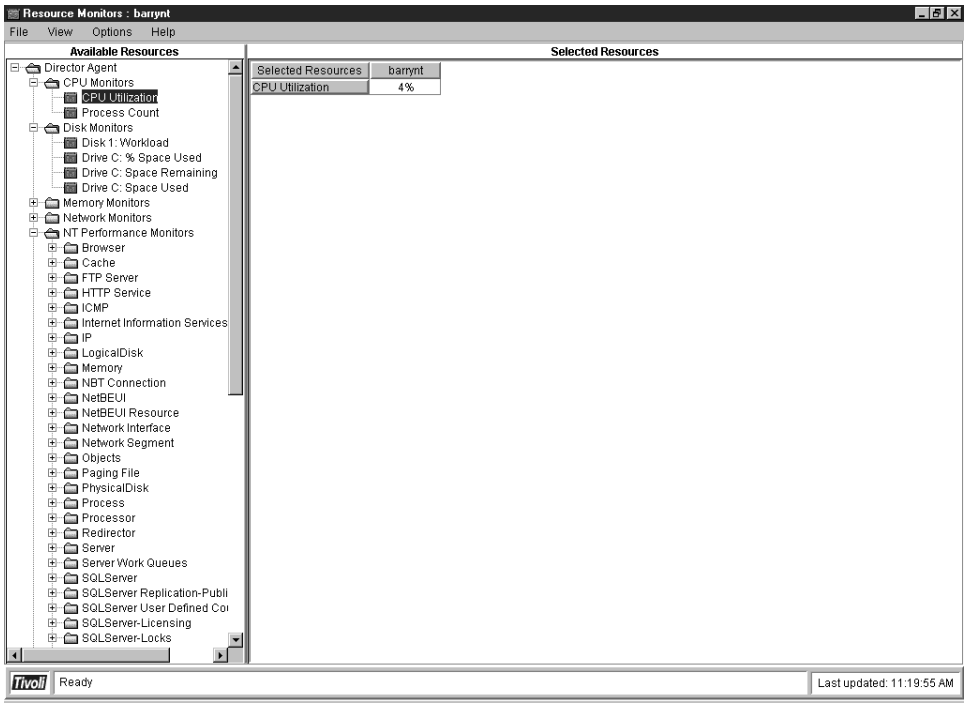


Figure 112. Selected Resource Monitor

6. To remove the attribute, place your mouse on the attribute and right-click your mouse to bring up the following options:
   a. Remove the row of monitors
   b. Record
   c. Set a Group or Individual Threshold
   d. Hide the Column

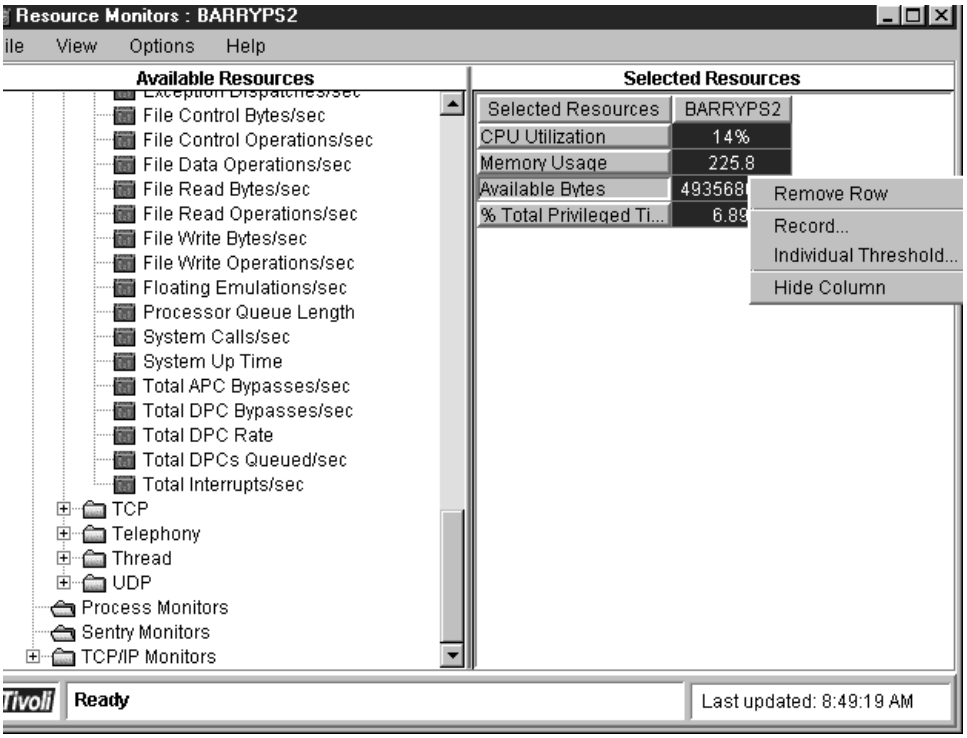


Figure 113. Attribute Actions

Recorded data can be graphed on the screen or exported as:

- CSV - Comma separated values
- HTM - HTML
- TXT - Formatted text

Note: Recording data uses lots of resources, so only record data that you really need.

Clicking on **Record** will let you record the data for further analysis. It will bring you to the following window:

Figure 114. Base Recording Window

Using the File pull-down menu, click on **New**. That will let you create a new record.

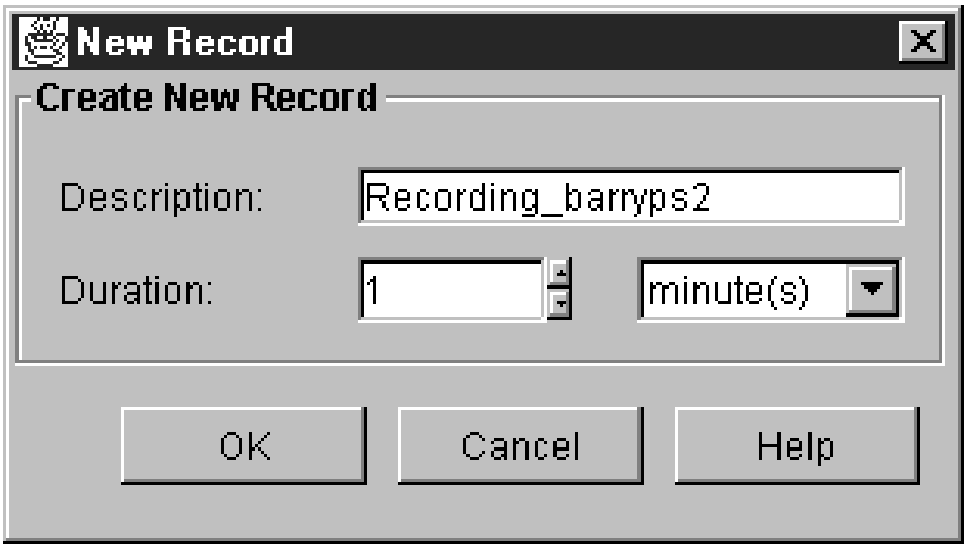


Figure 115. Description for the Recorded Data

After filling in the fields' data capture will begin. If you use the right mouse button, you will have different options to save or view the data as shown in the following window.

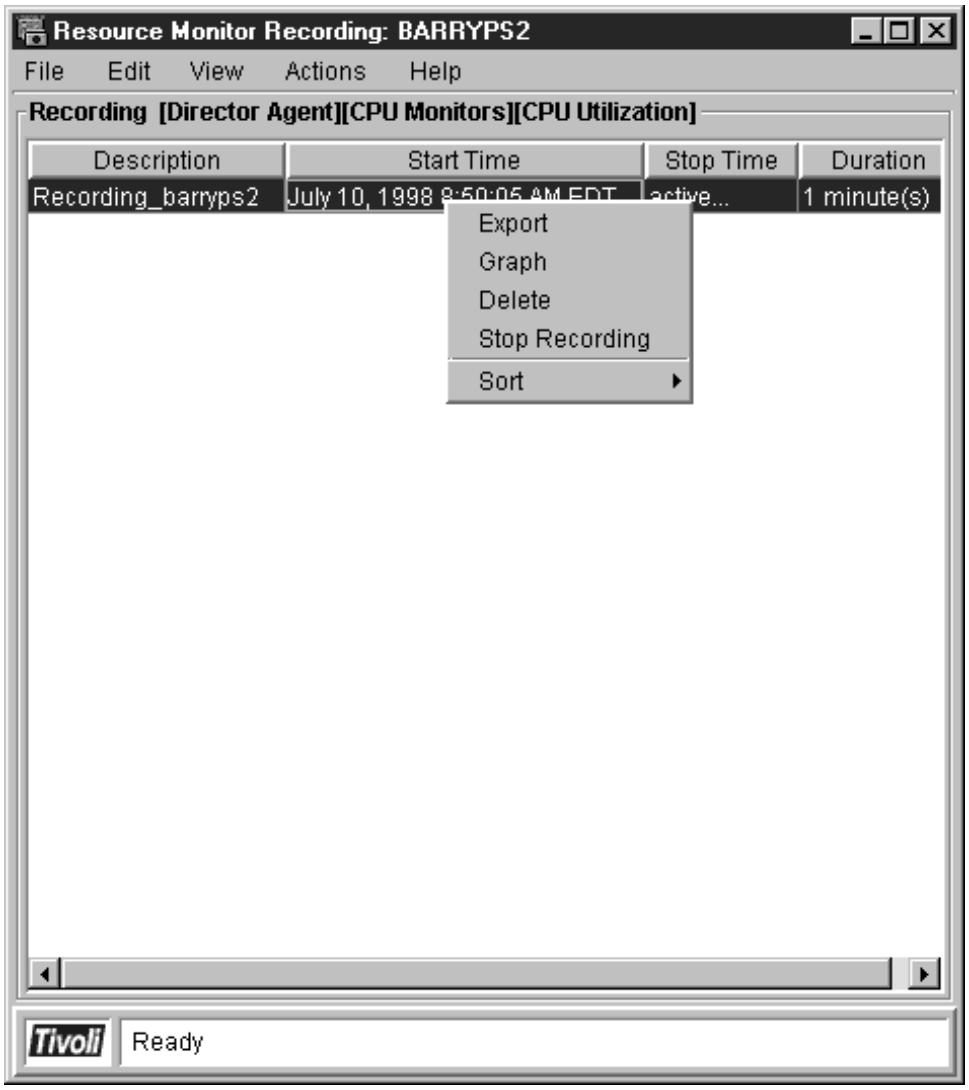


Figure 116. Views of the Data

To see a graph of the data just click on **Graph**.

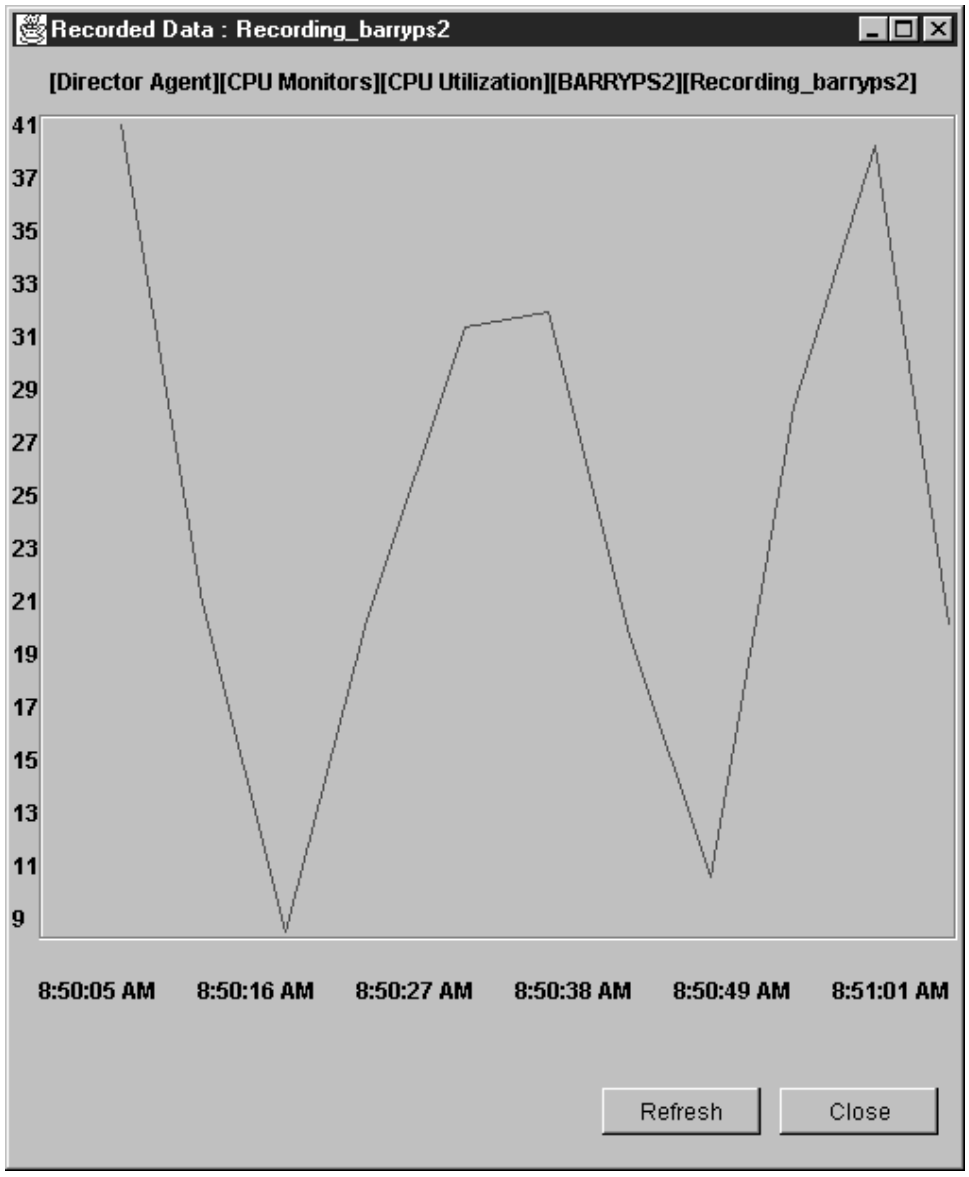


Figure 117. Graph Data

You can also export the data as was indicated earlier.

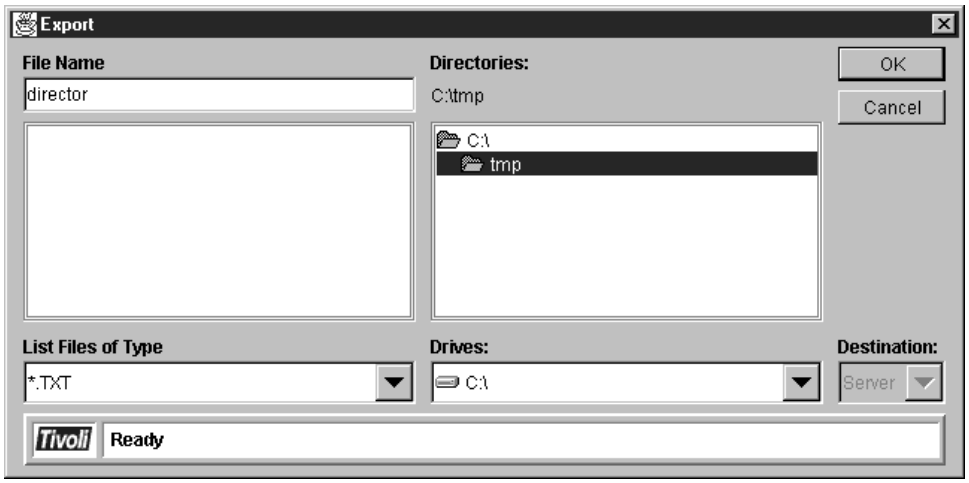


Figure 118. Exported Data

A sample of what the exported data looks as follows:

```
Machine Name   = BARRYPS2
Attribute Path = ffiDirector Agent“ffiCPU Monitors“ffiCPU Utilization“
Description    = Recording_barryps2
Start Time     =  July 10, 1998 at 8:50:05 AM
Stop Time      =  July 10, 1998 at 8:51:01 AM
Sampling Rate  = 5000 msecs

    July 10, 1998    8:50:10 AM       41%
    July 10, 1998    8:50:15 AM       22%
    July 10, 1998    8:50:20 AM        9%
    July 10, 1998    8:50:25 AM       22%
    July 10, 1998    8:50:31 AM       33%
    July 10, 1998    8:50:36 AM       34%
    July 10, 1998    8:50:41 AM       21%
    July 10, 1998    8:50:46 AM       12%
```

5.4 Monitoring a Managed Group

The process for monitoring a managed group is similar to that of a managed system. As discussed earlier, the logical structure for data that can be monitored is a tree structure of attributes. The population of attribute trees is displayed as you expand the tree hierarchy.

1. In this example, we will drag the Tivoli WorkGroup agents, which consist of the managed systems in the center panel, to the resource monitors on the right panel.

   A screen appears with a row of managed resources that belong to the managed group.

2. Expand the folder under the Available Resources in the left panel to display the set of monitors.

   Notice how many more monitors are available. This is because we are viewing the list of all available monitors that are available for all members of this managed group. The displayed list is an aggregation of all possible monitors from all available systems in the group. See Appendix B, “Resource Monitor

List” on page 243 for a list of all monitors provided with the Tivoli IT Director Agent.

3. When we drag the CPU monitoring attribute to the right panel of our selected resources, we see the CPU monitor initializing for the selected group resources.

   The monitors begin monitoring the individual resources. The figure below shows an example of a screen capture of the monitoring attributes active on the selected group.

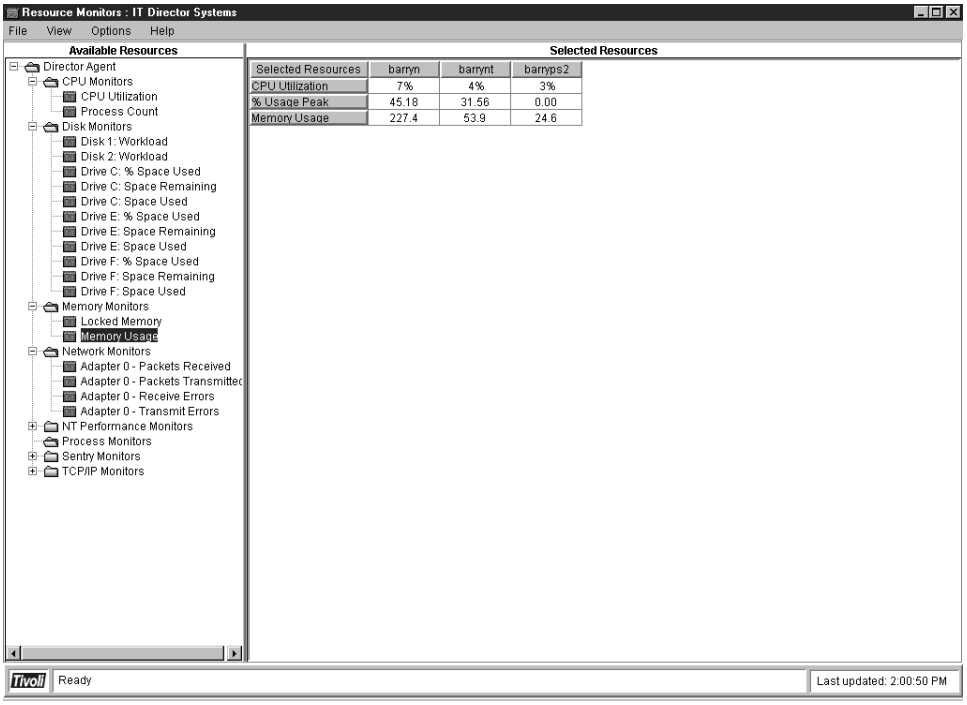


Figure 119. Selected Resource Monitor

   a. Clicking with the right mouse button on the CPU monitor row will bring up a dialog box with the following options:

      - Remove Row
      - Group Threshold - Allows you to set a group threshold.
      - Individual Threshold - Allows you to set an individual threshold.
      - Hide Column

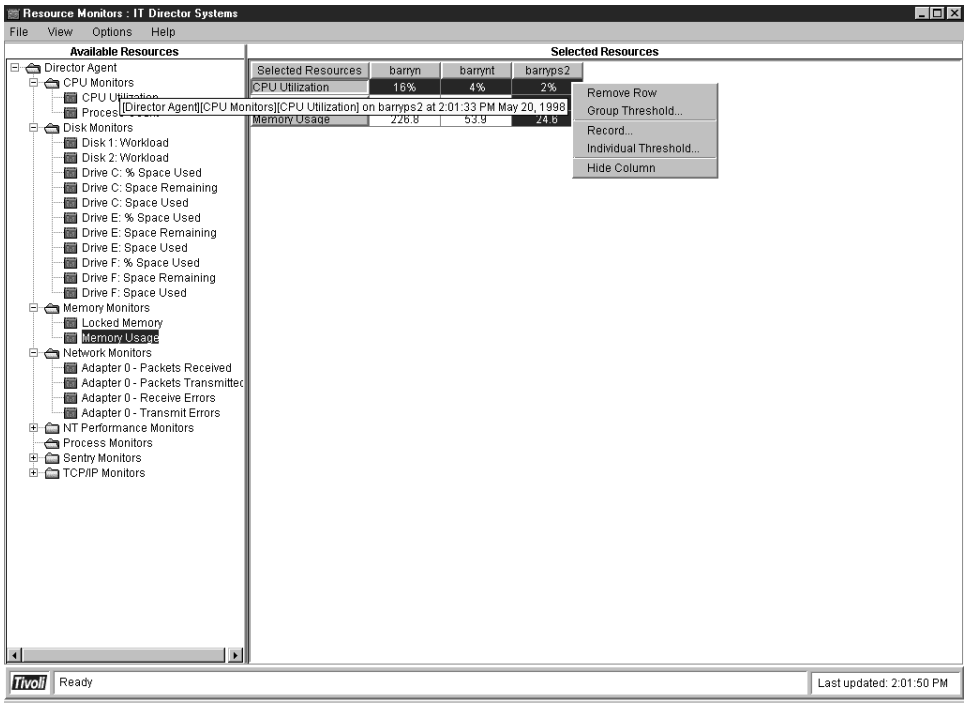


Figure 120. Pop-Up Dialog Box

If you move the mouse over the window, you will also notice that you can get additional information about some fields. This is called *hover help*.

5.5 Monitoring SNMP Services

In order to see all the SNMP devices that Tivoli IT Director has discovered, you should select **SNMP Devices** from the Groups pane.

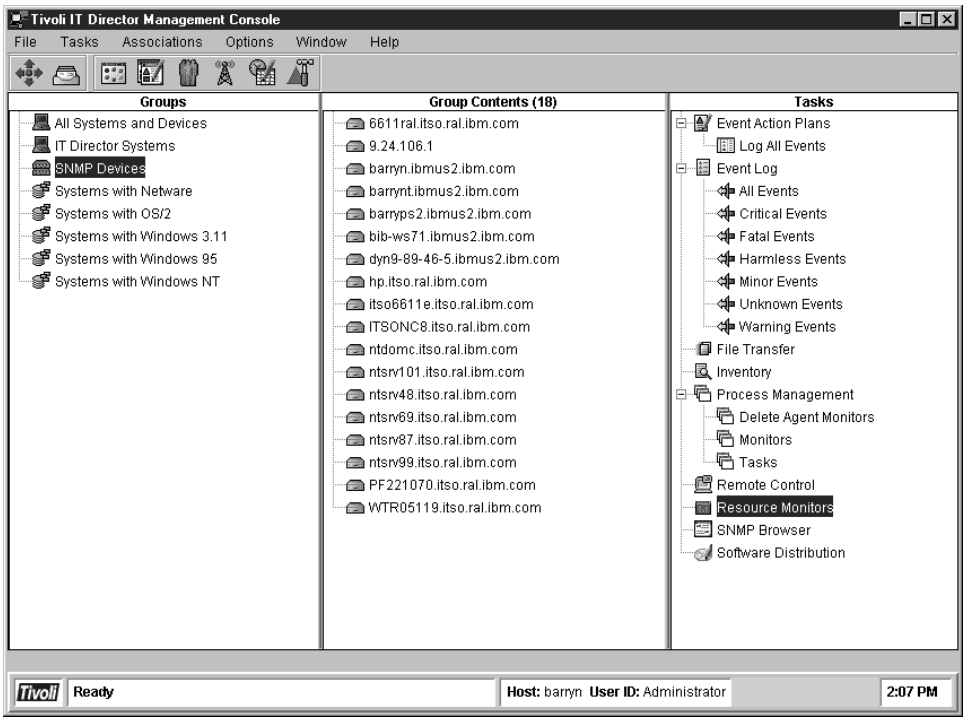


Figure 121. Selected Resource Monitor

The procedure for setting a monitor on an SNMP managed system is as follows:

1. To activate the resource monitors, drag the Resource Monitors task icon onto the desired SNMP device or drag the desired SNMP device onto the Resource Monitor icon.

   Notice that the available resource monitors displayed are MIB-2 values.

2. Expand the attribute view by clicking on the **mib-2** folder to display the available monitoring attributes.

   The action will display the available monitors.

3. As with previous examples, you can drag the individual monitor to the right panel screen to initialize and begin collecting monitoring data on the selected device as shown below:

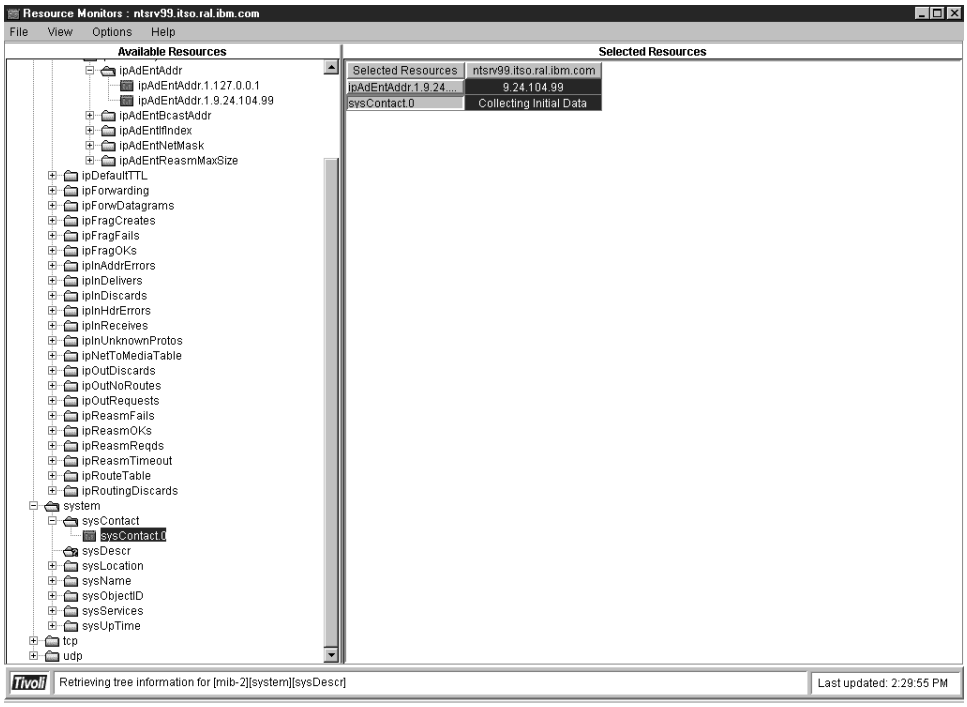


Figure 122. SNMP Device Monitor

4. You can also remove the monitor, set a threshold, or hide the column as displayed below.

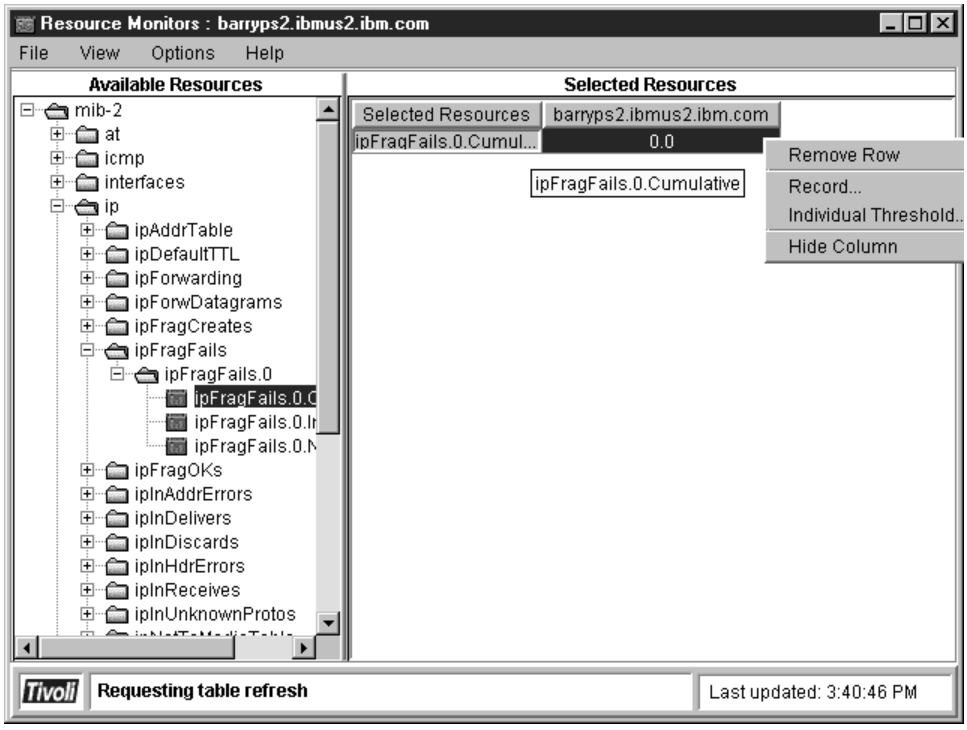


Figure 123. Selected Resource Monitor

5.5.1 Setting Monitor Thresholds

You can set thresholds for a specific managed system or system group. If you assign a threshold, an event is triggered if the threshold is met for the system to which the attribute applies. Thresholds will have a time duration associated with the monitor. For the threshold to be triggered, the measured value must meet the criteria for at least the time duration set for the threshold.

When you first drag your specific monitor to the managed system the monitor will perform a base initialization on the managed system. In our example, we want to set a threshold for a group of systems and monitor the disk space. In the particular managed group we selected, all machines have a physical drive c:. Therefore, we selected the Drive C: % Space Used monitor illustrated below.

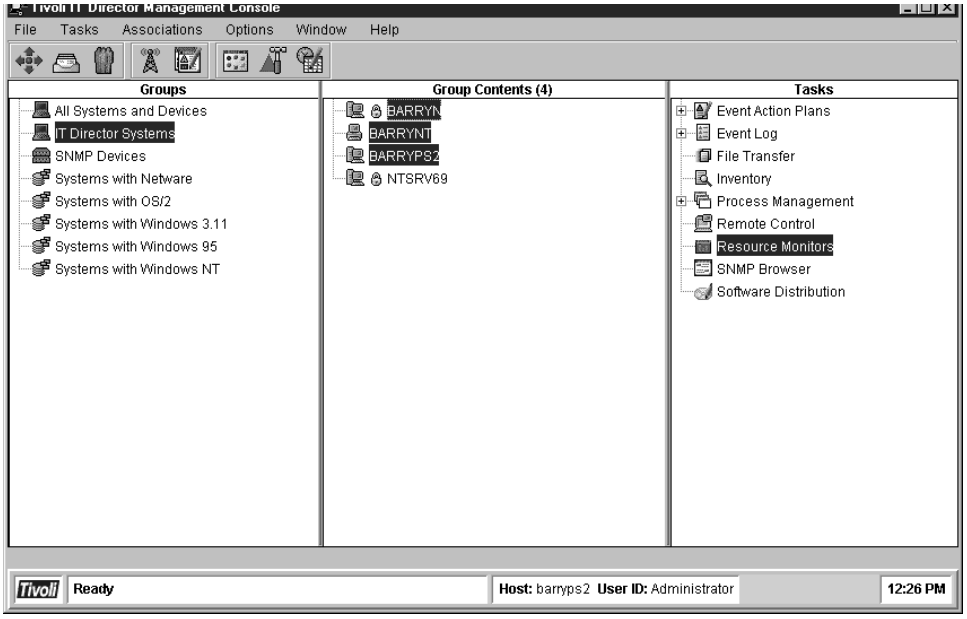


Figure 124. Selected Monitor Drive C:

We then drag the monitor to the right panel of our console. As with all monitors Tivoli IT Director performs an initialization of the selected monitors on all the resources.

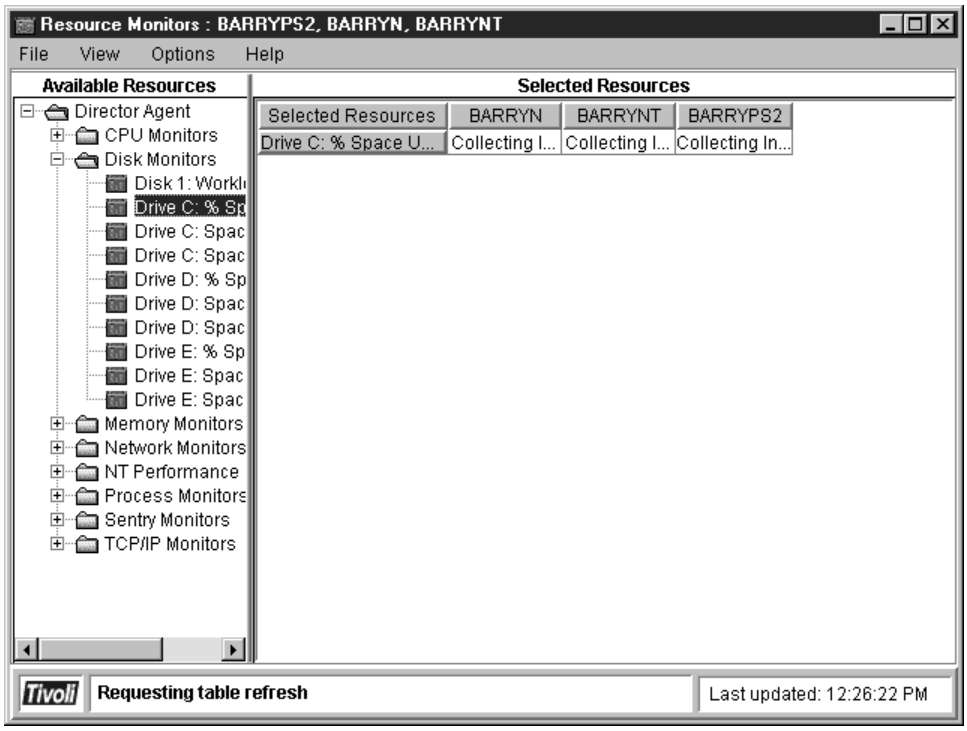


Figure 125. Monitors Initializing

The monitors are now actively monitoring their resources and we can set threshold options.

Note: The Active Monitor console is not required for thresholding to occur. Once the thresholding has been set, the values are checked until it is deleted or disabled.

In our example, we set a group threshold and send the data to the Tivoli IT Director ticker tape service.

1. In the left panel of the monitor console, right-click on the attribute system. A context dialog is displayed.

   Click on **Group Threshold** to bring up the System Threshold dialog.

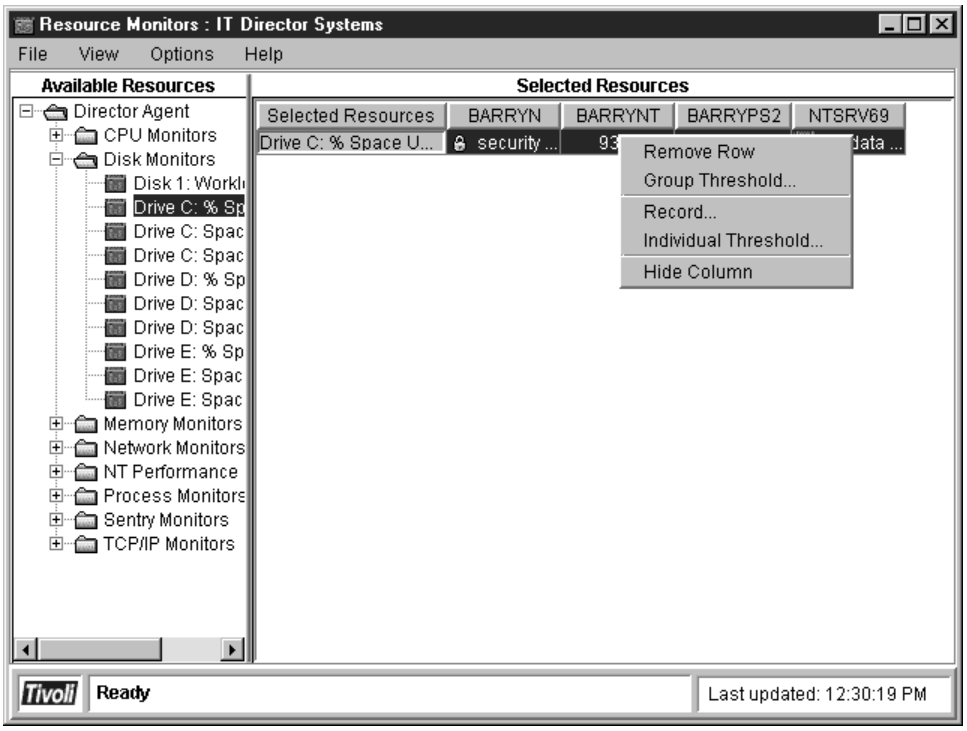


Figure 126. Group Threshold Dialog

2. Enter the thresholds values to monitor. Click on **OK** to continue. You need to provide a name for your threshold as well as configure the threshold duration.

   This example sets the native agent drive C: % Space Used as enabled. The minimum duration is 5 minutes, which means that the threshold must be crossed for a minimum of 5 minutes in order for it to qualify as a high error.

   Any of the managed systems in the managed group that have over 90% of their drive C: full would qualify as a high error condition for the threshold. Any C: drive over 70% full would qualify for a high warning threshold.

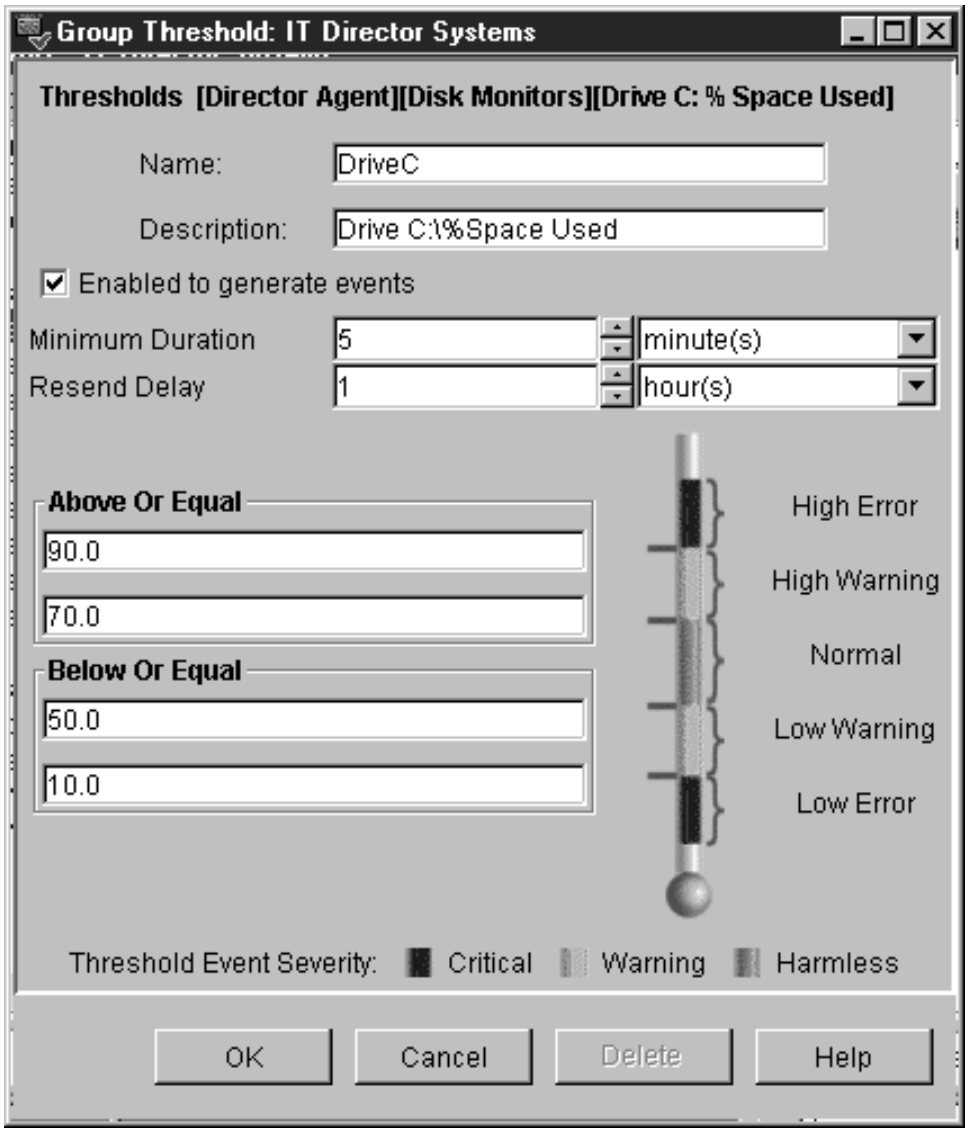


Figure 127. System Threshold Dialog

3. Next, we want to be alerted in some way if the threshold is crossed. Tivoli IT Director provides many options for handling threshold events (see 6.5.1, “Customizing an Event Action” on page 143).

In addition to having a threshold set on a numeric value you can set thresholds to compare for a string value as shown in the following window:

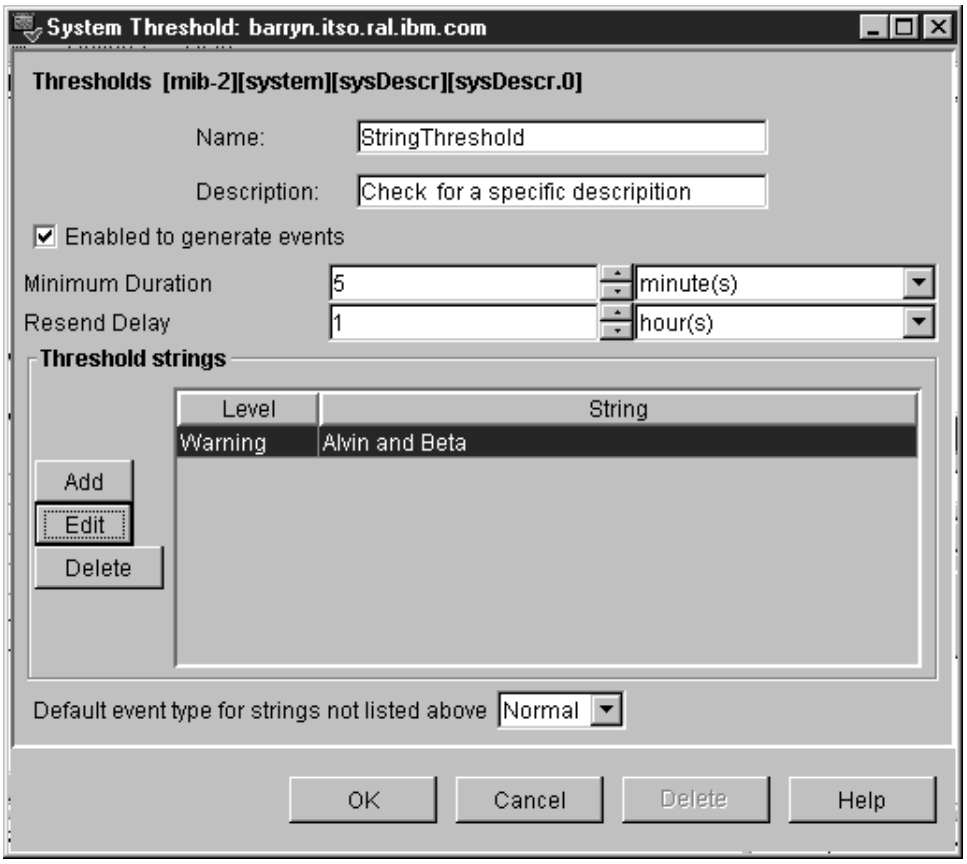


Figure 128. System Threshold Dialog

5.5.1.1 Using the Ticker Tape

In our example, we send the threshold values to the Tivoli IT Director ticker tape service. This will provide a marquee scrolling text of our monitor across the bottom of the main Tivoli IT Director console. To add the monitor to the ticker tape service, select the monitor and click on **Add to Ticker Tape on Director Management Console** as shown below.

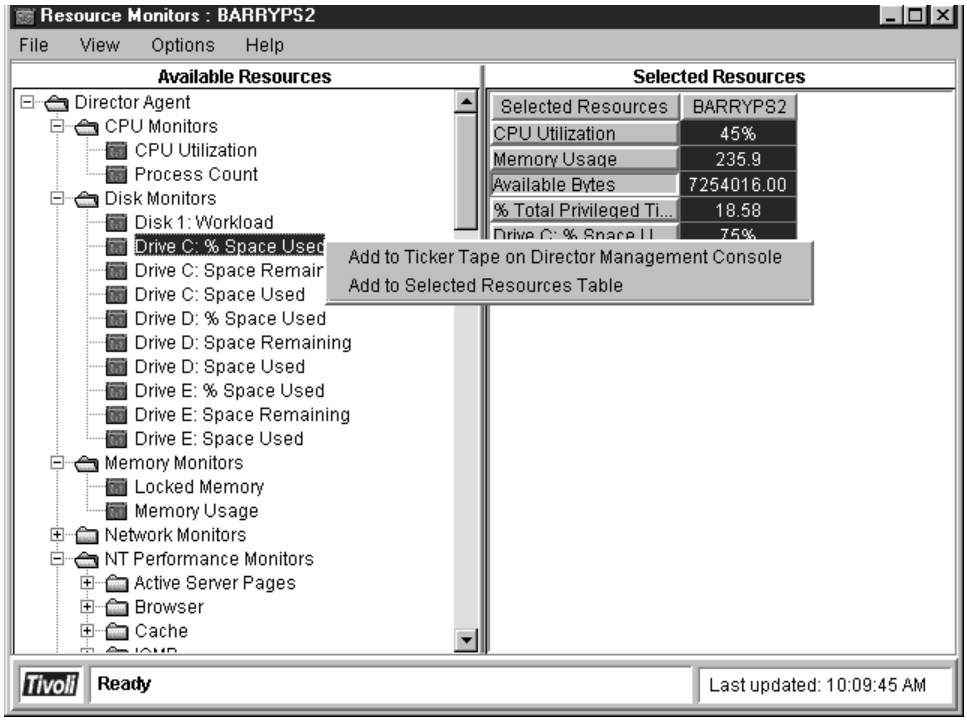


Figure 129. Adding Monitor to Status Panel

The monitors will begin displaying data from the agent systems at the bottom of the main console. We have not defined an action for the specific monitors so the values that will scroll across the bottom of the screen will represent all sampling data for our monitors. High alert conditions will be picked up by the Tivoli IT Director alert service where a defined action can be applied to the event. For more information on defining an action plan for monitors, please refer to 6.1, “Event Manager Configuration” on page 129.

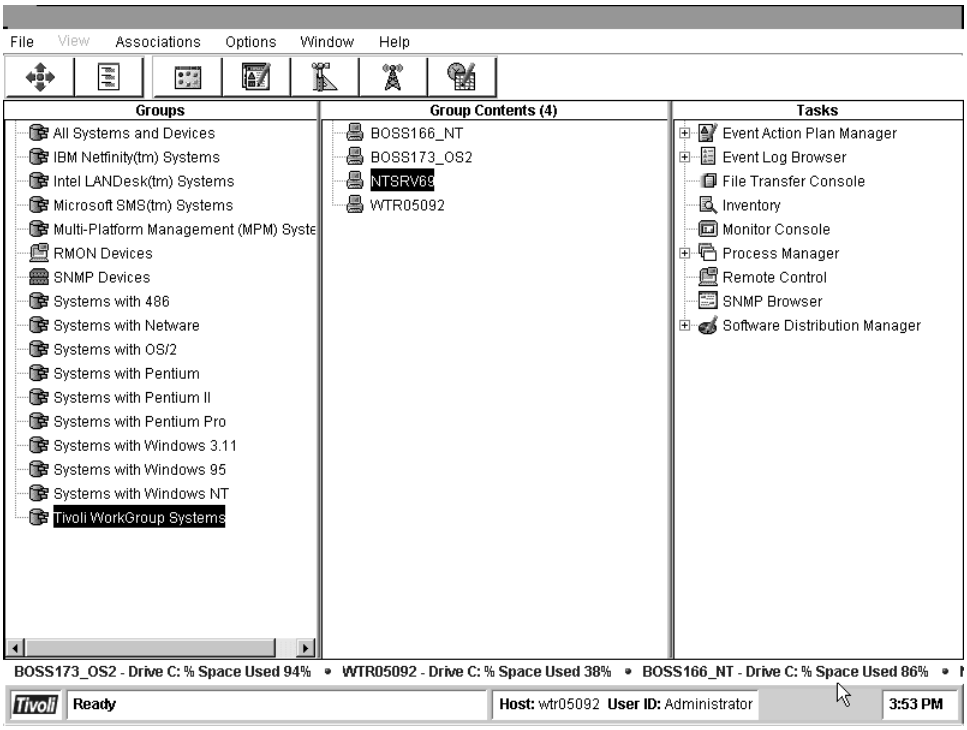


Figure 130. Ticker Tape Display

To remove monitors from the ticker tape service, click with the right mouse button on the ticker tape service on the main console. A dialog will appear similar to the one below where you can remove selected monitors or remove all monitors.

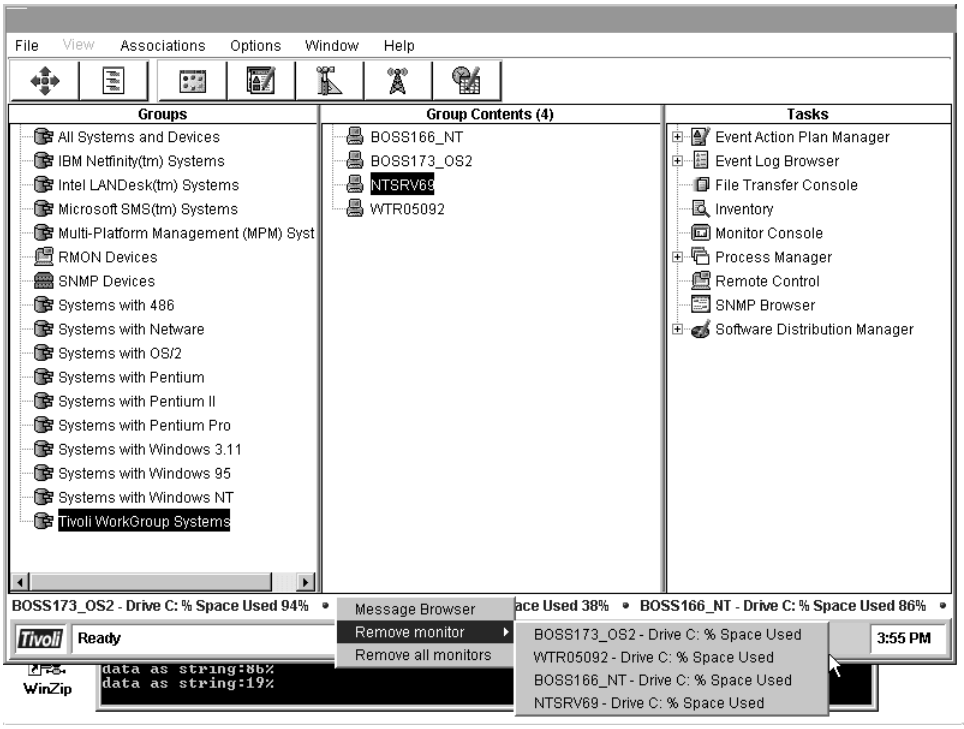


Figure 131. Removing Main Console Monitors

A unique feature of Tivoli IT Director is the ability to forward monitors to the Web Management Service. This provides a way for administrators to check on the conditions of devices through a simple browser. To forward your monitors to the Web Management Service, select **Options** from the Resource Monitor as shown below.

