NetScreen Concepts & Examples
ScreenOS Reference Guide

Volume 3: Administration

ScreenOS 5.0.0

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Rev. A

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FCC Statement

The following information is for FCC compliance of Class A devices: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. The equipment generates, uses, and can radiate radio-frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to correct the interference at their own expense.

The following information is for FCC compliance of Class B devices: The equipment described in this manual generates and may radiate radio-frequency energy. If it is not installed in accordance with NetScreen’s installation instructions, it may cause interference with radio and television reception. This equipment has been tested and found to comply with the limits for a Class B digital device in accordance with the specifications in part 15 of the FCC rules. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Consult the dealer or an experienced radio/TV technician for help.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.

Caution: Changes or modifications to this product could void the user's warranty and authority to operate this device.

Disclaimer

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR NETSCREEN REPRESENTATIVE FOR A COPY.

Contents

Preface

Juniper Networks NetScreen devices provide different ways for you to manage the devices, either locally or remotely. Volume 3, “Administration” describes the various methods for managing NetScreen devices and explains ScreenOS administrative levels. This volume also describes how to secure local and remote administration of NetScreen devices, and how to monitor device activity. An appendix contains brief descriptions of the NetScreen Management Information Base (MIB) files that support communications between NetScreen devices and SNMP management applications.

Conventions

This document contains several types of conventions, which are introduced in the following sections:

- "CLI Conventions"
- "WebUI Conventions" on page vii
- "Illustration Conventions" on page ix
- "Naming Conventions and Character Types" on page x

CLI Conventions

The following conventions are used when presenting the syntax of a command line interface (CLI) command:

- Anything inside square brackets [ ] is optional.
- Anything inside braces { } is required.
- If there is more than one choice, each choice is separated by a pipe (|). For example,

  ```
  set interface { ethernet1 | ethernet2 | ethernet3 } manage
  ```

  means "set the management options for the ethernet1, ethernet2, or ethernet3 interface".

- Variables appear in *italic.* For example:

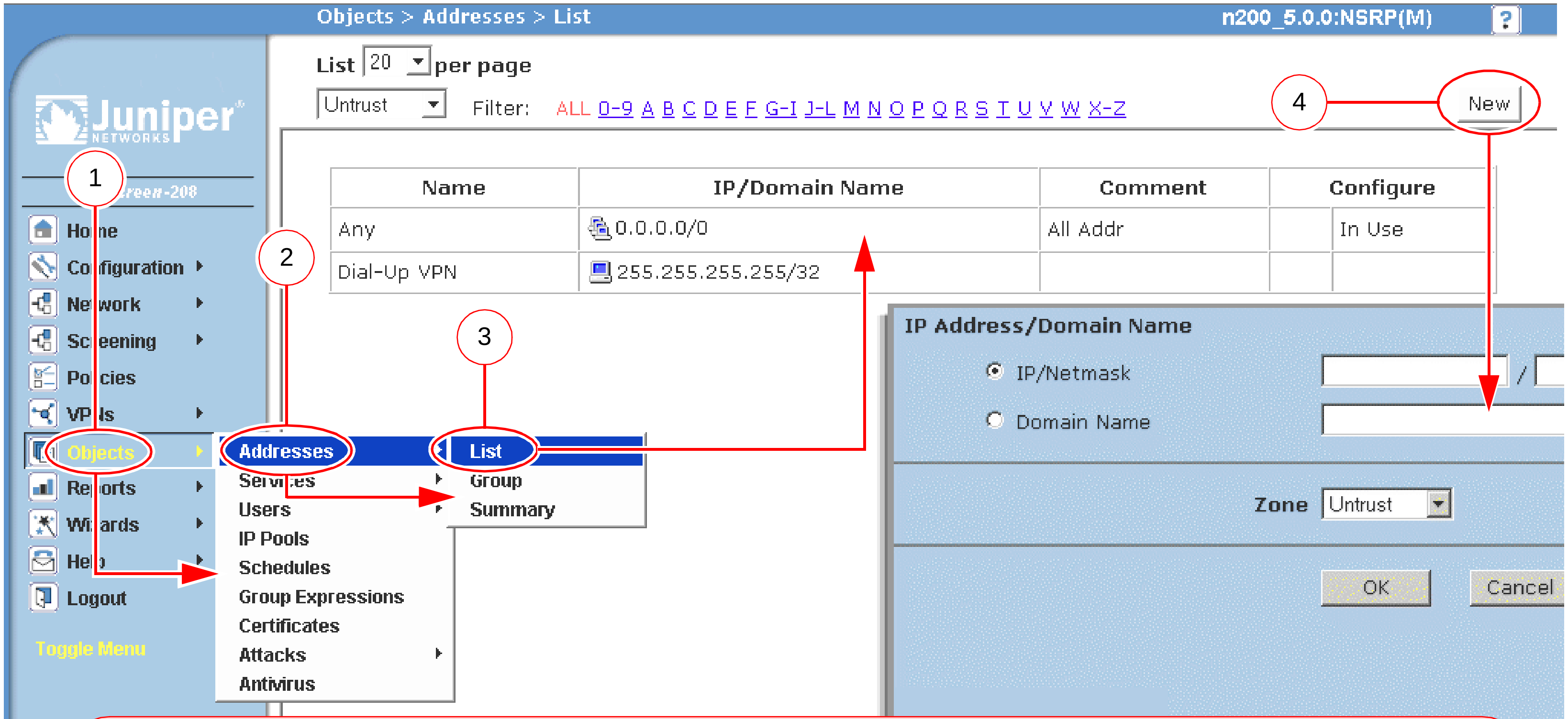
  ```
  set admin user name password
  ```

When a CLI command appears within the context of a sentence, it is in **bold** (except for variables, which are always in *italic*). For example: "Use the **get system** command to display the serial number of a NetScreen device."

Note: *When typing a keyword, you only have to type enough letters to identify the word uniquely. For example, typing* ***set adm u joe j12fmt54*** *is enough to enter the command* ***set admin user joe j12fmt54****. Although you can use this shortcut when entering commands, all the commands documented here are presented in their entirety.*

WebUI Conventions

Throughout this book, a chevron (>) is used to indicate navigation through the WebUI by clicking menu options and links. For example, the path to the address configuration dialog box is presented as **Objects > Addresses > List > New**. This navigational sequence is shown below.



List 20 per page

Untrust

Name	IP/Domain Name	Comment	Configure
Any	0.0.0.0/0	All Addr	In Use
Dial-Up VPN	255.255.255.255/32		

IP Address/Domain Name

● IP/Netmask /

○ Domain Name

Zone Untrust

1. Click **Objects** in the menu column.

   The Objects menu option expands to reveal a subset of options for Objects.

2. (Applet menu) Hover the mouse over **Addresses**.

   (DHTML menu) Click **Addresses**.

   The Addresses option expands to reveal a subset of options for Addresses.

3. Click **List**.

   The address book table appears.

4. Click the **New** link.

   The new address configuration dialog box appears.

To perform a task with the WebUI, you must first navigate to the appropriate dialog box where you can then define objects and set parameters. The set of instructions for each task is divided into two parts: a navigational path and configuration details. For example, the following set of instructions includes the path to the address configuration dialog box and the settings for you to configure:

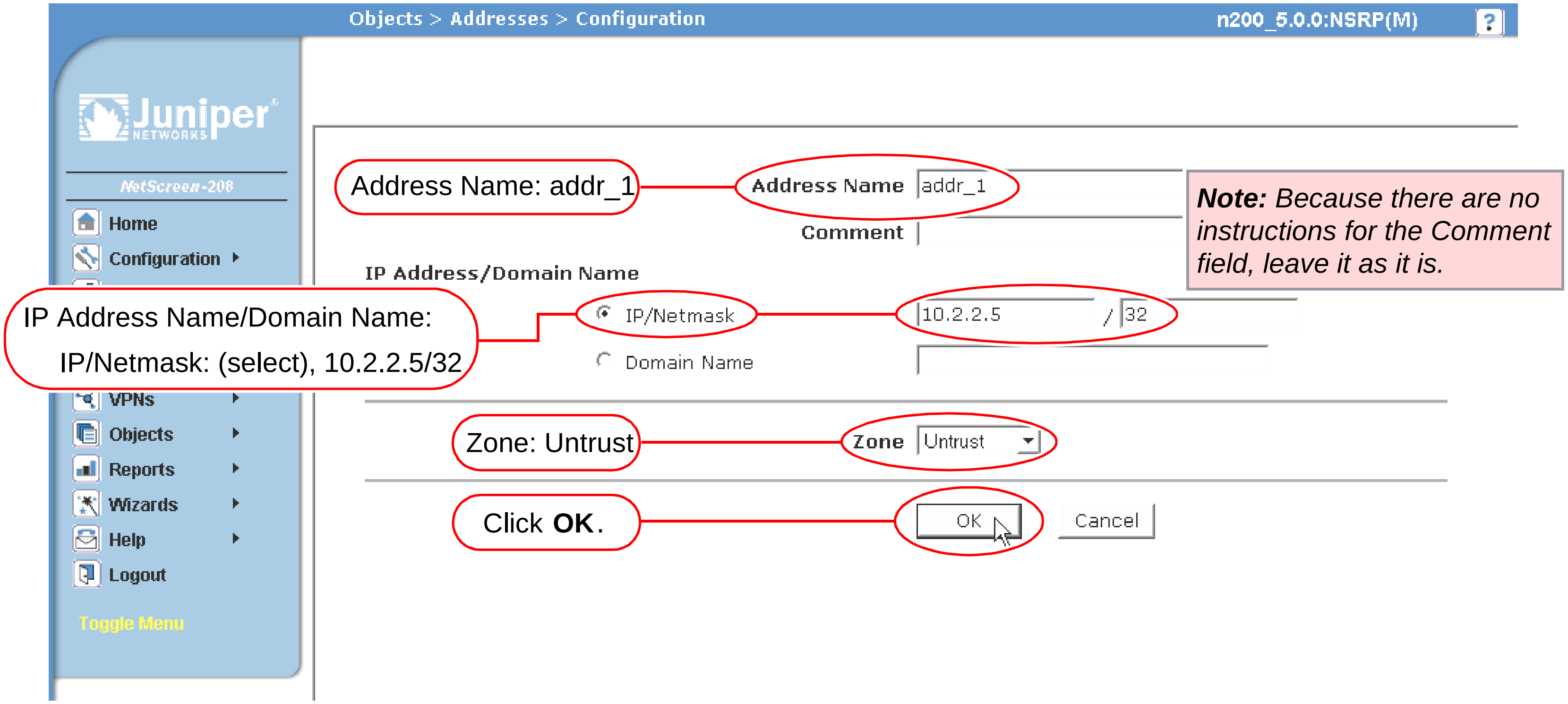
Objects > Addresses > List > New: Enter the following, and then click **OK**:

Address Name: addr_1

IP Address/Domain Name:

IP/Netmask: (select), 10.2.2.5/32

Zone: Untrust



Address Name: addr_1

Address Name addr_1

Comment

IP Address/Domain Name

IP Address Name/Domain Name:

IP/Netmask: (select), 10.2.2.5/32

● IP/Netmask 10.2.2.5 / 32

○ Domain Name

Zone: Untrust

Zone Untrust

Click **OK**.

***Note:** Because there are no instructions for the Comment field, leave it as it is.*

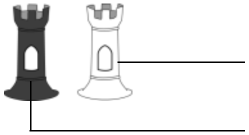
Illustration Conventions

The following graphics make up the basic set of images used in illustrations throughout this book:

Generic NetScreen Device

Virtual Routing Domain

Security Zone


Security Zone Interfaces

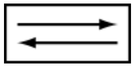
White = Protected Zone Interface
(example: Trust Zone)

Black = Outside Zone Interface
(example: Untrust Zone)

Tunnel Interface

VPN Tunnel

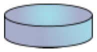
Router Icon


Switch Icon

Local Area Network (LAN)
with a Single Subnet

(example: 10.1.1.0/24)

Internet


Dynamic IP (DIP) Pool

Desktop Computer

Laptop Computer

Generic Network Device

(examples: NAT server,
Access Concentrator)

Server

Naming Conventions and Character Types

ScreenOS employs the following conventions regarding the names of objects—such as addresses, admin users, auth servers, IKE gateways, virtual systems, VPN tunnels, and zones—defined in ScreenOS configurations.

- If a name string includes one or more spaces, the entire string must be enclosed within double quotes (“); for example, **set address trust “local LAN” 10.1.1.0/24**.
- NetScreen trims any spaces leading or trailing text within a set of double quotes; for example, **“ local LAN ”** becomes **“local LAN”**.
- NetScreen treats multiple consecutive spaces as a single space.
- Name strings are case sensitive, although many CLI key words are case insensitive. For example, **“local LAN”** is different from **“local lan”**.

ScreenOS supports the following character types:

- Single-byte character sets (SBCS) and multiple-byte character sets (MBCS). Examples of SBCS are ASCII, European, and Hebrew. Examples of MBCS—also referred to as double-byte character sets (DBCS)—are Chinese, Korean, and Japanese.

  Note: *A console connection only supports SBCS. The WebUI supports both SBCS and MBCS, depending on the character sets that your Web browser supports.*

- ASCII characters from 32 (0x20 in hexidecimals) to 255 (0xff), except double quotes (“), which have special significance as an indicator of the beginning or end of a name string that includes spaces.

Juniper Networks NetScreen Documentation

To obtain technical documentation for any Juniper Networks NetScreen product, visit www.juniper.net/techpubs/.

To obtain the latest software version, visit: www.juniper.net/support/. After logging in, select the Download Software option, and then follow the displayed instructions. (You must be a registered user to download Netscreen software.)

If you find any errors or omissions in the following content, please contact us at the e-mail address below:

techpubs@netscreen.com

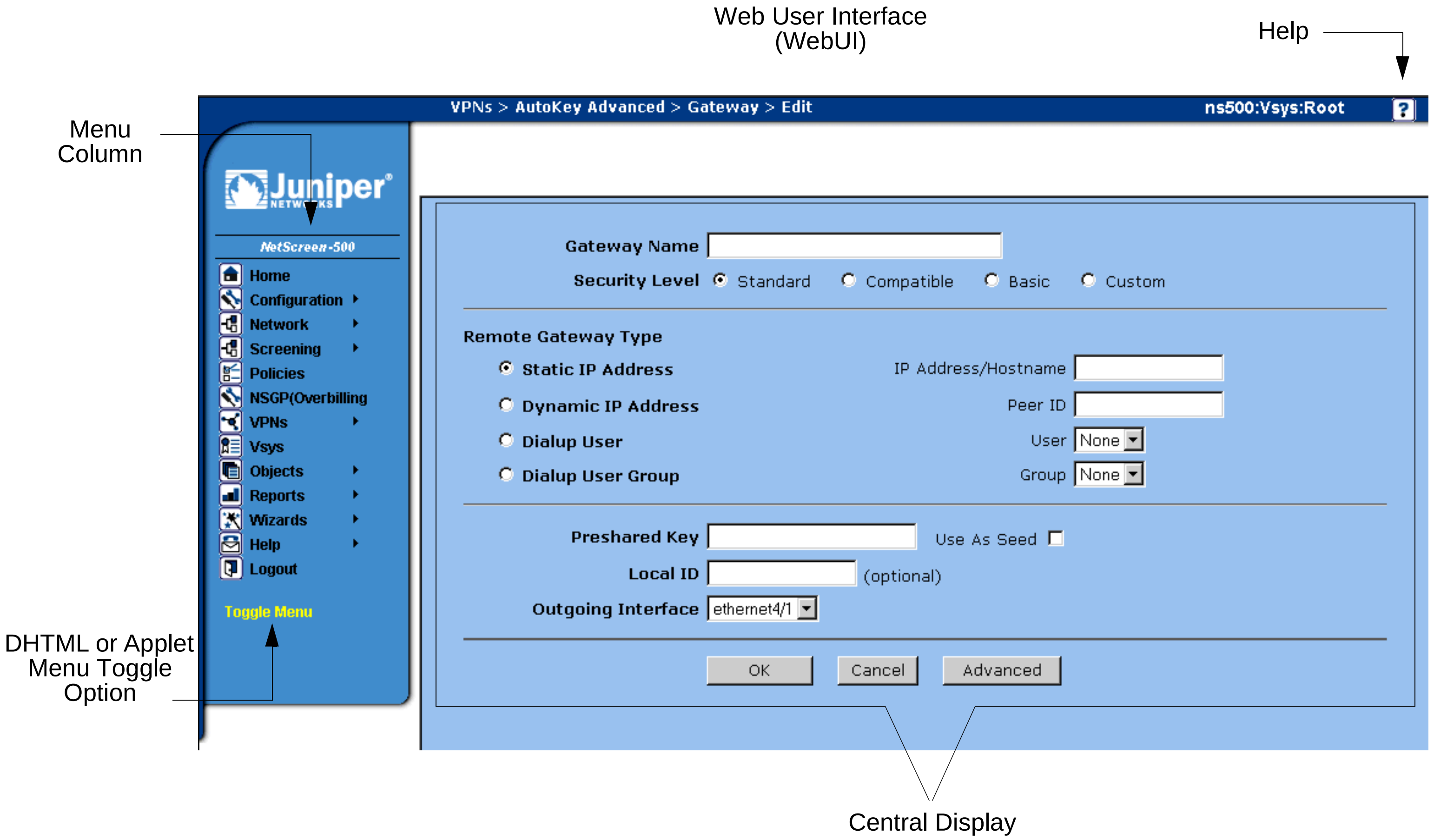
1

Administration

This chapter describes various management methods and tools, ways to secure administrative traffic, and the administrative privilege levels that you can assign to admin users. This chapter contains the following sections:

Management via the Web User Interface

For administrative ease and convenience, you can use the Web user interface (WebUI). NetScreen devices use Web technology that provides a Web-server interface to configure and manage the software.



Gateway Name

Security Level ● Standard ○ Compatible ○ Basic ○ Custom

Remote Gateway Type

● Static IP Address IP Address/Hostname

○ Dynamic IP Address Peer ID

○ Dialup User User None

○ Dialup User Group Group None

Preshared Key Use As Seed □

Local ID (optional)

Outgoing Interface ethernet4/1

To use the WebUI, you must have the following:

- Netscape Communicator (version 4.7 or later) or Microsoft Internet Explorer (version 5.5 or later)
- TCP/IP network connection to the NetScreen device

WebUI Help

You can view Help files for the WebUI at http://help.netscreen.com/help/english/<screenos_version>/ns<platform_number> (for example, http://help.netscreen.com/help/english/5.0.0/ns500).

You also have the option of relocating the Help files. You might want to store them locally and point the WebUI to either the administrator's workstation or to a secured server on the local network. In case you do not have Internet access, storing the Help files locally provides accessibility to them you otherwise would not have.

Copying the Help Files to a Local Drive

The Help files are available on the documentation CD. You can modify the WebUI to point to the Help files on the CD in your local CD drive. You can also copy the files from the CD to a server on your local network or to another drive on your workstation and configure the WebUI to invoke the Help files from there.

Note: *If you want to run the Help files directly from the documentation CD, you can skip this procedure. Proceed to "Pointing the WebUI to the New Help Location" below.*

1. Load the documentation CD in the CD drive of your workstation.
2. Navigate to the CD drive and copy the directory named "help".
3. Navigate to the location you want to store the Help directory and paste it there.

Pointing the WebUI to the New Help Location

You must now redirect the WebUI to point to the new location of the Help directory. Change the default URL to the new file path, where **<path>** is the specific path to the Help directory from the administrator's workstation.

1. Configuration > Admin > Management: In the Help Link Path field, replace the default URL **http://help.netscreen.com/help/english/<screenos_version>/ns<platform_number>**

   with

   (for local drive) **file://<path>…/help**

   or

   (for local server) **http://<server_name>…/<path>/help**

2. Click **Apply**.

   When you click the **help** link in the upper right corner of the WebUI, the device now uses the new path that you specified in the Help Link Path field to locate the appropriate Help file.

HTTP

With a standard Web browser you can access, monitor, and control your network security configurations remotely using the Hypertext Transfer Protocol (HTTP).

You can secure HTTP administrative traffic by encapsulating it in a virtual private network (VPN) tunnel or by using the Secure Sockets Layer (SSL) protocol. You can further secure administrative traffic by completely separating it from network user traffic. To do this, you can run all administrative traffic through the MGT interface—available on some NetScreen devices—or bind an interface to the MGT zone and devote it exclusively to administrative traffic.

> ***Note:*** *For more information, see “Secure Sockets Layer” on page 7, “VPN Tunnels for Administrative Traffic” on page 51, and “MGT and VLAN1 Interfaces” on page 30.*

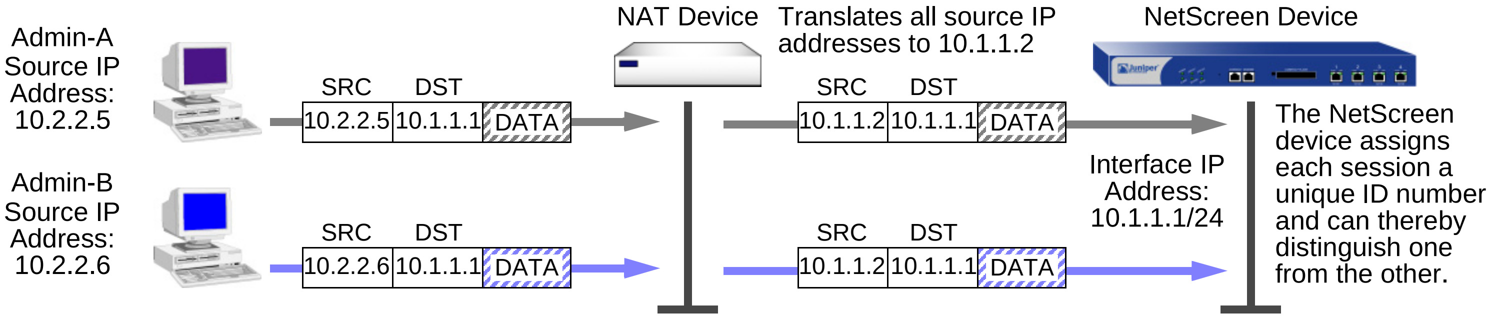
Session ID

The NetScreen device assigns each HTTP administrative session a unique session ID. For NetScreen devices that support virtual systems (vsys), the ID is globally unique across all systems—root and vsys.

