Assigning a RIP filter list to the outgoing filter

The outgoing filter allows or denies adding routes to outgoing RIP update packets. You can assign a single RIP filter list to the outgoing filter.

To assign a RIP filter list to the outgoing filter

1. Go to **System > RIP > Filter**.
2. Add RIP filter lists as required.
3. For Outgoing Routes Filter, select the name of the RIP filter list to assign to the outgoing filter.
4. Select Apply.

System configuration

Use the System Config page to make any of the following changes to the FortiWiFi system configuration:

- Setting system date and time
- Changing system options
- Adding and editing administrator accounts
- Configuring SNMP
- Replacement messages

Setting system date and time

For effective scheduling and logging, the FortiWiFi system time must be accurate. You can either manually set the FortiWiFi system time or you can configure the FortiWiFi unit to automatically keep its system time correct by synchronizing with a Network Time Protocol (NTP) server.

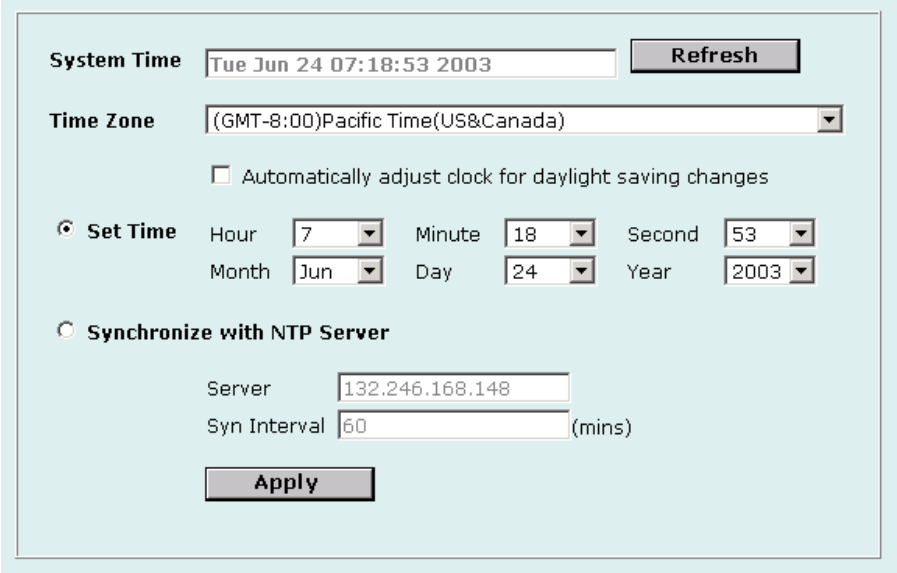
To set the date and time

1. Go to **System > Config > Time**.
2. Select Refresh to display the current FortiWiFi system date and time.
3. Select your Time Zone from the list.
4. Select the Automatically adjust clock for daylight saving changes check box if you want the FortiWiFi system clock to be adjusted automatically when your time zone changes to daylight saving time.
5. Select Set Time and set the FortiWiFi system date and time to the correct date and time, if required.
6. Select Synchronize with NTP Server to configure the FortiWiFi unit to use NTP to automatically set the system time and date.

   For more information about NTP and to find the IP address of an NTP server that you can use, see http://www.ntp.org.
7. Enter the IP address or domain name of the NTP server that the FortiWiFi unit can use to set its time and date.
8. Specify how often the FortiWiFi unit should synchronize its time with the NTP server. A typical Syn Interval would be 1440 minutes for the FortiWiFi unit to synchronize its time once a day.

9 Select Apply.

Figure 1: Example date and time setting



Changing system options

On the System Config Options page, you can:

- Set the system idle timeout.
- Set the authentication timeout.
- Select the language for the web-base manager.
- Modify the dead gateway detection settings.

To set the system idle timeout

1 Go to **System > Config > Options**.

2 For Idle Timeout, type a number in minutes.

3 Select Apply.

Idle Timeout controls the amount of inactive time that the web-based manager waits before requiring the administrator to log in again.

The default idle time out is 5 minutes. The maximum idle time out is 480 minutes (8 hours).

To set the Auth timeout

1 Go to **System > Config > Options**.

2 For Auth Timeout, type a number in minutes.

3 Select Apply.

Auth Timeout controls the amount of inactive time that the firewall waits before requiring users to authenticate again. For more information, see "Users and authentication" on page 193.

The default Auth Timeout is 15 minutes. The maximum Auth Timeout is 480 minutes (8 hours).

To select a language for the web-based manager

1 Go to **System > Config > Options**.

2 From the Languages list, select a language for the web-based manager to use.

3 Select Apply.

You can choose English, Simplified Chinese, Japanese, Korean, or Traditional Chinese.

Note: When the web-based manager language is set to use Simplified Chinese, Japanese, Korean, or Traditional Chinese, you can change to English by selecting the English button on the upper right of the web-based manager.

Modifying the Dead Gateway Detection settings

Modify dead gateway detection to control how the FortiWiFi unit confirms connectivity with a ping server added to an interface configuration. For information about adding a ping server to an interface, see "Adding a ping server to an interface" on page 117.

To modify the dead gateway detection settings

1 Go to **System > Config > Options**.

2 For Detection Interval, type a number in seconds to specify how often the FortiWiFi unit tests the connection to the ping target.

3 For Fail-over Detection, type a number of times that the connection test fails before the FortiWiFi unit assumes that the gateway is no longer functioning.

4 Select Apply.

Adding and editing administrator accounts

When the FortiWiFi unit is initially installed, it is configured with a single administrator account with the user name admin. From this administrator account, you can add and edit administrator accounts. You can also control the access level of each of these administrator accounts and control the IP address from which the administrator can connect to the FortiWiFi unit.

There are three administration account access levels:

admin	Has all permissions. Can view, add, edit, and delete administrator accounts. Can view and change the FortiWiFi configuration. The admin user is the only user who can go to the System Status page and manually update firmware, update the antivirus definitions, update the attack definitions, download or upload system settings, restore the FortiWiFi unit to factory defaults, restart the FortiWiFi unit, and shut down the FortiWiFi unit. There is only one admin user.
Read & Write	Can view and change the FortiWiFi configuration. Can view but cannot add, edit, or delete administrator accounts. Can change own administrator account password. Cannot make changes to system settings from the System Status page.
Read Only	Can view the FortiWiFi configuration.

Adding new administrator accounts

From the admin account, use the following procedure to add new administrator accounts and control their permission levels.

To add an administrator account

1. Go to **System > Config > Admin**.
2. Select New to add an administrator account.
3. Type a login name for the administrator account.

   The login name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.
4. Type and confirm a password for the administrator account.

   For improved security, the password should be at least 6 characters long. The password can contain any characters except spaces.
5. Optionally type a Trusted Host IP address and netmask for the location from which the administrator can log into the web-based manager.

   If you want the administrator to be able to access the FortiWiFi unit from any address, set the trusted host to 0.0.0.0 and the netmask to 0.0.0.0.

   To limit the administrator to only access the FortiWiFi unit from a specific network, set the trusted host to the address of the network and set the netmask to the netmask for the network. For example, to limit an administrator to accessing the FortiWiFi unit from your internal network, set the trusted host to the address of your internal network (for example, 192.168.1.0) and set the netmask to 255.255.255.0.
6. Set the Permission level for the administrator.
7. Select OK to add the administrator account.

Editing administrator accounts

The admin account user can change individual administrator account passwords, configure the IP addresses from which administrators can access the web-based manager, and change the administrator permission levels.

Administrator account users with Read & Write access can change their own administrator passwords.

To edit an administrator account

1. Go to **System > Config > Admin**.
2. To change an administrator account password, select Change Password .
3. Type the Old Password.
4. Type and confirm a new password.

   For improved security, the password should be at least 6 characters long. The password can contain any characters except spaces. If you enter a password that is less than 6 characters long, the system displays a warning message but still accepts the password.
5. Select OK.
6. To edit the settings of an administrator account, select Edit .
7. Optionally type a Trusted Host IP address and netmask for the location from which the administrator can log into the web-based manager.

   If you want the administrator to be able to access the FortiWiFi unit from any address, set the trusted host to 0.0.0.0 and the netmask to 255.255.255.255.

   To limit the administrator to only be able to access the FortiWiFi unit from a specific network, set the trusted host to the address of the network and set the netmask to the netmask for the network. For example, to limit an administrator to accessing the FortiWiFi unit from your internal network, set the trusted host to the address of your internal network (for example, 192.168.1.0) and set the netmask to 255.255.255.0.
8. Change the administrator's permission level as required.
9. Select OK.
10. To delete an administrator account, choose the account to delete and select Delete .

Configuring SNMP

You can configure the FortiWiFi SNMP agent to report system information and send traps to SNMP managers. Using an SNMP manager, you can access SNMP traps and data from any FortiWiFi interface or VLAN subinterface configured for SNMP management access.

The FortiWiFi SNMP implementation is read-only. SNMP v1 and v2c compliant SNMP managers have read-only access to FortiWiFi system information and can receive FortiWiFi traps. To monitor FortiWiFi system information and receive FortiWiFi traps you must compile Fortinet proprietary MIBs as well as Fortinet-supported standard MIBs into your SNMP manager.

RFC support includes support for most of RFC 2665 (Ethernet-like MIB) and most of RFC 1213 (MIB II) (for more information, see FortiWiFi MIBs).

This section describes:

- Configuring the FortiWiFi unit for SNMP monitoring
- Configuring FortiWiFi SNMP support
- FortiWiFi MIBs
- FortiWiFi traps
- Fortinet MIB fields

Configuring the FortiWiFi unit for SNMP monitoring

Before a remote SNMP manager can connect to the FortiWiFi agent, you must configure one or more FortiWiFi interfaces to accept SNMP connections. See "Controlling administrative access to an interface" on page 117.

Configuring FortiWiFi SNMP support

Use the information in this section to configure the FortiWiFi unit so that an SNMP manager can connect to the FortiWiFi SNMP agent to receive management information and traps.

- Configuring SNMP access to an interface
- Configuring SNMP community settings

Configuring SNMP access to an interface

Before a remote SNMP manager can connect to the FortiWiFi agent, you must configure one or more FortiWiFi interface's to accept SNMP connections. The configuration steps to follow depend on whether the FortiWiFi unit is operating in NAT/Route mode or Transparent mode.

To configure SNMP access to an interface in NAT/Route mode

1. Go to **System > Network > Interface**.
2. Choose the interface that the SNMP manager connects to and select Modify .
3. For Administrative Access select SNMP.
4. Select OK.

To configure SNMP access to an interface in Transparent mode

1. Go to **System > Network > Management**.
2. Choose the interface that the SNMP manager connects to and select SNMP.

Select Apply.

Configuring SNMP community settings

You can configure a single SNMP community for each FortiWiFi device. An SNMP community consists of identifying information about the FortiWiFi unit, your SNMP get community and trap community strings, and the IP addresses of up to three SNMP managers that can receive traps sent by the FortiWiFi SNMP agent.

To configure SNMP community settings

1 Go to **System > Config > SNMP v1/v2c**.

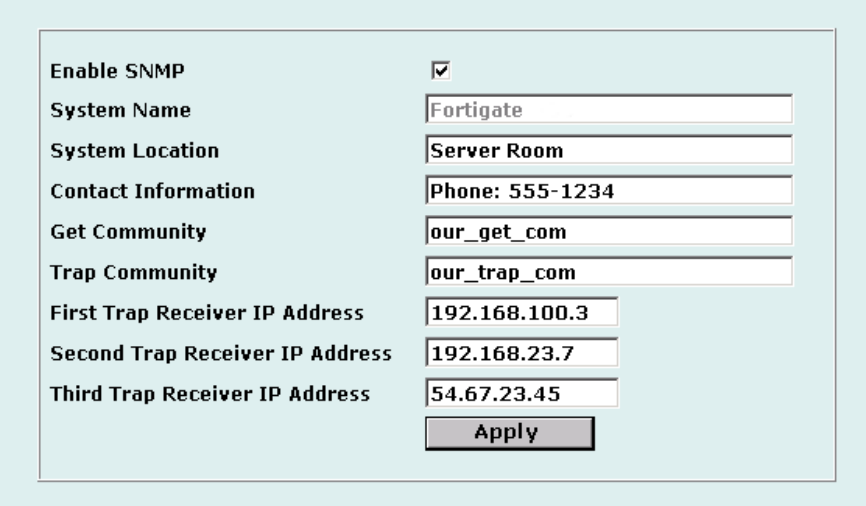
2 Select the Enable SNMP check box.

3 Configure the following SNMP settings:

System Name	Automatically set to the FortiWiFi host name. To change the System Name, see "Changing the FortiWiFi host name" on page 74.
System Location	Describe the physical location of the FortiWiFi unit. The system location description can be up to 31 characters long and can contain spaces, numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. The \ < > [ ] ` $ % & characters are not allowed.
Contact Information	Add the contact information for the person responsible for this FortiWiFi unit. The contact information can be up to 31 characters long and can contain spaces, numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. The \ < > [ ] ` $ % & characters are not allowed.
Get Community	Also called read community, get community is a password to identify SNMP get requests sent to the FortiWiFi unit. When an SNMP manager sends a get request to the FortiWiFi unit, it must include the correct get community string. The default get community string is "public". Change the default get community string to keep intruders from using get requests to retrieve information about your network configuration. The get community string must be used in your SNMP manager to enable it to access FortiWiFi SNMP information. The get community string can be up to 31 characters long and can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Spaces and the \ < > [ ] ` $ % & characters are not allowed.
Trap Community	The trap community string functions like a password that is sent with SNMP traps. The default trap community string is "public". Change the trap community string to the one accepted by your trap receivers. The trap community string can be up to 31 characters long and can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Spaces and the \ < > [ ] ` $ % & characters are not allowed.
Trap Receiver IP Addresses	Type the IP addresses of up to three trap receivers on your network that are configured to receive traps from your FortiWiFi unit. Traps are only sent to the configured addresses.

4 Select Apply.

Figure 2: Sample SNMP configuration



FortiWiFi MIBs

The FortiWiFi SNMP agent supports FortiWiFi proprietary MIBs as well as standard RFC 1213 and RFC 2665 MIBs. The FortiWiFi MIBs are listed in Table 1. You can obtain these MIB files from Fortinet technical support. To be able to communicate with the SNMP agent, you must compile all of these MIBs into your SNMP manager.

Your SNMP manager might already include standard and private MIBs in a compiled database that is ready to use. You must add the Fortinet proprietary MIBs to this database. If the standard MIBs used by the Fortinet SNMP agent are already compiled into your SNMP manager you do not have to compile them again.