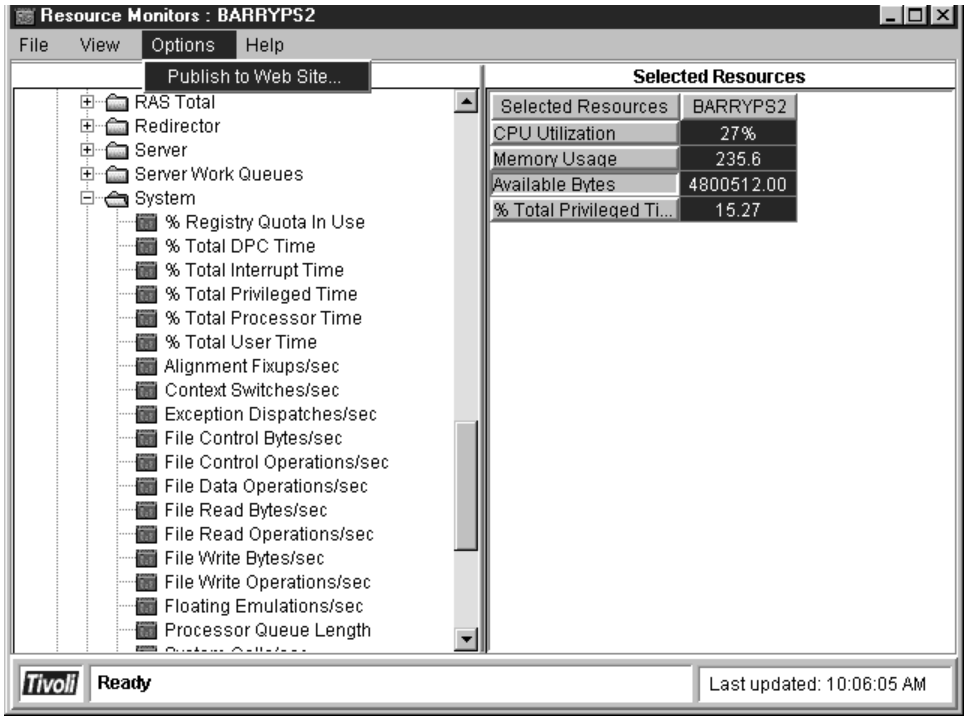


Figure 132. Publish to Web Site

A Monitor Webcasting window will appear providing you with options for giving your monitor a name and a description. You also have options for publishing intervals and maximum number of tables. For more information regarding the Web Management Service in Tivoli IT Director please see Chapter 8, “Web Publishing and Internet Technologies” on page 199.

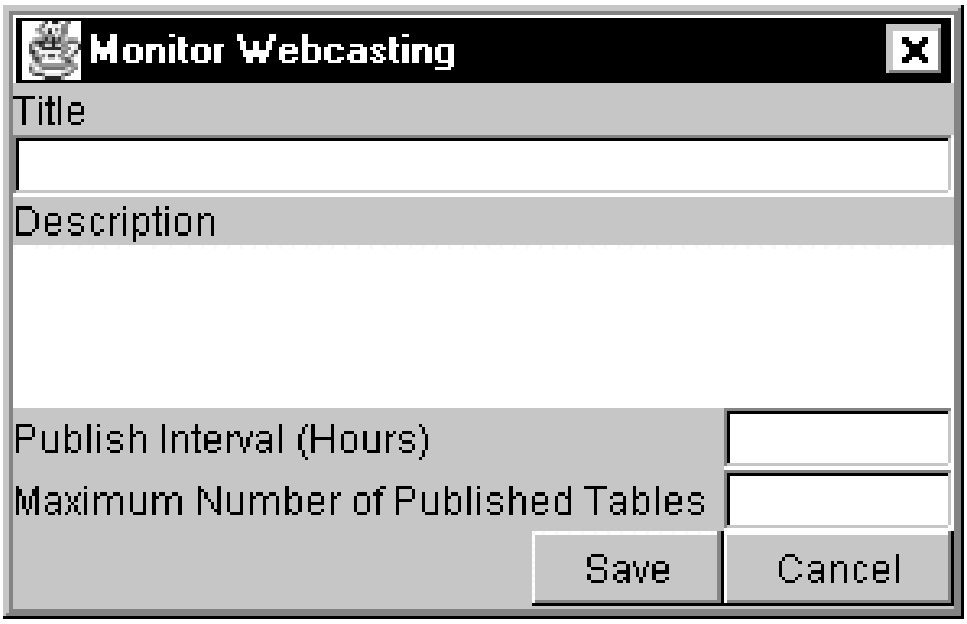


Figure 133. Monitor Webcasting Dialog

5.6 Process Manager

A key feature of Tivoli IT Director is the ability to manage individual processes on remote systems. The Process Manager allows the administrator to view and manipulate all applications and processes. The system administrator will be able to set a monitor for a particular process or application so that if an application or process terminates an event will be generated. Other monitors can be set to create events if a particular application is started.

The process management task of Tivoli IT Director is an interactive task that is only applicable to native managed systems. Therefore, SNMP and MPM managed systems do not have the capability to be monitored and managed to this level of detail.

If you try to drop the icon onto a non-Tivoli Workgroup system you will get an error message that says, *The targeted system does not support this task*.

5.7 Viewing Processes, Applications and Drivers

The Process Manager for Tivoli IT Director is activated from the main console.

- The task icon can be dragged and dropped on the target managed system systems.
- The managed systems can be dragged and dropped on the task icon.

To use the Process Manager:

1. Locate the Process Manager task icon in the right panel of the window and the managed system for which you want to view data in the left panel.

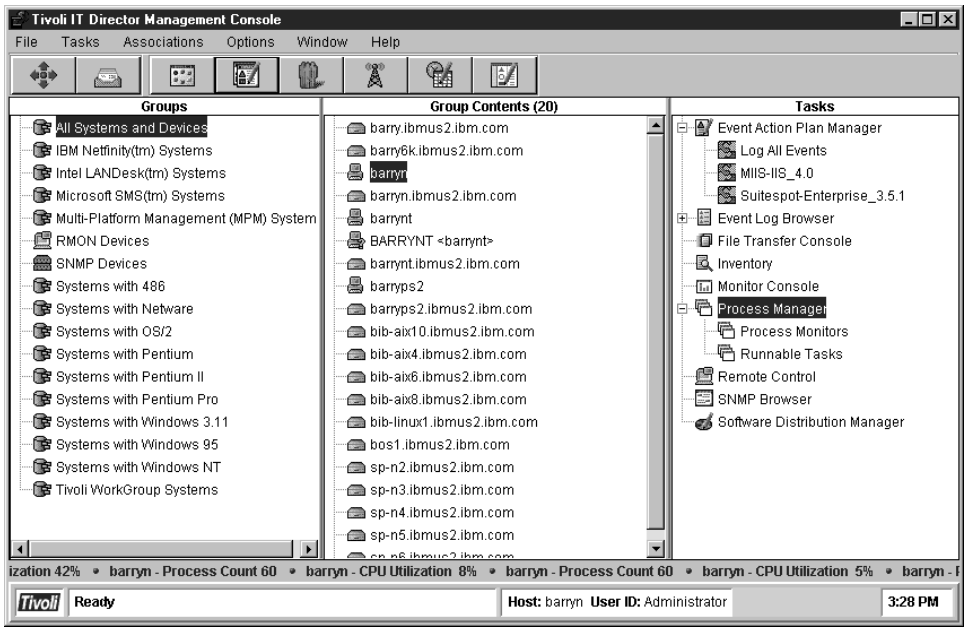


Figure 134. Process Manager Screen

2. Drag the task icon to the managed system or system group for which you want to view data or drag the managed system to the task icon. The action brings up the Process Manager window.

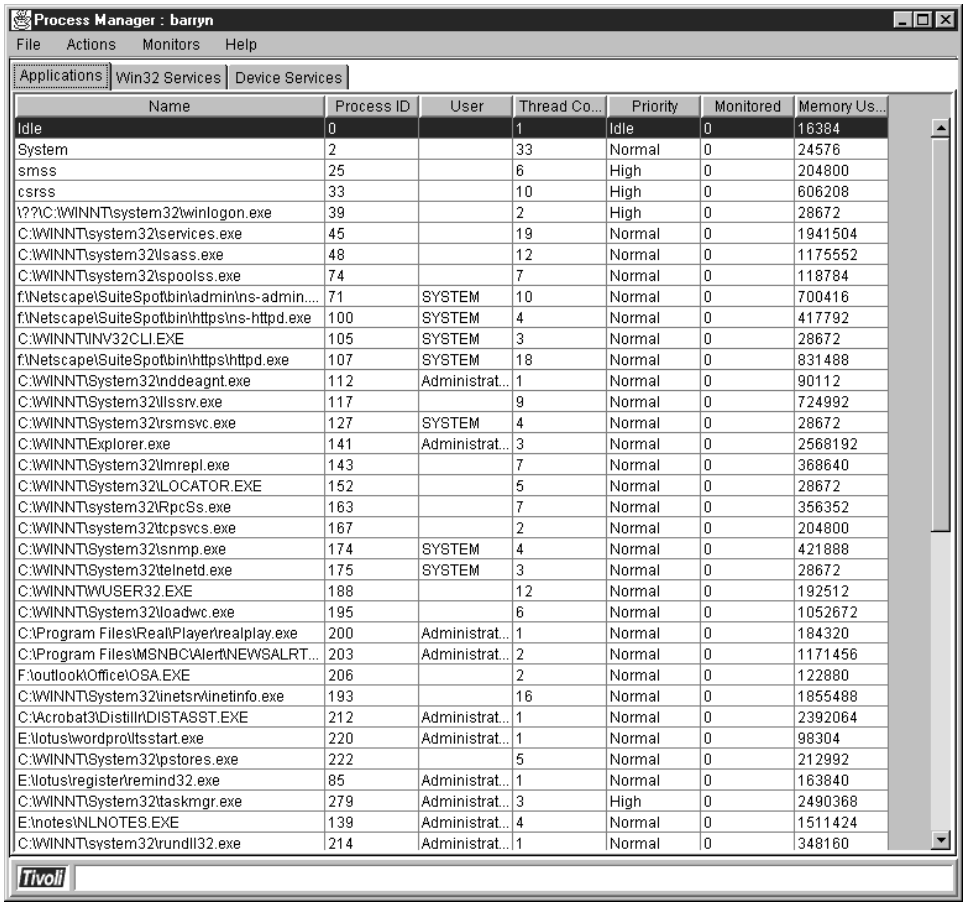


Figure 135. Dragging Task to Managed System

Depending upon the operating system, this window has up to three tabs for the types of processes that can be managed:

- Applications
- Win32 Services
- Driver Services

The tool bar of the Process Manger window has File, Actions, Monitor and Help pull-down menus to work with.

3. The selections for the actions menu will change based on which tab window you are currently viewing. The potential actions are:
   - Applications - Execute command and close application.
   - Win32 Services - Execute command, pause, continue, start or stop the service.
   - Device Services - Execute command, start or stop the service.

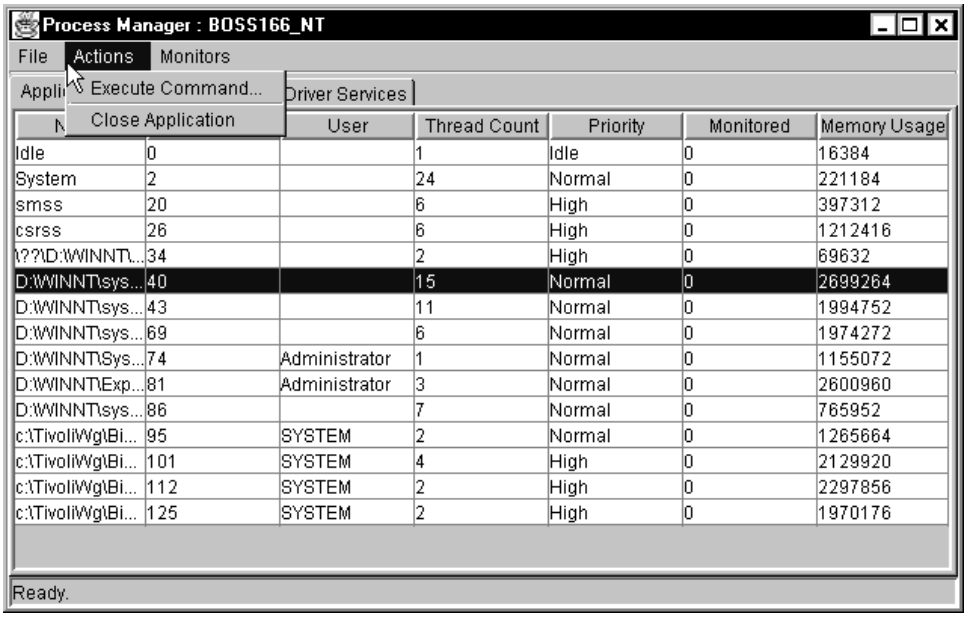


Figure 136. Resource Monitor System

When looking at the Applications tab, the most interesting fields are the Memory Used and User fields.

The Win32 Services tab shows you the name of the service and its current state. You would get similar information from the Windows NT control panel or the Windows NT Web administrator function.

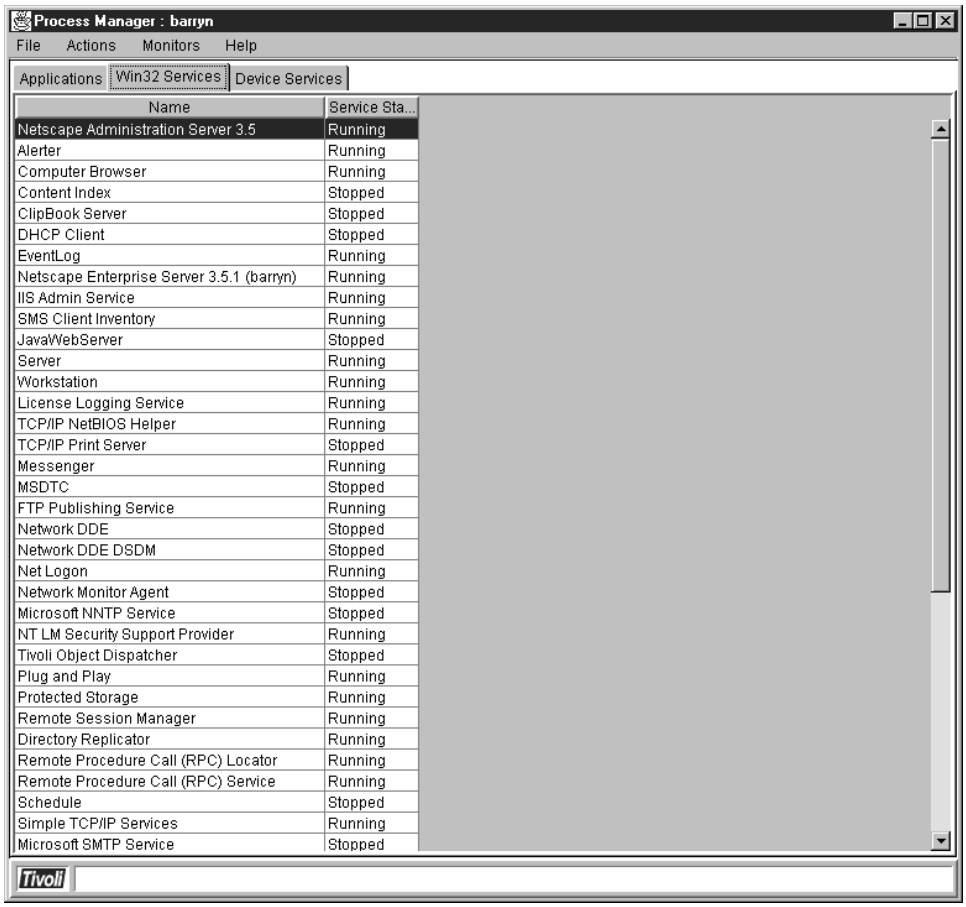


Figure 137. Win32 Services Window

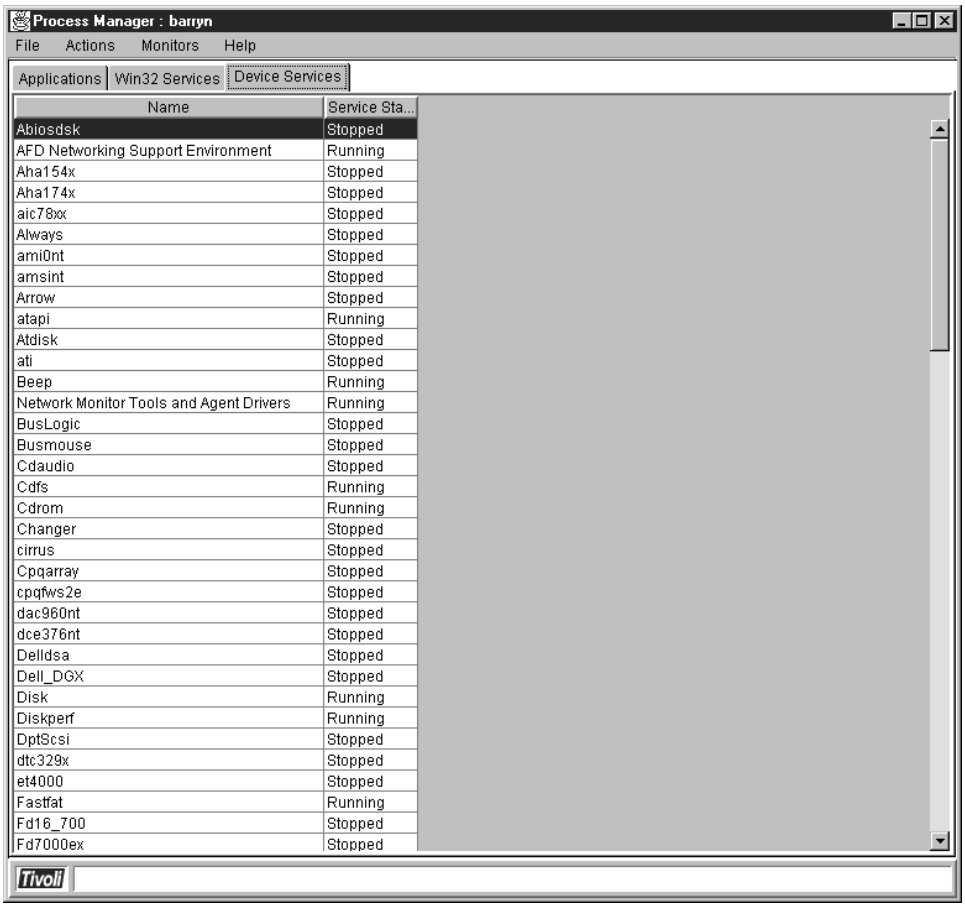


Figure 138. Driver Services Window

5.8 Starting a Process

To start an application or program on the managed systems using the Process Manager, click on **Actions** from the menu bar and then select **Execute Application**. The following window will appear.

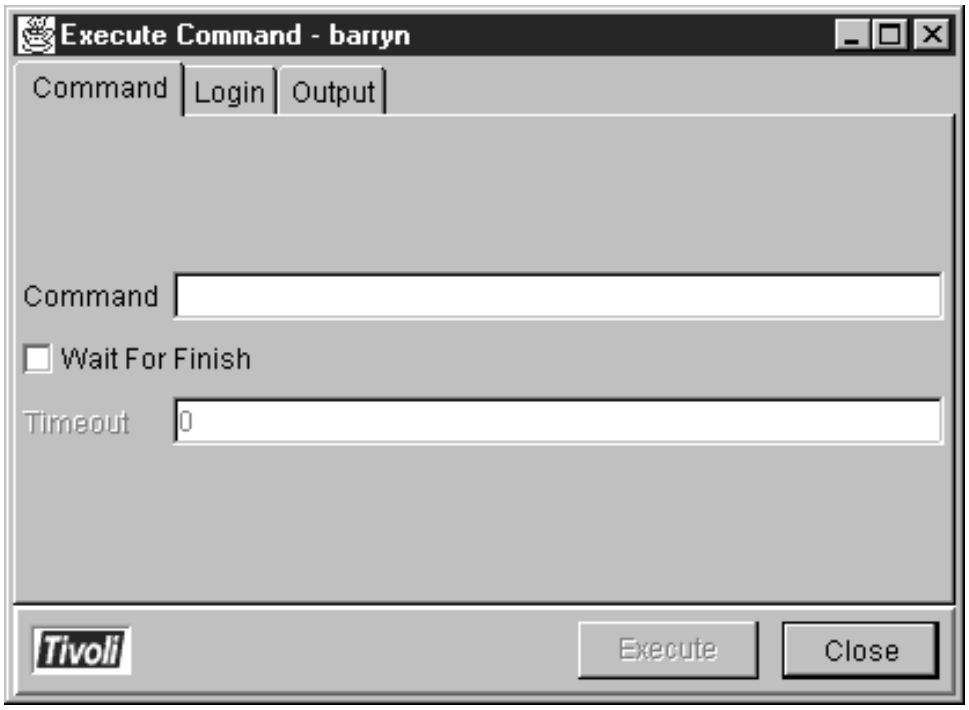


Figure 139. Execute Command Dialog

The Execute Command dialog will allow you to enter the name and path of the program to run and any additional parameters or information. If you are running a command-line application, do not check the Wait For Finish option. This will allow the output of the program to be displayed in the output area at the bottom of the window. If you are starting a graphical application, then always select that option. This will only start the application and not wait for output information. There are also tabs for user ID (login) information and for the output.

In this example, we execute the NETSTAT command as Administrator. We want the Execution output to appear in our window.

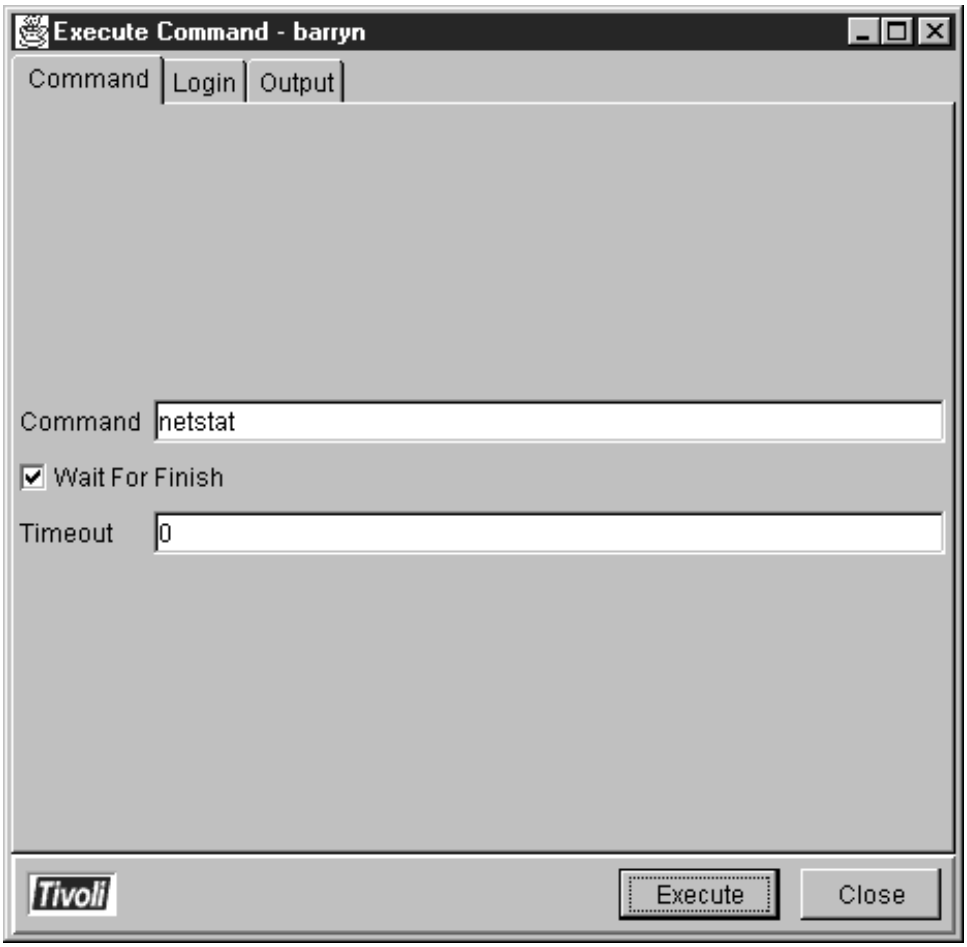


Figure 140. Execute Command Window

The next figure shows the NETSTAT results screen:

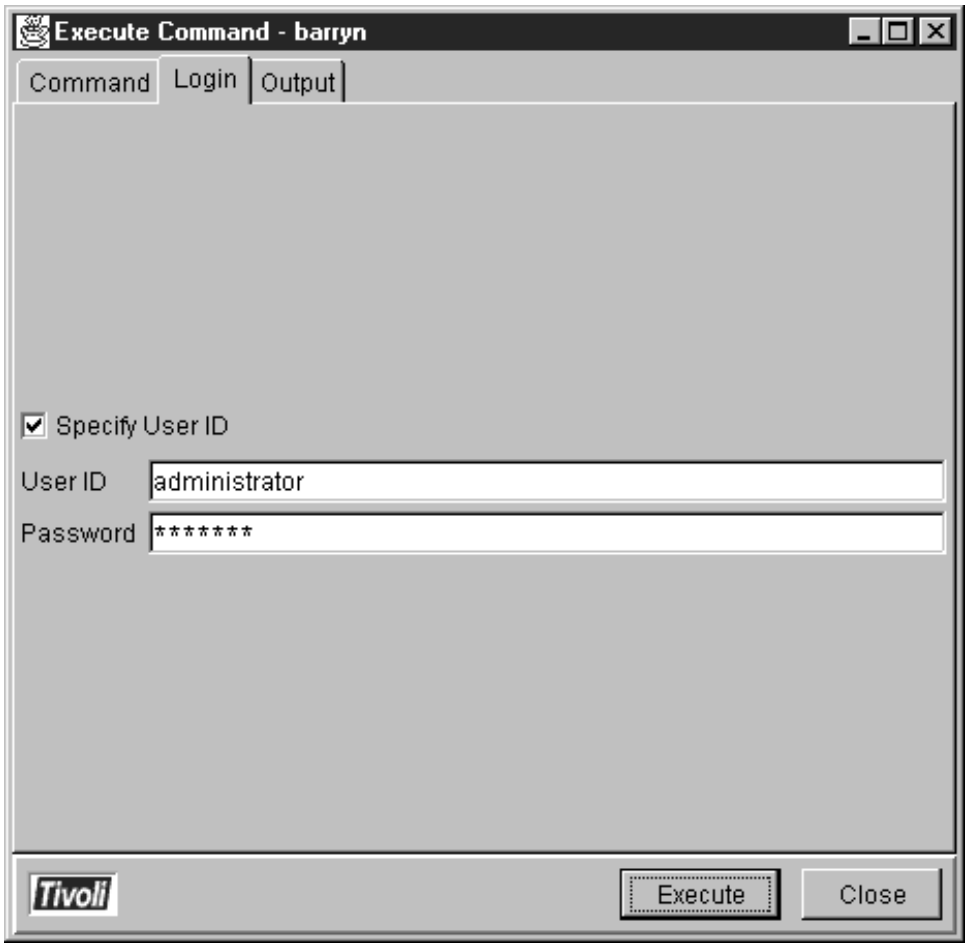


Figure 141. Execute Command User ID

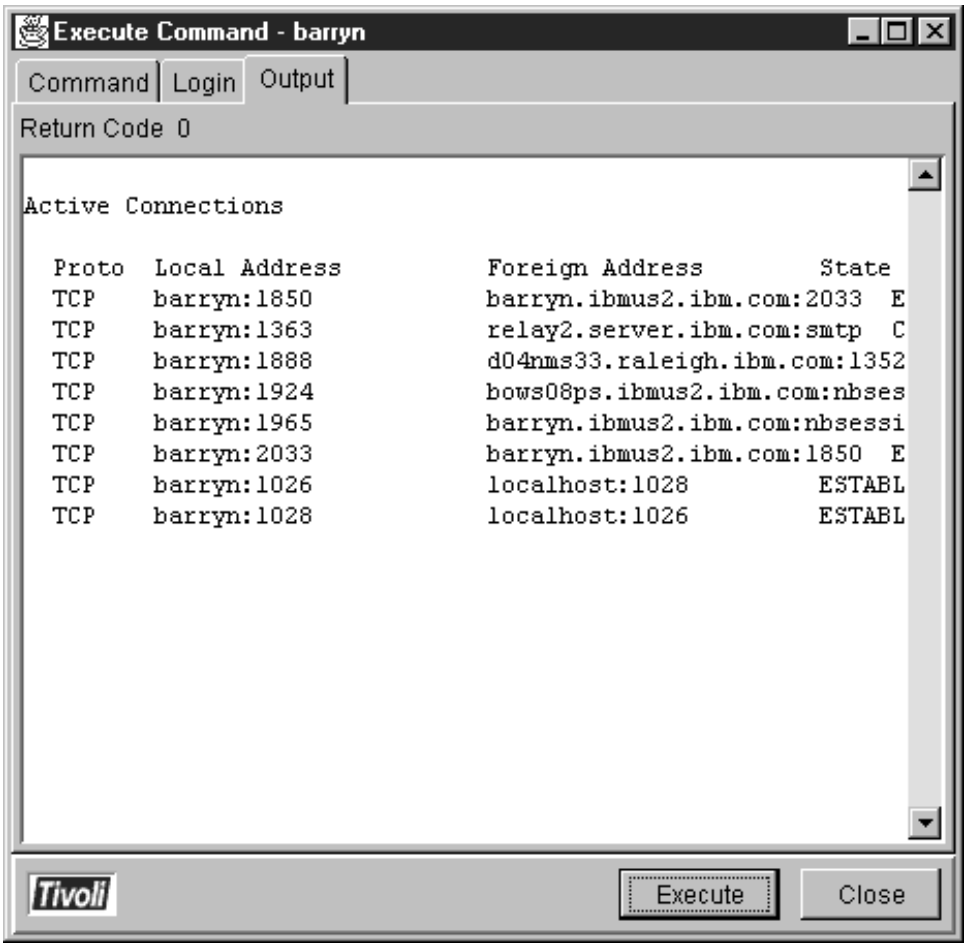


Figure 142. Execute Command Results

If we were to run the command as an unprivileged user, such as GUEST shown in Figure 143 on page 120, then we would receive the failure dialog box shown in Figure 144 on page 120.

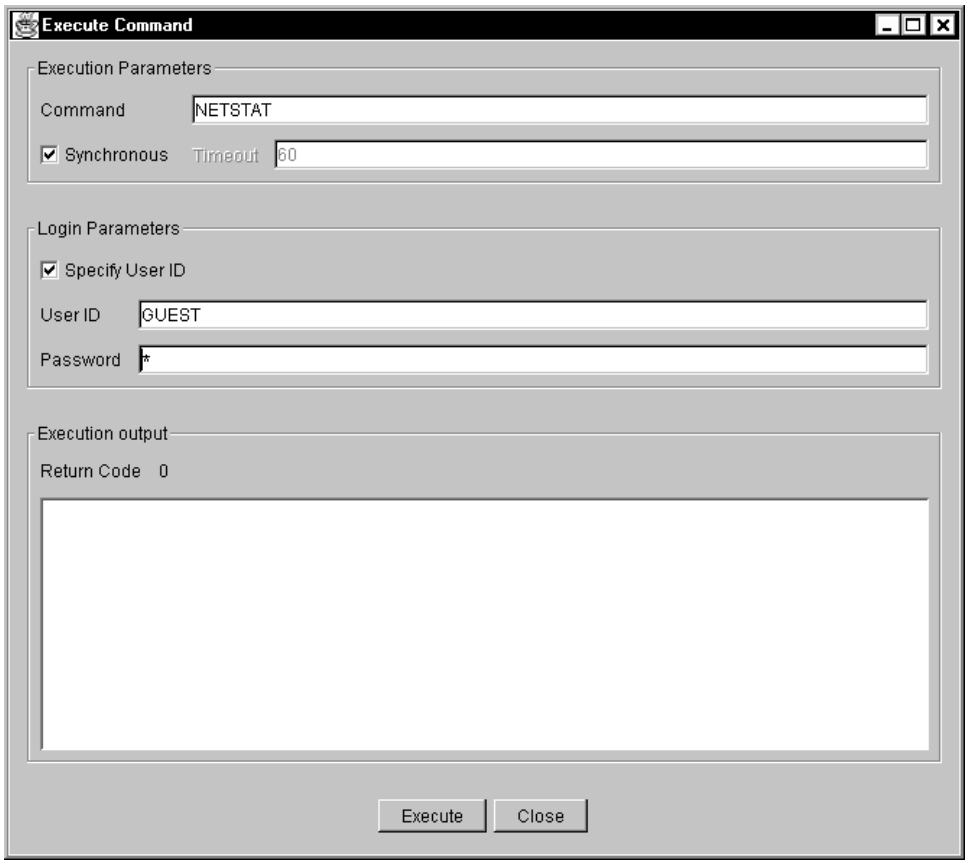


Figure 143. Execute Command with Guest ID

Figure 144. Security Violation

The Login Parameters allow you to specify a valid user name and password on the destination host. The program you specify will then run as the designated user.

Note: The Login Parameters feature is only supported on Windows NT.

> If you are executing a .COM file under Windows, make sure that you execute it by running a new COMMAND (or CMD as appropriate). For example, to run KEYB.COM, in the command window type `COMMAND.COM /C KEYB.COM`.

You can also get basic operating system information by clicking on the **File** and then **OS Information** pull-down options.

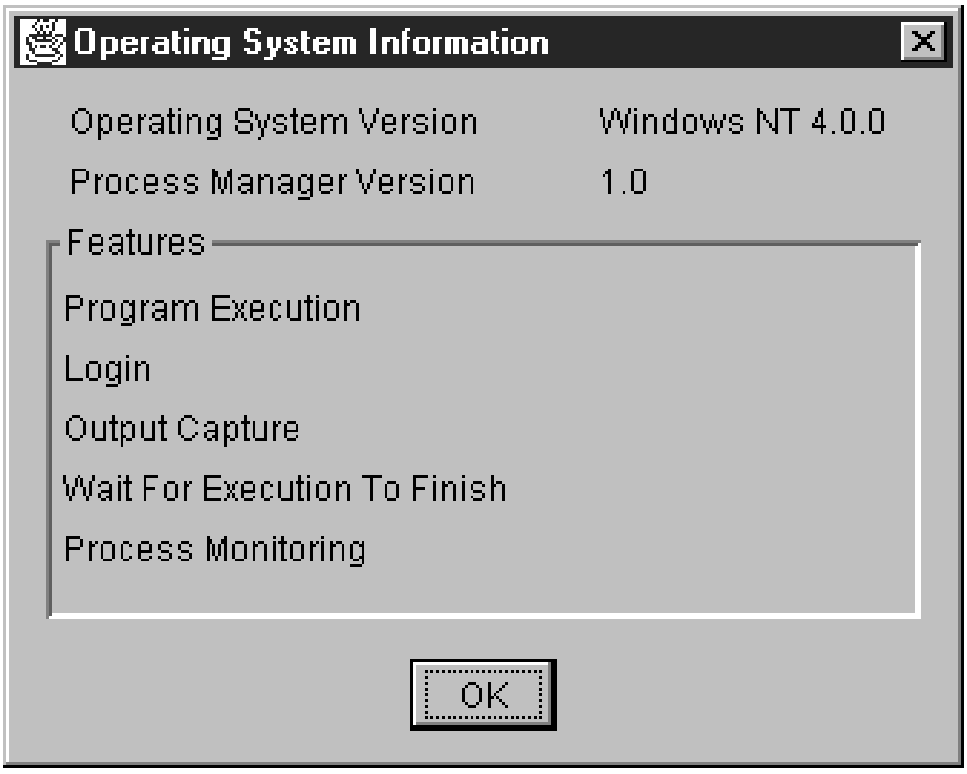


Figure 145. Basic Operating System Information

5.9 Stopping a Process

The Process Manager also allows you to stop an application or process. First select the application or process, then click on **Actions** on the menu bar. From the **Actions** menu select **Close Application** or you may highlight the application and click the right mouse button. This will bring up a Close Application dialog as well. Both options will immediately stop the selected application.

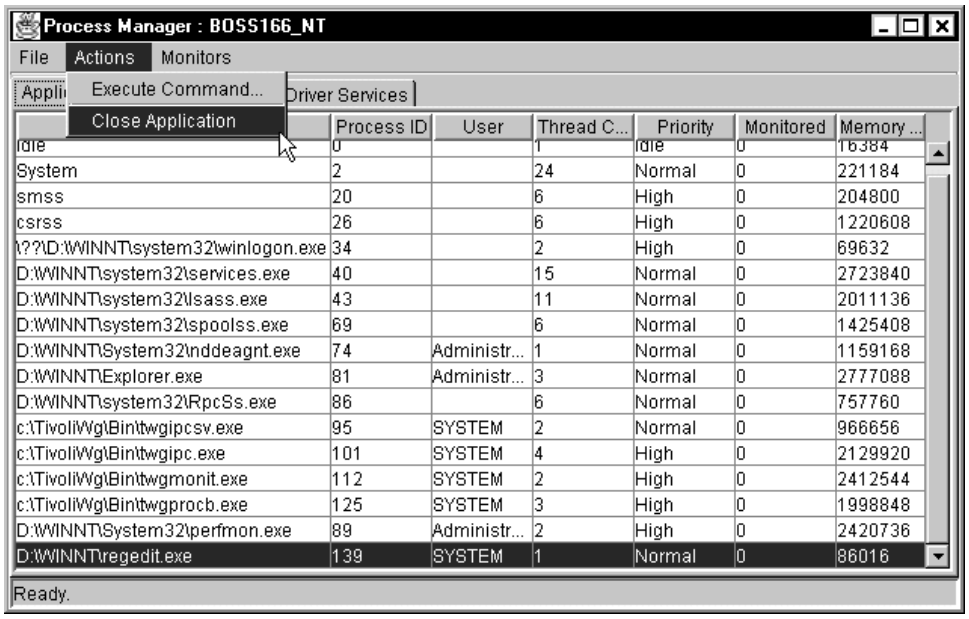


Figure 146. Close Application Dialog

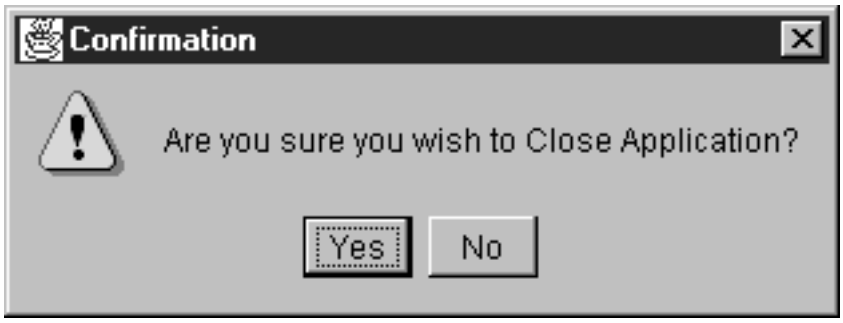


Figure 147. Confirmation

5.10 Performance Information Using NT Tools

In addition to the tools that come with Tivoli IT Director you should be aware that you can do some performance monitoring of Tivoli IT Director itself, using some standard Windows NT built-in tools. In order to know what executables to monitor you can issue the command `twgengin list`.

```
JVM for 'com.tivoli.twg.ams.server.AMSServer' is running (pid=316)
JVM for 'com.tivoli.twg.alertmgr.TWGEventServer' is running (pid=263)
JVM for 'com.tivoli.twg.itech.TWGSMCClient' is running (pid=224)
JVM for 'com.tivoli.twg.itech.TWGWebMgrServer' is running (pid=233)
JVM for 'com.tivoli.twg.inventory.StartInv' is running (pid=247)
JVM for 'com.tivoli.twg.monitor.TWGMonMain' is running (pid=222)
JVM for 'com.tivoli.twg.fsclient.FSClient' is running (pid=281)
JVM for 'com.tivoli.twg.filetransfer.server.TWGStartFtServer' is running (pid=574)
JVM for 'Tivoli Workgroup Log Engine' is running (pid=246)
JVM for 'TWGLogEngine' is running (pid=246)
Main server JVM (com.tivoli.twg.engine.TWGServerMain) is running (pid=412)
```

If you use the Windows NT Task Manager, you can see some performance information about some of the Tivoli IT Director tasks.

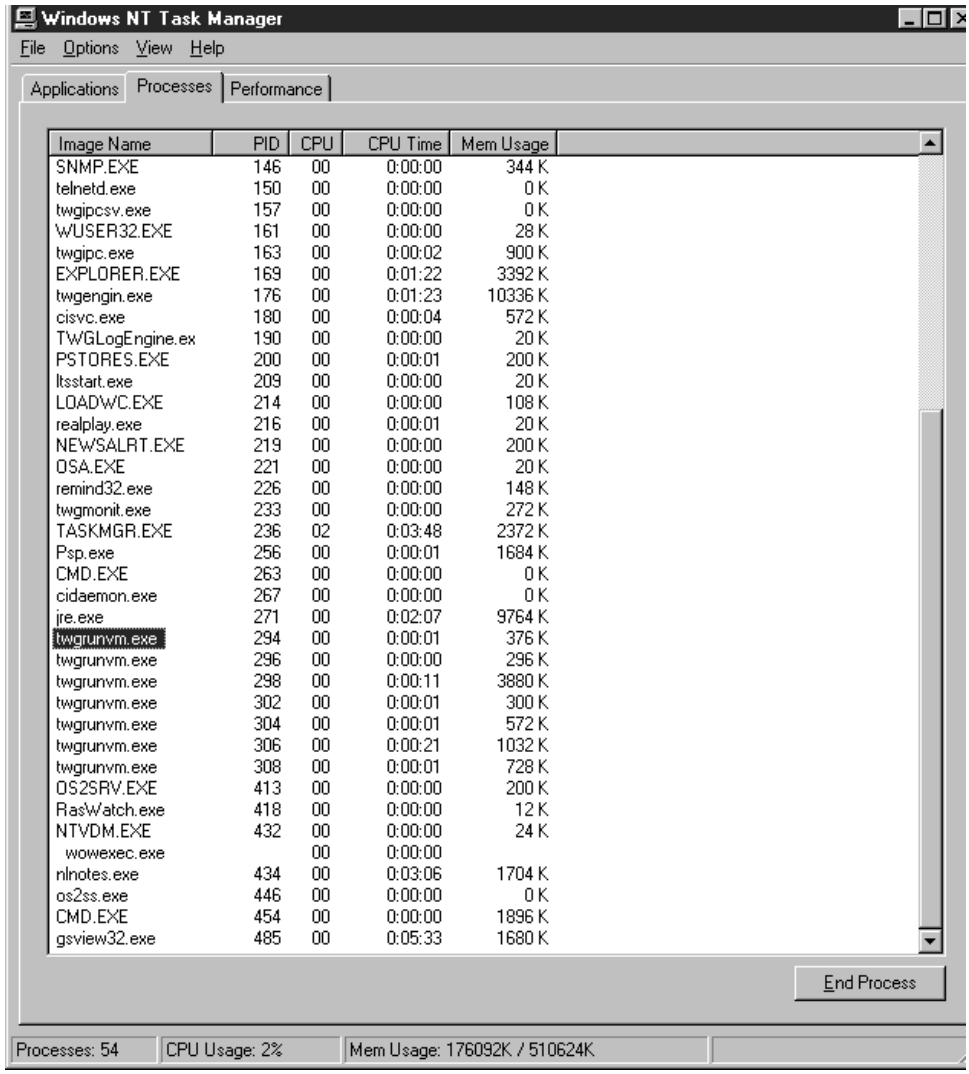


Figure 148. Close Application Dialog

In Figure 148 you can see the CPU time and the memory usage for twgrunvm.exe. If you use the view pull-down menu and select **Select Columns**, you can view additional metrics. With Windows NT V4.0 and SP3 you get the following options:

- Memory usage delta
- Page faults
- Page faults delta
- Virtual memory size
- Paged pool
- Non-paged pool
- Base priority
- Handle count
- Thread count

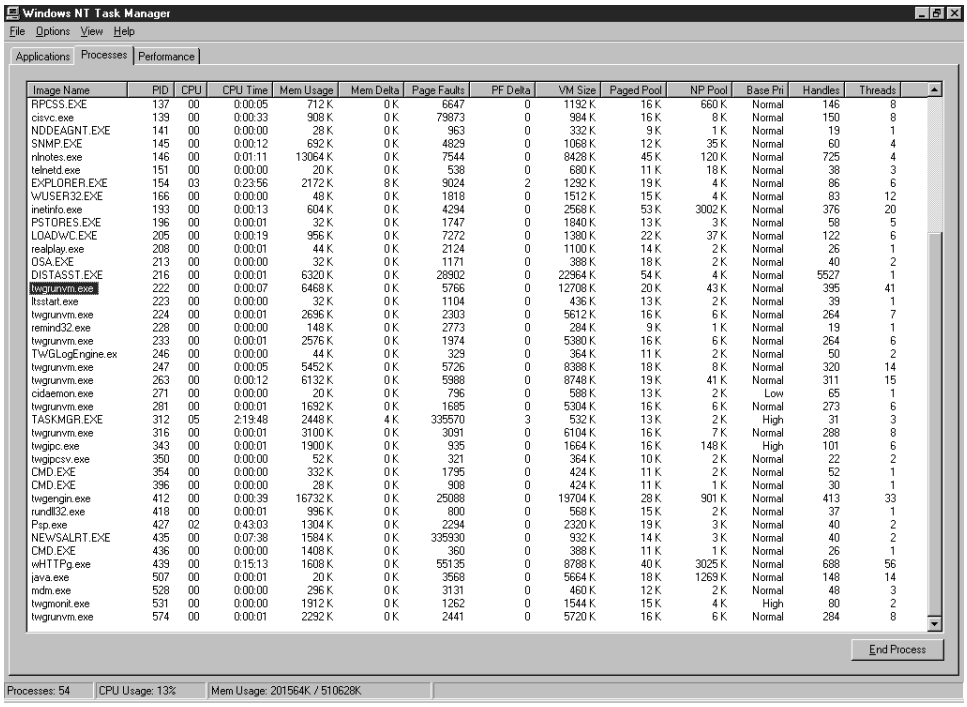


Figure 149. Task Manager Details

If you want to start doing some performance monitoring and data gathering you can use the Windows NT Performance Monitor function. To start it click on **Start, Programs, Administrative Tools** and **Performance Monitor**. That will bring up the Performance Monitor window. To start selecting items to be monitoring you should click on the **+** box. That will bring you to the following window:

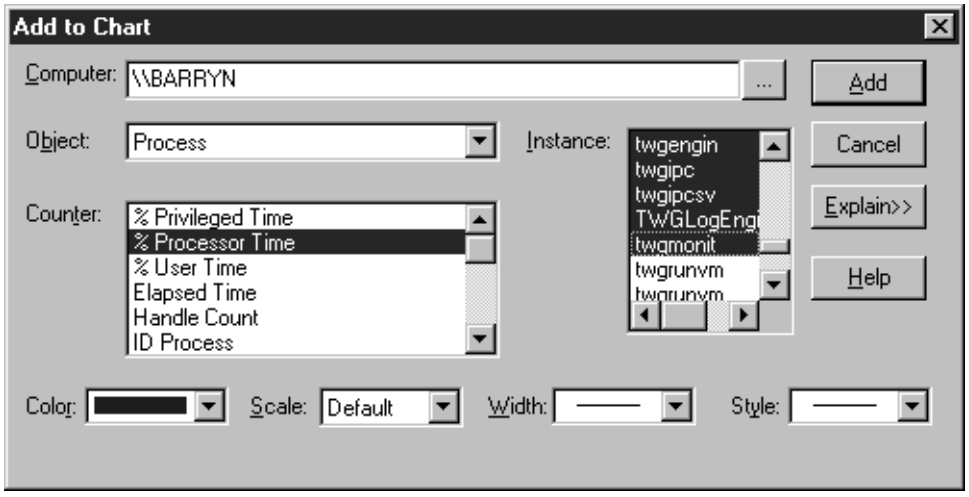


Figure 150. Add Performance Metrics to Chart

You can select any computer in your domain to monitor. The field that we focused on was the System field. The system that we selected was **Process** since we wanted to monitor some specific processes. There are metrics associated with that system. We selected a few of the counters to gather data on. For those counters, we also had to select an instance. The instance is the task name as shown in the following window:

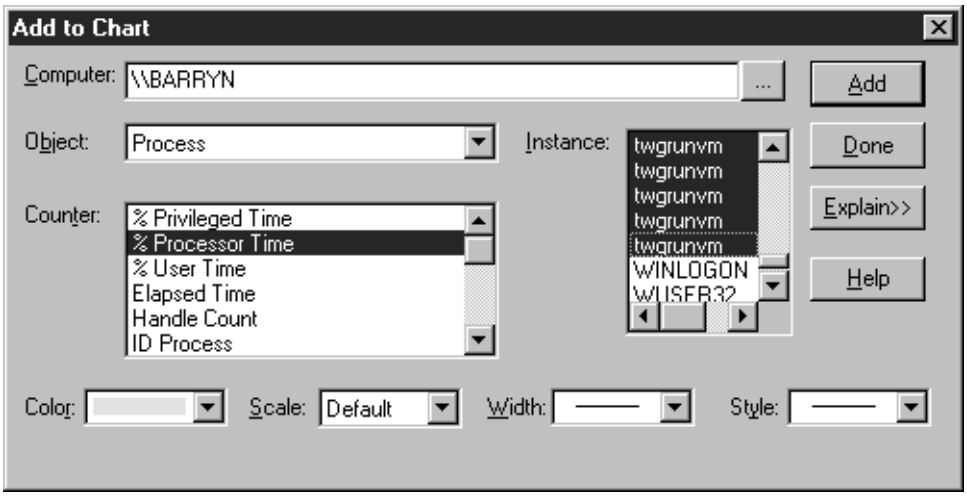


Figure 151. Counter and Instance

Once you click on **Add**, it will begin charting the values.

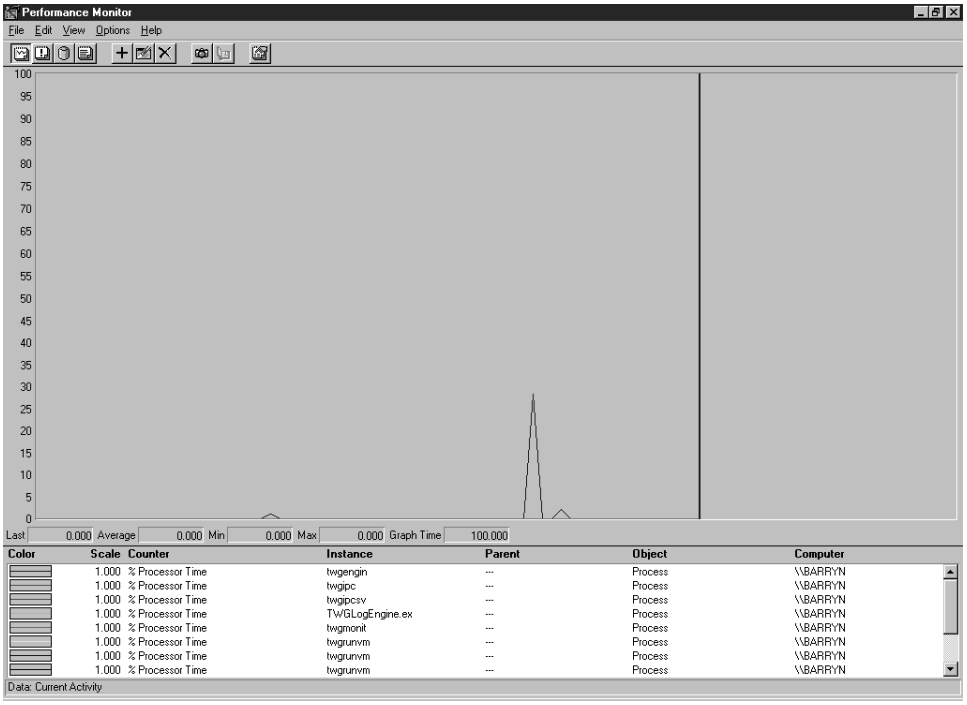


Figure 152. Graph of Metrics

From the charting function you can change to any of the following functions:

- Alert
- Log
- Report

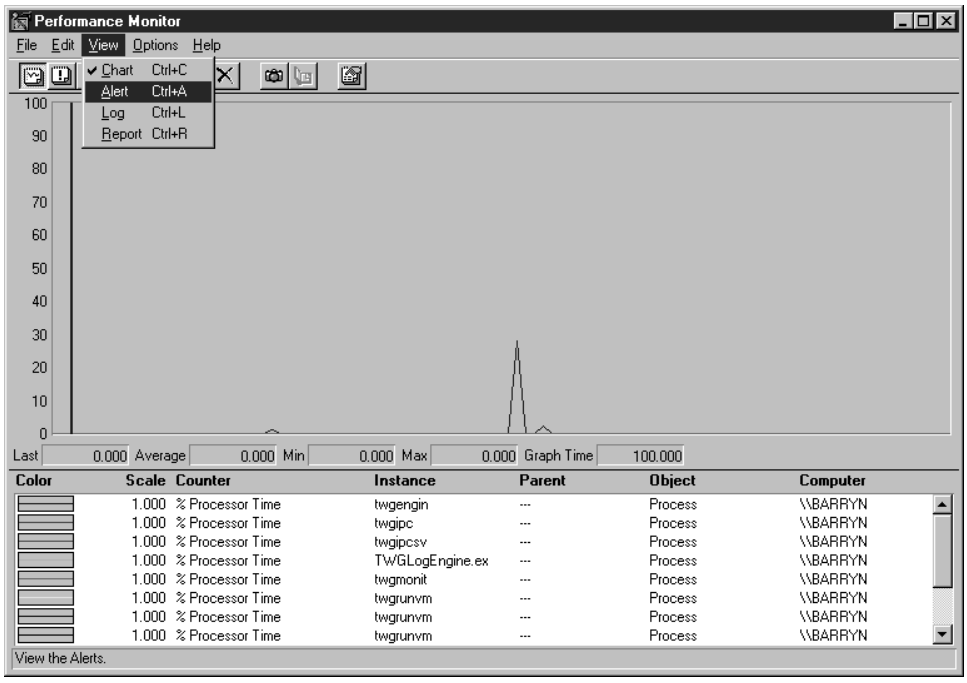


Figure 153. Change to Performance Report

You can decide what you want to receive reports on in the following window:

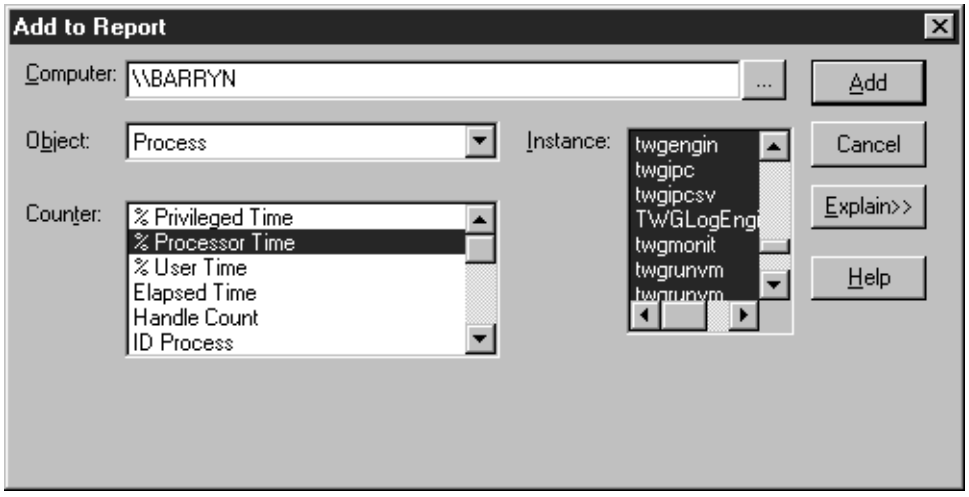


Figure 154. Design Report

After selecting **Add** you will get the following report:

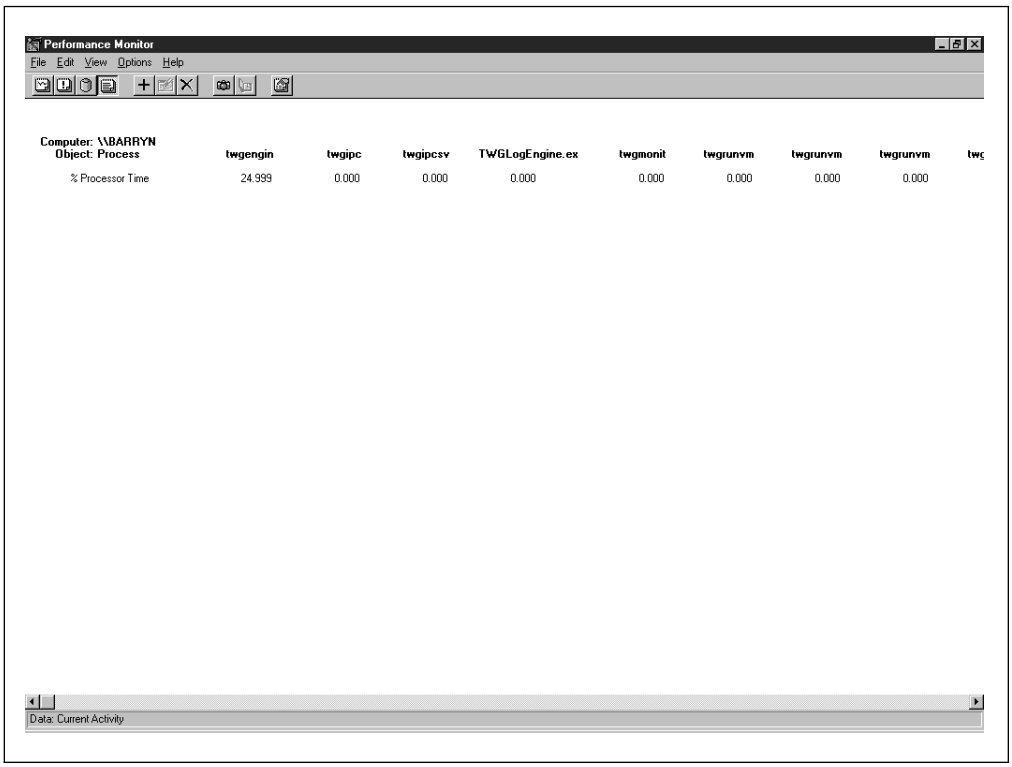


Figure 155. Performance Report

You can choose to save the data to a file with the logging function.