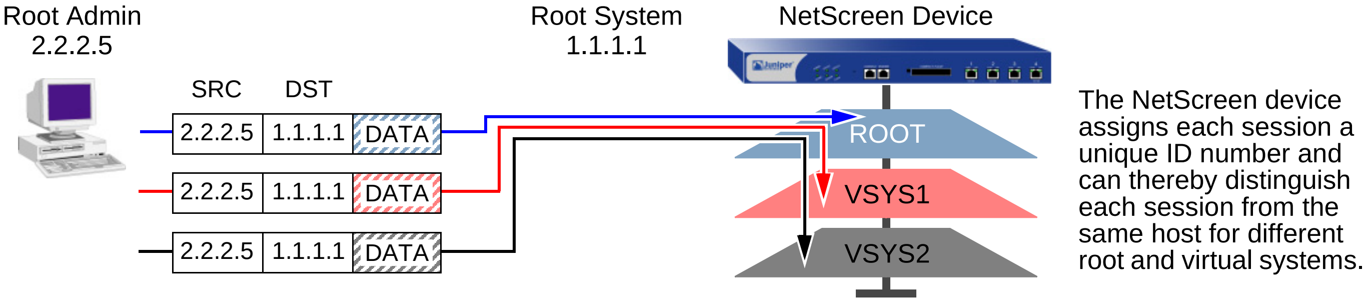
Each session ID is a 39-byte number resulting from the combination of five pseudo-randomly generated numbers. The randomness of the ID generation—versus a simple numerical incrementation scheme—makes the ID nearly impossible to predict. Furthermore, the randomness combined with the length of the ID makes accidental duplication of the same ID for two concurrent administrative sessions extremely unlikely.

The following are two benefits that a session ID provides to NetScreen administrators:

- The NetScreen device can distinguish concurrent sessions from multiple admins behind a NAT device that assigns the same source IP address to all outbound packets.



- The NetScreen device can distinguish concurrent root-level admin sessions from the same source IP address to the root system, and from there to different virtual systems.


Root Admin
2.2.2.5
SRC
DST
2.2.2.5
1.1.1.1
DATA
2.2.2.5
1.1.1.1
DATA
2.2.2.5
1.1.1.1
DATA
Root System
1.1.1.1
NetScreen Device
ROOT
VSYS1
VSYS2
The NetScreen device assigns each session a unique ID number and can thereby distinguish each session from the same host for different root and virtual systems.

Secure Sockets Layer

Secure Sockets Layer (SSL) is a set of protocols that can provide a secure connection between a Web client and a Web server communicating over a TCP/IP network. ScreenOS provides:

- Web SSL support
- SSL version 3 compatibility (not version 2)
- Netscape Communicator 4.7x and Internet Explorer 5.x compatibility[1]
- Public Key Infrastructure (PKI) key management integration (see “Public Key Cryptography” on page **5**-15.)

SSL is not a single protocol, but consists of the SSL Handshake Protocol (SSLHP), which allows the server and client to authenticate each other and negotiate an encryption method, and the SSL Record Protocol (SSLRP), which provides basic security services to higher-level protocols such as HTTP. These two protocols operate at the following two layers in the Open Systems Interconnection (OSI) model:

- SSLHP at the application layer (layer 7)
- SSLRP at the presentation layer (layer 6)

Independent of application protocol, SSL uses TCP to provide secure service. SSL uses certificates to authenticate first the server or both the client and the server, and then encrypt the traffic sent during the session. Before using SSL, you must first create a public/private key pair and then load a certificate. Because SSL is integrated with PKI key/certificate management, you can select the SSL certificate from one of the certificates in the certificate list. You can also use the same certificate for an IPSec VPN.

Note: *For information on obtaining certificates, see “Certificates and CRLs” on page* ***5****-21.*

[1] Check your Web browser to see how strong the ciphers can be and which ones your browser supports. (Both the NetScreen device and your Web browser must support the same kind and size of ciphers you use for SSL.) In Internet Explorer 5x, click **Help**, **About Internet Explorer**, and read “Cipher Strength.” To obtain the advanced security package, click the **Update Information** link. In Netscape Communicator, click **Help**, **About Communicator**, and read the section about RSA®. To change the SSL configuration settings, click **Security Info**, **Navigator**, **Configure SSL v3**.

NetScreen supports the following encryption algorithms for SSL:

- RC4 with 40-bit and 128-bit keys
- DES: Data Encryption Standard
- 3DES: Triple DES

NetScreen supports the same authentication algorithms for SSL as for VPNs—Message Digest version 5 (MD5) and Secure Hash Algorithm version 1 (SHA-1). The RC4 algorithms are always paired with MD5; DES and 3DES with SHA-1.

The basic steps for setting up SSL are as follows:

1. Obtain a certificate and load it on the NetScreen device[2].

   For details on requesting and loading a certificate, see *“Certificates and CRLs” on page* ***5***-21.

2. Enable SSL management:

   Configuration > Admin > Management: Enter the following, and then click **Apply**:

   Certificate: Select the certificate you intend to use from the drop-down list.

   Cipher: Select the cipher you intend to use from the drop-down list.

3. Configure the interface through which you manage the NetScreen device to permit SSL management:

   Network > Interfaces > Edit (for the interface you want to manage): Enable the **SSL** management service check box, and then click **OK**.

4. Connect to the NetScreen device via the SSL port. That is, when you type the IP address for managing the NetScreen device in your browser’s URL field, change “http” to “https”, and follow the IP address with a colon and the HTTPS (SSL) port number (for example, https://123.45.67.89:1443).

[2] Be sure to specify a bit length that your Web browser also supports.

Management via the Command Line Interface

Advanced administrators can attain finer control by using the command line interface (CLI). To configure a NetScreen device with the CLI, you can use any software that emulates a VT100 terminal. With a terminal emulator, you can configure the NetScreen device using a console from any Windows, UNIX™, or Macintosh® operating system. For remote administration through the CLI, you can use Telnet or Secure Shell (SSH). With a direct connection through the console port, you can use Hyperterminal®.

Note: *For a complete listing of the ScreenOS CLI commands, refer to the* NetScreen CLI Reference Guide*.*

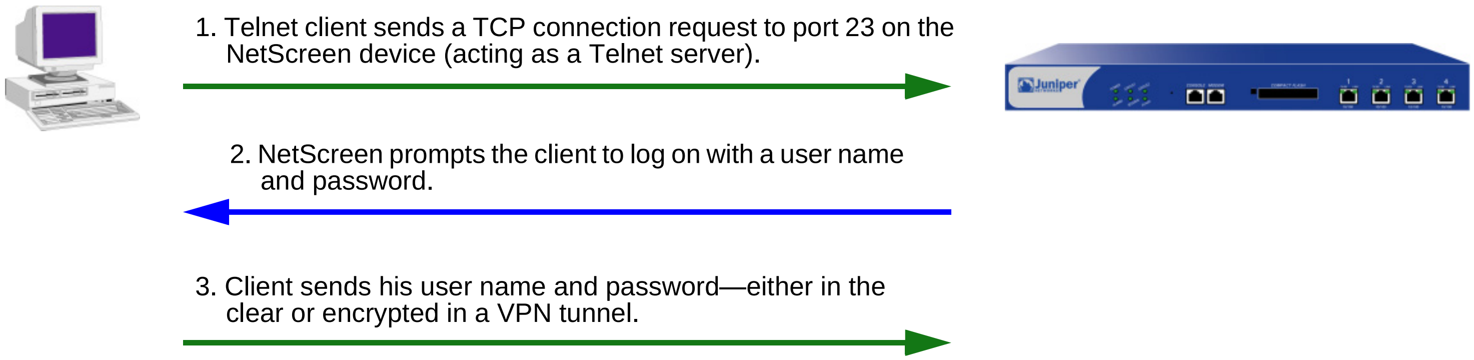
Telnet

Telnet is a login and terminal emulation protocol that uses a client/server relationship to connect to and remotely configure network devices over a TCP/IP network. The administrator launches a Telnet client program on the administration workstation and creates a connection with the Telnet server program on the NetScreen device. After logging on, the administrator can issue CLI commands, which are sent to the Telnet program on the NetScreen device, effectively configuring the device as if operating through a direct connection. Using Telnet to manage NetScreen devices requires the following:

- Telnet software on the administrative workstation
- An Ethernet connection to the NetScreen device

The setup procedure to establish a Telnet connection is as follows:

Establishing a Telnet connection



1. Telnet client sends a TCP connection request to port 23 on the NetScreen device (acting as a Telnet server).

2. NetScreen prompts the client to log on with a user name and password.

3. Client sends his user name and password—either in the clear or encrypted in a VPN tunnel.

To minimize an unauthorized user’s chances of logging in to a device, you can limit the number of unsuccessful login attempts allowed before the NetScreen device terminates a Telnet session. This restriction also protects against certain types of attacks, such as automated dictionary attacks.

By default, the NetScreen device allows up to three unsuccessful login attempts before it closes the Telnet session. To change this number, enter the following command:

```
set admin access attempts number
```

Note: *You must use the CLI to set this restriction.*

Securing Telnet Connections

You can secure Telnet traffic by completely separating it from network user traffic. Depending upon your NetScreen device model, you can run all administrative traffic through the MGT interface or devote an interface such as the DMZ entirely to administrative traffic.

In addition, to ensure that admin users use a secure connection when they manage a NetScreen device through Telnet, you can require such users to telnet only through a virtual private network (VPN) tunnel[3]. After you have set this restriction, the device denies access if anyone tries to telnet without going through a VPN tunnel.

To restrict Telnet access through a VPN, enter the following command:

```
set admin telnet access tunnel
```

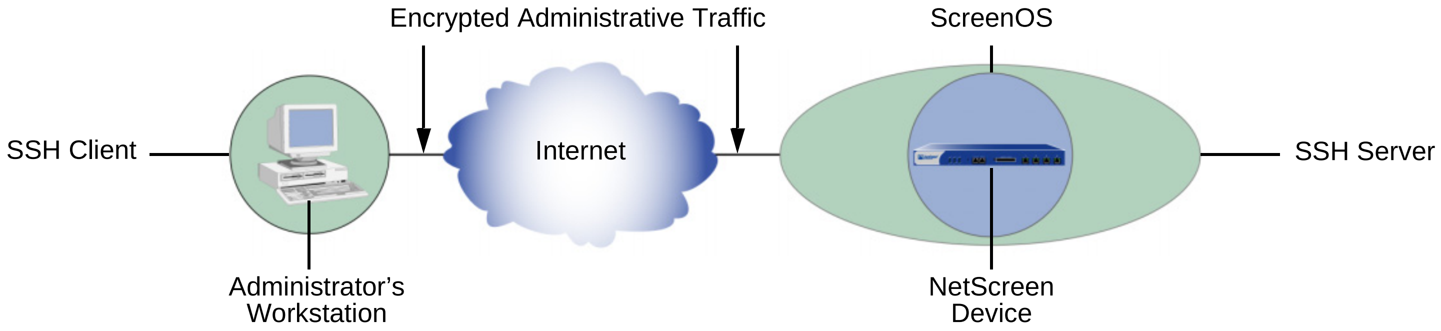
Note: *You must use the CLI to set this restriction .*

[3] For information on VPN tunnels, see Volume 5, “VPNs”.

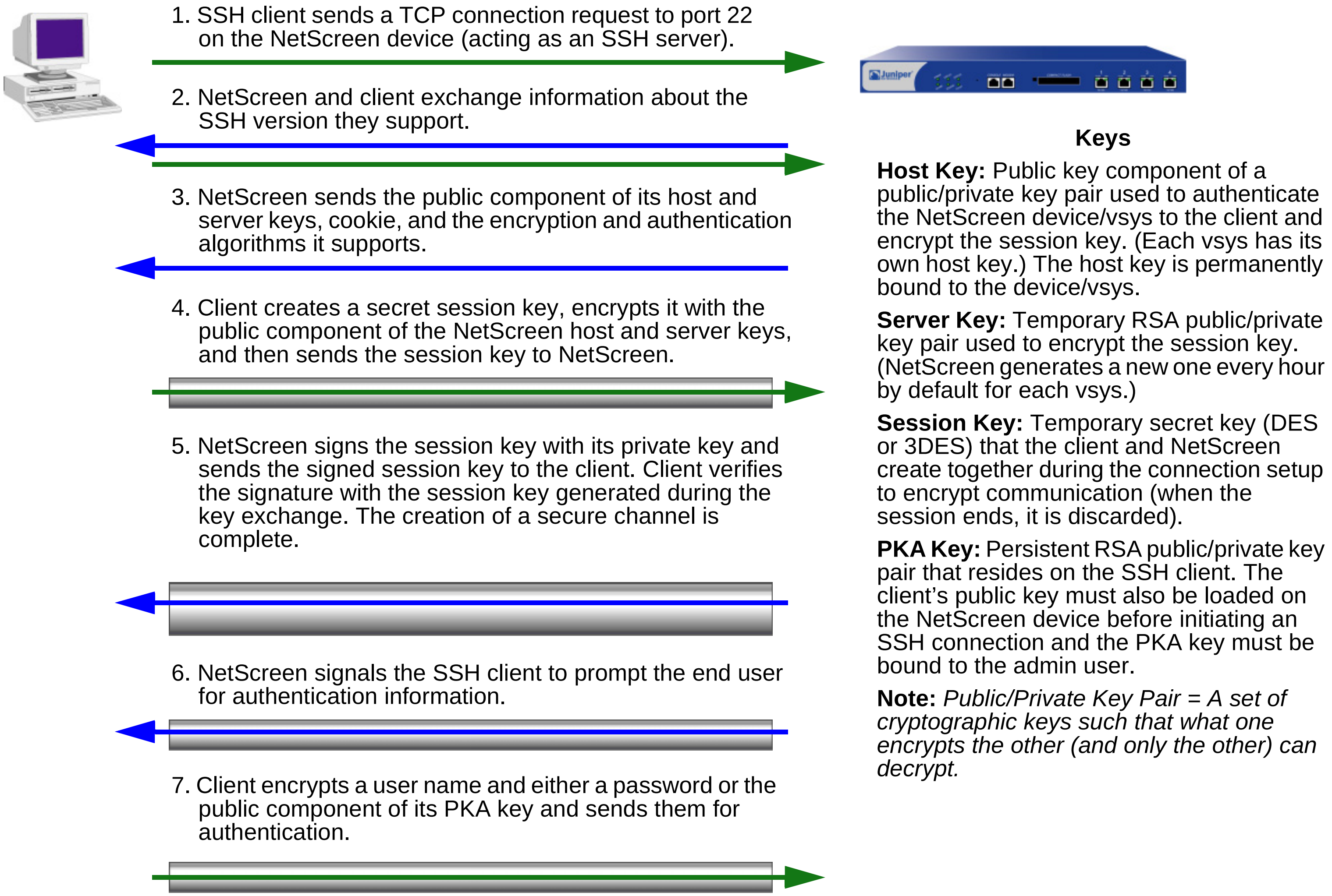
Secure Shell

The built-in Secure Shell (SSH) server on a NetScreen device provides a means by which administrators can remotely manage the device in a secure manner using applications that are Secure Shell (SSH) aware. SSH allows you to open a remote command shell securely and execute commands. SSH provides protection from IP or DNS spoofing attacks and password or data interception.

You can choose to run either an SSH version 1 (SSHv1) or SSH version 2 (SSHv2) server on the NetScreen device. SSHv2 is considered more secure than SSHv1 and is currently being developed as the IETF standard. However, SSHv1 has been widely deployed and is commonly used. Note that SSHv1 and SSHv2 are not compatible with each other. That is, you cannot use an SSHv1 client to connect to an SSHv2 server on the NetScreen device, or vice versa. The client console or terminal application must run the same SSH version as the server.



The basic SSH connection procedure is shown below:



1. SSH client sends a TCP connection request to port 22 on the NetScreen device (acting as an SSH server).
2. NetScreen and client exchange information about the SSH version they support.
3. NetScreen sends the public component of its host and server keys, cookie, and the encryption and authentication algorithms it supports.
4. Client creates a secret session key, encrypts it with the public component of the NetScreen host and server keys, and then sends the session key to NetScreen.
5. NetScreen signs the session key with its private key and sends the signed session key to the client. Client verifies the signature with the session key generated during the key exchange. The creation of a secure channel is complete.
6. NetScreen signals the SSH client to prompt the end user for authentication information.
7. Client encrypts a user name and either a password or the public component of its PKA key and sends them for authentication.

Keys

Host Key: Public key component of a public/private key pair used to authenticate the NetScreen device/vsys to the client and encrypt the session key. (Each vsys has its own host key.) The host key is permanently bound to the device/vsys.

Server Key: Temporary RSA public/private key pair used to encrypt the session key. (NetScreen generates a new one every hour by default for each vsys.)

Session Key: Temporary secret key (DES or 3DES) that the client and NetScreen create together during the connection setup to encrypt communication (when the session ends, it is discarded).

PKA Key: Persistent RSA public/private key pair that resides on the SSH client. The client's public key must also be loaded on the NetScreen device before initiating an SSH connection and the PKA key must be bound to the admin user.

Note: *Public/Private Key Pair = A set of cryptographic keys such that what one encrypts the other (and only the other) can decrypt.*

A maximum of five SSH sessions are allowed on a NetScreen device at any one time.

Client Requirements

As mentioned previously, the client application must run the same SSH version as the server on the NetScreen device. SSHv2 clients must be configured to request the Diffie-Hellman key exchange algorithm and the Digital Signature Algorithm (DSA) for public key device authentication. SSHv1 clients must be configured to request the RSA for public key device authentication.

Basic SSH Configuration on the NetScreen Device

The following are the basic steps for configuring SSH on a NetScreen device:

1. Determine whether you will use password or Public Key Authentication (PKA) for SSH. If PKA will be used, the PKA keys must be bound to an admin before SSH connections can be made. See “Authentication” on page 15 for more information about using passwords or PKA.
2. Determine which version of SSH you need to enable on the NetScreen device. (Remember that the client application and the SSH server on the NetScreen device must run the same SSH version.) If you enabled SSH on the NetScreen device in a previous ScreenOS version, SSHv1 runs when you enable SSH now. To see which version of SSH is active but not enabled on the NetScreen device, enter the CLI **get ssh** command:

   ```
   ns-> get ssh
   SSH V1 is active
   SSH is not enabled
   SSH is not ready for connections
   Maximum sessions: 8
   Active sessions: 0
   ```

   In the output shown above, SSHv1 is active and runs when you enable SSH. If you want to use a different SSH version, make sure that all keys created with the previous version are removed. For example, to clear SSHv1 keys and to use SSHv2, enter the following CLI commands:

   ```
   ns-> delete ssh device all
   ```

The following messages appear:

```
SSH disabled for vsys: 1
PKA key deleted from device: 0
Host keys deleted from device: 1
Execute the ‘set ssh version v2’ command to activate SSH v2 for the device
```

To use SSHv2, enter the following CLI command:

```
ns-> set ssh version v2
```

Note: *Setting the SSH version does not enable SSH on the NetScreen device.*

3. If you do not want to use port 22 (the default port) for SSH client connections, you can specify a port number between 1024 and 32767[4].

   ```
   ns-> set admin ssh port 1024
   ```

4. Enable SSH for the root system or for the virtual system. See “SSH and Vsys” on page 17 for additional information about enabling and using SSH on a per-vsys basis.

   To enable SSH for the root system:

   ```
   ns-> set ssh enable
   ```

   To enable SSH for a vsys, you need to first enter the vsys and then enable SSH:

   ```
   ns-> set vsys v1
   ns(v1)-> set ssh enable
   ```

5. Enable SSH on the interface on which the SSH client will connect.

   ```
   ns-> set interface manage ssh
   ```

6. Distribute the host key that is generated on the NetScreen device to the SSH client. See “Host Key” on page 18 for more information.

[4] You can also use the WebUI to change the port number and enable SSHv2 and SCP on the Configuration > Admin > Management page.

Authentication

An administrator can connect to a NetScreen device with SSH using one of two authentication methods:

- **Password Authentication:** This method is used by administrators who need to configure or monitor a NetScreen device. The SSH client initiates an SSH connection to the NetScreen device. If SSH manageability is enabled on the interface receiving the connection request, the NetScreen device signals the SSH client to prompt the user for a user name and password. When the SSH client has this information, it sends it to the NetScreen device, which compares it with the user name and password in the admin user's account. If they match, the NetScreen device authenticates the user. If they do not match, the NetScreen device rejects the connection request.
- **Public Key Authentication (PKA):** This method provides increased security over the password authentication method and allows you to run automated scripts. Basically, instead of a user name and password, the SSH client sends a user name and the public key component of a public/private key pair[5]. The NetScreen device compares it with up to four public keys that can be bound to an admin. If one of the keys matches, the NetScreen device authenticates the user. If none of them match, the NetScreen device rejects the connection request.

Both authentication methods require the establishment of a secure connection before the SSH client logs on. After an SSH client has established an SSH connection with the NetScreen device, he must authenticate himself either with a user name and password or with a user name and public key.

Both password authentication and PKA require that you create an account for the admin user on the NetScreen device and enable SSH manageability on the interface through which you intend to manage the NetScreen device via an SSH connection. (For information about creating an admin user account, see "Defining Admin Users" on page 39.) The password authentication method does not require any further set up on the SSH client.

On the other hand, to prepare for PKA, you must first perform the following tasks:

[5] The supported authentication algorithms are RSA for SSHv1 and DSA for SSHv2.

1. On the SSH client, generate a public and private key pair using a key generation program. (The key pair is either RSA for SSHv1 or DSA for SSHv2. See the SSH client application documentation for more information.)

   > ***Note:*** *If you want to use PKA for automated logins, you must also load an agent on the SSH client to decrypt the private key component of the PKA public/private key pair and hold the decrypted version of the private key in memory.*

2. Move the public key from the local SSH directory to a directory on your TFTP server[6], and launch the TFTP program.
3. Log on to the NetScreen device so that you can configure it through the CLI.
4. To load the public key from the TFTP server to the NetScreen device, enter one of the following CLI commands:

   For SSHv1:

   ```
   exec ssh tftp pka-rsa [ username name ] file-name name_str ip-addr
        tftp_ip_addr
   ```

   For SSHv2:

   ```
   exec ssh tftp pka-dsa [ user-name name ] file-name name_str ip-addr
        tftp_ip_addr
   ```

   The **username** or **user-name** options are only available to the root admin, so that only the root admin can bind an RSA key to another admin. When you—as the root admin or as a read/write admin—enter the command without a user name, the NetScreen device binds the key to your own admin account; that is, it binds the key to the admin that enters the command.

   > ***Note:*** *The NetScreen device supports up to four PKA public keys per admin user.*

[6] You can also paste the content of the public key file directly into the CLI command **set ssh pka-rsa [username** *name_str* **] key** *key_str* (for SSHv1) or **set ssh pka-dsa [user-name** *name_str* **] key** *key_str* (for SSHv2), pasting it where indicated by the variable *key_str*, or into the Key field in the WebUI (Configuration > Admin > Administrators > SSH PKA). However, the CLI and WebUI have a size restriction: the public key size cannot exceed 512 bits. This restriction is not present when loading the key via TFTP.

