12

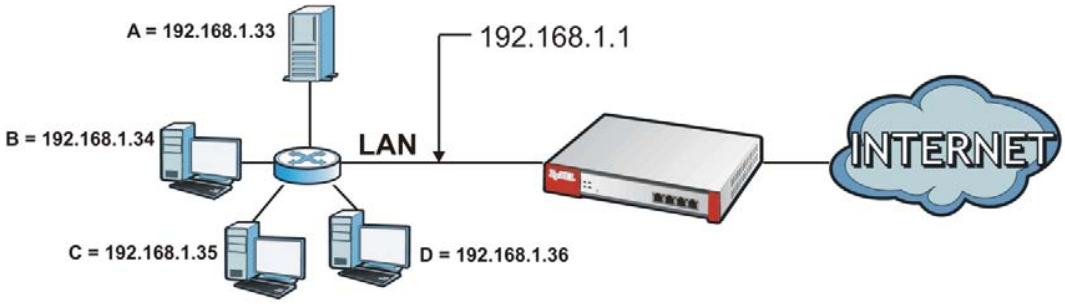
NAT

12.1 NAT Overview

NAT (Network Address Translation - NAT, RFC 1631) is the translation of the IP address of a host in a packet. For example, the source address of an outgoing packet, used within one network is changed to a different IP address known within another network. Use Network Address Translation (NAT) to make computers on a private network behind the USG available outside the private network. If the USG has only one public IP address, you can make the computers in the private network available by using ports to forward packets to the appropriate private IP address.

Suppose you want to assign ports 21-25 to one FTP, Telnet and SMTP server (**A** in the example), port 80 to another (**B** in the example) and assign a default server IP address of 192.168.1.35 to a third (**C** in the example). You assign the LAN IP addresses and the ISP assigns the WAN IP address. The NAT network appears as a single host on the Internet.

Figure 167 Multiple Servers Behind NAT Example



12.1.1 What You Can Do in this Chapter

Use the **NAT** screens (see Section 12.2 on page 255) to view and manage the list of NAT rules and see their configuration details. You can also create new NAT rules and edit or delete existing ones.

12.1.2 What You Need to Know

NAT is also known as virtual server, port forwarding, or port translation.

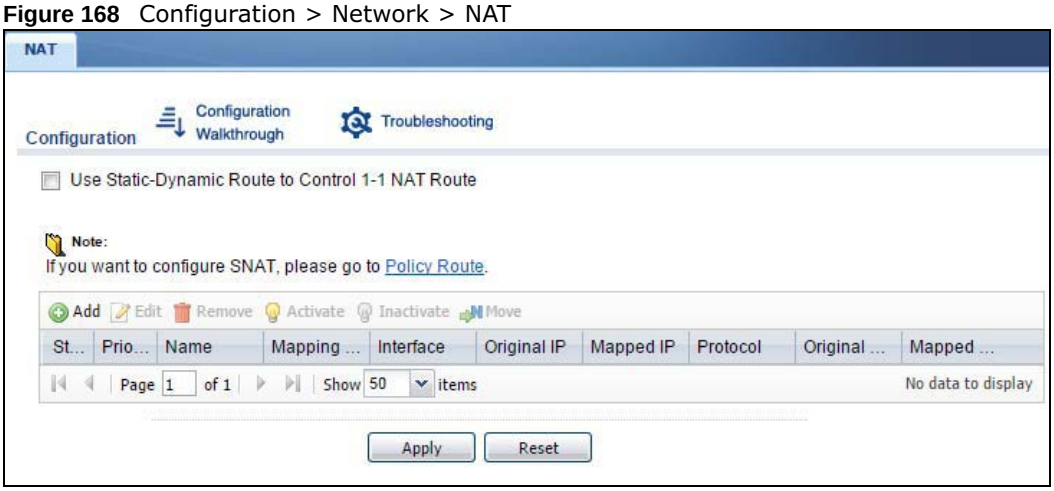
12.2 The NAT Screen

The **NAT** summary screen provides a summary of all NAT rules and their configuration. In addition, this screen allows you to create new NAT rules and edit and delete existing NAT rules. To access this

screen, login to the Web Configurator and click **Configuration > Network > NAT**. The following screen appears, providing a summary of the existing NAT rules.

Click on the icons to go to the OneSecurity.com website where there is guidance on configuration walkthroughs, troubleshooting, and other information.

Figure 168 Configuration > Network > NAT



The following table describes the labels in this screen.

Table 104 Configuration > Network > NAT

LABEL	DESCRIPTION
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The USG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
#	This field is a sequential value, and it is not associated with a specific entry.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Name	This field displays the name of the entry.
Mapping Type	This field displays what kind of NAT this entry performs: **Virtual Server**, **1:1 NAT**, or **Many 1:1 NAT**.
Interface	This field displays the interface on which packets for the NAT entry are received.
Original IP	This field displays the original destination IP address (or address object) of traffic that matches this NAT entry. It displays **any** if there is no restriction on the original destination IP address.
Mapped IP	This field displays the new destination IP address for the packet.
Protocol	This field displays the service used by the packets for this NAT entry. It displays **any** if there is no restriction on the services.
Original Port	This field displays the original destination port(s) of packets for the NAT entry. This field is blank if there is no restriction on the original destination port.
Mapped Port	This field displays the new destination port(s) for the packet. This field is blank if there is no restriction on the original destination port.

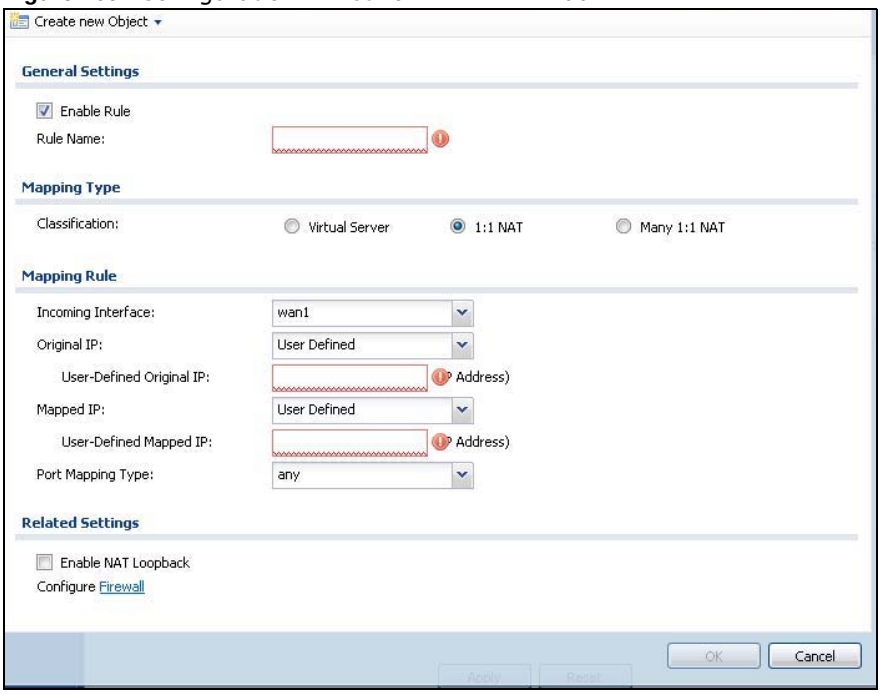
Table 104 Configuration > Network > NAT (continued)

LABEL	DESCRIPTION
Apply	Click this button to save your changes to the USG.
Reset	Click this button to return the screen to its last-saved settings.

12.2.1 The NAT Add/Edit Screen

The **NAT Add/Edit** screen lets you create new NAT rules and edit existing ones. To open this window, open the **NAT** summary screen. (See Section 12.2 on page 255.) Then, click on an **Add** icon or **Edit** icon to open the following screen.

Figure 169 Configuration > Network > NAT > Add



The following table describes the labels in this screen.

Table 105 Configuration > Network > NAT > Add

LABEL	DESCRIPTION
Create new Object	Use to configure any new settings objects that you need to use in this screen.
Enable Rule	Use this option to turn the NAT rule on or off.
Rule Name	Type in the name of the NAT rule. The name is used to refer to the NAT rule. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.

Table 105 Configuration > Network > NAT > Add (continued)

LABEL	DESCRIPTION
Classification	Select what kind of NAT this rule is to perform. **Virtual Server** - This makes computers on a private network behind the USG available to a public network outside the USG (like the Internet). **1:1 NAT** - If the private network server will initiate sessions to the outside clients, select this to have the USG translate the source IP address of the server's outgoing traffic to the same public IP address that the outside clients use to access the server. **Many 1:1 NAT -** If you have a range of private network servers that will initiate sessions to the outside clients and a range of public IP addresses, select this to have the USG translate the source IP address of each server's outgoing traffic to the same one of the public IP addresses that the outside clients use to access the server. The private and public ranges must have the same number of IP addresses. One many 1:1 NAT rule works like multiple 1:1 NAT rules, but it eases configuration effort since you only create one rule.
Incoming Interface	Select the interface on which packets for the NAT rule must be received. It can be an Ethernet, VLAN, bridge, or PPPoE/PPTP interface.
Original IP	Specify the destination IP address of the packets received by this NAT rule's specified incoming interface. **any** - Select this to use all of the incoming interface's IP addresses including dynamic addresses or those of any virtual interfaces built upon the selected incoming interface. **User Defined** - Select this to manually enter an IP address in the **User Defined** field. For example, you could enter a static public IP assigned by the ISP without having to create a virtual interface for it. Host address - select a host address object to use the IP address it specifies. The list also includes address objects based on interface IPs. So for example you could select an address object based on a WAN interface even if it has a dynamic IP address.
User Defined Original IP	This field is available if **Original IP** is **User Defined**. Type the destination IP address that this NAT rule supports.
Original IP Subnet/ Range	This field displays for Many 1:1 NAT. Select the destination IP address subnet or IP address range that this NAT rule supports. The original and mapped IP address subnets or ranges must have the same number of IP addresses.
Mapped IP	Select to which translated destination IP address this NAT rule forwards packets. **User Defined** - this NAT rule supports a specific IP address, specified in the **User Defined** field. HOST address - the drop-down box lists all the HOST address objects in the USG. If you select one of them, this NAT rule supports the IP address specified by the address object.
User Defined Original IP	This field is available if **Mapped IP** is **User Defined**. Type the translated destination IP address that this NAT rule supports.
Mapped IP Subnet/ Range	This field displays for **Many 1:1 NAT**. Select to which translated destination IP address subnet or IP address range this NAT rule forwards packets. The original and mapped IP address subnets or ranges must have the same number of IP addresses.

Table 105 Configuration > Network > NAT > Add (continued)

LABEL	DESCRIPTION
Port Mapping Type	Use the drop-down list box to select how many original destination ports this NAT rule supports for the selected destination IP address (**Original IP**). Choices are: **Any** - this NAT rule supports all the destination ports. **Port** - this NAT rule supports one destination port. **Ports** - this NAT rule supports a range of destination ports. You might use a range of destination ports for unknown services or when one server supports more than one service. **Service** - this NAT rule supports a service such as FTP (see **Object > Service > Service**) **Service-Group** - this NAT rule supports a group of services such as all service objects related to DNS (see **Object > Service > Service Group**)
Protocol Type	This field is available if **Mapping Type** is **Port** or **Ports**. Select the protocol (**TCP**, **UDP**, or **Any**) used by the service requesting the connection.
Original Port	This field is available if **Mapping Type** is **Port**. Enter the original destination port this NAT rule supports.
Mapped Port	This field is available if **Mapping Type** is **Port**. Enter the translated destination port if this NAT rule forwards the packet.
Original Start Port	This field is available if **Mapping Type** is **Ports**. Enter the beginning of the range of original destination ports this NAT rule supports.
Original End Port	This field is available if **Mapping Type** is **Ports**. Enter the end of the range of original destination ports this NAT rule supports.
Mapped Start Port	This field is available if **Mapping Type** is **Ports**. Enter the beginning of the range of translated destination ports if this NAT rule forwards the packet.
Mapped End Port	This field is available if **Mapping Type** is **Ports**. Enter the end of the range of translated destination ports if this NAT rule forwards the packet. The original port range and the mapped port range must be the same size.
Enable NAT Loopback	Enable NAT loopback to allow users connected to any interface (instead of just the specified **Incoming Interface**) to use the NAT rule's specified **Original IP** address to access the **Mapped IP** device. For users connected to the same interface as the **Mapped IP** device, the USG uses that interface's IP address as the source address for the traffic it sends from the users to the **Mapped IP** device. For example, if you configure a NAT rule to forward traffic from the WAN to a LAN server, enabling NAT loopback allows users connected to other interfaces to also access the server. For LAN users, the USG uses the LAN interface's IP address as the source address for the traffic it sends to the LAN server. See NAT Loopback on page 260 for more details. If you do not enable NAT loopback, this NAT rule only applies to packets received on the rule's specified incoming interface.
Security Policy	By default the security policy blocks incoming connections from external addresses. After you configure your NAT rule settings, click the **Security Policy** link to configure a security policy to allow the NAT rule's traffic to come in. The USG checks NAT rules before it applies To-USG security policies, so To-USG security policies, do not apply to traffic that is forwarded by NAT rules. The USG still checks other security policies, according to the source IP address and mapped IP address.
OK	Click **OK** to save your changes back to the USG.
Cancel	Click **Cancel** to return to the **NAT** summary screen without creating the NAT rule (if it is new) or saving any changes (if it already exists).

12.3 NAT Technical Reference

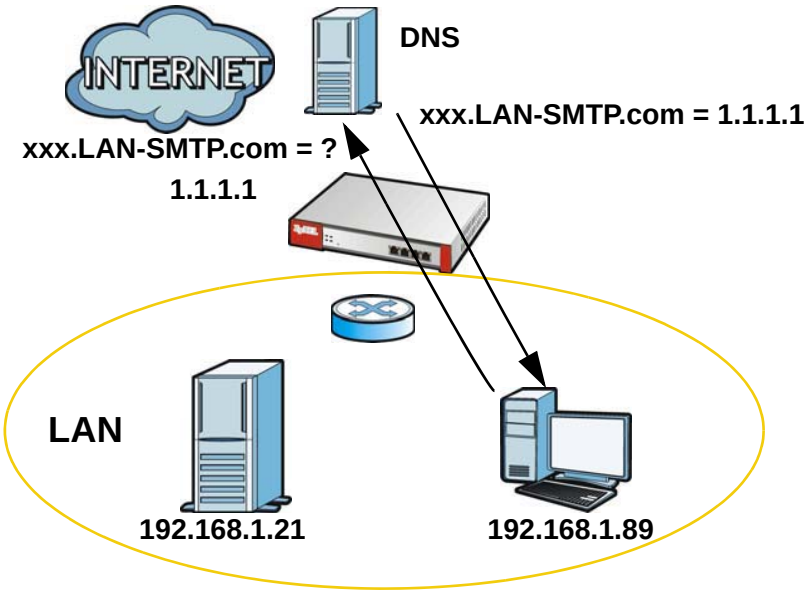
Here is more detailed information about NAT on the USG.

NAT Loopback

Suppose an NAT 1:1 rule maps a public IP address to the private IP address of a LAN SMTP e-mail server to give WAN users access. NAT loopback allows other users to also use the rule's original IP to access the mail server.

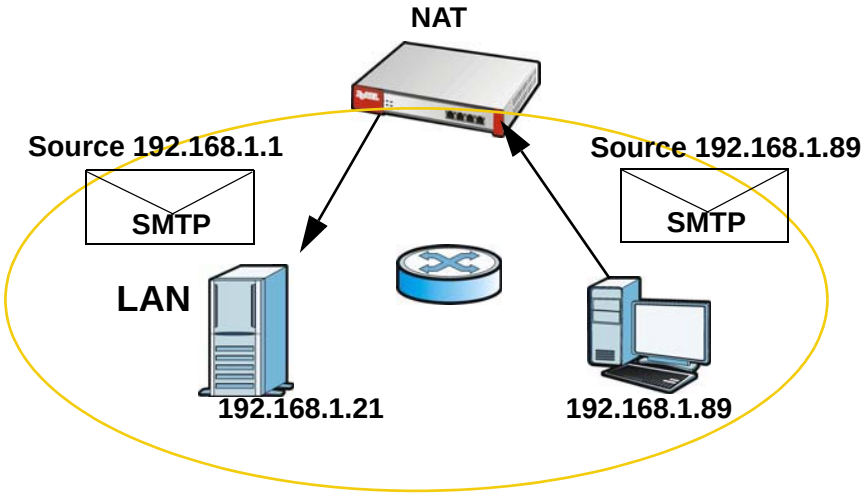
For example, a LAN user's computer at IP address 192.168.1.89 queries a public DNS server to resolve the SMTP server's domain name (xxx.LAN-SMTP.com in this example) and gets the SMTP server's mapped public IP address of 1.1.1.1.

Figure 170 LAN Computer Queries a Public DNS Server



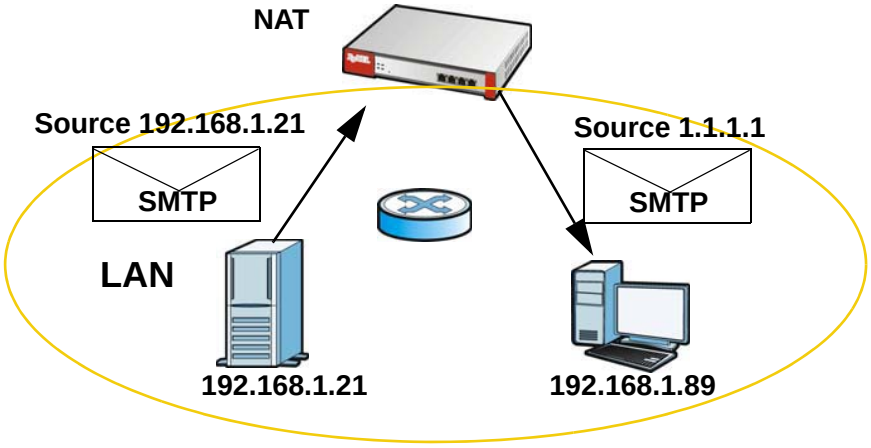
The LAN user's computer then sends traffic to IP address 1.1.1.1. NAT loopback uses the IP address of the USG's LAN interface (192.168.1.1) as the source address of the traffic going from the LAN users to the LAN SMTP server.

Figure 171 LAN to LAN Traffic



The LAN SMTP server replies to the USG's LAN IP address and the USG changes the source address to 1.1.1.1 before sending it to the LAN user. The return traffic's source matches the original destination address (1.1.1.1). If the SMTP server replied directly to the LAN user without the traffic going through NAT, the source would not match the original destination address which would cause the LAN user's computer to shut down the session.

Figure 172 LAN to LAN Return Traffic



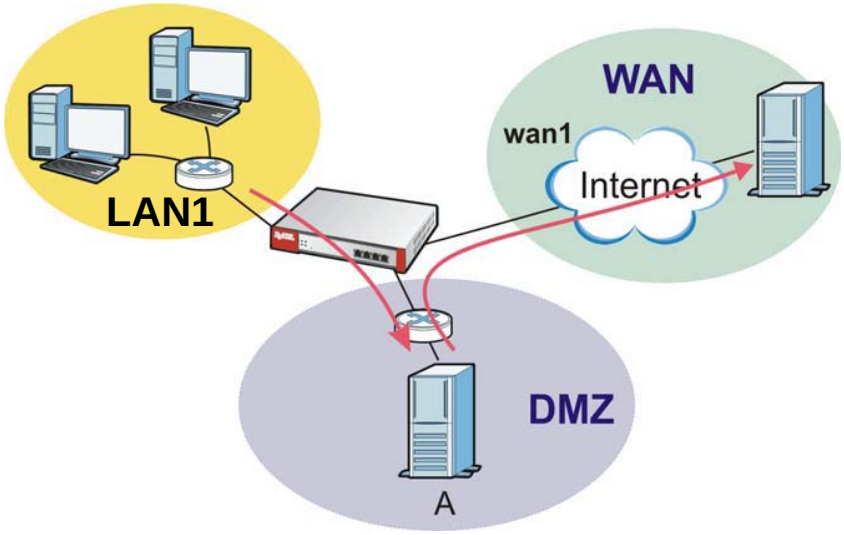
13

HTTP Redirect

13.1 Overview

HTTP redirect forwards the client's HTTP request (except HTTP traffic destined for the USG) to a web proxy server. In the following example, proxy server **A** is connected to the **DMZ** interface. When a client connected to the **LAN1** zone wants to open a web page, its HTTP request is redirected to proxy server **A** first. If proxy server **A** cannot find the web page in its cache, a policy route allows it to access the Internet to get them from a server. Proxy server **A** then forwards the response to the client.

Figure 173 HTTP Redirect Example



13.1.1 What You Can Do in this Chapter

Use the **HTTP Redirect** screens (see Section 13.2 on page 263) to display and edit the HTTP redirect rules.

13.1.2 What You Need to Know

Web Proxy Server

A proxy server helps client devices make indirect requests to access the Internet or outside network resources/services. A proxy server can act as a security policy or an ALG (application layer gateway) between the private network and the Internet or other networks. It also keeps hackers from knowing internal IP addresses.

A client connects to a web proxy server each time he/she wants to access the Internet. The web proxy provides caching service to allow quick access and reduce network usage. The proxy checks its local cache for the requested web resource first. If it is not found, the proxy gets it from the specified server and forwards the response to the client.

HTTP Redirect, Security Policy and Policy Route

With HTTP redirect, the relevant packet flow for HTTP traffic is:

1. Security Policy
2. HTTP Redirect
3. Policy Route

Even if you set a policy route to the same incoming interface and service as a HTTP redirect rule, the USG checks the HTTP redirect rules first and forwards HTTP traffic to a proxy server if matched. You need to make sure there is no security policy(s) blocking the HTTP requests from the client to the proxy server.

You also need to manually configure a policy route to forward the HTTP traffic from the proxy server to the Internet. To make the example in Figure 173 on page 262 work, make sure you have the following settings.

For HTTP traffic between **lan1** and **dmz**:

- a from LAN1 to DMZ security policy (default) to allow HTTP requests from **lan1** to **dmz**. Responses to this request are allowed automatically.
- a HTTP redirect rule to forward HTTP traffic from **lan1** to proxy server **A**.

For HTTP traffic between **dmz** and **wan1**:

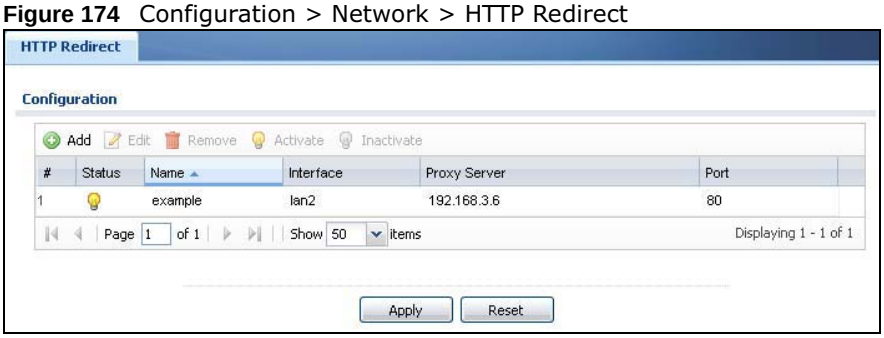
- a from DMZ to WAN security policy (default) to allow HTTP requests from **dmz** to **wan1**. Responses to these requests are allowed automatically.
- a policy route to forward HTTP traffic from proxy server **A** to the Internet.

13.2 The HTTP Redirect Screen

To configure redirection of a HTTP request to a proxy server, click **Configuration > Network > HTTP Redirect**. This screen displays the summary of the HTTP redirect rules.

Note: You can configure up to one HTTP redirect rule for each (incoming) interface.

Figure 174 Configuration > Network > HTTP Redirect



The following table describes the labels in this screen.

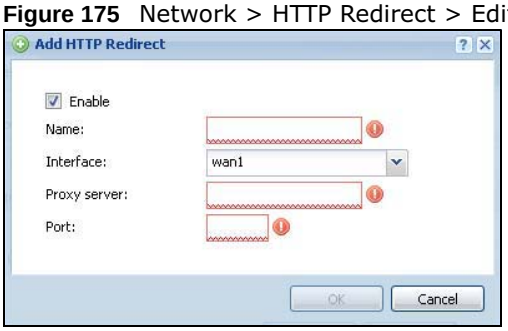
Table 106 Configuration > Network > HTTP Redirect

LABEL	DESCRIPTION
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The USG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
#	This field is a sequential value, and it is not associated with a specific entry.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Name	This is the descriptive name of a rule.
Interface	This is the interface on which the request must be received.
Proxy Server	This is the IP address of the proxy server.
Port	This is the service port number used by the proxy server.
Apply	Click **Apply** to save your changes back to the USG.
Reset	Click **Reset** to return the screen to its last-saved settings.

13.2.1 The HTTP Redirect Edit Screen

Click **Network > HTTP Redirect** to open the **HTTP Redirect** screen. Then click the **Add** or **Edit** icon to open the **HTTP Redirect Edit** screen where you can configure the rule.

Figure 175 Network > HTTP Redirect > Edit



The following table describes the labels in this screen.

Table 107 Network > HTTP Redirect > Edit

LABEL	DESCRIPTION
Enable	Use this option to turn the HTTP redirect rule on or off.
Name	Enter a name to identify this rule. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
Interface	Select the interface on which the HTTP request must be received for the USG to forward it to the specified proxy server.
Proxy Server	Enter the IP address of the proxy server.
Port	Enter the port number that the proxy server uses.
OK	Click **OK** to save your changes back to the USG.
Cancel	Click **Cancel** to exit this screen without saving.

14 ALG

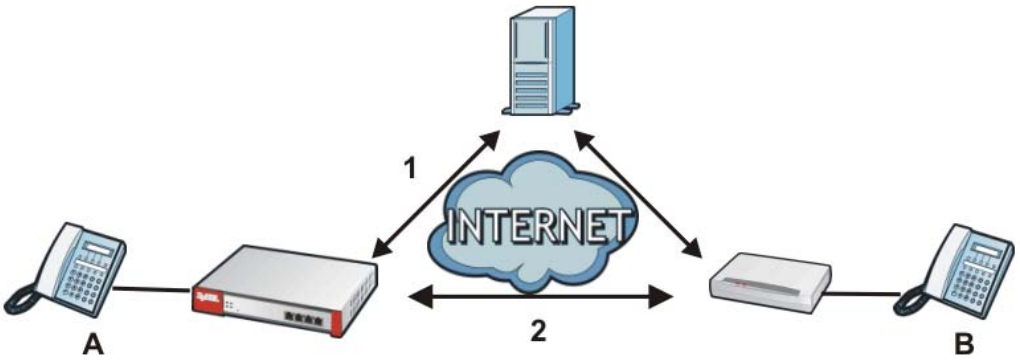
14.1 ALG Overview

Application Layer Gateway (ALG) allows the following applications to operate properly through the USG's NAT.

- SIP - Session Initiation Protocol (SIP) - An application-layer protocol that can be used to create voice and multimedia sessions over Internet.
- H.323 - A teleconferencing protocol suite that provides audio, data and video conferencing.
- FTP - File Transfer Protocol - an Internet file transfer service.

The following example shows SIP signaling (**1**) and audio (**2**) sessions between SIP clients **A** and **B** and the SIP server.

Figure 176 SIP ALG Example



The ALG feature is only needed for traffic that goes through the USG's NAT.

14.1.1 What You Need to Know

Application Layer Gateway (ALG), NAT and Security Policy

The USG can function as an Application Layer Gateway (ALG) to allow certain NAT un-friendly applications (such as SIP) to operate properly through the USG's NAT and security policy. The USG dynamically creates an implicit NAT session and security policy session for the application's traffic from the WAN to the LAN. The ALG on the USG supports all of the USG's NAT mapping types.

FTP ALG

The FTP ALG allows TCP packets with a specified port destination to pass through. If the FTP server is located on the LAN, you must also configure NAT (port forwarding) and security policies if you

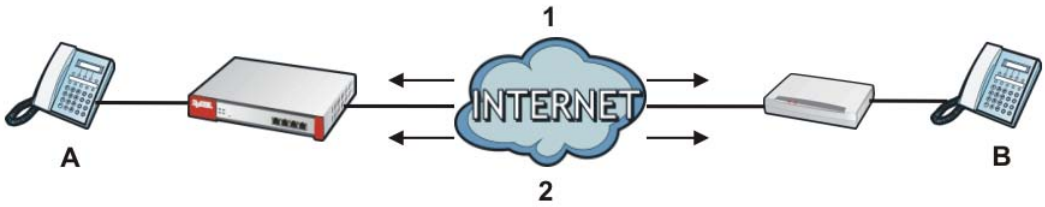
want to allow access to the server from the WAN. Bandwidth management can be applied to FTP ALG traffic.

H.323 ALG

- The H.323 ALG supports peer-to-peer H.323 calls.
- The H.323 ALG handles H.323 calls that go through NAT or that the USG routes. You can also make other H.323 calls that do not go through NAT or routing. Examples would be calls between LAN IP addresses that are on the same subnet.
- The H.323 ALG allows calls to go out through NAT. For example, you could make a call from a private IP address on the LAN to a peer device on the WAN.
- The H.323 ALG operates on TCP packets with a specified port destination.
- Bandwidth management can be applied to H.323 ALG traffic.
- The USG allows H.323 audio connections.
- The USG can also apply bandwidth management to traffic that goes through the H.323 ALG.

The following example shows H.323 signaling (1) and audio (2) sessions between H.323 devices A and B.

Figure 177 H.323 ALG Example



SIP ALG

- SIP phones can be in any zone (including LAN, DMZ, WAN), and the SIP server and SIP clients can be in the same network or different networks. The SIP server cannot be on the LAN. It must be on the WAN or the DMZ.
- There should be only one SIP server (total) on the USG's private networks. Any other SIP servers must be on the WAN. So for example you could have a Back-to-Back User Agent such as the IPPBX x6004 or an asterisk PBX on the DMZ or on the LAN but not on both.
- Using the SIP ALG allows you to use bandwidth management on SIP traffic. Bandwidth management can be applied to FTP ALG traffic. Use the option in the **Configuration > BWM** screen to configure the highest bandwidth available for SIP traffic.
- The SIP ALG handles SIP calls that go through NAT or that the USG routes. You can also make other SIP calls that do not go through NAT or routing. Examples would be calls between LAN IP addresses that are on the same subnet.
- The SIP ALG supports peer-to-peer SIP calls. The security policy (by default) allows peer to peer calls from the LAN zone to go to the WAN zone and blocks peer to peer calls from the WAN zone to the LAN zone.
- The SIP ALG allows UDP packets with a specified port destination to pass through.
- The USG allows SIP audio connections.
- You do not need to use TURN (Traversal Using Relay NAT) for VoIP devices behind the USG when you enable the SIP ALG.

Peer-to-Peer Calls and the USG

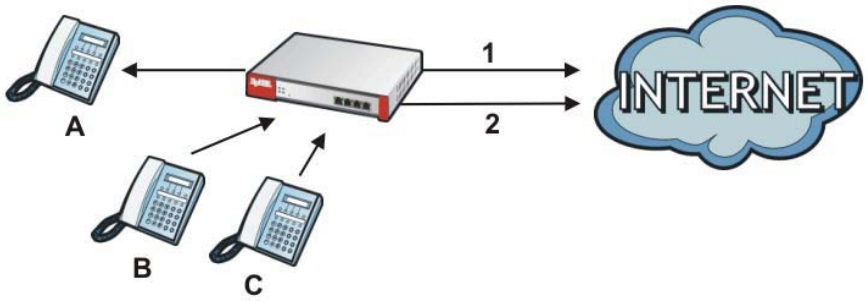
The USG ALG can allow peer-to-peer VoIP calls for both H.323 and SIP. You must configure the security policy and NAT (port forwarding) to allow incoming (peer-to-peer) calls from the WAN to a private IP address on the LAN (or DMZ).

VoIP Calls from the WAN with Multiple Outgoing Calls

When you configure the security policy and NAT (port forwarding) to allow calls from the WAN to a specific IP address on the LAN, you can also use policy routing to have H.323 (or SIP) calls from other LAN or DMZ IP addresses go out through a different WAN IP address. The policy routing lets the USG correctly forward the return traffic for the calls initiated from the LAN IP addresses.

For example, you configure the security policy and NAT to allow LAN IP address **A** to receive calls from the Internet through WAN IP address **1**. You also use a policy route to have LAN IP address **A** make calls out through WAN IP address **1**. Configure another policy route to have H.323 (or SIP) calls from LAN IP addresses **B** and **C** go out through WAN IP address **2**. Even though only LAN IP address **A** can receive incoming calls from the Internet, LAN IP addresses **B** and **C** can still make calls out to the Internet.

Figure 178 VoIP Calls from the WAN with Multiple Outgoing Calls

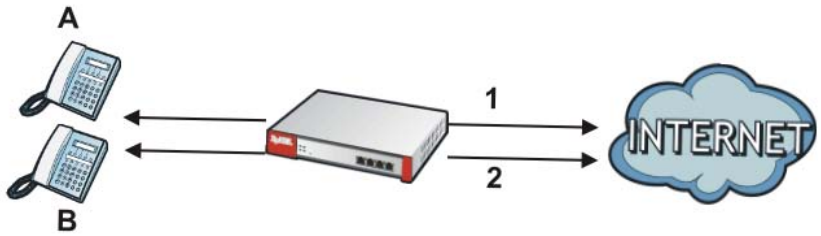


VoIP with Multiple WAN IP Addresses

With multiple WAN IP addresses on the USG, you can configure different security policy and NAT (port forwarding) rules to allow incoming calls from each WAN IP address to go to a specific IP address on the LAN (or DMZ). Use policy routing to have the H.323 (or SIP) calls from each of those LAN or DMZ IP addresses go out through the same WAN IP address that calls come in on. The policy routing lets the USG correctly forward the return traffic for the calls initiated from the LAN IP addresses.

For example, you configure security policy and NAT rules to allow LAN IP address **A** to receive calls through public WAN IP address **1**. You configure different security policy and port forwarding rules to allow LAN IP address **B** to receive calls through public WAN IP address **2**. You configure corresponding policy routes to have calls from LAN IP address **A** go out through WAN IP address **1** and calls from LAN IP address **B** go out through WAN IP address **2**.

Figure 179 VoIP with Multiple WAN IP Addresses



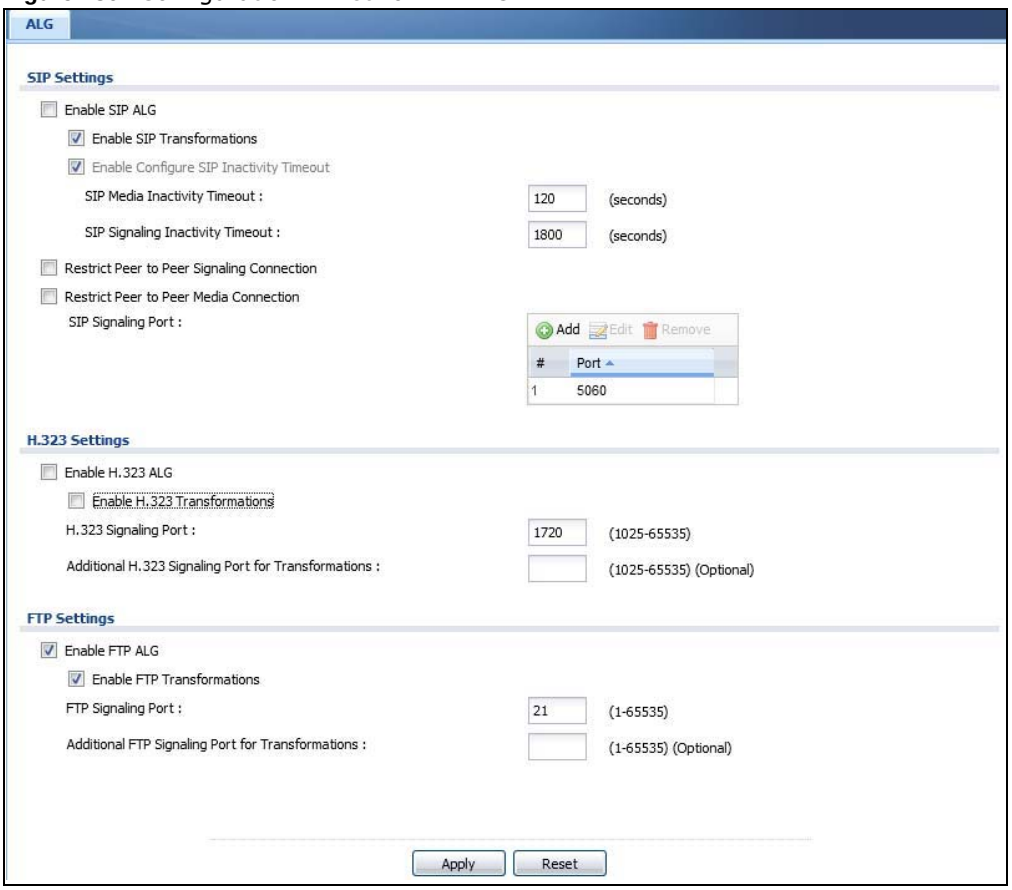
14.1.2 Before You Begin

You must also configure the security policy and enable NAT in the USG to allow sessions initiated from the WAN.

14.2 The ALG Screen

Click **Configuration > Network > ALG** to open the **ALG** screen. Use this screen to turn ALGs off or on, configure the port numbers to which they apply, and configure SIP ALG time outs.

Figure 180 Configuration > Network > ALG



The following table describes the labels in this screen.

Table 108 Configuration > Network > ALG

LABEL	DESCRIPTION
Enable SIP ALG	Turn on the SIP ALG to detect SIP traffic and help build SIP sessions through the USG's NAT.
Enable SIP Transformations	Select this to have the USG modify IP addresses and port numbers embedded in the SIP data payload. You do not need to use this if you have a SIP device or server that will modify IP addresses and port numbers embedded in the SIP data payload.
Enable Configure SIP Inactivity Timeout	Select this option to have the USG apply SIP media and signaling inactivity time out limits.
SIP Media Inactivity Timeout	Use this field to set how many seconds (1~86400) the USG will allow a SIP session to remain idle (without voice traffic) before dropping it. If no voice packets go through the SIP ALG before the timeout period expires, the USG deletes the audio session. You cannot hear anything and you will need to make a new call to continue your conversation.
SIP Signaling Inactivity Timeout	Most SIP clients have an "expire" mechanism indicating the lifetime of signaling sessions. The SIP user agent sends registration packets to the SIP server periodically and keeps the session alive in the USG. If the SIP client does not have this mechanism and makes no calls during the USG SIP timeout, the USG deletes the signaling session after the timeout period. Enter the SIP signaling session timeout value (1~86400).
Restrict Peer to Peer Signaling Connection	A signaling connection is used to set up the SIP connection. Enable this if you want signaling connections to only arrive from the IP address(es) you registered with. Signaling connections from other IP addresses will be dropped.
Restrict Peer to Peer Media Connection	A media connection is the audio transfer in a SIP connection. Enable this if you want media connections to only arrive from the IP address(es) you registered with. Media connections from other IP addresses will be dropped.
SIP Signaling Port	If you are using a custom UDP port number (not 5060) for SIP traffic, enter it here. Use the **Add** icon to add fields if you are also using SIP on additional UDP port numbers.
Additional SIP Signaling Port (UDP) for Transformations	If you are also using SIP on an additional UDP port number, enter it here.
Enable H.323 ALG	Turn on the H.323 ALG to detect H.323 traffic (used for audio communications) and help build H.323 sessions through the USG's NAT.
Enable H.323 Transformations	Select this to have the USG modify IP addresses and port numbers embedded in the H.323 data payload. You do not need to use this if you have a H.323 device or server that will modify IP addresses and port numbers embedded in the H.323 data payload.
H.323 Signaling Port	If you are using a custom TCP port number (not 1720) for H.323 traffic, enter it here.
Additional H.323 Signaling Port for Transformations	If you are also using H.323 on an additional TCP port number, enter it here.
Enable FTP ALG	Turn on the FTP ALG to detect FTP (File Transfer Program) traffic and help build FTP sessions through the USG's NAT.

Table 108 Configuration > Network > ALG (continued)

LABEL	DESCRIPTION
Enable FTP Transformations	Select this option to have the USG modify IP addresses and port numbers embedded in the FTP data payload to match the USG's NAT environment. Clear this option if you have an FTP device or server that will modify IP addresses and port numbers embedded in the FTP data payload to match the USG's NAT environment.
FTP Signaling Port	If you are using a custom TCP port number (not 21) for FTP traffic, enter it here.
Additional FTP Signaling Port for Transformations	If you are also using FTP on an additional TCP port number, enter it here.
Apply	Click **Apply** to save your changes back to the USG.
Reset	Click **Reset** to return the screen to its last-saved settings.

14.3 ALG Technical Reference

Here is more detailed information about the Application Layer Gateway.

ALG

Some applications cannot operate through NAT (are NAT un-friendly) because they embed IP addresses and port numbers in their packets' data payload. The USG examines and uses IP address and port number information embedded in the VoIP traffic's data stream. When a device behind the USG uses an application for which the USG has VoIP pass through enabled, the USG translates the device's private IP address inside the data stream to a public IP address. It also records session port numbers and allows the related sessions to go through the security policy so the application's traffic can come in from the WAN to the LAN.

ALG and Trunks

If you send your ALG-managed traffic through an interface trunk and all of the interfaces are set to active, you can configure routing policies to specify which interface the ALG-managed traffic uses.

You could also have a trunk with one interface set to active and a second interface set to passive. The USG does not automatically change ALG-managed connections to the second (passive) interface when the active interface's connection goes down. When the active interface's connection fails, the client needs to re-initialize the connection through the second interface (that was set to passive) in order to have the connection go through the second interface. VoIP clients usually re-register automatically at set intervals or the users can manually force them to re-register.

