ZENworks Endpoint Security Management

Version 3.2

Administrator's Manual

June 14, 2007

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ZENworks Endpoint Security Management

Novell's ZENworks Endpoint Security Management (ESM) provides complete, centralized security management for all endpoints in the enterprise. Because ESM applies security at the most vulnerable point, the endpoint, all security settings are applied and enforced regardless of whether the user is connecting to the network directly, dialing in remotely, or even not connecting to corporate infrastructure at all. This is critical to not only protect the data within the corporate perimeter, but also to protect the critical data that resides on the endpoint device itself.

ESM automatically adjusts security settings and user permissions based on the current network environment characteristics. A sophisticated engine is used to determine the user's location and automatically adjusts firewall settings and permissions for applications, adapters, hardware, etc.

Security is enforced through the creation and distribution of ESM security policies. Each location (Work, Home, Alternate, Airport, etc.) listed in a security policy is assigned to a network environment (or multiple network environments). A location determines which hardware is available and the degree of firewall settings that are activated within the network environment. The firewall settings determine which networking ports, access control lists (ACLs), and applications are accessible/required. Various integrity checks and scripts can be run at location change to ensure that all required security software is up to date and running.

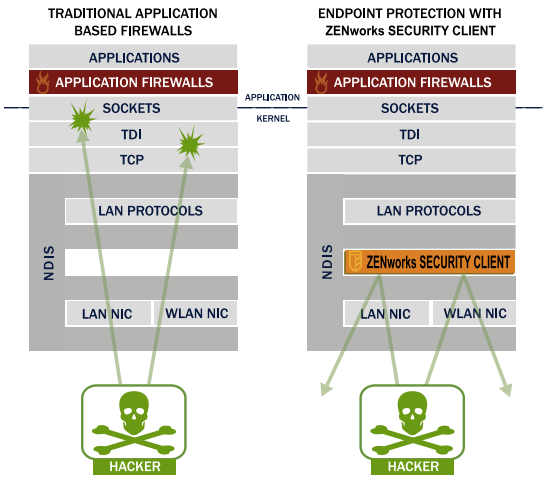


Figure 1: Effectiveness of NDIS-layer firewall

In securing mobile devices, ESM is superior to typical personal firewall technologies which operate only in the application layer or as a firewall-hook driver. ESM client security is integrated into the Network Driver Interface Specification (NDIS) driver for each network interface card (NIC), providing security protection from the moment traffic enters the PC. Differences between ESM and application-layer firewalls and filter drivers are illustrated in Figure 1.

Security decisions and system performance are optimized when security implementations operate at the lowest appropriate layer of the protocol stack. With ESM's ZENworks Security Client, unsolicited traffic is dropped at the lowest levels of the NDIS driver stack by means of Adaptive Port Blocking (stateful packet inspection) technology. This approach protects against protocol-based attacks including unauthorized port scans, SYN Flood, NetBIOS, and DDOS attacks.

ESM Overview

ESM consists of five high-level functional components: **Policy Distribution Service**, **Management Service**, **Management Console**, **Client Location Assurance Service**, and the **ZENworks Security Client**. The figure below shows these components in the architecture

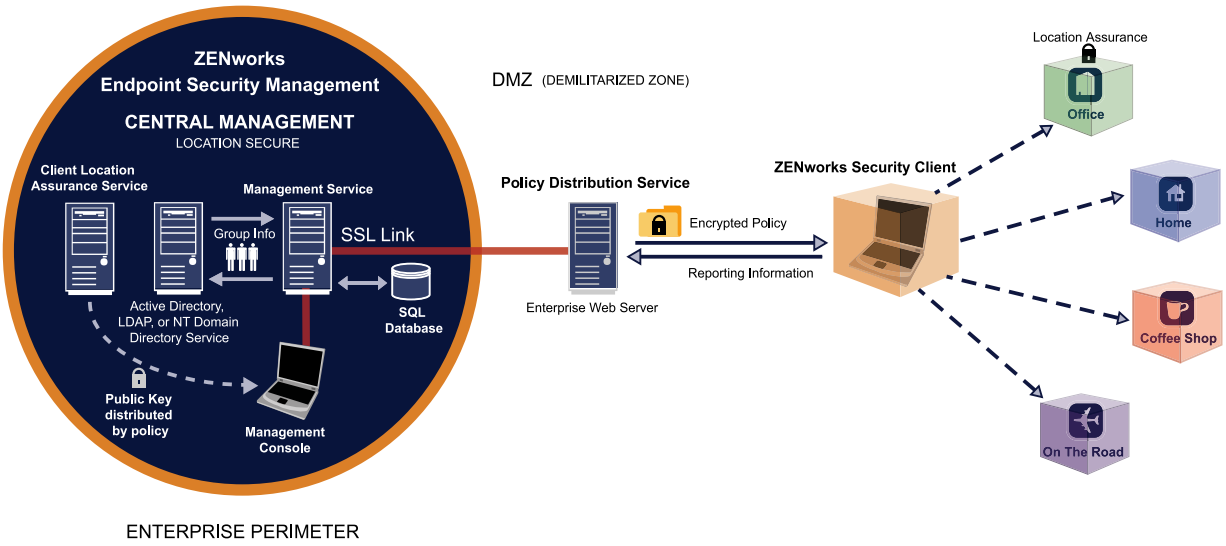


Figure 2: ESM Architecture

The **ZENworks Security Client** (ZSC) is responsible for enforcement of the distributed security policies on the endpoint system. When the ZSC is installed on all enterprise PCs, these endpoints may now travel outside the corporate perimeter and maintain their security, while endpoints inside the perimeter will receive additional security checks within the perimeter firewall.

Each **Central Management** component is installed separately, the following components are installed on servers which are secured inside the corporate perimeter:

- **Policy Distribution Service** is responsible for the distribution of security policies to the ZSC, and retrieval of reporting data from the ZSCs. The Policy Distribution Service can be deployed in the DMZ, outside the enterprise firewall, to ensure regular policy updates for mobile endpoints
- **Management Service** is responsible for user policy assignment and component authentication; reporting data retrieval, creation and dissemination of ESM reports; and security policy creation and storage
- **Management Console** is a visible user interface, which can run directly on the server hosting the Management Service or on a workstation residing inside the corporate firewall with connection to the Management Service server. The Management Console is used to both configure the Management Service and to create and manage user and group security policies. Policies can be created, copied, edited, disseminated, or deleted using the editor
- **Client Location Assurance Service** provides a cryptographic guarantee that ZENworks Security Clients are actually in a defined location, as other existing network environment parameters indicate

System Requirements

Table 1: System Requirements

Server System Requirements	Endpoint System Requirements
Operating Systems: Microsoft Windows 2000 Server SP4 Microsoft Windows 2000 Advanced Server SP4 Windows 2003 Server **Processor:** 3.0 GHz Pentium 4 HT (or greater) 756 MB RAM minimum (1 GB+ Recommended) **Disk Space:** 500 MB - Without local Microsoft SQL database 5 GB - With local MS SQL database (SCSI recommended) **Required Software:** Supported RDBMS (SQL Server Standard, SQL Server Enterprise, Microsoft SQL Server 2000 SP4, or SQL 2005) Microsoft Internet Information Services (configured for SSL) Supported Directory Services (eDirectory, Active Directory, or NT Domains*) * = NT Domains is only supported when the Management Service is installed on a Windows 2000, or 2000 advanced server (SP4).	**Operating Systems:** Windows XP SP1 Windows XP SP2 Windows 2000 SP4 **Processor:** 600MHz Pentium 3 (or greater) Minimum 128 MB RAM (256 MB or greater recommended **Disk Space:** 5 MB required, 5 additional MB recommended for reporting data **Required Software:** Windows 3.1 Installer All Windows updates should be current

ASP.NET

The Policy Distribution, Management, and Client Location Assurance services require a LOCAL account of ASP.NET to be enabled. If this is disabled, the services will NOT work correctly.

Reliable Time Stamp

The Novell ESM solution gathers data from multiple sources and collates this data to create a wide variety of security and audit reports. The utility and probative value of these reports is greatly diminished if disparate sources disagree as to times, and so it is strongly recommended that anyone installing ESM provide for enterprise-wide time synchronization (such as that provided by Active Directory, or through the use of Network Time Protocol).

The ESM Administrator(s) should follow all installation, operation, and maintenance recommendations provided in this document and the ESM Installation and Quick-Start guide, in order to ensure a strong security environment.

About the ESM Manuals

The ZENworks Endpoint Security Management manuals provide three levels of guidance for the users of the product.

- **ESM Administrator's Manual** - This guide is written for the ESM Administrators who are required to manage the ESM services, create security policies for the enterprise, generate and analyze reporting data, and provide troubleshooting for end-users. Instructions for completing these tasks are provided in this manual
- **ESM Installation and Quick-Start Guide** - This guide provides complete installation instructions for the ESM components and assists the user in getting those components up and running
- **ZENworks Security Client User's Manual** - This manual is written to instruct the end-user on the operation of the ZENworks Security Client (ZSC). This guide may be sent to all employees in the enterprise to help them understand how to use the ZSC

Policy Distribution Service

The Policy Distribution Service is a web service application that, when requested, distributes security policies and other necessary data to ZENworks Security Clients. ESM security policies are created and edited with the Management Service's Management Console, then published to the Policy Distribution Service where they are downloaded by the client at check-in.

The Policy Distribution Service authenticates ZENworks Security Clients based on the user ID credentials obtained from the Management Service, and supplies each client with the designated security policy.

Reporting data is collected by ZENworks Security Clients and passed up to the Policy Distribution Service. This data is periodically collected by the Management Service and then deleted from the Policy Distribution Service.

The Policy Distribution Service does not initiate any communications with the other ESM components, and only responds to others. It does not hold sensitive data in the clear, nor does it hold the keys needed to decrypt the sensitive data. It does not hold user credentials, or any other user-specific data.

Server Selection and Installation

Please refer to the Installation and Quick Start guide for selection and installation instructions.

Server Maintenance

It is recommended that regular Disk Cleanup tasks be configured to run on this server to remove temporary files out of the Windows\temp folder. Under extreme load conditions windows can generate an inordinate amount of temporary files that needlessly take up disk space.

Upgrading the Software

The ESM Policy Distribution Service software can be upgraded by running the new installation software.

Uninstall

To uninstall the Policy Distribution Service, use the Add/Remove Programs function in the Windows Control Panel, or run the installation again from the ESM installation CD.

Securing Server Access

Physical Access Control

Physical access to the Distribution Service Server should be controlled to prevent access by unauthorized parties. Measures taken should be appropriate to the risks involved. There are multiple available standards and guidelines available, including NIST recommendations, HIPAA requirements, ISO/IEC 17799, and less formal collections of recommendations such as CISSP or SANS guidelines. Even when a given regulatory frameworks is not applicable, it may still act as a valuable resource and planning guide.

Likewise, Disaster Recovery and Business Continuity mechanisms to protect the Distribution Server should be put in place to protect the server if an organizational risk assessment identifies a need for such steps. The mechanisms best used will depend on the specifics of the organization and its desired risk profile, and cannot be described in advance. The same standards and guidelines sources listed above can be helpful in this decision as well.

Network Access Control

The Distribution Server can be further protected from unauthorized access by restricting network access to it. This may take the form of some or all of the following:

- restricting incoming connection attempts to those ports and protocols from which a valid access attempt might be expected;
- restricting outgoing connection attempts to those IP addresses to which a valid access attempt might be expected; and/or
- restricting outgoing connection attempts to those ports and protocols to which a valid access attempt might be expected.

Such measures can be imposed through the use of standard firewall technology.

High Availability

High Availability mechanisms for the Distribution Server should be put in place if an organizational risk assessment identifies a need for such steps. There are multiple alternative mechanisms for building high availability solutions, ranging from the general (DNS round-robining, layer 3 switches, etc.) to the vendor specific (the Microsoft web site has multiple resources on high availability web services and clustering issues). Those implementing and maintaining an ESM solution should determine which class of high availability solution is most appropriate for their context. It should be kept in mind that the Distribution Server has been architected to function in non-high-availability situations, and does not require High Availability to provide its services.

Running the Service

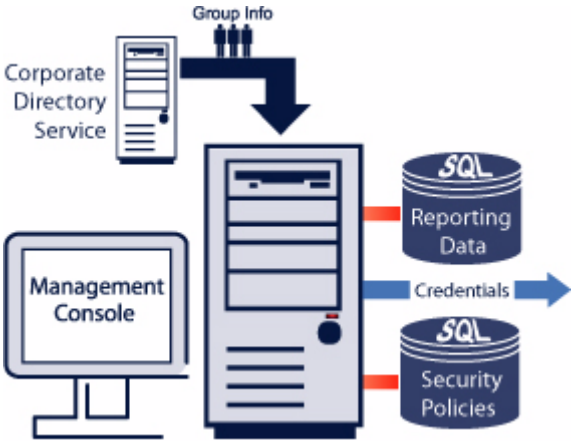
The Policy Distribution Service launches immediately following installation, with no reboot of the server required. The Management Console can adjust upload times for the Distribution Service using the Configuration feature (See “Infrastructure and Scheduling” on page 28). For other monitoring capabilities see:

- “Server Communication Checks” on page 207
- “System Monitor” on page 214

Management Service

The Management Service is the central service for ESM. It is used to create authentication credentials, design and store security policies and their components, and provide remediation through a robust reporting service. It provides security policies and user information to the Policy Distribution Service, as well as providing opaque credentials to ZENworks Security Clients.

Security policies, credentials, and reports are stored in an SQL database(s), which may reside on the same server as the Management Service or on remote servers.



Server Selection and Installation

Please refer to the Installation and Quick Start guide for selection and installation instructions.

Server Maintenance

It is recommended that regular Disk Cleanup tasks be configured to run on this server to remove temporary files out of the Windows\temp folder. Under extreme load conditions windows can generate an inordinate amount of temporary files that needlessly take up disk space.

Upgrading the Software

The ESM Management Service software can be upgraded by running the new installation software.

Uninstall

To uninstall the Management Service, use the Add/Remove Programs function in the Windows Control Panel.

To uninstall the Management Console (when run on a separate PC), use the Add/Remove Programs function in the Windows Control Panel.

Securing Server Access

Physical Access Control

Physical access to the Management Server should be controlled to prevent access by unauthorized parties. Measures taken should be appropriate to the risks involved. There are multiple available standards and guidelines available, including NIST recommendations, HIPAA requirements, ISO/IEC 17799, and less formal collections of recommendations such as CISSP or SANS guidelines. Even when a given regulatory frameworks is not applicable, it may still act as a valuable resource and planning guide.

Disaster Recovery and Business Continuity: Disaster Recovery and Business Continuity mechanisms to protect the Management Server should be put in place to protect the server if an organizational risk assessment identifies a need for such steps. The mechanisms best used will depend on the specifics of the organization and its desired risk profile, and cannot be described in advance. There are multiple available standards and guidelines available, including NIST recommendations, HIPAA requirements, ISO/IEC 17799, and less formal collections of recommendations such as CISSP or SANS guidelines.

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The Management Server can be further protected from unauthorized access by restricting network access to it. This may take the form of some or all of the following:

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Such measures can be imposed through the use of standard firewall technology.

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High Availability mechanisms for the Management Server should be put in place if an organizational risk assessment identifies a need for such steps. There are multiple alternative mechanisms for building high availability solutions, ranging from the general (DNS round-robining, layer 3 switches, etc.) to the vendor specific (the Microsoft web site has multiple resources on high availability web services). Those implementing and maintaining an ESM solution should determine which class of high availability solution is most appropriate for their context. It should be kept in mind that the Management Server has been architected to function in non-high-availability situations, and does not require High Availability to provide its services.

Running the Service

The Management Service launches immediately following installation, with no reboot of the server required. The Management Console is used to manage the data on the Management Service. See “Infrastructure and Scheduling” on page 28. for more details.

For other monitoring capabilities see:

- “Server Communication Checks” on page 207
- “System Monitor” on page 214

Distributing ESM Credentials (Key Management Key)

The Management Service automatically distributes credentials to each ZSC when it is installed and checks-in to the Management Service for the first time. Once this credential is distributed, the ZSC will be permitted to receive policies from the Policy Distribution Service, and provide reporting data to the Reporting Service.

Periodic Renewal of the Key Management Key (KMK)

Cryptographic best practices dictate that the KMK be renewed at regular intervals to prevent certain cryptographic attacks from being practical. This need only take place on a relatively long cycle: typically on the order of once every year, and should not be done too frequently because the change-over does involve some effort and bandwidth costs.

To renew the KMK, perform the following steps:

Step 1: Open the Communications Console on the Management Service (*Start/Programs/Novell/ Management Service/ESM Communications Console*)**.**

Note:

Running the Communications Console will cause the Management Service to lose user and log data, however, policy data will not be deleted.

Step 2: Allow the Communications Console to run a complete check.

Step 3: Have all end-users authenticate to the Management Service (either via VPN or while inside the appropriate firewall), by right-clicking the ZSC task-tray icon and selecting “Check for Policy Update.”

Step 4: The Management Console will automatically pass the new KMK credentials down. In some cases, the user will have to authenticate to the domain (username and password).

Until the endpoints renew their KMK, they will not be able to communicate with the Policy Distribution Service.

Management Console

The Management Console is the central access and control for the Management Service.

Double-click the Management Console Icon on the desktop to launch the login window. Log in to the Console by entering the administrator name and password. The username entered MUST be an authorized user on the Management Service (see “Permissions Settings” on page 24).

Note:

It is recommended that the console be closed or minimized when not in use.

Task Bar

The Task-bar on the left provides access to the Management Console tasks (see Figure 3).

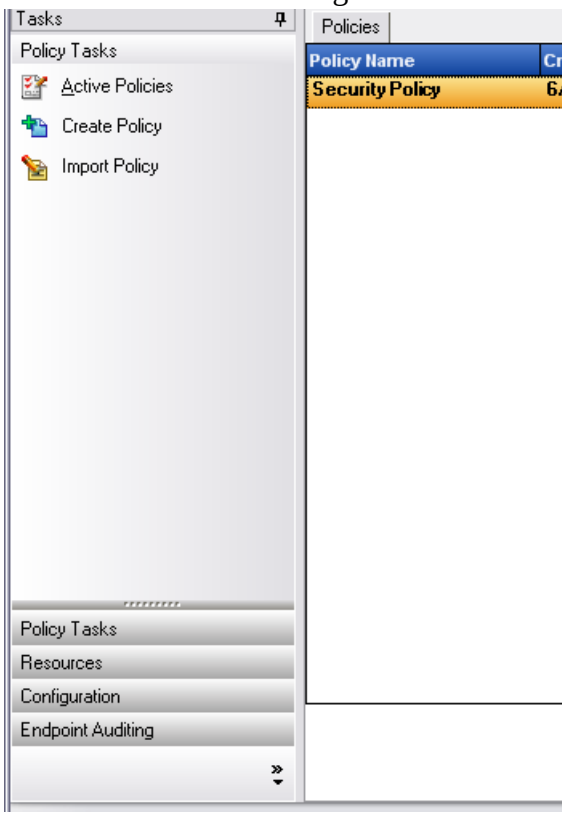

Figure 3: The Management Console

The functions available in the task bar are described on the following page. Click each topic to view the available tools.

Policy Tasks

The Primary function of the Management Console is the creation and dissemination of Security Policies. The Policy Tasks guide the administrator through creating and editing security policies which are used by the ZENworks Security Client to apply centrally managed security to each endpoint.

The Policy Tasks are:

- Active Policies - This displays a list of current policies, which can be reviewed and edited. Click on the policy to open it
- Create Policies - This begins the policy creation process (see below)
- Import Policies - This imports policies created on other Management Services (See “Importing Policies” on page 202)

Clicking any of the policy tasks will minimize the tasks menu. This can be viewed again by clicking on the tab on the left side.

See “Creating and Distributing ESM Security Policies” on page 78 to learn about the policy tasks and how to create and manage security policies.

Resources

The following resources are available to help you:

- Contact Support - This link will launch a browser, and take you to our Support Contact Page
- Online Technical Support - This link will launch browser, and take you to our Main Support Page
- Management Console Help - Launches Help

Configuration

The Management Service Configuration window provides controls for both the ESM server infrastructure and controls for monitoring additional enterprise directory services. See “Configuration Window” on page 28 for details. This control is not available when running a "Stand-Alone" Management Console (see ESM Installation and Quick-Start Guide for details).

Endpoint Auditing

Endpoint Auditing gives you access to ESM Reporting and Alerting.

Alerts monitoring ensures that any attempts to compromise corporate security policies are reported in the Management Console. This allows the ESM Administrator to know of potential problems and take any appropriate remedial actions. The Alerts dashboard is completely

configurable, granting total control over when and how frequently alerts are triggered. See “Alerts Monitoring” on page 33 for details.

Reporting is critical in assessing and implementing strong security policies. Reports may be accessed through the Management Console by clicking on Reports. The endpoint security information gathered and reported back is also completely configurable, and can be gathered by domain, group, or individual user. See “Reporting” on page 37 for details.

Menu Bar

The menu bar gives you access to all functions of the Management Console. As with all Windows menus, simply click the menu link to display the menu items. The menu items are described below. .

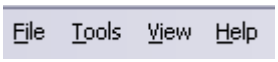

Figure 4: Menu Bar

- **File** - The File menu is used for the creation and management of policies
  - **New** - creates a new policy
  - **Refresh Policy List** - updates the list to display all active policies
  - **Delete** - deletes the selected policy
  - **Import** - imports a policy into the Management Console
  - **Export** - exports a policy and the required SETUP.SEN file to a specified location outside of the Management Service database
  - **Exit** - Closes the Management Console software, logging out the user
- **Tools** - The Tools menu is used to control the Management Service
  - **Configuration** - opens the Configuration window
  - **Permissions** - opens the Permissions window
- **View** - The View menu gives you an option to change to key policy tasks without using the task bar
  - **Policy** - when a policy is open, switches the view to that policy
  - **Policy List** - displays the policy list
  - **Alerts** - displays the Alerts dashboard
  - **Reporting** - displays the Reporting dashboard
- **Help** - The Help menu gives you access to the Management Console Help tool and the About box
  - **Help** - launches the Management Console Help tool, which can guide you through policy creation as well as all Management Console tasks (also available by pressing the F1 key on your keyboard)

- **About** - launches the About window, which displays the current version of the Management Console. This is where the license key is entered if purchased after installation

Permissions Settings

This control is found in the Tools menu, and is only accessible by the primary administrator for the Management Service and/or any whom have been granted "permissions" access by that administrator. This control is not available when running the "Stand-Alone" Management Console.

The permissions settings define which user or group of users are permitted access to the Management Console, Publish Policies, and/or Change Permission Settings.

During the Management Server installation, an administrator or Resource Account name is entered into the configuration form (see the ESM Installation and Quick-Start Guide). Once a successful test has been performed and the user information saved, five permissions are automatically granted to this user (see below).

Once the Management Console is installed, the resource user (defined above) will be the ONLY user with full permissions, though ALL user groups within the domain will be granted Management Console Access. The resource user should remove access from all but the groups/ users who should have access. The resource user may set additional permissions for the designated users. The permissions granted have the following results:

When the Management Console is launched, the permissions are retrieved from the Permission table. These permissions tell the console whether the user has the rights to log-in to the Console, Create or Delete policies, change Permissions settings, and whether or not they can Publish policies, and to whom they are permitted to publish to.

- Management Console Access: the user may view policies and components, and edit existing policies. Users granted ONLY this privilege will not be permitted to add or delete polices; the publish and permissions options will be unavailable
- Publish Policy: the user may publish policies ONLY to assigned users/groups
- Change Permission: the user may access and change permissions settings for other users that have already been defined, or grant permissions to new users
- Create Policies: the user may create new policies in the Management Console
- Delete Policies: the user may delete ANY policy in the Management Console

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Note:

For security purposes, it is recommended that only the resource user or very FEW administrators be granted the Change Permission and Delete Policies permissions.

Administrative Permissions

To set the Administrative Permissions, perform the following steps:

Step 1: Open the Tools menu and select Permissions. The groups associated with this domain are displayed (see Figure 5).

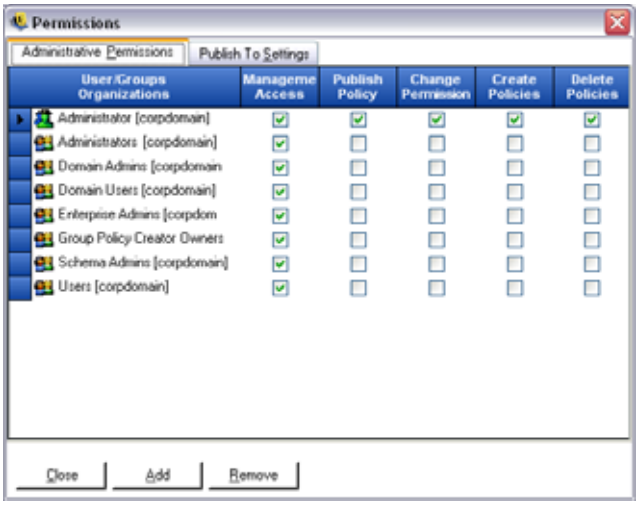

Figure 5: Management Console Permissions Settings Window

Note:

All groups are granted access to the Management Console by default, though they will be unable to perform policy tasks. Access to the console can be removed by un-checking the permission.

Step 2: To load users/groups to this list, do the following:

a. Click the Add button on the bottom of the screen, the Organization Table will display (see Figure 6).

Figure 6: Permission Settings Organization Table

b. Select the appropriate users/groups from the list. To select multiple users, select individually by holding down the CTRL key, or select a series by selecting the top, then holding down the SHIFT key, then selecting the bottom selection.

c. When all users/groups have been selected, click the OK button. This will add the users/groups to the grid on the Permissions form.

Step 3: Assign any (or all) permissions to the available users/groups.

Step 4: To remove a selected user/group, highlight the name and click Remove. The selected name will be moved back to Organization Table

.

Publish To Settings

Users/Groups who have Publish Policy checked will need to be assigned users and/or groups to publish to. To set the Publish To Settings, perform the following steps:

Step 1: Click the Publish Settings tab.

Step 2: Select the users/groups granted the Publish permission from the drop-down list (see Figure 7).

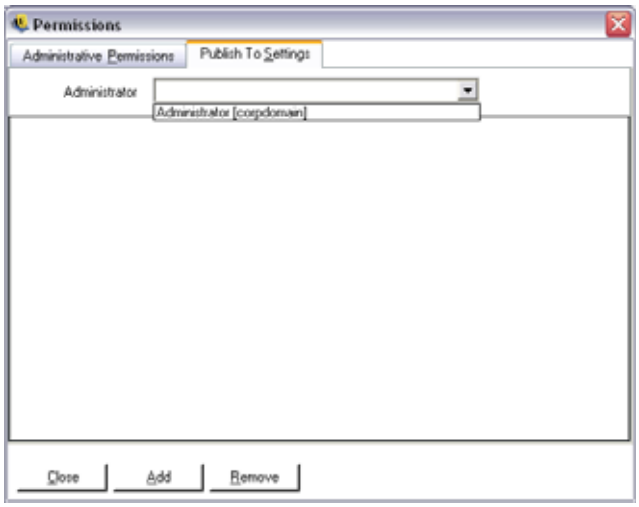

Figure 7: Publish To Settings

Step 3: Assign users/groups to this user/group by:

a. Click the Add button on the bottom of the screen, the Organization Table will display.

b. Select the appropriate users/groups from the list. To select multiple users, select individually by holding down the CTRL key, or select a series by selecting the top, then holding down the SHIFT key, then selecting the bottom selection.

c. When all users/groups have been selected, click the OK button. This will add the users/groups to the selected name's publish list (see Figure 8).

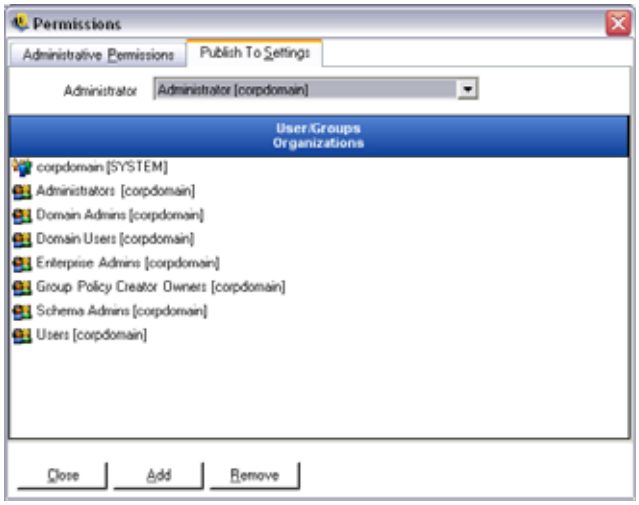

Figure 8: Publish To List

Step 4: To remove a selected user/group, highlight the name in the list, and click Remove. The selected name will be moved back to the Organization Table.

The permission sets are immediately implemented, so the administrator only needs to click Close, and accept the changes to return to the editor.

When a new directory service is added (see Managing and Adding Directory Services on page 34), the Resource Account entered is granted full permissions settings, as described above.

Configuration Window

The Configuration window gives the ESM Administrator access to the Infrastructure and Scheduling, Authenticating Directories, and Server Synchronization controls. Click the Configuration link on the main page, or open the Tools menu and select Configuration. The Configuration window will display (see Figure 9).

Note:

This function is NOT available if this is a Stand-Alone Management Console.

Infrastructure and Scheduling

The infrastructure and scheduling module allows the ESM Administrator to designate and change the Policy Distribution Service URL and control the synchronization intervals for the ESM components (see Figure 9).

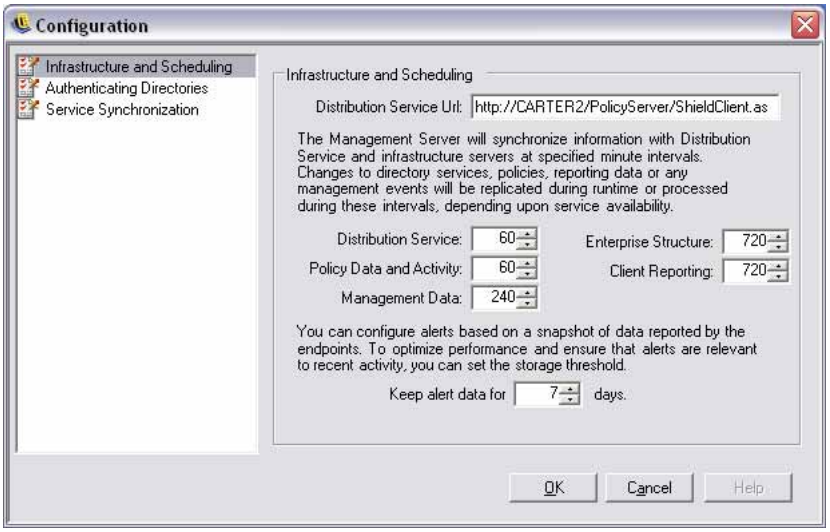

Figure 9: Infrastructure and Scheduling Window

Distribution Service URL

This will update the Policy Distribution Service location for both the Management Service and all ZENworks Security Clients (without requiring them to be reinstalled) if the Policy Distribution Service is moved to a new server. The URL for the current server is listed in the text field, only the server name should be changed to point to the new server. DO NOT change any information after the server name.

Example:

If the current URL is listed as http:\\ACME\PolicyServer\ShieldClient.asmx and the Policy Distribution Service has been installed on a new server, ACME 43, the URL should be updated as: http:\\ACME43\PolicyServer\ShieldClient.asmx

Once the URL has been updated, click OK. This will update all policies and send an automatic update of the Policy Distribution Service. This will also update the Management Service.

When changing the server URL, it is recommended that the old Policy Distribution Service not be terminated until the updated policies have a 100% adherence level (see Reporting Service).

Scheduling

The Scheduling components permit the ESM Administrator to designate when the Management Service will synchronize with other ESM components, to ensure all data and queued jobs match any recent activity, and to schedule the SQL maintenance jobs. All time increments are in minutes.

The scheduling is broken down as follows:

- Distribution Service - synchronization schedule with the Policy Distribution Service
- Policy Data and Activity - synchronization schedule with policy updates.
- Management Data - policy synchronization with the Management Service
- Enterprise Structure - synchronization schedule with the enterprise directory service (Active Directory, NT Domain, and/or LDAP). Changes in the enterprise directory service are monitored so that corresponding changes in user-policy assignments can be detected and sent to the Policy Distribution Service for Client authentication
- Client Reporting - frequency the Management Service will interrogate for and download reporting data from the Policy Distribution Service
- Keep alert data for: - You can configure alerts based on a snapshot of data reported by the endpoints. To optimize performance, and ensure that alerts are relevant to recent activity, you can se the storage threshold based on a number of days.

Authenticating Directories

Policies are distributed to end-users by interrogating the Enterprise's existing directory service (Active Directory, NT Domain*, and/or LDAP). The Authenticating Directories service, is responsible for handling end-user credentials and authentication issues for the Policy Distribution Service.

* = NT Domain is only supported when the Management Service is installed on a Windows 2000, or 2000 advanced server (SP4)

Click Authenticating Directories to display the manager.

Managing and Adding Directory Services

An initial directory service is normally detected and monitored during the Management Service communication check at installation. Authenticating Directories can, if required, manage users from multiple directories and multiple directory platforms.

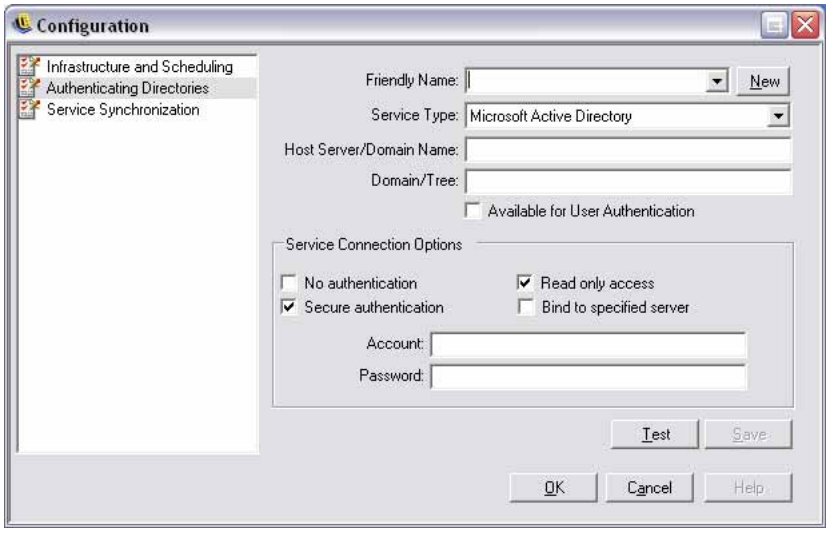

Figure 10: Authenticating Directories Window

All information, with the exception of the directory type may be updated. To add a new directory service, perform the following steps:

Step 1: Click New (located next to Friendly Name)

Step 2: Enter a friendly name for the Directory Service and select its Service Type from the pull-down list

Step 3: In the Host/DN box enter the hostname of a domain controller and leave the Domain/DC box blank (this box will auto populate after a successful test of the user account in Step 7)

Step 4: Check Available for User Authentication if this is the domain a Management Service is installed on to display the domain in the login pull-down menu. If this is a separate domain, leave unchecked

Step 5: Select a Service Connection Option:

- No authentication - login and password not required for connection to directory service
- Secure authentication - login and password required for connection to directory service
- Read only access - Management Service cannot make updates or changes to the directory service
- Bind to specified server - creates a direct connection to the server hosting the directory service (machine name [netbios] name must be specified in Step 1). This will increase the speed and efficiency of the connection between the services

Step 6: Enter the directory service login name under Account and the login password in the Password field. The login name entered must be a user who has permission to view the ENTIRE directory tree. It is recommended that this user be either the domain administrator or an OU administrator

---

Note:

The password entered should be set to not expire, nor should this account ever be disabled.

Step 7: Click Test to verify communication to this directory service. If communication cannot be established, the user is notified of the error. Any inaccurate information will be corrected (when possible) by the interface during the test

Step 8: Click Save to update or add a directory service. Click OK or Cancel to exit the Configuration window and return to the login screen.

Step 9: Click OK or Cancel to exit the Configuration window and return to the Mangement Console.

Service Synchronization

This control lets you to force a synchronization of the Management Service and Policy Distribution Service. This will update all alerting, reporting and policy distribution.

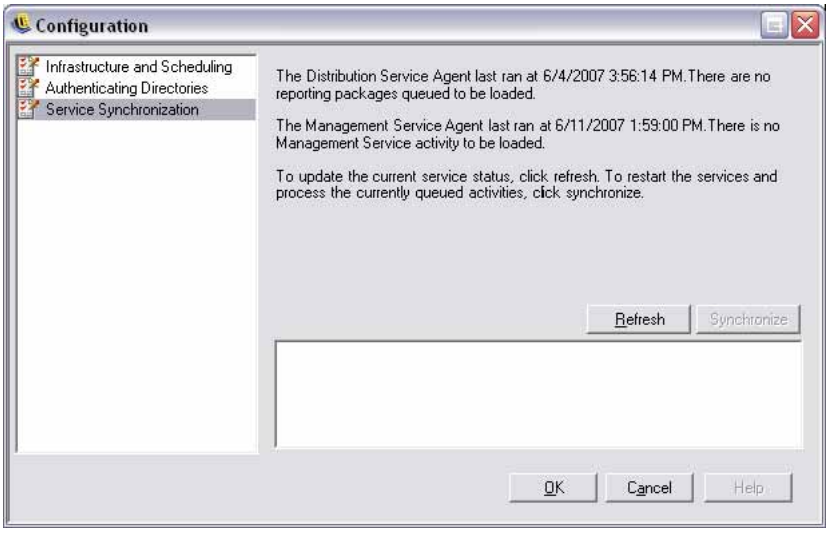

Figure 11: Service Synchronization

1. To update the current service status, click **Refresh**.
2. To restart the services and process the currently queued activities, click **Synchronize**.

Alerts Monitoring

Alerts monitoring allows the ESM Administrator to effortlessly gauge at a glance the security state of all ESM managed endpoints throughout the enterprise. Alerts triggers are fully configurable and can report either a warning, or as a full emergency alert. This tool is accessed either through Endpoint Auditing on the task bar, or through the View menu. To access Alerts, select the Alerts icon (Alerts) (see Figure 12).

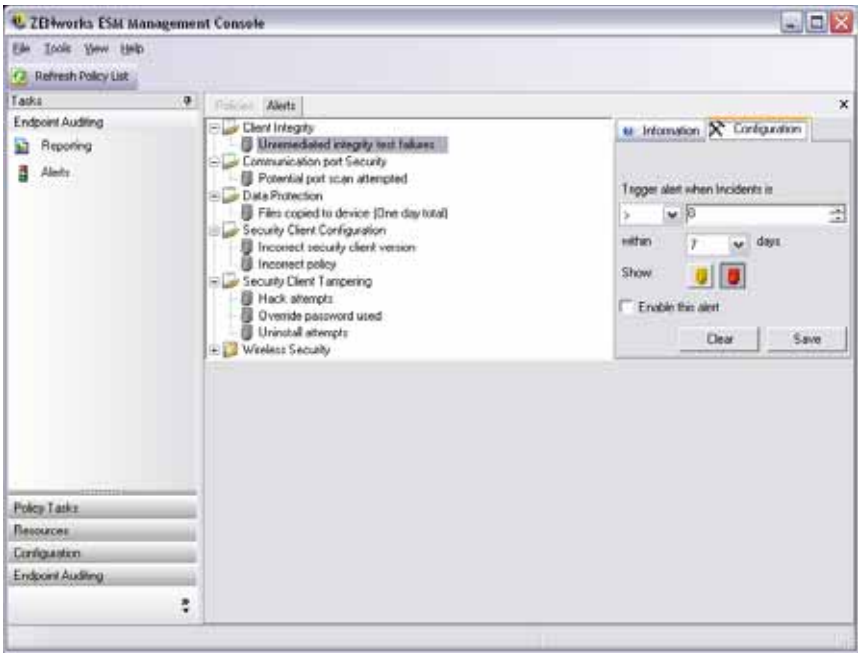

Figure 12: Alerts Dashboard

Alerts monitoring is available for the following areas:

- **Client Integrity** - notifies of unremediated integrity test results
- **Communication Port Security** - notifies of potential port scan attempts
- **Data Protection** - notifies of files that are copied to removable storage devices within a one day period
- **Security Client Configuration** - notifies of incorrect security client versions and incorrect policies
- **Security Client Tampering** - notifies of user hack attempts, uninstall attempts and usage of the override password
- **Wireless Security** - notifies of unsecure access points, both detected and connected to by the end-user

Configuring ESM for Alerts

Alerts monitoring requires reporting data be collected and uploaded at regular intervals to give the most accurate picture of the current endpoint security environment. Unmanaged ZENworks Security Clients do not provide reporting data, and will therefore not be included in the Alerts monitoring.

Activating Reporting

Reporting should be activated in each security policy. See “Compliance Reporting” on page 197 for details on setting up reporting for a security policy. Adjust report send times to an interval that will give you consistent updates on endpoint status. Additionally, an alert will not activate without a report. Any activity you wish to be alerted to, must have an appropriate report assigned to it in the security policy.

Optimizing Synchronization

By default, the ESM Reporting service syncs every 12 hours. This means that reporting and alerts data will not be ready until 12 hours have passed from installation. To adjust this time frame, open the Configuration tool (see “Scheduling” on page 29), and adjust the Client Reporting time to the number of minutes appropriate for your needs and your environment.

When data is needed immediately, the Service Synchronization option in the Configuration tool can immediately lynch the Policy Distribution Service (which collects the reporting data from the endpoints) and the Reporting Service, which will update all alerts based on the newly collected data. See “Service Synchronization” on page 32 for details.

Configuring Alert Triggers

Alert triggers can be adjusted to thresholds that fit your corporate security needs. To adjust alerts from their defaults, perform the following steps:

Step 1: Select an alert from the list and click the Configuration tab on the right (see Figure 13).

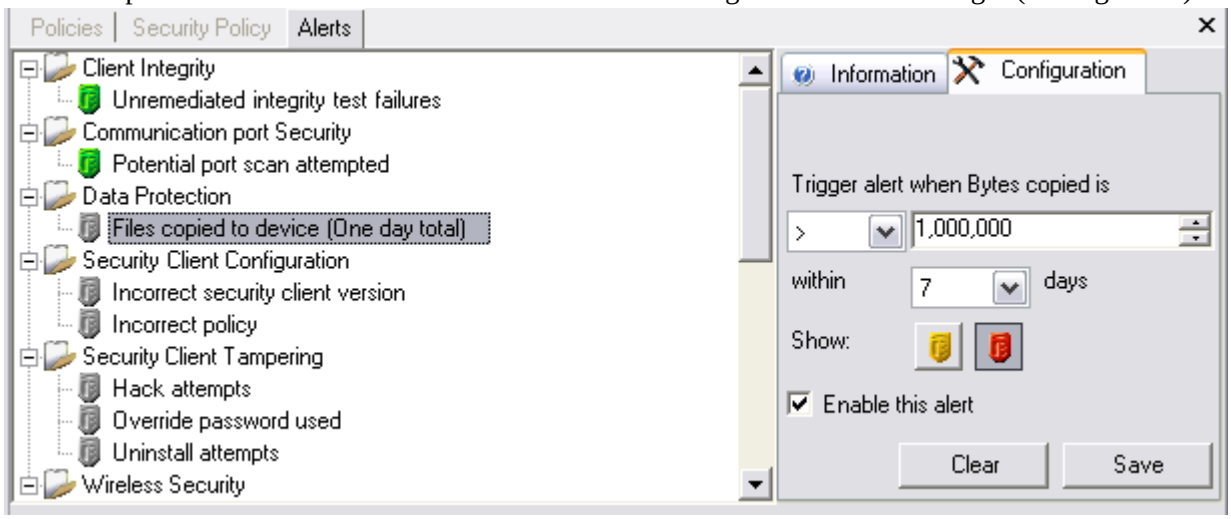

Figure 13: Alerts Configuration Tab

Step 2: Adjust the trigger threshold by first, selecting condition from the drop down list. This states whether the trigger number is:

- Equal to (=)
- Greater than (<)
- Greater than or equal to (<=)
- Less than (>)
- Less than or equal to (>=)

Step 3: Adjust the trigger number. This number is variant, depending upon the type of alert.

Step 4: Select the number of days that this number must be met.

Step 5: Select the trigger type, whether it's the *warning* icon ( ) or the *emergency* icon ( ).

Step 6: Ensure *Enable this alert* is checked.

Step 7: Click **Save** to save the alert.

Managing Alerts

Alerts notify you of issues that need to be remediated within the endpoint security environment. Remediation is normally handled on a case-by-case and individual or group basis. To help identify the issue, Alert reports are displayed when the alert is selected (see Figure 14).

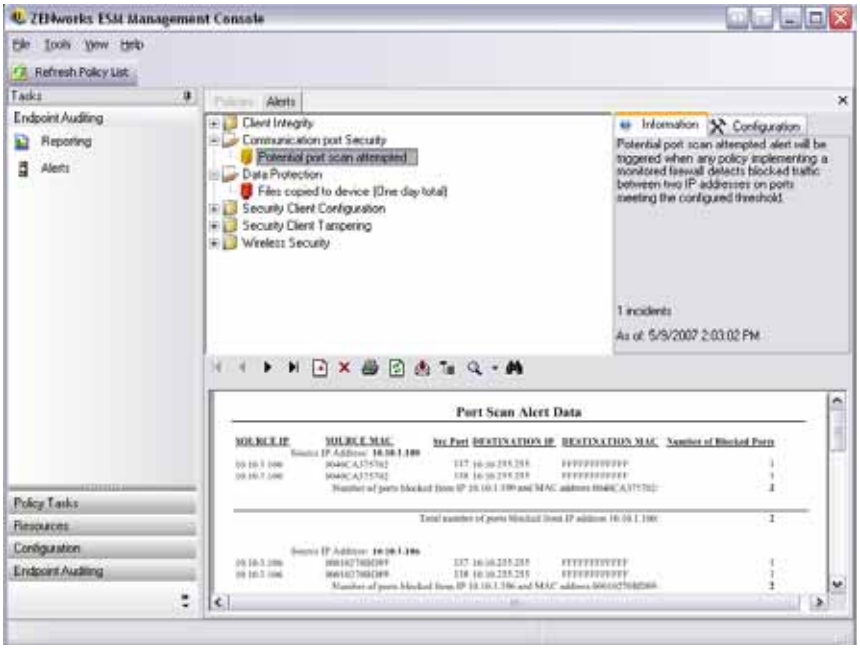

Figure 14: Alert Reporting

This report displays the current trigger results, displaying information by affected user or device. The data provided here provides the necessary information to take remediation actions to correct

any potential corporate security issues. Additional information can be found by opening Reporting.

Once remediation actions have been taken, the alert will remain active until the next reporting update. To “clear” an alert, perform the following steps:

Step 1: Select an alert from the list and click the Configuration tab on the right (see Figure 15).

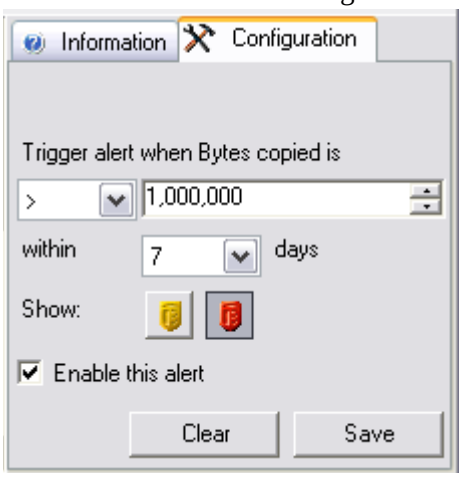

Figure 15: Alerts Configuration Tab

Step 2: Click **Clear**. This will clear the reporting data from Alerts (this data is still available in the reporting database), and will not reactivate until new data is received.

Reporting

The Reporting Service provides Adherence and Status reports for the Enterprise. The available data is provided for directories and user groups within a directory. Novell reports provide feedback on the effects individual policy components can have on enterprise endpoints. Requests for these reports are set in the Security Policy (see “Compliance Reporting” on page 197, for more information), and can provide useful data to determine policy updates.

Select Reporting from either the Endpoint Auditing task bar, or the View menu. The list of available reports will display (click on the "plus" sign icons next to each report type to expand the list - see Figure 16).

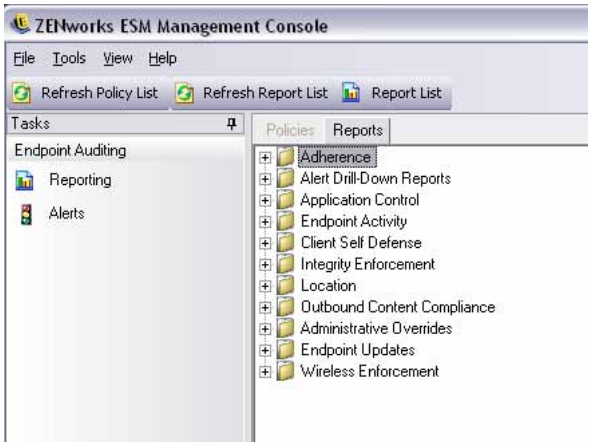

Figure 16: Reports Menu

Reports are configured by identifying the date range and other parameters (i.e., user, location). To set the dates, click to expand to the calendar view, then select the month and day (be sure to click on the day to change the date parameter - see Figure 17).

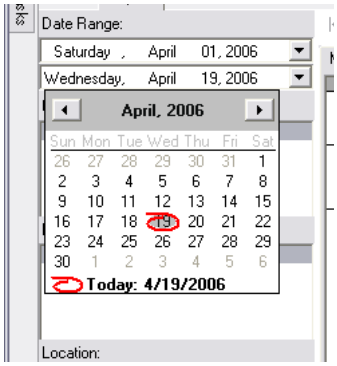

Figure 17: Use calendar tool to set the date-range

Click **View** to generate the report.

Once a report is generated it can be viewed through the Management Console, printed, emailed and/or exported as a.pdf file, using the report toolbar (see Figure 18).

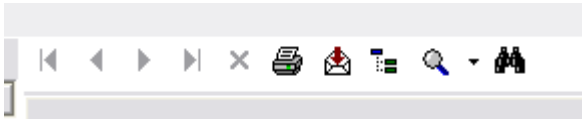

Figure 18: Report Toolbar

When reviewing reports, the arrow buttons will help you navigate through each page of the report. Reports will typically have charts and graphs on the first page with the gathered data on the remaining pages, ordered by date and type.

The printer button will print the full report using the default printer for this computer.

The Export button saves the report as a PDF file, Excel spreadsheet, Word document, or RTF file for distribution.

The Group Tree button will toggle a list of parameters to the side of the report. Select any of these parameters to “drill-down” further into the report. Click the Group Tree button to close the side-bar.

The magnifying glass button provides a drop-down menu to adjust the current view size.

The binoculars button opens a search window.

When you mouse over a certain parameter, like a user name or device name, for example, the mouse will change to a magnifying glass. You can double-click on that particular item and display a new report for just that object. Click the “X” button to close the current view and return to the original report.

To return to the report list, click the Report List icon above the report window (see Figure 19).