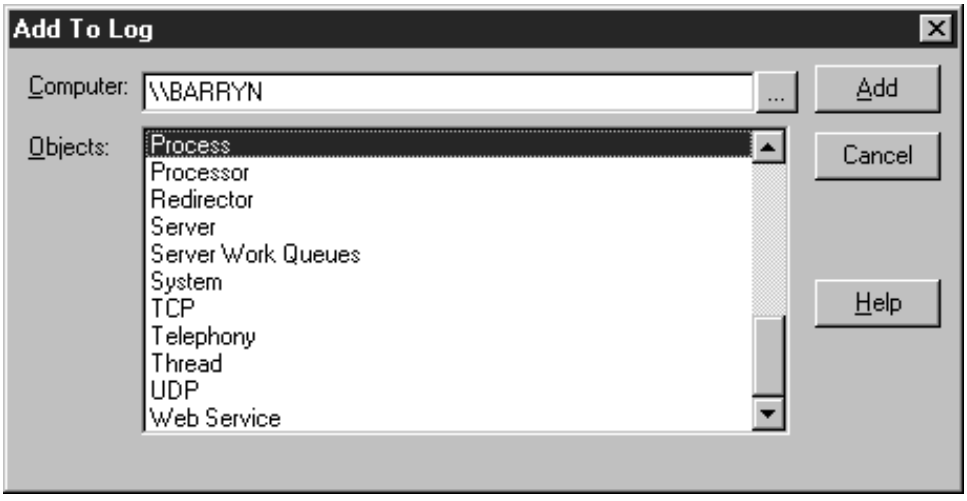


Figure 156. Systems to Log

You can also choose to have alerts sent to Windows NT event processes.

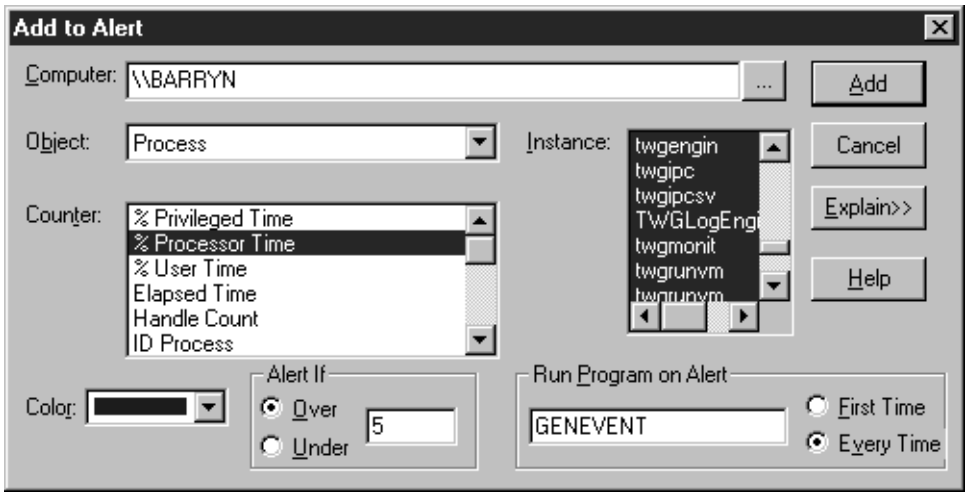


Figure 157. Alert Function

Chapter 6. Event Management

Event Management is probably the most customizable and therefore the most difficult task to understand.

The Tivoli IT Director Event Management service enables you to identify, categorize and automatically initiate actions in response to network events.

Event Management has two main functions:

1. Maintain a log of all events that are received and logged by the Tivoli IT Director server for all systems.
2. Execute predefined or user-defined responses to specific events.

There are three main pieces to understanding Event Management:

1. Event Manager Configuration - Allows you to configure an event action plan which is basically a relationship between specific types of events and specific actions.
2. Event Action Plans - Allows you to associate or disassociate event action plans and managed systems and devices.
3. Event Log Browser - Allows you to view all events that have been saved to the event log.

6.1 Event Manager Configuration

The Event Manager configuration allows you to build event action plans. Event action plans at a minimum consist of an event filter and an event action.

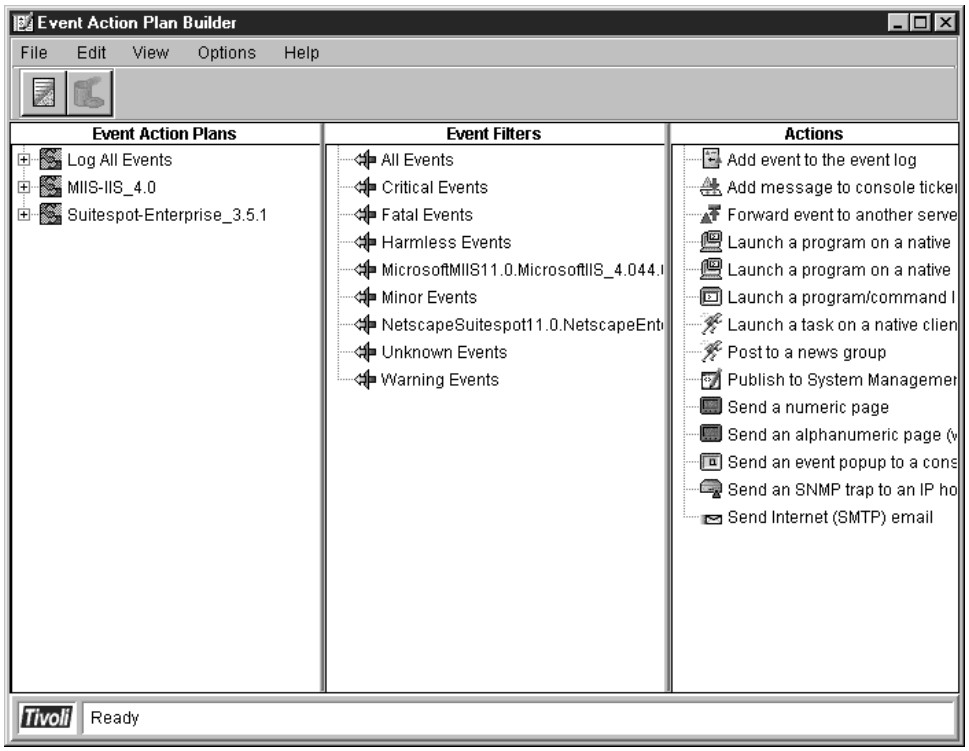


Figure 158. Event Action Plan Builder

An event filter is defined by the selection criteria for the type of events you are interested in. Event actions are actions that will take place once an event is produced that meets the criteria of a specific event filter.

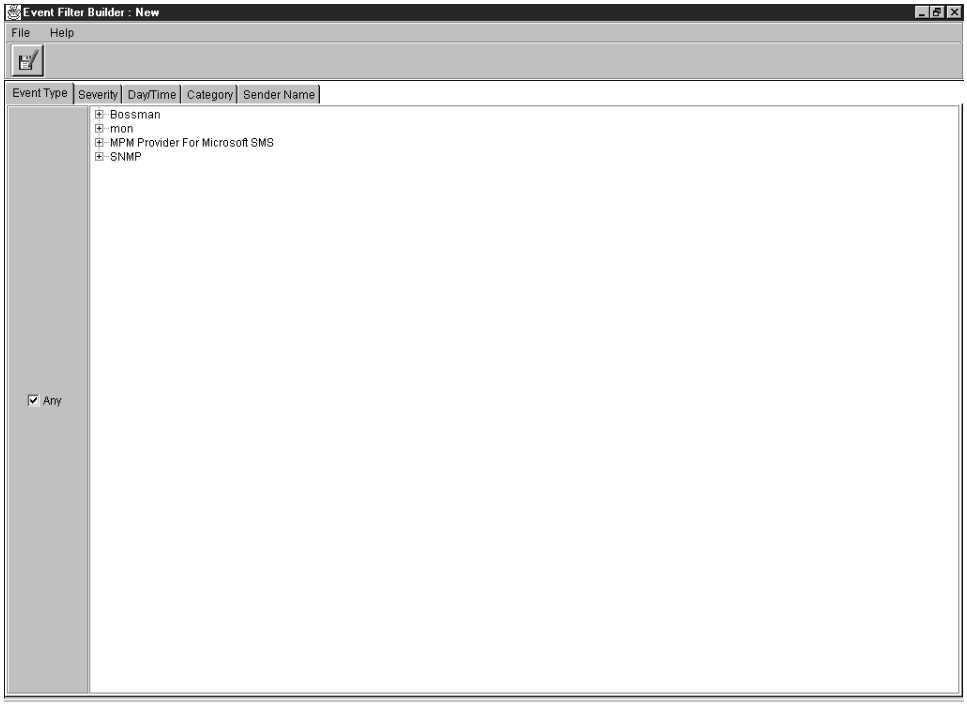


Figure 159. Event Filter Builder

To simplify, at least one event filter combined with at least one event action makes up a minimal event action plan.

An event in Tivoli IT Director is a notification that something has occurred. On other systems management applications it might be called an alert. All events are automatically sent to the event processor on the Tivoli IT Director server.

Events can be generated by:

- The server itself
- The Tivoli IT Director tasks
- The native agents
- SNMP agents
- MPM agents
- From the command line using genevent

Once these events are routed to the event processor, an action may be taken as a result of that particular event.

Note: By default, *events* and *actions* are not associated. The administrator must take specific steps to associate a specific action to a specific event.

6.1.1 Understanding Events and Event Actions

An event is a way to identify a change of state for a process or device on the network. It is really anything that can occur on the system that is measurable. For example, if a workstation changes from online to offline on the network or if an NT service stops.

Tivoli IT Director define the characteristics of an event by its origin, cause and severity.

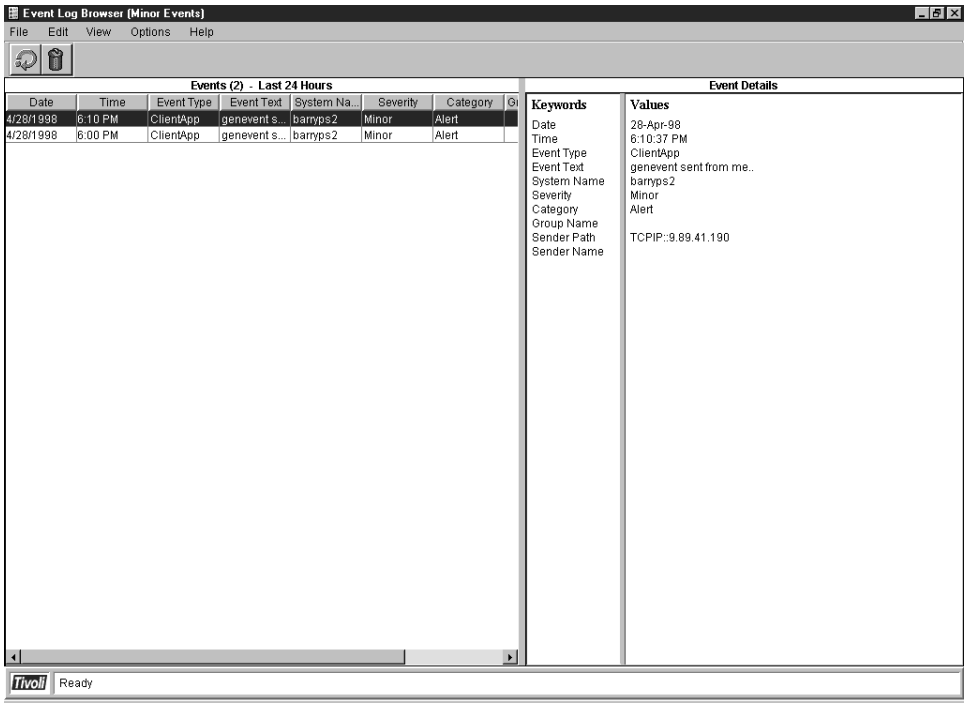


Figure 160. Event Log Browser - From a Genevent Command

Each of these items are described in more detail in 6.7.3, “Event Log Entries” on page 152.

- Date - Identifies the day the event was generated.
- Time - Identifies the time of day the event was generated.
- Event Type - Provides origination information and descriptive detail to help identify the source and cause of the event.
- Event Text - Provides additional descriptive detail to help identify the cause of the event.
- System Name - Identifies the name of the managed system from which the event was received.
- Severity - Identifies the urgency of the event.
- Category - Identifies the status of the event, for example, whether the problem causing the event has been resolved.
- Sender Name - If the event was sent by another Tivoli IT Director server, identifies the name of the Tivoli IT Director server that sent the event.

You are able to define your own events using the genevent utility.

Please see 6.6, “Creating Your Own Events” on page 149 for more information on customizing your own events.

Actions define what steps to take in response to an event, for example, entering the event in the event log or executing a command. Actions that can be taken in response to an event are predefined by Tivoli IT Director and selected using the Event Management interface.

Please see 6.2, “Understanding Event Action Plans” on page 135 for a listing of actions that can be selected.

6.1.2 Understanding Event Filters

An event filter describes a set of characteristics, for example, severity and event type, that is used to select a single event or a group of events. When applied to a managed system, group or group of managed systems, an event filter can be used by the:

- Event Log Browser - To control which events are displayed for viewing.
- Event Manager - To control which events trigger the initiation of specific actions.

Tivoli IT Director provides predefined event filters and a utility that enables you to create custom filters.

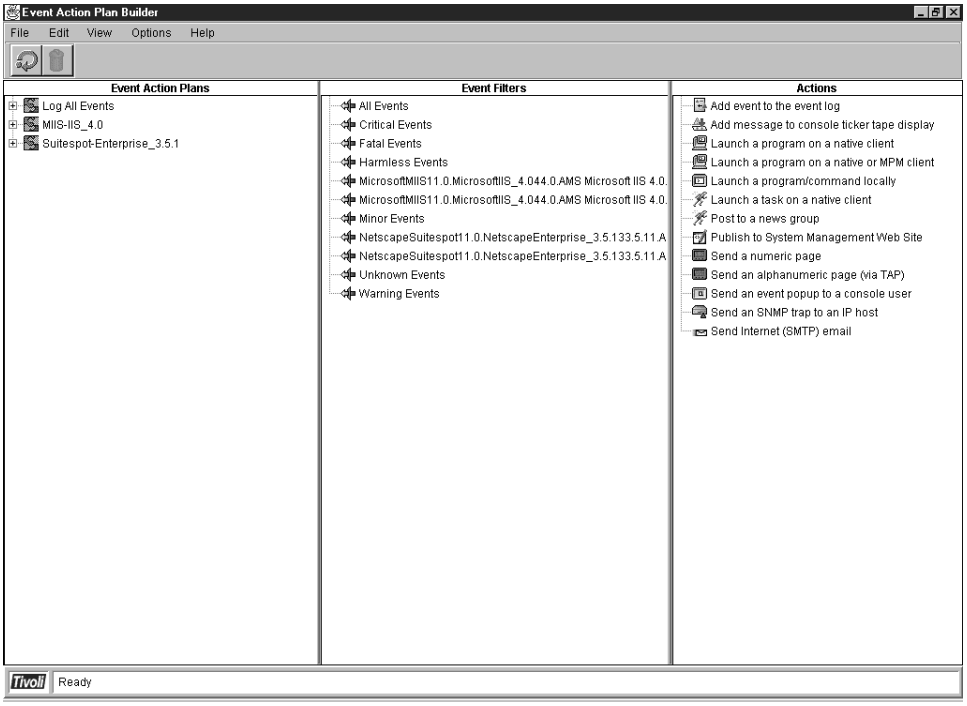


Figure 161. Event Action Plan Builder

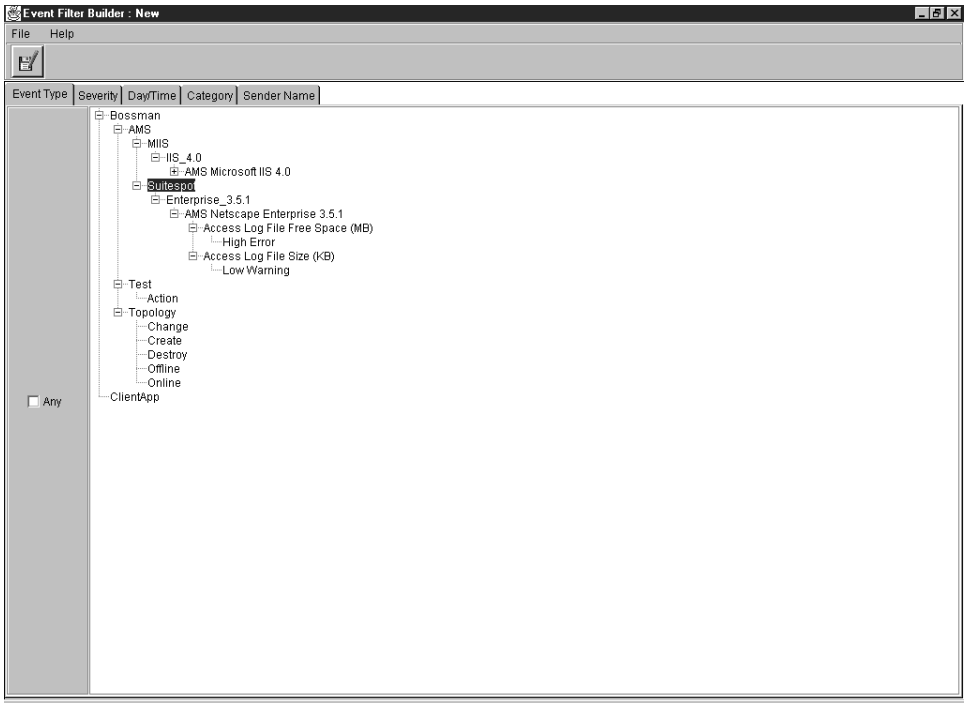


Figure 162. Custom Event Filter

6.1.3 Predefined Event Filters

Predefined event filters are supplied by Tivoli IT Director and listed in the Event Action Plan Builder as selectable event filter icons for viewing the event log and for creating event action plans.

Predefined event filters are designed to meet many of the basic monitoring requirements of your network environment.

6.1.4 User-Defined Event Filters

Tivoli IT Director provides a facility to create your own filters, according to the needs of your networking environment.

To create a filter, you choose from one or more event categories from the dialog window, such as:

- Time and date the event occurred
- Severity of the event
- Originator of the event
- Type of event

Each filtering characteristic is represented as a field name when you view the event log.

Please see 6.4, “Creating an Event Filter” on page 135 for more information on creating filters through the Event Management interface.

6.2 Understanding Event Action Plans

An event action plan binds one or more event filters to one or more actions. For example, a plan can be created to send a page to the network administrator if an event with a severity level of *critical* or *fatal* is received by the Tivoli IT Director server.

Applying an event action plan to a managed system or system group causes the specified action to be initiated if the event originates from the system or system group to which the plan is applied.

Multiple event filters can be bound to the same action and a single event filter can be bound to multiple actions.

6.3 Performing Event Management Tasks

Some of the action items related to events that can be performed from the Tivoli IT Director console are:

- View events using the event log
- Create an event filter
- Create an event action
- Create an event action plan
- Apply an event action plan to a managed system or system group
- Edit and delete existing event filters
- Delete selected events from the event log

To create an event filter, event action or event action plan, select the **Event Action Plan Builder** task from the **Task** pull-down menu.

Note: If you are creating an event filter, action or event action plan for the first time, the panels contain only the predefined event filters, actions and event action plans, supplied as part of the Event Management service.

6.4 Creating an Event Filter

Use the following procedures to create an event filter:

1. Display the Event Action Plan Builder using the process from 6.3, “Performing Event Management Tasks.”

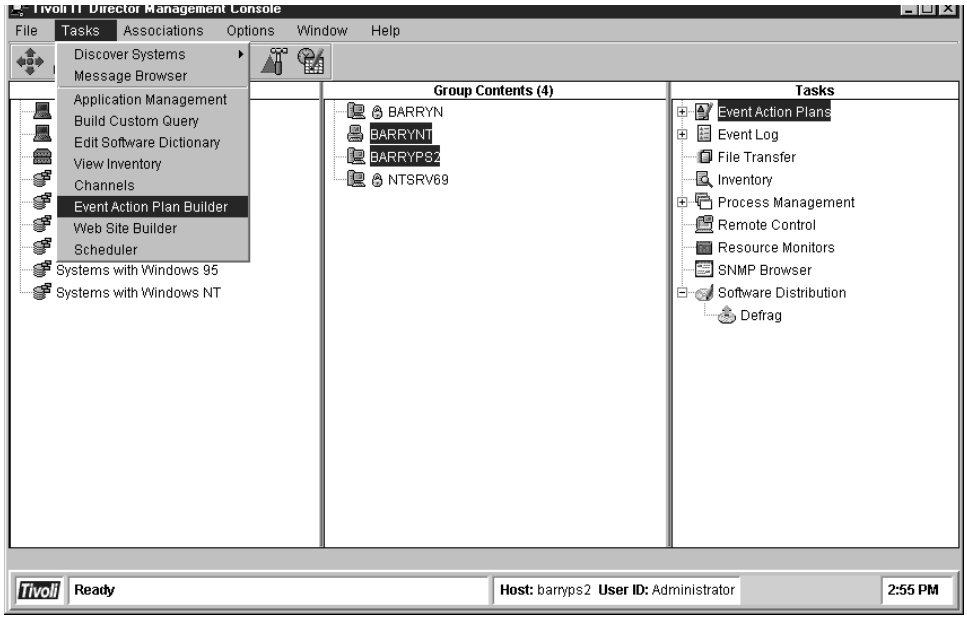


Figure 163. Selecting Event Action Plan Builder

You will then be presented with the Event Action Plan Builder.

2. Right-mouse click anywhere in the middle panel except on a system.

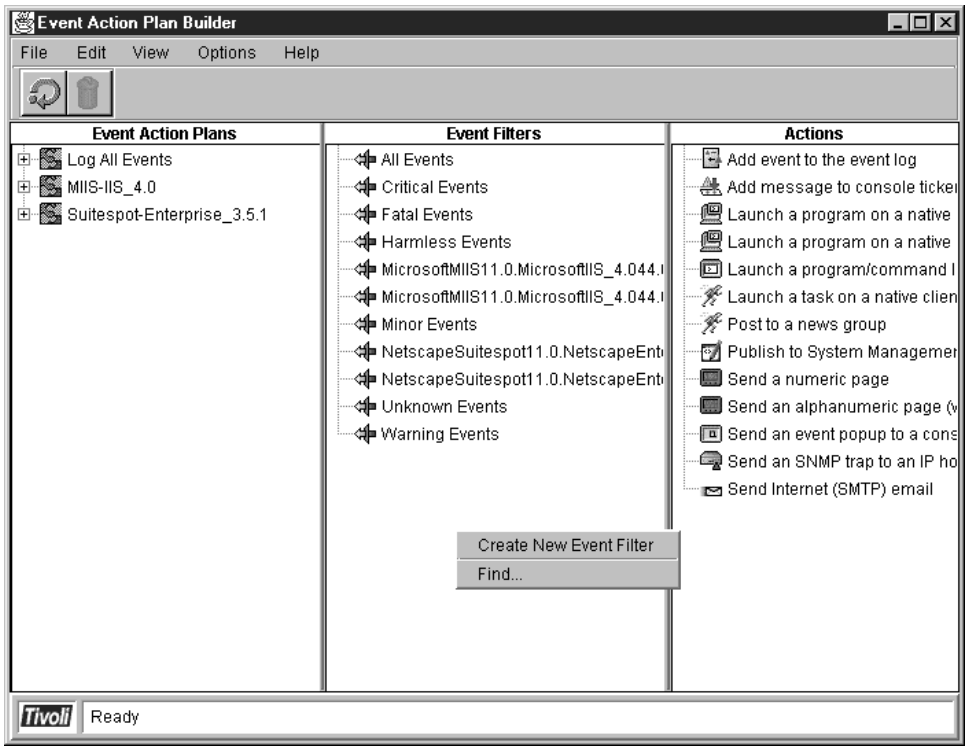


Figure 164. Create New Event Filter

The Event Filter Builder: New window is displayed.

3. Select one or more entries from each category that you want to use as filtering criteria.

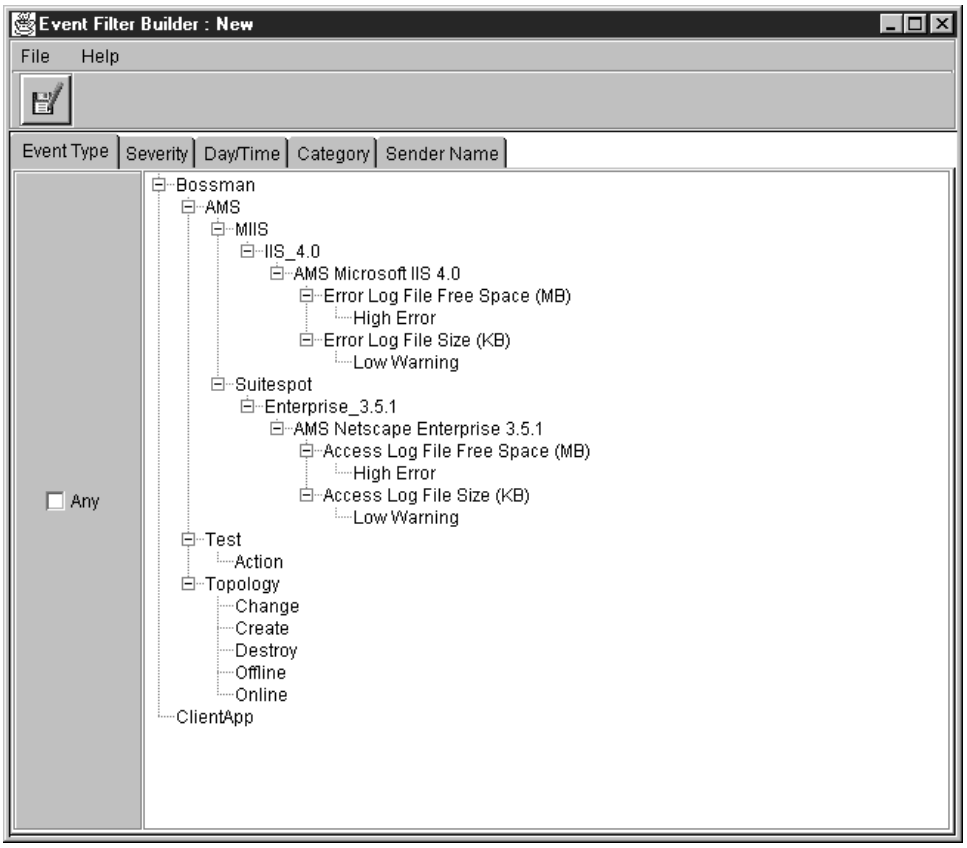


Figure 165. Select Criteria

To select all entries in a category, click the **Any** button at the top of the category display. This deselects any and lets you customize the filter.

4. Click on **Save As** to save your data.

Figure 166. Save Event Filter

You should see the new filter show up in the Event Action Plan Builder under the Event Filters category, as shown in the following window:

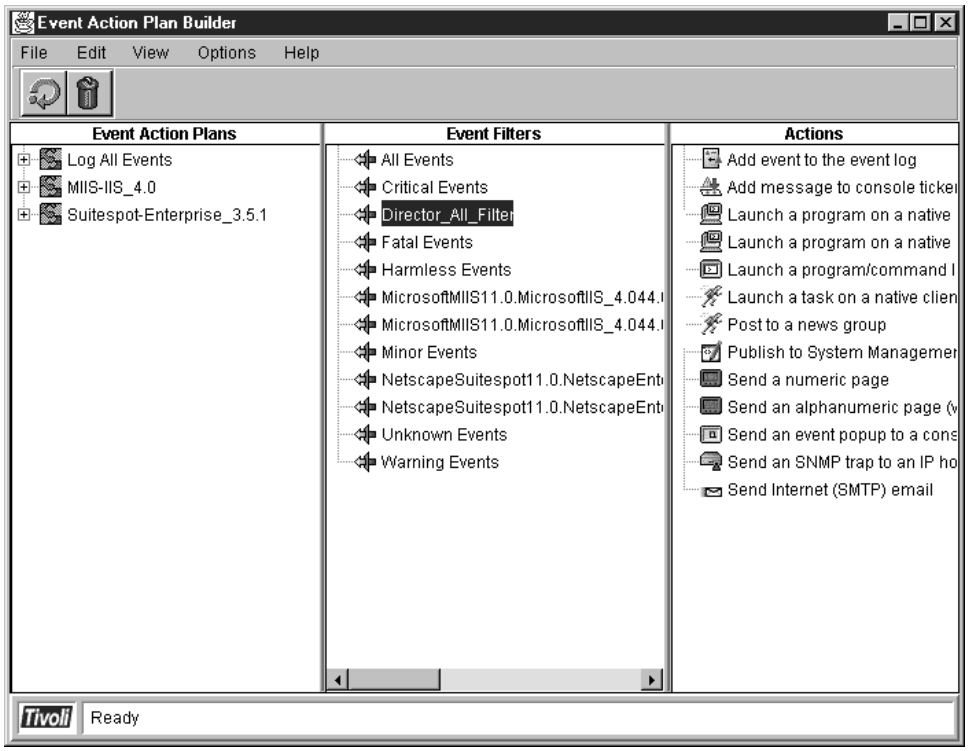


Figure 167. New Event Filter Display

If you use the Help menu, you can get detailed descriptions on every field. The following window shows you an example for the Event Filter Builder:

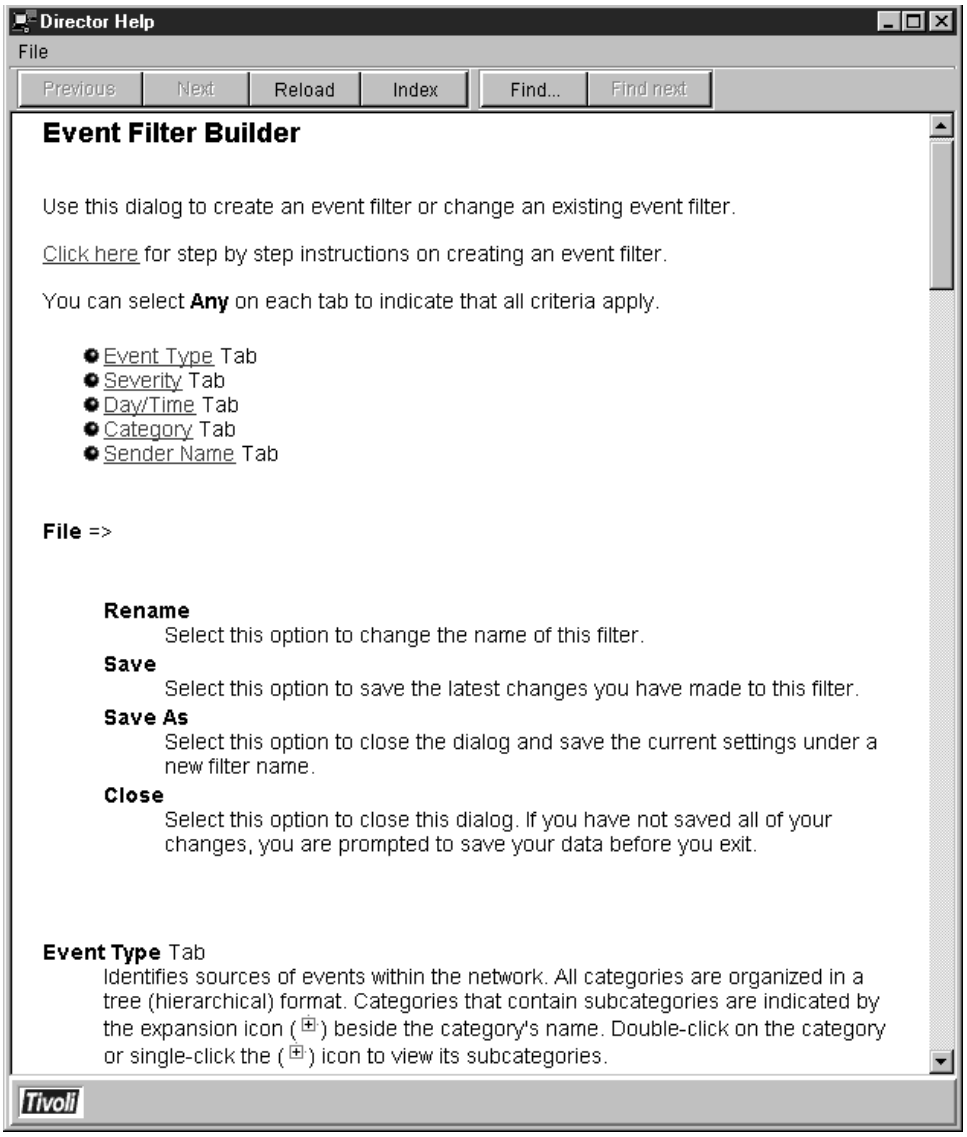


Figure 168. Tivoli IT Director Help

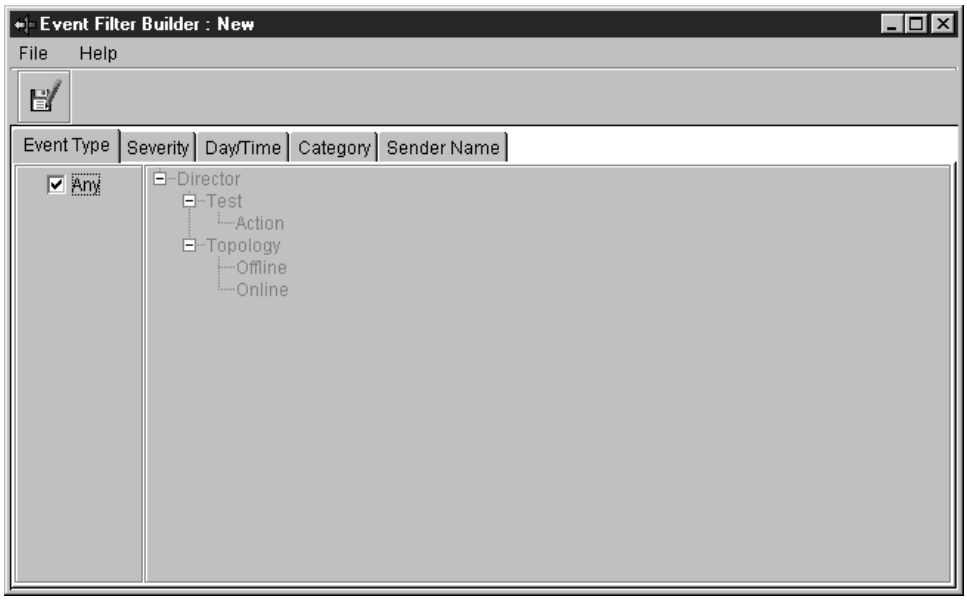


Figure 169. Event Type

Figure 169 shows details about the event type in the Event Filter Builder. A break out of the options follow:

Event Type Provides origination information and descriptive detail in a hierarchical format.

The format of Event Type is:

network type.2nd level.3rd level.4th level.5th level

Where:

- network type - Identifies the origin of the event.

  This category is intended to isolate events from the different types of supported Tivoli IT Director agents.

  The network types are:

  – Tivoli IT Director* - The event could have originated from anywhere within the Tivoli IT Director network. This qualifier would not be useful as a filtering criterion.

  – Tivoli IT Director - The event originated from within the Tivoli IT Director native network.

  – SNMP - The event originated from an SNMP network as an SNMP trap.

  – LANDesk - The event originated from a LANDesk MPM provider as a LANDesk event.

  – Netfinity - The event originated from a Netfinity MPM provider as a Netfinity alert.

  – SMS - The event originated from an SMS MPM provider.

- 2nd level - Further qualifies the network type by identifying the topographical component from which the event originated. For example, a managed system (Mobject) or a CPU.

- 3rd level - Further qualifies the topology component. For example, if the topology component is a CPU, this data could be Threshold, indicating that the event was generated when the CPU usage threshold was met.
- 4th level and 5th level - These qualifiers may be included to further define the event types.

Severity Identifies the urgency of the event. Severity is typically used in action plans because it identifies potentially urgent problems requiring immediate attention.

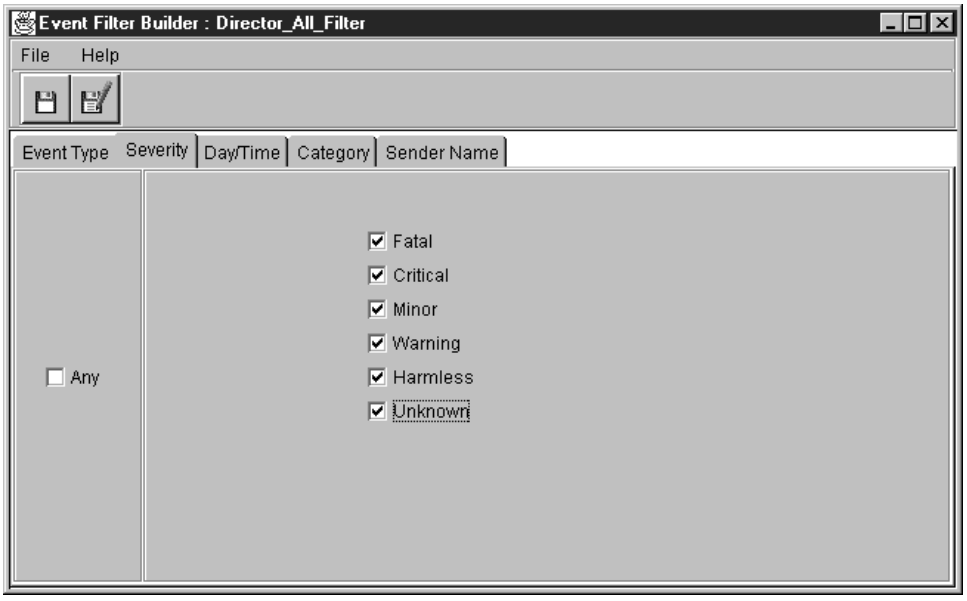


Figure 170. Event Severity

Severity levels in the order of least severe to most severe are as follows:

- Unknown - The application that generated the event did not assign a severity level.
- Harmless - The application that issued the event has assigned a severity level indicating that the event is for information only. No potential problems should occur.
- Warning - The application that issued the event has assigned a severity level indicating the source of the event is not necessarily problematic but may warrant investigation.
- Minor - The application that issued the event has assigned a severity level indicating the source of the event should not cause immediate program failure but should be resolved.
- Critical - The application that issued the event has assigned a severity level indicating the source of the event may cause program failure and should be resolved immediately.
- Fatal - The application that issued the event has assigned a severity level indicating the source of the event has already caused the program to fail and should be resolved before the program is restarted.

Category Identifies the status of the event.

Figure 171. Event Category

Possible categories are:

- Alert - Signifies the problem.
- Update - Signifies that the problem has escalated or changed in some matter.
- Resolution - Signifies that the problem has been resolved and is no longer a problem.

Sender Name Identifies the source from which the event was sent. This tab indicates a source only when the event is sent from third parties or Genevent.

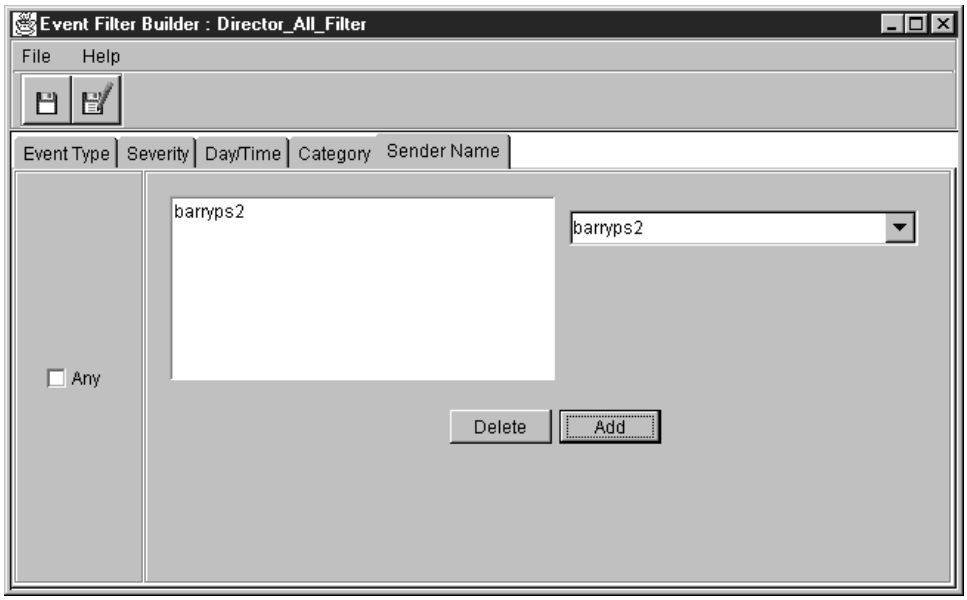


Figure 172. Sender Name

6.5 Creating and Applying an Event Action Plan

Use the procedures described in this section to create an event action plan and apply the plan to a managed system, group or group of managed systems.

6.5.1 Customizing an Event Action

To customize an event action for your networking environment, double-click on the action category you want to use to create an action in the left panel of the Event Action Plan Builder window.

You can also click the right mouse button on the required action and select **Customize**.

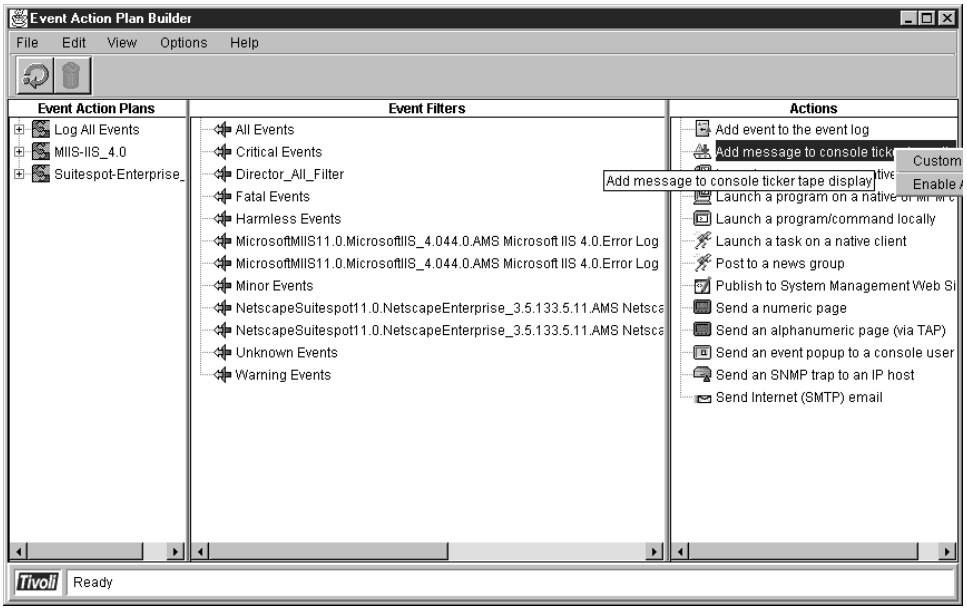


Figure 173. Selecting an Action Plan

The action editor for the action you just selected is displayed. For example, to create a new ticker-tape message on the console display, double-click on the **Add message to console ticker tape display** as shown in Figure 173.

For detailed help on any of the fields you should reference the online help that comes with Tivoli IT Director. Figure 168 on page 139 shows an example of the online help.

When you have finished defining the action(s), click on **Save As** to save your data.

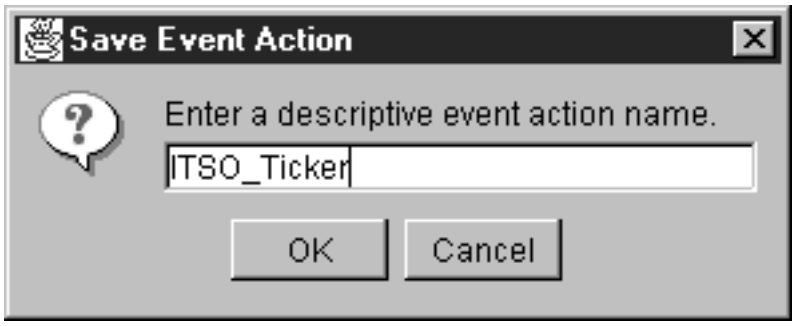


Figure 174. Save New Event Action

The new event action should now appear in the window as a system within the category you used to create the action.

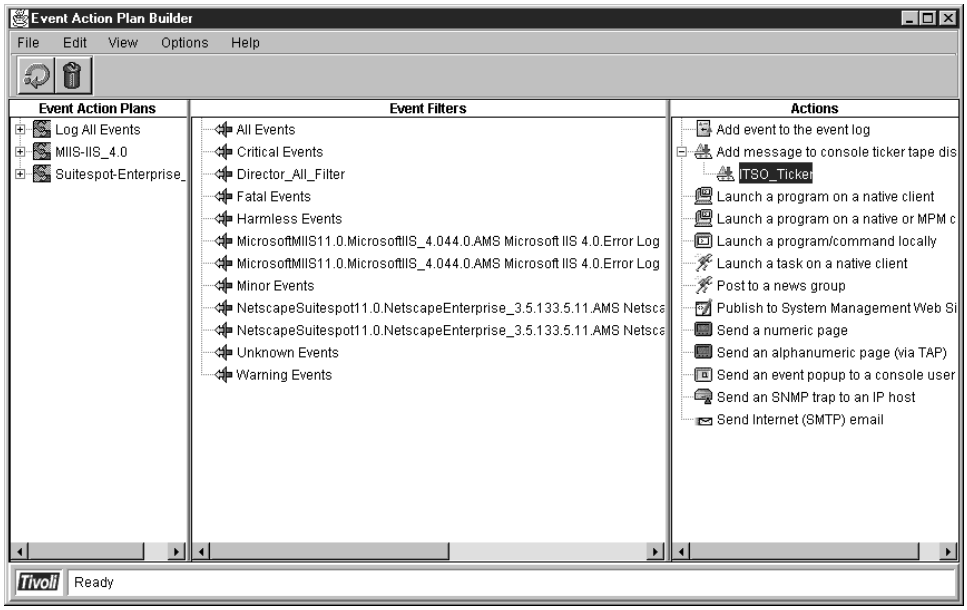


Figure 175. View of Saved Action

For example, if you created a ticker-tape display and called it ITSO_Ticker, the system will display under Add message to console ticker tape display with this name.

6.5.2 Creating an Event Action Plan

Use the following procedures to create an event action plan:

1. Display the Event Action Plan Builder window and click with the right mouse button in the clear space of the Event Action Plan area on the left-hand side of the display. Then select **Create New Event Action Plan**.

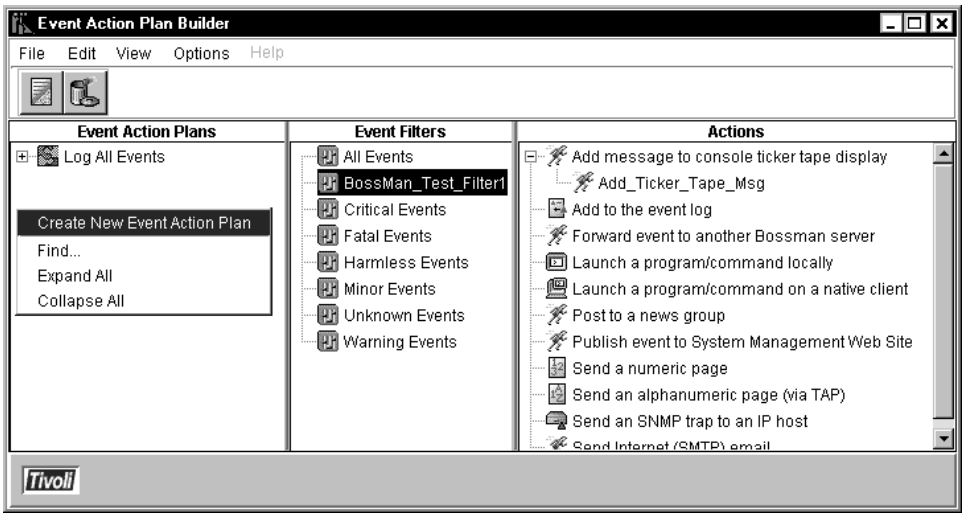


Figure 176. Create New Event Action Plan

Enter the name of your new action plan in the dialog box and click on **OK**.