FTP

File Transfer Protocol (FTP) is an Internet file transfer service that operates on the Internet and over TCP/IP networks. A system running the FTP server accepts commands from a system running an FTP client. The service allows users to send commands to the server for uploading and downloading files.

H.323

H.323 is a standard teleconferencing protocol suite that provides audio, data and video conferencing. It allows for real-time point-to-point and multipoint communication between client computers over a packet-based network that does not provide a guaranteed quality of service. NetMeeting uses H.323.

SIP

The Session Initiation Protocol (SIP) is an application-layer control (signaling) protocol that handles the setting up, altering and tearing down of voice and multimedia sessions over the Internet. SIP is used in VoIP (Voice over IP), the sending of voice signals over the Internet Protocol.

SIP signaling is separate from the media for which it handles sessions. The media that is exchanged during the session can use a different path from that of the signaling. SIP handles telephone calls and can interface with traditional circuit-switched telephone networks.

RTP

When you make a VoIP call using H.323 or SIP, the RTP (Real time Transport Protocol) is used to handle voice data transfer. See RFC 1889 for details on RTP.

15

UPnP

15.1 UPnP and NAT-PMP Overview

The USG supports both UPnP and NAT-PMP to permit networking devices to discover each other and connect seamlessly.

Universal Plug and Play (UPnP) is a distributed, open networking standard that uses TCP/IP for simple peer-to-peer network connectivity between devices. A UPnP device can dynamically join a network, obtain an IP address, convey its capabilities and learn about other devices on the network. In turn, a device can leave a network smoothly and automatically when it is no longer in use. A gateway that supports UPnP is called Internet Gateway Device (IGD). The standardized Device Control Protocol (DCP) is defined by the UPnP Forum for IGDs to configure port mapping automatically.

NAT Port Mapping Protocol (NAT-PMP), introduced by Apple and implemented in current Apple products, is used as an alternative NAT traversal solution to the UPnP IGD protocol. NAT-PMP runs over UDP port 5351. NAT-PMP is much simpler than UPnP IGD and mainly designed for small home networks. It allows a client behind a NAT router to retrieve the router's public IP address and port number and make them known to the peer device with which it wants to communicate. The client can automatically configure the NAT router to create a port mapping to allow the peer to contact it.

15.2 What You Need to Know

UPnP hardware is identified as an icon in the Network Connections folder (Windows XP). Each UPnP compatible device installed on your network will appear as a separate icon. Selecting the icon of a UPnP device will allow you to access the information and properties of that device.

15.2.1 NAT Traversal

UPnP NAT traversal automates the process of allowing an application to operate through NAT. UPnP network devices can automatically configure network addressing, announce their presence in the network to other UPnP devices and enable exchange of simple product and service descriptions. NAT traversal allows the following:

- Dynamic port mapping
- Learning public IP addresses
- Assigning lease times to mappings

Windows Messenger is an example of an application that supports NAT traversal and UPnP.

See the NAT chapter for more information on NAT.

15.2.2 Cautions with UPnP and NAT-PMP

The automated nature of NAT traversal applications in establishing their own services and opening security policy ports may present network security issues. Network information and configuration may also be obtained and modified by users in some network environments.

When a UPnP or NAT-PMP device joins a network, it announces its presence with a multicast message. For security reasons, the USG allows multicast messages on the LAN only.

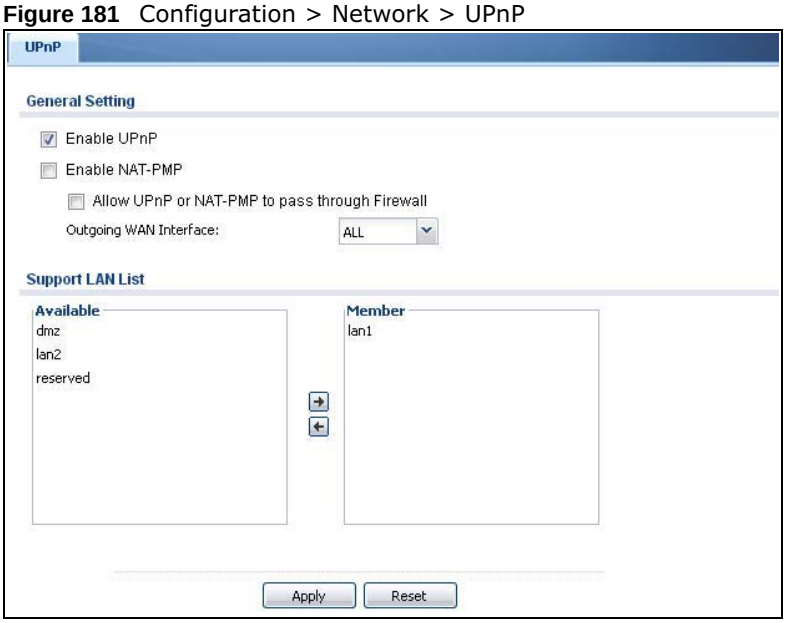
All UPnP-enabled or NAT-PMP-enabled devices may communicate freely with each other without additional configuration. Disable UPnP or NAT-PMP if this is not your intention.

15.3 UPnP Screen

Use this screen to enable UPnP and NAT-PMP on your USG.

Click **Configuration > Network > UPnP** to display the screen shown next.

Figure 181 Configuration > Network > UPnP



The following table describes the fields in this screen.

Table 109 Configuration > Network > UPnP

LABEL	DESCRIPTION
Enable UPnP	Select this check box to activate UPnP on the USG. Be aware that anyone could use a UPnP application to open the web configurator's login screen without entering the USG's IP address (although you must still enter the password to access the web configurator).
Enable NAT-PMP	NAT Port Mapping Protocol (NAT-PMP) automates port forwarding to allow a computer in a private network (behind the USG) to automatically configure the USG to allow computers outside the private network to contact it. Select this check box to activate NAT-PMP on the USG. Be aware that anyone could use a NAT-PMP application to open the web configurator's login screen without entering the USG's IP address (although you must still enter the password to access the web configurator).
Allow UPnP or NAT-PMP to pass through Firewall	Select this check box to allow traffic from UPnP-enabled or NAT-PMP-enabled applications to bypass the security policy. Clear this check box to have the security policy block all UPnP or NAT-PMP application packets (for example, MSN packets).
Outgoing WAN Interface	Select through which WAN interface(s) you want to send out traffic from UPnP-enabled or NAT-PMP-enabled applications. If the WAN interface you select loses its connection, the USG attempts to use the other WAN interface. If the other WAN interface also does not work, the USG drops outgoing packets from UPnP-enabled or NAT-PMP-enabled applications.
Support LAN List	The **Available** list displays the name(s) of the internal interface(s) on which the USG supports UPnP and/or NAT-PMP. To enable UPnP and/or NAT-PMP on an interface, you can double-click a single entry to move it or use the [Shift] or [Ctrl] key to select multiple entriess and click the right arrow button to add to the **Member** list. To remove an interface, select the name(s) in the **Member** list and click the left arrow button.
Apply	Click **Apply** to save your changes back to the USG.
Reset	Click **Reset** to return the screen to its last-saved settings.

15.4 Technical Reference

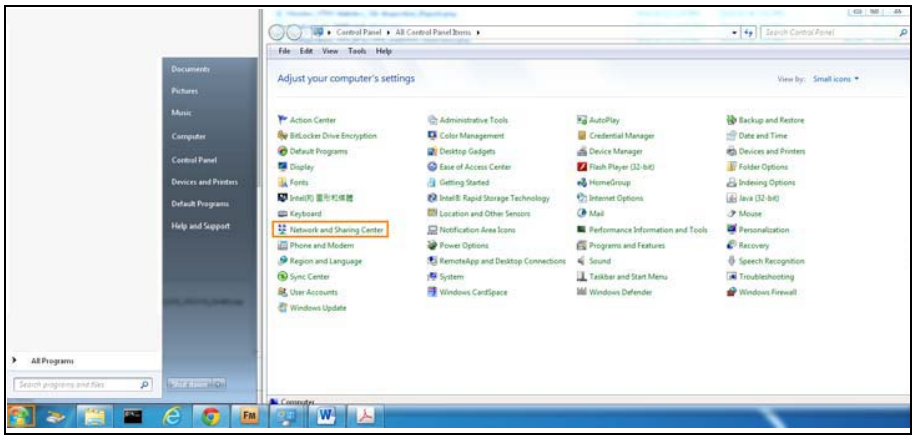
The sections show examples of using UPnP.

15.4.1 Turning on UPnP in Windows 7 Example

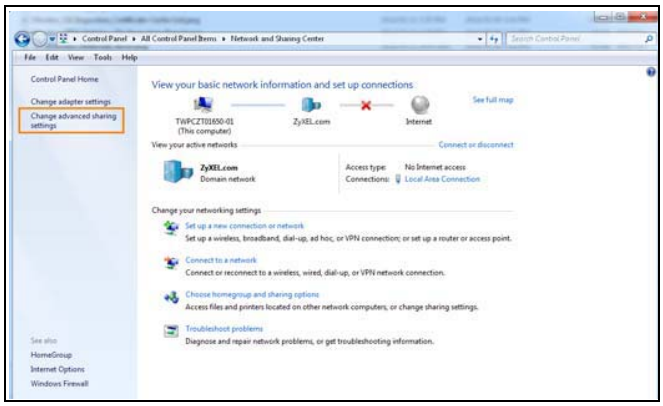
This section shows you how to use the UPnP feature in Windows 7. UPnP server is installed in Windows 7. Activate UPnP on the USG.

Make sure the computer is connected to a LAN port of the USG. Turn on your computer and the USG.

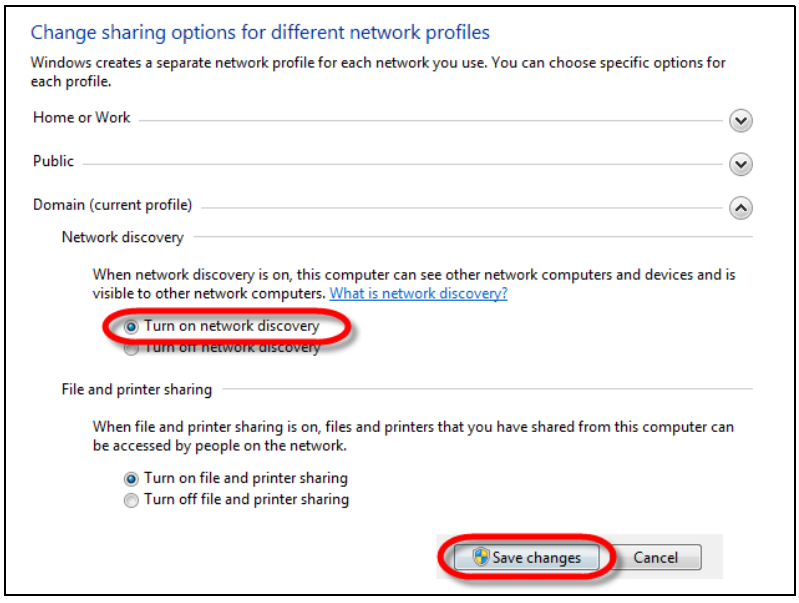
1 Click the start icon, **Control Panel** and then the **Network and Sharing Center.**



2 Click **Change Advanced Sharing Settings**.



3 Select **Turn on network discovery** and click **Save Changes**. Network discovery allows your computer to find other computers and devices on the network and other computers on the network to find your computer. This makes it easier to share files and printers.



15.4.2 Using UPnP in Windows XP Example

This section shows you how to use the UPnP feature in Windows XP. You must already have UPnP installed in Windows XP and UPnP activated on the USG.

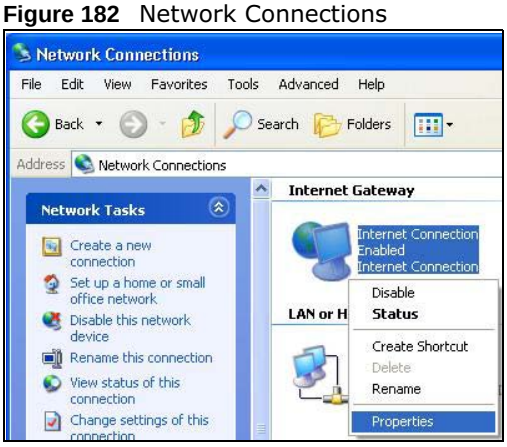
Make sure the computer is connected to a LAN port of the USG. Turn on your computer and the USG.

15.4.2.1 Auto-discover Your UPnP-enabled Network Device

1 Click **start** and **Control Panel**. Double-click **Network Connections**. An icon displays under Internet Gateway.

2 Right-click the icon and select **Properties**.

Figure 182 Network Connections



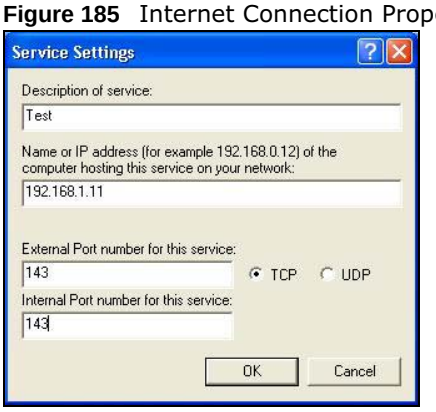
3 In the **Internet Connection Properties** window, click **Settings** to see the port mappings there were automatically created.

Figure 183 Internet Connection Properties

4 You may edit or delete the port mappings or click **Add** to manually add port mappings.

Figure 184 Internet Connection Properties: Advanced Settings

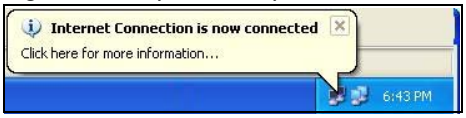
Figure 185 Internet Connection Properties: Advanced Settings: Add



Note: When the UPnP-enabled device is disconnected from your computer, all port mappings will be deleted automatically.

5 Select **Show icon in notification area when connected** option and click **OK**. An icon displays in the system tray.

Figure 186 System Tray Icon



6 Double-click on the icon to display your current Internet connection status.

Figure 187 Internet Connection Status

15.4.3 Web Configurator Easy Access

With UPnP, you can access the web-based configurator on the USG without finding out the IP address of the USG first. This comes helpful if you do not know the IP address of the USG.

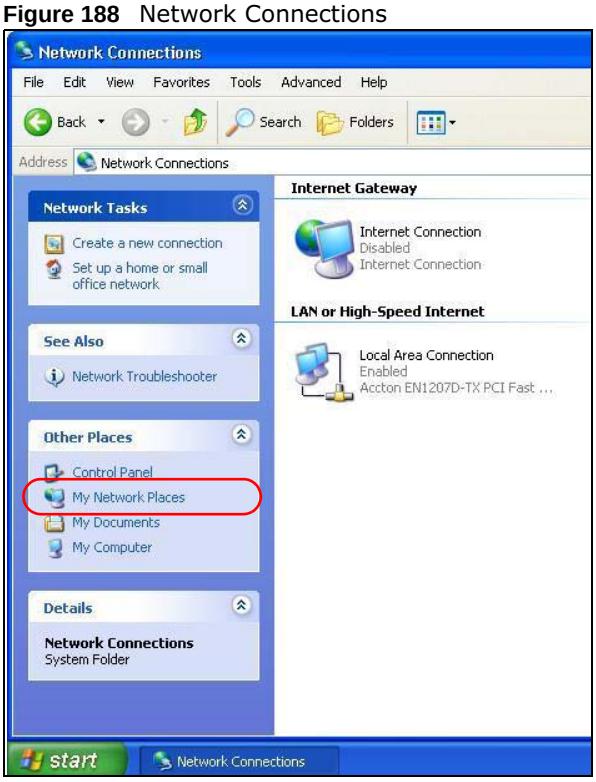
Follow the steps below to access the web configurator.

1 Click **Start** and then **Control Panel**.

2 Double-click **Network Connections**.

3 Select **My Network Places** under **Other Places**.

Figure 188 Network Connections



4 An icon with the description for each UPnP-enabled device displays under **Local Network**.

5 Right-click on the icon for your USG and select **Invoke**. The web configurator login screen displays.

Figure 189 Network Connections: My Network Places

6 Right-click on the icon for your USG and select **Properties**. A properties window displays with basic information about the USG.

Figure 190 Network Connections: My Network Places: Properties: Example

16

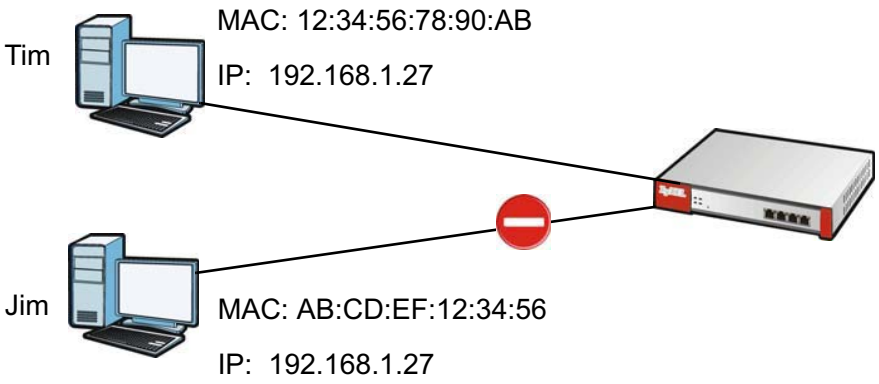
IP/MAC Binding

16.1 IP/MAC Binding Overview

IP address to MAC address binding helps ensure that only the intended devices get to use privileged IP addresses. The USG uses DHCP to assign IP addresses and records the MAC address it assigned to each IP address. The USG then checks incoming connection attempts against this list. A user cannot manually assign another IP to his computer and use it to connect to the USG.

Suppose you configure access privileges for IP address 192.168.1.27 and use static DHCP to assign it to Tim's computer's MAC address of 12:34:56:78:90:AB. IP/MAC binding drops traffic from any computer trying to use IP address 192.168.1.27 with another MAC address.

Figure 191 IP/MAC Binding Example



16.1.1 What You Can Do in this Chapter

- Use the **Summary** and **Edit** screens (Section 16.2 on page 283) to bind IP addresses to MAC addresses.
- Use the **Exempt List** screen (Section 16.3 on page 285) to configure ranges of IP addresses to which the USG does not apply IP/MAC binding.

16.1.2 What You Need to Know

DHCP

IP/MAC address bindings are based on the USG's dynamic and static DHCP entries.

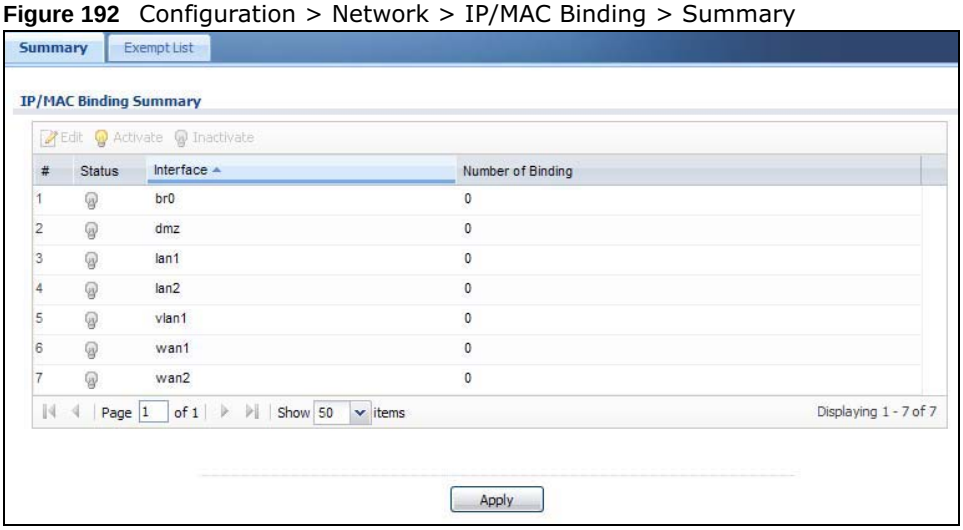
Interfaces Used With IP/MAC Binding

IP/MAC address bindings are grouped by interface. You can use IP/MAC binding with Ethernet, bridge, VLAN, and WLAN interfaces. You can also enable or disable IP/MAC binding and logging in an interface's configuration screen.

16.2 IP/MAC Binding Summary

Click **Configuration > Network > IP/MAC Binding** to open the **IP/MAC Binding Summary** screen. This screen lists the total number of IP to MAC address bindings for devices connected to each supported interface.

Figure 192 Configuration > Network > IP/MAC Binding > Summary



The following table describes the labels in this screen.

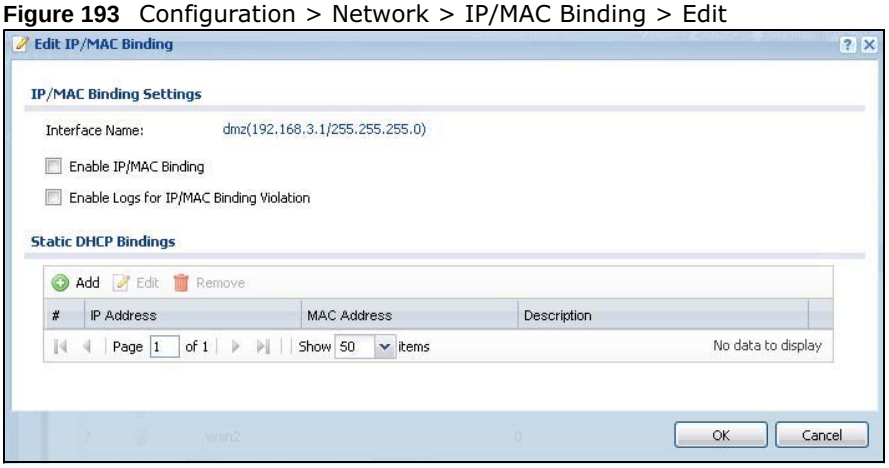
Table 110 Configuration > Network > IP/MAC Binding > Summary

LABEL	DESCRIPTION
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
#	This field is a sequential value, and it is not associated with a specific entry.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Interface	This is the name of an interface that supports IP/MAC binding.
Number of Binding	This field displays the interface's total number of IP/MAC bindings and IP addresses that the interface has assigned by DHCP.
Apply	Click **Apply** to save your changes back to the USG.

16.2.1 IP/MAC Binding Edit

Click **Configuration > Network > IP/MAC Binding > Edit** to open the **IP/MAC Binding Edit** screen. Use this screen to configure an interface's IP to MAC address binding settings.

Figure 193 Configuration > Network > IP/MAC Binding > Edit



The following table describes the labels in this screen.

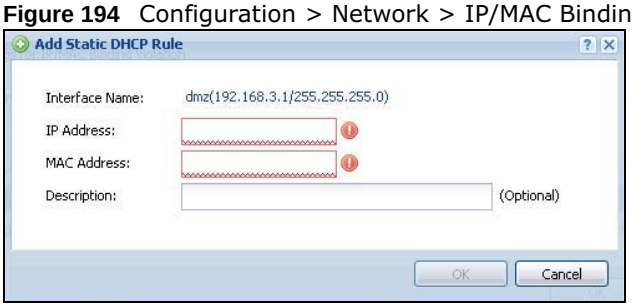
Table 111 Configuration > Network > IP/MAC Binding > Edit

LABEL	DESCRIPTION
IP/MAC Binding Settings	
Interface Name	This field displays the name of the interface within the USG and the interface's IP address and subnet mask.
Enable IP/MAC Binding	Select this option to have this interface enforce links between specific IP addresses and specific MAC addresses. This stops anyone else from manually using a bound IP address on another device connected to this interface. Use this to make use only the intended users get to use specific IP addresses.
Enable Logs for IP/MAC Binding Violation	Select this option to have the USG generate a log if a device connected to this interface attempts to use an IP address not assigned by the USG.
Static DHCP Bindings	This table lists the bound IP and MAC addresses. The USG checks this table when it assigns IP addresses. If the computer's MAC address is in the table, the USG assigns the corresponding IP address. You can also access this table from the interface's edit screen.
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The USG confirms you want to remove it before doing so.
#	This is the index number of the static DHCP entry.
IP Address	This is the IP address that the USG assigns to a device with the entry's MAC address.
MAC Address	This is the MAC address of the device to which the USG assigns the entry's IP address.
Description	This helps identify the entry.
OK	Click **OK** to save your changes back to the USG.
Cancel	Click **Cancel** to exit this screen without saving.

16.2.2 Static DHCP Edit

Click **Configuration > Network > IP/MAC Binding > Edit** to open the **IP/MAC Binding Edit** screen. Click the **Add** or **Edit** icon to open the following screen. Use this screen to configure an interface's IP to MAC address binding settings.

Figure 194 Configuration > Network > IP/MAC Binding > Edit > Add



The following table describes the labels in this screen.

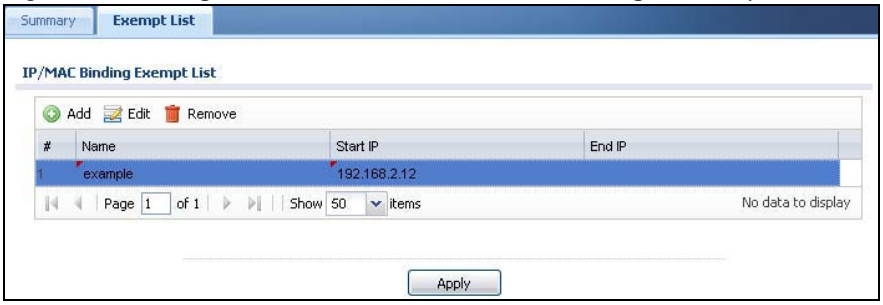
Table 112 Configuration > Network > IP/MAC Binding > Edit > Add

LABEL	DESCRIPTION
Interface Name	This field displays the name of the interface within the USG and the interface's IP address and subnet mask.
IP Address	Enter the IP address that the USG is to assign to a device with the entry's MAC address.
MAC Address	Enter the MAC address of the device to which the USG assigns the entry's IP address.
Description	Enter up to 64 printable ASCII characters to help identify the entry. For example, you may want to list the computer's owner.
OK	Click **OK** to save your changes back to the USG.
Cancel	Click **Cancel** to exit this screen without saving.

16.3 IP/MAC Binding Exempt List

Click **Configuration > Network > IP/MAC Binding > Exempt List** to open the **IP/MAC Binding Exempt List** screen. Use this screen to configure ranges of IP addresses to which the USG does not apply IP/MAC binding.

Figure 195 Configuration > Network > IP/MAC Binding > Exempt List



The following table describes the labels in this screen.

Table 113 Configuration > Network > IP/MAC Binding > Exempt List

LABEL	DESCRIPTION
Add	Click this to create a new entry.
Edit	Click an entry or select it and click **Edit** to modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The USG confirms you want to remove it before doing so.

Table 113 Configuration > Network > IP/MAC Binding > Exempt List (continued)

LABEL	DESCRIPTION
#	This is the index number of the IP/MAC binding list entry.
Name	Enter a name to help identify this entry.
Start IP	Enter the first IP address in a range of IP addresses for which the USG does not apply IP/MAC binding.
End IP	Enter the last IP address in a range of IP addresses for which the USG does not apply IP/MAC binding.
Add icon	Click the **Add** icon to add a new entry. Click the **Remove** icon to delete an entry. A window displays asking you to confirm that you want to delete it.
Apply	Click **Apply** to save your changes back to the USG.

17

Layer 2 Isolation

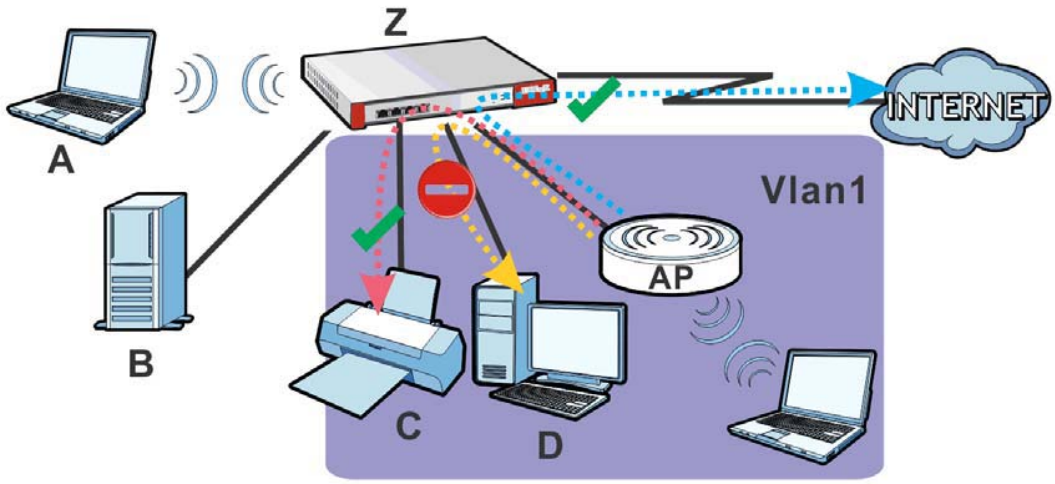
17.1 Overview

Layer-2 isolation is used to prevent connected devices from communicating with each other in the USG's local network(s), except for the devices in the white list, when layer-2 isolation is enabled on the USG and the local interface(s).

Note: The security policy control must be enabled before you can use layer-2 isolation.

In the following example, layer-2 isolation is enabled on the USG's interface Vlan1. A printer, PC and AP are in the Vlan1. The IP address of network printer (**C**) is added to the white list. With this setting, the connected AP then cannot communicate with the PC (**D**), but can access the network printer (**C**), server (**B**), wireless client (**A**) and the Internet.

Figure 196 Layer-2 Isolation Application



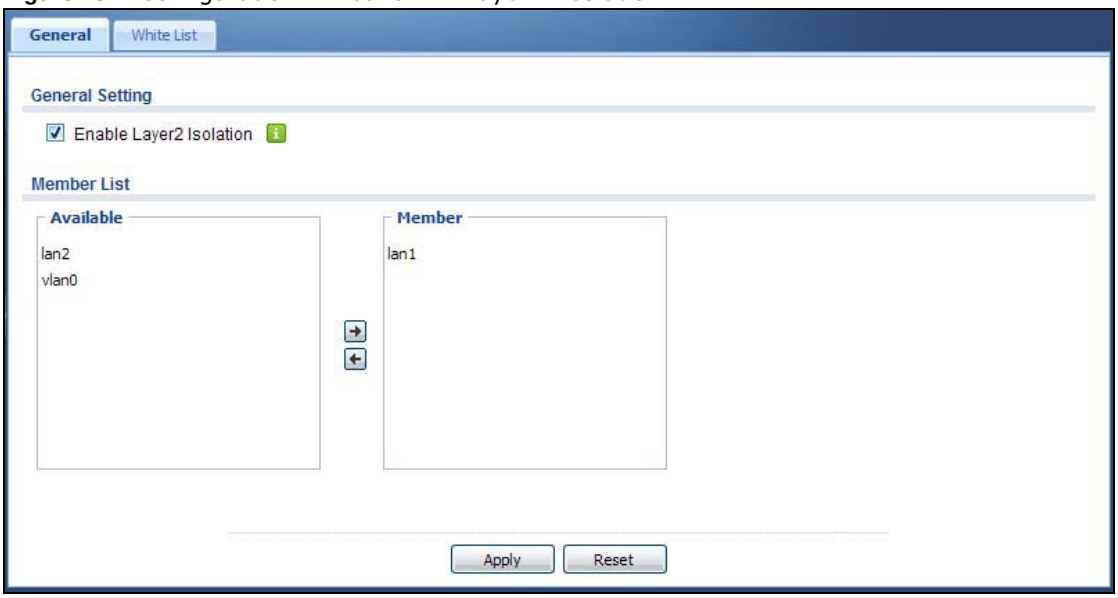
17.1.1 What You Can Do in this Chapter

- Use the **General** screen (Section 17.2 on page 288) to enable layer-2 isolation on the USG and the internal interface(s).
- Use the **White List** screen (Section 17.3 on page 288) to enable and configures the white list.

17.2 Layer-2 Isolation General Screen

This screen allows you to enable Layer-2 isolation on the USG and specific internal interface(s). To access this screen click **Configuration > Network > Layer 2 Isolation**.

Figure 197 Configuration > Network > Layer 2 Isolation



The following table describes the labels in this screen.

Table 114 Configuration > Network > Layer 2 Isolation

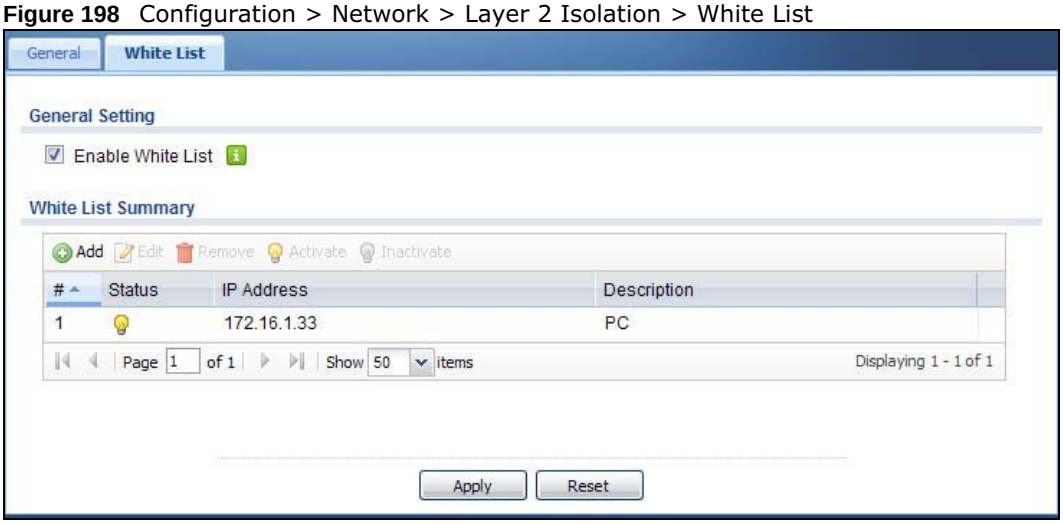
LABEL	DESCRIPTION
Enable Layer2 Isolation	Select this option to turn on the layer-2 isolation feature on the USG. Note: You can enable this feature only when the security policy is enabled.
Member List	The **Available** list displays the name(s) of the internal interface(s) on which you can enable layer-2 isolation. To enable layer-2 isolation on an interface, you can double-click a single entry to move it or use the [Shift] or [Ctrl] key to select multiple entriess and click the right arrow button to add to the **Member** list. To remove an interface, select the name(s) in the **Member** list and click the left arrow button.
Apply	Click **Apply** to save your changes back to the USG.
Reset	Click **Reset** to return the screen to its last-saved settings.

17.3 White List Screen

IP addresses that are not listed in the white list are blocked from communicating with other devices in the layer-2-isolation-enabled internal interface(s) except for broadcast packets.

To access this screen click **Configuration > Network > Layer 2 Isolation > White List**.

Figure 198 Configuration > Network > Layer 2 Isolation > White List



The following table describes the labels in this screen.

Table 115 Configuration > Network > Layer 2 Isolation > White List

LABEL	DESCRIPTION
Enable White List	Select this option to turn on the white list on the USG. Note: You can enable this feature only when the security policy is enabled.
Add	Click this to add a new rule.
Edit	Click this to edit the selected rule.
Remove	Click this to remove the selected rule.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
#	This field is a sequential value, and it is not associated with a specific rule.
Status	This icon is lit when the rule is active and dimmed when the rule is inactive.
IP Address	This field displays the IP address of device that can be accessed by the devices connected to an internal interface on which layer-2 isolation is enabled.
Description	This field displays the description for the IP address in this rule.
Apply	Click **Apply** to save your changes back to the USG.
Reset	Click **Reset** to return the screen to its last-saved settings.

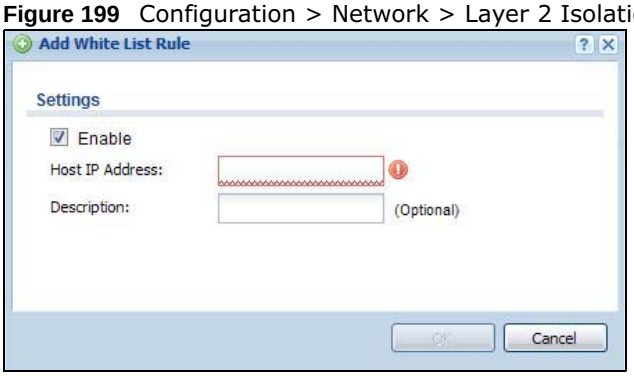
17.3.1 Add/Edit White List Rule

This screen allows you to create a new rule in the white list or edit an existing one. To access this screen, click the **Add** button or select an entry from the list and click the **Edit** button.

Note: You can configure up to 100 white list rules on the USG.

Note: You need to know the IP address of each connected device that you want to allow to be accessed by other devices when layer-2 isolation is enabled.

Figure 199 Configuration > Network > Layer 2 Isolation > White List > Add/Edit



The following table describes the labels in this screen.

Table 116 Configuration > Network > Layer 2 Isolation > White List > Add/Edit

LABEL	DESCRIPTION
Enable	Select this option to turn on the rule.
Host IP Address	Enter an IPv4 address associated with this rule.
Description	Specify a description for the IP address associated with this rule. Enter up to 60 characters, spaces and underscores allowed.
OK	Click **OK** to save your changes back to the USG.
Cancel	Click **Cancel** to exit this screen without saving your changes.

18

Inbound Load Balancing

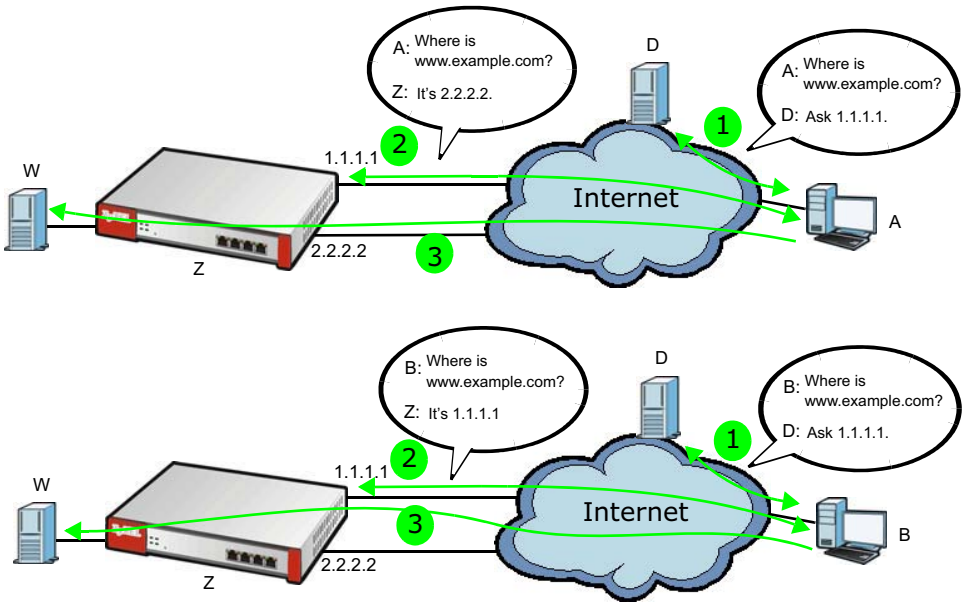
18.1 Inbound Load Balancing Overview

Inbound load balancing enables the USG to respond to a DNS query message with a different IP address for DNS name resolution. The USG checks which member interface has the least load and responds to the DNS query message with the interface's IP address.

In the following figure, an Internet host (**A**) sends a DNS query message to the DNS server (**D**) in order to resolve a domain name of www.example.com. DNS server **D** redirects it to the USG (**Z**)'s WAN1 with an IP address of 1.1.1.1. The USG receives the DNS query message and responds to it with the WAN2's IP address, 2.2.2.2, because the WAN2 has the least load at that moment.

Another Internet host (**B**) also sends a DNS query message to ask where www.example.com is. The USG responds to it with the WAN1's IP address, 1.1.1.1, since WAN1 has the least load this time.

Figure 200 DNS Load Balancing Example



18.1.1 What You Can Do in this Chapter

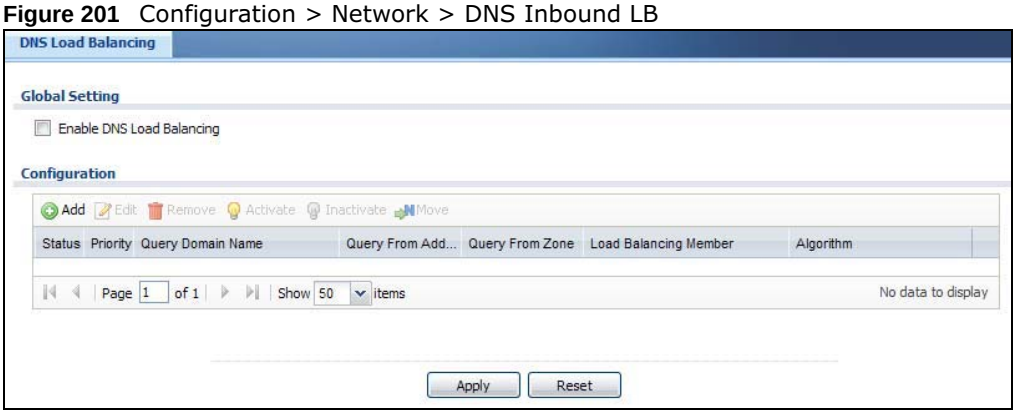
- Use the **Inbound LB** screen (see Section 18.2 on page 292) to view a list of the configured DNS load balancing rules.
- Use the **Inbound LB Add/Edit** screen (see Section 18.2.1 on page 293) to add or edit a DNS load balancing rule.

18.2 The Inbound LB Screen

The **Inbound LB** screen provides a summary of all DNS load balancing rules and the details. You can also use this screen to add, edit, or remove the rules. Click **Configuration > Network > Inbound LB** to open the following screen.