When an administrator attempts to log on via SSH on an interface that has SSH manageability enabled, the NetScreen device first checks if a public key is bound to that administrator. If so, the NetScreen device authenticates the administrator using PKA. If a public key is not bound to the administrator, the NetScreen device prompts for a user name and password. (You can use the following command to force an admin to use only the PKA method: **set admin ssh password disable username** *name_str* .) Regardless of the authentication method you intend the administrator to use, when you initially define his or her account, you still must include a password, even though when you later bind a public key to this user, the password becomes irrelevant.

SSH and Vsys

For NetScreen devices that support vsys, you can enable and configure SSH on a per-vsys basis. Each vsys has its own host key (see “Host Key” on page 18) and maintains and manages a PKA key for the admin of the system.

Note that the maximum number of SSH sessions is a device-wide limit and is between 2 and 24, depending upon the device. If the maximum number of SSH clients are already logged into the device, no other SSH client can log in to the SSH server. The root system and the vsys share the same SSH port number. This means that if you change the SSH port from the default port 22, the port is changed for all vsys as well.

Host Key

The host key allows the NetScreen device to identify itself to an SSH client. On NetScreen devices that support virtual systems (vsys), each vsys has its own host key. When SSH is first enabled on a vsys (for devices that support vsys) or on a NetScreen device, a host key is generated that is unique to the vsys or device. The host key is permanently bound to the vsys or device and the same host key is used if SSH is disabled and then enabled again.

The host key on the NetScreen device must be distributed to the SSH client in one of two ways:

- Manually—the root or vsys admin sends the host key to the client admin user via e-mail, phone, etc. The receiving admin stores the host key in the appropriate SSH file on the SSH client system. (The SSH client application determines the file location and format.)
- Automatically—When the SSH client connects to the NetScreen device, the SSH server sends the unencrypted public component of the host key to the client. The SSH client searches its local host key database to see if the received host key is mapped to the address of the NetScreen device. If the host key is unknown (there is no mapping to the NetScreen device address in the client’s host key database), the Admin user may be able to decide whether to accept the host key. Otherwise, the connection is terminated. (See the appropriate SSH client documentation for information on accepting unknown host keys.)

To verify that the SSH client has received the correct host key, the Admin user on the client system can generate the SHA hash of the received host key. The client Admin user can then compare this SHA hash with the SHA hash of the host key on the NetScreen device. On the NetScreen device, you can display the SHA hash of the host key by executing the CLI command **get ssh host-key**.

Example: SSHv1 with PKA for Automated Logins

In this example, you (as the root admin) set up SSHv1 public key authentication (PKA) for a remote host that runs an automated script. The sole purpose for this remote host to access the NetScreen device is to download the configuration file every night. Because authentication is automated, no human intervention is necessary when the SSH client logs on to the NetScreen device.

You define an admin user account named cfg, with password cfg and read-write privileges. You enable SSH manageability on interface ethernet1, which is bound to the Untrust zone.

You have previously used a key generation program on your SSH client to generate an RSA public/private key pair, moved the public key file, which has the file name “idnt_cfg.pub”, to a directory on your TFTP server, and launched the TFTP program. The IP address of the TFTP server is 10.1.1.5.

WebUI

Configuration > Admin > Administrators > New: Enter the following, and then click **OK**:

Name: cfg

New Password: cfg

Confirm Password: cfg

Privileges: Read-Write (select)

SSH Password Authentication: (select)

Network > Interfaces > Edit (for ethernet1): Select **SSH** in Service Options, and then click **OK**.

Note: *You can only load a public key file for SSH from a TFTP server via the* ***exec ssh*** *command.*

CLI

```
set admin user cfg password cfg privilege all
set interface ethernet1 manage ssh
exec ssh tftp pka-rsa username cfg file-name idnt_cfg.pub ip-addr 10.1.1.5
save
```

Secure Copy (SCP)

Secure Copy (SCP) provides a way for a remote client to transfer files to or from the NetScreen device using the SSH protocol. (The SSH protocol provides authentication, encryption, and data integrity to the SCP connection.) The NetScreen device acts as an SCP server to accept connections from SCP clients on remote hosts.

SCP requires that the remote client be authenticated before file transfer commences. SCP authentication is exactly the same process used to authenticate SSH clients. The SCP client can be authenticated with either a password or a PKA key. Once the SCP client is authenticated, one or more files can be transferred to or from the NetScreen device. The SCP client application determines the exact method for specifying the source and destination file names; refer to the SCP client application documentation.

SCP is disabled by default on the NetScreen device. To enable SCP, you must also enable SSH.

WebUI

Configuration > Admin > Management: Select the following, and then click **Apply**:

Enable SSH: (select)

Enable SCP: (select)

CLI

```
set ssh enable
set scp enable
save
```

The following is an example of an SCP client command to copy the configuration file from flash memory on a NetScreen device (administrator name is netscreen and IP address is 10.1.1.1) to the file ns_sys_config_backup on the client system:

```
scp netscreen@10.1.1.1:ns_sys_config ns_sys_config_backup
```

You need to consult your SCP client application documentation for information on how to specify the administrator name, device IP address, source file, and destination file.

Serial Console

You can manage a NetScreen device through a direct serial connection from the administrator’s workstation to the NetScreen device via the console port. Although a direct connection is not always possible, this is the most secure method for managing the device provided that the location around the NetScreen device is secure.

Note: *To prevent unauthorized users from logging in remotely as the root admin, you can require the root admin to log in to the NetScreen device through the console only. For additional information on this restriction, see “Restricting the Root Admin to Console Access” on page 50.*

Depending on your NetScreen device model, creating a serial connection requires one of the following cables:

- A female DB-9 to male DB-25 straight-through serial cable
- A female DB-9 to male DB-9 straight-through serial cable
- A female DB-9 to male MiniDIN-8 serial cable
- A female DB-9 to RJ-45 adapter with an RJ-45 to RJ-45 straight-through ethernet cable

You will also need Hyperterminal software (or another kind of VT100 terminal emulator) on the management workstation, with the Hyperterminal port settings configured as follows:

- Serial communications 9600 bps
- 8 bit
- No parity
- 1 stop bit
- No flow control

Note: *For more details on using Hyperterminal, see the "Getting Started" chapter in the* NetScreen CLI Reference Guide *or the "Initial Configuration" chapter in one of the installer's guides.*

Modem Port

You can also manage the NetScreen device by connecting the administrator's workstation to the modem port on the device. The modem port functions similarly to the console port, except that you cannot define parameters for the modem port or use this connection to upload an image.

To prevent unauthorized users from managing the device through a direct connection to the console or modem port, you can disable both ports by entering the following commands:

```
set console disable
set console aux disable
```

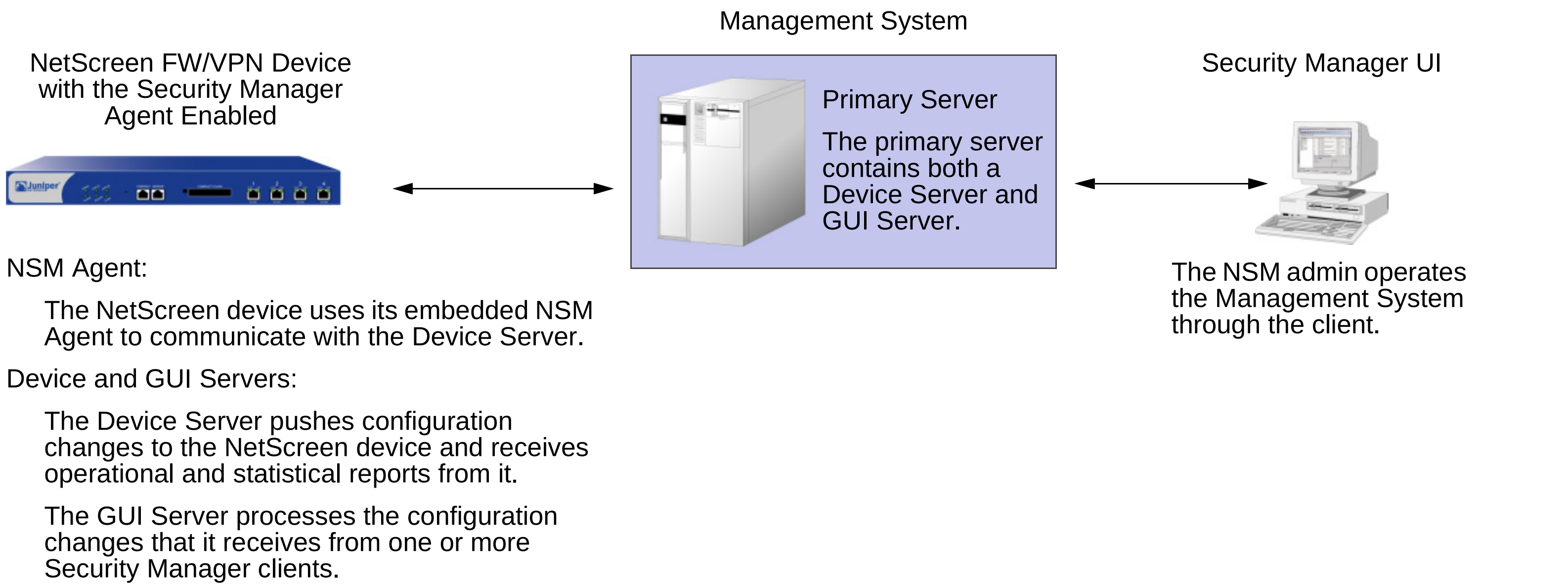
Note: *On the NetScreen-5XT, you can use the modem port to connect to an external modem only.*

Management via NetScreen-Security Manager

NetScreen-Security Manager (NSM) is an enterprise-level management application that configures multiple devices over a LAN or WAN environment. The Security Manager UI enables administrators to configure many devices from central locations.

Security Manager uses two components to allow remote communication with NetScreen devices.

- The *Management System*, a set of services that reside on an external host. These services process, track, and store device management information exchanged between the device and the Security Manager UI.
- The *Agent*, a service that resides on each managed NetScreen device. The Agent receives configuration parameters from the external Management System and pushes it to ScreenOS. The Agent also monitors the device and transmits reports back to the Management System.


Management System
NetScreen FW/VPN Device with the Security Manager Agent Enabled
Security Manager UI
Primary Server
Juniper

The primary server contains both a Device Server and GUI Server.

The NSM admin operates the Management System through the client.

NSM Agent:

The NetScreen device uses its embedded NSM Agent to communicate with the Device Server.

Device and GUI Servers:

The Device Server pushes configuration changes to the NetScreen device and receives operational and statistical reports from it.

The GUI Server processes the configuration changes that it receives from one or more Security Manager clients.

For more information about these and other Security Manager components, refer to the *NetScreen-Security Manager 2004 Administrator’s Guide*.

Initiating Connectivity Between Agent and Management System

Before the Security Manager can access and manage the NetScreen device, it is necessary to initiate communication between the Agent (which resides on the device) and the Management System (which resides on an external host).

Initialization may require up to two users at two different sites, depending upon the current availability of the NetScreen device. These users may include the *Security Manager administrator*, who uses the Security Manager UI on a client host, and the *on-site user*, who executes CLI commands on the NetScreen device via a console session. Possible initialization cases are as follows.

- Case 1: The device already has a known IP address, and is reachable over your network infrastructure.

  In this case, the Security Manager administrator adds the device using the Security Manager UI on the client host. (No on-site user is necessary.) The NetScreen device automatically connects back to the Management System, and is ready to send configuration information to the NSM database that resides there.

- Case 2: The IP address is unreachable.

  In this case, both users perform initialization tasks. The administrator adds the device through the Security Manager UI. The administrator also determines which CLI commands the on-site user needs, and delivers them to the user, who then executes them through the console. The device then automatically connects with the Management System, and is ready to send configuration information to the NSM database.

  Note: *If the device runs ScreenOS version 4.x, the on-site user must manually enable NetScreen-Global PRO, NACN, or both before the device can establish a connection to the Management System.*

- Case 3: The device is new and contains factory default settings.

  In this case, both users perform initialization tasks. The on-site user can use an encrypted configuration script called *Configlet*, which the Security Manager administrator generates. The process is as follows.

  a. The Security Manager administrator selects the device platform and ScreenOS version, using the Add Device wizard in the Security Manager UI.

  b. The administrator edits the device and enters any desired configuration.

c. The administrator Activates the device.

d. The administrator generates and delivers the Configlet file (or the necessary CLI commands, as with Case 2) to the on-site user.

e. The on-site user executes Configlet (or the CLI commands).

For more information, refer to “Adding Devices” in *NetScreen-Security Manager 2004 Administrator’s Guide*.

Enabling and Disabling the Agent

Before the NetScreen device can communicate with the Management System, you must enable the Agent that resides on the device.

Example: Enabling the Security Manager Agent

In the following example you enable the Agent.

WebUI

Configuration > Admin > NSM: Enter the following, and then click **Apply**:

Enable Communication with NetScreen Security Manager (NSM): (select)

CLI

```
set nsmgmt enable
save
```

Changing Management System Server Address

The IP address by which the Agent identifies the external Management System servers is a configurable parameter.

Example: Setting the Primary Server IP Address

In the following example you set the primary server IP address to 1.1.1.1.

WebUI

Configuration > Admin > NSM: Enter the following, and then click **Apply**:

Primary IP Address/Name: 1.1.1.1

CLI

```
set nsmgmt server primary 1.1.1.1
save
```

Setting Report Parameters

The Agent monitors the NetScreen device events and transmits reports back to the Management System. This allows the Security Manager administrator to view the events from the Security Management UI.

The categories of events tracked by the Agent are as follows.

- *Alarms* report potentially dangerous attacks or traffic anomalies, including attacks detected through deep inspection.
- *Log events* report changes in device configuration and non-severe changes that occur on the device.
- *Protocol distribution* events report messages generated by the following services:
  - AH (Authentication Header)
  - ESP (Encapsulating Security Payload)
  - GRE (Generic Routing Encapsulation)

  - ICMP (Internet Control Message Protocol)
  - OSPF (Open Shortest Path First)
  - TCP (Transmission Control Protocol)
  - UDP (User Datagram Protocol)
- *Statistics* messages report the following statistical information.
  - Attack statistics
  - Ethernet statistics
  - Traffic flow statistics
  - Policy statistics

Example: Enabling Alarm and Statistics Reporting

In the following example you enable transmission of all Alarm and Statistics messages to the Management System.

WebUI

Configuration > Admin > NSM: Enter the following, and then click **Apply**:

Attack Statistics: (select)

Policy Statistics: (select)

Attack Alarms: (select)

Traffic Alarms: (select)

Flow Statistics: (select)

Ethernet Statistics: (select)

Deep Inspection Alarms: (select)

Event Alarms: (select)

CLI

```
set nsmgmt report statistics attack enable
set nsmgmt report statistics policy enable
set nsmgmt report alarm attack enable
set nsmgmt report alarm traffic enable
set nsmgmt report statistics flow enable
set nsmgmt report statistics ethernet enable
set nsmgmt report alarm idp enable
set nsmgmt report alarm other enable
save
```

Controlling Administrative Traffic

ScreenOS provides the following options for configuring and managing the NetScreen device:

- **WebUI:** Selecting this option allows the interface to receive HTTP traffic for management via the Web user interface (WebUI).
- **Telnet:** A terminal emulation program for TCP/IP networks such as the Internet, Telnet is a common way to remotely control network devices. Selecting this option enables Telnet manageability.
- **SSH:** You can administer the NetScreen device from an Ethernet connection or a dial-in modem using Secure Command Shell (SSH). You must have an SSH client that is compatible with Version 1.5 of the SSH protocol. These clients are available for Windows 95 and later, Windows NT, Linux, and UNIX. The NetScreen device communicates with the SSH client through its built-in SSH server, which provides device configuration and management services. Selecting this option enables SSH manageability.
- **SNMP:** The NetScreen device supports both SNMPv1 and SNMPv2c, and all relevant Management Information Base II (MIB II) groups, as defined in RFC-1213. Selecting this option enables SNMP manageability.
- **SSL:** Selecting this option allows the interface to receive HTTPS traffic for secure management of the NetScreen device via the WebUI.
- **NS Security Manager:** Selecting this option allows the interface to receive NetScreen-Security Manager traffic.
- **Ping:** Selecting this option allows the NetScreen device to respond to an ICMP echo request, or ping, which determines whether a specific IP address is accessible over the network.
- **Ident-Reset:** Services like Mail and FTP send identification requests. If they receive no acknowledgement, they send the request again. While the request is processing, there is no user access. By enabling the Ident-reset option, the NetScreen device sends a TCP reset announcement in response to an IDENT request to port 113 and restores access that has been blocked by an unacknowledged identification request.

To use these options, you enable them on one or more interfaces, depending on your security and administrative needs.

MGT and VLAN1 Interfaces

Some NetScreen devices have a physical interface—Management (MGT)—dedicated exclusively for management traffic. Use this interface for management traffic when running the NetScreen device in NAT or Route mode.

In Transparent mode, you can configure all NetScreen devices to allow administration through the logical interface, VLAN1. To enable management traffic to reach the VLAN1 interface, you must enable the management options you want both on VLAN1 and on the Layer 2 zones—V1-Trust, V1-Untrust, V1-DMZ, user-defined Layer 2 zone—through which the management traffic passes to reach VLAN1.

To maintain the highest level of security, Juniper Networks recommends that you limit administrative traffic exclusively to the VLAN1 or MGT interface and user traffic to the security zone interfaces. Separating administrative traffic from network user traffic greatly increases administrative security and assures constant management bandwidth.

Example: Administration through the MGT Interface

In this example, you set the IP address of the MGT interface to 10.1.1.2/24 and enable the MGT interface to receive Web and SSH administrative traffic.

WebUI

Network > Interfaces > Edit (for mgt): Enter the following, and then click **OK**:

IP Address/Netmask: 10.1.1.2/24

Management Services: WebUI, SSH: (select)

CLI

```
set interface mgt ip 10.1.1.2/24
set interface mgt manage web
set interface mgt manage ssh
save
```

Example: Administration through the VLAN1 Interface

In this example, you set the IP address of the VLAN1 interface to 10.1.1.1/24 and enable the VLAN1 interface to receive Telnet and Web administrative traffic through the V1-Trust zone.

WebUI

Network > Interfaces > Edit (for VLAN1): Enter the following, and then click **OK**:

IP Address/Netmask: 10.1.1.1/24

Management Services: WebUI, Telnet: (select)

Network > Zones > Edit (for V1-Trust): Select the following, and then click **OK**:

Management Services: WebUI, Telnet: (select)

CLI

```
set interface vlan1 ip 10.1.1.1/24
set interface vlan1 manage web
set interface vlan1 manage telnet
set zone v1-trust manage web
set zone v1-trust manage telnet
save
```

Administrative Interface

On NetScreen devices that have multiple physical interfaces for network traffic, but no physical MGT interface, you might dedicate one physical interface exclusively for administration, separating management traffic completely from network user traffic. For example, you might have local management access the device through an interface bound to the Trust zone and remote management through an interface bound to the Untrust zone.

Example: Setting Administrative Interface Options

In this example, you bind ethernet1 to the Trust zone and ethernet3 to the Untrust zone. You assign ethernet1 the IP address 10.1.1.1/24 and give it the Manage IP address 10.1.1.2. (Note that the Manage IP address must be in the same subnet as the security zone interface IP address.) You also allow ethernet 1 to receive Web and Telnet traffic. You then assign ethernet3 the IP address 1.1.1.1/32. You do not allow administrative traffic through ethernet3.

WebUI

Network > Interfaces > Edit (for ethernet1): Enter the following, and then click **Apply**:

Zone Name: Trust

Static IP: (select this option when present)

IP Address/Netmask: 10.1.1.1/24

Manage IP: 10.1.1.2

Management Services: WebUI, Telnet

Enter the following, and then click **OK**:

Interface Mode: NAT

Network > Interfaces > Edit (for ethernet3): Enter the following, and then click **OK**:

Zone Name: Untrust

Static IP: (select this option when present)

IP Address/Netmask: 1.1.1.1/32

Manageable: (clear)

CLI

```
set interface ethernet1 zone trust
set interface ethernet1 ip 10.1.1.1/24
set interface ethernet1 manage-ip 10.1.1.2
set interface ethernet1 telnet
set interface ethernet1 web
set interface ethernet1 nat

set interface ethernet3 zone untrust
set interface ethernet3 ip 1.1.1.1/32
save
```

Manage IP

Any physical, redundant, or aggregate interface or subinterface you bind to a security zone can have at least two IP addresses:

- An interface IP address, which connects to a network.
- A logical manage IP address for receiving administrative traffic.

When a NetScreen device is a backup unit in a redundant group for High Availability (HA), you can access and configure the unit through its manage IP address (or addresses)

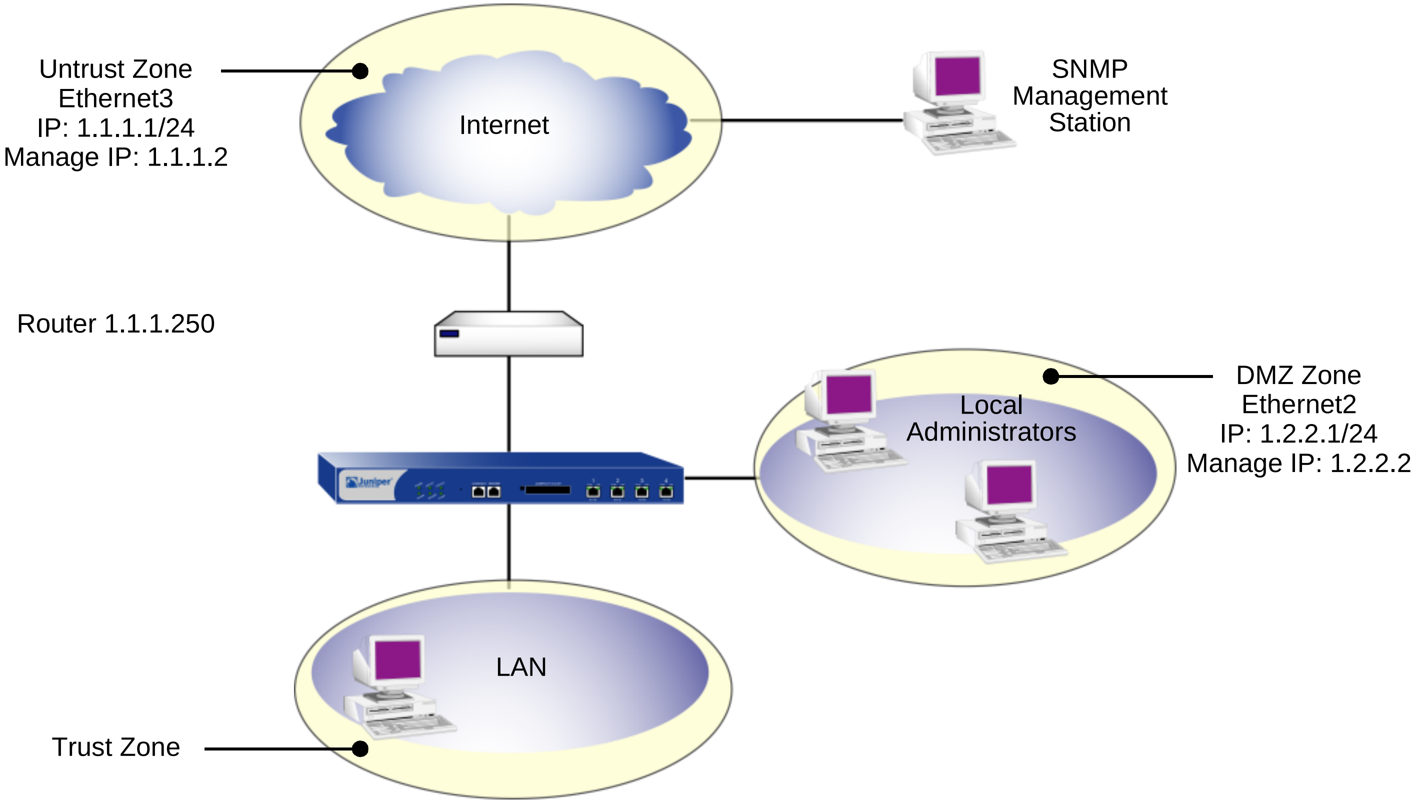
Note: *The manage IP address differs from the VLAN1 address in the following two ways:*

- *When the NetScreen device is in Transparent mode, the VLAN1 IP address can be the endpoint of a VPN tunnel, but the manage IP address cannot.*
- *You can define multiple manage IP addresses—one for each network interface—but you can only define one VLAN1 IP address—for the entire system.*

If you select the Manageable option on the interface configuration page in the WebUI, you can manage the NetScreen device either through the interface IP address or the Manage IP address associated with that interface.