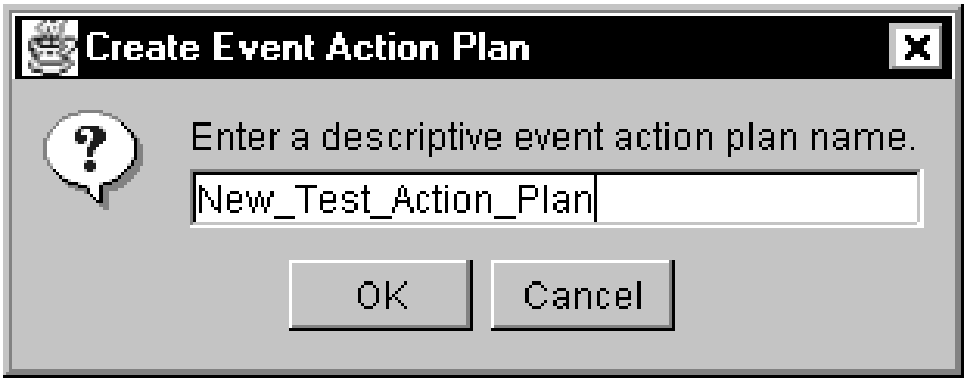


Figure 177. New Plan Name

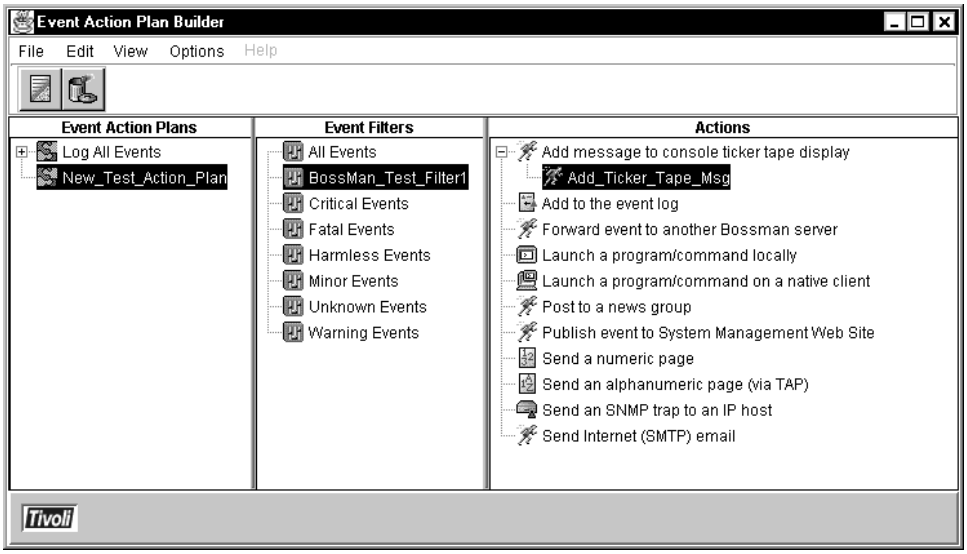


Figure 178. Display New Action Plan

2. Select a filter and drag it onto the action plan.

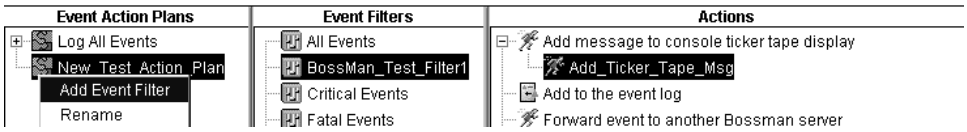


Figure 179. Select Event Filter

3. Select one or more actions and drag them onto the event filter that is associated with an event action plan. You could also use the right mouse button on the event filter that is associated with the action plan to add an action.

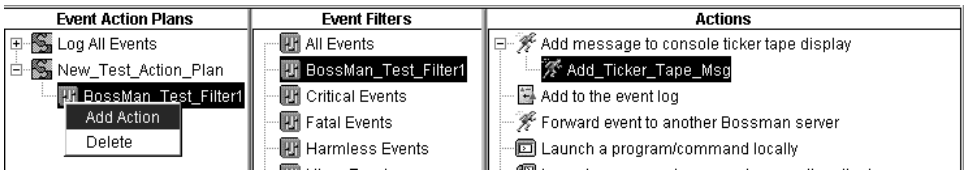


Figure 180. Select Event Action

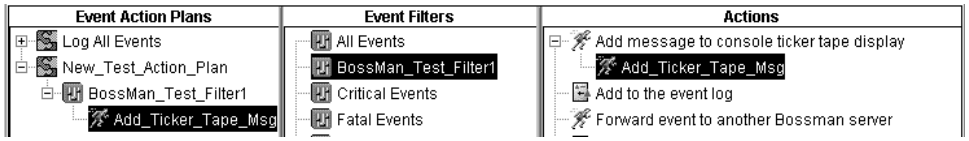


Figure 181. Final Result of Selections

4. If you want to add additional filter/action groups, you must repeat steps 4 and 5.
5. When you have finished defining the action plan, click on **File** and **Close** to save your data.

   The new event action plan is added to the Event Action Plans panel in the Event Action Plans window and to the Event Action Plans icon on the Tivoli IT Director console main window.

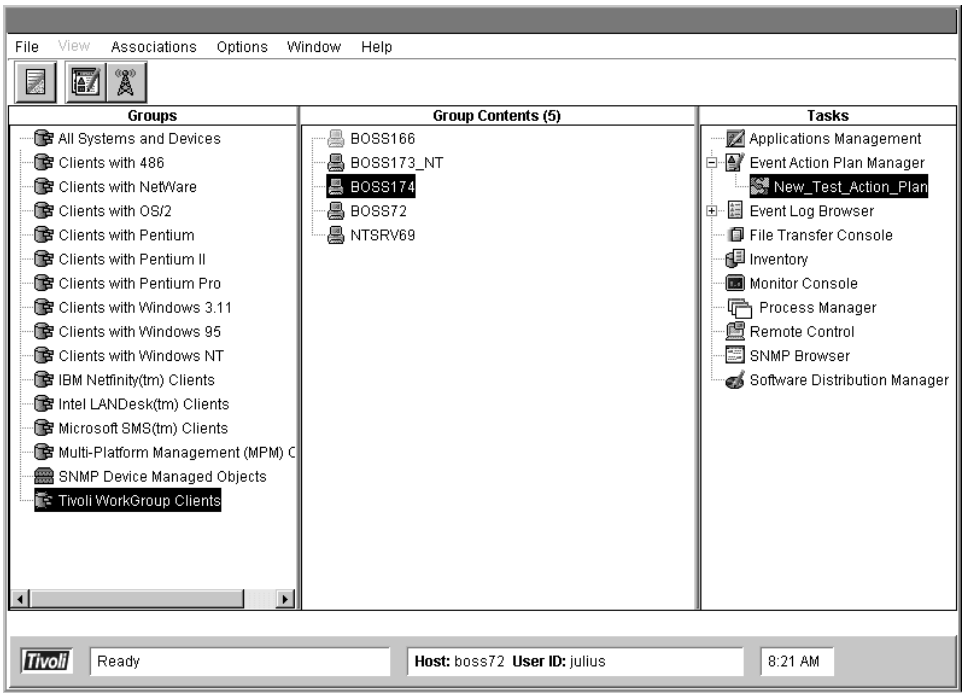


Figure 182. Display of New Action Plan from Console

Note: A plan is not active until it's applied to a managed system, group or group of managed systems.

6.5.3 Adding Actions to an Existing Event Action Plan

To add an action to an existing event action plan:

- Move the mouse pointer over the desired action.
- Use the right mouse button and select **Customize**.

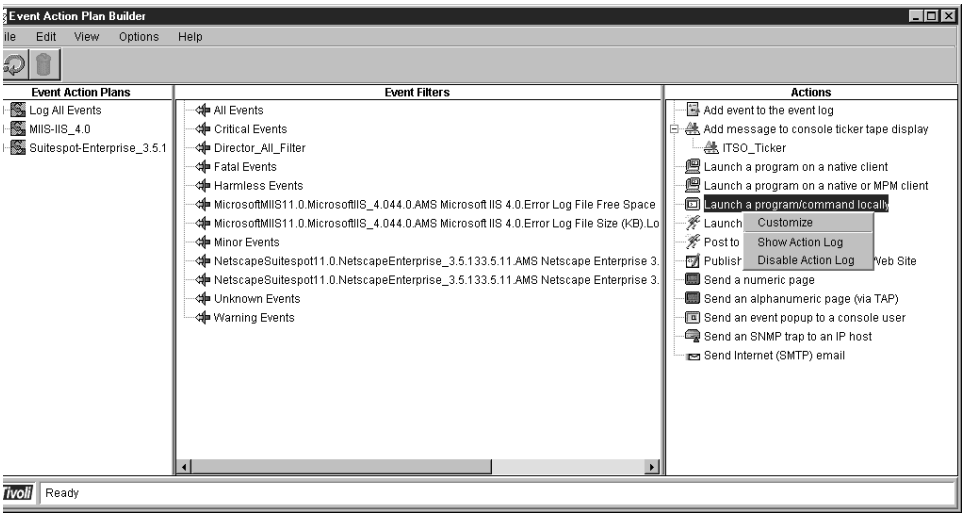


Figure 183. Customize Event Action

- Make the necessary changes and save the action.
- Move the mouse pointer over the desired action and drag the action onto the filter of a plan in the left panel.

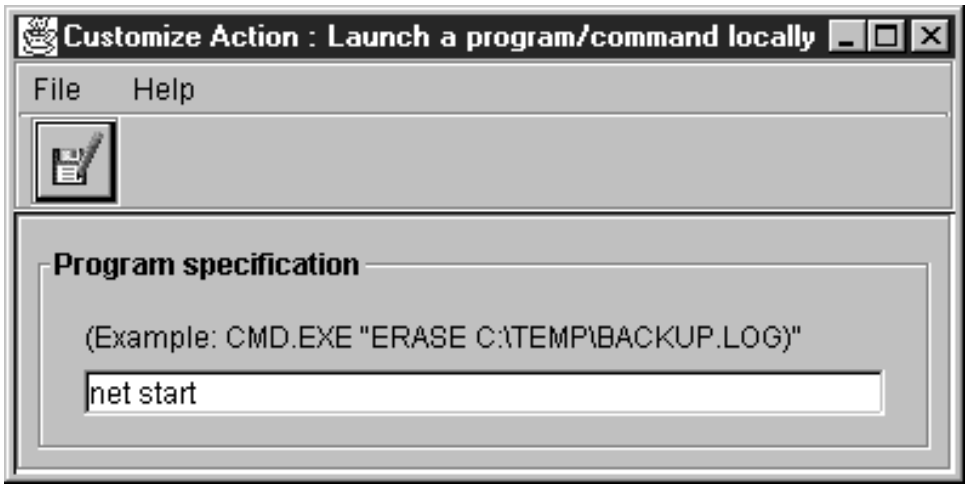


Figure 184. Launch a Program Locally

For example, assume you have an action called e-mail Dog in the right panel and an event action plan named Notify Dog with an associated filter Filter G in the left panel. You can drag e-mail Dog onto Filter G in the left panel and the plan is immediately updated.

6.5.4 Applying an Event Action Plan to an System

An event action plan is inactive until you apply it to a specific managed system, group or group of managed systems.

To activate an event action plan for an system, use the following procedures:

1. Double-click on the **Event Action Plans** icon in the tasks panel of the Tivoli IT Director console main window to display the Event Action Plans window.
2. Select the desired plan in the Event Action Plans right panel and drag the plan to the system or group to which you want the plan associated.

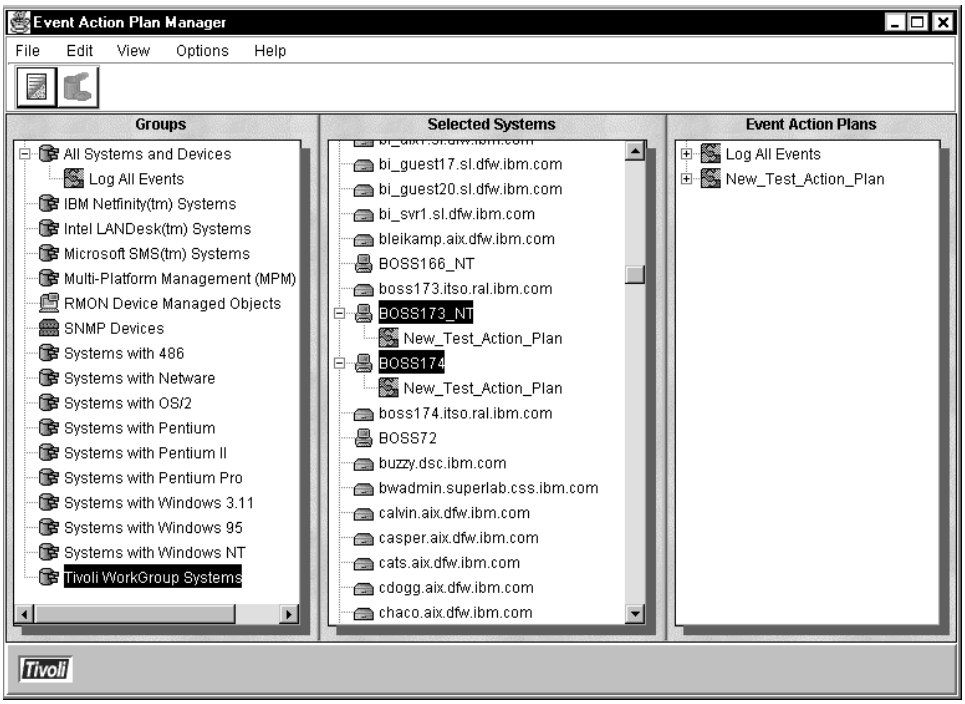


Figure 185. Adding New Plan to System

The plan's icon is added under the group name icon to which it is applied and the plan is activated.

3. Repeat step 2 for all associations you want to make. You can activate the same event action plan for multiple systems.

6.6 Creating Your Own Events

The Tivoli IT Director genevent utility enables you to define your own events.

The genevent command must be used from a command prompt. It is not available through the management console.

The following syntax can be used from a command prompt:

```
genevent
/required_parameters /optional _parameters
```

You must specify the following required_parameters:

/TYPE: *type* Where type is a dot-delimited string in the same format used to indicate Event Type.

Please see 6.4, “Creating an Event Filter” on page 135 for more information on which keywords can be used.

/TEXT: *text* Where text is a descriptive string you supply to identify the cause of the event.

You can also specify the following optional_parameters:

/DEST: *protocol::name* Where protocol is the transport used by the Tivoli IT Director server on which this event will be sent and name is the name of the targeted server used by the specified protocol for example,

NetBIOS::BOSS72. The default server to which this event is sent is this system's event server.

/SEV: *severity* Where severity indicates the urgency of this event.

Specify one or more of the following:

- Fatal
- Critical
- Minor
- Warning
- Harmless

These categories are described under 6.4, “Creating an Event Filter” on page 135.

The following shows an example of creating your own event and then displaying the event from the event log browser.

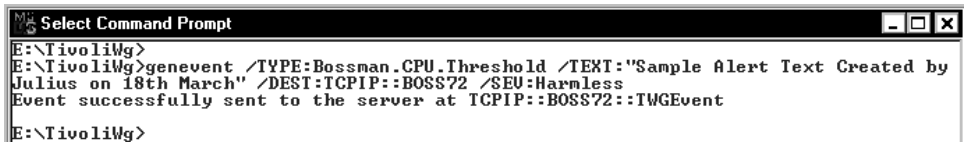


Figure 186. The GENEVENT Command

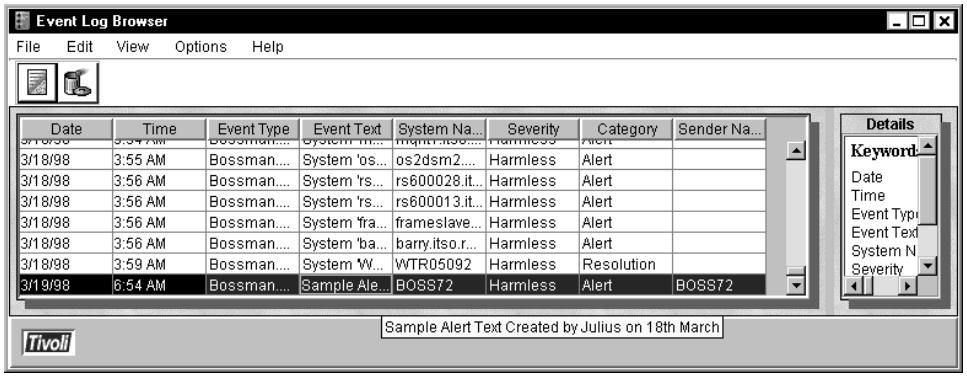


Figure 187. Viewing Event Information - Overview

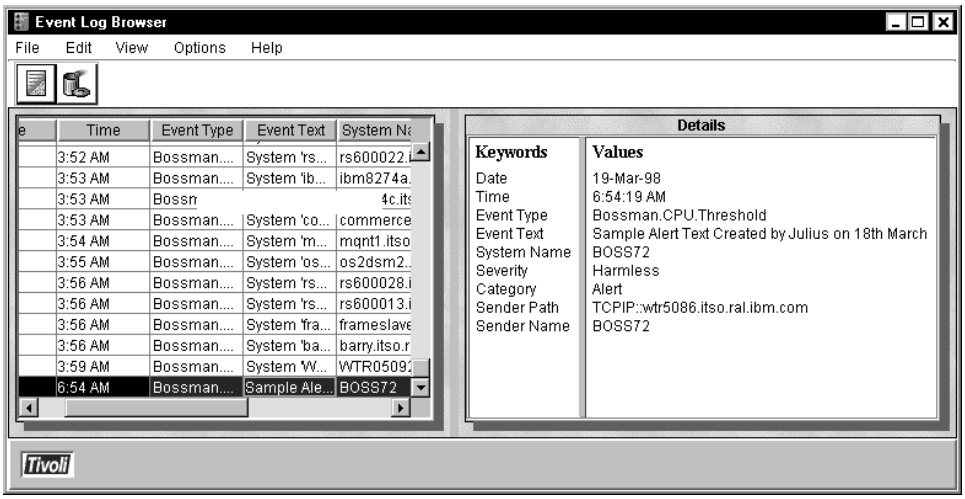


Figure 188. Viewing Event Information - Details

6.7 Viewing Entries in the Event Log

In this section, we describe how to use the Event Log Browser to view events in the event log and describe the purpose of each field in an event entry.

6.7.1 View All Logged Events

By default, the Add to the event log action is coupled to all events received by the Tivoli IT Director server. Therefore, when you start the Event Log Browser without specifying a filter or a managed system, all events are displayed.

To view all logged events using the right mouse button, click on the **All Events** icon in the Tasks pane shown in Figure 189 on page 152. Then click on **Open**.

The Event Log Browser is started and displays all logged events.

6.7.2 Viewing Events by System

Tivoli IT Director supplies predefined system groups. You can create user-defined groups to limit the number of displayed events to only those that meet a filtering criteria and originate from a specified managed system or system group.

To view a filtered list of events from a single managed system or group either:

1. Drag the icon of the managed system or group from the Groups panel onto the icon of the event filter in the Tasks panel.
2. Drag the event filter from the Tasks panel onto the managed system or group in the Groups panel.

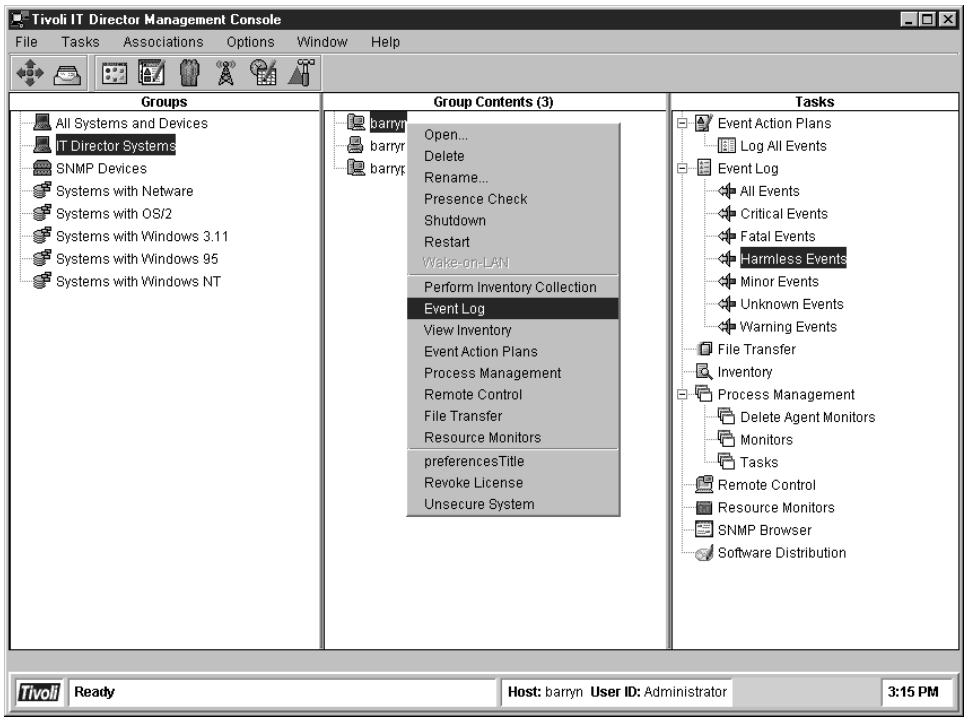


Figure 189. Open the Event Log

6.7.3 Event Log Entries

Each entry in the event log is subdivided into the following fields:

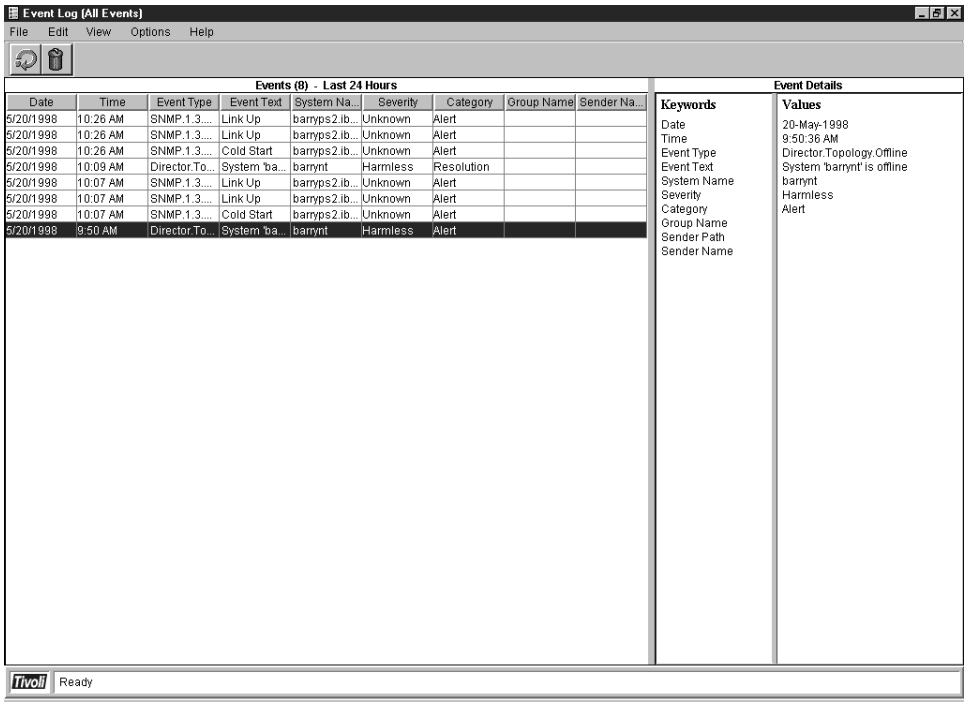


Figure 190. Viewing Event Log by System

Note: Most of the fields described in this section are also used as filtering criteria.

Date Identifies the calendar date on which the event was generated.

Time Identifies the time of day the event was generated.

Event Type Provides origination information and descriptive detail in a hierarchical format.

6.8 Performing Maintenance Tasks

The maintenance tasks described in the following sections can be performed.

6.8.1 Editing an Existing Event Filter

Use the following procedures to edit an existing event filter:

1. Display the Event Action Plan Builder by clicking with the right mouse button on the **Event Action Plans** task in the Tasks section of the Tivoli IT Director console and selecting **Build Event Action Plan**.

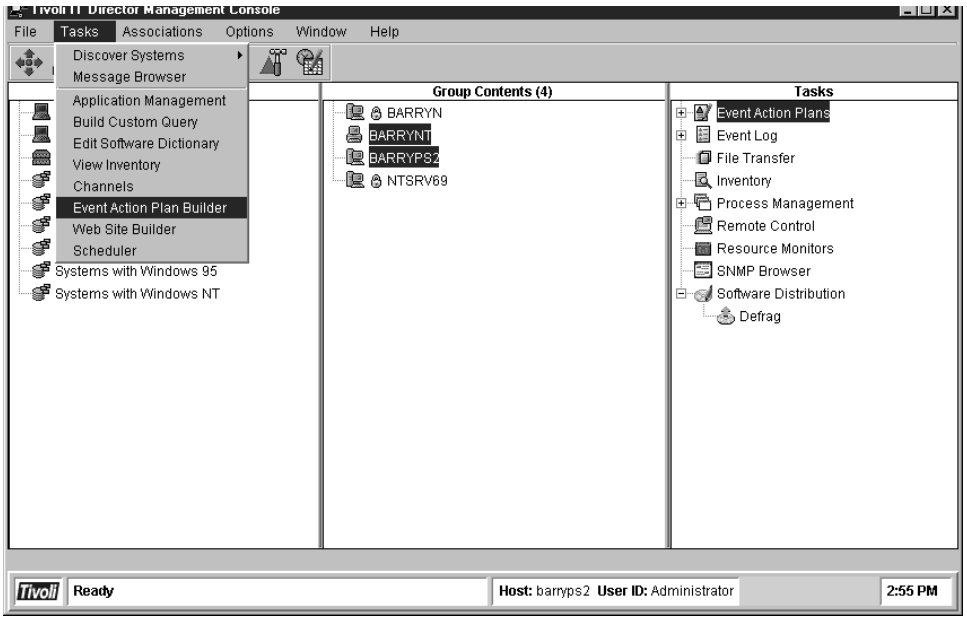


Figure 191. Selecting Event Action Plan Builder

You will then be presented with the Event Action Plan Builder.

2. Click with the right mouse button on the required filter and select **Edit** to edit the filter and make the necessary changes.
3. Click on **File** and select **Save** from the action bar.

6.8.2 Deleting an Event Filter

Use the following procedures to delete an existing event filter:

1. Display the Event Action Plan Builder by clicking with the right mouse button on the **Event Action Plans** task in the Tasks section of the Tivoli IT Director console and selecting **Build Event Action Plan**.

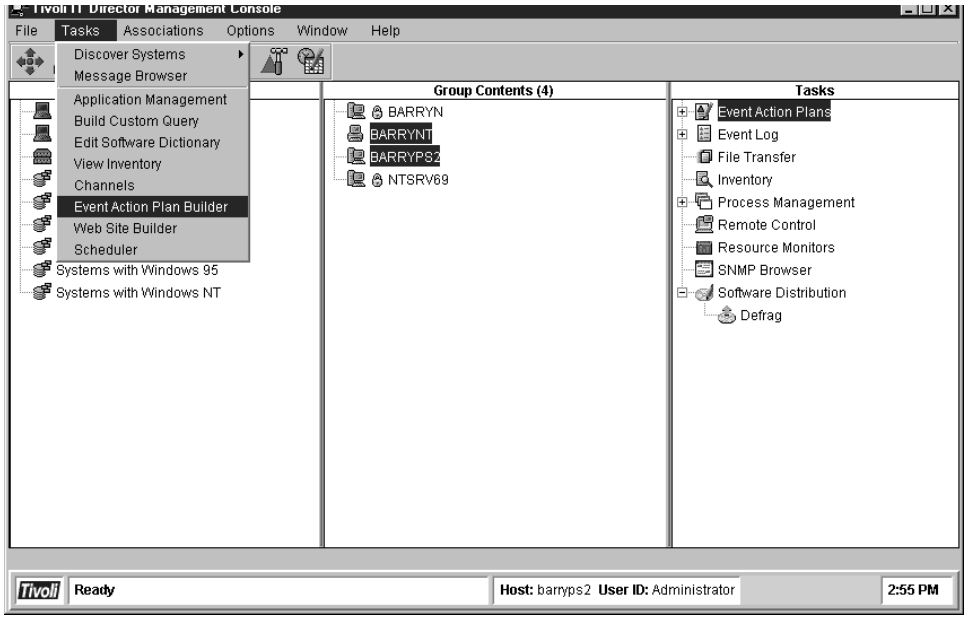


Figure 192. Selecting Event Action Plan Builder

You will then be presented with the Event Action Plan Builder.

2. Click with the right mouse button on the required filter and select **Delete** to delete the filter.

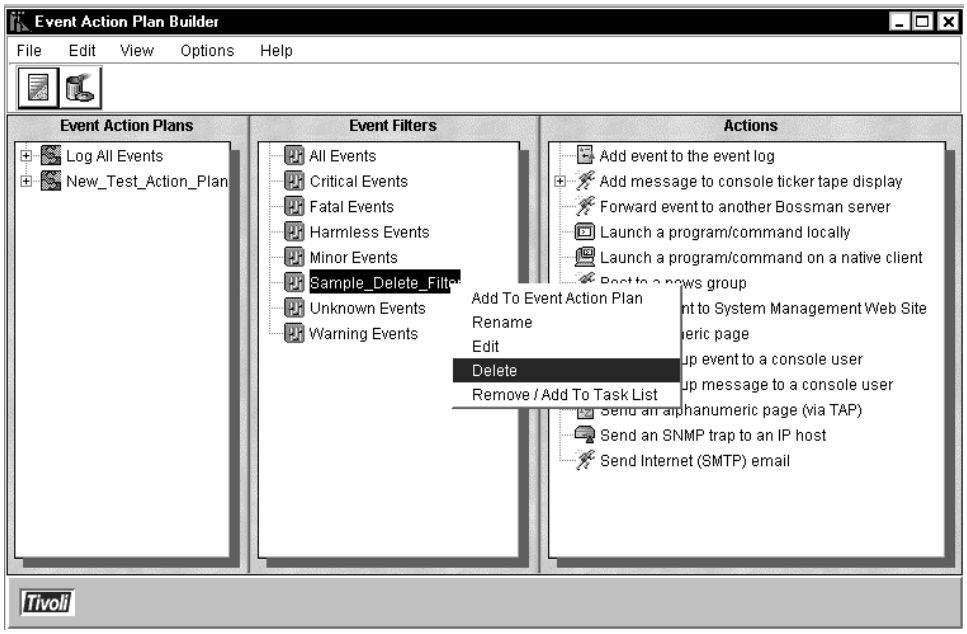


Figure 193. Deleting an Event Filter

You will then be asked to confirm that you really want to delete this filter.

3. Reply **Yes** to complete the deletion.

6.8.3 Deleting Events from the Event Log

Use the following procedures to delete an existing event from the event log:

1. Click with the right mouse button on the **Event Log Browser** task in the Tasks section of the Tivoli IT Director console and select **Open**.

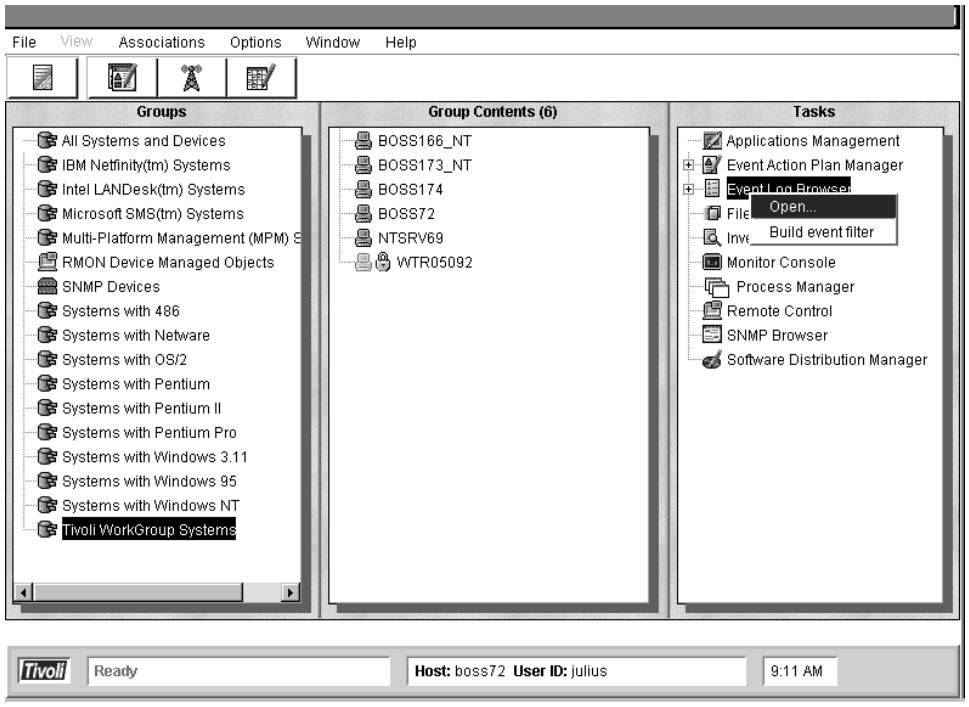


Figure 194. Selecting Event Log Browser

You will then be presented with the Event Log Browser.

2. Click with the right mouse button on the required event and select **Delete** to delete the event.

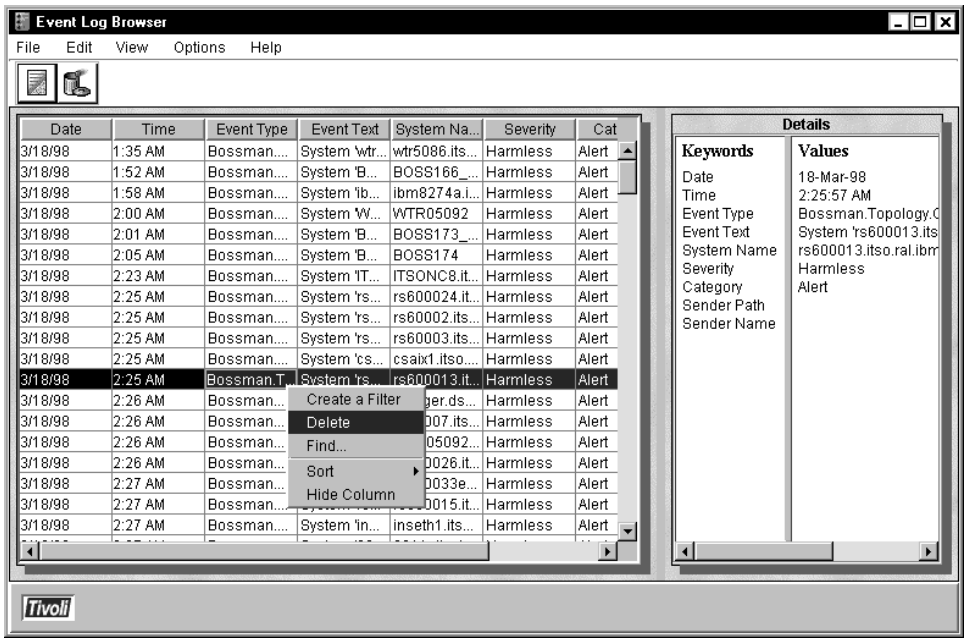


Figure 195. Deleting an Event from the Log

You will then be asked to confirm that you really want to delete this event.

3. Reply **Yes** to complete the deletion.

Chapter 7. Inventory and Software Distribution

This chapter describes Inventory and Software Distribution from the Tivoli IT Director server out to its agents (both native and non-native).

7.1 Introduction to Inventory Management

Inventory in Tivoli IT Director can be divided into two logical tasks:

- Inventory collection
- Inventory views

Inventory collection in Tivoli IT Director is an automatic task that occurs whenever a new managed system is discovered by the Tivoli IT Director topology engine. Once the new system is discovered, the appropriate Inventory method is automatically selected and executed. This results in hardware and software (if applicable) inventory being collected and inserted into the Tivoli IT Director Inventory database. The frequency of inventory collection can be customized per managed system type. For example, you might want an inventory for native managed systems to be collected daily while only collecting the inventory for SNMP managed systems weekly.

The next logical action is that of an Inventory view or query. After inventory data has been collected by the Tivoli IT Director server engine and placed in the database, the data can be accessible for querying functions. All of the data that is inserted into the database becomes valid criteria for Inventory queries.

7.1.1 Support Architectures

Tivoli IT Director requires a database for system repository and Inventory collection. The database manager service is implemented in Java, using JDBC for all database operations. Tivoli IT Director supports the following databases:

- Microsoft JET database
- Microsoft SQL Server

JET is accessed via a programming interface using ODBC and JDBC. Tivoli IT Director ships with Microsoft JET and does not require an additional license.

7.2 Discovery and Initial Inventory

When the Tivoli IT Director server service comes up for the first time, the following things occur:

- Inventory databases are created.
- Inventory database tables are created.
- Local storage files are created.

The discovery process occurs every time that you manually request it. The discovery process discovers all systems that are running the Tivoli IT Director native agent, all SNMP agents, and all MPM agents on managed systems in your environment. Every time a new manageable system is discovered, an entry is

made into the SQL database and the Tivoli IT Director Inventory task is notified that the new device must now be inventoried.

The Tivoli IT Director Inventory task immediately begins performing hardware and software inventories on all new manageable systems that have been discovered. Once the inventory data has been received for a system, it is parsed and stored in the database tables.

You can also set a stale date for a managed system, a date after which the inventory data is considered out of date. An updated inventory is then performed on that managed system. You may also select a managed system and invoke an inventory update for it immediately (see 7.5, “Inventory Collection Preferences” on page 168).

7.3 Using the Inventory Query Browser

To activate the Inventory Query Browser locate the Inventory task on the Tivoli IT Director main console as shown below:

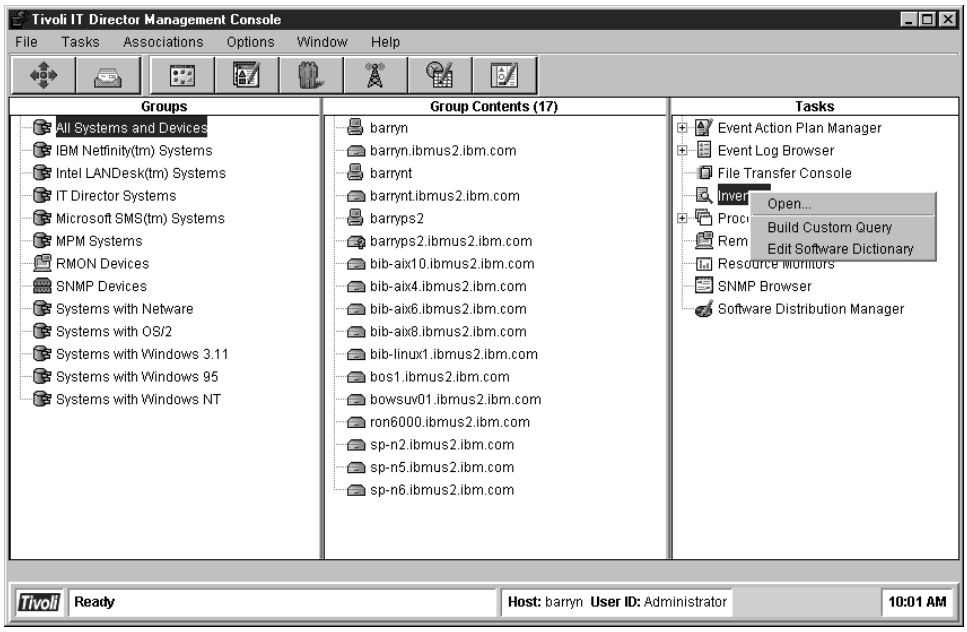


Figure 196. Tivoli IT Director Inventory Task

To activate the Inventory task you can drag the Inventory task onto a single managed system or a group of managed systems. You can also drag the selected managed group or managed system onto the Inventory task. The action will result in a window similar to Figure 197 on page 159.

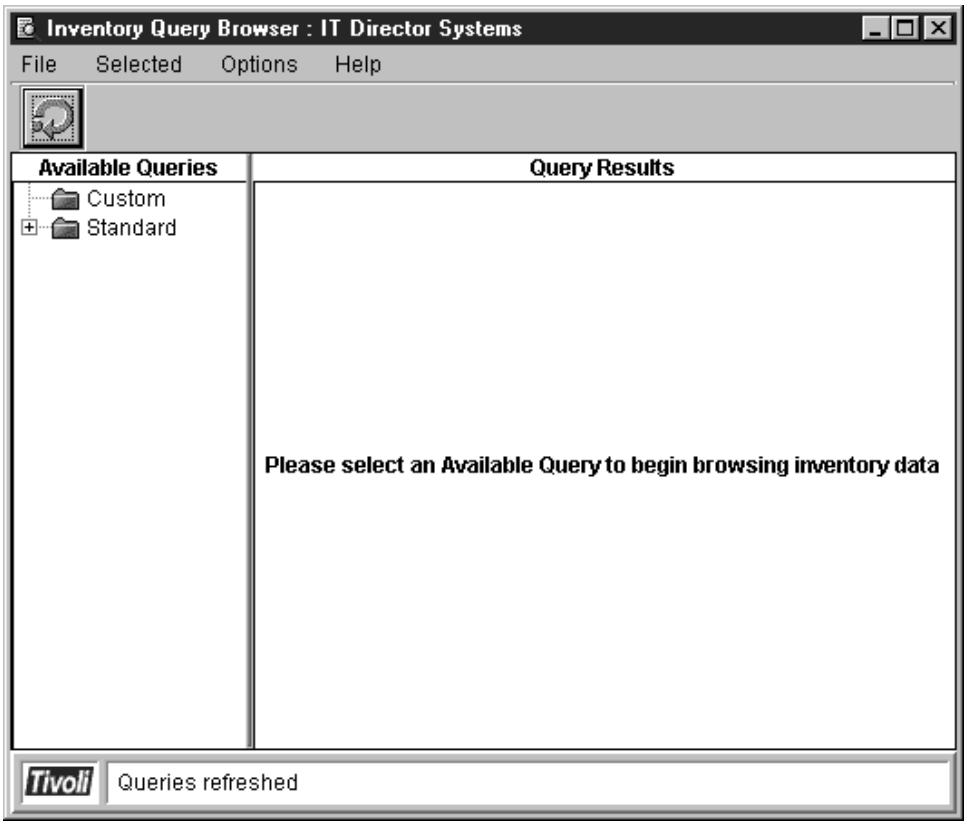


Figure 197. Tivoli IT Director Standard Inventory Task Expanded

In our example, we dragged the Inventory Task icon onto the managed system BARRYN, which is a Windows NT Server 4.0.

The Inventory task is divided up into two panels. The left panel displays the available Inventory queries. The right panel displays the results of the query. The two available queries are the Custom query and the Standard query. Custom queries are defined by the administrator whereas the Standard queries are default queries that come with Tivoli IT Director.

From the available queries panel select the **Standard Queries** folder and expand the view as illustrated in Figure 198 on page 160.

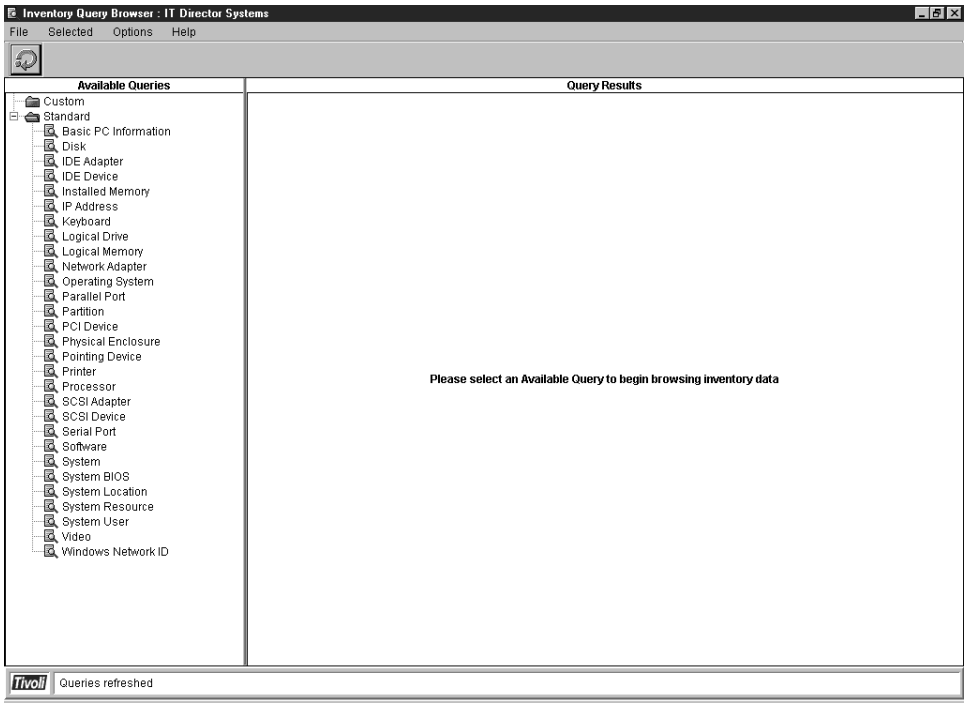


Figure 198. Tivoli IT Director Inventory Task

In the example below we have selected the default query named IP Address, and the results of the query display in the right panel in tabular format. In our example, the Query Results window will display inventory information about the managed system named BARRYN. The information will include items such as the Managed System Name, the Managed System's Tivoli IT Director ID and the IP Address. For a complete listing of all Tivoli IT Director Inventory tables please refer to Appendix A, “Database Table Definitions” on page 229.

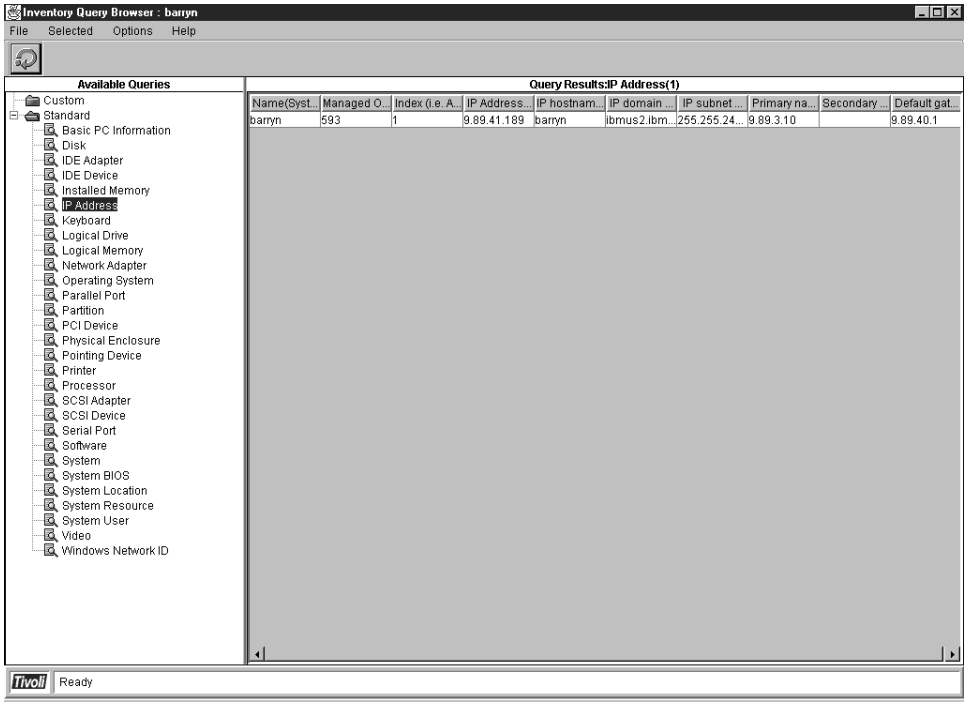


Figure 199. IP Address Query Result

You can perform an inventory operation against a managed group. All of the managed systems belonging to the group would then be displayed in the query as shown below.

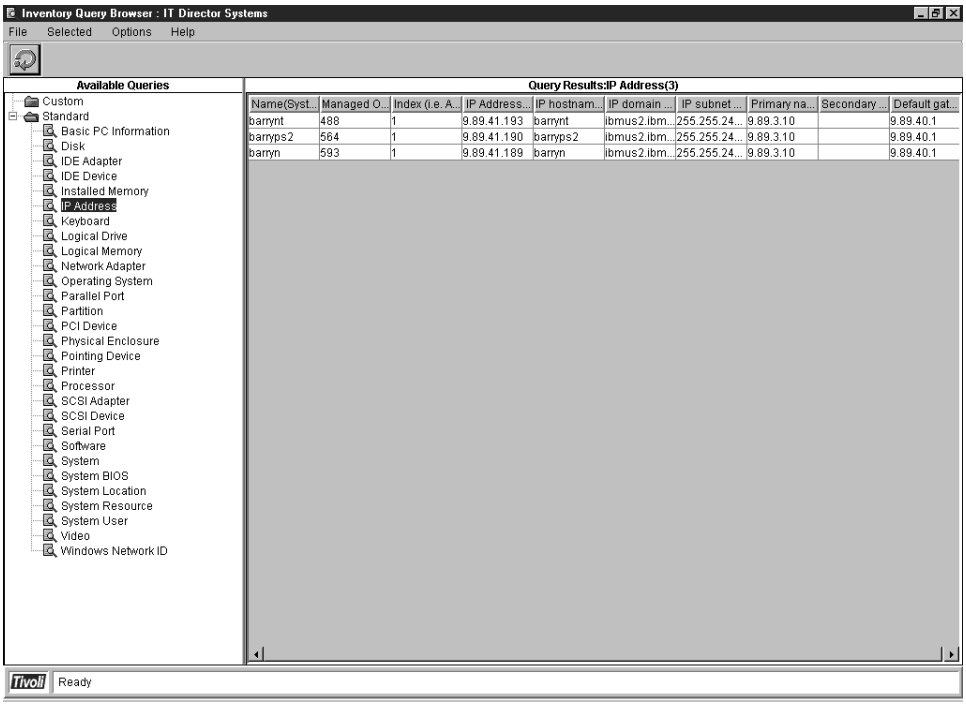


Figure 200. Query Result for Managed Group

When an inventory query completes, the results are displayed in the Results panel on the right side of the Inventory Browser console. The results are shown in tabular columns in the order they were defined when the query was originally built.

You can also look at the inventory for a group of SNMP devices. Just drag the Inventory task to the SNMP Devices group. After you expand out the Standard entry, just select one of the values and the results will appear in the right pane as shown in the following window:

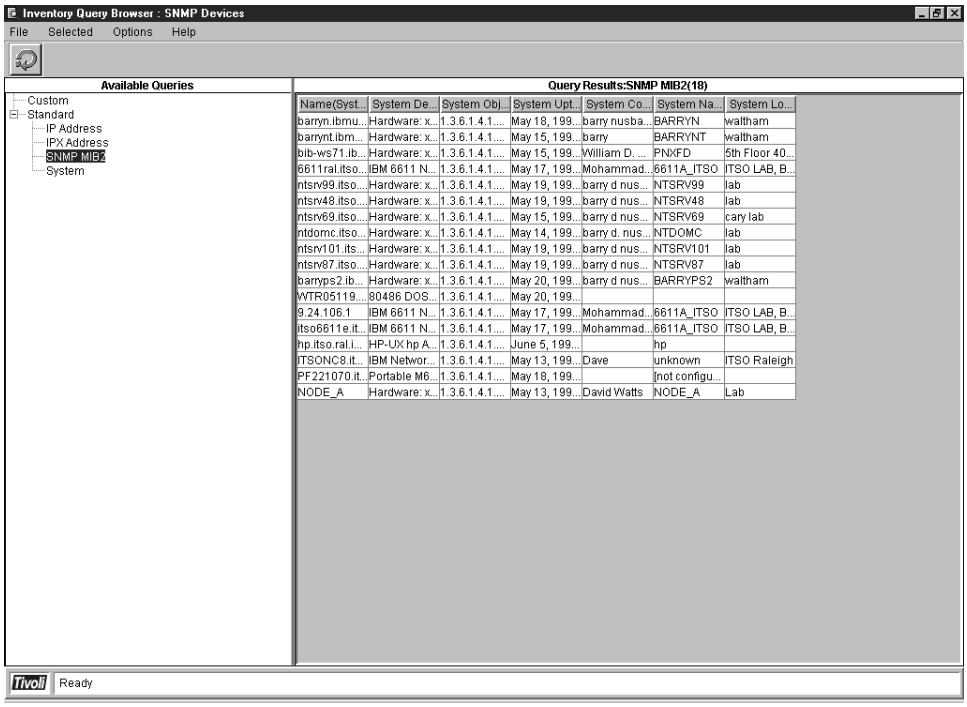


Figure 201. Query Result for SNMP Devices

After the results are displayed, you can use your mouse to drag the edge of columns left and right, changing the width of each column independently to view the data more easily. You can also right-click on them with the mouse to perform the following actions:

- Re-order the columns
- Hide or show columns

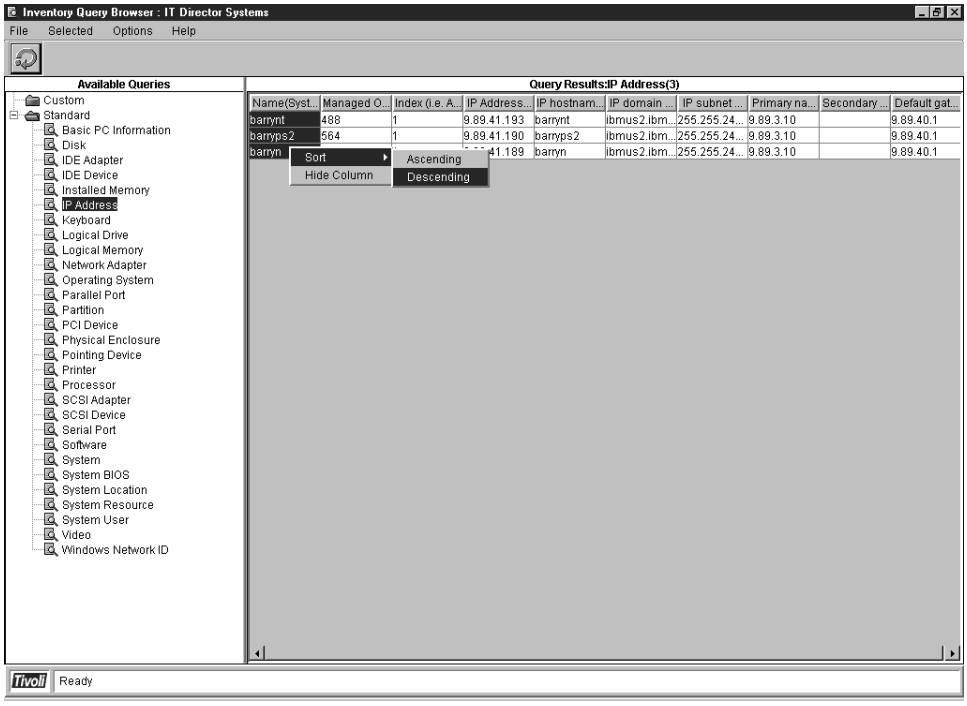


Figure 202. IP Address Query Result

The results of inventory queries can also be exported. The two export formats are:

- HTML
- Comma Separated Value Format (CSV)

For more information on exporting inventory information please see 7.4.1, “Exporting Inventory Data” on page 167.