Note: After you finish the inbound load balancing settings, go to security policy and NAT screens to configure the corresponding rule and virtual server to allow the Internet users to access your internal servers.

Figure 201 Configuration > Network > DNS Inbound LB



The following table describes the labels in this screen.

Table 117 Configuration > Network > Inbound LB

LABEL	DESCRIPTION
Global Setting	
Enable DNS Load Balancing	Select this to enable DNS load balancing.
Configuration	
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The USG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Move	To move an entry to a different number in the list, click the **Move** icon. In the field that appears, specify the number to which you want to move the entry.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Priority	This field displays the order in which the USG checks the member interfaces of this DNS load balancing rule.
Query Domain Name	This field displays the domain name for which the USG manages load balancing between the specified interfaces.
Query From Address	This field displays the source IP address of the DNS query messages to which the USG applies the DNS load balancing rule.
Query From Zone	The USG applies the DNS load balancing rule to the query messages received from this zone.

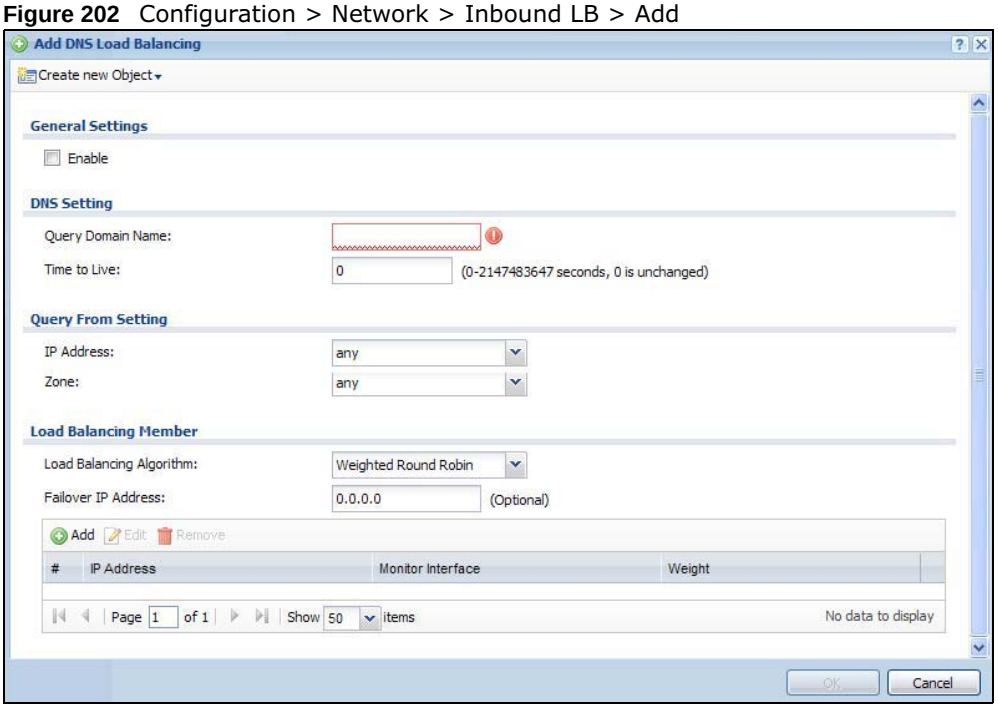
Table 117 Configuration > Network > Inbound LB (continued)

LABEL	DESCRIPTION
Load Balancing Member	This field displays the member interfaces which the USG manages for load balancing.
Algorithm	This field displays the load balancing method the USG uses for this DNS load balancing rule. **Weighted Round Robin** - Each member interface is assigned a weight. An interface with a larger weight gets more chances to transmit traffic than an interface with a smaller weight. For example, if the weight ratio of wan1 and wan2 interfaces is 2:1, the USG chooses wan1 for 2 sessions' traffic and wan2 for 1 session's traffic in each round of 3 new sessions. **Least Connection** - The USG chooses choose a member interface which is handling the least number of sessions. **Least Load - Outbound** - The USG chooses a member interface which is handling the least amount of outgoing traffic. **Least Load - Inbound** - The USG chooses a member interface which is handling the least amount of incoming traffic. **Least Load - Total** - The USG chooses a member interface which is handling the least amount of outgoing and incoming traffic.
Apply	Click this button to save your changes to the USG.
Reset	Click this button to return the screen to its last-saved settings.

18.2.1 The Inbound LB Add/Edit Screen

The **Add DNS Load Balancing** screen allows you to add a domain name for which the USG manages load balancing between the specified interfaces. You can configure the USG to apply DNS load balancing to some specific hosts only by configuring the **Query From** settings. Click **Configuration > Network > Inbound LB** and then the **Add** or **Edit** icon to open this screen.

Figure 202 Configuration > Network > Inbound LB > Add



The following table describes the labels in this screen.

Table 118 Configuration > Network > Inbound LB > Add/Edit

LABEL	DESCRIPTION
Create New Object	Use this to configure any new setting objects that you need to use in this screen.
General Settings	
Enable	Select this to enable this DNS load balancing rule.
DNS Setting	
Query Domain Name	Type up to 255 characters for a domain name for which you want the USG to manage DNS load balancing. You can use a wildcard (*) to let multiple domains match the name. For example, use *.example.com to specify any domain name that ends with "example.com" would match.
Time to Live	Enter the number of seconds the USG recommends DNS request hosts to keep the DNS entry in their caches before removing it. Enter 0 to have the USG not recommend this so the DNS request hosts will follow their DNS server's TTL setting.
Query From Setting	
IP Address	Enter the IP address of a computer or a DNS server which makes the DNS queries upon which to apply this rule. DNS servers process client queries using recursion or iteration: • In recursion, DNS servers make recursive queries on behalf of clients. So you have to configure this field to the DNS server's IP address when recursion is used. • In iteration, a client asks the DNS server and expects the best and immediate answer without the DNS server contacting other DNS servers. If the primary DNS server cannot provide the best answer, the client makes iteration queries to other configured DNS servers to resolve the name. You have to configure this field to the client's IP address when iteration is used.
Zone	Select the zone of DNS query messages upon which to apply this rule.
Load Balancing Member	
Load Balancing Algorithm	Select a load balancing method to use from the drop-down list box. Select **Weighted Round Robin** to balance the traffic load between interfaces based on their respective weights. An interface with a larger weight gets more chances to transmit traffic than an interface with a smaller weight. For example, if the weight ratio of wan1 and wan2 interfaces is 2:1, the USG chooses wan1 for 2 sessions' traffic and wan2 for every session's traffic in each round of 3 new sessions. Select **Least Connection** to have the USG choose the member interface which is handling the least number of sessions. Select **Least Load - Outbound** to have the USG choose the member interface which is handling the least amount of outgoing traffic. Select **Least Load - Inbound** to have the USG choose the member interface which is handling the least amount of incoming traffic. Select **Least Load - Total** to have the USG choose the member interface which is handling the least amount of outgoing and incoming traffic.
Failover IP Address	Enter an alternate IP address with which the USG will respond to a DNS query message when the load balancing algorithm cannot find any available interface.
Add	Click this to create a new member interface for this rule.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.

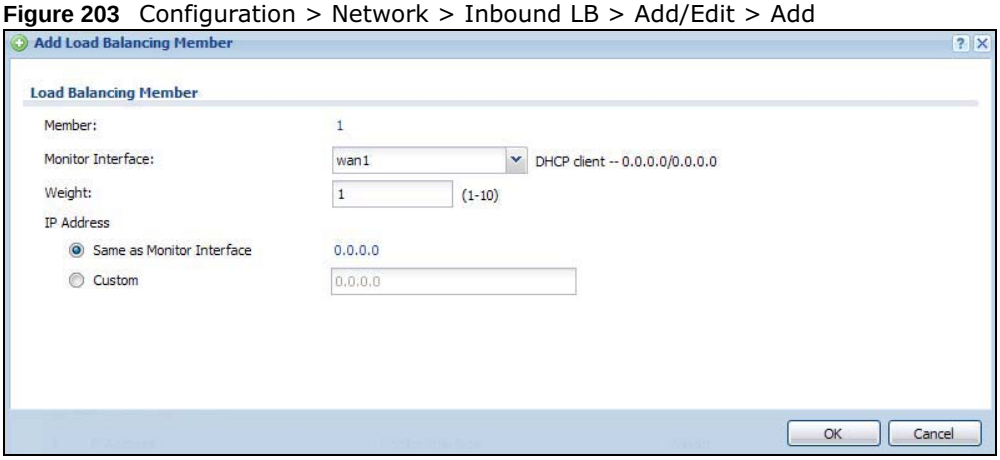
Table 118 Configuration > Network > Inbound LB > Add/Edit (continued)

LABEL	DESCRIPTION
Remove	To remove an entry, select it and click **Remove**. The USG confirms you want to remove it before doing so.
#	This field displays the order in which the USG checks this rule's member interfaces.
IP Address	This field displays the IP address of the member interface.
Monitor Interface	This field displays the name of the member interface. The USG manages load balancing between the member interfaces.
Weight	This field is available if you selected **Weighted Round Robin** as the load balancing algorithm. This field displays the weight of the member interface. An interface with a larger weight gets more chances to transmit traffic than an interface with a smaller weight.
OK	Click **OK** to save your changes back to the USG.
Cancel	Click **Cancel** to exit this screen without saving.

18.2.2 The Inbound LB Member Add/Edit Screen

The **Add Load Balancing Member** screen allows you to add a member interface for the DNS load balancing rule. Click **Configuration > Network > Inbound LB > Add or Edit** and then an **Add** or **Edit** icon to open this screen.

Figure 203 Configuration > Network > Inbound LB > Add/Edit > Add



The following table describes the labels in this screen.

Table 119 Configuration > Network > Inbound LB > Add/Edit > Add/Edit

LABEL	DESCRIPTION
Member	The USG checks each member interface's loading in the order displayed here.
Monitor Interface	Select an interface to associate it with the DNS load balancing rule. This field also displays whether the IP address is a static IP address (**Static**), dynamically assigned (**Dynamic**) or obtained from a DHCP server (**DHCP Client**), as well as the IP address and subnet mask.
Weight	This field is available if you selected **Weighted Round Robin** for the load balancing algorithm. Specify the weight of the member interface. An interface with a larger weight gets more chances to transmit traffic than an interface with a smaller weight.
IP Address	

Table 119 Configuration > Network > Inbound LB > Add/Edit > Add/Edit (continued)

LABEL	DESCRIPTION
Same as Monitor Interface	Select this to send the IP address displayed in the **Monitor Interface** field to the DNS query senders.
Custom	Select this and enter another IP address to send to the DNS query senders.
OK	Click **OK** to save your changes back to the USG.
Cancel	Click **Cancel** to exit this screen without saving.

19

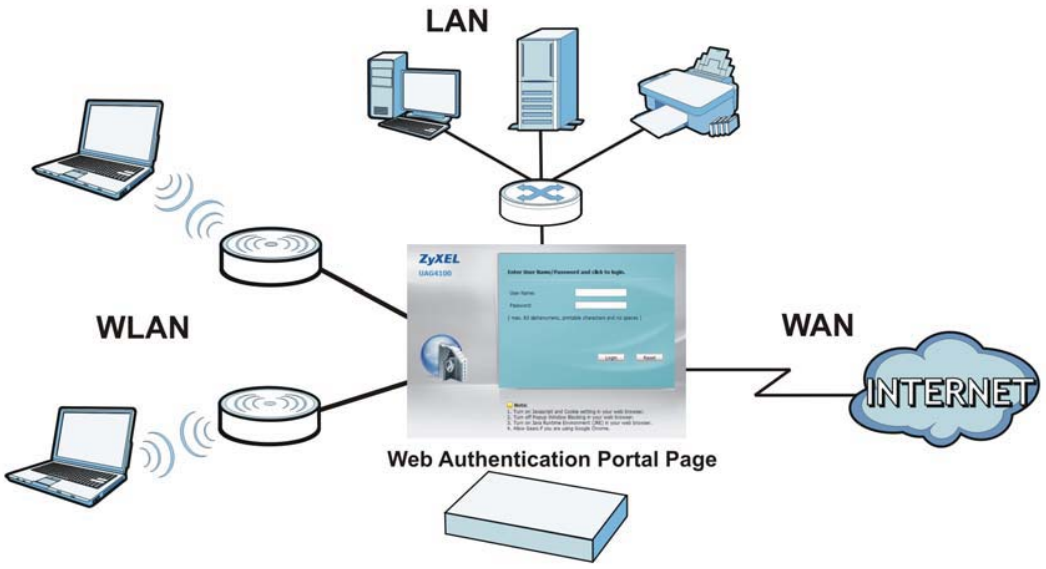
Web Authentication

19.1 Web Auth Overview

Web authentication can intercept network traffic, according to the authentication policies, until the user authenticates his or her connection, usually through a specifically designated login web page. This means all web page requests can initially be redirected to a special web page that requires users to authenticate their sessions. Once authentication is successful, they can then connect to the rest of the network or Internet.

As soon as a user attempt to open a web page, the USG reroutes his/her browser to a web portal page that prompts him/her to log in.

Figure 204 Web Authentication Example



The web authentication page only appears once per authentication session. Unless a user session times out or he/she closes the connection, he or she generally will not see it again during the same session.

19.1.1 What You Can Do in this Chapter

- Use the **Configuration > Web Authentication** screens (Section 19.2 on page 298) to create and manage web authentication policies.
- Use the **Configuration > Web Authentication > SSO** screen (Section 19.3 on page 302) to configure how the USG communictates with a Single Sign-On agent.

19.1.2 What You Need to Know

Single Sign-On

A SSO (Single Sign On) agent integrates Domain Controller and USG authentication mechanisms, so that users just need to log in once (single) to get access to permitted resources.

Forced User Authentication

Instead of making users for which user-aware policies have been configured go to the USG **Login** screen manually, you can configure the USG to display the **Login** screen automatically whenever it routes HTTP traffic for anyone who has not logged in yet.

Note: This works with HTTP traffic only. The USG does not display the **Login** screen when users attempt to send other kinds of traffic.

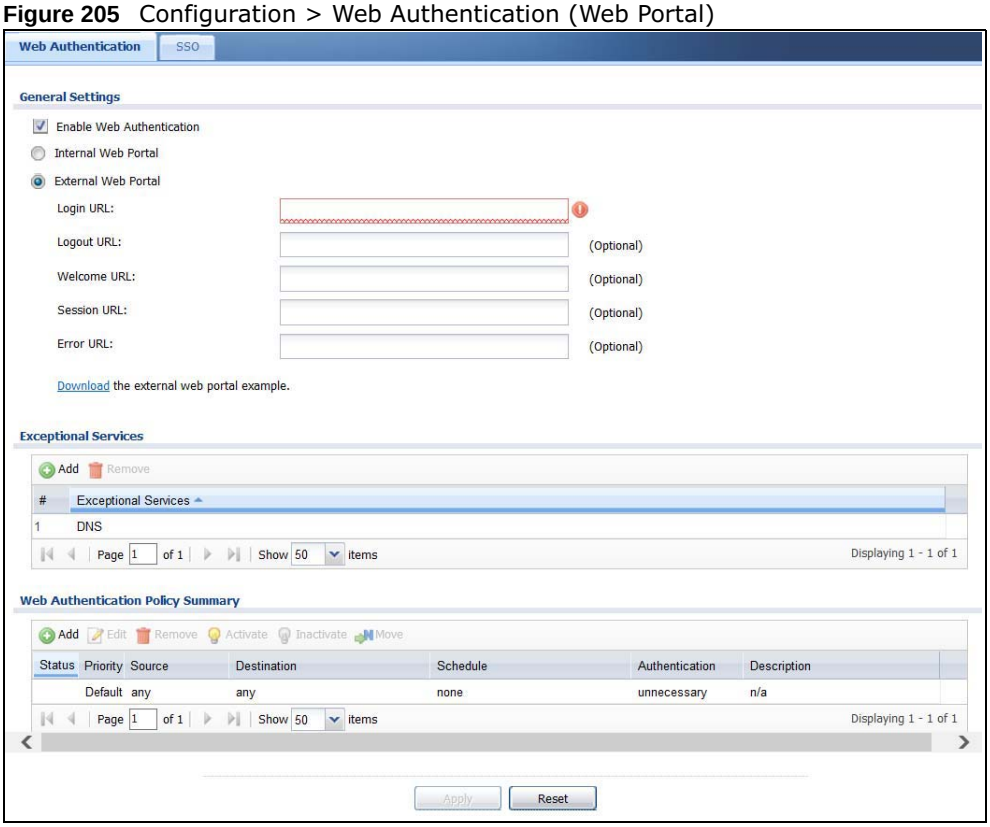
The USG does not automatically route the request that prompted the login, however, so users have to make this request again.

19.2 Web Authentication Screen

The **Web Authentication** screen displays the web portal settings and web authentication policies you have configured on the USG. The screen differs depending on what you select in the **Authentication** field.

Click **Configuration > Web Authentication** to display the screen.

Figure 205 Configuration > Web Authentication (Web Portal)



The following table gives an overview of the objects you can configure.

Table 120 Configuration > Web Authentication

LABEL	DESCRIPTION
Enable Web Authentication	Select **Enable Web Authentication** to turn on the web authentication feature. Once enabled, all network traffic is blocked until a client authenticates with the USG through the specifically designated web portal.
Internal Web Portal	Select this to use the default login page built into the USG. If you later assign a custom login page, you can still return to the USG's default page as it is saved indefinitely. The login page appears whenever the web portal intercepts network traffic, preventing unauthorized users from gaining access to the network. You can customize the login page built into the USG in the **System > WWW > Login Page** screen.
External Web Portal	Select this to use a custom login page from an external web portal instead of the default one built into the USG. You can configure the look and feel of the web portal page.
Login URL	Specify the login page's URL; for example, http://IIS server IP Address/login.html. The Internet Information Server (IIS) is the web server on which the web portal files are installed.
Logout URL	Specify the logout page's URL; for example, http://IIS server IP Address/logout.html. The Internet Information Server (IIS) is the web server on which the web portal files are installed.
Welcome URL	Specify the welcome page's URL; for example, http://IIS server IP Address/welcome.html. The Internet Information Server (IIS) is the web server on which the web portal files are installed.

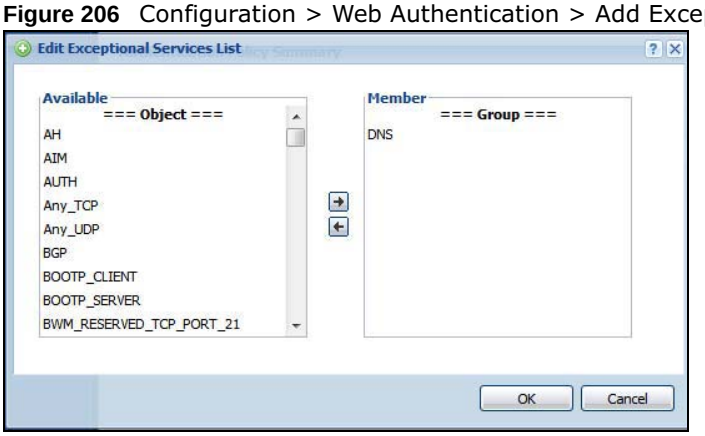
Table 120 Configuration > Web Authentication (continued)

LABEL	DESCRIPTION
Session URL	Specify the session page's URL; for example, http://IIS server IP Address/session.html. The Internet Information Server (IIS) is the web server on which the web portal files are installed.
Error URL	Specify the error page's URL; for example, http://IIS server IP Address/error.html. The Internet Information Server (IIS) is the web server on which the web portal files are installed.
Download	Click this to download an example web portal file for your reference.
Exceptional Services	Use this table to list services that users can access without logging in. In the list, select one or more entries and click **Remove** to delete it or them. Keeping DNS as a member allows users' computers to resolve domain names into IP addresses. Click Add to add new services that users can access without logging in.
Web Authentication Policy Summary	Use this table to manage the USG's list of web authentication policies.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The USG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Move	To move an entry to a different number in the list, click the **Move** icon. In the field that appears, specify the number to which you want to move the interface.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Priority	This is the position of the authentication policy in the list. The priority is important as the policies are applied in order of priority. **Default** displays for the default authentication policy that the USG uses on traffic that does not match any exceptional service or other authentication policy. You can edit the default rule but not delete it.
Source	This displays the source address object to which this policy applies.
Destination	This displays the destination address object to which this policy applies.
Schedule	This field displays the schedule object that dictates when the policy applies. **none** means the policy is active at all times if enabled.
Authentication	This field displays the authentication requirement for users when their traffic matches this policy. **unnecessary** - Users do not need to be authenticated. **required** - Users need to be authenticated. They must manually go to the login screen. The USG will not redirect them to the login screen. **force** - Users need to be authenticated. The USG automatically displays the login screen whenever it routes HTTP traffic for users who have not logged in yet.
Description	If the entry has a description configured, it displays here. This is **n/a** for the default policy.
Apply	Click this button to save your changes to the USG.
Reset	Click this button to return the screen to its last-saved settings.

19.2.1 Creating Exceptional Services

This screen lists services that users can access without logging in. Click **Add** under **Exceptional Services** in the previous screen to display this screen. You can change the list's membership here. Available services appear on the left. Select any services you want users to be able to access without logging in and click the right arrow button **->** to add them. The member services are on the right. Select any service that you want to remove from the member list, and click the left arrow **<-** button to remove them. Then click **OK** to apply the changes and return to the main **Web Authentication** screen. Alternatively, click **Cancel** to discard the changes and return to the main **Web Authentication** screen.

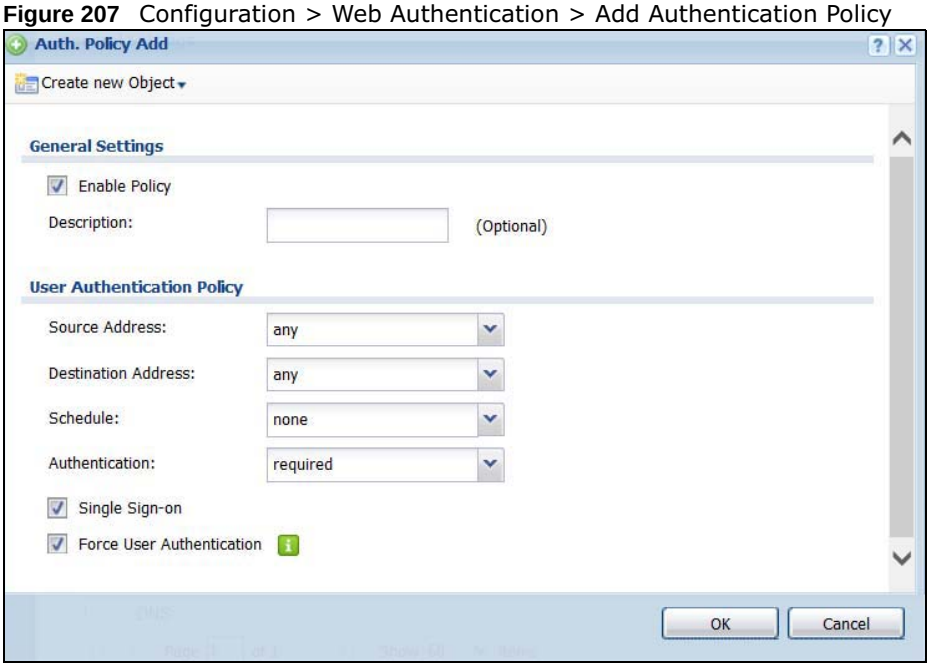
Figure 206 Configuration > Web Authentication > Add Exceptional Service



19.2.2 Creating/Editing an Authentication Policy

Click **Configuration > Web Authentication** and then the **Add** (or **Edit**) icon in the **Web Authentication Policy Summary** section to open the **Auth. Policy Add/Edit** screen. Use this screen to configure an authentication policy.

Figure 207 Configuration > Web Authentication > Add Authentication Policy



The following table gives an overview of the objects you can configure.

Table 121 Configuration > Web Authentication > Add Authentication Policy

LABEL	DESCRIPTION
Create new Object	Use to configure any new settings objects that you need to use in this screen. Select Address or Schedule.
Enable Policy	Select this check box to activate the authentication policy. This field is available for user-configured policies.
Description	Enter a descriptive name of up to 60 printable ASCII characters for the policy. Spaces are allowed. This field is available for user-configured policies.
User Authentication Policy	Use this section of the screen to determine which traffic requires (or does not require) the senders to be authenticated in order to be routed.
Source Address	Select a source address or address group for whom this policy applies. Select **any** if the policy is effective for every source. This is **any** and not configurable for the default policy.
Destination Address	Select a destination address or address group for whom this policy applies. Select **any** if the policy is effective for every destination. This is **any** and not configurable for the default policy.
Schedule	Select a schedule that defines when the policy applies. Otherwise, select **none** and the rule is always effective. This is **none** and not configurable for the default policy.
Authentication	Select the authentication requirement for users when their traffic matches this policy. **unnecessary** - Users do not need to be authenticated. **required** - Users need to be authenticated. If **Force User Authentication** is selected, all HTTP traffic from unauthenticated users is redirected to a default or user-defined login page. Otherwise, they must manually go to the login screen. The USG will not redirect them to the login screen.
Single Sign-on	This field is available for user-configured policies that require Single Sign-On (SSO). Select this to have the USG enable the SSO feature. You can set up this feature in the SSO screen.
Force User Authentication	This field is available for user-configured policies that require authentication. Select this to have the USG automatically display the login screen when users who have not logged in yet try to send HTTP traffic.
OK	Click **OK** to save your changes back to the USG.
Cancel	Click **Cancel** to exit this screen without saving.

19.3 SSO Overview

The SSO (Single Sign-On) function integrates Domain Controller and USG authentication mechanisms, so that users just need to log in once (single login) to get access to permitted resources.

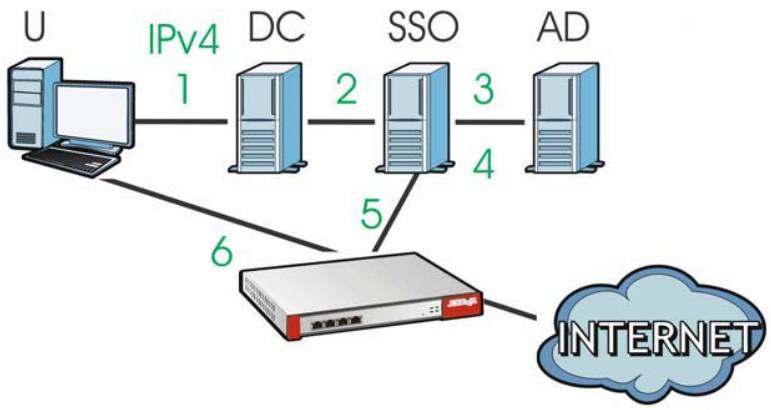
In the following figure, **U** user logs into a Domain Controller (**DC**) which passes the user's login credentials to the SSO agent. The SSO agent checks that these credentials are correct with the AD server, and if the AD server confirms so, the SSO then notifies the USG to allow access for the user to the permitted resource (Internet access, for example).

Note: The USG, the DC, the SSO agent and the AD server must all be in the same domain and be able to communicate with each other.

SSO does not support IPv6, LDAP or RADIUS; you must use it in an IPv4 network environment with Windows AD (Active Directory) authentication database.

You must enable Web Authentication in the Configuration > Web Authentication screen.

Figure 208 SSO Overview



U	User
DC	Domain Controller
SSO	Single Sign-On agent
AD	Active Directory

Install the SSO Agent on one of the following platforms:

- Windows 7 Professional (32-bit and 64-bit)
- Windows Server 2008 Enterprise (32-bit and 64-bit)
- Windows 2008 R2 (64-bit)
- Windows Server 2012 (64-bit)

19.4 SSO - USG Configuration

This section shows what you have to do on the USG in order to use SSO.

Table 122 USG - SSO Agent Field Mapping

USG		SSO	
SCREEN	**FIELD**	**SCREEN**	**FIELD**
Web Authentication > SSO	Listen Port	Agent Configuration Page > Gateway Setting	Gateway Port
Web Authentication > SSO	Primary Agent Port	Agent Configuration Page	Agent Listening Port
Object > User/Group > User > Add	Group Identifier	Agent Configuration Page > Configure LDAP/AD Server	Group Membership
Object > AAA Server > Active Directory > Add	Base DN	Agent Configuration Page > Configure LDAP/AD Server	Base DN
Object > AAA Server > Active Directory > Add	Bind DN	Agent Configuration Page > Configure LDAP/AD Server	Bind DN
Object > User/Group > User > Add	User Name	Agent Configuration Page > Configure LDAP/AD Server	Login Name Attribute
Object > AAA Server > Active Directory > Add	Server Address	Agent Configuration Page > Configure LDAP/AD Server	Server Address
Network > Interface > Ethernet > wan (IPv4)	IP address	Agent Configuration Page > Gateway Setting	Gateway IP

19.4.1 Configuration Overview

These are the screens you need to configure:

- Configure the USG to Communicate with SSO on page 304
- Enable Web Authentication on page 305
- Create a Security Policy on page 306
- Configure User Information on page 307
- Configure an Authentication Method on page 308
- Configure Active Directory on page 309 or Configure Active Directory on page 309

19.4.2 Configure the USG to Communicate with SSO

Use **Configuration > Web Authentication > SSO** to configure how the USG communicates with the Single Sign-On (**SSO**) agent.

Figure 209 Configuration > Web Authentication > SSO

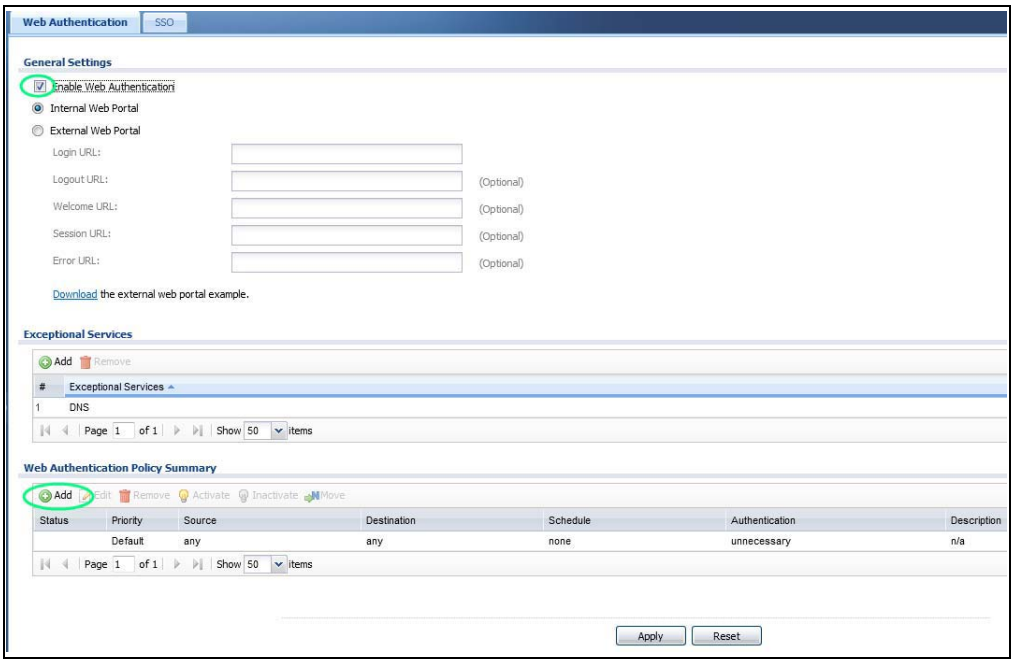
The following table gives an overview of the objects you can configure.

Table 123 Configuration > Web Authentication > SSO

LABEL	DESCRIPTION
Listen Port	The default agent listening port is 2158. If you change it on the USG, then change it to the same number in the **Gateway Port** field on the SSO agent too. Type a number ranging from 1025 to 65535.
Agent PreShareKey	Type 8-32 printable ASCII characters or exactly 32 hex characters (0-9; a-f). The Agent PreShareKey is used to encrypt communications between the USG and the SSO agent.
Primary Agent Address	Type the IPv4 address of the SSO agent. The USG and the SSO agent must be in the same domain and be able to communicate with each other.
Primary Agent Port	Type the same port number here as in the **Agent Listening Port** field on the SSO agent. Type a number ranging from 1025 to 65535.
Secondary Agent Address (Optional)	Type the IPv4 address of the backup SSO agent if there is one. The USG and the backup SSO agent must be in the same domain and be able to communicate with each other.
Secondary Agent Port (Optional)	Type the same port number here as in the **Agent Listening Port** field on the backup SSO agent if there is one. Type a number ranging from 1025 to 65535.
Apply	Click this button to save your changes to the USG.
Reset	Click this button to return the screen to its last-saved settings

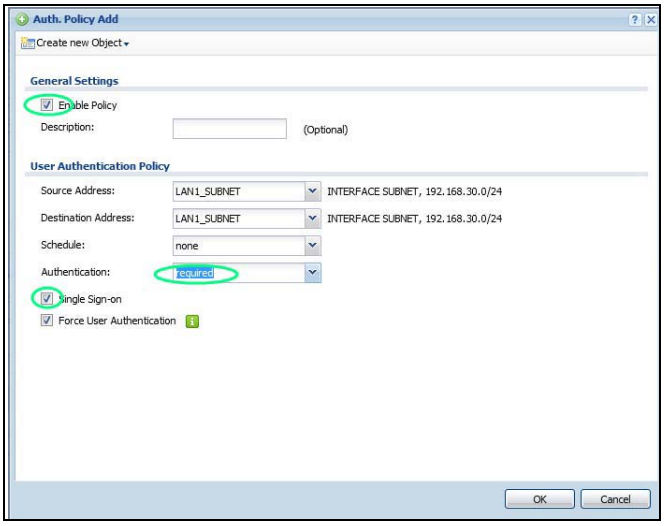
19.4.3 Enable Web Authentication

Enable **Web Authentication** and add a web authentication policy.



Make sure you select **Enable Policy, Single Sign-On** and choose **required** in **Authentication**.

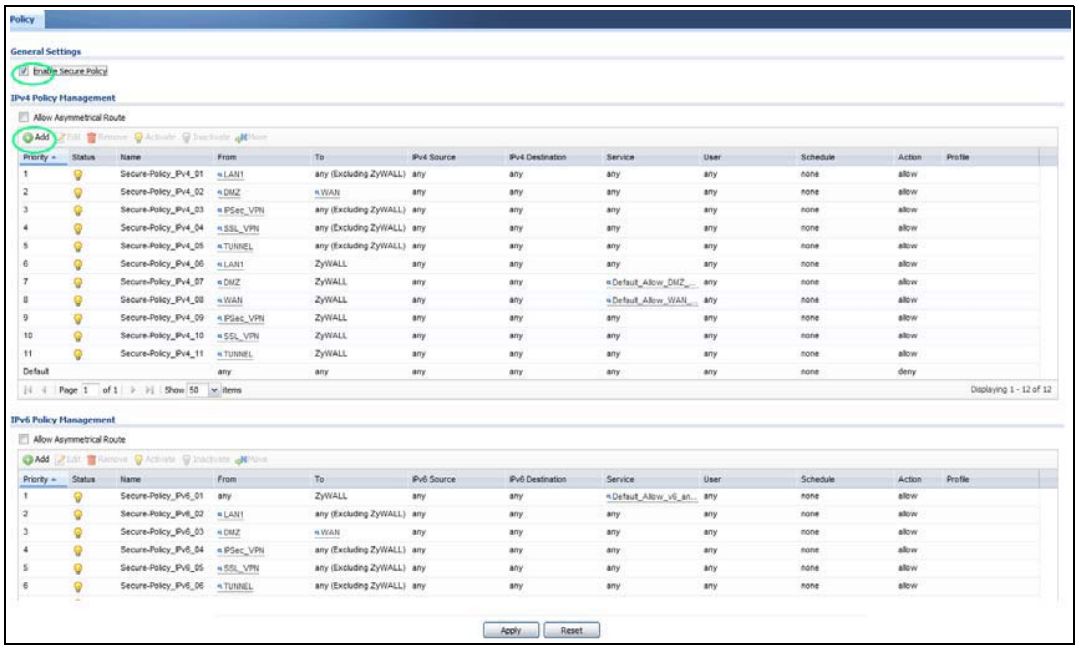
Do NOT select **any** as the **source address** unless you want all incoming connections to be authenticated!



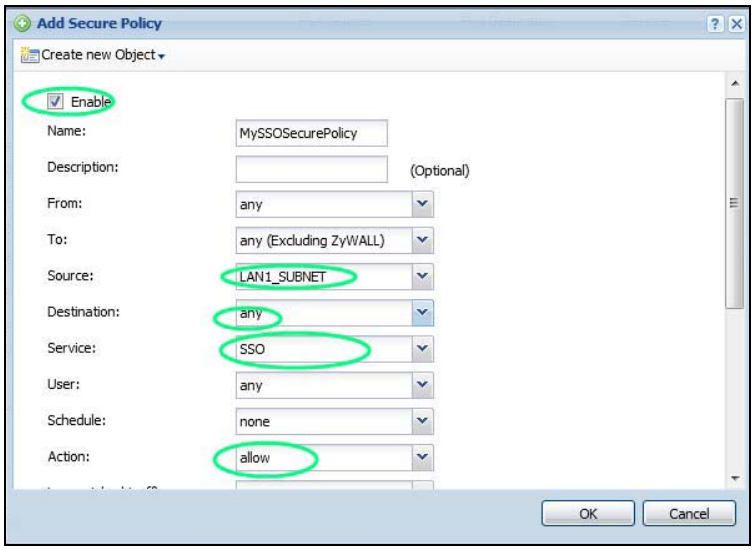
See Table 120 on page 299 and Table 121 on page 302 for more information on configuring these screens.

19.4.4 Create a Security Policy

Configure a Security Policy for SSO traffic source and destination direction in order to prevent the security policy from blocking this traffic. Go to **Configuration > Security Policy > Policy** and add a new policy if a default one does not cover the SSO web authentication traffic direction.

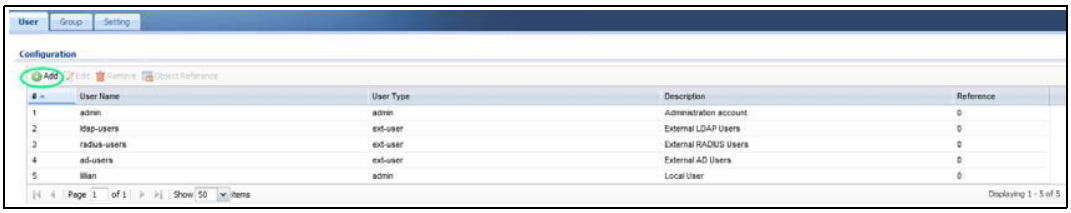


Configure the fields as shown in the following screen. Configure the source and destination addresses according to the SSO web authrntication traffic in your network.

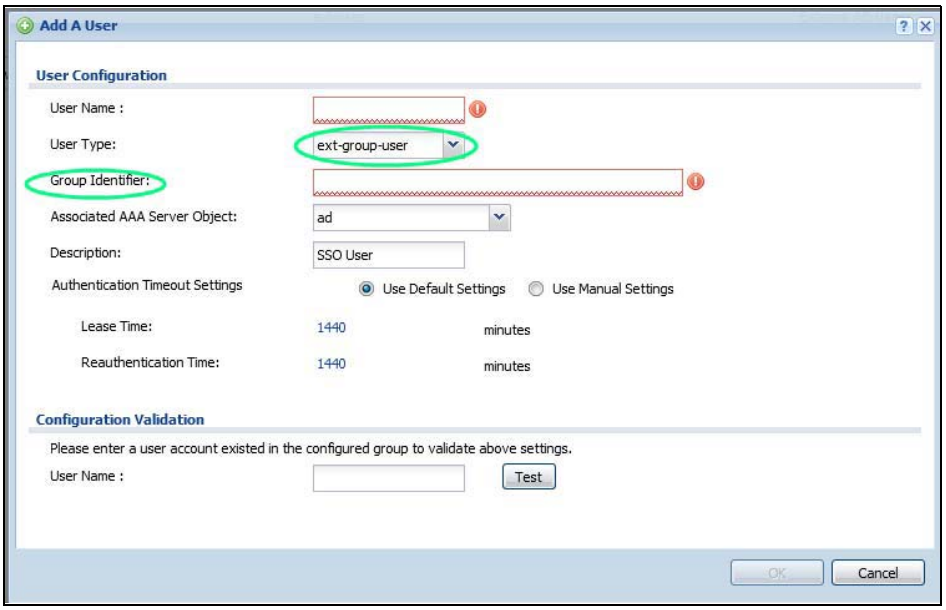


19.4.5 Configure User Information

Configure a **User** account of the **ext-group-user** type.

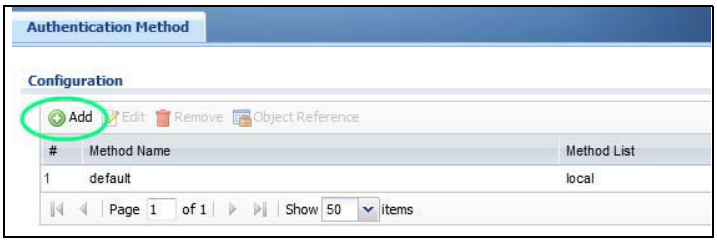


Configure **Group Identifier** to be the same as **Group Membership** on the SSO agent.

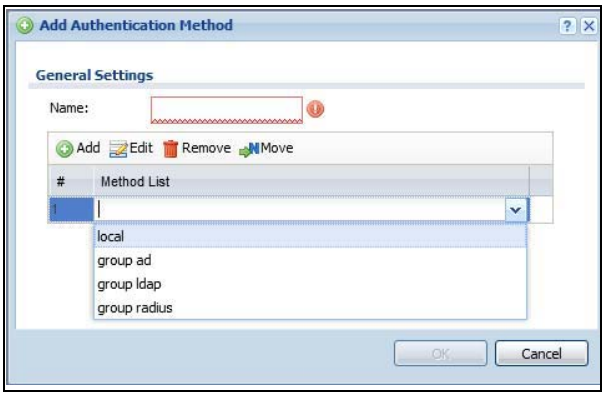


19.4.6 Configure an Authentication Method

Configure Active Directory (AD) for authentication with SSO.