Example: Setting Manage IPs for Multiple Interfaces

In this example, ethernet2 is bound to the DMZ zone and ethernet3 is bound to the Untrust zone. You set the management options on each interface to provide access for the specific kinds of administrative traffic using each interface. You allow HTTP and Telnet access on ethernet2 for a group of local administrators in the DMZ zone, and SNMP access on ethernet3 for central management from a remote SNMP management station. Ethernet2 and ethernet3 each have a manage IP address, to which the various kinds of administrative traffic are directed.



Note: *You also need to set a route directing self-generated SNMP traffic to use ethernet3 to reach the external router at IP address 1.1.1.250.*

WebUI

Network > Interfaces > Edit (ethernet2): Enter the following, and then click **OK**:

Zone Name: DMZ

Static IP: (select this option when present)

IP Address/Netmask: 1.2.2.1/24

Manage IP: 1.2.2.2

Management Services: WebUI, Telnet: (select)

Network > Interfaces > Edit (ethernet3): Enter the following, and then click **OK**:

Zone Name: Untrust

Static IP: (select this option when present)

IP Address/Netmask: 1.1.1.1/24

Manage IP: 1.1.1.2

Management Services: SNMP

CLI

```
set interface ethernet2 zone dmz
set interface ethernet2 ip 1.2.2.1/24
set interface ethernet2 manage-ip 1.2.2.2
set interface ethernet2 manage web
set interface ethernet2 manage telnet

set interface ethernet3 zone untrust
set interface ethernet3 ip 1.1.1.1/24
set interface ethernet3 manage-ip 1.1.1.2
set interface ethernet3 manage snmp
save
```

Levels of Administration

NetScreen devices support multiple administrative users. For any configuration changes made by an administrator, the NetScreen device logs the following information:

- The name of the administrator making the change
- The IP address from which the change was made
- The time of the change

There are several levels of administrative user. The availability of some of these levels depends on the model of your NetScreen device. The following sections list all the admin levels and the privileges for each level. These privileges are only accessible to an admin after he or she successfully logs in with a valid user name and password.

Root Administrator

The root administrator has complete administrative privileges. There is only one root administrator per NetScreen device. The root administrator has the following privileges:

- Manages the root system of the NetScreen device
- Adds, removes, and manages all other administrators
- Establishes and manages virtual systems, and assigns physical or logical interfaces to them
- Creates, removes, and manages virtual routers (VRs)
- Adds, removes, and manages security zones
- Assigns interfaces to security zones
- Performs asset recovery
- Sets the device to FIPS mode
- Resets the device to its default settings
- Updates the firmware
- Loads configuration files
- Clears all active sessions of a specified admin or of all active admins

Read/Write Administrator

The read/write administrator has the same privileges as the root administrator, but cannot create, modify, or remove other admin users. The read/write administrator has the following privileges:

- Creates virtual systems and assigns a virtual system administrator for each one
- Monitors any virtual system
- Tracks statistics (a privilege that cannot be delegated to a virtual system administrator)

Read-Only Administrator

The read-only administrator has only viewing privileges using the WebUI, and can only issue the **get** and **ping** CLI commands. The read-only administrator has the following privileges:

- Read-only privileges in the root system, using the following four commands: **enter**, **exit**, **get**, and **ping**
- Read-only privileges in virtual systems

Virtual System Administrator

Some NetScreen devices support virtual systems. Each virtual system (vsys) is a unique security domain, which can be managed by virtual system administrators with privileges that apply only to that vsys. Virtual system administrators independently manage virtual systems through the CLI or WebUI. On each vsys, the virtual system administrator has the following privileges:

- Creates and edits auth, IKE, L2TP, XAuth, and Manual Key users
- Creates and edits services
- Creates and edits policies
- Creates and edits addresses
- Creates and edits VPNs
- Modifies the virtual system administrator login password
- Creates and manages security zones
- Adds and removes virtual system read-only administrators

Virtual System Read-Only Administrator

A virtual system read-only administrator has the same set of privileges as a read-only administrator, but only within a specific virtual system. A virtual system read-only administrator has viewing privileges for his particular vsys through the WebUI, and can only issue the **enter**, **exit**, **get**, and **ping** CLI commands within his vsys.

Note: *For more information on virtual systems, see "Virtual Systems" on page* ***7****-1.*

Defining Admin Users

The root administrator is the only one who can create, modify, and remove admin users. In the following example, the one performing the procedure must be a root administrator.

Example: Adding a Read-Only Admin

In this example, you—as the root admin—add a read-only administrator named Roger with password 2bd21wG7.

WebUI

Configuration > Admin > Administrators > New: Enter the following, and then click **OK**:

Name: Roger

New Password: 2bd21wG7[7]

Confirm New Password: 2bd21wG7

Privileges: Read-Only (select)

CLI

```
set admin user Roger password 2bd21wG7 privilege read-only
save
```

[7] The password can be up to 31 characters long and is case sensitive.

Example: Modifying an Admin

In this example, you—as the root admin—change Roger’s privileges from read-only to read/write.

WebUI

Configuration > Admin > Administrators > Edit (for Roger): Enter the following, and then click **OK**:

Name: Roger

New Password: 2bd21wG7

Confirm New Password: 2bd21wG7

Privileges: Read-Write (select)

CLI

```
unset admin user Roger
set admin user Roger password 2bd21wG7 privilege all
save
```

Example: Deleting an Admin

In this example, you—as the root admin—delete the admin user Roger.

WebUI

Configuration > Admin > Administrators: Click **Remove** in the Configure column for Roger.

CLI

```
unset admin user Roger
save
```

Example: Clearing an Admin’s Sessions

In this example, you—as the root admin—terminate all active sessions of the admin user Roger. When you execute the following command, the NetScreen device closes all active sessions and automatically logs off Roger from the system.

WebUI

> **Note:** *You must use the CLI to clear an admin’s sessions.*

CLI

```
clear admin name Roger
save
```

Securing Administrative Traffic

To secure the NetScreen device during setup, perform the following steps:

1. On the Web interface, change the administrative port.

   See "Changing the Port Number" on page 43.

2. Change the user name and password for administration access.

   See "Changing the Admin Login Name and Password" on page 44.

3. Define the management client IP addresses for the admin users.

   See "Restricting Administrative Access" on page 49.

4. Turn off any unnecessary interface management service options.

   See "Controlling Administrative Traffic" on page 29.

5. Disable the ping and ident-reset service options on the interfaces, both of which respond to requests initiated by unknown parties and can reveal information about your network:

WebUI

Network > Interfaces > Edit (for the interface you want to edit): Disable the following service options, and then click **OK**:

Ping: Selecting this option allows the NetScreen device to respond to an ICMP echo request, or "ping," which determines whether a specific IP address is accessible from the device.

Ident-Reset: When a service such as Mail or FTP sends an identification request and receives no acknowledgment, it sends the request again. While the request is in progress, user access is disabled. With the Ident-Reset check box enabled, the NetScreen device automatically restores user access.

CLI

```
unset interface interface manage ping
unset interface interface manage ident-reset
```

Changing the Port Number

Changing the port number to which the NetScreen device listens for HTTP management traffic improves security. The default setting is port 80, the standard port number for HTTP traffic. After you change the port number, you must then type the new port number in the URL field in your Web browser when you next attempt to contact the NetScreen device. (In the following example, the administrator needs to enter http://188.30.12.2:15522.)

Example: Changing the Port Number

In this example, the IP address of the interface bound to the Trust zone is 10.1.1.1/24. To manage the NetScreen device via the WebUI on this interface, you must use HTTP. To increase the security of the HTTP connection, you change the HTTP port number from 80 (the default) to 15522.

WebUI

Configuration > Admin > Management: In the HTTP Port field, type **15522**, and then click **Apply**.

CLI

```
set admin port 15522
save
```

Changing the Admin Login Name and Password

By default, the initial login name for NetScreen devices is **netscreen**. The initial password is also **netscreen**. Because these have been widely published, Juniper Networks recommends you change the login name and password immediately. The login name and password are both case-sensitive. They can contain any character that can be entered from the keyboard except for ? and “. Record the new admin login name and password in a secure manner.

***Warning:** Be sure to record your new password. If you forget it, you must reset the NetScreen device to its factory settings, and all your configurations will be lost. For more information, see “Resetting the Device to the Factory Default Settings” on page 48.*

Admin users for the NetScreen device can be authenticated using the internal database or an external auth server[8]. When the admin user logs on to the NetScreen device, it first checks the local internal database for authentication. If there is no entry present and an external auth server is connected, it then checks for a matching entry in the external auth server database. After an admin user successfully logs on to an external auth server, the NetScreen device maintains the admin’s login status locally.

***Note:** For more information about admin user levels, see “Levels of Administration” on page 37. For more about using external auth servers, see “External Auth Servers” on page **2**-392.*

When the root admin changes any attribute of an admin user’s profile—user name, password, or privilege—any administrative session that that admin currently has open automatically terminates. If the root admin changes any of these attributes for himself, or if a root-level read/write admin or vsys read/write admin changes his own password, all of that user’s currently open admin sessions[9] terminate, other than the one in which he made the change.

[8] NetScreen supports RADIUS, SecurID, and LDAP servers for admin user authentication. (For more information, see “Admin Users” on page **2**-481.) Although the root admin account must be stored on the local database, you can store root-level read/write and root-level read-only admin users on an external auth server. To store root-level and vsys-level admin users on an external auth server and query their privileges, the server must be RADIUS and you must load the netscreen.dct file on it. (See “NetScreen Dictionary File” on page **2**-397.)

[9] The behavior of an HTTP or HTTPS session using the WebUI is different. Because HTTP does not support a persistent connection, any change that you make to your own user profile automatically logs you out of that and all other open sessions.

Example: Changing an Admin User’s Login Name and Password

In this example, you—as the root admin—change a read/write administrator’s login name from “John” to “Smith” and his password from xL7s62a1 to 3MAb99j2[10].

Note: *For information on the different levels of administrators, see “Levels of Administration” on page 37.*

WebUI

Configuration > Admin > Administrators > Edit (for John): Enter the following, and then click **OK**:

Name: Smith

New Password: 3MAb99j2

Confirm New Password: 3MAb99j2

CLI

```
unset admin user John
set admin user Smith password 3MAb99j2 privilege all
save
```

[10] Instead of using actual words for passwords, which might be guessed or discovered through a dictionary attack, you can use an apparently random string of letters and numbers. To create such a string that you can easily remember, compose a sentence and use the first letter from each word. For example, “Charles will be 6 years old on November 21” becomes “Cwb6yooN21.”

Example: Changing One’s Own Password

Admin users with read/write privileges can change their own administrator password, but not their login name. In this example, an administrator with read/write privileges and the login name “Smith” changes his password from 3MAb99j2 to ru494Vq5.

WebUI

Configuration > Admin > Administrators > Edit (for first entry): Enter the following, and then click **OK**:

Name: Smith

New Password: ru494Vq5

Confirm New Password: ru494Vq5

CLI

```
set admin password ru494Vq5
save
```

Setting the Minimum Length of the Root Admin Password

In some corporations, one person might initially configure the device as the root admin, but another person later assumes the role of root admin and manages the device. To prevent the subsequent root admin from using short passwords that are potentially easier to decode, the initial root admin can set a minimum length requirement for the root admin’s password to any number from 1 to 31.

Note that you can set the minimum password length only if you are the root admin and your own password meets the minimum length requirement you are attempting to set. Otherwise, the NetScreen device displays an error message.

To specify a minimum length for the root admin’s password, enter the following command:

```
set admin password restrict length number
```

Note: *You must use the CLI to set this restriction .*

Resetting the Device to the Factory Default Settings

If the admin password is lost, you can use the following procedure to reset the NetScreen device to its default settings. The configurations will be lost, but access to the device will be restored. To perform this operation, you need to make a console connection, which is described in detail in the *NetScreen CLI Reference Guide* and the installer’s guides.

> ***Note:*** *By default the device recovery feature is enabled. You can disable it by entering the* ***unset admin device-reset*** *command. Also, if the NetScreen device is in FIPS mode, the recovery feature is automatically disabled.*

1. At the login prompt, type the serial number of the device.
2. At the password prompt, type the serial number again.

   The following message appears:

   !!!! Lost Password Reset !!!! You have initiated a command to reset the device to factory defaults, clearing all current configuration, keys and settings. Would you like to continue? y/n
3. Press the **Y** key.

   The following message appears:

   !! Reconfirm Lost Password Reset !! If you continue, the entire configuration of the device will be erased. In addition, a permanent counter will be incremented to signify that this device has been reset. This is your last chance to cancel this command. If you proceed, the device will return to factory default configuration, which is: System IP: 192.168.1.1; username: netscreen; password: netscreen. Would you like to continue? y/n
4. Press the **Y** key to reset the device.

   You can now log on using *netscreen* as the default username and password.

Restricting Administrative Access

You can administer NetScreen devices from one or multiple addresses of a subnet. By default, any host on the trusted interface can administer a NetScreen device. To restrict this ability to specific workstations, you must configure management client IP addresses.

Note: *The assignment of a management client IP address takes effect immediately. If you are managing the device via a network connection and your workstation is not included in the assignment, the NetScreen device immediately terminates your current session and you are no longer able to manage the device from that workstation.*

Example: Restricting Administration to a Single Workstation

In this example, the administrator at the workstation with the IP address 172.16.40.42 is the only administrator specified to manage the NetScreen device.

WebUI

Configuration > Admin > Permitted IPs: Enter the following, and then click **Add**:

IP Address / Netmask: 172.16.40.42/32

CLI

```
set admin manager-ip 172.16.40.42/32
save
```

Example: Restricting Administration to a Subnet

In this example, the group of administrators with workstations in the 172.16.40.0/24 subnet are specified to manage a NetScreen device.

WebUI

Configuration > Admin > Permitted IPs: Enter the following, and then click **Add**:

IP Address / Netmask: 172.16.40.0/24

CLI

```
set admin manager-ip 172.16.40.0 255.255.255.0
save
```

Restricting the Root Admin to Console Access

You can also require the root admin to log in to the NetScreen device through the console only. This restriction requires the root admin to have physical access to the device to log in, thus preventing unauthorized users from logging in remotely as the root admin. After you have set this restriction, the device denies access if anyone tries to log in as the root admin through other means, such as the WebUI, Telnet, or SSH, even if these management options are enabled on the ingress interface.

To restrict the access of the root admin to the console only, enter the following command:

```
set admin root access console
```

Note: *You must use the CLI to set this restriction.*

VPN Tunnels for Administrative Traffic

You can use virtual private network (VPN) tunnels to secure remote management of a NetScreen device from either a dynamically assigned or fixed IP address. Using a VPN tunnel, you can protect any kind of traffic, such as NetScreen-Security Manager, HTTP, Telnet, or SSH. (For information about creating a VPN tunnel to secure self-initiated traffic such as Security Manager reports, syslog reports or SNMP traps, see "VPN Tunnels for Self-Initiated Traffic" on page 97.)

NetScreen supports two types of VPN tunnel configurations:

- **Route-Based VPNs**: The NetScreen device uses route table entries to direct traffic to tunnel interfaces, which are bound to VPN tunnels. (For details, see Volume 5, "VPNs".)
- **Policy-Based VPNs**: The NetScreen device uses the VPN tunnel names specifically referenced in policies to direct traffic through VPN tunnels. (For details, see Volume 5, "VPNs".)

For each VPN tunnel configuration type, there are the following types of VPN tunnel:

- **Manual Key**: You manually set the three elements that define a Security Association (SA) at both ends of the tunnel: a Security Parameters Index (SPI), an encryption key, and an authentication key. To change any element in the SA, you must manually enter it at both ends of the tunnel.
- **AutoKey IKE with Preshared Key**: One or two preshared secrets—one for authentication and one for encryption—function as seed values. Using them, the IKE protocol generates a set of symmetrical keys at both ends of the tunnel; that is, the same key is used to encrypt and decrypt. At predetermined intervals, these keys are automatically regenerated.
- **AutoKey IKE with Certificates**: Using the Public Key Infrastructure (PKI), the participants at both ends of the tunnel use a digital certificate (for authentication) and an RSA public/private key pair (for encryption). The encryption is asymmetrical; that is, one key in a pair is used to encrypt and the other to decrypt.

> ***Note:*** *For a complete description of VPN tunnels, see Volume 5, "VPNs". For more information on NetScreen-Remote, refer to the NetScreen-Remote User's Guide.*

If you use a policy-based VPN configuration, you must create an address book entry with the IP address of an interface in any zone other than the one to which the outgoing interface is bound. You can then use that as the source address in policies referencing the VPN tunnel. This address also serves as the end entity address for the remote IPSec peer. If you are using a route-based VPN configuration, such an address book entry is unnecessary.

Example: Administration through a Route-Based Manual Key VPN Tunnel

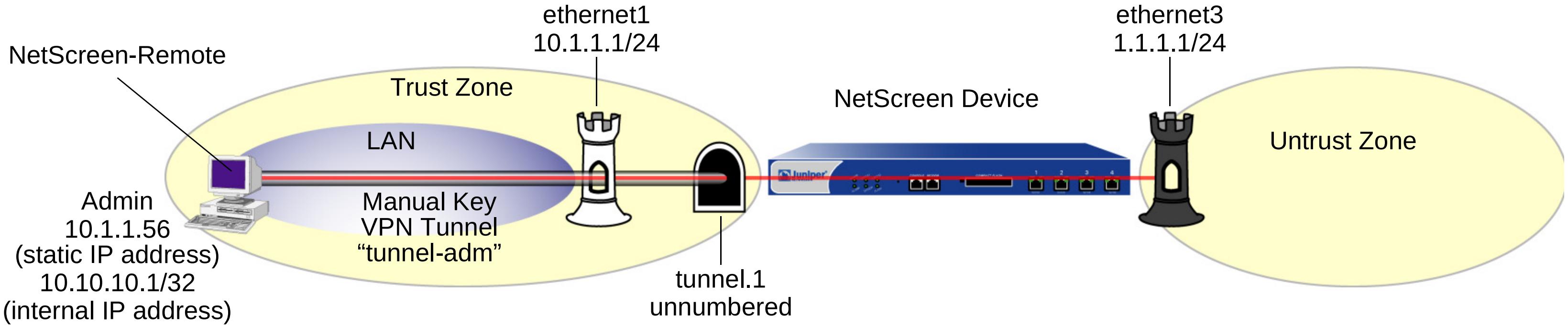
In this example, you set up a route-based Manual Key VPN tunnel to provide confidentiality for administrative traffic. The tunnel extends from the NetScreen-Remote VPN client running on an admin's workstation at 10.1.1.56 to ethernet1 (10.1.1.1/24). The admin's workstation and ethernet1 are both in the Trust zone. You name the tunnel "tunnel-adm". You create an unnumbered tunnel interface, name it tunnel.1, and bind it to the Trust zone and to the VPN tunnel "tunnel-adm".

The NetScreen device uses the internal IP address configured on the NetScreen-Remote—10.10.10.1—as the destination address to target beyond the peer gateway address of 10.1.1.56. You define a route to 10.10.10.1/32 through tunnel.1. A policy is unnecessary because of the following two reasons:

- The VPN tunnel protects administrative traffic that terminates at the NetScreen device itself instead of passing through the device to another security zone.
- This is a route-based VPN, meaning that the route lookup—not a policy lookup—links the destination address to the tunnel interface, which is bound to the appropriate VPN tunnel.

***Note:** Compare this example with "Example: Administration through a Policy-Based Manual Key VPN Tunnel" on page 58.*

The NetScreen-Remote uses the IP address of ethernet3—1.1.1.1—as the destination address to target beyond the remote gateway at 10.1.1.1. The NetScreen-Remote configuration specifies the remote party ID type as "IP address" and the protocol as "All".



WebUI

1. Interfaces

Network > Interfaces > Edit (ethernet1): Enter the following, and then click **Apply**:

Zone Name: Trust

Static IP: (select this option when present)

IP Address/Netmask: 10.1.1.1/24

Select the following, and then click **OK**:

Interface Mode: NAT

Network > Interfaces > Edit (ethernet3): Enter the following, and then click **OK**:

Zone Name: Untrust

Static IP: (select this option when present)

IP Address/Netmask: 1.1.1.1/24

Network > Interfaces > New Tunnel IF: Enter the following, and then click **OK**:

Tunnel Interface Name: Tunnel.1

Zone (VR): Trust (trust-vr)

Unnumbered: (select)

Interface: ethernet1(trust-vr)[11]

[11] The unnumbered tunnel interface borrows the IP address of the specified security zone interface.