Figure 19: Report list icon

Reports are not available until data has been uploaded from the ZENworks Security Clients. By default, the ESM Reporting service syncs every 12 hours. This means that reporting and alerts data will not be ready until 12 hours have passed from installation. To adjust this time frame, open the Configuration tool (see “Scheduling” on page 29), and adjust the Client Reporting time to the number of minutes appropriate for your needs and your environment.

Reports that do not have data available will have the “Configure” or “Preview” button grayed out, with the words **No data** underneath (see Figure 20).

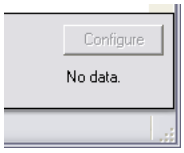

Figure 20: No data

Adherence Reports

Adherence Reports provide compliance information regarding the distribution of security policies to managed users. A score of 100% adherence indicates that all managed users have "checked in" and received the current policy.

Endpoint Check-In Adherence

This report gives a summary of the days since check-in by enterprise endpoints, and the age of their current policy, these numbers are averaged to summarize the report. This report requires no variables be entered. The report will display the users by name, which policies have been assigned to them, the days since their last check-in, and the age of their policy.

Endpoint Client Versions

Shows the most recently reported version of the client on each endpoint. Set the date parameters to generate this report.

Endpoints that Never Checked-In

Lists the user accounts that have registered with the Management Service but have never checked with the Distribution Service for a policy update. Select one or more groups to generate the report.

Note:

These may be Management Console users that don't have a Security Client installed in their names.

Group Policy Non-Compliance

Shows groups where some users do not have the correct policy. Selections can be made for one or more groups to generate the report.

Endpoint State History by Machine

This report gives the most recent status (in a given date-range) of ESM-protected endpoints, grouped by machine name. It displays the logged-on user name, current policy, ESM client version, and network location. This report requires a range of dates to be entered. The administrator can drill-down by double-clicking on any entry to see a complete list of status reports for a particular machine.

Policy Assignment

This report shows which users/groups (accounts) have received the specified policy. Select the desired policy from the list and click View to run the report.

Endpoint State History by User

This report gives the most recent status (in a given date-range) of ESM-protected endpoints, grouped by user name. It displays the machine name, current policy, ESM client version, and network location. This report requires a range of dates to be entered. The administrator can drill-down by double-clicking on any entry to see a complete list of status reports for a particular user.

Alert Drill-Down Reports

Additional alert information is available in these drill-down reports. These reports will only display data when an alert has been triggered. Clearing an alert will also clear the alert report, however, the data will still be available in a standard report.

Client Tampering Alert Data

Displays instances where a user has made an unauthorized attempt to modify or disable the ZENworks Security Client.

Files Copied Alert Data

Shows accounts that have copied data to removable storage.

Incorrect Client Version Alert Data

Shows the history of the status of the ZSC Update process.

Incorrect Client Policy Alert Data

Shows users who do not have the correct policy.

Integrity Failures Alert Data

Reports on the history of success/failure client integrity checks.

Override Attempts Alert Data

Instances where client self-defense mechanisms have been administratively overridden, granting privileged control over the ZENworks Security Client.

Port Scan Alert Data

Shows the number of blocked packets on the number of different ports (a large number of ports may indicate a port scan occurred).

Uninstall Attempt Alert Data

Users that have attempted to uninstall the ZENworks Security Client.

Unsecure Access Point Alert Data

Unsecured access points detected by the ZENworks Security Client.

Unsecure Access Point Connection Alert Data

Unsecured access points connected to by the ZENworks Security Client.

Application Control Report

Reports all unauthorized attempts by blocked applications to access the network or run when not permitted by the policy.

Application Control Details

This report displays the date, location, the action taken by the ZSC, the application that attempted run, and the number of times this was attempted. Dates displayed in UTC.

Enter the date parameters, select the application name(s) from the list, select the user accounts, and click View to run the report (see Figure 21).

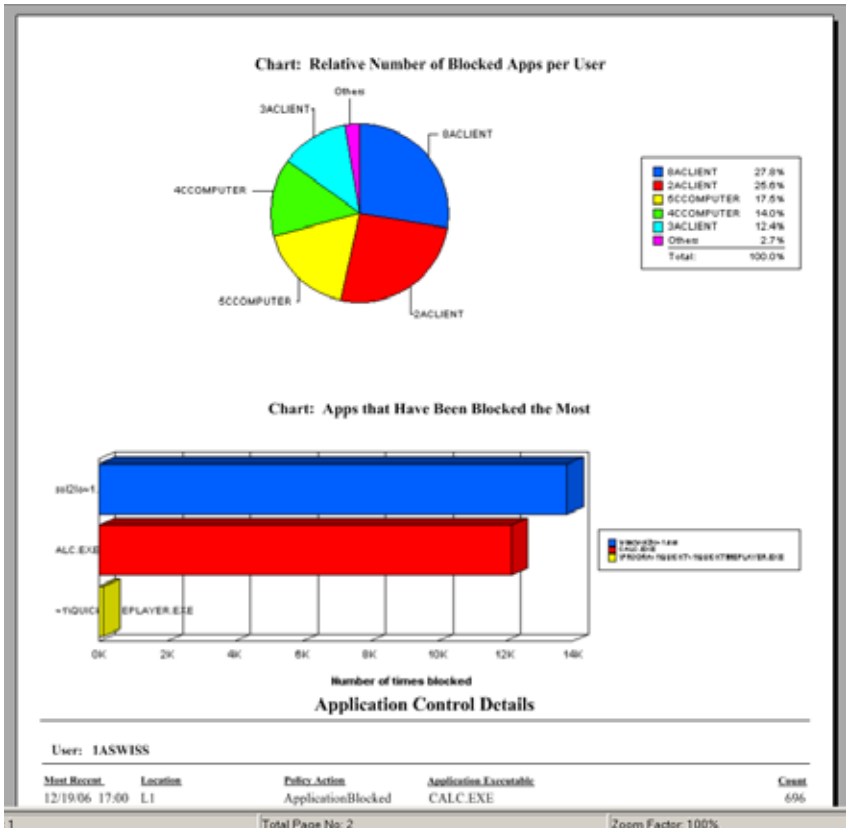

Figure 21: Sample Blocked Applications Report

Endpoint Activity Reports

Endpoint activity reports provide feedback for individual policy components and the effect they have on the operation of the endpoint.

Blocked Packets by IP Address

Block Packet Report filtered by Destination IP. Dates displayed in UTC.

Select the destination IP from the list and set the date parameters. The report displays the dates, locations, affected ports, and the name of the blocked packets.

Blocked Packets by User

Block Packet Report filtered by User. Dates displayed in UTC. The data provided is essentially the same as Blocked Packets by Destination IP, just broken down by user.

Network Usage Statistics by User

Report of packets sent, received or blocked, and network errors, filtered by end-users. This report requires a range of dates to be entered. Dates displayed in UTC.

Network Usage Statistics by Adapter Type

Report of packets sent, received or blocked, and network errors filtered by adapter type. This report requires a range of dates to be entered and the Location. Dates displayed in UTC.

Endpoint Updates Report

Shows the status of the ZSC Update process (see “ZSC Update” on page 93). Dates displayed in UTC.

Chart Percentage of ZSC Update Failures

Charts the percentage of ZSC Update that have failed (and not been remediated). No parameters are required to generate this report.

History of ZSC Update Status

Shows the history of the status of the ZSC Update process. Select the date range and click View to run the report. The report displays which users have checked-in and received the update.

Chart Types of Failed ZSC Updates

Shows ZSC Updates that have failed (and not been remediated). Select the date range and click View to run the report. The report shows which users have checked-in, but had a failed update installation.

Client Self Defense Report

ZENworks Security Client Hack Attempts

Reports instances where a user has made an unauthorized attempt to modify or disable the ZENworks Security Client. Dates displayed in UTC.

Enter the date parameters, and click View to run the report.

Integrity Enforcement Report

Provides reporting for antivirus/anti-spyware integrity results.

Client Integrity History

Reports on the success/failure of client integrity checks. Dates displayed in UTC.

Select the date range for the report, integrity rule(s), and user name(s).

Unremediated Integrity Failures by Rule

Reports on integrity rules and tests that have failed and not yet been remediated.

Select the integrity rule(s), and click View to run the report.

Unremediated Integrity Failures by User

Reports on users that have failed integrity tests and not yet remediated.

Select the user names(s), and click View to run the report.

Location Reports

Provides data for common location usage. i.e., what locations are most commonly used by end-users.

Location Usage Data

Information gathered from individual clients about what locations are used, and when. Dates displayed in UTC. The locations displayed are ONLY the locations used by the user. Unused locations will not be displayed. Select the date range to generate the report (see Figure 22).

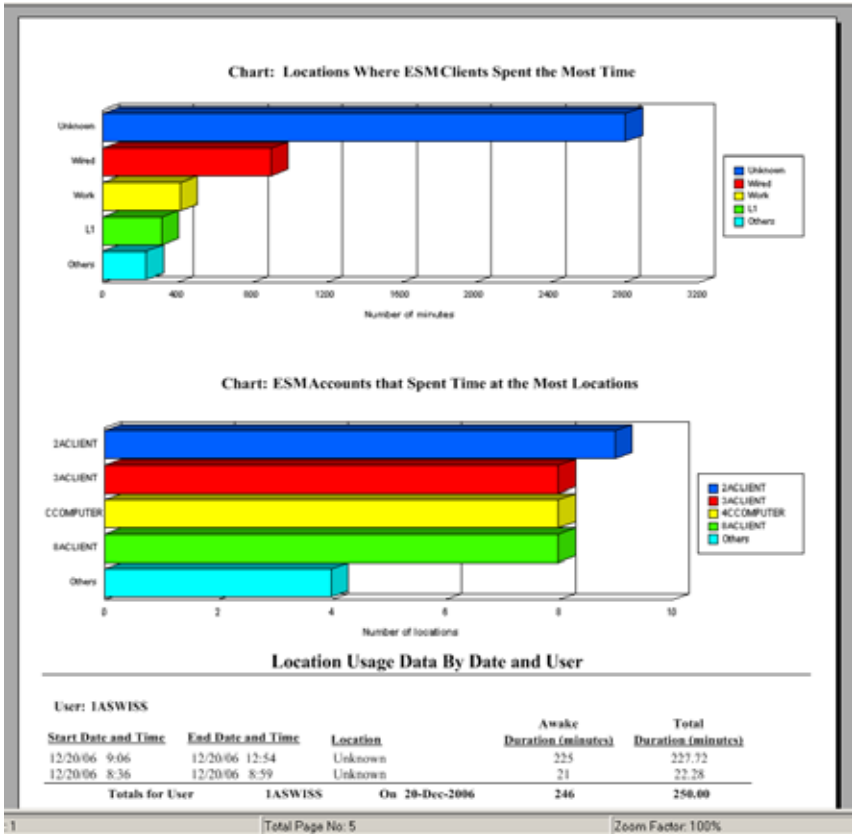

Figure 22: Sample Location Usage Report

Outbound Content Compliance Reports

Provides information regarding the use of removable drives and identifies which files have been uploaded to such drives.

Removable Storage Activity by Account

Shows accounts that have copied data to removable storage. No parameters are required to generate this report.

Removable Storage Activity by Device

Shows removable storage devices to which files have been copied. Select the date range, user name(s), and location(s) to generate this report.

Detected Removable Storage Devices

Shows removable storage devices that have been detected on the endpoint. Select the date range, user name(s), and location(s) to generate this report (see Figure 23).

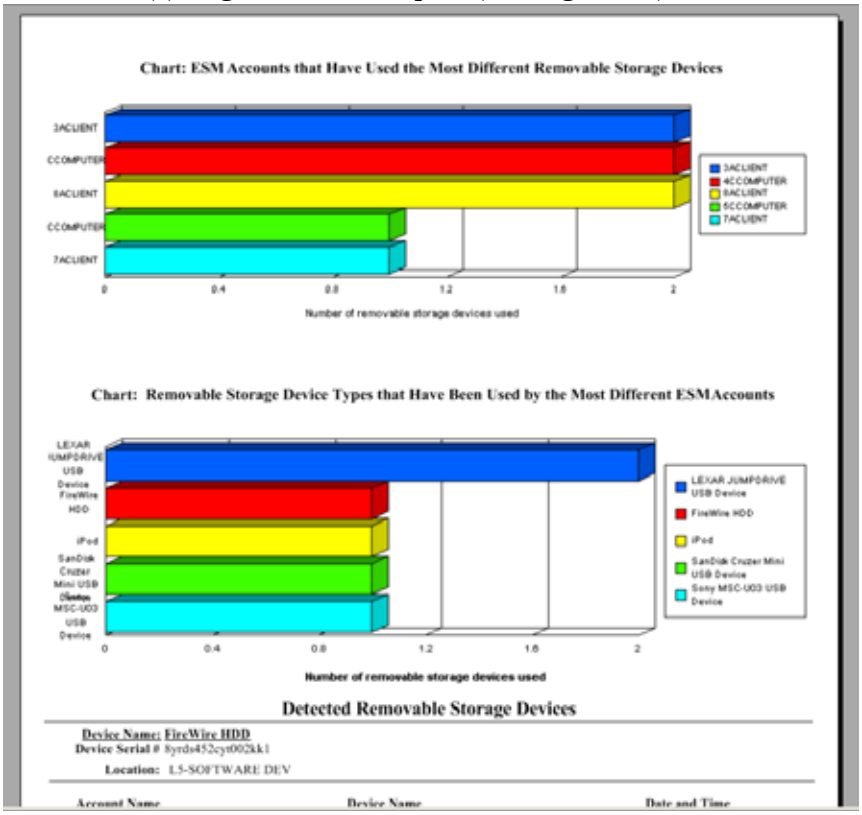

Figure 23: Sample Detected Removable Storage Devices report

Chart 7 Days of Removable Storage Activity by Account

Chart of accounts that have recently copied data to removable storage. Enter the date range to generate this report.

Administrative Overrides Report

Reports instances where client self-defence mechanisms have been administratively overridden, granting privileged control over the ZENworks Security Client.

ZENworks Security Client Overrides

This report shows successful override attempts by user and date. Dates displayed in UTC.

Select the user and date range, then click View to run the report.

Endpoint Updates Report

Shows the status of the ZSC Update process (see “ZSC Update” on page 93). Dates displayed in UTC.

History of ZSC Update Status

Shows the history of the status of the ZSC Update process. Select the date range and click View to run the report. The report displays which users have checked-in and received the update.

Wireless Enforcement Reports

Provides reports regarding wi-fi environments the endpoint is exposed to.

Wireless Connection Availability

Displays the access points available for connection by policy and location. Includes the channel, SSID, MAC address and whether or not the AP was encrypted.

Wireless Environment

The Wireless Environment report provides a survey of all detected access points (APs), regardless of ownership. Includes the frequency, signal strength and whether or not the AP was encrypted. Dates displayed in UTC. Select the desired locations(s) and the date range to generate this report (see Figure 24).

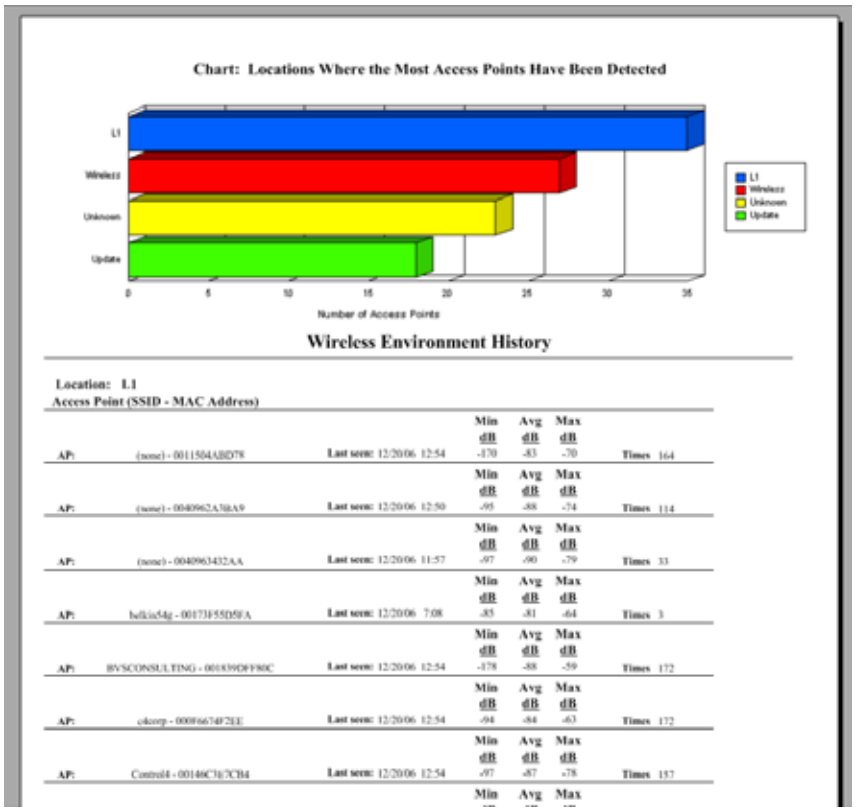

Figure 24: Sample Wireless Environment History report

Generating Custom Reports

Software Requirements

ODBC-compliant reporting tools (i.e., Crystal Reports, Brio, Actuate) may be used to create custom reports not included in the Novell reports list. These reporting tools can view and query the reporting information from a common data warehouse, star format.

The reports included with ESM were created using Crystal Reports for Visual Studio .NET (SP2). This version of Crystal Reports is bundled with Visual Studio .NET and is available as an optional component. To learn more, visit http://msdn.microsoft.com/vstudio/team/crystalreports/default.aspx

Creating a ESM Compliant Report

Before you begin, please review the report creation process outlined at: http://msdn.microsoft.com/vstudio/team/crystalreports/gettingstarted/default.aspx

The first phase implementation of the ESM reporting framework has the following requirements of every report to be integrated into the system:

- The report may be based on only one data source. That data source must be a single table or view residing within the source database (see Figure 25).

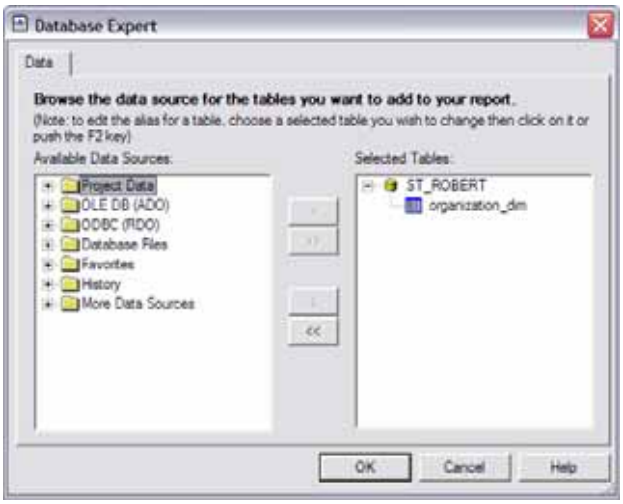

Figure 25: Browse the Reporting Data Source

- The report must have a title specified and saved with the report. Optional title, subject, author and comments will be displayed if specified (see Figure 26).

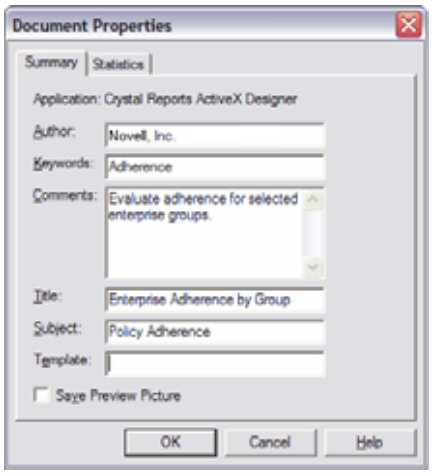

Figure 26: Report Document Properties

- The report may not contain any sub-reports.
- Filtering parameters must be named the same as the target columns within the database fields of the table or view.

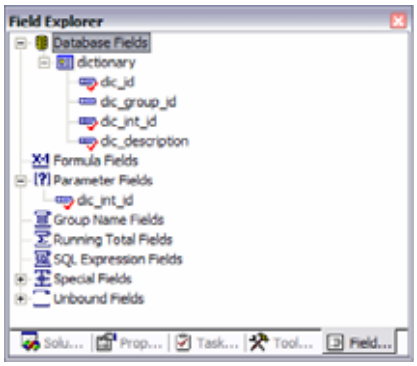

Figure 27: Available Database Fields

What reporting information is available?

The ESM reporting database is designed to closely model the star schema format. What is a star schema? A single "fact" table containing a compound primary key, with one segment for each "dimension," and additional columns of additive, numeric facts.

The Reporting Service includes the following two dimension tables:

ORGANIZATION_DIM: The organization table, defining the instances of users, groups, organizational units, containers and services in a hierarchal relationship. Each row represents one of these units.

UNIT_MEMBER_DIM: Association of organization units to other organization units. For example, while a user may be stored within a specific container within Active Directory, he/she

may also be a member of an organization unit or security groups. Each row represents a relationship of organization units.

The data source will need to be defined to the reporting tool, typically for most third-party applications the following steps may be followed:

Step 1: Define an OLEDB ADO connection to the server hosting the Management Service

Step 2: Select the Microsoft OLE DB Provider for SQL Server

Step 3: Enter the Management Service server as the server

Step 4: Enter the SQL account name and password

Step 5: Enter the Reporting Service database name (default name is STRSDB) as the database

The following views are available for report generation:

EVENT_ACCESSPOINT_FACT_VW: This view describes the access points observed by user, day, policy, location and access point instance.

EVENT_BLOCKEDPACKETS_FACT_VW: This view describes the summarized instances of port activity that was blocked due to policy configuration by the endpoint. The information is logged user, day, policy, location and source/destination ip/port.

EVENT_CLIENTACTIVITY_FACT_VW: This view describes the summarized instances of port activity at the endpoint. The information is logged user, day, policy, location and device.

EVENT_CLIENTAPPLICATIONS_FACT_VW: This view describes the summarized instances of application use (duration) by user, day, policy, location and application.

EVENT_CLIENTDEFENSE_HACK_FACT_VW: This view describes the instances of hack attempts against the endpoint client. Active users, applications and services are included within the report. The data is grouped by user, day, policy, location and attack result.

EVENT_CLIENTDEFENSE_OVERRIDES_FACT_VW: This view describes the instances of policy override and the affected devices. The data is grouped by user, day, policy, location and override type.

EVENT_CLIENTDEFENSE_UNINSTALL_FACT_VW: This view describes the instances of attempts to remove the endpoint client. The data is grouped by user, day, policy, location and attack result.

EVENT_CLIENTDEVICE_FACT_VW: This view describes the types of devices in use by an endpoint. The data is grouped by user, day, policy, location and device type.

EVENT_CLIENTENVIRONMENTS_FACT_VW: This view describes the custom (stamped) network environments used for location detection. The data is grouped by user, day, policy, location, device type and environment data.

EVENT_CLIENTINTEGRITY_FACT_VW: This view describes the results of integrity rules applied at the endpoint. The data is grouped by user, day, policy, location and rule.

EVENT_CLIENTLOCATION_FACT_VW: This view describes the time at location as well as adapter (configuration and type) used at the location. The data is grouped by user, day, policy and location.

EVENT_CLIENTRULE_FACT_VW: This view describes the generic reporting mechanism for integrity and scripting rules. The data is grouped by user, day, policy, location and rule.

EVENT_COMPONENTACTION_FACT_VW: This view describes the Management Console activity performed on specific components. For example, you could see when the policy update interval was changed for a specific location in a policy. The data is grouped by user, day, policy, component and defines the new and old value.

EVENT_MANGERIO_FACT_VW: This view describes when a component has been created or edited. The data is grouped by user, day, component and action.

EVENT_ORGANIZATIONACTION_FACT_VW: This view describes the user activity as it relates to ESM integration with an Enterprise information repository. All user management activities are reflected within this table.

EVENT_POLICYCOMPONENT_FACT_VW: This view describes the interaction of components and policies. For example, when a location is added to a policy, an audit row would reflect that change. The data is grouped by user, day, policy, component and action.

EVENT_PUBLISHACTION_FACT_VW: This view describes the policy and component assignment to an organization.

EVENT_SERVERACTION_FACT_VW: This view describes the user activity with the Distribution Service. (Check In, for example)

EVENT_USERACTION_FACT_VW: This view describes the user policy activity with the Distribution Service. (Policy, Key, EFS Key, Schema downloads.)

So how do I create a report?

The following steps describe the creation of a simple report. The following example uses the Visual Studio.NET 2003 Enterprise Architect IDE.

Step 1: From the IDE, select Add New Item and add a new Crystal Report (see Figure 28)

Figure 28: Add New Crystal Report

Step 2: The simplest method for this example is to create a report using the wizard (see Figure 29)

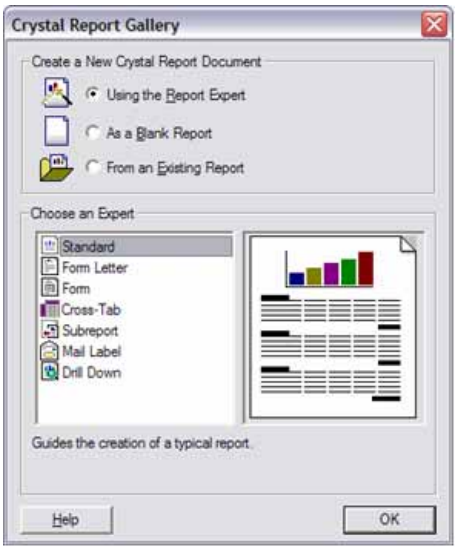

Figure 29: Crystal Reports Wizard

Step 3: Define the data source. Access the Management Service reporting service database within data (see Figure 30)

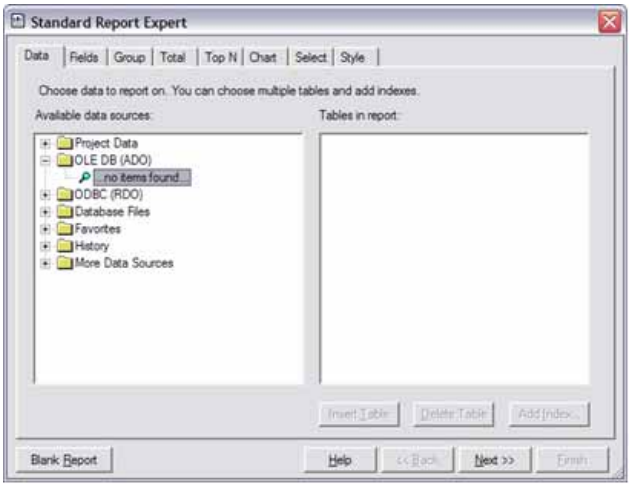

Figure 30: Access Reporting Service Database

Step 4: Using the connection definition wizard (see Figure 31), define an OLEDB ADO connection to the Reporting Service database. Select the Microsoft OLE DB Provider for SQL Server and click Next.

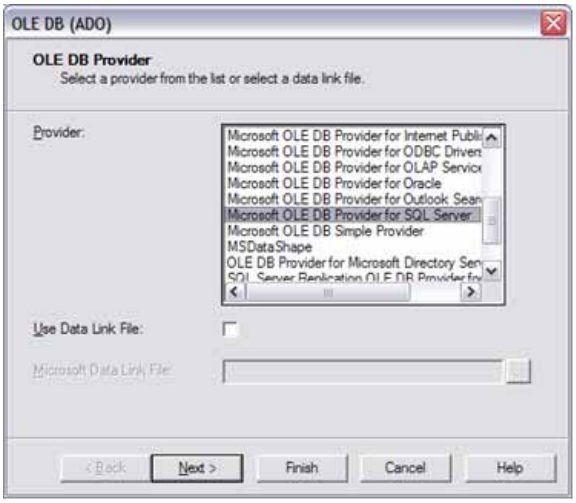

Figure 31: Select OLE DB Provider

Step 5: Select the Reporting server. Enter the user id, password, and database name for the Reporting Service (see Figure 32 - refer to the ESM Installation and Quick-Start Guide for more information) Click Next then Finish.

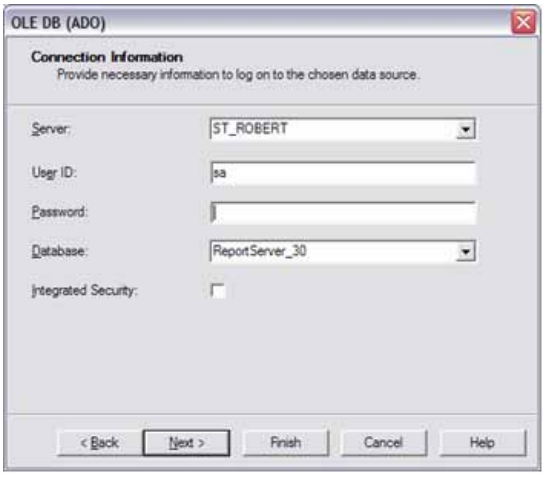

Figure 32: Enter Server Information

Step 6: Select the source table or view that you will be using for your report by expanding the tree nodes as shown (see Figure 33)

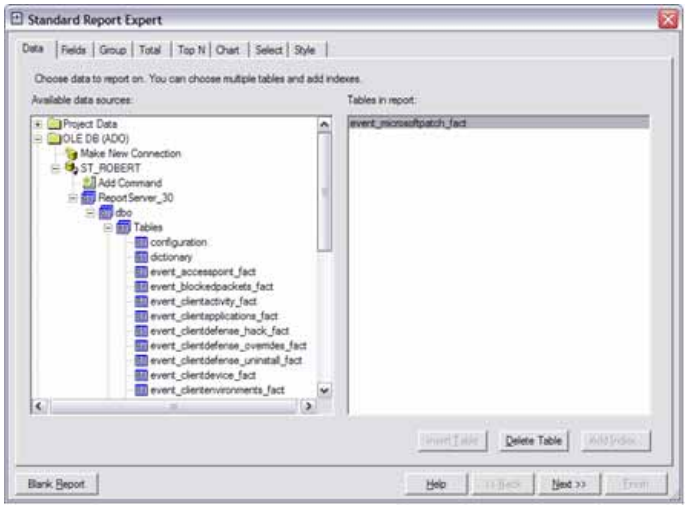

Figure 33: Select Source Table or View

Step 7: Under the Fields tab, select the table or view columns that you wish to include within your report (see Figure 34). Click Next to continue

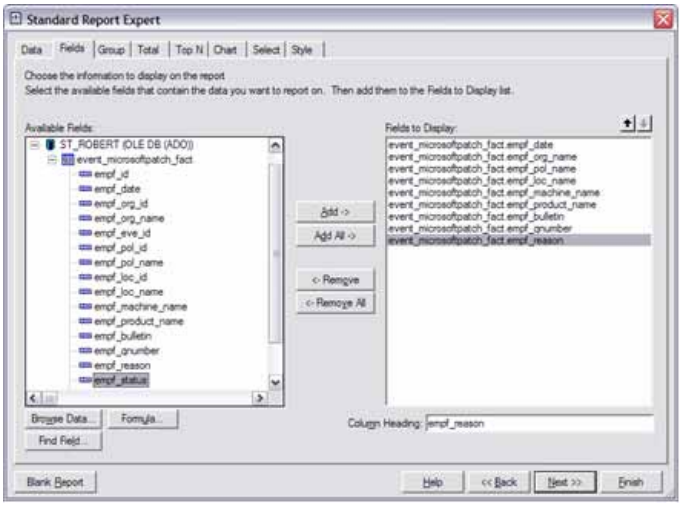

Figure 34: Select the columns to include

Step 8: If you are planning to group or summarize your data, click the Group tab and select the columns you wish to group by as shown (see Figure 35). Click Next or Select the Style tab.

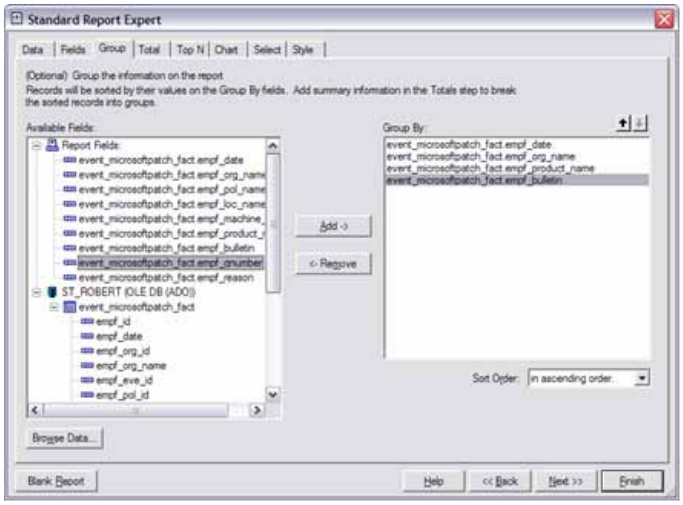

Figure 35: Select Columns to Group

Step 9: Title the report and select the style (see Figure 36). The report builder displays (see Figure 37)

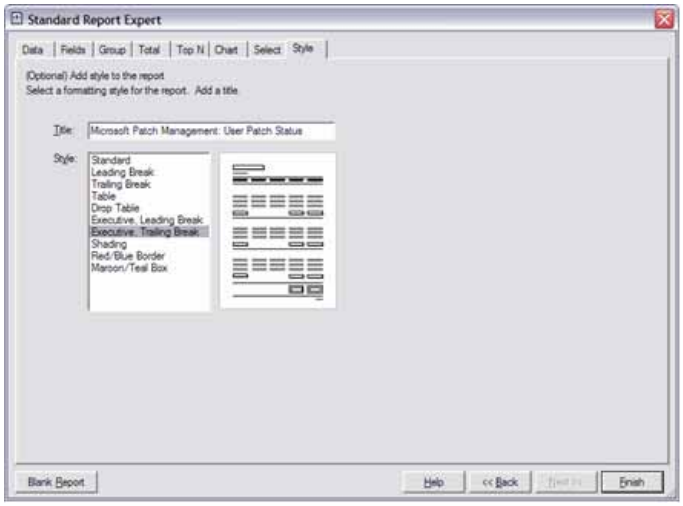

Figure 36: Select Style

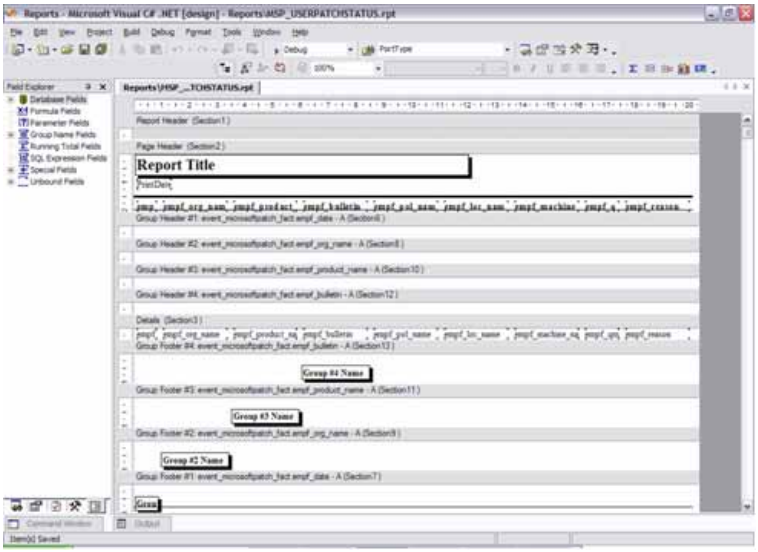

Figure 37: Visual Basic Report Builder

Step 10: To set up a filter, right click on the Parameter Fields item in the field explorer and select New (see Figure 38)

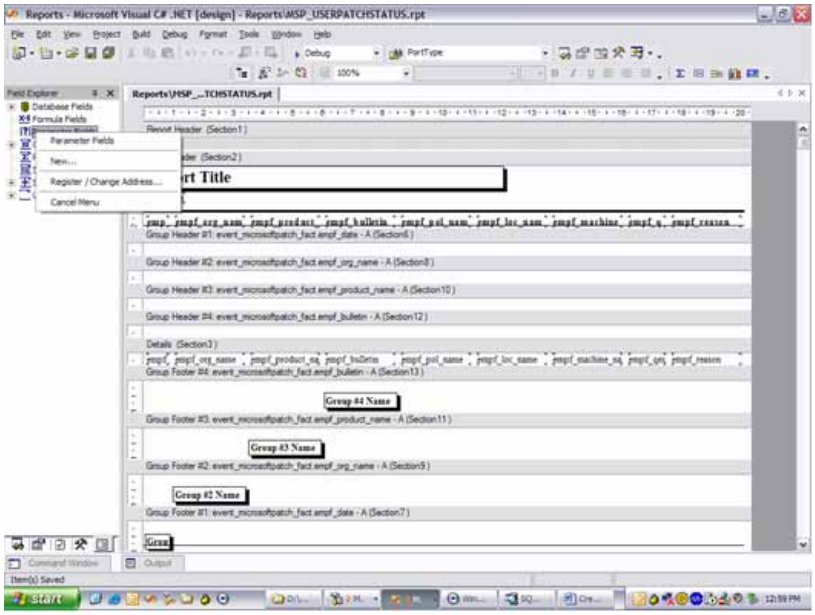

Figure 38: Setting Up a Filter

Step 11: The following filter allows you to select multiple users to filter by with the prompting text of "User Name:" displayed within the UI. Notice, the parameter is named the same as the column (see Figure 39)

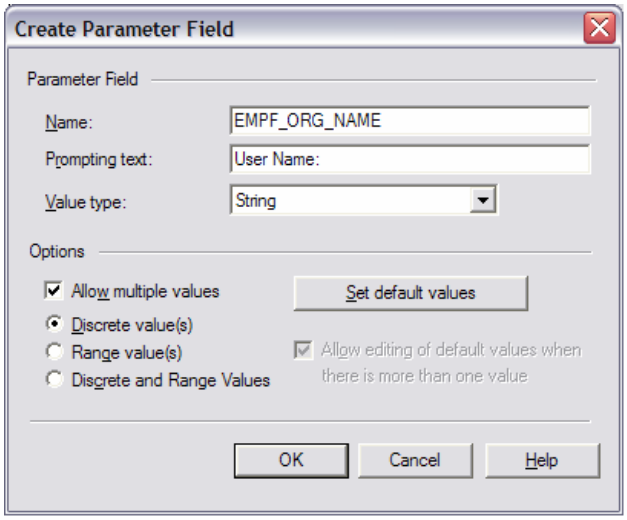

Figure 39: Create Parameter Field

Step 12: Right click on the report and select Report->Edit Selection Formula->Records (see Figure 40)

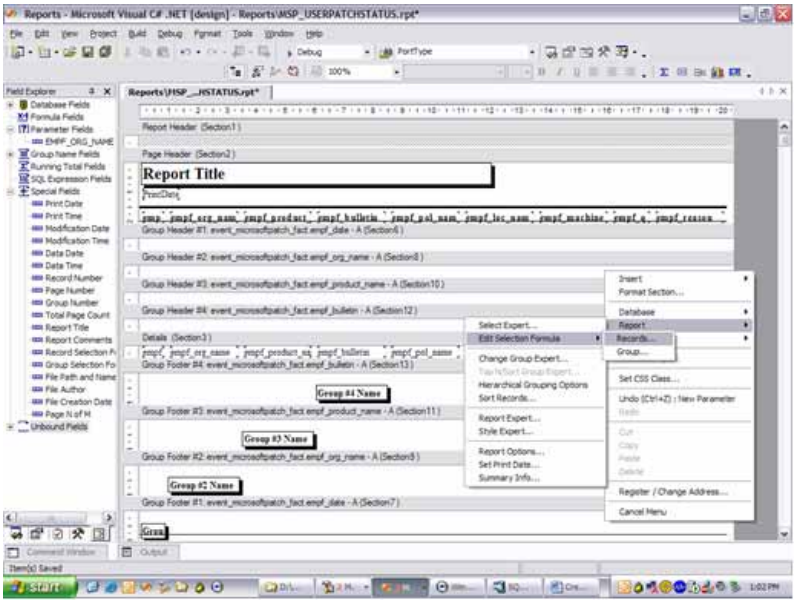

Figure 40: Link the Parameter

Step 13: So, using the new parameter, specify only the records where the field equals the values selected in the parameter. Select the column and then a comparison (=) and then the parameter. Type CTRL-S to save the filter

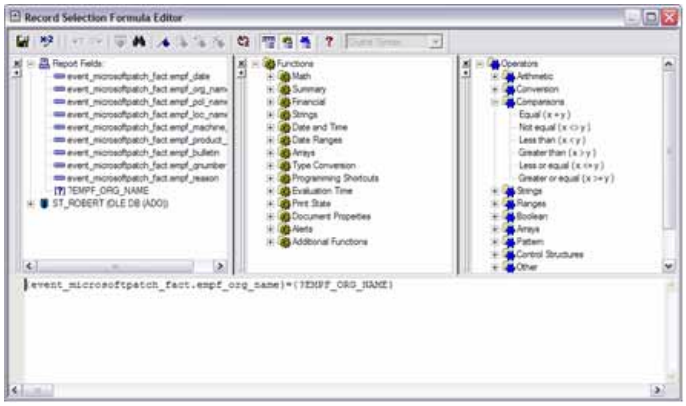

Figure 41: Specify the Correct Records

Step 14: Repeat steps 10-13 for each filter. Edit the design of the report and save.

Step 15: After a custom report is generated, the report can be dropped into the \Program Files\Novell\Management Service\Reports\Reports\ directory on the Management Service Server. Once there, the new report will display in the reports list in the Reporting Service web interface (click Refresh List to display the new reports).

Override-Password Key Generator

Productivity interruptions that a user may experience due to restrictions to connectivity; disabled software execution; or access to removable storage devices are likely caused by the security policy the ZSC is enforcing. Changing locations or firewall settings will most often lift these restrictions and restore the interrupted functionality. However, in some cases the restriction could be implemented in such a way that they are restricted in all locations and/or all firewall settings, or that the user is unable to make a location or firewall setting change.

When this occurs, the restrictions in the current policy can be lifted via a password override to allow productivity until the policy can be modified. This feature allows an administrator to set up password protected override for specified users and functionality, which temporarily permits the necessary activities.

Password overrides disable the current security policy (restoring the default, All Open policy) for a pre-defined period of time, once the time-limit has expired, the current or updated policy will be restored. The password for a policy is set in the security policy's Global Rules settings.

Password override:

- Overrides application blocking
- Allows user to change locations
- Allows user to change firewall settings
- Overrides hardware control (thumb drivers, CDROM, etc.)

The password entered into the policy should NEVER be issued to an end-user. It is recommended that the Override-Password Key Generator be used to generate a short-term-use key (see Figure 42).

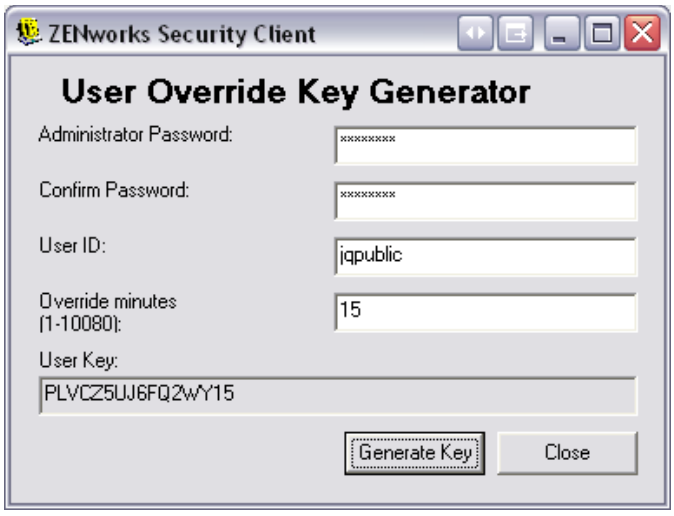

Figure 42: Override Password Key Generator

To generate an override key, perform the following steps:

Step 1: Open the Override-Password Key Generator through Start\All Programs\Novell\ESM Management Console\Override-Password Generator. The Password Generator will display. (see Figure 42)

Step 2: Enter the policy password in the Administrator Password field, and confirm it in the next field

Step 3: Enter the user name the end-user logged-in with

Step 4: Set the amount of time the policy will be disabled

Step 5: Click the Generate Key button to generate an override key

This key can be either read to the end-user during a help-desk call, or it can be copied and pasted into an email. The end-user will enter the key into their ZSC's Administration window (see ZSC User's Guide). This key will only be good for that user's policy and ONLY for the specified amount of time. Once the key has been used, it cannot be used again.

Note:

If the user logs-off or reboots their machine during password override, the password will expire, and a new one will need to be issued.

If a new policy has been written prior to the time limit expiring, the end-user should be instructed to “Check for a Policy Update,” rather than clicking the Load Policy button on the ZSC about box.

USB Drive Scanner

An authorized USB device list can be generated and imported into a policy using the optional USB Drive Scanner tool (included with the installation package). See page 90 for details on implementing an authorized USB Devices list into a Security Policy.

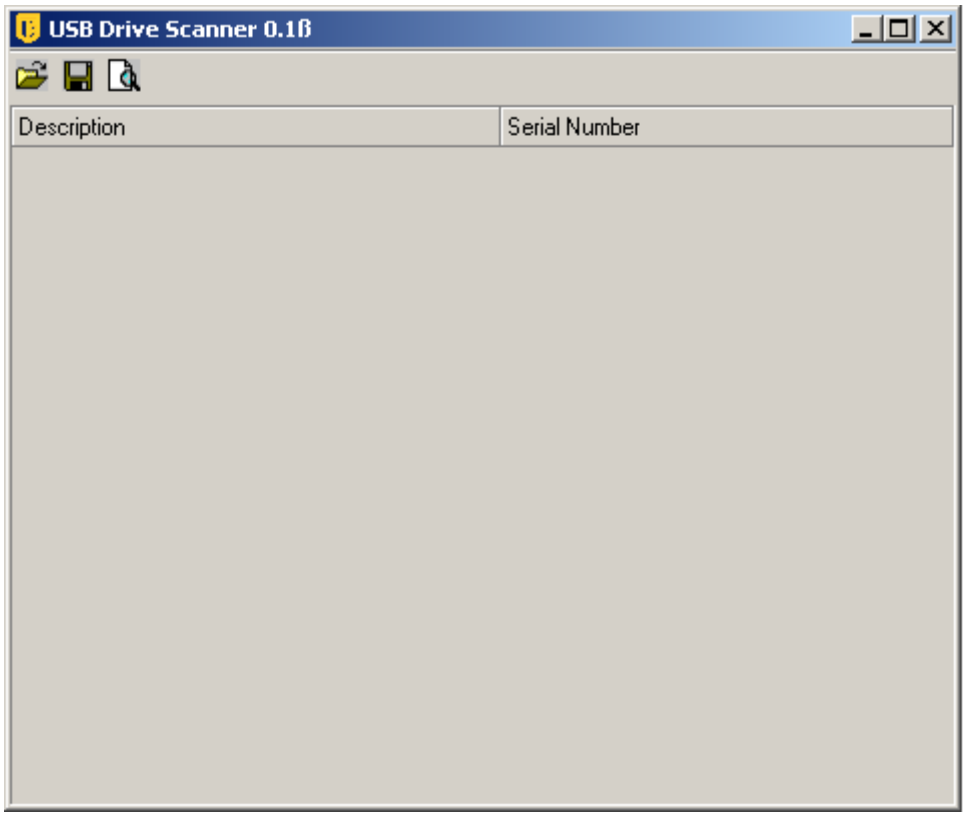

Figure 43: USB Drive Scanner

To generate an authorized devices list, perform the following steps:

Step 1: Open the USB Drive Scanner application

Note:

This is a separate installation from the Management Service and Management Console. A shortcut to the tool will display on the desktop.

Step 2: Insert a USB Device into the USB port on the computer. The device MUST have a serial number

Step 3: Click the "Scan" icon ( ), the name of the device and its serial number will display in the appropriate fields (see Figure 44)

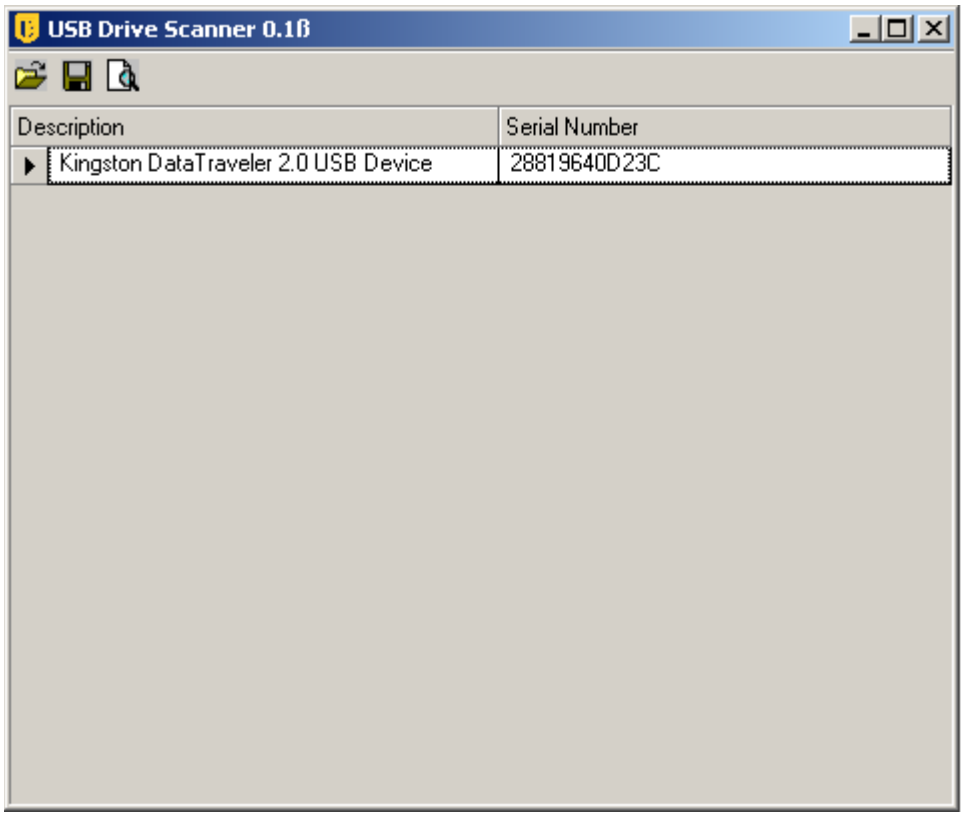

Figure 44: Scan for Device Name and Serial Number

Step 4: Repeat steps 2 and 3 until all devices have been entered into the list

Step 5: Click the "Save" icon ( ) and save the list (see page 92 for instructions on how to import the list into a policy)

To edit a saved file, click the "Browse" icon ( ) and open the file.

Client Location Assurance Service

The Client Location Assurance Service (CLAS) is an optional feature that provides a cryptographically-hardened verification that a pre-defined network environment, identified by the ZENworks Security Client's location verification process, is correct. This service is only reliable in network environments that are completely and exclusively under the control of the ESM Administrator. CLAS should always be installed behind the enterprise firewall, yet be accessible to any endpoint.

The ZENworks Security Client uses a fixed port to send a challenge to CLAS. CLAS decrypts the packet and responds to the challenge, proving that it has the private key matching the public key forming the heart of the digital certificate.

Server Selection and Installation

Please refer to the Installation and Quick Start guide for selection and installation instructions.