Table 1: FortiWiFi MIBs

MIB file name or RFC	Description
fortinet-trap.mib	The Fortinet trap MIB is a proprietary MIB that is required for your SNMP manager to receive traps from the FortiWiFi SNMP agent. For more information about FortiWiFi traps, see "FortiWiFi traps" on page 151.
fortinet.mib	The Fortinet MIB is a proprietary MIB that includes detailed FortiWiFi system configuration information. Add this MIB to your SNMP manager to monitor all FortiWiFi configuration settings.
RFC-1213 (MIB II)	The FortiWiFi SNMP agent supports MIB II groups with the following exceptions.
	No support for the EGP group from MIB II (RFC 1213, section 3.11 and 6.10).
	Protocol statistics returned for MIB II groups (IP/ICMP/TCP/UDP/etc.) do not accurately capture all FortiWiFi traffic activity. More accurate information can be obtained from the information reported by the Fortinet MIB.
RFC-2665 (Ethernet-like MIB)	The FortiWiFi SNMP agent supports Ethernet-like MIB information with the following exception.
	No support for the dot3Tests and dot3Errors groups.

FortiWiFi traps

The FortiWiFi agent can send traps to up to three SNMP trap receivers on your network that are configured to receive traps from the FortiWiFi unit. For these SNMP managers to receive traps, you must load and compile the Fortinet trap MIB onto the SNMP manager.

General FortiWiFi traps

Table 2: General FortiWiFi traps

Trap message	Description
Cold Start	The FortiWiFi unit starts or restarts. An administrator enables the SNMP agent or changes FortiWiFi SNMP settings. This trap is sent when the agent starts during system startup.
System Down	The SNMP agent stops because the FortiWiFi unit shuts down.
Agent Down	An administrator disables the SNMP agent.
Agent Up	An administrator enables the SNMP agent. This trap is also sent when the agent starts during system startup.
The <interface_name> Interface IP is changed to <new_IP> (Serial No.: <FortiWiFi_serial_no>)	The IP address of an interface of a FortiWiFi unit changes. The trap message includes the name of the interface, the new IP address of the interface, and the serial number of the FortiWiFi unit. This trap can be used to track interface IP address changes for interfaces configured with dynamic IP addresses set using DHCP or PPPoE.

System traps

Table 3: FortiWiFi system traps

Trap message	Description
interface <interface_name> is up.	An interface changes from the up state to the running state, indicating that the interface has been connected to a network. When the interface is up it is administratively up but not connected to a network. When the interface is running it is administratively up and connected to a network.
interface <interface_name> is down.	An interface changes from the running state to the up state, indicating that the interface has been disconnected from a network.
CPU usage high	CPU usage exceeds 90%.
memory low	Memory usage exceeds 90%.
disk low	On a FortiWiFi unit with a hard drive, hard drive usage exceeds 90%.
<FortiWiFi_serial_no> <interface_name>	The configuration of an interface of a FortiWiFi unit changes. The trap message includes the name of the interface and the serial number of the FortiWiFi unit.
HA switch	The primary unit in an HA cluster fails and is replaced with a new primary unit.

VPN traps

Table 4: FortiWiFi VPN traps

Trap message	Description
VPN tunnel is up	An IPSec VPN tunnel starts up and begins processing network traffic.
VPN tunnel down	An IPSec VPN tunnel shuts down.

NIDS traps

Table 5: FortiWiFi NIDS traps

Trap message	Description
Flood attack happened.	NIDS attack prevention detects and provides protection from a syn flood attack.
Port scan attack happened.	NIDS attack prevention detects and provides protection from a port scan attack.

Antivirus traps

Table 6: FortiWiFi antivirus traps

Trap message	Description
virus detected	The FortiWiFi unit detects a virus and removes the infected file from an HTTP or FTP download or from an email message.

Logging traps

Table 7: FortiWiFi logging traps

Trap message	Description
log full	On a FortiWiFi unit with a hard drive, hard drive usage exceeds 90%. On a FortiWiFi unit without a hard drive, log to memory usage has exceeds 90%.

Fortinet MIB fields

The Fortinet MIB contains fields for configuration settings and current status information for all parts of the FortiWiFi product. This section lists the names of the high-level MIB fields and describes the configuration and status information available for each one. You can view more details about the information available from all Fortinet MIB fields by compiling the fortinet.mib file into your SNMP manager and browsing the Fortinet MIB fields.

System configuration and status

Table 8: System MIB fields

MIB field	Description
fnSysStatus	FortiWiFi system configuration including operation mode, firmware version, virus definition version, attack definition version, and serial number. Status monitor information including current CPU usage, CPU idle status, CPU interrupts, memory usage, system up time, the number of active communication sessions, as well as descriptive information for each active communication session.
fnSysUpdate	FortiWiFi system update configuration including connection status to the FDN, push update status, periodic update status, and current virus and attack definitions versions.
fnSysNetwork	FortiWiFi system network configuration including the interface, VLAN, routing, DHCP, zone, and DNS configuration.
fnSysConfig	FortiWiFi system configuration including time, options, administrative users, and HA configuration.
fnSysSnmp	FortiWiFi SNMP configuration.

Firewall configuration

Table 9: Firewall MIB fields

MIB field	Description
fnFirewallPolicy	FortiWiFi firewall policy list including complete configuration information for each policy.
fnFirewallAddress	FortiWiFi firewall address and address group list.
fnFirewallService	FortiWiFi firewall service and service group list.
fnFirewallSchedule	FortiWiFi firewall schedule list.
fnFirewallVirtualIP	FortiWiFi firewall virtual IP list.
fnFirewallIpPool	FortiWiFi firewall IP pool list.
fnFirewallIPMACBinding	FortiWiFi firewall IP/MAC binding configuration.
fnFirewallContProfiles	FortiWiFi firewall content profile list.

Users and authentication configuration

Table 10: User and authentication MIB fields

FnUserLocalTable	Local user list.
FnUserRadiusSrvTable	RADIUS server list.
FnUserGrpTable	User group list.

VPN configuration and status

Table 11: VPN MIB fields

fnVpnIpsec	IPSec VPN configuration including the Phase 1 list, Phase 2 list, manual key list, and VPN concentrator list. Status and timeout for each VPN tunnel (Phase 2) and the dialup monitor list showing dialup tunnel status.
fnVpnPPTP	PPTP VPN configuration.
fnVpnL2TP	L2TP VPN configuration.
fnVpnCert	IPSec VPN with certificates configuration.

NIDS configuration

Table 12: NIDS MIB fields

fnNidsDetection	NIDS detection configuration.
fnNidsPrevention	NIDS prevention configuration.
fnNidsResponse	NIDS response configuration.

Antivirus configuration

Table 13: Antivirus MIB fields

fnAvFileBlock	Antivirus file blocking configuration.
fnAvQuarantine	Antivirus quarantine configuration.
fnAVConfig	Antivirus configuration including the current virus definition virus list.

Web filter configuration

Table 14: Web filter MIB fields

fnWebFiltercfgMsgTable	Web filter content block list and configuration.
fnWebFilterUrlBlk	Web filter URL block list.
fnWebFilterScripts	Web filter script blocking configuration.
fnWebFilterExemptUrl	Web filter exempt URL list.

Logging and reporting configuration

Table 15: Logging and reporting MIB fields

fnLoglogSetting	Log setting configuration.
fnLoglog	Log setting traffic filter configuration.
fnLogAlertEmail	Alert email configuration.

Replacement messages

Replacement messages are added to content passing through the firewall to replace:

- Files or other content removed from POP3 and IMAP email messages by the antivirus system,
- Files or other content removed from HTTP downloads by the antivirus system or web filtering,
- Files removed from FTP downloads by the antivirus system.

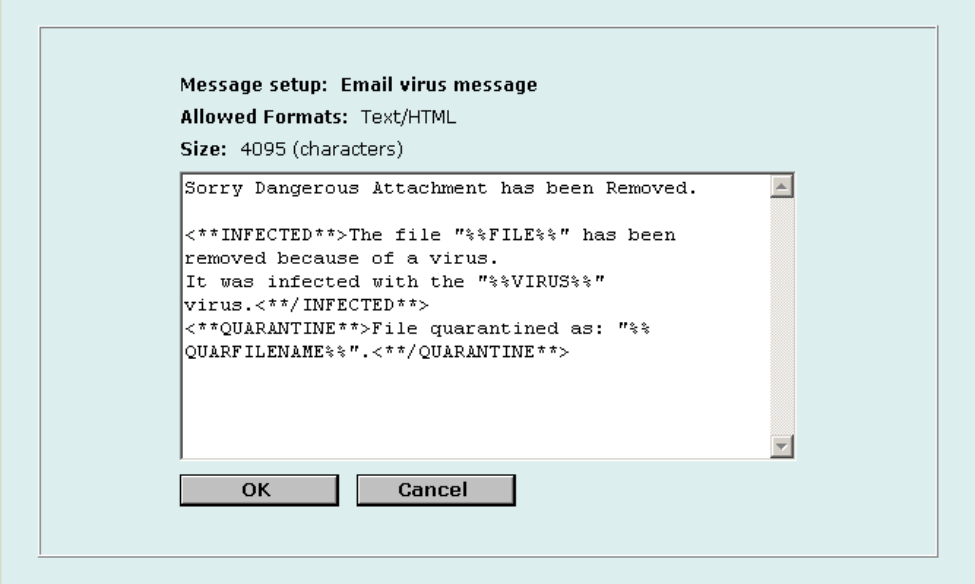
You can edit the content of replacement messages.

You can also edit the content added to alert email messages to control the information that appears in alert emails for virus incidents, NIDS events, critical system events, and disk full events.

This section describes:

- Customizing replacement messages
- Customizing alert emails

Figure 3: Sample replacement message



Customizing replacement messages

Each of the replacement messages in the replacement message list is created by combining replacement message sections. You can use these sections as building blocks to create your own replacement messages.

You can edit any of the replacement messages in the replacement message list and add and edit the replacement message sections as required.

To customize a replacement message

1 Go to **System > Config > Replacement Messages**.

2 For the replacement message that you want to customize, select Modify .

3 In the Message setup dialog box, edit the content of the message.
Table 16 lists the replacement message sections that can be added to replacement messages and describes the tags that can appear in each section. In addition to the allowed tags you can add text. For mail and HTTP messages you can also add HTML code.

4 Select OK to save the changes.

Table 16: Replacement message sections

File blocking	Used for file blocking (all services).	
Section Start	<**BLOCKED**>	
Allowed Tags	%%FILE%%	The name of the file that was blocked.
	%%URL%%	The URL of the blocked web page.
Section End	<**/BLOCKED**>	

Scanning	Used for virus scanning (all services).	
Section Start	<**INFECTED**>	
Allowed Tags	%%FILE%%	The name of the file that was infected.
	%%VIRUS%%	The name of the virus infecting the file.
	%%URL%%	The URL of the blocked web page or file.
Section End	<**/INFECTED**>	

Quarantine	Used when quarantine is enabled (permitted for all scan services and block services for email only).	
Section Start	<**QUARANTINE**>	
Allowed Tag	%%QUARFILE NAME%%	The name of the file that was quarantined.
Section End	<**/QUARANTINE**>	

Customizing alert emails

Customize alert emails to control the content displayed in alert email messages sent to system administrators.

To customize alert emails

1 Go to **System > Config > Replacement Messages**.

2 For the alert email message that you want to customize, select Modify .

3 In the Message setup dialog box, edit the text of the message.
Table 17 lists the replacement message sections that can be added to alert email messages and describes the tags that can appear in each section. In addition to the allowed tags you can add text and HTML code.

4 Select OK to save the changes.

Table 17: Alert email message sections

NIDS event	Used for NIDS event alert email messages	
Section Start	<**NIDS_EVENT**>	
Allowed Tags	%%NIDS_EVENT%%	The NIDS attack message.
Section End	<**/NIDS_EVENT**>	

Virus alert	Used for virus alert email messages	
Section Start	<**VIRUS_ALERT**>	
Allowed Tags	%%VIRUS%%	The name of the virus.
	%%PROTOCOL%%	The service for which the virus was detected.
	%%SOURCE_IP%%	The IP address from which the virus was received. For email this is the IP address of the email server that sent the email containing the virus. For HTTP this is the IP address of web page that sent the virus.
	%%DEST_IP%%	The IP address of the computer that would have received the virus. For POP3 this is the IP address of the user's computer that attempted to download the email containing the virus.
	%%EMAIL_FROM%%	The email address of the sender of the message in which the virus was found.
	%%EMAIL_TO%%	The email address of the intended receiver of the message in which the virus was found.
Section End	<**/VIRUS_ALERT**>	

Block alert	Used for file block alert email messages	
Section Start	<**BLOCK_ALERT**>	
Allowed Tags	%%FILE%%	The name of the file that was blocked.
	%%PROTOCOL%%	The service for which the file was blocked.
	%%SOURCE_IP%%	The IP address from which the block file was received. For email this is the IP address of the email server that sent the email containing the blocked file. For HTTP this is the IP address of web page that sent the blocked file.
	%%DEST_IP%%	The IP address of the computer that would have received the blocked file. For email this is the IP address of the user's computer that attempted to download the message from which the file ware removed.
	%%EMAIL_FROM%%	The email address of the sender of the message from which the file was removed.
	%%EMAIL_TO%%	The email address of the intended receiver of the message from which the file was removed.
Section End	<**/BLOCK_ALERT**>	

Critical event	Used for critical firewall event alert emails.	
Section Start	<**CRITICAL_EVENT**>	
Allowed Tags	%%CRITICAL_EVENT%%	The firewall critical event message
Section End	<**/CRITICAL_EVENT**>	

Firewall configuration

Firewall policies control all traffic passing through the FortiWiFi unit. Firewall policies are instructions that the FortiWiFi unit uses to decide what to do with a connection request. When the firewall receives a connection request in the form of a packet, it analyzes the packet to extract its source address, destination address, and service (port number).

For the packet to be connected through the FortiWiFi unit, a firewall policy must be in place that matches the source address, destination address, and service of the packet. The policy directs the firewall action on the packet. The action can be to allow the connection, deny the connection, require authentication before the connection is allowed, or process the packet as an IPSec VPN packet. You can also add schedules to policies so that the firewall can process connections differently depending on the time of day or the day of the week, month, or year.

Each policy can be individually configured to route connections or apply network address translation (NAT) to translate source and destination IP addresses and ports. You can add IP pools to use dynamic NAT when the firewall translates source addresses. You can use policies to configure port address translation (PAT) through the FortiWiFi.

You can add content profiles to policies to apply antivirus protection, web filtering, and email filtering to web, file transfer, and email services. You can create content profiles that perform one or any combination of the following actions:

- Apply antivirus protection to HTTP, FTP, SMTP, IMAP, or POP3 services.
- Apply web filtering to HTTP services.
- Apply email filtering to IMAP and POP3 services.

You can also add logging to a firewall policy so that the FortiWiFi unit logs all connections that use this policy.

This chapter describes:

- Default firewall configuration
- Adding firewall policies
- Configuring policy lists
- Addresses
- Services
- Schedules
- Virtual IPs
- IP pools
- IP/MAC binding
- Content profiles

Default firewall configuration

By default, the users on your internal network can connect through the FortiWiFi unit to the Internet through the WAN1 and WAN2 interfaces. Users on the wireless network can also connect to the internet through the WAN1 and WAN2 interfaces. The firewall blocks all other connections. The firewall is configured with default policies that matches any connection request received from the internal network and instructs the firewall to forward the connection through the WAN1 or WAN2 interfaces to the Internet. Other default policies match any connection from the wireless network and instructs the firewall to forward the connection through the WAN1 or WAN2 interfaces. The destination interface selected depends on the destination of the packet, as determined by routing.