2. VPN

VPNs > Manual Key > New: Enter the following, and then click **OK**:

VPN Tunnel Name: tunnel-adm

Gateway IP: 10.1.1.56

Security Index (HEX Number): 5555 (Local) 5555 (Remote)

Outgoing Interface: ethernet1

ESP-CBC: (select)

Encryption Algorithm: DES-CBC

Generate Key by Password[12]: netscreen1

Authentication Algorithm: MD5

Generate Key by Password: netscreen2

> Advanced: Enter the following, and then click **Return** to set the advanced options and return to the basic configuration page:

Bind to Tunnel Interface: (select), Tunnel.1

3. Route

Network > Routing > Routing Entries > trust-vr New: Enter the following, and then click **OK**:

Network Address/Netmask: 10.10.10.1/32

Gateway: (select)

Interface: Tunnel.1

Gateway IP Address: 0.0.0.0

[12] Because NetScreen-Remote processes passwords into keys differently than other NetScreen products do, after you configure the tunnel do the following: (1) Return to the Manual Key Configuration dialog box (click **Edit** in the Configure column for “tunnel-adm”); (2) copy the generated hexadecimal keys; and (3) use those hexadecimal keys when configuring the NetScreen-Remote end of the tunnel.

CLI

1. Interfaces

```
set interface ethernet1 zone trust
set interface ethernet1 ip 10.1.1.1/24
set interface ethernet1 nat

set interface ethernet3 zone untrust
set interface ethernet3 ip 1.1.1.1/24
set interface tunnel.1 zone trust

set interface tunnel.1 ip unnumbered interface ethernet1[13]
```

2. VPN

```
set vpn tunnel-adm manual 5555 5555 gateway 10.1.1.56 outgoing ethernet1 esp
    des password netscreen1 auth md5 password netscreen2[14]
set vpn tunnel-adm bind interface tunnel.1
```

3. Route

```
set vrouter trust-vr route 10.10.10.1/32 interface tunnel.1
save
```

[13] The unnumbered tunnel interface borrows the IP address of the specified security zone interface.

[14] Because NetScreen-Remote processes passwords into keys differently than other NetScreen products do, after you configure the tunnel do the following: (1) Type **get vpn admin-tun**; (2) copy the hexadecimal keys generated by “netscreen1” and “netscreen2”; and (3) use those hexadecimal keys when configuring the NetScreen-Remote end of the tunnel.

NetScreen-Remote Security Policy Editor

1. Click **Options** > **Global Policy Settings**, and select the **Allow to Specify Internal Network Address** check box.
2. Click **Options > Secure > Specified Connections**.
3. Click **Add a new connection**, and type **Admin** next to the new connection icon that appears.
4. Configure the connection options:

    Connection Security: Secure

    Remote Party Identity and Addressing:

    ID Type: IP Address, 1.1.1.1

    Protocol: All

    Connect using Secure Gateway Tunnel: (select)

    ID Type: IP Address, 10.1.1.1

5. Click the **PLUS** symbol, located to the left of the unix icon, to expand the connection policy.
6. Click **My Identity**, in the Select Certificate drop-down list, choose **None**, and in the Internal Network IP Address, type **10.10.10.1**.
7. Click **Security Policy**, and select **Use Manual Keys**.
8. Click the **PLUS** symbol, located to the left of the Security Policy icon, and then the **PLUS** symbol to the left of Key Exchange (Phase 2) to expand the policy further.
9. Click **Proposal 1**, and select the following IPSec Protocols:

    Encapsulation Protocol (ESP): (select)

    Encrypt Alg: DES

    Hash Alg: MD5

    Encapsulation: Tunnel

10. Click **Inbound Keys**, and in the Security Parameters Index field, type **5555**.
11. Click **Enter Key**, enter the following[15], and then click **OK**:

    Choose key format: Binary

    ESP Encryption Key: dccbee96c7e546bc

    ESP Authentication Key: dccbe9e6c7e546bcb0b667794ab7290c

12. Click **Outbound Keys**, and in the Security Parameters Index field, type **5555**.
13. Click **Enter Key**, enter the following[15], and then click **OK**:

    Choose key format: Binary

    ESP Encryption Key: dccbee96c7e546bc

    ESP Authentication Key: dccbe9e6c7e546bcb0b667794ab7290c

14. Click **Save**.

[15] These are the two generated keys that you copied after configuring the NetScreen device.

Example: Administration through a Policy-Based Manual Key VPN Tunnel

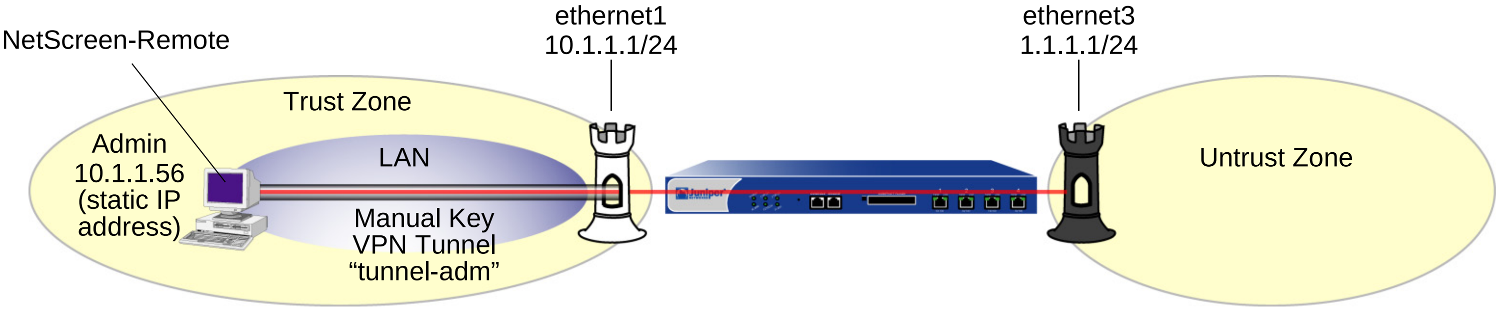
In this example, you set up a policy-based Manual Key VPN tunnel for administrative traffic. The tunnel extends from the NetScreen-Remote VPN client running on an admin's workstation at 10.1.1.56 to ethernet1 (10.1.1.1/24). The admin's workstation and ethernet1 are both in the Trust zone. You name the tunnel "tunnel-adm" and bind it to the Trust zone.

The NetScreen device uses the internal IP address configured on the NetScreen-Remote—10.10.10.1—as the destination address to target beyond the peer gateway address of 10.1.1.56. You define a Trust zone address book entry specifying 10.10.10.1/32, and an Untrust zone address book entry specifying the IP address of ethernet3. Although the address of the ethernet3 interface is 1.1.1.1/24, the address you create has a 32-bit netmask: 1.1.1.1/32. You use this address and the internal address of the admin's workstation in the policy you create referencing the tunnel "tunnel-adm". A policy is necessary because this is a policy-based VPN, meaning that the policy lookup—not a route lookup—links the destination address to the appropriate VPN tunnel.

You must also define a route to 10.10.10.1/32 through ethernet1.

Note: *Compare this example with "Example: Administration through a Route-Based Manual Key VPN Tunnel" on page 52.*

The NetScreen-Remote uses the IP address 1.1.1.1 as the destination address to target beyond the remote gateway at 10.1.1.1. The NetScreen-Remote tunnel configuration specifies the remote party ID type as IP address and the protocol as "All".



WebUI

1. Interfaces

Network > Interfaces > Edit (ethernet1): Enter the following, and then click **Apply**:

Zone Name: Trust

Static IP: (select this option when present)

IP Address/Netmask: 10.1.1.1/24

Select the following, and then click **OK**:

Interface Mode: NAT

Network > Interfaces > Edit (ethernet3): Enter the following, and then click **OK**:

Zone Name: Untrust

Static IP: (select this option when present)

IP Address/Netmask: 1.1.1.1/24

2. Addresses

Objects > Addresses > List > New: Enter the following, and then click **OK**:

Address Name: Untrust-IF

IP Address/Domain Name:

IP/Netmask: (select), 1.1.1.1/32

Zone: Untrust

Objects > Addresses > List > New: Enter the following, and then click **OK**:

Address Name: admin

IP Address/Domain Name:

IP/Netmask: (select), 10.10.10.1/32

Zone: Trust

3. VPN

VPNs > Manual Key > New: Enter the following, and then click **OK**:

VPN Tunnel Name: tunnel-adm

Gateway IP: 10.1.1.56

Security Index (HEX Number): 5555 (Local) 5555 (Remote)

Outgoing Interface: ethernet1

ESP-CBC: (select)

Encryption Algorithm: DES-CBC

Generate Key by Password[16]: netscreen1

Authentication Algorithm: MD5

Generate Key by Password: netscreen2

4. Route

Network > Routing > Routing Entries > trust-vr New: Enter the following, and then click **OK**:

Network Address/Netmask: 10.10.10.1/32

Gateway: (select)

Interface: ethernet1

Gateway IP Address: 0.0.0.0

[16] Because NetScreen-Remote processes passwords into keys differently than other NetScreen products do, after you configure the tunnel do the following: (1) Return to the Manual Key Configuration dialog box (click **Edit** in the Configure column for “tunnel-adm”); (2) copy the generated hexadecimal keys; and (3) use those hexadecimal keys when configuring the NetScreen-Remote end of the tunnel.

5. Policies

Policies > (From: Trust, To: Untrust) New: Enter the following, and then click **OK**:

Source Address:

Address Book Entry: (select), admin

Destination Address:

Address Book Entry: (select), Untrust-IF

Service: Any

Action: Tunnel

Tunnel:

VPN: tunnel-adm

Modify matching bidirectional VPN policy: (select)

Position at Top: (select)

CLI

1. Interfaces

```
set interface ethernet1 zone trust
set interface ethernet1 ip 10.1.1.1/24
set interface ethernet1 nat

set interface ethernet3 zone untrust
set interface ethernet3 ip 1.1.1.1/24
```

2. Addresses

```
set address trust admin 10.10.10.1/32
set address untrust Untrust-IF 1.1.1.1/32
```

3. VPN

```
set vpn tunnel-adm manual 5555 5555 gateway 10.1.1.56 outgoing ethernet1 esp
    des password netscreen1 auth md5 password netscreen2
```
[17]

4. Route

```
set vrouter trust-vr route 10.10.10.1/32 interface ethernet1
```

5. Policies

```
set policy top from trust to untrust admin Untrust-IF any tunnel vpn tunnel-adm
set policy top from untrust to trust Untrust-IF admin any tunnel vpn tunnel-adm
save
```

[17] Because NetScreen-Remote processes passwords into keys differently than other NetScreen products do, after you configure the tunnel do the following: (1) Type **get vpn admin-tun**; (2) copy the hexadecimal keys generated by “netscreen1” and “netscreen2”; and (3) use those hexadecimal keys when configuring the NetScreen-Remote end of the tunnel.

NetScreen-Remote Security Policy Editor

1. Click **Options > Secure > Specified Connections**.
2. Click **Add a new connection**, and type **Admin** next to the new connection icon that appears.
3. Configure the connection options:

   Connection Security: Secure

   Remote Party Identity and Addressing:

   ID Type: IP Address, 1.1.1.1

   Protocol: All

   Connect using Secure Gateway Tunnel: (select)

   ID Type: IP Address, 10.1.1.1

4. Click the **PLUS** symbol, located to the left of the unix icon, to expand the connection policy.
5. Click **My Identity**, and in the Select Certificate drop-down list, choose **None**.
6. Click **Security Policy**, and select **Use Manual Keys**.
7. Click the **PLUS** symbol, located to the left of the Security Policy icon, and then the **PLUS** symbol to the left of Key Exchange (Phase 2) to expand the policy further.
8. Click **Proposal 1**, and select the following IPSec Protocols:

   Encapsulation Protocol (ESP): (select)

   Encrypt Alg: DES

   Hash Alg: MD5

   Encapsulation: Tunnel

9. Click **Inbound Keys**, and in the Security Parameters Index field, type **5555**.
10. Click **Enter Key**, enter the following[18], and then click **OK**:

    Choose key format: Binary

    ESP Encryption Key: dccbee96c7e546bc

    ESP Authentication Key: dccbe9e6c7e546bcb0b667794ab7290c

11. Click **Outbound Keys**, and in the Security Parameters Index field, type **5555**.
12. Click **Enter Key**, enter the following[15], and then click **OK**:

    Choose key format: Binary

    ESP Encryption Key: dccbee96c7e546bc

    ESP Authentication Key: dccbe9e6c7e546bcb0b667794ab7290c

13. Click **Save**.

[18] These are the two generated keys that you copied after configuring the NetScreen device.

2

Monitoring NetScreen Devices

This chapter discusses the following topics about monitoring NetScreen devices:

Storing Log Information

All NetScreen devices allow you to store event and traffic log data internally (in flash storage) and externally (in a number of locations). Although storing log information internally is convenient, the amount of memory is limited. When the internal storage space completely fills up, the NetScreen device begins overwriting the oldest log entries with the latest ones. If this first-in-first-out (FIFO) mechanism occurs before you save the logged information, you can lose data. To mitigate such data loss, you can store event and traffic logs externally in a syslog or WebTrends server, or in the NetScreen-Global PRO database. The NetScreen device sends new event and traffic log entries to an external storage location every second.

The following list provides the possible destinations for logged data:

- **Console:** A useful destination for all log entries to appear when you are troubleshooting a NetScreen device through the console. Optionally, you might elect to have only alarm messages (critical, alert, emergency) appear here to alert you immediately if you happen to be using the console at the time an alarm is triggered.
- **Internal:** The internal database on a NetScreen device is a convenient destination for log entries, but of limited space.
- **Email:** A convenient method for sending event and traffic logs to remote administrators.
- **SNMP:** In addition to the transmission of SNMP traps, a NetScreen device can also send alarm messages (critical, alert, emergency) from its event log to an SNMP community.
- **Syslog:** All event and traffic log entries that a NetScreen device can store internally, it can also send to a syslog server. Because syslog servers have a much greater storage capacity than the internal flash storage on a NetScreen device, sending data to a syslog server can mitigate data loss that might occur when log entries exceed the maximum internal storage space. Syslog stores alert- and emergency-level events in the security facility that you specify, and all other events (including traffic data) in the facility you specify.
- **WebTrends:** Allows you to view log data for critical-, alert-, and emergency-level events in a more graphical format than syslog, which is a text-based tool.
- **CompactFlash (PCMCIA):** The advantage of this destination is portability. After storing data on a CompactFlash card, you can physically remove the card from the NetScreen device and store it or load it on another device.

Event Log

NetScreen provides an event log for monitoring system events such as admin-generated configuration changes, and self-generated messages and alarms regarding operational behavior and attacks. The NetScreen device categorizes system events by the following severity levels:

- **Emergency:** Messages on SYN attacks, Tear Drop attacks, and Ping of Death attacks. For more information on these types of attacks, see Volume 4, "Attack Detection and Defense Mechanisms".
- **Alert:** Messages about conditions that require immediate attention, such as firewall attacks and the expiration of license keys.
- **Critical:** Messages about conditions that probably affect the functionality of the device, such as high availability (HA) status changes.
- **Error:** Messages about error conditions that probably affect the functionality of the device, such as a failure in antivirus scanning or in communicating with SSH servers.
- **Warning:** Messages about conditions that could affect the functionality of the device, such as a failure to connect to email servers or authentication failures, timeouts, and successes.
- **Notification:** Messages about normal events, including configuration changes initiated by an admin.
- **Information:** Messages that provide general information about system operations.
- **Debugging:** Messages that provide detailed information used for debugging purposes.

The event log displays the date, time, level and description of each system event. You can view system events for each category stored in flash storage on the NetScreen device through the WebUI or the CLI. You can also open or save the file to the location you specify, and then use an ASCII text editor (such as Notepad or WordPad) to view the file. Alternatively, you can send them to an external storage space (see "Storing Log Information" on page 66).

Note: *For detailed information about the messages that appear in the event log, refer to the* NetScreen Message Log Reference Guide.

Viewing the Event Log

You can view the event log stored in the device by using the CLI or the WebUI. You can display log entries by severity level and search the event log by keyword in both the WebUI and CLI.

To display the event log by severity level, do either of the following:

WebUI

Reports > System Log > Event: Select a severity level from the Log Level drop-down list.

CLI

```
get event level { emergency | alert | critical | error | warning | notification
    | information | debugging }
```

To search the event log by keyword, do either of the following:

WebUI

Reports > System Log > Event: Type a word or word phrase up to 15 characters in length in the search field, and then click **Search**.

CLI

```
get event include word_string
```

Example: Viewing the Event Log by Severity Level and Keyword

In this example, you view event log entries with a “warning” severity level and do a search for the keyword AV.

WebUI

Reports > System Log > Event:

Log Level: Warning (select)

Search: AV Click **Search**.

CLI

```
get event level warning include av
```

```
Date       Time     Module Level Type Description
2003-05-16 15:56:20 system warn 00547 AV scanman is removed.
2003-05-16 09:45:52 system warn 00547 AV test1 is removed.
Total entries matched = 2
```

Sorting and Filtering the Event Log

Additionally, you can use the CLI to sort or filter the event log based on the following criteria:

- **Source or Destination IP Address:** Only certain events contain a source or destination IP address, such as land attacks or ping flood attacks. When you sort event logs by source or destination IP address, the device sorts and displays only the event logs that contain source or destination IP addresses. It ignores all event logs with no source or destination IP address.

  When you filter the event log by by specifying a source or destination IP address or range of addresses, the device displays the log entries for the specified source or destination IP address, or range of addresses.

- **Date:** You can sort the event log by date only, or by date and time. When you sort log entries by date and time, the device lists the log entries in descending order by date and time.

  You can also filter event log entries by specifying a start date, an end date, or a date range. When you specify a start date, the device displays log entries with date/time stamps after the start date. When you specify an end date, the device displays log entries with date/time stamps before the end date.

- **Time:** When you sort logs by time, the device displays the log entries in descending order by time, regardless of the date. When you specify a start time, the device displays log entries with time stamps after the specified start time, regardless of the date. When you specify an end time, the device displays log entries with time stamps before the specified end time, regardless of the date. When you specify both a start and end time, the device displays log entries with time stamps within the specified time period.
- **Message Type ID Number:** You can display event log entries for a specific message type ID number, or you can display log entries with message type ID numbers within a specified range. The device displays log entries with the message type ID number(s) you specified, in descending order by date and time.

Example: Sorting Event Log Entries by IP Address

In this example you view event log entries that contain source IP addresses within the range 10.100.0.0 to 10.200.0.0. The log entries are also sorted by source IP address.

CLI

```
get event sort-by src-ip 10.100.0.0-10.200.0.0
```

Downloading the Event Log

You can open or save the event log to the location you specify, and then use an ASCII text editor (such as Notepad or WordPad) to view the file. Alternatively, you can send the log entries to an external storage space (see "Storing Log Information" on page 66). You can download the entire event log through the WebUI. You can download the event log by severity level through the CLI.

Example: Downloading the Event Log

In this example, you download the event log to the local directory "C:\netscreen\logs". You name the file "evnt07-02.txt".

WebUI

1. Reports > System Log > Event: Click **Save**.

   The File Download dialog box prompts you to open the file (using an ASCII editor) or save it to disk.

2. Select the **Save** option, and then click **OK**.

   The File Download dialog box prompts you to choose a directory.

3. Specify **C:\netscreen\logs**, name the file "evnt07-02.txt", and then click **Save**.

Example: Downloading the Event Log for Critical Events

In this example, you download the critical events entered in the event log to the root directory of a TFTP server at the IP address 10.10.20.200 (CLI). You name the file "crt_evnt07-02.txt".

CLI

```
get event level critical > tftp 10.10.20.200 crt_evnt07-02.txt
```

TRAFFIC LOG

The NetScreen device can monitor and record traffic that it permits or denies based on previously configured policies. You can enable the logging option for each policy that you configure. When you enable the logging option for a policy that permits traffic, the device records the traffic allowed by that policy. When you enable the logging option for a policy that denies traffic, the device records traffic that attempted to pass through the device, but was dropped because of that policy.

A traffic log notes the following elements for each session:

- Date and time that the connection started
- Source address and port number
- Translated source address and port number
- Destination address and port number
- The duration of the session
- The service used in the session

To log all traffic that a NetScreen device receives, you must enable the logging option for all policies. To log specific traffic, enable logging only on policies that apply to that traffic. To enable the logging option on a policy, do either of the following:

WebUI

Policies > (From: *src_zone*, To: *dst_zone*) New : Select **Logging** and then click **OK**.

CLI

```
set policy from src_zone to dst_zone src_addr dst_addr service action log
```

In addition to logging traffic for a policy, the device can also maintain a count in bytes of all network traffic to which the policy was applied. When you enable the counting option, the device includes the following information when it displays traffic log entries

- The number of bytes transmitted from a source to a destination
- The number of bytes transmitted from a destination to a source

To enable the counting option on a policy, do either of the following:

WebUI

Policies > (From: *src_zone*, To: *dst_zone*) New > Advanced: Select **Counting**, click **Return**, and then click **OK**.

CLI

```
set policy from src_zone to dst_zone src_addr dst_addr service action log count
```

Viewing the Traffic Log

You can view traffic log entries stored in flash storage on the NetScreen device through either the CLI or WebUI:

WebUI

Policies > ▦ (for policy ID *number*)

or

Reports > Policies > ▦ (for policy ID *number*)

CLI

```
get log traffic policy number
```

Example: Viewing Traffic Log Entries

In this example, you view the traffic log details of a policy with ID number 3, and for which you have previously enabled logging:

WebUI

Policies: Click the ▦ icon for the policy with ID number 3.

The following information appears:

Date/Time	**Source Address/Port**	**Destination Address/Port**	**Translated Source Address/Port**	**Translated Destination Address/Port**	**Service**	**Duration**	Bytes Sent	Bytes Received
2003-01-09 21:33:43	1.1.1.1:1046	10.1.1.5:80	1.1.1.1:1046	10.1.1.5:80	HTTP	1800 sec.	326452	289207

Sorting and Filtering the Traffic Log

Similar to the event log, when you use the CLI to view the traffic log, you can sort or filter the log entries according to the following criteria:

- **Source or Destination IP Address:** You can sort the traffic log by source or destination IP address. YOu can also filter the traffic log by specifying a source or destination IP address or range of addresses.
- **Date:** You can sort the traffic log by date only, or by date and time. The device lists the log entries in descending order by date and time.

  You can also filter event log entries by specifying a start date, an end date, or a date range. When you specify a start date, the device displays log entries with date/time stamps after the start date. When you specify an end date, the device displays log entries with date/time stamps before the end date.
- **Time:** When you sort the traffic log by time, the device displays the log entries in descending order by time, regardless of the date. When you specify a start time, the device displays log entries with time stamps after the specified start time, regardless of the date. When you specify an end time, the device displays log entries with time stamps before the specified end time, regardless of the date. When you specify both a start and end time, the device displays log entries with time stamps within the specified time period.

Example: Sorting the Traffic Log by Time

In this example you view traffic logs sorted by time with a time stamp after 1:00 a.m.

CLI

```
get log traffic sort-by time start-time 01:00:00
```

Downloading the Traffic Log

You can also open or save the log to the location you specify, and then use an ASCII text editor (such as Notepad or WordPad) to view the file.