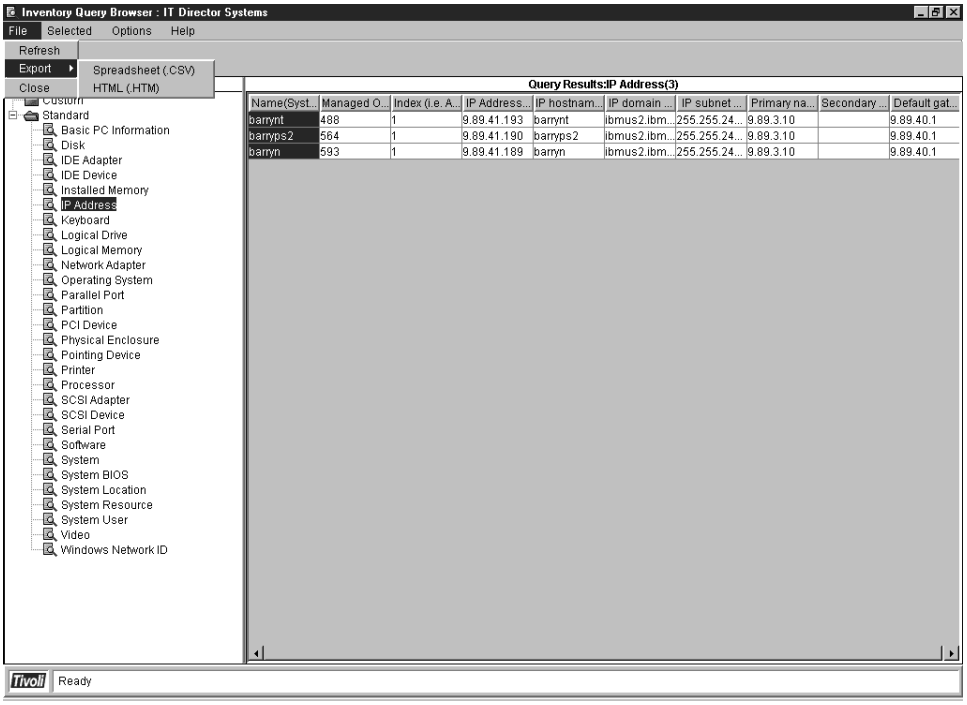


Figure 203. File Export Dialog

7.4 Building Custom Queries

There are many useful queries defined in the Default Query section of the Inventory Query Browser. However, you may wish to build your own custom inventory queries using the Inventory Query Builder.

To create a custom query go to the Inventory Task icon under the Tasks list in the main console. Use the right mouse button to activate the Build Custom Query dialog box.

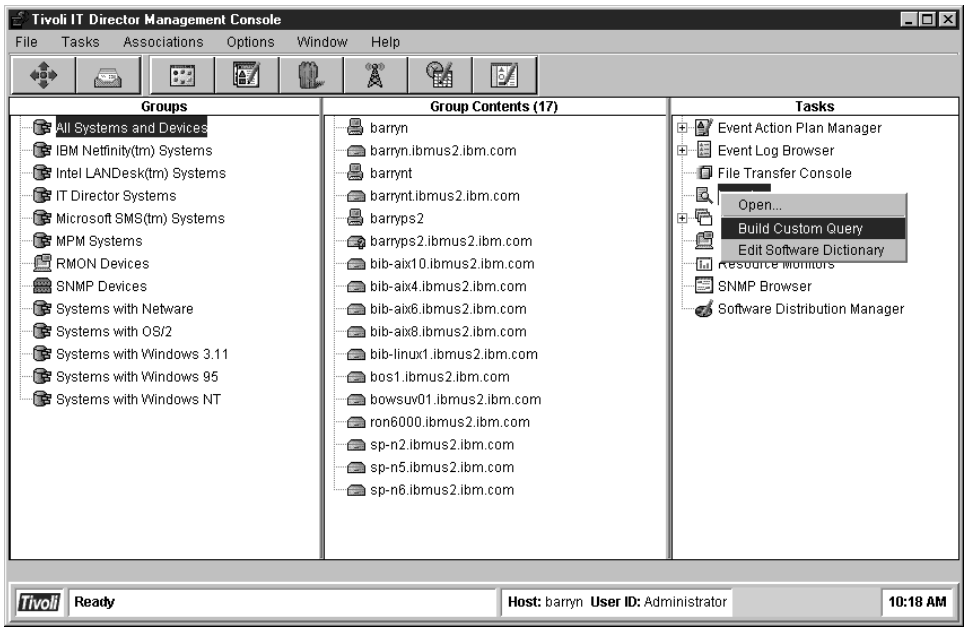


Figure 204. Build Custom Query Dialog

The Inventory Query Builder window will appear similar to Figure 205 on page 165.

The Inventory Query Builder is similar to the Inventory Query Browser in that it is also divided into two main sections: Available Criteria and Selected Criteria.

In order to build a custom query, you select available data criteria from the left panel and add them to the right panel. You can mix and match and order your query choices any way you like.

Each Inventory table in the Tivoli IT Director Inventory database is represented by an icon in the tree structure in the left panel. Clicking on one or more of these icons will expand the view to a tree structure and display the various data criteria in the table.

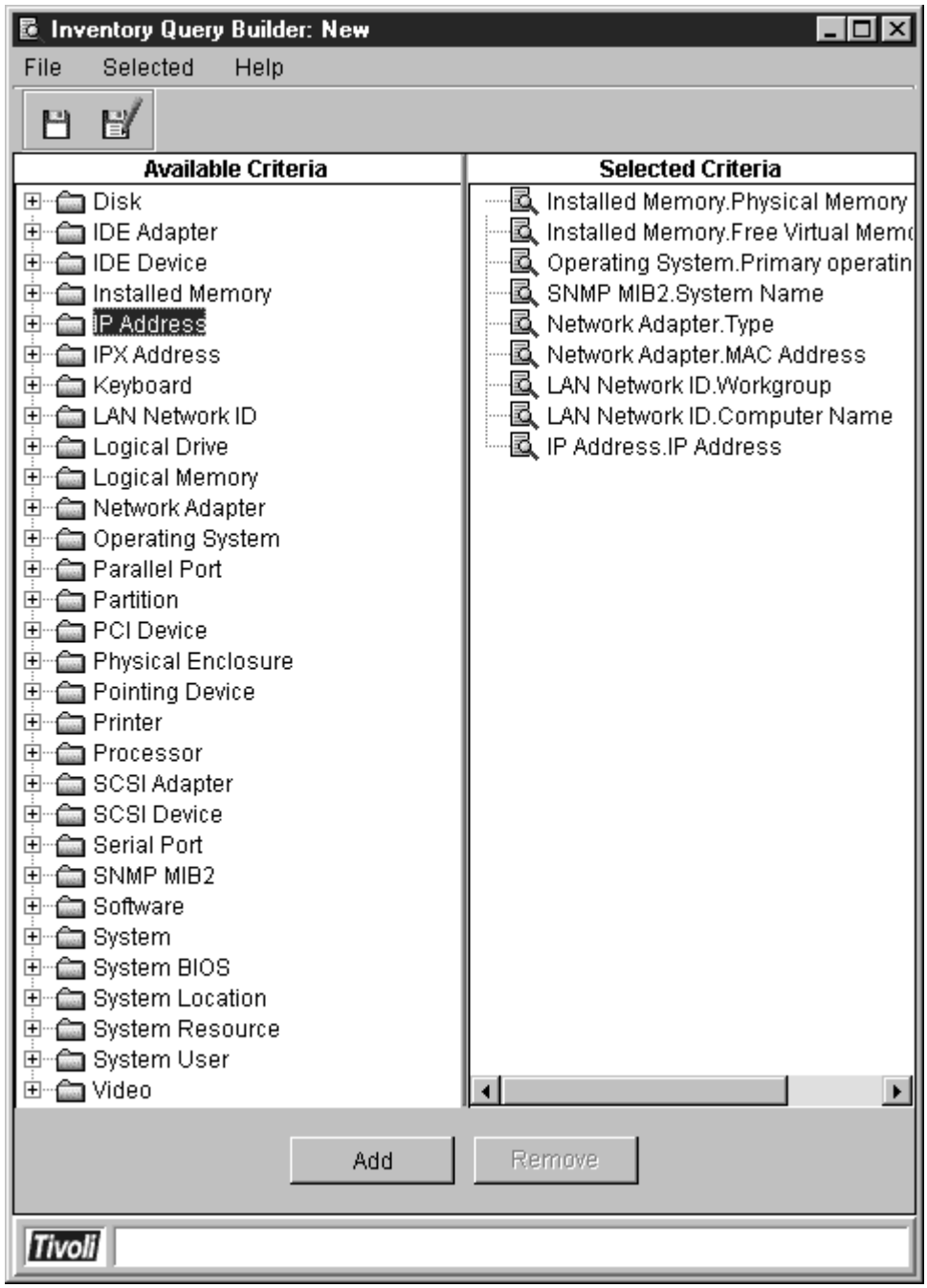


Figure 205. Available Inventory Criteria

The Custom Query Browser is particularly useful when you want to do ad-hoc queries of the Tivoli IT Director Inventory. You may wish to get certain data on your systems prior to performing a software distribution. In our example, we selected for our custom query the following attributes:

- Physical Memory Installed
- Free Virtual Memory
- Primary operating system
- System Name
- Adapter Type

- MAC Address
- Workgroup
- Computer Name
- IP Address

Note: The above does not represent any special sequence or order but rather just an example.

You can select any individual table definition and click on the **Add** button at the bottom of the panel. You can also select a group of definitions by tagging them and clicking on **Add** or simply dragging the definitions onto the right panel.

This action will result in a window similar to Figure 206 below, with the Selected Criteria displayed in the right side panel of the Inventory Query Builder.

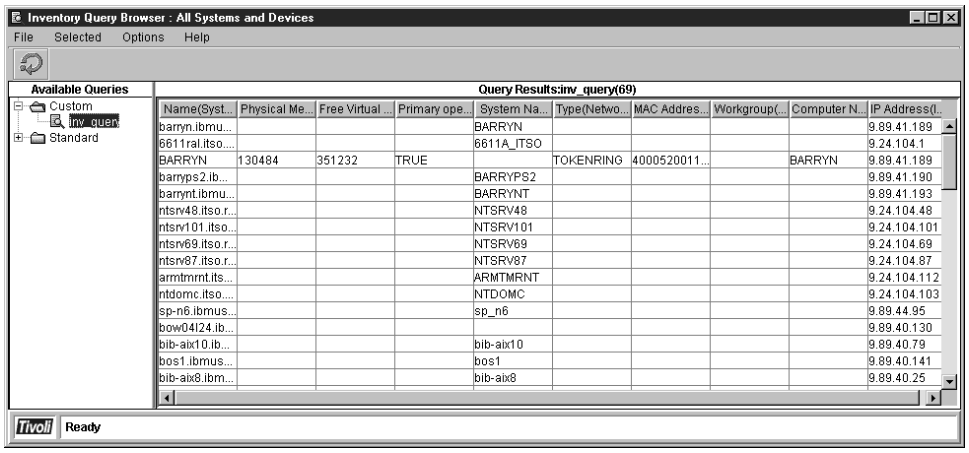


Figure 206. Selected Criteria

To save your custom query go to **File>Save As** or click on the diskette icon at the top of the console window.

A dialog box asking for a query name will be presented. Give your custom query a name and click on **OK** to continue.

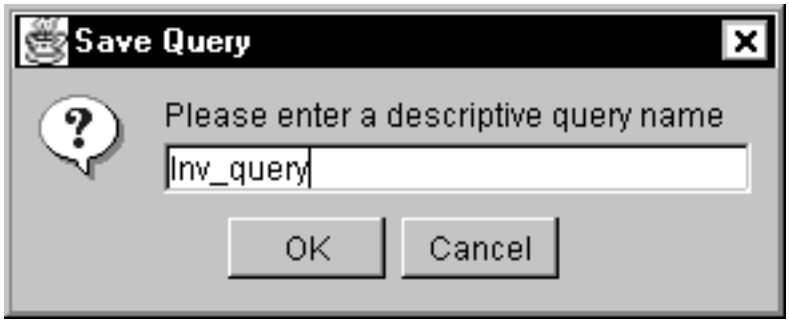


Figure 207. Save Custom Query

Your custom query will be saved and can be viewed in the Inventory Query Browser main window at any time.

7.4.1 Exporting Inventory Data

As mentioned earlier in this section you can export your query results to a spread sheet or to HTML. To export to HTML click on **File** and **Export** (refer to Figure 203 on page 163). A pop-up window will appear similar to the one below:

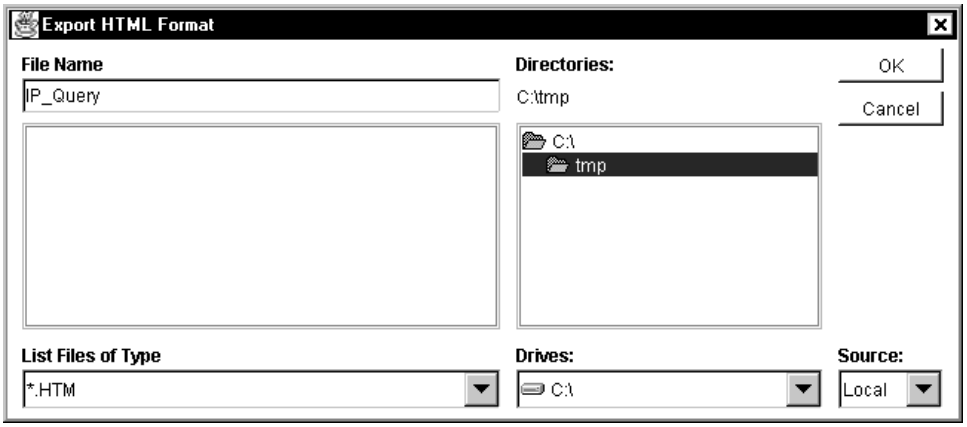
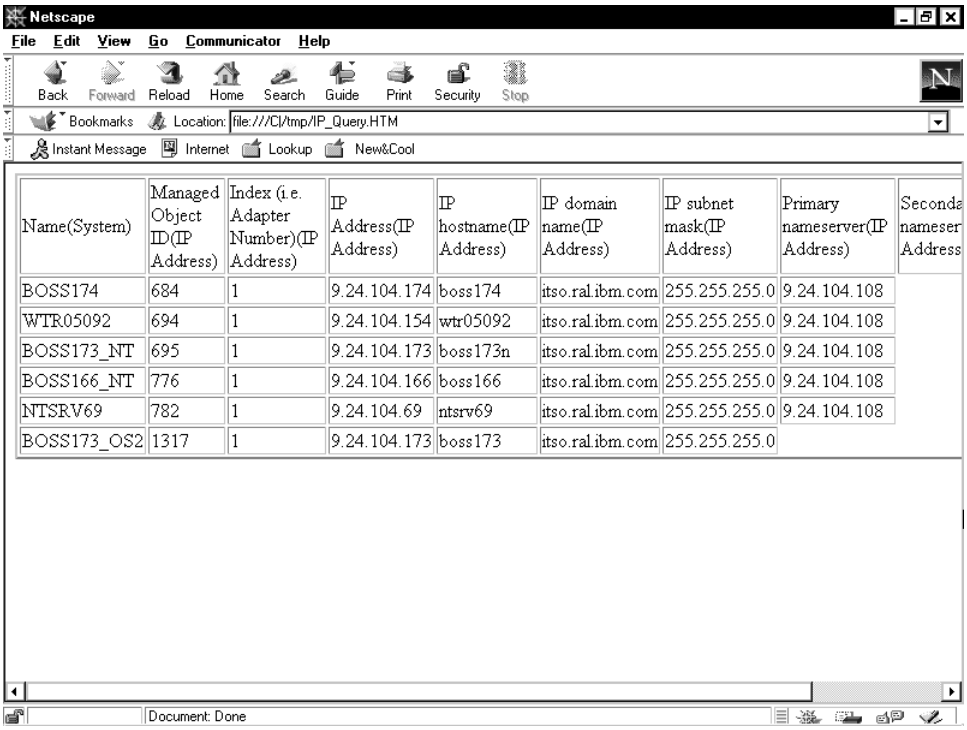


Figure 208. Save HTML File Dialog

You are prompted to save your export file. In our example, we saved our file to c:\tmp. Next, you need to load an Internet browser to view your HTML file. We used Netscape Communicator to view our file.



Name(System)	Managed Object ID(IP Address)	Index (i.e. Adapter Number)(IP Address)	IP Address(IP Address)	IP hostname(IP Address)	IP domain name(IP Address)	IP subnet mask(IP Address)	Primary nameserver(IP Address)	Seconda nameser Address
BOSS174	684	1	9.24.104.174	boss174	itso.ral.ibm.com	255.255.255.0	9.24.104.108	
WTR05092	694	1	9.24.104.154	wtr05092	itso.ral.ibm.com	255.255.255.0	9.24.104.108	
BOSS173_NT	695	1	9.24.104.173	boss173n	itso.ral.ibm.com	255.255.255.0	9.24.104.108	
BOSS166_NT	776	1	9.24.104.166	boss166	itso.ral.ibm.com	255.255.255.0	9.24.104.108	
NTSRV69	782	1	9.24.104.69	ntsrv69	itso.ral.ibm.com	255.255.255.0	9.24.104.108	
BOSS173_OS2	1317	1	9.24.104.173	boss173	itso.ral.ibm.com	255.255.255.0		

Figure 209. Save HTML File Dialog

7.5 Inventory Collection Preferences

By selecting **Options** and then **Server Preferences** from the main Tivoli IT Director management console you can access the Inventory Collection Preferences.

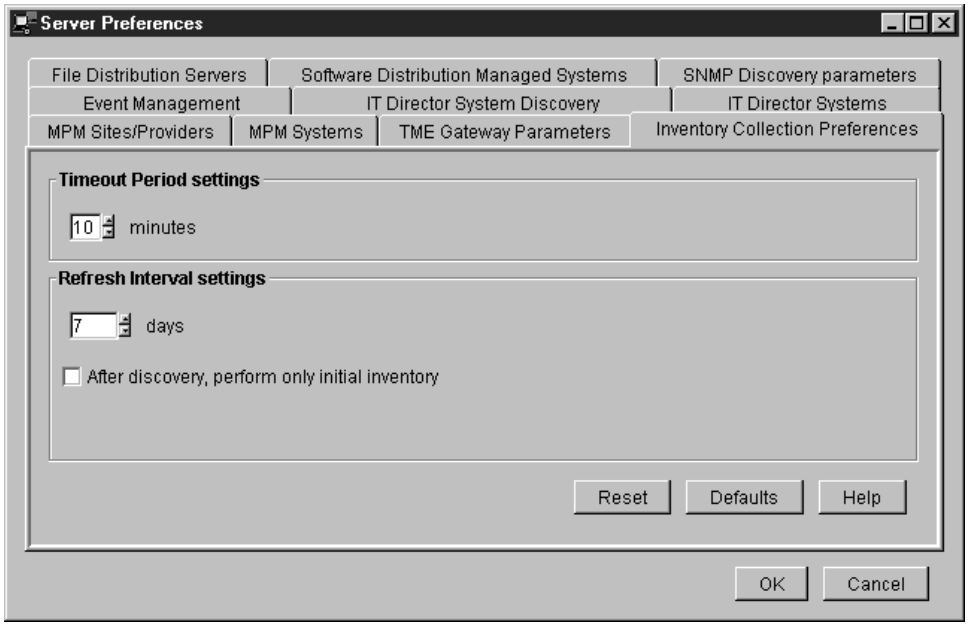


Figure 210. Inventory Preferences

These preferences allow you to configure three options pertaining to Inventory collections:

1. Attempt/Timeout Period

   This is the time limit that the Tivoli IT Director management server will wait for an agent to respond to an Inventory request.

2. Refresh Rate Setting

   This is the frequency at which the Tivoli IT Director Server will refresh the Inventory database.

3. After discovery, perform only initial inventory

   By checking this option, inventory will only be collected when the system or device is initially discovered and is never refreshed.

7.6 Modifying the Software Dictionary Definitions

In order to modify the software dictionary definitions locate the Inventory Task icon in the main Tivoli IT Director console. Use the right mouse button to bring up the Edit Software Dictionary option as shown in Figure 211 on page 169. You can also use the Tasks pull-down menu on the console to achieve the same result.

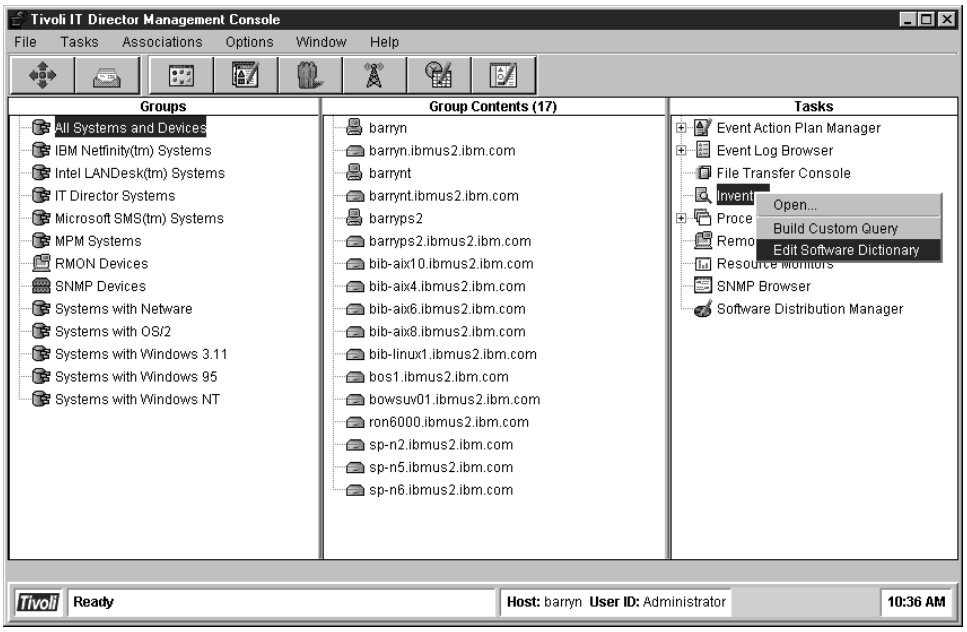


Figure 211. Edit Software Dictionary Dialog

The main software dictionary menu is divided into three panels. The left panel lists the available software entries displayed in expanding folder format. The right panel displays the entry description with the associated files for the entry in the bottom panel.

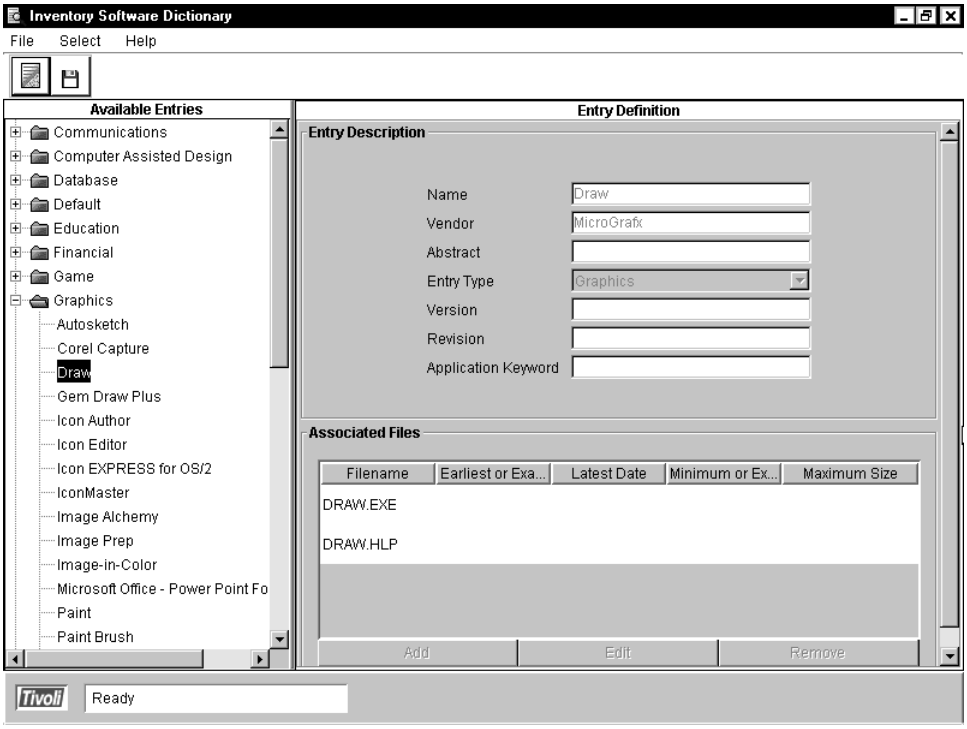


Figure 212. File Description

To add a new entry click on **File** and **New** and enter in the description information for your application. In our example, we have entered in information about an application called DiskLite, which is a disk defragmentation application.

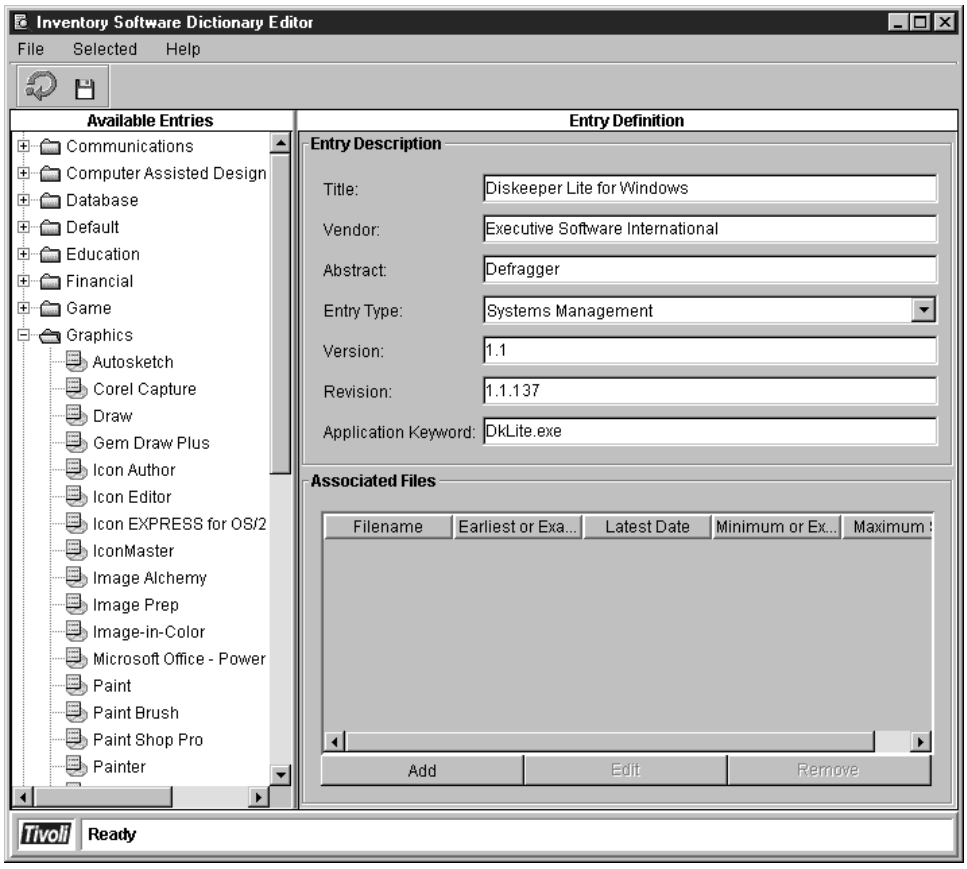


Figure 213. DiskLite Description

Next, you need to click on the **Add** button. A pop-up menu will appear similar to the one below with options for manual input or for input from a file.

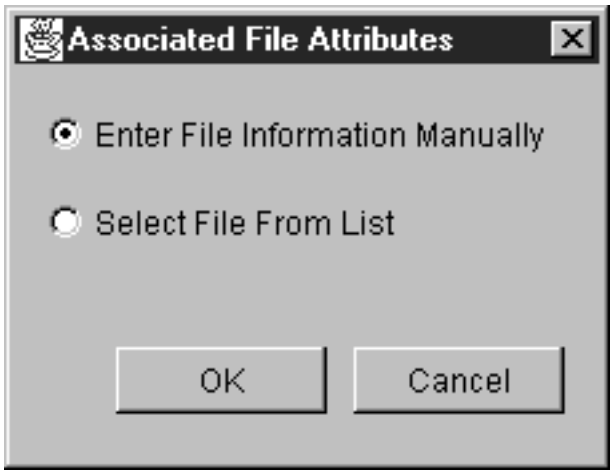


Figure 214. Manual/File Input Dialog

Click on **OK** after selecting to enter file information manually.

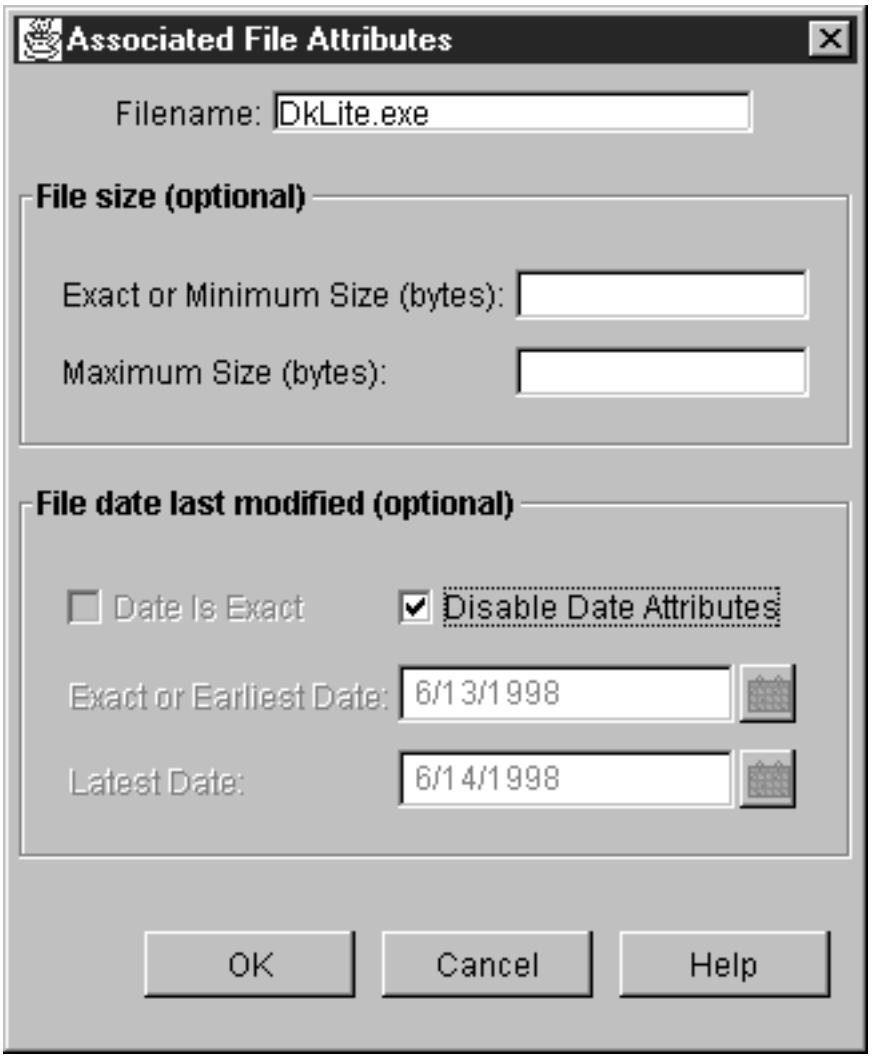


Figure 215. File Attribute Dialog

Click on **OK** to save your values.

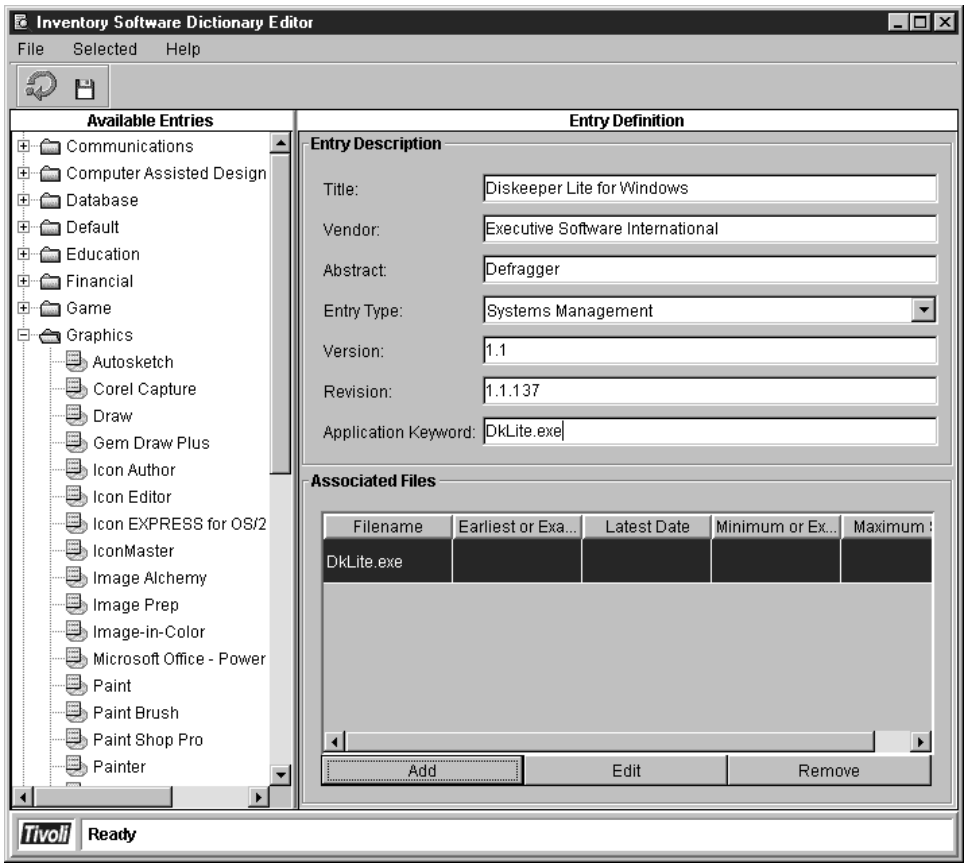


Figure 216. Add Entry Definition

7.7 Software Distribution

Tivoli IT Director Software Distribution service provides a facility for flexible installation of application software. This section provides step-by-step examples of how to use the various software distribution options in Tivoli IT Director.

The Tivoli IT Director Software Distribution facility provides an easy-to-use GUI for constructing and delivering software applications. The GUI was designed so that administrators could create custom distributions as well as take advantage of mechanisms for importing applications into Tivoli IT Director.

Tivoli IT Director Software Distribution consists of several components listed and described below:

- **Software Distribution Server**

  This component is the Software Distribution Server task found on the main console. The server is responsible for contacting the agent, initiating and invoking the proper distribution, and for collecting and logging of these distributions.

- **Software Distribution Agent**

  The Software Distribution agent is the component responsible for processing application file packages on native agents. In the Tivoli IT Director architecture,

the Software distribution agent is implemented as part of the native agent, thus foregoing the requirement of a JVM installation on Tivoli IT Director agents.

- **File Packages**

  File packages are the actual distributions that you create and target to the systems in your environment. The various types of file packages that you can create are listed below.

  – Custom file packages

  – Imported third-party file packages

  – Templates for common applications

7.8 Supported Agent Systems

Tivoli IT Director Software Distribution is supported on the following agents system machines using the following systems:

- Windows 3.x
- Windows 95
- Windows 4.0 Workstation
- Windows NT Server 4.0
- Windows NT V3.51
- OS/2 Warp

Note: Software Distribution to NetWare servers is not supported.

7.9 Building Software Distribution Packages

Building a Software Distribution package starts with the Tivoli IT Director Software Distribution console. To access the Software Distribution console, double-click on the **Software Distribution Manager** icon as shown below:

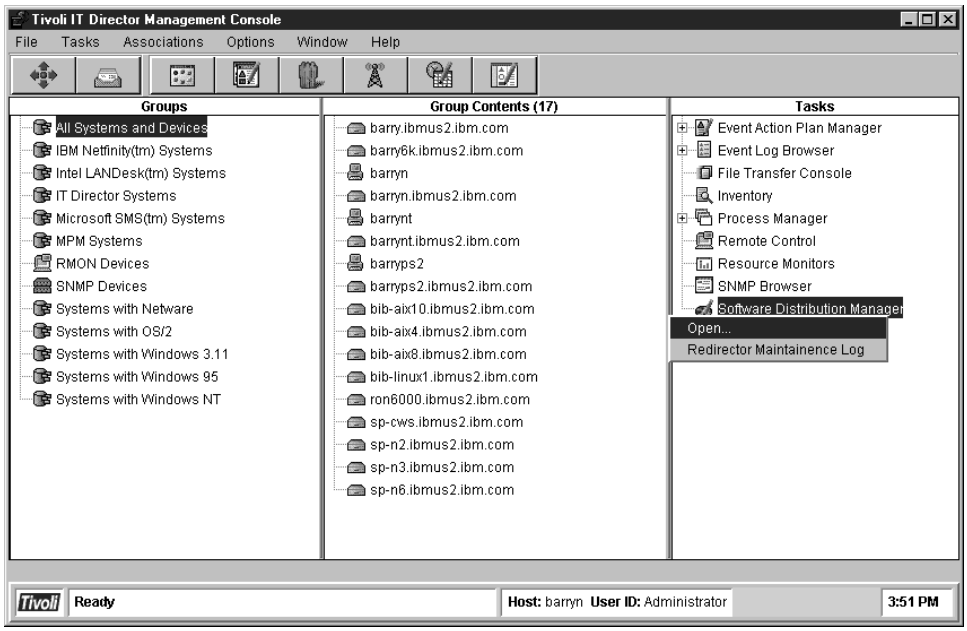


Figure 217. Software Distribution Manager Task

The Software Distribution Package Builder appears in a separate window as shown in Figure 218 on page 175. The package builder provides several choices for building software file packages.

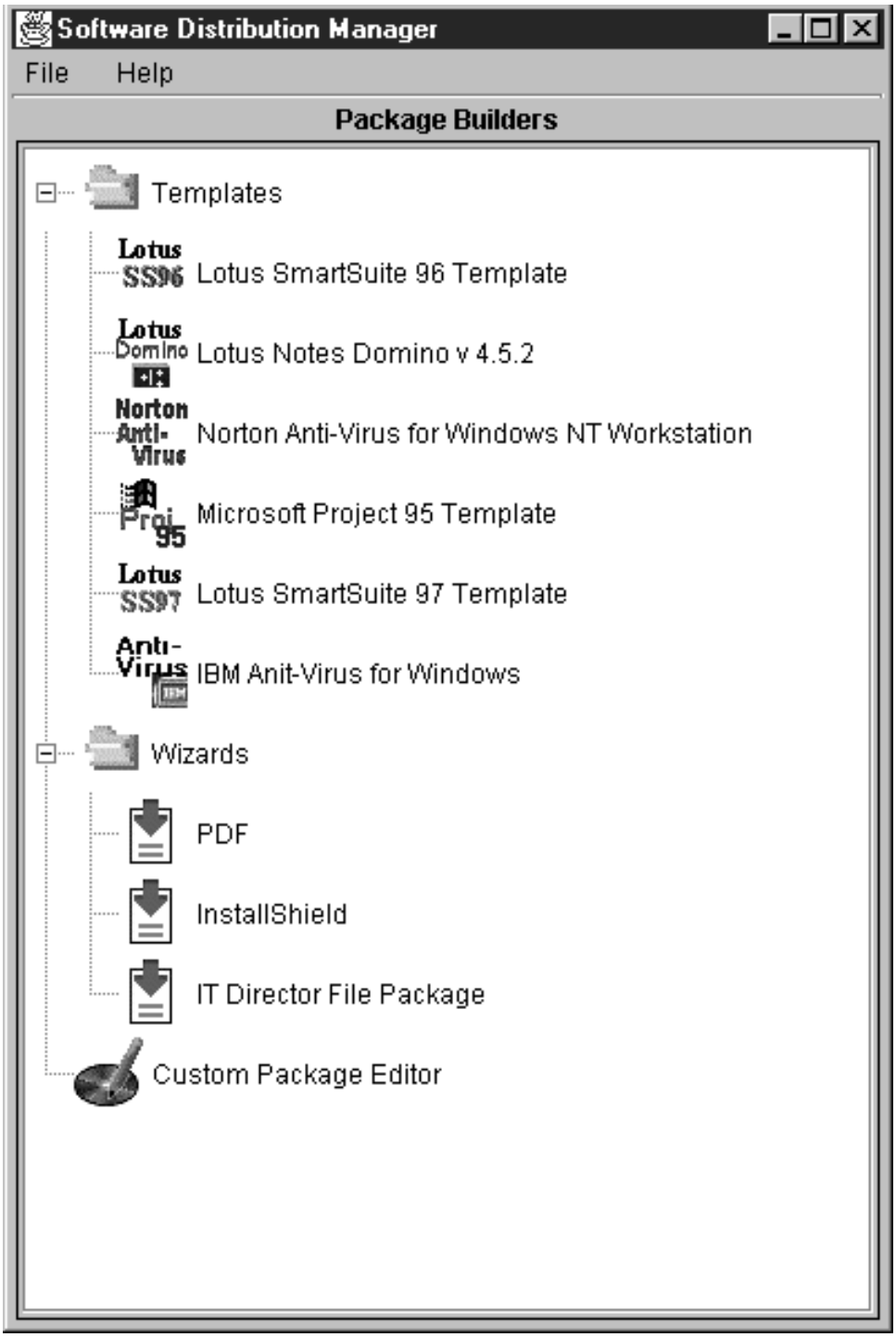


Figure 218. Software Distribution Manager

7.9.1 File Package Types

Listed below is a brief description of the different file package types found in Tivoli IT Director:

- **Package Templates**

  Package templates provide shortcuts and information for building common popular application software.

- **Package Wizards**

  The Package Wizard allows you to import applications into software file packages for distribution. The three supported package wizards are:

  – PDF Importer

  – InstallShield Importer

  – Tivoli IT Director File Package

- **Custom Package Editor**

  The Custom Package Editor provides a method for designing and customizing a file package.

7.10 Custom Package Editor

The Custom Package Editor allows you to select the exact files you want to be installed on target systems. You would use this method when the application software can not be imported, the application does not have an installation executable, or you require further customization.

The first step in creating a custom file package is to start the Custom Package Editor from the Software Distribution console. From the window you opened in Figure 218 on page 175 double-click on **Custom Package Editor**. The following window will appear:

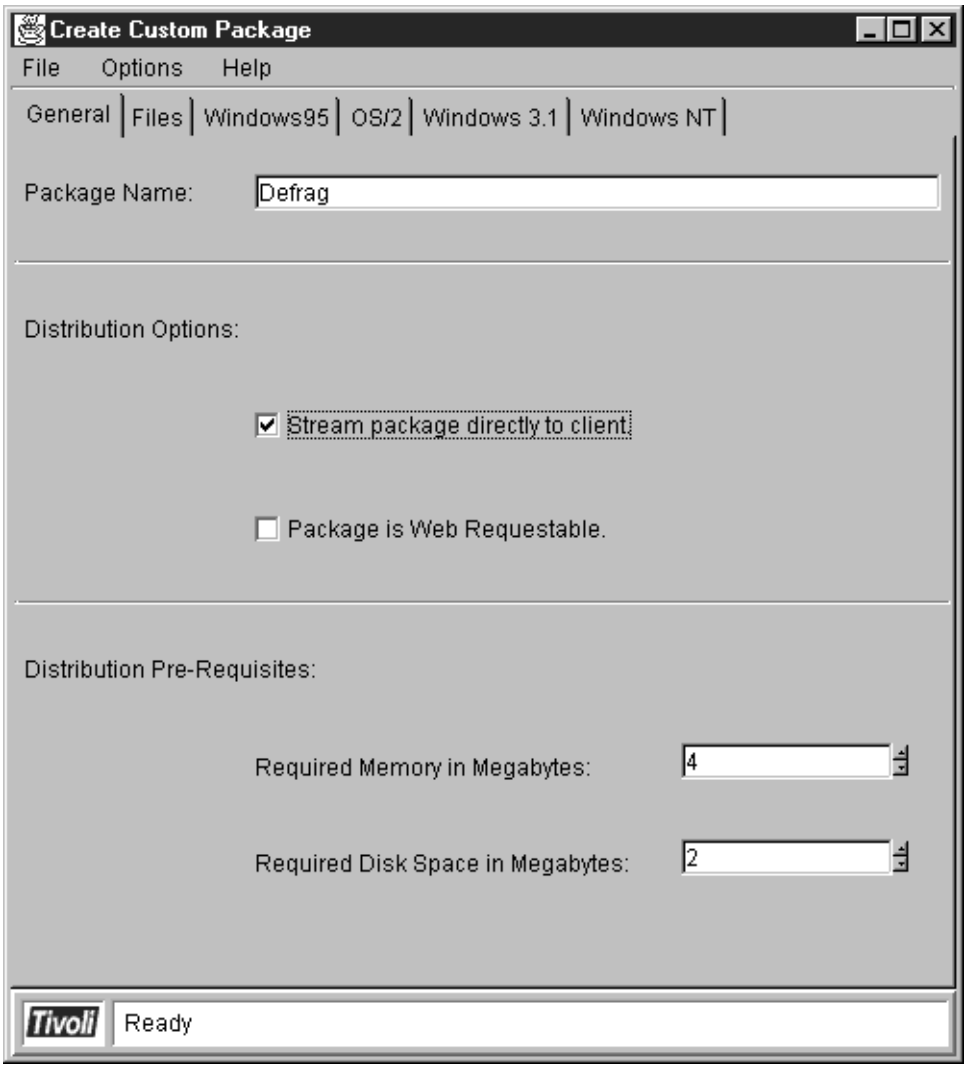


Figure 219. General Package Information

The Custom Package Editor presents you with a series of tab selections that allow you to customize your software delivery needs.

- **General**

  Enables you to specify global package options. On the General page, shown in Figure 219, you can name the file package with a descriptive name and select the distribution options you desire. In addition, you can specify how the package gets distributed as well as place some prerequisite limitations on the package.

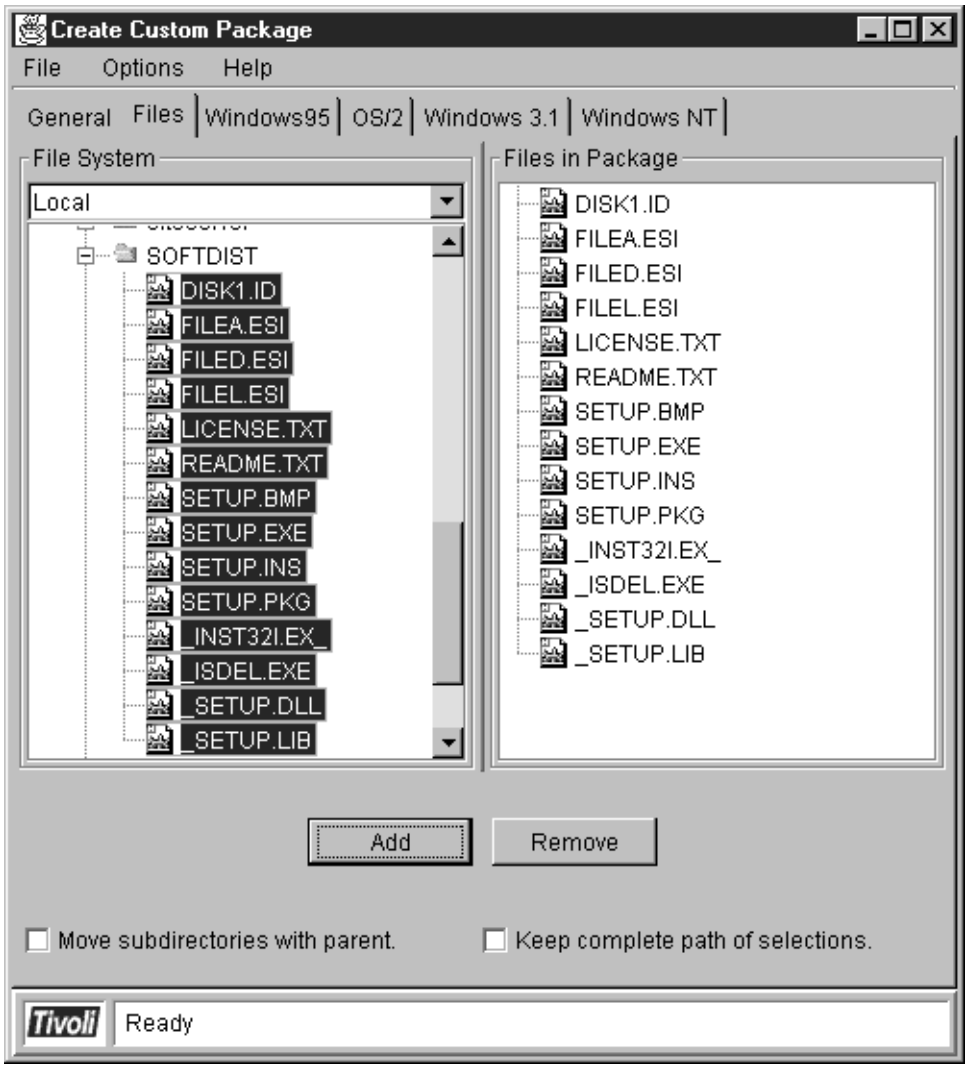


Figure 220. Files to Distribute

- **Files**

  Enables you to select the files to be distributed and installed. From the Files page you can select the files and or entire subdirectories you want to distribute. You can select files from the console system or from the Tivoli IT Director server system.

  If you wish to select multiple files, you can hold down the Ctrl key while clicking on your selections. You can also move entire directories and maintain their directory structure.

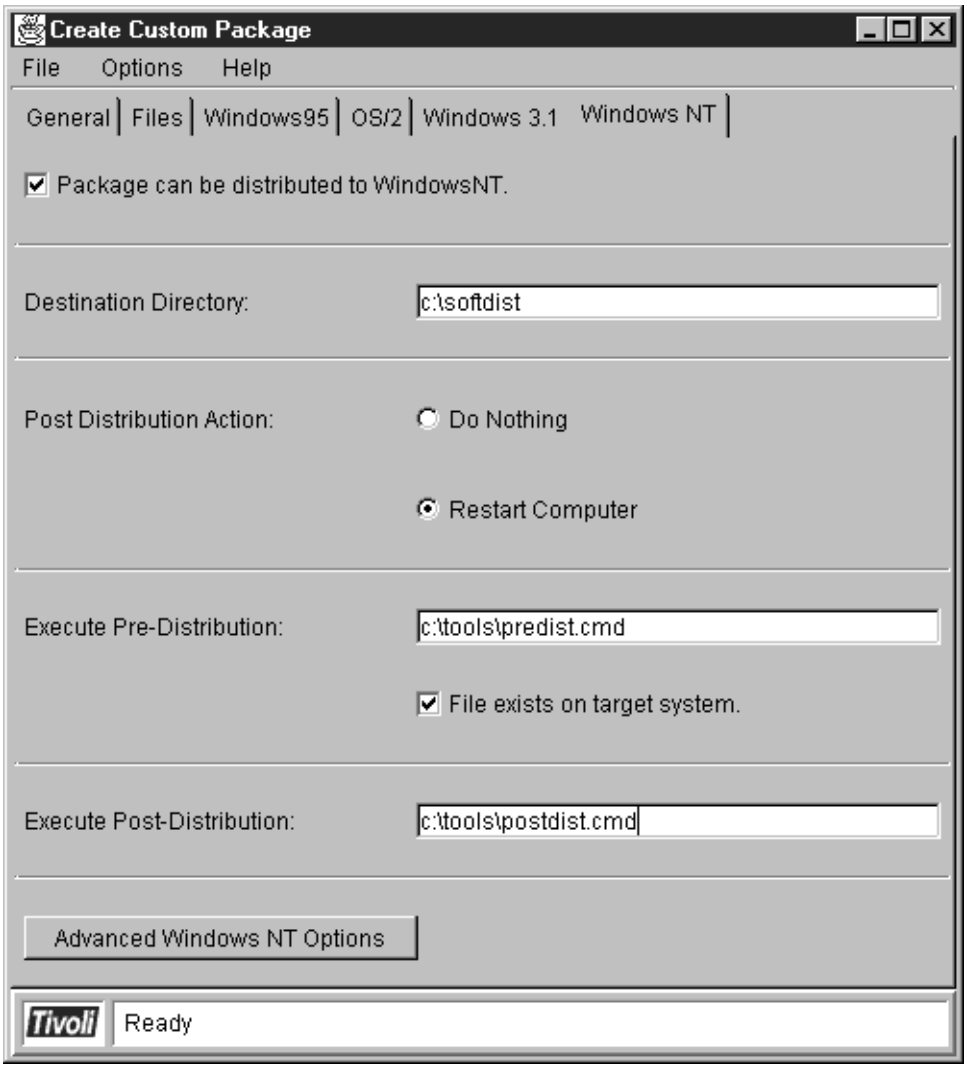


Figure 221. Operating System Specifics

- **Windows 95, OS/2, Windows 3.1 and Windows NT**

  These tabs allow you to input operation system-specific installation options. Figure 221 shows you a sample for Windows NT. The only place where the different operating systems differ is when you click on the Advanced Options button. Figure 222 on page 180 through Figure 224 on page 181 shows the advanced options for Windows NT. Windows 95 has the same options. OS/2 and Windows 3.1 don't have a registry so they are slightly different. You do not have to customize the tabs for the operating systems that you do not intend to distribute this package to. It is possible that you maybe distributing a package to more then one operating system.

