Practical Intrusion Detection Non-Unix Based Systems

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Overview

- Introduction
- Specific intrusion types
  - Windows NT
  - Macintosh
  - Novell
- Intrusion detection
- Resources

Introduction

- **Trends for computer systems are moving towards the desktop**
  - **The separation between Unix and desktop system capabilities is narrowing**
  - **Desktop computers are**
    - **Becoming as powerful as Unix boxes**
    - **More economical**
  - **More similarity of services and avenues for intrusions**
    - **Desktop systems have added TCP/IP for routing across Wide Area Networks (WANs)**
    - **Traditional network services now available on desktop systems**
  - **NT servers had 85% growth rate in 1996 (International Data Corporation)**

Introduction (continued)

- Windows NT appears to be hacker's next target
- Public announcements of attacks
  - Scriptors of Doom to hit NT
    - Announcement by editor of Phrack Magazine
  - Emerging NT newsgroups
    - Bug reports starting to show up
    - New NT bugtraq
- Hackers don't do cost benefit analysis but . . .
  - NT provides a new area of challenge to hackers
    - Encouraged by promotion of NT "security"
  - NT supports the traditional network services that have been so effective in hacking Unix machines

Specific intrusion types

- Intrusion model
- General intrusion paths on desktop systems
- Intrusion paths for Windows NT
- Intrusion paths for Macintosh
- Intrusion paths for Novell

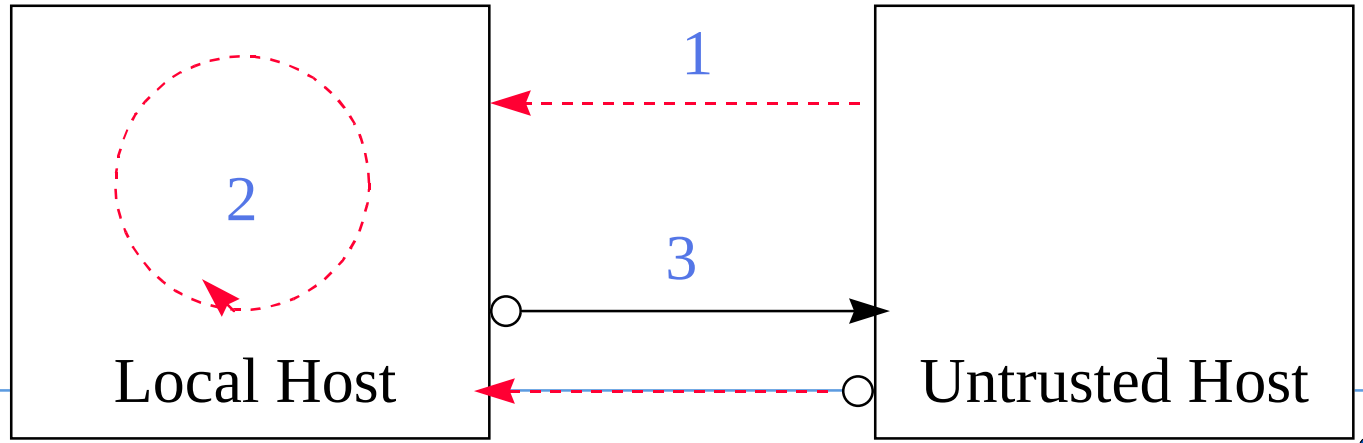
Intrusion model

Type 1: Attacks on network and dial-up services

Type 2: Physical attacks against a local system

- **Virus attacks using current privilege**
- **Non-privileged users attempting to gain privilege to view, alter, or control**

Type 3: Server attacks on client applications NEW



General intrusion paths on desktop systems

- Many intrusions are on client machines vulnerable to untrusted host connections via web browsers
- Adding third-party software on top of the operating system often introduces points for intrusion
  - End users install pre-released software with no notion of the security implications
  - Misconfiguration of software opens systems to attack
  - Word and Excel files allow macro viruses across platforms
- Some attacks on desktop systems use different vulnerabilities to provide similar intrusion opportunities as in Unix
  - phf attack --> Internet Information Server (IIS) ".." bug
  - Network File System (NFS) attack --> Apple public file servers misconfigured as writable

Intrusion paths for Windows NT

- Type 3 Intrusions
  - Internet Explorer 3.x (Windows NT and 95)
    - Five serious security bugs discovered in March, 1997
    - Malicious .url or .lnk files
    - Malicious icon can be embedded within a web page
    - Version 3.02 is now available and claims to fix these problems
  - Active X
    - ActiveX enabled browsers inherit capabilities of the local user, thus enabling an accepted malicious ActiveX control to execute arbitrary commands
  - Shockwave (Windows NT and 95)
    - Allows malicious webpage developers to create a Shockwave movie that will read through a user's e-mail and potentially upload it to their web server

Intrusion paths for Windows NT (continued)

- Type 2 Intrusions
  - Physical Access
    - Viruses have always been a problem on desktop systems
      - Master Boot Record can be infected on NT systems by booting off of an infected floppy disk or by running a “dropper” program from a DOS session
    - NTFSDOS.exe overrides the NTFS security
    - Running Password Dump utility which generates a hashed password file then running NT Crack to create dictionary attack
      - See CIAC Bulletin H-45 at http://ciac.llnl.gov

Intrusion paths for Windows NT (continued)

- Type 1 Intrusions
  - IIS
    - Older versions of IIS tend to be buggy
      - The “..” bug
      - .BAT and .CMD files
  - Denial of Service
    - A problem with Remote Procedure Call (RPC) services causes NT to consume 100% of CPU time

Intrusion paths for Macintosh

- Shockwave is a problem on Macs also
- Most commonly used intrusion paths:
  - Unsecured network services
  - Unsecured file sharing can allow for open access to what may be private information
- Seems to have no publically known “back doors” in locked down systems
  - Mac hack contest

Intrusion paths for Novell

- The intruder is typically an insider
  - Gains physical access to the console
  - Installs sniffer or other password grabber on the local network
- Default configuration for privileged accounts is wide open
  - "Out of the box" with no passwords on accounts for
    - Supervisor
    - Admin (Netware 4.x)
    - User_Template (Netware 4.x)
- Installation of software automatically creates [Root] and [Public] directories
  - Rights are inherited on files and directories created under those directories unless blocked

Intrusion detection

- **Windows NT**
  - **Auditing and logging**
    - **User account auditing**
    - **File and directory auditing**
    - **Registry auditing**
    - **Viewing audit logs**
    - **Managing audit logs**
  - **Native tools**
  - **Third party tools**
- **Macintosh**
  - **Tools**
- **Novell**
  - **Auditing and log files**
  - **Tools**

Windows NT - Auditing and logging

- **Types of Auditing**
  - **User Account**
    - **Tracks security events and puts entries in the server's security log**
  - **File and Directory**
    - **Tracks file system events**
  - **Registry**
    - **Tracks important registry files**

Windows NT - User account auditing

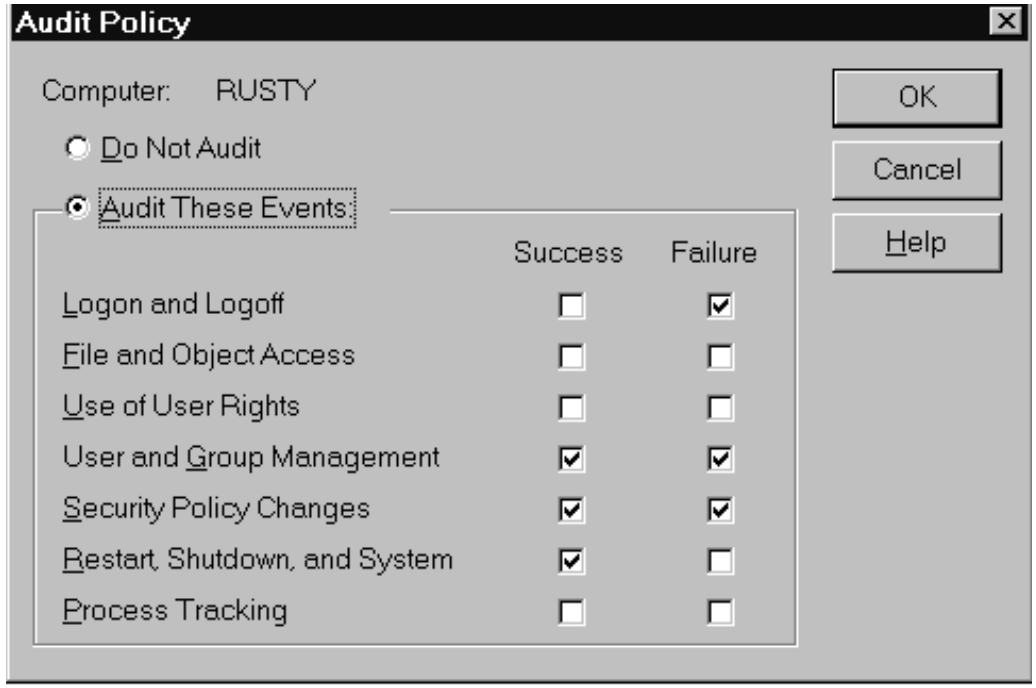
- User Manager's Audit Policy
  - What events should be audited?
    - Logon / Logoff
      - Reports users logging on or off or that have made a network connection
      - Track failures for unauthorized attempts to log on
    - File and Object Access
      - Reports user accessing a directory, file, registry, or printer
      - Track failures for attempted unauthorized access
    - User Rights
      - Reports when a user exercises a user right
      - Track failures
    - User and Group Management
      - Reports when a user account has been created or changed in some way
      - Track both successes and failures

Windows NT - User account auditing (continued)

- **Security policy changes**
  - **Reports changes to the User Rights, Audit or Trust Relationship policies**
  - **Track both successes and failures**
- **Restart, shutdown, and system**
  - **Reports when a user or an event occured to shutdown or restart the system**
  - **These events will probably not happen often, so it is safe to monitor both successes and failures**
- **Process tracking**
  - **Tracks information for events such as program activation and exits**
  - **Enable these events only when system is believed to be under attack**

Windows NT - User account auditing (continued)

- To access *Audit Policy* menu
  - Must be Administrator
  - User Manager->Policies->Audit