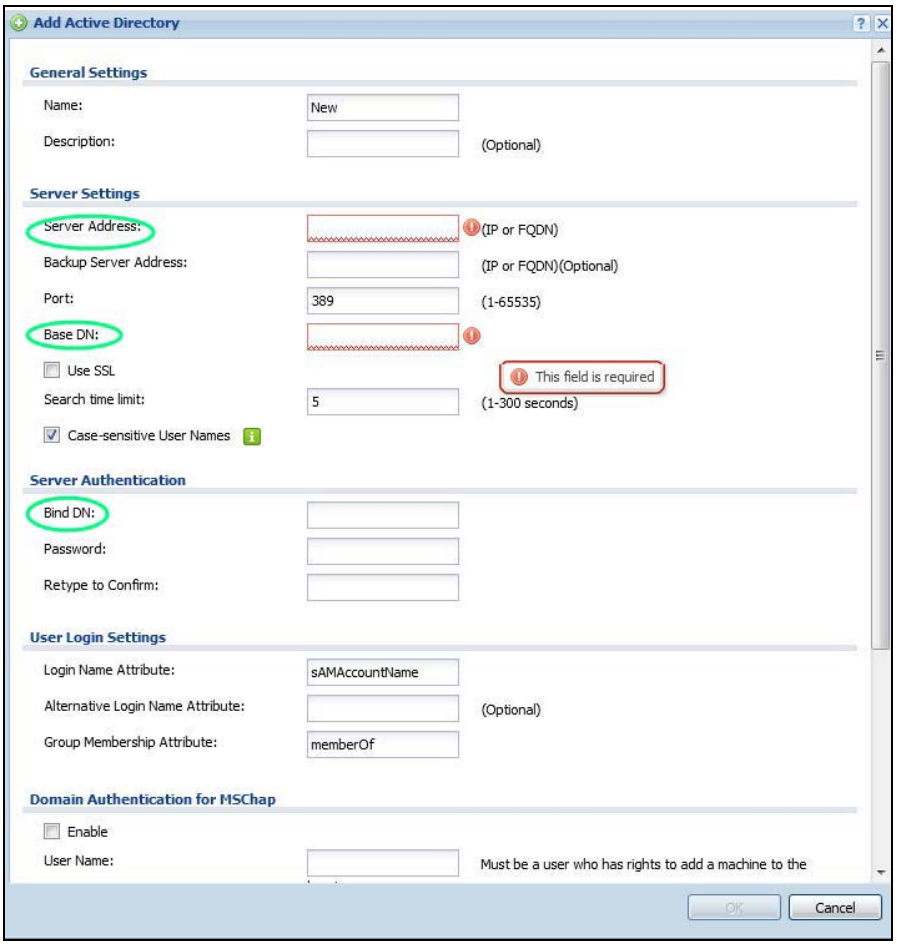
Choose **group ad** as the authentication server for SSO.



19.4.7 Configure Active Directory

You must configure an Active Directory (AD) server in **AAA Setup** to be the same as AD configured on the SSO agent.

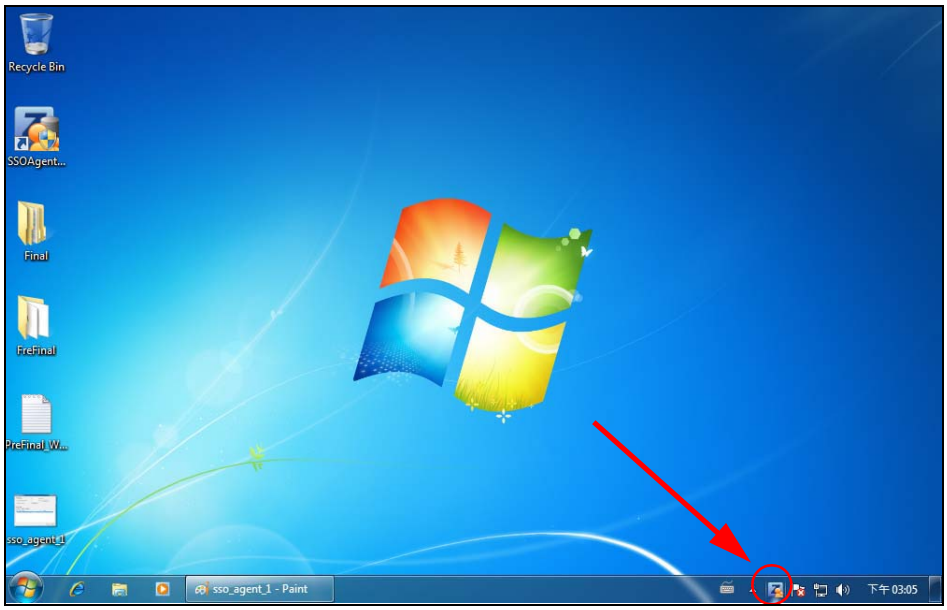
The default AD server port is 389. If you change this, make sure you make the same changes on the SSO. Configure the **Base DN** exactly the same as on the Domain Controller and SSO. **Bind DN** is a user name and password that allows the USG to join the domain with administrative privileges. It is a required field.



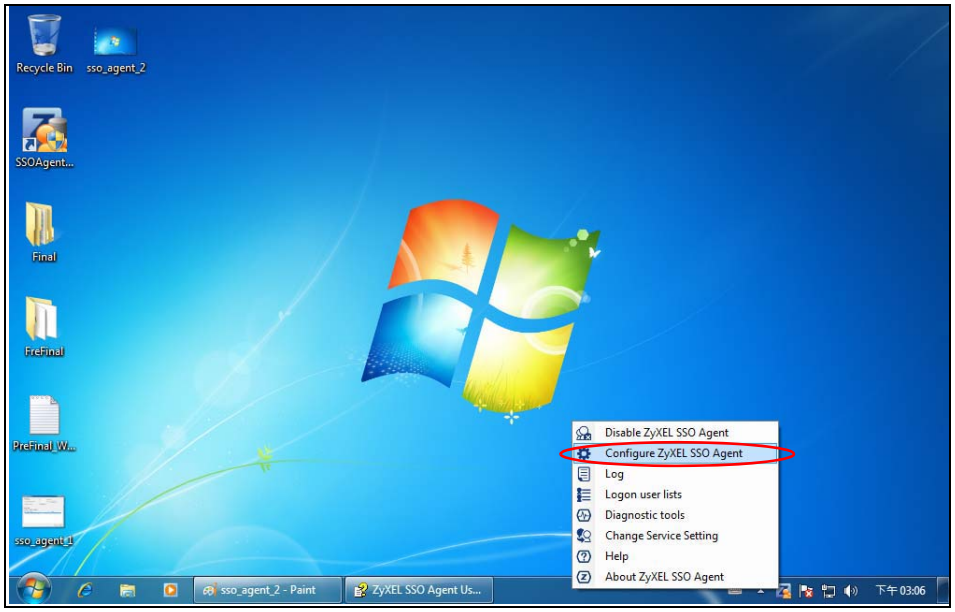
19.5 SSO Agent Configuration

This section shows what you have to do on the SSO agent in order to work with the USG.

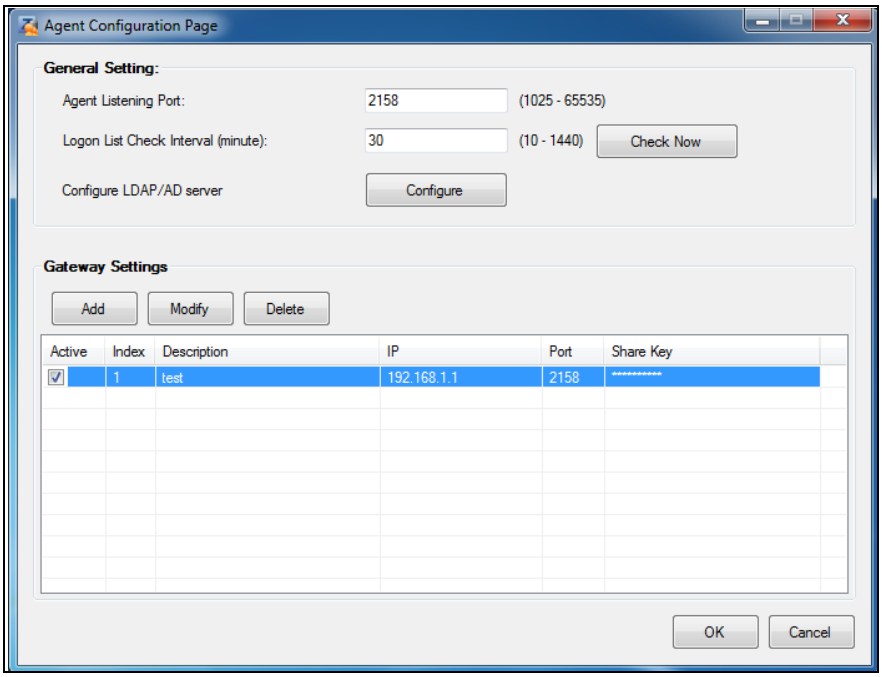
After you install the SSO agent, you will see an icon in the system tray (bottom right of the screen)



Right-click the SSO icon and select **Configure ZyXEL SSO Agent**.

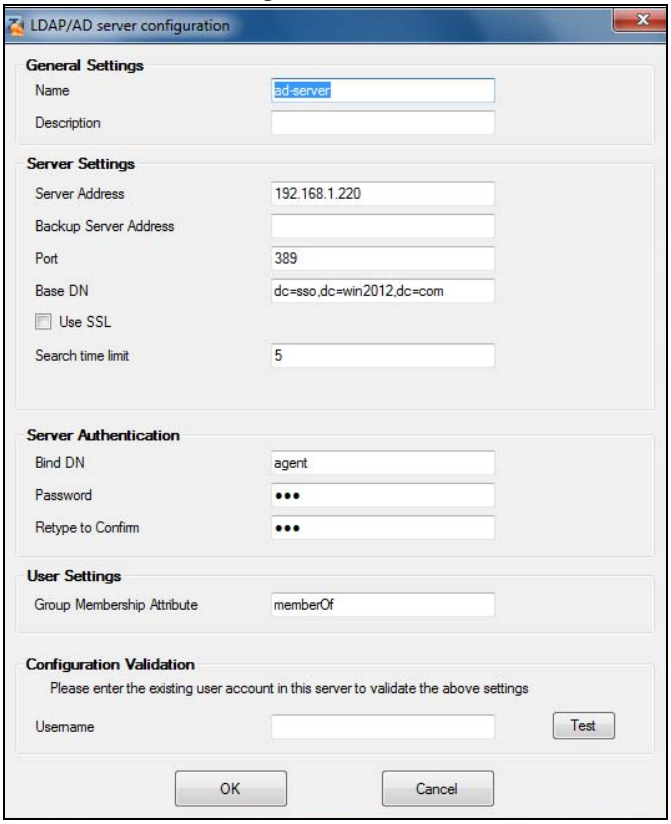


Configure the **Agent Listening Port**, **AD server** exactly as you have done on the USG. Add the USG IP address as the **Gateway**. Make sure the USG and SSO agent are able to communicate with each other.

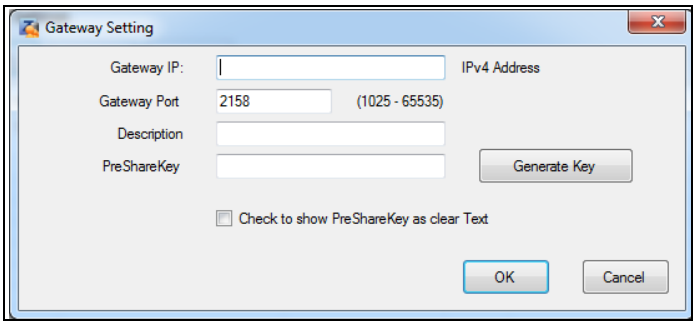


Configure the **Server Address**, **Port**, **Base DN**, **Bind DN**, **Login Name Attribute** and **Group Membership** for the AD server settings exactly as you have done on the USG. **Group Membership** is called **Group Identifier** on the USG.

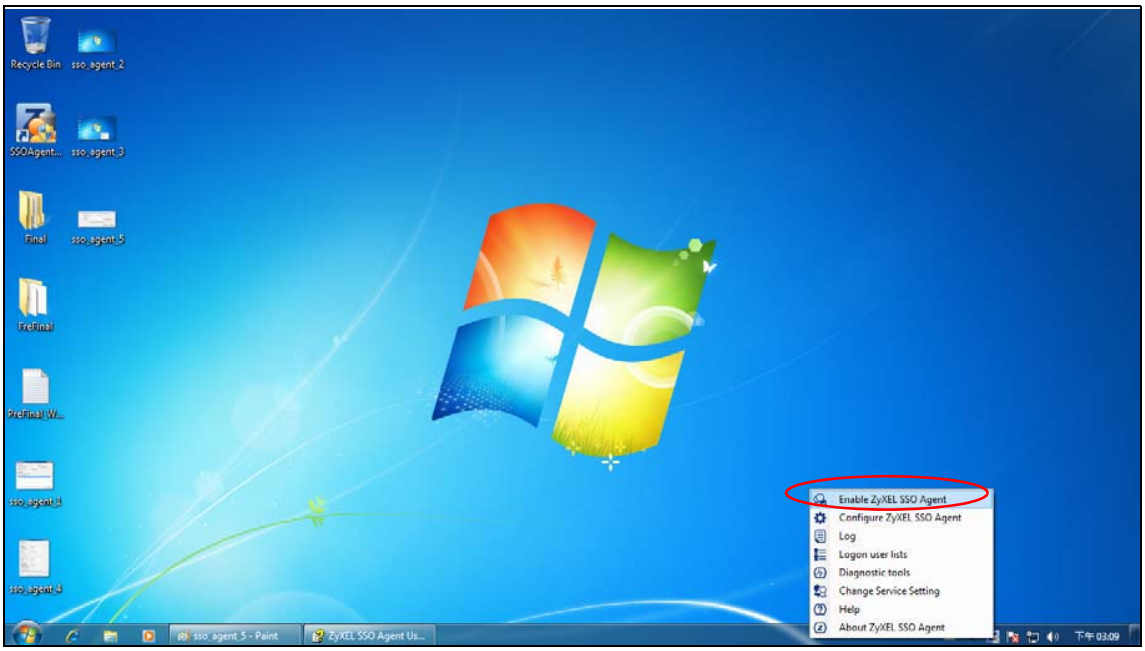
LDAP/AD Server Configuration



Configure the **Gateway IP** address, **Gateway Port** and **PreShareKey** exactly as you have done in the USG **Configuration > Web Authentication > SSO** screen. If you want to use **Generate Key** to have the SSO create a random password, select **Check** to show **PreShareKey** as clear Text so as to see the password, then copy and paste it to the USG.



After all SSO agent configurations are done, right-click the SSO icon in the system tray and select **Enable ZyXEL SSO Agent**.



20

Security Policy

20.1 Overview

A security policy is a template of security settings that can be applied to specific traffic at specific times. The policy can be applied:

- to a specific direction of travel of packets (from / to)
- to a specific source and destination address objects
- to a specific type of traffic (services)
- to a specific user or group of users
- at a specific schedule

The policy can be configured:

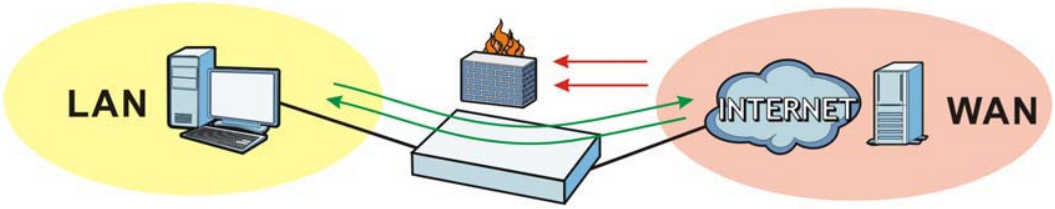
- to allow or deny traffic that matches the criteria above
- send a log or alert for traffic that matches the criteria above
- to apply the actions configured in the UTM profile (content filter,) to traffic that matches the criteria above

Note: Security policies can be applied to both IPv4 and IPv6 traffic.

The security policies can also limit the number of user sessions.

The following example shows the USG's default security policies behavior for a specific direction of travel of packets. WAN to LAN traffic and how stateful inspection works. A LAN user can initiate a Telnet session from within the LAN zone and the USG allows the response. However, the USG blocks incoming Telnet traffic initiated from the WAN zone and destined for the LAN zone.

Figure 210 Default Directional Security Policy Example



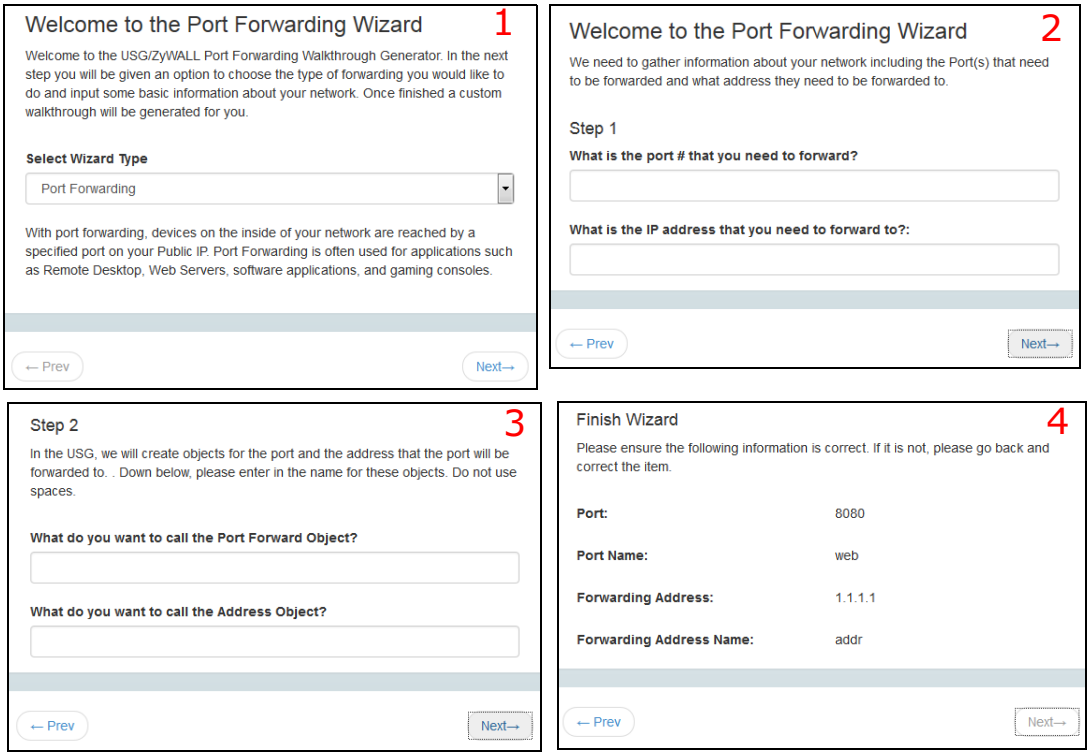
20.2 One Security

OneSecurity.com is a website with guidance on configuration walkthroughs, troubleshooting, and other information.

Note: Note that the walkthroughs do not perform the actual configuring, but just show you how to do it.

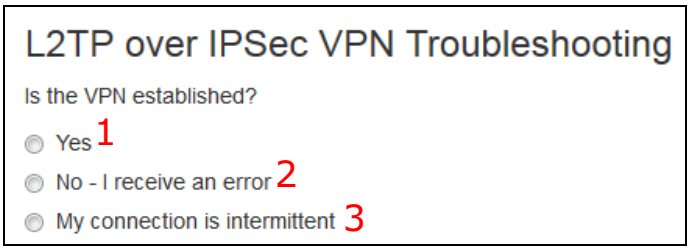
This is an example of a port forwarding configuration walkthrough.

Figure 211 Example of a Port Forwarding Configuration Walkthrough.



This is an example of L2TP over IPSec VPN Troubleshooting troubleshooting.

Figure 212 Example of L2TP over IPSec Troubleshooting - 1



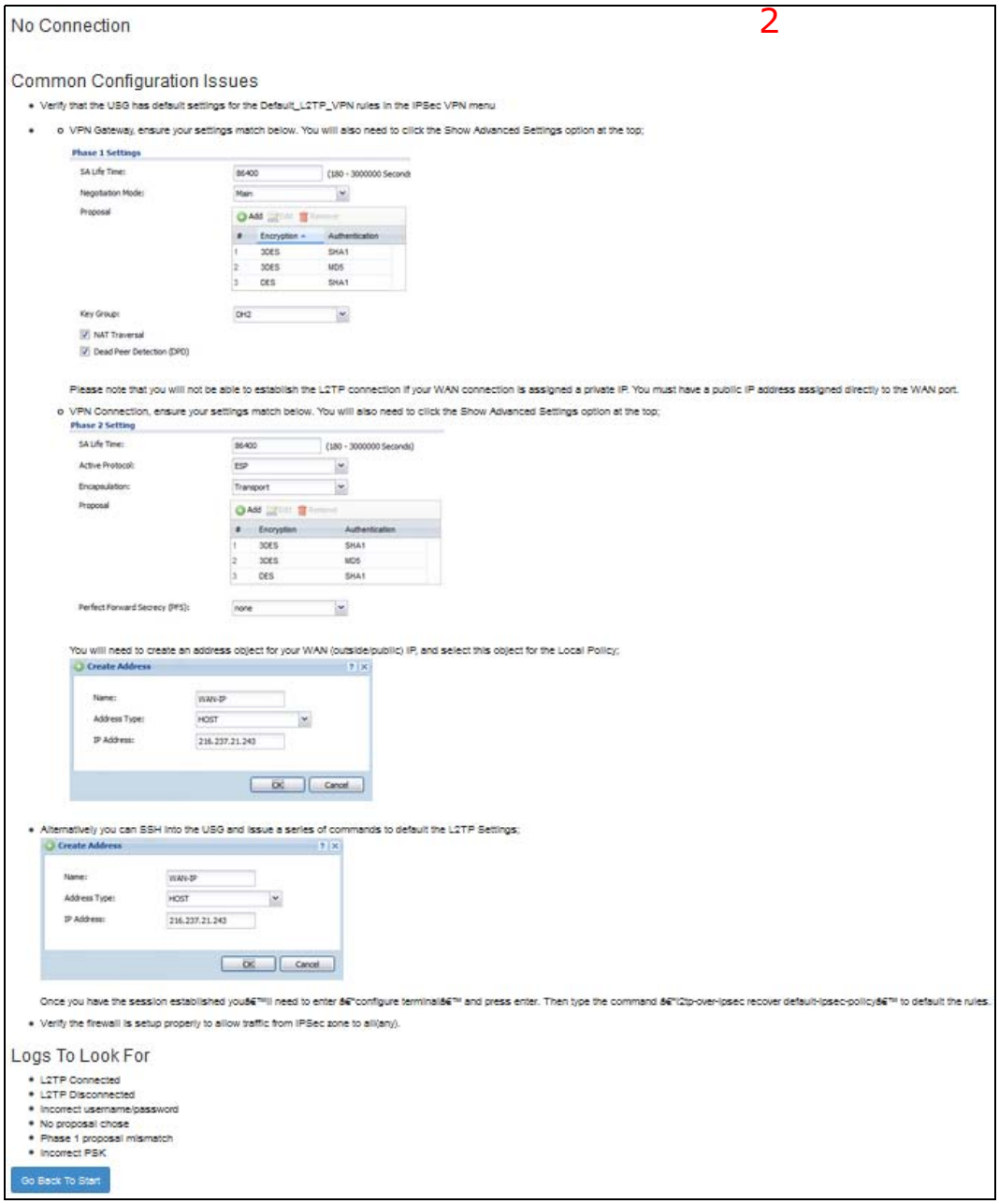
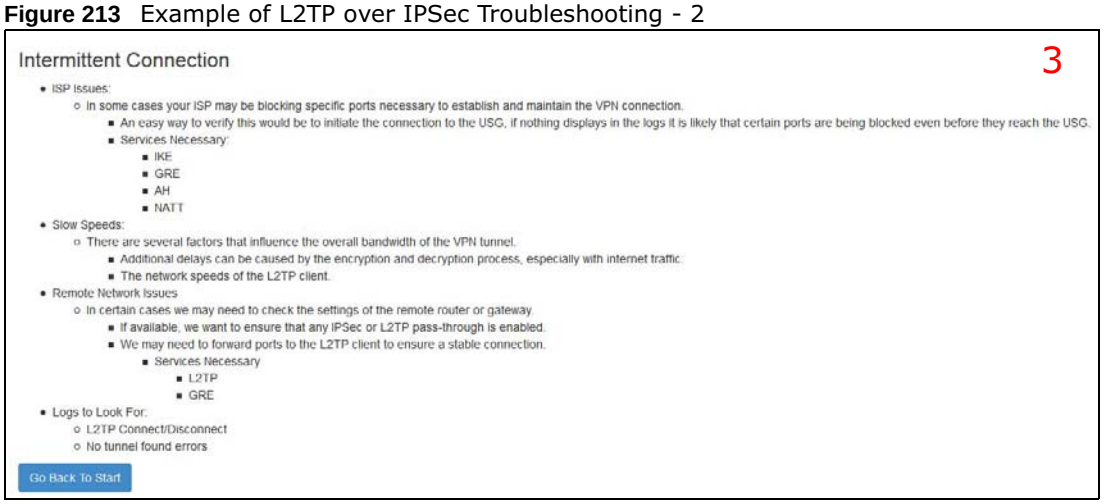


Figure 213 Example of L2TP over IPSec Troubleshooting - 2



In the USG, you will see icons that link to OneSecurity walkthroughs, troubleshooting and so on in certain screens.

For example, at the time of writing, these are the OneSecurity icons you can see.

Table 124 OneSecurity Icons

ONESECURITY ICON	SCREEN
Configuration Walkthrough	Click this icon to go to a series of screens that guide you how to configure the feature. Note that the walkthroughs do not perform the actual configuring, but just show you how to do it. • Licensing > Registration • Network > NAT • Network > Routing > Policy Route • UTM Profile > Content Filter • UTM Profile > Anti-Spam • VPN > IPSec VPN • VPN > SSL VPN • VPN > L2TP VPN
Troubleshooting	Click this icon to go to a series of screens that guide you how to fix problems with the feature. • Network > NAT • Network > Routing > Policy Route • UTM Profile > Content Filter • UTM Profile > Anti-Spam • VPN > IPSec VPN • VPN > SSL VPN • VPN > L2TP VPN
Content Filter	Click this icon for more information on Content Filter, which controls access to specific web sites or web content. • UTM Profile > Content Filter
Anti-Spam	Click this icon for more information on Anti-Spam which can mark or discard spam (unsolicited commercial or junk e-mail) and e-mail from certain servers suspect of being used by spammers. • UTM Profile > Anti-Spam

Table 124 OneSecurity Icons (continued)

ONESECURITY ICON	SCREEN
	Click this icon for more information on IPSec and SSL VPN. Internet Protocol Security (IPSec) VPN connects IPSec routers or remote users using IPSec client software. SSL VPN allows users to use a web browser for secure remote user login without need of a VPN router or VPN client software. • VPN > IPSec VPN • VPN > SSL VPN
	Click this icon to download VPN client software. • VPN > IPSec VPN • VPN > SSL VPN
	Click this icon for more information on the Wireless AP Controller which sets how the USG allows APs to connect to the wireless network. • Wireless > AP Management > Mgnt. AP List

20.3 What You Can Do in this Chapter

- Use the **Security Policy Control** screens (Section 20.4 on page 320) to enable or disable policies, asymmetrical routes, and manage and configure policies.
- Use the **Session Control** screens (see Section 20.5 on page 326) to limit the number of concurrent NAT/security policies traffic sessions a client can use.

20.3.1 What You Need to Know

Stateful Inspection

The USG uses stateful inspection in its security policies. The USG restricts access by screening data packets against defined access rules. It also inspects sessions. For example, traffic from one zone is not allowed unless it is initiated by a computer in another zone first.

Zones

A zone is a group of interfaces. Group the USG's interfaces into different zones based on your needs. You can configure security policies for data passing between zones or even between interfaces.

Default Directional Security Policy Behavior

Security Policies can be grouped based on the direction of travel of packets to which they apply. Here is the The USG has default Security Policy behavior for traffic going through the USG in various directions.

Table 125 Directional Security Policy Behavior

FROM ZONE TO ZONE	BEHAVIOR
From any to Device	DHCP traffic from any interface to the USG is allowed.
From LAN1 to any (other than the USG)	Traffic from the LAN1 to any of the networks connected to the USG is allowed.
From LAN2 to any (other than the USG)	Traffic from the LAN2 to any of the networks connected to the USG is allowed.
From LAN1 to Device	Traffic from the LAN1 to the USG itself is allowed.
From LAN2 to Device	Traffic from the LAN2 to the USG itself is allowed.
From WAN to Device	The default services listed in To-Device Policies on page 319 are allowed from the WAN to the USG itself. All other WAN to USG traffic is dropped.
From any to any	Traffic that does not match any security policy is dropped. This includes traffic from the WAN to any of the networks behind the USG. This also includes traffic to or from interfaces that are not assigned to a zone (extra-zone traffic).

To-Device Policies

Policies with **Device** as the **To Zone** apply to traffic going to the USG itself. By default:

- The Security Policy allows only LAN, or WAN computers to access or manage the USG.
- The USG allows DHCP traffic from any interface to the USG.
- The USG drops most packets from the WAN zone to the USG itself and generates a log except for AH, ESP, GRE, HTTPS, IKE, NATT.

When you configure a Security Policy rule for packets destined for the USG itself, make sure it does not conflict with your service control rule. The USG checks the security policy before the service control rules for traffic destined for the USG.

A **From Any To Device** direction policy applies to traffic from an interface which is not in a zone.

Global Security Policies

Security Policies with **from any** and/or **to any** as the packet direction are called global Security Policies. The global Security Policies are the only Security Policies that apply to an interface that is not included in a zone. The **from any** policies apply to traffic coming from the interface and the **to any** policies apply to traffic going to the interface.

Security Policy Rule Criteria

The USG checks the schedule, user name (user's login name on the USG), source IP address and object, destination IP address and object, IP protocol type of network traffic (service) and UTM profile criteria against the Security Policies (in the order you list them). When the traffic matches a policy, the USG takes the action specified in the policy.

User Specific Security Policies

You can specify users or user groups in Security Policies. For example, to allow a specific user from any computer to access a zone by logging in to the USG, you can set up a policy based on the user name only. If you also apply a schedule to the Security Policy, the user can only access the network at the scheduled time. A user-aware Security Policy is activated whenever the user logs in to the USG and will be disabled after the user logs out of the USG.

Session Limits

Accessing the USG or network resources through the USG requires a NAT session and corresponding Security Policy session. Peer to peer applications, such as file sharing applications, may use a large number of NAT sessions. A single client could use all of the available NAT sessions and prevent others from connecting to or through the USG. The USG lets you limit the number of concurrent NAT/Security Policy sessions a client can use.

20.4 The Security Policy Screen

Asymmetrical Routes

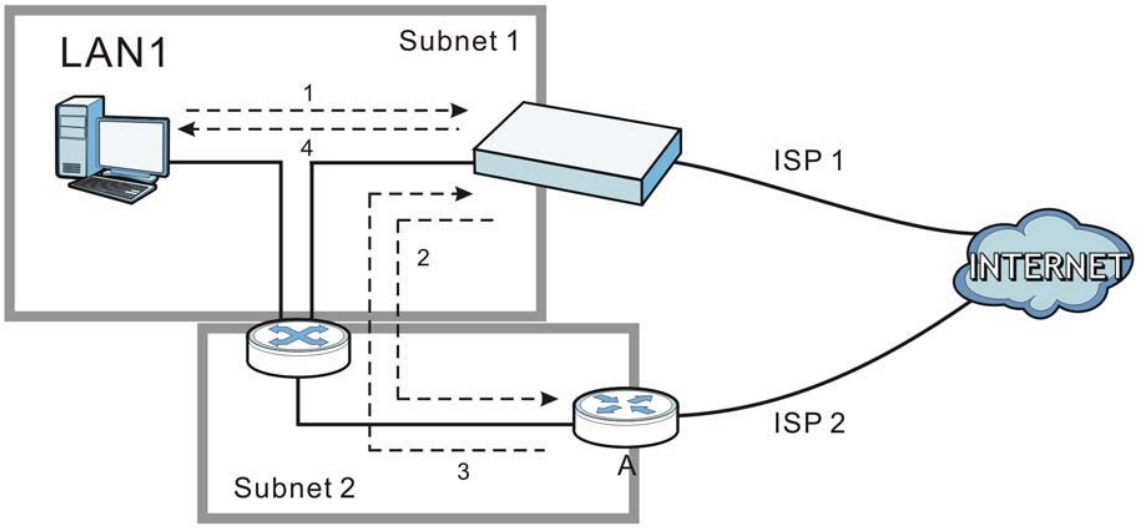
If an alternate gateway on the LAN has an IP address in the same subnet as the USG's LAN IP address, return traffic may not go through the USG. This is called an asymmetrical or "triangle" route. This causes the USG to reset the connection, as the connection has not been acknowledged.

You can have the USG permit the use of asymmetrical route topology on the network (not reset the connection). However, allowing asymmetrical routes may let traffic from the WAN go directly to the LAN without passing through the USG. A better solution is to use virtual interfaces to put the USG and the backup gateway on separate subnets. Virtual interfaces allow you to partition your network into logical sections over the same interface. See the chapter about interfaces for more information.

By putting LAN 1 and the alternate gateway (**A** in the figure) in different subnets, all returning network traffic must pass through the USG to the LAN. The following steps and figure describe such a scenario.

1. A computer on the LAN1 initiates a connection by sending a SYN packet to a receiving server on the WAN.
2. The USG reroutes the packet to gateway **A**, which is in **Subnet 2**.
3. The reply from the WAN goes to the USG.
4. The USG then sends it to the computer on the LAN1 in **Subnet 1**.

Figure 214 Using Virtual Interfaces to Avoid Asymmetrical Routes



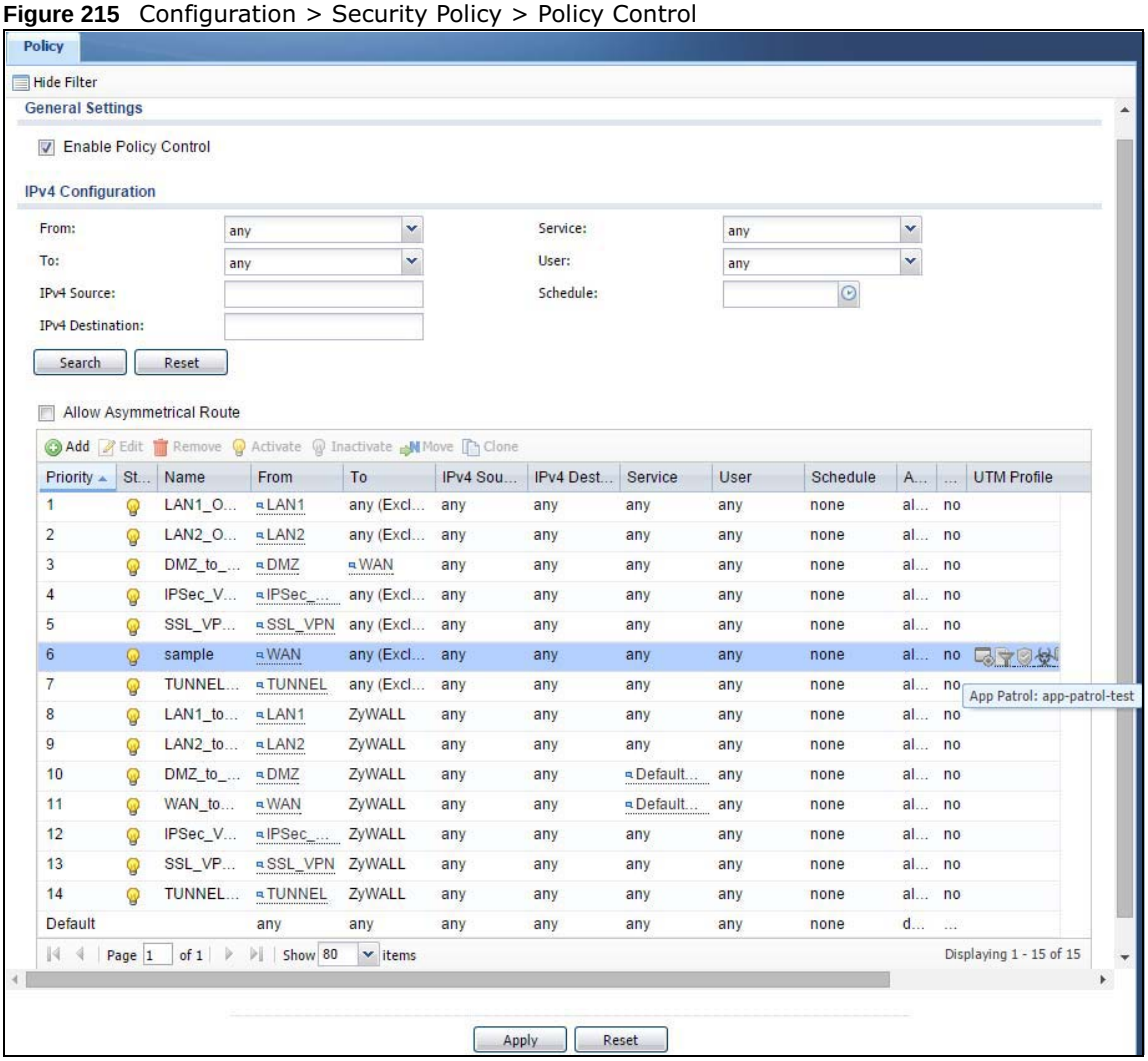
20.4.1 Configuring the Security Policy Control Screen

Click **Configuration > Security Policy > Policy Control** to open the **Security Policy** screen. Use this screen to enable or disable the Security Policy and asymmetrical routes, set a maximum number of sessions per host, and display the configured Security Policies. Specify from which zone packets come and to which zone packets travel to display only the policies specific to the selected direction. Note the following.

- Besides configuring the Security Policy, you also need to configure NAT rules to allow computers on the WAN to access LAN devices.
- The USG applies NAT (Destination NAT) settings before applying the Security Policies. So for example, if you configure a NAT entry that sends WAN traffic to a LAN IP address, when you configure a corresponding Security Policy to allow the traffic, you need to set the LAN IP address as the destination.
- The ordering of your policies is very important as policies are applied in sequence.

The following screen shows the Security Policy summary screen.

Figure 215 Configuration > Security Policy > Policy Control



The following table describes the labels in this screen.

Table 126 Configuration > Security Policy > Policy Control

LABEL	DESCRIPTION
Show Filter/Hide Filter	Click **Show Filter** to display IPv4 and IPv6 (if enabled) security policy search filters.
IPv4 / IPv6 Configuration	Use IPv4 / IPv6 search filters to find specific IPv4 and IPv6 (if enabled) security policies based on direction, application, user, source, destination and/or schedule.
From / To	Select a zone to view all security policies from a particular zone and/or to a particular zone. **any** means all zones.
IPv4 / IPv6 Source	Type an IPv4 or IPv6 IP address to view all security policies based on the IPv4 / IPv6 source address object used. • An IPv4 IP address is written as four integer blocks separated by periods. This is an example IPv4 address: 172.16.6.7. • An 128-bit IPv6 address is written as eight 16-bit hexadecimal blocks separated by colons (:). This is an example IPv6 address: 2001:0db8:1a2b:0015:0000:0000:1a2f:0000.

Table 126 Configuration > Security Policy > Policy Control (continued)

LABEL	DESCRIPTION
IPv4 / IPv6 Destination	Type an IPv4 or IPv6 IP address to view all security policies based on the IPv4 / IPv6 destination address object used. • An IPv4 IP address is written as four integer blocks separated by periods. This is an example IPv4 address: 172.16.6.7. • An 128-bit IPv6 address is written as eight 16-bit hexadecimal blocks separated by colons (:). This is an example IPv6 address: 2001:0db8:1a2b:0015:0000:0000:1a2f:0000.
Service	View all security policies based the service object used.
User	View all security policies based on user or user group object used.
Schedule	View all security policies based on the schedule object used.
General Settings	Enable or disable the Security Policy feature on the USG.
Enable Policy Control	Select this to activate Security Policy on the USG to perform access control.
IPv4/IPv6 Policy Management	Use the following items to manage IPv4 and IPv6 policies.
Allow Asymmetrical Route	If an alternate gateway on the LAN has an IP address in the same subnet as the USG's LAN IP address, return traffic may not go through the USG. This is called an asymmetrical or "triangle" route. This causes the USG to reset the connection, as the connection has not been acknowledged. Select this check box to have the USG permit the use of asymmetrical route topology on the network (not reset the connection). Note: Allowing asymmetrical routes may let traffic from the WAN go directly to the LAN without passing through the USG. A better solution is to use virtual interfaces to put the USG and the backup gateway on separate subnets.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The USG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Move	To change a policy's position in the numbered list, select the policy and click **Move** to display a field to type a number for where you want to put that policy and press [ENTER] to move the policy to the number that you typed. The ordering of your policies is important as they are applied in order of their numbering.
Clone	Use **Clone** to create a new entry by modifying an existing one. • Select an existing entry. • Click **Clone**, type a number where the new entry should go and then press [ENTER]. • A configuration copy of the selected entry pops up. You must at least change the name as duplicate entry names are not allowed.
The following read-only fields summarize the policies you have created that apply to traffic traveling in the selected packet direction.	
Priority	This is the position of your Security Policy in the global policy list (including all through-USG and to-USG policies). The ordering of your policies is important as policies are applied in sequence. **Default** displays for the default Security Policy behavior that the USG performs on traffic that does not match any other Security Policy.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.