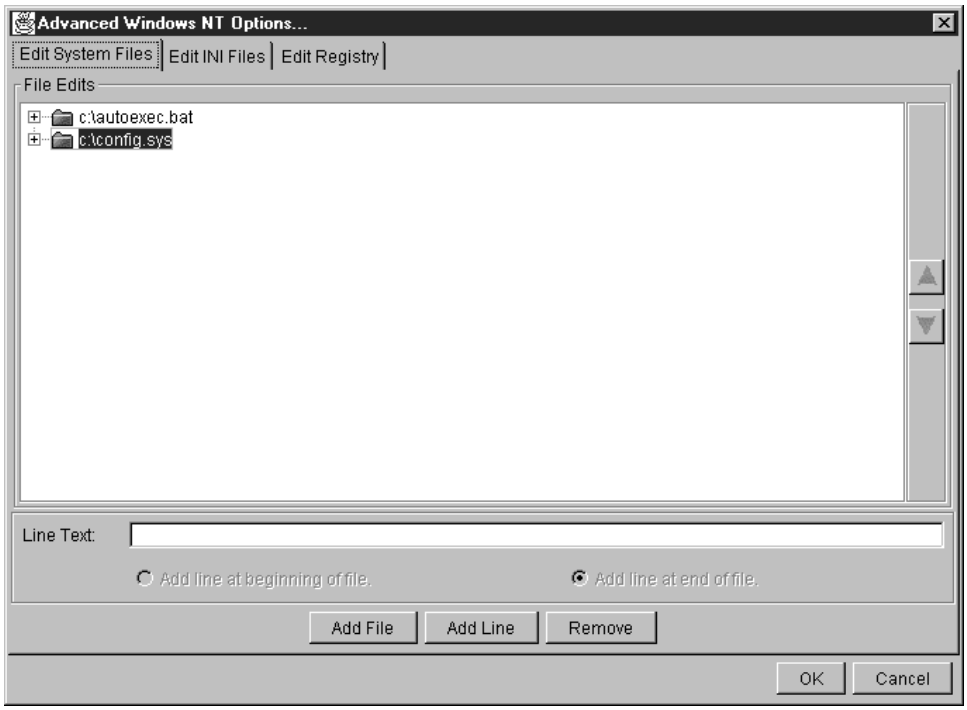


Figure 222. Advanced - System Files

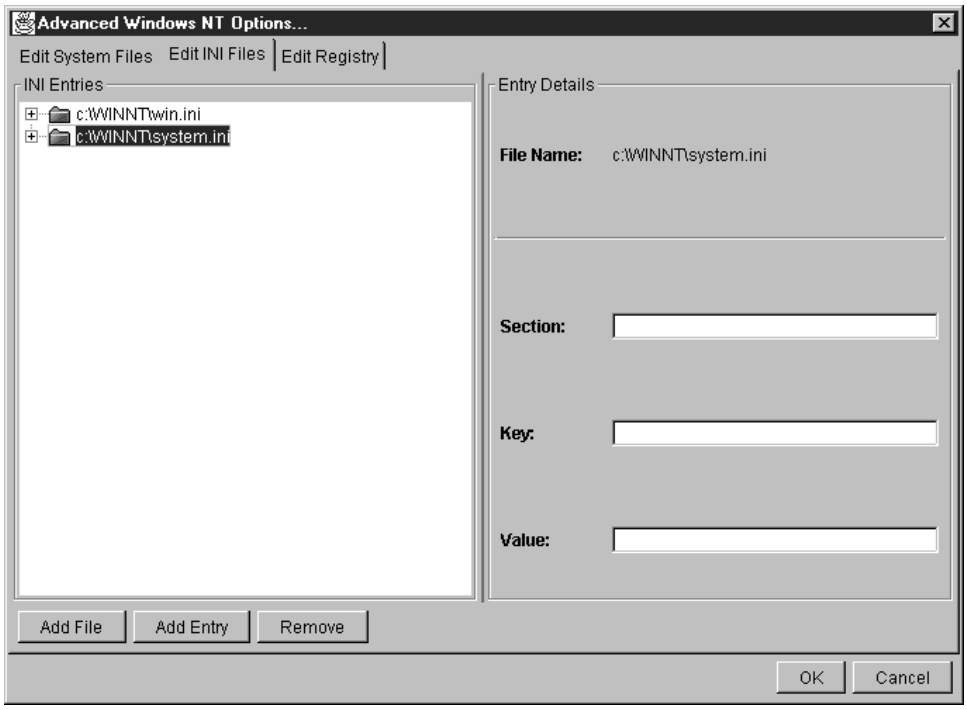


Figure 223. Advanced - INI Files

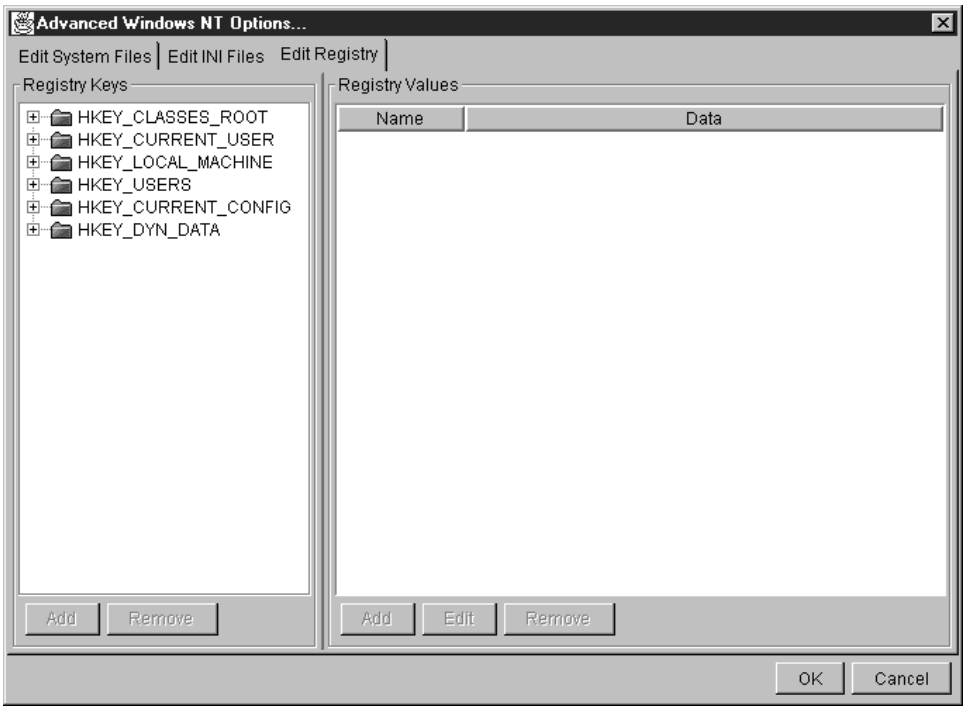


Figure 224. Advanced - Registry Files

After making all of your changes to the package you should save it and export it. You can click on **File** then **Save** followed by **File** and **Export**. You should also notice in the lower left corner off the window that it flashes `Creating software package`, until it is done.

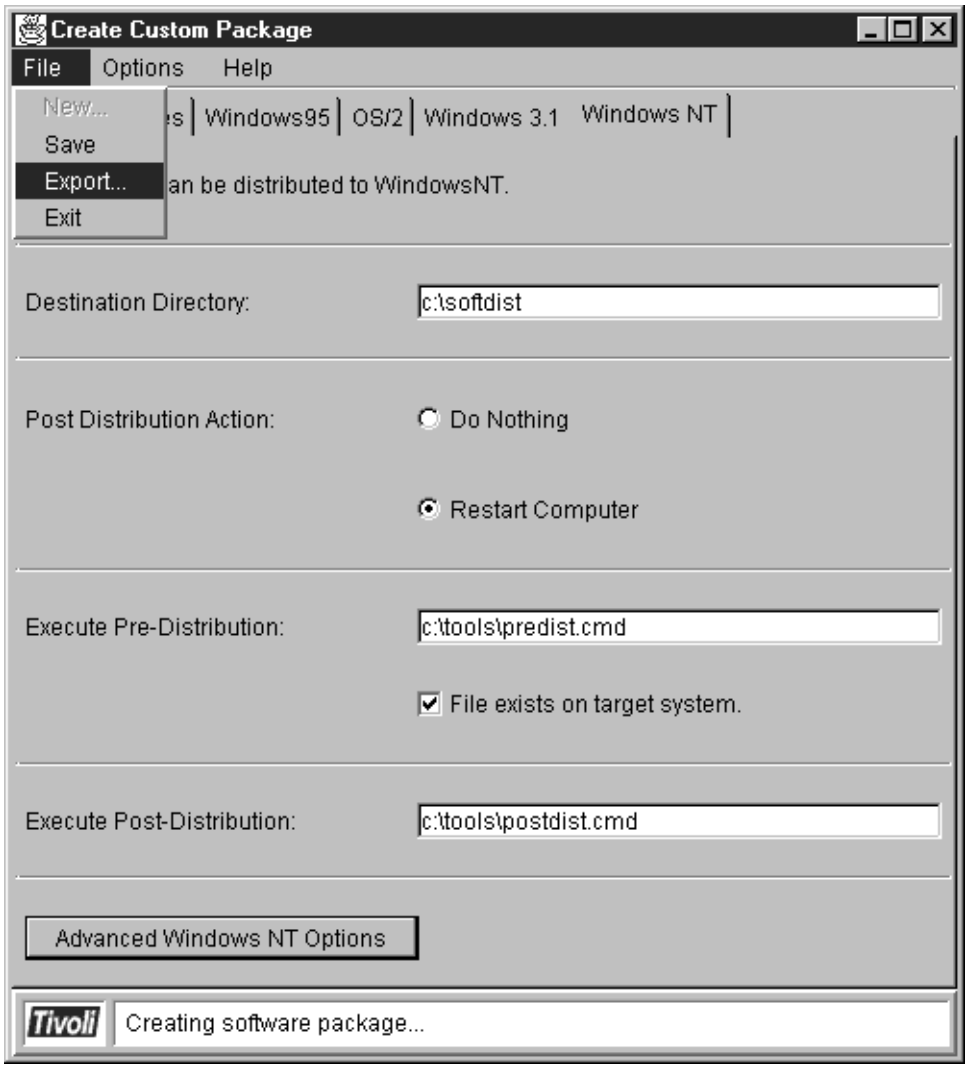


Figure 225. Save and Export the Package

After you click on **Export** you will be prompted for where you want to store the bfp file.

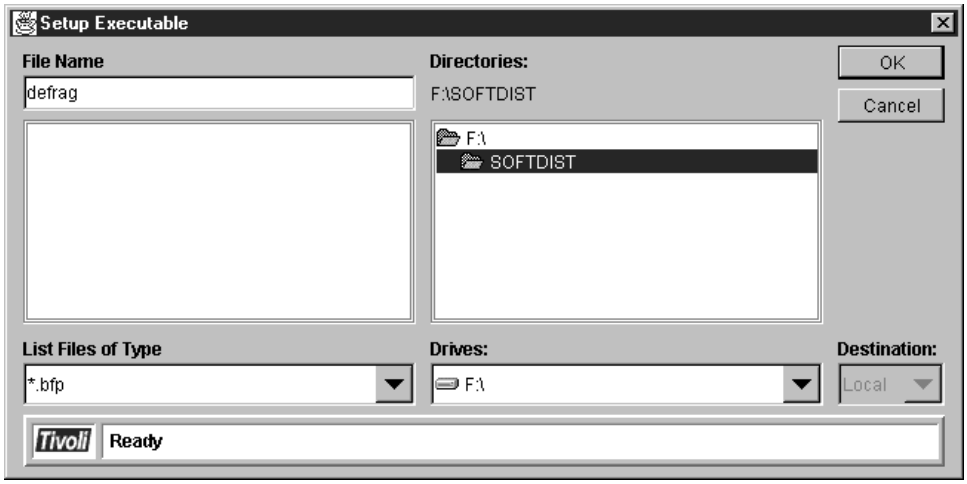


Figure 226. Save and Export the Package

After you exit the Custom Package utility you should notice that the Software Distribution Manager Task on the right side has a child process attached to it. If you use the right mouse button, you will see that you can edit or delete the package you just created as well as build an uninstall package.

Note: You can only edit or delete custom packages.

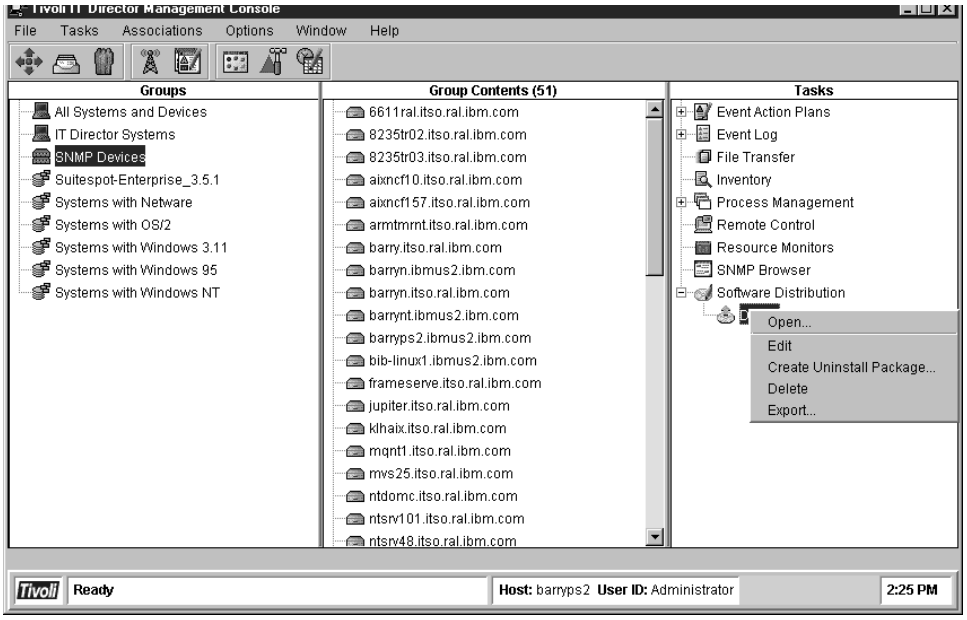


Figure 227. Console Updates

You can then drag the package you created onto a native agent. Upon doing so you will get the following pop-up window:

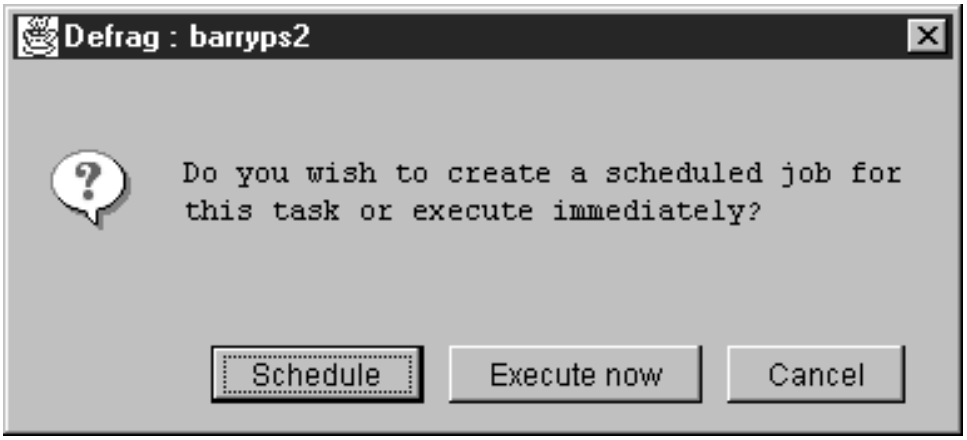


Figure 228. Schedule or Execute Now

You can either use the Schedule function or distribute it right away. In this case we chose to distribute it right away. A window showing the status of the distribution appeared. The window was updated when the package was distributed.

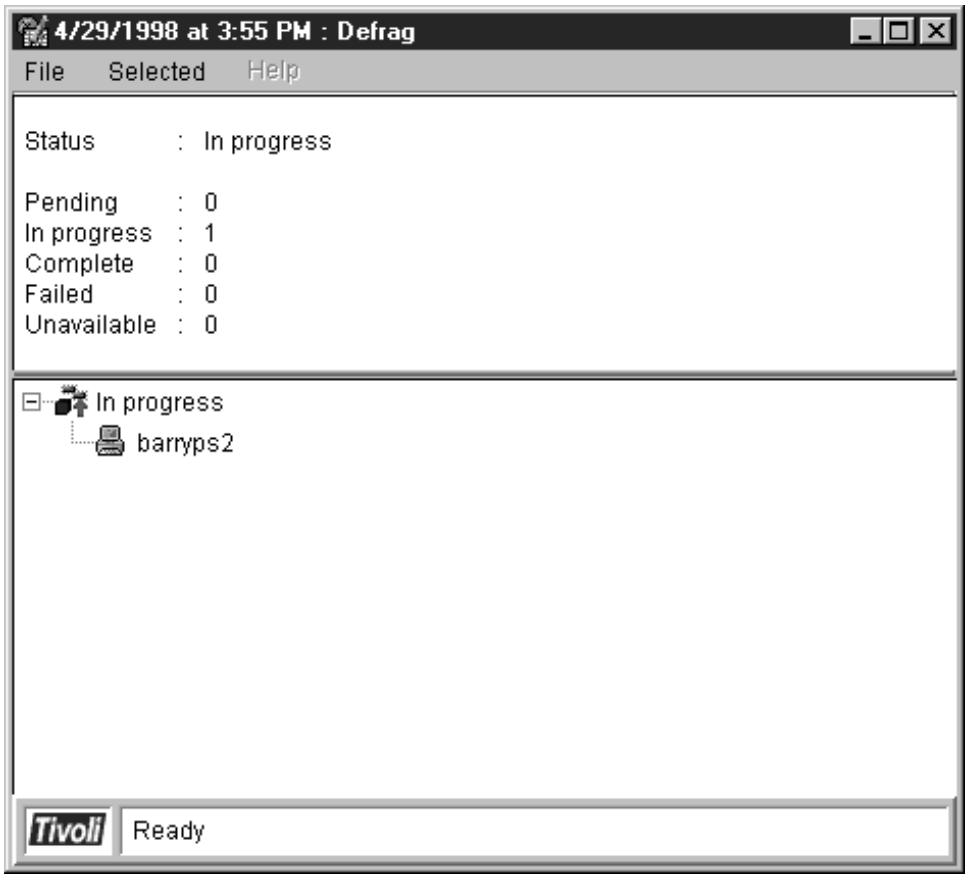


Figure 229. Package Distribution Status

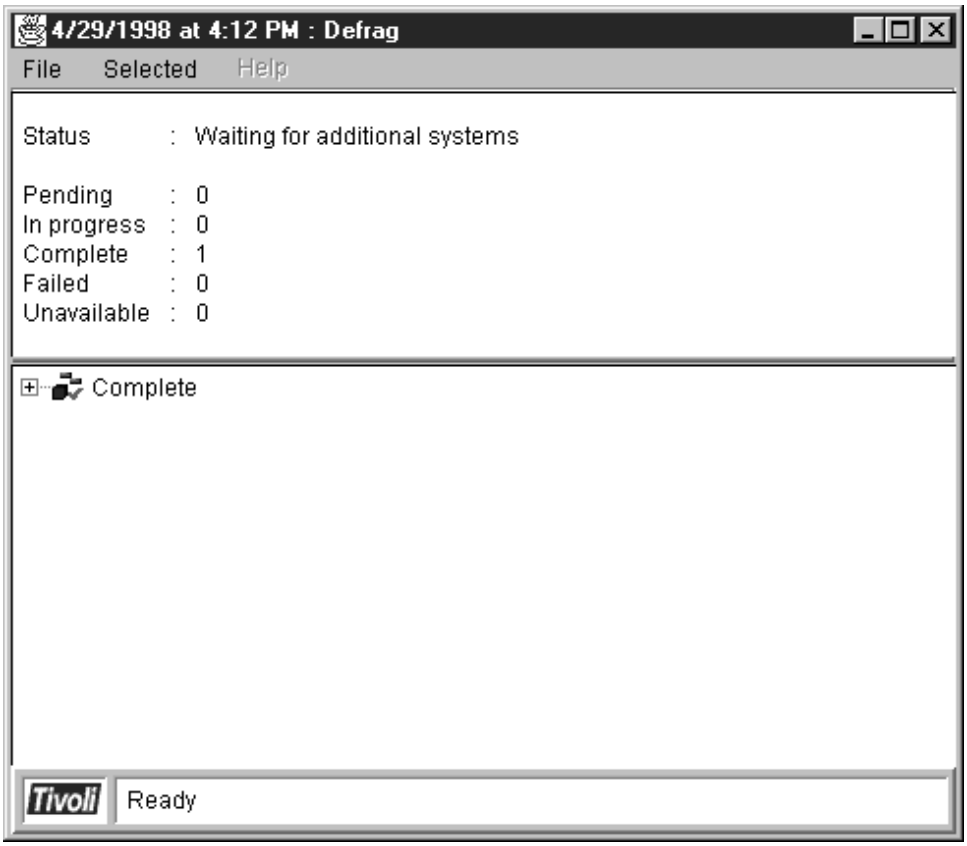


Figure 230. Package Distribution Completed

If you use the right mouse button on the native agent, you will get an option to view the log. You can choose to expand the contents of the log to a more detailed view as follows:

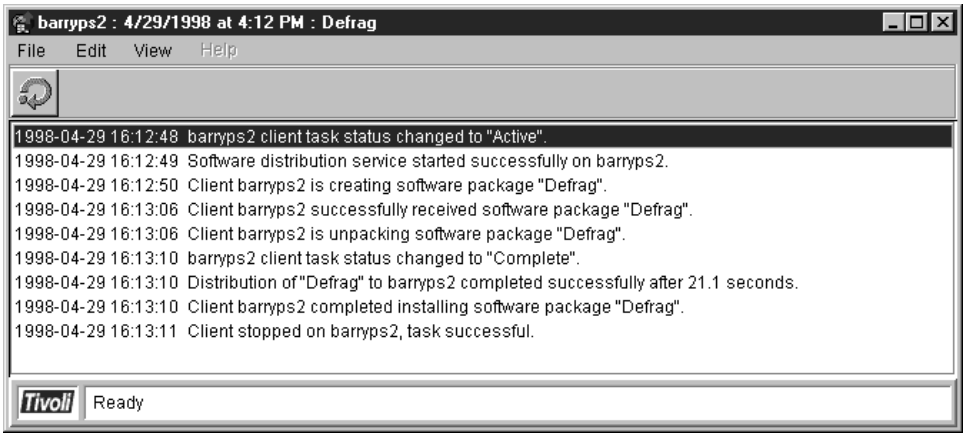


Figure 231. Package Distribution Completed

Note: If the software distribution fails, a file called bmpackag.log will be created in the \TivoliWg\bin directory on the agent where the failure occurred.

7.11 PDF Wizards

Tivoli IT Director comes with several wizards to guide you through the software distribution process. All you need to know are where the files are stored. In the case of the PDF distributor you just need to know where the setup, PDF and other files that are part of the package are stored. Then just follow the script.

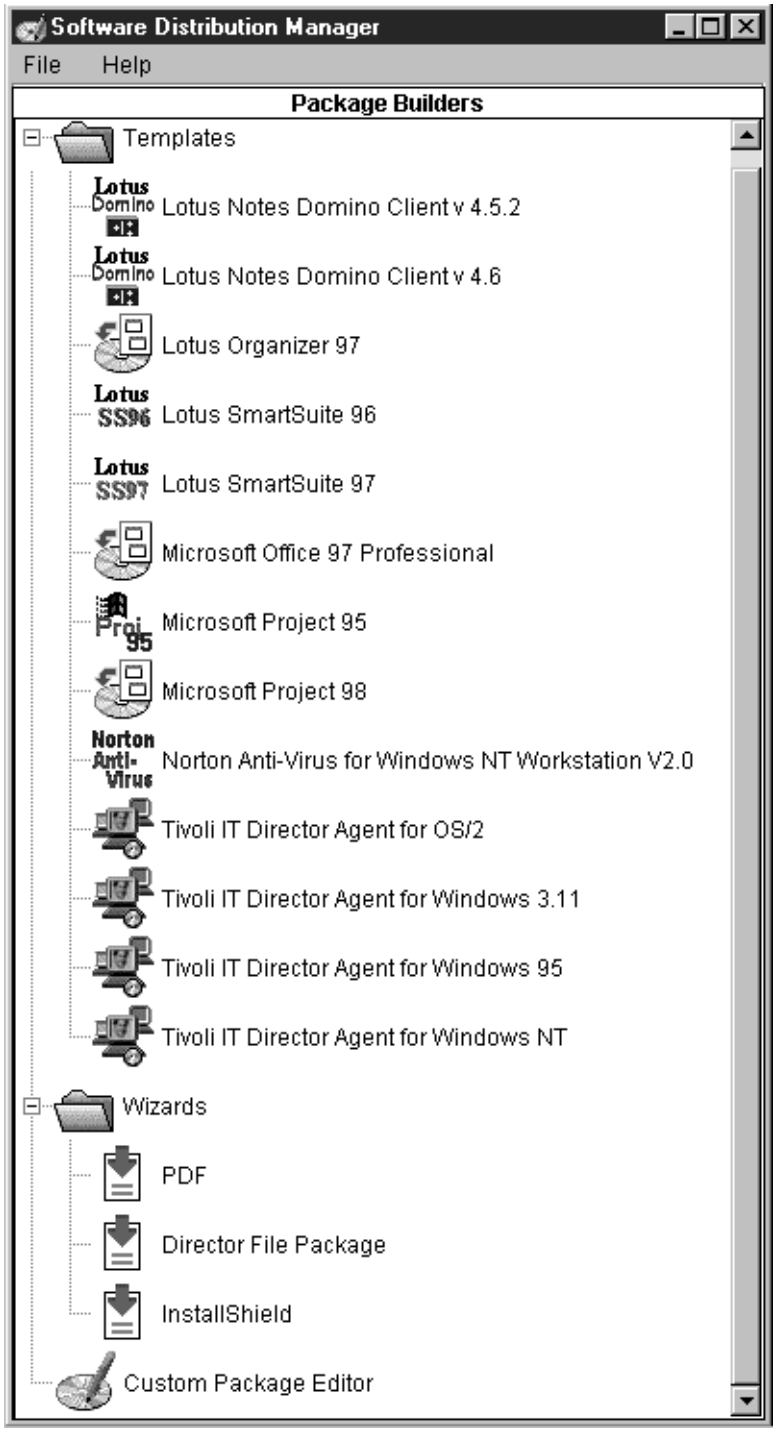


Figure 232. Software Distribution Wizards

To start the process double-click on the **PDF** icon in the Software Distribution Manager shown in Figure 232.

You have to know where your setup and PDF files are stored. You can use the built-in browser function to locate them if you are unsure of the directory you stored them in. The files can be located on the system that you are running the console on, or they can be stored at the Tivoli IT Director server itself. After you enter the file locations click on **Next**.

Figure 233. Build PDF Package

The PDF wizard will read the control information from the package and fill in the fields for you, as shown in Figure 234 on page 188.

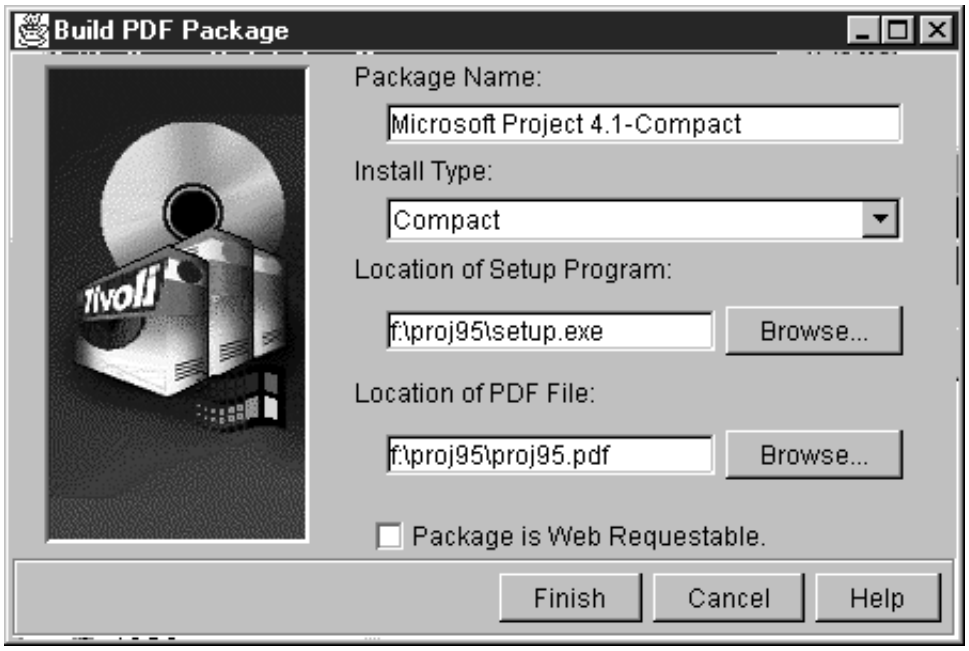


Figure 234. Control Information

If all of the information, including the install type, is correct, click on **Finish**. This will start creating the software package.

Figure 235. Create Software Package

Once the package is created your main console will be updated with the new package in the Tasks pane. If you expand out the Software Distribution Manager, you should see the new package as shown in the following window:

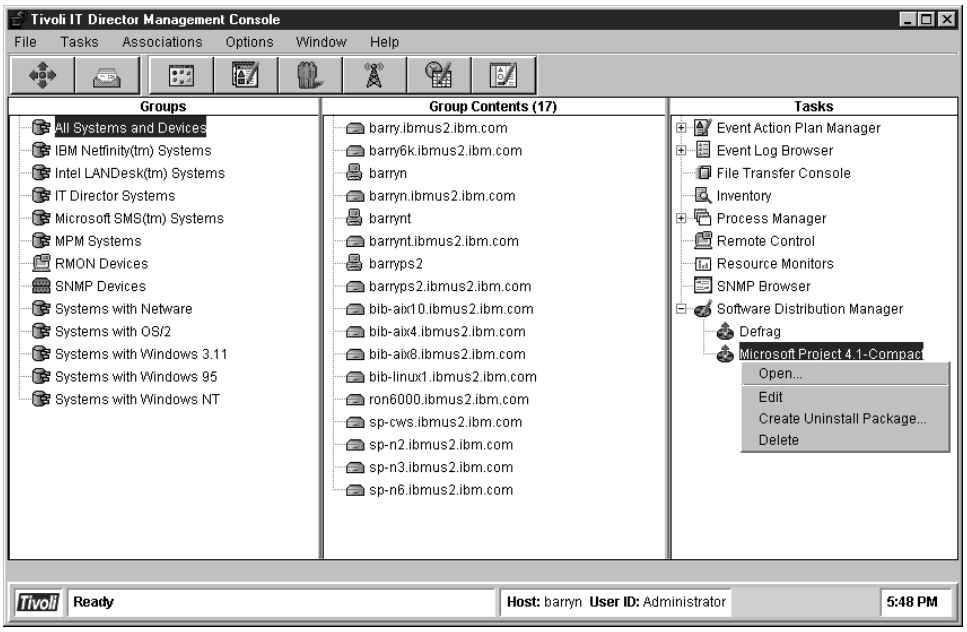


Figure 236. Main Console - New Package Available

If you drag the package over to a native agent, you will get a pop-up window asking you whether you want to schedule the installation, or execute it right away.

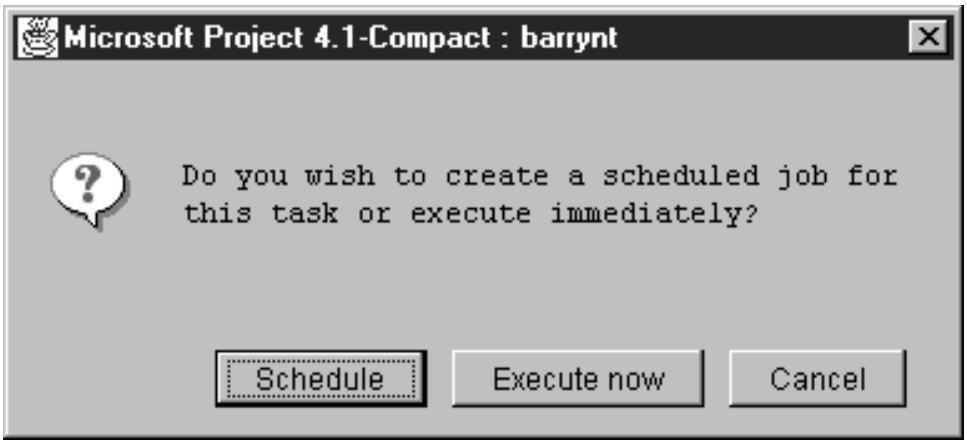


Figure 237. Drop and Drag the PDF

Once it begins execution, a status window will appear showing its current status as well as the systems that the package is being distributed to.

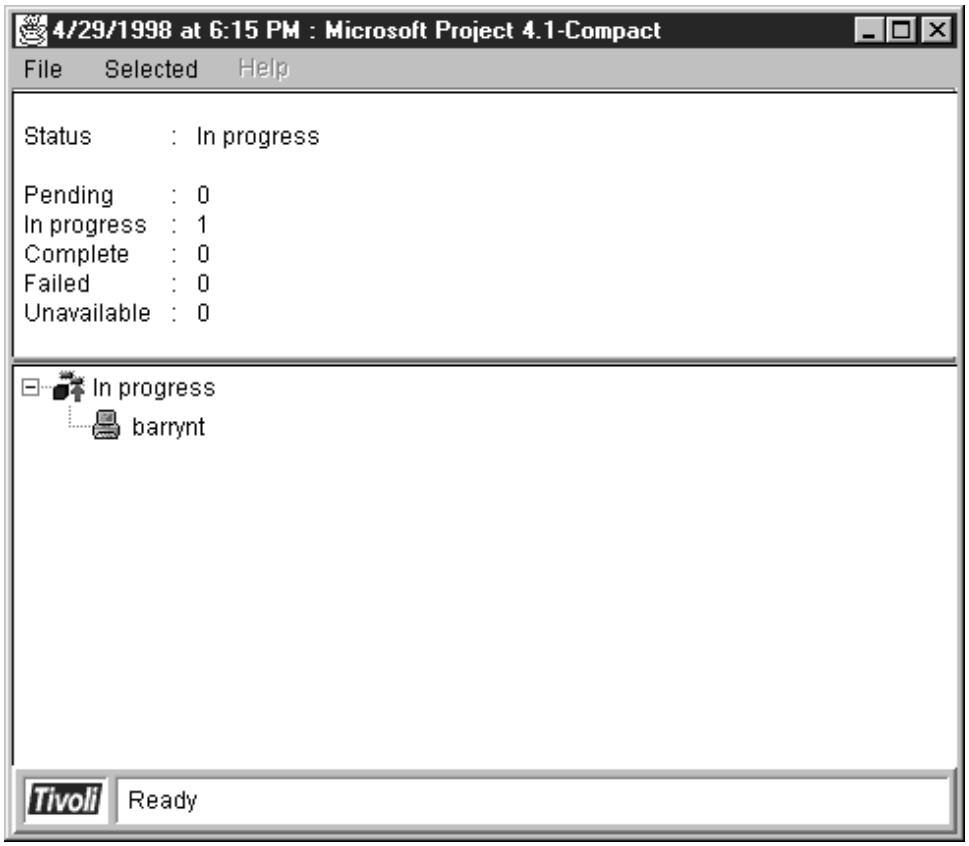


Figure 238. Status of the Distribution

When the distribution finishes the status window will be updated to show that it either failed or it completed successfully.

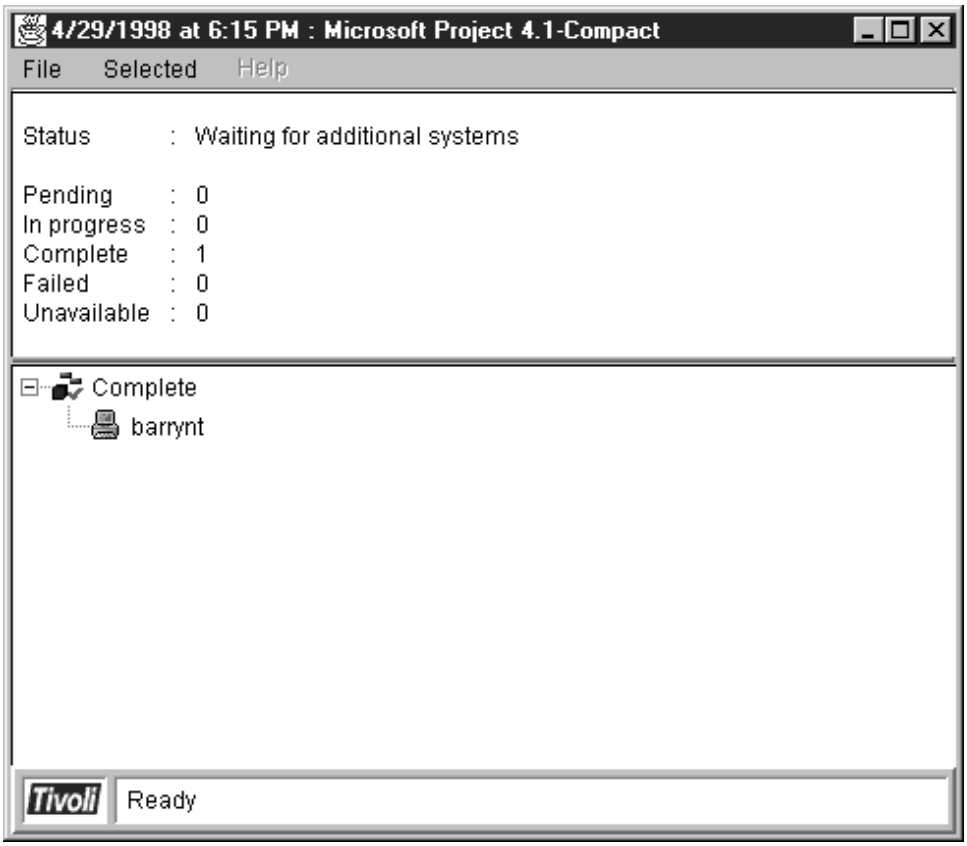


Figure 239. Status of the Distribution

If you want to check the progress of the distribution or analyze the results, you can look in the log. You can use the right mouse button on the agent (in the status window) to see the log.

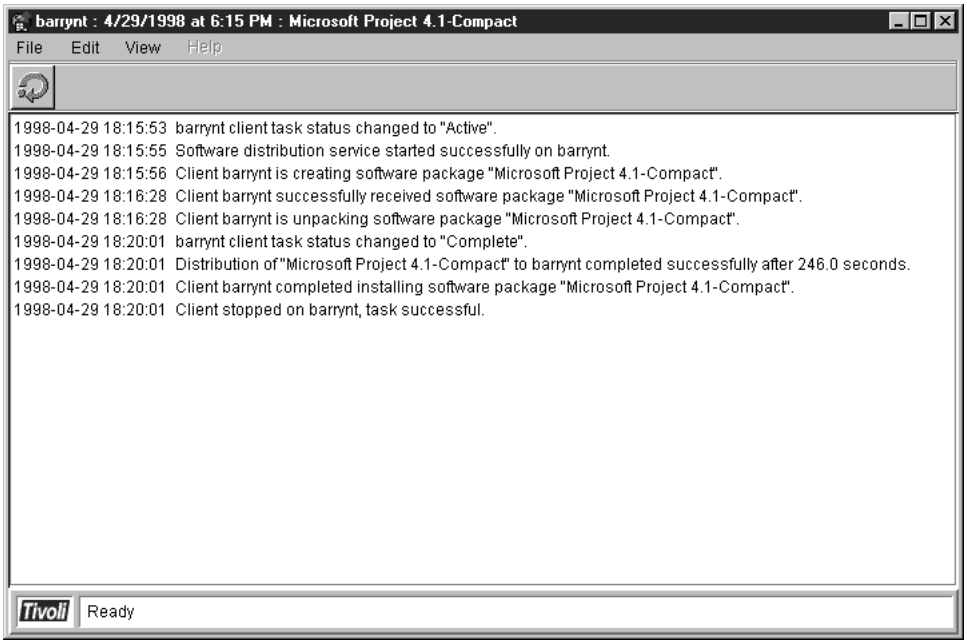


Figure 240. Distribution Log

7.11.1 File Packages Using InstallShield Importer

Another option for creating a file distribution package is to use the InstallShield wizard. Use this option when you have an application that uses a setup.exe or install.exe and InstallShield. If you are not sure whether or not your application uses InstallShield for its installation, you can click on the install executable and you will see a screen similar to the that follows:

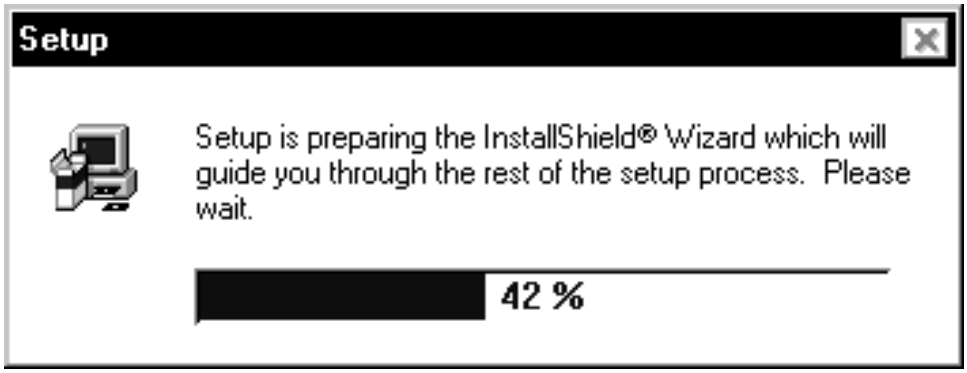


Figure 241. InstallShield Setup Screen

Note: What you are looking for are the keywords InstallShield Wizard.

7.11.2 Using InstallShield for Windows Platforms

Tivoli IT Director uses InstallShield Silent, which allows for a silent or unattended installation. In order to provide a silent install you must first record the necessary key strokes and answers to questions that your installation requires. You must first provide a response file to save that information. The InstallShield importer allows for the creation of a file package complete with a response file via the InstallShield Importer tool.

Note: InstallShield importer functions are only supported on 32-bit Windows platforms.

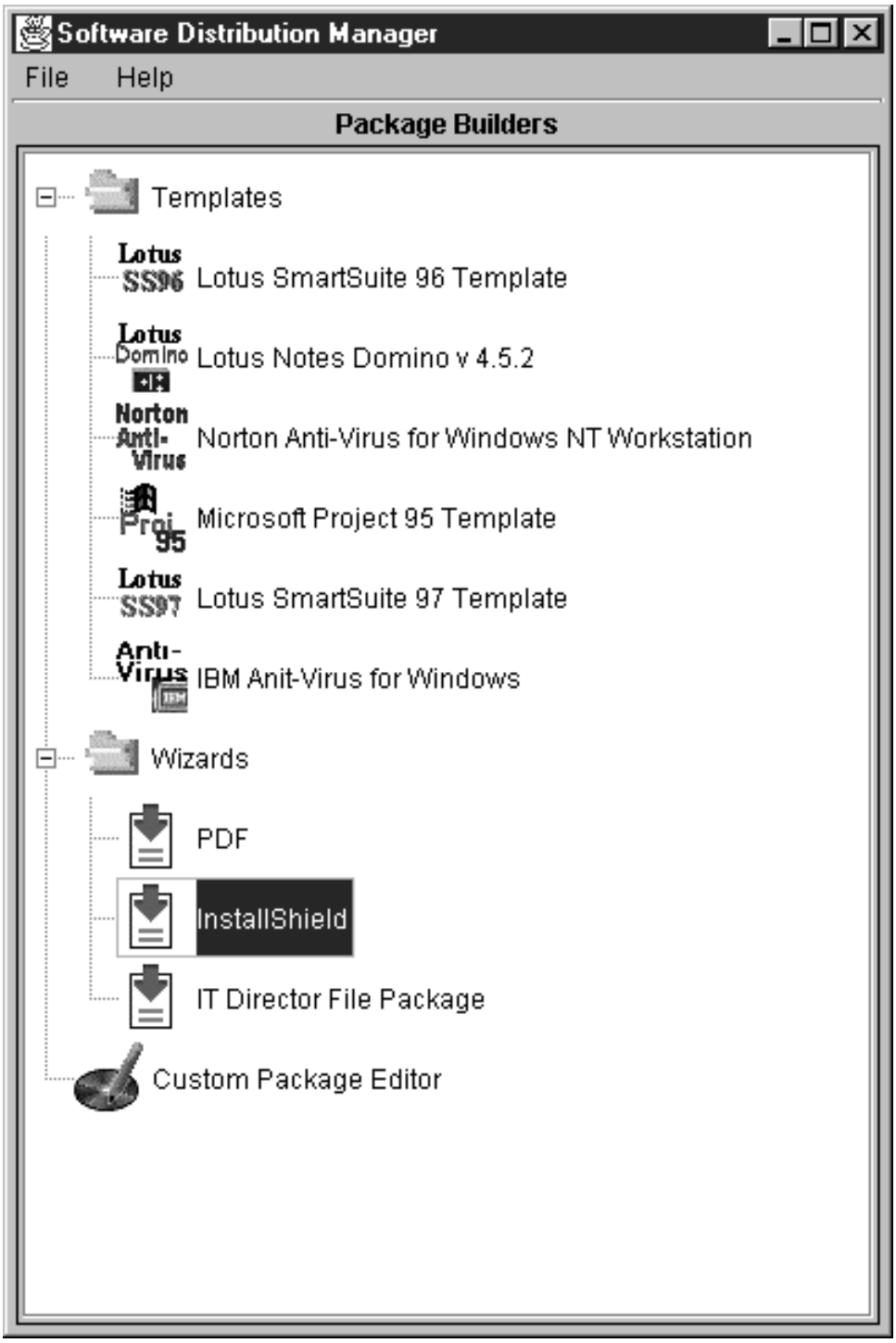


Figure 242. InstallShield Setup Screen

Before you begin you must first create your application's response file. In order to build the response file you need to run your application's setup.exe or install.exe; however, in this case you want only to capture the responses and not actually install the application. The directory that we worked with follows:

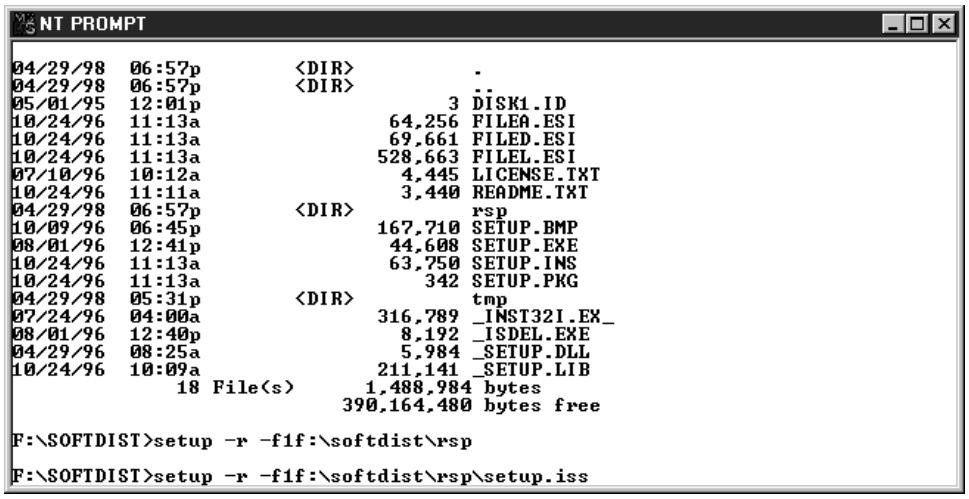


Figure 243. Diskeeper Install Directory

To build a response file follow the following steps:

1. Open a command prompt or DOS window and change to the directory where the install executable for your application is located.
2. You next want to run the install executable with the following parameters:

   ```
   setup.exe
   ```

   or

   ```
   install.exe -r -f1{path
   of response file},
   ```

   where

   - -r indicates to build a response file.
   - -f1 is followed by a fully qualified path and file name.
3. Answer the questions in response to your application as you would normally in order to build the response file.
4. When the installation is finished you are ready to build your Software Distribution package.

The response file will look something like the following:

```
[InstallShield Silent]
Version=v3.00.000
File=Response File
[DlgOrder]
Dlg0=SdWelcome-0
Count=6
Dlg1=SdShowDlgEdit1-0
Dlg2=SdLicense-0
Dlg3=SdAskDestPath-0
Dlg4=SdShowDlgEdit1-1
Dlg5=MessageBox-0
[SdWelcome-0]
Result=1
[SdShowDlgEdit1-0]
szEdit1=
Result=1
[SdLicense-0]
Result=1
[Application]
Name=Diskeeper Lite
Version=1.1
Company=Executive Software
[SdAskDestPath-0]
szDir=C:\ExecSoft\DkLite
Result=1
[SdShowDlgEdit1-1]
szEdit1=*.*
Result=1
[MessageBox-0]
Result=1
```

Figure 244. Response File

Once the response file is built you can use the InstallShield wizard that comes with Tivoli IT Director; just double-click on the icon to start the process. The following window will appear:

Figure 245. Build Package

Fill in the locations of the setup file and the response file and click on **Next**. The wizard will read the response file and create a window similar to the following:

Figure 246. Package Details

Click on **Finish** when you are ready to create the package.

Figure 247. Creating the Package

The console will get updated with the new package. Drag it over to your native agents to begin the installation process.

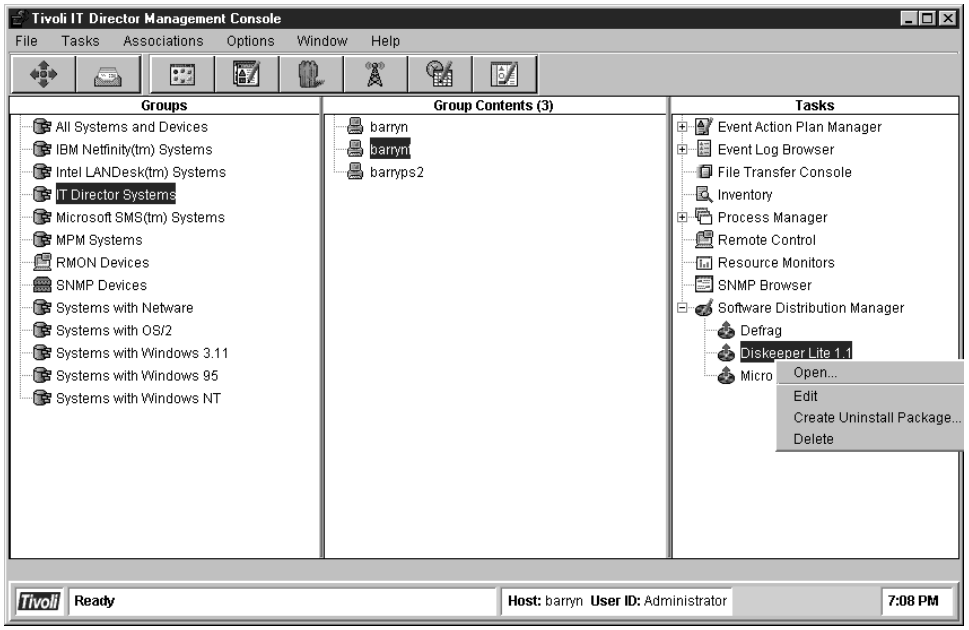


Figure 248. Creating the Package

At that point it is just like the PDF install process where you can schedule it to run now or later on.

Chapter 8. Web Publishing and Internet Technologies

This chapter explains how Tivoli IT Director takes advantage of Internet technologies by delivering systems management information to general users, enabling the Internet capabilities and extending the functions of Tivoli IT Director subsystems such as Event Management and monitoring.

With Tivoli IT Director you can perform event management and monitor tasks via the Internet notifying administrators or particular end users when an event has occurred.

Tivoli IT Director includes the following Internet services:

- Systems Management home page
- E-Mail and News Action handlers
- Monitor Webcasting
- Event Webcasting
- Systems management channels

8.1 Systems Management Home Page

Defining a systems management home page on the Internet enhances the capabilities of the system administrator as well as the general users who are no longer restricted to being in one central place to either query system status, request available Software Distribution packages or even view any events that may have been occurred on their resources.

Tivoli IT Director allows you to create and publish your home page on the Internet or your Intranet, without knowing anything about HTML coding. Once you have created your home page, you are then able to view alerts or even query system status. If you are familiar with HTML or have some tools to generate HTML, you can probably write some simple applications to add additional information to the Web pages that Tivoli IT Director creates for you.