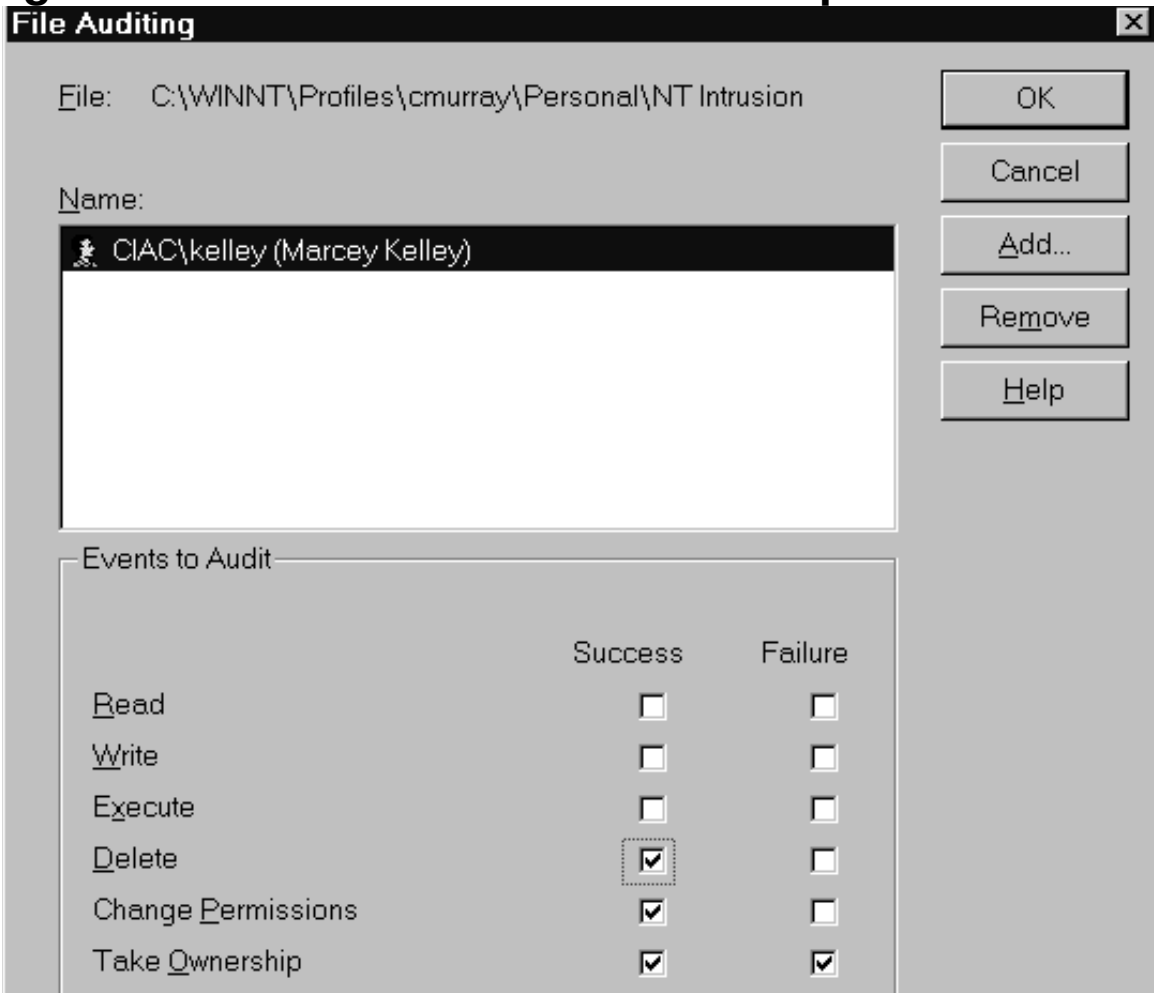


Windows NT - Directory and file auditing

- **Directory and File Auditing**
  - **Audit controls on files and directories log events only if *File and Object Access* is enabled in the User Manager's Audit Policy**
  - **Only items on logical disks formatted with NT File System (NTFS) have directory and file audit controls**
  - **NT sets audit controls on a newly created object to those of its parent directory**
  - **Types of auditable events are:**
    - **Read, Write, Execute, Delete, Change Permissions, and Take Ownership**

Windows NT - Directory and file auditing (continued)

- **To access *File Auditing* screen**
  - **Must be Administrator**
  - **Right mouse button on file icon->Properties->Security->Auditing**



Windows NT - Registry auditing

- **Some NT concepts**
  - **Windows NT Registry**
    - **A database of information replacing the INI files used in the Windows 3.x environment**
  - **Registry key**
    - **Is analogous to a directory in a file system**
  - **Registry subkeys**
    - **Are analogous to files**
  - **Rights**
    - **Privileges given to you by the system administrator**
  - **Access Control List (ACL)**
    - **A tag attached to each file or directory controlling which accounts can access the item to which the ACL is attached**
  - **Objects**
    - **All NT resources are referred to as objects**
      - **Threads, processes, files and directories**

Windows NT - Registry auditing (continued)

- Registry auditing
  - Query Value
    - System activity that attempts to read a value entry from a key
  - Set Value
    - System activity that attempts to set value entries in a key
  - Create Subkey
    - An attempt to create subkeys on a key
  - Enumerate Subkeys
    - Any event attempting to identify the subkeys of a key
  - Notify
    - Notification event from a key
  - Create Link
    - Events that attempt to create a symbolic link in a particular key

Windows NT - Registry auditing (continued)

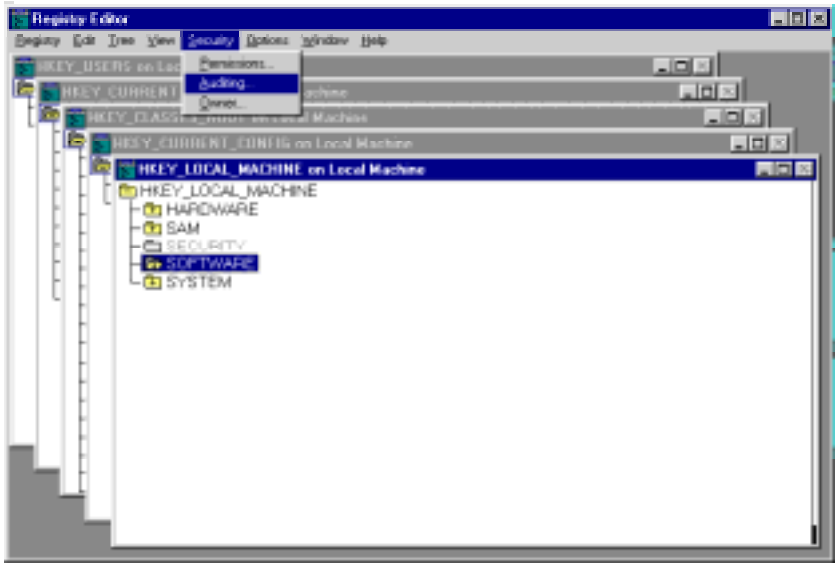
- Delete
  - Attempts to delete a key
- Write Discretionary Access Control (DAC)
  - An attempt to gain access to a key to write an ACL (assigning a permission)
- Read Control
  - Attempt to access the security assigned to a key

Windows NT - Registry auditing (continued)

- **Registry editor**
  - **Access failures are generally more valuable and far less frequent than successes**
    - **Can indicate attempt to access restricted keys**
  - **Audit controls on files and directories log events only if *File and Object Access* is enabled in the User Manager's Audit Policy**

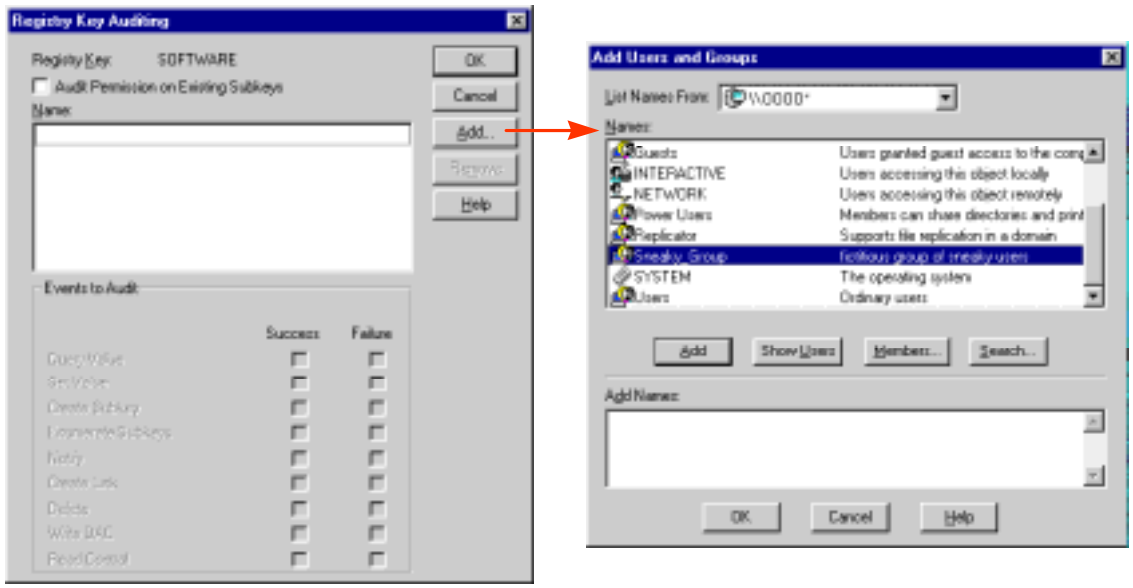
Windows NT - Registry auditing (continued)

- To start editor (REGEDT32)
  - Select Auditing in the Security Menu
  - Add users or groups you want to apply auditing to
  - Select types of events to be logged



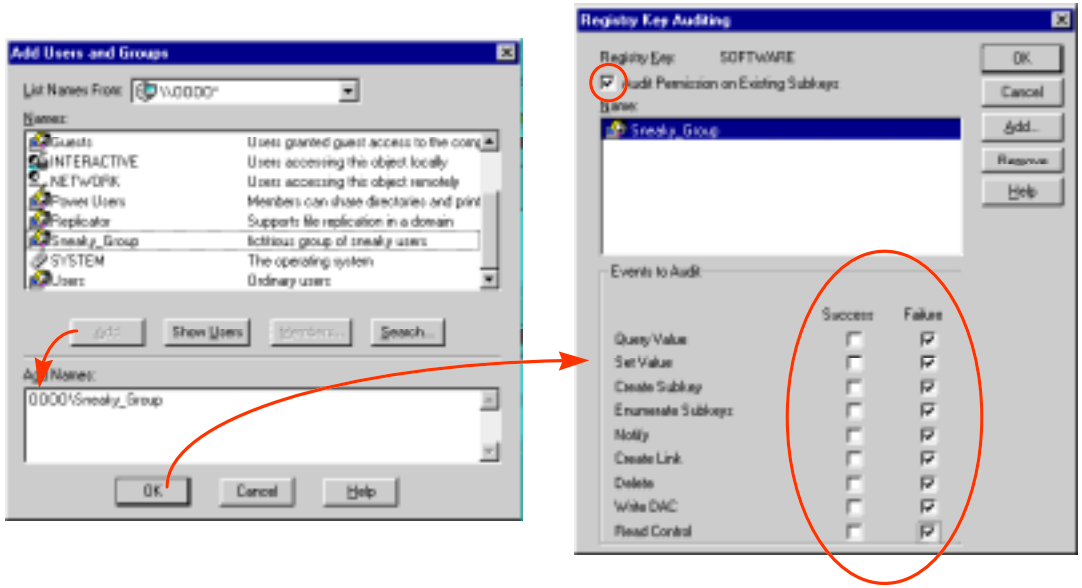
Windows NT - Registry auditing (continued)

- Carefully select groups and users for logging registry key events



Windows NT - Registry auditing (continued)

- Example of events to audit for a group of users
- Check *Audit Permission on Existing Subkeys* box to propagate auditing options to subkeys of the key selected



Windows NT - Viewing audit logs

- **Event Viewer**
  - **Can view all events, filter events, newest first, oldest first, or find a specific event**
  - **Administrative tools->Event Viewer->Log menu->Security**

Event Viewer - Security Log on \\RUSTY

Log View Options Help

Date	Time	Source	Category	Event	User	Computer
4/9/97	2:53:58 PM	Security	Logon/Logoff	538	cmurray	RUSTY
4/9/97	2:53:21 PM	Security	Logon/Logoff	538	Administrator	RUSTY
4/9/97	2:53:21 PM	Security	Logon/Logoff	528	Administrator	RUSTY
4/9/97	2:53:21 PM	Security	Logon/Logoff	528	Administrator	RUSTY
4/9/97	10:56:34 AM	Security	Logon/Logoff	528	cmurray	RUSTY
4/9/97	10:56:19 AM	Security	Logon/Logoff	538	Administrator	RUSTY
4/9/97	10:55:21 AM	Security	Logon/Logoff	538	Administrator	RUSTY
4/9/97	10:55:20 AM	Security	Logon/Logoff	528	Administrator	RUSTY
4/9/97	10:55:20 AM	Security	Logon/Logoff	528	Administrator	RUSTY
4/9/97	10:55:06 AM	Security	Logon/Logoff	529	SYSTEM	RUSTY
4/9/97	10:54:58 AM	Security	Logon/Logoff	529	SYSTEM	RUSTY
4/9/97	10:54:54 AM	Security	Logon/Logoff	538	Administrator	RUSTY
4/9/97	10:54:12 AM	Security	Policy Change	612	Administrator	RUSTY
4/9/97	10:53:17 AM	Security	Logon/Logoff	538	Administrator	RUSTY
4/9/97	10:53:17 AM	Security	Logon/Logoff	528	Administrator	RUSTY
4/9/97	10:53:16 AM	Security	Logon/Logoff	528	Administrator	RUSTY
4/7/97	9:06:33 AM	Security	Logon/Logoff	528	cmurray	RUSTY
4/2/97	4:41:26 PM	Security	Policy Change	612	Administrator	RUSTY
4/2/97	4:39:59 PM	Security	Policy Change	612	Administrator	RUSTY
4/2/97	4:38:39 PM	Security	Logon/Logoff	529	SYSTEM	RUSTY
4/2/97	4:38:33 PM	Security	Logon/Logoff	529	SYSTEM	RUSTY
4/2/97	4:36:03 PM	Security	Logon/Logoff	529	SYSTEM	RUSTY
4/2/97	4:26:59 PM	Security	Policy Change	612	Administrator	RUSTY

Windows NT - Viewing audit logs (continued)