The default policy also applies virus scanning to all HTTP, FTP, SMTP, POP3, and IMAP traffic matched by the policy. The policy applies virus scanning because the Antivirus & Web Filter option is selected and the Content profile is set to Scan. For more information about content profiles, see "Content profiles" on page 189.

Figure 4: Default firewall policy

#	ID	Source	Dest	Schedule	Service	Action	Enable	Config
1	1	Internal_All	WAN1_All	Always	HTTPS	ACCEPT	☑	

- Interfaces
- Addresses
- Services
- Schedules
- Content profiles

Interfaces

Add policies to control connections between FortiWiFi interfaces and between the networks connected to these interfaces. By default, you can add policies for connections that include the internal, WAN1, and DMZ interfaces. If you want to add policies that include the WAN2 and WLAN interface or the modem interface, you must add firewall addresses for these interfaces. For information about firewall addresses, see "Addresses" on page 169.

Addresses

To add policies between interfaces, the firewall configuration must contain addresses for each interface. By default the firewall configuration includes the following firewall addresses.

- Internal_All, added to the internal interface, this address matches all addresses on the internal network.
- WAN1_All, added to the WAN1 interface, this address matches all addresses on the WAN1 network.
- WAN2_All, added to the WAN2 interface, this address matches all addresses on the WAN2 network.
- WLAN_All, added to the WLAN interface, this address matches all addresses on the wireless (WLAN) network.
- DMZ_All, added to the DMZ interface, this address matches all addresses on the DMZ network.

The firewall uses these addresses to match the source and destination addresses of packets received by the firewall. The default Internal->WAN1 policy matches all connections from the internal network because it includes the Internal_All address. The default policy also matches all connections to the WAN1 network because it includes the WAN1_All address.

The other default policies function in the same manner.

You can add more addresses to each interface to improve the control you have over connections through the firewall. For more information about addresses, see "Addresses" on page 169.

You can also add firewall policies that perform network address translation (NAT). To use NAT to translate destination addresses, you must add virtual IPs. Virtual IPs map addresses on one network to a translated address on another network. For more information about Virtual IPs, see "Virtual IPs" on page 180.

Services

Policies can control connections based on the service or destination port number of packets. The default policy accepts connections using any service or destination port number. The firewall is configured with over 40 predefined services. You can add these services to a policy for more control over the services that can be used by connections through the firewall. You can also add user-defined services. For more information about services, see "Services" on page 172.

Schedules

Policies can control connections based on the time of day or day of the week when the firewall receives the connection. The default policy accepts connections at any time. The firewall is configured with one schedule that accepts connections at any time. You can add more schedules to control when policies are active. For more information about schedules, see "Schedules" on page 177.

Content profiles

Add content profiles to policies to apply antivirus protection, web filtering, and email filtering to web, file transfer, and email services. The FortiWiFi unit includes the following default content profiles:

- Strict—to apply maximum content protection to HTTP, FTP, IMAP, POP3, and SMTP content traffic.
- Scan—to apply antivirus scanning to HTTP, FTP, IMAP, POP3, and SMTP content traffic.
- Web—to apply antivirus scanning and Web content blocking to HTTP content traffic.
- Unfiltered—to allow oversized files to pass through the FortiWiFi unit without scanned for viruses.

The default policy includes the scan content profile.

For more information about content profiles, see "Content profiles" on page 189.

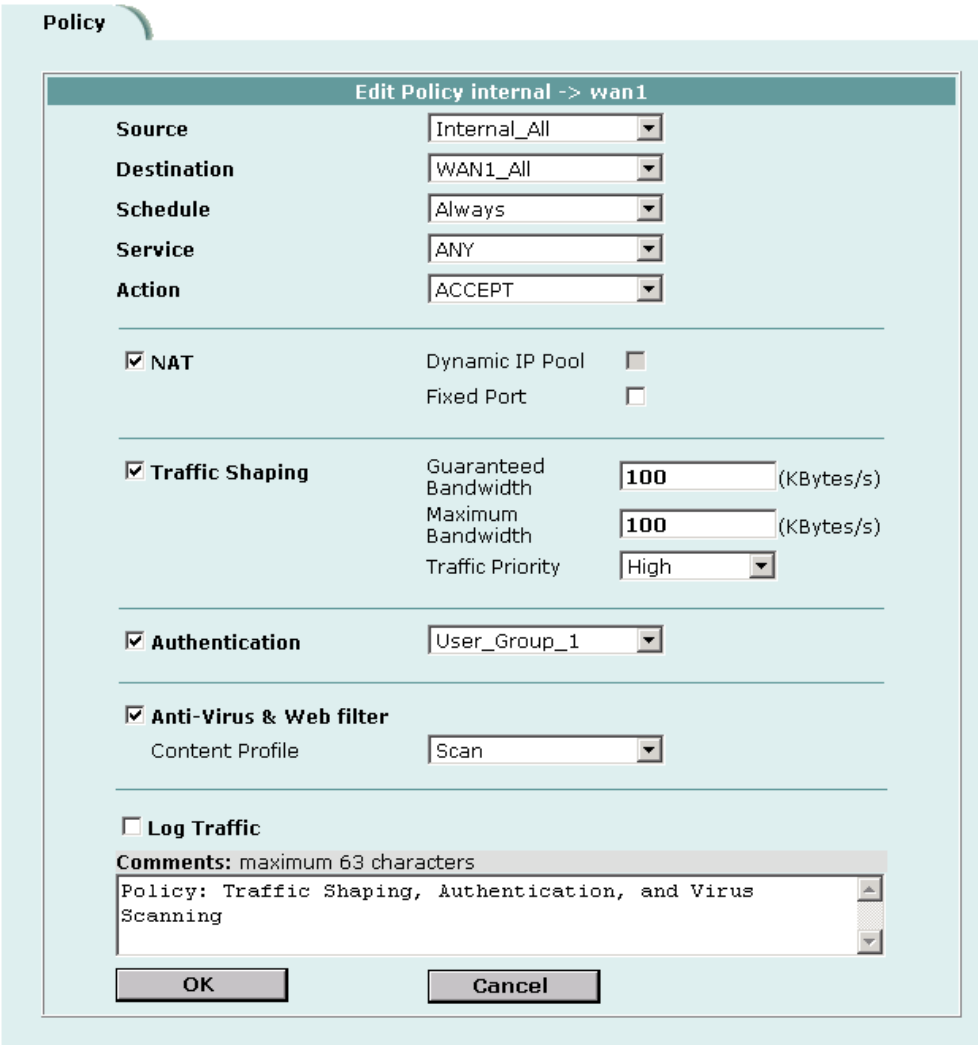
Adding firewall policies

Add Firewall policies to control connections and traffic between FortiWiFi interfaces.

To add a firewall policy

1. Go to **Firewall > Policy**.
2. Select the policy list to which you want to add the policy.
3. Select New to add a new policy.
   You can also select Insert Policy before on a policy in the list to add the new policy above a specific policy.
4. Configure the policy:
   For information about configuring the policy, see "Firewall policy options" on page 163.
5. Select OK to add the policy.
6. Arrange policies in the policy list so that they have the results that you expect.
   For information about arranging policies in a policy list, see "Configuring policy lists" on page 167.

Figure 5: Adding a NAT/Route policy



Firewall policy options

This section describes the options that you can add to firewall policies.

Source

Select an address or address group that matches the source address of the packet. Before you can add this address to a policy, you must add it to the source interface. For information about adding an address, see "Addresses" on page 169.

Destination

Select an address or address group that matches the destination address of the packet. Before you can add this address to a policy, you must add it to the destination interface. For information about adding an address, see "Addresses" on page 169.

For NAT/Route mode policies where the address on the destination network is hidden from the source network using NAT, the destination can also be a virtual IP that maps the destination address of the packet to a hidden destination address. See "Virtual IPs" on page 180.

Schedule

Select a schedule that controls when the policy is available to be matched with connections. See "Schedules" on page 177.

Service

Select a service that matches the service (port number) of the packet. You can select from a wide range of predefined services or add custom services and service groups. See "Services" on page 172.

Action

Select how you want the firewall to respond when the policy matches a connection attempt.

ACCEPT	Accept the connection. If you select ACCEPT, you can also configure NAT and Authentication for the policy.
DENY	Deny the connection. The only other policy option that you can configure is Log Traffic, to log the connections denied by this policy.
ENCRYPT	Make this policy an IPSec VPN policy. If you select ENCRYPT, you can select an AutoIKE Key or Manual Key VPN tunnel for the policy and configure other IPSec settings. You cannot add authentication to an ENCRYPT policy. ENCRYPT is not available in Transparent mode. See "Configuring encrypt policies" on page 215.

NAT

Configure the policy for NAT. NAT translates the source address and the source port of packets accepted by the policy. If you select NAT, you can also select Dynamic IP Pool and Fixed Port. NAT is not available in Transparent mode.

Dynamic IP Pool	Select Dynamic IP Pool to translate the source address to an address randomly selected from an IP pool. The IP pool must be added to the destination interface of the policy. You cannot select Dynamic IP Pool if the destination interface is configured using DHCP or PPPoE. For information about adding IP pools, see "IP pools" on page 184.
Fixed Port	Select Fixed Port to prevent NAT from translating the source port. Some applications do not function correctly if the source port is changed. If you select Fixed Port, you must also select Dynamic IP Pool and add a dynamic IP pool address range to the destination interface of the policy. If you do not select Dynamic IP Pool, a policy with Fixed Port selected can only allow one connection at a time for this port or service.

VPN Tunnel

Select a VPN tunnel for an ENCRYPT policy. You can select an AutoIKE key or Manual Key tunnel. VPN Tunnel is not available in Transparent mode.

Allow inbound	Select Allow inbound so that users behind the remote VPN gateway can connect to the source address.
Allow outbound	Select Allow outbound so that users can connect to the destination address behind the remote VPN gateway.
Inbound NAT	Select Inbound NAT to translate the source address of incoming packets to the FortiWiFi internal IP address.
Outbound NAT	Select Outbound NAT to translate the source address of outgoing packets to the FortiWiFi external IP address.

Traffic Shaping

Traffic Shaping controls the bandwidth available to and sets the priority of the traffic processed by the policy. Traffic Shaping makes it possible to control which policies have the highest priority when large amounts of data are moving through the FortiWiFi device. For example, the policy for the corporate web server might be given higher priority than the policies for most employees' computers. An employee who needs unusually high-speed Internet access could have a special outgoing policy set up with higher bandwidth.

If you set both guaranteed bandwidth and maximum bandwidth to 0 the policy does not allow any traffic.

Guaranteed Bandwidth	You can use traffic shaping to guarantee the amount of bandwidth available through the firewall for a policy. Guarantee bandwidth (in Kbytes) to make sure that there is enough bandwidth available for a high-priority service.
Maximum Bandwidth	You can also use traffic shaping to limit the amount of bandwidth available through the firewall for a policy. Limit bandwidth to keep less important services from using bandwidth needed for more important services.
Traffic Priority	Select High, Medium, or Low. Select Traffic Priority so that the FortiWiFi unit manages the relative priorities of different types of traffic. For example, a policy for connecting to a secure web server needed to support e-commerce traffic should be assigned a high traffic priority. Less important services should be assigned a low priority. The firewall provides bandwidth to low-priority connections only when bandwidth is not needed for high-priority connections.

Authentication

Select Authentication and select a user group to require users to enter a user name and password before the firewall accepts the connection. Select the user group to control the users that can authenticate with this policy. For information about adding and configuring user groups, see "Configuring user groups" on page 199. You must add user groups before you can select Authentication.

You can select Authentication for any service. Users can authenticate with the firewall using HTTP, Telnet, or FTP. For users to be able to authenticate you must add an HTTP, Telnet, or FTP policy that is configured for authentication. When users attempt to connect through the firewall using this policy they are prompted to enter a firewall username and password.

If you want users to authenticate to use other services (for example POP3 or IMAP) you can create a service group that includes the services for which you want to require authentication, as well as HTTP, Telnet, and FTP. Then users could authenticate with the policy using HTTP, Telnet, or FTP before using the other service.

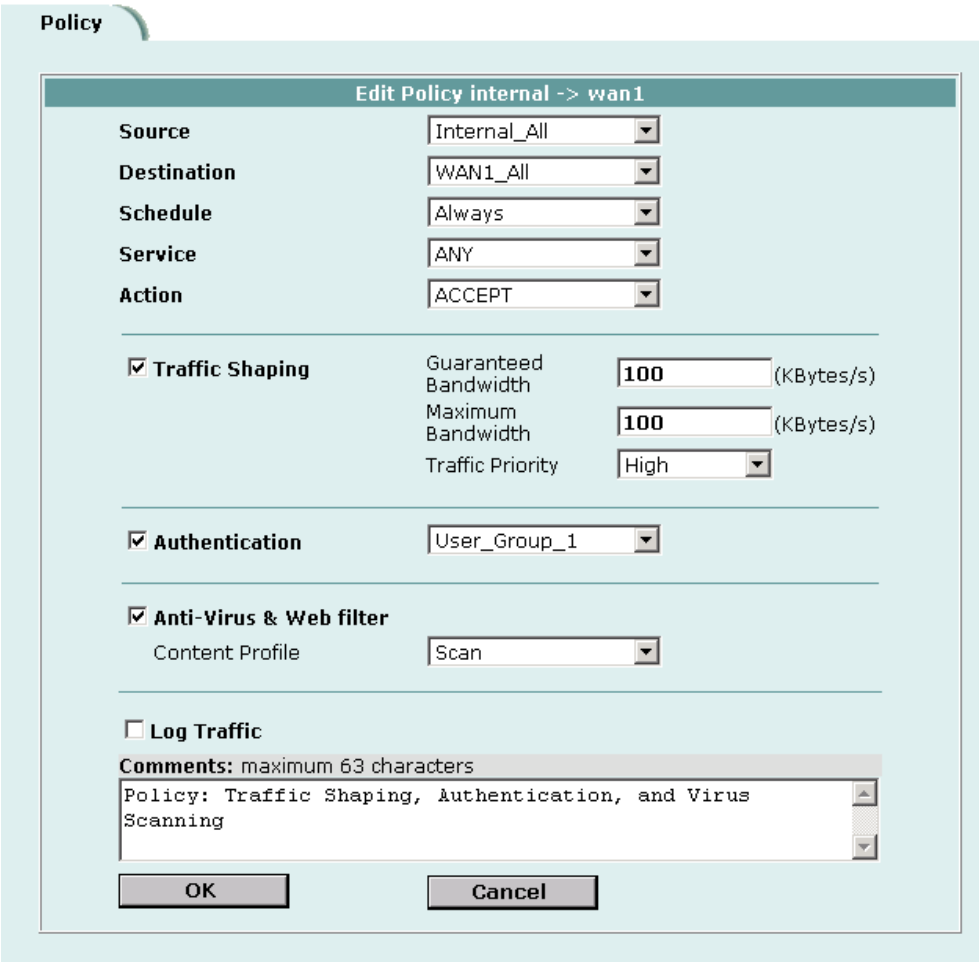
In most cases you should make sure that users can use DNS through the firewall without authentication. If DNS is not available users cannot connect to a web, FTP, or Telnet server using a domain name.