To create your own home page, you should perform the following:

1. Click on the **Web Site Builder** icon from the Tivoli IT Director console or use the pull-down menu under Tasks.

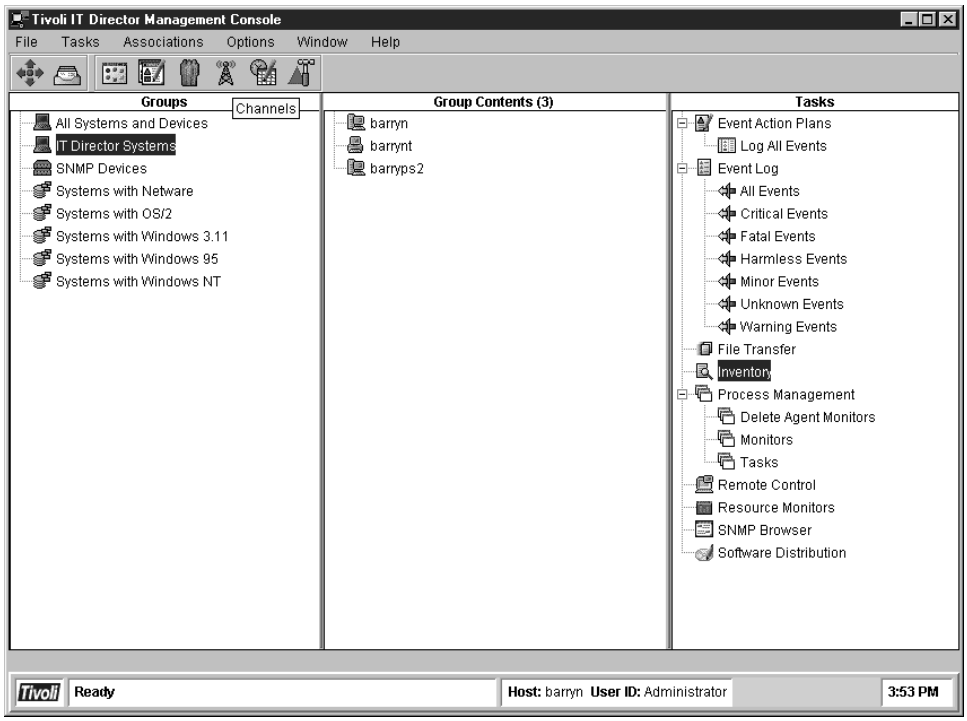


Figure 249. Web Site Manager Selection

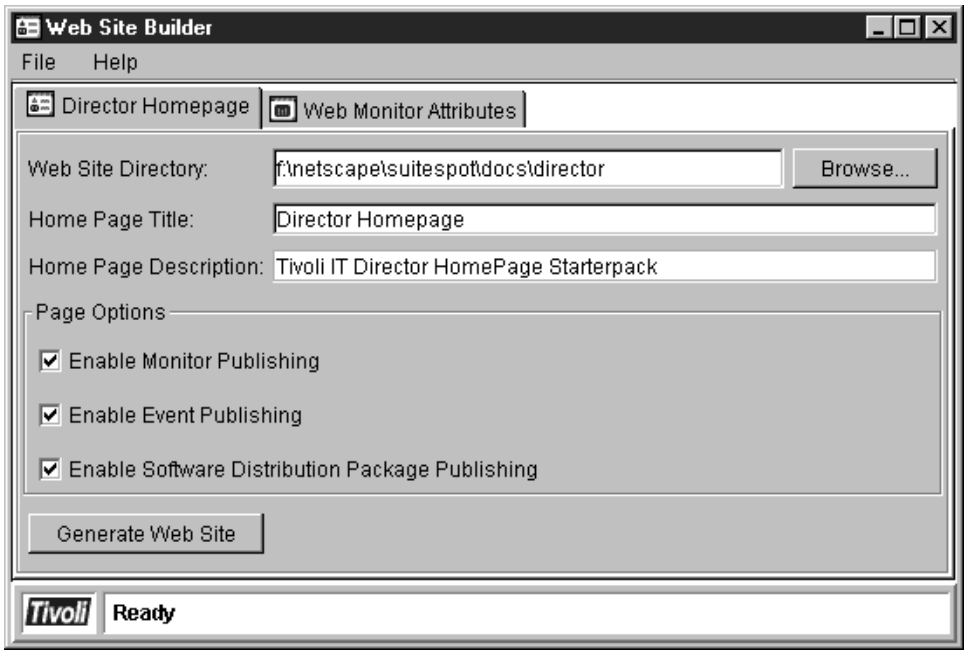


Figure 250. Web Site Manager

2. Fill in the directory path name where you would like your HTML home page stored. You will need to know the setup of your Web server so you know what pages can be *served* to users. Also, from a security perspective you want to make sure that no one else can write to those pages or run executable programs from it. In our case we used Netscape SuiteSpot V3.51 as our Web server on the Windows NT 4.0 platform.

Note: If you know the correct path name where you want to store your home page, you can enter it directly in the area provided, or you can click on the **Browse** button and search for the correct directory.

3. Give your home page a title.
4. Enter a description for this home page.
5. Decide if you will be publishing events, monitors and software distributions.
6. Click on **Generate Web Site**.

When the home page has been generated, you will receive the following window:

Figure 251. Home Page Generated

Once the home page has been generated, you can now generate Web information for:

- Monitors
- Events
- Software Distribution

Note: If you are already familiar with HTML coding and decide to make your own modifications to the source files after they are generated, be aware that any newly created home pages will be written over the existing Web page and as such all of your customization work may be lost.

From the following home page you can get to each of the Web functions:

Figure 252. Web Site Home Page

After specifying that we wanted to broadcast events to the Web we sent a couple of genevents to verify that it was set up correctly:

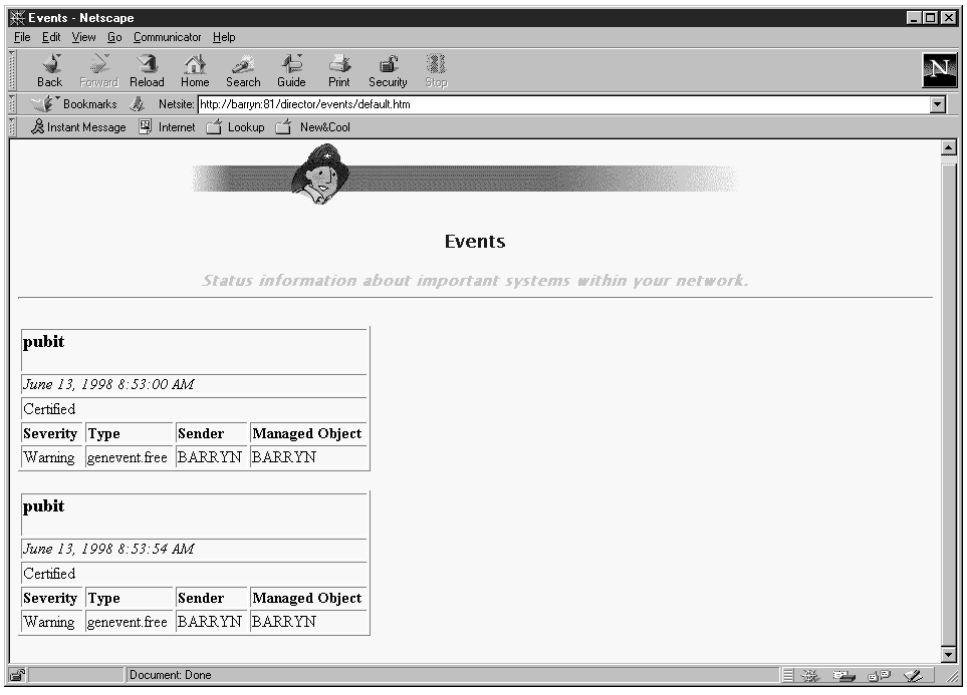


Figure 253. Sample Events

To verify that monitoring could be broadcasted we turned on monitoring for a few simple metrics:

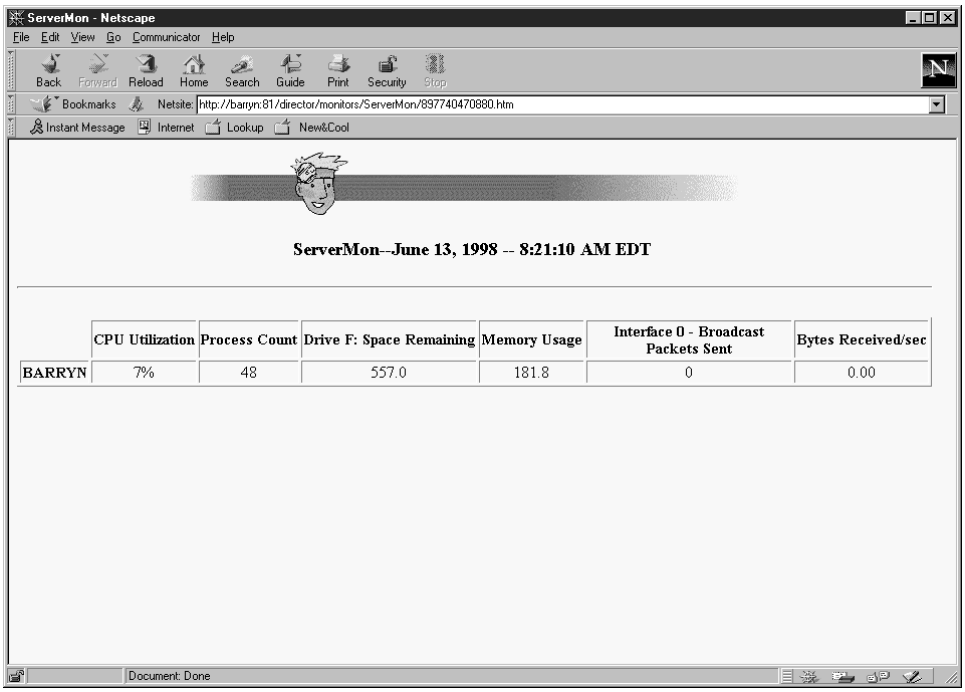


Figure 254. Monitors

8.2 Monitor Webcasting

The monitoring component of Tivoli IT Director allows you to publish monitor data to the Systems Management home page. This allows users with access to the Web page to check on the status of important systems. This data can be updated periodically based upon the customization parameters entered during the setup phase.

1. From the Tivoli IT Director console, select the system you want to be monitored.

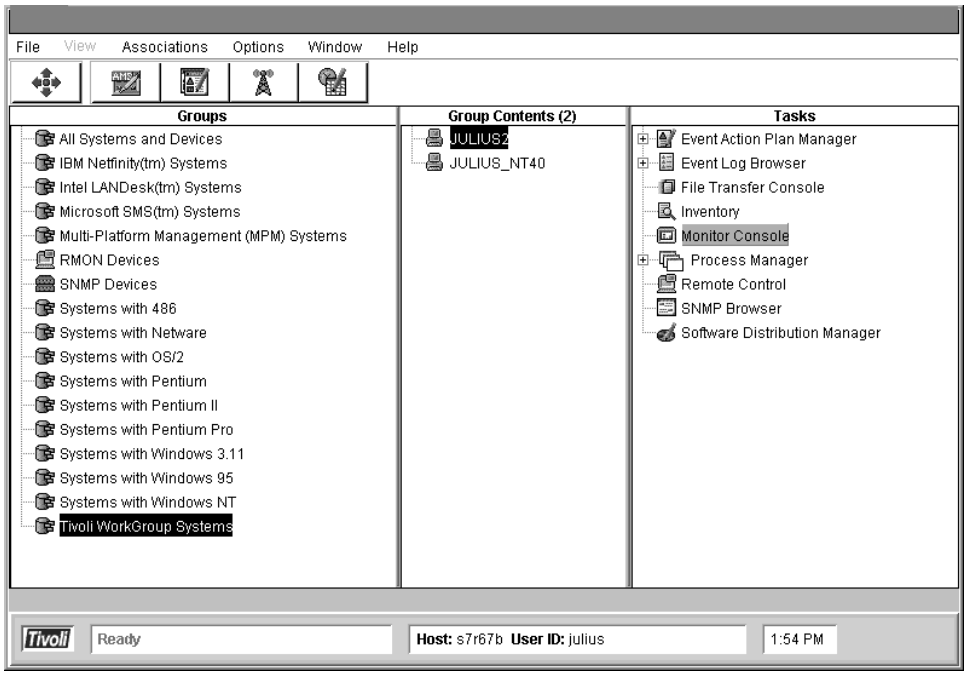


Figure 255. System to Monitor

2. Drag/drop the icon for the Monitor Console system from the Tasks list onto the required system or use the right mouse button on the system.
3. The Monitor Console will be started for this resource
4. Select the required monitors that you want displayed on the Web page.

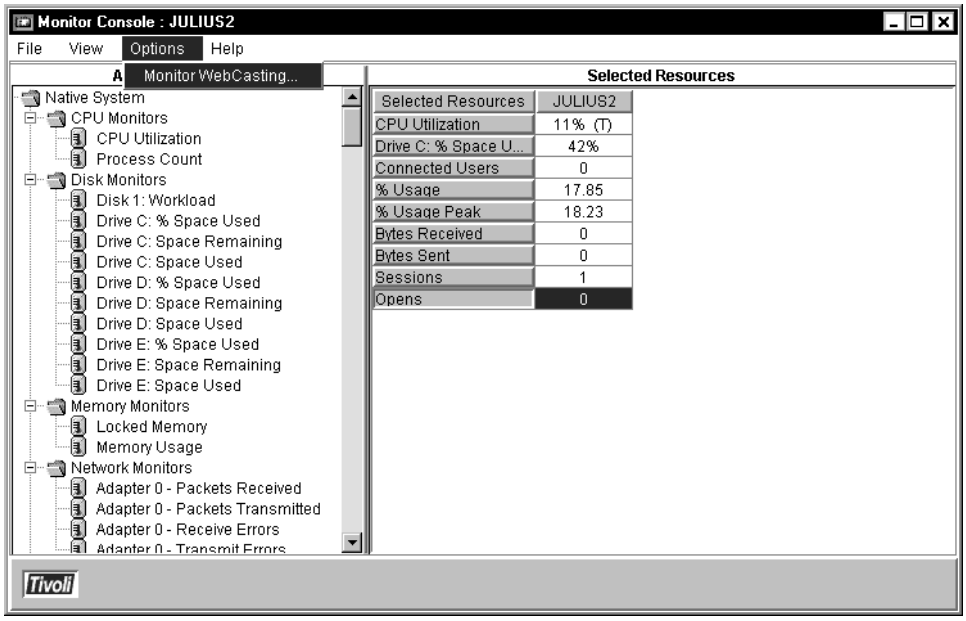


Figure 256. Sample Monitors

5. Click on **Options** from the action bar and then select **Monitor WebCasting**.
6. Enter the title and description of your monitor.

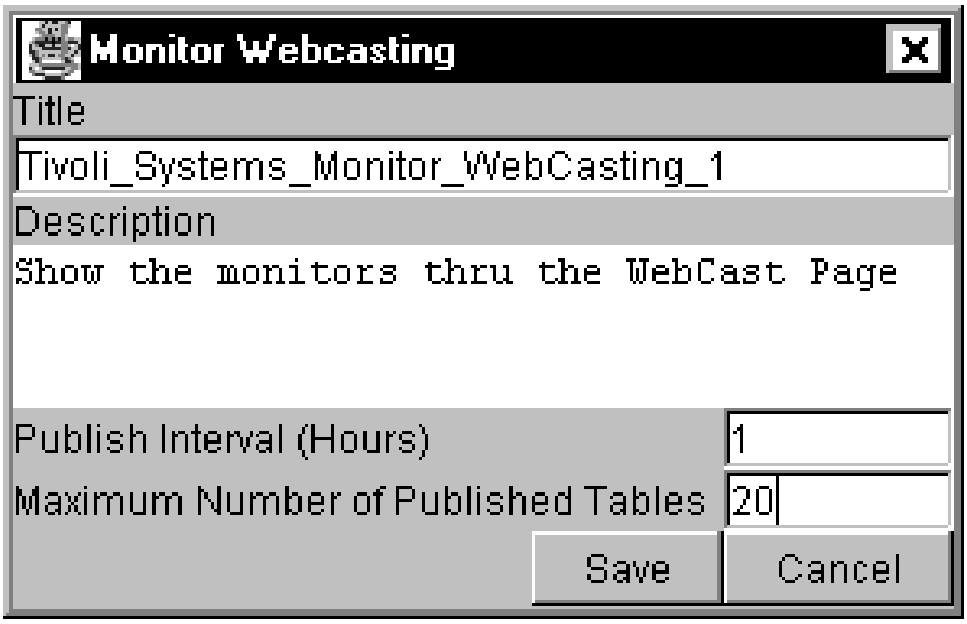


Figure 257. Webcasting Set Up

7. Enter the hourly interval that you would like these monitors to be published to the Web page.
8. Enter the Maximum Number of Published Tables to be displayed.
9. Click on **Save**.
10. Go to your browser to view the results.

    When you go to the Monitor Webcast page you will see that a new monitor has been produced with the name given when you created your new monitor.

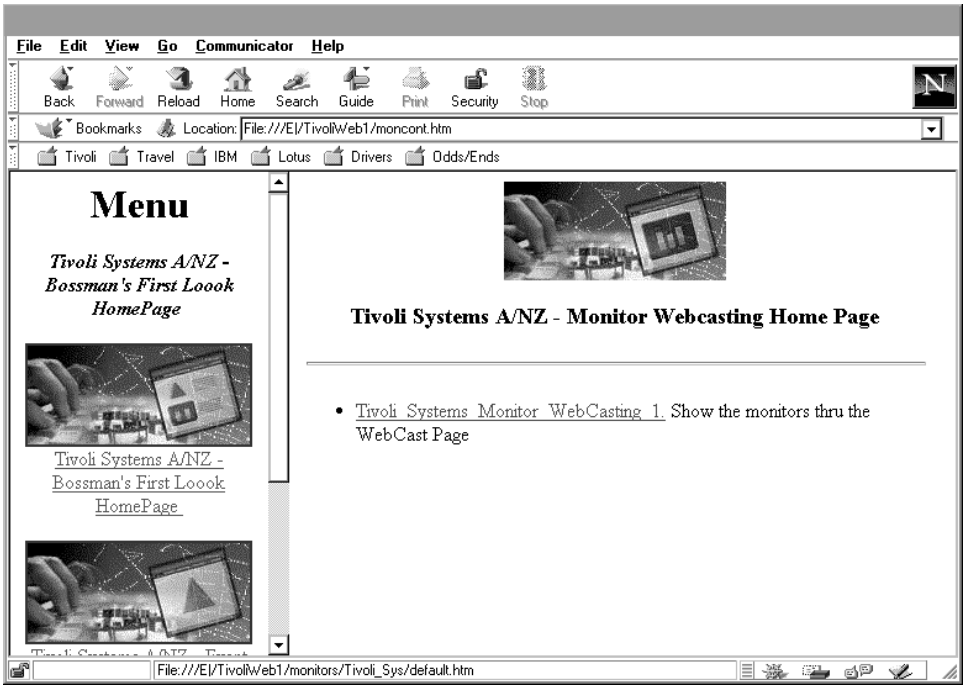


Figure 258. Monitor Web Page

11. Click on the hypertext portion of this selection. You will be shown all available monitors for this resource. All monitors will be date and time stamped.

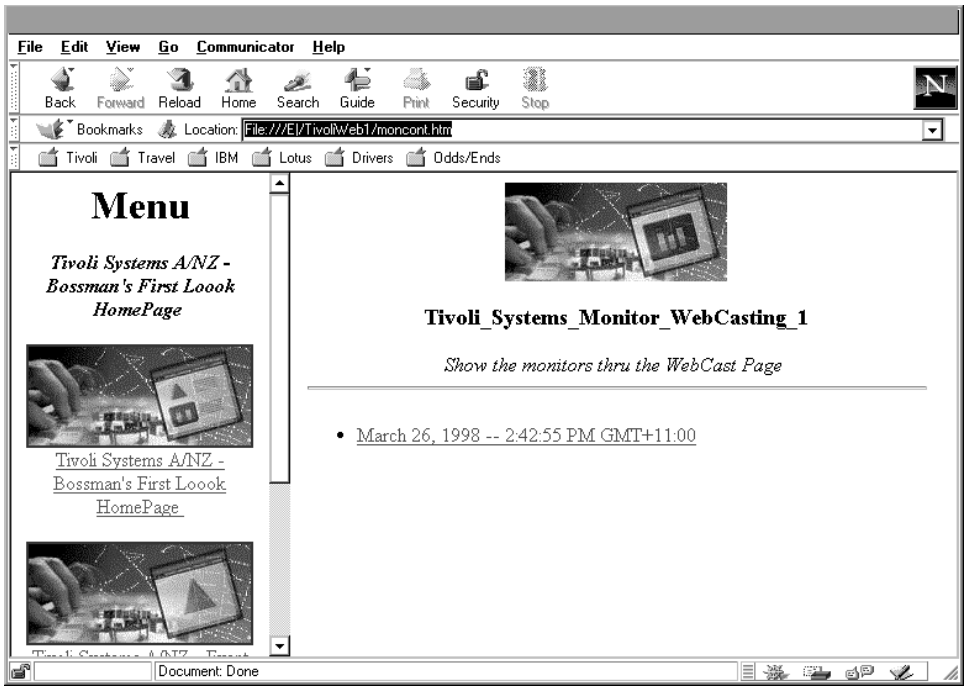


Figure 259. Select Time Interval

12. Click on the hypertext portion of the required monitor to show the tables requested.

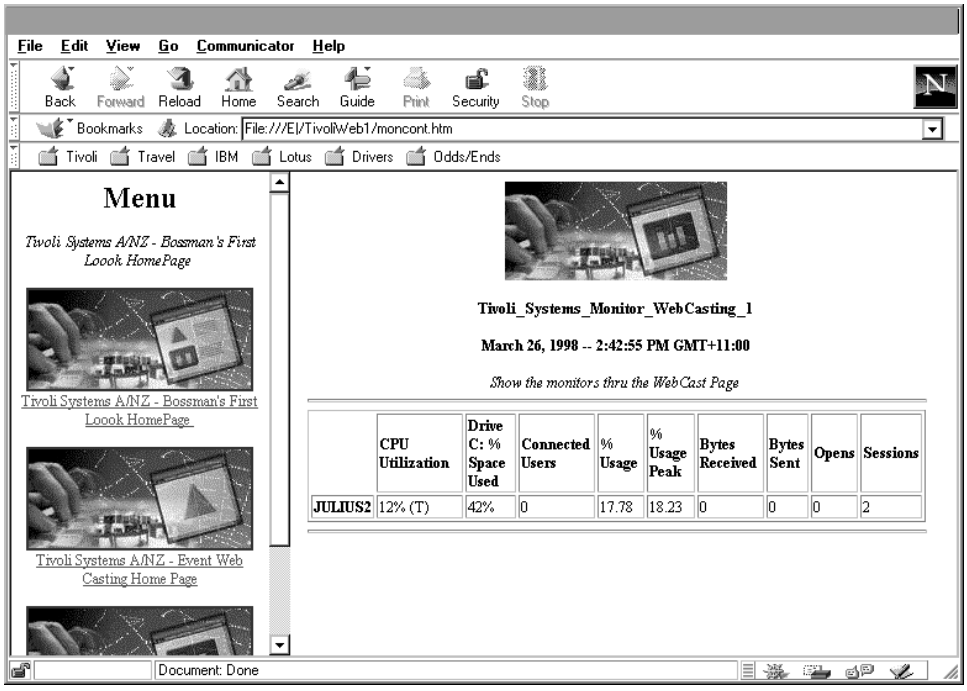


Figure 260. View Specific Monitoring Data

8.3 E-Mail and News Action Handlers

Using the Tivoli IT Director Event Management tasks, there is the capability to send e-mail and new group postings via Webcasting when an event has as occurred.

1. Click with the right mouse button on the **Event Action Plans** icon on the Tivoli IT Director management console.
2. Select **Build Event Action Plan**.

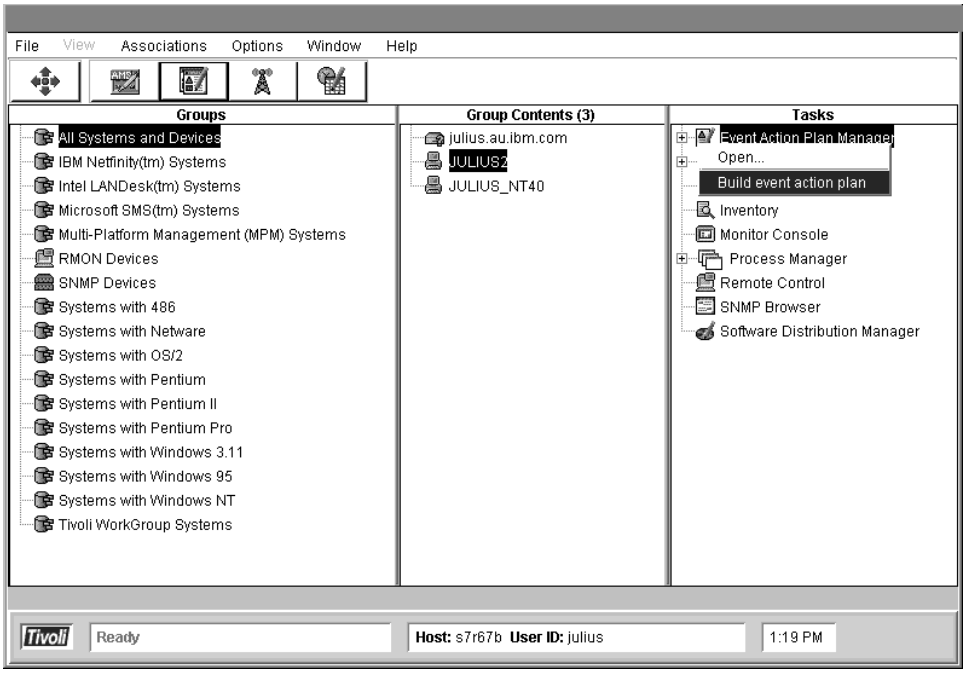


Figure 261. Select Build Event Action Plan

3. To post to a news group, click with the right mouse button on that task from the Actions sections list on the right-hand side of the screen and select **Customize**.

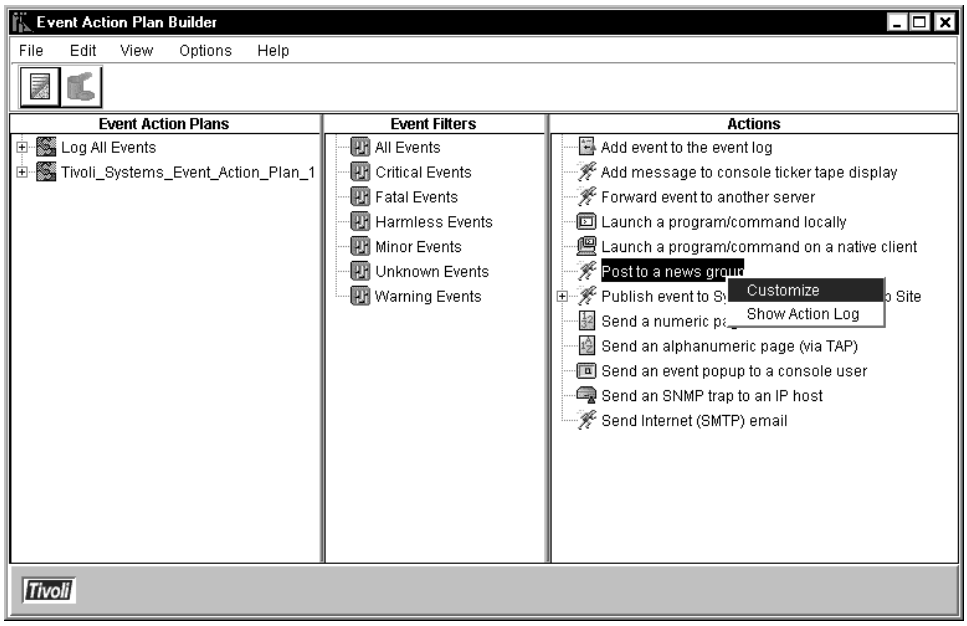


Figure 262. Customize Event

4. From the Customize Action dialog box, enter the required details for:
   - News Group

     For example, `Junk`
   - Reply-to Address

     For example, `Julius.Milczarek@tivoli.com`
   - News Host

     For example, `mdthomas.raleigh.ibm.com`
   - Port

     For example, `119`
   - Subject for News Posting

     For example, `Tivoli_Systems_News_1`

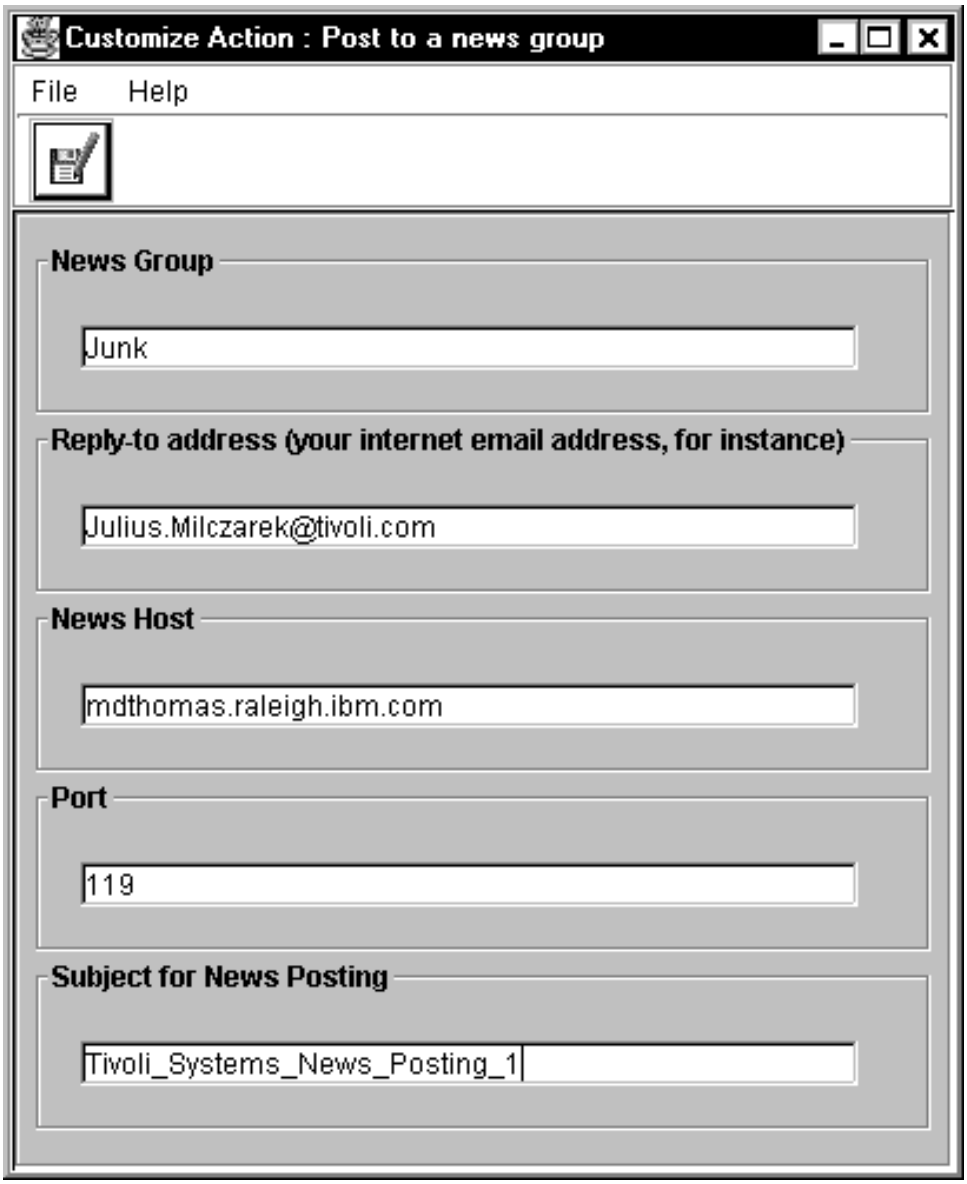


Figure 263. Post Setup

5. Click on the **Save** button at top of the dialog page.
6. Enter a descriptive name for your action.

Figure 264. Event Action Name

Your new action will be displayed under the Post to news group action icon.

7. Click with the right mouse button on the new action and select **Test**.

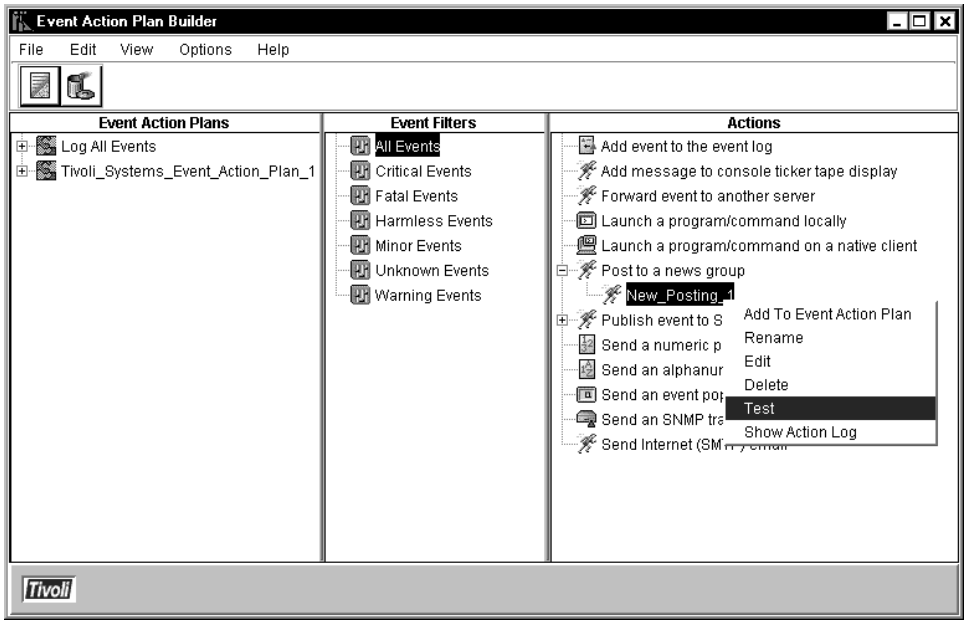


Figure 265. Event Action Plan Builder

8. Click on **OK** in the information dialog box that will appear telling you that the action has been launched.

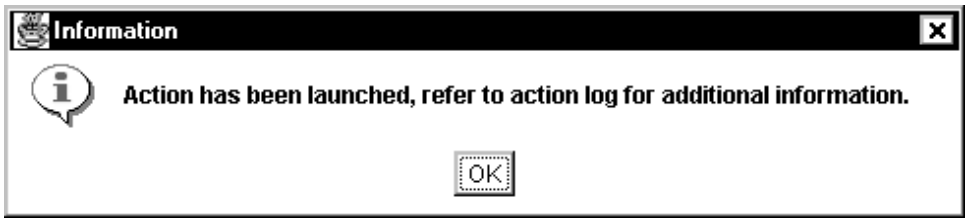


Figure 266. Action Launched

9. Verify that your news host is defined in your browser preferences.
10. Start **Discussion Group Viewer**. For example, we used Netscape Collabra.
11. Find the message you would like to view.

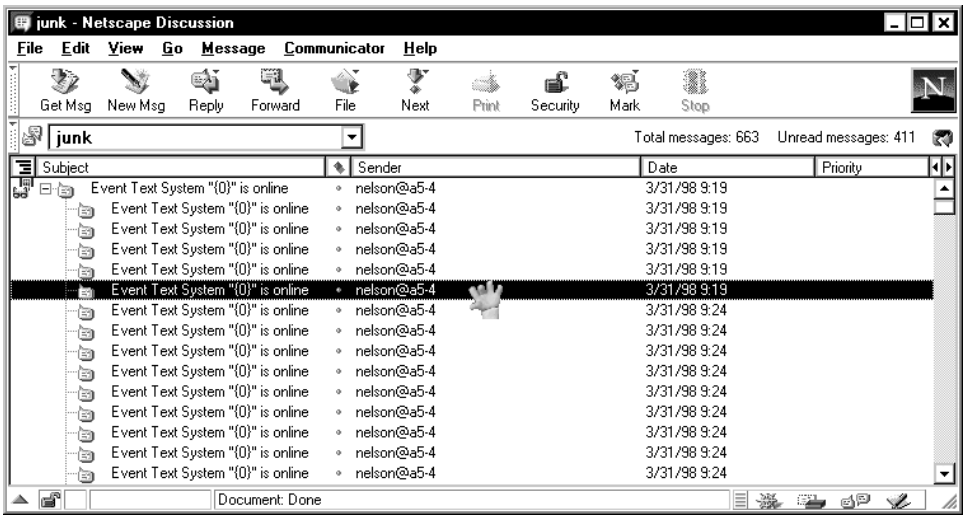


Figure 267. View the Message

12. Double-click on this message to view the details.

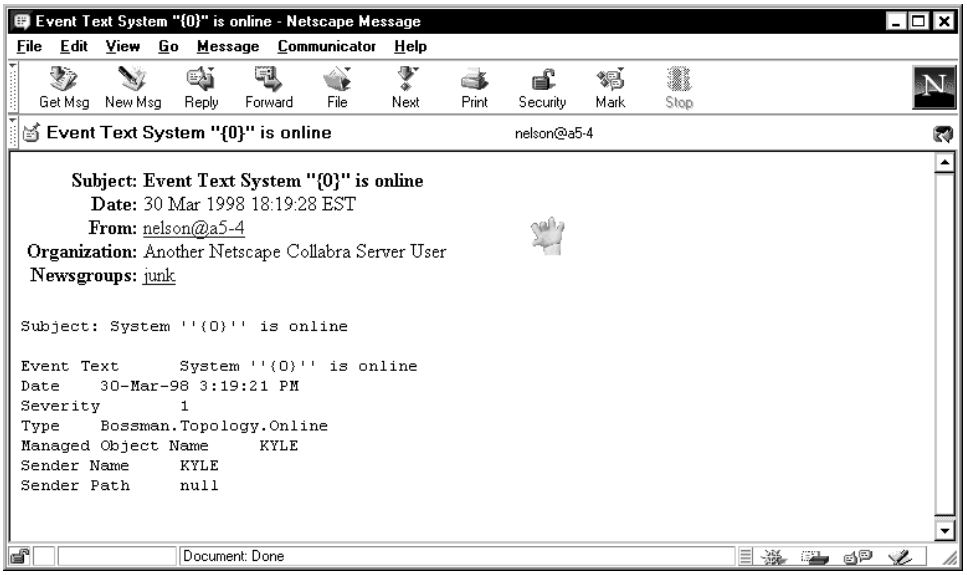


Figure 268. Message Details

1. Click with the right mouse button on the **Event Action Plans** icon on the Tivoli IT Director management console.
2. Select **Build Event Action Plan**.

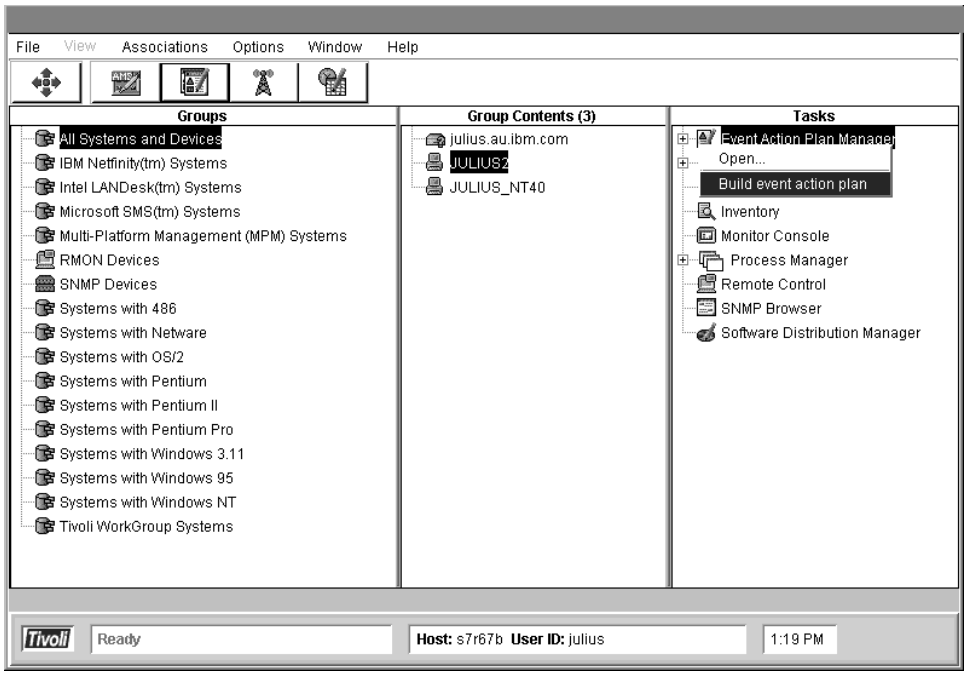


Figure 269. Select Build Event Action Plan

3. To Send Internet (SMTP) e-mail, click with the right mouse button on that task from the Actions sections list on the right-hand side of the screen and select **Customize**.

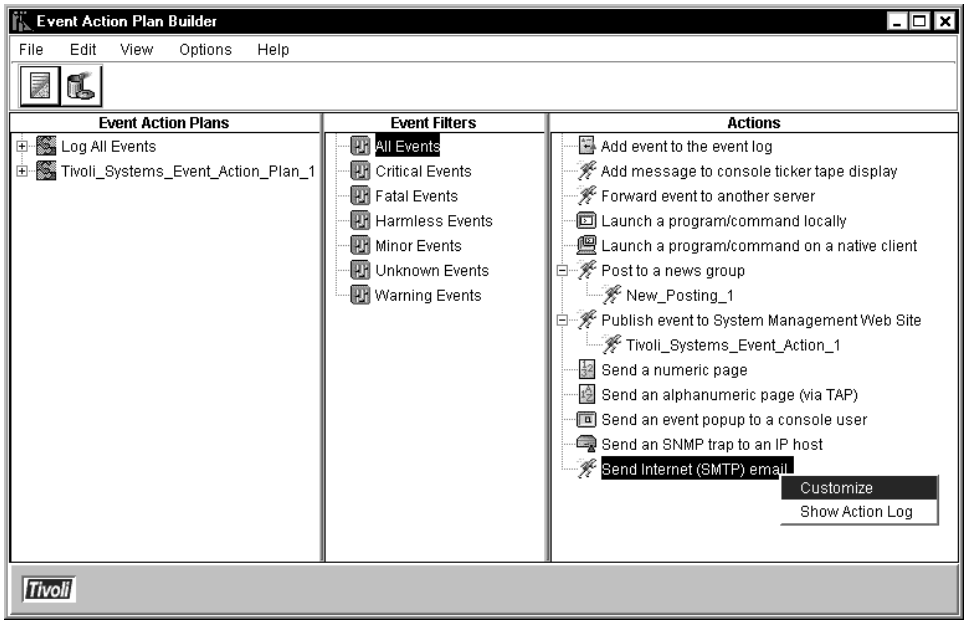


Figure 270. Customize SMTP

4. From the Customize Action dialog box, enter the required details for:
   - Internet E-Mail Address

     For example, `Julius.Milczarek@tivoli.com`
   - Reply-To

For example, `Gus.Nader@tivoli.com`

- SMTP e-mail server

  For example, `news-s01.ny.us.ibm.net`

- SMTP Port

  For example, `25`

- Subject for Mail Posting

  For example, `Tivoli_Systems_News_1`

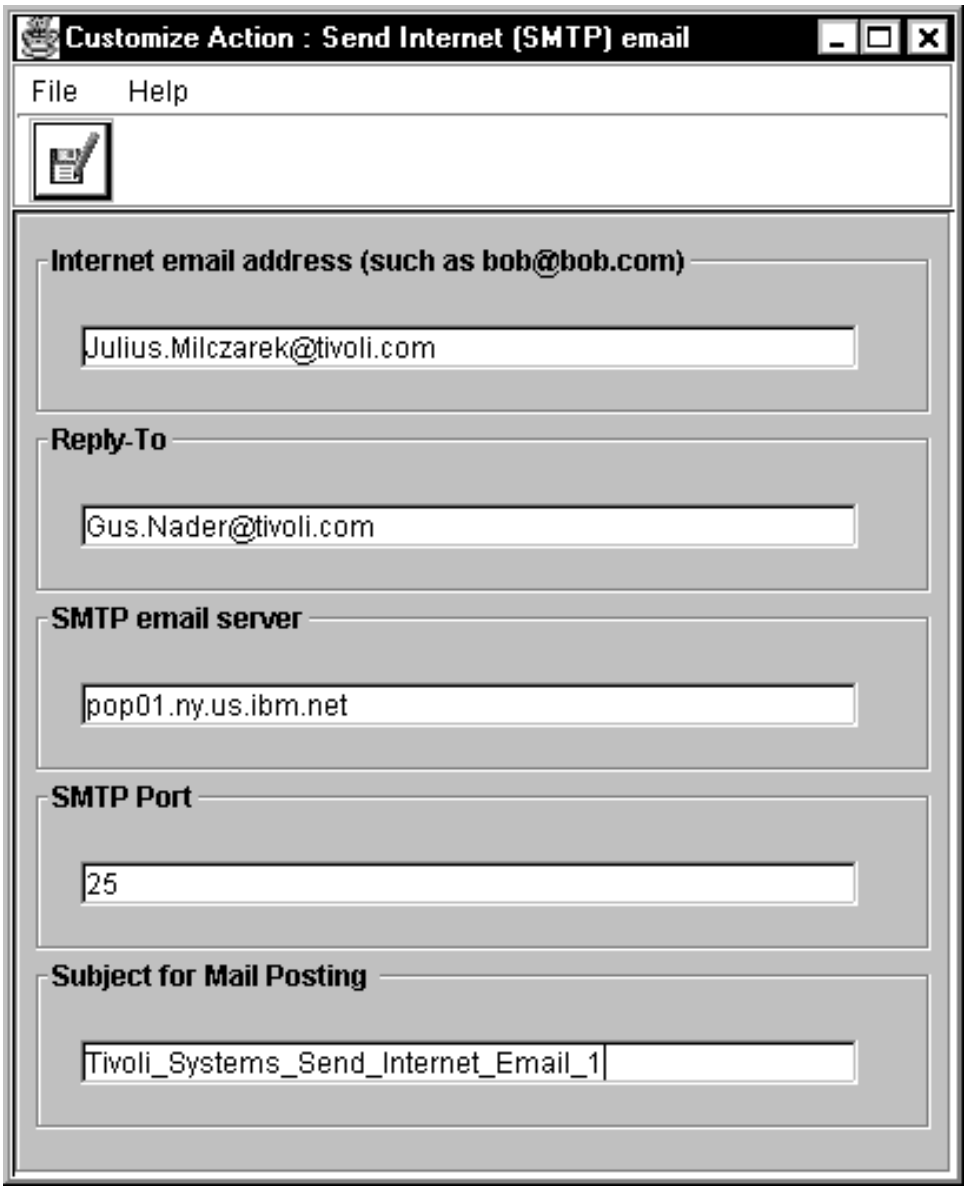


Figure 271. Customize E-Mail Information

5. Click on the **Save** button at top of the dialog page.
6. Enter a descriptive name for your action.

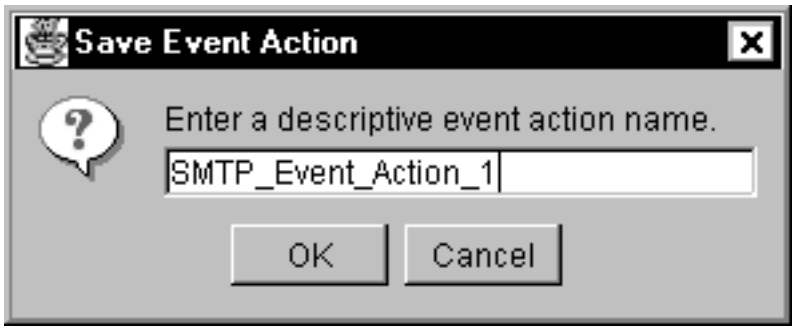


Figure 272. Save Event Action

Your new action will be displayed under the Send Internet (SMTP) e-mail action icon.

7. Click with the right mouse button on the new action and select **Test**.

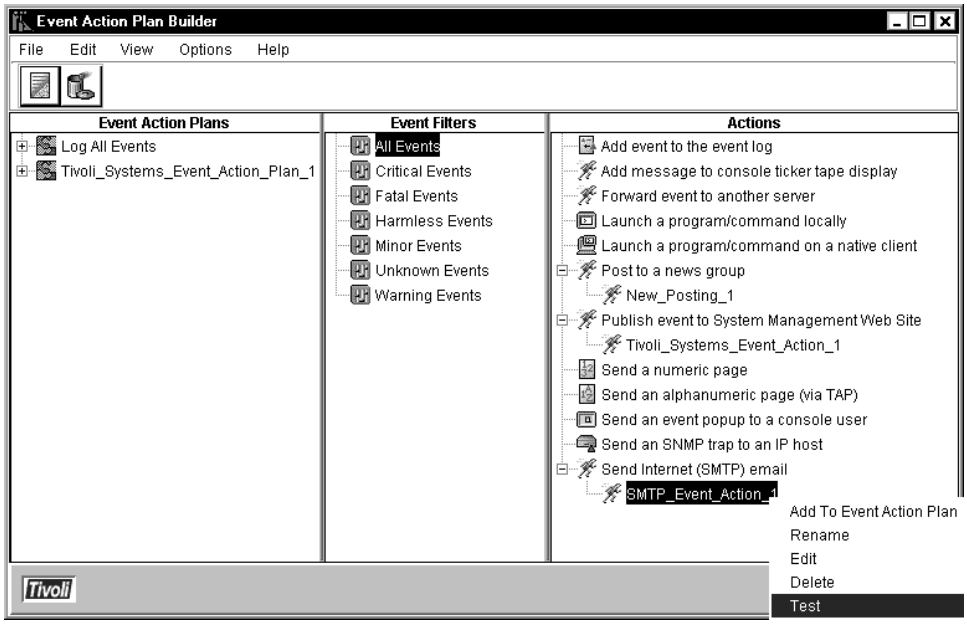


Figure 273. Test Your Event

8. Click on **OK** to complete the test.

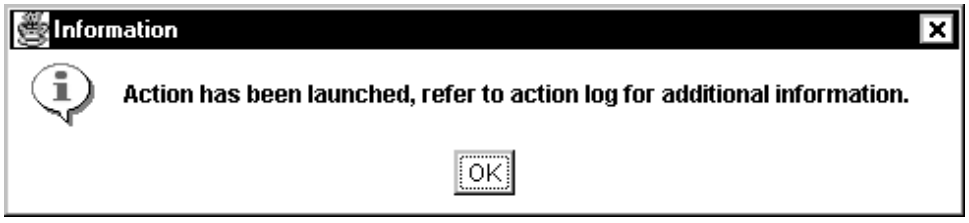


Figure 274. Event Tested

8.4 Systems Management Channels

Tivoli IT Director will be able to subscribe to Webcast channels allowing administrators the capability via the systems management channel service to broadcast customized information directly.

The main purpose of the channel will be to push software packages to the Tivoli IT Director server.

Administrators will also be able to communicate the availability of certain software patches, the latest technology news or even advertise promotions.

1. Click on the **Systems Management Channel Console** icon on the action bar of the Tivoli IT Director management console. You will be presented with the Systems Management Channel Console.

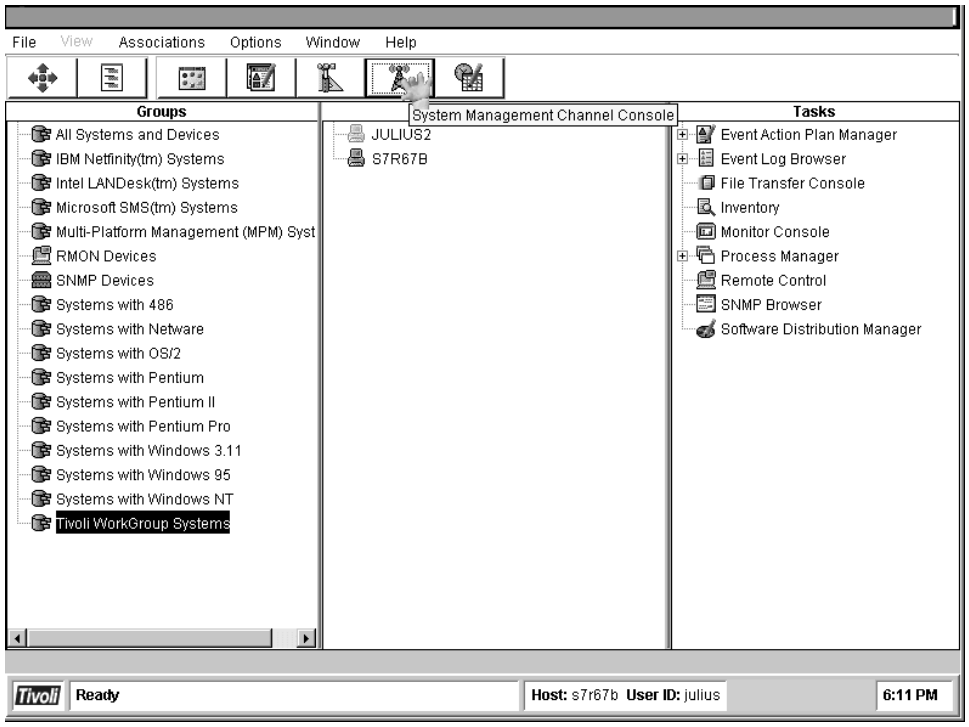


Figure 275. Systems Management Channel Console Selection

Figure 276. Channel Console

2. If you have a proxy server, you can define this by clicking on the **Options** button on the action bar and selecting **Set Proxy**.