Event Detail

Date:	4/2/97	Event ID:	529
Time:	4:36:03 PM	Source:	Security
User:	NT AUTHORITY\SYSTEM	Type:	Failure Audit
Computer:	RUSTY	Category:	Logon/Logoff

Description:

```
Logon Failure:
        Reason:                 Unknown user name or bad password
        User Name:              Administrator
        Domain:                 CIAC
        Logon Type:             2
        Logon Process:          User32
        Authentication Package:
MICROSOFT_AUTHENTICATION_PACKAGE_V1_0
        Workstation Name:       RUSTY
```

Data: Bytes Words

Close | Previous | Next | Help

Windows NT - Managing audit logs

- Managing the audit logs
  - Base your audit selection criteria on perceived threats to your system
    - Do a threat analysis and develop auditing strategies to counter them
  - Choose Event Log settings carefully
    - Where possible, only audit failed access attempts
    - Try to audit at the directory level by placing items of high audit value in their own directory trees
  - Audit important system files
    - Registry, event log files, and user profiles are all stored in WINNT\SYSTEM32\config
  - Time and date changes
    - May want to remove the Right to change system time from Power Users

Windows NT - Managing audit logs (continued)

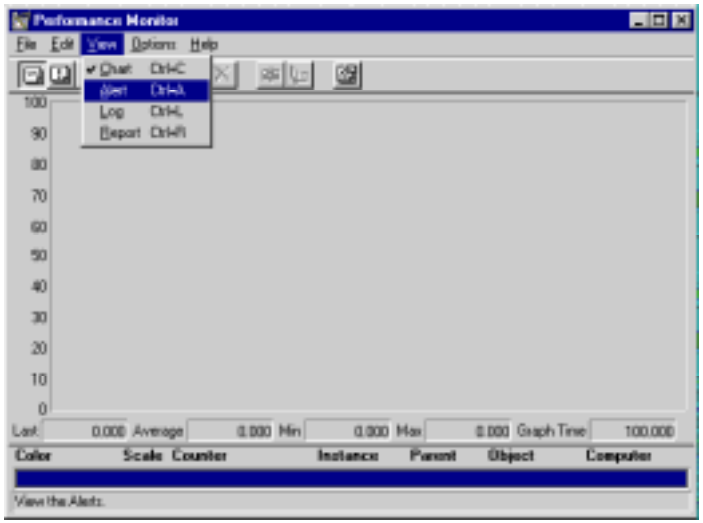
- Auditing requires planning and determining not only what needs to be monitored as well as what does not
- Target specific threats especially those you can only control by auditing
- Everything CANNOT be saved!
  - Consumes too much storage space
  - Impossible to distinguish between routine and suspicious events
- Use third party exception management tools

Native Windows NT tools - Performance Monitor

- **Performance Monitor (NT 4.0)**
  - Generates alerts when specified system values pass thresholds
  - Some values in the System category are
    - Error Access Permissions
      - Count of the number of times an attempt to open a file fails due to insufficient access permissions
    - Errors Granted Access
      - Count of the number of times attempts to access an open file fail
    - Errors Logon
      - Count of the number of failed logon attempts to the system

Native Windows NT tools - Performance Monitor (continued)

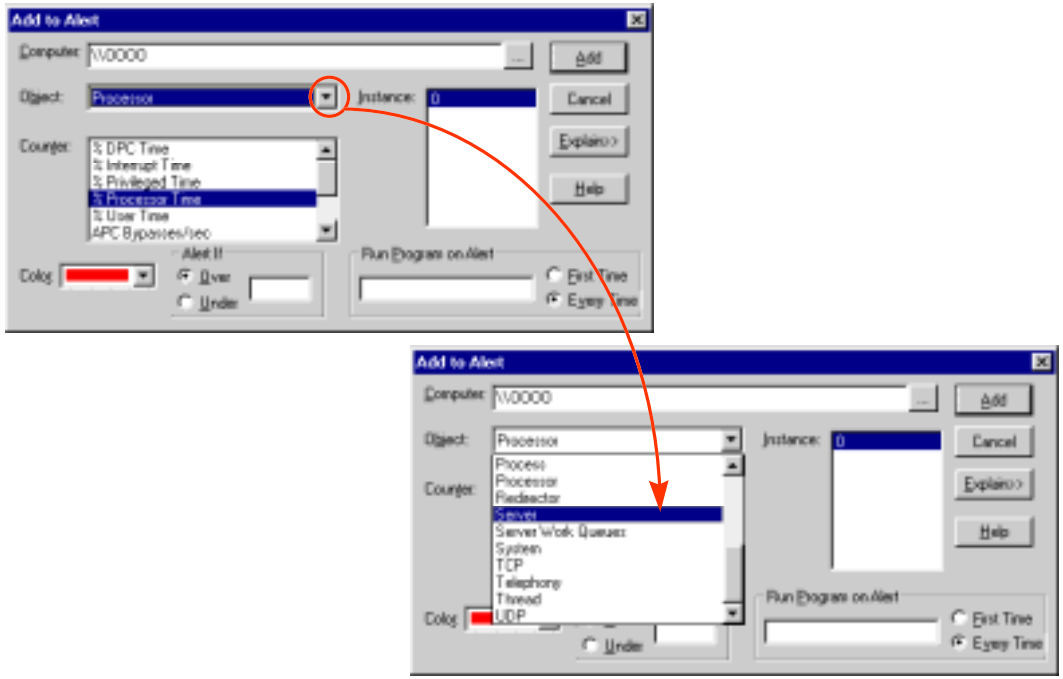
- To set an alert
  - Select Alert from the View Menu
  - Select event to be alerted
  - Set desired threshold value



Native Windows NT tools - Performance Monitor (continued)

- **Performance Monitor example**
  - **Adding an alert for specified number of failed logon attempts**
    - **Select *Add to Alert* from the Edit Menu of the Performance Monitor**
      - **Will bring up dialog box to define alerts based on system values set to be monitored**
    - **Select category of system values from which a specific value will be picked to be monitored**

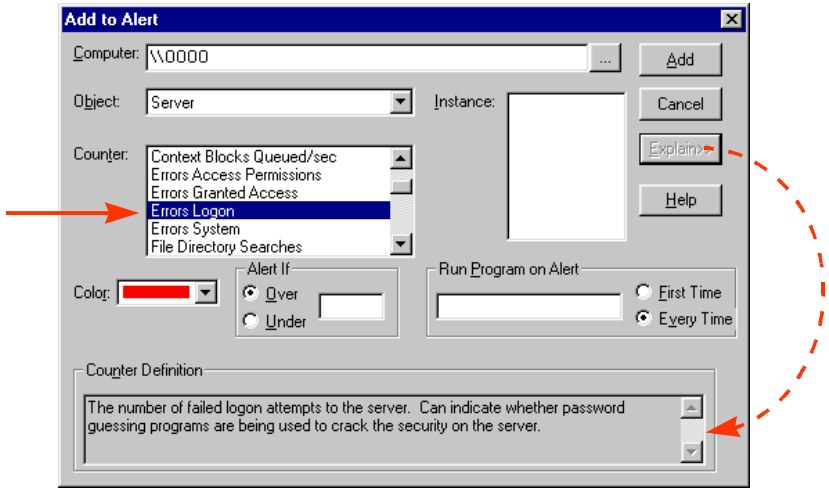
Native Windows NT tools - Performance Monitor (continued)



Native Windows NT tools - Performance Monitor (continued)

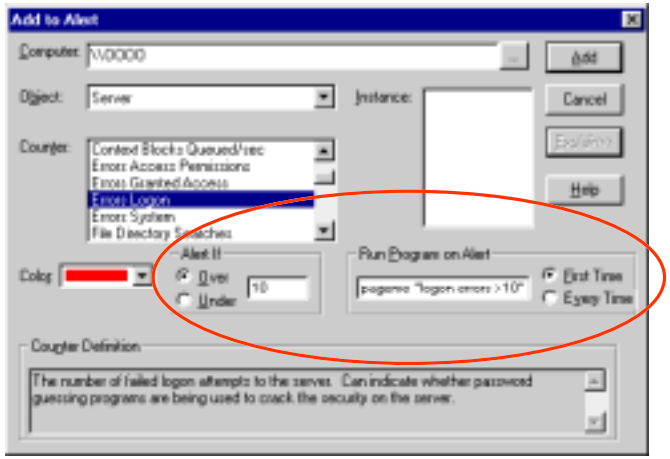
- **Explain button will provide a short explanation describing a Counter within an object**

NT 4.0 Performance Monitor Alerts



Native Windows NT tools - Performance Monitor (continued)

- Set threshold values in *Alert If* box
- To execute a command in the event of an alert
  - Specify program/command in *Run Program on Alert* box

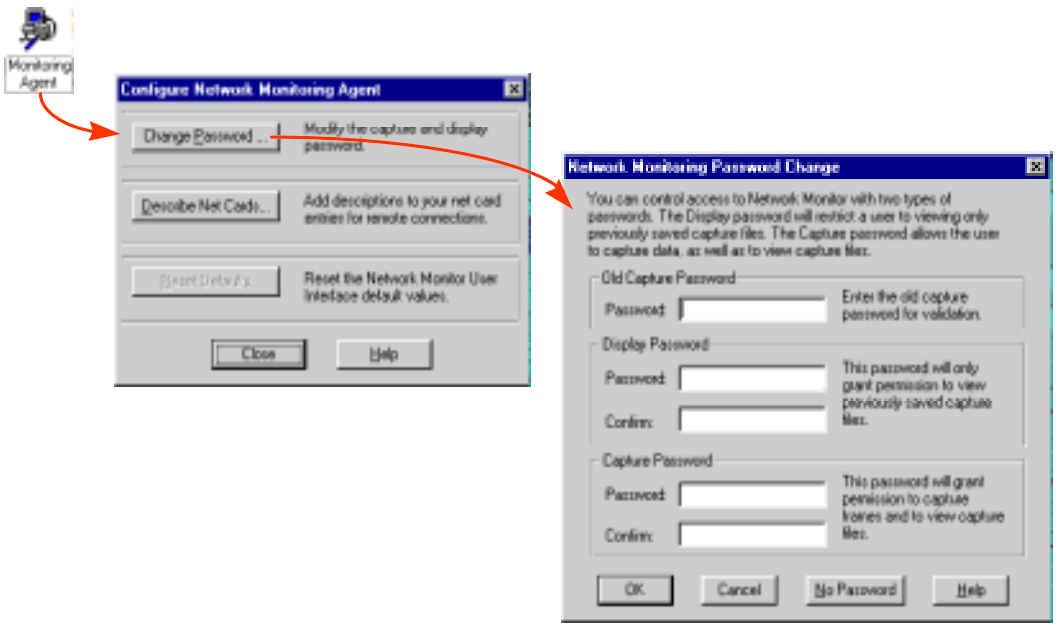


Native Windows NT tools - Network Monitor

- **Windows NT 4.0 Network Monitor**
  - **Packet sniffing program that allows authorized users to monitor traffic specific to the system where it is installed**
    - **Does not capture all network traffic on a given network segment**
  - **Can perform a variety of packet capturing tasks**
    - **May be configured to trigger execution of a command based on appearance of specific data in a packet**
    - **Using this feature, administrators can have a command executed that alerts them to suspicious packets or possible intrusive activities**

Native Windows NT tools - Network Monitor (continued)

- Access privileges to this tool should be restricted to protect against misuse
  - Need Administrator privileges
- Passwords should be set in the *Monitoring Agent Control Panel* to limit authorized users abilities
  - If no passwords are set, Network Monitor is available to all

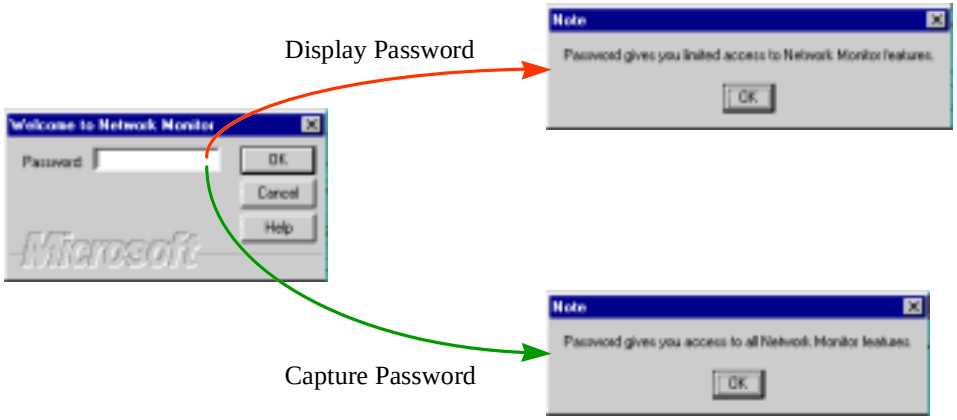


Native Windows NT tools - Network Monitor (continued)