Table 126 Configuration > Security Policy > Policy Control (continued)

LABEL	DESCRIPTION
Name	This is the name of the Security policy.
From / To	This is the direction of travel of packets. Select from which zone the packets come and to which zone they go. Security Policies Rare grouped based on the direction of travel of packets to which they apply. For example, from **LAN** to **LAN** means packets traveling from a computer or subnet on the LAN to either another computer or subnet on the LAN. From **any** displays all the Security Policies for traffic going to the selected **To Zone**. To **any** displays all the Security Policies for traffic coming from the selected **From Zone**. From **any** to **any** displays all of the Security Policies. To **ZyWALL** policies are for traffic that is destined for the USG and control which computers can manage the USG.
IPv4 / IPv6 Source	This displays the IPv4 / IPv6 source address object to which this Security Policy applies.
IPv4 / IPv6 Destination	This displays the IPv4 / IPv6 destination address object to which this Security Policy applies.
Service	This displays the service object to which this Security Policy applies.
User	This is the user name or user group name to which this Security Policy applies.
Schedule	This field tells you the schedule object that the policy uses. **none** means the policy is active at all times if enabled.
Action	This field displays whether the Security Policy silently discards packets without notification (**deny**), permits the passage of packets (**allow**) or drops packets with notification (**reject**)
UTM Profile	This field shows you which UTM profiles (content filter, anti-spam) apply to this Security policy. Click an applied UTM profile icon to edit the profile directly.
Apply	Click **Apply** to save your changes back to the USG.
Reset	Click **Reset** to return the screen to its last-saved settings.

20.4.2 The Security Policy Control Add/Edit Screen

In the **Security Policy Control** screen, click the **Edit** or **Add** icon to display the **Security Policy Edit or Add** screen.

Figure 216 Configuration > Security Policy > Policy Control > Add

The following table describes the labels in this screen.

Table 127 Configuration > Security Policy > Policy Control > Add

LABEL	DESCRIPTION
Create new Object	Use to configure any new settings objects that you need to use in this screen.
Enable	Select this check box to activate the Security policy.
Name	Type a name to identify the policy
Description	Enter a descriptive name of up to 60 printable ASCII characters for the Policy. Spaces are allowed.
From To	For through-USG policies, select the direction of travel of packets to which the policy applies. **any** means all interfaces. **Device** means packets destined for the USG itself.
Source	Select an IPv4 / IPv6 address or address group object to apply the policy to traffic coming from it. Select **any** to apply the policy to all traffic coming from IPv4 / IPv6 addresses.
Destination	Select an IPv4 / IPv6 address or address group to apply the policy to traffic going to it. Select **any** to apply the policy to all traffic going to IPv4 / IPv6 addresses.
Service	Select a service or service group from the drop-down list box.
User	This field is not available when you are configuring a to-USG policy. Select a user name or user group to which to apply the policy. The Security Policy is activated only when the specified user logs into the system and the policy will be disabled when the user logs out. Otherwise, select **any** and there is no need for user logging. Note: If you specified a source IP address (group) instead of **any** in the field below, the user's IP address should be within the IP address range.
Schedule	Select a schedule that defines when the policy applies. Otherwise, select **none** and the policy is always effective.

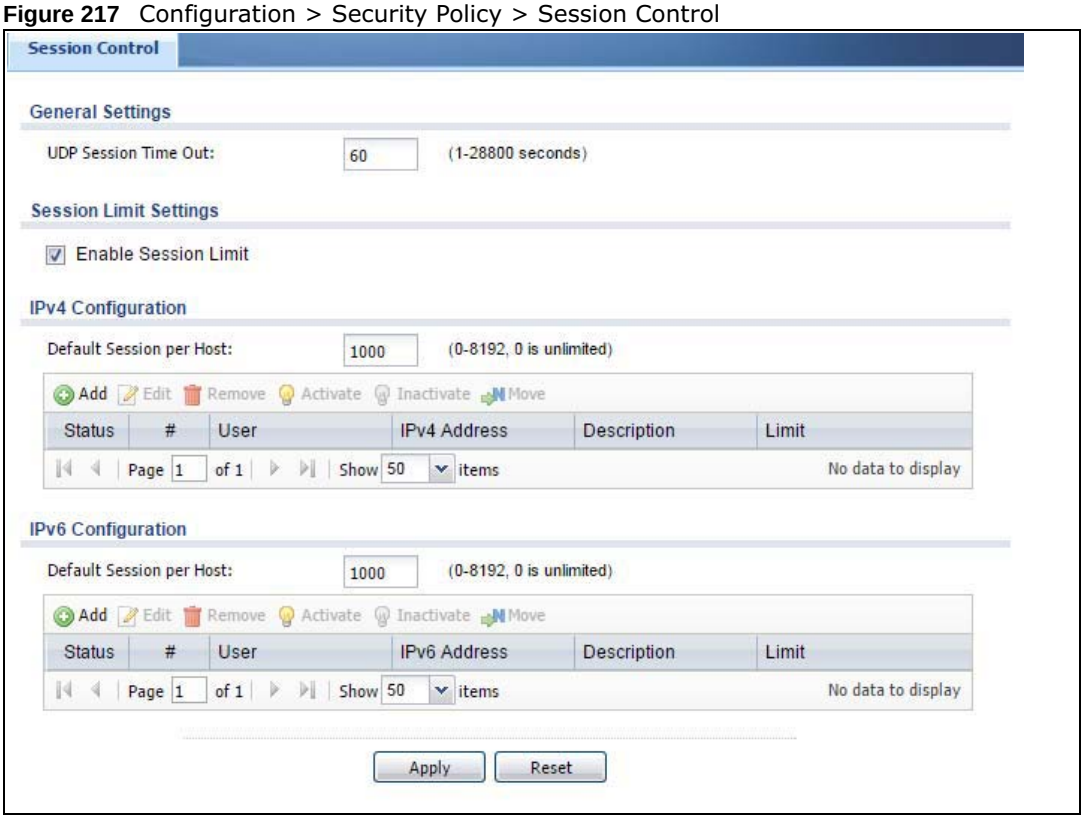
Table 127 Configuration > Security Policy > Policy Control > Add (continued)

LABEL	DESCRIPTION
Action	Use the drop-down list box to select what the Security Policy is to do with packets that match this policy. Select **deny** to silently discard the packets without sending a TCP reset packet or an ICMP destination-unreachable message to the sender. Select **reject** to discard the packets and send a TCP reset packet or an ICMP destination-unreachable message to the sender. Select **allow** to permit the passage of the packets.
Log matched traffic	Select whether to have the USG generate a log (**log**), log and alert (**log alert**) or not (**no**) when the policy is matched to the criteria listed above..
UTM Profile	Use this section to apply anti- x profiles (created in the **Configuration > UTM Profile** screens) to traffic that matches the criteria above. You must have created a profile first; otherwise **none** displays. Use **Log** to generate a log (**log**), log and alert (**log alert**) or not (**no**) for all traffic that matches criteria in the profile.
Content Filter	Select a Content Filter profile from the list box; **none** displays if no profiles have been created in the **Configuration > UTM Profile > Content Filter** screen.
Anti-Spam	Select an Anti-Spam profile from the list box; **none** displays if no profiles have been created in the **Configuration > UTM Profile > Anti-Spam** screen.
OK	Click **OK** to save your customized settings and exit this screen.
Cancel	Click **Cancel** to exit this screen without saving.

20.5 The Session Control Screen

Click **Configuration > Security Policy > Session Control** to display the **Security Policy Session Control** screen. Use this screen to limit the number of concurrent NAT/Security Policy sessions a client can use. You can apply a default limit for all users and individual limits for specific users, addresses, or both. The individual limit takes priority if you apply both.

Figure 217 Configuration > Security Policy > Session Control



The following table describes the labels in this screen.

Table 128 Configuration > Security Policy > Session Control

LABEL	DESCRIPTION
General Settings	
UDP Session Time Out	Set how many seconds the USG will allow a UDP session to remain idle (without UDP traffic) before closing it.
Session Limit Settings	
Enable Session limit	Select this check box to control the number of concurrent sessions hosts can have.
IPv4 / IPv6 Rule Summary	This table lists the rules for limiting the number of concurrent sessions hosts can have.
Default Session per Host	This field is configurable only when you enable session limit. Use this field to set a common limit to the number of concurrent NAT/Security Policy sessions each client computer can have. If only a few clients use peer to peer applications, you can raise this number to improve their performance. With heavy peer to peer application use, lower this number to ensure no single client uses too many of the available NAT sessions. Create rules below to apply other limits for specific users or addresses.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.

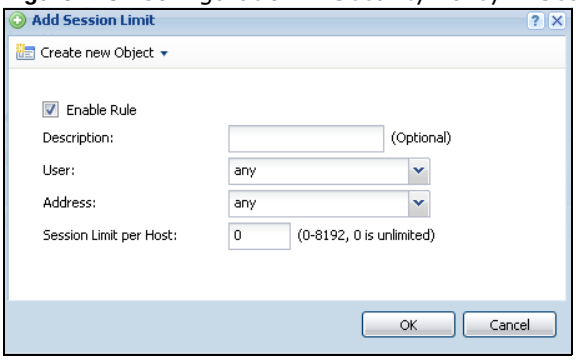
Table 128 Configuration > Security Policy > Session Control (continued)

LABEL	DESCRIPTION
Remove	To remove an entry, select it and click **Remove**. The USG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Move	To change a rule's position in the numbered list, select the rule and click **Move** to display a field to type a number for where you want to put that rule and press [ENTER] to move the rule to the number that you typed. The ordering of your rules is important as they are applied in order of their numbering.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
#	This is the index number of a session limit rule. It is not associated with a specific rule.
User	This is the user name or user group name to which this session limit rule applies.
IPv4 / IPv6 Address	This is the IPv4 / IPv6 address object to which this session limit rule applies.
Description	This is the information configured to help you identify the rule.
Limit	This is how many concurrent sessions this user or address is allowed to have.
Apply	Click **Apply** to save your changes back to the USG.
Reset	Click **Reset** to return the screen to its last-saved settings.

20.5.1 The Session Control Add/Edit Screen

Click **Configuration > Security Policy > Session Control** and the **Add** or **Edit** icon to display the **Add or Edit** screen. Use this screen to configure rules that define a session limit for specific users or addresses.

Figure 218 Configuration > Security Policy > Session Control > Edit



The following table describes the labels in this screen.

Table 129 Configuration > Security Policy > Session Control > Add / Edit

LABEL	DESCRIPTION
Create new Object	Use to configure new settings for User or Address objects that you need to use in this screen.Click on the down arrow to see the menu.
Enable Rule	Select this check box to turn on this session limit rule.
Description	Enter information to help you identify this rule. Use up to 60 printable ASCII characters. Spaces are allowed.

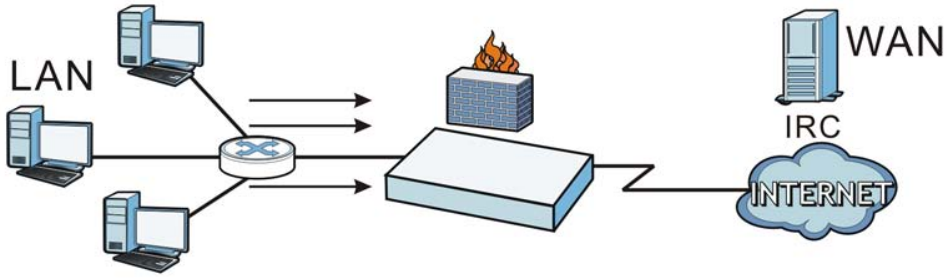
Table 129 Configuration > Security Policy > Session Control > Add / Edit (continued)

LABEL	DESCRIPTION
User	Select a user name or user group to which to apply the rule. The rule is activated only when the specified user logs into the system and the rule will be disabled when the user logs out. Otherwise, select **any** and there is no need for user logging. Note: If you specified an IP address (or address group) instead of **any** in the field below, the user's IP address should be within the IP address range.
Address	Select the IPv4 source address or address group to which this rule applies. Select **any** to apply the rule to all IPv4 source addresses.
IPv6 Address	Select the IPv6 source address or address group to which this rule applies. Select **any** to apply the rule to all IPv6 source addresses.
Session Limit per Host	Use this field to set a limit to the number of concurrent NAT/Security Policy sessions this rule's users or addresses can have. For this rule's users and addresses, this setting overrides the **Default Session per Host** setting in the general **Security Policy Session Control** screen.
OK	Click **OK** to save your customized settings and exit this screen.
Cancel	Click **Cancel** to exit this screen without saving.

20.6 Security Policy Example Applications

Suppose you decide to block LAN users from using IRC (Internet Relay Chat) through the Internet. To do this, you would configure a LAN to WAN Security Policy that blocks IRC traffic from any source IP address from going to any destination address. You do not need to specify a schedule since you need the Security Policy to always be in effect. The following figure shows the results of this policy.

Figure 219 Blocking All LAN to WAN IRC Traffic Example



Your Security Policy would have the following settings.

Table 130 Blocking All LAN to WAN IRC Traffic Example

#	USER	SOURCE	DESTINATION	SCHEDULE	UTM PROFILE	ACTION
1	Any	Any	Any	Any	IRC	Deny
2	Any	Any	Any	Any	Any	Allow

- The first row blocks LAN access to the IRC service on the WAN.
- The second row is the Security Policy's default policy that allows all LAN1 to WAN traffic.

The USG applies the security policies in order. So for this example, when the USG receives traffic from the LAN, it checks it against the first policy. If the traffic matches (if it is IRC traffic) the security policy takes the action in the policy (drop) and stops checking the subsequent security policies. Any traffic that does not match the first security policy will match the second security policy and the USG forwards it.

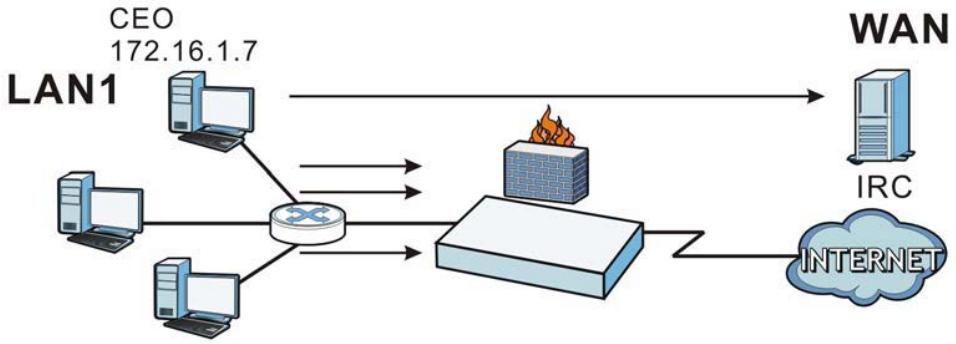
Now suppose you need to let the CEO use IRC. You configure a LAN1 to WAN security policy that allows IRC traffic from the IP address of the CEO's computer. You can also configure a LAN to WAN policy that allows IRC traffic from any computer through which the CEO logs into the USG with his/her user name. In order to make sure that the CEO's computer always uses the same IP address, make sure it either:

- Has a static IP address,

  or
- You configure a static DHCP entry for it so the USG always assigns it the same IP address.

Now you configure a LAN1 to WAN security policy that allows IRC traffic from the IP address of the CEO's computer (172.16.1.7 for example) to go to any destination address. You do not need to specify a schedule since you want the security policy to always be in effect. The following figure shows the results of your two custom policies.

Figure 220 Limited LAN to WAN IRC Traffic Example



Your security policy would have the following configuration.

Table 131 Limited LAN1 to WAN IRC Traffic Example 1

#	USER	SOURCE	DESTINATION	SCHEDULE	UTM PROFILE	ACTION
1	Any	172.16.1.7	Any	Any	IRC	Allow
2	Any	Any	Any	Any	IRC	Deny
3	Any	Any	Any	Any	Any	Allow

- The first row allows the LAN1 computer at IP address 172.16.1.7 to access the IRC service on the WAN.
- The second row blocks LAN1 access to the IRC service on the WAN.
- The third row is the default policy of allowing all traffic from the LAN1 to go to the WAN.

Alternatively, you configure a LAN1 to WAN policy with the CEO's user name (say CEO) to allow IRC traffic from any source IP address to go to any destination address.

Your Security Policy would have the following settings.

Table 132 Limited LAN1 to WAN IRC Traffic Example 2

#	USER	SOURCE	DESTINATION	SCHEDULE	UTM PROFILE	ACTION
1	CEO	Any	Any	Any	IRC	Allow
2	Any	Any	Any	Any	IRC	Deny
3	Any	Any	Any	Any	Any	Allow

- The first row allows any LAN1 computer to access the IRC service on the WAN by logging into the USG with the CEO's user name.
- The second row blocks LAN1 access to the IRC service on the WAN.
- The third row is the default policy of allowing allows all traffic from the LAN1 to go to the WAN.

The policy for the CEO must come before the policy that blocks all LAN1 to WAN IRC traffic. If the policy that blocks all LAN1 to WAN IRC traffic came first, the CEO's IRC traffic would match that policy and the USG would drop it and not check any other security policies.

21

IPSec VPN

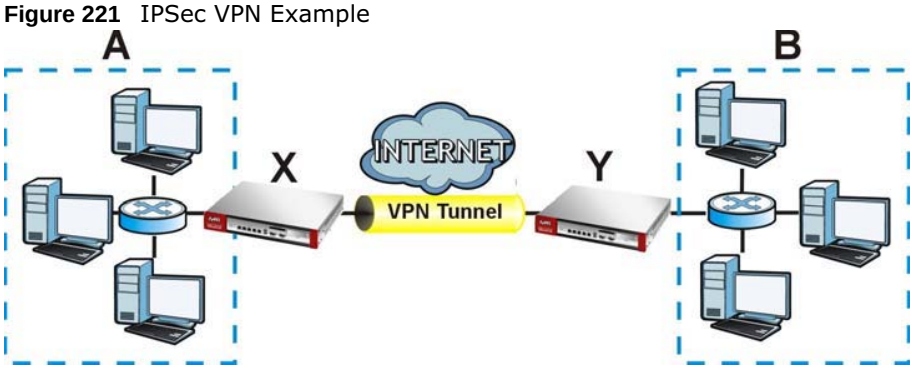
21.1 Virtual Private Networks (VPN) Overview

A virtual private network (VPN) provides secure communications between sites without the expense of leased site-to-site lines. A secure VPN is a combination of tunneling, encryption, authentication, access control and auditing. It is used to transport traffic over the Internet or any insecure network that uses TCP/IP for communication.

IPSec VPN

Internet Protocol Security (IPSec) VPN connects IPSec routers or remote users using IPSec client software. This standards-based VPN offers flexible solutions for secure data communications across a public network. IPSec is built around a number of standardized cryptographic techniques to provide confidentiality, data integrity and authentication at the IP layer. The USG can also combine multiple IPSec VPN connections into one secure network. Here local USG **X** uses an IPSec VPN tunnel to remote (peer) USG **Y** to connect the local (**A**) and remote (**B**) networks.

Figure 221 IPSec VPN Example



Internet Key Exchange (IKE): IKEv1 and IKEv2

The USG supports IKEv1 and IKEv2 for IPv4 and IPv6 traffic. IKE (Internet Key Exchange) is a protocol used in setting up security associations that allows two parties to send data securely.

IKE uses certificates or pre-shared keys for authentication and a Diffie–Hellman key exchange to set up a shared session secret from which encryption keys are derived. A security policy for each peer must be manually created.

IPSec VPN consists of two phases: Phase 1 and Phase 2. Phase 1's purpose is to establish a secure authenticated communication channel by using the Diffie–Hellman key exchange algorithm to generate a shared secret key to encrypt IKE communications. This negotiation results in one single bi-directional ISAKMP Security Association (SA). The authentication can be performed using either pre-shared key (shared secret), signatures, or public key encryption. Phase 1 operates in either

Main Mode or **Aggressive Mode**. **Main Mode** protects the identity of the peers, but **Aggressive Mode** does not.

During Phase 2, the remote IPSec routers use the secure channel established in Phase 1 to negotiate Security Associations for IPsec. The negotiation results in a minimum of two unidirectional security associations (one inbound and one outbound). Phase 2 uses Quick Mode (only). Quick mode occurs after IKE has established the secure tunnel in Phase 1. It negotiates a shared IPSec policy, derives shared secret keys used for the IPSec security algorithms, and establishes IPSec SAs. Quick mode is also used to renegotiate a new IPSec SA when the IPSec SA lifetime expires.

In the USG, use the **VPN Connection** tab to set up Phase 2 and the **VPN Gateway** tab to set up Phase 1.

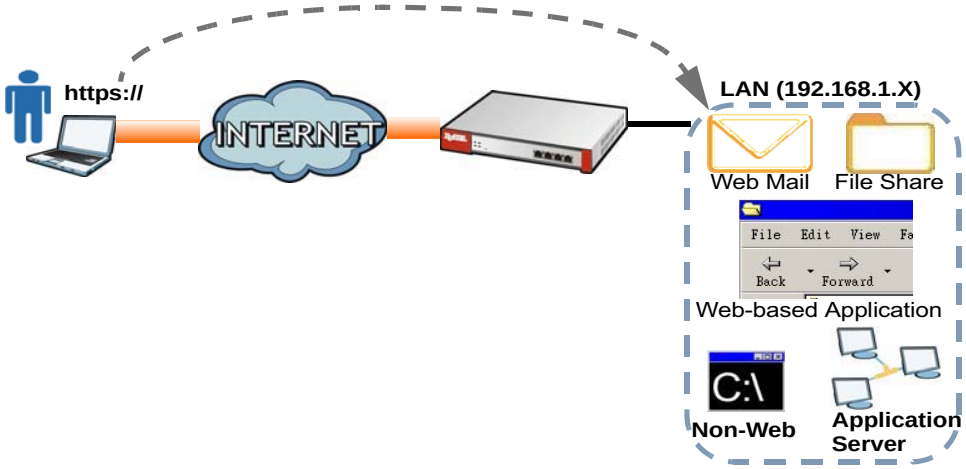
Some differences between IKEv1 and IKEv2 include:

- IKEv2 uses less bandwidth than IKEv1. IKEv2 uses one exchange procedure with 4 messages. IKEv1 uses two phases with Main Mode (9 messages) or Aggressive Mode (6 messages) in phase 1.
- IKEv2 supports Extended Authentication Protocol (EAP) authentication, and IKEv1 supports X-Auth. EAP is important when connecting to existing enterprise authentication systems.
- IKEv2 always uses NAT traversal and Dead Peer Detection (DPD), but they can be disabled in IKEv1 using USG firmware (the default is on).
- Configuration payload (includes the IP address pool in the VPN setup data) is supported in IKEv2 (off by default), but not in IKEv1.
- Narrowed (has the SA apply only to IP addresses in common between the USG and the remote IPSec router) is supported in IKEv2, but not in IKEv1.
- The IKEv2 protocol supports connectivity checks which is used to detect whether the tunnel is still up or not. If the check fails (the tunnel is down), IKEv2 can re-establish the connection automatically. The USG uses firmware to perform connectivity checks when using IKEv1.

SSL VPN

SSL VPN uses remote users' web browsers to provide the easiest-to-use of the USG's VPN solutions. A user just browses to the USG's web address and enters his user name and password to securely connect to the USG's network. Remote users do not need to configure security settings. Here a user uses his browser to securely connect to network resources in the same way as if he were part of the internal network. See Chapter 22 on page 367 for more on SSL VPN.

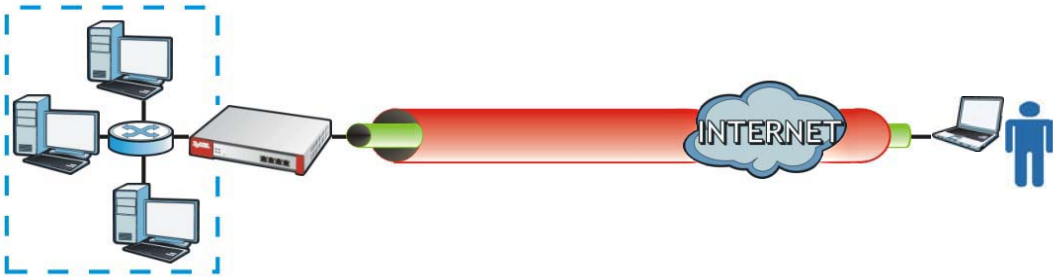
Figure 222 SSL VPN



L2TP VPN

L2TP VPN uses the L2TP and IPSec client software included in remote users' Android, iOS, or Windows operating systems for secure connections to the network behind the USG. The remote users do not need their own IPSec gateways or third-party VPN client software. For example, configure sales representatives' laptops, tablets, or smartphones to securely connect to the USG's network. See Chapter 25 on page 395 for more on L2TP over IPSec.

Figure 223 L2TP VPN



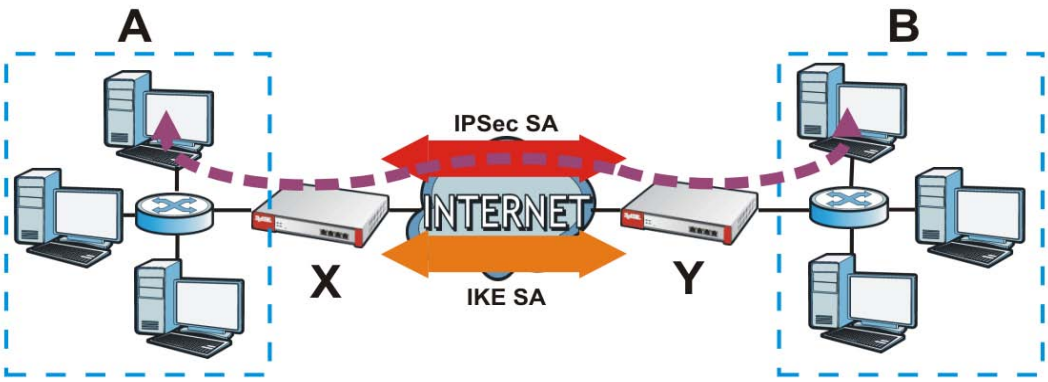
21.1.1 What You Can Do in this Chapter

- Use the **VPN Connection** screens (see Section 21.2 on page 337) to specify which IPSec VPN gateway an IPSec VPN connection policy uses, which devices behind the IPSec routers can use the VPN tunnel, and the IPSec SA settings (phase 2 settings). You can also activate or deactivate and connect or disconnect each VPN connection (each IPSec SA).
- Use the **VPN Gateway** screens (see Section 21.2.1 on page 338) to manage the USG's VPN gateways. A VPN gateway specifies the IPSec routers at either end of a VPN tunnel and the IKE SA settings (phase 1 settings). You can also activate and deactivate each VPN gateway.
- Use the **VPN Concentrator** screens (see Section 21.4 on page 353) to combine several IPSec VPN connections into a single secure network.
- Use the **Configuration Provisioning** screen (see Section 21.5 on page 355) to set who can retrieve VPN rule settings from the USG using the USG IPSec VPN Client.

21.1.2 What You Need to Know

An IPSec VPN tunnel is usually established in two phases. Each phase establishes a security association (SA), a contract indicating what security parameters the USG and the remote IPSec router will use. The first phase establishes an Internet Key Exchange (IKE) SA between the USG and remote IPSec router. The second phase uses the IKE SA to securely establish an IPSec SA through which the USG and remote IPSec router can send data between computers on the local network and remote network. This is illustrated in the following figure.

Figure 224 VPN: IKE SA and IPSec SA

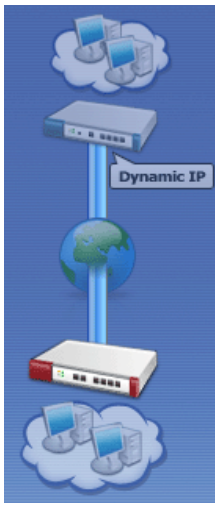


In this example, a computer in network **A** is exchanging data with a computer in network **B**. Inside networks **A** and **B**, the data is transmitted the same way data is normally transmitted in the networks. Between routers **X** and **Y**, the data is protected by tunneling, encryption, authentication, and other security features of the IPSec SA. The IPSec SA is secure because routers **X** and **Y** established the IKE SA first.

Application Scenarios

The USG's application scenarios make it easier to configure your VPN connection settings.

Table 133 IPSec VPN Application Scenarios

SITE-TO-SITE	SITE-TO-SITE WITH DYNAMIC PEER	REMOTE ACCESS (SERVER ROLE)	REMOTE ACCESS (CLIENT ROLE)
			
Choose this if the remote IPSec router has a static IP address or a domain name. This USG can initiate the VPN tunnel. The remote IPSec router can also initiate the VPN tunnel if this USG has a static IP address or a domain name.	Choose this if the remote IPSec router has a dynamic IP address. You don't specify the remote IPSec router's address, but you specify the remote policy (the addresses of the devices behind the remote IPSec router). This USG must have a static IP address or a domain name. Only the remote IPSec router can initiate the VPN tunnel.	Choose this to allow incoming connections from IPSec VPN clients. The clients have dynamic IP addresses and are also known as dial-in users. You don't specify the addresses of the client IPSec routers or the remote policy. This creates a dynamic IPSec VPN rule that can let multiple clients connect. Only the clients can initiate the VPN tunnel.	Choose this to connect to an IPSec server. This USG is the client (dial-in user). Client role USGs initiate IPSec VPN connections to a server role USG. This USG can have a dynamic IP address. The IPSec server doesn't configure this USG's IP address or the addresses of the devices behind it. Only this USG can initiate the VPN tunnel.

Finding Out More

- See Section 21.6 on page 357 for IPSec VPN background information.
- See the help in the IPSec VPN quick setup wizard screens.

21.1.3 Before You Begin

This section briefly explains the relationship between VPN tunnels and other features. It also gives some basic suggestions for troubleshooting.

You should set up the following features before you set up the VPN tunnel.

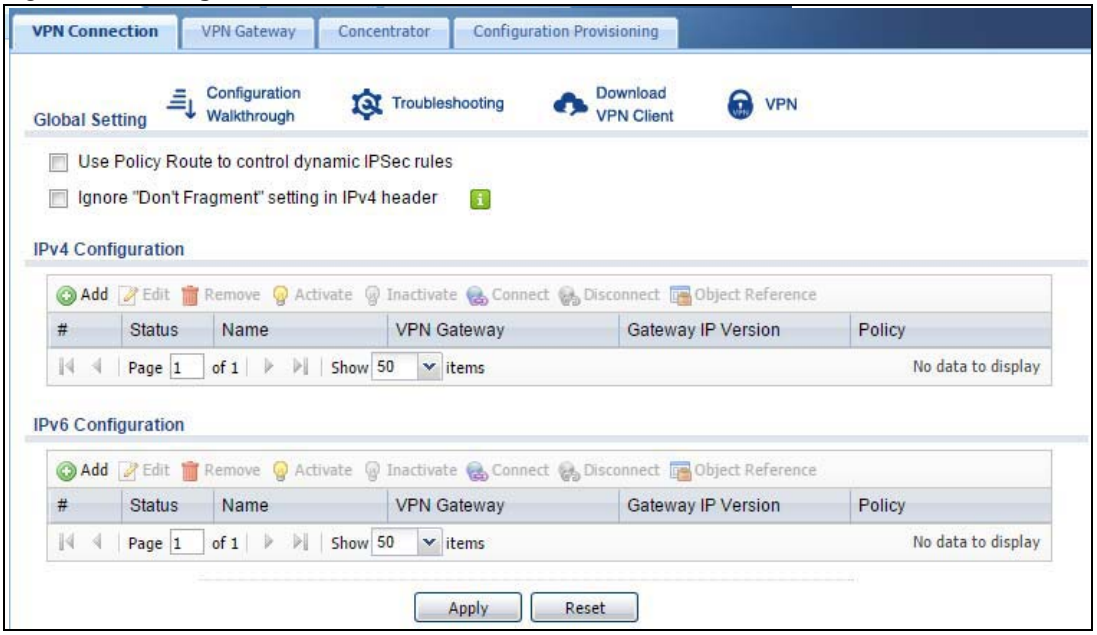
- In any VPN connection, you have to select address objects to specify the local policy and remote policy. You should set up the address objects first.
- In a VPN gateway, you can select an Ethernet interface, virtual Ethernet interface, VLAN interface, or virtual VLAN interface to specify what address the USG uses as its IP address when it establishes the IKE SA. You should set up the interface first.
- In a VPN gateway, you can enable extended authentication. If the USG is in server mode, you should set up the authentication method (AAA server) first. The authentication method specifies how the USG authenticates the remote IPSec router.
- In a VPN gateway, the USG and remote IPSec router can use certificates to authenticate each other. Make sure the USG and the remote IPSec router will trust each other's certificates.

21.2 The VPN Connection Screen

Click **Configuration > VPN > IPSec VPN** to open the **VPN Connection** screen. The **VPN Connection** screen lists the VPN connection policies and their associated VPN gateway(s), and various settings. In addition, it also lets you activate or deactivate and connect or disconnect each VPN connection (each IPSec SA). Click a column's heading cell to sort the table entries by that column's criteria. Click the heading cell again to reverse the sort order.

Click on the icons to go to the OneSecurity.com website where there is guidance on configuration walkthroughs, troubleshooting and other information.

Figure 225 Configuration > VPN > IPSec VPN > VPN Connection



Each field is discussed in the following table.

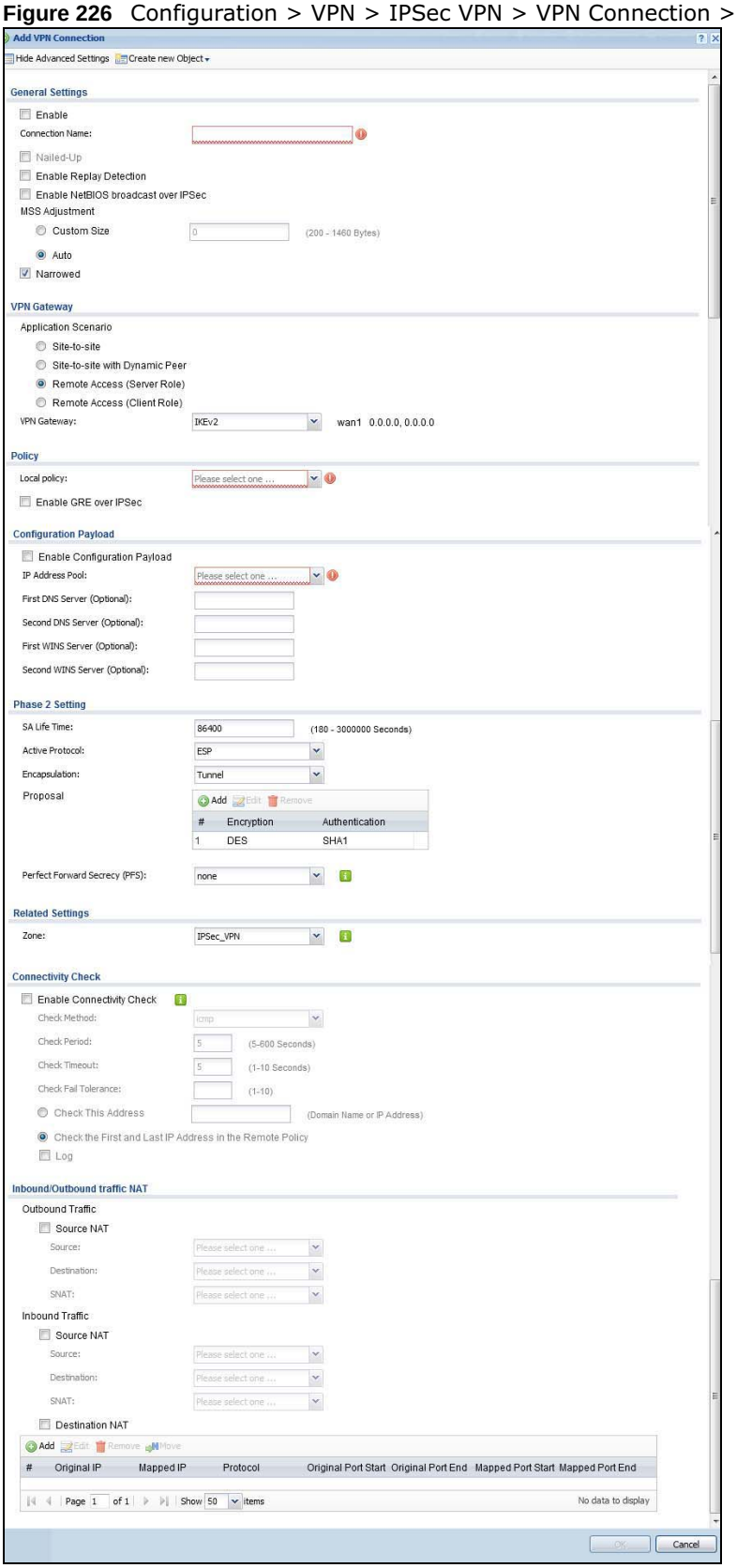
Table 134 Configuration > VPN > IPSec VPN > VPN Connection

LABEL	DESCRIPTION
Global Setting	The following two fields are for all IPSec VPN policies. Click on the VPN icon to go to the ZyXEL VPN Client product page at the ZyXEL website.
Use Policy Route to control dynamic IPSec rules	Select this to be able to use policy routes to manually specify the destination addresses of dynamic IPSec rules. You must manually create these policy routes. The USG automatically obtains source and destination addresses for dynamic IPSec rules that do not match any of the policy routes. Clear this to have the USG automatically obtain source and destination addresses for all dynamic IPSec rules.
Ignore "Don't Fragment" setting in packet header	Select this to fragment packets larger than the MTU (Maximum Transmission Unit) that have the "Don't Fragment" bit in the IP header turned on. When you clear this the USG drops packets larger than the MTU that have the "Don't Fragment" bit in the header turned on.
IPv4 / IPv6 Configuration	
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The USG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Connect	To connect an IPSec SA, select it and click **Connect**.
Disconnect	To disconnect an IPSec SA, select it and click **Disconnect**.
Object Reference	Select an entry and click **Object Reference** to open a screen that shows which settings use the entry. See Section 9.3.2 on page 163 for an example.
#	This field is a sequential value, and it is not associated with a specific connection.
Status	The activate (light bulb) icon is lit when the entry is active and dimmed when the entry is inactive. The connect icon is lit when the interface is connected and dimmed when it is disconnected.
Name	This field displays the name of the IPSec SA.
VPN Gateway	This field displays the VPN gateway in use for this VPN connection.
Gateway IP Version	This field displays what IP version the associated VPN gateway(s) is using. An IPv4 gateway may use an IKEv1 or IKEv2 SA. An IPv6 gateway may use IKEv2 only.
Policy	This field displays the local policy and the remote policy, respectively.
Apply	Click **Apply** to save your changes back to the USG.
Reset	Click **Reset** to return the screen to its last-saved settings.

21.2.1 The VPN Connection Add/Edit (IKE) Screen

The **VPN Connection Add/Edit Gateway** screen allows you to create a new VPN connection policy or edit an existing one. To access this screen, go to the **Configuration > VPN Connection** screen (see Section 21.2 on page 337), and click either the **Add** icon or an **Edit** icon.

Figure 226 Configuration > VPN > IPSec VPN > VPN Connection > Edit (IKE)



Each field is described in the following table.

Table 135 Configuration > VPN > IPSec VPN > VPN Connection > Edit

LABEL	DESCRIPTION
Show Advanced Settings / Hide Advanced Settings	Click this button to display a greater or lesser number of configuration fields.
Create new Object	Use to configure any new settings objects that you need to use in this screen.
General Settings	
Enable	Select this check box to activate this VPN connection.
Connection Name	Type the name used to identify this IPSec SA. You may use 1-31 alphanumeric characters, underscores (_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
Nailed-Up	Select this if you want the USG to automatically renegotiate the IPSec SA when the SA life time expires.
Enable Replay Detection	Select this check box to detect and reject old or duplicate packets to protect against Denial-of-Service attacks.
Enable NetBIOS Broadcast over IPSec	Select this check box if you the USG to send NetBIOS (Network Basic Input/Output System) packets through the IPSec SA. NetBIOS packets are TCP or UDP packets that enable a computer to connect to and communicate with a LAN. It may sometimes be necessary to allow NetBIOS packets to pass through IPSec SAs in order to allow local computers to find computers on the remote network and vice versa.
MSS Adjustment	Select **Custom Size** to set a specific number of bytes for the Maximum Segment Size (MSS) meaning the largest amount of data in a single TCP segment or IP datagram for this VPN connection. Some VPN clients may not be able to use a custom MSS size if it is set too small. In that case those VPN clients will ignore the size set here and use the minimum size that they can use. Select **Auto** to have the USG automatically set the MSS for this VPN connection.
Narrowed	If the IP range on the USG (local policy) and the local IP range on the remote IPSec router overlap in an IKEv2 SA, then you may select **Narrowed** to have the SA only apply to the IP addresses in common. Here are some examples. USG (local policy) Remote IPSec router IKEv2 SA-1 192.168.20.0/24 192.168.20.1 ~ 192.168.20.20 Narrowed 192.168.20.1 ~ 192.168.20.20 IKEv2 SA- 2 192.168.30.50 ~ 192.168.30.70 192.168.30.60 ~ 192.168.30.80 Narrowed 192.168.30.60 ~ 192.168.30.70
VPN Gateway	
Application Scenario	Select the scenario that best describes your intended VPN connection. **Site-to-site** - Choose this if the remote IPSec router has a static IP address or a domain name. This USG can initiate the VPN tunnel. **Site-to-site with Dynamic Peer** - Choose this if the remote IPSec router has a dynamic IP address. Only the remote IPSec router can initiate the VPN tunnel. **Remote Access (Server Role)** - Choose this to allow incoming connections from IPSec VPN clients. The clients have dynamic IP addresses and are also known as dial-in users. Only the clients can initiate the VPN tunnel. **Remote Access (Client Role)** - Choose this to connect to an IPSec server. This USG is the client (dial-in user) and can initiate the VPN tunnel.