Server Maintenance

It is recommended that regular Disk Cleanup tasks be configured to run on this server to remove temporary files out of the Windows\temp folder. Under extreme load conditions windows can generate an inordinate amount of temporary files that needlessly take up disk space.

Upgrading the Software

The CLAS software can be upgraded by running the new installation software.

Uninstall

To uninstall CLAS, use the Add/Remove Programs function in the Windows Control Panel.

Securing Server Access

Physical Access Control

Physical access to the CLAS Server should be controlled to prevent access by unauthorized parties. Measures taken should be appropriate to the risks involved. There are multiple available standards and guidelines available, including NIST recommendations, HIPAA requirements, ISO/IEC 17799, and less formal collections of recommendations such as CISSP or SANS guidelines. Even when a given regulatory frameworks is not applicable, it may still act as a valuable resource and planning guide.

Likewise, Disaster Recovery and Business Continuity mechanisms to protect the CLAS Server should be put in place to protect the server if an organizational risk assessment identifies a need for such steps. This is very simple to do, as the vast majority of the CLAS server configuration is generated by the default install process, and all that needs to be backed up (and protected appropriately) is the private key used for the cryptographic challenge-response mechanism. With this key, the CLAS server can be recreated from the readily-available install files.

Network Access Control

The CLAS Server should be further protected from unauthorized access by restricting network access to it. At a minimum, it is critical to the functionality of CLAS that network access to the CLAS server be restricted to hosts that reside on the location-defining network. To repeat, there should be no connectivity whatsoever to the CLAS server from devices which are not already in the policy-defined network location that CLAS is providing location assurance for, and any deviation from this requirement negates all assurance value of CLAS.

Furthermore, network access restrictions should include:

3. all incoming connection attempts should be restricted to HTTP over port 80; and
4. no outgoing connection attempts should be allowed.

All these measures can be imposed through the use of standard firewall technology.

High Availability

High Availability mechanisms for the CLAS Server are strongly recommended. There are multiple alternative mechanisms for building high availability solutions, ranging from the general (DNS round-robining, layer 3 switches, etc.) to the vendor specific (the Microsoft web site has multiple resources on high availability web services). Those implementing and maintaining an ESM solution should determine which class of high availability solution is most appropriate for their context.

Optional Server Configurations

Multiple CLAS iterations may be installed on servers throughout the enterprise, to either cryptographically assure additional locations, or to assure that if the primary CLAS server goes down, the location can still be verified by the ZENworks Security Client.

In the case of the second scenario, the private key is located based on URL, rather than IP address. Therefore, a block of servers can be set up to share a single URL. CLAS may either be installed on a single server, then that server's image can be copied to each additional server, or it may be installed on each server separately, and the private and public keys can be copied over to the other servers. ALL servers in a URL block MUST have the same private and public keys.

Transferring the Public Key to the Management Service

After installation has completed, the generated public key, which will be transferred via security policy to the ZSC, is located in the \Program Files\Novell\Novell ESM CLAS directory on the server. The public key is identified by the filename publickey. This filename can be changed to any name desired.

The public key file will need to then be copied and transferred to the Management Service (anywhere on the service), which will allow the Management Console to access and distribute the key to all ZENworks Security Clients through a security policy.

The public key contains both the matching key information and the CLAS URL information. This information is imported into the Management Console and sent down through a security policy.

Updating the Encryption Keys

Encryption keys can be periodically updated (recommended) by uninstalling and reinstalling CLAS. When CLAS is reinstalled, new private and public keys are generated. The public key should then be transferred to the management service and imported again into the affected security policies to update all ZENworks Security Clients at their next policy check-in.

ZENworks Security Client Management

ESM utilizes an installed client application to enforce complete security on the endpoint itself. This ZENworks Security Client (ZSC) protects client data by determining in real-time the network location of the endpoint, and based on that location:

- Implements policy-based filtering of all incoming and outgoing traffic
- Implements policy-based control over hardware use (such as that of WLAN access points, removable media and network adapters)
- Validates anti-virus software status
- Collects security-centric statistics and event traps, and passing that information to centralized servers for collation and analysis; and
- Launches nominated applications in policy-defined situations (for example, the policy is set that in a certain location a VPN program must be used to access the network, that program is launched by the ZSC)

If the network environment is not recognized, the ZSC sets the location to a default Unknown location, and applies the Unknown security policy. Security policies are completely configurable by the ESM Administrator (see Chapter 7). For ZSC operating instructions, see the ESM ZENworks Security Client User's Guide.

All ZSC security functionality is determined by the security policy.

Prior to Installing the ZENworks Security Client

- It is recommended ALL anti-virus software be shut down during the installation of the ZENworks Security Client.
- Verify all Microsoft security patches and updates are current.

For installation instructions, please see the Installation and Quick Start Guide provided with this software.

Uninstall

To uninstall the ZENworks Security Client, go to start\programs\Novell\ZENworks Security Client\uninstall ZENworks Security Client.

You can optionally uninstall by:

1. Running setup.exe with /V”STUNINSTALL=1”
2. Running the following command: msiexec.exe /X {C1773AE3-3A47-48EB-9338-7FF2CDC73E67} STUNINSTALL=1

Note:

To specify the uninstall password you can also pass this MSI Property: STUIP=\"password goes here\"

It is recommended any wireless card be ejected prior to uninstallation, the Wi-Fi radio be switched-off, and all software with a network connection be closed (i.e.: VPN or FTP software).

Note:

It is recommended that prior to uninstalling the ZENworks Security Client, that a simple policy be distributed to those clients. Policies which globally disable Wi-Fi functionality, disable any communication hardware, and/or storage devices can leave that hardware disabled following uninstallation, requiring that each device be manually re-enabled.

Client Self Defense

The ZSC is protected from being intentionally or unintentionally uninstalled, shutdown, disabled, or tampered with in any way that would expose sensitive data to unauthorized users. Each measure protects the client against a specific vulnerability:

- Normal uninstall is not allowed without an installation password (if implemented, see ESM Installation and Quick-Start Guide), or an uninstall MSI is pushed down by the administrator
- Windows Task Manager requests to terminate STEngine.exe and STUser.exe processes are disallowed
- Service Pause/Stop and client uninstall is controlled by password, defined in the policy
- Critical files and registry entries are protected and monitored. If a change is made to any of the keys or values that are not valid, the registry its immediately changed back to valid values
- NDIS filter driver binding protection. If the NDIS driver is not bound to each adapter, STEngine will rebind the NDIS filter driver.

Upgrading the ZSC

The ZENworks Security Client may be upgraded in any of three ways:

- By physically running the new install executable (default name is setup.exe) with the the STUPGRADE=1 switch activated, on each client machine
- By running an MSI uninstall of the current ZSC and running a new installation (MSI CANNOT perform upgrades)
- By utilizing the ZSC Update option (RECOMMENDED, see “ZSC Update” on page 93)

Setting the Upgrade Switch

Step 1: Open the new installation package for the ZSC and right-click setup.exe.

Step 2: Select **Create Shortcut**.

Step 3: Right-click the shortcut and select **Properties**.

Step 4: At the end of the *Target* field, **after** the quotes, click the space bar once to enter a space, then type **/V“STUPGRADE=1”**

Example: “C:\Documents and Settings\euser\Desktop\CL-Release-3.2.455\setup.exe” **/V“STUPGRADE=1”.**

Step 5: Click OK.

Step 6: Double-click the shortcut to lauch the upgrade installer.

Running the ZSC

The ZSC will run automatically at system startup. For user operation of the ZSC, see the ZSC User's Manual.

The User's Manual can be distributed to all users to help them better understand the operation of their new notebook security software.

Multiple User Support

For machines that have multiple users logging onto them, each user account will have its own, separate Novell environment - the users can have separate policies and saved network environments. Each account will need to login to the Management Service separately to receive its credential in order to download its published policy.

In a case where a user either can't or refuses to login, they will get the initial policy that was included at ZSC installation. This helps discourage a user from creating a different account to avoid policy restrictions.

Since only one policy can be enforced at a time, Microsoft's "Fast User Switching" (FUS) is not supported. The ZSC turns off FUS at installation.

For an unmanaged client, the first policy that is pushed to one of the users will be applied to all users until the other users drop in their policies.

The users on a single computer must all be managed or unmanaged. If managed, all the users must use the same Management and Policy Distribution Service.

Machine-Based Policies

The option for using machine-based, rather than user-based policies is set at ZSC installation (see the ESM Installation and Quick-Start Guide for details). When selected, the machine will be assigned the policy from the Management Service, and that policy will be applied to ALL users who log-on to that machine. Users who have a policy assigned to them for use on another machine will not have that policy transfer over when they log-on to a machine with a machine-based policy. Rather, the computer-based policy will be enforced.

Note:

The machine must be a member of the Policy Distribution Service's domain for the first policy sent down. Occasionally, Microsoft will not generate the SID immediately, which can prevent the ZSC on that machine from receiving its credential from the Management Service. When this occurs, reboot the machine following complete ZSC installation to receive the credentials

When switching an ZSC from accepting user-based policies to accepting machine-based policies, it will continue to enforce/use the LAST policy downloaded by the current user, until credentials are provided. If multiple users exist on the machine, it will use only the policy assigned to the currently logged in user. If a new user logs in, and the computer SID is unavailable, it will use the default policy included at installation, until the computer SID is available. Once the computer SID is available for the endpoint, all users will have the machine-based policy applied.

Distributing Unmanaged Policies

To distribute polices to unmanaged ZSCs, perform the following steps:

Step 1: Locate and copy the Management Console's setup.sen file to a separate folder.

The setup.sen file is generated at installation of the Management Console, and placed in \Program Files\Novell\ESM Management Console\

Step 2: Create a policy in the Management Console (see Chapter 7)

Step 3: Use the Export command (see page 116) to export the policy to the same folder containing the setup.sen file.

All policies distributed MUST be named policy.sen for an unmanaged ZSC to accept them.

Step 4: Distribute the policy.sen and setup.sen files. These files MUST be copied to the \Program Files\Novell\ZENworks Security Client\ directory for all unmanaged clients.

The Setup.sen file only needs to be copied to the unmanaged ZSCs once, with the first policy. Afterwards, only new policies need to be distributed.

ZENworks Security Client Diagnostics Tools

The ZENworks Security Client features several diagnostics tools which can create a customized diagnostics package which can then be delivered to Novell Technical Support to resolve any issues. Optionally, logging and reporting can be activated to provide full details regarding endpoint usage. Administrators can also view the current policy, add rule scripting, and check the ZSC driver status.

Each function of the diagnostics tools are discussed in detail below.

Creating a Diagnostics Package

If problems occur due to the ZSC's presence on the endpoint, administrators can provide fully-detailed diagnostics information packages to Novell Technical Support. This information is vital in resolution of any issues. The diagnostics package is defined by the following items:

- **Bindings** - captures the current driver bindings for the endpoint
- **Client Status** - captures the current client status (displayed on the About window) as well as other internal status
- **Driver Status** - captures the current status of all drivers on the endpoint (displayed in the Driver Status window)
- **Group Policy Object** - captures the current GPO for the user/endpoint as designated by your directory service (i.e., Active Directory)
- **Log Files** - captures the designated logs (see " Logging")
- **Policy** - captures the current policy running on the ZSC (see " View Policy")
- **Network Environments** - captures the current and detected network environments
- **Registry Settings** - captures the current registry settings
- **Reports** - captures any reports in the temp directory (see " Reporting")
- **System Event Logs** - captures the current System Event logs
- **System Information** - captures all system information

To create a diagnostics package, perform the following steps:

Step 1: Right-click on the ZSC icon and select About. The About screen will display (see Figure 45).

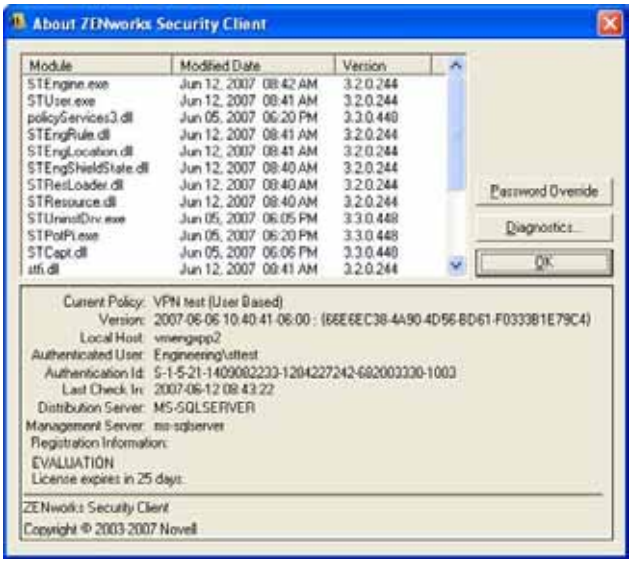

Figure 45: ZENworks Security Client About Screen

Step 2: Click Diagnostics. The Diagnostics window will display (see Figure 46).

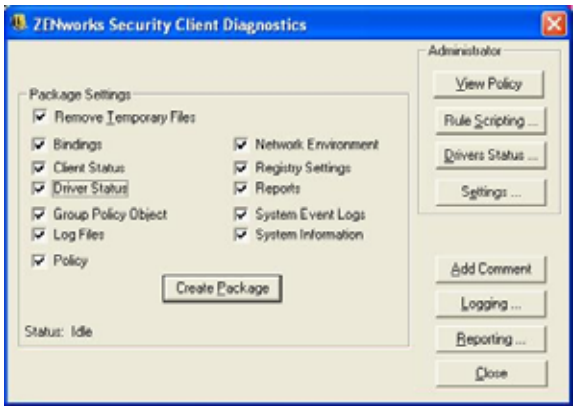

Figure 46: ZENworks Security Client Diagnostics Screen

Step 3: Select the items to be included in the package (all are checked by default).

Step 4: Click Create Package to generate the package.

Step 5: The generated package (ESSDiagnostics_YYYYMMDD_HHMMSS.zip.enc) will be available on the desktop. This encrypted zip file can now be sent to Technical Support.

Remove Temporary Files

This setting, ONLY available when password override is active in the policy, can be unchecked to keep each package component type in a temporary directory. This setting should only be unchecked when a Novell Professional Services representative is present on-site and wishes to

check individual logs. Otherwise, the files generated will unnecessarily take up disk space over time.

Administrator Views

Note:

The Administrator views, like the Remove Temporary Files check-box, will only display when password override is present in the policy. The first button will require that either the password or temporary password be entered. After the password is entered it will not need to be entered again, so long as the diagnostics window remains open.

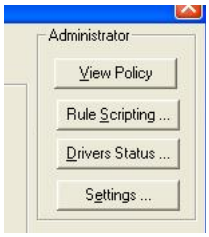

Figure 47: Administrator Views

View Policy

The view policy button displays the current policy on the device. The display (see Figure 48) shows basic policy information and can be used to troubleshoot suspected policy issues.

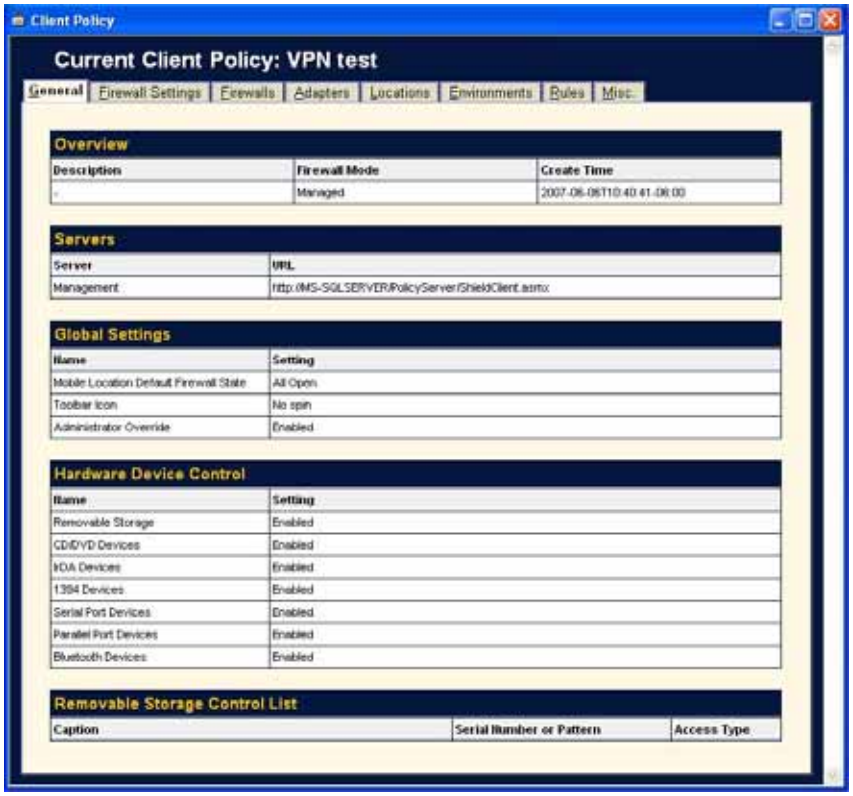

Figure 48: View Policy Window

The policy display divides the policy components into the following tabs:

- **General** - displays the global and default settings for the policy
- **Firewall Settings** - displays the Port, ACL, and Application groups available in this policy
- **Firewalls** - displays the firewalls and their individual settings
- **Adapters** - displays the permitted network adapters
- **Locations** - displays each location, and the settings for each
- **Environments** - displays the settings for defined network environments
- **Rules** - displays integrity and scripting rules in this policy
- **Misc**. - displays assigned reporting, hyperlinks and custom user messages for this policy

Rule Scripting

This tool allows the administrator to enter a specific script into the ZSC that will run on this endpoint, only. The scripting window (see Figure 49) can browse for an available script (Note: Scripts MUST be either jscript or vbscript), or a script can be created using this tool.

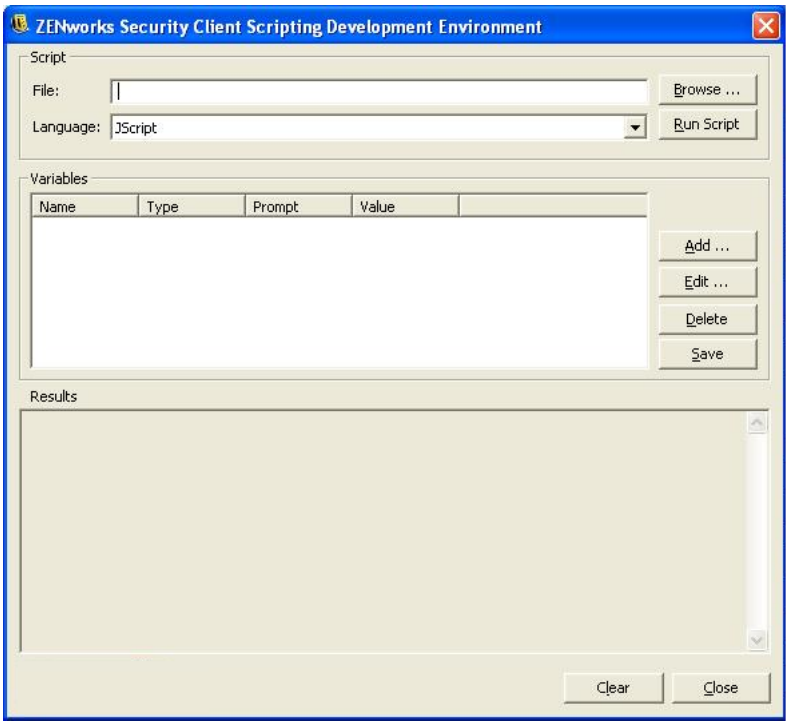

Figure 49: Rule Scripting Window

Variables are created by clicking *Add*, which will display a second window (see Figure 50) where the variable information may be entered.

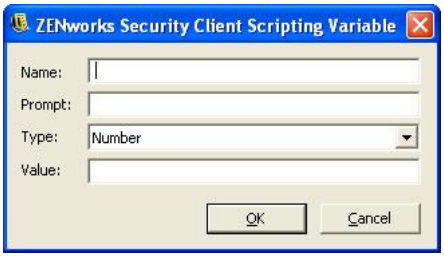

Figure 50: Scripting Variable Window

Editing a variable will launch the same window, where you can edit as needed. *Delete* will remove the variable. Click *Save* on the main scripting window once a variable is set.

Driver Status

Displays the current status of all drivers and affected components (see Figure 51).

Figure 51: Client Driver Status Window

Settings

Administrators can adjust the settings for the ZENworks Security Client without having to perform a reinstall of the software. The following actions can be taken using the Settings control, by checking off the actions you wish to perform and clicking the “Apply” button:

- Disable Self Defense (persistent)
- Clear File Protection
- Reset to Default Policy
- Clear Uninstall Password
- Reset Uninstall Password

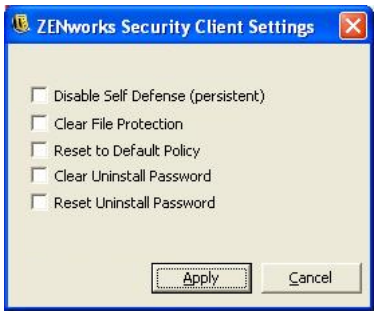

Figure 52: ZENworks Security Client Settings Control

Disable Self Defense

When applied, all protections used to keep the client installed and active on the machine will be disabled. Disabling should only be used when performing patch fixes to the ZSC.

WARNING:

This must be un-checked and applied again, or Client Self Defense will remain off.

Clear File Protection

This will clear the hashes from the protected files. The current policies and licensing information will remain. Once the hashes are cleared, the file may be updated. This can only be performed while Client Self Defense is turned off.

Reset to Default Policy

Restores the original policy to permit check-in when the current policy is blocking access.

Clear Uninstall Password

This clears the password that is required for uninstalling the ZSC. Once cleared, the ZSC can be uninstalled without a password prompt. Use when the uninstall password is failing, or lost.

Reset Uninstall Password

Resets the password required to uninstall the ZSC. The administrator will be prompted with a window to enter the new uninstall password.

Logging

Logging can be turned on for the ZSC, permitting it to log specific system events. The default logs gathered by the ZSC are XML Validation and Commenting. Additional logs can be selected from the checklist. When troubleshooting, it is recommended that logging be set according to the directions of Technical Support and the circumstances that lead to the error be repeated.

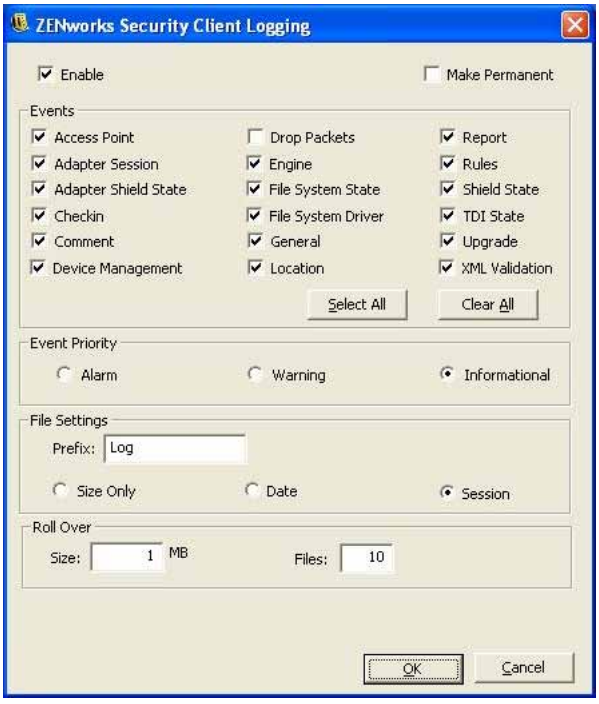

Figure 53: Logging Window

Additionally, the type of log created, file settings and roll over settings can be adjusted, based on your current needs.

To make the new logs record every time, check the Make Permanent box, otherwise the ZSC will revert to its default logs at the next reboot.

Add Comment

The option to add a comment to the logs is available on the diagnostics window. Click the Add Comments button, and the add comment window will display (see Figure 54). Comments will be included with the next batch of logs.

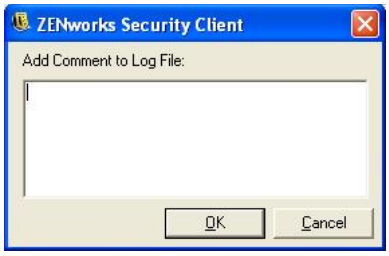

Figure 54: Comment Window

Note:

If the Comments option in logging is unchecked, the Add Comments button will not display.

Reporting

This control allows the addition of reports for this endpoint. Reports may be added and increased in duration, however they cannot fall below what was already assigned by the policy (i.e., specific reporting, if activated in the policy, cannot be turned off). See “Compliance Reporting” on page 197. for descriptions of the report types.

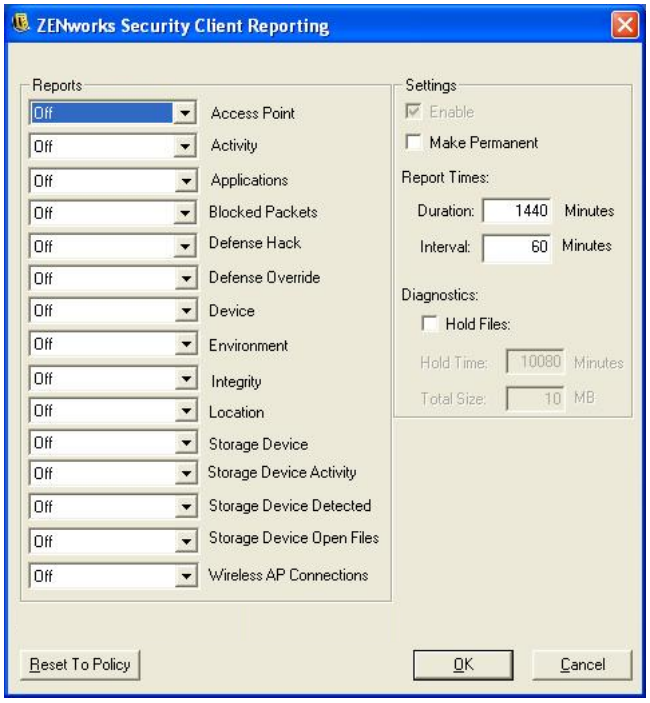

Figure 55: Reporting Overrides

The duration settings for each report type are:

- **Off** - data will not be gathered
- **On** - data will be gathered based on the set duration
- **On - Disregard Duration** - the data will be gathered indefinitely

The duration and send interval can be set using the Report Times controls on the right of the screen.

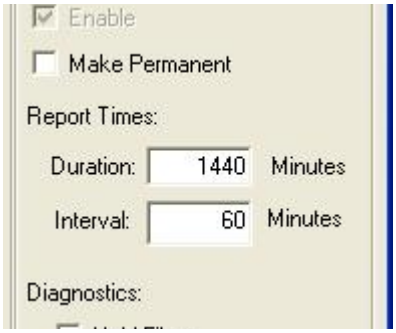

Figure 56: Duration Settings, and Make Permanent

Check the Make Permanent box to continue uploading the new reports for just this end-user, otherwise reporting will revert to the policy default at the next reboot.

Making Reports Available for a Diagnostics Package

To capture reports in the diagnostics package, check the Hold Files box in the Reporting window. This will hold reports after uploading in the temp directory for the time/space defined in the Reporting window. These reports can then be bundled in the diagnostics package.

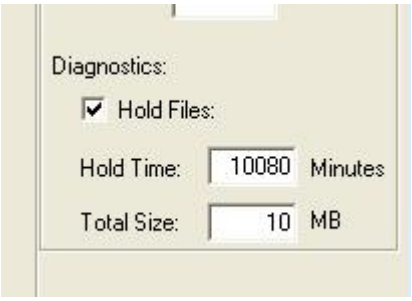

Figure 57: Hold Reports for Diagnostics

Creating and Distributing ESM Security Policies

Security Policies are used by the ZENworks Security Client to apply location security to mobile users. Decisions on networking port availability, network application availability, file storage device access, and wired or Wi-Fi connectivity are determined by the administrator for each location.

Security policies can be custom-created for the enterprise, individual user groups, or individual users/machines. Security policies can allow full employee productivity while securing the endpoint, or can restrict the employee to only running certain applications and having only authorized hardware available to them.

To begin a security policy, click **New Policy** in the File menu of the Management Console

Policy Tabs and Tree

A security policy is written/edited by navigating through the available tabs at the top of the screen, and the components tree on the left.

The available tabs are:

- Global Policy Settings - Settings which are applied as defaults throughout the policy
- Locations - These policy rules are applied within a specific location type, whether specified as a single network, or a type of network such as a coffee shop or airport
- Integrity and Remediation Rules - Assures essential software (such as antivirus and spyware) is running and up-to-date on the device
- Compliance Reporting - Instructs whether reporting data (including the type of data) is gathered for this particular policy
- Publish -Publishes the completed policy to individual users, directory service user groups, and/or individual machines.

The Policy Tree displays the available subset components for the tabbed categories. For example, Global Policy Settings include subsets of Wireless Control, ZSC Update, and VPN Enforcement. ONLY the items contained on the primary subset page are required to define a category, the remaining subsets are optional components.

Policy Toolbar

The policy toolbar (see Figure 58) provides four controls. The Save control is available throughout policy creation, while the component controls are only available under the Locations and Integrity tabs.

Figure 58: Policy Toolbar

Explanations of the tools are provided below:

- **Save** - Saves the policy in its current state

IMPORTANT:

As you complete each component subset, it is HIGHLY recommended you click the Save icon on the Policy toolbar. If incomplete or incorrect data is entered into a component, the error notification screen will display - see “Error Notification” on page 81 for more details.

- **New Component** - Creates a new component in a Location or Integrity subset. Once the policy is saved, a new component is available to associate in other policies
- **Associate Component** - This control opens the Select Component screen for the current subset (see Figure 59). The available components include any pre-defined components included at installation, and all components created in other policies.

Figure 59: Select Component Window

IMPORTANT:

Changes made to associated components will affect all other instances of that component.

Example: You can create a single Location component named "Work," which defines the corporate network environment and security settings to be applied whenever an endpoint enters that environment. This component can now be applied to all security policies. Updates to the environment or security settings can be changed in the component in one policy and will update the same component in all other policies that it's associated to.

Use the Show Usage command to view all other policies associated with this component (see below).

- **Remove Component** - This control will remove a component from the policy. The component will still be available for association in this and other policies.

Show Usage

Changes made to shared policy components will affect all policies they are associated with. Prior to updating or otherwise changing a policy component, it is recommended that you run the Show Usage command to determine which policies will be affected by the change.

1. Right-click the component and select Show Usage
2. A pop-up window will display, showing each instance of this component in other policies (see Figure 60).

Figure 60: Show Usage Window

Error Notification

When the administrator attempts to save a policy with incomplete or incorrect data in a component, the Validation pane will display at the bottom of the Management console, highlighting each error. The errors MUST be corrected before the policy can be saved.

Double-click each validation row to navigate to the screen with the error. Errors are highlighted as shown in the figure below (see Figure 61).

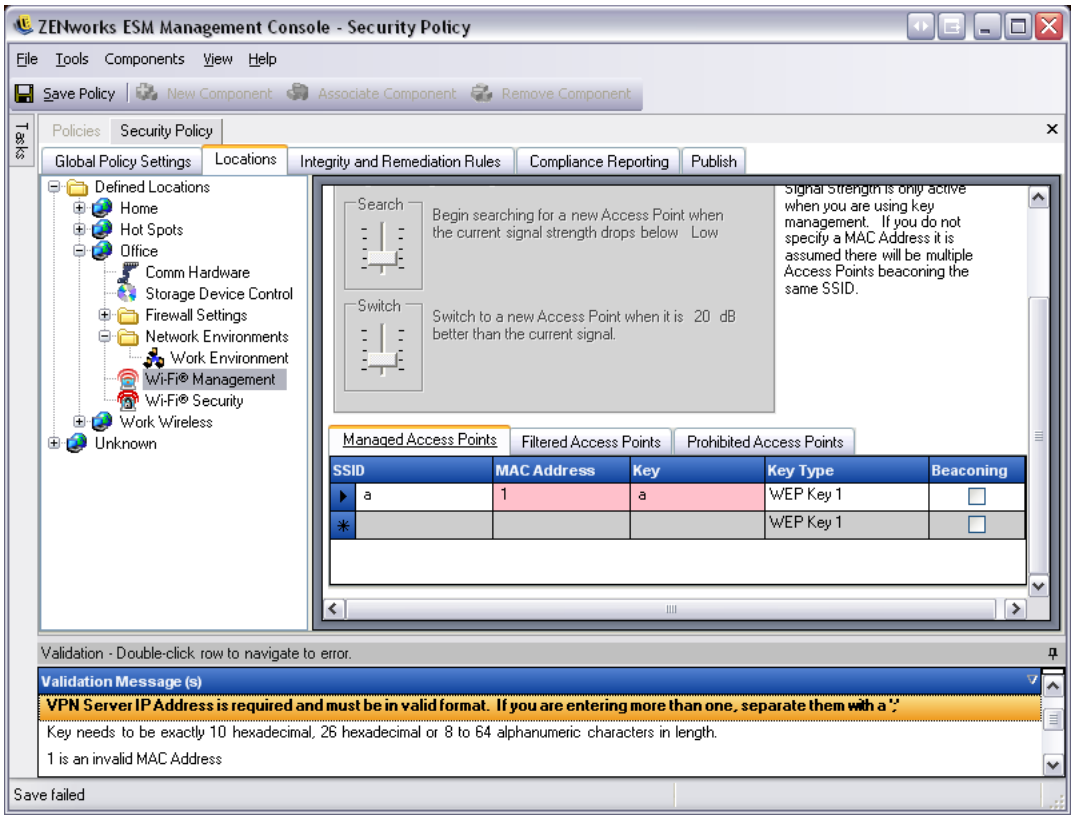

Figure 61: Error Notification Pane

Creating Security Policies

To create a new policy, click Create Policy. The Create Policy window displays. Enter a name for the policy and click OK. This name can be changed at any time using the primary global settings (See “Global Policy Settings” on page 85.).

Security policies are built by defining all the Global Settings (default behaviors), then creating/associating existing components for that policy, such as Locations, Firewalls and Integrity Rules, and finally establishing Compliance Reporting for the policy.

The components are created either within a “dummy” policy or are associated from other policies. It is assumed that for your first few policies you will be creating all of the unique locations, firewall settings and integrity rules for the enterprise. These components will be stored in the Management Service’s database for possible later use in other policies.

The diagram below shows the components for each level, and a resulting policy taken from the selections (see Figure 62).

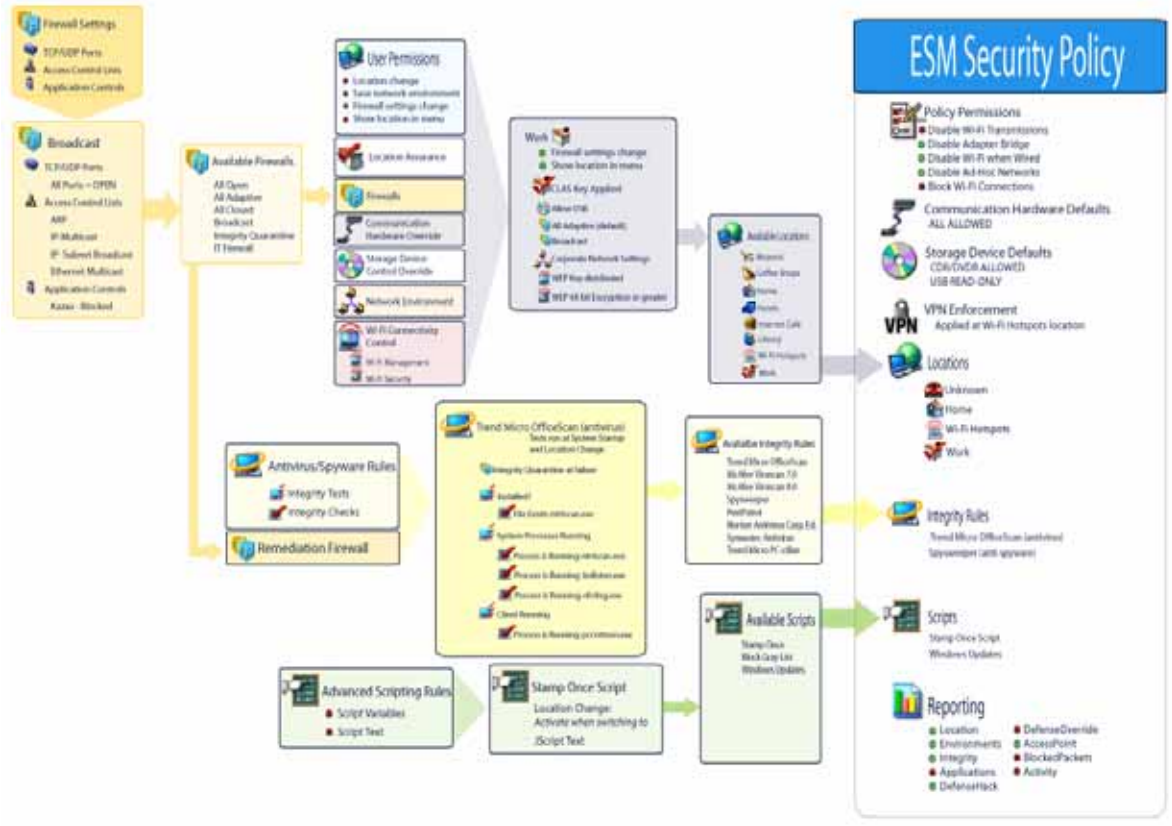

Figure 62: ESM Security Policy creation process

Custom User Messages

Custom User Messages allow the ESM Administrator to create messages which directly answer security policy questions as the user encounters policy enforced security restrictions, or provide specific instructions to the user. User messages controls (see Figure 64) are available in various components of the policy.

Figure 63: Custom User Message with a Hyperlink

To create a custom user message, perform the following steps (Figure 64 for an example of the control):

Step 1: Enter a title for the message. This displays on the top bar of the message box (see example in Figure 63 above)

Step 2: Enter the message. The message is limited to 1000 characters

Step 3: If a hyperlink is required, check the hyperlinks box and enter the necessary

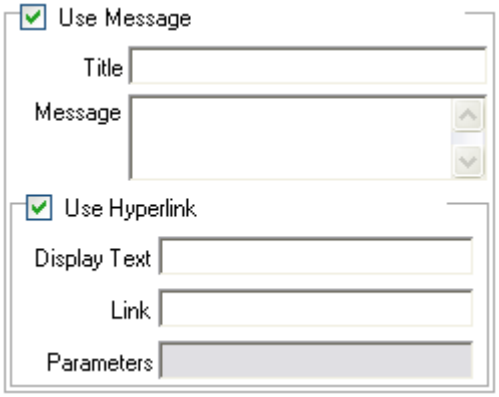

Figure 64: Custom Message and Hyperlink Controls

Note:

Changing the Message or Hyperlink in a shared component will change in all other instances of that component. Use the Show Usage command to view all other policies associated with this component.

Hyperlinks

An administrator can incorporate hyperlinks in custom messages to assist in explaining security policies or provide links to software updates to maintain integrity compliance. Hyperlinks are available in several policy components. A VPN hyperlink can be created which can point to either the VPN client executable, or to a batch file which can run and fully log the user in to the VPN (see See “VPN Enforcement” on page 94. for more details).

Figure 65: Custom User Message with a Hyperlink

To create a hyperlink, perform the following steps (see Figure 66 for an example of the control):

Step 1: Enter a name for the link. This is the name that will display below the message (required for Advanced VPN hyperlinks as well).

Step 2: Enter the hyperlink

Step 3: Enter any switches or other parameters for the link (use for VPN enforcement)

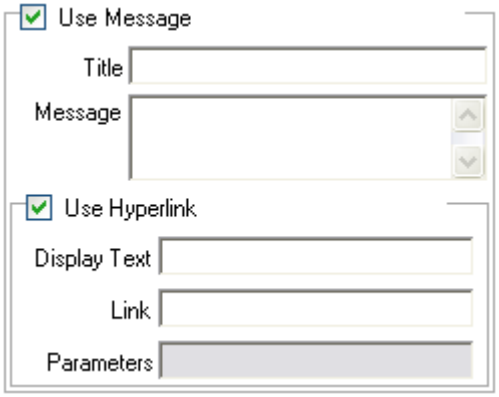

Figure 66: Custom Message and Hyperlink Controls

Note:

Changing the Message or Hyperlink in a shared component will change in all other instances of that component. Use the Show Usage command to view all other policies associated with this component.

Global Policy Settings

The global policy settings are applied as basic defaults for the policy. To access this control, open the **Global Policy Settings** tab and click the **Policy Settings** icon in the policy tree on the left.

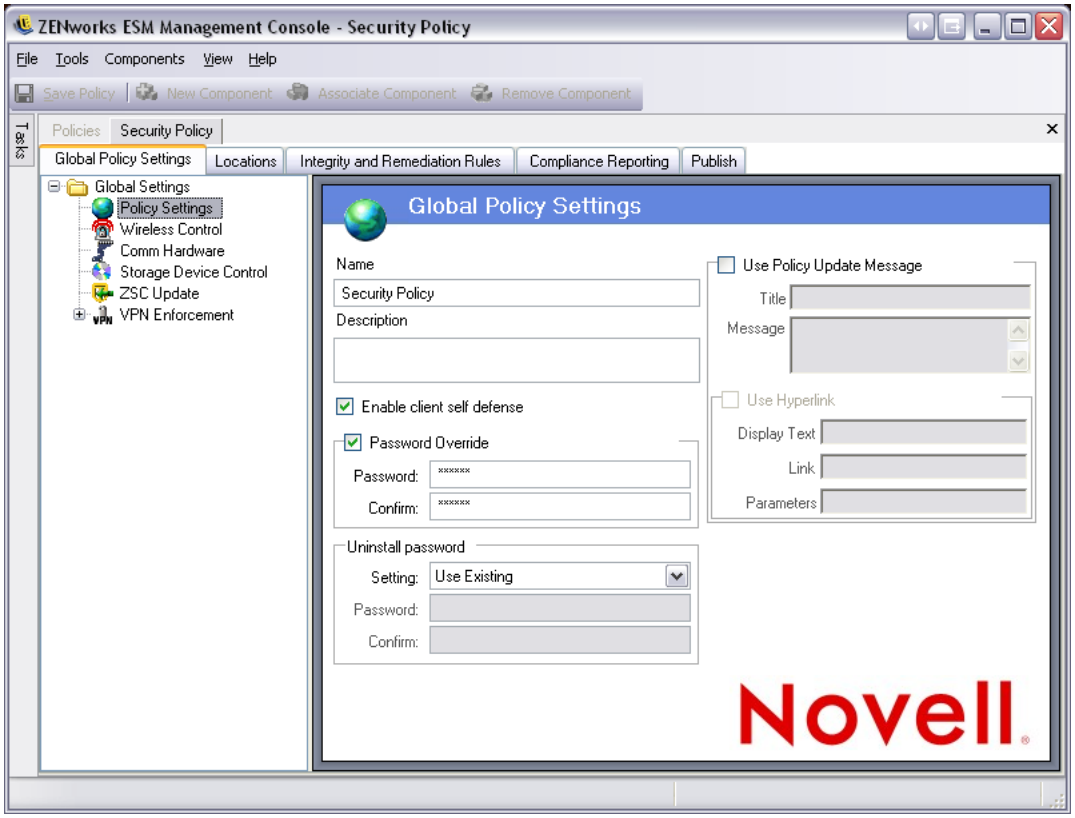

Figure 67: Global Policy Settings

The primary global settings are:

- **Policy Name and Description** - The policy name (defined at new policy creation) can be adjusted here. A description of the policy may also be entered.
- **Enable client self defense** - Client Self Defense can be enabled or disabled by policy. Leaving this box checked will ensure that Client Self Defense is active. Unchecking will deactivate Client Self Defense for all endpoints consuming this policy.
- **Password Override** - This feature allows an administrator to set up a password override which can temporarily disable the policy for a specified period of time. Check the Password Override box and enter the password in the provided field. Enter the password again in the confirmation field. Use this password in the Override Password Generator to generate the password key for this policy.

WARNING:

It is HIGHLY RECOMMENDED that end-users are NOT given this password, rather the Override Password Generator should be used to generate a temporary key for them.

- **Policy Update Message** - A Custom User Message can be displayed whenever the policy is updated. Click on the check box, then enter the Message information in the provided boxes (See “Custom User Messages” on page 83. for more information).
- **Use Hyperlink** - A hyperlink to additional information, corporate policy, etc. may be included at the bottom of the custom message (See “Hyperlinks” on page 84. for more information).

Figure 68: Updated Policy Custom Message with Hyperlink

- **Uninstall Password** - It is recommended that every ZENworks Security Client be installed with an uninstall password, to prevent the user from uninstalling the software. This password is normally configured at installation, however, the password can now be updated, enabled or disabled via policy.

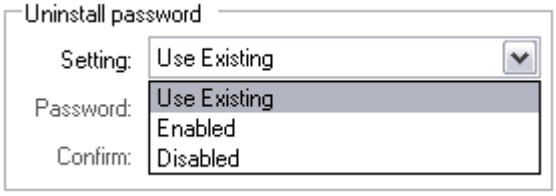

Figure 69: Uninstall Password Controls

  - The default setting is **Use Existing**, which will not change the uninstall password
  - **Enabled** is used to either activate an uninstall password, or to change it. Enter the new password and confirm it
  - **Disabled** is used to deactivate the uninstall password requirement

Wireless Control

Wireless Control globally sets adapter connectivity parameters to secure both the endpoint and the network. To access this control, open the **Global Policy Settings** tab and click the **Wireless Control** icon in the policy tree on the left.

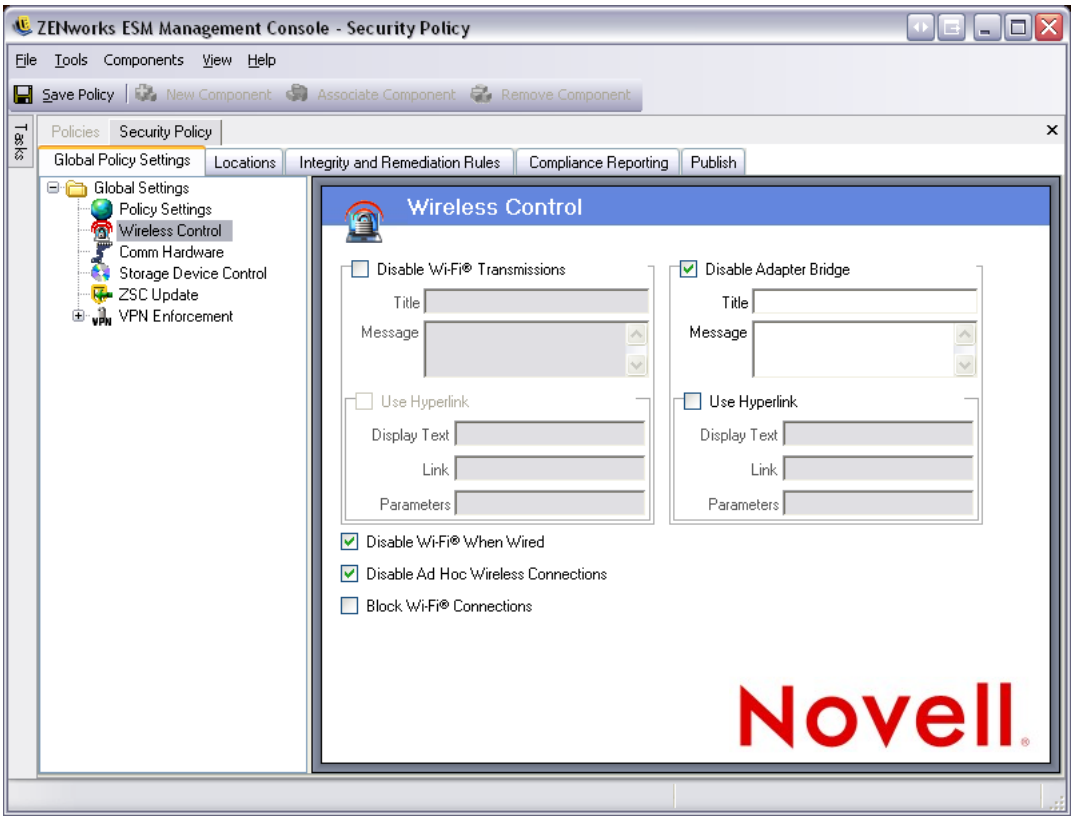

Figure 70: Policy Components

- **Disable Wi-Fi® Transmissions**
  This setting globally disables ALL Wi-Fi adapters, up to and including complete silencing of a built-in Wi-Fi radio.

  A Custom User Message and Hyperlink can be displayed when the user attempts to activate a Wi-Fi connection (See “Custom User Messages” on page 83. for more information).

- **Disable Adapter Bridge**
  This setting disables the networking bridge functionality included with Windows XP, which allows the user to bridge multiple adapters and act as a hub on the network.

  A Custom User Message and Hyperlink can be displayed when the user attempts a Wi-Fi connection (See “Custom User Messages” on page 83. for more information).

- **Disable Wi-Fi When Wired**
  All Wi-Fi Adapters are disabled when the user has a wired (LAN through the NIC) connection.

- **Disable AdHoc Networks**
  This setting globally disables all AdHoc connectivity, thereby enforcing Wi-Fi connectivity over a network (i.e., via an Access Point) and restricts all peer-to-peer networking of this type.
- **Block Wi-Fi® Connections**
  This setting will block Wi-Fi connections without silencing the Wi-Fi radio. Use this setting when you want to disable Wi-Fi connection, but want to use Access Points for Location Detection (see “Locations” on page 98 for more information).

Global Communication Hardware Control

This component sets the policy defaults for all communication hardware. To access this control, open the **Global Policy Settings** tab and click the **Comm Hardware** icon in the policy tree on the left.