Anti-Virus & Web filter

Enable antivirus protection and web filter content filtering for traffic controlled by this policy. You can select Anti-Virus & Web filter if Service is set to ANY, HTTP, SMTP, POP3, IMAP, or FTP or to a service group that includes the HTTP, SMTP, POP3, IMAP, or FTP services.

Select a content profile to configure how antivirus protection and content filtering is applied to the policy. For information about selecting a content profile, see "Content profiles" on page 189.

Figure 6: Adding a Transparent mode policy



Log Traffic

Select Log Traffic to write messages to the traffic log whenever the policy processes a connection. For information about logging, see "Logging and reporting" on page 273.

Comments

You can add a description or other information about the policy. The comment can be up to 63 characters long, including spaces.

Configuring policy lists

The firewall matches policies by searching for a match starting at the top of the policy list and moving down until it finds the first match. You must arrange policies in the policy list from more specific to more general.

For example, the default policy is a very general policy because it matches all connection attempts. When you create exceptions to that policy, you must add them to the policy list above the default policy. No policy below the default policy will ever be matched.

This section describes:

- Policy matching in detail
- Changing the order of policies in a policy list
- Enabling and disabling policies

Policy matching in detail

When the FortiWiFi unit receives a connection attempt at an interface, it must select a policy list to search through for a policy that matches the connection attempt. The FortiWiFi unit chooses the policy list based on the source and destination addresses of the connection attempt.

The FortiWiFi unit then starts at the top of the selected policy list and searches down the list for the first policy that matches the connection attempt source and destination addresses, service port, and time and date at which the connection attempt was received. The first policy that matches is applied to the connection attempt. If no policy matches, the connection is dropped.

The default policy accepts all connection attempts from the internal network to the Internet. From the internal network, users can browse the web, use POP3 to get email, use FTP to download files through the firewall, and so on. If the default policy is at the top of the Internal->WAN1 policy list, the firewall allows all connections from the internal network through the WAN1 interface to the Internet because all connections match the default policy. If more specific policies are added to the list below the default policy, they are never matched.

A policy that is an exception to the default policy, for example, a policy to block FTP connections, must be placed above the default policy in the Internal->WAN1 policy list. In this example, all FTP connection attempts from the internal network would then match the FTP policy and be blocked. Connection attempts for all other kinds of services would not match with the FTP policy but they would match with the default policy. Therefore, the firewall would still accept all other connections from the internal network.

Note: Policies that require authentication must be added to the policy list above matching policies that do not; otherwise, the policy that does not require authentication is selected first.

Changing the order of policies in a policy list

To change the order of a policy in a policy list

1. Go to **Firewall > Policy**.
2. Select the policy list that you want to change the order of.
3. Choose the policy that you want to move and select Move To to change its order in the policy list.
4. Type a number in the Move to field to specify where in the policy list to move the policy and select OK.

Enabling and disabling policies

You can enable and disable policies in the policy list to control whether the policy is active or not. The FortiWiFi unit matches enabled policies but does not match disabled policies.

Disabling policies

Disable a policy to temporarily prevent the firewall from selecting the policy. Disabling a policy does not stop active communications sessions that have been allowed by the policy. For information about stopping active communication sessions, see "System status" on page 87.

To disable a policy

1. Go to **Firewall > Policy**.
2. Select the policy list that contains the policy that you want to disable.
3. Clear the check box of the policy to disable it.

Enabling policies

Enable a policy that has been disabled so that the firewall can match connections with the policy.

To enable a policy

1. Go to **Firewall > Policy**.
2. Select the policy list that contains the policy that you want to enable.
3. Select the check box of the policy to enable it.

Addresses

All policies require source and destination addresses. To add addresses to a policy between two interfaces, you must first add addresses to the address list for each interface.

You can add, edit, and delete all firewall addresses as required. You can also organize related addresses into address groups to simplify policy creation.

A firewall address consists of an IP address and a netmask. This information can represent:

- The address of a subnet (for example, for a class C subnet, IP address: 192.168.20.0 and Netmask: 255.255.255.0).
- A single IP address (for example, IP Address: 192.168.20.1 and Netmask: 255.255.255.255)
- All possible IP addresses (represented by IP Address: 0.0.0.0 and Netmask: 0.0.0.0)

Note: IP address: 0.0.0.0 and Netmask: 255.255.255.255 is not a valid firewall address.

This section describes:

- Adding addresses
- Editing addresses
- Deleting addresses
- Organizing addresses into address groups

Adding addresses

To add an address

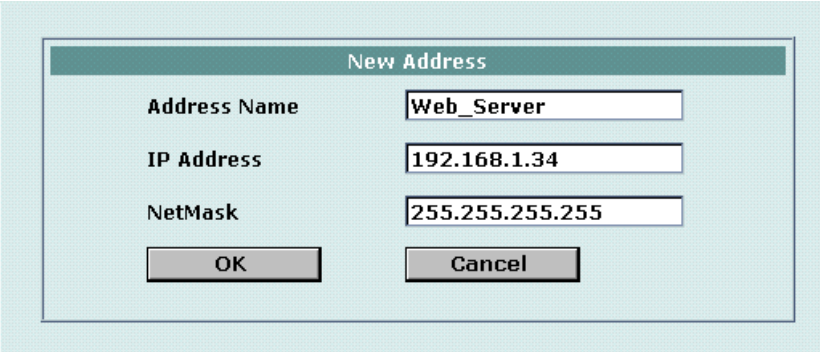
1. Go to **Firewall > Address**.
2. Select the interface that you want to add the address to.
3. Select New to add a new address.
4. Enter an Address Name to identify the address.
   The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Spaces and other special characters are not allowed.
5. Enter the IP Address.
   The IP address can be:
   - The IP address of a single computer (for example, 192.45.46.45).
   - The IP address of a subnetwork (for example, 192.168.1.0 for a class C subnet).
   - 0.0.0.0 to represent all possible IP addresses

6 Enter the Netmask.
The netmask corresponds to the type of address that you are adding. For example:
- The netmask for the IP address of a single computer should be 255.255.255.255.
- The netmask for a class A subnet should be 255.0.0.0.
- The netmask for a class B subnet should be 255.255.0.0.
- The netmask for a class C subnet should be 255.255.255.0.
- The netmask for all addresses should be 0.0.0.0

Note: To add an address to represent any address on a network set the IP Address to 0.0.0.0 and the Netmask to 0.0.0.0

7 Select OK to add the address.

Figure 7: Adding an internal address



Editing addresses

Edit an address to change its IP address and netmask. You cannot edit the address name. To change the address name, you must delete the address entry and then add the address again with a new name.

To edit an address

1 Go to **Firewall > Address**.
2 Select the interface list containing the address that you want to edit.
3 Choose an address to edit and select Edit Address .
4 Make the required changes and select OK to save the changes.

Deleting addresses

Deleting an address removes it from an address list. To delete an address that has been added to a policy, you must first remove the address from the policy.

To delete an address

1 Go to **Firewall > Address**.
2 Select the interface list containing the address that you want to delete.
You can delete any address that has a Delete Address icon .

3 Choose an address to delete and select Delete .

4 Select OK to delete the address.

Organizing addresses into address groups

You can organize related addresses into address groups to make it easier to add policies. For example, if you add three addresses and then add them to an address group, you only have to add one policy using the address group rather than a separate policy for each address.

You can add address groups to any interface. The address group can only contain addresses from that interface. Address groups are available in interface source or destination address lists.

Address groups cannot have the same names as individual addresses. If an address group is included in a policy, it cannot be deleted unless it is first removed from the policy.

To organize addresses into an address group

1 Go to **Firewall > Address > Group**.

2 Select the interface that you want to add the address group to.

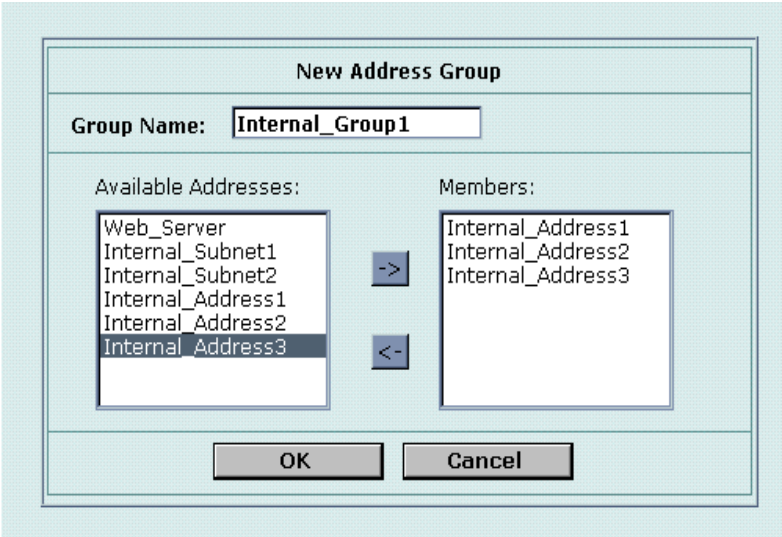
3 Enter a Group Name to identify the address group.
The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.

4 To add addresses to the address group, select an address from the Available Addresses list and select the right arrow to add it to the Members list.

5 To remove addresses from the address group, select an address from the Members list and select the left arrow to remove it from the group.

6 Select OK to add the address group.

Figure 8: Adding an internal address group



Services

Use services to determine the types of communication accepted or denied by the firewall. You can add any of the predefined services to a policy. You can also create custom services and add services to service groups.

This section describes:

- Predefined services
- Adding custom TCP and UDP services
- Adding custom ICMP services
- Adding custom IP services
- Grouping services

Predefined services

The FortiWiFi predefined firewall services are listed in Table 18. You can add these services to any policy.

Table 18: FortiWiFi predefined services

Service name	Description	Protocol	Port
ANY	Match connections on any port. A connection that uses any of the predefined services is allowed through the firewall.	all	all
GRE	Generic Routing Encapsulation. A protocol that allows an arbitrary network protocol to be transmitted over any other arbitrary network protocol, by encapsulating the packets of the protocol within GRE packets.		47
AH	Authentication Header. AH provides source host authentication and data integrity, but not secrecy. This protocol is used for authentication by IPSec remote gateways set to aggressive mode.		51
ESP	Encapsulating Security Payload. This service is used by manual key and AutoIKE VPN tunnels for communicating encrypted data. AutoIKE key VPN tunnels use ESP after establishing the tunnel using IKE.		50
AOL	AOL instant messenger protocol.	tcp	5190-5194
BGP	Border Gateway Protocol routing protocol. BGP is an interior/exterior routing protocol.	tcp	179
DHCP-Relay	Dynamic Host Configuration Protocol (DHCP) allocates network addresses and delivers configuration parameters from DHCP servers to hosts.	udp	67
DNS	Domain name service for translating domain names into IP addresses.	tcp	53
		udp	53
FINGER	A network service that provides information about users.	tcp	79
FTP	FTP service for transferring files.	tcp	21

Table 18: FortiWiFi predefined services (Continued)

Service name	Description	Protocol	Port
GOPHER	Gopher communication service. Gopher organizes and displays Internet server contents as a hierarchically structured list of files.	tcp	70
H323	H.323 multimedia protocol. H.323 is a standard approved by the International Telecommunication Union (ITU) that defines how audiovisual conferencing data is transmitted across networks.	tcp	1720, 1503
HTTP	HTTP is the protocol used by the word wide web for transferring data for web pages.	tcp	80
HTTPS	HTTP with secure socket layer (SSL) service for secure communication with web servers.	tcp	443
IKE	IKE is the protocol to obtain authenticated keying material for use with ISAKMP for IPSEC.	udp	500
IMAP	Internet Message Access Protocol is a protocol used for retrieving email messages.	tcp	143
Internet-Locator-Service	Internet Locator Service includes LDAP, User Locator Service, and LDAP over TLS/SSL.	tcp	389
IRC	Internet Relay Chat allows people connected to the Internet to join live discussions.	tcp	6660-6669
L2TP	L2TP is a PPP-based tunnel protocol for remote access.	tcp	1701
LDAP	Lightweight Directory Access Protocol is a set of protocols used to access information directories.	tcp	389
NetMeeting	NetMeeting allows users to teleconference using the Internet as the transmission medium.	tcp	1720
NFS	Network File System allows network users to access shared files stored on computers of different types.	tcp	111, 2049
NNTP	Network News Transport Protocol is a protocol used to post, distribute, and retrieve USENET messages.	tcp	119
NTP	Network time protocol for synchronizing a computer's time with a time server.	tcp	123
OSPF	Open Shortest Path First (OSPF) routing protocol. OSPF is a common link state routing protocol.		89
PC-Anywhere	PC-Anywhere is a remote control and file transfer protocol.	udp	5632
PING	ICMP echo request/reply for testing connections to other devices.	icmp	8
TIMESTAMP	ICMP timestamp request messages.	icmp	13
INFO_REQUEST	ICMP information request messages.	icmp	15
INFO_ADDRESS	ICMP address mask request messages.	icmp	17
POP3	Post office protocol email protocol for downloading email from a POP3 server.	tcp	110

Table 18: FortiWiFi predefined services (Continued)

Service name	Description	Protocol	Port
PPTP	Point-to-Point Tunneling Protocol is a protocol that allows corporations to extend their own corporate network through private tunnels over the public Internet.	tcp	1723
QUAKE	For connections used by the popular Quake multi-player computer game.	udp	26000, 27000, 27910, 27960
RAUDIO	For streaming real audio multimedia traffic.	udp	7070
RLOGIN	Rlogin service for remotely logging into a server.	tcp	513
RIP	Routing Information Protocol is a common distance vector routing protocol.	udp	520
SMTP	For sending mail between email servers on the Internet.	tcp	25
SNMP	Simple Network Management Protocol is a set of protocols for managing complex networks	tcp	161-162
		udp	161-162
SSH	SSH service for secure connections to computers for remote management.	tcp	22
		udp	22
SYSLOG	Syslog service for remote logging.	udp	514
TALK	A protocol supporting conversations between two or more users.	udp	517-518
TCP	All TCP ports.	tcp	0-65535
TELNET	Telnet service for connecting to a remote computer to run commands.	tcp	23
TFTP	Trivial file transfer protocol, a simple file transfer protocol similar to FTP but with no security features.	udp	69
UDP	All UDP ports.	udp	0-65535
UUCP	Unix to Unix copy utility, a simple file copying protocol.	udp	540
VDOLIVE	For VDO Live streaming multimedia traffic.	tcp	7000-7010
WAIS	Wide Area Information Server. An Internet search protocol.	tcp	210
WINFRAME	For WinFrame communications between computers running Windows NT.	tcp	1494
X-WINDOWS	For remote communications between an X-Window server and X-Window clients.	tcp	6000-6063

Adding custom TCP and UDP services

Add a custom TCP or UDP service if you need to create a policy for a service that is not in the predefined service list.