Alternatively, you can send traffic log entries to an external storage space (see “Storing Log Information” on page 66). The NetScreen device makes an entry in the traffic log when a session terminates. When you enable the NetScreen device to send traffic log entries to an external storage location, it sends new entries every second. Because the NetScreen device makes a traffic log entry when a session closes, the NetScreen device sends traffic log entries for all sessions that have closed within the past second. You can also include traffic log entries with event log entries sent by e-mail to an admin.

Example: Downloading a Traffic Log

In this example, you download the traffic log for a policy with ID number 12. For the WebUI, you download it to the local directory “C:\netscreen\logs”. For the CLI, you download it to the root directory of a TFTP server at the IP address 10.10.20.200. You name the file “traf_log11-21-02.txt”.

WebUI

1. Reports > Policies > ▦ (for policy ID 12): Click **Save**.

   The File Download dialog box prompts you to open the file (using an ASCII editor) or save it to disk.

2. Select the **Save** option, and then click **OK**.

   The File Download dialog box prompts you to choose a directory.

3. Specify C:\netscreen\logs, name the file traf_log11-21-02.txt, and then click **Save**.

CLI

```
get log traffic policy 12 > tftp 10.10.20.200 traf_log11-21-02.txt
```

Self Log

NetScreen provides a self log to monitor and record all packets terminated at the NetScreen device. For example, if you disable some management options on an interface—such as WebUI, SNMP, and ping—and HTTP, SNMP, or ICMP traffic is sent to that interface, entries appear in the self log for each dropped packet.

To activate the self log, do one of the following:

WebUI

Configuration > Report Settings > Log Settings: Select the **Log Packets Terminated to Self** check box, and then click **Apply**.

CLI

```
set firewall log-self
```

When you enable the self log, the NetScreen device logs the entries in two places: the self log and the traffic log. Similar to the traffic log, the self log displays the date, time, source address/port, destination address/port, duration, and service for each dropped packet terminating at the NetScreen device. Self log entries typically have a source zone of Null, and a destination zone of “self”.

Viewing the Self Log

You can view the self log, which is stored in flash storage on the NetScreen device, through either the CLI or WebUI.

WebUI

Reports > System Log > Self

CLI

```
get log self
```

Sorting and Filtering the Self Log

Similar to the event and traffic logs, when you use the CLI to view the self log, you can sort or filter the log entries according to the following criteria:

- **Source or Destination IP Address:** You can sort the self log by source or destination IP address. YOu can also filter the self log by specifying a source or destination IP address or range of addresses.
- **Date:** You can sort the self log by date only, or by date and time. The device lists the log entries in descending order by date and time.

  You can also filter self log entries by specifying a start date, an end date, or a date range. When you specify a start date, the device displays log entries with date/time stamps after the start date. When you specify an end date, the device displays log entries with date/time stamps before the end date.
- **Time:** When you sort the self log by time, the NetScreen device displays the log entries in descending order by time, regardless of the date. When you specify a start time, the device displays log entries with time stamps after the specified start time, regardless of the date. When you specify an end time, the device displays log entries with time stamps before the specified end time, regardless of the date. When you specify both a start and end time, the device displays log entries with time stamps within the specified time period.

Example: Filtering the Self Log by Time

In this example, you filter self log entries by the end time. The NetScreen device displays log entries with time stamps before the specified end time:

CLI

```
get log self end-time 16:32:57

===============================================================================
Date       Time       Duration Source IP        Port Destination IP   Port Serv
===============================================================================
2003-08-21 16:32:57    0:00:00 10.100.25.1         0 224.0.0.5           0 OSPF
2003-08-21 16:32:47    0:00:00 10.100.25.1         0 224.0.0.5           0 OSPF

           Total entries matched = 2
```

Downloading the Self Log

You can also save the log as a text file to a location you specify, and then use an ASCII text editor (such as Notepad or WordPad) to view it.

Example: Downloading the Self Log

In this example, you download a self log to the local directory “C:\netscreen\logs” (WebUI) or to the root directory of a TFTP server at the IP address 10.10.20.200 (CLI). You name the file “self_log07-03-02.txt”.

WebUI

1. Reports > System Log > Self: Click **Save**.

   The File Download dialog box prompts you to open the file (using an ASCII editor) or save it to disk.

2. Select the **Save** option, and then click **OK**.

   The File Download dialog box prompts you to choose a directory.

3. Specify C:\netscreen\logs, name the file self_log07-03-02.txt, and then click **Save**.

CLI

```
get log self > tftp 10.10.20.200 self_log07-03-02.txt
```

Asset Recovery Log

NetScreen provides an asset recovery log to display information about each time the device is returned to its default settings using the asset recovery procedure (see "Resetting the Device to the Factory Default Settings" on page 48). In addition to viewing the asset recovery log through the WebUI or CLI, you can also open or save the file to the location you specify. Use an ASCII text editor (such as Notepad) to view the file.

Example: Downloading the Asset Recovery Log

In this example, you download the asset recovery log to the local directory "C:\netscreen\logs" (WebUI) or to the root directory of a TFTP server at the IP address 10.10.20.200 (CLI). You name the file "sys_rst.txt".

WebUI

1. Reports > System Log > Asset Recovery: Click **Save**.

   The File Download dialog box prompts you to open the file (using an ASCII editor) or save it to disk.

2. Select the **Save** option, and then click **OK**.

   The File Download dialog box prompts you to choose a directory.

3. Specify C:\netscreen\logs, name the file sys_rst.txt, and then click **Save**.

CLI

```
get log asset-recovery > tftp 10.10.20.200 sys_rst.txt
```

Traffic Alarms

The NetScreen device supports traffic alarms when traffic exceeds thresholds that you have defined in policies. You can configure the NetScreen device to alert you through one or more of the following methods whenever the NetScreen device generates a traffic alarm:

- Console
- Internal (Event Log)
- E-mail
- SNMP
- Syslog
- WebTrends
- NetScreen-Global PRO

You set alarm thresholds to detect anomalous activity. To know what constitutes anomalous activity, you must first establish a baseline of normal activity. To create such a baseline for network traffic, you must observe traffic patterns over a period of time. Then, after you have determined the amount of traffic that you consider as normal, you can set alarm thresholds above that amount. Traffic exceeding that threshold triggers an alarm to call your attention to a deviation from the baseline. You can then evaluate the situation to determine what caused the deviation and whether you need to take action in response.

You can also use traffic alarms to provide policy-based intrusion detection and notification of a compromised system. Examples of the use of traffic alarms for these purposes are provided below.

Example: Policy-Based Intrusion Detection

In this example, there is a Web server with IP address 211.20.1.5 (and name “web1”) in the DMZ zone. You want to detect any attempts from the Untrust zone to access this Web server via Telnet. To accomplish this, you create a policy denying Telnet traffic from any address in the Untrust zone destined to the Web server named web1 in the DMZ zone, and you set a traffic alarm threshold at 64 bytes. Because the smallest size of IP packet is 64 bytes, even one Telnet packet attempting to reach the Web server from the Untrust zone will trigger an alarm.

WebUI

Objects > Addresses > List > New: Enter the following, and then click **OK**:

Address Name: web1

IP Address/Domain Name:

IP/Netmask: (select), 211.20.1.5/32

Zone: DMZ

Policies > (From: Untrust, To: DMZ) New: Enter the following, and then click **OK**:

Source Address:

Address Book Entry: (select), Any

Destination Address:

Address Book Entry: (select), web1

Service: Telnet

Action: Deny

> Advanced: Enter the following, and then click **Return** to set the advanced options and return to the basic configuration page:

Counting: (select)

Alarm Threshold: 64 Bytes/Sec, 0 Kbytes/Min

CLI

```
set address dmz web1 211.20.1.5/32
set policy from untrust to dmz any web1 telnet deny count alarm 64 0
save
```

Example: Compromised System Notification

In this example, you use traffic alarms to provide notification of a compromised system. You have an FTP server with IP address 211.20.1.10 (and name ftp1) in the DMZ zone. You want to allow FTP-get traffic to reach this server. You don’t want traffic of any kind to originate from the FTP server. The occurrence of such traffic would indicate that the system has been compromised, perhaps by a virus similar to the NIMDA virus. You define an address for the FTP server in the Global zone, so that you can then create two global policies.

WebUI

Objects > Addresses > List > New: Enter the following, and then click **OK**:

Address Name: ftp1

IP Address/Domain Name:

IP/Netmask: (select), 211.20.1.10/32

Zone: Global

Policies > (From: Global, To: Global) New: Enter the following, and then click **OK**:

Source Address:

Address Book Entry: (select), Any

Destination Address:

Address Book Entry: (select), ftp1

Service: FTP-Get

Action: Permit

Policies > (From: Global, To: Global) New: Enter the following, and then click **OK**:

Source Address:

Address Book Entry: (select), ftp1

Destination Address:

Address Book Entry: (select), Any

Service: ANY

Action: Deny

> Advanced: Enter the following, and then click **Return** to set the advanced options and return to the basic configuration page:

Counting: (select)

Alarm Threshold: 64 Bytes/Sec, 0 Kbytes/Min

CLI

```
set address global ftp1 211.20.1.10/32
set policy global any ftp1 ftp-get permit
set policy global ftp1 any any deny count alarm 64 0
save
```

Example: Sending E-mail Alerts

In this example, you set up notification by e-mail alerts when there is an alarm. The mail server is at 172.16.10.254, the first e-mail address to be notified is jharker@juniper.net, and the second address is driggs@juniper.net. The NetScreen device includes traffic logs with event logs sent via e-mail.

WebUI

Configuration > Report Settings > Email: Enter the following information, then click **Apply**:

Enable E-Mail Notification for Alarms: (select)

Include Traffic Log: (select)

SMTP Server Name: 172.16.10.254[1]

E-Mail Address 1: jharker@juniper.net

E-Mail Address 2: driggs@juniper.net

CLI

```
set admin mail alert
set admin mail mail-addr1 jharker@juniper.net
set admin mail mail-addr2 driggs@juniper.net
set admin mail server-name 172.16.10.254
set admin mail traffic-log
save
```

[1] If you have DNS enabled, you can also use a host name for the mail server, such as mail.juniper.net.

Syslog

A NetScreen device can generate syslog messages for system events at predefined severity levels (see the list of severity levels in "Event Log" on page 67), and optionally for traffic that policies permit across a firewall. It sends these messages to up to four designated syslog hosts running on UNIX/Linux systems. For each syslog host, you can specify the following:

- Whether the NetScreen device includes traffic log entries, event log entries, or both traffic and event log entries
- Whether to send traffic through a VPN tunnel to the syslog server and—if through a VPN tunnel—which interface to use as the source interface (for examples, see "Example: Self-Generated Traffic through a Route-Based Tunnel" on page 99 and "Example: Self-Generated Traffic through a Policy-Based Tunnel" on page 109)
- The port to which the NetScreen device sends syslog messages
- The security facility, which classifies and sends emergency and alert level messages to the Syslog host; and the regular facility, which classifies and sends all other messages for events unrelated to security

By default, the NetScreen device sends messages to syslog hosts via UDP (port 514). To increase the reliability of the message delivery, you can change the transport protocol for each syslog host to TCP.

You can use syslog messages to create e-mail alerts for the system administrator, or to display messages on the console of the designated host using UNIX syslog conventions.

Note: *On UNIX/Linux platforms, modify the /etc/rc.d/init.d/syslog file so that syslog retrieves information from the remote source (syslog -r).*

Example: Enabling Multiple Syslog Servers

In this example, you configure the NetScreen device to send event and traffic logs via TCP to three syslog servers at the following IP addresses/port numbers: 1.1.1.1/1514, 2.2.2.1/2514, and 3.3.3.1/3514. You set both the security and facility levels to Local0.

WebUI

Configuration > Report Settings > Syslog: Enter the following, and then click **Apply**:

Enable syslog messages: Select this option to send logs to the specified syslog servers.

No.: Select 1, 2, and 3 to indicate you are adding 3 syslog servers.

IP/Hostname: 1.1.1.1, 2.2.2.1, 3.3.3.1

Port: 1514, 2514, 3514

Security Facility: Local0, Local0, Local0

Facility: Local0, Local0, Local0

Event Log: (select)

Traffic Log: (select)

TCP: (select)

CLI

```
set syslog config 1.1.1.1 port 1514
set syslog config 1.1.1.1 log all
set syslog config 1.1.1.1 facilities local0 local0
set syslog config 1.1.1.1 transport tcp
set syslog config 2.2.2.1 port 2514
set syslog config 2.2.2.1 log all
set syslog config 2.2.2.1 facilities local0 local0
set syslog config 2.2.2.1 transport tcp
set syslog config 3.3.3.1 port 3514
set syslog config 3.3.3.1 log all
set syslog config 3.3.3.1 facilities local0 local0
set syslog config 2.2.2.1 transport tcp
set syslog enable
save
```

WebTrends

NetIQ offers a product called the WebTrends Firewall Suite that allows you to create customized reports based on the logs generated by a NetScreen device. WebTrends analyzes the log files and displays the information you need in a graphical format. You can create reports on all events and severity levels or focus on an area such as firewall attacks. (For additional information on WebTrends, refer to the WebTrends product documentation.)

You can also send WebTrends messages through a VPN tunnel. In the WebUI, use the **Use Trust Zone Interface as Source IP for VPN** option. In the CLI, use the **set webtrends vpn** command.

Example: Enabling WebTrends for Notification Events

In the following example, you send notification messages to the WebTrends host (172.10.16.25).

WebUI

1. WebTrends Settings

Configuration > Report Settings > WebTrends: Enter the following, and then click **Apply**:

Enable WebTrends Messages: (select)

WebTrends Host Name/Port: 172.10.16.25/514

2. Severity Levels

Configuration > Report Settings > Log Settings: Enter the following, then click **Apply**:

WebTrends Notification: (select)

Note: *When you enable WebTrends on a NetScreen device running in Transparent mode, you must set up a static route. See “Routing Tables and Static Routing” on page* ***2*** *-29.*

CLI

3. WebTrends Settings

```
set webtrends host-name 172.10.16.25
set webtrends port 514
set webtrends enable
```

4. Severity Levels

```
set log module system level notification destination webtrends
save
```

SNMP

The Simple Network Management Protocol (SNMP) agent for the NetScreen device provides network administrators with a way to view statistical data about the network and the devices on it, and to receive notification of system events of interest.

NetScreen supports the SNMPv1 protocol, described in RFC-1157, “A Simple Network Management Protocol” and the SNMPv2c protocol, described in the following RFCs:

- RFC-1901, “Introduction to Community-based SNMPv2”
- RFC-1905, “Protocol Operations for Version 2 of the Simple Network Management Protocol (SNMPv2)”
- RFC-1906, “Transport Mappings for Version 2 of the Simple Network Management Protocol (SNMPv2)”

NetScreen also supports all relevant Management Information Base II (MIB II) groups defined in RFC-1213, “Management Information Base for Network Management of TCP/IP-based internets: MIB-II”. NetScreen also has private enterprise MIB files, which you can load into an SNMP MIB browser. A list of the NetScreen MIBs is included in the appendix. (See Appendix A, “SNMP MIB Files”.)

Accordingly, the NetScreen SNMP agent generates the following traps, or notifications, when specified events or conditions occur:

- **Cold Start Trap:** The NetScreen device generates a cold start trap when it becomes operational after you power it on.
- **Trap for SNMP Authentication Failure:** The SNMP agent in the NetScreen device triggers the authentication failure trap if someone attempts to connect to it using an incorrect SNMP community string or if the IP address of the host attempting the connection is not defined in an SNMP community. (This option is enabled by default.)
- **Traps for System Alarms:** NetScreen device error conditions and firewall conditions trigger system alarms. Three NetScreen enterprise traps are defined to cover alarms related to hardware, security, and software. (For more information on firewall settings and alarms, see “ICMP Fragments” on page **4** -176, and “Traffic Alarms” on page 82.)
- **Traps for Traffic Alarms:** Traffic alarms are triggered when traffic exceeds the alarm thresholds set in policies. (For more information on configuring policies, see “Policies” on page **2** -213.)

The following table lists possible alarm types and their associated trap number:

Trap Enterprise ID	Description
100	Hardware problems
200	Firewall problems
300	Software problems
400	Traffic problems
500	VPN problems
600	NSRP problems
800	DRP problems
900	Interface failover problems
1000	Firewall attacks

Note: *The network administrator must have an SNMP manager application such as HP OpenView® or SunNet Manager™ to browse the SNMP MIB II data and to receive traps from either the trusted or untrusted interface. There are also several shareware and freeware SNMP manager applications available from the Internet.*

NetScreen devices do not ship with a default configuration for the SNMP manager. To configure your NetScreen device for SNMP, you must first create communities, define their associated hosts, and assign permissions (read/write or read-only).

When you create an SNMP community, you can specify whether the community supports SNMPv1, SNMPv2c, or both SNMP versions, as required by the SNMP management stations. (For backward compatibility with earlier ScreenOS releases that only support SNMPv1, NetScreen devices support SNMPv1 by default.) If an SNMP community supports both SNMP versions, you must specify a trap version for each community member.

For security reasons, an SNMP community member with read/write privileges can change only the following variables on a NetScreen device:

- **sysContact** - Contact information for the admin of the NetScreen device in case the SNMP admin needs to contact him or her. This can be the NetScreen admin’s name, e-mail address, telephone number, location in an office, or a combination of such information.
- **sysLocation** - The physical location of the NetScreen device. This can be anything from the name of a country, city, or building, to its exact location on a rack in a network operation center (NOC).
- **sysName** - The name that SNMP administrators use for the NetScreen device. By convention, this is a fully-qualified domain name (FQDN), but it can also be any name that is meaningful to the SNMP admins.
- **snmpEnableAuthenTraps** - This enables or disables the SNMP agent in the NetScreen device to generate a trap whenever someone attempts to contact the SNMP agent with an incorrect SNMP community name.
- **ipDefaultTTL** - The default value inserted into the time-to-live (TTL) field in the IP header of datagrams originating from the NetScreen device whenever the transport layer protocol does not supply a TTL value.
- **ipForwarding** - This indicates whether or not the NetScreen device forwards traffic—other than that destined for the NetScreen device itself. By default, the NetScreen device indicates that it does not forward traffic (a deceit to disguise its true nature).

Implementation Overview

The following points summarize how NetScreen has implemented SNMP in its devices:

- SNMP administrators are grouped in SNMP communities. A NetScreen device can support up to three communities, with up to eight members in each community.
- A community member can be either a single host or a subnet of hosts, depending on the netmask you use when defining the member. By default, the NetScreen device assigns an SNMP community member with a 32-bit netmask (255.255.255.255), which defines it as a single host.
- If you define an SNMP community member as a subnet, any device on that subnet can poll the NetScreen device for SNMP MIB information. However, the NetScreen device cannot send an SNMP trap to a subnet, only to an individual host.
- Each community has either read-only or read-write permission for the MIB II data.
- Each community can support SNMPv1, SNMPv2c, or both. If a community supports both versions of SNMP, you must specify a trap version for each community member.
- You can allow or deny each community from receiving traps.
- You can access the MIB II data and traps through any physical interface.
- Each system alarm (a system event classified with a severity level of critical, alert, or emergency) generates a single NetScreen enterprise SNMP trap to each of the hosts in each community that is set to receive traps.
- The NetScreen device sends Cold Start / Link Up / Link Down traps to all hosts in communities that you set to receive traps.
- If you specify trap-on for a community, you also have the option to allow traffic alarms.
- You can send SNMP messages through a route-based or policy-based VPN tunnel. For more information, see “VPN Tunnels for Self-Initiated Traffic” on page 97.

Example: Defining a Read/Write SNMP Community

In this example, you create an SNMP community, named *MAge11.* You assign it read/write privileges and enable its members to receive MIB II data and traps. It has the following two members 1.1.1.5/32 and 1.1.1.6/32. Each of these members has an SNMP manager application running a different version of SNMP: SNMPv1 and SNMPv2c.

Note: *Because the community name functions as a password, protect its secrecy with caution.*

You provide contact information for the local admin of the NetScreen device in case an SNMP community member needs to contact him—name: al_baker@mage.com. You also provide the location of the NetScreen device—location: 3-15-2. These numbers indicate that the device is on the third floor, in the fifteenth row, and in the second position in that row.

You also enable the SNMP agent to generate traps whenever someone illegally attempts an SNMP connection to the NetScreen device. Authentication failure traps is a global setting that applies to all SNMP communities and is disabled by default.

Finally, you enable SNMP manageability on ethernet1, an interface that you have previously bound to the Trust zone. This is the interface through which the SNMP manager application communicates with the SNMP agent in the NetScreen device.

WebUI

Configuration > Report Settings > SNMP: Enter the following settings, and then click **Apply**:

System Contact: al_baker@mage.com

Location: 3-15-2

Enable Authentication Fail Trap: (select)

Configuration > Report Settings > SNMP > New Community: Enter the following settings, and then click **OK**:

Community Name: MAge11

Permissions:

Write: (select)

Trap: (select)

Including Traffic Alarms: (clear)

Version: ANY (select)

Hosts IP Address/Netmask and Trap Version:
1.1.1.5/32 v1
1.1.1.6/32 v2c

Network > Interfaces > Edit (for ethernet1): Enter the following settings, and then click **OK**:

Service Options:

Management Services: SNMP

CLI

```
set snmp contact al_baker@mage.com
set snmp location 3-15-2
set snmp auth-trap enable
set snmp community MAge11 read-write trap-on version any
set snmp host Mage 1.1.1.5/32 trap v1
set snmp host Mage 1.1.1.6/32 trap v2
set interface ethernet1 manage snmp
save
```

VPN Tunnels for Self-Initiated Traffic

You can use virtual private network (VPN) tunnels to secure remote monitoring of a NetScreen device from a fixed IP address. Using a VPN tunnel, you can protect traffic addressed to and initiated from a NetScreen device. Types of traffic initiated from a NetScreen device can include NetScreen-Global PRO reports, event log entries sent to syslog and WebTrends servers, and SNMP MIB traps.

NetScreen supports two types of VPN tunnel configurations:

- **Route-Based VPNs**: The NetScreen device uses route table entries to direct traffic to tunnel interfaces, which are bound to VPN tunnels.

  To send traffic such as event log entries, NetScreen-Global PRO reports, or SNMP traps generated by the NetScreen device through a route-based VPN tunnel, you must manually enter a route to the proper destination. The route must point to the tunnel interface that is bound to the VPN tunnel through which you want the NetScreen device to direct the traffic. No policy is required.

- **Policy-Based VPNs**: The NetScreen device uses the VPN tunnel names specifically referenced in policies to direct traffic through VPN tunnels.