- There are two levels of access that can be enabled
  - Display Password
    - Displays contents of a previously executed packet capture data file
  - Capture Password
    - Captures packets and stores results in a file

Native Windows NT tools - Network Monitor (continued)

- ***Display Password*** **provides limited use of the Network Monitor**
- ***Capture Password*** **enables all features of the Network Monitor**

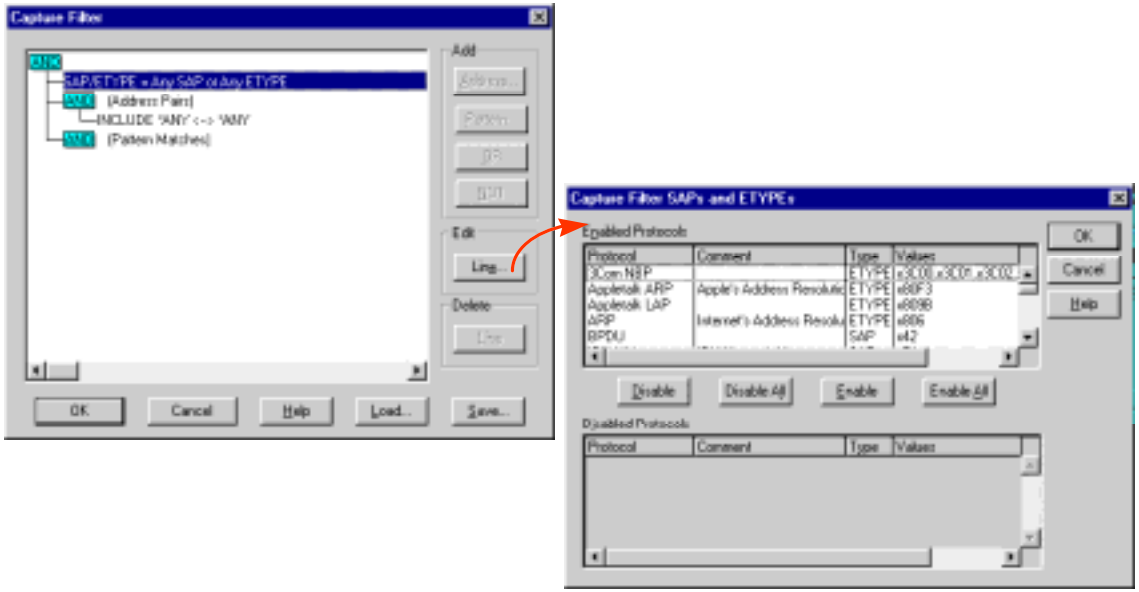


Native Windows NT tools - Network Monitor (continued)

- **Network Monitor example**
  - **Alerting to FTP (TCP port 21) connection attempts to server**
  - **Need to use *Capture Password***
  - ***Create Filter* to collect packets that are**
    - **IP protocol frames**
    - **Addresses to the target host 10.20.30.40**
    - **With a TCP destination of port 21 (0x0015 hex)**
  - **Setup trigger to report when specified connect attempts are detected**

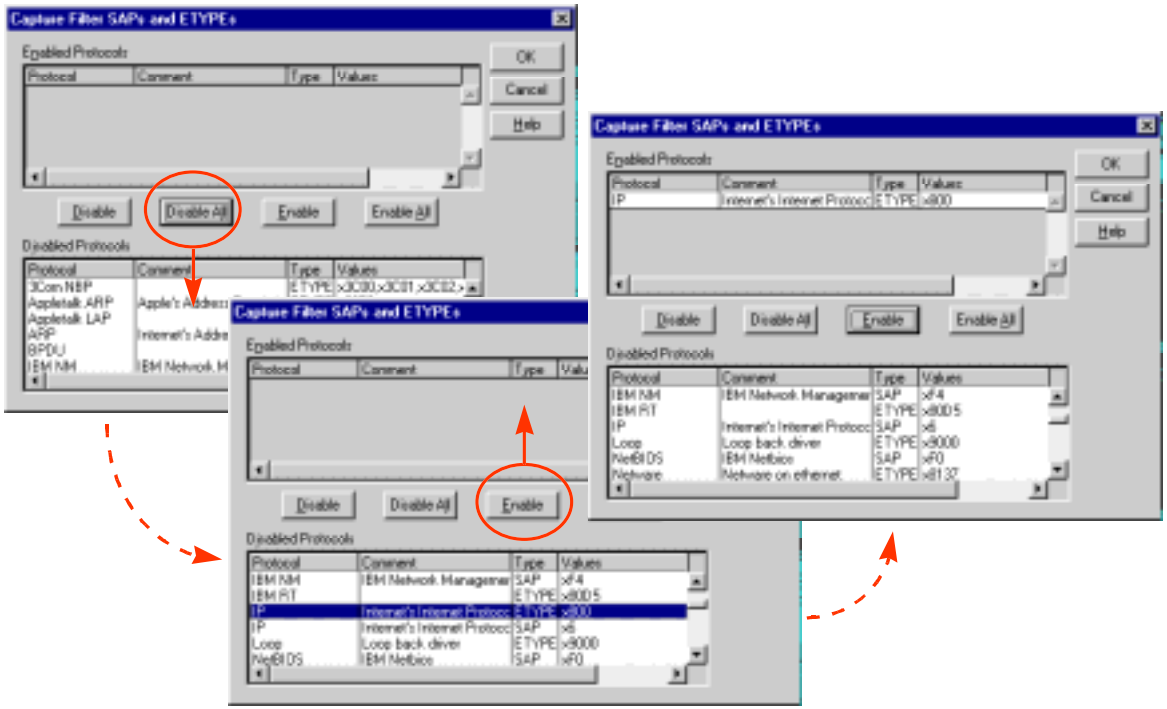
Native Windows NT tools - Network Monitor (continued)

- *Select Filter* from Capture Menu of Network Monitor main menu
  - Default settings capture of all types of packets from every location addressed to/from NT Server
  - Default restricts packet capturing to/from the NT Server that Network Monitor is running on
- Select *Edit Line* from the Capture Filter Dialog Box



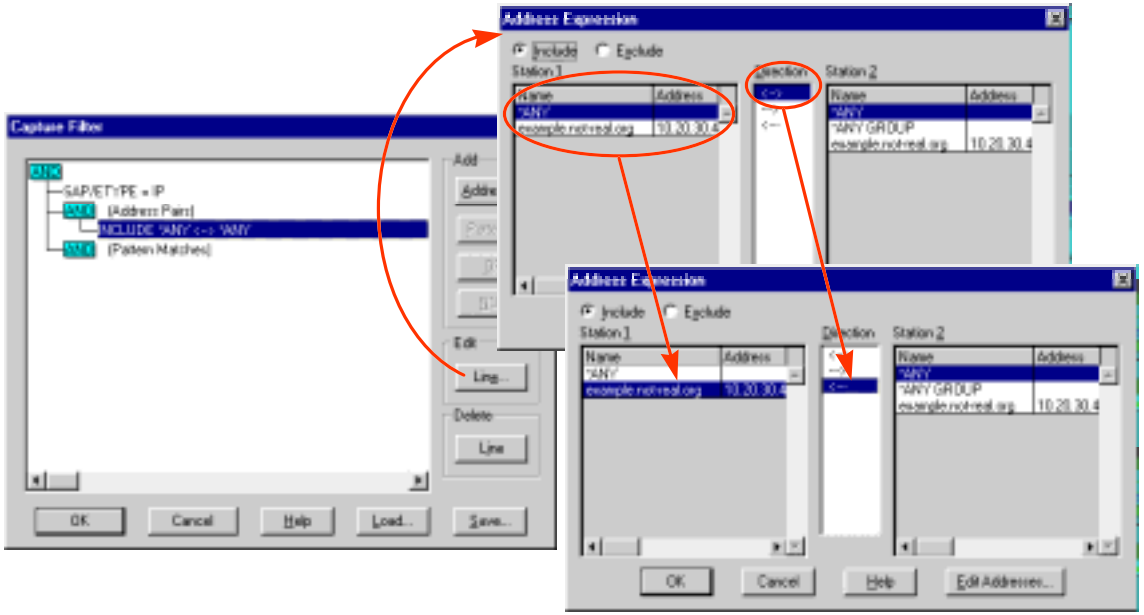
Native Windows NT tools - Network Monitor (continued)

- Capture Filter Service Access Points (SAP)s and Ethertypes (ETYPE)s show protocols that Network Monitor will recognize in the Enabled Protocols window
- To see packets that are not SAP packets
  - Disable all protocols and add back entry for IP (ETYPE)



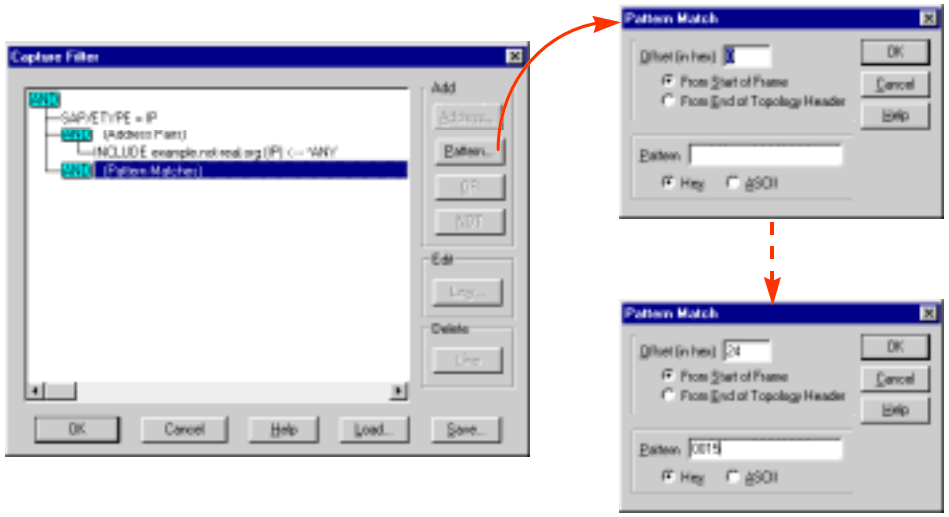
Native Windows NT tools - Network Monitor (continued)

- To include packets that arrive at example.not-real.org from any host



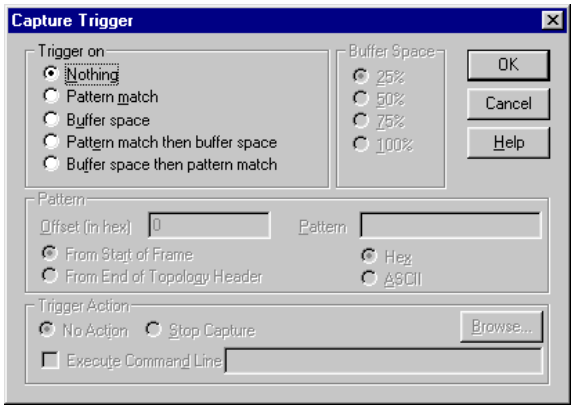
Native Windows NT tools - Network Monitor (continued)

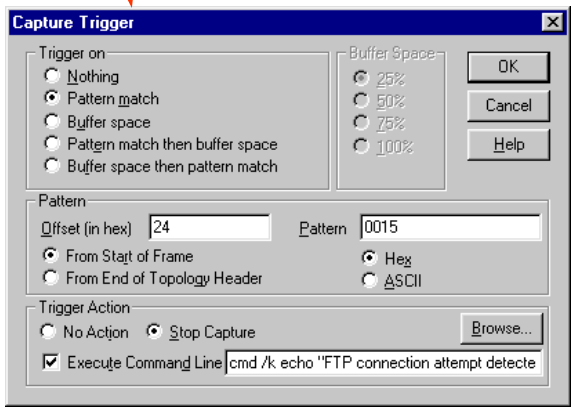
- Define the characteristic pattern in packet which represents an FTP connection request
  - Offset in IP packet of destination port is 24 (hex)
  - 16 bit value representing FTP connection is 015 (hex)



Native Windows NT tools - Network Monitor (continued)