To add a custom TCP or UDP service

1. Go to **Firewall > Service > Custom**.
2. Select TCP/UDP from the Protocol list.

3 Select New.

4 Type a Name for the new custom TCP or UDP service. This name appears in the service list used when you add a policy.
The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.

5 Select the Protocol (either TCP or UDP) used by the service.

6 Specify a Source and Destination Port number range for the service by entering the low and high port numbers. If the service uses one port number, enter this number in both the low and high fields.

7 If the service has more than one port range, select Add to specify additional protocols and port ranges.
If there are too many port range rows, select Delete to remove each extra row.

8 Select OK to add the custom service.
You can now add this custom service to a policy.

Adding custom ICMP services

Add a custom ICMP service if you need to create a policy for a service that is not in the predefined service list.

To add a custom ICMP service

1 Go to **Firewall > Service > Custom**.

2 Select ICMP from the Protocol list.

3 Select New.

4 Type a Name for the new custom ICMP service. This name appears in the service list used when you add a policy.
The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.

5 Specify the ICMP type and code for the service.

6 Select OK to add the custom service.
You can now add this custom service to a policy.

Adding custom IP services

Add a custom IP service if you need to create a policy for a service that is not in the predefined service list.

To add a custom IP service

1 Go to **Firewall > Service > Custom**.

2 Select IP from the Protocol list.

3 Select New.

4 Type a Name for the new custom IP service. This name appears in the service list used when you add a policy.
The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.

5 Specify the IP protocol number for the service.

6 Select OK to add the custom service.
You can now add this custom service to a policy.

Grouping services

To make it easier to add policies, you can create groups of services and then add one policy to provide or block access for all the services in the group. A service group can contain predefined services and custom services in any combination. You cannot add service groups to another service group.

To group services

1 Go to **Firewall > Service > Group**.

2 Select New.

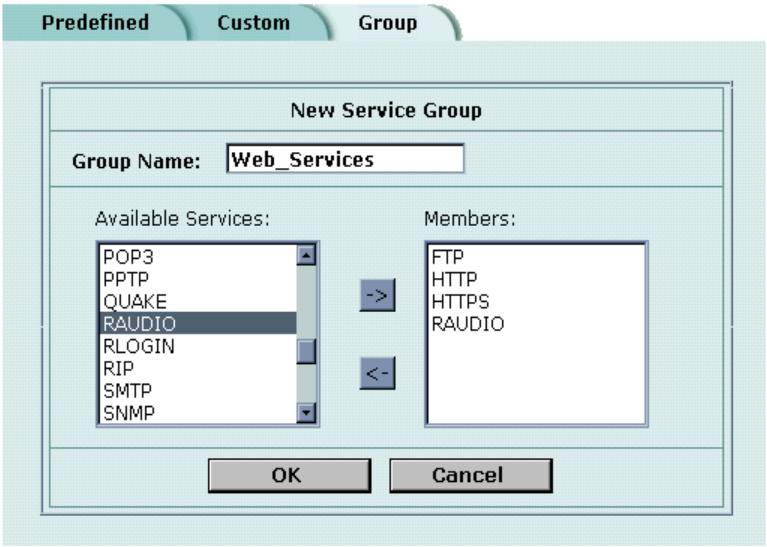
3 Type a Group Name to identify the group.
This name appears in the service list when you add a policy and cannot be the same as a predefined service name.
The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.

4 To add services to the service group, select a service from the Available Services list and select the right arrow to copy it to the Members list.

5 To remove services from the service group, select a service from the Members list and select the left arrow to remove it from the group.

6 Select OK to add the service group.

Figure 9: Adding a service group



Schedules

Use schedules to control when policies are active or inactive. You can create one-time schedules and recurring schedules.

You can use one-time schedules to create policies that are effective once for the period of time specified in the schedule. Recurring schedules repeat weekly. You can use recurring schedules to create policies that are effective only at specified times of the day or on specified days of the week.

This section describes:

- Creating one-time schedules
- Creating recurring schedules
- Adding schedules to policies

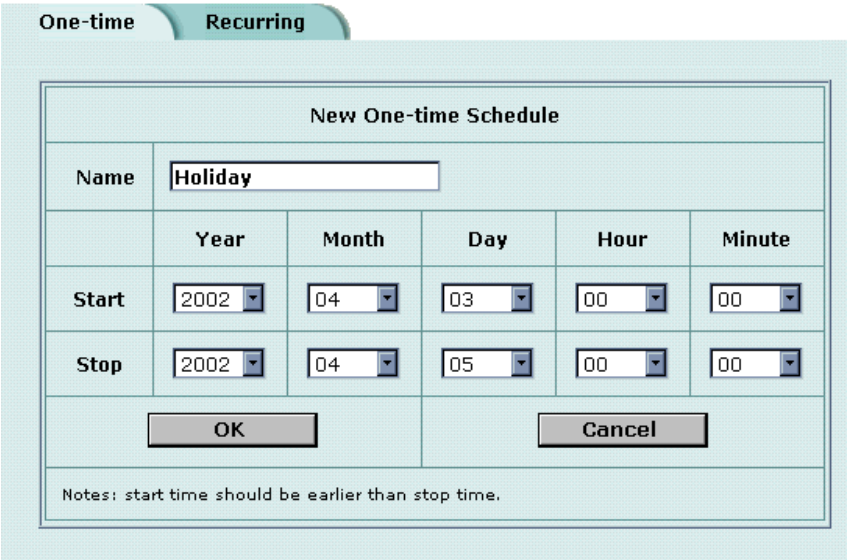
Creating one-time schedules

You can create a one-time schedule that activates or deactivates a policy for a specified period of time. For example, your firewall might be configured with the default policy that allows access to all services on the Internet at all times. You can add a one-time schedule to block access to the Internet during a holiday period.

To create a one-time schedule

1. Go to **Firewall > Schedule > One-time**.
2. Select New.
3. Type a Name for the schedule.
   The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.
4. Set the Start date and time for the schedule.
   Set Start and Stop times to 00 for the schedule to be active for the entire day.
5. Set the Stop date and time for the schedule.
   One-time schedules use a 24-hour clock.
6. Select OK to add the one-time schedule.

Figure 10: Adding a one-time schedule



Creating recurring schedules

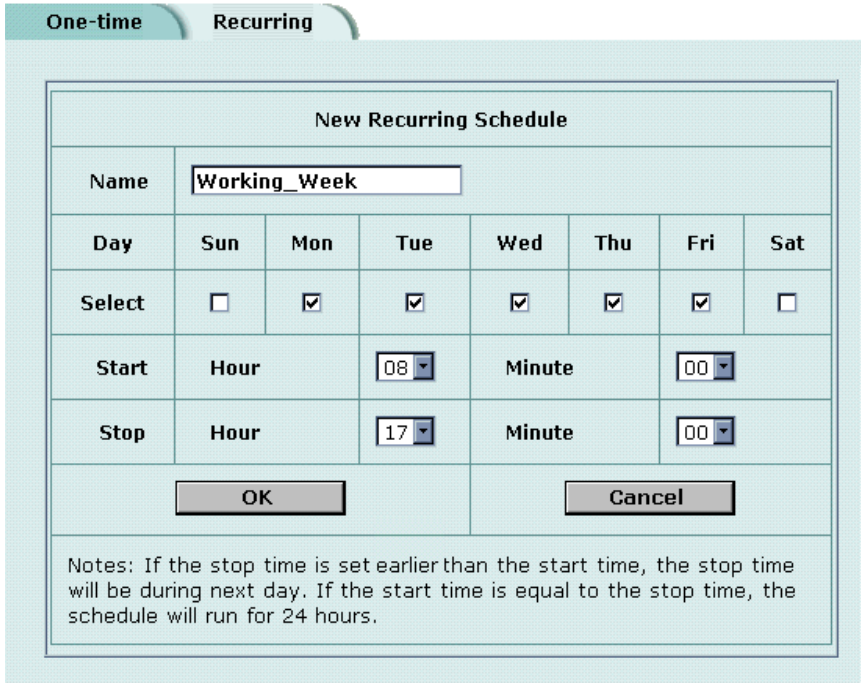
You can create a recurring schedule that activates or deactivates policies at specified times of the day or on specified days of the week. For example, you might want to prevent Internet use outside working hours by creating a recurring schedule.

If you create a recurring schedule with a stop time that occurs before the start time, the schedule starts at the start time and finishes at the stop time on the next day. You can use this technique to create recurring schedules that run from one day to the next. You can also create a recurring schedule that runs for 24 hours by setting the start and stop times to the same time.

To create a recurring schedule

1. Go to **Firewall > Schedule > Recurring**.
2. Select New to create a new schedule.
3. Type a Name for the schedule.
   The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.
4. Select the days of the week that you want the schedule to be active on.
5. Set the Start and Stop hours in between which you want the schedule to be active.
   Recurring schedules use a 24-hour clock.
6. Select OK to save the recurring schedule.

Figure 11: Adding a recurring schedule



Adding schedules to policies

After you create schedules, you can add them to policies to schedule when the policies are active. You can add the new schedules to policies when you create the policy, or you can edit existing policies and add a new schedule to them.

To add a schedule to a policy

1. Go to **Firewall > Policy**.
2. Create a new policy or edit a policy to change its schedule.
3. Configure the policy as required.
4. Add a schedule by selecting it from the Schedule list.
5. Select OK to save the policy.
6. Arrange the policy in the policy list to have the effect that you expect.

   For example, to use a one-time schedule to deny access to a policy, add a policy that matches the policy to be denied in every way. Choose the one-time schedule that you added and set Action to DENY. Then place the policy containing the one-time schedule in the policy list above the policy to be denied.

Virtual IPs

Use virtual IPs to access IP addresses on a destination network that are hidden from the source network by NAT security policies. To allow connections between these networks, you must create a mapping between an address on the source network and the real address on the destination network. This mapping is called a virtual IP.

For example, if the computer hosting your web server is located on your DMZ network, it could have a private IP address such as 10.10.10.3. To get packets from the Internet to the web server, you must have an external address for the web server on the Internet. You must then add a virtual IP to the firewall that maps the external IP address of the web server to the actual address of the web server on the DMZ network. To allow connections from the Internet to the web server, you must then add a WAN1->DMZ or WAN2->DMZ firewall policy and set Destination to the virtual IP.

You can create two types of virtual IPs:

Static NAT Used to translate an address on a source network to a hidden address on a destination network. Static NAT translates the source address of return packets to the address on the source network.

Port Forwarding Used to translate an address and a port number on a source network to a hidden address and, optionally, a different port number on a destination network. Using port forwarding you can also route packets with a specific port number and a destination address that matches the IP address of the interface that receives the packets. This technique is called port forwarding or port address translation (PAT). You can also use port forwarding to change the destination port of the forwarded packets.

Note: If you use the setup wizard to configure internal server settings, the firewall adds port forwarding virtual IPs and policies for each server that you configure.

Note: Virtual IPs are not required in Transparent mode.

This section describes:

- Adding static NAT virtual IPs
- Adding port forwarding virtual IPs
- Adding policies with virtual IPs

Adding static NAT virtual IPs

To add a static NAT virtual IP

1. Go to **Firewall > Virtual IP**.
2. Select New to add a virtual IP.
3. Type a Name for the virtual IP.
   The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.

4 Select the virtual IP External Interface from the list.

The external interface is the interface connected to the source network that receives the packets to be forwarded to the destination network.

You can set the virtual IP external interface to any FortiWiFi interface. Table 19 contains example virtual IP external interface settings and describes the policies that you can add the resulting virtual IP to.

Table 19: Virtual IP External Interface examples

External Interface	Description
internal	To map an internal address to a wan1, wan2, DMZ, or modem address. If you select internal, the static NAT virtual IP can be added to Internal->WAN1, Internal->WAN2, Internal->DMZ, and Internal->modem policies.
wan1	To map an Internet address to an internal or DMZ address. If you select wan1, the static NAT virtual IP can be added to WAN1->Internal, WAN1->DMZ, WAN1-> WAN2, and WAN1-> modem policies.

5 In the Type section, select Static NAT.

6 Enter the External IP Address that you want to map to an address on the destination network.

For example, if the virtual IP provides access from the Internet to a web server on a destination network, the external IP address must be a static IP address obtained from your ISP for your web server. This address must be a unique address that is not used by another host and cannot be the same as the IP address of the external interface selected in step 4. However, this address must be routed to this interface. The virtual IP address and the external IP address can be on different subnets.

If the IP address of the external interface selected in step 4 is set using PPPoE or DHCP, you can enter 0.0.0.0 for the external IP address. The FortiWiFi unit substitutes the IP address set for this external interface using PPPoE or DHCP.

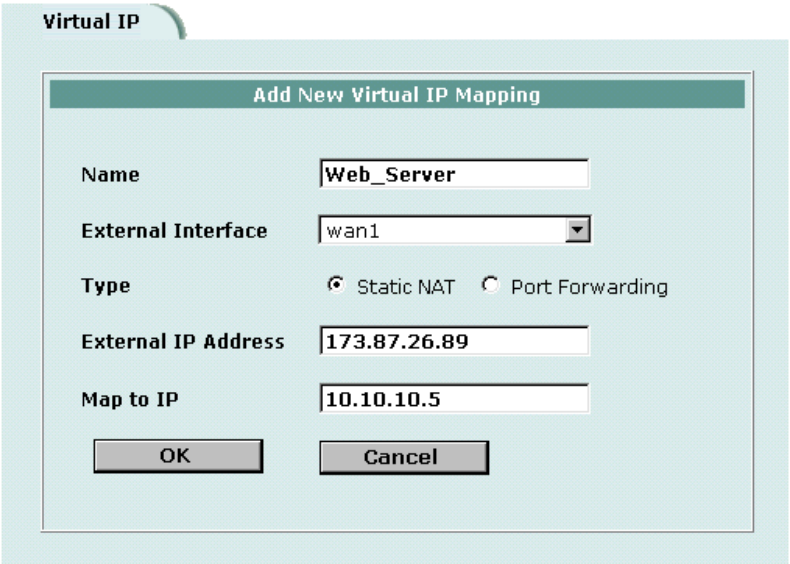
7 In Map to IP, type the real IP address on the destination network, for example, the IP address of a web server on an internal network.

Note: The firewall translates the source address of outbound packets from the host with the Map to IP address to the virtual IP External IP Address, instead of the firewall external address.

8 Select OK to save the virtual IP.

You can now add the virtual IP to firewall policies.

Figure 12: Adding a static NAT virtual IP



Adding port forwarding virtual IPs

To add port forwarding virtual IPs

1. Go to **Firewall > Virtual IP**.
2. Select New to add a virtual IP.
3. Type a Name for the virtual IP.
   The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.
4. Select the virtual IP External Interface from the list.
   The external interface is the interface connected to the source network that receives the packets to be forwarded to the destination network.
5. In the Type section, select Port Forwarding.
6. Enter the External IP Address that you want to map to an address on the destination zone.
   You can set the external IP address to the IP address of the external interface selected in step 4 or to any other address.
   If the IP address of the external interface selected in step 4 is set using PPPoE or DHCP, you can enter 0.0.0.0 for the External IP Address. The FortiWiFi unit substitutes the IP address set for this external interface using PPPoE or DHCP.
   For example, if the virtual IP provides access from the Internet to a server on your internal network, the external IP address must be a static IP address obtained from your ISP for this server. This address must be a unique address that is not used by another host. However, this address must be routed to the external interface selected in step 4. The virtual IP address and the external IP address can be on different subnets.