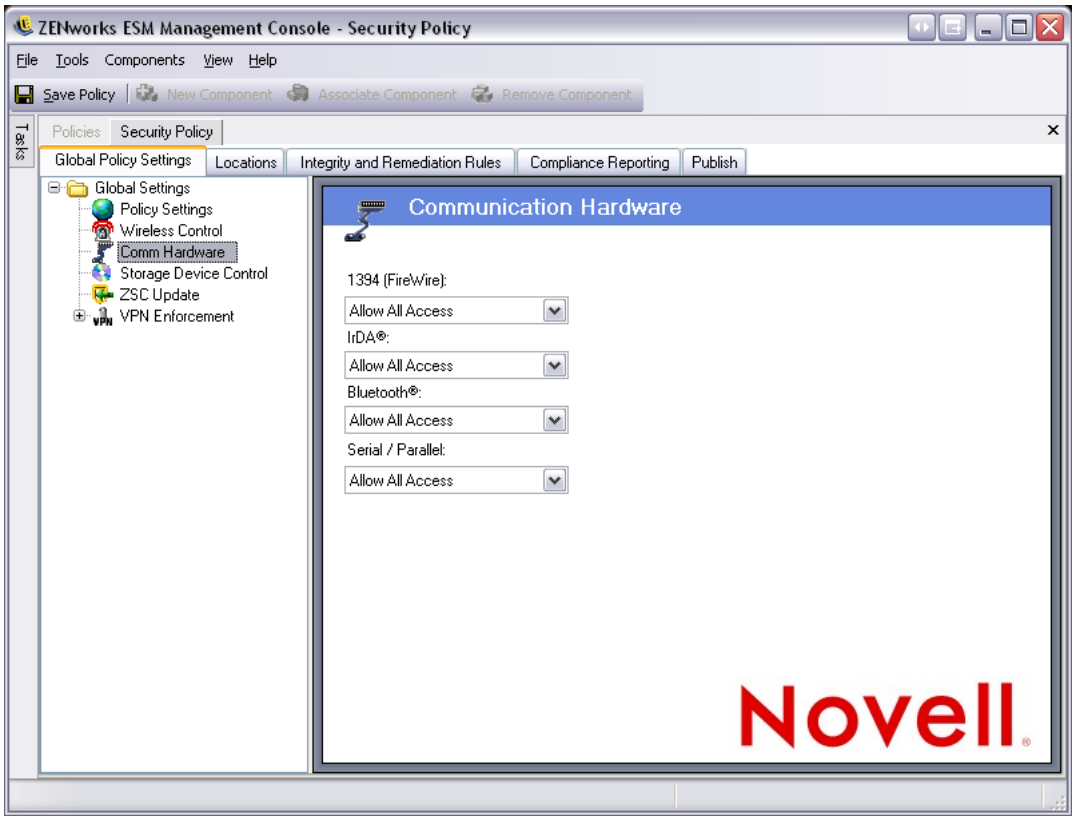

Figure 71: Global Communication Hardware Control

The following communication hardware types may have their default set as either enable or disable for each type:

- **IrDA®** (Infrared Data Association) - controls the infrared access port on the endpoint
- **Bluetooth®** - controls the Bluetooth® access port on the endpoint
- **1394 (FireWire™)** - controls the FireWire™ access port on the endpoint
- **Serial/Parallel** - controls serial and parallel port access on the endpoint

Enable allows complete access to the communication port. Disable denies all access to the communication port. The driver-level communication hardware on the endpoint (NIC, modem, and Wi-Fi [card or radio]) are controlled by location, and do not have a global default. See “Communication Hardware Settings” on page 103 for more details.

Storage Device Control

This control sets the default storage device settings for the policy, where all external file storage devices are either allowed to read/write files, function in a read-only state, or be fully disabled. When disabled, these devices are rendered unable to retrieve any data from the endpoint; while the hard drive and all network drives will remain accessible and operational.

To access this control, open the **Global Policy Settings** tab and click the **Storage Device Control** icon in the policy tree on the left.

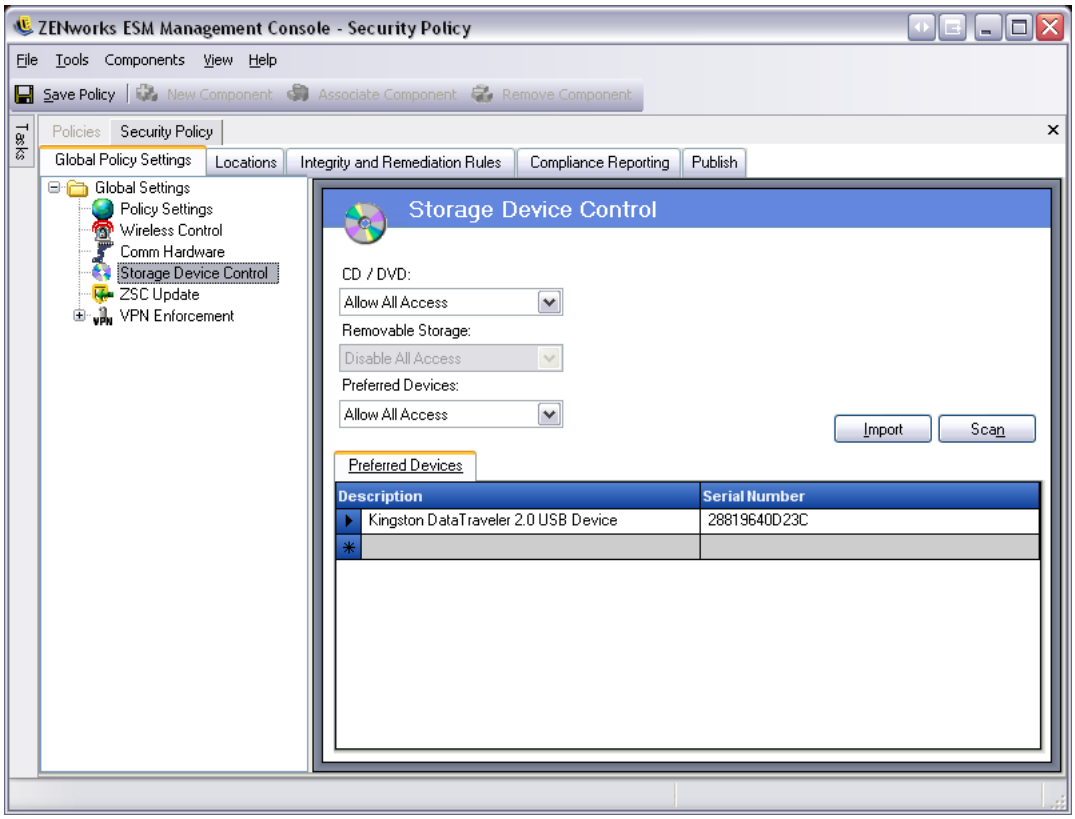

Figure 72: Global Storage Device Control

Storage Device Control is differentiated between **Removable Storage** (USB "thumb-drives", Flash memory cards, and SCSI PCMCIA memory cards, along with traditional zip, floppy, and external CDR drives) and the **CD/DVD** drives (including CD-ROM, CD-R/RW, DVD, DVD R/RW). The hard drive and network drives (when available) will always be allowed.

To set the policy default for storage devices, select the global setting for both types from the drop-down lists:

- **Enable** - The device type is allowed by default
- **Disable** - The device type is disallowed. When users attempt to access files on a defined storage device, they receive an error message from the operating system, or the application attempting to access the local storage device, that the action has failed

- **Read-Only** - the device type is set as Read-Only. When users attempt to write to the device, they receive an error message from the operating system, or the application attempting to access the local storage device, that the action has failed

---

Note:

If you wish to disable or set as "Read-Only" the CD-Rom drives and/or the floppy drives on a group of endpoints, the Local Security Settings (passed down through a directory service group policy object) must have both Devices: Restrict CD-ROM access to locally logged-on user only and Devices: Restrict floppy access to locally logged-on user only set as Disabled. To verify this, open either the group policy object, or open Administrative Tools on a machine. Look in Local Security Settings - Security Options, and verify both devices are disabled (see Figure 73). Disabled is the default.

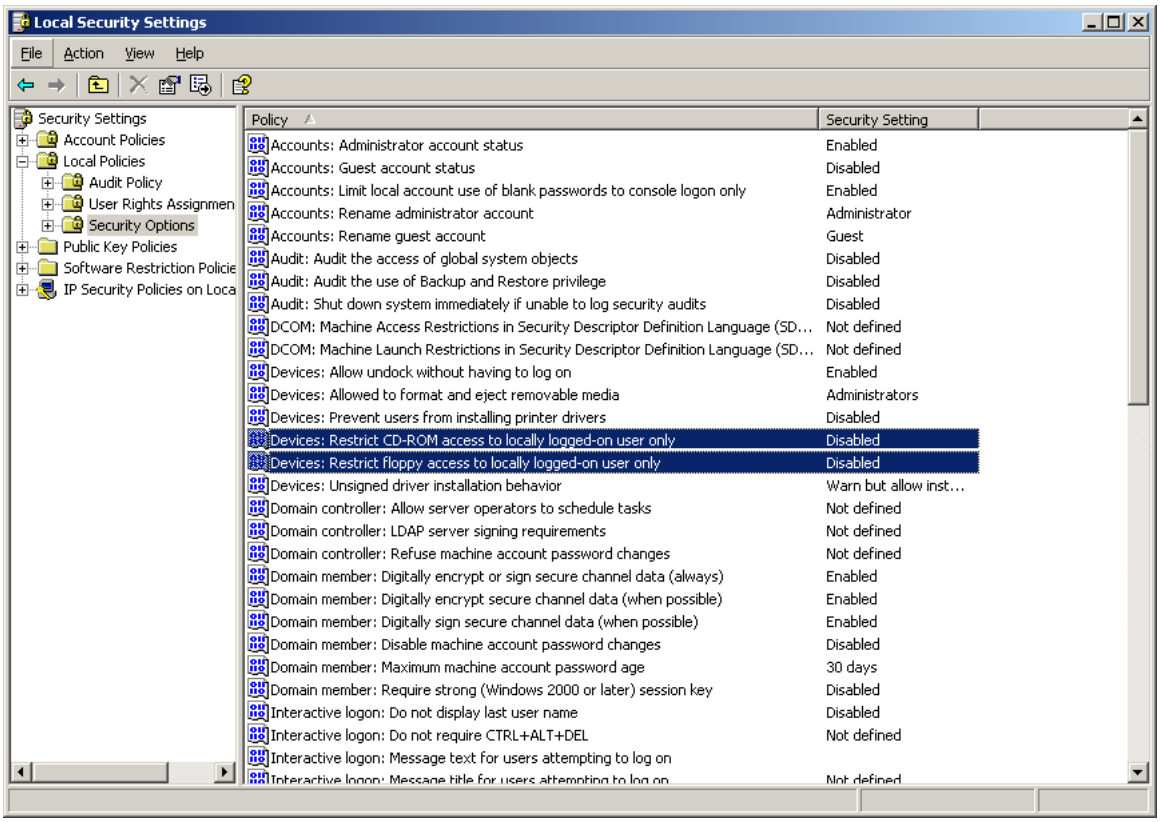

Figure 73: Verify Local Storage Device Options are set as Disabled

Preferred Devices

Preferred Removable Storage Devices may be optionally entered into a list, permitting only the authorized devices access when the global setting is used at a location (see “Storage Device Control” on page 105 for more details). Devices entered into this list MUST have a serial number.

To enter a preferred device, perform the following steps:

Step 1: Insert the device into the USB port on the machine that the Management Console is installed on.

Step 2: Once the device is ready, click the Scan button. If the device has a serial number, its Description and Serial Number will display on the list.

Step 3: Select a setting from the drop-down list (the Global Removable Device setting will not be applied for this policy):

- **Enable** - The devices on the preferred list are permitted full read/write capability, all other USB and other external storage devices are disabled
- **Read-Only** - The devices on the preferred list are permitted read-only capability, all other USB and other external storage devices are disabled

Repeat steps 1 and 2 for each device that will be permitted in this policy. All devices will have the same setting applied.

Note:

Location-based Storage Device Control settings will override the global settings. For example, you may define that at the Work location, all external storage devices are permitted, while allowing only the global default at all other locations, limiting users to the devices on the preferred list.

Importing Device Lists

The Novell USB Drive Scanner Application generates a list of devices and their serial numbers (See “USB Drive Scanner” on page 60.). To import this list, click Import and browse to the list. The list will populate the Description and Serial Number fields.

ZSC Update

Patches to repair any minor defects in the ZENworks Security Client are made available with regular ESM updates. rather than providing a new installer, which will need to be distributed through MSI to all endpoints, ZSC Update allows the administrator to dedicate a zone on the network which will distribute update patches to end-users when they associate to that network environment.

To access this control, open the **Global Policy Settings** tab and click the **ZSC Update** icon in the policy tree on the left

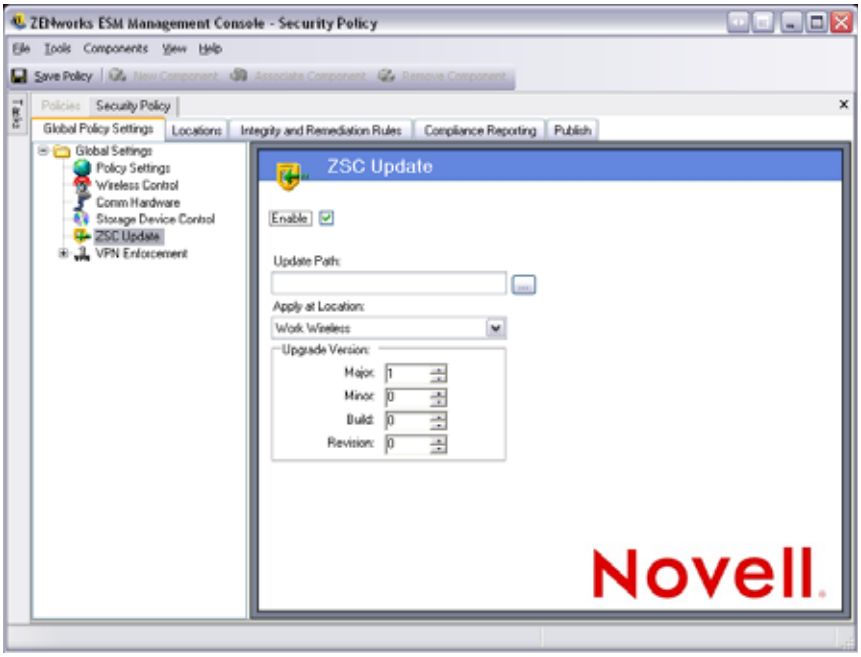

Figure 74: ZSC Update

To facilitate simple and secure distribution of these patches to all ZSC users, perform the following steps:

Step 1: Check Enable to activate the screen and the rule

Step 2: Select the location where the ZSC will look for the updates. Due to the recommendations in the next step, the location associated with the enterprise environment (i.e.: the "Work" location) is the recommended candidate

Step 3: Enter the URI where the patch has been stored (Note: This will need to point to the patch file, which can be either the setup.exe file for the ZENworks Security Client, or an MSI file created from the .exe). For security purposes, it is recommended that these files be stored on a secure server behind the corporate firewall

Step 4: Enter the version information for this file in the provided fields. Version information is found by installing the ZENworks Security Client and opening the About screen (see the ESM ZENworks Security Client User's Guide for details). The version number for STEngine.exe is the version number you will want to use in the fields

Each time the user enters the assigned location, the ZSC will check the URI for an update that matches that version number. If an update is available the ZSC will download and install it.

VPN Enforcement

This rule enforces the use of either an SSL or a client-based VPN (Virtual Private Network). This rule is typically applied at wireless hotspots, allowing the user to associate and connect to the public network, at which time the rule will attempt to make the VPN connection, then switch the user to a defined location and firewall setting. All parameters are at the discretion of the administrator. All parameters will override existing policy settings. The VPN-Enforcement component requires the user be connected to a network prior to launching.

To access this control, open the **Global Policy Settings** tab and click the **VPN Enforcement** icon in the policy tree on the left

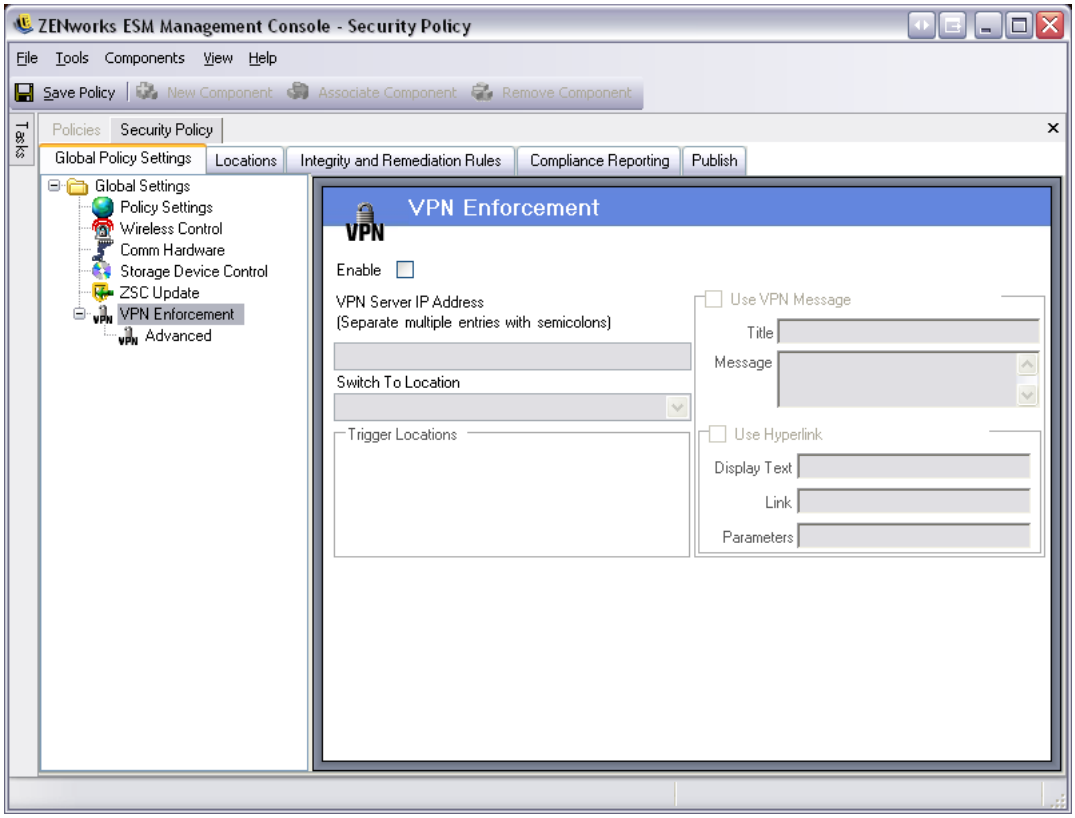

Figure 75: Basic VPN Enforcement

To add VPN enforcement to a new or existing security policy, perform the following steps:

Step 5: At LEAST two additional locations must be created, FIRST

Step 6: Check Enable to activate the screen and the rule

Step 7: Enter the IP address(es) for the VPN Server in the provided field. If multiple addresses are entered, separate each with a semi-colon (example: 10.64.123.5;66.744.82.36)

Step 8: Select the Switch-To Location from the drop-down list. The ZSC will switch to this selected location once the VPN authenticates (see the Switch-To Location for more details)

Step 9: Check-off the Trigger locations where the VPN enforcement rule will be applied. For strict VPN enforcement, it is recommended the default Unknown location be used for this policy. Once the network has authenticated, the VPN rule will activate and switch to the assigned Switch-To Location

---

Note:

The location switch will occur BEFORE the VPN connection, once the network has authenticated (see Advanced VPN settings)

Step 10: Enter a Custom User Message which will display when the VPN has authenticated to the network. For non-client VPNs, this should be sufficient.

For VPNs with a client include a Hyperlink which points to the VPN Client.

Example: C:\Program Files\Cisco Systems\VPN Client\ipsecdialer.exe

This link will launch the application, but the user will still need to log-in. A switch can be entered into the Parameters field, or a batch file could be created and pointed to, rather than the client executable)

Note:

VPN clients that generate virtual adapters (e.g., Cisco Systems VPN Client 4.0) will display the: "Policy Has Been Updated" message. The Policy has not been updated, the ZSC is simply comparing the virtual adapter to any adapter restrictions in the current policy.

The standard VPN Enforcement settings described above make VPN connectivity an option. The user will be granted connectivity to the current network whether they launch their VPN or not. For stricter enforcement, see Advanced VPN Settings below.

The Switch-to Location

The Switch-to location is the location the ZSC will switch to when the VPN is activated. It is recommended that this location contain some restrictions, and only a single restrictive firewall setting as its default.

The "All-Closed" firewall setting, which closes all TCP/UDP ports, is recommend for strict VPN enforcement. This setting will prevent any unauthorized networking, while the VPN IP address will act as an ACL to the VPN server, and permit network connectivity.

Advanced VPN Settings

Advanced VPN controls are used to set Authentication Timeouts to secure against VPN failure, connect commands for client-based VPNs, and Adapter controls to control the adapters permitted VPN access.

To access this control, open the **Global Policy Settings** tab, click the "+" symbol next to **VPN Enforcement**, and click the **Advanced** icon in the policy tree on the left

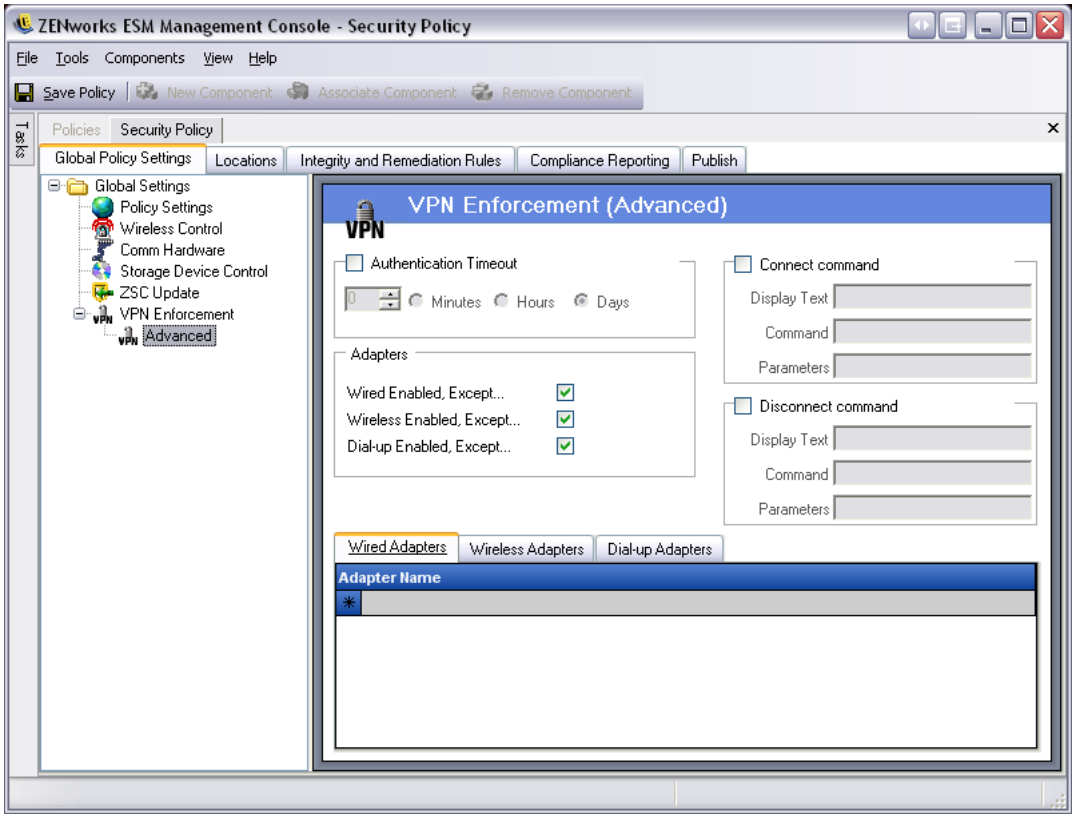

Figure 76: Advanced VPN Settings

Authentication Timeout

Administrators can place the endpoint in a secured firewall setting (the firewall setting of the "Switch To Location" - see above), to secure against any failure of VPN connectivity. The Authentication Timeout is the amount of time the ZSC will wait to gain authentication to the VPN server. It is recommended this parameter be set above 1 minute to allow authentication over slower connections.

Connect Commands

When using the Authentication timer, Connect and Disconnect commands are used to control client-based VPN activation. Enter the location of the VPN client and the required switches in the Parameters fields. The Disconnect command is optional, and provided for VPN clients that require the user disconnects before they log-off the network.

Note:

VPN clients that generate virtual adapters (e.g., Cisco Systems VPN Client 4.0) will display the: "Policy Has Been Updated" message, and may switch away from the current location temporarily. The Policy has not been updated, the ZSC is simply comparing the virtual adapter to any adapter restrictions in the current policy. It is recommended that when running VPN clients of this type that the Disconnect command hyperlink NOT be used.

VPN Adapter Controls

This is essentially a "mini" Adapter policy specific to the VPN Enforcement.

If an adapter is checked (changing it to Enabled, Except), those adapters (Wireless being specific to card type) are permitted connectivity to the VPN.

Adapters entered into the exception list(s) below, are denied connectivity to the VPN, while all others of that type will be given connectivity.

If an adapter is left is un-checked (Disabled, Except), then ONLY the adapters entered into the exception list will be permitted to connect to the VPN, all others will be denied connectivity.

This control can be used for adapters incompatible to the VPN, for example, or adapters not supported by the IT department.

This rule will override the adapter policy set for the switch-to location.

Locations

Locations are rule-groups assigned to network environments. These environments can be set in the policy (see “Network Environments” on page 106), or by the user, when permitted. Each location can be given unique security settings, denying access to certain kinds of networking and/or hardware in more hostile network environments, and granting broader access within trusted environments.

To access Location controls, open the **Locations** tab

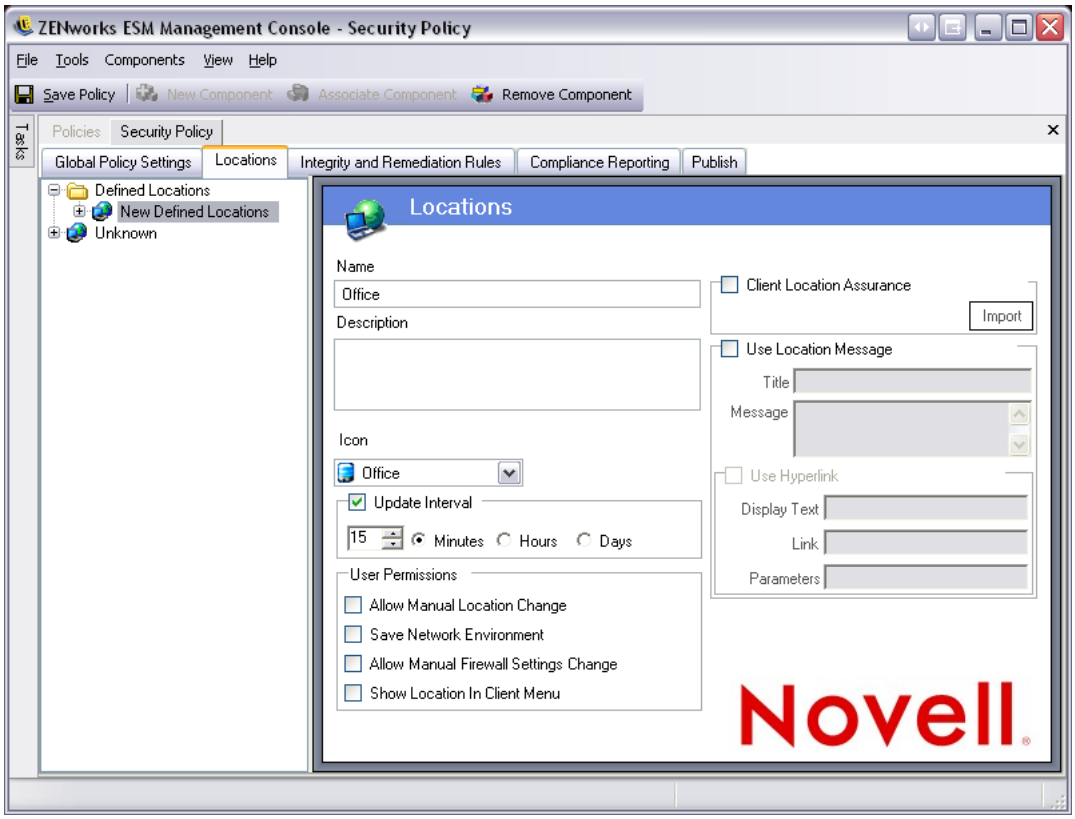

Figure 77: Location Settings

The Unknown Location

All policies have a default Unknown location. This is the location the ZENworks Security Client will switch the user to when they leave a known network environment. This Unknown location is unique for each policy and is not available as a shared component. Network Environments cannot be set nor saved for this location.

To access the Unknown Location controls, open the **Locations** tab and click the **Unknown** location in the policy tree on the left.

Defined Locations

Defined locations may be created for the policy, or existing locations (those created for other policies) may be associated.

To create a new location:

Step 1: Select Defined Locations, then click the **New Component** button

Step 2: Name the location and provide a description

Step 3: Define the location settings (see below)

Step 4: Click **Save**. Repeat the above steps to create a new location

To associate an existing location:

Step 1: Select Defined Locations and click the **Associate Component** button

Step 2: Select the desired location(s) from the list

Step 3: The location settings may be re-defined

Note:

Changing the settings in a shared component will affect ALL OTHER instances of this same component. Use the Show Usage command to view all other policies associated with this component.

Step 4: Click **Save**

It is recommended that multiple defined locations (beyond simple Work and Unknown locations) be defined in the policy to provide the user with varying security permissions when they connect outside the enterprise firewall. Keeping the location names simple (i.e., Coffee Shops, Airports, Home, etc.) and providing a visual cue through the location's Task Tray Icon, which helps the user easily switch to the appropriate security settings required for each network environment.

Location Settings

Setting the Location Icon

The location icon provides a visual cue to the user which identifies their current location. The location icon displays on the taskbar in the notification area. Use the pull-down list to view and select from the available location icons:

Airport	Silverware
Alt Location	Hotspot
Alt Office	House
Bed	Lamp
Book	Mobile
Brief Case	Mug
Burger	Water Cooler
Coffee	Paper Clip
Desk	Stapler

Select an icon which will help the end-user easily identify their location at a glance.

Update Interval

This setting determines the frequency the ZSC will check for a policy update when it enters this location. The frequency time is set in minutes, hours, or days. Unchecking this parameter means the ZSC will NOT check for an update at this location.

User Permissions

User permissions within a location include:

- **Change Location** - this permits the end-user to change to and out of this location. For non-managed locations (i.e., hot-spots, airports, hotels, etc.), this permission should be granted. In controlled environments, where the network parameters are known, this permission can be disabled. The user will NOT be able to switch to, or out of any locations when this permission is disabled, rather the ZSC will rely on the network environment parameters entered for this location
- **Change Firewall Settings** - this allows the user to change their firewall settings
- **Save Network Environment** - this allows the user to save the network environment to this location, to permit automatic switching to the location when the user returns. Recommended for any locations the user will need to switch to. Multiple network environments may be saved for a single location. For example, if a Location defined as Airport is part of the current policy, each airport visited by the user can be saved as a network environment for this location. This way, a mobile user can return to a saved airport environment, and the ZENworks Security Client will automatically switch to the Airport location, and apply the defined security settings. A user may, of course, change to a location and not save the environment.

- **Show Location in Client Menu** - this setting allows the location to display in the client menu. If this is unchecked, the location will not display at any time.

Client Location Assurance

Because the network environment information used to determine a location can be easily spoofed, thereby potentially exposing the endpoint to intrusion, the option of cryptographic verification of a location is available through the Client Location Assurance Service(CLAS). This service is only reliable in network environments that are completely and exclusively under the control of the Enterprise. Adding Client Location Assurance to a location, means that the firewall settings and permissions for this location can be set as less restrictive, assuming the endpoint is now protected behind the network firewall.

The ZENworks Security Client uses a fixed, enterprise-configurable port to send a challenge to the Client Location Assurance Service. The Client Location Assurance Service decrypts the packet and responds to the challenge, proving that it has the private key matching the public key. The tray icon displayed will include a check-mark, indicating the user is in the correct location (see Figure 78).

Figure 78: CLAS location checked

The ZSC will NOT switch to the location unless it can detect the CLAS server. If the CLAS server is not detected, even if all other network parameters match up, the ZSC will remain in the Unknown location to secure the endpoint.

To activate CLAS for a location:

Check to activate the assurance requirement, then import the CLAS public key into the policy by clicking **Import** and browsing to the file. The word **Configured** will display when the key is successfully imported.

Note:

This option is not available for the Unknown location.

Use Location Message

This setting allows an optional Custom User Message to display when the ZSC switches to this location. This message can provide instructions for the end-user, details about policy restrictions under this location, or include a Hyperlink to more information.

Location Components

The firewall settings, Wi-Fi Connectivity Control, and network environment settings are entered as separate components within a location. Communication hardware and storage device control (defined previously under Global Rules) may be adjusted at each location.

- See “Communication Hardware Settings” on page 103
- See “Storage Device Control” on page 105
- See “Firewall Settings” on page 116
- See “Network Environments” on page 106
- See “Wi-Fi Management” on page 109
- See “Wi-Fi Security” on page 114

Communication Hardware Settings

Communication hardware controls by location which hardware types are permitted a connection within this network environment. As it was previously determined whether to globally enable or disable each setting, the default selection: Apply Global Setting will maintain the default setting for the device. The default may be optionally enabled or disabled at this location, overriding the global setting.

To access this control, open the **Locations** tab and click the **Comm Hardware** icon in the policy tree on the left.

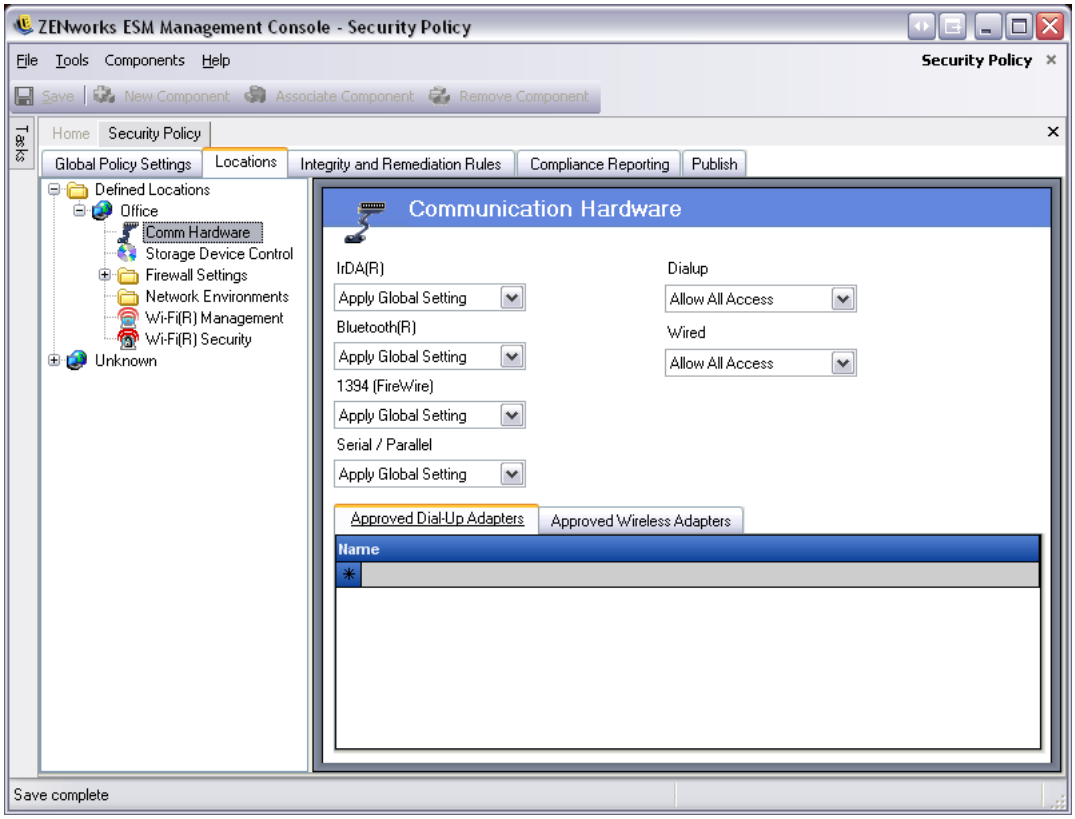

Figure 79: Location Communication Hardware Control

Select to either enable, disable, or apply the global setting for each communication hardware device listed:

- **IrDA®** (Infrared Data Association) - controls the infrared access port on the endpoint
- **Bluetooth®** - controls the Bluetooth® access port on the endpoint
- **1394 (FireWire™)** - controls the FireWire™ access port on the endpoint
- **Serial/Parallel** - controls serial and parallel port access on the endpoint
- **Dialup** - controls modem connectivity by location - not given a global setting
- **Wired** - controls LAN card connectivity by location - not given a global setting

Enable allows complete access to the communication port.

Disable denies all access to the communication port.

Note:

Wi-Fi Adapters are either controlled globally, or disabled locally using the Wi-Fi Security Controls. Adapters may be specified by brand using the Approved Wireless Adapter list (see below).

Approved Dialup Adapters List

The ZSC can block all but specified, approved dialup adapters (modems) from connecting. For example, an administrator can implement a policy which only allows a specific brand or type of modem card. This reduces the support costs associated with employees' use of unsupported hardware.

Approved Wireless Adapters List

The ZSC can block all but specified, approved wireless adapter(s) from connecting. For example, an administrator can implement a policy which only allows a specific brand or type of wireless card. This reduces the support costs associated with employees' use of unsupported hardware, and better enables support for, and enforcement of, IEEE standards-based security initiatives, as well as LEAP, PEAP, WPA, TKIP, and others.

Using the AdapterAware™ Feature:

The ZENworks Security Client receives notification whenever a network device is installed in the system and determines if the device is authorized or unauthorized. If it is unauthorized, the solution will disable the device driver, which renders this new device unusable, and will notify the user of the situation.

Note:

When a new unauthorized adapter (both Dial-up and Wireless) first installs its drivers on the endpoint (via PCMCIA or USB), the adapter will show as enabled in Windows Device Manager until the system is re-booted, though all network connectivity will be blocked.

Enter the name of each adapter allowed. Partial adapter names are permitted. Adapter names are limited to 50 characters and are case sensitive. The device name is needed by the Windows 2000 operating system to provide this functionality. If no adapters are entered, ALL adapters of the type will be allowed. If only one adapter is entered, then only that single adapter will be allowed at this location.

Note:

If the endpoint is in a location that defines ONLY an AP's SSID as the network identification, the ZSC will switch to that location BEFORE disabling the unauthorized adapter. A password override should be used to provide a manual location switch if this occurs.

Storage Device Control

This control overrides the global setting at this location. To access this control, open the **Locations** tab and click the **Storage Device Control** icon in the policy tree on the left.

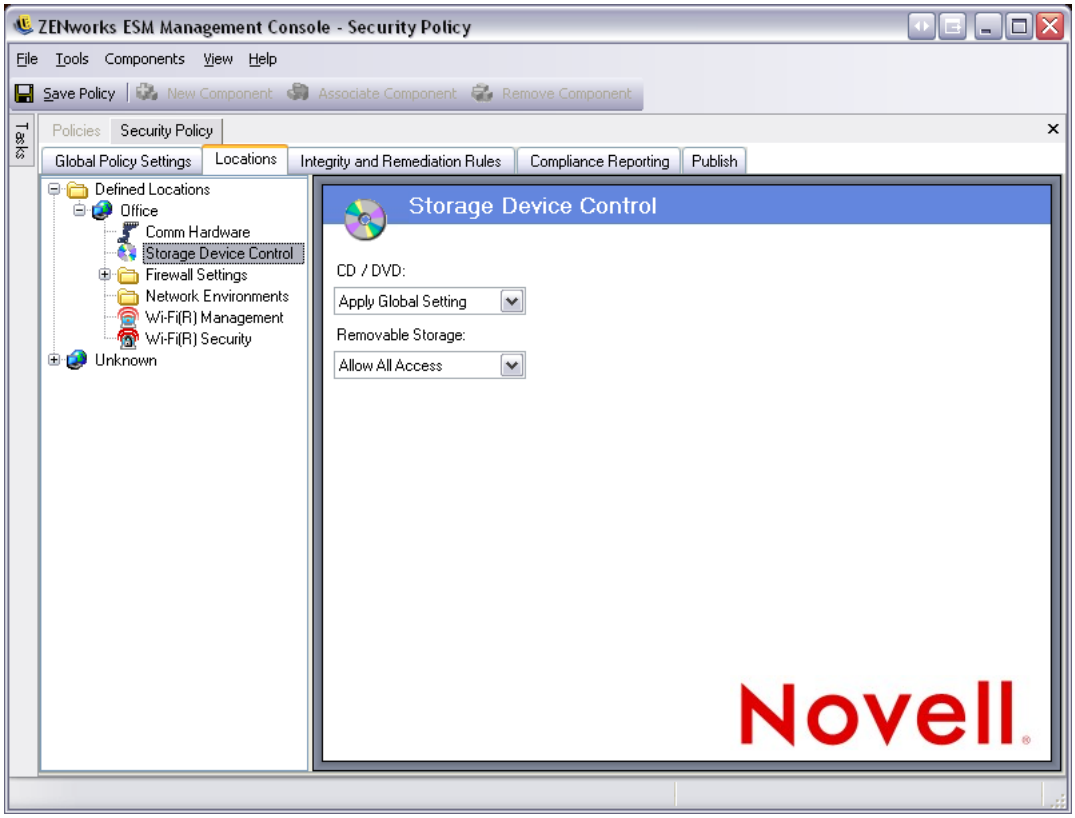

Figure 80: Location Storage Device Control

Preferred devices will be overridden when Disable or Read-Only is selected at this level. Use Apply Global Setting to allow only preferred devices.

- **Apply Global Setting** - Applies the default setting
- **Enable** - The device type is allowed by default - This setting will override a global setting which includes a serial numbered device, but disables all others
- **Disable** - The device type is disallowed. When users attempt to access files on a defined storage device, they receive an error message from the operating system, or the application attempting to access the local storage device, that the action has failed
- **Read-Only** - the device type is set as Read-Only. When users attempt to write to the device, they receive an error message from the operating system, or the application attempting to access the local storage device, that the action has failed

Network Environments

If the network parameters (Gateway server(s), DNS server(s), DHCP server(s), WINS server(s), available access points, and/or specific adapter connections) are known for a location, the service details (IP and/or MAC), which identify the network, can be entered into the policy to provide immediate location switching without requiring the user having to save the environment as a location.

To access this control, open the **Locations** tab and click the **Network Environments** folder in the policy tree on the left.

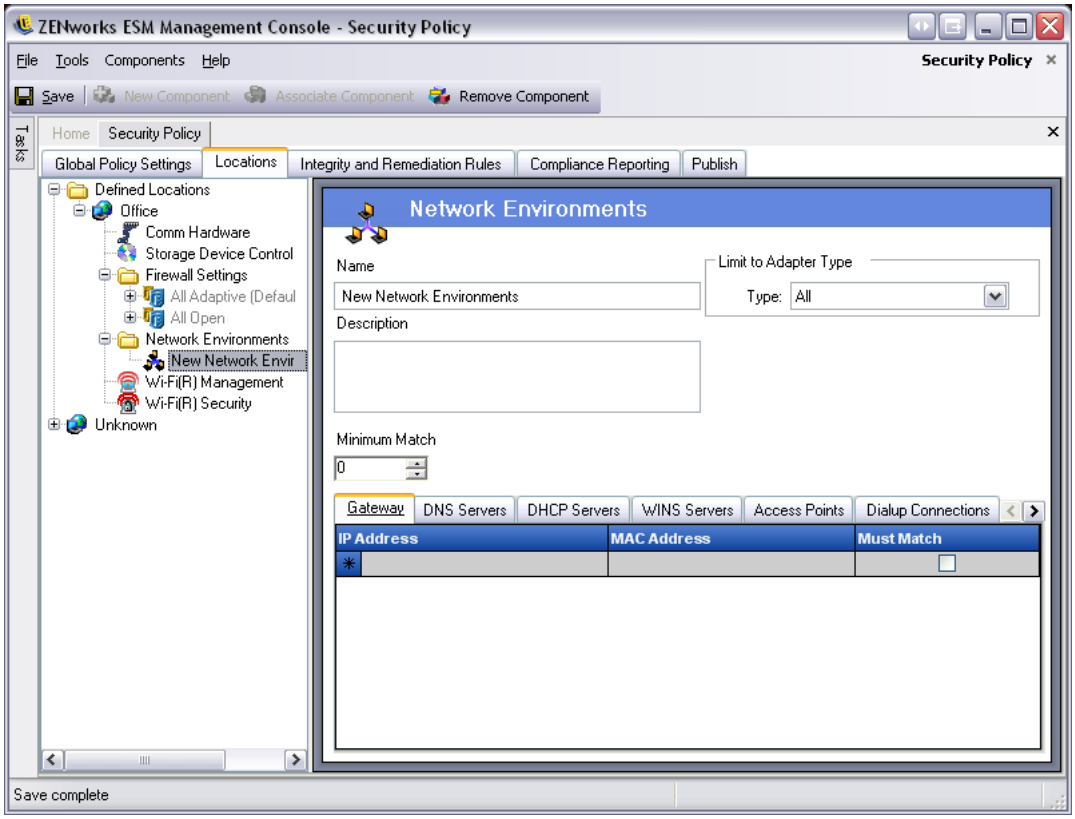

Figure 81: Network Environments

The lists provided allow the administrator to define which network services are present in the environment. Each network service may contain multiple addresses. The administrator determines how many of the addresses are required to match in the environment to activate the location switch.

It is required that 2 or more location parameters be used in each network environment definition.

To define a network environment, perform the following steps:

Step 1: Select Network Environments in the components tree and click the New Component button

Step 2: Name the network environment and provide a description

Step 3: Select which adapter type is permitted to access this Network Environment from the drop-down list

Step 4: Enter the following information for each service:

- The IP address(es) - Limited to 15 characters, and only containing the numbers 0-9 and periods (example: 123.45.6.789)
- MAC address(es) (Optional) - Limited to 12 characters, and only containing the numbers 0-9 and the letters A-F (upper and lower case); separated by colons example: 00:01:02:34:05:B6
- Check whether identification of this service is required to define the network environment

Step 5: The Access Points, Dialup Connections, and Adapters tabs have the following requirements:

- When entering Access Points as network environment parameters, the MAC address is required to make the setting a Match
- For Dialup Connections, the RAS Entry name from the phone book or the dialed number may be entered

---

Note:

Phone book entries MUST contain alpha characters and cannot contain only special characters (@, #, $,%, -, etc.) or numeric characters (1-9). Entries that only contain special and numeric characters are assumed to be dialed numbers.

- Adapters can be entered to restrict exactly which adapters, specifically, are permitted access to this network environment (see Step 3 regarding setting adapter limitations). Enter the SSID for each allowed adapter. If no SSIDs are entered, all adapters of the permitted type are granted access

Step 6: Each Network Environment has a minimum number of addresses the ZSC uses to identify it. The number set in Minimum Match must not exceed the total number of network addresses identified as being required in the tabbed lists. Enter the minimum number of network services required to identify this network environment

To associate an existing Network Environment to this location:

Note:

Associating a single network environment to two or more locations within in the same security policy will cause unpredictable results, and is NOT recommended.

Step 1: Select Network Environments in the components tree and click the Associate Component button

Step 2: Select the network environment(s) from the list

Step 3: The environment parameters may be re-defined

Note:

Changing the settings in a shared component will affect ALL OTHER instances of this same component. Use the Show Usage command to view all other policies associated with this component.

Step 4: Click **Save**

Wi-Fi Management

Wi-Fi management allows the administrator to create Access Point (AP) lists. The wireless access points entered into these lists will determine which APs the endpoint is permitted and not permitted to connect to within the location, and which access points it's permitted to see in Microsoft's Zero Configuration Manager (Zero Config). 3rd party wireless configuration managers are not supported with this functionality. If no access points are entered, all will be available to the endpoint.

To access this control, open the **Locations** tab and click the **Wi-Fi Management** icon in the policy tree on the left.

Note:

In either of the Wi-Fi Connectivity Controls: Wi-Fi Security and Wi-Fi Management, unchecking enable will disable ALL Wi-Fi connectivity in this location.

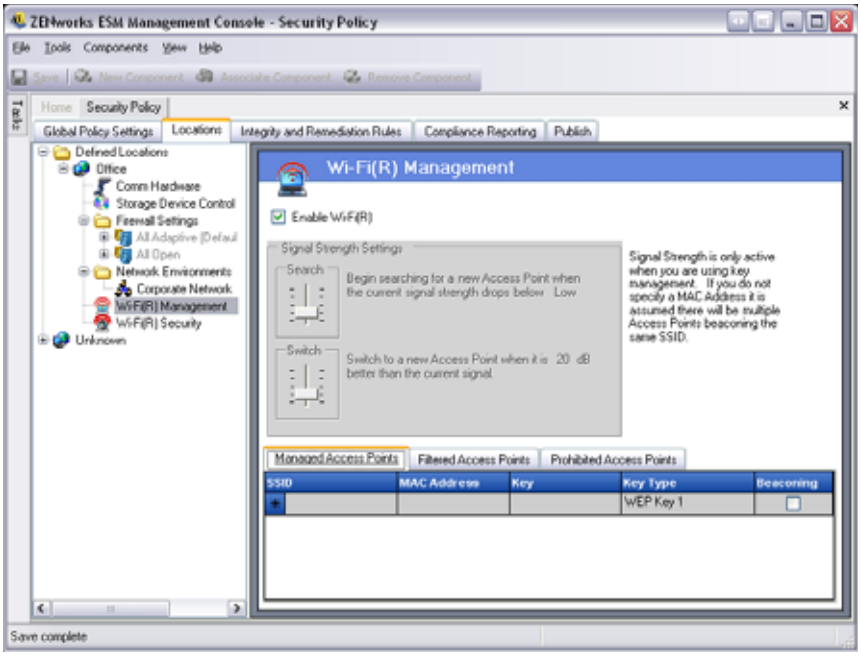

Figure 82: Wi-Fi Management

Entering APs into the Managed Access Points list will turn off Zero Config and force the endpoint to connect ONLY to the APs listed when they're available. If the Managed APs are not available, the ZSC will fall back to the Filtered Access Point List (see below). APs entered into Prohibited Access Points will never display in Zero Config.

Note:

The access point list is only supported on the Windows XP operating system. Prior to deploying an access point list, it is recommended all endpoints clear the preferred networks list out of Zero Config.

Managed Access Points

ESM provides a simple process to automatically distribute and apply Wired Equivalent Privacy (WEP) keys without user intervention (bypassing and shutting down Microsoft's Zero Configuration manager), and protects the integrity of the keys by not passing them in the clear over an email or a written memo. In fact, the end-user will never need to know the key to automatically connect to the access point. This helps prevent possible re-distribution of the keys to unauthorized users.

Due to the inherent security vulnerabilities of Shared WEP Key Authentication, Novell supports ONLY Open WEP Key Authentication. With Shared Authentication the client/AP key validation process sends both a clear text and encrypted version of a challenge phrase that is EASILY sniffed wirelessly. This can give a hacker both the clear and encrypted versions of a phrase. Once they have this information, cracking the key becomes trivial.

Figure 83: Managed Access Points Control

Enter the following information for each AP:

- **SSID** - Identify the SSID number (case sensitive)
- **MAC Address** - Identify the MAC Address (recommended, due to the commonality among SSIDs. If not specified, it is assumed there will be multiple AP's beaconing the same SSID)
- **Key** - Enter the WEP key for the Access Point (either 10 or 26 hexadecimal characters)
- **Key Type** - Identify the encryption key index, by selecting the appropriate level from the drop-down list
- **Beaconing** - Check if the defined AP is currently broadcasting its SSID. Leave un-checked if this is a non-beaconing AP

Note:

The ZSC will attempt to first connect to each beaconing AP listed in the policy. If no beaconing AP can be located, the ZSC will then attempt to connect to any non-beaconing APs (identified by SSID) listed in the policy.

When one or more access points (APs) are defined in the Managed APs list, the Signal Strength switching for the Wi-Fi adapter may be set. See page 100 for information on Signal Strength Settings.

Filtered Access Points

Access points entered into the Filtered Access Points list are the ONLY APs which will display in Zero Config, this prevents an endpoint from connecting to unauthorized APs.