Table 135 Configuration > VPN > IPSec VPN > VPN Connection > Edit (continued)

LABEL	DESCRIPTION
VPN Gateway	Select the VPN gateway this VPN connection is to use or select **Create Object** to add another VPN gateway for this VPN connection to use.
Policy	
Local Policy	Select the address corresponding to the local network. Use **Create new Object** if you need to configure a new one.
Remote Policy	Select the address corresponding to the remote network. Use **Create new Object** if you need to configure a new one.
Enable GRE over IPSec	Select this to allow traffic using the Generic Routing Encapsulation (GRE) tunneling protocol through an IPSec tunnel.
Policy Enforcement	Clear this to allow traffic with source and destination IP addresses that do not match the local and remote policy to use the VPN tunnel. Leave this cleared for free access between the local and remote networks. Selecting this restricts who can use the VPN tunnel. The USG drops traffic with source and destination IP addresses that do not match the local and remote policy.
Configuration Payload	This is only available when you have created an IKEv2 Gateway and are using **Remote Access (Server Role)**.
Enable Configuration Payload	Select this to have at least have the IP address pool included in the VPN setup data.
IP Address Pool:	Select an address object from the drop-down list box.
First DNS Server (optional)	The Domain Name System (DNS) maps a domain name to an IP address and vice versa. The USG uses these (in the order you specify here) to resolve domain names for VPN. Enter a DNS server's IP address.
Second DNS Server (Optional)	Enter a secondary DNS server's IP address that is checked if the first one is unavailable.
First WINS Server (Optional)	Type the IP address of the WINS (Windows Internet Naming Service) server that you want to send to the DHCP clients. The WINS server keeps a mapping table of the computer names on your network and the IP addresses that they are currently using.
Second WINS Server (Optional)	Enter a secondary WINS server's IP address that is checked if the first one is unavailable.
Phase 2 Settings	
SA Life Time	Type the maximum number of seconds the IPSec SA can last. Shorter life times provide better security. The USG automatically negotiates a new IPSec SA before the current one expires, if there are users who are accessing remote resources.
Active Protocol	Select which protocol you want to use in the IPSec SA. Choices are: **AH** (RFC 2402) - provides integrity, authentication, sequence integrity (replay resistance), and non-repudiation but not encryption. If you select **AH**, you must select an **Authentication** algorithm. **ESP** (RFC 2406) - provides encryption and the same services offered by **AH**, but its authentication is weaker. If you select **ESP**, you must select an **Encryption** algorithm and **Authentication** algorithm. Both **AH** and **ESP** increase processing requirements and latency (delay). The USG and remote IPSec router must use the same active protocol.
Encapsulation	Select which type of encapsulation the IPSec SA uses. Choices are **Tunnel** - this mode encrypts the IP header information and the data. **Transport** - this mode only encrypts the data. The USG and remote IPSec router must use the same encapsulation.

Table 135 Configuration > VPN > IPSec VPN > VPN Connection > Edit (continued)

LABEL	DESCRIPTION
Proposal	Use this section to manage the encryption algorithm and authentication algorithm pairs the USG accepts from the remote IPSec router for negotiating the IPSec SA.
Add	Click this to create a new entry.
Edit	Select an entry and click this to be able to modify it.
Remove	Select an entry and click this to delete it.
#	This field is a sequential value, and it is not associated with a specific proposal. The sequence of proposals should not affect performance significantly.
Encryption	This field is applicable when the **Active Protocol** is **ESP**. Select which key size and encryption algorithm to use in the IPSec SA. Choices are: **NULL** - no encryption key or algorithm **DES** - a 56-bit key with the DES encryption algorithm **3DES** - a 168-bit key with the DES encryption algorithm **AES128** - a 128-bit key with the AES encryption algorithm **AES192** - a 192-bit key with the AES encryption algorithm **AES256** - a 256-bit key with the AES encryption algorithm The USG and the remote IPSec router must both have at least one proposal that uses use the same encryption and the same key. Longer keys are more secure, but require more processing power, resulting in increased latency and decreased throughput.
Authentication	Select which hash algorithm to use to authenticate packet data in the IPSec SA. Choices are **SHA1**, **SHA256**, **SHA512** and **MD5**. SHA is generally considered stronger than **MD5**, but it is also slower. The USG and the remote IPSec router must both have a proposal that uses the same authentication algorithm.
Perfect Forward Secrecy (PFS)	Select whether or not you want to enable Perfect Forward Secrecy (PFS) and, if you do, which Diffie-Hellman key group to use for encryption. Choices are: **none** - disable PFS **DH1** - enable PFS and use a 768-bit random number **DH2** - enable PFS and use a 1024-bit random number **DH5** - enable PFS and use a 1536-bit random number PFS changes the root key that is used to generate encryption keys for each IPSec SA. The longer the key, the more secure the encryption, but also the longer it takes to encrypt and decrypt information. Both routers must use the same DH key group. PFS is ignored in initial IKEv2 authentication but is used when reauthenticating.
Related Settings	
Zone	Select the security zone into which to add this VPN connection policy. Any security rules or settings configured for the selected zone apply to this VPN connection policy.
Connectivity Check	The USG can regularly check the VPN connection to the gateway you specified to make sure it is still available.
Enable Connectivity Check	Select this to turn on the VPN connection check.

Table 135 Configuration > VPN > IPSec VPN > VPN Connection > Edit (continued)

LABEL	DESCRIPTION
Check Method	Select how the USG checks the connection. The peer must be configured to respond to the method you select. Select **icmp** to have the USG regularly ping the address you specify to make sure traffic can still go through the connection. You may need to configure the peer to respond to pings. Select **tcp** to have the USG regularly perform a TCP handshake with the address you specify to make sure traffic can still go through the connection. You may need to configure the peer to accept the TCP connection.
Check Port	This field displays when you set the **Check Method** to **tcp**. Specify the port number to use for a TCP connectivity check.
Check Period	Enter the number of seconds between connection check attempts.
Check Timeout	Enter the number of seconds to wait for a response before the attempt is a failure.
Check Fail Tolerance	Enter the number of consecutive failures allowed before the USG disconnects the VPN tunnel. The USG resumes using the first peer gateway address when the VPN connection passes the connectivity check.
Check this Address	Select this to specify a domain name or IP address for the connectivity check. Enter that domain name or IP address in the field next to it.
Check the First and Last IP Address in the Remote Policy	Select this to have the USG check the connection to the first and last IP addresses in the connection's remote policy. Make sure one of these is the peer gateway's LAN IP address.
Log	Select this to have the USG generate a log every time it checks this VPN connection.
Inbound/Outbound traffic NAT	
Outbound Traffic	
Source NAT	This translation hides the source address of computers in the local network. It may also be necessary if you want the USG to route packets from computers outside the local network through the IPSec SA.
Source	Select the address object that represents the original source address (or select **Create Object** to configure a new one). This is the address object for the computer or network outside the local network. The size of the original source address range (**Source**) must be equal to the size of the translated source address range (**SNAT**).
Destination	Select the address object that represents the original destination address (or select **Create Object** to configure a new one). This is the address object for the remote network.
SNAT	Select the address object that represents the translated source address (or select **Create Object** to configure a new one). This is the address object for the local network. The size of the original source address range (**Source**) must be equal to the size of the translated source address range (**SNAT**).
Inbound Traffic	
Source NAT	This translation hides the source address of computers in the remote network.
Source	Select the address object that represents the original source address (or select **Create Object** to configure a new one). This is the address object for the remote network. The size of the original source address range (**Source**) must be equal to the size of the translated source address range (**SNAT**).
Destination	Select the address object that represents the original destination address (or select **Create Object** to configure a new one). This is the address object for the local network.

Table 135 Configuration > VPN > IPSec VPN > VPN Connection > Edit (continued)

LABEL	DESCRIPTION
SNAT	Select the address object that represents the translated source address (or select **Create Object** to configure a new one). This is the address that hides the original source address. The size of the original source address range (**Source**) must be equal to the size of the translated source address range (**SNAT**).
Destination NAT	This translation forwards packets (for example, mail) from the remote network to a specific computer (for example, the mail server) in the local network.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry.
Edit	Select an entry and click this to be able to modify it.
Remove	Select an entry and click this to delete it.
Move	To change an entry's position in the numbered list, select it and click **Move** to display a field to type a number for where you want to put that entry and press [ENTER] to move the entry to the number that you typed.
#	This field is a sequential value, and it is not associated with a specific NAT record. However, the order of records is the sequence in which conditions are checked and executed.
Original IP	Select the address object that represents the original destination address. This is the address object for the remote network.
Mapped IP	Select the address object that represents the desired destination address. For example, this is the address object for the mail server.
Protocol	Select the protocol required to use this translation. Choices are: **TCP**, **UDP**, or **All**.
Original Port Start / Original Port End	These fields are available if the protocol is **TCP** or **UDP**. Enter the original destination port or range of original destination ports. The size of the original port range must be the same size as the size of the mapped port range.
Mapped Port Start / Mapped Port End	These fields are available if the protocol is **TCP** or **UDP**. Enter the translated destination port or range of translated destination ports. The size of the original port range must be the same size as the size of the mapped port range.
OK	Click **OK** to save the changes.
Cancel	Click **Cancel** to discard all changes and return to the main VPN screen.

21.3 The VPN Gateway Screen

The **VPN Gateway** summary screen displays the IPSec VPN gateway policies in the USG, as well as the USG's address, remote IPSec router's address, and associated VPN connections for each one. In addition, it also lets you activate and deactivate each VPN gateway. To access this screen, click **Configuration > VPN** > **Network** > **IPSec VPN** > **VPN Gateway**. The following screen appears.

Figure 227 Configuration > VPN > IPSec VPN > VPN Gateway

Each field is discussed in the following table. See Section 21.3.1 on page 346 for more information.

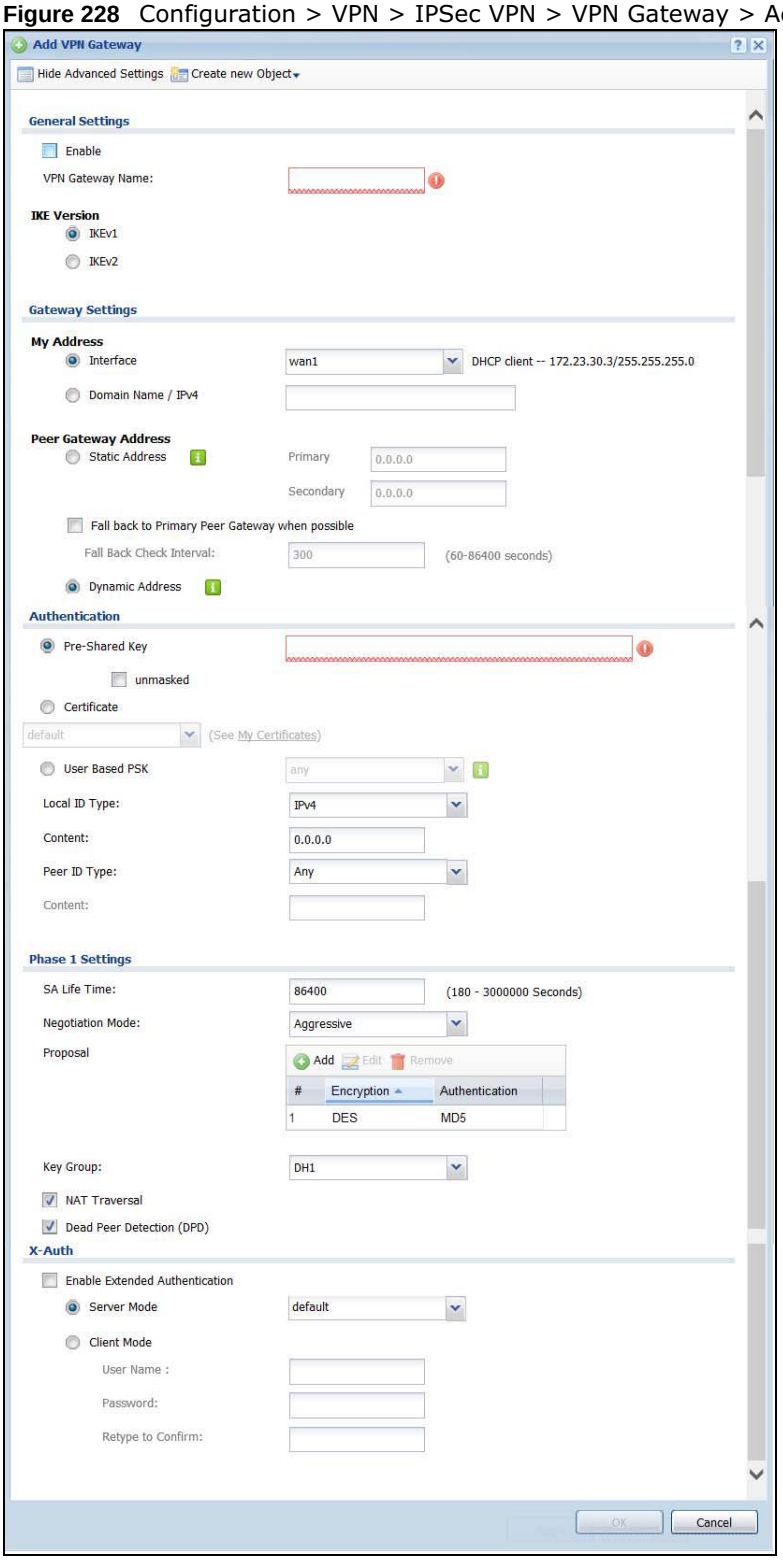
Table 136 Configuration > VPN > IPSec VPN > VPN Gateway

LABEL	DESCRIPTION
Add	Click this to create a new entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The USG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Object References	Select an entry and click **Object Reference**s to open a screen that shows which settings use the entry. See Section 9.3.2 on page 163 for an example.
#	This field is a sequential value, and it is not associated with a specific VPN gateway.
Status	The activate (light bulb) icon is lit when the entry is active and dimmed when the entry is inactive.
Name	This field displays the name of the VPN gateway
My address	This field displays the interface or a domain name the USG uses for the VPN gateway.
Secure Gateway	This field displays the IP address(es) of the remote IPSec routers.
VPN Connection	This field displays VPN connections that use this VPN gateway.
IKE Version	This field displays whether the gateway is using **IKEv1** or **IKEv2**. **IKEv1** applies to IPv4 traffic only. **IKEv2** applies to both IPv4 and IPv6 traffic. IKE (Internet Key Exchange) is a protocol used in setting up security associations that allows two parties to send data securely. See Section 21.1 on page 332 for more information on IKEv1 and IKEv2.
Apply	Click **Apply** to save your changes back to the USG.
Reset	Click **Reset** to return the screen to its last-saved settings.

21.3.1 The VPN Gateway Add/Edit Screen

The **VPN Gateway Add/Edit** screen allows you to create a new VPN gateway policy or edit an existing one. To access this screen, go to the **VPN Gateway summary** screen (see Section 21.3 on page 344), and click either the **Add** icon or an **Edit** icon.

Figure 228 Configuration > VPN > IPSec VPN > VPN Gateway > Add/Edit



Each field is described in the following table.

Table 137 Configuration > VPN > IPSec VPN > VPN Gateway > Add/Edit

LABEL	DESCRIPTION
Show Advanced Settings / Hide Advanced Settings	Click this button to display a greater or lesser number of configuration fields.
Create New Object	Use to configure any new settings objects that you need to use in this screen.
General Settings	
Enable	Select this to activate the VPN Gateway policy.
VPN Gateway Name	Type the name used to identify this VPN gateway. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
IKE Version	
IKEv1 / IKEv2	Select **IKEv1** or **IKEv2**. **IKEv1** applies to IPv4 traffic only. IKEv2 applies to both IPv4 and IPv6 traffic. IKE (Internet Key Exchange) is a protocol used in setting up security associations that allows two parties to send data securely. See Section 21.1 on page 332 for more information on IKEv1 and IKEv2.
Gateway Settings	
My Address	Select how the IP address of the USG in the IKE SA is defined. If you select **Interface**, select the Ethernet interface, VLAN interface, virtual Ethernet interface, virtual VLAN interface or PPPoE/PPTP interface. The IP address of the USG in the IKE SA is the IP address of the interface. If you select **Domain Name / IP**, enter the domain name or the IP address of the USG. The IP address of the USG in the IKE SA is the specified IP address or the IP address corresponding to the domain name. 0.0.0.0 is not generally recommended as it has the USG accept IPSec requests destined for any interface address on the USG.
Peer Gateway Address	Select how the IP address of the remote IPSec router in the IKE SA is defined. Select **Static Address** to enter the domain name or the IP address of the remote IPSec router. You can provide a second IP address or domain name for the USG to try if it cannot establish an IKE SA with the first one. **Fall back to Primary Peer Gateway when possible**: When you select this, if the connection to the primary address goes down and the USG changes to using the secondary connection, the USG will reconnect to the primary address when it becomes available again and stop using the secondary connection. Users will lose their VPN connection briefly while the USG changes back to the primary connection. To use this, the peer device at the secondary address cannot be set to use a nailed-up VPN connection. In the **Fallback Check Interval** field, set how often to check if the primary address is available. Select **Dynamic Address** if the remote IPSec router has a dynamic IP address (and does not use DDNS).
Authentication	Note: The USG and remote IPSec router must use the same authentication method to establish the IKE SA.

Table 137 Configuration > VPN > IPSec VPN > VPN Gateway > Add/Edit (continued)

LABEL	DESCRIPTION
Pre-Shared Key	Select this to have the USG and remote IPSec router use a pre-shared key (password) to identify each other when they negotiate the IKE SA. Type the pre-shared key in the field to the right. The pre-shared key can be: • alphanumeric characters or ,;.|`~!@#$%^&*()_+\{}':./<>=-" • pairs of hexadecimal (0-9, A-F) characters, preceded by "0x". Type "0x" at the beginning of a hexadecimal key. For example, "0x0123456789ABCDEF" is in hexadecimal format; "0123456789ABCDEF" is in ASCII format. If you use hexadecimal, you must enter twice as many characters since you need to enter pairs. The USG and remote IPSec router must use the same pre-shared key. Select **unmasked** to see the pre-shared key in readable plain text.
Certificate	Select this to have the USG and remote IPSec router use certificates to authenticate each other when they negotiate the IKE SA. Then select the certificate the USG uses to identify itself to the remote IPsec router. This certificate is one of the certificates in **My Certificates**. If this certificate is self-signed, import it into the remote IPsec router. If this certificate is signed by a CA, the remote IPsec router must trust that CA. Note: The IPSec routers must trust each other's certificates. The USG uses one of its **Trusted Certificates** to authenticate the remote IPSec router's certificate. The trusted certificate can be a self-signed certificate or that of a trusted CA that signed the remote IPSec router's certificate.
User-based PSK	User-based PSK (IKEv1 only) generates and manages separate pre-shared keys for every user. This enables multiple users, each with a unique key, to access the same VPN gateway policy with one-to-one authentication and strong encryption. Access can be denied on a per-user basis thus allowing VPN SA user-based policies. Click **User-Based PSK** then select a user or group object who is allowed VPN SA access using this VPN gateway policy. This is for IKEv1 only.
Local ID Type	This field is read-only if the USG and remote IPSec router use certificates to identify each other. Select which type of identification is used to identify the USG during authentication. Choices are: **IPv4** or **IPv6** - the USG is identified by an IP address **DNS** - the USG is identified by a domain name **E-mail** - the USG is identified by the string specified in this field
Content	This field is read-only if the USG and remote IPSec router use certificates to identify each other. Type the identity of the USG during authentication. The identity depends on the **Local ID Type**. **IP** - type an IP address; if you type 0.0.0.0, the USG uses the IP address specified in the **My Address** field. This is not recommended in the following situations: • There is a NAT router between the USG and remote IPSec router. • You want the remote IPSec router to be able to distinguish between IPSec SA requests that come from IPSec routers with dynamic WAN IP addresses. In these situations, use a different IP address, or use a different **Local ID Type**. **DNS** - type the fully qualified domain name (FQDN). This value is only used for identification and can be any string that matches the peer ID string. **E-mail** - the USG is identified by the string you specify here; you can use up to 63 ASCII characters including spaces, although trailing spaces are truncated. This value is only used for identification and can be any string.

Table 137 Configuration > VPN > IPSec VPN > VPN Gateway > Add/Edit (continued)

LABEL	DESCRIPTION
Peer ID Type	Select which type of identification is used to identify the remote IPSec router during authentication. Choices are: **IP** - the remote IPSec router is identified by an IP address **DNS** - the remote IPSec router is identified by a domain name **E-mail** - the remote IPSec router is identified by the string specified in this field **Any** - the USG does not check the identity of the remote IPSec router If the USG and remote IPSec router use certificates, there is one more choice. **Subject Name** - the remote IPSec router is identified by the subject name in the certificate
Content	This field is disabled if the **Peer ID Type** is **Any**. Type the identity of the remote IPSec router during authentication. The identity depends on the **Peer ID Type**. If the USG and remote IPSec router do not use certificates, **IP** - type an IP address; see the note at the end of this description. **DNS** - type the fully qualified domain name (FQDN). This value is only used for identification and can be any string that matches the peer ID string. **E-mail** - the remote IPSec router is identified by the string you specify here; you can use up to 31 ASCII characters including spaces, although trailing spaces are truncated. This value is only used for identification and can be any string. If the USG and remote IPSec router use certificates, type the following fields from the certificate used by the remote IPSec router. **IP** - subject alternative name field; see the note at the end of this description. **DNS** - subject alternative name field **E-mail** - subject alternative name field **Subject Name** - subject name (maximum 255 ASCII characters, including spaces) Note: If **Peer ID Type** is **IP**, please read the rest of this section. If you type 0.0.0.0, the USG uses the IP address specified in the **Secure Gateway Address** field. This is not recommended in the following situations: • There is a NAT router between the USG and remote IPSec router. • You want the remote IPSec router to be able to distinguish between IPSec SA requests that come from IPSec routers with dynamic WAN IP addresses. In these situations, use a different IP address, or use a different **Peer ID Type**.
Phase 1 Settings	
SA Life Time (Seconds)	Type the maximum number of seconds the IKE SA can last. When this time has passed, the USG and remote IPSec router have to update the encryption and authentication keys and re-negotiate the IKE SA. This does not affect any existing IPSec SAs, however.
Negotiation Mode	Select the negotiation mode to use to negotiate the IKE SA. Choices are **Main** - this encrypts the USG's and remote IPSec router's identities but takes more time to establish the IKE SA **Aggressive** - this is faster but does not encrypt the identities The USG and the remote IPSec router must use the same negotiation mode.
Proposal	Use this section to manage the encryption algorithm and authentication algorithm pairs the USG accepts from the remote IPSec router for negotiating the IKE SA.

Table 137 Configuration > VPN > IPSec VPN > VPN Gateway > Add/Edit (continued)

LABEL	DESCRIPTION
Add	Click this to create a new entry.
Edit	Select an entry and click this to be able to modify it.
Remove	Select an entry and click this to delete it.
#	This field is a sequential value, and it is not associated with a specific proposal. The sequence of proposals should not affect performance significantly.
Encryption	Select which key size and encryption algorithm to use in the IKE SA. Choices are: **DES** - a 56-bit key with the DES encryption algorithm **3DES** - a 168-bit key with the DES encryption algorithm **AES128** - a 128-bit key with the AES encryption algorithm **AES192** - a 192-bit key with the AES encryption algorithm **AES256** - a 256-bit key with the AES encryption algorithm The USG and the remote IPSec router must use the same key size and encryption algorithm. Longer keys require more processing power, resulting in increased latency and decreased throughput.
Authentication	Select which hash algorithm to use to authenticate packet data in the IPSec SA. Choices are **SHA1**, **SHA256**, **SHA512** and **MD5**. SHA is generally considered stronger than **MD5**, but it is also slower. The remote IPSec router must use the same authentication algorithm.
Key Group	Select which Diffie-Hellman key group (DH*x*) you want to use for encryption keys. Choices are: **DH1** - use a 768-bit random number **DH2** - use a 1024-bit random number **DH5** - use a 1536-bit random number The longer the key, the more secure the encryption, but also the longer it takes to encrypt and decrypt information. Both routers must use the same DH key group.
NAT Traversal	Select this if any of these conditions are satisfied. • This IKE SA might be used to negotiate IPSec SAs that use ESP as the active protocol. • There are one or more NAT routers between the USG and remote IPSec router, and these routers do not support IPSec pass-thru or a similar feature. The remote IPSec router must also enable NAT traversal, and the NAT routers have to forward packets with UDP port 500 and UDP 4500 headers unchanged. This field applies for IKEv1 only. NAT Traversal is always performed when you use IKEv2.
Dead Peer Detection (DPD)	Select this check box if you want the USG to make sure the remote IPSec router is there before it transmits data through the IKE SA. The remote IPSec router must support DPD. If there has been no traffic for at least 15 seconds, the USG sends a message to the remote IPSec router. If the remote IPSec router responds, the USG transmits the data. If the remote IPSec router does not respond, the USG shuts down the IKE SA. If the remote IPSec router does not support DPD, see if you can use the VPN connection connectivity check (see Section 21.2.1 on page 338). This field applies for IKEv1 only. Dead Peer Detection (DPD) is always performed when you use IKEv2.

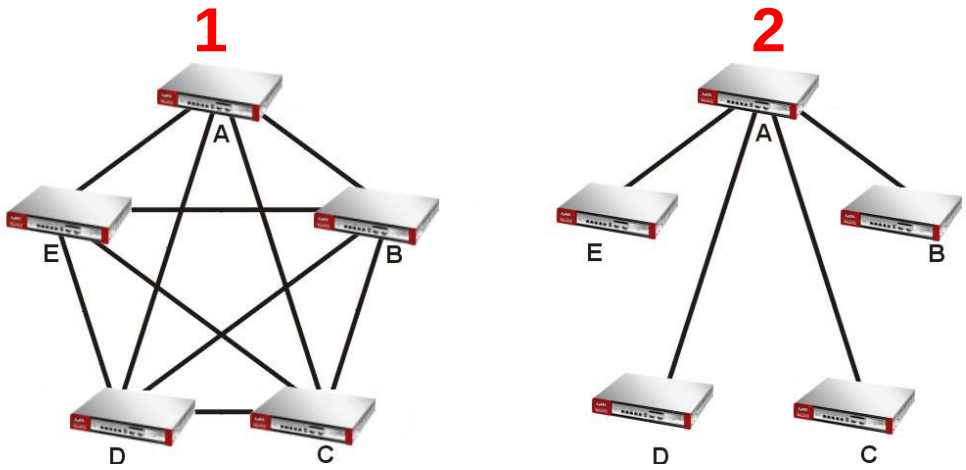
Table 137 Configuration > VPN > IPSec VPN > VPN Gateway > Add/Edit (continued)

LABEL	DESCRIPTION
X Auth / Extended Authentication Protocol	This part of the screen displays **X-Auth** when using **IKEv1** and **Extended Authentication Protocol** when using **IKEv2**.
X-Auth	This displays when using IKEv1. When different users use the same VPN tunnel to connect to the USG (telecommuters sharing a tunnel for example), use X-auth to enforce a user name and password check. This way even though telecommuters all know the VPN tunnel's security settings, each still has to provide a unique user name and password.
Enable Extended Authentication	Select this if one of the routers (the USG or the remote IPSec router) verifies a user name and password from the other router using the local user database and/or an external server.
Server Mode	Select this if the USG authenticates the user name and password from the remote IPSec router. You also have to select the authentication method, which specifies how the USG authenticates this information.
Client Mode	Select this radio button if the USG provides a username and password to the remote IPSec router for authentication. You also have to provide the **User Name** and the **Password**.
User Name	This field is required if the USG is in **Client Mode** for extended authentication. Type the user name the USG sends to the remote IPSec router. The user name can be 1-31 ASCII characters. It is case-sensitive, but spaces are not allowed.
Password	This field is required if the USG is in **Client Mode** for extended authentication. Type the password the USG sends to the remote IPSec router. The password can be 1-31 ASCII characters. It is case-sensitive, but spaces are not allowed.
Retype to Confirm	Type the exact same password again here to make sure an error was not made when typing it originally.
Extended Authentication Protocol	This displays when using **IKEv2**. EAP uses a certificate for authentication.
Enable Extended Authentication	Select this if one of the routers (the USG or the remote IPSec router) verifies a user name and password from the other router using the local user database and/or an external server or a certificate.
Server Mode	Select this if the USG authenticates the user name and password from the remote IPSec router. You also have to select an AAA method, which specifies how the USG authenticates this information and who may be authenticated (**Allowed User**).
Client Mode	Select this radio button if the USG provides a username and password to the remote IPSec router for authentication. You also have to provide the **User Name** and the **Password**.
User Name	This field is required if the USG is in **Client Mode** for extended authentication. Type the user name the USG sends to the remote IPSec router. The user name can be 1-31 ASCII characters. It is case-sensitive, but spaces are not allowed.
Password	This field is required if the USG is in **Client Mode** for extended authentication. Type the password the USG sends to the remote IPSec router. The password can be 1-31 ASCII characters. It is case-sensitive, but spaces are not allowed.
Retype to Confirm	Type the exact same password again here to make sure an error was not made when typing it originally.
OK	Click **OK** to save your settings and exit this screen.
Cancel	Click **Cancel** to exit this screen without saving.

21.4 VPN Concentrator

A VPN concentrator combines several IPSec VPN connections into one secure network.

Figure 229 VPN Topologies (Fully Meshed and Hub and Spoke)



In a fully-meshed VPN topology (**1** in the figure), there is a VPN connection between every pair of routers. In a hub-and-spoke VPN topology (**2** in the figure), there is a VPN connection between each spoke router (**B**, **C**, **D**, and **E**) and the hub router (**A**), which uses the VPN concentrator. The VPN concentrator routes VPN traffic between the spoke routers and itself.

A VPN concentrator reduces the number of VPN connections that you have to set up and maintain in the network. You might also be able to consolidate the policy routes in each spoke router, depending on the IP addresses and subnets of each spoke.

However a VPN concentrator is not for every situation. The hub router is a single failure point, so a VPN concentrator is not as appropriate if the connection between spoke routers cannot be down occasionally (maintenance, for example). There is also more burden on the hub router. It receives VPN traffic from one spoke, decrypts it, inspects it to find out to which spoke to route it, encrypts it, and sends it to the appropriate spoke. Therefore, a VPN concentrator is more suitable when there is a minimum amount of traffic between spoke routers.

21.4.1 VPN Concentrator Requirements and Suggestions

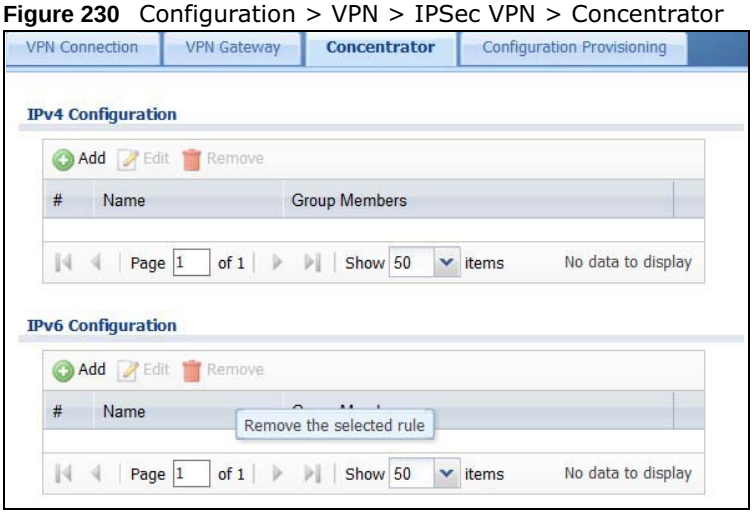
Consider the following when using the VPN concentrator.

- The local IP addresses configured in the VPN rules should not overlap.
- The concentrator must have at least one separate VPN rule for each spoke. In the local policy, specify the IP addresses of the networks with which the spoke is to be able to have a VPN tunnel. This may require you to use more than one VPN rule for each spoke.
- To have all Internet access from the spoke routers go through the VPN tunnel, set the VPN rules in the spoke routers to use 0.0.0.0 (any) as the remote IP address.
- Your security policies can still block VPN packets.

21.4.2 VPN Concentrator Screen

The **VPN Concentrator** summary screen displays the VPN concentrators in the USG. To access this screen, click **Configuration > VPN** > **IPSec VPN** > **Concentrator**.

Figure 230 Configuration > VPN > IPSec VPN > Concentrator



Each field is discussed in the following table. See Section 21.4.3 on page 354 for more information.

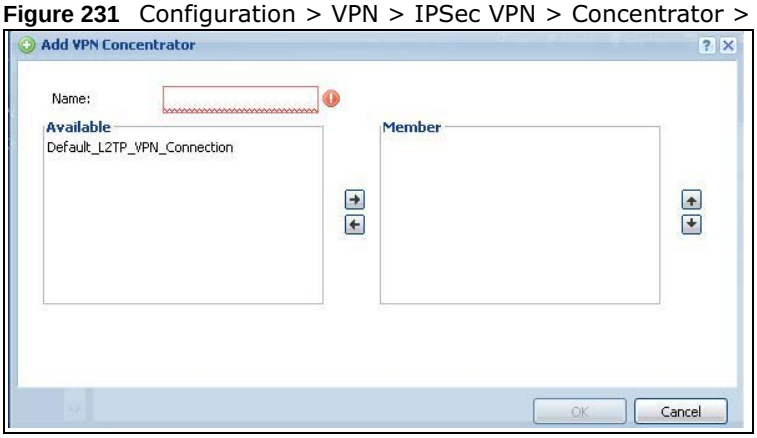
Table 138 Configuration > VPN > IPSec VPN > Concentrator

LABEL	DESCRIPTION
IPv4/IPv6 Configuration	Choose to configure for IPv4 or IPv6 traffic.
Add	Click this to create a new entry.
Edit	Select an entry and click this to be able to modify it.
Remove	Select an entry and click this to delete it.
#	This field is a sequential value, and it is not associated with a specific concentrator.
Name	This field displays the name of the VPN concentrator.
Group Members	These are the VPN connection policies that are part of the VPN concentrator.

21.4.3 The VPN Concentrator Add/Edit Screen

Use the **VPN Concentrator Add/Edit** screen to create or edit a VPN concentrator. To access this screen, go to the **VPN Concentrator summary** screen (see Section 21.4 on page 353), and click either the **Add** icon or an **Edit** icon.

Figure 231 Configuration > VPN > IPSec VPN > Concentrator > Add/Edit



Each field is described in the following table.

Table 139 VPN > IPSec VPN > Concentrator > Add/Edit

LABEL	DESCRIPTION
Name	Enter the name of the concentrator. You may use 1-31 alphanumeric characters, underscores(_), or dashes (-), but the first character cannot be a number. This value is case-sensitive.
Member	Select the concentrator's IPSec VPN connection policies. Note: You must disable policy enforcement in each member. See Section 21.2.1 on page 338. IPSec VPN connection policies that do not belong to a VPN concentrator appear under **Available**. Select any VPN connection policies that you want to add to the VPN concentrator and click the right arrow button to add them. The VPN concentrator's member VPN connections appear under **Member**. Select any VPN connections that you want to remove from the VPN concentrator, and click the left arrow button to remove them.
OK	Click **OK** to save your changes in the USG.
Cancel	Click **Cancel** to exit this screen without saving.

21.5 USG IPSec VPN Client Configuration Provisioning

Use the **Configuration > VPN > IPSec VPN > Configuration Provisioning** screen to configure who can retrieve VPN rule settings from the USG using the USG IPSec VPN Client. In the USG IPSec VPN Client, you just need to enter the IP address of the USG to get all the VPN rule settings automatically. You do not need to manually configure all rule settings in the USG IPSec VPN client.

VPN rules for the USG IPSec VPN Client have certain restrictions. They must *not* contain the following settings:

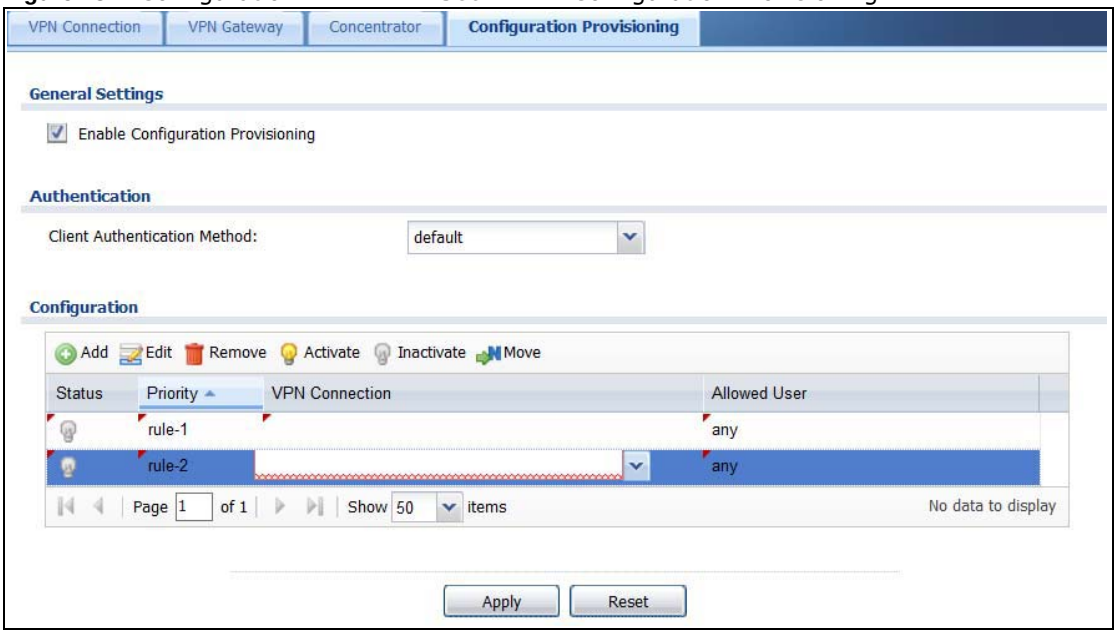
- **AH** active protocol
- **NULL** encryption
- **SHA512** authentication
- A subnet or range remote policy

The following VPN Gateway rules configured on the USG cannot be provisioned to the IPSec VPN Client:

- IPv4 rules with IKEv2 version
- IPv4 rules with User-based PSK authentication
- IPv6 rules

In the USG **Quick Setup** wizard, you can use the **VPN Settings for Configuration Provisioning** wizard to create a VPN rule that will not violate these restrictions.

Figure 232 Configuration > VPN > IPSec VPN > Configuration Provisioning



Each field is discussed in the following table.

Table 140 Configuration > VPN > IPSec VPN > Configuration Provisioning

LABEL	DESCRIPTION
Enable Configuration Provisioning	Select this for users to be able to retrieve VPN rule settings using the USG IPSec VPN client.
Client Authentication Method	Choose how users should be authenticated. They can be authenticated using the local database on the USG or an external authentication database such as LDAP, Active Directory or RADIUS. **default** is a method you configured in **Object > Auth Method.** You may configure multiple methods there. If you choose the local database on the USG, then configure users using the **Object > User/Group** screen. If you choose LDAP, Active Directory or RADIUS authentication servers, then configure users on the respective server.
Configuration	When you add or edit a configuration provisioning entry, you are allowed to set the **VPN Connection** and **Allowed User** fields. Duplicate entries are not allowed. You cannot select the same **VPN Connection** and **Allowed User** pair in a new entry if the same pair exists in a previous entry. You can bind different rules to the same user, but the USG will only allow VPN rule setting retrieval for the first match found.

Table 140 Configuration > VPN > IPSec VPN > Configuration Provisioning (continued)

LABEL	DESCRIPTION
Add	Click **Add** to bind a configured VPN rule to a user or group. Only that user or group may then retrieve the specified VPN rule settings. If you click **Add** without selecting an entry in advance then the new entry appears as the first entry. Entry order is important as the USG searches entries in the order listed here to find a match. After a match is found, the USG stops searching. If you want to add an entry as number three for example, then first select entry 2 and click **Add**. To reorder an entry, use **Move**.
Edit	Select an existing entry and click **Edit** to change its settings.
Remove	To remove an entry, select it and click **Remove**. The USG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**. Make sure that **Enable Configuration Provisioning** is also selected.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Move	Use **Move** to reorder a selected entry. Select an entry, click **Move**, type the number where the entry should be moved, press <ENTER>, then click **Apply**.
Status	This icon shows if the entry is active (yellow) or not (gray). VPN rule settings can only be retrieved when the entry is activated (and **Enable Configuration Provisioning** is also selected).
Priority	Priority shows the order of the entry in the list. Entry order is important as the USG searches entries in the order listed here to find a match. After a match is found the USG stops searching.
VPN Connection	This field shows all configured VPN rules that match the rule criteria for the USG IPSec VPN client. Select a rule to bind to the associated user or group.
Allowed User	Select which user or group of users is allowed to retrieve the associated VPN rule settings using the USG IPSec VPN client. A user may belong to a number of groups. If entries are configured for different groups, the USG will allow VPN rule setting retrieval based on the first match found. Users of type **admin** or **limited-admin** are not allowed.
Apply	Click **Apply** to save your changes back to the USG.
Reset	Click **Reset** to return the screen to its last-saved settings.

21.6 IPSec VPN Background Information

Here is some more detailed IPSec VPN background information.

IKE SA Overview

The IKE SA provides a secure connection between the USG and remote IPSec router.

It takes several steps to establish an IKE SA. The negotiation mode determines how many. There are two negotiation modes--main mode and aggressive mode. Main mode provides better security, while aggressive mode is faster.

Note: Both routers must use the same negotiation mode.

These modes are discussed in more detail in Negotiation Mode on page 361. Main mode is used in various examples in the rest of this section.

The USG supports IKEv1 and IKEv2. See Section 21.1 on page 332 for more information.