7 Enter the External Service Port number that you want to configure port forwarding for.

The external service port number must match the destination port of the packets to be forwarded. For example, if the virtual IP provides access from the Internet to a web server, the external service port number is 80 (the HTTP port).

8 In Map to IP, enter the real IP address on the destination network.

For example, the real IP address could be the IP address of a web server on an internal network.

9 In Map to Port, enter the port number to be added to packets when they are forwarded.

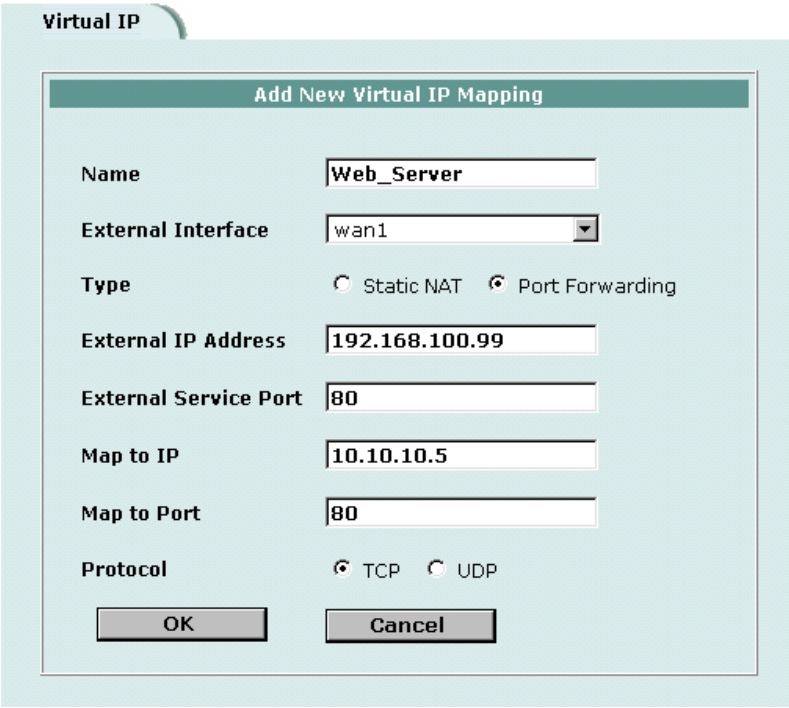
If you do not want to translate the port, enter the same number as the External Service Port.

If you want to translate the port, enter the port number to which to translate the destination port of the packets when they are forwarded by the firewall.

10 Select the protocol (TCP or UDP) that you want the forwarded packets to use.

11 Select OK to save the port forwarding virtual IP.

Figure 13: Adding a port forwarding virtual IP



Adding policies with virtual IPs

Use the following procedure to add a policy that uses a virtual IP to forward packets.

To add a policy with a virtual IP

1. Go to **Firewall > Policy**.
2. Select the type of policy that you want to add.
   - The source interface must match the interface selected in the External Interface list.
   - The destination interface must match the interface connected to the network with the Map to IP address.
3. Use the following information to configure the policy.

Source	Select the source address from which users can access the server.
Destination	Select the virtual IP.
Schedule	Select a schedule as required.
Service	Select the service that matches the Map to Service that you selected for the port-forwarding virtual IP.
Action	Set action to ACCEPT to accept connections to the internal server. You can also select DENY to deny access.
NAT	Select NAT if the firewall is protecting the private addresses on the destination network from the source network.
Authentication	Optionally select Authentication and select a user group to require users to authenticate with the firewall before accessing the server using port forwarding.
Log Traffic **Anti-Virus & Web filter**	Select these options to log port-forwarded traffic and apply antivirus and web filter protection to this traffic.

4. Select OK to save the policy.

IP pools

An IP pool (also called a dynamic IP pool) is a range of IP addresses added to a firewall interface. If you add IP pools to an interface, you can select Dynamic IP Pool when you configure a policy with the destination set to this interface. You can add an IP pool if you want to add NAT mode policies that translate source addresses to addresses randomly selected from the IP pool rather than being limited to the IP address of the destination interface.

For example, if you add an IP pool to the internal interface, you can select Dynamic IP pool for WAN1->Internal, WAN2->Internal and DMZ->Internal policies.

You can add multiple IP pools to any interface but only the first IP pool is used by the firewall.

This section describes:

- Adding an IP pool
- IP Pools for firewall policies that use fixed ports
- IP pools and dynamic NAT

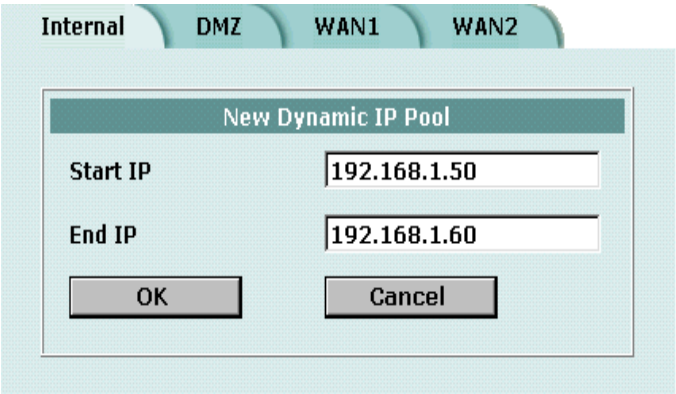
Adding an IP pool

To add an IP pool

1. Go to **Firewall > IP Pool**.
2. Select the interface to which to add the IP pool.
3. Select New to add a new IP pool to the selected interface.
4. Enter the Start IP and End IP addresses for the range of addresses in the IP pool.

   The start IP and end IP must define the start and end of an address range. The start IP must be lower than the end IP. The start IP and end IP must be on the same subnet as the IP address of the interface that you are adding the IP pool.
5. Select OK to save the IP pool.

Figure 14: Adding an IP Pool



IP Pools for firewall policies that use fixed ports

Some network configurations do not operate correctly if a NAT policy translates the source port of packets used by the connection. NAT translates source ports to keep track of connections for a particular service. You can select fixed port for NAT policies to prevent source port translation. However, selecting fixed port means that only one connection can be supported through the firewall for this service. To be able to support multiple connections, you can add an IP pool to the destination interface, and then select dynamic IP pool in the policy. The firewall randomly selects an IP address from the IP pool and assigns it to each connection. In this case the number of connections that the firewall can support is limited by the number of IP addresses in the IP pool.

IP pools and dynamic NAT

You can use IP pools for dynamic NAT. For example, your organization might have purchased a range of Internet addresses but you might have only one Internet connection on the external interface of your FortiWiFi unit.

You can assign one of your organization's Internet IP addresses to the external interface of the FortiWiFi unit. If the FortiWiFi unit is operating in NAT/Route mode, all connections from your network to the Internet appear to come from this IP address.

If you want connections to originate from all your Internet IP addresses, you can add this address range to an IP pool for the external interface. Then you can select Dynamic IP Pool for all policies with the external interface as the destination. For each connection, the firewall dynamically selects an IP address from the IP pool to be the source address for the connection. As a result, connections to the Internet appear to be originating from any of the IP addresses in the IP pool.

IP/MAC binding

IP/MAC binding protects the FortiWiFi unit and your network from IP spoofing attacks. IP spoofing attacks try to use the IP address of a trusted computer to connect to, or through, the FortiWiFi unit from a different computer. The IP address of a computer is easy to change to a trusted address, but MAC addresses are added to ethernet cards at the factory and are not easy to change.

You can enter the static IP addresses and corresponding MAC addresses of trusted computers in the static IP/MAC table.

If you have trusted computers with dynamic IP addresses that are set by the FortiWiFi DHCP server, the FortiWiFi unit adds these IP addresses and their corresponding MAC addresses to the dynamic IP/MAC table. For information about viewing the table, see "Viewing a DHCP server dynamic IP list" on page 129. The dynamic IP/MAC binding table is not available in Transparent mode.

You can enable IP/MAC binding for packets in sessions connecting to the firewall or passing through the firewall.

Note: If you enable IP/MAC binding and change the IP address of a computer with an IP or MAC address in the IP/MAC list, you must also change the entry in the IP/MAC list or the computer does not have access to or through the FortiWiFi unit. You must also add the IP/MAC address pair of any new computer that you add to your network or the new computer does not have access to or through the FortiWiFi unit.

This section describes:

- Configuring IP/MAC binding for packets going through the firewall
- Configuring IP/MAC binding for packets going to the firewall
- Adding IP/MAC addresses
- Viewing the dynamic IP/MAC list
- Enabling IP/MAC binding

Configuring IP/MAC binding for packets going through the firewall

Use the following procedure to use IP/MAC binding to filter packets that a firewall policy would normally allow through the firewall.

To configure IP/MAC binding for packets going through the firewall

1. Go to **Firewall > IP/MAC Binding > Setting**.
2. Select the Enable IP/MAC binding going through the firewall check box.
3. Go to **Firewall > IP/MAC Binding > Static IP/MAC**.

4 Select New to add IP/MAC binding pairs to the IP/MAC binding list.

All packets that would normally be allowed through the firewall by a firewall policy are first compared with the entries in the IP/MAC binding list. If a match is found, then the firewall attempts to match the packet with a policy.

For example, if the IP/MAC pair IP 1.1.1.1 and 12:34:56:78:90:ab:cd is added to the IP/MAC binding list:

- A packet with IP address 1.1.1.1 and MAC address 12:34:56:78:90:ab:cd is allowed to go on to be matched with a firewall policy.
- A packet with IP 1.1.1.1 but with a different MAC address is dropped immediately to prevent IP spoofing.
- A packet with a different IP address but with a MAC address of 12:34:56:78:90:ab:cd is dropped immediately to prevent IP spoofing.
- A packet with both the IP address and MAC address not defined in the IP/MAC binding table:
  - is allowed to go on to be matched with a firewall policy if IP/MAC binding is set to Allow traffic,
  - is blocked if IP/MAC binding is set to Block traffic.

Configuring IP/MAC binding for packets going to the firewall

Use the following procedure to use IP/MAC binding to filter packets that would normally connect with the firewall (for example, when an administrator is connecting to the FortiWiFi unit for management).

To configure IP/MAC binding for packets going to the firewall

1 Go to **Firewall > IP/MAC Binding > Setting**.

2 Select the Enable IP/MAC binding going to the firewall check box.

3 Go to **Firewall > IP/MAC Binding > Static IP/MAC**.

4 Select New to add IP/MAC binding pairs to the IP/MAC binding list.

All packets that would normally connect to the firewall are first compared with the entries in the IP/MAC binding table.

For example, if the IP/MAC pair IP 1.1.1.1 and 12:34:56:78:90:ab:cd is added to the IP/MAC binding list:

- A packet with IP address 1.1.1.1 and MAC address 12:34:56:78:90:ab:cd is allowed to connect to the firewall.
- A packet with IP 1.1.1.1 but with a different MAC address is dropped immediately to prevent IP spoofing.
- A packet with a different IP address but with a MAC address of 12:34:56:78:90:ab:cd is dropped immediately to prevent IP spoofing.
- A packet with both the IP address and MAC address not defined in the IP/MAC binding table:
  - is allowed to connect to the firewall if IP/MAC binding is set to Allow traffic,
  - is blocked if IP/MAC binding is set to Block traffic.

Adding IP/MAC addresses

To add an IP/MAC address

1. Go to **Firewall > IP/MAC Binding > Static IP/MAC**.
2. Select New to add an IP address/MAC address pair.
3. Enter the IP Address and the MAC Address.

   You can bind multiple IP addresses to the same MAC address. You cannot bind multiple MAC addresses to the same IP address.

   However, you can set the IP address to 0.0.0.0 for multiple MAC addresses. This means that all packets with these MAC addresses are matched with the IP/MAC binding list.

   Similarly, you can set the MAC address to 00:00:00:00:00:00 for multiple IP addresses. This means that all packets with these IP addresses are matched with the IP/MAC binding list.
4. Type a Name for the new IP/MAC address pair.

   The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.
5. Select the Enable check box to enable IP/MAC binding for the IP/MAC pair.
6. Select OK to save the IP/MAC binding pair.

Viewing the dynamic IP/MAC list

To view the dynamic IP/MAC list

1. Go to **Firewall > IP/MAC Binding > Dynamic IP/MAC**.

Enabling IP/MAC binding

Caution: Make sure that you have added the IP/MAC Address pair of your management computer before enabling IP/MAC binding.

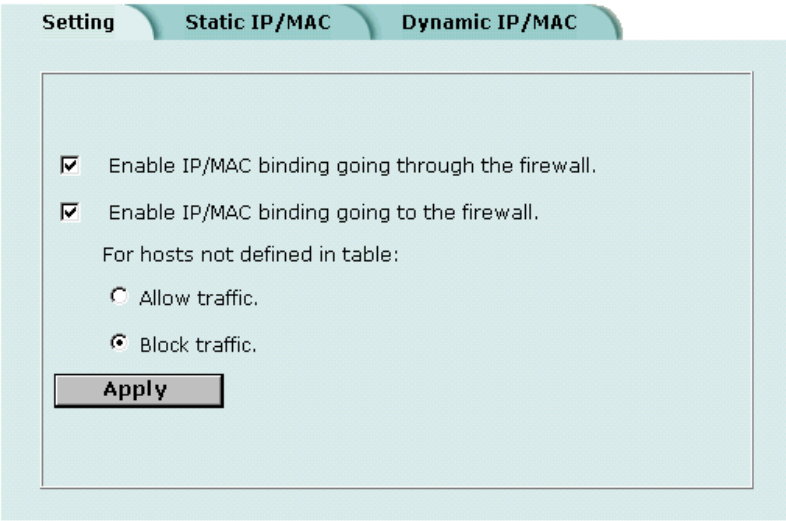
To enable IP/MAC binding

1. Go to **Firewall > IP/MAC Binding > Setting**.
2. Select the Enable IP/MAC binding going through the firewall check box if you want to turn on IP/MAC binding for packets that could be matched by policies.
3. Select the Enable IP/MAC binding going to the firewall check box if you want to turn on IP/MAC binding for packets connecting to the firewall.
4. Configure how IP/MAC binding handles packets with IP and MAC addresses that are not defined in the IP/MAC list.

   Select Allow traffic to allow all packets with IP and MAC address pairs that are not added to the IP/MAC binding list.

   Select Block traffic to block packets with IP and MAC address pairs that are not added to the IP/MAC binding list.
5. Select Apply to save the changes.