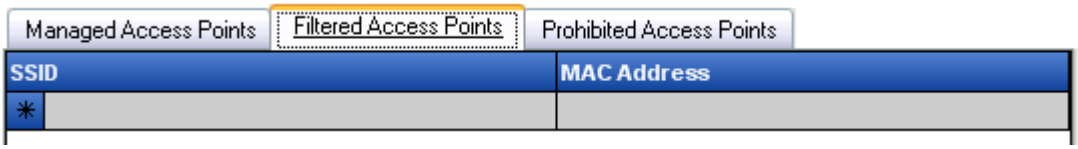

Figure 84: Filtered Access Points Control

Enter the following information for each AP:

- **SSID** - Identify the SSID number (case sensitive)
- **MAC Address** - Identify the MAC Address (recommended, due to the commonality among SSIDs. If not specified, it is assumed there will be multiple AP's beaconing the same SSID)

Prohibited Access Points

Access points entered into the Prohibited Access Points list will not display in Zero Config, nor will the endpoint be permitted to connect to them.

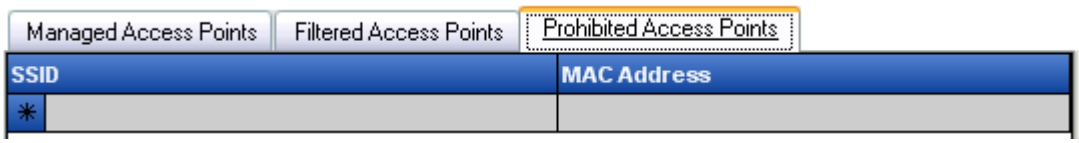

Figure 85: Prohibited Access Points Control

Enter the following information for each AP:

- **SSID** - Identify the SSID number (case sensitive)
- **MAC Address** - Identify the MAC Address (recommended, due to the commonality among SSIDs. If not specified, it is assumed there will be multiple AP's beaconing the same SSID)

Wi-Fi Signal Strength Settings

When more than one WEP-managed access points (APs) are defined in the list, the signal strength switching for the Wi-Fi adapter may be set. The signal strength thresholds can be adjusted by location to determine when the ZSC will search for, discard, and switch to another access point defined in the list.

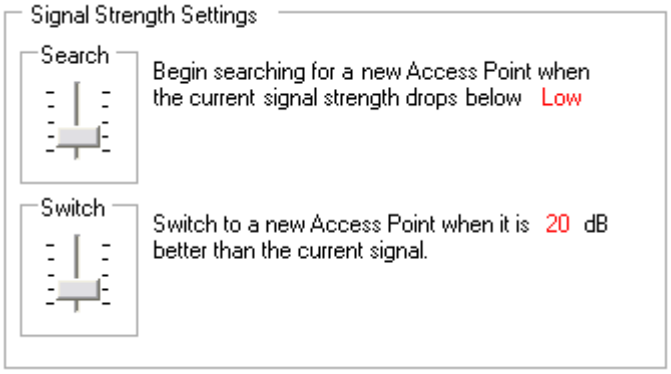

Figure 86: Signal Strength Control

The following information can be adjusted above or below the current defaults:

- **Search** (default: Low [-70 dB]) - When this signal strength level is reached, the ZSC will begin to search for a new AP to connect to.
- **Switch** (default: +20 dB) - In order for the ZSC to connect to a new AP, that AP must broadcast at the designated signal strength level above the current connection.

The signal strength threshholds are determined by the amount of power (in dB) reported through the PC's miniport driver. As each Wi-Fi card and/or radio may treat the dB signals differently for their Received Signal Strength Indication (RSSI) the numbers will vary from adapter to adapter.

The default numbers associated with the defined threshholds in the Management Console are generic for most Wi-Fi adapters. It is recommended you research your Wi-Fi adapter's RSSI values to input an accurate level. The Novell values are:

Table 2: Signal Strength thresholds

Name	Default Value
Excellent	-40 dB
Very Good	-50 dB
Good	-60 dB
Low	-70 dB
Very Low	-80 dB

Note:

Although the above signal strength names match those used by Microsoft's Zero Configuration Service, the threshholds may not match. Zero Config determines its values based on the Signal to Noise Ratio (SNR) and not solely on the dB value reported from RSSI. For example, if a Wi-Fi adapter were receiving a signal at -54 dB and had a noise level of -22 dB, the SNR would report as 32dB (-54 - -22=32), which on the Zero Configuration scale would translate as Excellent signal strength, even though on the Novell scale, the -54 dB signal (if reported that way through the miniport driver, possibly reported lower) would indicate a Very Good signal strength.

It's important to note that the end-user will NEVER see the Novell signal strength thresholds, this information is merely provided to show the difference between what the user may see through Zero Config, and what is actually occurring behind the scenes.

Wi-Fi Security

If Wi-Fi Communication Hardware (Wi-Fi adapter PCMCIA or other cards, and/or built-in Wi-Fi radios) is globally permitted (see “Wireless Control” on page 87), additional settings can be applied to the adapter at this location.

To access this control, open the **Locations** tab and click the **Wi-Fi Security** icon in the policy tree on the left.

Note:

In either of the Wi-Fi Connectivity Controls: Wi-Fi Security and Wi-Fi Management, unchecking enable will disable ALL Wi-Fi connectivity in this location.

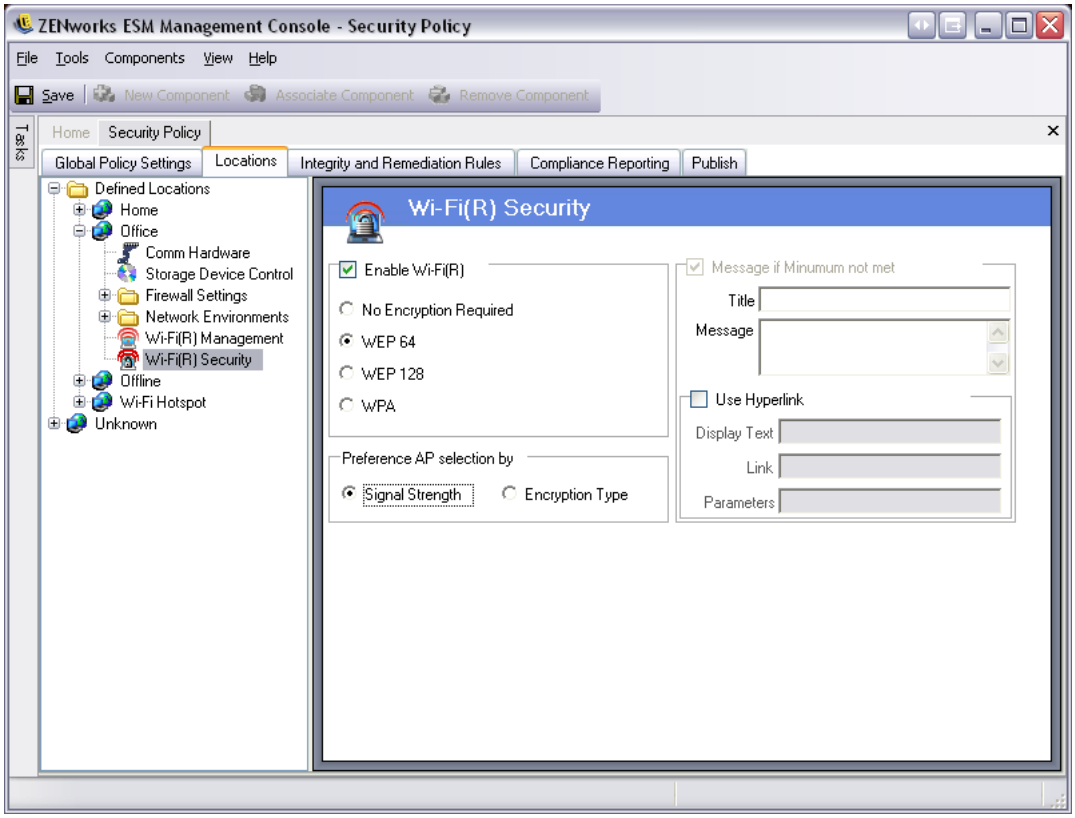

Figure 87: Wi-Fi Security

The Wi-Fi adapter can be set to only communicate with access points with a specific level of encryption or greater in a given location.

For example, if a WPA configuration of access points were deployed in a branch office, the adapter can be restricted to only communicate with access points with a level of WEP 128 encryption or greater, thus preventing it from accidentally associating with rogue, non-secure APs.

It is recommended a Custom User Message be written when the setting is placed above "No Encryption Required."

Preference AP Selection by...

A preference can be set to connect to APs by order of encryption level or by signal strength when two or more Access Points are entered into the Managed and Filtered Access Points lists. The level selected will enforce connectivity with APs that meet the minimum encryption requirement or greater.

Example: if WEP 64 is the encryption requirement: If encryption is the preference, then APs with the highest encryption strength will be given preference over all others. If signal strength is the preference, then the strongest signal will be given the preference when connecting.

Firewall Settings

Firewall Settings control the connectivity of all networking ports, Access Control lists, network packets (ICMP, ARP, etc.), and which applications are permitted to get a socket out or function, when the firewall setting is applied.

To access this control, open the **Locations** tab and click the **Firewall Settings** icon in the policy tree on the left.

Each component of a firewall setting is configured separately, with only the default behavior of the TCP/UDP ports required to be set. This setting affects all TCP /UDP ports when this firewall setting is used. Individual or grouped ports may be created with a different setting.

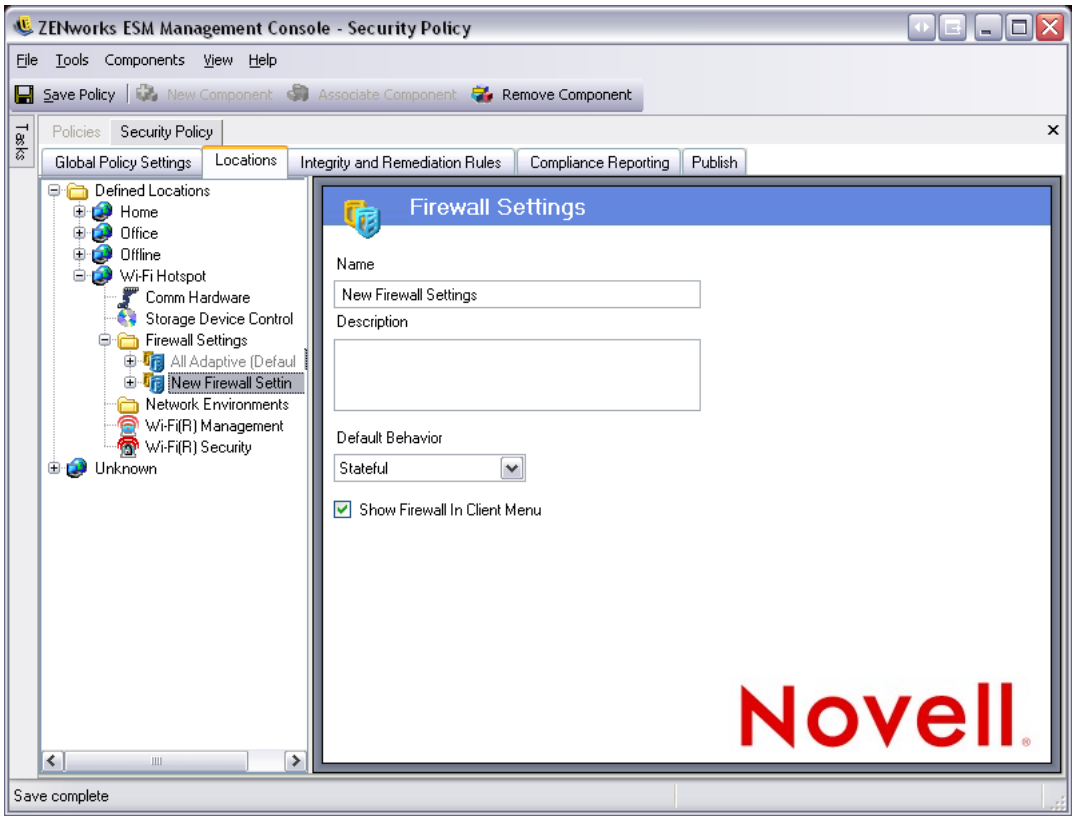

Figure 88: Firewall Settings

To create a new firewall setting:

Step 1: Select Firewall Settings in the components tree and click the **New Component** button

Step 2: Name the firewall setting and provide a description

Step 3: Select the default behavior for all TCP/UDP ports

Additional ports and lists may be added to the firewall settings, and given unique behaviors which will override the default setting.

Example: The default behavior for all ports is set as All Stateful. The ports lists for Streaming Media and Web Browsing are added to the firewall setting. The Streaming

Media port behavior is set as Closed, and the Web Browsing port behavior is set as Open. Network traffic through TCP Ports 7070, 554, 1755, and 8000 would be blocked. Network traffic through ports 80 and 443 would be open and visible on the network. All other ports would operate in Stateful mode, requiring the traffic through them be solicited first.

Step 4: Select whether to display this firewall in the ZSC menu (if unchecked, the user will not see this firewall setting)

Step 5: Click **Save**. Repeat the above steps to create another firewall setting

To associate an existing firewall setting:

Step 1: Select Firewall Settings in the components tree and click the Associate Component button

Step 2: Select the desired firewall setting(s) from the list

Step 3: The default behavior setting may be re-defined

Note:

Changing the settings in a shared component will affect ALL OTHER instances of this same component. Use the Show Usage command to view all other policies associated with this component.

Step 4: Click **Save**

Multiple firewall settings can be included within a single location. One is defined as the default setting, with the remaining settings available as options for the user to switch to. Having multiple settings are useful when a user may normally need certain security restrictions within a network environment and occasionally needs those restrictions either lifted or increased for a short period of time, for specific types of networking (i.e., ICMP Broadcasts).

Three firewall settings are included at installation, they are:

- **All Adaptive** - This firewall setting sets all networking ports as **stateful** (all unsolicited inbound network traffic is blocked. All outbound network traffic is allowed), ARP and 802.1x packets are permitted, and all network applications are permitted a network connection, all.
- **All Open** - This firewall setting sets all networking ports as open (all network traffic is allowed), all packet types are permitted. All network applications are permitted a network connection
- **All Closed** - This firewall setting closes all networking ports, and restricts all packet types.

A new location will have the single firewall setting, All Open, set as the default. To set a different firewall setting as the default, right click the desired Firewall Setting and choose Set as Default.

TCP/UDP Ports

Endpoint data is primarily secured by controlling TCP/UDP port activity. This feature allows you to create a list of TCP/UDP ports which will be uniquely handled in this firewall setting. The lists contain a collection of ports and port ranges, together with their transport type, which defines the function of the range.

To access this control, open the **Locations** tab, click the "+" symbol next to **Firewall Settings**, click the "+" symbol next to the desired Firewall, and click the **TCP/UDP Ports** icon in the policy tree on the left.

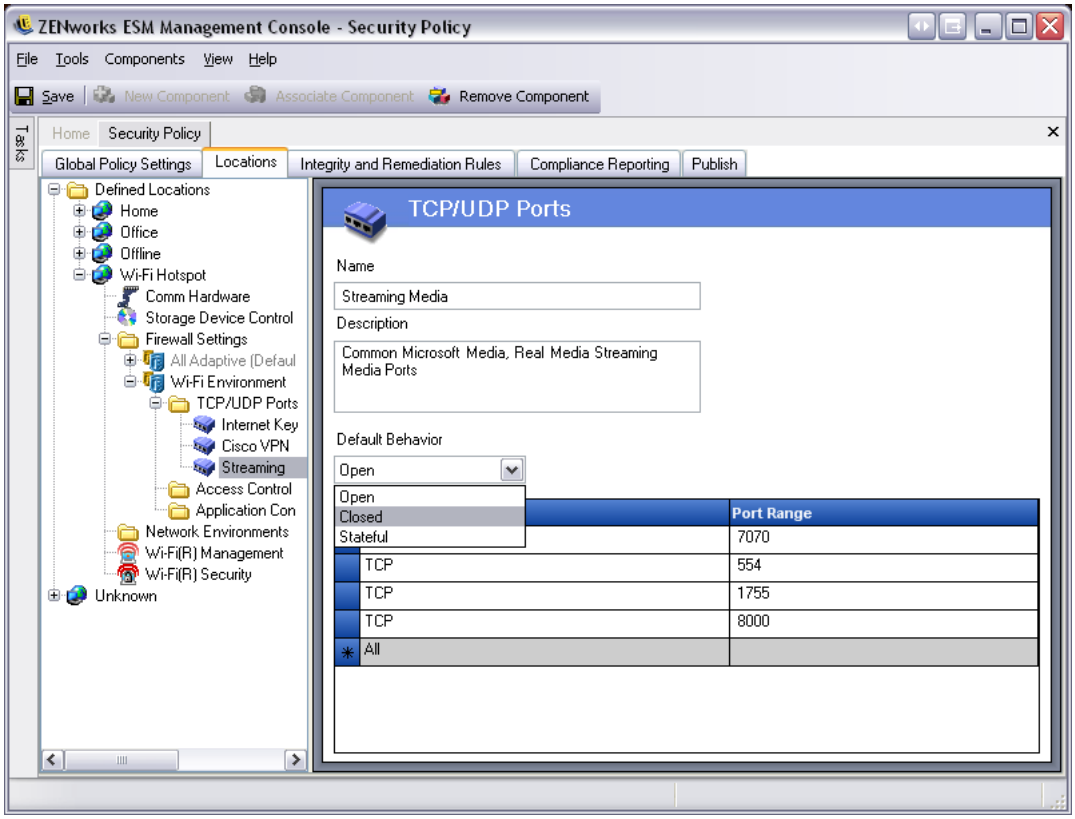

Figure 89: TCP/UDP Ports Settings

New TCP/UDP port lists can be defined with individual ports or as a range (1-100) per each line of the list.

To create a new TCP/UDP port setting:

Step 1: Select TCP/UDP Ports from the components tree and click the **Add New** button

Step 2: Name the port list and provide a description

Step 3: Select the port behavior from the drop-down list. The optional behaviors are:

- **Open** - All network inbound and outbound traffic is allowed. Because all network traffic is allowed your computer identity is visible for this port or port range.

- **Closed** - All inbound and outbound network traffic is blocked. Because all network identification requests are blocked your computer identity is concealed for this port or port range.
- **Stateful** - All unsolicited inbound network traffic is blocked. All outbound network traffic is allowed over this port or port range.

Step 4: Enter the transport type:

- All (all port types listed below)
- Ether
- IP
- TCP
- UDP

Step 5: Enter Ports and Port Ranges as either:

- Single ports
- A range of ports with the first port number, followed by a dash, and the last port number

  Example: 1-100 would add all ports between 1 and 100

Please visit the Internet Assigned Numbers Authority pages (www.iana.org) for a complete Ports and transport types list.

Click **Save**. Repeat the above steps to create a new setting

To associate an existing TCP/UDP port to this firewall setting:

Step 1: Select TCP/UDP Ports from the component tree and click the **Associate Component** button

Step 2: Select the desired port(s) from the list

Step 3: The default behavior setting may be re-defined

Note:

Changing the settings in a shared component will affect ALL OTHER instances of this same component. Use the Show Usage command to view all other policies associated with this component.

Step 4: Click **Save**

Several TCP/UDP port groups have been bundled and are available at installation:

Table 3: TCP/UDP Ports

Name	Description	Transport	Value
All Ports	All Ports	All	1-65535
BlueRidge VPN	Ports used by the BlueRidge VPN Client	UDP	820
Cisco VPN	Ports used by the Cisco VPN Client	IP UDP UDP UDP UDP UDP	50,51 500,4500 1000-1200 62514,62515,62517 62519-62521 62532,62524
Common Networking	Commonly required Networking Ports for building fire-walls	TCP UDP UDP TCP UDP TCP UDP	53 53 67,68 546, 547 546, 547 647, 847 647, 847
Database Communication	Microsoft, Oracle, Siebel, Sybase, SAP Database Ports	TCP TCP TCP UDP TCP TCP TCP TCP	4100 1521 1433 1444 2320 49998 3200 3600
File Transfer Protocol (FTP)	File Transfer Protocol Port	TCP/UDP	21
Instant Messaging	Microsoft, AOL, Yahoo Instant Messaging Ports	TCP TCP UDP UDP TCP UDP TCP UDP TCP UDP TCP TCP	6891-6900 1863,443 1863,443 5190 6901 6901 5000-5001 5055 20000-20059 4000 4099 5190
Internet Key Exchange Com-patible VPN	Ports used by Internet Key Exchange Compatible VPN Clients	UDP	500
Microsoft Networking	Common File Sharing / Active Directory Ports	TCP/UDP	135-139, 445
Open Ports	Ports that are opened for this firewall	TCP/UDP	80
Streaming Media	Common Microsoft/Real Streaming Media Ports	TCP	7070, 554, 1755, 8000
Web Browsing	Common Web Browser Ports, including SSL	All	80, 443

Access Control Lists

There may be some addresses which require unsolicited traffic be passed regardless of the current port behavior (i.e., enterprise back-up server, exchange server, etc.). In instances where unsolicited traffic needs to be passed to and from trusted servers, an Access Control List (ACL) can be created to resolve this issue.

To access this control, open the **Locations** tab, click the "+" symbol next to **Firewall Settings**, click the "+" symbol next to the desired Firewall, and click the **Access Control Lists** icon in the policy tree on the left.

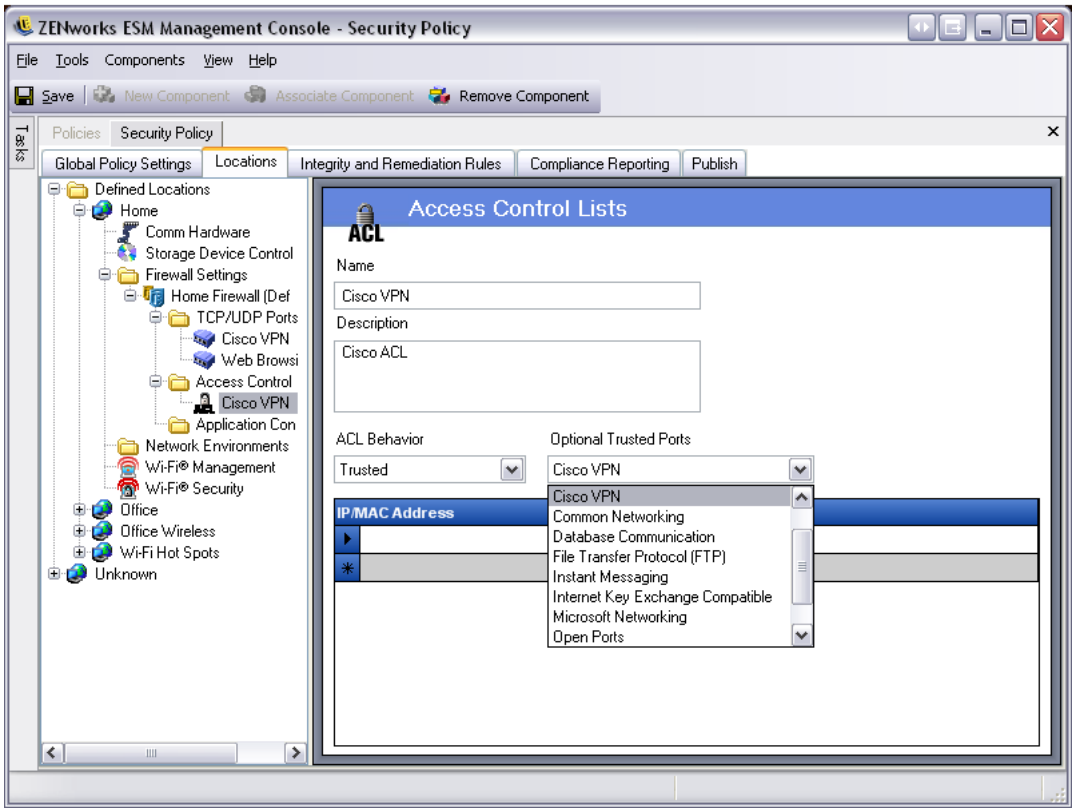

Figure 90: Access Control Lists Settings

To create a new ACL setting:

Step 1: Select Access Control List from the components tree and click the **Add New** button

Step 2: Name the ACL and provide a description

Step 3: Enter the ACL address or Macro

Step 4: Enter the ACL type:

- **IP** - This type limits the address to 15 characters, and only containing the numbers 0-9 and periods (example: 123.45.6.189). IP addresses may also be entered as a range (example: 123.0.0.0 - 123.0.0.255)

- **MAC** - This type limits the address to 12 characters, and only containing the numbers 0-9 and the letters A-F (upper and lower case); separated by colons (example: 00:01:02:34:05:B6)

Step 5: Select the ACL Behavior drop-down box and determine whether the ACLs listed should be Trusted (allow it always even if all TCP/UDP ports are closed) or Non-Trusted (block access)

Step 6: If Trusted, select the Optional Trusted Ports (TCP/UDP) this ACL will use. These ports will permit all ACL traffic, while other TCP/UDP ports will maintain their current settings. Selecting ‹None› means any port may be used by this ACL

Step 7: Click **Save**. Repeat the above steps to create a new setting

To associate an existing ACL/Macro to this firewall setting:

Step 1: Select Access Control List from the component tree and click the **Associate Component** button

Step 2: Select the ACL(s)/Macro(s) from the list

Step 3: The ACL behavior settings may be re-defined

Note:

Changing the settings in a shared component will affect ALL OTHER instances of this same component. Use the Show Usage command to view all other policies associated with this component.

Step 4: Click **Save**

Network Address Macros List

The following is a list of special Access Control macros. These can be associated individually as part of an ACL in a firewall setting.

Table 4: Network Address Macros

Macro	Description
[Arp]	Allow ARP (Address Resolution Protocol) packets. The term Address Resolution refers to the process of finding an address of a computer in a network. The address is Resolved using a protocol in which a piece of information is sent by a client process executing on the local computer to a server process executing on a remote computer. The information received by the server allows the server to uniquely identify the network system for which the address was required and therefore to provide the required address. The address resolution procedure is completed when the client receives a response from the server containing the required address.
[Icmp]	Allow ICMP (Internet Control Message Protocol) packets. ICMPs are used by routers, intermediary devices, or hosts to communicate updates or error information to other routers, intermediary devices, or hosts. ICMP messages are sent in several situations: for example, when a datagram cannot reach its destination, when the gateway does not have the buffering capacity to forward a datagram, and when the gateway can direct the host to send traffic on a shorter route.
[IpMulticast]	Allow IP Multicast packets. Multicast is a bandwidth-conserving technology that reduces traffic by simultaneously delivering a single stream of information to thousands of corporate recipients and homes. Applications that take advantage of multicast include videoconferencing, corporate communications, distance learning, and distribution of software, stock quotes, and news. Multicast packets may be distributed using either IP or Ethernet addresses.
[EthernetMulticast]	Allow Ethernet Multicast packets.
[IpSubnetBrdcast]	Allow Subnet Broadcast packets. Subnet broadcasts are used to send packets to all hosts of a subnetted, supernetted, or otherwise nonclassful network. All hosts of a nonclassful network listen for and process packets addressed to the subnet broadcast address.
[Snap]	Allow Snap encoded packets.
[LLC]	Allow LLC encoded packets.
[Allow8021X]	Allow 802.1x packets. To overcome deficiencies in Wired Equivalent Privacy (WEP) keys, Microsoft and other companies are utilizing 802.1x as an alternative authentication method. 802.1x is a port-based, network access control, which uses Extensible Authentication Protocol (EAP), or certificates. Currently, most major wireless card vendors and many access point vendors support 802.1x. This setting also allows Light Extensible Authentication Protocol (LEAP) and WiFi Protected Access (WPA) authentication packets.
[Gateway]	Represents the current IP configuration Default Gateway address. When this value is entered, the ZENworks Security Client allows all network traffic from the current IP configuration Default Gateway as a trusted ACL.
[GatewayAll]	Same as [Gateway] but for ALL defined gateways.
[Wins]	Represents current client IP configuration Default WINS Server address. When this value is entered, the ZENworks Security Client allows all network traffic from the current IP configuration Default WINS server as a trusted ACL.
[WinsAll]	Same as [Wins] but for ALL defined WINS servers.

Table 4: Network Address Macros

Macro	Description
[Dns]	Represents current client IP configuration Default DNS server address. When this value is entered, the ZENworks Security Client allows all network traffic from the current IP configuration Default DNS server as a trusted ACL.
[DnsAll]	Same as [Dns] but for ALL defined DNS servers.
[Dhcp]	Represents current client IP configuration Default DHCP server address. When this value is entered, the ZENworks Security Client allows all network traffic from the current IP configuration Default DHCP server as a trusted ACL.
[DhcpAll]	Same as [Dhcp] but for ALL defined DHCP servers.

Application Controls

This feature allows the administrator to block applications either from gaining network access, or from simply executing at all.

To access this control, open the **Locations** tab, click the "+" symbol next to **Firewall Settings**, click the "+" symbol next to the desired Firewall, and click the **Applications Controls** icon in the policy tree on the left.

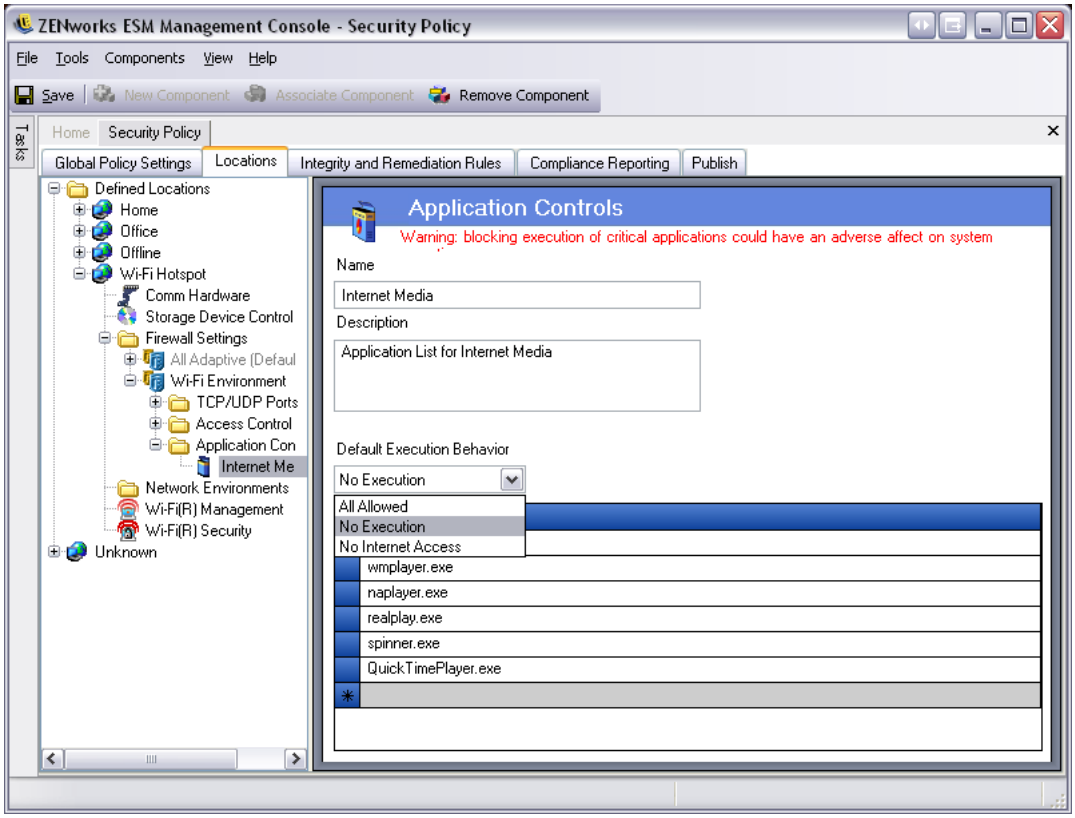

Figure 91: Application Control Settings

T**o create a new application control setting**:

Step 1: Select Application Controls in the components tree and click the **Add New** button

Step 2: Name the application control list and provide a description

Step 3: Select an execution behavior. This behavior will be applied to all applications listed. If multiple behaviors are required (example: some networking applications are denied network access, while all file sharing applications are denied execution), multiple application controls will need to be defined. Select one of the following:

- **All Allowed** - all applications listed will be permitted to execute and have network access
- **No Execution** - all applications listed will not be permitted to execute

- **No Network Access** - all applications listed will be denied network access. Applications (such as web-browsers) launched from an application will also be denied network access

Note:

Blocking network access for an application does not affect saving files to mapped network drives. Users will be permitted to save to all network drives available to them.

Step 4: Enter each application to block. One application must be entered per row

WARNING:

Blocking execution of critical applications could have an adverse affect on system operation. Blocked Microsoft Office applications will attempt to run their installation program.

Step 5: Click **Save**. Repeat the above steps to create a new setting

To associate an existing application control list to this firewall setting:

Step 1: Select Application Controls in the components tree and click the **Associate Component** button

Step 2: Select an application set from the list

Step 3: The applications and the level of restriction may be re-defined

Note:

Changing the settings in a shared component will affect ALL OTHER instances of this same component. Use the Show Usage command to view all other policies associated with this component.

Step 4: Click **Save**

The available application controls are identified below, the default execution behavior is No Network Access:

Table 5: Application Controls

Name	Applications
Web Browsers	explore.exe; netscape.exe; netscp.exe
Instant Messaging	aim.exe; icq.exe; msmsgs.exe; msnmsgr.exe; trillian.exe; ypager.exe
File Sharing	blubster.exe; grokster.exe; imesh.exe; kazaa.exe; morpheus.exe; napster.exe; winmx.exe

Table 5: Application Controls

Name	Applications
Internet Media	mplayer2.exe; wmplayer.exe; naplayer.exe; realplay.exe; spinner.exe; QuickTimePlayer.exe
Gray List Minimally Functional (Default=ALL ALLOWED, see “Block Gray List Script” on page 196)	Svchost.exe; Lsass.exe; Winlogon.exe; Wmiprvse.exe; Services.exe; STEngine.exe; STUser.exe; Explorer.exe; PolicyEditor.exe; UnmanagedEditor.exe; Smss.exe; dllhost.exe; crss.exe; taskmgr.exe

If the same application is added to two different application controls in the same firewall setting (i.e., kazaa.exe is blocked from executing in one application control, and blocked from gaining network access in another defined application control under the same firewall setting), the most stringent control for the given executable will be applied (i.e., kazaa would be blocked from executing)

Integrity and Remediation Rules

ESM provides the ability to verify required software is running on the endpoint, and provides instant remediation procedures if the verification fails.

Antivirus/Spyware Rules

Antivirus/Spyware Integrity checks verify that designated Antivirus or Spyware software on the Endpoint is running and up to date, and can mandate immediate remediation, restricting a user to specific updates until the endpoint is in compliance. It can also establish rules which will automatically place non-compliant devices into a safe, customizable quarantine zone, preventing infection of other users on the network by this endpoint. Once endpoints are determined compliant by a follow-up test, security settings automatically return to their original state.

See “Antivirus/Spyware Rules” on page 129.

Advanced Scripting Rules

Along with simple menu-driven integrity rule creation mechanisms, ESM includes an advanced integrity rule scripting tool which gives administrators the ability to create extremely flexible and complex integrity rules and remediation actions.

The scripting tool uses the common scripting languages VBScript or JScript to create rules which contain both a trigger (when to execute the rule) and the actual script (the logic of the rule).

The triggers or events that cause the execution of the rule include startup, location change, time interval, time of day, adapter arrival or removal, media connect or disconnect, policy update, process change, etc.

See “Advanced Scripting Rules” on page 135.

Antivirus/Spyware Rules

Antivirus/spyware Rules verify that designated antivirus or spyware software on the endpoint is running and up to date. Tests are run to determine if the software is running and if the version is up-to-date. Success in both checks will allow switching to any defined locations. Failure of either test could result in any or all of the following actions (defined by the Administrator):

- A report is sent to the Reporting Service
- A custom user message is displayed, with an optional launch link which provides information on how to fix the rule violation
- The user is switched to a Quarantined State, which limits the user's network access and/or disallows certain programs from accessing the network, which prevents the user from further infecting the network

Once endpoints are determined compliant by a follow-up test, security settings automatically return to their original state.

To access this control, open the **Integrity and Remediation Rules** and click the **Antivirus/ Spyware Rules** icon in the policy tree on the left.

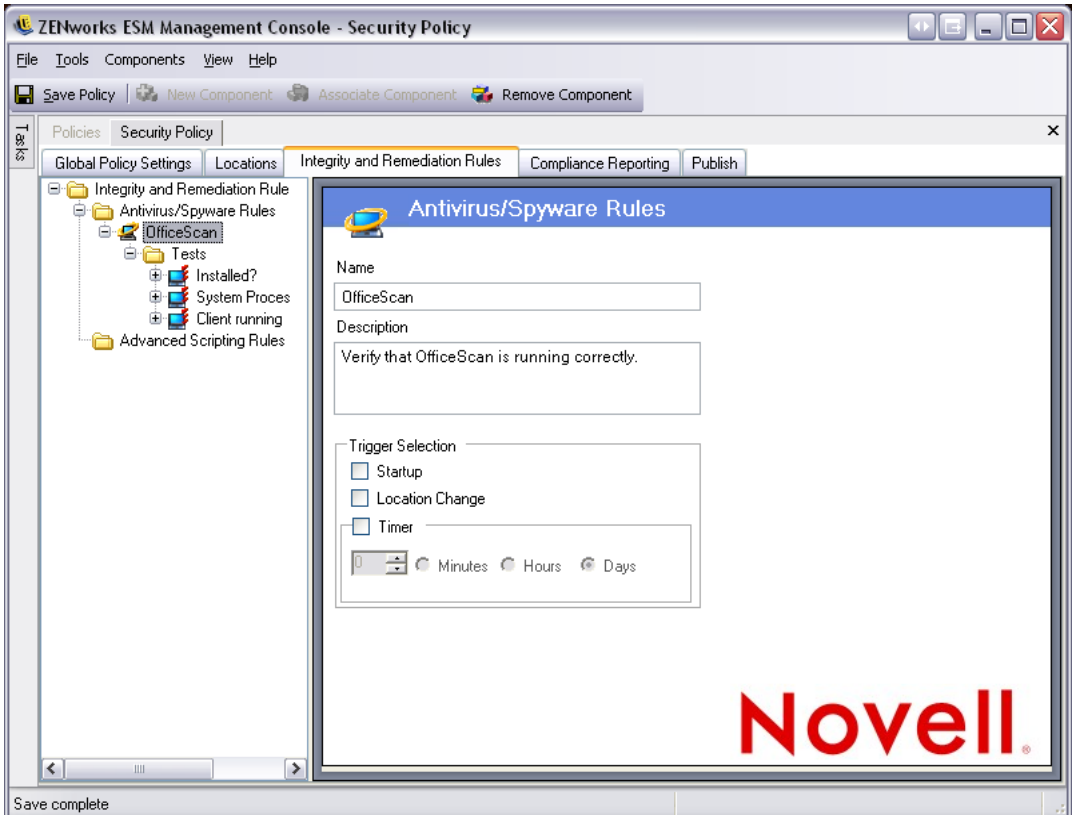

Figure 92: Antivirus/Spyware Integrity rules

Custom tests for software not on the default list may be created. A single test can be created to run checks for one or MORE software pieces within the same rule. Each set of Process Running and File Exists checks will have their own Success/Failure results.

To create a new antivirus/spyware rule:

Step 1: Select Antivirus/Spyware Rules from the components tree and click the **Add New** button

Step 2: Name the rule and provide a description

Step 3: Select the trigger for the rule

- **Startup** - run tests at system startup
- **Location Change** - run the tests whenever the ZSC switches to a new location
- **Timer** - integrity tests may be performed on a defined schedule by the minute, hour, or day. Set the time for how often the tests will run

Step 4: Click **Save**.

Step 5: Define the Integrity Tests (see “Integrity Tests” on page 131)

Step 6: Repeat the above steps to create a new antivirus/spyware rule

Associate Existing Antivirus/Spyware Rules:

Step 1: Select Antivirus/Spyware Rules and click **Associate Component**

Step 2: Select the desired Rule(s) from the list

Step 3: The tests, checks, and results may be re-defined

Note:

Changing the settings in a shared component will affect ALL OTHER instances of this same component. Use the Show Usage command to view all other policies associated with this component.

Step 4: Click **Save**

Step 5: Integrity tests and checks will be automatically included and can be edited as necessary

Integrity Tests

Each integrity test can run two checks, File Exists and Process Running. Each test will have its own Success and Fail results.

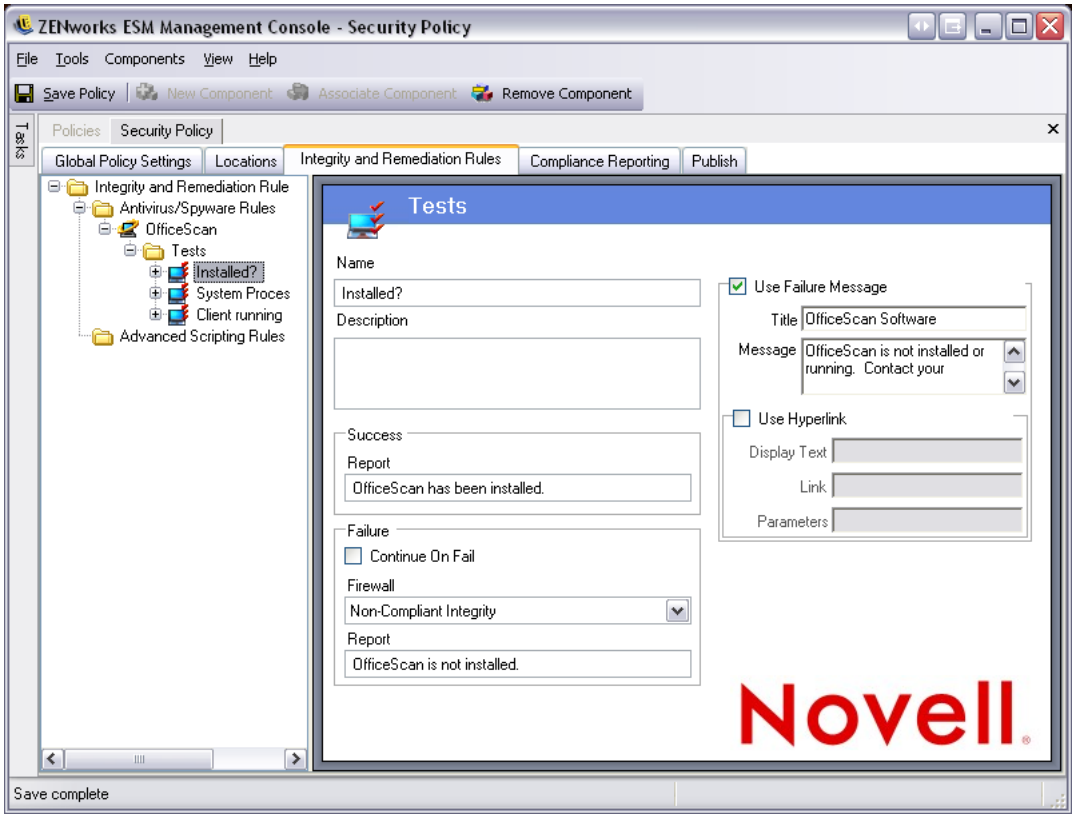

Figure 93: Integrity Tests

All defined antivirus/spyware rules have standard tests and checks pre-written. Additional tests may be added to the integrity rule.

Multiple tests will run in the order entered here. The first test MUST complete successfully before the next test will run.

To create an integrity test, perform the following steps:

Step 1: Select **Integrity Tests** on the component tree and click **Add New**

Step 2: Name the test and provide a description

Step 3: Enter the success report text for the test

Step 4: Define the following for a test failure:

- **Continue on Fail** - check this if the user may continue to network connectivity if the test fails, or if the test should repeat
- **Firewall Setting** - this setting will be applied if the test fails. All Closed, Non-compliant Integrity or a custom Quarantine firewall setting will prevent the user from connecting to the network.

- **Message** - select a custom user message to be displayed at test failure. This can include remediation steps for the end-user
- **Report** - enter the failure report, which will be sent to the Reporting Service

Step 5: Enter a Failure Message. This message will display only when one or more of the checks fail. Click on the check box, then enter the Message information in the provided boxes (see Creating Custom User Messages for more information)

Step 6: A hyperlink can be added to provide remediation options. This can be a link to more information, or a link to download a patch or update for the test failure (see Creating Hyperlinks for more information)

Step 7: Click **Save**.

Step 8: Define the integrity checks (see following page)

Step 9: Repeat the above steps to create a new antivirus/spyware test

Integrity Checks

The checks for each test determine if one or more of the antivirus/spyware process is running, and/or if essential files exist. At least one check must be defined for an integrity test to run.

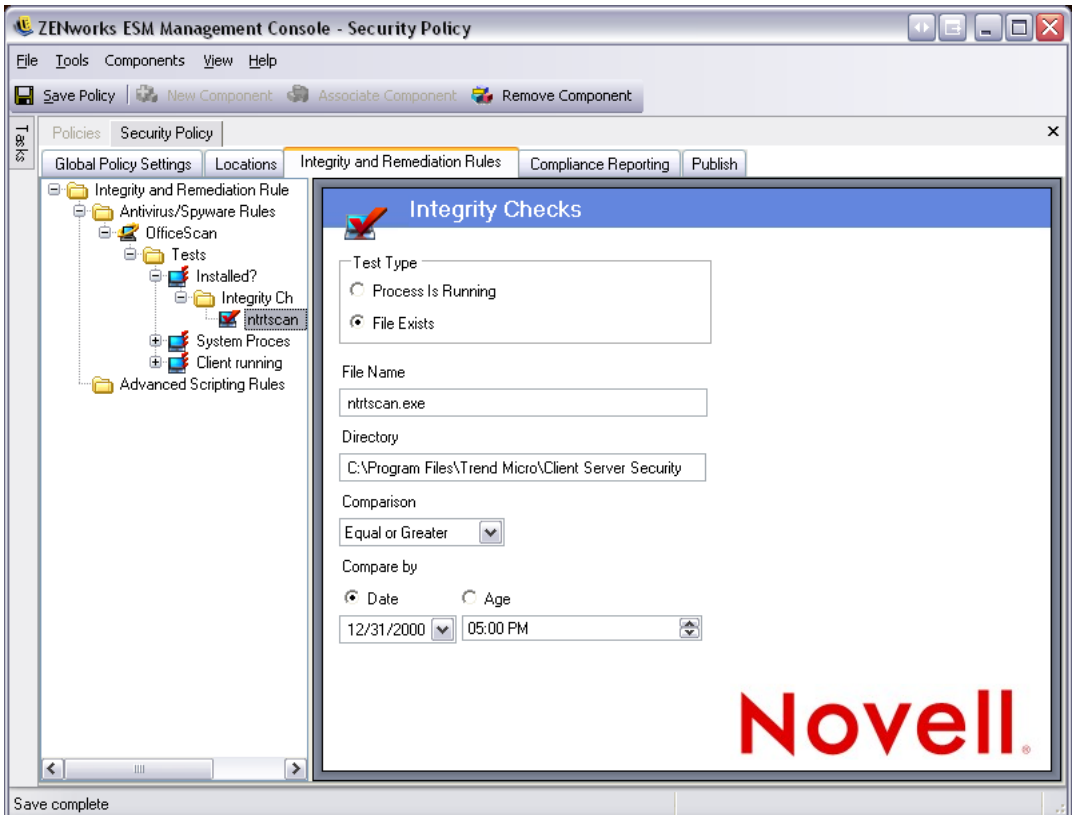

Figure 94: Integrity Checks

To create a new check, select **Integrity Checks** from the policy tree on the left, and click **Add New**. Select one of the two check types and enter the information described below:

Process is Running

This check is used to determine if the software is running at the time of the triggering event (i.e., the AV client). The only information required for this check is the executable name.

File Exists

This check is used to determine if the software is current and up-to-date at the time of the triggering event.

Enter the following information in the provided fields:

- **File Name** - the file name
- **File Directory** - directory where the file should reside

Note:

This file CANNOT exist in the root c:\ directory for this check to function.

- **File Comparison** - this is a date comparison, select from the pull-down list either:
  - None
  - Equal
  - Equal or Greater
  - Equal or Less
- **Compare by** - Age or Date
  - **Date** ensures the file is no older than a specified date and time (i.e., the date of the last update)
  - **Age** ensures a file is no older than a specific time period, measured in days.

Note:

The “Equal” File Comparison will be treated as “Equal or Less” when using the “Age” check.

The checks will be run in the order entered.

Advanced Scripting Rules

ESM includes an advanced rule scripting tool which gives administrators the ability to create extremely flexible and complex rules and remediation actions.

To access this control, open the **Integrity and Remediation Rules** and click the **Advanced Scripting Rules** icon in the policy tree on the left

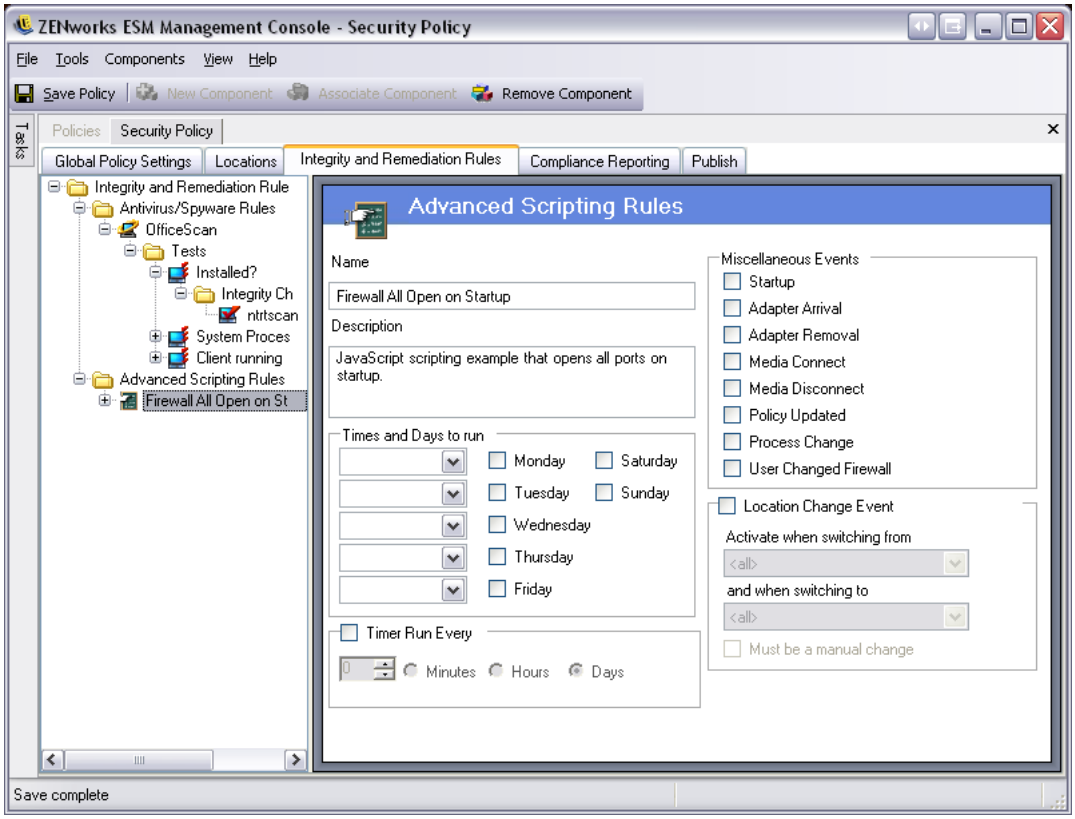

Figure 95: Advanced Scripting

The scripting tool uses either of the common scripting languages, **VBScript** or **JScript**, to create rules which contain both a trigger (when to execute the rule) and the actual script (the logic of the rule). The administrator is not restricted on the type of script to be run.