IP Addresses of the USG and Remote IPSec Router

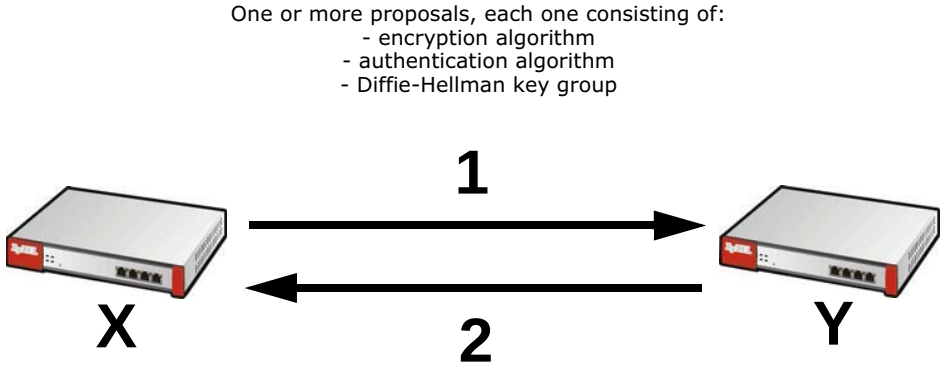
To set up an IKE SA, you have to specify the IP addresses of the USG and remote IPSec router. You can usually enter a static IP address or a domain name for either or both IP addresses. Sometimes, your USG might offer another alternative, such as using the IP address of a port or interface, as well.

You can also specify the IP address of the remote IPSec router as 0.0.0.0. This means that the remote IPSec router can have any IP address. In this case, only the remote IPSec router can initiate an IKE SA because the USG does not know the IP address of the remote IPSec router. This is often used for telecommuters.

IKE SA Proposal

The IKE SA proposal is used to identify the encryption algorithm, authentication algorithm, and Diffie-Hellman (DH) key group that the USG and remote IPSec router use in the IKE SA. In main mode, this is done in steps 1 and 2, as illustrated next.

Figure 233 IKE SA: Main Negotiation Mode, Steps 1 - 2: IKE SA Proposal



The USG sends one or more proposals to the remote IPSec router. (In some devices, you can only set up one proposal.) Each proposal consists of an encryption algorithm, authentication algorithm, and DH key group that the USG wants to use in the IKE SA. The remote IPSec router selects an acceptable proposal and sends the accepted proposal back to the USG. If the remote IPSec router rejects all of the proposals, the USG and remote IPSec router cannot establish an IKE SA.

Note: Both routers must use the same encryption algorithm, authentication algorithm, and DH key group.

In most USGs, you can select one of the following encryption algorithms for each proposal. The algorithms are listed in order from weakest to strongest.

- Data Encryption Standard (DES) is a widely used method of data encryption. It applies a 56-bit key to each 64-bit block of data.
- Triple DES (3DES) is a variant of DES. It iterates three times with three separate keys, effectively tripling the strength of DES.
- Advanced Encryption Standard (AES) is a newer method of data encryption that also uses a secret key. AES applies a 128-bit key to 128-bit blocks of data. It is faster than 3DES.

Some USGs also offer stronger forms of AES that apply 192-bit or 256-bit keys to 128-bit blocks of data.

In most USGs, you can select one of the following authentication algorithms for each proposal. The algorithms are listed in order from weakest to strongest.

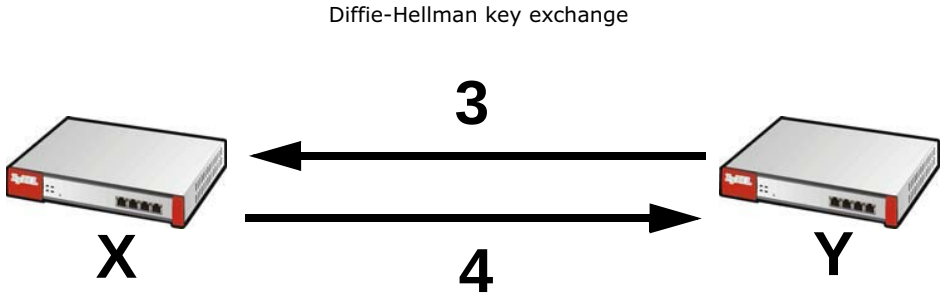
- MD5 (Message Digest 5) produces a 128-bit digest to authenticate packet data.
- SHA1 (Secure Hash Algorithm) produces a 160-bit digest to authenticate packet data.
- SHA256 (Secure Hash Algorithm) produces a 256-bit digest to authenticate packet data.
- SHA512 (Secure Hash Algorithm) produces a 512-bit digest to authenticate packet data.

See Diffie-Hellman (DH) Key Exchange on page 359 for more information about DH key groups.

Diffie-Hellman (DH) Key Exchange

The USG and the remote IPSec router use DH public-key cryptography to establish a shared secret. The shared secret is then used to generate encryption keys for the IKE SA and IPSec SA. In main mode, this is done in steps 3 and 4, as illustrated next.

Figure 234 IKE SA: Main Negotiation Mode, Steps 3 - 4: DH Key Exchange



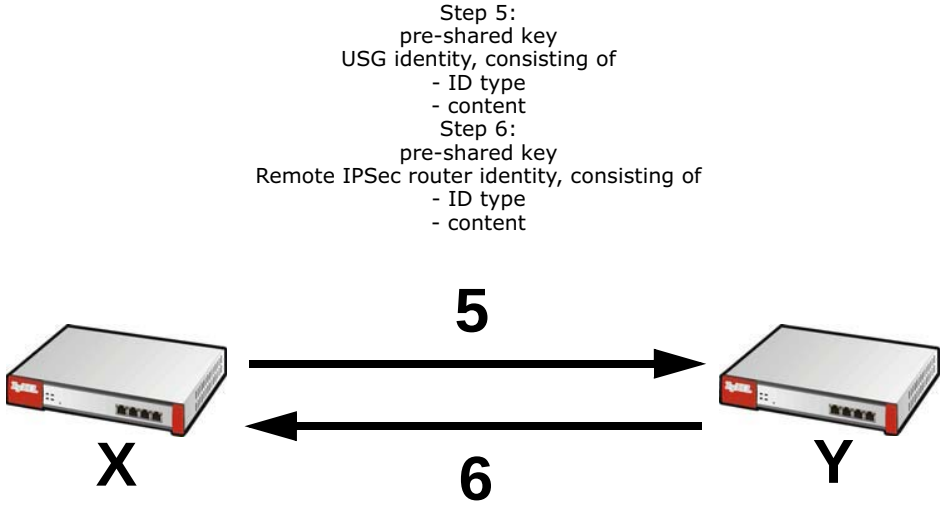
DH public-key cryptography is based on DH key groups. Each key group is a fixed number of bits long. The longer the key, the more secure the encryption, but also the longer it takes to encrypt and decrypt information. For example, DH2 keys (1024 bits) are more secure than DH1 keys (768 bits), but DH2 keys take longer to encrypt and decrypt.

Authentication

Before the USG and remote IPSec router establish an IKE SA, they have to verify each other's identity. This process is based on pre-shared keys and router identities.

In main mode, the USG and remote IPSec router authenticate each other in steps 5 and 6, as illustrated below. The identities are also encrypted using the encryption algorithm and encryption key the USG and remote IPSec router selected in previous steps.

Figure 235 IKE SA: Main Negotiation Mode, Steps 5 - 6: Authentication (continued)



You have to create (and distribute) a pre-shared key. The USG and remote IPSec router use it in the authentication process, though it is not actually transmitted or exchanged.

Note: The USG and the remote IPSec router must use the same pre-shared key.

Router identity consists of ID type and content. The ID type can be domain name, IP address, or e-mail address, and the content is a (properly-formatted) domain name, IP address, or e-mail address. The content is only used for identification. Any domain name or e-mail address that you enter does not have to actually exist. Similarly, any domain name or IP address that you enter does not have to correspond to the USG's or remote IPSec router's properties.

The USG and the remote IPSec router have their own identities, so both of them must store two sets of information, one for themselves and one for the other router. Local ID type and content refers to the ID type and content that applies to the router itself, and peer ID type and content refers to the ID type and content that applies to the other router.

Note: The USG's local and peer ID type and content must match the remote IPSec router's peer and local ID type and content, respectively.

For example, in Table 141 on page 360, the USG and the remote IPSec router authenticate each other successfully. In contrast, in Table 142 on page 361, the USG and the remote IPSec router cannot authenticate each other and, therefore, cannot establish an IKE SA.

Table 141 VPN Example: Matching ID Type and Content

USG	REMOTE IPSEC ROUTER
Local ID type: E-mail	Local ID type: IP
Local ID content: tom@yourcompany.com	Local ID content: 1.1.1.2
Peer ID type: IP	Peer ID type: E-mail
Peer ID content: 1.1.1.2	Peer ID content: tom@yourcompany.com

Table 142 VPN Example: Mismatching ID Type and Content

USG	REMOTE IPSEC ROUTER
Local ID type: E-mail	Local ID type: IP
Local ID content: tom@yourcompany.com	Local ID content: 1.1.1.2
Peer ID type: IP	Peer ID type: E-mail
Peer ID content: 1.1.1.20	Peer ID content: tom@yourcompany.com

It is also possible to configure the USG to ignore the identity of the remote IPSec router. In this case, you usually set the peer ID type to **Any**. This is less secure, so you should only use this if your USG provides another way to check the identity of the remote IPSec router (for example, extended authentication) or if you are troubleshooting a VPN tunnel.

Additional Topics for IKE SA

This section provides more information about IKE SA.

Negotiation Mode

There are two negotiation modes--main mode and aggressive mode. Main mode provides better security, while aggressive mode is faster.

Main mode takes six steps to establish an IKE SA.

Steps 1 - 2: The USG sends its proposals to the remote IPSec router. The remote IPSec router selects an acceptable proposal and sends it back to the USG.

Steps 3 - 4: The USG and the remote IPSec router exchange pre-shared keys for authentication and participate in a Diffie-Hellman key exchange, based on the accepted DH key group, to establish a shared secret.

Steps 5 - 6: Finally, the USG and the remote IPSec router generate an encryption key (from the shared secret), encrypt their identities, and exchange their encrypted identity information for authentication.

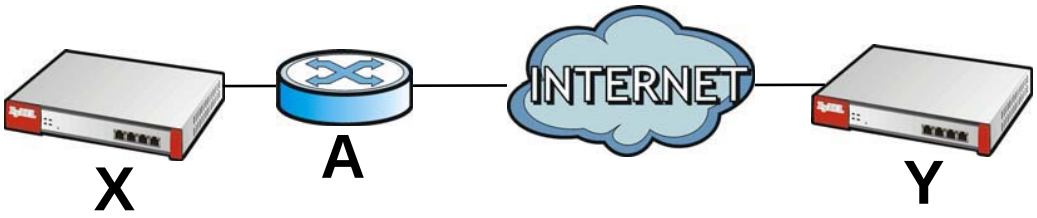
In contrast, aggressive mode only takes three steps to establish an IKE SA. Aggressive mode does not provide as much security because the identity of the USG and the identity of the remote IPSec router are not encrypted. It is usually used in remote-access situations, where the address of the initiator is not known by the responder and both parties want to use pre-shared keys for authentication. For example, the remote IPSec router may be a telecommuter who does not have a static IP address.

VPN, NAT, and NAT Traversal

In the following example, there is another router (**A**) between router **X** and router **Y**.

Figure 236 VPN/NAT Example

If router **A** does NAT, it might change the IP addresses, port numbers, or both. If router **X** and router **Y** try to establish a VPN tunnel, the authentication fails because it depends on this information. The routers cannot establish a VPN tunnel.



Most routers like router **A** now have an IPSec pass-thru feature. This feature helps router **A** recognize VPN packets and route them appropriately. If router **A** has this feature, router **X** and router **Y** can establish a VPN tunnel as long as the active protocol is ESP. (See Active Protocol on page 363 for more information about active protocols.)

If router A does not have an IPSec pass-thru or if the active protocol is AH, you can solve this problem by enabling NAT traversal. In NAT traversal, router **X** and router **Y** add an extra header to the IKE SA and IPSec SA packets. If you configure router **A** to forward these packets unchanged, router **X** and router **Y** can establish a VPN tunnel.

You have to do the following things to set up NAT traversal.

- Enable NAT traversal on the USG and remote IPSec router.
- Configure the NAT router to forward packets with the extra header unchanged. (See the field description for detailed information about the extra header.)

The extra header may be UDP port 500 or UDP port 4500, depending on the standard(s) the USG and remote IPSec router support.

X-Auth / Extended Authentication

X-Auth / Extended authentication is often used when multiple IPSec routers use the same VPN tunnel to connect to a single IPSec router. For example, this might be used with telecommuters.

In extended authentication, one of the routers (the USG or the remote IPSec router) provides a user name and password to the other router, which uses a local user database and/or an external server to verify the user name and password. If the user name or password is wrong, the routers do not establish an IKE SA.

You can set up the USG to provide a user name and password to the remote IPSec router, or you can set up the USG to check a user name and password that is provided by the remote IPSec router.

If you use extended authentication, it takes four more steps to establish an IKE SA. These steps occur at the end, regardless of the negotiation mode (steps 7-10 in main mode, steps 4-7 in aggressive mode).

Certificates

It is possible for the USG and remote IPSec router to authenticate each other with certificates. In this case, you do not have to set up the pre-shared key, local identity, or remote identity because the certificates provide this information instead.

- Instead of using the pre-shared key, the USG and remote IPSec router check the signatures on each other's certificates. Unlike pre-shared keys, the signatures do not have to match.
- The local and peer ID type and content come from the certificates.

Note: You must set up the certificates for the USG and remote IPSec router first.

IPSec SA Overview

Once the USG and remote IPSec router have established the IKE SA, they can securely negotiate an IPSec SA through which to send data between computers on the networks.

Note: The IPSec SA stays connected even if the underlying IKE SA is not available anymore.

This section introduces the key components of an IPSec SA.

Local Network and Remote Network

In an IPSec SA, the local network, the one(s) connected to the USG, may be called the local policy. Similarly, the remote network, the one(s) connected to the remote IPSec router, may be called the remote policy.

Active Protocol

The active protocol controls the format of each packet. It also specifies how much of each packet is protected by the encryption and authentication algorithms. IPSec VPN includes two active protocols, AH (Authentication Header, RFC 2402) and ESP (Encapsulating Security Payload, RFC 2406).

Note: The USG and remote IPSec router must use the same active protocol.

Usually, you should select ESP. AH does not support encryption, and ESP is more suitable with NAT.

Encapsulation

There are two ways to encapsulate packets. Usually, you should use tunnel mode because it is more secure. Transport mode is only used when the IPSec SA is used for communication between the USG and remote IPSec router (for example, for remote management), not between computers on the local and remote networks.

Note: The USG and remote IPSec router must use the same encapsulation.

These modes are illustrated below.

Figure 237 VPN: Transport and Tunnel Mode Encapsulation

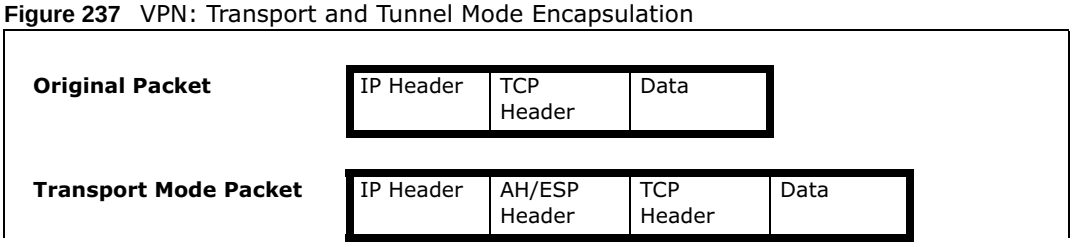
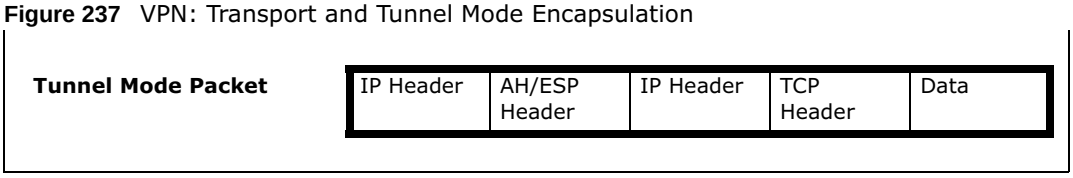


Figure 237 VPN: Transport and Tunnel Mode Encapsulation



In tunnel mode, the USG uses the active protocol to encapsulate the entire IP packet. As a result, there are two IP headers:

- Outside header: The outside IP header contains the IP address of the USG or remote IPSec router, whichever is the destination.
- Inside header: The inside IP header contains the IP address of the computer behind the USG or remote IPSec router. The header for the active protocol (AH or ESP) appears between the IP headers.

In transport mode, the encapsulation depends on the active protocol. With AH, the USG includes part of the original IP header when it encapsulates the packet. With ESP, however, the USG does not include the IP header when it encapsulates the packet, so it is not possible to verify the integrity of the source IP address.

IPSec SA Proposal and Perfect Forward Secrecy

An IPSec SA proposal is similar to an IKE SA proposal (see IKE SA Proposal on page 358), except that you also have the choice whether or not the USG and remote IPSec router perform a new DH key exchange every time an IPSec SA is established. This is called Perfect Forward Secrecy (PFS).

If you enable PFS, the USG and remote IPSec router perform a DH key exchange every time an IPSec SA is established, changing the root key from which encryption keys are generated. As a result, if one encryption key is compromised, other encryption keys remain secure.

If you do not enable PFS, the USG and remote IPSec router use the same root key that was generated when the IKE SA was established to generate encryption keys.

The DH key exchange is time-consuming and may be unnecessary for data that does not require such security.

PFS is ignored in initial IKEv2 authentication but is used when reauthenticating.

Additional Topics for IPSec SA

This section provides more information about IPSec SA in your USG.

Authentication and the Security Parameter Index (SPI)

For authentication, the USG and remote IPSec router use the SPI, instead of pre-shared keys, ID type and content. The SPI is an identification number.

Note: The USG and remote IPSec router must use the same SPI.

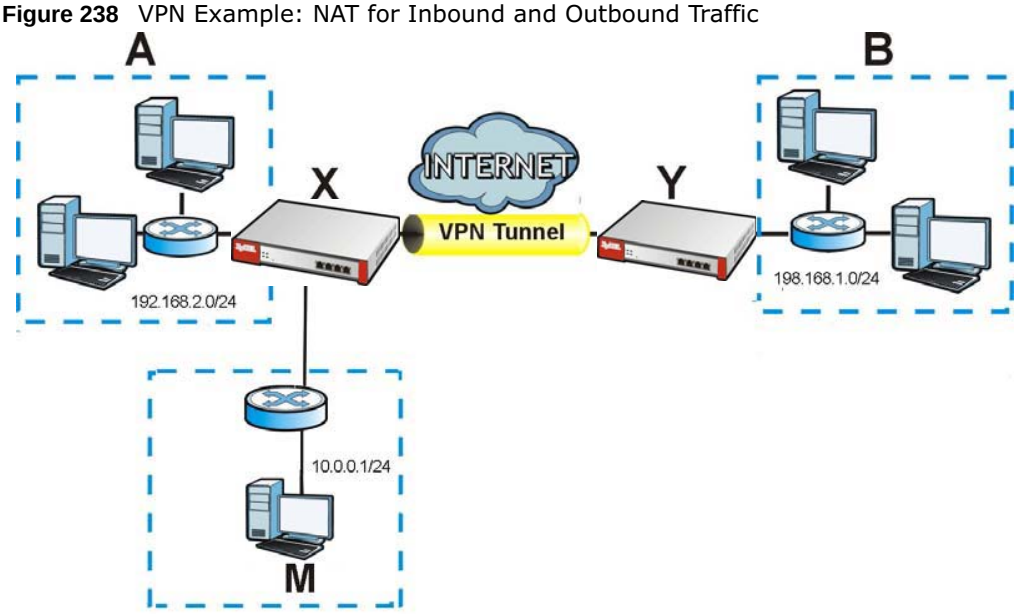
NAT for Inbound and Outbound Traffic

The USG can translate the following types of network addresses in IPSec SA.

- Source address in outbound packets - this translation is necessary if you want the USG to route packets from computers outside the local network through the IPSec SA.
- Source address in inbound packets - this translation hides the source address of computers in the remote network.
- Destination address in inbound packets - this translation is used if you want to forward packets (for example, mail) from the remote network to a specific computer (like the mail server) in the local network.

Each kind of translation is explained below. The following example is used to help explain each one.

Figure 238 VPN Example: NAT for Inbound and Outbound Traffic



Source Address in Outbound Packets (Outbound Traffic, Source NAT)

This translation lets the USG route packets from computers that are not part of the specified local network (local policy) through the IPSec SA. For example, in Figure 238 on page 365, you have to configure this kind of translation if you want computer **M** to establish a connection with any computer in the remote network (**B**). If you do not configure it, the remote IPSec router may not route messages for computer **M** through the IPSec SA because computer **M**'s IP address is not part of its local policy.

To set up this NAT, you have to specify the following information:

- Source - the original source address; most likely, computer **M**'s network.
- Destination - the original destination address; the remote network (**B**).
- SNAT - the translated source address; the local network (**A**).

Source Address in Inbound Packets (Inbound Traffic, Source NAT)

You can set up this translation if you want to change the source address of computers in the remote network. To set up this NAT, you have to specify the following information:

- Source - the original source address; the remote network (**B**).

- Destination - the original destination address; the local network (**A**).
- SNAT - the translated source address; a different IP address (range of addresses) to hide the original source address.

Destination Address in Inbound Packets (Inbound Traffic, Destination NAT)

You can set up this translation if you want the USG to forward some packets from the remote network to a specific computer in the local network. For example, in Figure 238 on page 365, you can configure this kind of translation if you want to forward mail from the remote network to the mail server in the local network (**A**).

You have to specify one or more rules when you set up this kind of NAT. The USG checks these rules similar to the way it checks rules for a security policy. The first part of these rules define the conditions in which the rule apply.

- Original IP - the original destination address; the remote network (**B**).
- Protocol - the protocol [TCP, UDP, or both] used by the service requesting the connection.
- Original Port - the original destination port or range of destination ports; in Figure 238 on page 365, it might be port 25 for SMTP.

The second part of these rules controls the translation when the condition is satisfied.

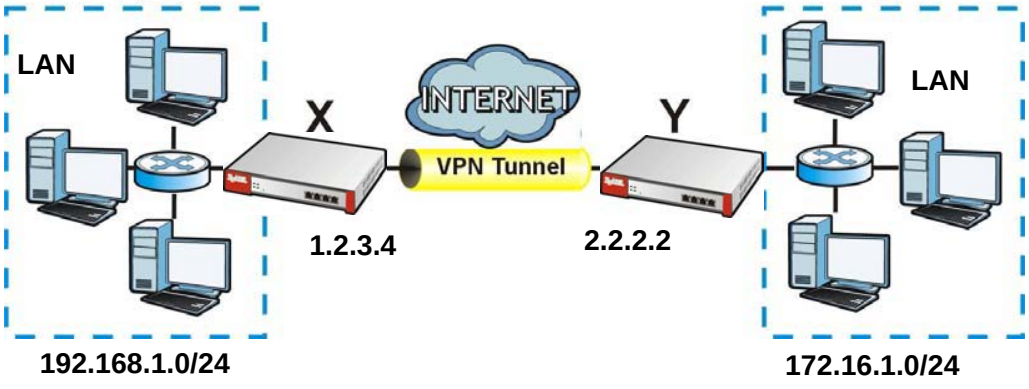
- Mapped IP - the translated destination address; in Figure 238 on page 365, the IP address of the mail server in the local network (**A**).
- Mapped Port - the translated destination port or range of destination ports.

The original port range and the mapped port range must be the same size.

IPSec VPN Example Scenario

Here is an example site-to-site IPSec VPN scenario.

Figure 239 Site-to-site IPSec VPN Example



22

SSL VPN

22.1 Overview

Use SSL VPN to allow users to use a web browser for secure remote user login. The remote users do not need a VPN router or VPN client software.

22.1.1 What You Can Do in this Chapter

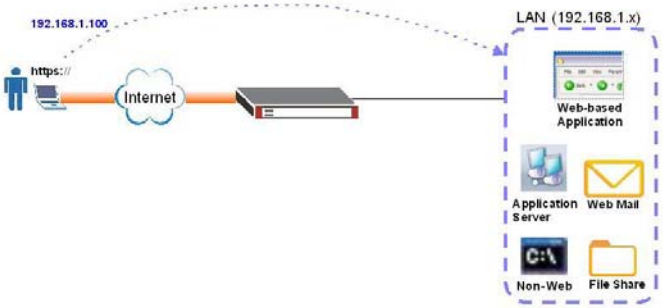
- Use the **VPN > SSL VPN > Access Privilege** screens (see Section 22.2 on page 368) to configure SSL access policies.
- Use the Click **VPN > SSL VPN** > **Global Setting** screen (see Section 22.3 on page 372) to set the IP address of the USG (or a gateway device) on your network for full tunnel mode access, enter access messages or upload a custom logo to be displayed on the remote user screen.
- Use the **VPN > SSL VPN > SecuExtender** screen (see Section 22.4 on page 374) to update and check the current and latest version of the Security Extender.

22.1.2 What You Need to Know

Full Tunnel Mode

In full tunnel mode, a virtual connection is created for remote users with private IP addresses in the same subnet as the local network. This allows them to access network resources in the same way as if they were part of the internal network.

Figure 240 Network Access Mode: Full Tunnel Mode



SSL Access Policy

An SSL access policy allows the USG to perform the following tasks:

- limit user access to specific applications or file sharing server on the network.
- allow user access to specific networks.

- assign private IP addresses and provide DNS/WINS server information to remote users to access internal networks.

SSL Access Policy Objects

The SSL access policies reference the following objects. If you update this information, in response to changes, the USG automatically propagates the changes through the SSL policies that use the object(s). When you delete an SSL policy, the objects are not removed.

Table 143 Objects

OBJECT TYPE	OBJECT SCREEN	DESCRIPTION
User Accounts	User Account/ User Group	Configure a user account or user group to which you want to apply this SSL access policy.
Application	SSL Application	Configure an SSL application object to specify the type of application and the address of the local computer, server, or web site SSL users are to be able to access.
IP Pool	Address	Configure an address object that defines a range of private IP addresses to assign to user computers so they can access the internal network through a VPN connection.
Server Addresses	Address	Configure address objects for the IP addresses of the DNS and WINS servers that the USG sends to the VPN connection users.
VPN Network	Address	Configure an address object to specify which network segment users are allowed to access through a VPN connection.

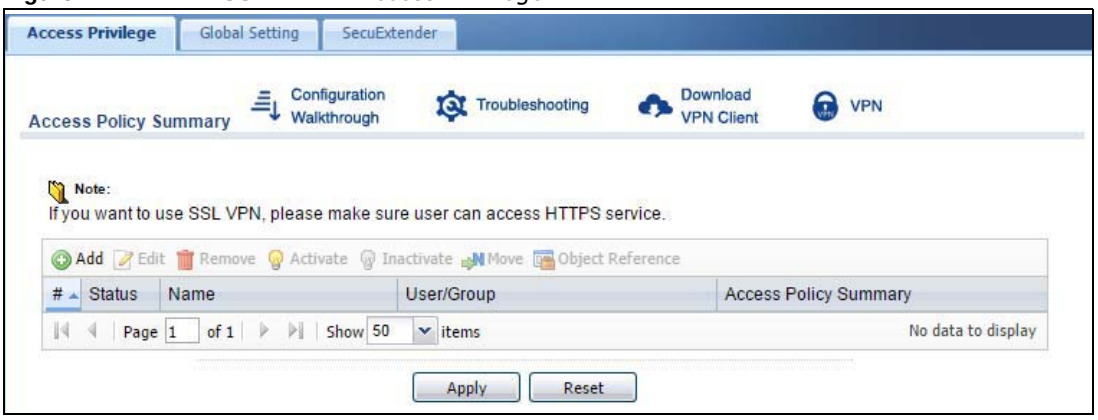
You cannot delete an object that is referenced by an SSL access policy. To delete the object, you must first unassociate the object from the SSL access policy.

22.2 The SSL Access Privilege Screen

Click **VPN > SSL VPN** to open the **Access Privilege** screen. This screen lists the configured SSL access policies.

Click on the icons to go to the OneSecurity.com website where there is guidance on configuration walkthroughs, troubleshooting and other information.

Figure 241 VPN > SSL VPN > Access Privilege



The following table describes the labels in this screen.

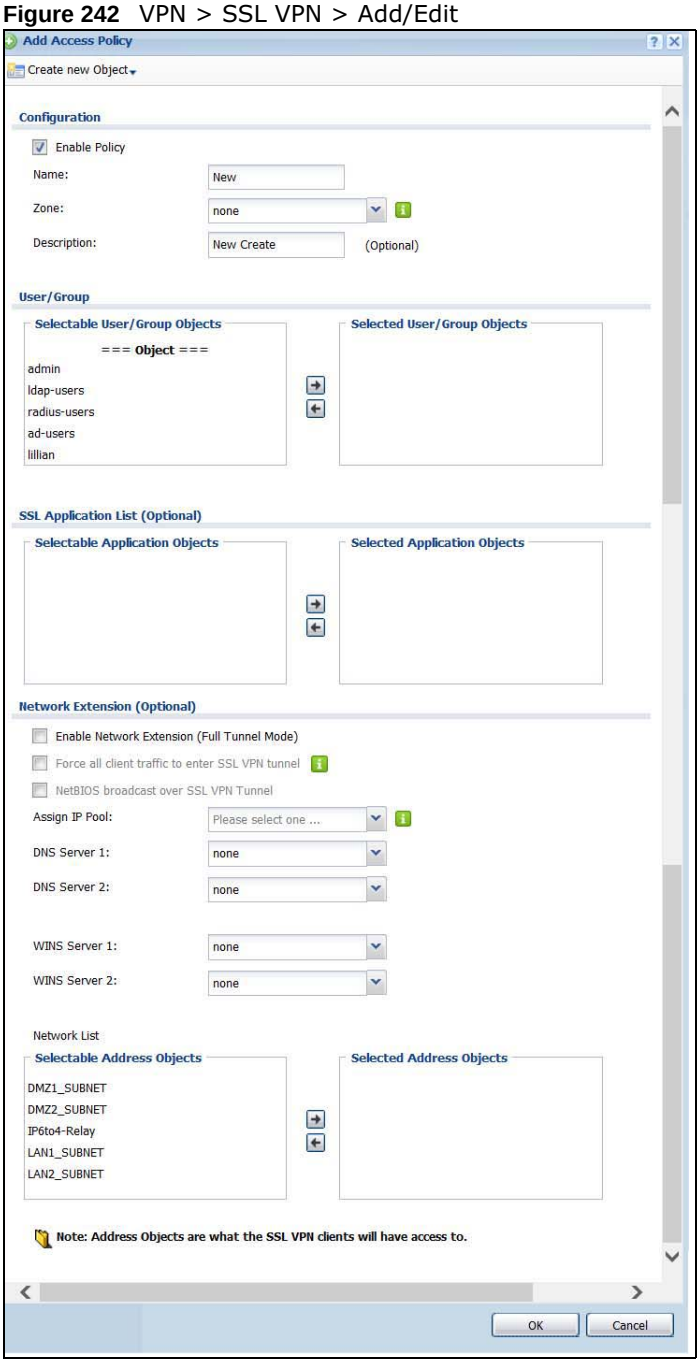
Table 144 VPN > SSL VPN > Access Privilege

LABEL	DESCRIPTION
Access Policy Summary	This screen shows a summary of SSL VPN policies created. Click on the VPN icon to go to the ZyXEL VPN Client product page at the ZyXEL website.
Add	Click this to create a new entry. Select an entry and click **Add** to create a new entry after the selected entry.
Edit	Double-click an entry or select it and click **Edit** to open a screen where you can modify the entry's settings.
Remove	To remove an entry, select it and click **Remove**. The USG confirms you want to remove it before doing so.
Activate	To turn on an entry, select it and click **Activate**.
Inactivate	To turn off an entry, select it and click **Inactivate**.
Move	To move an entry to a different number in the list, click the **Move** icon. In the field that appears, specify the number to which you want to move the interface.
Object References	Select an entry and click **Object Reference**s to open a screen that shows which settings use the entry. Click Refresh to update information on this screen.
#	This field displays the index number of the entry.
Status	This icon is lit when the entry is active and dimmed when the entry is inactive.
Name	This field displays the descriptive name of the SSL access policy for identification purposes.
User/Group	This field displays the user account or user group name(s) associated to an SSL access policy. This field displays up to three names.
Access Policy Summary	This field displays details about the SSL application object this policy uses including its name, type, and address.
Apply	Click **Apply** to save the settings.
Reset	Click **Reset** to discard all changes.

22.2.1 The SSL Access Privilege Policy Add/Edit Screen

To create a new or edit an existing SSL access policy, click the **Add** or **Edit** icon in the **Access Privilege** screen.

Figure 242 VPN > SSL VPN > Add/Edit



The following table describes the labels in this screen.

Table 145 VPN > SSL VPN > Access Privilege > Add/Edit

LABEL	DESCRIPTION
Create new Object	Use to configure any new settings objects that you need to use in this screen.
Configuration	
Enable Policy	Select this option to activate this SSL access policy.

Table 145 VPN > SSL VPN > Access Privilege > Add/Edit (continued)

LABEL	DESCRIPTION
Name	Enter a descriptive name to identify this policy. You can enter up to 31 characters (“a-z”, A-Z”, “0-9”) with no spaces allowed.
Zone	Select the zone to which to add this SSL access policy. You use zones to apply security settings such as security policy and remote management.
Description	Enter additional information about this SSL access policy. You can enter up to 60 characters ("0-9", "a-z", "A-Z", "-" and "_").
User/Group	The **Selectable User/Group Objects** list displays the name(s) of the user account and/or user group(s) to which you have not applied an SSL access policy yet. To associate a user or user group to this SSL access policy, select a user account or user group and click the right arrow button to add to the **Selected User/Group Objects** list. You can select more than one name. To remove a user or user group, select the name(s) in the **Selected User/Group Objects** list and click the left arrow button. Note: Although you can select admin and limited-admin accounts in this screen, they are reserved for device configuration only. You cannot use them to access the SSL VPN portal.
SSL Application List (Optional)	The **Selectable Application Objects** list displays the name(s) of the SSL application(s) you can select for this SSL access policy. To associate an SSL application to this SSL access policy, select a name and click the right arrow button to add to the **Selected Application Objects** list. You can select more than one application. To remove an SSL application, select the name(s) in the **Selected Application Objects** list and click the left arrow button. Note: To allow access to shared files on a Windows 7 computer, within Windows 7 you must enable sharing on the folder and also go to the **Network and Sharing Center**’s **Advanced sharing settings** and turn on the current network profile’s file and printer sharing.
Network Extension (Optional)	
Enable Network Extension	Select this option to create a VPN tunnel between the authenticated users and the internal network. This allows the users to access the resources on the network as if they were on the same local network. This includes access to resources not supported by SSL application objects. For example this lets users Telnet to the internal network even though the USG does not have SSL application objects for Telnet. Clear this option to disable this feature. Users can only access the applications as defined by the VPN tunnel’s selected SSL application settings and the remote user computers are not made to be a part of the local network.
Force all client traffic to SSL VPN tunnel	Select this to send all traffic from the SSL VPN clients through the SSL VPN tunnel. This replaces the default gateway of the SSL VPN clients with the SSL VPN gateway.
NetBIOS broadcast over SSL VPN Tunnel	Select this to search for a remote computer and access its applications as if it was in a Local Area Network. The user can find a computer not only by its IP adress but also by computer name.
Assign IP Pool	Define a separate pool of IP addresses to assign to the SSL users. Select it here. The SSL VPN IP pool should not overlap with IP addresses on the USG's local networks (LAN and DMZ for example), the SSL user's network, or the networks you specify in the SSL VPN **Network List**.
DNS/WINS Server 1..2	Select the name of the DNS or WINS server whose information the USG sends to the remote users. This allows them to access devices on the local network using domain names instead of IP addresses.

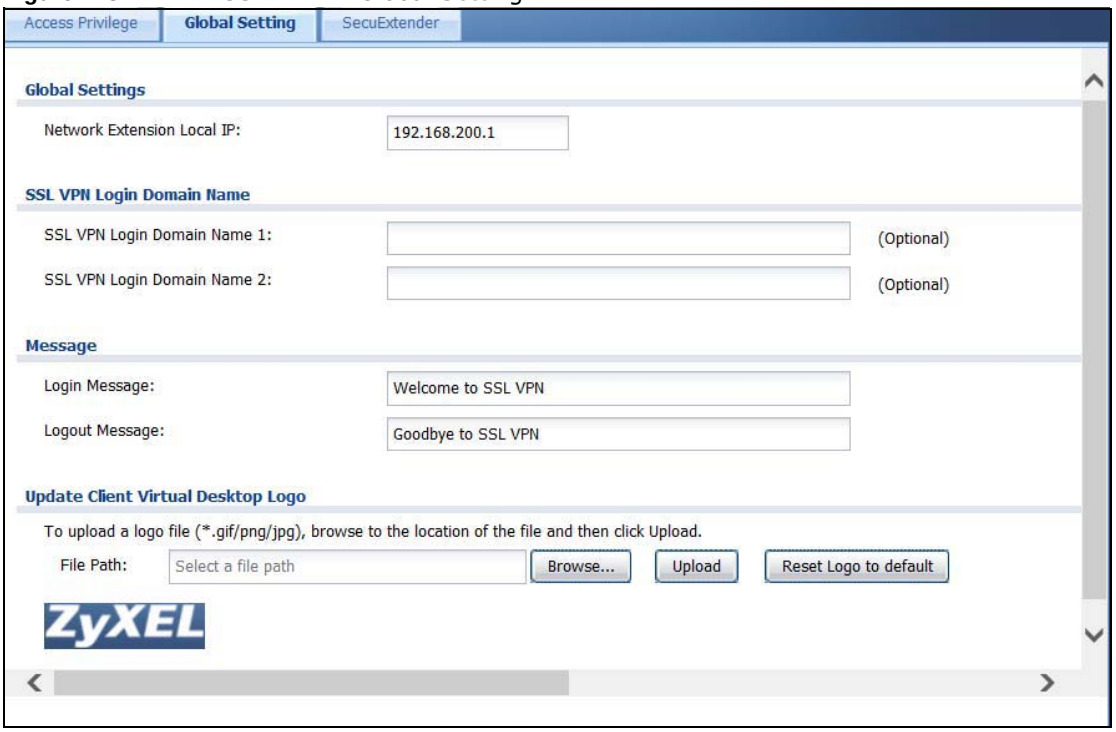
Table 145 VPN > SSL VPN > Access Privilege > Add/Edit (continued)

LABEL	DESCRIPTION
Network List	To allow user access to local network(s), select a network name in the **Selectable Address Objects** list and click the right arrow button to add to the **Selected Address Objects** list. You can select more than one network. To block access to a network, select the network name in the **Selected Address Objects** list and click the left arrow button.
OK	Click **OK** to save the changes and return to the main **Access Privilege** screen.
Cancel	Click **Cancel** to discard all changes and return to the main **Access Privilege** screen.

22.3 The SSL Global Setting Screen

Click **VPN > SSL VPN** and click the **Global Setting** tab to display the following screen. Use this screen to set the IP address of the USG (or a gateway device) on your network for full tunnel mode access, enter access messages or upload a custom logo to be displayed on the remote user screen.

Figure 243 VPN > SSL VPN > Global Setting



The following table describes the labels in this screen.

Table 146 VPN > SSL VPN > Global Setting

LABEL	DESCRIPTION
Global Setting	
Network Extension Local IP	Specify the IP address of the USG (or a gateway device) for full tunnel mode SSL VPN access. Leave this field to the default settings unless it conflicts with another interface.

Table 146 VPN > SSL VPN > Global Setting (continued)

LABEL	DESCRIPTION
SSL VPN Login Domain Name	
SSL VPN Login Domain Name 1/2	Specify a full domain name for users to use for SSL VPN login. The domain name must be registered to one of the USG's IP addresses or be one of the USG's DDNS entries. You can specify up to two domain names so you could use one domain name for each of two WAN ports. For example, www.zyxel.com is a fully qualified domain name where "www" is the host. The USG displays the normal login screen without the button for logging into the Web Configurator.
Message	
Login Message	Specify a message to display on the screen when a user logs in and an SSL VPN connection is established successfully. You can enter up to 60 characters (0-9, a-z, A-Z, '()+,/:=?;!*#@$_%-") with spaces allowed.
Logout Message	Specify a message to display on the screen when a user logs out and the SSL VPN connection is terminated successfully. You can enter up to 60 characters (0-9, a-z, A-Z, '()+,/:=?;!*#@$_%-") with spaces allowed.
Update Client Virtual Desktop Logo	You can upload a graphic logo to be displayed on the web browser on the remote user computer. The ZyXEL company logo is the default logo. Specify the location and file name of the logo graphic or click **Browse** to locate it. Note: The logo graphic must be GIF, JPG, or PNG format. The graphic should use a resolution of 103 x 29 pixels to avoid distortion when displayed. The USG automatically resizes a graphic of a different resolution to 103 x 29 pixels. The file size must be 100 kilobytes or less. Transparent background is recommended.
Browse	Click **Browse** to locate the graphic file on your computer.
Upload	Click **Upload** to transfer the specified graphic file from your computer to the USG.
Reset Logo to Default	Click **Reset Logo to Default** to display the ZyXEL company logo on the remote user's web browser.
Apply	Click **Apply** to save the changes and/or start the logo file upload process.
Reset	Click **Reset** to return the screen to its last-saved settings.

22.3.1 How to Upload a Custom Logo

Follow the steps below to upload a custom logo to display on the remote user SSL VPN screens.