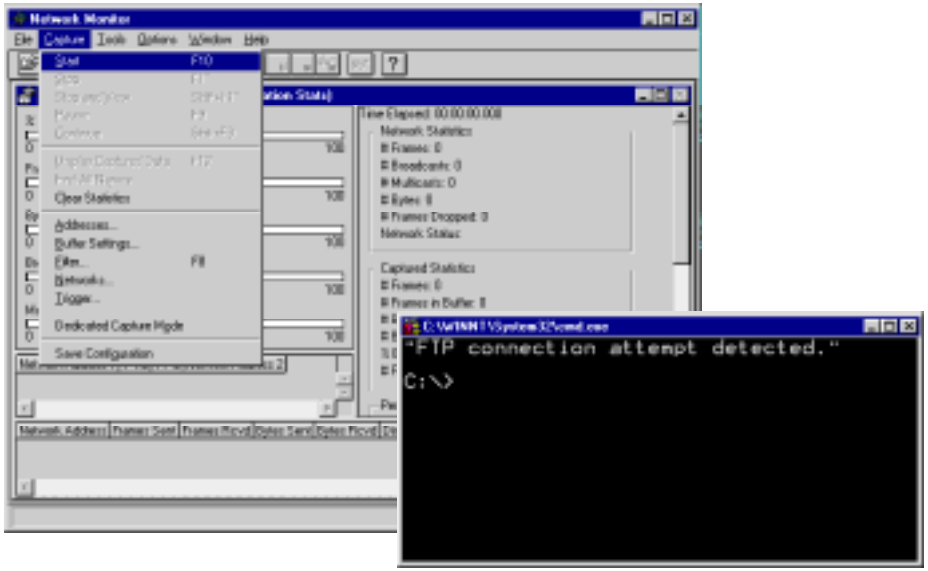
- Select *Trigger* from Capture menu of main menu
- Set pattern offset and pattern
- Trigger Action box
  - *No Action* will execute command specified for every match and continue to capture packets - BE CAREFUL
  - *Stop Capture* will stop capturing packets when match occurs





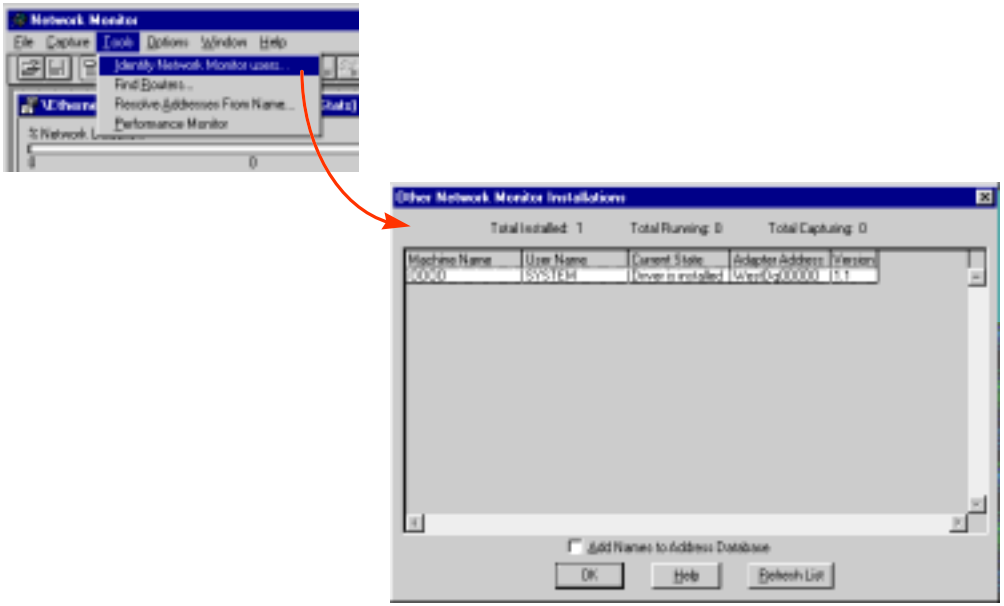
Native Windows NT tools - Network Monitor (continued)

– **Example output when capture occurs**



Native Windows NT tools - Network Monitor (continued)

- Can also identify other instances of Network Monitor running on the network



Native Windows NT tools - Password Filter

- **Password Filter (Passfilt.dll)**
  - Provides enhanced security against password guessing or dictionary attacks
  - Passwords must contain
    - More than six characters
    - A combination of alpha, numeric and non-alphanumeric characters
  - Passwords must not contain
    - Your user name or any part of your full name
  - Only available with Windows NT 4.0 Service Pack 2

Third party Windows NT tools

- **Windows NT Resource Kit**
  - **C2 Configuration Manager (C2CCONFIG.EXE)**
    - **Compares current security configuration of a Windows NT Workstation with the C2 level security requirements as defined by the National Computer Security Center (NCSC)**
  - **Crystal Reports Event Log Viewer**
    - **Full featured report writer**
      - **Allows viewing, sort/filter/group, save and print**
    - **Uses NT event logs from one or more systems**

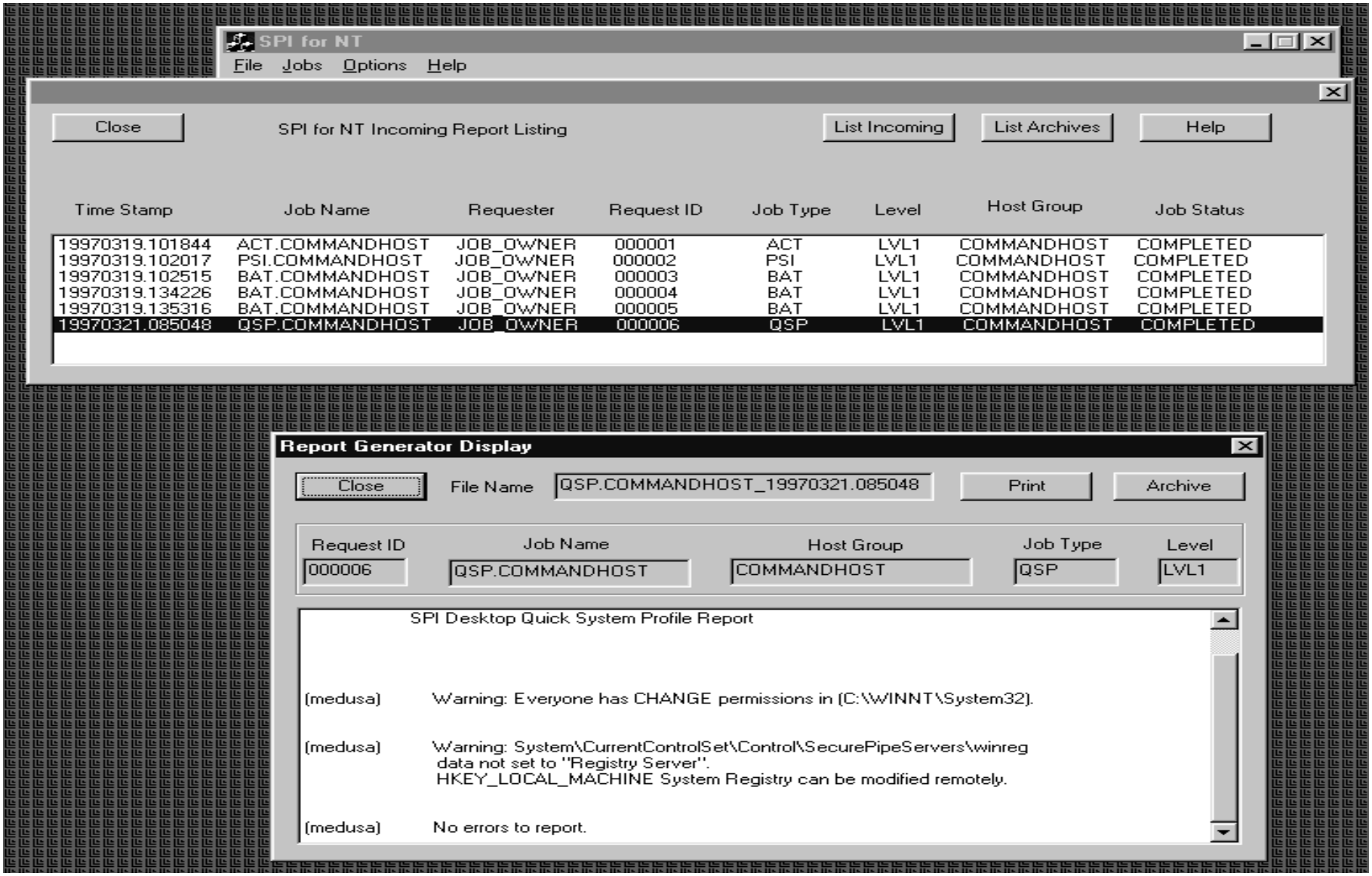
Third party Windows NT tools (continued)

- **SPI for NT**
  - **Employs a suite of five security tools:**
    - **Access Control Test (ACT)**
    - **Password Security Inspector (PSI)**
    - **Quick System Profile (QSP)**
    - **Binary Authentication Tool (BAT)**
    - **Change Detector Tool (CDT)**
  - **Hooks are included to incorporate an anti-virus tool into this package**
  - **Future releases will contain auxiliary hooks to incorporate other security tools**
  - **Available from http://ciac.llnl.gov/tools**

Third party Windows NT tools (continued)

- **QSP**
  - **Performs various checks of the system to determine vulnerabilities that exist**
  - **NT registry keys, system files and dynamically linked libraries are checked to ensure Guest group only has READ access**

SPI-NT QSP Report Example



Third party Windows NT tools (continued)

- **BAT**
  - Determines whether Service Packs need to be installed to keep system current
  - Reports if files are missing or don't match any known binary from the original distribution through the latest Service Pack
  - Binary authentication table is provided with installation
    - Table includes the filename and MD5 checksum value
    - Files that cannot be verified through a checksum may be trojaned

SPI-NT BAT Report

SPI for NT

File Jobs Options Help

Close | SPI for NT Incoming Report Listing | List Incoming | List Archives | Help

Time Stamp	Job Name	Requester	Request ID	Job Type	Level	Host Group	Job Status
19970319.101844	ACT.COMMANDHOST	JOB_OWNER	000001	ACT	LVL1	COMMANDHOST	COMPLETED
19970319.102017	PSI.COMMANDHOST	JOB_OWNER	000002	PSI	LVL1	COMMANDHOST	COMPLETED
19970319.102515	BAT.COMMANDHOST	JOB_OWNER	000003	BAT	LVL1	COMMANDHOST	COMPLETED
19970319.134226	BAT.COMMANDHOST	JOB_OWNER	000004	BAT	LVL1	COMMANDHOST	COMPLETED
19970319.135316	BAT.COMMANDHOST	JOB_OWNER	000005	BAT	LVL1	COMMANDHOST	COMPLETED