Advanced Scripting is implemented sequentially, along with other integrity rules, therefore a long-running script will prevent other rules (including "timed" rules) from executing until that script is complete.

To create a new advanced scripting rule:

Step 1: Select Advanced Scripting Rules from the components tree and click **Add New**

Step 2: Name the rule and provide a description

Step 3: Enter the triggering event(s)

- Times and Days to Run - up to five different times may be set for the script to run. The run will occur weekly, on the selected day(s)

- Timer Run Every- set the time to run every minute, hour, or day
- Miscellaneous Events - the script will run when one or more of the selected event(s) occur on the endpoint
- Location Change Event - the script will run when a selected location change event occurs. These events are NOT independent. They are additive to the previous event.
  - **Check Location Change Event** - script will run at ALL location changes
  - **Activate when switching from** - script will run only when the user leaves this (specified) location to any location
  - **Activate when switching to** - script will run when the user enters this (specified) location from any location (if Activate when switching from was given a location parameter (example: office), the script will ONLY run when the location switches from office to the specified location)
  - **Must be a manual change** - script will run only when the user manually switches from or to a location

Step 4: Create any Script Variables - See “Script Variables” on page 137.

Step 5: Write the Script Text - See “Script Text” on page 194.

Step 6: Click **Save**. Repeat the above steps to create a new advanced scripting rule

To associate an existing advanced scripting rule:

Step 1: Select Advanced Scripting Rules in the components tree and click **Associate New**

Step 2: Select the desired rule(s) from the list

Step 3: The trigger event, variables, or script may be re-defined

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Note:

Changing the settings in a shared component will affect ALL OTHER instances of this same component. Use the Show Usage command to view all other policies associated with this component.

Step 4: Click **Save**

Script Variables

This is an optional setting, which permits the Administrator to define a variable (var) for the script and either be able to use ESM functionality (i.e., launch defined custom user messages or hyperlink; switch to a defined location or firewall setting) or have the freedom to change the value of a variable without changing the script itself.

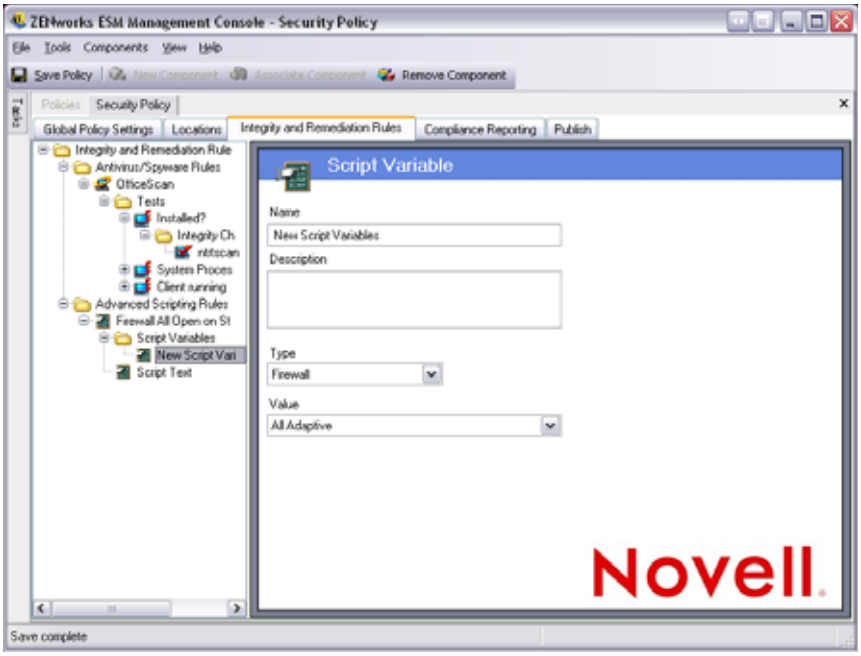


Figure 96: Script Variables

To create a new script variable:

Step 1: Select **Script Variables** from the components tree and click **Add New**

Step 2: Name the variable and provide a description

Step 3: Select type of variable:

- **Custom User Messages** - defines a custom user message which can launch as an action
- **Firewall** - defines a firewall setting which can be applied as an action
- **Hyperlinks** - defines a hyperlink which can be launched as an action
- **Location** - defines a location which can be applied as an action
- **Number** - defines a number value
- **String** - defines a string value

Step 4: Select/enter the value of the variable

Step 5: Click **Save**. Repeat the above steps to create a new variable

Rule Scripting Parameters

The ZENworks Endpoint Security Management (ESM) supports standard Jscript and VBScript coding methods readily available, with the following exceptions:

1. WScript.Echo - Not supported - (displaying return values back to a parent window are not support (since the parent window is unavailable)). Use the Action.Message ESM API instead.
2. Access to Shell Objects - Use the following modified nomenclature/call:

   [JScript]
   Use:
   var WshShell = new ActiveXObject("WScript.Shell");
   Instead of:
   var WshShell = WScript.CreateObject ("WScript.Shell");

   [VBScript]
   Use:
   Dim WshShell
   Set WshShell = CreateObject("WScript.Shell")
   Instead of:
   Dim WshShell
   Set WshShell = WScript.CreateObject("WScript.Shell")
3. All scripts are executed in the "system context" unless the following comment is added to the top of the script:
   [Jscript]
   //@ImpersonateLoggedOnUser
   [VBScript]
   '@ImpersonateLoggedOnUser

Rule Scripting

A rule consists of two parts. The first part is the Trigger Events which determine when to execute the rule. The second part is the scripting code which contains the logic of the rule. The Endpoint Security Client provides three namespaces and five interfaces for the script, which allows the script to control or access the client.

The namespaces are as follows:

1. **Query**. This namespace provides methods to get the current state of the client. For example, information about the adapters, shield states and location.
2. **Action**. This namespace provides methods that get the client to do something. For example, a call that puts the client into a quarantined shield state.
3. **Storage**. This namespace provides a mechanism for the script to store variables for the session or permanently. These could be used to tell the script if the rule had failed the last time it was run. It could be used to store when this rule last ran.

The interfaces are as follows:

1. **IClientAdapter**. This interface describes an adapter in the client network environment.
2. **IClientEnvData**. This interface returns environment data about a Server or Wireless Access Point.
3. **IClientNetEnv**. Provides Network Environment Information.
4. **IClientWAP**. Provides information about a Wireless Access Point.
5. **IClientAdapterList**. A list of adapters in the client network environment.

Trigger Events

Triggers are events that cause the Endpoint Security Client to determine when and if a rule should be executed. These events can either be internal to the client or some external event monitored by the client.

- **AdapterArrival**
  Desc: Adapter arrival has occurred.
  Parameters:
  None.
- AdapterRemoval
  Desc: Adapter had been removed.
  Parameters:
  None.
- **DownloadFailed**
  Desc: This event is triggered in response to Action.DownloadAsync if the file was not successfully downloaded.
  Parameters:
  None.
- **DownloadSuccess**
  Desc: This event is triggered in response to Action.DownloadAsync if the file was successfully downloaded
  Parameters:
  None.
- **LocationChange**
  Desc: Run the rule when entering or leaving a particular location or all locations.
  Parameters:
  OldLocation (opt): Uuid of a Location
  NewLocation (opt): Uuid of a Location
  ManualChange(opt): (true/false). User manually changed location.
- **MediaConnect**
  Desc: Adapter has connection.
  Parameters:
  None.
- **MediaDisconnect**
  Desc: Adapter has lost its connection.
  Parameters:
  None.
- **PolicyUpdated**
  Desc: Called when client is first started and whenever a new policy is applied.
  Parameters:
  None.

- **ProcessChange**
  Desc: Trigger whenever a process is created or deleted.
  Parameters:
  None.

- **Startup**
  Desc: Run the rule when the engine is started.
  Parameters:
  None.

- **TimeOfDay**
  Desc: Run the rule at a particular time or times of day. Or at least once a day. This will store the last time this was triggered.
  Parameters:
  Time: HH:MM (Example: 04:00,15:10) Military time. Lowest to highest. Max=5. Comma separated.
  Days: (Sun,Mon,Tue,Wed,Thu,Fri,Sat) One or more. Comma separated.
  Type: (Local/UTC).

- **Timer**
  Desc: Run the rule every n milliseconds.
  Parameters:
  Interval: Number of milliseconds

- **UserChangeShield**
  Desc: The user had manually changed the shield state.
  Parameters:
  None.

- **WithinTime**
  Desc: Run the rule every n minutes starting from the last time the rule was executed. If the computer has been turned off it will execute the rule if the specified time has past since the last time the rule was executed.
  Parameters:
  WithinMinutes: Number of seconds

General Enumerations and File substitutions

EAccessState

eApplyGlobalSetting = -1

eDisableAccess = 0

eAllowAccess = 1

EAdapterType

- eWIRED
- eWIRELESS
- eDIALUPCONN

EComparison

- eEQUAL
- eLESS
- eGREATER
- eEQUALORLESS
- eEQUALORGREATER

ESTDisplayMsg

- eONLYONCE
- eEVERYTIME
- eSECONDS
- eNOMSG

EHardwareDeviceController

eIrDA = 0

e1394

eBlueTooth

eSerialPort

eParrallelPort

ELogLevel

- eALARM
- eWARN
- eINFO

EMATCHTYPE

- eUNDEFINED
- eLOCALIP
- eGATEWAY
- eDNS
- eDHCP
- eWINS
- eWAP
- eDIALUP
- eUNKNOWN
- eDOMAIN
- eRULE
- eUSERSELECTED

EMinimumWiFiSecurityState

eNoEncryptionRequired = 0

eWEP64

eWEP128

eWPA

ERegKey

- eCLASSES_ROOT
- eCURRENT_USER
- eLOCAL_MACHINE
- eUSERS
- eCURRENT_CONFIG

ERegType

- eSTRING
- eDWORD
- eBINARY
- eMULTI_SZ
- eEXPAND_SZ

EServiceState

eRUN

eSTOP

ePAUSE

ePENDING

eNOTREG

EVariableScope

ePolicyChange = 0// reset on a policy update

eLocationChange = 1// reset on a location change

TRIGGEREVENT

eTIMER

eSTARTUP

eLOCATIONCHANGE

eTIMEOFDAY

eADAPTERARRIVAL

eADAPTERREMOVAL

eMEDIACONNECT

eMEDIADISCONNECT

ePOLICYUPDATED

eUSERCHANGEDSHIELD

ePROCESSCHANGE

eWITHINTIME

eRUNNOW

eDOWNLOADFAILED

eDOWNLOADSUCCESS

Table 6: Shell Folder Names

%windows%	C:\Windows
%system%	%windows%\System32
%startup%	%programs%\Startup
%startmenu%	%profile%\Start Menu
%programs%	%startmenu%\Programs
%commonprogramfiles%	%programfiles%\Common

Table 6: Shell Folder Names

%programfiles%	C:\Program Files
%profile%	C:\Documents and Settings\username
%localappdata%	%profile%\Local Settings\Application Data
%appdata%	%profile%\Application Data
%commonappdata%	C:\Documents and Settings\All Users\Application Data
%commonprograms%	C:\Documents and Settings\All Users\Start Menu\Programs
%cookie%	%profile%\Cookies

Action Namespace

CheckForUpdate

JScript

```
Action.CheckForUpdate();
```

VBScript

```
Action.CheckForUpdate()
```

ClearFixedShieldState

SetShieldStateByName

Trace

Sleep

Note:

When setting the ShieldState (firewall) by name, the name specified MUST EXACTLY match the firewall specified in the policy. Three firewall settings are always available regardless of the policy ("All Closed", "All Adaptive", and "All Open").

JScript

```
Action.SetShieldStateByName("Closed",true);
Action.Trace("Start 20 second sleep");
Action.Sleep(20000);
var ret = Action.ClearFixedShieldState();
if(ret == true)
  Action.Trace("ret = true");
```

```
else
  Action.Trace("ret = false");
```

VBScript

```
Action.SetShieldStateByName "Closed",true
Action.Trace("Start 20 second sleep")
Action.Sleep(20000)
dim ret
ret = Action.ClearFixedShieldState()
if(ret = true) then
  Action.Trace("ret = true")
else
  Action.Trace("ret = false")
end if
```

ClearStamp

SwitchLocationByName

Stamp

Note

When setting the Location by name, the name specified MUST EXACTLY match the location specified in the policy.

JScript

```
Action.SwitchLocationByName("Base");
Action.Stamp();
Action.Trace("Begin 20 second sleep");
Action.Sleep(20000);
Action.SwitchLocationByName("Base");
Action.ClearStamp();
```

VBScript

```
Action.SwitchLocationByName("Base")
Action.Stamp()
Action.Trace("Begin 20 second sleep")
Action.Sleep(20000)
Action.SwitchLocationByName("Base")
Action.ClearStamp()
```

Details:

Base must be the name of a valid location which can be stamped. This script will then switch to location Base, then stamp it, sleep for 20 seconds, make sure we didn't spin out of the location by switching back to base and then clear the stamp. This script performed all actions as expected.

CreateRegistryKey

JScript

```
var ret = Action.CreateRegistryKey(eLOCAL_MACHINE,"Software\\Novell","Tester");
if(ret == true)
  Action.Trace("Create Key is Successful");
else
  Action.Trace("Create Key did not work");
```

VBScript

```
dim ret
ret = Action.CreateRegistryKey(eLOCAL_MACHINE,"Software\\Novell","Tester")
if(ret = true) then
  Action.Trace("Create Key is Successful")
else
  Action.Trace("Create Key did not work")
end if
```

DeleteRegistryKey

JScript

```
var ret = Action.DeleteRegistryKey(eLOCAL_MACHINE,"Software\\Novell\\Tester");
if(ret == true)
  Action.Trace("Delete Key is Successful");
else
  Action.Trace("Delete Key did not work");
```

VBScript

```
dim ret
ret = Action.DeleteRegistryKey(eLOCAL_MACHINE,"Software\\Novell\\Tester")
if(ret = true) then
  Action.Trace("Delete Key is Successful")
else
  Action.Trace("Delete Key did not work")
end if
```

DeleteRegistryValue

JScript

```
Action.DeleteRegistryValue(eLOCAL_MACHINE,"Software\\Novell\\Tester","val1");
Action.DeleteRegistryValue(eLOCAL_MACHINE,"Software\\Novell\\Tester","val2");
```

VBScript

```
Action.DeleteRegistryValue eLOCAL_MACHINE,"Software\\Novell\\Tester","val1"
Action.DeleteRegistryValue eLOCAL_MACHINE,"Software\\Novell\\Tester","val2"
```

DisplayMessage

DisplayMessageByName

Note

The first parameter of the DisplayMessage call is a unique integer identifier for each action.
When calling the Message by name, the name specified MUST EXACTLY match the DisplayMessage specified in the policy.

JScript

```
Action.DisplayMessage("40","Message40", "Message Here", "question", "");

Action.Sleep(10000);

Action.DisplayMessageByName("Message40");
```

VBScript

```
Action.DisplayMessage "40","Message40", "Message Here", "question", ""

Action.Sleep(10000)

Action.DisplayMessageByName "Message40"
```

Details:

This script will create a Message Box with all parameters and then wait 10 seconds, (during which the tester should click Ok to end box display) and then it will be displayed by the ID and wait 10 seconds, (again, the tester should click Ok to end box display) and then it will display the Message Box by

EnableAdapterType

JScript

```
Action.EnableAdapterType(false, eWIRELESS);

Action.EnableAdapterType(true, eWIRELESS);

Action.EnableAdapterType(false, eWIRED);

Action.EnableAdapterType(true, eWIRED);

Action.EnableAdapterType(false, eDIALUPCONN);

Action.EnableAdapterType(true, eDIALUPCONN);
```

VBScript

```
Action.EnableAdapterType false, eWIRELESS

Action.EnableAdapterType true, eWIRELESS

Action.EnableAdapterType false, eWIRED
```

Action.EnableAdapterType true, eWIRED

Action.EnableAdapterType false, eDIALUPCONN

Action.EnableAdapterType true, eDIALUPCONN

Launch

Note

The first parameter of the Launch call is a unique integer identifier for each action.

JScript

Action.Launch("50","C:\calco.exe","");

VBScript

Action.Launch "51","C:\calco.exe",""

LaunchAsSystem

JScript

Action.LaunchAsSystem("C:\calco.exe"," sParameters ", "sWorkingDir",true);

VBScript

Action.LaunchAsSystem "C:\calco.exe"," sParameters"," sWorkingDir",true

LaunchAsUserWithCode

This launches in the user context and returns the exit code of the application launched.

JScript

Action.LaunchAsUserWithCode(appToLaunch, "sParameters", "sWorkingDir", bShow, bWait, nExitCode);

VBScript

Action.LaunchAsUserWithCode appToLaunch, "sParameters", "sWorkingDir", bShow, bWait, nExitCode

Details:

Preliminary setup required creating a policy which included a new Integrity rule with a custom message. The custom message included a launch link which was added to the SCC menu bar.

LaunchLinkByName

Note

When setting the LaunchLink by name, the name specified MUST EXACTLY match the launch link specified in the policy.

JScript

```
Action.LaunchLinkByName("MyLink");
```

VBScript

```
Action.LaunchLinkByName "MyLink"
```

LogEvent

JScript

```
Action.LogEvent("MyEvent", eALARM, "This is a log test message");
```

VBScript

```
Action.LogEvent "MyEvent", eALARM, "This is a vb log test message"
```

Details:

Pre-requisite is that logging needs to be enabled.

Message

Asynchronous Message (displayed and script continues):

JScript

```
Action.Message("Display sync message");
```

VBScript

Action.Message "Display sync message"

Synchronous Message (displayed and waits for user respond before the script continues):

Note:

nTimeoutSeconds values of -1 or 0 will NEVER timeout

---

nMessageType (buttons shown):

1. Ok/Cancel
2. Abort/Retry/Ignore
3. Yes/No/Cancel

Currently, the return value which of these buttons pressed by the user is NOT returned, so it is NOT helpful for conditional logic control.

JScript

Action.Message("Message Title Bar", nMessageType, nTimeoutSeconds);

VBScript

Action.Message "Message Title Bar", nMessageType, nTimeoutSeconds

PauseService

JScript

Action.PauseService("lanmanworkstation");

VBScript

Action.PauseService "lanmanworkstation"

Details:

Make sure you use the actual service name, not the display name.

Prompt

This API creates dialog boxes and user interfaces. It will be covered in a future revision given the complexity and need for examples.

StartService

JScript

```
Action.StartService("lanmanworkstation","");
```

VBScript

```
Action.StartService "lanmanworkstation",""
```

Details:

Make sure you use the actual service name, not the display name.

StopService

JScript

```
Action.StopService("lanmanworkstation");
```

VBScript

```
Action.StopService "lanmanworkstation"
```

Details:

Make sure you use the actual service name, not the display name.

WriteRegistryDWORD

WriteRegistryString

JScript

```
    var ret = Action.CreateRegistryKey(eLOCAL_MACHINE,"Software\\Novell","Tester");
    if(ret == true)
      Action.Trace("Create Key is Successful");
    else
      Action.Trace("Create Key did not work");
Action.WriteRegistryDWORD(eLOCAL_MACHINE,"Software\\Novell\\Tester","val1",24);
Action.WriteRegistryString(eLOCAL_MACHINE,"Software\\Novell\\Tester","val2","Novell");
```

VBScript

```
dim ret
ret = Action.CreateRegistryKey(eLOCAL_MACHINE,"Software\\Novell","Tester")
if(ret = true) then
  Action.Trace("Create Key is Successful")
else
  Action.Trace("Create Key did not work")
end if

Action.WriteRegistryDWORD eLOCAL_MACHINE,"Software\\Novell\\Tester","val1",24
Action.WriteRegistryString eLOCAL_MACHINE,"Software\\Novell\\Tester","val2","Novell"
```

Query Namespace

FileExistsVersion

JScript

```
var ret;
ret = Query.FileExistsVersion("C:","ocalco.exe",eEQUAL,"5","1","2600","0");
if(ret == 1)
  Action.Trace("File is Equal");
else
  Action.Trace("File is Not Equal");
```

VBScript

```
dim ret
ret = Query.FileExistsVersion("C:\","ocalco.exe",eEQUAL,"5","1","2600","0")
if(ret = true) then
  Action.Trace("File is Equal")
else
  Action.Trace("File is Not Equal")
end if
```

Note:

Not all files have file version information.

Script as above performed correctly.

GetAdapters

JScript

```
var adplist;
var adplength;
var adp;

adplist = Query.GetAdapters();
```

```
adplength = adplist.Length;

Action.Trace("adplength = " + adplength);

if(adplength > 0)
{
  adp = adplist.Item(0);
  Action.Trace("DeviceID = " + adp.DeviceID);
  Action.Trace("Enabled = " + adp.Enabled);
  Action.Trace("IP = " + adp.IP);
  Action.Trace("MAC = " + adp.MAC);
  Action.Trace("MaxSpeed = " + adp.MaxSpeed);
  Action.Trace("Name = " + adp.Name);
  Action.Trace("SubNetMask = " + adp.SubNetMask);
  Action.Trace("Type = " + adp.Type);
}
```

VBScript

```
dim adplist
dim adplength
dim adp

set adplist = Query.GetAdapters()
adplength = CInt(adplist.Length)

Action.Trace("adplength = " & adplength)

if(adplength > 0) then
  set adp = adplist.Item(0)
  Action.Trace("DeviceID = " & adp.DeviceID)
  Action.Trace("Enabled = " & adp.Enabled)
```

```
  Action.Trace("IP = " & adp.IP)
  Action.Trace("MAC = " & adp.MAC)
  Action.Trace("MaxSpeed = " & CLng(adp.MaxSpeed))
  Action.Trace("Name = " & adp.Name)
  Action.Trace("SubNetMask = " & adp.SubNetMask)
  Action.Trace("Type = " & adp.Type)
end if
```

Details:

This script will get a list of adapters, the length of the list (number of adapters) and enumerate the properties of the first index in the list.

GetCheckinTime

JScript

```
var ret;
ret = Query.GetCheckinTime();
Action.Trace("LastCheckIn = " + ret);
```

VBScript

```
dim ret
ret = Query.GetCheckinTime()
Action.Trace("LastCheckIn = " & ret)
```

GetLocationMatchData

LocationMatchCount

JScript

```
var envdata;
var envdatalength;
```

```
envdatalength = Query.LocationMatchCount;

Action.Trace("MatchCount = " + envdatalength);

if(envdatalength > 0)
{
  envdata = Query.GetLocationMatchData(0);
  Action.Trace("IP = " + envdata.IP);
  Action.Trace("MAC = " + envdata.MAC);
  Action.Trace("SSID = " + envdata.SSID);
  Action.Trace("Type = " + envdata.Type);
}
```

VBScript

```
dim envdata
dim envdatalength

envdatalength = Query.LocationMatchCount

Action.Trace("MatchCount = " & envdatalength)

if(envdatalength > 0) then
  set envdata = Query.GetLocationMatchData(0)
  Action.Trace("IP = " & envdata.IP)
  Action.Trace("MAC = " & envdata.MAC)
  Action.Trace("SSID = " & envdata.SSID)
  Action.Trace("Type = " & envdata.Type)
end if
```

Details:

This script requires an environment to be defined for a location in the policy in order to provide useful data.

This script will then get the Location Match Count and if it is greater than 0, then it will enumerate the attributes for the first Location Match Data.

IsAdapterTypeConnected

JScript

```
var ret;
ret = Query.IsAdapterTypeConnected(eWIRED);
Action.Trace("IsWiredConnected = " + ret);
ret = Query.IsAdapterTypeConnected(eWIRELESS);
Action.Trace("IsWirelessConnected = " + ret);
ret = Query.IsAdapterTypeConnected(eDIALUPCONN);
Action.Trace("IsModemConnected = " + ret);
```

VBScript

```
dim ret
ret = Query.IsAdapterTypeConnected(eWIRED)
Action.Trace("IsWiredConnected = " & ret)
ret = Query.IsAdapterTypeConnected(eWIRELESS)
Action.Trace("IsWirelessConnected = " & ret)
ret = Query.IsAdapterTypeConnected(eDIALUPCONN)
Action.Trace("IsModemConnected = " & ret)
```

IsAuthenticated

JScript

```
var ret = Query.IsAuthenticated();
Action.Trace("Is authenticated = " + ret);
```

VBScript

```
dim ret
```

```
ret = Query.IsAuthenticated()
Action.Trace("Is authenticated = " & ret)
```

IsWindowsXP

JScript

```
var ret = Query.IsWindowsXP();
Action.Trace("Is XP = " + ret);
```

VBScript

```
dim ret
ret = Query.IsWindowsXP()
Action.Trace("Is XP = " & ret)
```

IsWindows2000

JScript

```
var ret = Query.IsWindows2000();
Action.Trace("Is Win2000 = " + ret);
```

VBScript

```
dim ret
ret = Query.IsWindows2000()
Action.Trace("Is Win2000 = " & ret)
```

ProcessIsRunning

JScript

```
var ret = Query.ProcessIsRunning("STEngine.exe",eEQUAL,"","","","");
Action.Trace("Is Running = " + ret);
```

VBScript

```
dim ret
ret = Query.ProcessIsRunning("STEngine.exe",eEQUAL,"","","","")
```

```
Action.Trace("Is Win2000 = " & ret)
```

RegistryKeyExists

JScript

```
var ret;
ret = Query.RegistryKeyExists(eLOCAL_MACHINE,"Software\\Novell");
Action.Trace("Reg Key Exists = " + ret);
```

VBScript

```
dim ret
ret = Query.RegistryKeyExists(eLOCAL_MACHINE,"Software\\Novell")
Action.Trace("Reg Key Exists = " & ret)
```

RegistryValueDWORD

JScript

```
    var ret;
    ret = Query.RegistryKeyExists(eLOCAL_MACHINE,"Software\\Novell\\Logging");
    Action.Trace("Reg Key Exists = " + ret);

    ret =
Query.RegistryValueDWORD(eLOCAL_MACHINE,"Software\\Novell\\Logging","Enabled");
    Action.Trace("Reg Value = " + ret);
```

VBScript

```
    dim ret
    ret = Query.RegistryKeyExists(eLOCAL_MACHINE,"Software\Novell\Logging")
    Action.Trace("Reg Key Exists = " & ret)

    ret =
Query.RegistryValueDWORD(eLOCAL_MACHINE,"Software\Novell\Logging","Enabled")
    Action.Trace("Reg Value = " & CLng(ret))
```

RegistryValueExists

JScript

```
var ret;
ret = Query.RegistryKeyExists(eLOCAL_MACHINE,"Software\\Novell\\Logging");
Action.Trace("Reg Key Exists = " + ret);

ret =
Query.RegistryValueExists(eLOCAL_MACHINE,"Software\\Novell\\Logging","Enabled",eDW
ORD);
Action.Trace("Reg Value Exists = " + ret);
```

VBScript

```
dim ret
ret = Query.RegistryKeyExists(eLOCAL_MACHINE,"Software\\Novell\\Logging")
Action.Trace("Reg Key Exists = " & ret)

ret =
Query.RegistryValueExists(eLOCAL_MACHINE,"Software\\Novell\\Logging","Enabled",eDW
ORD)
Action.Trace("Reg Value Exists = " & ret)
```

RegistryValueString

JScript

```
var ret;
ret = Query.RegistryKeyExists(eLOCAL_MACHINE,"Software\\Novell\\Logging");
Action.Trace("Reg Key Exists = " + ret);

ret = Query.RegistryValueString(eLOCAL_MACHINE,"Software\\Novell\\Logging","test");
Action.Trace("Reg Value Is = " + ret);
```

VBScript

```
dim ret
ret = Query.RegistryKeyExists(eLOCAL_MACHINE,"Software\\Novell\\Logging")
Action.Trace("Reg Key Exists = " & ret)

ret = Query.RegistryValueString(eLOCAL_MACHINE,"Software\\Novell\\Logging","test")
Action.Trace("Reg Value Is = " & ret)
```

LocationName

LocationUuid

MaxConnectionSpeed

OSServicePack

PolicyName

PolicyTime

PolicyUuid

LocationIsStamped

TriggerEvent

TriggerEventData1

JScript

```
var ret;
ret = Query.LocationName;
Action.Trace("Location Name = " + ret);
ret = Query.LocationUuid;
Action.Trace("Location Uuid = " + ret);
ret = Query.MaxConnectionSpeed;
Action.Trace("MaxConnectionSpeed = " + ret);
ret = Query.OSServicePack;
Action.Trace("OSServicePack = " + ret);
ret = Query.PolicyName;
Action.Trace("PolicyName = " + ret);
ret = Query.PolicyTime;
Action.Trace("PolicyTime = " + ret);
```

```
ret = Query.PolicyUuid;
Action.Trace("PolicyUuid = " + ret);
ret = Query.LocationIsStamped;
Action.Trace("LocationIsStamped = " + ret);
ret = Query.TriggerEvent;
Action.Trace("TriggerEvent = " + ret);
ret = Query.TriggerEventParameter;
Action.Trace("TriggerEventParameter = " + ret);
```

VBScript

```
dim ret
ret = Query.LocationName
Action.Trace("Location Name = " & ret)
ret = Query.LocationUuid
Action.Trace("Location Uuid = " & ret)
ret = Query.MaxConnectionSpeed
Action.Trace("MaxConnectionSpeed = " & CLng(ret))
ret = Query.OSServicePack
Action.Trace("OSServicePack = " & ret)
ret = Query.PolicyName
Action.Trace("PolicyName = " & ret)
ret = Query.PolicyTime
Action.Trace("PolicyTime = " & ret)
ret = Query.PolicyUuid
Action.Trace("PolicyUuid = " & ret)
ret = Query.LocationIsStamped
Action.Trace("LocationIsStamped = " & ret)
ret = Query.TriggerEvent
Action.Trace("TriggerEvent = " & ret)
ret = Query.TriggerEventParameter
Action.Trace("TriggerEventParameter = " & ret)
```

RemovableMediaState

CDMediaState

HDCState

WiFiDisabledState

WiFiDisabledWhenWiredState

AdHocDisabledState

AdapterBridgeDisabledState

MinimumWiFiSecurityState

DialupDisabledState

JScript

```
var ret;

Action.Trace("Reset Policy Change");
ret = Action.RemovableMediaState(-1, ePolicyChange);
Action.Trace("RemovableMediaState = " + ret);
ret = Action.CDMediaState(-1, ePolicyChange);
Action.Trace("CDMediaState = " + ret);
ret = Action.HDCState(eApplyGlobalSetting, eIrDA, ePolicyChange);
Action.Trace("\nHDCState(eApplyGlobalSetting, eIrDA) = " + ret);
ret = Action.HDCState(eApplyGlobalSetting, e1394, ePolicyChange);
Action.Trace("HDCState(eApplyGlobalSetting, e1394) = " + ret);
ret = Action.HDCState(eApplyGlobalSetting, eBlueTooth, ePolicyChange);
Action.Trace("HDCState(eApplyGlobalSetting, eBlueTooth) = " + ret);
ret = Action.HDCState(eApplyGlobalSetting, eSerialPort, ePolicyChange);
Action.Trace("HDCState(eApplyGlobalSetting, eSerialPort) = " + ret);
ret = Action.HDCState(eApplyGlobalSetting, eParrallelPort, ePolicyChange);
Action.Trace("HDCState(eApplyGlobalSetting, eParrallelPort) = " + ret);
ret = Action.WiFiDisabledState(eApplyGlobalSetting, ePolicyChange);
Action.Trace("\nWiFiDisabledState = " + ret);
ret = Action.WiFiDisabledWhenWiredState(eApplyGlobalSetting, ePolicyChange);
```

```
Action.Trace("WiFiDisabledWhenWiredState = " + ret);
ret = Action.AdHocDisabledState(eApplyGlobalSetting, ePolicyChange);
Action.Trace("AdHocDisabledState = " + ret);
ret = Action.AdapterBridgeDisabledState(eApplyGlobalSetting, ePolicyChange);
Action.Trace("AdapterBridgeDisabledState = " + ret);
ret = Action.MinimumWiFiSecurityState(eGlobalSetting, ePolicyChange);
Action.Trace("MinimumWiFiSecurityState = " + ret);
ret = Action.WiredDisabledState(eGlobalSetting, ePolicyChange);
Action.Trace("WiredDisabledState = " + ret);
ret = Action.DialupDisabledState(eGlobalSetting, ePolicyChange);
Action.Trace("DialupDisabledState = " + ret);
Action.Trace("Reset Location Change state");
ret = Action.RemovableMediaState(-1, eLocationChange);
Action.Trace("RemovableMediaState = " + ret);
ret = Action.CDMediaState(-1, eLocationChange);
Action.Trace("CDMediaState = " + ret);
ret = Action.HDCState(eApplyGlobalSetting, eIrDA, eLocationChange);
Action.Trace("\nHDCState(eApplyGlobalSetting, eIrDA) = " + ret);
ret = Action.HDCState(eApplyGlobalSetting, e1394, eLocationChange);
Action.Trace("HDCState(eApplyGlobalSetting, e1394) = " + ret);
ret = Action.HDCState(eApplyGlobalSetting, eBlueTooth, eLocationChange);
Action.Trace("HDCState(eApplyGlobalSetting, eBlueTooth) = " + ret);
ret = Action.HDCState(eApplyGlobalSetting, eSerialPort, eLocationChange);
Action.Trace("HDCState(eApplyGlobalSetting, eSerialPort) = " + ret);
ret = Action.HDCState(eApplyGlobalSetting, eParrallelPort, eLocationChange);
Action.Trace("HDCState(eApplyGlobalSetting, eParrallelPort) = " + ret);
ret = Action.WiFiDisabledState(eApplyGlobalSetting, eLocationChange);
Action.Trace("\nWiFiDisabledState = " + ret);
ret = Action.WiFiDisabledWhenWiredState(eApplyGlobalSetting, eLocationChange);
Action.Trace("WiFiDisabledWhenWiredState = " + ret);
ret = Action.AdHocDisabledState(eApplyGlobalSetting, eLocationChange);
```

```
Action.Trace("AdHocDisabledState = " + ret);
ret = Action.AdapterBridgeDisabledState(eApplyGlobalSetting, eLocationChange);
Action.Trace("AdapterBridgeDisabledState = " + ret);
ret = Action.MinimumWiFiSecurityState(eGlobalSetting, eLocationChange);
Action.Trace("MinimumWiFiSecurityState = " + ret);
ret = Action.WiredDisabledState(eGlobalSetting, eLocationChange);
Action.Trace("WiredDisabledState = " + ret);
ret = Action.DialupDisabledState(eGlobalSetting, eLocationChange);
Action.Trace("DialupDisabledState = " + ret);
```

VBScript

```
dim ret;
Action.Trace("Reset Policy Change")
ret = Action.RemovableMediaState(-1, ePolicyChange)
Action.Trace("RemovableMediaState = " & ret)
ret = Action.CDMediaState(-1, ePolicyChange)
Action.Trace("CDMediaState = " & ret)
ret = Action.HDCState(eApplyGlobalSetting, eIrDA, ePolicyChange)
Action.Trace("\nHDCState(eApplyGlobalSetting, eIrDA) = " & ret)
ret = Action.HDCState(eApplyGlobalSetting, e1394, ePolicyChange)
Action.Trace("HDCState(eApplyGlobalSetting, e1394) = " & ret)
ret = Action.HDCState(eApplyGlobalSetting, eBlueTooth, ePolicyChange)
Action.Trace("HDCState(eApplyGlobalSetting, eBlueTooth) = " & ret)
ret = Action.HDCState(eApplyGlobalSetting, eSerialPort, ePolicyChange)
Action.Trace("HDCState(eApplyGlobalSetting, eSerialPort) = " & ret)
ret = Action.HDCState(eApplyGlobalSetting, eParrallelPort, ePolicyChange)
Action.Trace("HDCState(eApplyGlobalSetting, eParrallelPort) = " & ret)
ret = Action.WiFiDisabledState(eApplyGlobalSetting, ePolicyChange)
Action.Trace("\nWiFiDisabledState = " & ret)
ret = Action.WiFiDisabledWhenWiredState(eApplyGlobalSetting, ePolicyChange)
Action.Trace("WiFiDisabledWhenWiredState = " & ret)
```

```
ret = Action.AdHocDisabledState(eApplyGlobalSetting, ePolicyChange)
Action.Trace("AdHocDisabledState = " & ret)
ret = Action.AdapterBridgeDisabledState(eApplyGlobalSetting, ePolicyChange)
Action.Trace("AdapterBridgeDisabledState = " & ret)
ret = Action.MinimumWiFiSecurityState(eGlobalSetting, ePolicyChange)
Action.Trace("MinimumWiFiSecurityState = " & ret)
ret = Action.WiredDisabledState(eGlobalSetting, ePolicyChange)
Action.Trace("WiredDisabledState = " & ret)
ret = Action.DialupDisabledState(eGlobalSetting, ePolicyChange)
Action.Trace("DialupDisabledState = " & ret)
Action.Trace("Reset Location Change state")
ret = Action.RemovableMediaState(-1, eLocationChange)
Action.Trace("RemovableMediaState = " & ret)
ret = Action.CDMediaState(-1, eLocationChange)
Action.Trace("CDMediaState = " & ret)
ret = Action.HDCState(eApplyGlobalSetting, eIrDA, eLocationChange)
Action.Trace("\nHDCState(eApplyGlobalSetting, eIrDA) = " & ret)
ret = Action.HDCState(eApplyGlobalSetting, e1394, eLocationChange)
Action.Trace("HDCState(eApplyGlobalSetting, e1394) = " & ret)
ret = Action.HDCState(eApplyGlobalSetting, eBlueTooth, eLocationChange)
Action.Trace("HDCState(eApplyGlobalSetting, eBlueTooth) = " & ret)
ret = Action.HDCState(eApplyGlobalSetting, eSerialPort, eLocationChange)
Action.Trace("HDCState(eApplyGlobalSetting, eSerialPort) = " & ret)
ret = Action.HDCState(eApplyGlobalSetting, eParrallelPort, eLocationChange)
Action.Trace("HDCState(eApplyGlobalSetting, eParrallelPort) = " & ret)
ret = Action.WiFiDisabledState(eApplyGlobalSetting, eLocationChange)
Action.Trace("\nWiFiDisabledState = " & ret)
ret = Action.WiFiDisabledWhenWiredState(eApplyGlobalSetting, eLocationChange)
Action.Trace("WiFiDisabledWhenWiredState = " & ret)
ret = Action.AdHocDisabledState(eApplyGlobalSetting, eLocationChange)
Action.Trace("AdHocDisabledState = " & ret)
```

```
ret = Action.AdapterBridgeDisabledState(eApplyGlobalSetting, eLocationChange)
Action.Trace("AdapterBridgeDisabledState = " & ret)
ret = Action.MinimumWiFiSecurityState(eGlobalSetting, eLocationChange)
Action.Trace("MinimumWiFiSecurityState = " & ret)
ret = Action.WiredDisabledState(eGlobalSetting, eLocationChange)
Action.Trace("WiredDisabledState = " & ret)
ret = Action.DialupDisabledState(eGlobalSetting, eLocationChange)
Action.Trace("DialupDisabledState = " & ret)
```

RemovableMediaState

CDMediaState

HDCState

IsWiFiDisabled

IsWiFiDisabledWhenWired

IsAdHocDisabled

IsAdapterBridgeDisabled

MinimumWiFiSecurityState

IsWiredDisabled

IsDialupDisabled

JScript

```
var ret;
Action.Trace("Status");
ret = Query.RemovableMediaState();
Action.Trace("RemovableMediaState = " + ret);
ret = Query.CDMediaState();
Action.Trace("CDMediaState = " + ret);
ret = Query.HDCState(eIrDA);
Action.Trace("\nHDCState(eIrDA) = " + ret);
ret = Query.HDCState(e1394);
Action.Trace("HDCState(e1394) = " + ret);
```

```
ret = Query.HDCState(eBlueTooth);
Action.Trace("HDCState(eBlueTooth) = " + ret);
ret = Query.HDCState(eSerialPort);
Action.Trace("HDCState(eSerialPort) = " + ret);
ret = Query.HDCState(eParrallelPort);
Action.Trace("HDCState(eParrallelPort) = " + ret);
ret = Query.IsWiFiDisabled();
Action.Trace("\nIsWiFiDisabled = " + ret);
ret = Query.IsWiFiDisabledWhenWired();
Action.Trace("IsWiFiDisabledWhenWired = " + ret);
ret = Query.IsAdHocDisabled();
Action.Trace("IsAdHocDisabled = " + ret);
ret = Query.IsAdapterBridgeDisabled();
Action.Trace("IsAdapterBridgeDisabled = " + ret);
ret = Query.MinimumWiFiSecurityState();
Action.Trace("MinimumWiFiSecurityState = " + ret);
ret = Query.IsWiredDisabled();
Action.Trace("IsWiredDisabled = " + ret);
ret = Query.IsDialupDisabled();
Action.Trace("IsDialupDisabled = " + ret);
```

VBScript

```
dim ret;
Action.Trace("Status")
ret = Query.RemovableMediaState()
Action.Trace("RemovableMediaState = " & ret)
ret = Query.CDMediaState()
Action.Trace("CDMediaState = " & ret)
ret = Query.HDCState(eIrDA)
Action.Trace("\nHDCState(eIrDA) = " & ret)
ret = Query.HDCState(e1394)
```

```
Action.Trace("HDCState(e1394) = " & ret)
ret = Query.HDCState(eBlueTooth)
Action.Trace("HDCState(eBlueTooth) = " & ret)
ret = Query.HDCState(eSerialPort)
Action.Trace("HDCState(eSerialPort) = " & ret)
ret = Query.HDCState(eParrallelPort)
Action.Trace("HDCState(eParrallelPort) = " & ret)
ret = Query.IsWiFiDisabled()
Action.Trace("\nIsWiFiDisabled = " & ret)
ret = Query.IsWiFiDisabledWhenWired()
Action.Trace("IsWiFiDisabledWhenWired = " & ret)
ret = Query.IsAdHocDisabled()
Action.Trace("IsAdHocDisabled = " & ret)
ret = Query.IsAdapterBridgeDisabled()
Action.Trace("IsAdapterBridgeDisabled = " & ret)
ret = Query.MinimumWiFiSecurityState()
Action.Trace("MinimumWiFiSecurityState = " & ret)
ret = Query.IsWiredDisabled()
Action.Trace("IsWiredDisabled = " & ret)
ret = Query.IsDialupDisabled()
Action.Trace("IsDialupDisabled = " & ret)
```

Storage Namespace

There are two kinds of storage in the Endpoint Security Client storage space. Persistent storage remains between sessions of the client, while transient storage exists only for the duration of the client. Transient values can be accessed in each rule script invocation. Also, persistent storage can only store and retrieve string values, while transient storage store and retrieve those values that a VARIANT can hold.

Note

Each script variable stored in the "secure store" is preceded by a "rule id" (one for each script). Variables that need to be shared between scripts MUST have a forward slash BEFORE the variable name in EACH "persist" function accessing them to make that variable global, or accessible, to each script:

Example - "global" variable between scripts: "boolWarnedOnPreviousLoop"
Storage.PersistValueExists("/boolWarnedOnPreviousLoop");

SetNameValue

NameValueExists

GetNameValue

JScript

```
var ret;
Storage.SetNameValue("testval",5);
ret = Storage.NameValueExists("testval");
Action.Trace("NameValueExists = " + ret);
ret = Storage.GetNameValue("testval");
Action.Trace("GetNameValue = " + ret);
```

VBScript

```
dim ret
Storage.SetNameValue "testval",5
ret = Storage.NameValueExists("testval")
Action.Trace("NameValueExists = " & ret)
ret = Storage.GetNameValue("testval")
Action.Trace("GetNameValue = " & ret)
```

SetPersistString

PersistValueExists

GetPersistString

JScript

```
var ret;
Storage.SetPersistString("teststr","pstring");
ret = Storage.PersistValueExists("teststr");
Action.Trace("PersistValueExists = " + ret);
ret = Storage.GetPersistString("teststr");
```

```
Action.Trace("GetPersistString = " + ret);
```

VBScript

```
dim ret
Storage.SetPersistString "teststr", "pstring"
ret = Storage.PersistValueExists("teststr")
Action.Trace("PersistValueExists = " & ret)
ret = Storage.GetPersistString("teststr")
Action.Trace("GetPersistString = " & ret)
```

RuleState

JScript

```
Storage.RuleState = true;
var ret = Storage.RuleState;
Action.Trace("RuleState = " + ret);
```

VBScript

```
dim ret
Storage.RuleState = true
ret = Storage.RuleState
Action.Trace("RuleState = " & ret)
```

RetrySeconds

JScript

```
var ret;
Storage.RetrySeconds = 30;
ret = Storage.RetrySeconds;
Action.Trace("RetrySeconds = " + ret);
```

VBScript

```
dim ret
```

```
Storage.RetrySeconds = 30
ret = Storage.RetrySeconds
Action.Trace("RetrySeconds = " & ret)
```

Interfaces

These interfaces are returned by one of the methods of the namespaces described in section 3 or by one of the methods or properties of the following interfaces.

IClientAdapter Interface

This interface returns information about an adapter.

GetNetworkEnvironment

JScript

```
var adplist;
var adplength;
var adp;
var env;
var ret;

adplist = Query.GetAdapters();
adplength = adplist.Length;

Action.Trace("adplength = " + adplength);

if(adplength > 0)
{
  adp = adplist.Item(0);
  env = adp.GetNetworkEnvironment();
  ret = env.DHCPCount;
  Action.Trace("DHCPCount = " + ret);
  ret = env.DNSCount;
  Action.Trace("DNSCount = " + ret);
```

```
  ret = env.GatewayCount;
  Action.Trace("GatewayCount = " + ret);
  ret = env.WINSCount;
  Action.Trace("WINSCount = " + ret);
}
```

VBScript

```
dim adplist
dim adplength
dim adp
dim env
dim ret

set adplist = Query.GetAdapters()
adplength = adplist.Length

Action.Trace("adplength = " & CInt(adplength))

if(CInt(adplength) > 0) then
  set adp = adplist.Item(0)
  set env = adp.GetNetworkEnvironment()
  ret = env.DHCPCount
  Action.Trace("DHCPCount = " & ret)
  ret = env.DNSCount
  Action.Trace("DNSCount = " & ret)
  ret = env.GatewayCount
  Action.Trace("GatewayCount = " & ret)
  ret = env.WINSCount
  Action.Trace("WINSCount = " & ret)
end if
```

DeviceID

See Query Namespace - GetAdapters

Enabled

See Query Namespace - GetAdapters

IP

See Query Namespace - GetAdapters

MAC

See Query Namespace - GetAdapters

MaxSpeed

See Query Namespace - GetAdapters

Name

See Query Namespace - GetAdapters

SubNetMask

See Query Namespace - GetAdapters

Type

See Query Namespace - GetAdapters

IClientEnvData Interface

This interface returns environment data about a Server or Wireless Access Point.

IP

See Query Namespace - GetLocationMatchData

MAC

See Query Namespace - GetLocationMatchData

SSID

See Query Namespace - GetLocationMatchData

Type

See Query Namespace - GetLocationMatchData

IClientNetEnv Interface

This interface provides Network Environment Information.

GetDHCPItem

JScript

```
var adplist;
var adplength;
var adp;
var env;
var ret;
var item;

adplist = Query.GetAdapters();
adplength = adplist.Length;

Action.Trace("adplength = " + adplength);

if(adplength > 0)
{
  adp = adplist.Item(0);
  env = adp.GetNetworkEnvironment();

  ret = env.DHCPCount;
  Action.Trace("DHCPCount = " + ret);
  if(ret > 0)
  {
    item = env.GetDHCPItem(0);
    ret = item.IP;
    Action.Trace("IP = " + ret);
  }
}
```

VBScript

```
dim adplist
dim adplength
```

```
dim adp
dim env
dim ret
dim item

set adplist = Query.GetAdapters()
adplength = adplist.Length

Action.Trace("adplength = " & CInt(adplength))

if(CInt(adplength) > 0) then
  set adp = adplist.Item(0)
  set env = adp.GetNetworkEnvironment()

  ret = env.DHCPCount
  Action.Trace("DHCPCount = " & ret)
  if(ret > 0) then
    set item = env.GetDHCPItem(0)
    ret = item.IP
    Action.Trace("IP = " & ret)
  end if
end if
```

GetDNSItem

JScript

```
var adplist;
var adplength;
var adp;
var env;
var ret;
var item;
```

```
adplist = Query.GetAdapters();
adplength = adplist.Length;

Action.Trace("adplength = " + adplength);

if(adplength > 0)
{
  adp = adplist.Item(0);
  env = adp.GetNetworkEnvironment();

  ret = env.DNSCount;
  Action.Trace("DNSCount = " + ret);
  if(ret > 0)
  {
    item = env.GetDNSItem(0);
    ret = item.IP;
    Action.Trace("IP = " + ret);
  }
}
```

VBScript

```
dim adplist
dim adplength
dim adp
dim env
dim ret
dim item

set adplist = Query.GetAdapters()
adplength = adplist.Length
```

```
Action.Trace("adplength = " & CInt(adplength))

if(CInt(adplength) > 0) then
  set adp = adplist.Item(0)
  set env = adp.GetNetworkEnvironment()

  ret = env.DNSCount
  Action.Trace("DNSCount = " & ret)
  if(ret > 0) then
    set item = env.GetDNSItem(0)
    ret = item.IP
    Action.Trace("IP = " & ret)
  end if
end if
```

GetGatewayItem

JScript

```
var adplist;
var adplength;
var adp;
var env;
var ret;
var item;

adplist = Query.GetAdapters();
adplength = adplist.Length;

Action.Trace("adplength = " + adplength);

if(adplength > 0)
```

```
{
  adp = adplist.Item(0);
  env = adp.GetNetworkEnvironment();

  ret = env.GatewayCount;
  Action.Trace("GatewayCount = " + ret);
  if(ret > 0)
  {
    item = env.GetGatewayItem(0);
    ret = item.IP;
    Action.Trace("IP = " + ret);
  }
}
```

VBScript

```
dim adplist
dim adplength
dim adp
dim env
dim ret
dim item

set adplist = Query.GetAdapters()
adplength = adplist.Length

Action.Trace("adplength = " & CInt(adplength))

if(CInt(adplength) > 0) then
  set adp = adplist.Item(0)
  set env = adp.GetNetworkEnvironment()
```

```
  ret = env.GatewayCount
  Action.Trace("GatewayCount = " & ret)
  if(ret > 0) then
    set item = env.GetGatewayItem(0)
    ret = item.IP
    Action.Trace("IP = " & ret)
  end if
end if
```

GetWINSItem

JScript

```
var adplist;
var adplength;
var adp;
var env;
var ret;
var item;

adplist = Query.GetAdapters();
adplength = adplist.Length;

Action.Trace("adplength = " + adplength);

if(adplength > 0)
{
  adp = adplist.Item(0);
  env = adp.GetNetworkEnvironment();

  ret = env.WINSCount;
  Action.Trace("WINSCount = " + ret);
  if(ret > 0)
```

```
  {
    item = env.GetWINSItem(0);
    ret = item.IP;
    Action.Trace("IP = " + ret);
  }
}
```

VBScript

```
dim adplist
dim adplength
dim adp
dim env
dim ret
dim item

set adplist = Query.GetAdapters()
adplength = adplist.Length

Action.Trace("adplength = " & CInt(adplength))

if(CInt(adplength) > 0) then
  set adp = adplist.Item(0)
  set env = adp.GetNetworkEnvironment()

  ret = env.WINSCount
  Action.Trace("WINSCount = " & ret)
  if(ret > 0) then
    set item = env.GetWINSItem(0)
    ret = item.IP
    Action.Trace("IP = " & ret)
  end if
```

end if

GetWirelessAPItem

WirelessAPCount

JScript

```
var adplist;
var adplength;
var adp;
var env;
var apitem;
var adptype;
var adpname;
var apcount;
var i;

adplist = Query.GetAdapters();
adplength = adplist.Length;
Action.Trace("adplength = " + adplength);

if(adplength > 0)
{
  for(i=0;i < adplength;i++)
 {
   adp = adplist.Item(i);
   adptype = adp.Type;
   if(adptype == eWIRELESS)
   {
     Action.Trace("Wireless index = " + i);
     adpname = adp.Name;
     Action.Trace("adp = " + adpname);
```

```
      env = adp.GetNetworkEnvironment();
      apcount = env.WirelessAPCount;
      Action.Trace("WirelessAPCount = " + apcount);
      if(apcount > 0)
      {
        apitem = env.GetWirelessAPItem(0);
        Action.Trace("apitem.SSID = " + apitem.SSID);
      }
    }
  }
}
```

VBScript

```
dim adplist
dim adplength
dim adp
dim env
dim apitem
dim adptype
dim adpname
dim apcount
dim i

set adplist = Query.GetAdapters()
adplength = adplist.Length
Action.Trace("adplength = " & CInt(adplength))

if(CInt(adplength) > 0) then
  For i = 0 To (CInt(adplength) - 1)
    set adp = adplist.Item(i)
    adptype = adp.Type
```

```
    if(adptype = eWIRELESS) then
      Action.Trace("Wireless index = " & i)
      adpname = adp.Name
      Action.Trace("adp = " & adpname)

      set env = adp.GetNetworkEnvironment()
      apcount = env.WirelessAPCount
      Action.Trace("WirelessAPCount = " & apcount)
      if(apcount > 0) then
        set apitem = env.GetWirelessAPItem(0)
        Action.Trace("apitem.SSID = " & apitem.SSID)
      end if
    end if
  Next
end if
```

DHCPCount

See ICLIENTADAPTER Interface - GetNetworkEnvironment

DNSCount

See ICLIENTADAPTER Interface - GetNetworkEnvironment

GatewayCount

See ICLIENTADAPTER Interface - GetNetworkEnvironment

WINSCount

See ICLIENTADAPTER Interface - GetNetworkEnvironment

WirelessAPCount

See ICLIENTADAPTER Interface - GetNetworkEnvironment

IClientWAP Interface

This interface provides information about a Wireless Access Point.