1 Click **VPN > SSL VPN** and click the **Global Setting** tab to display the configuration screen.

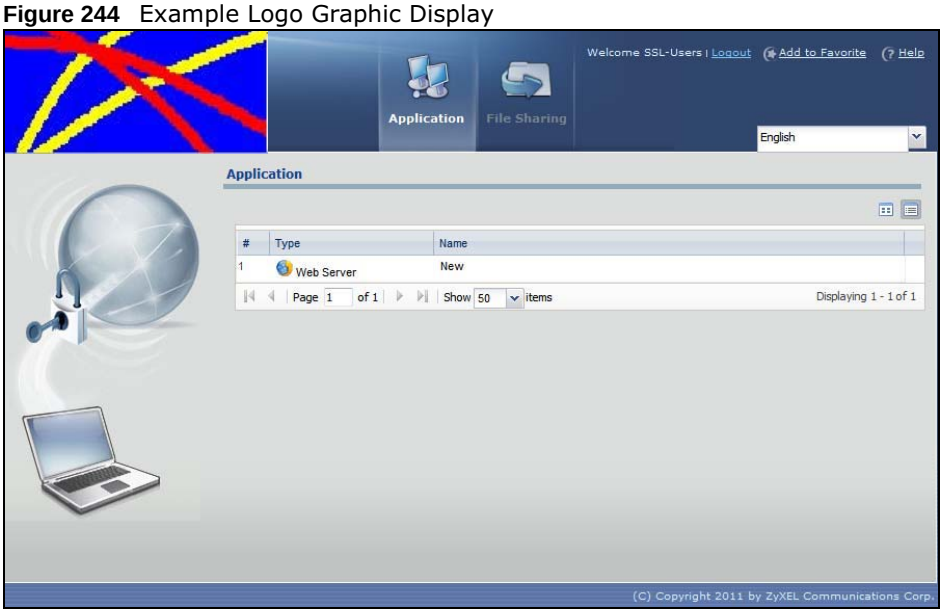
2 Click **Browse** to locate the logo graphic. Make sure the file is in GIF, JPG, or PNG format.

3 Click **Apply** to start the file transfer process.

4 Log in as a user to verify that the new logo displays properly.

The following shows an example logo on the remote user screen.

Figure 244 Example Logo Graphic Display



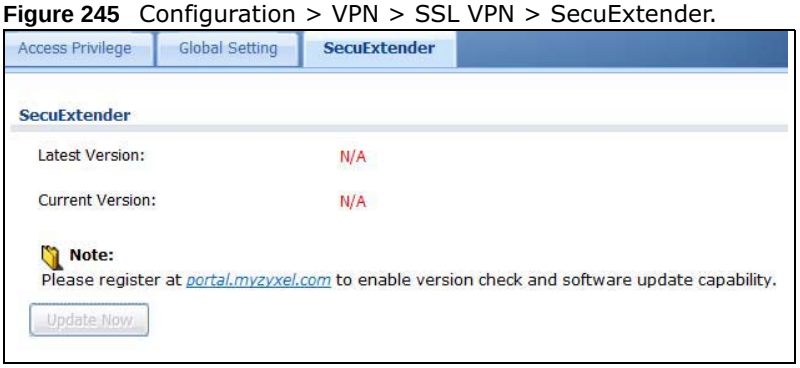
22.4 USG SecuExtender

The USG automatically loads the USG SecuExtender client program to your computer after a successful login to an SSL VPN tunnel with network extension support enabled. The USG SecuExtender lets you:

- Access servers, remote desktops and manage files as if you were on the local network.
- Use applications like e-mail, file transfer, and remote desktop programs directly without using a browser. For example, you can use Outlook for e-mail instead of the USG's web-based e-mail.
- Use applications, even proprietary applications, for which the USG does not offer SSL application objects.

The applications must be installed on your computer. For example, to use the VNC remote desktop program, you must have the VNC client installed on your computer. Please refer to the **SecuExtender** chapter for details.

Figure 245 Configuration > VPN > SSL VPN > SecuExtender.



The following table describes the labels in this screen.

Table 147 Configuration > VPN > SSL VPN > SecuExtender

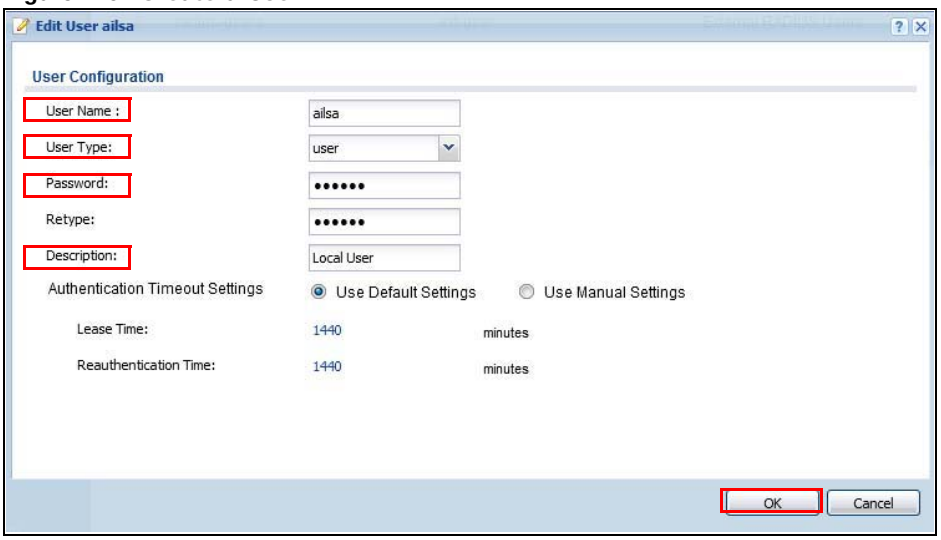
LABEL	DESCRIPTION
Latest Version	This displays the latest version of the USG Security SecuExtender that is available.
Current Version	This displays the current version of SecuExtender that is installed in the USG.
Note:	You need to register first at portal.myzyxel.com to download the latest version of SecuExtender.
Update Now	The USG periodically checks if there's a later version of SecuExtender at the portal. The **Update Now** button is enabled when thre is.Click **Update Now** to get the latest version of SecuExtender.

22.4.1 Example: Configure USG for SecuExtender

Make these configurations on the USG to allow the remote user to access resources behind the USG using SecuExtender. These steps can be performed in any order.

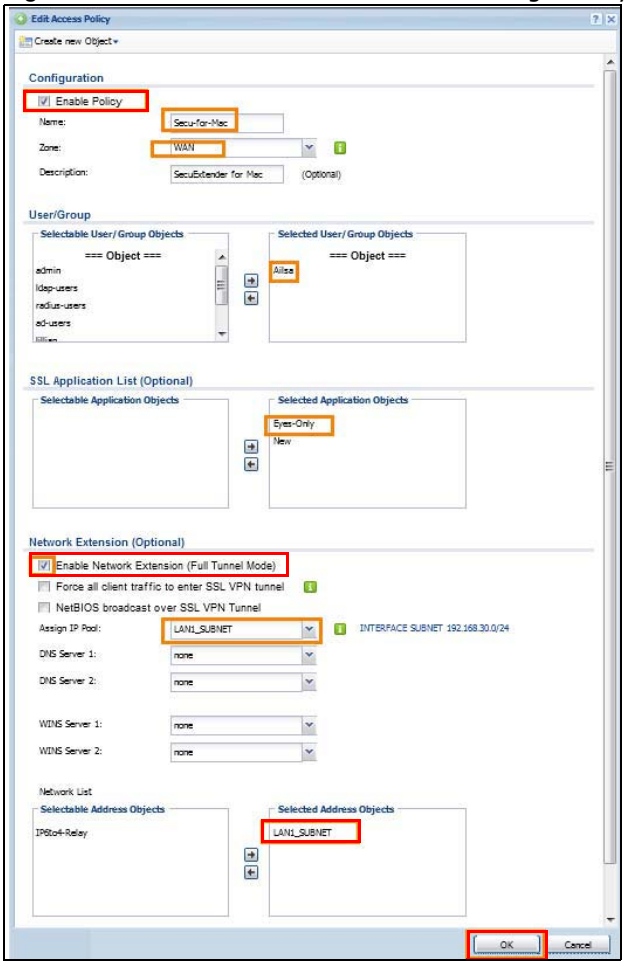
1 Create a user that can log into the USG. Using the USG web configurator, go to **Configuration > Object > User > Add** and substitute your information for the information shown in the following example.

Figure 246 Create a User



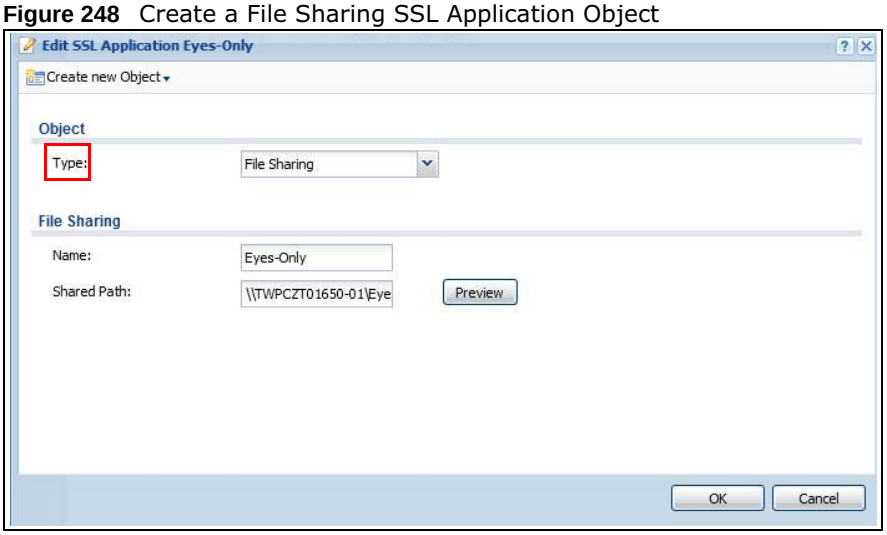
2 Next create an SSL VPN Access Privilege policy substituting your information for the information shown in the following example. Using the USG web configurator, go to **Configuration > VPN > SSL VPN > Access Privilege > Add**.

Figure 247 Create an SSL VPN Access Privilege Policy

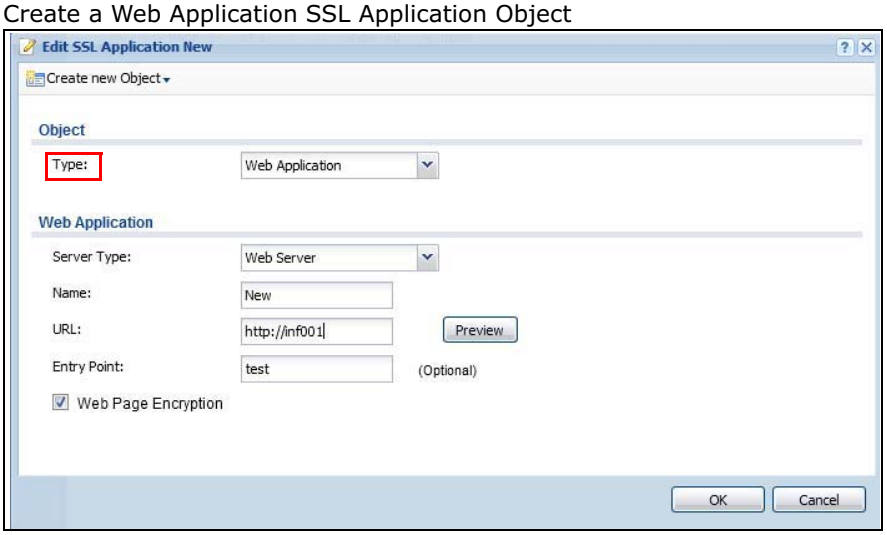


3 Then create **File Sharing** and **Web Application** SSL Application objects. Using the USG web configurator, go to **Configuration > Object > SSL Application > Add** and select the **Type** accordingly. Substitute your information for the information shown in the following example.

Figure 248 Create a File Sharing SSL Application Object



Create a Web Application SSL Application Object



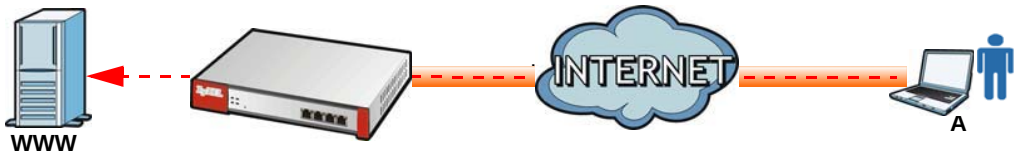
23

SSL User Screens

23.1 Overview

This chapter introduces the remote user SSL VPN screens. The following figure shows a network example where a remote user (**A**) logs into the USG from the Internet to access the web server (**WWW**) on the local network.

Figure 249 Network Example



23.1.1 What You Need to Know

The USG can use SSL VPN to provide secure connections to network resources such as applications, files, intranet sites or e-mail through a web-based interface and using Microsoft Outlook Web Access (OWA).

Network Resource Access Methods

As a remote user, you can access resources on the local network using one of the following methods.

- Using a supported web browser

  Once you have successfully logged in through the USG, you can access intranet sites, web-based applications, or web-based e-mails using one of the supported web browsers.
- Using the USG SecuExtender client

  Once you have successfully logged into the USG, if the SSL VPN access policy has network extension enabled the USG automatically loads the USG SecuExtender client program to your computer. With the USG SecuExtender, you can access network resources, remote desktops and manage files as if you were on the local network. See Chapter 24 on page 391 for more on the USG SecuExtender.

System Requirements

Here are the browser and computer system requirements for remote user access.

- Windows 7 (32 or 64-bit), Vista (32 or 64-bit), 2003 (32-bit), XP (32-bit), or 2000 (32-bit)
- Internet Explorer 7 and above or Firefox 1.5 and above

- Using RDP requires Internet Explorer
- Sun's Runtime Environment (JRE) version 1.6 or later installed and enabled.

Required Information

A remote user needs the following information from the network administrator to log in and access network resources.

- the domain name or IP address of the USG
- the login account user name and password
- if also required, the user name and/or password to access the network resource

Certificates

The remote user's computer establishes an HTTPS connection to the USG to access the login screen. If instructed by your network administrator, you must install or import a certificate (provided by the USG or your network administrator).

Finding Out More

See Chapter 22 on page 367 for how to configure SSL VPN on the USG.

23.2 Remote SSL User Login

This section shows you how to access and log into the network through the USG. Example screens for Internet Explorer are shown.

1 Open a web browser and enter the web site address or IP address of the USG. For example, "http://sslvpn.mycompany.com".

Figure 250 Enter the Address in a Web Browser

2 Click **OK** or **Yes** if a security screen displays.

Figure 251 Login Security Screen

3 A login screen displays. Enter the user name and password of your login account. If a token password is also required, enter it in the **One-Time Password** field. Click **SSL VPN** to log in and establish an SSL VPN connection to the network to access network resources.

Figure 252 Login Screen

4 Your computer starts establishing a secure connection to the USG after a successful login. This may take up to two minutes. If you get a message about needing Java, download and install it and restart your browser and re-login. If a certificate warning screen displays, click **OK**, **Yes** or **Continue**.

Figure 253 Java Needed Message

5 The USG tries to install the SecuExtender client. As shown next, you may have to click some pop-ups to get your browser to allow the installation.

Figure 254 ActiveX Object Installation Blocked by Browser

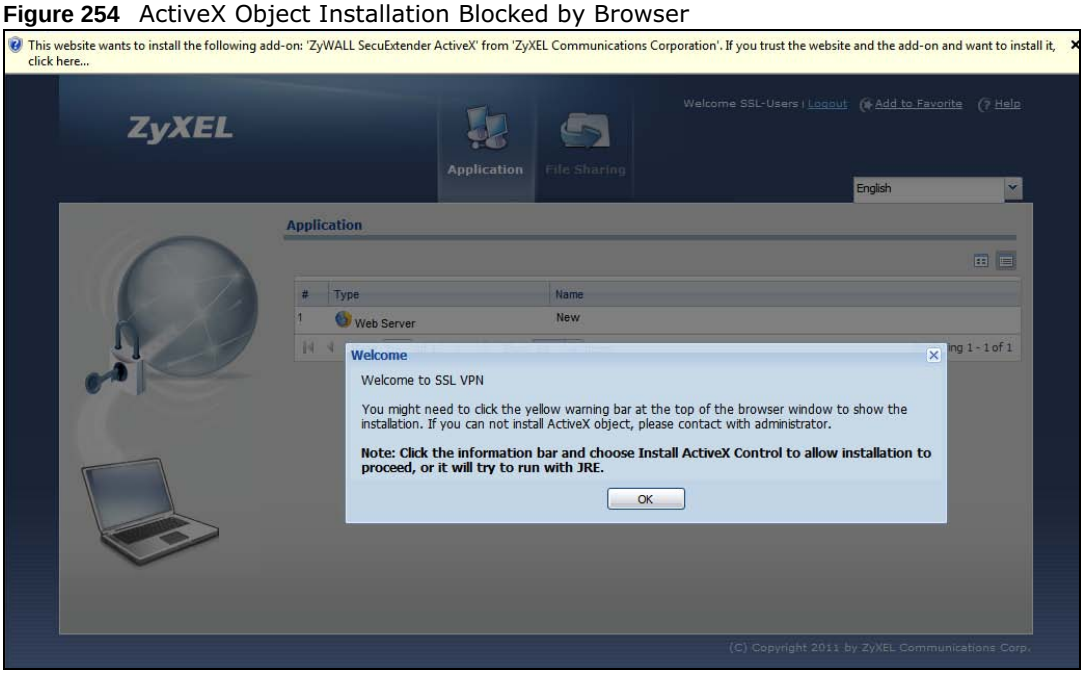
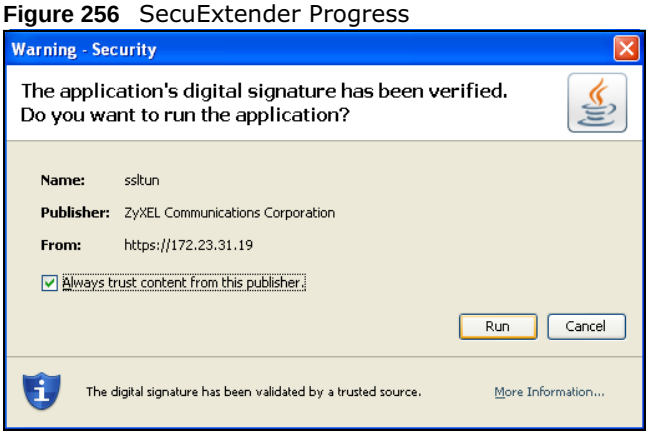


Figure 255 SecuExtender Blocked by Internet Explorer

6 The USG tries to run the "ssltun" application. You may need to click something to get your browser to allow this. In Internet Explorer, click **Run**.

Figure 256 SecuExtender Progress

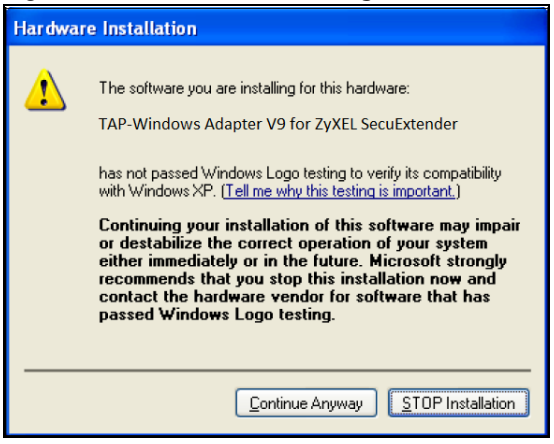


7 Click **Next** to use the setup wizard to install the SecuExtender client on your computer.

Figure 257 SecuExtender Progress

8 If a screen like the following displays, click **Continue Anyway** to finish installing the SecuExtender client on your computer.

Figure 258 Installation Warning



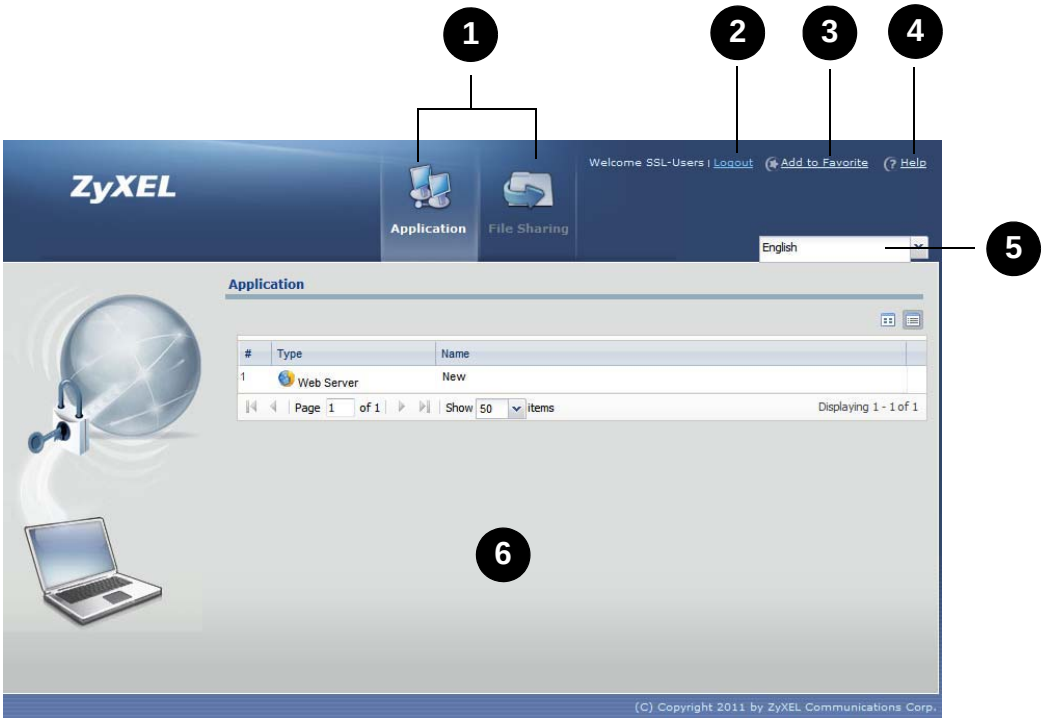
9 The **Application** screen displays showing the list of resources available to you. See Figure 259 on page 383 for a screen example.

Note: Available resource links vary depending on the configuration your network administrator made.

23.3 The SSL VPN User Screens

This section describes the main elements in the remote user screens.

Figure 259 Remote User Screen



The following table describes the various parts of a remote user screen.

Table 148 Remote User Screen Overview

#	DESCRIPTION
1	Click on a menu tab to go to the **Application** or **File Sharing** screen.
2	Click this icon to log out and terminate the secure connection.
3	Click this icon to create a bookmark to the SSL VPN user screen in your web browser.
4	Click this icon to display the on-line help window.
5	Select your preferred language for the interface.
6	This part of the screen displays a list of the resources available to you. In the **Application** screen, click on a link to access or display the access method. In the **File Sharing** screen, click on a link to open a file or directory.

23.4 Bookmarking the USG

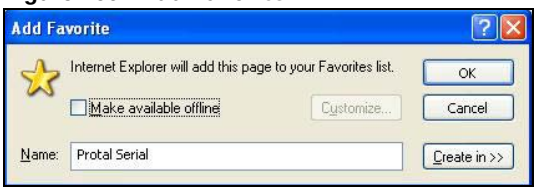
You can create a bookmark of the USG by clicking the **Add to Favorite** icon. This allows you to access the USG using the bookmark without having to enter the address every time.

1 In any remote user screen, click the **Add to Favorite** icon.

2 A screen displays. Accept the default name in the **Name** field or enter a descriptive name to identify this link.

3 Click **OK** to create a bookmark in your web browser.

Figure 260 Add Favorite



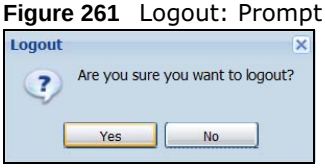
23.5 Logging Out of the SSL VPN User Screens

To properly terminate a connection, click on the **Logout** icon in any remote user screen.

1 Click the **Logout** icon in any remote user screen.

2 A prompt window displays. Click **OK** to continue.

Figure 261 Logout: Prompt



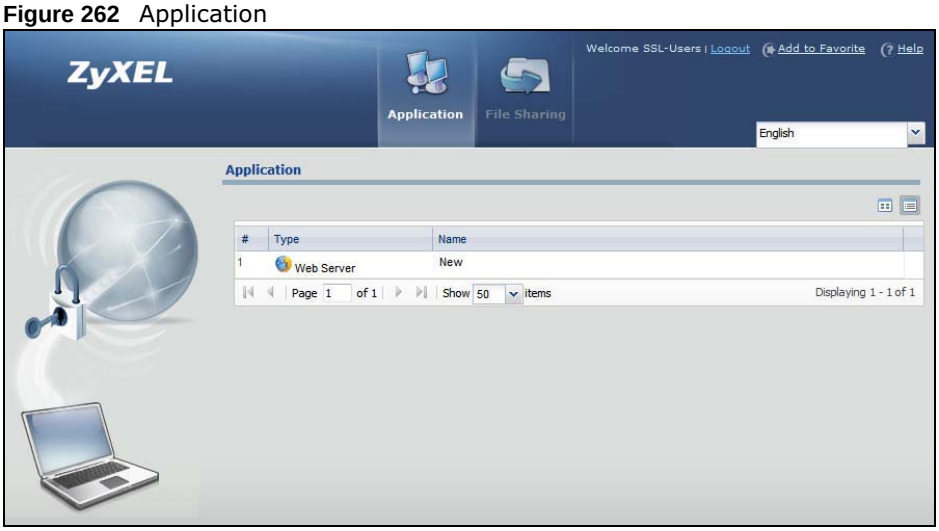
23.6 SSL User Application Screen

Use the **Application** tab's screen to access web-based applications (such as web sites and e-mail) on the network through the SSL VPN connection. Which applications you can access depends on the USG's configuration.

The **Name** field displays the descriptive name for an application. The **Type** field displays wether the application is a web site (**Web Server**) or web-based e-mail using Microsoft Outlook Web Access (**OWA**).

To access a web-based application, simply click a link in the **Application** screen to display the web screen in a separate browser window.

Figure 262 Application



23.7 SSL User File Sharing

The **File Sharing** screen lets you access files on a file server through the SSL VPN connection. Use it to display and access shared files/folders on a file server.

You can also perform the following actions:

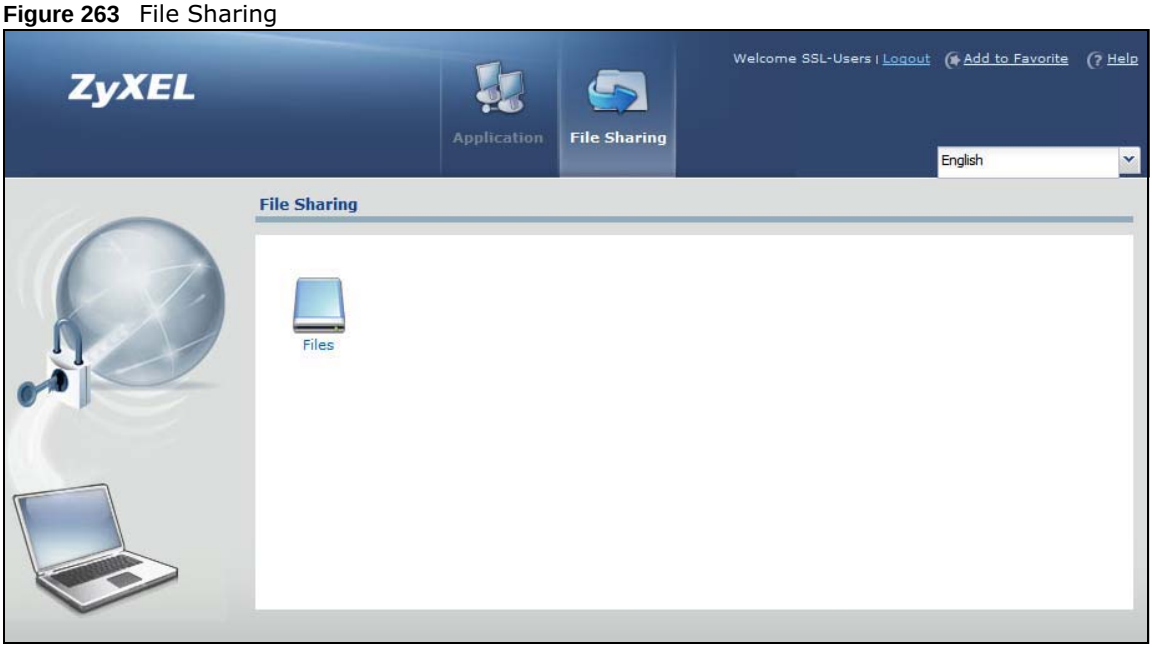
- Access a folder.
- Open a file (if your web browser cannot open the file, you are prompted to download it).
- Save a file to your computer.
- Create a new folder.
- Rename a file or folder.
- Delete a file or folder.
- Upload a file.

Note: Available actions you can perform in the **File Sharing** screen vary depending on the rights granted to you on the file server.

23.7.1 The Main File Sharing Screen

The first **File Sharing** screen displays the name(s) of the shared folder(s) available. The following figure shows an example with one file share.

Figure 263 File Sharing



23.7.2 Opening a File or Folder

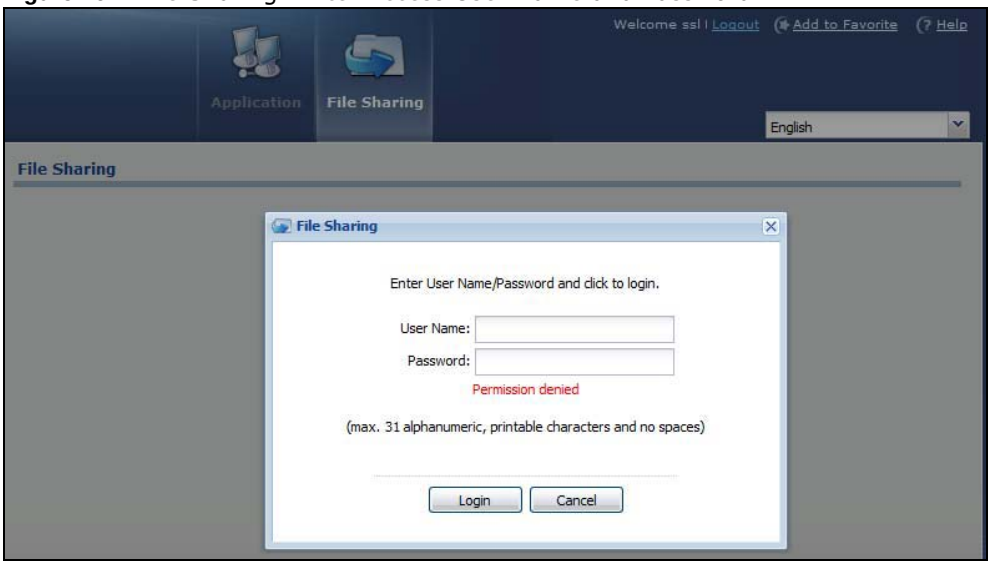
You can open a file if the file extension is recognized by the web browser and the associated application is installed on your computer.

1 Log in as a remote user and click the **File Sharing** tab.

2 Click on a file share icon.

3 If an access user name and password are required, a screen displays as shown in the following figure. Enter the account information and click **Login** to continue.

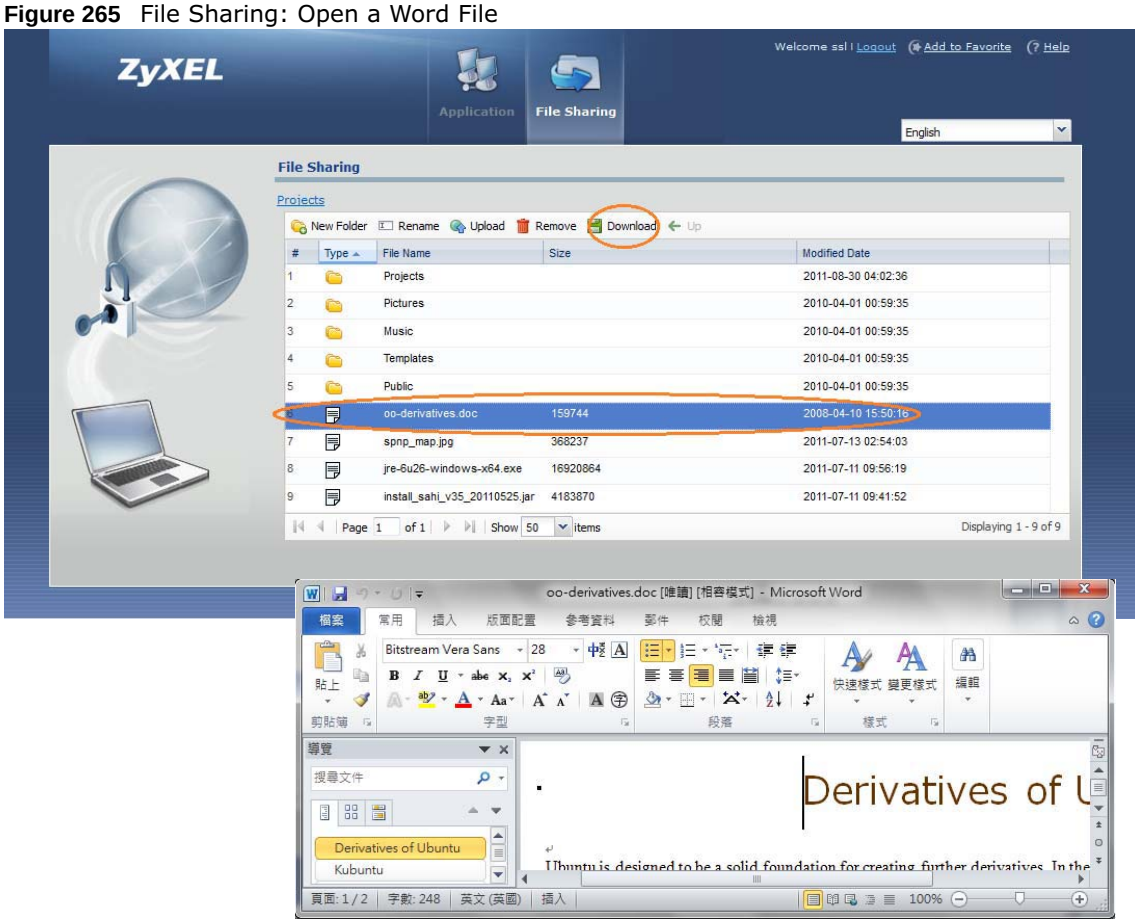
Figure 264 File Sharing: Enter Access User Name and Password



4 A list of files/folders displays. Double click a file to open it in a separate browser window or select a file and click **Download** to save it to your computer. You can also click a folder to access it.

For this example, click on a .doc file to open the Word document.

Figure 265 File Sharing: Open a Word File



23.7.3 Downloading a File

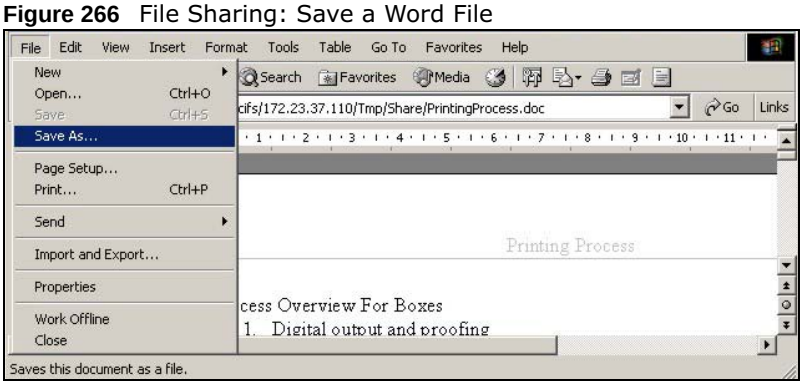
You are prompted to download a file which cannot be opened using a web browser.

Follow the on-screen instructions to download and save the file to your computer. Then launch the associated application to open the file.

23.7.4 Saving a File

After you have opened a file in a web browser, you can save a copy of the file by clicking **File > Save As** and following the on-screen instructions.

Figure 266 File Sharing: Save a Word File



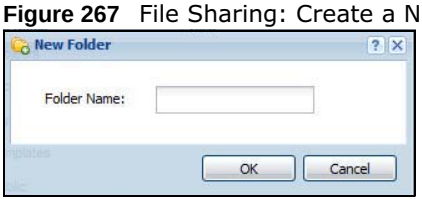
23.7.5 Creating a New Folder

To create a new folder in the file share location, click the **New Folder** icon.

Specify a descriptive name for the folder. You can enter up to 356 characters. Then click **Add**.

Note: Make sure the length of the folder name does not exceed the maximum allowed on the file server.

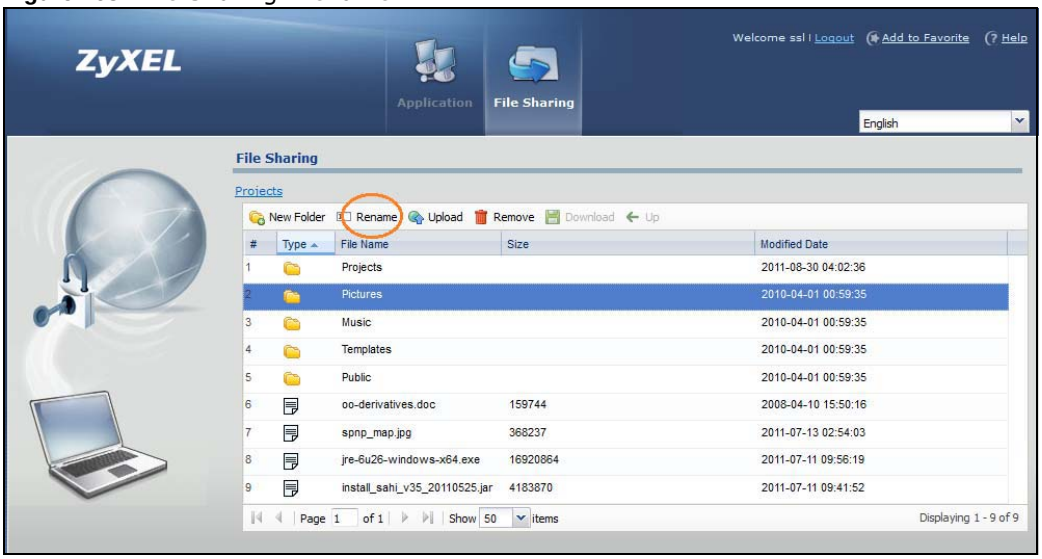
Figure 267 File Sharing: Create a New Folder



23.7.6 Renaming a File or Folder

To rename a file or folder, select a file or folder and click the **Rename** icon.

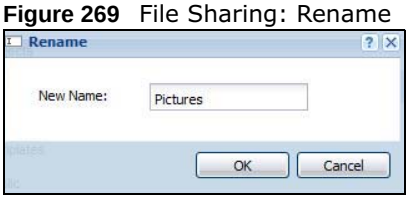
Figure 268 File Sharing: Rename



A popup window displays. Specify the new name and/or file extension in the field provided. You can enter up to 356 characters. Then click **Apply**.

Note: Make sure the length of the name does not exceed the maximum allowed on the file server.
You may not be able to open a file if you change the file extension.

Figure 269 File Sharing: Rename



23.7.7 Deleting a File or Folder

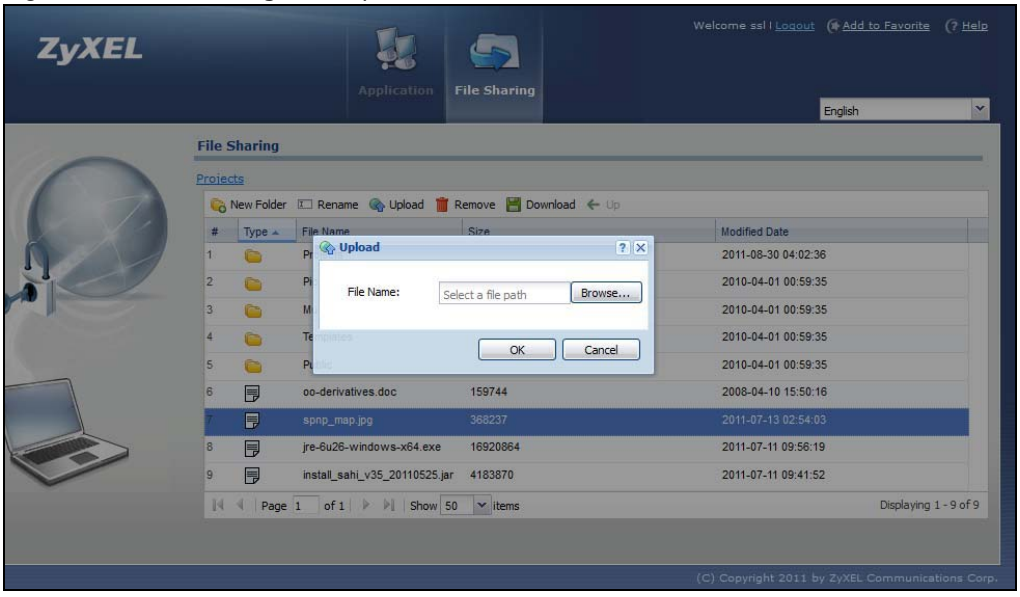
Click the **Delete** icon next to a file or folder to remove it.

23.7.8 Uploading a File

Follow the steps below to upload a file to the file server.

1. Log into the remote user screen and click the **File Sharing** tab.
2. Click **Upload** and specify the location and/or name of the file you want to upload. Or click **Browse** to locate it.
3. Click **OK** to send the file to the file server.
4. After the file is uploaded successfully, you should see the name of the file and a message in the screen.

Figure 270 File Sharing: File Upload



Note: Uploading a file with the same name and file extension replaces the existing file on the file server. No warning message is displayed.