Report Generator Display

Close | File Name: BAT.COMMANDHOST_19970319.135316 | Print | Archive

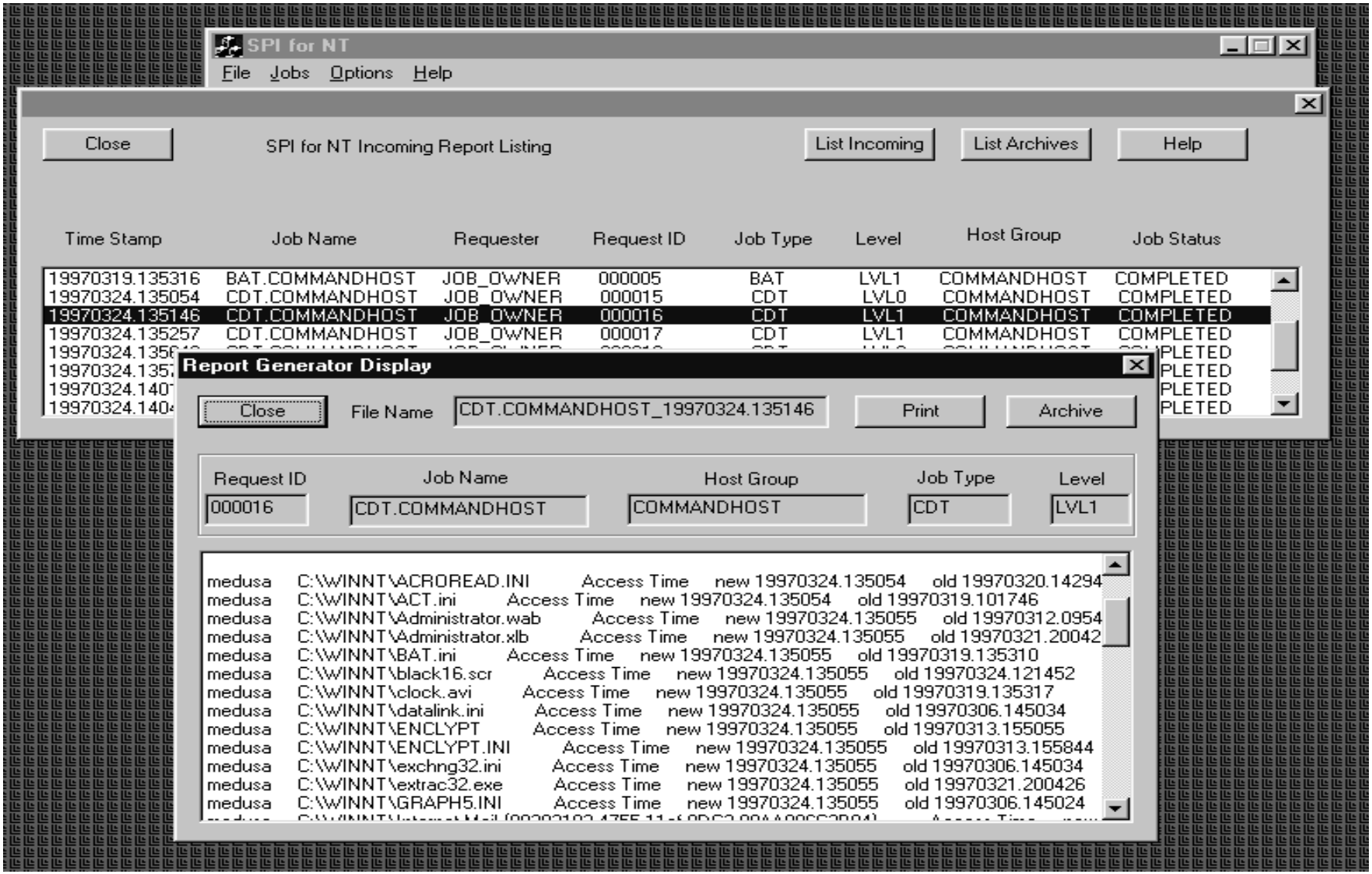
Request ID	Job Name	Host Group	Job Type	Level
000005	BAT.COMMANDHOST	COMMANDHOST	BAT	LVL1

```
Unrecognized Binaries Found

C:\WINNT\system.ini

    5685CAC9B3BA0538686FAC53EF600DF3 Current Check Sum
    EE600165C40F493305A7EE244D75FE76 Authentication Check Sum

C:\WINNT\system32\AUTOEXEC.NT

    34FD06063AEFF65D81025000B80D82F6 Current Check Sum
    85F4FB754F54014E8BF87B109E3D7589 Authentication Check Sum

C:\WINNT\system32\CONFIG.NT
```

Third party Windows NT tools (continued)

- **CDT**
  - Reports changes to a set of user selected files
  - After a “baseline” snapshot has been taken of the selected files
    - Future checks can be made to determine what files have been added, deleted or changed
  - Attributes checked to determine if files have changed
    - Owner
    - File size, mode
    - MD5 checksum
    - Checksum length
    - Permissions
    - Creation, modify, change and access time

SPI-NT CDT Report Example

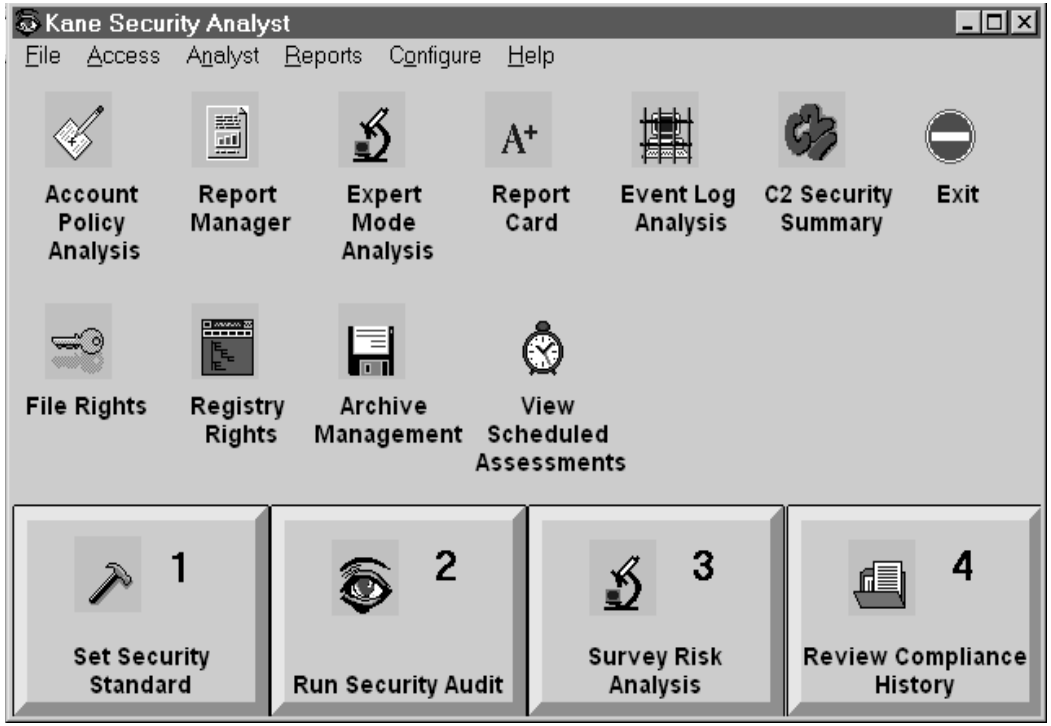


Third party Windows NT tools (continued)

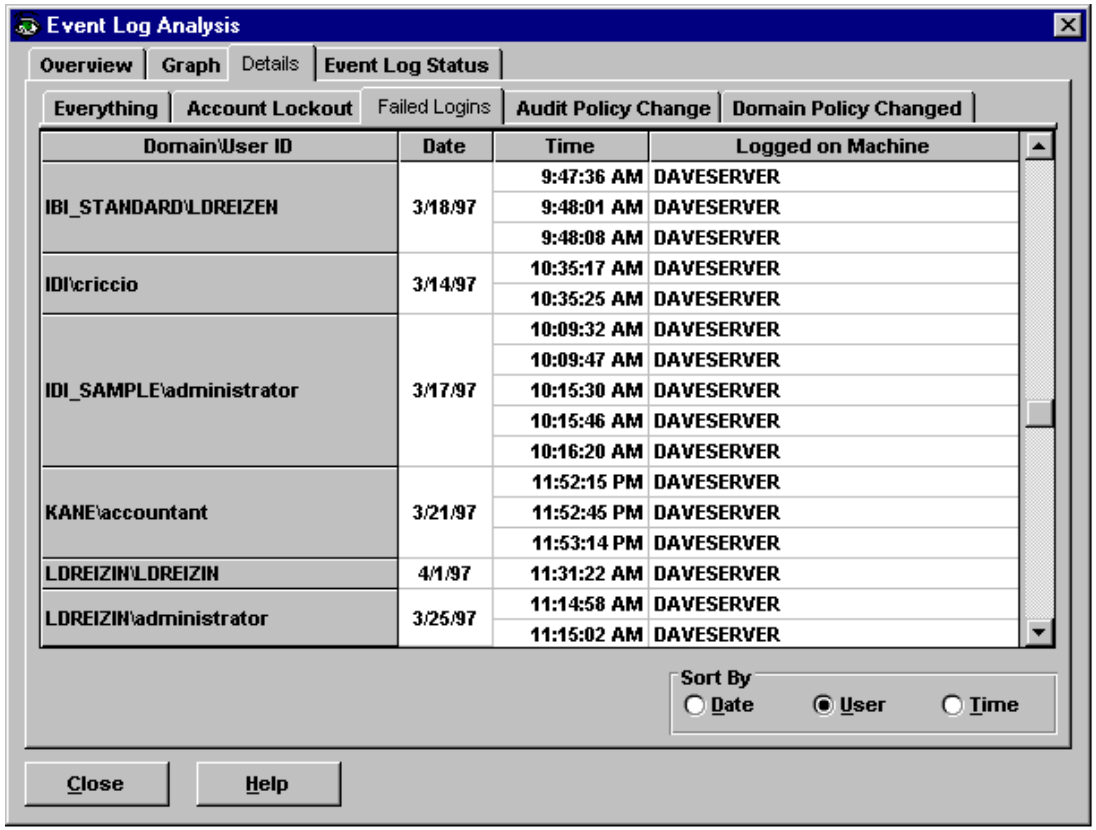
- **Kane Security Analyst**
  - Registry security settings
  - Trust relationships
  - Domain security
  - Auditing policies, Event Logs
  - Rights, permissions, and shares
  - Also available for Novell
  - Available from http://www.intrusion.com

Third party Windows NT tools (continued)

- **Kane Security Analyst**
  - Kane provides many security related functions
  - Most useful intrusion detection feature is the Event Log Analysis



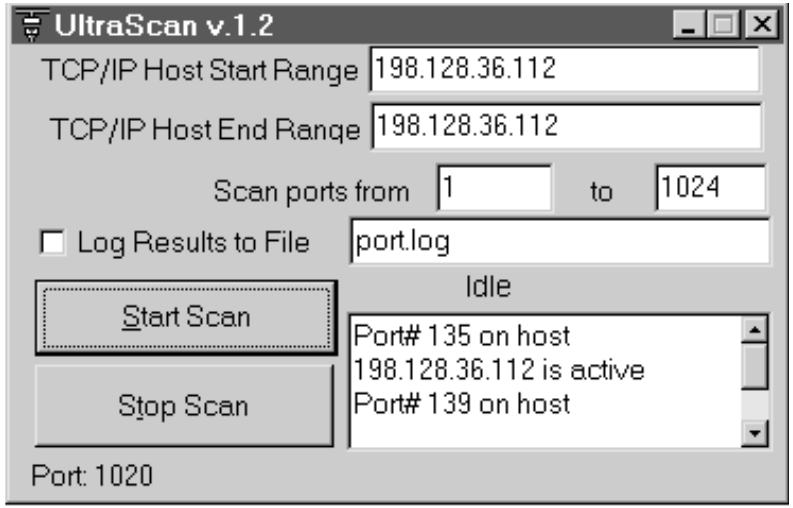
Third party Windows NT tools (continued)



Domain\User ID	Date	Time	Logged on Machine
IBI_STANDARD\LDREIZEN	3/18/97	9:47:36 AM	DAVESERVER
		9:48:01 AM	DAVESERVER
		9:48:08 AM	DAVESERVER
IDI\criccio	3/14/97	10:35:17 AM	DAVESERVER
		10:35:25 AM	DAVESERVER
IDI_SAMPLE\administrator	3/17/97	10:09:32 AM	DAVESERVER
		10:09:47 AM	DAVESERVER
		10:15:30 AM	DAVESERVER
		10:15:46 AM	DAVESERVER
		10:16:20 AM	DAVESERVER
KANE\accountant	3/21/97	11:52:15 PM	DAVESERVER
		11:52:45 PM	DAVESERVER
		11:53:14 PM	DAVESERVER
LDREIZIN\LDREIZIN	4/1/97	11:31:22 AM	DAVESERVER
LDREIZIN\administrator	3/25/97	11:14:58 AM	DAVESERVER
		11:15:02 AM	DAVESERVER

Third party Windows NT tools (continued)

- **UltraScan 1.2**
  - **Provides port status on a range of IP addresses and port numbers**
  - **Shareware**
  - **http://www.ntsecurity.net**



Third party Windows NT tools (continued)

- **NTRegmon**
  - **Displays all registry activity taking place on a Windows NT system**
  - **Advanced filtering capabilities keep log files helpful**
  - **http://www.ntsecurity.net**