  To send self-initiated traffic through a policy-based VPN tunnel, you must include the source and destination addresses in the policy. For the source address, use the IP address of an interface on the NetScreen device. For the destination address, use the IP address of the storage server or SNMP community member’s workstation, if it is located behind a remote NetScreen device. If the remote SNMP community member uses the NetScreen-Remote VPN client to make VPN connections to the local NetScreen device, use an internal IP address defined on the NetScreen-Remote as the destination address.

  > ***Note:*** *In releases prior to ScreenOS 5.0.0, the source address had to be the default interface bound to the Trust zone, and the destination address had to be in the Untrust zone. In the current release, this restriction has been eliminated.*

If either the remote gateway or the end entity has a dynamically assigned IP address, then the NetScreen device cannot initiate the formation of a VPN tunnel because these addresses cannot be predetermined, and thus you cannot define routes to them. In such cases, the remote host must initiate the VPN connection. After either a policy-based or route-based VPN tunnel is established, both ends of the tunnel can initiate traffic if policies permit it. Also, for a route-based VPN, there must be a route to the end entity through a tunnel interface bound to the VPN tunnel—either because you manually entered the route or because the local NetScreen device received the route through the exchange of dynamic routing messages after a tunnel was established. (For information about dynamic routing protocols, see Volume 6, “Dynamic Routing”.) You can also use VPN monitoring with the rekey option or IKE heartbeats to ensure that once the tunnel is established, it remains up regardless of VPN activity. (For more information about these options, see “VPN Monitoring” on page **5** -309, and “Monitoring Mechanisms” on page **5** -386.)

For each VPN tunnel configuration type, you can use any of the following types of VPN tunnel:

- **Manual Key**: You manually set the three elements that define a Security Association (SA) at both ends of the tunnel: a Security Parameters Index (SPI), an encryption key, and an authentication key. To change any element in the SA, you must manually enter it at both ends of the tunnel.
- **AutoKey IKE with Preshared Key**: One or two preshared secrets—one for authentication and one for encryption—function as seed values. Using them, the IKE protocol generates a set of symmetrical keys at both ends of the tunnel; that is, the same key is used to encrypt and decrypt. At predetermined intervals, these keys are automatically regenerated.
- **AutoKey IKE with Certificates**: Using the Public Key Infrastructure (PKI), the participants at both ends of the tunnel use a digital certificate (for authentication) and an RSA public/private key pair (for encryption). The encryption is asymmetrical; that is, one key in a pair is used to encrypt and the other to decrypt.

Note: *For a complete description of VPN tunnels, see Volume 5, “VPNs”. For more information on NetScreen-Remote, refer to the* NetScreen-Remote User’s Guide.

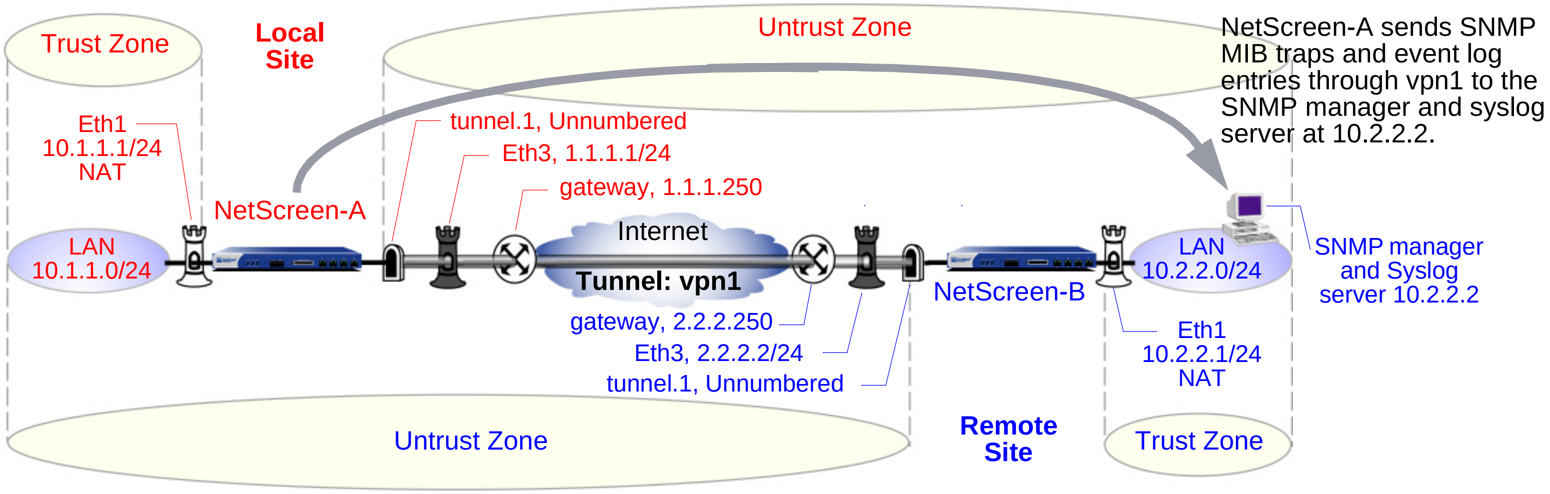
Example: Self-Generated Traffic through a Route-Based Tunnel

In this example, you configure a local NetScreen device (NetScreen-A) to send SNMPv1 MIB traps and syslog reports through a route-based AutoKey IKE VPN tunnel to an SNMP community member behind a remote NetScreen device (NetScreen-B). The tunnel uses a preshared key (Ci5y0a1aAG) for data origin authentication and the security level predefined as “Compatible” for both Phase 1 and Phase 2 proposals. You, as the local admin for NetScreen-A, create the tunnel.1 interface and bind it to vpn1. You and the admin for NetScreen-B define the following proxy IDs:

NetScreen-A		NetScreen-B	
Local IP	10.1.1.1/32	Local IP	10.2.2.2/32
Remote IP	10.2.2.2/32	Remote IP	10.1.1.1/32
Service	Any	Service	Any

You bind ethernet1 to the Trust zone, and ethernet3 to the Untrust zone. The default gateway IP address is 1.1.1.250. All zones are in the trust-vr routing domain.

***Note:** Compare this example with “Example: Self-Generated Traffic through a Policy-Based Tunnel” on page 109.*



The remote admin for NetScreen-B uses similar settings to define that end of the AutoKey IKE VPN tunnel so that the preshared key, proposals, and proxy IDs match.

You also configure an SNMP community named “remote_admin” with read/write privileges, and you enable the community to receive traps. You define the host at 10.2.2.2/32 as a community member[2].

WebUI (NetScreen-A)

1. Interfaces

Network > Interfaces > Edit (for ethernet1): Enter the following, and then click **Apply**:

Zone Name: Trust

Static IP: (select this option when present)

IP Address/Netmask: 10.1.1.1/24[3]

Select the following, and then click **OK**:

Interface Mode: NAT (select)[4]

Network > Interfaces > Edit (for ethernet3): Enter the following, and then click **OK**:

Zone Name: Untrust

Static IP: (select this option when present)

IP Address/Netmask: 1.1.1.1/24

Service Options:

Management Services: SNMP

[2] This example assumes that the remote admin has already set up the syslog server and SNMP manager application that supports SNMPv1. When the remote admin sets up the VPN tunnel on his NetScreen device, he uses 1.1.1.1 as the remote gateway and 10.1.1.1 as the destination address.

[3] When the remote admin configures the SNMP manager, he must enter **10.1.1.1** in the Remote SNMP Agent field. This is the address to which the SNMP manager sends queries.

[4] By default, any interface that you bind to the Trust zone is in NAT mode. Consequently, this option is already enabled for interfaces bound to the Trust zone.

Network > Interfaces > New Tunnel IF: Enter the following, and then click **OK**:

Tunnel Interface Name: tunnel.1

Zone (VR): Untrust (trust-vr)

Unnumbered: (select)

Interface: ethernet1(trust-vr)

2. Syslog and SNMP

Configuration > Report Settings > Syslog: Enter the following, and then click **Apply**:

Enable Syslog Messages: (select)

No.: Select 1 to indicate you are adding 1 syslog server.

IP/ Hostname: 10.2.2.2

Port: 514

Security Facility: auth/sec

Facility: Local0

Configuration > Report Settings > SNMP > New Community: Enter the following, and then click **OK**:

Community Name: remote_admin

Permissions:

Write: (select)

Trap: (select)

Including Traffic Alarms: (clear)

Version: V1

Hosts IP Address/Netmask:

10.2.2.2/32 V1

Trap Version:

V1

3. VPN

VPNs > AutoKey IKE > New: Enter the following, and then click **OK**:

VPN Name: vpn1

Security Level: Compatible

Remote Gateway: Create a Simple Gateway: (select)

Gateway Name: to_admin

Type: Static IP, Address/Hostname: 2.2.2.2

Preshared Key: Ci5y0a1aAG

Security Level: Compatible

Outgoing interface: ethernet3

> Advanced: Enter the following advanced settings, and then click **Return** to return to the basic AutoKey IKE configuration page:

Bind to: Tunnel Interface: (select), tunnel.1

Proxy-ID: (select)

Local IP/Netmask: 10.1.1.1/32

Remote IP/Netmask: 10.2.2.2/32

Service: ANY

4. Routes

Network > Routing > Routing Entries > trust-vr New: Enter the following, and then click **OK**:

Network Address/Netmask:10.2.2.2/32

Gateway: (select)

Interface: tunnel.1

Gateway IP Address: 0.0.0.0

Network > Routing > Routing Entries > trust-vr New: Enter the following, and then click **OK**:

Network Address/Netmask: 0.0.0.0/0

Gateway: (select)

Interface: ethernet3

Gateway IP Address: (select) 1.1.1.250

CLI (NetScreen-A)

1. Interfaces

```
set interface ethernet1 zone trust
set interface ethernet1 ip 10.1.1.1/24[5]
set interface ethernet1 nat[6]
set interface ethernet3 zone untrust
set interface ethernet3 ip 1.1.1.1/24
set interface ethernet3 manage snmp
set interface tunnel.1 zone untrust
set interface tunnel.1 ip unnumbered interface ethernet1
```

2. VPN

```
set ike gateway to_admin address 2.2.2.2 outgoing-interface ethernet3 preshare
    Ci5y0a1aAG sec-level compatible
set vpn vpn1 gateway to_admin sec-level compatible
set vpn vpn1 bind interface tunnel.1
set vpn vpn1 proxy-id local-ip 10.1.1.1/32 remote-ip 10.2.2.2/32 any
```

[5] When the remote admin configures the SNMP manager, he must enter **10.1.1.1** in the Remote SNMP Agent field. This is the address to which the SNMP manager sends queries.

[6] By default, any interface that you bind to the Trust zone is in NAT mode. Consequently, this option is already enabled for interfaces bound to the Trust zone.

3. Syslog and SNMP

```
set syslog config 10.2.2.2 auth/sec local0
set syslog enable
set snmp community remote_admin read-write trap-on version v1
set snmp host remote_admin 10.2.2.2/32
```

4. Routes

```
set vrouter trust-vr route 10.2.2.2/32 interface tunnel.1
set vrouter trust-vr route 0.0.0.0/0 interface ethernet3 gateway 1.1.1.250
save
```

WebUI (NetScreen-B)

1. Interfaces

Network > Interfaces > Edit (for ethernet1): Enter the following, and then click **Apply**:

Zone Name: Trust

Static IP: (select this option when present)

IP Address/Netmask: 10.2.2.1/24

Select the following, and then click **OK**:

Interface Mode: NAT

Network > Interfaces > Edit (for ethernet3): Enter the following, and then click **OK**:

Zone Name: Untrust

Static IP: (select this option when present)

IP Address/Netmask: 2.2.2.2/24

Network > Interfaces > New Tunnel IF: Enter the following, and then click **OK**:

Tunnel Interface Name: tunnel.1

Zone (VR): Untrust (trust-vr)

Unnumbered: (select)

Interface: ethernet1(trust-vr)

2. Addresses

Objects > Addresses > List > New: Enter the following, and then click **OK**:

Address Name: addr1

IP Address/Domain Name: IP/Netmask: 10.2.2.2/32

Zone: Trust

Objects > Addresses > List > New: Enter the following, and then click **OK**:

Address Name: ns-a

IP Address/Domain Name: IP/Netmask: 10.1.1.1/32

Zone: Untrust

3. Service Group

Objects > Services > Groups > New: Enter the following group name, move the following services, and then click **OK**:

Group Name: s-grp1

Select **Syslog** and use the **<<** button to move the service from the Available Members column to the Group Members column.

Select **SNMP** and use the **<<** button to move the service from the Available Members column to the Group Members column.

4. VPN

VPNs > AutoKey IKE > New: Enter the following, and then click **OK**:

VPN Name: vpn1

Security Level: Compatible

Remote Gateway: Create a Simple Gateway: (select)

Gateway Name: to_admin

Type: Static IP, Address/Hostname: 1.1.1.1

Preshared Key: Ci5y0a1aAG

Security Level: Compatible

Outgoing Interface: ethernet3

> Advanced: Enter the following advanced settings, and then click **Return** to return to the basic AutoKey IKE configuration page:

Bind to: Tunnel Interface: (select), tunnel.1

Proxy-ID: (select)

Local IP/Netmask: 10.2.2.2/32

Remote IP/Netmask: 10.1.1.1/32

Service: Any

5. Routes

Network > Routing > Routing Entries > trust-vr New: Enter the following, and then click **OK**:

Network Address/Netmask:10.1.1.1/32

Gateway: (select)

Interface: tunnel.1

Gateway IP Address: 0.0.0.0

Network > Routing > Routing Entries > trust-vr New: Enter the following, and then click **OK**:

Network Address/Netmask: 0.0.0.0/0

Gateway: (select)

Interface: ethernet3

Gateway IP Address: (select) 2.2.2.250

6. Policies

Policies > (From: Trust, To: Untrust) New: Enter the following, and then click **OK**:

Source Address:

Address Book Entry: (select), addr1

Destination Address:

Address Book Entry: (select), ns-a

Service: s-grp1

Action: Permit

Position at Top: (select)

Policies > (From: Untrust, To: Trust) New: Enter the following, and then click **OK**:

Source Address:

Address Book Entry: (select), ns-a

Destination Address:

Address Book Entry: (select), addr1

Service: s-grp1

Action: Permit

Position at Top: (select)

CLI (NetScreen-B)

1. Interfaces

```
set interface ethernet1 zone trust
set interface ethernet1 ip 10.2.2.1/24
set interface ethernet1 nat
set interface ethernet3 zone untrust
set interface ethernet3 ip 2.2.2.2/24
set interface tunnel.1 zone untrust
set interface tunnel.1 ip unnumbered interface ethernet1
```

2. Addresses

```
set address trust addr1 10.2.2.2/32
set address untrust ns-a 10.1.1.1/32
```

3. Service Group

```
set group service s-grp1
set group service s-grp1 add syslog
set group service s-grp1 add snmp
```

4. VPN

```
set ike gateway to_admin address 1.1.1.1 outgoing-interface ethernet3 preshare
    Ci5y0a1aAG sec-level compatible
set vpn vpn1 gateway to_admin sec-level compatible
set vpn vpn1 bind interface tunnel.1
set vpn vpn1 proxy-id local-ip 10.2.2.2/32 remote-ip 10.1.1.1/32 any
```

5. Routes

```
set vrouter trust-vr route 10.1.1.1/32 interface tunnel.1
set vrouter trust-vr route 0.0.0.0/0 interface ethernet3 gateway 2.2.2.250
```

6. Policies

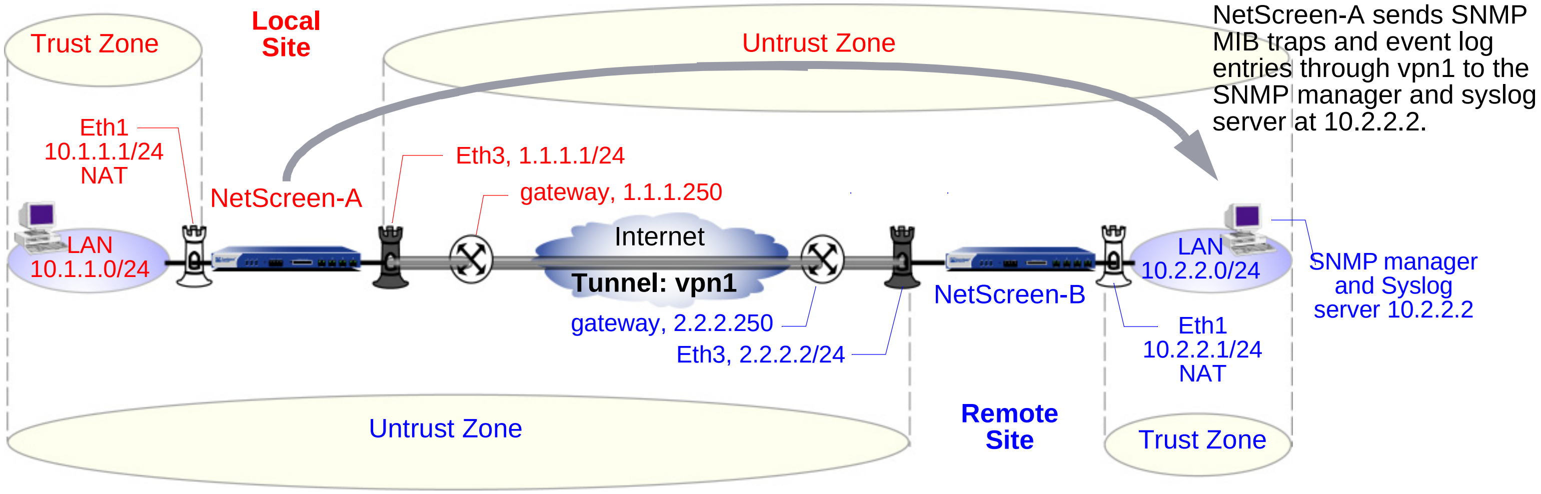
```
set policy top from trust to untrust addr1 ns-a s-grp1 permit
set policy top from untrust to trust ns-a addr1 s-grp1 permit
save
```

Example: Self-Generated Traffic through a Policy-Based Tunnel

In this example, you configure a local NetScreen device (NetScreen-A) to send SNMPv2c MIB traps and syslog reports[7] through a policy-based AutoKey IKE VPN tunnel (vpn1) to an SNMP community member behind a remote NetScreen device (NetScreen-B). The tunnel uses a preshared key (Ci5y0a1aAG) for data origin authentication and the security level predefined as "Compatible" for both Phase 1 and Phase 2 proposals.

Both you and the remote admin bind ethernet1 to the Trust zone, and ethernet3 to the Untrust zone on NetScreen-A and NetScreen-B. The default gateway IP address for NetScreen-A is 1.1.1.250. The default gateway IP address for NetScreen-B is 2.2.2.250. All zones are in the trust-vr routing domain.

Note: *Compare this example with "Example: Self-Generated Traffic through a Route-Based Tunnel" on page 99.*



You also configure an SNMP community named "remote_admin" with read/write privileges, and you enable the community to receive traps. You define the host at 10.2.2.2/32 as a community member.

[7] This example assumes that the remote admin has already set up the syslog server and an SNMP manager application that supports SNMPv2c. When the remote admin sets up the VPN tunnel on his NetScreen device, he uses 1.1.1.1 as the remote gateway and 10.1.1.1 as the destination address.

The inbound and outbound policies on NetScreen-A match the outbound and inbound policies on NetScreen-B. The addresses and service used in the policies are as follows:

- 10.1.1.1/32, the address of the Trust zone interface on NetScreen-A
- 10.2.2.2/32, the address of the host for the SNMP community member and syslog server
- Service group named “s-grp1”, which contains SNMP and syslog services

From the policies that you and the admin for NetScreen-B create, the two NetScreen devices derive the following proxy IDs for vpn1:

NetScreen-A		NetScreen-B	
Local IP	10.1.1.1/32	Local IP	10.2.2.2/32
Remote IP	10.2.2.2/32	Remote IP	10.1.1.1/32
Service	Any	Service	Any

Note: *NetScreen treats a service group as “any” in proxy IDs.*

WebUI (NetScreen-A)

1. Interfaces – Security Zones

Network > Interfaces > Edit (for ethernet1): Enter the following, and then click **OK**:

Zone Name: Trust

Static IP: (select this option when present)

IP Address/Netmask: 10.1.1.1/24[8]

Select the following, and then click **OK**:

Interface Mode: NAT (select)[9]

[8] When the remote admin configures the SNMP manager, he must enter **10.1.1.1** in the Remote SNMP Agent field. This is the address to which the SNMP manager sends queries.

[9] By default, any interface that you bind to the Trust zone is in NAT mode. Consequently, this option is already enabled for interfaces bound to the Trust zone.

Network > Interfaces > Edit (for ethernet3): Enter the following, and then click **OK**:

Zone Name: Untrust

Static IP: (select this option when present)

IP Address/Netmask: 1.1.1.1/24

Service Options:

Management Services: SNMP

2. Addresses

Objects > Addresses > List > New: Enter the following, and then click **OK**:

Address Name: trust_int

IP Address/Domain Name: IP/Netmask: 10.1.1.1/32

Zone: Trust

Objects > Addresses > List > New: Enter the following, and then click **OK**:

Address Name: remote_admin

IP Address/Domain Name: IP/Netmask: 10.2.2.2/32

Zone: Untrust

3. Service Group

Objects > Services > Groups > New: Enter the following group name, move the following services, and then click **OK**:

Group Name: s-grp1

Select **Syslog** and use the **<<** button to move the service from the Available Members column to the Group Members column.

Select **SNMP** and use the **<<** button to move the service from the Available Members column to the Group Members column.

4. VPN

VPNs > AutoKey IKE > New: Enter the following, and then click **OK**:

VPN Name: vpn1

Security Level: Compatible

Remote Gateway: Create a Simple Gateway: (select)

Gateway Name: to_admin

Type: Static IP, Address/Hostname: 2.2.2.2

Preshared Key: Ci5y0a1aAG

Security Level: Compatible

Outgoing Interface: ethernet3

5. Syslog and SNMP

Configuration > Report Settings > Syslog: Enter the following, and then click **Apply**:

Enable Syslog Messages: (select)

Source Interface: ethernet1

No.: Select 1 to indicate you are adding 1 syslog server.