AvgRssi

See IClientNetEnv Interface - GetWirelessAPItem

MAC

See IClientNetEnv Interface - GetWirelessAPItem

MaxRssi

See IClientNetEnv Interface - GetWirelessAPItem

MinRssi

See IClientNetEnv Interface - GetWirelessAPItem

Rssi

See IClientNetEnv Interface - GetWirelessAPItem

SSID

See IClientNetEnv Interface - GetWirelessAPItem

IClientAdapterList Interface

This interface is a list of adapters in the network environment.

Item & Length

See Query Namespace - GetAdapters

Sample Scripts

Create Registry Shortcut (VB Script)

'This script is to ONLY run at STARTUP of the ZENworks Security Client

'The script creates a desktop and program files shortcut that is linked to a VBScript file that the script also creates

'The VBScript is located in the ZENworks Security Client installation folder. It sets a registry entry to TRUE.

'A second script, included in the policy, reads this registry entry. If the entry is TRUE, it will launch the dialog box

'that allows the user to control wireless adapters.

'This script also disables wireless adapters at startup. Per customer request, Modems will ALSO be disabled since the

'3G wireless card instantiate as modems.

'********** Global Varialbles

set WshShell = CreateObject ("WScript.Shell")

Dim strStartMenu

```
strStartMenu = WshShell.SpecialFolders("AllUsersPrograms")
Dim strDesktop
strDesktop = WshShell.SpecialFolders("AllUsersDesktop")

'*************** Main Loop
DisableWirelessAdapters()
CreateStartMenuFolder()
CreateStartMenuProgramFilesShortcut()
CreateDesktopAllUsersShortcut()
CreateVbsFileToWriteRegEntry()


'*************** Functions to do each action
Function DisableWirelessAdapters()
Dim ret
'NOTE: 1 means this action can be undone on a location change if the policy allows
'0 means this action can be undone on a policy update if the policy allows
ret = Action.WiFiDisabledState(eDisableAccess, 1)
Action.Trace("Disallow Wi-Fi = " & ret)
'Again, per the customer request, Modems will be disabled to deal with 3G wireless cards that act as modems in the network stack
ret = Action.DialupDisabledState ( eDisableAccess , 1 )
Action.Trace("Disallow Modem = " & ret)
End Function

Function CreateStartMenuProgramFilesShortcut()
'create the Start Menu folder and then create the shortcut
set oShellLinkStartMenu = WshShell.CreateShortcut (strStartMenu & "\Novell\Enable Wireless Adapter Control.lnk")
oShellLinkStartMenu.TargetPath = "C:\Program Files\Novell\ZENworks Security Client\wareg.vbs"
oShellLinkStartMenu.WindowStyle = 1
```

```
oShellLinkStartMenu.Hotkey = "CTRL+SHIFT+W"
oShellLinkStartMenu.IconLocation = "C:\Program Files\Novell\ZENworks Security Client\STEngine.exe, 0"
oShellLinkStartMenu.Description = "Launch Novell Wireless Adapter Control Dialog Box"
oShellLinkStartMenu.WorkingDirectory = "C:\Program Files\Novell\ZENworks Security Client"
oShellLinkStartMenu.Save
End Function

Function CreateDesktopAllUsersShortcut()
'create the desktop folder shortcut
set oShellLinkDesktop = WshShell.CreateShortcut (strDesktop & "\Enable Wireless Adapter Control.lnk")
oShellLinkDesktop.TargetPath = "C:\Program Files\Novell\ZENworks Security Client\wareg.vbs"
oShellLinkDesktop.WindowStyle = 1
oShellLinkDesktop.Hotkey = "CTRL+SHIFT+W"
oShellLinkDesktop.IconLocation = "C:\Program Files\Novell\ZENworks Security Client\STEngine.exe, 0"
oShellLinkDesktop.Description = "Launch Novell Wireless Adapter Control Dialog Box"
oShellLinkDesktop.WorkingDirectory = "C:\Program Files\Novell\ZENworks Security Client"
oShellLinkDesktop.Save
End Function

Function CreateVbsFileToWriteRegEntry()
'First build the VBScript file to write the registry key
Dim pathToTempVbsFile
pathToTempVbsFile = "C:\Program Files\Novell\ZENworks Security Client\wareg.vbs"
Dim ofileSysObj, fileHandle
set ofileSysObj = CreateObject ( "Scripting.FileSystemObject" )
set fileHandle = ofileSysObj.CreateTextFile ( pathToTempVbsFile , true )
fileHandle.WriteLine "Dim WshShell"
fileHandle.WriteLine "Set WshShell = CreateObject(""WScript.Shell"")"
```

```
fileHandle.WriteLine "WshShell.RegWrite ""HKLM\SOFTWARE\Novell\MSC\STUWA"", ""true"", ""REG_SZ"""
fileHandle.Close
Action.Trace ("Wrote the VBScript file to: " + pathToTempVbsFile )
End Function

Function CreateStartMenuFolder
  Dim fso, f, startMenuSenforceFolder
 startMenuSenforceFolder = strStartMenu & "\Novell"
Set fso = CreateObject("Scripting.FileSystemObject")
If (fso.FolderExists(startMenuSenforceFolder)) Then
Action.Trace(startMenuSenforceFolder & " Already exists, so NOT creating it.")
Else
Action.Trace("Creating folder: " & startMenuSenforceFolder)
   Set f = fso.CreateFolder(startMenuSenforceFolder)
   CreateFolderDemo = f.Path
End If
End Function
```

Allow Only One Connection Type (JScript)

```
// Disable Wired and Wireless if Dialup is connection
// Disable Modem and Wired if Wireless is connected
// Disable Modem and Wireless if Wired is connected
// Reenable all hardware (based off policy settings) if there are NO active network connections

//NOTE:  The order for checking sets the precedence for allowed connections
// As coded below, Wired is first, then Wireless, then Modem.  So if
// you have both a wired and modem connection when this script is
// launched, then the modem will be disabled (i.e. the wired is preferred)

var CurLoc = Query.LocationName;
```

```
Action.Trace("CurLoc is: " + CurLoc);
if (CurLoc ==  "Desired Location")
{//only run this script if the user is in the desired location.  This MUST MATCH the exact name of the location in the policy
}

var Wired = Query.IsAdapterTypeConnected( eWIRED );
Action.Trace("Connect Status of Wired is: " + Wired);
var Wireless = Query.IsAdapterTypeConnected( eWIRELESS );
Action.Trace("Connect Status of Wireless is: " + Wireless );
var Dialup = Query.IsAdapterTypeConnected( eDIALUPCONN );
Action.Trace("Connect Status of Dialup is: " + Dialup );

var wiredDisabled = Query.IsWiredDisabled();
Action.Trace("Query on WiredDisabled is: " + wiredDisabled );

var wifiDisabled = Query.IsWiFiDisabled();
Action.Trace("Query on WifiDisabled is: " + wifiDisabled );

var dialupDisabled = Query.IsDialupDisabled();
Action.Trace("Query on DialupDisabled is: " + dialupDisabled );

//check if there is a wired connection
if (Wired)
{
Action.Trace ("Wired Connection Only!");
Action.DialupDisabledState ( eDisableAccess , 0 );
Action.WiFiDisabledState ( eDisableAccess , 0) ;
//alternative call
//Action.EnableAdapterType (false, eDIALUPCONN );
```

```
//Action.EnableAdapterType (false, eWIRELESS );
}
else
{
Action.Trace("NO Wired connection found.");
}

//check if there is a wireless connection
if (Wireless)
{
Action.Trace ("Wireless Connection Only!");
Action.WiredDisabledState ( eDisableAccess , 0);
Action.DialupDisabledState ( eDisableAccess , 0);
//alternative call
//Action.EnableAdapterType (false, eDIALUPCONN );
//Action.EnableAdapterType (false, eWIRED );
}
else
{
Action.Trace("NO Wireless connection found.");
}

//check if there is a modem connection
if (Dialup)
{
Action.Trace ("Dialup Connection Only!");
Action.WiredDisabledState ( eDisableAccess , 0);
Action.WiFiDisabledState ( eDisableAccess , 0);
//alternative call
//Action.EnableAdapterType (false, eWIRED );
```

```
//Action.EnableAdapterType (false, eWIRELESS );
}
else
{
Action.Trace("NO Dialup connection found.");
}
if (( !Wired ) && ( !Wireless ) && ( !Dialup ))
{//Apply Global settings so you don't override policy settings
Action.Trace("NO connections so, enable all");
Action.DialupDisabledState ( eApplyGlobalSetting , 1);
Action.WiredDisabledState ( eApplyGlobalSetting , 1);
Action.WiFiDisabledState ( eApplyGlobalSetting , 1);
}
```

Script Text

The ESM Administrator is not limited to the type of script the ZENworks Security Client may execute. It is recommended that ANY script be tested prior to distributing the policy.

Select the script type (Jscript or VBscript) and enter the script text in the provided field. The script may be copied from another source and pasted into the field. See “Rule Scripting Parameters” on page 138, for acceptable script syntax.

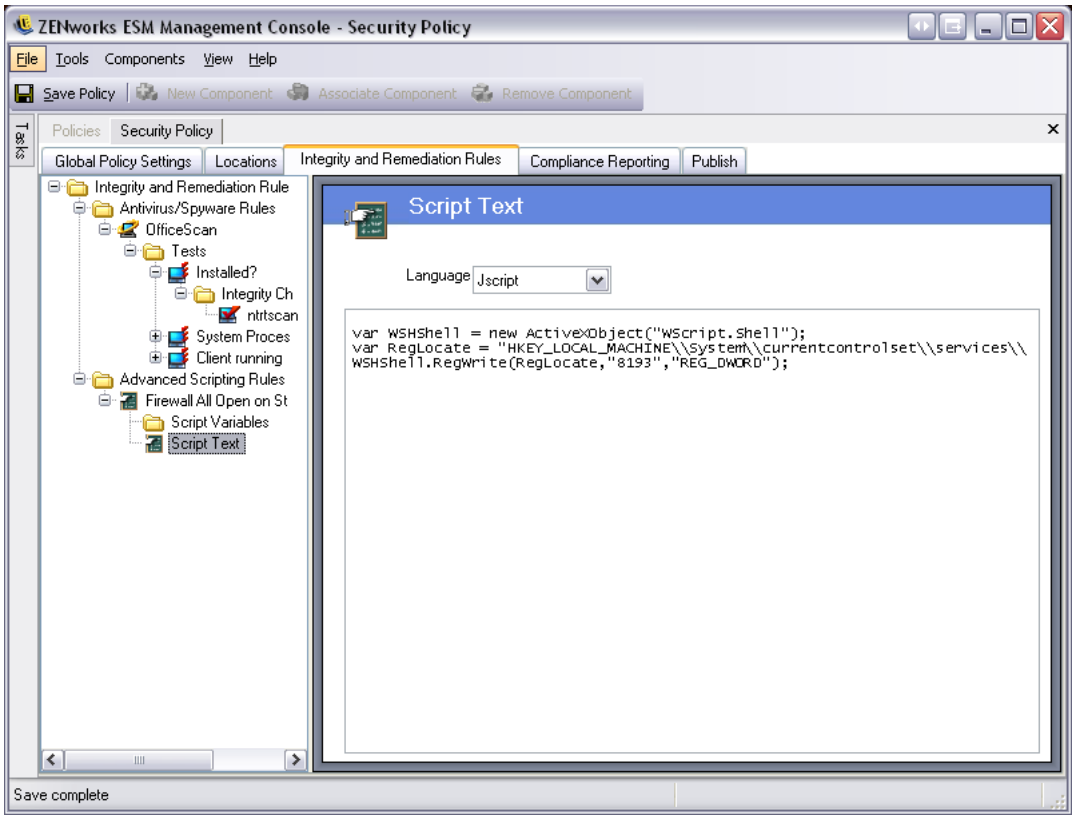


Figure 97: Script Text Window

Stamp Once Script

The Stamp Once script enforces a single network environment save at a designated location. When the user enters the desired network environment, they should be instructed to switch to the location assigned below and then perform a network environment save (see the ZSC User's Manual or Help). After this environment has been saved, the ZSC will not permit additional network environments to be saved at that location.

Note:

This script works best when used for an environment that will likely NOT change its network parameters (i.e., an end-user's home network, or a satellite office). If network identifiers change (IP and/or MAC addresses) the ZSC may not be able to recognize the location, and will remain in the default Unknown location.

To initiate the Stamp Once Script, perform the following steps:

Step 1: Under ***Locations***, create or select the location which will use the Stamp Once functionality

Step 2: **IMPORTANT**: under User Permissions, un-check Save Network Environment

Step 3: Associate the Stamp Once scripting rule to this policy

Step 4: Set the triggering event to ***Location Change: Activate when switching to***. Select the configured location from Step 1 and 2 above

Step 5: Open the location_locked variable and select the same location as in step 4, above

Block Gray List Script

This script will block ALL non-approved software from executing. This script is a Global Rule, and is not applied per location. When activated, this Script will disable (prevent from executing) ALL applications with the exception of the ones included in the Gray List Application Controls list.

To initiate the Block Gray List Script, perform the following steps:

Step 1: In EACH location in this policy, create a NEW firewall setting and set it as the default

Step 2: Remove the previous default firewall settings (All Adaptive), as well as any other Novell firewall settings that cannot be altered (set as read-only)

Step 3: Under the new firewall settings associate the existing Application Control setting: Gray List Minimally Functional, and leave the Default Execution Behavior set to All Allowed

WARNING:

Every firewall setting contained in this policy MUST contain the Gray List Minimally Functional Application Control.

Step 4: Open the setting and add any additional, required applications to the list

Note:

Once this script executes, ONLY the applications on this list will run on the endpoint.

Step 5: Associate the Block Gray List scripting rule to this policy

Compliance Reporting

Because of the level and access of the ZSC's drivers, virtually every transaction the endpoint performs can be reported. The endpoint can have each optional system inventory run for troubleshooting and policy creation purposes. To access this control, open the **Compliance Reporting** tab.

Note:

Reporting is not available when running the Stand-Alone Management Console

---

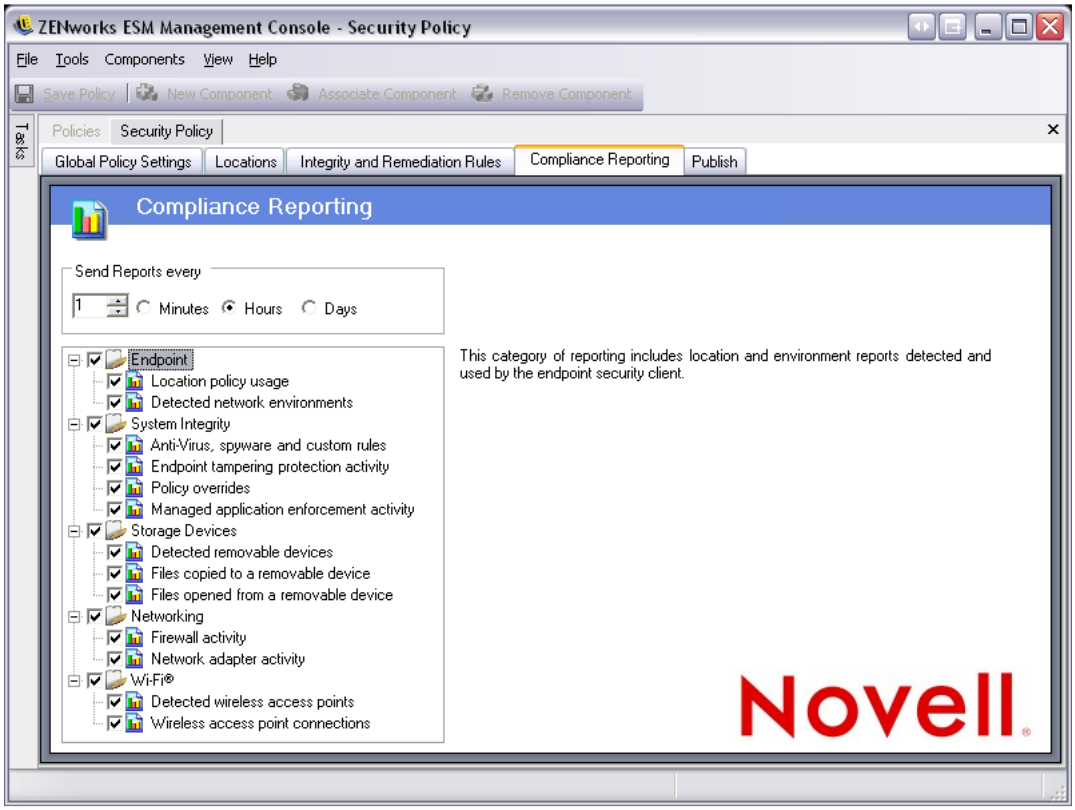


Figure 98: Compliance Reporting

To run compliance reporting for this policy, perform the following steps:

Step 1: Define the Send Time. This is the timeframe that data will be uploaded from the ZSC to the Policy Distribution Service.

Step 2: Check each report category, or type, you wish to capture.

The following reporting features are available:

Endpoint

- **Location policy usage** - the ZENworks Security Client will report all location policies enforced and the duration of that enforcement

- **Detected network environments** - the ZENworks Security Client will report all detected network environment settings

System Integrity

- **Anti-virus, spyware, and custom rules** - the ZENworks Security Client will report the configured integrity messages based on test results
- **Endpoint tampering protection activity** - the ZENworks Security Client will report any attempts to tamper with the security client
- **Policy overrides** - the ZENworks Security Client will report all attempts to initiate the administrative override on the security client
- **Managed application enforcement activity** - the ZENworks Security Client will report all enforcement activities for managed applications

Storage Devices

- **Detected removable devices** - the ZENworks Security Client will report all removable storage devices detected by the security client
- **Files copied to a removable device** - the ZENworks Security Client will report files that are copied to a removable storage device
- **Files opened from a removable device** - the ZENworks Security Client will report files that are opened from a removable storage device

Networking

- **Firewall activity** - the ZENworks Security Client will report all traffic blocked by the firewall configured for the applied location policy. Enabling this report may result in large volumes of data being gathered

WARNING:

The following data can overwhelm a database very quickly when gathered. A test of ONE ZENworks Security Client reported 1,115 data uploads of blocked packets over a 20 hour period. It is recommended that a monitoring and tuning period with a test client in the affected environment be run prior to wide-scale deployment.

- **Network adapter activity** - the ZENworks Security Client will report all traffic activity for a managed network device

Wi-Fi®

- **Detected wireless access points** - the ZENworks Security Client will report all detected access points
- **Wireless access point connections** - the ZENworks Security Client will report all access point connections made by the endpoint

Publishing Security Policies

Completed security policies are sent to the end-users using the publishing mechanism. Once a policy has been published, it can be further updated with the end-user receiving updates at their scheduled check-ins. To publish a policy, click the **Publish** tab. The following information is displayed:

- The current directory tree
- The policy's created and modified dates
- The Refresh and Publish buttons

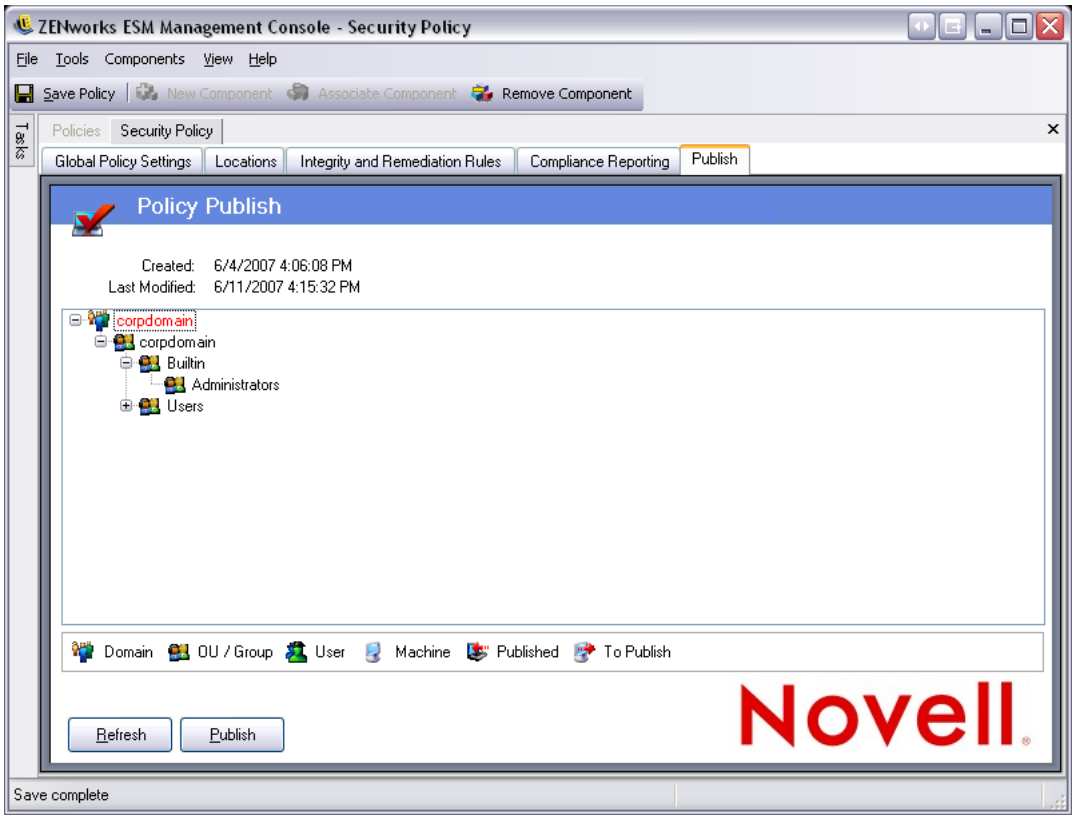


Figure 99: Publish a Security Policy

Based on the current user's publishing permissions, the directory tree may display with one or more of the selections in red. Users will NOT be permitted to publish to any users/groups displayed in red.

Users and their associated groups will not display until they have authenticated to the Management Service. Changes in the corporate directory service may not immediately display in the Management Console. Click Refresh to update the directory tree for the Management Service.

To publish a policy, perform the following steps:

Step 1: Select a user group (or single users) from the directory tree on the left. Double-click the user(s) to select them (if a user group is selected, all users will be included)

Users who have not received the policy will have the  icon next to their name. If a user/group has already received the policy, they will have the  icon next to their name in the directory tree.

To "unselect" a user or group, double-click them again to remove the  icon

Step 2: Click **Publish** to send the policy to the Policy Distribution Service

Updating a Published Policy

Once a policy has been published to the user(s), simple updates can be maintained by editing the components in a policy, and re-publishing. For example, if the ESM Administrator needed to change the WEP key for an access point, they would only need to edit the key, save the policy, and click **Publish**. The affected end-users will receive the updated policy (and the new key) at their next check-in.

Exporting a Policy

Policies may be exported from the Management Console and distributed via email or through a network share. This can be used to distribute enterprise-level policies in environments where multiple Management Services and Policy Editors are deployed.

To export a security policy:

Step 1: Open the File menu and select **Export**

Step 2: Enter a destination, and give the policy a name with an extension of .sen (example: C:\Desktop\salespolicy.sen)

If in doubt, click the **...** button to the right of the field, to browse to a location. The policy will still need to be given a name

Step 3: Click **Export**

TWO files will be exported. The first, is the policy (*.sen file). The second is the SETUP.SEN file, which is required to decrypt the policy at import.

Exported policies MUST be imported into a Management Console before they can be published to managed users.

Importing Policies

A policy can be imported from any file location on the available network.

Step 1: In the Management Console, Open the File menu and select **Import Policy**. If you are currently editing or drafting a policy, the editor will close the policy (prompting you to save it) before opening the import window

Step 2: Enter the file location and file name in the provided field

Step 3: If in doubt, click the ... button to the right of the field, to browse.

Once the policy is imported, it can be further edited, or immediately published.

Exporting Policies to Unmanaged Users

If Unmanaged ZENworks Security Clients have been deployed within the enterprise, a Stand-Alone Management Console MUST be installed to create their policies (see the ESM Installation and Quick Start Guide for installation instructions).

To distribute unmanaged polices, perform the following steps:

Step 1: Locate and copy the Management Console's setup.sen file to a separate folder.

The setup.sen file is generated at installation of the Management Console, and placed in *\Program Files\Novell\ESM Management Console*

Step 2: Create a policy in the Management Console (see Administrator's Manual)

Step 3: Use the Export command to export the policy to the same folder containing the setup.sen file.

All policies distributed MUST be named policy.sen for the ZSC to accept them.

Step 4: Distribute the policy.sen and setup.sen files. These files MUST be copied to the *\Program Files\Novell\ZENworks Security Client* directory for all unmanaged clients.

The Setup.sen file only needs to be copied to the unmanaged ZSCs once, with the first policy. Afterwards, only new policies need to be distributed.

Troubleshooting

Overview

Common issues with ESM can be traced to problems with server operability. The following pages outline specific configuration and troubleshooting tasks that can help you resolve issues on the ESM back-end.

Allowing ASP.NET 1.1 Functions

To run the ESM back-end services on a Windows 2003 web server, ASP.NET 1.1 functions need to be allowed.

Note:

ASP.NET is allowed by default on Windows 2000 servers.

To enable ASP.NET, perform the following steps:

Step 1: Open the Internet Information Services Manager (see Figure 100)

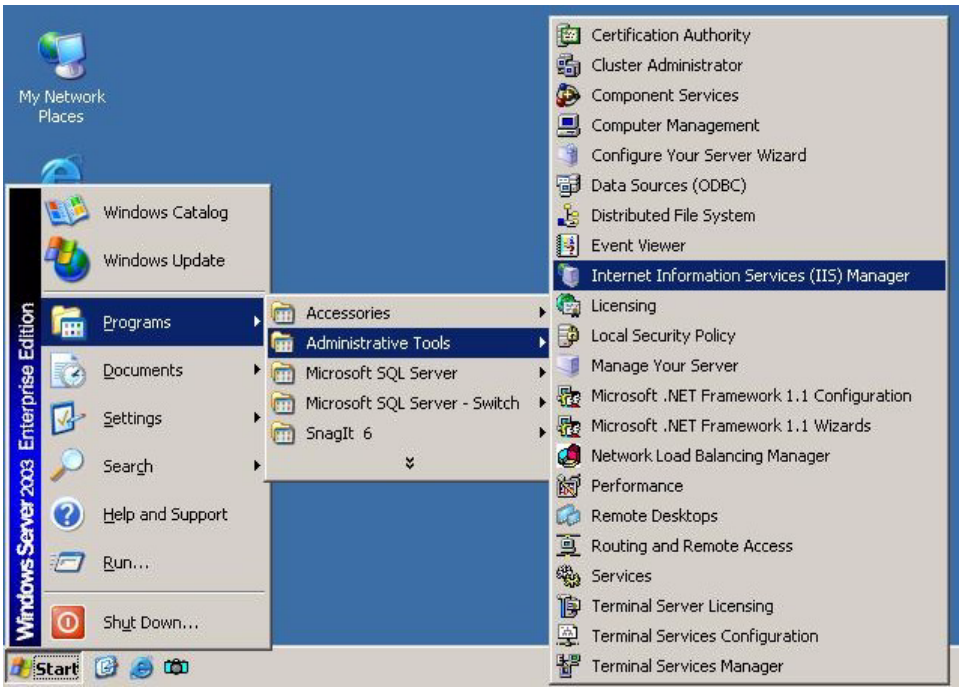


Figure 100: Open IIS Manager

Step 2: Open Web Service Extensions

Step 3: Highlight ASP.NET v1.1.x and click Allow (see Figure 101)

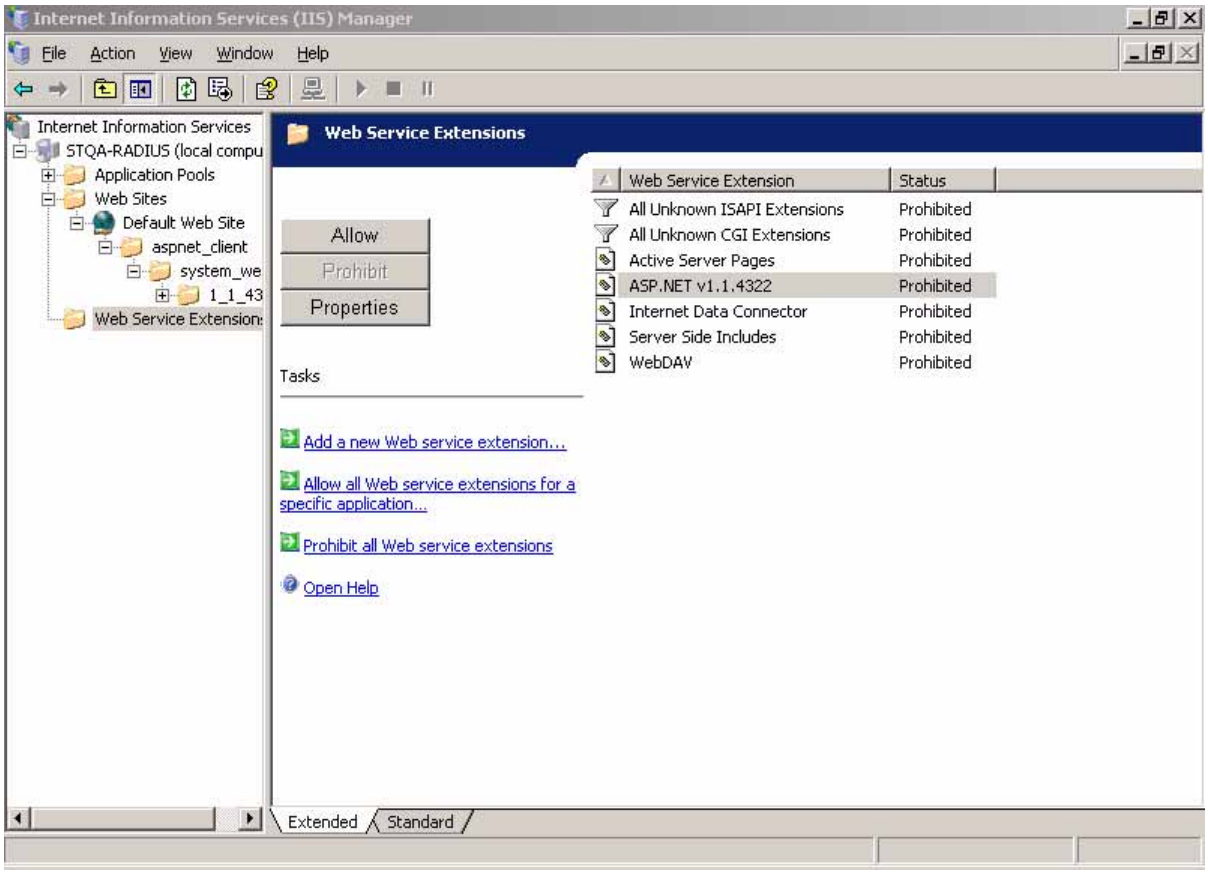


Figure 101: Allowing ASP.NET

Step 4: This will activate the ASP.NET functions, and allow the Policy Distribution Service to function on a Windows 2003 Server

Server Communication Checks

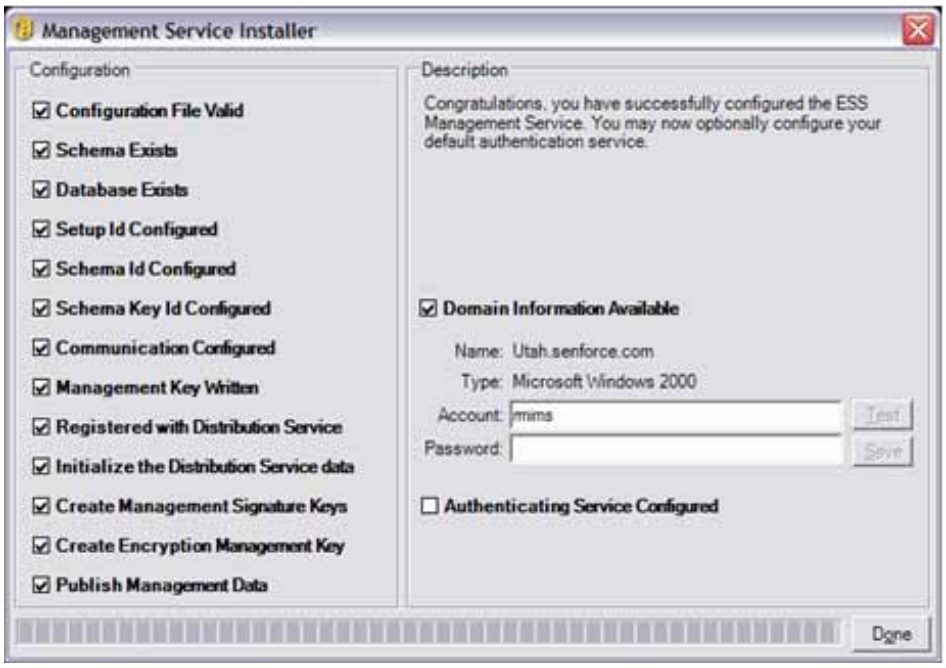


Figure 102: Communications Console

The Communications Console is an initialization and reset utility. The utility will first be run when installing the product. It initializes the Distribution Service with files encrypted and signed by the Management Service. Additionally it allows you to optionally configure a Windows NT or Windows 2000 Active Directory for authentication. Rerunning the Communications Console (**Start/Programs/Novell/Management Service/ESM Communications Console**) will cause you to lose user and log data, however, Policy data will not be deleted.

The Communications Console exercises a majority of the communication requirements for a managed installation and is an excellent last resort tool for resetting and/or diagnosing server communication issues.

If one of the test fails (the check is not marked), mouse over the item to receive instructions on items to check to remedy the situation. Check the Pause Configuration Validation to pause the timer, which will retry the tests every ten seconds.

The test items are as follows:

- **Configuration File Valid**
  This test verifies that the Novell Management Service Installer has received the configuration information entered during installation. If the installation information provided was invalid, or the installation did not successfully communicate the settings to the installer, the Configuration File Valid test will fail.
- **Schema Exists**
  This test verifies that the policy schema is available for publishing to the ESM

Distribution Service. If this test fails, the file is missing or an incorrect path may have been specified by the Management Service Install.

- **Database Exists**
  This test verifies that the Management Service can successfully communicate with the Management Service database and that the database has been populated. If this test failed, communication with the database host may have failed or the account settings used to connect may be incorrect
- **Setup ID Configured**
  This test verifies that the Setup Id generated by the Novell Distribution Service was appropriately written to the Management Service database. If this test fails, the installation process may have been unable to read or write the setting to the Management Service database.
- **Schema ID Configured**
  This test verifies that the unique Novell Distribution Service assigned schema identifier was written to the Management Service database. If this test fails, the installation process may have been unable to read or write the setting to the Management Service database.
- **Schema Key ID Configured**
  This test verifies that the unique Novell Distribution Service assigned schema encryption key identifier was written to the Management Service database. If this test fails, the installation process may have been unable to read or write the setting to the Management Service database.
- **Communication Configured**
  This test verifies that the Management Service has been configured to communicate with the Distribution Service. If this test fails, the installation process may have been unable to specify the location within the Management Service Installer configuration.
- **Management Key Written**
  This test verifies that the unique encryption key used for information security was written to the Management Service database successfully. If this test failed, communication with the database host may have failed or the account settings used to connect may be incorrect.
- **Registered with Distribution Service**
  This test verifies that the Management Service can communicate and establish a secure session identity for policy management. If this test fails, the Management Service may be unable to communicate with the Distribution Service, the SSL certificate may not be trusted, or the Setup Id may be incorrect.
- **Initialize the Distribution Service data**
  This test verifies that the Management Service was able to save the policy schema to the Distribution Service using the assigned Management Service account. If this test fails the installation may have not successfully configured encryption, or the Distribution Service may be unavailable

- **Create Management Signature Keys**
  This test verifies that the unique signature keys used for information security were written to the Management Service database successfully. If this test failed, communication with the database host may have failed, the account settings used to connect may be incorrect or the installation may have failed to configure your server correctly.
- **Create Encryption Management Key**
  This test verifies that the unique encryption management key used for information security was written to the Distribution Service successfully. If this test failed, communication with the Distribution Service host may have failed, or the installation may have failed to configure your server correctly.
- **Publish Management Data**
  This test publishes the schema and encryption management key to all users managed by this Management Service.

If there is a problem or error, the application exception will be logged. The most common issues preventing a successful installation are:

1. **Certificate configuration**. Verify that the certificate is trusted and valid. Ensure that the certificate is placed in a certificate store that the ASP.NET account has access to.
2. **DNS or name resolution issues**. Verify communication with the Distribution Server by opening one of the following URLs:
   - (DS) http://machinename/policyserver/shieldclient.asmx (client)

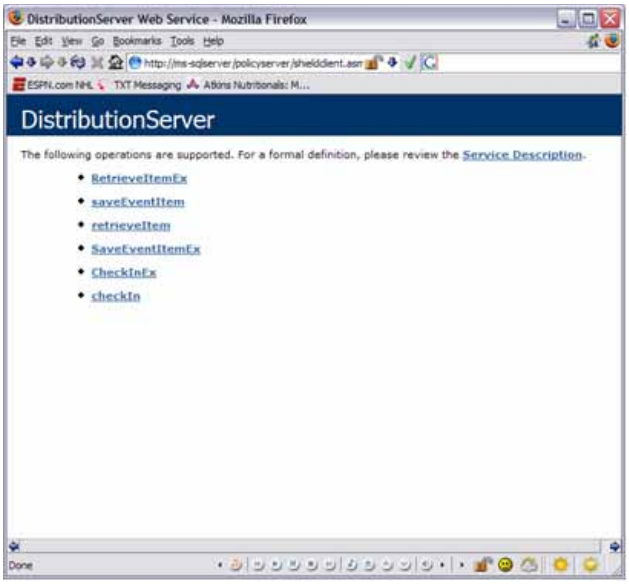


Figure 103: Distribution Service - Client Communication

- (DS) https://machinename/policyserver/policyserver.soap?wsdl (server)

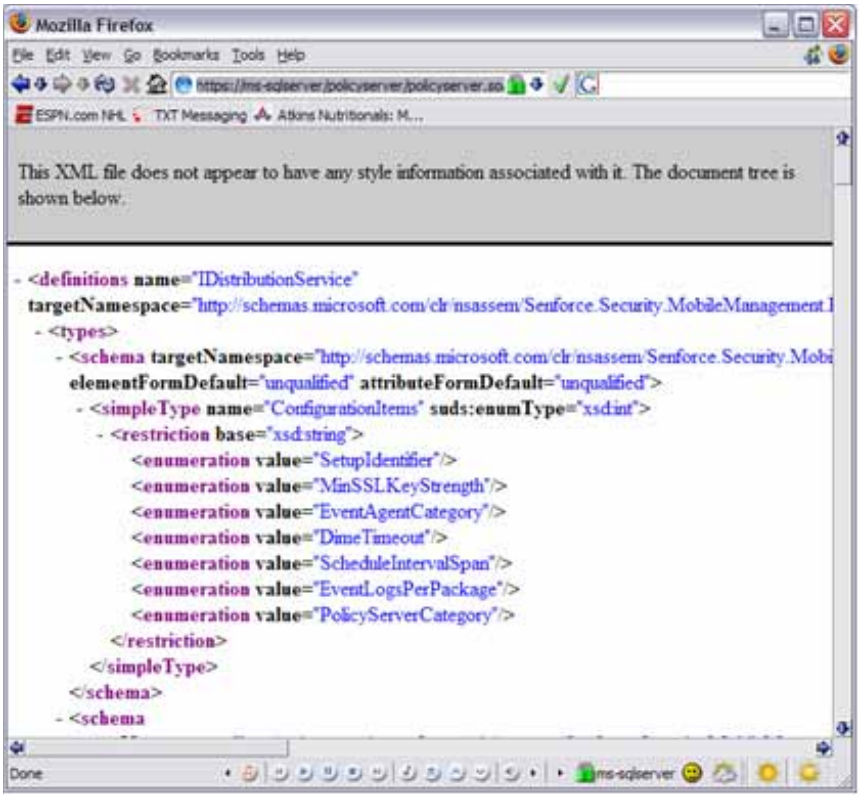


Figure 104: Distribution Service - Server Communication

- (MS) https://machinename/authenticationserver/userservice.asmx (client)

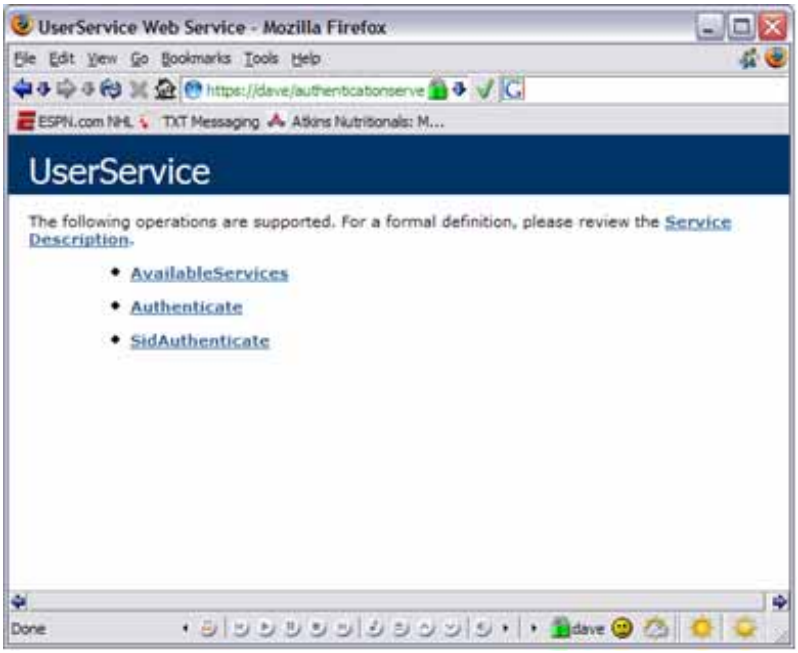


Figure 105: Management Service - Client Communication

- (MS) https://machinename/authenticationhelper/authenicationhelper.soap?wsdl (server)

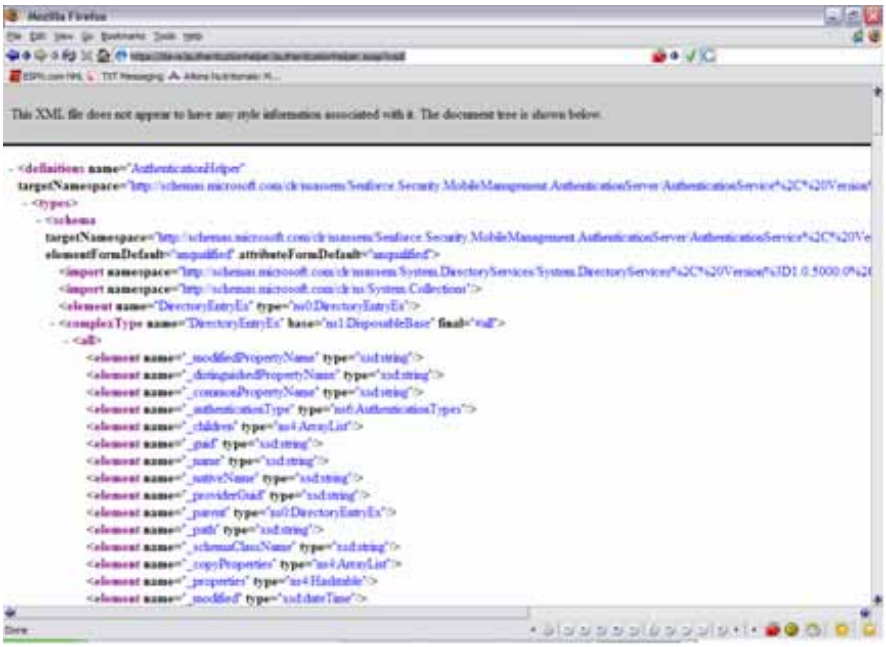


Figure 106: Management Service - Server Communication

Getting Trace Information from the Management Server Agent

Some of the services have tracing built into them by default. Add the following section to the ManagementServerAgent.exe.config file after the "system.runtime.remoting" section and before the "exceptionManagement" section to enable tracing.

```
<system.diagnostics>
  <trace>
    <listeners>
      <add name="EventLogTraceListener"
      type="System.Diagnostics. EventLogTraceListener "
      initializeData="Management Service Agent Debug"/>
    </listeners>
  </trace>
</system.diagnostics>
```

The resulting log will show the following:

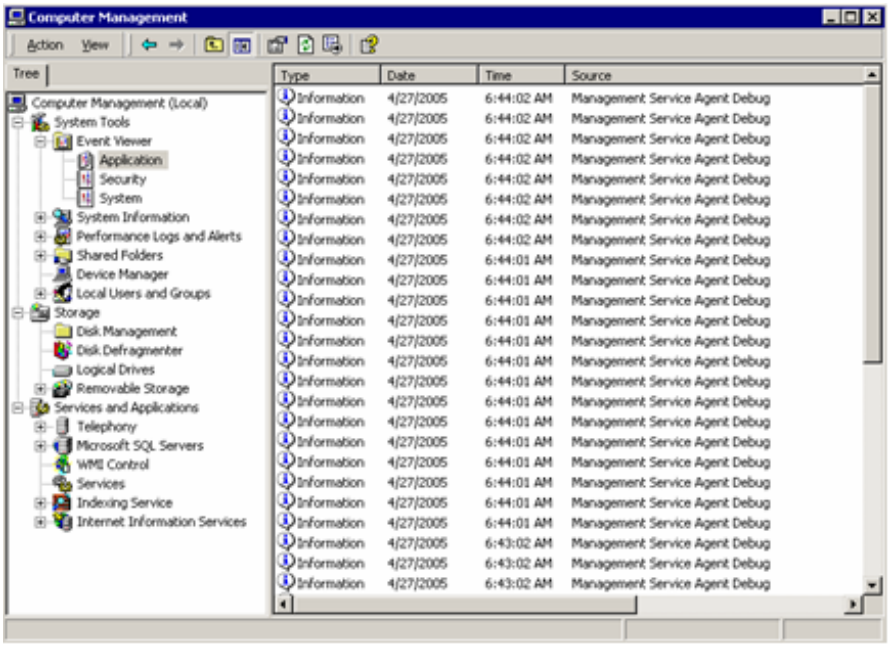


Figure 107: Trace Log

Alternatively, you may option to log the data to a text file, using the same procedure, insert the following section into the configuration file:

```
<system.diagnostics>
  <trace autoflush="true">
    <listeners>
      <add name="TextWriterTraceListener"
      type="System.Diagnostics.TextWriterTraceListener"
      initializeData="C:\MSA_TRACE.LOG"/>
    </listeners>
  </trace>
</system.diagnostics>
```

The trace information will be written to the file specified. Content example below:

```
OnStart
InitTimer
LoadConfiguration
AddSchedule[DirectoryServiceSyncFrequency,1]
AddSchedule[MSMaintenanceFrequency,1440]
AddSchedule[PolicyAndPublishSyncFrequency,1]
AddSchedule[ReportingDataSyncFrequency,1]
AddSchedule[RSMaintenanceFrequency,1440]
AddSchedule[RSNotificationPollFrequency,1]
AddSchedule[UserDataSyncFrequency,1]
AddSchedule[DSReportingPollFrequency,1]
ServiceStartScheduleOverrides
ServiceStartScheduleOverrides->UserDataSyncFrequency,2
ServiceStartScheduleOverrides->ReportingDataSyncFrequency,2
OnStart->Configuring Remoting
```

Troubleshooting SQL Server Issues

System Monitor

System Monitor is a MMC snap-in that lets you view real-time performance data contained in the counters from your server or other servers or workstations on your network. In addition, System Monitor allows you to review performance data that is stored in a log file created with Performance Logs and Alerts snap-in.

Windows 2000 and Windows 2003 are modular, object-oriented operating systems. Each subsystem within the operating system is an object. For example, the CPU is an object, the memory is an object and the storage subsystem is an object. As the server performs various tasks, each of these objects generates performance data.