NT Registry Monitor

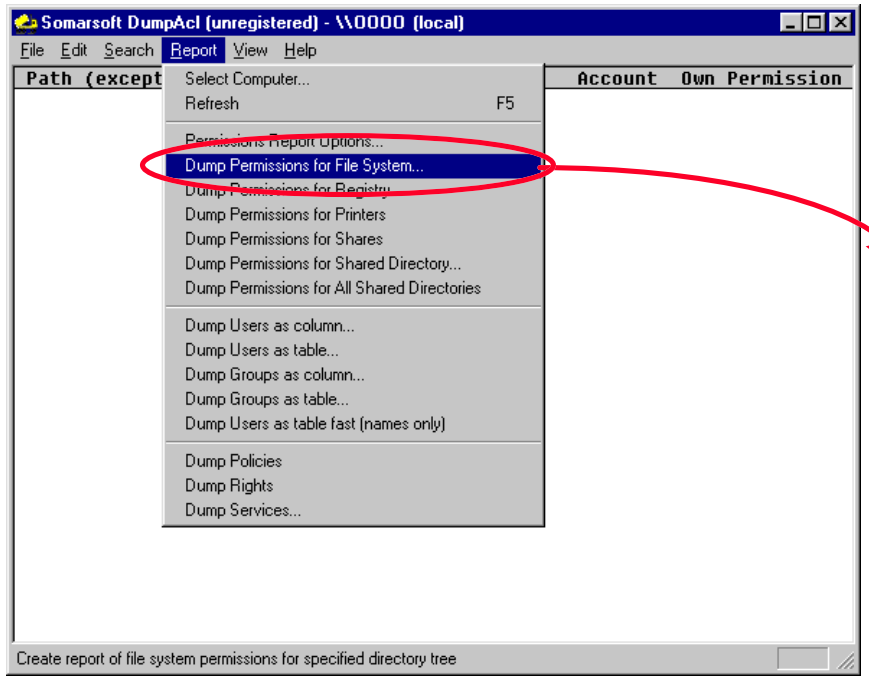
File Events Help

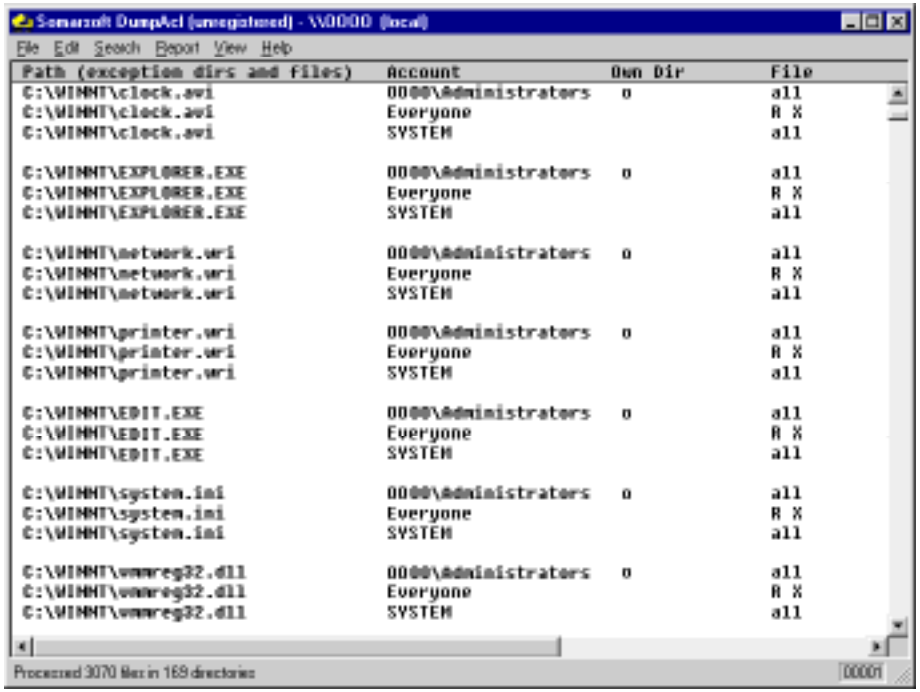
#	Process	Request	Path	Result	Other
146	calc.exe	CreateKey	USERS\S-1-5-21-1022309625-114961431-1233284464-1000\Software\Mic...	SUCCESS	Key: 0xE119CF20
147	calc.exe	OpenKey	MACHINE	SUCCESS	Key: 0xE119A200
148	calc.exe	CreateKey	MACHINE\Software\Microsoft\Windows\CurrentVersion\Explorer	SUCCESS	Key: 0xE1439880
149	calc.exe	OpenKey	USERS\S-1-5-21-1022309625-114961431-1233284464-1000\Software\Mic...	SUCCESS	Key: 0xE17B3F60
150	calc.exe	QueryValue	USERS\S-1-5-21-1022309625-114961431-1233284464-1000\Software\Mic...	NOTFOUND	
151	calc.exe	CloseKey	USERS\S-1-5-21-1022309625-114961431-1233284464-1000\Software\Mic...	SUCCESS	Key: 0xE17B3F60
152	calc.exe	QueryValue	USERS\S-1-5-21-1022309625-114961431-1233284464-1000\Software\Mic...	NOTFOUND	
153	calc.exe	OpenKey	USERS\S-1-5-21-1022309625-114961431-1233284464-1000	SUCCESS	Key: 0xE137BA20
154	calc.exe	CloseKey	USERS\S-1-5-21-1022309625-114961431-1233284464-1000	SUCCESS	Key: 0xE137BA20
155	calc.exe	OpenKey	USERS\S-1-5-21-1022309625-114961431-1233284464-1000\Control Panel...	SUCCESS	Key: 0xE137BA20
156	calc.exe	QueryValue	USERS\S-1-5-21-1022309625-114961431-1233284464-1000\Control Panel...	SUCCESS	"."
157	calc.exe	CloseKey	USERS\S-1-5-21-1022309625-114961431-1233284464-1000\Control Panel...	SUCCESS	Key: 0xE137BA20
158	perfmon.exe	OpenKey	0xE115D2C0\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Perflib	SUCCESS	Key: 0xE137BA20
159	perfmon.exe	CloseKey	0xE115D2C0\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Perflib	SUCCESS	Key: 0xE137BA20
160	calc.exe	CloseKey	ROOT\CLSID	SUCCESS	Key: 0xE15DFCE0
161	calc.exe	CloseKey	USERS\S-1-5-21-1022309625-114961431-1233284464-1000\Software\Mic...	SUCCESS	Key: 0xE119CF20
162	calc.exe	CloseKey	MACHINE\Software\Microsoft\Windows\CurrentVersion\Explorer	SUCCESS	Key: 0xE1439880
163	calc.exe	CloseKey	ROOT	SUCCESS	Key: 0xE13C8A20
164	calc.exe	CloseKey	USERS\S-1-5-21-1022309625-114961431-1233284464-1000	SUCCESS	Key: 0xE113D9E0
165	calc.exe	CloseKey	MACHINE	SUCCESS	Key: 0xE119A200
166	perfmon.exe	OpenKey	0xE115D2C0\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Perflib	SUCCESS	Key: 0xE113D9E0
167	perfmon.exe	CloseKey	0xE115D2C0\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Perflib	SUCCESS	Key: 0xE113D9E0

Third party Windows NT tools (continued)

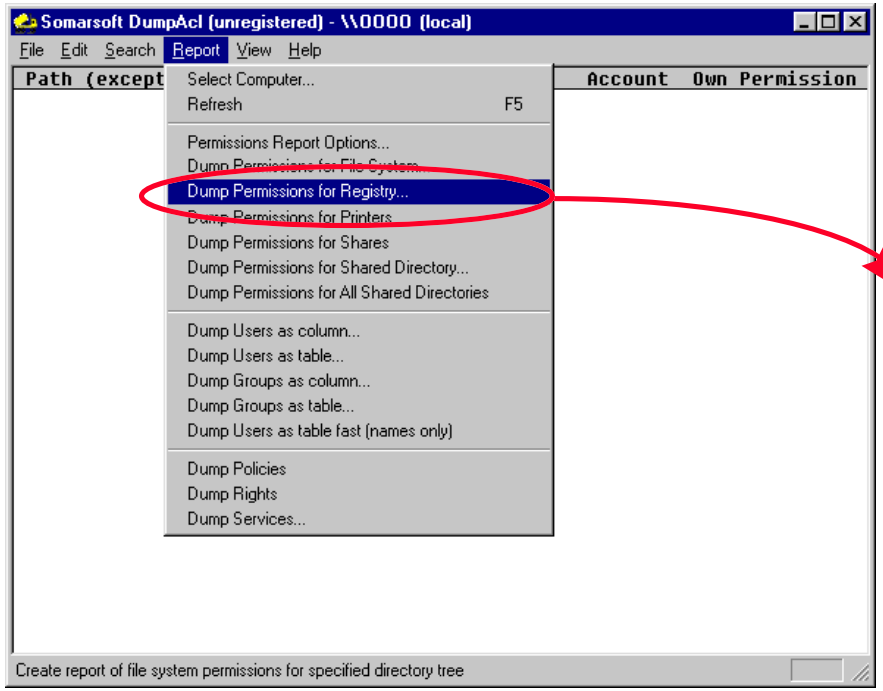
- **Somarsoft DumpACL**
  - **Provides a quick way to list information useful for system administration and security checks**
    - **Reports permissions for file system, Registry, shares, printers**
    - **Reports user/group information**
    - **Reports policies, rights, trusts, and other security information**
    - **Query capability**
    - **Reports on local and remote systems on a network**
  - **Available from http://www.somar.com**

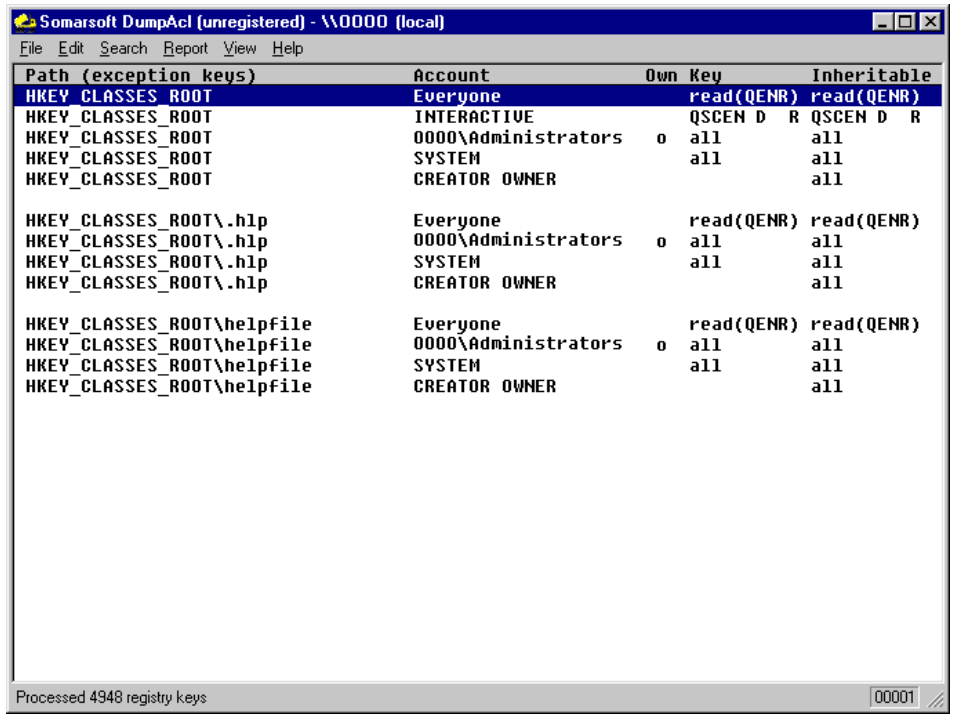
Third party Windows NT tools (continued)





Third party Windows NT tools (continued)





Third party Windows NT tools (continued)