Figure 277. Set Proxy

3. Enter your Web proxy name or address and click on **Save**.

   Be sure to update the Port field. The default port for proxy servers is 80.

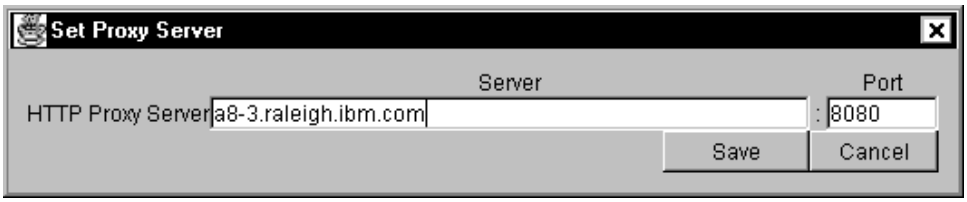


Figure 278. Update Proxy and Port

If you do not have a Web proxy to define or have already taken the steps to define your Web proxy, you can now subscribe to your channel.

4. Click on **Channel** from the action bar and select **Subscribe**.

Figure 279. Subscribe to the Channel

You will now be presented with a Channel Selectors dialog where you enter the required URL you wish to subscribe to.

5. Enter the required URL Name of the Channel for example, http://mdthomas.raleigh.ibm.com/smc/reseller2.cdf.

Figure 280. Enter URL Where the CDF Is Located

6. Next you will enter the refresh interval, in minutes that you would like this information to be posted as well as a user ID and password.

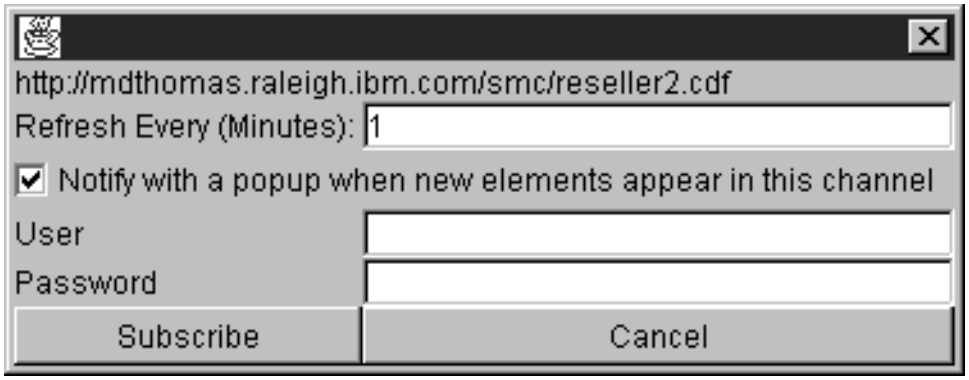


Figure 281. Refresh Interval

Once you click on Subscribe, the status indicator at the bottom of the Systems Management Channel Console will show that you are being subscribed to the channel.

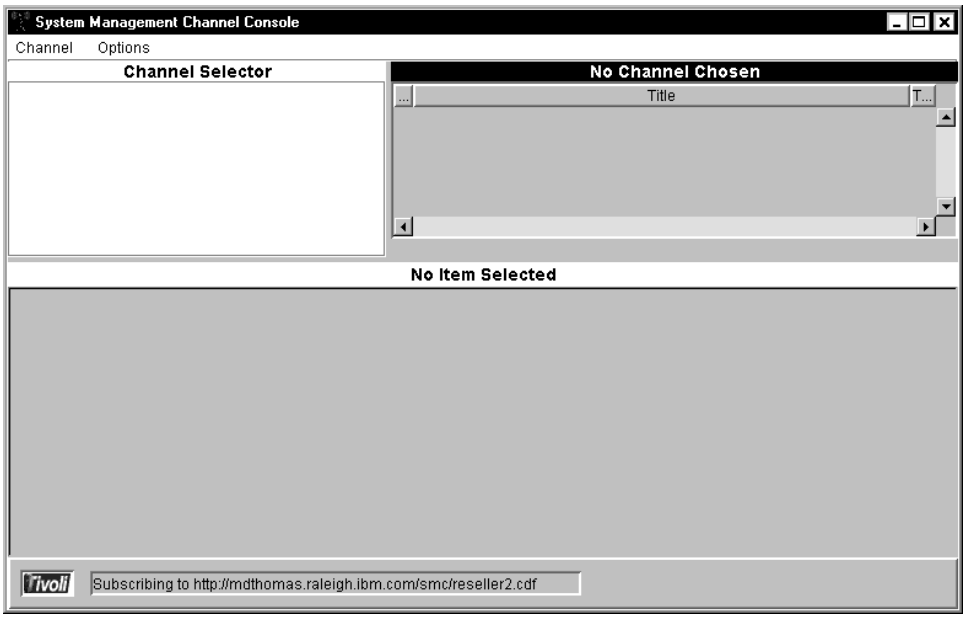


Figure 282. Subscribing to the Channel

Once the subscription is complete, the Channel Selector section will show the channels that you are subscribed to.

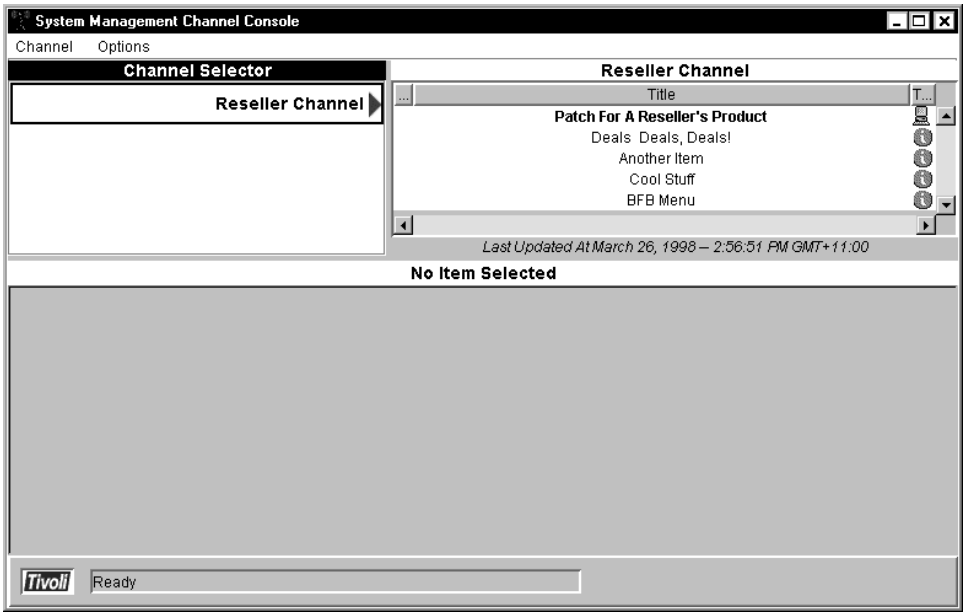


Figure 283. List of Subscriptions

Figure 284. Another Channel

7. Clicking on the required channel will display that channels titles in the right-hand pane of the console.
8. Click on the required title to see selected information.

   Clicking on Patch for a Reseller's Product will display the following information in the bottom section of the console, showing package information and an option to get packages.

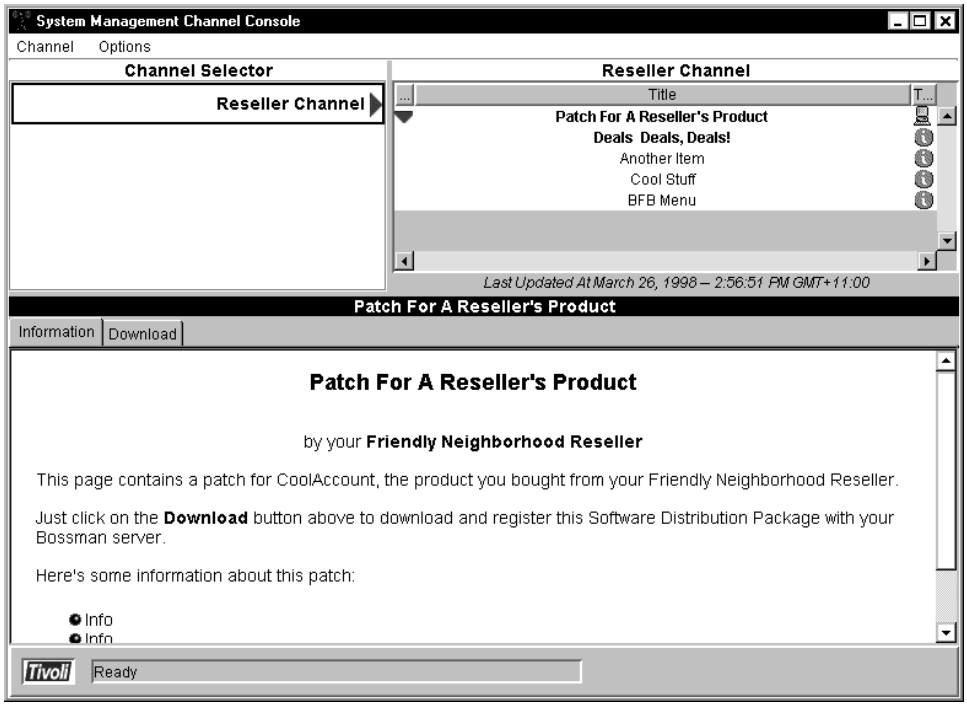


Figure 285. Get Packages

9. Highlight the required package you wish to download and click on the **Download** button.

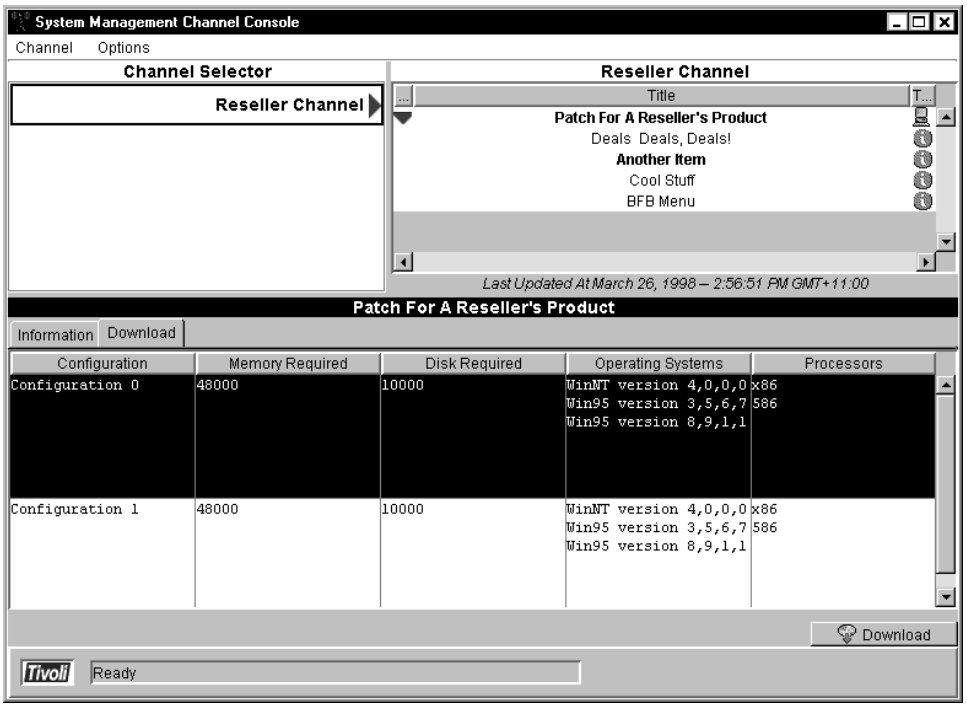


Figure 286. Download Packages

The following status dialog will inform you once download has completed.

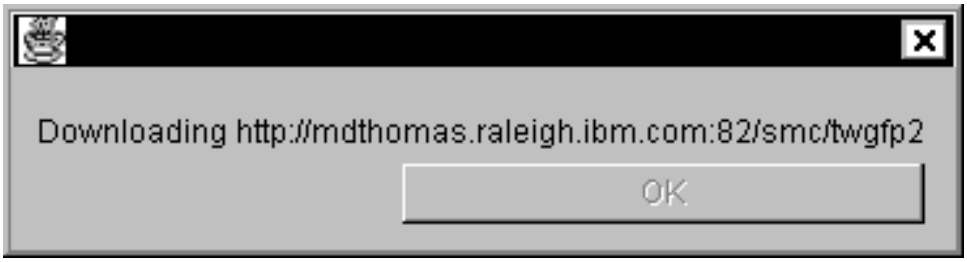


Figure 287. Downloading

Once the package has been downloaded, it will be listed as a Software Distribution package under the Software Distribution task on the Tivoli IT Director management console.

Chapter 9. SNMP Management

Tivoli IT Director will allow the system administrator to perform management of SNMP devices via the SNMP Browser. The ability to collect inventory, monitor via RMON and receive SNMP traps from the devices is built into the inventory, resource monitoring and event management tasks. Tivoli IT Director will provide the system administrator with a simple SNMP Browser/Editor in the event that more detailed information is needed from the SNMP device. The device information for compiled MIBs will be readable in text format. All others will appear in ASN.1 notation.

Tivoli IT Director will convert the SNMP traps into Tivoli IT Director alerts and forward it onto its Alert Manager function.

9.1 Purpose and Process

The SNMP Browser provides a *tree-view* of the device attributes for easy navigation and browsing of the information that is available on the selected system or systems.

The SNMP Browser can do both snmpgets and snmpsets to view or modify data at the SNMP device.

SNMP management is centered around device descriptions called Management Information Bases (MIBs).

MIBs are defined by standards committees or manufacturer of SNMP devices. The MIB is used by the manufacturer of the SNMP device to define the management attributes that will be exposed.

The MIB also acts as a translation reference for the SNMP Browser. Without using MIBs, the SNMP Browser can still display all of the device's data, but it is not in an understandable format.

Tivoli IT Director has three MIBs supplied:

- RMON
- MIB2
- LAN Manager (NT Server)

If SNMP devices have specific MIBs, Tivoli IT Director can utilize them.

To utilize a MIB, it has to be compiled with the Tivoli IT Director MIB compiler.

9.2 Compiling the MIB

When you click with the right mouse button on the SNMP Devices group on the management console, one of the selections is Compile a new MIB.

You will see a panel to select a MIB file from. When you are satisfied with your MIB selection, select **Compile**.

The MIB file will be sent to the server for compilation. The status window at the bottom indicates the current process with the compilation.

When the compile completes, Tivoli IT Director can now utilize the MIB when browsing SNMP devices.

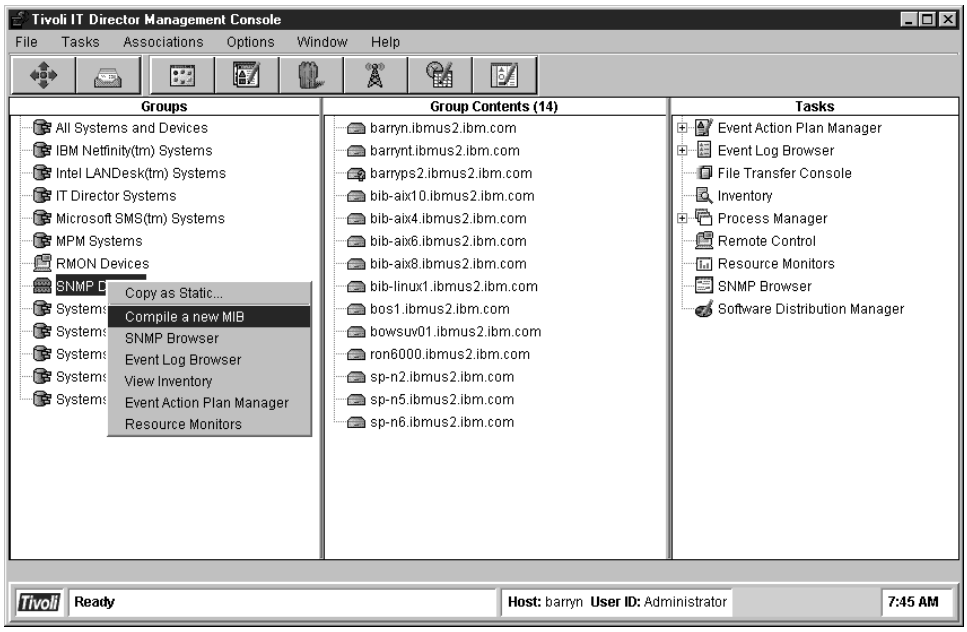


Figure 288. Selecting SNMP Devices - MIB Compile

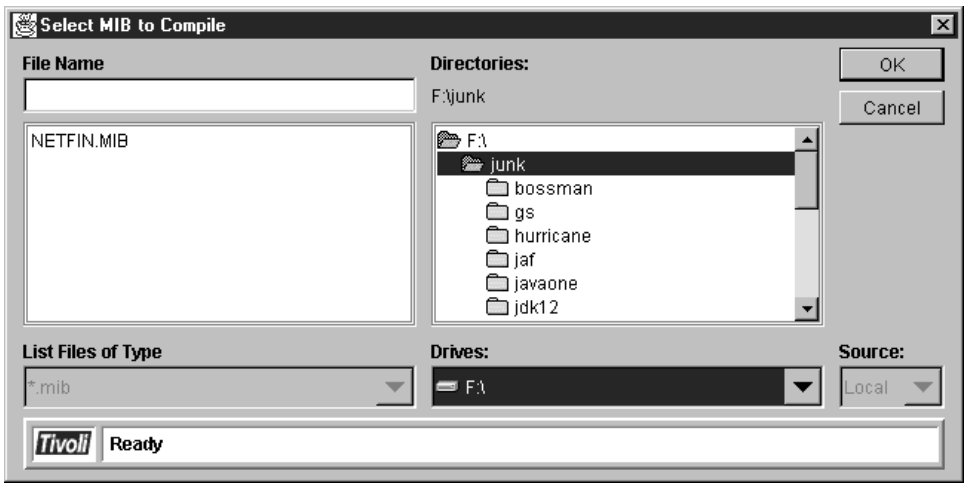


Figure 289. Locate MIB

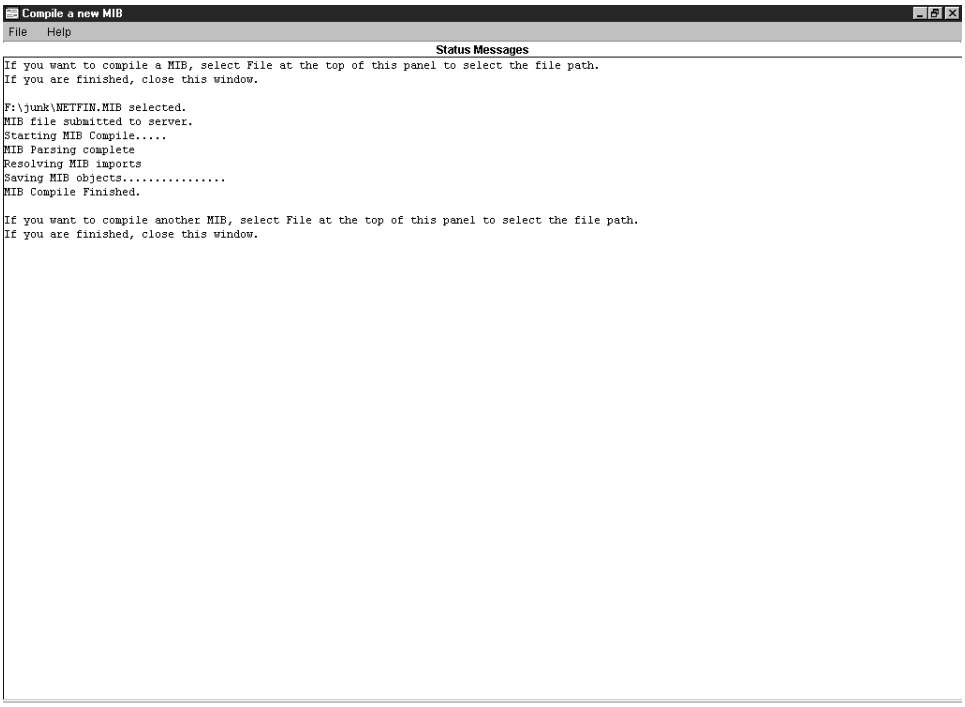


Figure 290. MIB Compile

9.3 Using the SNMP Browser

Start the SNMP Browser by either dragging and dropping the task to the system or group, or the group or system to the SNMP Browser task on the Tivoli IT Director management console.

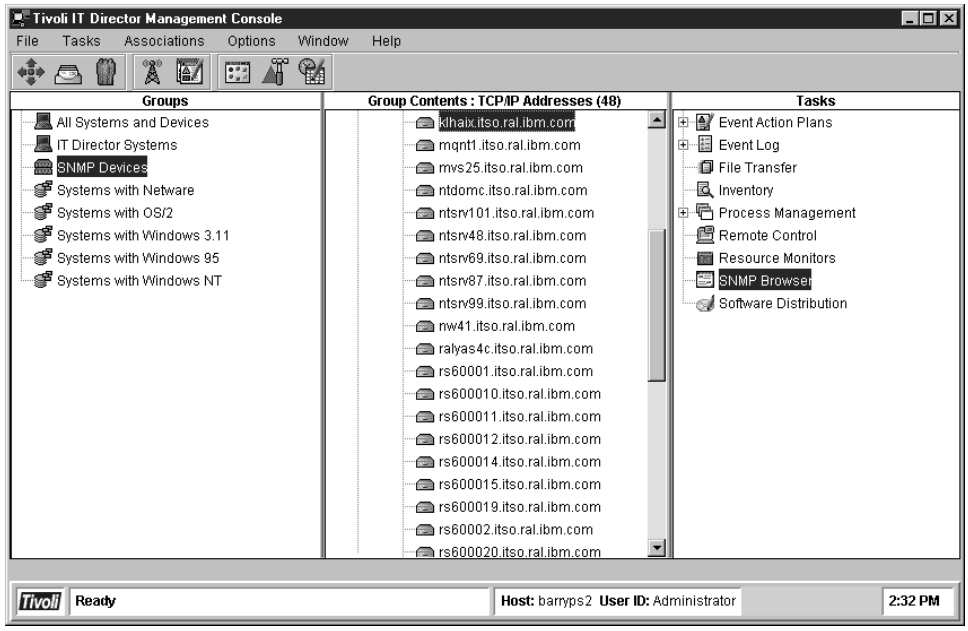


Figure 291. Selecting SNMP Devices to Browse

Note: This is a one-to-many task, so multiple systems can be selected for browsing.

If no MIBs have been compiled or devices are returning information that cannot be found in the compiled MIBs, the information displayed in the browser will be displayed in a dotted decimal format. If the MIBs have been compiled, the information will be displayed as textual names with meaningful information.

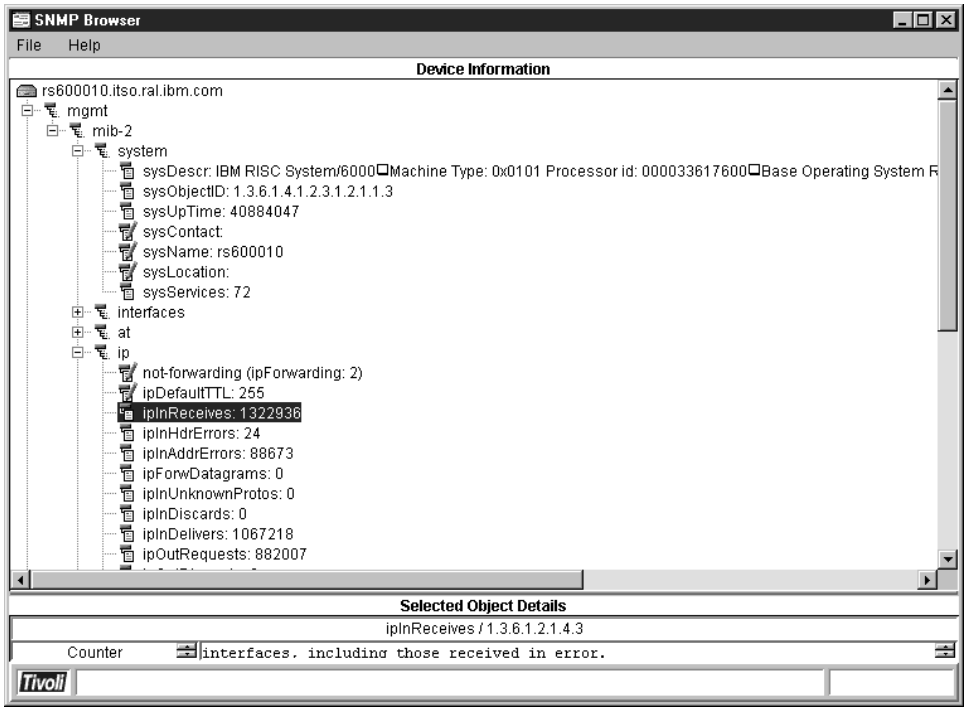


Figure 292. Tivoli IT Director SNMP MIB Browser

The SNMP MIB Browser window has two main sections:

- Top Section - Contains the SNMP systems being browsed.
- Bottom Section - Contains details about a selected attribute from an SNMP device.

The title bar of the bottom section contains the name of the selected attribute and information about the access and any other important variable information.

The bottom panel displays the descriptive information that is available about the selected attribute.

9.4 Setting SNMP Community Names

SNMP devices and agents use community names to allow or restrict access. Community names can be any textual name and by default the name is set to Public. In some cases, you may need to change the SNMP community name to allow you to gain access to a specific SNMP device. To do this on the console select **Options** and **Server Preferences**. Within the Server Preferences window select the **SNMP Discovery** tab and you can then modify the community name for a device.

Note: Community names are specific to each individual SNMP device.

9.5 Setting SNMP Discovery Parameters

The SNMP discovery process can be changed by accessing **Server Preferences** from the **Options** menu on the main Tivoli IT Director management console. Changing these discovery parameters expand or narrow the search boundaries for SNMP devices.

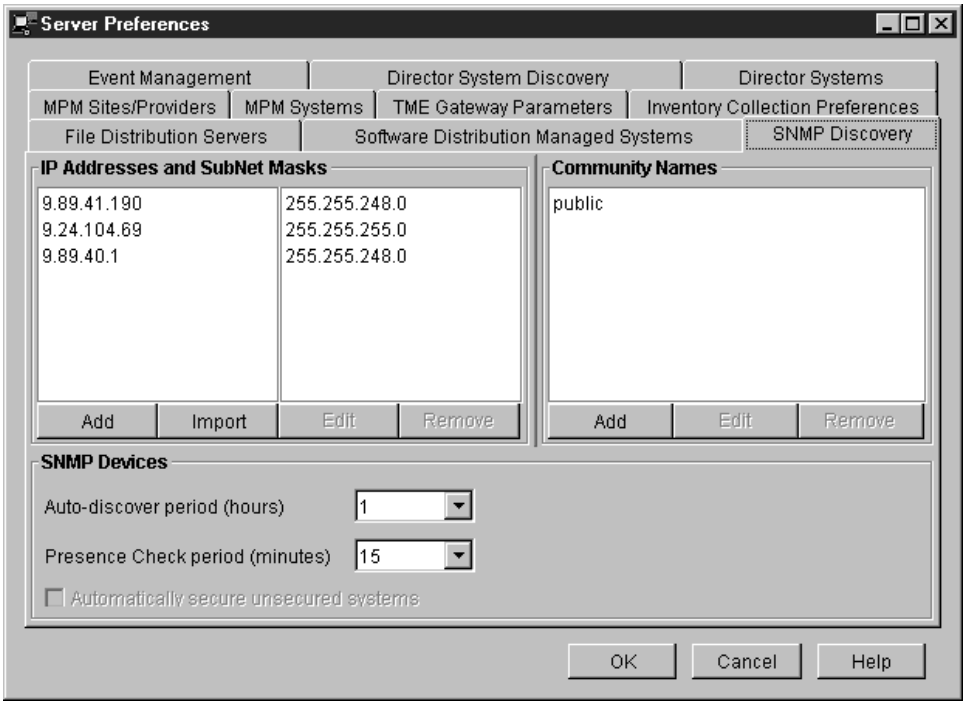


Figure 293. Tivoli IT Director SNMP Discovery Parameters

The following explains each of the three panels in the Server Preferences screen.

- IP Addresses - This contains the IP addresses used to start a discovery.

  This is also thought of as the seed address.

- Community Names - This allows you to enter the community names used on your network to allow access to SNMP devices.

- Subnet Masks - Allows you to specify the subnets to be included in the discovery.

  By entering 0.0.0.0, all subnets are valid for the discovery.

  Note: 0.0.0.0 is the default setting for this section.

In addition to using the configurable IP options with a seed address, a community name and the subnet mask, Tivoli IT Director does an ARP poll. It reads the Address Translation table on the seed device and uses that address to help it with discovery.

If any of the subnets are set to 0.0.0.0, all of the devices will be added.

Appendix A. Database Table Definitions

This Appendix contains a list of the Inventory database tables and a description of the data they contain.

Each table has a unique table name, which is followed by one or more rows defining the following of the data in each table:

- Name
- Type
- Description

Table 4. Table A1

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
DISK_TYPE (KEY=2)	CHAR(32)	Disk type - ENUM
DISK_INDEX (KEY=3)	INT	
DISK_INTERFAC_TYPE	CHAR(32)	Interface type - ENUM
DISK_INTERFACE_DESCR	CHAR(64)	
DISK_MEDIA_LOADED	CHAR(10)	Is media currently loaded? - ENUM
DISK_REMOVABLE_DRIVE	CHAR(10)	Is the drive removable? - ENUM
DISK_REMOVABLE_MEDIA	CHAR(10)	Is the media removable? - ENUM
DISK_DEVICE_ID	INT	
DISK_LOGICAL_UNIT	INT	
DISK_CYLINDERS	INT	
DISK_SECTORS_PER_TRACK	INT	
DISK_SECTOR_SIZE	INT	
DISK_TOTAL_SIZE_KB	INT	
DISK HEADS	INT	
DISK_BAD_SECTORS	INT	
DISK_PARTITIONS	INT	
DISK_TOTAL_SECTORS	INT	
DISK_FRU_INDEX	INT	

Table 5. Table A2

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object identifier
SYSTEM_NAME	CHAR (64)	System name
LOCATION	CHAR(64)	System location
USER_NAME	CHAR(64)	Primary user name
USER_PHONE	CHAR(64)	Primary user phone

Table 6. Table A3

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
IDE_INDEX (KEY=2)	INT	
IDE_BUS_TYPE	CHAR(32)	
IDE_LOCATION	CHAR(32)	
DEVICES_CONNECTED	INT	

Table 7. Table A4

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
IDE_ADAPTER_INDEX (KEY=2)	INT	
IDE_DEVICE_INDEX (KEY=3)	INT	
DEVICE_TYPE	CHAR(32)	ENUM
DEVICE_SIZE	INT	
UNIT_STATUS	CHAR(32)	ENUM
MEDIA_STATUS	CHAR(32)	ENUM
PRODUCT_ID	CHAR(40)	

Table 8 (Page 1 of 2). Table A5

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID

Table 8 (Page 2 of 2). Table A5

Field Name	Data Type	Description
PHYSICAL_MEMORY_KB	INT	Total physical memory installed (in kilobytes)
FREE_PHYSICAL_MEMORY_KB	INT	Free physical memory (in kilobytes)
VIRTUAL_MEMORY_KB	INT	Total virtual memory/paging space (in kilobytes)
FREE_VIRTUAL_MEMORY_KB	INT	Free virtual memory/paging space (in kilobytes)
PAGE_SIZE	INT	Page size (in bytes)

Table 9. Table A6

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
IP_INDEX (KEY=2)	INT	Index (for example, adapter number)
IP_ADDRESS	CHAR(16)	IP address in dotted notation
IP_HOSTNAME	CHAR(255)	IP hostname
IP_DOMAIN	CHAR(255)	IP domain name
SUBNET_MASK	CHAR(16)	IP subnet mask
NAMESERVER1	CHAR(16)	Primary nameserver
NAMESERVER2	CHAR(16)	Secondary nameserver
DEFAULT_GATEWAY	CHAR(16)	Defauft gateway (router)
IP_FORWARDING	CHAR(10)	IP forwarding enabled? - ENUM
DHCP_ENABLED	CHAR(10)	DHCP enabled? - ENUM

Table 10 (Page 1 of 2). Table A7

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
KEYBOARD_LAYOUT	CHAR(80)	Description of keyboard layout
KEYBOARD_TYPE	CHAR(80)	Type of keyboard

Table 10 (Page 2 of 2). Table A7

Field Name	Data Type	Description
CONNECTOR_TYPE	CHAR(20)	Type of keyboard connector - ENUM
FRU_INDEX	INT	Index into FRU table
COUNTRY_CODE	CHAR(3)	Country code (for example, US)
SUBCOUNTRY_CODE	CHAR(3)	Sub-country code (for example, 103)
CODEPAGE	INT	Code page (for example, 437)
TYPEMATIC_RATE	INT	Characters per second
TYPEMATIC_DELAY	INT	Repeat delay in milliseconds

Table 11. Table A8

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
DRIVE_INDEX (KEY=2)	INT	
DRIVE_TYPE	CHAR(20)	Type of drive
DRIVE_NAME	CHAR(64)	Name of drive (for example, G: remote disk attached by LAN)
DRIVE_PATH	CHAR(255)	Path used to access this logical drive (for remote drives)
DRIVE_TOTAL_SIZE_KB	INT	Total size, in kilobytes
DRIVE_FREE_SIZE_KB	INT	Remaining free size, in kilobytes

Table 12 (Page 1 of 2). Table A9

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
BASE_MEMORY_KB	INT	Base memory installed (in kilobytes)
FREE_BASE_MEMORY_KB	INT	Free base memory (in kilobytes)
EXTENDED_MEMORY_KB	INT	Extended memory installed (in kilobytes)
FREE_EXTENDED_MEMORY_KB	INT	Free extended memory (in kilobytes)

Table 12 (Page 2 of 2). Table A9

Field Name	Data Type	Description
EXTENDED_MANAGER_NAME	CHAR(64)	Name of extended memory manager
EXTENDED_MANAGER_VERSION	CHAR(64)	Version of extended memory manager
EXPANDED_MEMORY_KB	INT	Expanded memory installed (in kilobytes)
FREE_EXPANDED_MEMORY_KB	INT	Free expanded memory (in kilobytes)
EXPANDED_MANAGER_NAME	CHAR(64)	Name of the expanded memory manager
EXPANDED_MANAGER_VERSION	CHAR(64)	Version of the expanded memory manager

Table 13. Table A10

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
LABEL	CHAR(64)	Short identifier
DESCRIPTION	CHAR(255)	Description of managed object
FIRST_ATTEMPT	DATETIME	Date and time of first attempted inventory update
LAST_ATTEMPT	DATETIME	Date and time of last attempted inventory update
LAST_UPDATE	DATETIME	Date and time of last successful inventory update
DATE_CREATED	DATETIME	Date and time the entry was created

Table 14 (Page 1 of 2). Table A11

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
OP_SYS_INDEX	INT	
OP_SYS_NAME	CHAR(64)	Operating system name (NT, OS/2)
OP_SYS_TYPE	CHAR(64)	Operating system type - ENUM
OP_SYS_VERSION	CHAR(64)	Operating system version

Table 14 (Page 2 of 2). Table A11

Field Name	Data Type	Description
OP_SYS_PRIMARY	CHAR(20)	Is this the primary operating system? - ENUM
OP_SYS_REVISION	CHAR(32)	OS revision (build level, service pack)
OP_SYS_DESCRIPTION	CHAR(64)	OS description

Table 15. Table A12

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
PORT_INDEX (KEY=2)	INT	
BASE_10_ADDRESS	INT	
IRQ_USED	INT	
LOGICAL_NAME	CHAR(32)	
CONNECTOR_TYPE	CHAR(40)	ENUM

Table 16. Table A13

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
PARTITION_INDEX (KEY=2)	INT	
PARTITION_NAME	CHAR(32)	Normally the drive letter
PARTITION_TOTAL_SIZE_KB	INT	Total size (in kilobytes)
PARTITION_FREE_SIZE_KB	INT	Free space (in kilobytes)
PARTITION_LABEL	CHAR(40)	Label
PARTITION_FILESYSTEM	CHAR(32)	ENUM

Table 17 (Page 1 of 2). Table A14

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
PCI_BUS_NUMBER (KEY=2)	INT	
PCI_DEVICE_NUMBER (KEY=3)	INT	

Table 17 (Page 2 of 2). Table A14

Field Name	Data Type	Description
MANUFACTURER	CHAR(40)	
PCI_TYPE	CHAR(40)	
CLASS_CODE	INT	
VENDOR_ID	INT	
DEVICE_ID	INT	
REVISION_ID	INT	
CACHE_LINE_SIZE	INT	
LATENCY_TIMER	INT	
MIN_GNT	INT	
MAX_LAT	INT	
INTERRUPT_LINE	INT	
INTERRUPT_PIN	INT	
ROM_BASE_ADDRESS	INT	
HEADER_TYPE	INT	
BIST	INT	Built-in self-test
COMMAND_REGISTER	INT	
STATUS_REGISTER	INT	

Table 18. Table A15

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
ASSET_TAG	CHAR(80)	

Table 19 (Page 1 of 2). Table A16

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
TYPE	CHAR(32)	Type of mouse - ENUM
INTERFACE	CHAR(32)	Interface type - ENUM

Table 19 (Page 2 of 2). Table A16

Field Name	Data Type	Description
IRQ	INT	Interrupt level
BUTTONS	INT	Number of buttons on the mouse
PORT_NAME	CHAR(32)	
DRIVER_NAME	CHAR(32)	
DRIVER_VERSION	CHAR(32)	
DOUBLE_CLICK_RATE	INT	Double_click interval (millisec)
HANDEDNESS	CHAR(20)	Right-handed or left-handed - ENUM
SENSITIVITY	INT	(mickeys/cm)

Table 20. Table A17

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
PRINTER_INDEX	INT	
PORT	CHAR(40)	
QUEUE	CHAR(40)	
DRIVER	CHAR(40)	
MODEL	CHAR(40)	

Table 21 (Page 1 of 2). Table A18

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
PROCESSOR_INDEX (KEY=2)	INT	
PROCESSOR_TYPE	CHAR(32)	Processor type - ENUM
FAMILY	CHAR(32)	Processor family - ENUM
VERSION	CHAR(80)	Processor version
MAXIMUM_SPEED	INT	Maximum speed of installed processor in MHz
CURRENT_SPEED	INT	Current speed of installed processor in MHz

Table 21 (Page 2 of 2). Table A18

Field Name	Data Type	Description
UPGRADE	CHAR(20)	Method to upgrade - ENUM
FRU_INDEX	INT	
INTERNAL_CACHE	CHAR(20)	Internal processor cache - ENUM
EXTERNAL_CACHE	CHAR(20)	External processor cache - ENUM

Table 22 (Page 1 of 2). Table A19

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
SCSI_ADAPTER_INDEX (KEY=2)	INT	
ADAPTER_TYPE	CHAR(40)	
LOCATION	CHAR(40)	
PUN	INT	Physical unit number
LUN	INT	Logical unit number
BUS_TYPE	CHAR(40)	
BUS_WIDTH	INT	(in bits)
IO_ACCESS	CHAR(40)	ENUM
HOST_BUS	CHAR(40)	ENUM
HOST_BUS_WIDTH	INT	(in bits)
ADDRESS_OVER_16	CHAR(40)	Addresses greater than 16 Mb - ENUM
SCB_COMMANDS	CHAR(40)	Supports SCB - ENUM
SCATTER_GATHER	CHAR(40)	ENUM
CHS	CHAR(40)	Cylinder/head/sector addressing - ENUM
MAX_SCATTER_GATHER_LIST	INT	
MAX_CDB_L FNGTH	INT	Maximum control data block transfer length in bytes)
ADD_MAJOR_LEVEL	INT	
ADD_MINOR LEVEL	INT	

Table 22 (Page 2 of 2). Table A19

Field Name	Data Type	Description
DEVICES_CONNECTED	INT	

Table 23. Table A20

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
SCSI _ ADAPTER_INDEX (KEY=2)	INT	
SCSI_DEVICE_INDEX (KEY=3)	INT	
PUN	INT	
LUN	INT	
DEVICE_TYPE	CHAR(32)	ENUM
DEVICE_SIZE	INT	
VENDOR_ID	CHAR(40)	
PRODUCT_ID	CHAR(40)	
PRODUCT_REVISION_LEVEL	CHAR(40)	
VENDOR_STRING	CHAR(255)	
VENDOR_DATA	CHAR(255)	
SERIAL_NUMBER	CHAR(40)	

Table 24. Table A21

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
PORT_INDEX (KEY=2)	INT	
BASE_10_ADDRESS	INT	
IRQ_USED	INT	
LOGICAL_NAME	CHAR(32)	
CONNECTOR_TYPE	CHAR(40)	ENUM

Table 25. Table A22

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
SYSDESCR	CHAR(255)	
SYSOBJEC_ND	CHAR(255)	
SYSUPTIME	DATETIME	
SYSCONTACT	CHAR(255)	
SYSNAME	CHAR(255)	
SYSLOCATION	CHAR(255)	

Table 26. Table A23

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
PROGRAM_TITLE	CHAR(64)	
INSTALL_PATH	CHAR(255)	
VERSION_ID	CHAR(16)	
RELEASE_LEVEL	CHAR(12)	
VENDOR_NAME	CHAR(32)	
FILE_DATETIME	DATETIME	
MAJOR_VERSION	CHAR(32)	
MINOR_VERSION	CHAR(32)	
REVISION	CHAR(32)	
BUILD	CHAR(32)	
LANGUAGE_EDITION	CHAR(32)	
ID_CODE	CHAR(32)	

Table 27 (Page 1 of 2). Table A24

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
BIOS_INDEX (KEY=2)	INT	

Table 27 (Page 2 of 2). Table A24

Field Name	Data Type	Description
BIOS_MANUFACTURER	CHAR(40)	
BIOS_VERSION	CHAR(40)	
BIOS_RELEASE_DATE	DATETIME	

Table 28. Table A25

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
RESOURCE_INDEX (KEY=2)	INT	
RESOURCE_USER	INT	
RESOURCE_SET	INT	
DESCRIPTION	CHAR(80)	
RESOURCE_WPE	CHAR(20)	
RESOURCE_NUMBER	INT	
START_ADDRESS	CHAR(16)	
END_ADDRESS	CHAR(16)	

Table 29 (Page 1 of 2). Table A26

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
VIDEO_INDEX (KEY=2)	INT	Adapter index
VIDEO_ADAPTER	CHAR(40)	Type of adapter in use
VIDEO_TYPE	CHAR(40)	Type of display in use
VIDEO_MEMORY_KB	INT	Amount of memory (in kilobytes)
COLORS	INT	Number of colors displayed
HORIZONTAL_RES	INT	Horizontal resolution of screen (in pixels)
VERTICAL_RES	INT	Vertical resolution of screen (in pixels)
BITS_PER_PIXEL	INT	Numer of bits used for each pixel

Table 29 (Page 2 of 2). Table A26

Field Name	Data Type	Description
VIDEO_SUBSYSTEM	INT	Video subsystem, O=primary
SLOT_LOCATION	INT	Video adapter slot location

Table 30. Table A27

Field Name	Data Type	Description
MANAGED_OBJ_ID (KEY=1)	INT	Managed object ID
COMPUTER_NAME	CHAR(16)	Computer name
USERNAME	CHAR(16)	Computer name
DOMAIN	CHAR(16)	Domain name
REG_OWNER	CHAR(80)	Registered owner
REG_ORGANIZATION	CHAR(80)	Registered organization
REG_PRODUCT_ID	CHAR(40)	Registered product ID

Appendix B. Resource Monitor List

Following is a list of all of the monitors delivered with Tivoli IT Director. You will not see all of these monitors for each device as individually they are not all supported on each device. It is a collective list.

Note: Monitor data collection rates are every 5 seconds except as noted.

B.1 Windows NT

The following monitors are available on the Windows NT platform:

- CPU Monitors:
  - CPU Utilization
  - CPU "x" Utilization (on SMP machines)
  - Process Count
- Disk Monitors:

  Note: The disk drive monitors will repeat for each local non-removable logical drive found. The refresh interval is 5 minutes

  .
  - Disk 1 Workload
  - Drive C: % Space Used
  - Drive C: Space Remaining
  - Drive C: Space Used
- Memory Monitors:
  - Locked Memory
  - Memory Usage
- Network Monitors:

  Note: The adapter monitors will repeat for each installed network driver interface.
  - Adapter 0 " Bytes Received
  - Adapter 0 " Bytes Transmitted
  - Adapter 0 " Packets Received
  - Adapter 0 " Packets Transmitted
  - Adapter 0 " Receive Errors
  - Adapter 0 " Transmit Errors
- NT Performance Monitors

  Note: The number of NT Performance Monitors can vary. These monitors are gathered directly from the Windows NT Performance Monitor (PerfMon) subsystem. These monitors change dynamically. On a typical Windows NT system over 3500 different attributes can be monitored under the Windows NT Performance Monitors.

- TCP/IP Monitors:

  Note: The Interface monitors will repeat for each configured IP network interface.

  - Interface 0 " Broadcast Packets Received
  - Interface 0 " Broadcast Packets Sent
  - Interface 0 " Bytes Received
  - Interface 0 " Bytes Sent
  - Interface 0 " Unicast Packets Received
  - Interface 0 " Unicast Packets Sent
  - IP Packets Received
  - IP Packets Received with Errors
  - IP Packets Sent
  - TCP Connections
  - UDP Datagrams Received
  - UDP Datagrams Sent
- Process Monitors:

  Note: The number of applications or executables monitored by the Process Monitors varies and is configured by the IT Director Administrator from the Process Manager Console. Each one of the attributes under Process Monitors will be present for each executable being monitored. The refresh interval is 1 minute

  .

  - Current Active Processes
  - Maximum running at once
  - Maximum running yesterday
  - New executions counted
  - Total execution time
  - Yesterday's execution time
  - Yesterday's new executions
- Sentry Monitors

  Note: The Sentry Monitors depend upon which AMS packages have been installed and have variable data collection refresh rates.

B.2 Windows 95

The following monitors are available on the Windows NT platform:

- CPU Monitors:
  - CPU Utilization
  - Process Count
- Disk Monitors:

Note: The disk drive monitors will repeat for each local non-removable logical drive found. The refresh interval is 5 minutes

.

  - Disk Workload
  - Drive C: % Space Used
  - Drive C: Space Remaining
  - Drive C: Space Used

- Memory Monitors:
  - Locked Memory
  - Memory Usage
- Performance Statistics:

  Note: The Windows 95 Performance statistics are dynamic and may be different on each machine.
- File System:
  - Bytes read/second
  - Bytes written/second
  - Dirty data
  - Reads/second
  - Writes/second
- IPX/SPX-compatible protocol:
  - IPX packets lost/second
  - IPX packets received/second
  - IPX packets sent/second
  - Open sockets
  - Routing Table entries
  - SAP Table entries
  - SPX packets received/second
  - SPX packets sent/second
- Kernel:
  - Process usage (%)
  - Threads
  - Virtual Machines
- Memory Manager:
  - Allocated memory
  - Discards
  - Disk cache size
  - Free memory
  - Instance faults

  - Locked memory
  - Maximum disk cache size
  - Minimum disk cache size
  - Other memory
  - Page faults
  - Page-ins
  - Page-outs
  - Swapfile defective
  - Swapfile in use
  - Swapfile size
  - Swappable memory
- Microsoft Client for NetWare:
  - Burst packets dropped
  - Burst received gap time
  - Burst send gap time
  - Burst send gap time
  - Bytes in cache
  - Bytes read/second
  - Bytes written/second
  - Dirty bytes in cache
  - NCP packets dropped
  - Requests pending
- Microsoft Network Client:
  - Bytes read/second
  - Bytes written/second
  - Number of nets
  - Open files
  - Resources
  - Sessions
  - Transactions/second
- Process Monitors:

  Note: The number of applications or executables monitored by the Process Monitors varies and is configured by the IT Director Administrator from the Process Manager Console. Each one of the attributes under Process Monitors will be present for each executable being monitored. The refresh interval is 1 minute

  .
  - Current Active Processes

- Maximum running at once
- Maximum running yesterday
- New executions counted
- Total execution time
- Yesterday's execution time
- Yesterday's new executions

- Sentry Monitors

  Note: The Sentry Monitors depend upon which AMS packages have been installed and have variable data collection refresh rates.

B.3 Windows 3.1

The following monitors are available on the Windows 3.1 platform:

- CPU Monitors:
  - CPU Utilization
  - Process Count
  - CPU Cache Hit Rate (Pentium Processors only)
  - Floating Point Operation Rate (Pentium Processors only)
  - Integer Instructions Rate (Pentium Processors only)
  - Interrupt Rate (Pentium Processors only)
  - Memory I/O Rate (Pentium Processors only)
  - Port I/O Rate (Pentium Processors only)
- Disk Monitors:

  Note: The disk drive monitors will repeat for each local non-removable logical drive found. The refresh interval is 5 minutes

  .
  - Drive C: % Space Used
  - Drive C: Space Remaining
  - Drive C: Space Used
- Memory Monitors:
  - Locked Memory
  - Memory Usage
  - ECC Memory (if installed)
  - Resource Usage
- Process Monitors:

  Note: The number of applications or executables monitored by the Process Monitors varies and is configured by the IT Director Administrator from the Process Manager Console. Each one of the attributes under Process Monitors will be present for each executable being monitored. The refresh interval is 1 minute

.

- Current Active Processes
- Maximum running at once
- Maximum running yesterday
- New executions counted
- Total execution time
- Yesterday's execution time
- Yesterday's new executions

B.4 OS/2

The following monitors are available on the OS/2 platform:

- APM Monitors:

  Note: The APM Monitors are only supported on laptop systems with the correct vendor-supplied drivers.

  - Battery Remaining
  - Percent
- CPU Monitors:
  - CPU Utilization
  - CPU "x" Utilization (on SMP machines)
  - Process Count
  - Thread Count
  - CPU Cache Hit Rate (Pentium Processors only)
  - Floating Point Operation Rate (Pentium Processors only)
  - Integer Instructions Rate (Pentium Processors only)
  - Interrupt Rate (Pentium Processors only)
  - Memory I/O Rate (Pentium Processors only)
  - Port I/O Rate (Pentium Processors only)
- Disk Monitors:

  Note: The disk drive monitors will repeat for each local non-removable logical drive found. The refresh interval is 5 minutes

  .

  - Drive C: % Space Used
  - Drive C: Space Remaining
  - Drive C: Space Used
- Memory Monitors:
  - Locked Memory
  - Memory Usage
  - ECC Memory (if installed)

- OS/2 Server Monitors (30 second refresh):
  - Big Buf Shortage
  - Bytes Received
  - Bytes Sent
  - Connections
  - Logons
  - Opens
  - Print Jobs Queued
  - Response Time
  - Request Buf Shortage
  - Sessions
  - Shares
- OS/2 Swapfile Monitors:
  - Swap File Size
  - Swap Space Remaining
- Process Monitors:

  Note: The number of applications or executables monitored by the Process Monitors is varies and is configured by the IT Director Administrator from the Process Manager Console. Each one of the attributes under Process Monitors will be present for each executable being monitored. The refresh interval is 1 minute

  .
  - Current Active Processes
  - Maximum running at once
  - Maximum running yesterday
  - New executions counted
  - Total execution time
  - Yesterday's execution time
  - Yesterday's new executions
- Sentry Monitors

  Note: The Sentry Monitors depend upon which AMS packages have been installed and have variable data collection refresh rates.

B.5 NetWare

The following monitors are available on the NetWare platform:

- CPU Monitors:
  - CPU Utilization
  - CPU "x" Utilization (on SMP machines)
  - Process Count

  - Thread Count

- Disk Monitors:

  Note: The disk volume monitors will repeat for each volume detected on a NetWare Server. The refresh interval is 5 minutes

  .

  - Volume SYS: Space Remaining
  - Volume SYS: Space Used

- Memory Monitors:
  - Cache Blocks in Use
  - Percent of Cache in Use

- Process Monitors

  Note: The number of applications or executables monitored by the Process Monitors varies and is configured by the IT Director Administrator from the Process Manager Console. Each one of the attributes under Process Monitors will be present for each executable being monitored. The refresh interval is 1 minute

  .

  - Current Active Processes
  - Maximum running at once
  - Maximum running yesterday
  - New executions counted
  - Total execution time
  - Yesterday's execution time
  - Yesterday's new executions

Appendix C. Special Notices

This publication is intended to help programmers and systems analysts who are involved with systems management on the Intel platform in a workgroup environment. The information in this publication is not intended as the specification of any programming interfaces that are provided by Tivoli IT Director. See the PUBLICATIONS section of the IBM Programming Announcement for Tivoli IT Director for more information about what publications are considered to be product documentation.

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Appendix D. Related Publications

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

D.1 International Technical Support Organization Publications

For information on ordering these ITSO publications see “How to Get ITSO Redbooks” on page 255.

- *Integrating LAN Management Tools with Tivoli LAN Access*, SG24-2118

D.2 Redbooks on CD-ROMs

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  ```
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