IP/Hostname: 10.2.2.2

Port: 514

Security Facility: auth/sec

Facility: Local0

Configuration > Report Settings > SNMP > New Community: Enter the following, and then click **OK**:

Community Name: remote_admin

Permissions:

Write: (select)

Trap: (select)

Including Traffic Alarms: (clear)

Version: V2C

Hosts IP Address/Netmask:

10.2.2.2/32 V2C

Trap Version:

V2C

Source Interface:

ethernet1 (select)

Configuration > Report Settings > SNMP: Enter the following, and then click **Apply**:

Enable Authentication Fail Trap: (select)

6. Route

Network > Routing > Routing Entries > trust-vr New: Enter the following, and then click **OK**:

Network Address/Netmask: 0.0.0.0/0

Gateway: (select)

Interface: ethernet3

Gateway IP Address: 1.1.1.250

7. Policies

Policies > (From: Trust, To: Untrust) New: Enter the following, and then click **OK**:

Source Address:

Address Book Entry: (select), trust_int

Destination Address:

Address Book Entry: (select), remote_admin

Service: s-grp1

Action: Tunnel

Tunnel VPN: vpn1

Modify matching outgoing VPN policy: (select)

Position at Top: (select)

CLI (NetScreen-A)

1. Interfaces – Security Zones

```
set interface ethernet1 zone trust
set interface ethernet1 ip 10.1.1.1/24
set interface ethernet1 nat[10]
set interface ethernet3 zone untrust
set interface ethernet3 ip 1.1.1.1/24
set interface ethernet3 manage snmp
```

2. Addresses

```
set address trust trust_int 10.1.1.1/32
set address untrust remote_admin 10.2.2.2/32
```

3. Service Group

```
set group service s-grp1
set group service s-grp1 add syslog
set group service s-grp1 add snmp
```

[10] By default, any interface that you bind to the Trust zone is in NAT mode. Consequently, this option is already enabled for interfaces bound to the Trust zone.

4. VPN

```
set ike gateway to_admin address 2.2.2.2 outgoing-interface ethernet3 preshare
    Ci5y0a1aAG sec-level compatible
set vpn vpn1 gateway to_admin sec-level compatible
```

5. Syslog and SNMP

```
set syslog config 10.2.2.2 auth/sec local0
set syslog src-interface ethernet1
set syslog enable
set snmp community remote_admin read-write trap-on version v2c
set snmp host remote_admin 10.2.2.2/32 src-interface ethernet1
```

6. Route

```
set vrouter trust-vr route 0.0.0.0/0 interface ethernet3 gateway 1.1.1.250
```

7. Policies

```
set policy top from trust to untrust trust_int remote_admin s-grp1 tunnel vpn
    vpn1
set policy top from untrust to trust remote_admin trust_int s-grp1 tunnel vpn
    vpn1
save
```

WebUI (NetScreen-B)

1. Interfaces – Security Zones

Network > Interfaces > Edit (for ethernet1): Enter the following, and then click **Apply**:

Zone Name: Trust

Static IP: (select this option when present)

IP Address/Netmask: 10.2.2.1/24

Select the following, and then click **OK**:

Interface Mode: NAT

Network > Interfaces > Edit (for ethernet3): Enter the following, and then click **OK**:

Zone Name: Untrust

Static IP: (select this option when present)

IP Address/Netmask: 2.2.2.2/24

2. Addresses

Objects > Addresses > List > New: Enter the following, and then click **OK**:

Address Name: addr1

IP Address/Domain Name:

IP/Netmask: 10.2.2.2/32

Zone: Trust

Objects > Addresses > List > New: Enter the following, and then click **OK**:

Address Name: ns-a

IP Address/Domain Name:

IP/Netmask: 10.1.1.1/32

Zone: Untrust

3. Service Group

Objects > Services > Group: Enter the following group name, move the following services, and then click **OK**:

Group Name: s-grp1

Select **Syslog** and use the **<<** button to move the service from the Available Members column to the Group Members column.

Select **SNMP** and use the **<<** button to move the service from the Available Members column to the Group Members column.

4. VPN

VPNs > AutoKey IKE > New: Enter the following, and then click **OK**:

VPN Name: vpn1

Security Level: Compatible

Remote Gateway: Create a Simple Gateway: (select)

Gateway Name: to_admin

Type: Static IP, IP Address: 1.1.1.1

Preshared Key: Ci5y0a1aAG

Security Level: Compatible

Outgoing interface ethernet3

5. Route

Network > Routing > Routing Table > trust-vr New: Enter the following, and then click **OK**:

Network Address/Netmask: 0.0.0.0/0

Gateway: (select)

Interface: ethernet3

Gateway IP Address: (select) 2.2.2.250

6. Policies

Policies > (From: Trust, To: Untrust) New: Enter the following, and then click **OK**:

Source Address:

Address Book Entry: (select), addr1

Destination Address:

Address Book Entry: (select), ns-a

Service: s-grp1

Action: Tunnel

Tunnel VPN: vpn1

Modify matching outgoing VPN policy: (select)

Position at Top: (select)

CLI (NetScreen-B)

1. Interfaces – Security Zones

```
set interface ethernet1 zone trust
set interface ethernet1 ip 10.2.2.1/24
set interface ethernet1 nat
set interface ethernet3 zone untrust
set interface ethernet3 ip 2.2.2.2/24
```

2. Addresses

```
set address trust addr1 10.2.2.2/32
set address untrust ns-a 10.1.1.1/32
```

3. Service Group

```
set group service s-grp1
set group service s-grp1 add syslog
set group service s-grp1 add snmp
```

4. VPN

```
set ike gateway to_admin address 1.1.1.1 outgoing-interface ethernet3 preshare
    Ci5y0a1sec-level compatible
set vpn vpn1 gateway to_admin sec-level compatible
```

5. Route

```
set vrouter trust-vr route 0.0.0.0/0 interface ethernet3 gateway 2.2.2.250
```

6. Policies

```
set policy top from trust to untrust addr1 ns-a s-grp1 tunnel vpn vpn1
set policy top from untrust to trust ns-a addr1 s-grp1 tunnel vpn vpn1
save
```

COUNTERS

NetScreen provides screen, hardware, and flow counters for monitoring traffic. Counters give processing information for specified zones and interfaces, and help you to verify configurations for desired policies.

NetScreen provides the following screen counters for monitoring general firewall behavior and for viewing the amount of traffic affected by specified policies:

- **Bad IP Option Protection** – the number of frames discarded due to malformed or incomplete IP options
- **Dst IP-based session limiting** – the number of sessions dropped after the session threshold was reached
- **FIN bit with no ACK bit** – the number of packets detected and dropped with an illegal combination of flags
- **Fragmented packet protection** – the number of blocked IP packet fragments
- **HTTP Component Blocked** – the number of blocked packets with HTTP components
- **HTTP Component Blocking for ActiveX controls** – the number of ActiveX components blocked
- **HTTP Component Blocking for .exe files** – the number of blocked HTTP packets with .exe files
- **HTTP Component Blocking for Java applets** – the number of blocked Java components
- **HTTP Component Blocking for .zip files** – the number of blocked HTTP packets with .zip files
- **ICMP Flood Protection** – the number of ICMP packets blocked as part of an ICMP flood
- **ICMP Fragment** – the number of ICMP frames with the More Fragments flag set, or with offset indicated in the offset field
- **IP Spoofing Attack Protection** – the number of IP addresses blocked as part of an IP spoofing attack
- **IP Sweep Protection** – the number of IP sweep attack packets detected and blocked
- **Land Attack Protection** – the number of packets blocked as part of a suspected land attack
- **Large ICMP Packet** – the number of ICMP frames detected with an IP length greater than 1024
- **Limit Session** – the number of undeliverable packets because the session limit had been reached
- **Loose Src Route IP Option** – the number of IP packets detected with the Loose Source Route option enabled
- **Malicious URL Protection** – the number of suspected malicious URLs blocked

- **Ping-of-Death Protection** – the number of suspected and rejected ICMP packets that are oversized or of an irregular size
- **Port Scan Protection** – the number of port scans detected and blocked
- **Record Route IP Option** – the number of frames detected with the Record Route option enabled
- **Security IP Option** – the number of frames discarded with the IP Security option set
- **Src IP-based session limiting** – the number of sessions dropped after the session threshold was reached
- **Source Route IP Option Filter** – the number of IP source routes filtered
- **Stream IP Option** – the number of packets discarded with the IP Stream identifier set
- **Strict Src Route IP Option** – the number of packets detected with the Strict Source Route option enabled
- **SYN-ACK-ACK-Proxy DoS** – the number of blocked packets because of the SYN-ACK-ACK-proxy DoS SCREEN option
- **SYN and FIN bits set** – the number of packets detected with an illegal combination of flags
- **SYN Flood Protection** – the number of SYN packets detected as part of a suspected SYN flood
- **SYN Fragment Detection** – the number of packet fragments dropped as part of a suspected SYN fragments attack
- **Timestamp IP Option** – the number of IP packets discarded with the Internet Timestamp option set
- **TCP Packet without Flag** – the number of illegal packets dropped with missing or malformed flags field
- **Teardrop Attack Protection** – the number of packets blocked as part of a Teardrop attack
- **UDP Flood Protection** – the number of UDP packets dropped as part of a suspected UDP flood
- **Unknown Protocol Protection** – the number of packets blocked as part of an unknown protocol
- **WinNuke Attack Protection** – the number of packets detected as part of a suspected WinNuke attack

NetScreen provides the following hardware counters for monitoring hardware performance and packets with errors:

- **drop vlan** – the number of dropped packets because of missing VLAN tags, an undefined subinterface, or because VLAN trunking was not enabled when the NetScreen device was in Transparent mode
- **early frame** – counters used in an ethernet driver buffer descriptor management
- **in align err** – the number of incoming packets with an alignment error in the bit stream
- **in bytes** – the number of bytes received

- **in coll err** – the number of incoming collision packets
- **in crc err** – the number of incoming packets with a cyclic redundancy check (CRC) error
- **in dma err** – the number of incoming packets with a dma error
- **in misc err** – the number of incoming packets with a miscellaneous error
- **in no buffer** – the number of unreceivable packets because of unavailable buffers
- **in overrun** – the number of transmitted overrun packets
- **in packets** – the number of packets received
- **in short frame** – the number of incoming packets with an ethernet frame shorter than 64 bytes (including the frame checksum)
- **in underrun** – the number of transmitted underrun packets
- **late frame** – counters used in an ethernet driver buffer descriptor management
- **out bs pak** – the number of packets held in back store while searching for an unknown MAC address
- **out bytes** – the number of bytes sent
- **out coll err** – the number of outgoing collision packets
- **out cs lost** – the number of dropped outgoing packets because the Carrier Sense Multiple Access/Collision Detect (CSMA/CD) protocol lost the signal[11]
- **out defer** – the number of deferred outgoing packets
- **out discard** – the number of discarded outgoing packets
- **out heartbeat** – the number of outgoing heartbeat packets
- **out misc err** – the number of outgoing packets with a miscellaneous error
- **out no buffer** – the number of unsent packets because of unavailable buffers
- **out packets** – the number of packets sent
- **re xmt limit** – the number of dropped packets when the retransmission limit was exceeded while an interface was operating at half duplex

[11] For more information about the Carrier Sense Multiple Access/Collision Detect (CSMA/CD) protocol, see the IEEE 802.3 standard available at http://standards.ieee.org.

NetScreen also provides the following flow counters[12] for monitoring the number of packets inspected at the flow level:

- **address spoof** – the number of suspected address spoofing attack packets received
- **auth deny** – the number of times user authentication was denied.
- **auth fail** – the number of times user authentication failed
- **big bkstr** – the number of packets that are too big to buffer in the ARP backstore while waiting for MAC-to-IP address resolution
- **connections** – the number of sessions established since the last boot
- **encrypt fail** – the number of failed Point-to-Point Tunneling Protocol (PPTP) packets
- ***icmp broadcast** – the number of ICMP broadcasts received
- **icmp flood** – the number of ICMP packets that are counted toward the ICMP flood threshold
- **illegal pak**– the number of packets dropped because they do not conform to the protocol standards
- **in arp req** – the number of incoming arp request packets
- **in arp resp** – the number of outgoing arp request packets
- **in bytes** – the number of bytes received
- **in icmp** – the number of Internet Control Message Protocol (ICMP) packets received
- **in other** – the number of incoming packets that are of a different Ethernet type
- **in packets** – the number of packets received
- **in self** – the number of packets addressed to the NetScreen Management IP address
- ***in un auth** – the number of unauthorized incoming TCP, UDP, and ICMP packets
- ***in unk prot** – the number of incoming packets using an unknown ethernet protocol
- **in vlan** – the number of incoming vlan packets
- **in vpn** – the number of IPSec packets received
- **invalid zone** – the number of packets destined for an invalid security zone
- **ip sweep** – the number of packets received and discarded beyond the specified ip sweep threshold

[12] Counters preceded by an asterisk are not yet operational at the time of this writing and always display a value of 0.

- **land attack** – the number of suspected land attack packets received
- **loopback drop** – the number of packets dropped because they cannot be looped back through the NetScreen device. An example of a loopback session is when a host in the Trust zone sends traffic to a MIP or VIP address that is mapped to a server that is also in the Trust zone. The NetScreen device creates a loopback session that directs such traffic from the host to the MIP or VIP server.
- **mac relearn** – the number of times that the MAC address learning table had to relearn the interface associated with a MAC address because the location of the MAC address changed.
- **mac tbl full** – the number of times that the MAC address learning table completely filled up.
- **mal url** – the number of blocked packets destined for a URL determined to be malicious
- ***misc prot** – the number of packets using a protocol other than TCP, UDP, or ICMP
- **mp fail** – the number of times a problem occurred when sending a PCI message between the master processor module and the processor module
- **no conn** – the number of packets dropped because of unavailable Network Address Translation (NAT) connections
- **no dip** – the number of packets dropped because of unavailable Dynamic IP (DIP) addresses
- **no frag netpak** – the number of times that the available space in the netpak buffer fell below 70%
- ***no frag sess** – the number of times that fragmented sessions were greater than half of the maximum number of NAT sessions
- **no g-parent** – the number of packets dropped because the parent connection could not be found
- **no gate** – the number of packets dropped because no gate was available
- **no gate sess** – the number of terminated sessions because there were no gates in the firewall for them
- **no map** – the number of packets dropped because there was no map to the trusted side
- **no nat vector** – the number of packets dropped because the Network Address Translation (NAT) connection was unavailable for the gate
- ***no nsp tunnel** – the number of dropped packets sent to a tunnel interface to which no VPN tunnel is bound
- **no route** – the number of unroutable packets received
- **no sa** – the number of packets dropped because no Security Associations (SA) was defined
- **no sa policy** – the number of packets dropped because no policy was associated with an SA

- ***no xmit vpnf** – the number of dropped VPN packets due to fragmentation
- **null zone** – the number of dropped packets erroneously sent to an interface bound to the Null zone
- **nvec err** – the number of packets dropped because of NAT vector error
- **out bytes** – the number of bytes sent
- **out packets** – the number of packets sent
- **out vlan** – the number of outgoing vlan packets
- **ping of death** – the number of suspected Ping of Death attack packets received
- **policy deny** – the number of packets denied by a defined policy
- **port scan** – the number of packets that are counted as a port scan attempt
- **proc sess** – the number of times that the total number of sessions on a processor module exceeded the maximum threshold
- **sa inactive** – the number of packets dropped because of an inactive SA
- **sa policy deny** – the number of packets denied by an SA policy
- **sessn thresh** – the threshold for the maximum number of sessions
- ***slow mac** – the number of frames whose MAC addresses were slow to resolve
- **src route** – the number of packets dropped because of the filter source route option
- **syn frag** – the number of dropped SYN packets because of a fragmentation
- **tcp out of seq** – the number of TCP segments received whose sequence number is outside the acceptable range
- **tcp proxy** – the number of packets dropped from using a TCP proxy such as the SYN flood protection option or user authentication
- **tear drop** – the number of packets blocked as part of a suspected Tear Drop attack
- **tiny frag** – the number of tiny fragmented packets received
- **trmn drop** – the number of packets dropped by traffic management
- **trmng queue** – the number of packets waiting in the queue
- **udp flood** – the number of UDP packets that are counted toward the UDP flood threshold
- **url block** – the number of HTTP requests that were blocked

- **winnuke** – the number of WinNuke attack packets received
- **wrong intf** – the number of session creation messages sent from a processor module to the master processor module
- **wrong slot** – the number of packets erroneously sent to the wrong processor module

Example: Viewing Screen Counters

In this example, you view the NetScreen screen counters for the Trust zone.

WebUI

Reports > Counters > Zone Screen: Select **Trust** from the Zone drop-down list.

CLI

```
get counter screen zone trust
```

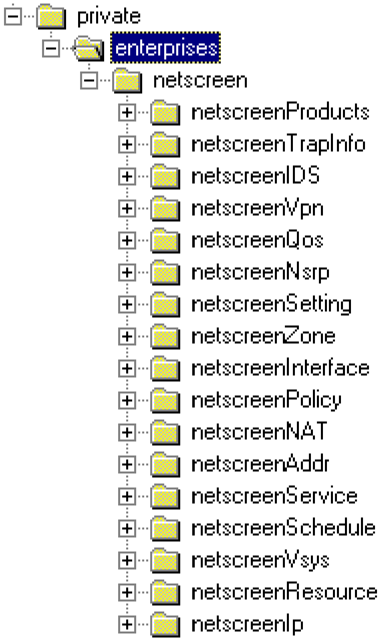
SNMP MIB Files

NetScreen provides MIB files to support SNMP communication between your organization’s applications and the SNMP agent in the NetScreen device. To obtain the latest MIB files, open a Web browser and visit www.netscreen.com/services/tac_online/index.jsp. Select a NetScreen product, and then select the MIB files for the ScreenOS version loaded on the NetScreen device.

The MIB files for the current ScreenOS version are fully compatible with SNMP agents in previous versions of ScreenOS. The NetScreen MIB files are organized in a multi-tier hierarchical structure and are described as follows:

The Primary-Level MIB File Folders

The MIB files are arranged in a hierarchical folder structure. The primary-level MIB folders are as follows:



- private
  - enterprises
    - netscreen
      - netscreenProducts
      - netscreenTrapInfo
      - netscreenIDS
      - netscreenVpn
      - netscreenQos
      - netscreenNsrp
      - netscreenSetting
      - netscreenZone
      - netscreenInterface
      - netscreenPolicy
      - netscreenNAT
      - netscreenAddr
      - netscreenService
      - netscreenSchedule
      - netscreenVsys
      - netscreenResource
      - netscreenIp

Each folder contains a category of MIB files.

netscreenProducts	Assigns Object Identifiers (OIDs) to different NetScreen product series.
netscreenTrapInfo	Defines enterprise traps sent by the NetScreen device.
netscreenIDS	Defines the NetScreen device intrusion detection service (IDS) configuration.
netscreenVpn	Defines NetScreen device VPN configuration and runtime information.
netscreenQos	Defines NetScreen device Quality of Service configuration.

netscreenNsrp	Defines NetScreen device NSRP configuration.
netscreenSetting	Defines miscellaneous NetScreen device configuration settings, such as DHCP, e-mail, authentication, and administrator.
netscreenZone	Defines zone information residing in the NetScreen Device.
netscreenInterface	Defines the NetScreen device’s interface configuration, including the virtual interface.
netscreenPolicy	Defines the outgoing and incoming policy configuration for the NetScreen device.
netscreenNAT	Defines NAT configuration, including Map IP, Dynamic IP and Virtual IP.
netscreenAddr	Represents the address table on a NetScreen interface.
netscreenService	Describes services (including user-defined) recognized by the NetScreen device.
netscreenSchedule	Defines NetScreen device task schedule information, configured by the user.
netscreenVsys	Defines NetScreen device virtual system (VSYS) configuration.
netscreenResource	Accesses information regarding the NetScreen device’s resource utilization.
netscreenIp	Accesses NetScreen device private IP-related information.
netScreen Chassis	Empty placeholder folder for future MIB support folders
netscreenVR	Defines NetScreen device virtual router (VR) configuration.

Secondary-Level MIB Folders

This section describes the secondary-level MIB files for NetScreen devices. Each secondary-level folder contains subsequent-level folders or MIB files.

netscreenProducts

netscreenGeneric	Generic object identifiers (OIDs) for NetScreen products
netscreenNs5	NetScreen-5XP OIDs
netscreenNs10	NetScreen-10XP OIDs
netscreenNs100	NetScreen-100 OIDs
netscreenNs1000	NetScreen-1000 OIDs
netscreenNs500	NetScreen-500 OIDs
netscreenNs50	NetScreen-50 OIDs
netscreenNs25	NetScreen-25 OIDs
netscreenNs204	NetScreen-204 OIDs
netscreenNs208	NetScreen-208 OIDs

netScreenIds

nsIdsProtect		IDS service on NetScreen device
	nsIdsProtectSetTable	IDS service enabled on NetScreen device
	nsIdsProtectThreshTable	IDS service threshold configuration
nsIdsAttkMonTable		Statistical Information about intrusion attempt

netscreenVpn

netscreenVpnMon	Show SA information of vpn tunnel
nsVpnManualKey	Manual key configuration
nsVpnIke	IKE configuration
nsVpnGateway	VPN tunnel gateway configuration
nsVpnPhaseOneCfg	IPSec Phase One configuration
nsVpnPhaseTwoCfg	IPSec Phase Two configuration
nsVpnCert	Certification configuration
nsVpnL2TP	L2TP configuration
nsVpnPool	IP pool configuration
nsVpnUser	VPN user configuration

netscreenQos

nsQosPly	QoS configuration on policy

netscreenSetting

nsSetGeneral	General configuration of NS device
nsSetAuth	Authentication method configuration
nsSetDNS	DNS server setting
nsSetURLFilter	URL filter setting
nsSetDHCP	DHCP server setting
nsSetSysTime	System time setting
nsSetEmail	E-mail setting
nsSetLog	Syslog setting
nsSetSNMP	SNMP agent configuration
nsSetGlbMng	Global management configuration
nsSetAdminUser	Administration user configuration
nsSetWebUI	Web UI configuration

netscreenZone

nsZoneCfg	Zone configuration for the device

netscreenPolicy

NsPlyTable	Policy configuration
NsPlyMonTable	Statistical Information about each policy

netscreenNAT

nsNatMipTable	Mapped IP configuration
nsNatDipTable	Dynamic IP configuration
nsNatVip	Virtual IP Configuration

netscreenAddr

nsAddrTable	Address table on a NetScreen interface

netscreenService

nsServiceTable	Service Information
nsServiceGroupTable	Service Group Information
nsServiceGrpMemberTable	Service Group Member Info

netscreenSchedule

nschOnceTable	One-time schedule information
nschRecurTable	Re-occur schedule information

netscreenVsys

nsVsysCfg	NetScreen device virtual system (VSYS) configuration

netscreenResource

nsresCPU	CPU utilization
nsresMem	Memory utilization
nsresSession	Session utilization

Note: *NetScreen no longer supports the failedSession counter.*

netscreenIp

nsIpArp	ARP table

netscreenVR[1]

nsOSPF	Open Shortest Path First (OSPF) protocol information
nsBGP	Border Gateway Protocol (BGP) protocol information
nsRIP	Routing Information Protocol (RIP) protocol information

[1] The netscreenVR MIBs are based on Structure of Management Information version 2 (SMIv2). All the other MIBs are based on SMIv1. You can access all the MIB II data, regardless of whether you are running SNMPv1 or SNMPv2c.

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