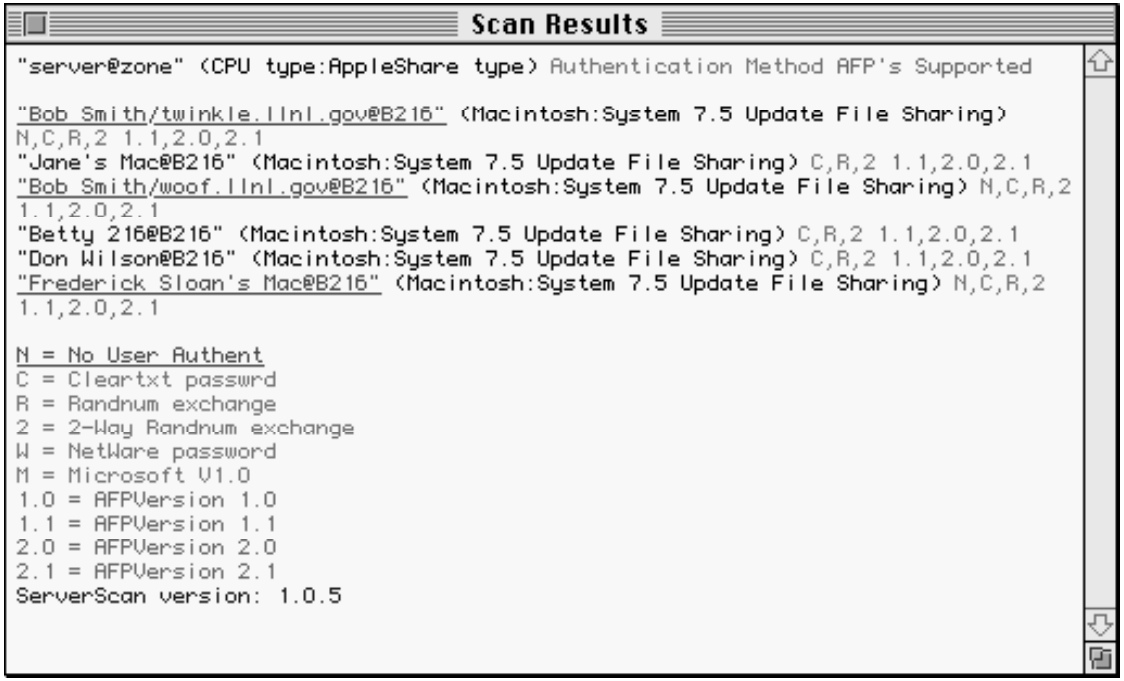
- **BindView**
  - Control domain rights permissions, and other critical system functions
  - Expose any active or potential security holes in your domains
  - Analyzes logged events on all NT machines across every domain
  - Reports across all domains without sacrificing security and regardless of trust relationships
  - Ensures that critical services and current service packs are running on all servers and workstations installed
  - http://www.bindview.com

Macintosh tools

- **Server Scan**
  - Appletalk network scanning tool
  - Scans zone(s) for Macintosh servers
  - Can be configured to crack user accounts and passwords
- **Nok Nok**
  - Control Panel that notifies, logs and limits sharing of local disks on an Appletalk network
- **Net Watchman**
  - Appletalk network scanning tool
  - Scans zone(s) for nodes and services
  - Notification of nodes appearing/disappearing
  - Visual mapping of zones, color coding alerts
  - All tools available from http://www.aggroup.com

Macintosh tools (continued)

- **ServerScan**
  - Shows a great deal of information about an Appletalk network
  - Appletalk hosts with “Guest” account enabled shown in red

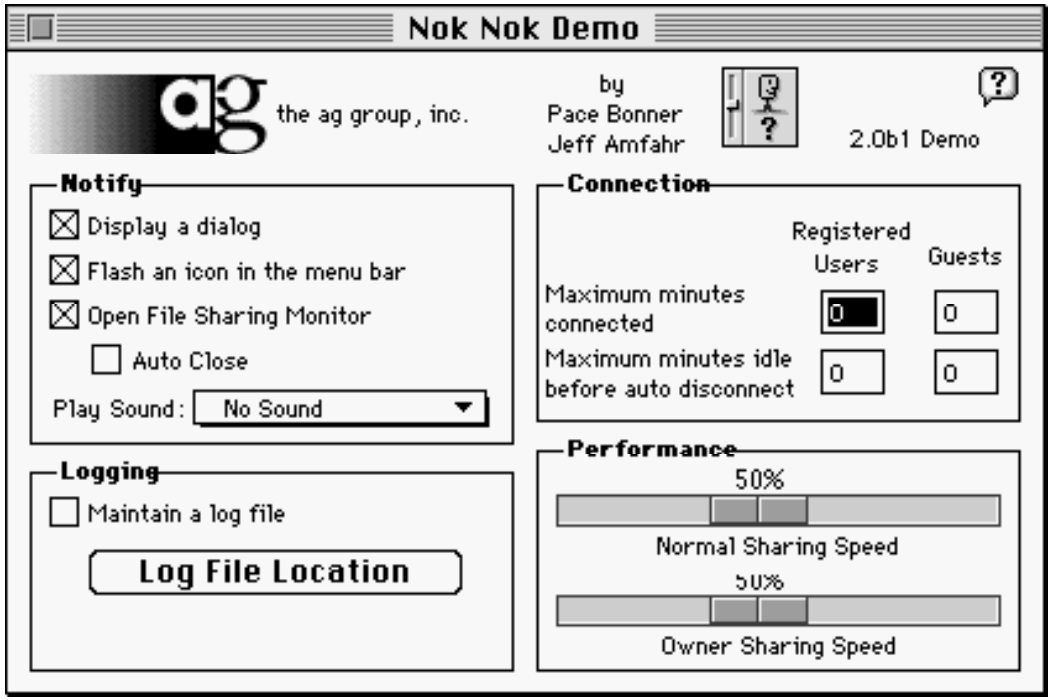


Scan Results

```
"server@zone" (CPU type:AppleShare type) Authentication Method AFP's Supported

"Bob Smith/twinkle.llnl.gov@B216" (Macintosh:System 7.5 Update File Sharing)
N,C,R,2 1.1,2.0,2.1
"Jane's Mac@B216" (Macintosh:System 7.5 Update File Sharing) C,R,2 1.1,2.0,2.1
"Bob Smith/woof.llnl.gov@B216" (Macintosh:System 7.5 Update File Sharing) N,C,R,2
1.1,2.0,2.1
"Betty 216@B216" (Macintosh:System 7.5 Update File Sharing) C,R,2 1.1,2.0,2.1
"Don Wilson@B216" (Macintosh:System 7.5 Update File Sharing) C,R,2 1.1,2.0,2.1
"Frederick Sloan's Mac@B216" (Macintosh:System 7.5 Update File Sharing) N,C,R,2
1.1,2.0,2.1

N = No User Authent
C = Cleartxt passwrd
R = Randnum exchange
2 = 2-Way Randnum exchange
W = NetWare password
M = Microsoft V1.0
1.0 = AFPVersion 1.0
1.1 = AFPVersion 1.1
2.0 = AFPVersion 2.0
2.1 = AFPVersion 2.1
ServerScan version: 1.0.5
```

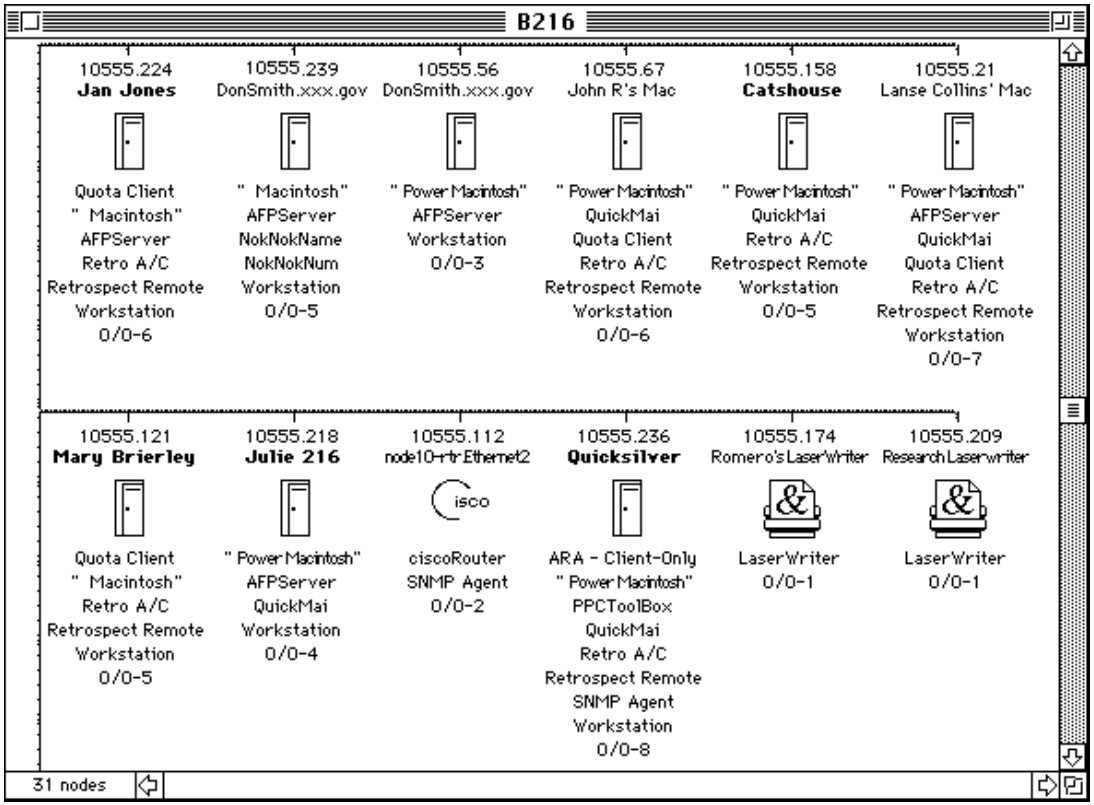
Macintosh tools (continued)

- **Nok Nok**
  - **Control Panel that notifies, logs and limits sharing of local disks on an Appletalk network.**



Macintosh tools (continued)

- **Net Watchman**
  - –Appletalk network mapping and change notification tool
  - –Notification of nodes appearing/disappearing
  - –Visual mapping of zones, color coding alerts



Novell important file information

- **Most important files**
  - **are located in SYS:_Netware directory (including bindery files).**
- **Other important directories**
  - **SYS:SYSTEM, SYS:PUBLIC, SYS:LOGIN**
- **Netware 3.x password and security files**
  - **located in SYS:SYSTEM directory. (NET$OBJ.SYS, NET$VAL.SYS, NET$PROP.SYS)**
- **Netware 4.x login names/password files**
  - **in SYS:_Netware: (PARTITION.NDS, BLOCK.NDS, ENTRY.NDS, VALUE.NDS)**

Novell log files

- The audit files are NET$AUDT.*; usually located in SYS:_Netware directory
  - auditing can be turned on or off
  - can be configured to capture log-in activity
- Novell's Accounting Feature"on"
  - Records changes in files such as
    - deleting
    - adding
    - other footprints
  - provides details to auditing files
- File Server Error log periodically
  - shows system downs, reboots, new system installations

Third party Novell tools

- **AUDIT**
  - for Netware 3.1x
  - Audit file analysis tool: filters important information
- **LOGIT**
  - Log chosen network events
- **EXPIRED**
  - search for unused (or expired) accounts
- **NECSEC**
  - check for bad or no passwords
- **http://www.best.com/~dmadden**

Native Novell tools

- CHKNULL.EXE
  - check for bad or no passwords
- Intrusion detection property
  - Password guessing alert-notifys sys admin when someone is guessing passwords
  - can be set to lock account when guessing is detected
- GRPLIST.EXE
  - Network configuration analyzers for weak or default accounts such as “guest”
- USERLST
  - Check for new/mysterious users
  - check privileges (especially supervisor)
- Bindfix
  - Checks for unaccounted changes in rights or privileges for users and container objects

Resources

- Books
- Websites
- Newsgroups

Books

- **Security Audit and Control**
  - Microsoft Press
- **Windows NT Security Handbook**
  - Tom Sheldon
  - Osborne McGraw-Hill
- **Windows NT Server 4.0 Professional Reference**
  - Karanjit Siyan
  - New Riders
- **The Complete Guide to Netware 4.1**
  - James Gaskin
  - Network Press
- **Novell's Netware Administrator's Handbook**
  - Kelley J.P. Lindberg
  - Sybex, Novell Press

Websites

- NT resources
  - Microsoft - http://www.microsoft.com
    - tools
    - knowledge base
  - NT Security - http://www.ntsecurity.net
  - NT FAQ - http://www.it.kth.se/~rom/ntsec.html
- Mac and NT resources
  - http://www.aggroup.com
  - http://www.macintouch.com
  - http://www.MacWEEK.com
- Novell resources
  - http://www.novell.com
  - http://www.best.com/~dmadden

Newsgroups

- **NT Bugtraq**
  - **e-mail to: listserver@rc.on.ca**
  - **in body of message: subscribe ntbugtraq <yourName>**
- **NT Security**
  - **e-mail to: majordomo@iss.net**
  - **in body of message: subscribe ntsecurity**
  - **for digest version: subscribe ntsecurity-digest**