Figure 15: IP/MAC settings



Content profiles

Use content profiles to apply different protection settings for content traffic that is controlled by firewall policies. You can use content profiles to:

- Configure antivirus protection for HTTP, FTP, POP3, SMTP, and IMAP policies
- Configure web filtering for HTTP policies
- Configure email filtering for IMAP and POP3 policies
- Configure oversized file and email blocking for HTTP, FTP, POP3, SMTP, and IMAP policies
- Pass fragmented email for POP3, SMTP, and IMAP policies

Using content profiles, you can build protection configurations that can be applied to different types of firewall policies. This allows you to customize types and levels of protection for different firewall policies.

For example, while traffic between internal and external addresses might need strict protection, traffic between trusted internal addresses might need moderate protection. You can configure policies for different traffic services to use the same or different content profiles.

Content profiles can be added to NAT/Route mode and Transparent mode policies.

- Default content profiles
- Adding content profiles
- Adding content profiles to policies

Default content profiles

The FortiWiFi unit has the following four default content profiles that are displayed on the Firewall Content Profile page. You can use the default content profiles or create your own.

Strict	To apply maximum content protection to HTTP, FTP, IMAP, POP3, and SMTP content traffic. You would not use the strict content profile under normal circumstances but it is available if you have extreme problems with viruses and require maximum content screening protection.
Scan	To apply antivirus scanning to HTTP, FTP, IMAP, POP3, and SMTP content traffic.
Web	To apply antivirus scanning and web content blocking to HTTP content traffic. You can add this content profile to firewall policies that control HTTP traffic.
Unfiltered	Use if you do not want to apply content protection to content traffic. You can add this content profile to firewall policies for connections between highly trusted or highly secure networks where content does not need to be protected.

Adding content profiles

If the default content profiles do not provide the protection that you require, you can create custom content profiles.

To add a content profile

1. Go to **Firewall > Content Profile**.
2. Select New.
3. Type a Profile Name.
4. Enable the antivirus protection options that you want.

Anti Virus Scan	Scan web, FTP, and email traffic for viruses and worms. See "Antivirus scanning" on page 248.
File Block	Delete files with blocked file patterns even if they do not contain viruses. Enable file blocking when a virus has been found that is so new that virus scanning does not detect it. See "File blocking" on page 249.

Note: If both Anti Virus Scan and File Block are enabled, the FortiWiFi unit blocks files that match enabled file patterns before they are scanned for viruses.

5. Enable the web filtering options that you want.

Web URL Block	Block unwanted web pages and web sites. This option adds FortiWiFi Web URL blocking (see "Configuring FortiWiFi Web URL blocking" on page 257), FortiWiFi Web Pattern blocking (see "Configuring FortiWiFi Web pattern blocking" on page 259), and Cerberian URL filtering (see "Configuring Cerberian URL filtering" on page 260) to HTTP traffic accepted by a policy.
Web Content Block	Block web pages that contain unwanted words or phrases. See "Content blocking" on page 254.
Web Script Filter	Remove scripts from web pages. See "Script filtering" on page 262.

Web Exempt List Exempt URLs from web filtering and virus scanning. See "Exempt URL list" on page 263.

6 Enable the email filter protection options that you want.

Email Block List Add a subject tag to email from unwanted addresses. See "Email block list" on page 270.

Email Exempt List Exempt sender address patterns from email filtering. See "Email exempt list" on page 271.

Email Content Block Add a subject tag to email that contains unwanted words or phrases. See "Email banned word list" on page 268.

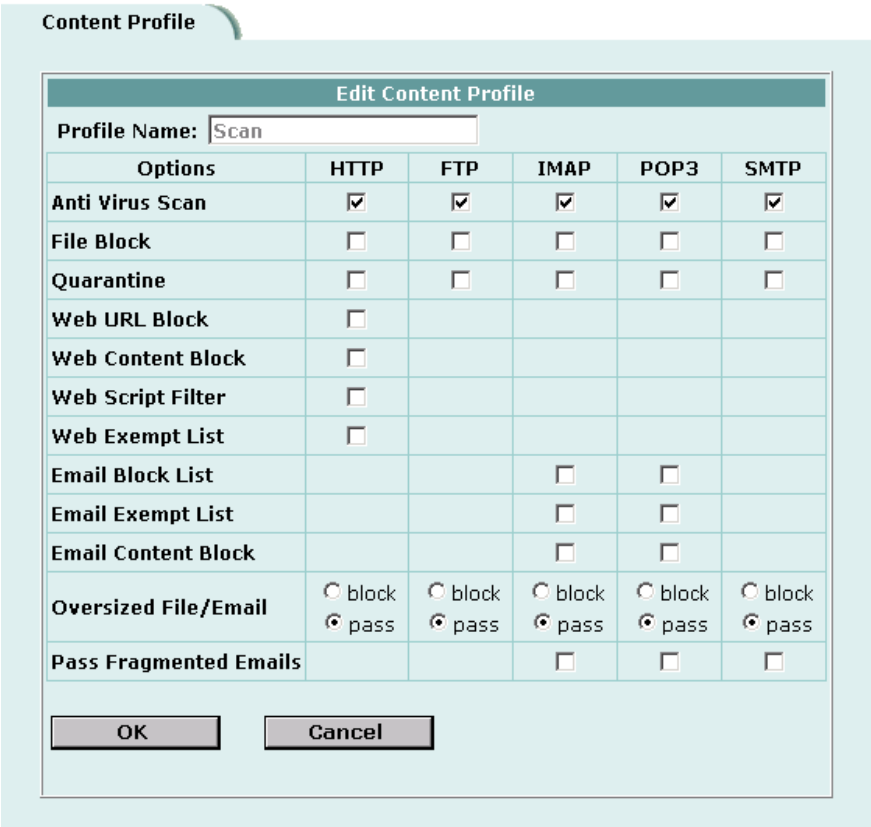
7 Enable the fragmented email and oversized file and email options that you want.

Oversized File/Email Block or pass files and email that exceed thresholds configured as a percent of system memory. See "Blocking oversized files and emails" on page 250.

Pass Fragmented Email Allow email messages that have been fragmented to bypass antivirus scanning. See "Exempting fragmented email from blocking" on page 250.

8 Select OK.

Figure 16: Example content profile



Adding content profiles to policies

You can add content profiles to policies with action set to allow or encrypt and with service set to ANY, HTTP, FTP, IMAP, POP3, SMTP, or a service group that includes these services.

To add a content profile to a policy

1. Go to **Firewall > Policy**.
2. Select a policy list that contains policies that you want to add a content profile to.

   For example, to enable network protection for files downloaded by internal network users from the web, select an internal to external policy list.
3. Select New to add a new policy, or choose a policy and select Edit .
4. Select the Anti-Virus & Web filter check box.
5. Select a content profile from the list.
6. Configure the remaining policy settings, if required.
7. Select OK.
8. Repeat this procedure for any policies that you want to enable network protection for.

Users and authentication

FortiWiFi units support user authentication to the FortiWiFi user database, a RADIUS server, and an LDAP server. You can add user names to the FortiWiFi user database and then add a password to allow the user to authenticate using the internal database. You can also add the names of RADIUS and LDAP servers. You can select RADIUS to allow the user to authenticate using the selected RADIUS server or LDAP to allow the user to authenticate using the selected LDAP server. You can disable a user name so that the user cannot authenticate.

To enable authentication, you must add user names to one or more user groups. You can also add RADIUS servers and LDAP servers to user groups. You can then select a user group when you require authentication.

You can select user groups to require authentication for:

- any firewall policy with Action set to ACCEPT
- IPSec dialup user phase 1 configurations
- XAuth functionality for phase 1 IPSec VPN configurations
- PPTP
- L2TP

When a user enters a user name and password, the FortiWiFi unit searches the internal user database for a matching user name. If Disable is selected for that user name, the user cannot authenticate and the connection is dropped. If Password is selected for that user and the password matches, the connection is allowed. If the password does not match, the connection is dropped.

If RADIUS is selected and RADIUS support is configured and the user name and password match a user name and password on the RADIUS server, the connection is allowed. If the user name and password do not match a user name and password on the RADIUS server, the connection is dropped.

If LDAP is selected and LDAP support is configured and the user name and password match a user name and password on the LDAP server, the connection is allowed. If the user name and password do not match a user name and password on the LDAP server, the connection is dropped.

If the user group contains user names, RADIUS servers, and LDAP servers, the FortiWiFi unit checks them in the order in which they have been added to the user group.

This chapter describes:

- Setting authentication timeout
- Adding user names and configuring authentication
- Configuring RADIUS support
- Configuring LDAP support
- Configuring user groups

Setting authentication timeout

Authentication timeout controls how long authenticated firewall connections can remain idle before users must authenticate again to get access through the firewall.

To set authentication timeout

1. Go to **System > Config > Options**.
2. In Auth Timeout, type a number, in minutes.
   The default authentication timeout is 15 minutes.

Adding user names and configuring authentication

Use the following procedures to add user names and configure authentication.

This section describes:

- Adding user names and configuring authentication
- Deleting user names from the internal database

Adding user names and configuring authentication

To add a user name and configure authentication

1. Go to **User > Local**.
2. Select New to add a new user name.
3. Type the User Name.
   The user name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.
4. Select one of the following authentication configurations:

Disable	Prevent this user from authenticating.
Password	Enter the password that this user must use to authenticate. The password should be at least six characters long. The password can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.

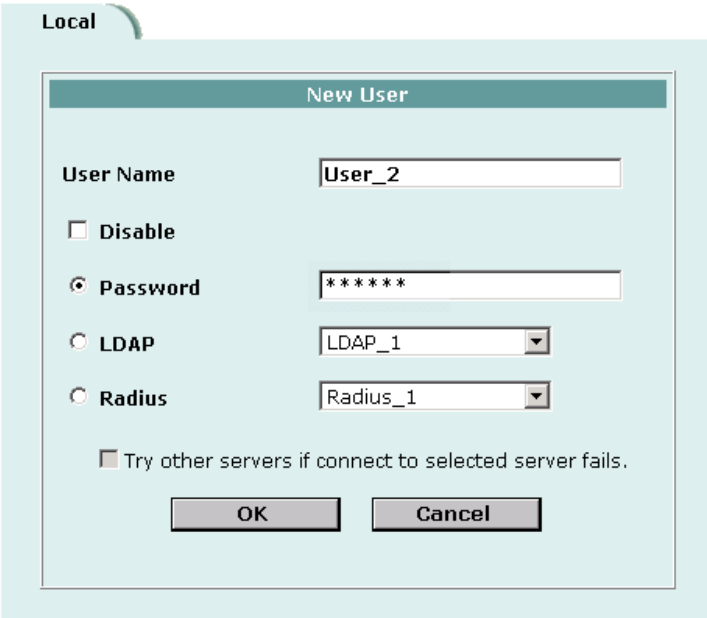
LDAP Require the user to authenticate to an LDAP server. Select the name of the LDAP server to which the user must authenticate. You can only select an LDAP server that has been added to the FortiWiFi LDAP configuration. See "Configuring LDAP support" on page 197.

Radius Require the user to authenticate to a RADIUS server. Select the name of the RADIUS server to which the user must authenticate. You can only select a RADIUS server that has been added to the FortiWiFi RADIUS configuration. See "Configuring RADIUS support" on page 196.

5 Select the Try other servers if connect to selected server fails check box if you have selected Radius and you want the FortiWiFi unit to try to connect to other RADIUS servers added to the FortiWiFi RADIUS configuration.

6 Select OK.

Figure 17: Adding a user name



Deleting user names from the internal database

You cannot delete user names that have been added to user groups. Remove user names from user groups before deleting them.

To delete a user name from the internal database

1 Go to **User > Local**.

2 Select Delete User for the user name that you want to delete.

3 Select OK.

Note: Deleting the user name deletes the authentication configured for the user.

Configuring RADIUS support

If you have configured RADIUS support and a user is required to authenticate using a RADIUS server, the FortiWiFi unit contacts the RADIUS server for authentication.

This section describes:

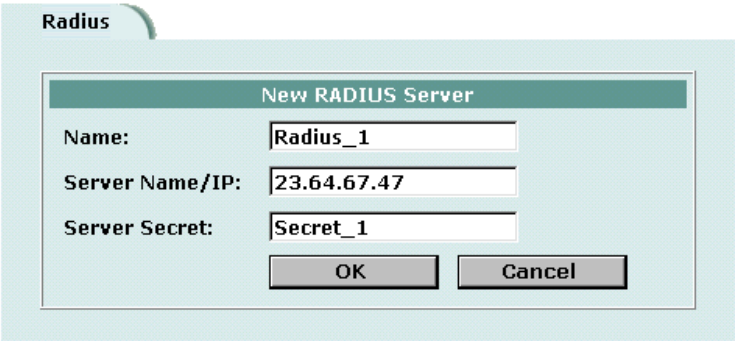
- Adding RADIUS servers
- Deleting RADIUS servers

Adding RADIUS servers

To add a RADIUS server

1. Go to **User > RADIUS**.
2. Select New to add a new RADIUS server.
3. Type the Name of the RADIUS server.
   You can type any name. The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.
4. Enter the Server Name or IP address of the RADIUS server.
5. Enter the RADIUS server secret.
6. Select OK.

Figure 18: Example RADIUS configuration



Deleting RADIUS servers

You cannot delete a RADIUS server that has been added to a user group.

To delete a RADIUS server

1. Go to **User > RADIUS**.
2. Select Delete beside the RADIUS server name that you want to delete.
3. Select OK.

Configuring LDAP support

If you have configured LDAP support and a user is required to authenticate using an LDAP server, the FortiWiFi unit contacts the LDAP server for authentication. To authenticate with the FortiWiFi unit, the user enters a user name and password. The FortiWiFi unit sends this user name and password to the LDAP server. If the LDAP server can authenticate the user, the user is successfully authenticated with the FortiWiFi unit. If the LDAP server cannot authenticate the user, the connection is refused by the FortiWiFi unit.

The FortiWiFi unit supports LDAP protocol functionality defined in RFC2251 for looking up and validating user names and passwords. ForitGate LDAP supports all LDAP servers compliant with LDAP v3.

FortiWiFi LDAP support does not extend to proprietary functionality, such as notification of password expiration, that is available from some LDAP servers. FortiWiFi LDAP support does not supply information to the user about why authentication failed.

LDAP user authentication is supported for PPTP, L2TP, IPSec VPN, and firewall authentication. With PPTP, L2TP, and IPSec VPN, PAP (packet authentication protocol) is supported and CHAP (Challenge-Handshake Authentication Protocol) is not.