Each object has several monitoring functions called counters. Each counter offers insight into a different aspect or function of the object. For example, the memory object has counters that measure % Committed Bytes in User and Available Bytes, Page Faults/sec. System Monitor takes the readings from these counters and presents the information to you in a human readable format (numbers or graphs.)

In addition, objects can be separated by instance. Instance is the terminology used to refer to multiple occurrences of the same type of object, such as in a multiprocessor server. A separate instance exists for each processor.

By default, System Monitor is started without any counters displayed. To add counters to be monitored, click the "+" button on the System Monitor menu bar. This opens the Add Counters dialog box shown below (see Figure 108).

Figure 108: Add Counters Dialogue Box

In the Add Counters dialog box, you can make choices from several areas to customize your monitoring needs. The choices found on this dialog box are as follows:

- **Computer** - This option allows you to select whether to add counters from the local computer or any remote computer on your network. You add remote computers using their Universal Naming Convention (UNC) computer name.
- **Performance object** - This is a drop-down list that displays all of the objects that are available for monitoring.
- **Counters** - This option allows you to select either all counters or individual counters from a list. Hold down the Shift or Control key and click the mouse to select multiple items.
- **Instance** - If an object has multiple instances, for example, your server has multiple network cards; you can select each individual instance or all instances.

After selecting each counter, click the Add button to add the counter to the System Monitor display. For a description of each counter, highlight the counter and click the Explain button. When finished, click the Close button.

The number of objects that are available for monitoring will vary by system. Most server services and applications will install their own counters that can be used to monitor performance of those functions.

Each counter can be displayed as a colored line in one of the graph views. Multiple counters from the same system or from remote systems can be viewed simultaneously. The figure below shows you an example of what one of the graph views may look like on your system (see Figure 109).

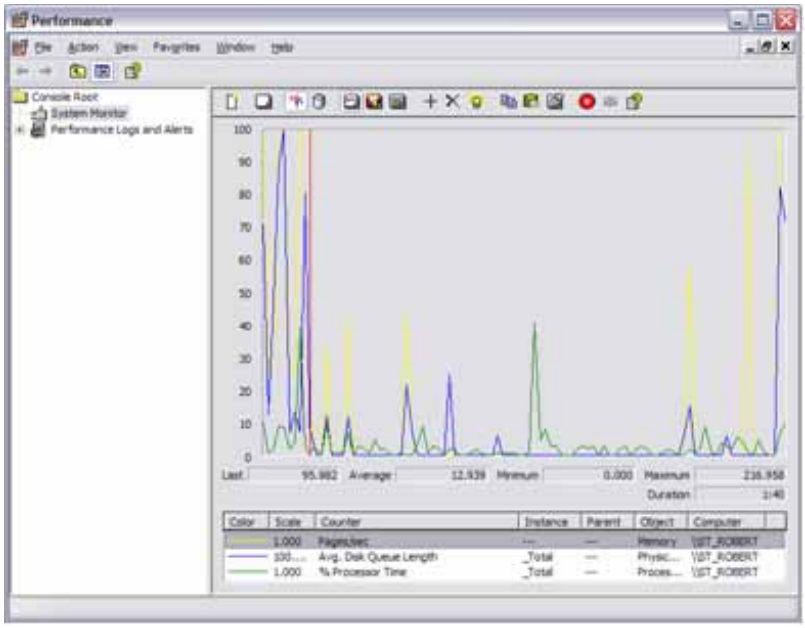


Figure 109: System Monitor Function

Of all the items you can monitor on a typical server, the objects that you need to monitor closely for performance issues are:

- Memory

- Processor
- Physical Disk
- Network

For a managed installation of ESM, the objects that you should monitor in addition are:

- ASP.NET
- ASP.NET Applications (selecting Novell specific instances)
- SQLServer:Access Methods
- SQLServer:Cache Manager
- SQLServer:Databases (selecting Novell specific instances)
- SQLServer:General Statistics
- SQLServer:Memory Manager
- SQLServer:Locks

Securing SQL Database Passwords

The SQL database passwords (if used) are stored as clear text in many of the ESM config files, and can present a security hole. To encrypt the passwords, the following is recommended:

Update the connection strings with an Integrated Security value.

This is an example of a connection string to an OleDb compliant data source, containing a User name and password:

<add key="NovellMSConnectionString" value="Provider=sqloledb;Data Source=ACME_MAIN;Initial Catalog=STMSDB;User Id=ST_STMSDB_USER;Password=abc123;" />

Replace the User Id and Password values with the value: Integrated Security=SSPI.

Example:

<add key="NovellMSConnectionString" value="Provider=sqloledb;Data Source=ACME_MAIN;Initial Catalog=STMSDB;Integrated Security=SSPI;" />

The file locations for the relevant connection strings are:

- \Program Files\Novell\ESM Management Console\PolicyEditor.exe.config
- \Program Files\Novell\ESM Standalone Management Console\UnmanagedEditor.exe.config
- \Program Files\Novell\ESM Standalone Management Console\UnmanagedEditorInstaller.exe.config
- \Program Files\Novell\ESM Distribution Service\PolicyServer\web.config
- \Program Files\Novell\ESM Distribution Service\PolicyServer\bin\AgentService.exe.config
- \Program Files\Novell\ESM Management Service\AuthenticationLib\web.config
- \Program Files\Novell\ESM Management Service\AuthenticationLiB\bin\AgentService.exe.config
- \Program Files\Novell\ESM Management Service\AuthenticationServer\web.config
- \Program Files\Novell\ESM Management Service\AuthenticationServer\bin\ManagementServerAgent.exe.config
- \Program Files\Novell\ESM Management Service\AuthenticationServer\bin\ManagementServerInstaller.exe.config
- \Program Files\Novell\ESM Management Service\Reporting\web.config

Microsoft SQL Profiler

SQL Profiler is a graphical tool that allows system administrators to monitor events in an instance of Microsoft® SQL Server™. You can capture and save data about each event to a file or SQL Server table to analyze later. For example, you can monitor a production environment to see which stored procedures (a group of Transact-SQL statements compiled into a single execution plan) are hampering performance by executing too slowly.

Use SQL Profiler to monitor only the events in which you are interested. If traces are becoming too large, you can filter them based on the information you want, so that only a subset of the event data is collected. Monitoring too many events adds overhead to the server and the monitoring process and can cause the trace file or trace table to grow very large, especially when the monitoring process takes place over a long period of time.

After you have traced events, SQL Profiler allows captured event data to be replayed against an instance of SQL Server, thereby effectively re-executing the saved events as they occurred originally.

Use SQL Profiler to:

- Monitor the performance of an instance of SQL Server.
- Debug Transact-SQL statements and stored procedures.
- Identify slow-executing queries.
- Test SQL statements and stored procedures in the development phase of a project by single-stepping through statements to confirm that the code works as expected.
- Troubleshoot problems in SQL Server by capturing events on a production system and replaying them on a test system. This is useful for testing or debugging purposes and allows users to continue using the production system without interference.
- Audit and review activity that occurred on an instance of SQL Server. This allows a security administrator to review any of the auditing events, including the success and failure of a login attempt and the success and failure of permissions in accessing statements and objects.

SQL Profiler provides a graphical user interface to a set of stored procedures that can be used to monitor an instance of SQL Server. For example, it is possible to create your own application that uses SQL Profiler stored procedures to monitor SQL Server.

You must have at least 10 megabytes (MB) of free space to run SQL Profiler. If free space drops below 10 MB while you are using SQL Profiler, all SQL Profiler functions will stop.

SQL Profiler Terminology

To use SQL Profiler, you need to understand the terminology that describes the way the tool functions. For example, you create a template that defines the data you want to collect. You collect this data by running a trace on the events defined in the template. While the trace is

running, the event classes and data columns that describe the event data are displayed in SQL Profiler.

Template

A template defines the criteria for each event you want to monitor with SQL Profiler. For example, you can create a template, specifying which events, data columns, and filters to use. Then you can save the template and launch a trace with the current template settings. The trace data captured is based upon the options specified in the template. A template is not executed, and must be saved to a file with the .tdf extension.

Trace

A trace captures data based upon the selected events, data columns, and filters. For example, you can create a template to monitor exception errors. To do this, you would select to trace the Exception event class, and the Error, State, and Severity data columns, which need to be collected for the trace results to provide meaningful data. After you save the template, you can then run it as a trace, and collect data on any Exception events that occur in the server. This trace data can be saved and then replayed at a later date, or used immediately for analysis.

Filter

When you create a trace or template, you can define criteria to filter the data collected by the event. If traces are becoming too large, you can filter them based on the information you want, so that only a subset of the event data is collected. If a filter is not set, all events of the selected event classes are returned in the trace output. For example, you can limit the Microsoft® Windows® 2000 user names in the trace to specific users, reducing the output data to only those users in which you are interested.

Event Category

An event category defines the way events are grouped. For example, all lock events classes are grouped within the Locks event category. However, event categories only exist within SQL Profiler. This term does not reflect the way engine events are grouped.

Event

An event is an action generated within the Microsoft SQL Server™ engine. For example:

- The login connections, failures, and disconnections.
- The Transact-SQL SELECT, INSERT, UPDATE, and DELETE statements.
- The remote procedure call (RPC) batch status.
- The start or end of a stored procedure.
- The start or end of statements within stored procedures.
- The start or end of an SQL batch.
- An error written to the SQL Server error log.
- A lock acquired or released on a database object.

- An opened cursor.
- Security permissions checks.

All of the data that is generated as a result of an event is displayed in the trace in a single row. This row contains columns of data called event classes that describe the event in detail.

Event Class

An event class is the column that describes the event that was produced by the server. The event class determines the type of data collected, and not all data columns are applicable to all event classes. Examples of event classes include:

"SQL:BatchCompleted, which indicates the completion of an SQL batch.

"The name of the computer on which the client is running.

"The ID of the object affected by the event, such as a table name.

"The SQL Server name of the user issuing the statement.

"The text of the Transact-SQL statement or stored procedure being executed.

"The time the event started and ended.

Data Column

The data columns describe the data collected for each of the event classes captured in the trace. Because the event class determines the type of data collected, not all data columns are applicable to all event classes. For example, the Binary Data data column, when captured for the Lock:Acquired event class, contains the value of the locked page ID or row but has no value for the Integer Data event class. Default data columns are populated automatically for all event classes.

Common SQL Profiler Actions

To Start a Trace:

Step 1: On the Start menu, point to Programs/Microsoft SQL Server, and then click Enterprise Manager.

Step 2: On the Tools menu, click SQL Profiler.

To add a filter to a Trace:

Step 1: On the File menu, point to Open, and then click Trace Template.

Step 2: Select the trace template to open.

Step 3: In the Trace Template Properties dialog box, click the Filters tab.

Step 4: In the Trace event criteria list, click a criterion.

Step 5: Enter a value in the field that appears beneath the criterion.

To Stop a Trace:

Step 1: Select a running trace.

Step 2: On the File menu, click Stop Trace, or close a trace window.

To Save Trace results:

Step 1: On the File menu, point to New, and then click Trace.

Step 2: In the Connect to SQL Server dialog box, select the server to which you want to connect and a connection method.

Step 3: In the Trace name box, type a name for the trace, and then select the Save to file check box.

Step 4: Set the maximum file size in the Set maximum file size (MB) check box. You must set the maximum file size if you are saving trace results to a file.

Step 5: Optionally, after saving the file, do the following:

- Select the Enable file rollover check box, which creates new files to store the trace data if the maximum file size is reached. This option is selected by default when you are saving trace results to a file.
- Select the Server processes SQL Server trace data check box.
- To avoid missing events, select this option.

Tracing Novell Database Installations

The Novell Database architecture uses stored procedures extensively throughout. It is important to be able to identify these interactions processes for debugging the system.

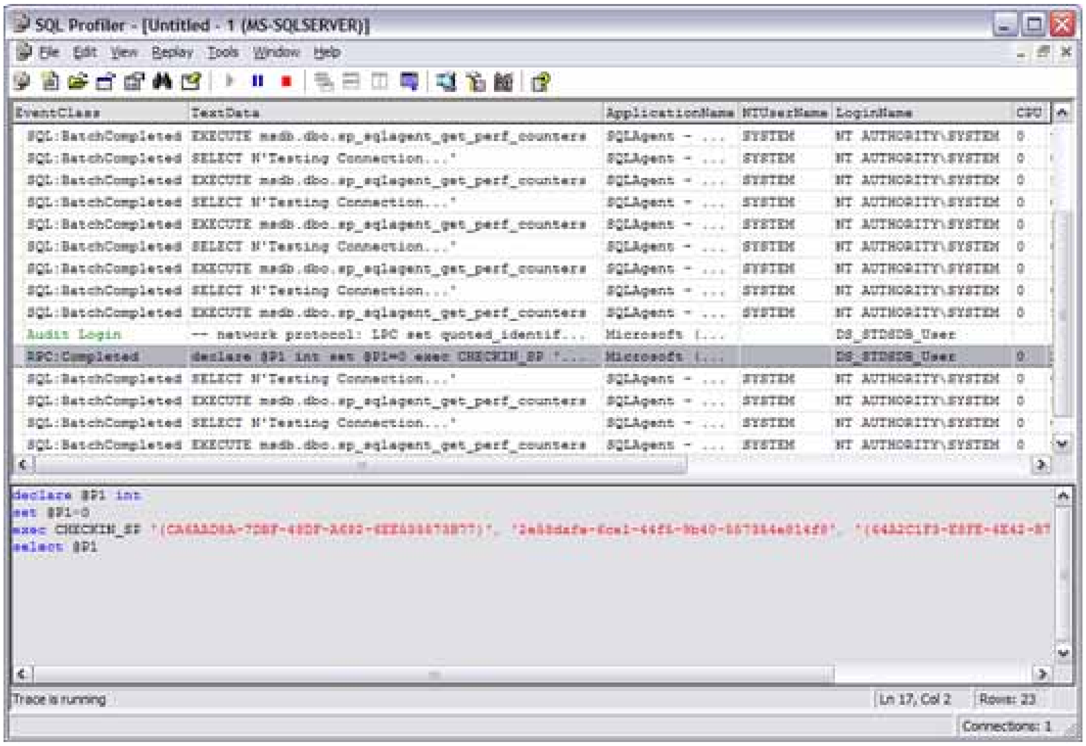


Figure 110: Database Tracing

The highlighted row represents a client check-in to the Distribution Service. The statement, decomposed shows the following:

Return Variable declaration: declare @P1 int

Return Variable assignment: set @P1=0

Call to Stored Procedure: exec CHECKIN_SP

User Credential: '{CA6AAD8A-7DBF-48DF-A682-6EE535573B77}',

Policy Id: '2e58dafe-6ce1-44f5-9b40-557354e814f8',

Location Id: '{64A2C1F3-E8FE-4E42-B77B-4C21A4C305BC}',

Result Code: @P1 output

If you are having difficulty getting the client to download a published policy, performing a trace and capturing the Check In call will aide in identifying whether or not a user has a policy assigned. In this example, using the captured SQL state above, open SQL Query Analyzer from the Tools Menu and connect to the Novell Distribution Service database instance. Paste the text captured from the trace into the window and run the query (F5, Ctrl-E or press the Play button.)

If the user has items assigned to him/her through publishing, you will receive rows. In every case, you will receive a result code as demonstrated below:

In this example we see that the user has a schema, policies, SUS files and an EFS key published (determined by the TypeId column.) The result code returned from the call, 0, indicates success.

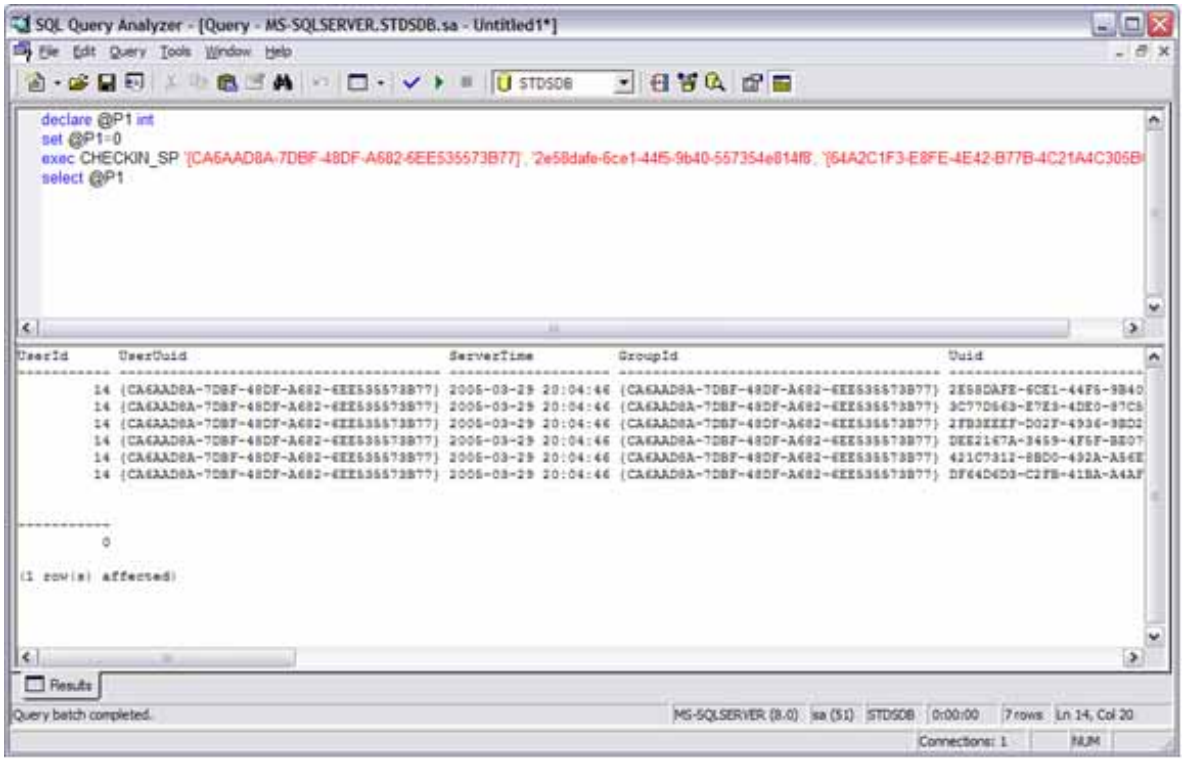


Figure 111: Trace Sample

The following outlines the result codes and types with their meanings:

0 = Success

1 = Unable to Communicate with Distribution Server (Client Only, rare)

2 = Failure at Distribution Service (Server Error, bad)

3 = Invalid Credential from client (Maybe not yet replicated)

4 = Invalid Argument (Data submitted from client was malformed)

5 = Failure at SOAP Client (common communications issue, check DNS, Certs, etc.)

6 = User Not associated to Group

7 = Client Communications Unsupported (rare)

10 = Non-SSL request failure (rare)

11 = Non SOAP request failure (rare)

Type Id:

53 = Policy

51 = Component

40 = Encryption Key

49 = Policy Signature

58 = Schema

54 = License

48 = SUS File

Event Logs

The Servers all log very extensive information on exception, for example:

General Information

****

Additional Info:

ExceptionManager.MachineName: EMSM25-DEV

ExceptionManager.TimeStamp: 3/15/2005 7:52:31 PM

ExceptionManager.FullName: Microsoft.ApplicationBlocks.ExceptionManagement, Version=1.0.1616.15402, Culture=neutral, PublicKeyToken=null

ExceptionManager.AppDomainName: managementserveragent.exe

ExceptionManager.ThreadIdentity:

ExceptionManager.WindowsIdentity: NT AUTHORITY\SYSTEM

1) Exception Information

****

Exception Type: System.Data.OleDb.OleDbException

ErrorCode: -2147217871

Errors: System.Data.OleDb.OleDbErrorCollection

Message: Timeout expired

Source: Microsoft OLE DB Provider for SQL Server

TargetSite: Int32 NextResults(IMultipleResults, System.Data.OleDb.OleDbConnection, System.Data.OleDb.OleDbCommand)

HelpLink: NULL

StackTrace Information

****

at System.Data.OleDb.OleDbDataReader.NextResults(IMultipleResults imultipleResults, OleDbConnection connection, OleDbCommand command)

at System.Data.OleDb.OleDbCommand.ExecuteReaderInternal(CommandBehavior behavior, String method)

at System.Data.OleDb.OleDbCommand.ExecuteNonQuery()

at Novell.ApplicationBlocks.Data.OleDbHelper.ExecuteNonQuery(OleDbConnection connection, CommandType commandType, String commandText, OleDbParameter[] commandParameters)

at Novell.ApplicationBlocks.Data.OleDbHelper.ExecuteNonQuery(String connectionString, CommandType commandType, String commandText, OleDbParameter[] commandParameters)

at Novell.Security.MobileManagement.AuthenticationServer.AuthenticationAgentServices.ExecuteAuditProcedure(String procedureName)

at Novell.Security.MobileManagement.AuthenticationServer.AuthenticationAgentServices.Process(AgentProcess processType, Int32& processActions)

Event Type: Error

Event Source: Novell Management Service Agent 3.0

Event Category: None

Event ID: 0

Date: 3/15/2005

Time: 7:52:41 PM

User: N/A

Computer: EMSM25-DEV

Description:

When troubleshooting an issue, it is important to review the Application Event Log to learn of any Novell exceptions that may have occurred during processing. Exceptions will and do occur under normal operation, however, they will be an indication as to where the problem may be in the system when diagnosing issues.

Microsoft SQL Enterprise Manager

SQL Server Enterprise Manager is the primary administrative tool for Microsoft® SQL Server™ 2000 and provides a Microsoft Management Console (MMC)-compliant user interface that allows users to:

- Define groups of servers running SQL Server.
- Register individual servers in a group.
- Configure all SQL Server options for each registered server.
- Create and administer all SQL Server databases, objects, logins, users, and permissions in each registered server.
- Define and execute all SQL Server administrative tasks on each registered server.
- Design and test SQL statements, batches, and scripts interactively by invoking SQL Query Analyzer.
- Invoke the various wizards defined for SQL Server.

MMC is a tool that presents a common interface for managing different server applications in a Microsoft Windows® network. Server applications provide a component called an MMC snap-in that presents MMC users with a user interface for managing the server application. SQL Server Enterprise Manager is the Microsoft SQL Server 2000 MMC snap-in.

To launch SQL Server Enterprise Manager, select the Enterprise Manager icon in the Microsoft SQL Server program group. On computers running Windows 2000, you can also launch SQL Server Enterprise Manager from Computer Management in Control Panel. MMC snap-ins launched from Computer Management do not have the ability to open child windows enabled by default. You may have to enable this option to use all the SQL Server Enterprise Manager features.

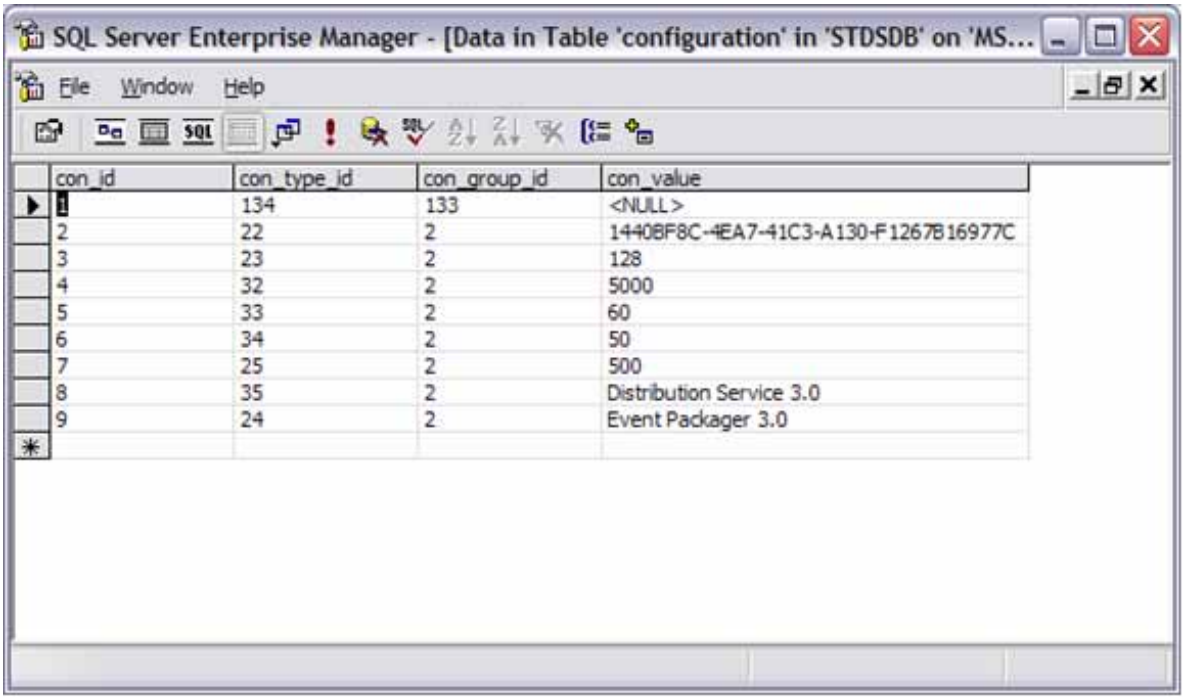
When examining Novell installations, the tables of interest, per database, are as follows:

Distribution Service

CONFIGURATION: Contains the settings used for the Distribution Service and Event Packager Agent Windows Service.

The settings, in storage order are:

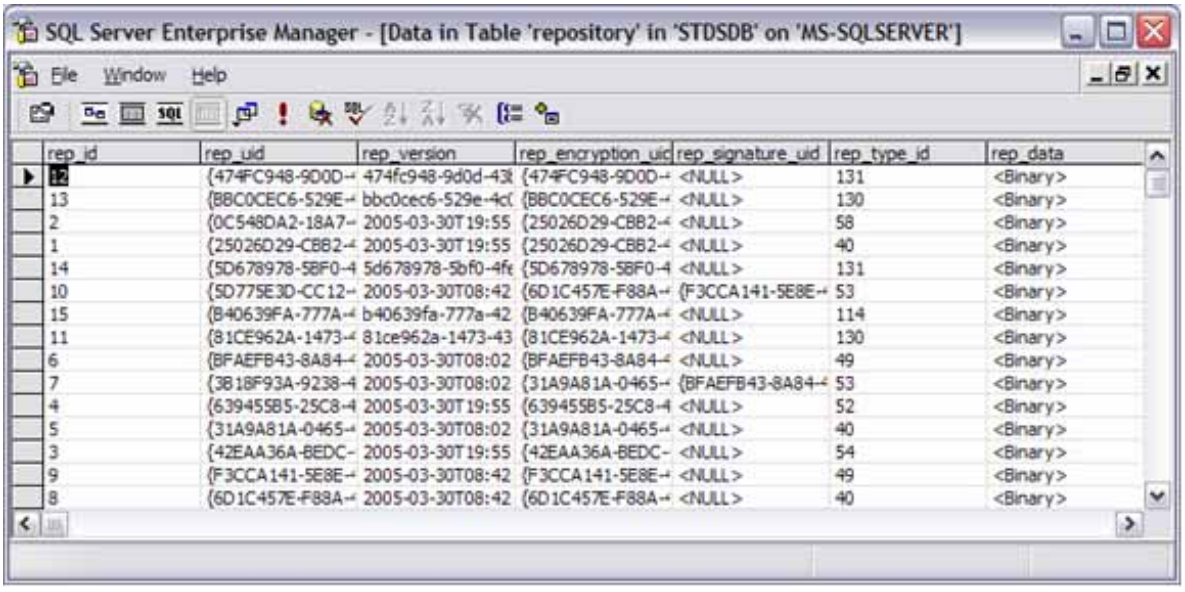
3. Distribution Server Role (future)
4. Setup ID
5. Minimum SSL Key Length
6. DIME Timeout
7. Schedule Interval for Event Packager (minutes)
8. Minimum Client Packages to add to Reporting Package
9. Maximum Client Packages to add to Reporting Package
10. Distribution Service Counter Category
11. Event Packager Service Counter Category



con_id	con_type_id	con_group_id	con_value
1	134	133	<NULL>
2	22	2	1440BF8C-4EA7-41C3-A130-F1267B16977C
3	23	2	128
4	32	2	5000
5	33	2	60
6	34	2	50
7	25	2	500
8	35	2	Distribution Service 3.0
9	24	2	Event Packager 3.0

Figure 112: Example Configuration Table

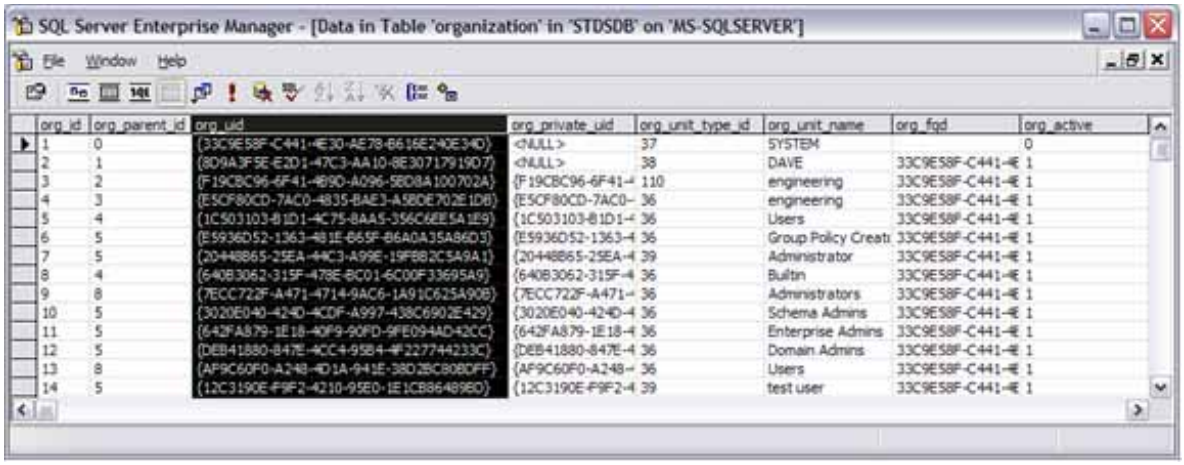
REPOSITORY: Contains the binary data for reporting, policies, etc.



rep_id	rep_uid	rep_version	rep_encryption_uid	rep_signature_uid	rep_type_id	rep_data
12	{474FC948-9D0D-…	474fc948-9d0d-43…	{474FC948-9D0D-…	<NULL>	131	<Binary>
13	{B8C0CEC6-529E-…	bbc0cec6-529e-4c…	{B8C0CEC6-529E-…	<NULL>	130	<Binary>
2	{0C548DA2-18A7-…	2005-03-30T19:55…	{25026D29-CBB2-…	<NULL>	58	<Binary>
1	{25026D29-CBB2-…	2005-03-30T19:55…	{25026D29-CBB2-…	<NULL>	40	<Binary>
14	{5D678978-5BF0-…	5d678978-5bf0-4f…	{5D678978-5BF0-…	<NULL>	131	<Binary>
10	{5D775E3D-CC12-…	2005-03-30T08:42…	{6D1C457E-F88A-…	{F3CCA141-5E8E-…	53	<Binary>
15	{B40639FA-777A-…	b40639fa-777a-42…	{B40639FA-777A-…	<NULL>	114	<Binary>
11	{81CE962A-1473-…	81ce962a-1473-43…	{81CE962A-1473-…	<NULL>	130	<Binary>
6	{BFAEFB43-8A84-…	2005-03-30T08:02…	{BFAEFB43-8A84-…	<NULL>	49	<Binary>
7	{3B18F93A-9238-…	2005-03-30T08:02…	{31A9A81A-0465-…	{BFAEFB43-8A84-…	53	<Binary>
4	{639455B5-25C8-…	2005-03-30T19:55…	{639455B5-25C8-…	<NULL>	52	<Binary>
5	{31A9A81A-0465-…	2005-03-30T08:02…	{31A9A81A-0465-…	<NULL>	40	<Binary>
3	{42EAA36A-BEDC-…	2005-03-30T19:55…	{42EAA36A-BEDC-…	<NULL>	54	<Binary>
9	{F3CCA141-5E8E-…	2005-03-30T08:42…	{F3CCA141-5E8E-…	<NULL>	49	<Binary>
8	{6D1C457E-F88A-…	2005-03-30T08:42…	{6D1C457E-F88A-…	<NULL>	40	<Binary>

Figure 113: Example Repository Table

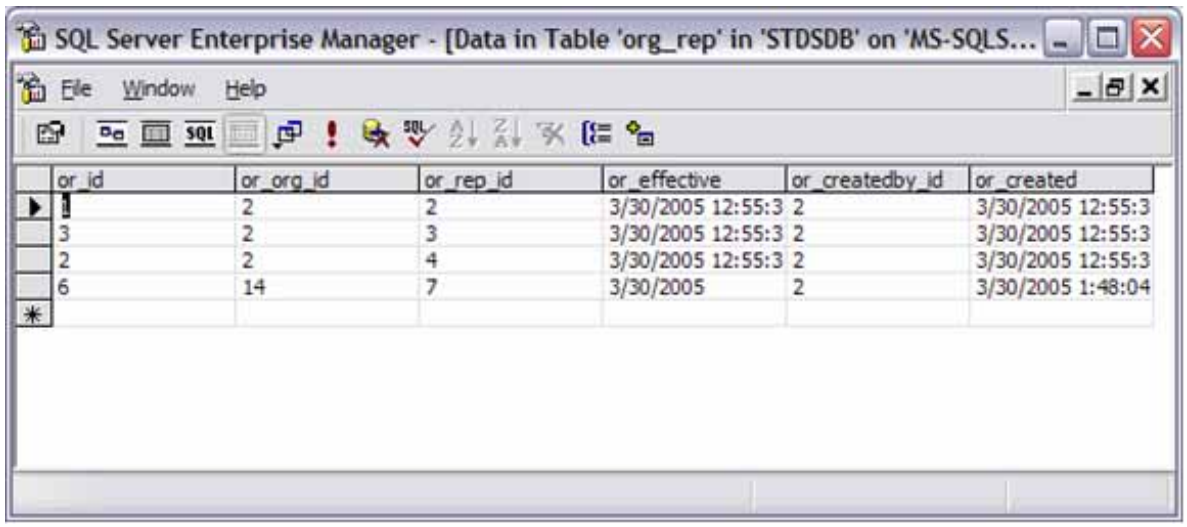
ORGANIZATION: Contains the user and group information. The ORG_UID represents the credential assigned to the user.



org_id	org_parent_id	org_uid	org_private_uid	org_unit_type_id	org_unit_name	org_fqd	org_active
1	0	{33C9E58F-C441-4E30-AE78-B616E240E34D}	<NULL>	37	SYSTEM		0
2	1	{8D9A3F5E-E2D1-47C3-AA10-8E3071791907}	<NULL>	38	DAVE	33C9E58F-C441-4E	1
3	2	{F19CBC96-6F41-489D-A096-5BD8A1007024}	{F19CBC96-6F41-4	110	engineering	33C9E58F-C441-4E	1
4	3	{E5CF80CD-7AC0-4835-BAE3-A5BDE702E1DB}	{E5CF80CD-7AC0-	36	engineering	33C9E58F-C441-4E	1
5	4	{1C503103-B1D1-4C75-BAA5-356C6EE5A1E9}	{1C503103-B1D1-4	36	Users	33C9E58F-C441-4E	1
6	5	{E5936D52-1363-481E-B65F-B6A0A35A86D3}	{E5936D52-1363-4	36	Group Policy Creati	33C9E58F-C441-4E	1
7	5	{20448B65-25EA-44C3-A99E-19FBB2C5A9A1}	{20448B65-25EA-4	39	Administrator	33C9E58F-C441-4E	1
8	4	{640B3062-315F-478E-BC01-6C00F33695A9}	{640B3062-315F-4	36	Builtin	33C9E58F-C441-4E	1
9	8	{7ECC722F-A471-4714-9AC6-1A91C625A90B}	{7ECC722F-A471-4	36	Administrators	33C9E58F-C441-4E	1
10	5	{3020E040-424D-4CDF-A997-438C6902E429}	{3020E040-424D-4	36	Schema Admins	33C9E58F-C441-4E	1
11	5	{642FA879-1E18-40F9-90FD-9FE094AD42CC}	{642FA879-1E18-4	36	Enterprise Admins	33C9E58F-C441-4E	1
12	5	{DEB41880-847E-4CC4-95B4-4F227744233C}	{DEB41880-847E-4	36	Domain Admins	33C9E58F-C441-4E	1
13	8	{AF9C60F0-A248-4D1A-941E-38D2BC80BDFF}	{AF9C60F0-A248-4	36	Users	33C9E58F-C441-4E	1
14	5	{12C3190E-F9F2-4210-95E0-1E1CB86489BD}	{12C3190E-F9F2-4	39	test user	33C9E58F-C441-4E	1

Figure 114: Example Organization Table

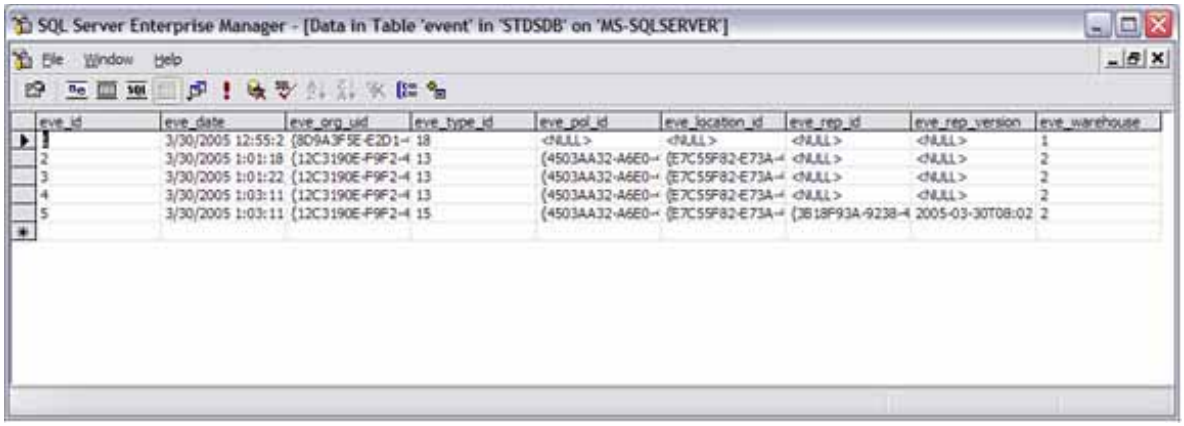
ORG_REP: Contains the Item to User and Item to Group assignments.



or_id	or_org_id	or_rep_id	or_effective	or_createdby_id	or_created
1	2	2	3/30/2005 12:55:3	2	3/30/2005 12:55:3
3	2	3	3/30/2005 12:55:3	2	3/30/2005 12:55:3
2	2	4	3/30/2005 12:55:3	2	3/30/2005 12:55:3
6	14	7	3/30/2005	2	3/30/2005 1:48:04

Figure 115: Example ORG_REP Table

EVENT: Contains log of user events used for reporting.



eve_id	eve_date	eve_org_uid	eve_type_id	eve_pol_id	eve_location_id	eve_rep_id	eve_rep_version	eve_warehouse
1	3/30/2005 12:55:2	{8D9A3F5E-E2D1-	18	<NULL>	<NULL>	<NULL>	<NULL>	1
2	3/30/2005 1:01:18	{12C3190E-F9F2-4	13	{4503AA32-A6E0-	{E7C55F82-E73A-	<NULL>	<NULL>	2
3	3/30/2005 1:01:22	{12C3190E-F9F2-4	13	{4503AA32-A6E0-	{E7C55F82-E73A-	<NULL>	<NULL>	2
4	3/30/2005 1:03:11	{12C3190E-F9F2-4	13	{4503AA32-A6E0-	{E7C55F82-E73A-	<NULL>	<NULL>	2
5	3/30/2005 1:03:11	{12C3190E-F9F2-4	15	{4503AA32-A6E0-	{E7C55F82-E73A-	{3B18F93A-9238-4	2005-03-30T08:02	2

Figure 116: Example Event Table

EVENT_CLIENTDATA: Contains the data uploaded by the client (can be manually retrieved using TEXTCOPY or NovellDBIO).

Note:

Contents of this table will fluctuate as data is packaged for the Management Service.

Management Service

CONFIGURATION: Contains the settings used for the Management Service and Management Agent Windows Service.

The settings, in storage order are:

12. Management Server Credential
13. Distribution Service URL
14. Distribution Service Schema Id
15. Distribution Service Schema Key Id
16. Distribution Service License Id
17. Authentication Service Counter Category
18. Authentication Service Minimum SSL Key Strength
19. Management Service KMK
20. Management Service Private Key
21. Distribution Service Remoting Timeout
22. Management Service Agent Counter Category
23. Distribution Service Setup Id
24. Management Service Public Key
25. Directory Service Synchronize Frequency
26. Policy and Publish Synchronize Frequency
27. Reporting Data Synchronize Frequency
28. User Data Synchronize Frequency

29. Distribution Server Reporting Poll Frequency
30. Report Server Notification Poll Frequency (future)
31. Management Service Maintenance Frequency
32. Report Service Maintenance Frequency
33. Distribution Service Virtual Directory (SSI)
34. Management Service Virtual Directory (SSI)
35. Distribution Service SUS File Id

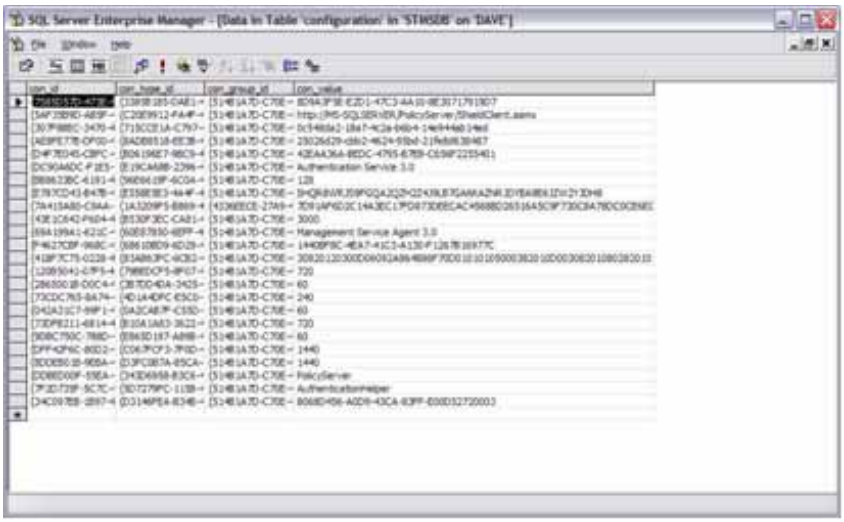


Figure 117: Example Configuration Table

These settings are managed from the Management Service Configuration form.

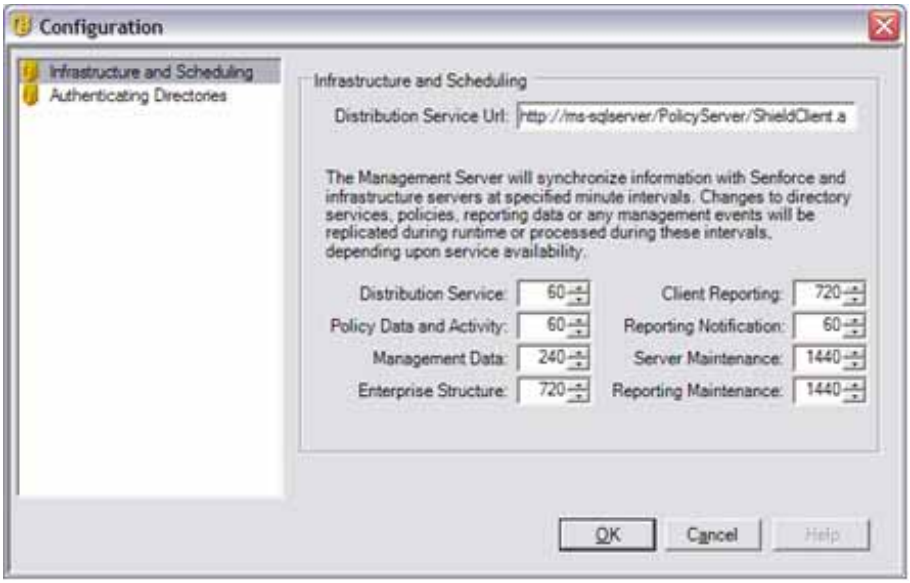


Figure 118: Configuration Form

ORGANIZATION: Contains the user and group information. The ORG_UID represents the credential assigned to the user.

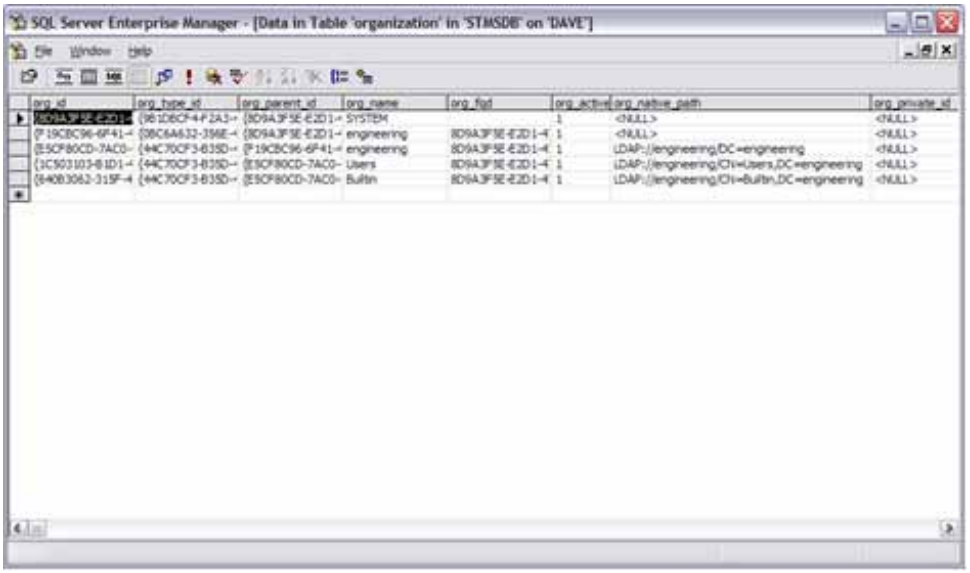


Figure 119: Example Organization Table

ORGANIZATION_AUDIT: Contains user replication information status. If oa_replicated is 0, then the account has not yet been moved to the Distribution Service by the Management Service Agent. If the oa_warehouse is 0, then the account has not yet been moved to the Reporting Service by the Management Service Agent.

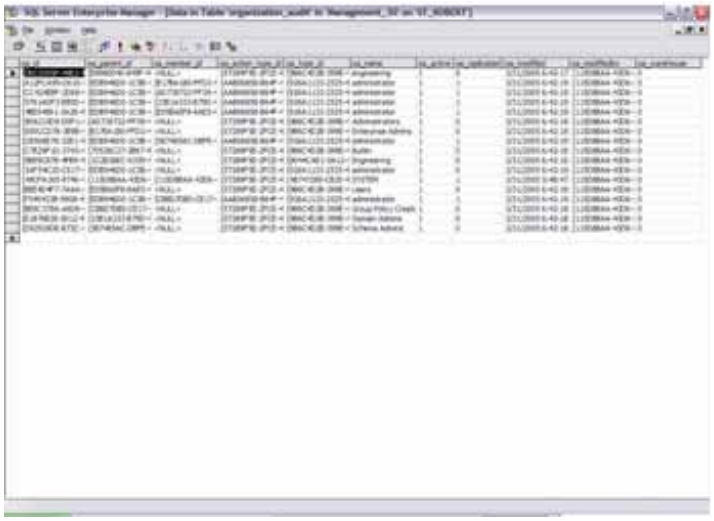


Figure 120: Organization Audit Table

PUBLISH_ORGANIZATION_AUDIT: Contains the user to policy (poa_ref_id) association to be published to the user or group on the Distribution Service. If poa_replicated is 0, the policy has not yet been published to the user. The Management Server Agent configuration (Distribution Service) will affect this synchronization frequency.

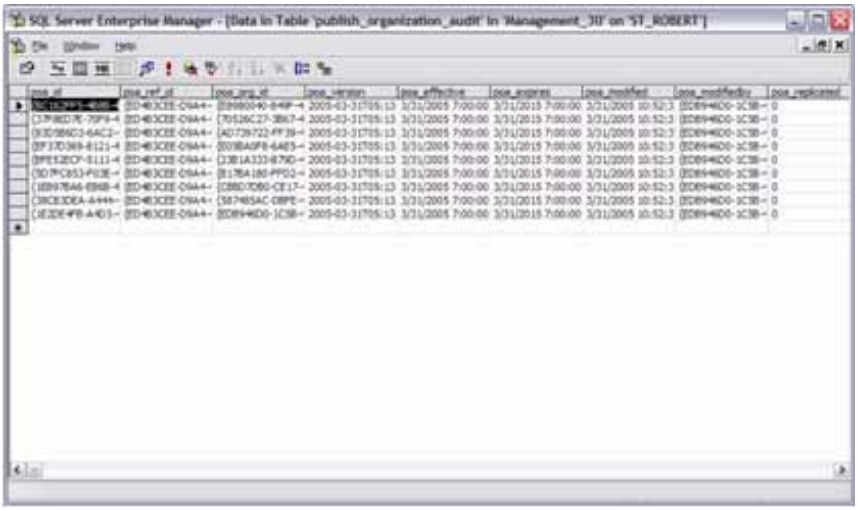


Figure 121: Example Publish_Organization_Audit Table

Acronym Glossary

ACL	Access Control List
AP	Access Point
ARP	Address Request Protocol
CLAS	Client Locations Assurance Service
DHCP	Dynamic Host Configuration Protocol
DMZ	De-Militarized Zone
DNS	Domain Name System
EAP	Extensible Access Protocol
ESM	ZENworks Endpoint Security Management
FQDN	Fully Qualified Domain Name
FTP	File Transfer Protocol
FUS	Fast User Switching
HTTP	Hyper Text Transport Protocol
ICMP	Internet Control Message Protocol
IIS	Internet Information Service
LDAP	Lightweight Directory Access Protocol
LEAP	Light Extensible Access Control
LLC	Logical Link Control
MAC	Media Access Control
MMC	Microsoft Management Console
MSI	Microsoft Installer
NAC	Network Access Control
NDIS	Network Driver Interface Specification
NIC	Network Interface Card
PEAP	Protected Extensible Authentication Protocol
RAS	Remote Access Service
RDBMS	Relational Database Management System
RPC	Remote Procedure Call
RSSI	Received Signal Strength Indication
SNAP	Scalable Node Address Protocol

SNR	Signal to Noise Ratio
SQL	Structured English Query Language
SSID	Service Set Identifier
SSL	Secure Socket Layering
SUS	Microsoft Software Update Services
TCP/IP	Transmission Control Protocol/Internet Protocol
TKIP	Temporal Key Integrity Protocol
UDP	User Datagram Protocol
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
USB	Universal Serial Bus
UTC	Coordinated Universal Time
VPN	Virtual Private Network
WEP	Wired Equivalent Privacy
WINS	Windows Internet Naming Service
WLAN	Wired Local Area Network
WPA	Wi-Fi Protected Access
ZSC	ZENworks Security Client

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