This section describes:

- Adding LDAP servers
- Deleting LDAP servers

Adding LDAP servers

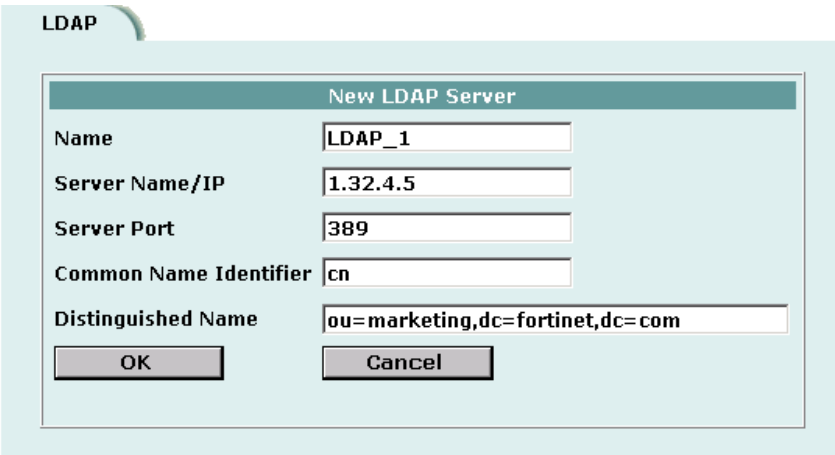
To add an LDAP server

1. Go to **User > LDAP**.
2. Select New to add a new LDAP server.
3. Type the Name of the LDAP server.
   You can type any name. The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.
4. Enter the Server Name or IP address of the LDAP server.
5. Enter the Server Port used to communicate with the LDAP server.
   By default LDAP uses port 389.
6. Enter the common name identifier for the LDAP server.
   The common name identifier for most LDAP servers is cn. However some servers use other common name identifiers such as uid.

7 Enter the distinguished name used to look up entries on the LDAP server.
Enter the base distinguished name for the server using the correct X.500 or LDAP format. The FortiWiFi unit passes this distinguished name unchanged to the server.
For example, you could use the following base distinguished name:
ou=marketing,dc=fortinet,dc=com
where ou is organization unit and dc is domain component
You can also specify multiple instances of the same field in the distinguished name, for example, to specify multiple organization units:
ou=accounts,ou=marketing,dc=fortinet,dc=com

8 Select OK.

Figure 19: Example LDAP configuration



Deleting LDAP servers

You cannot delete an LDAP server that has been added to a user group.

To delete an LDAP server

1 Go to **User > LDAP**.

2 Select Delete beside the LDAP server name that you want to delete.

3 Select OK.

Configuring user groups

To enable authentication, you must add user names, RADIUS servers, and LDAP servers to one or more user groups. You can then select a user group when you require authentication. You can select a user group to configure authentication for:

- Policies that require authentication. Only users in the selected user group or users that can authenticate with the RADIUS servers added to the user group can authenticate with these policies.
- IPSec VPN Phase 1 configurations for dialup users. Only users in the selected user group can authenticate to use the VPN tunnel.
- XAuth for IPSec VPN Phase 1 configurations. Only users in the selected user group can be authenticated using XAuth.
- The FortiWiFi PPTP configuration. Only users in the selected user group can use PPTP.
- The FortiWiFi L2TP configuration. Only users in the selected user group can use L2TP.

When you add user names, RADIUS servers, and LDAP servers to a user group, the order in which they are added determines the order in which the FortiWiFi unit checks for authentication. If user names are first, then the FortiWiFi unit checks for a match with these local users. If a match is not found, the FortiWiFi unit checks the RADIUS or LDAP server. If a RADIUS or LDAP server is added first, the FortiWiFi unit checks the server and then the local users.

If the user group contains users, RADIUS servers, and LDAP servers, the FortiWiFi unit checks them in the order in which they have been added to the user group.

This section describes:

- Adding user groups
- Deleting user groups

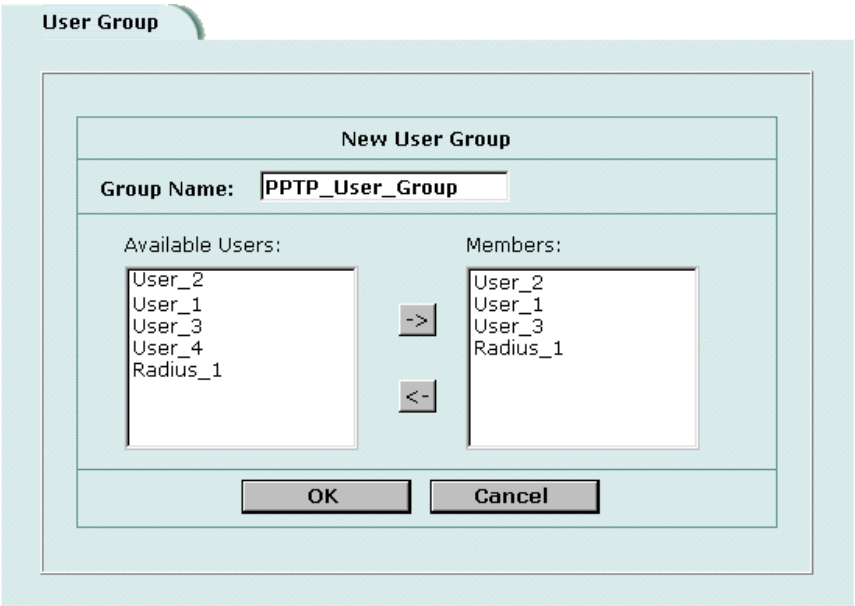
Adding user groups

Use the following procedure to add user groups to the FortiWiFi configuration. You can add user names, RADIUS servers, and LDAP servers to user groups.

To add a user group

1. Go to **User > User Group**.
2. Select New to add a new user group.

Figure 20: Adding a user group



3 Enter a Group Name to identify the user group.
The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.

4 To add users to the user group, select a user from the Available Users list and select the right arrow to add the name to the Members list.

5 To add a RADIUS server to the user group, select a RADIUS server from the Available Users list and select the right arrow to add the RADIUS server to the Members list.

6 To add an LDAP server to the user group, select an LDAP server from the Available Users list and select the right arrow to add the LDAP server to the Members list.

7 To remove users, RADIUS servers, or LDAP servers from the user group, select a user, RADIUS server, or LDAP server from the Members list and select the left arrow to remove the name, RADIUS server, or LDAP server from the group.

8 Select OK.

Deleting user groups

You cannot delete user groups that have been selected in a policy, a dialup user phase 1 configuration, or a PPTP or L2TP configuration.

To delete a user group

1 Go to **User > User Group**

2 Select Delete beside the user group that you want to delete.

3 Select OK.

IPSec VPN

A Virtual Private Network (VPN) is an extension of a private network that encompasses links across shared or public networks such as the Internet. For example, a company that has two offices in different cities, each with its own private network, can use a VPN to create a secure tunnel between the offices. Similarly, a teleworker can use a VPN client for remote access to a private office network. In both cases, the secure connection appears to the user as a private network communication, even though the communication is over a public network.

Secure VPN connections are enabled by a combination of tunneling, data encryption, and authentication. Tunneling encapsulates data so that it can be transferred over the public network. Instead of being sent in its original format, the data frames are encapsulated within an additional header and then routed between tunnel endpoints. Upon arrival at the destination endpoint, the data is decapsulated and forwarded to its destination within the private network.

Encryption changes a data stream from clear text (something that a human or a program can interpret) to cipher text (something that cannot be interpreted). The information is encrypted and decrypted using mathematical algorithms known as keys.

Authentication provides a means to verify the origin of a packet and the integrity of its contents. Authentication is done using checksums calculated with keyed hash function algorithms.

This chapter provides an overview about how to configure FortiWiFi IPSec VPN. For a complete description of FortiWiFi VPN, see the *FortiGate VPN Guide*.

- Key management
- Manual key IPSec VPNs
- AutoIKE IPSec VPNs
- Managing digital certificates
- Configuring encrypt policies
- IPSec VPN concentrators
- Monitoring and Troubleshooting VPNs

Key management

There are three basic elements in any encryption system:

- an algorithm that changes information into code,
- a cryptographic key that serves as a secret starting point for the algorithm,
- a management system to control the key.

IPSec provides two ways to handle key exchange and management:

- Manual Keys
- Automatic Internet Key Exchange (AutoIKE) with pre-shared keys or certificates

Manual Keys

When using manual keys, matching security settings must be entered at both ends of the tunnel. These settings, which include both the encryption and authentication keys, must be kept secret so that unauthorized parties cannot decrypt the data, even if they know which encryption algorithm is being used.

Automatic Internet Key Exchange (AutoIKE) with pre-shared keys or certificates

For using multiple tunnels, an automated system of key management is required. IPSec supports the automated generation and negotiation of keys using the Internet Key Exchange protocol. This method of key management is referred to as AutoIKE. Fortinet supports AutoIKE with pre-shared keys and AutoIKE with certificates.

AutoIKE with pre-shared keys

If both peers in a session are configured with the same pre-shared key, they can use it to authenticate themselves to each other. The peers do not send the key to each other. Instead, as part of the security negotiation process, they use it in combination with a Diffie-Hellman group to create a session key. The session key is used for encryption and authentication and is automatically regenerated by IKE during the communication session.

Pre-shared keys are similar to manual keys in that they require the network administrator to distribute and manage matching information at the VPN peer sites. Whenever a pre-shared key changes, the administrator must update both sites.

AutoIKE with certificates

This method of key management involves a trusted third party, the certificate authority (CA). Each peer in a VPN is first required to generate a set of keys, known as a public/private key pair. The CA signs the public key for each peer, creating a signed digital certificate. The peer then contacts the CA to retrieve their own certificates, plus that of the CA. After the certificates are uploaded to the FortiWiFi units and appropriate IPSec tunnels and policies are configured, the peers are ready to communicate. As they do, IKE manages the exchange of certificates, sending signed digital certificates from one peer to another. The signed digital certificates are validated by the presence of the CA certificate at each end. With authentication complete, the IPSec tunnel is then established.

In some respects, certificates are simpler to manage than manual keys or pre-shared keys. For this reason, certificates are best suited to large network deployments.

Manual key IPSec VPNs

When using manual keys, complementary security parameters must be entered at both ends of the tunnel. In addition to encryption and authentication algorithms and keys, the security parameter index (SPI) is required. The SPI is an arbitrary value that defines the structure of the communication between the peers. With other methods, the SPI is generated automatically but with the manual key configuration it must be entered as part of the VPN setup.

The encryption and authentication keys must match on the local and remote peers, that is, the SPI values must be mirror images of each other. After you enter these values, the VPN tunnel can start without a need for the authentication and encryption algorithms to be negotiated. Provided you entered correct, complementary values, the tunnels are established between the peers. This means that the tunnel already exists between the peers. As a result, when traffic matches a policy requiring the tunnel, it can be authenticated and encrypted immediately.

- General configuration steps for a manual key VPN
- Adding a manual key VPN tunnel

General configuration steps for a manual key VPN

A manual key VPN configuration consists of a manual key VPN tunnel, the source and destination addresses for both ends of the tunnel, and an encrypt policy to control access to the VPN tunnel.

To create a manual key VPN configuration

1. Add a manual key VPN tunnel. See “Adding a manual key VPN tunnel” on page 203.
2. Configure an encrypt policy that includes the tunnel, source address, and destination address for both ends of the tunnel. See “Configuring encrypt policies” on page 215.

Adding a manual key VPN tunnel

Configure a manual key tunnel to create an IPSec VPN tunnel between the FortiWiFi unit and a remote IPSec VPN client or gateway that is also using manual key.

To add a manual key VPN tunnel

1. Go to **VPN > IPSec > Manual Key**.
2. Select New to add a new manual key VPN tunnel.
3. Type a VPN Tunnel Name.

   The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.
4. Enter the Local SPI.

   The Local Security Parameter Index is a hexadecimal number of up to eight digits (digits can be 0 to 9, a to f) in the range bb8 to FFFFFFF. This number must be added to the Remote SPI at the opposite end of the tunnel.

5 Enter the Remote SPI.

The Remote Security Parameter Index is a hexadecimal number of up to eight digits (digits can be 0 to 9, a to f) in the range bb8 to FFFFFFF. This number must be added to the Local SPI at the opposite end of the tunnel.

6 Enter the Remote Gateway.

This is the external IP address of the FortiWiFi unit or other IPSec gateway at the opposite end of the tunnel.

7 Select an Encryption Algorithm from the list.

Use the same algorithm at both ends of the tunnel.

8 Enter the Encryption Key.

Each two-character combination entered in hexadecimal format represents one byte. Depending on the encryption algorithm that you select, you might be required to enter the key in multiple segments. Use the same encryption key at both ends of the tunnel.

DES	Enter a 16-character (8 byte) hexadecimal number (0-9, A-F).
3DES	Enter a 48-character (24 byte) hexadecimal number (0-9, A-F). Separate the number into three segments of 16 characters.
AES128	Enter a 32-character (16 byte) hexadecimal number (0-9, A-F). Separate the number into two segments of 16 characters.
AES192	Enter a 48-character (24 byte) hexadecimal number (0-9, A-F). Separate the number into three segments of 16 characters.
AES256	Enter a 64-character (32 byte) hexadecimal number (0-9, A-F). Separate the number into four segments of 16 characters.

9 Select an Authentication Algorithm from the list.

Use the same algorithm at both ends of the tunnel.

10 Enter the Authentication Key.

Each two-character combination entered in hexadecimal format represents one byte. Use the same authentication key at both ends of the tunnel.

MD5	Enter a 32-character (16 byte) hexadecimal number (0-9, A-F). Separate the number into two segments of 16 characters.
SHA1	Enter a 40-character (20 byte) hexadecimal number (0-9, A-F). Separate the number into two segments—the first of 16 characters; the second of 24 characters.

11 Select a concentrator if you want the tunnel to be part of a hub and spoke VPN configuration. See "Adding a VPN concentrator" on page 220.

12 Select OK to save the manual key VPN tunnel.

AutoIKE IPSec VPNs

FortiWiFi units support two methods of Automatic Internet Key Exchange (AutoIKE) for establishing IPSec VPN tunnels: AutoIKE with pre-shared keys and AutoIKE with digital certificates.

- General configuration steps for an AutoIKE VPN
- Adding a phase 1 configuration for an AutoIKE VPN
- Adding a phase 2 configuration for an AutoIKE VPN

General configuration steps for an AutoIKE VPN

An AutoIKE VPN configuration consists of phase 1 and phase 2 configuration parameters, the source and destination addresses for both ends of the tunnel, and an encrypt policy to control access to the VPN tunnel.

To create an AutoIKE VPN configuration

Note: Prior to configuring an AutoIKE VPN that uses digital certificates, you must add the CA and local certificates to the FortiWiFi unit. For information about digital certificates, see "Managing digital certificates" on page 212.

1. Add the phase 1 parameters. See "Adding a phase 1 configuration for an AutoIKE VPN" on page 205.
2. Add the phase 2 parameters. See "Adding a phase 2 configuration for an AutoIKE VPN" on page 210.
3. Configure an encrypt policy that includes the tunnel, source address, and destination address for both ends of the tunnel. See "Configuring encrypt policies" on page 215.

Adding a phase 1 configuration for an AutoIKE VPN

When you add a phase 1 configuration, you define the terms by which the FortiWiFi unit and a remote VPN peer (gateway or client) authenticate themselves to each other prior to establishing an IPSec VPN tunnel.

The phase 1 configuration is related to the phase 2 configuration. In phase 1 the VPN peers are authenticated; in phase 2 the tunnel is established. You have the option to use the same phase 1 parameters to establish multiple tunnels. In other words, the same remote VPN peer (gateway or client) can have multiple tunnels to the local VPN peer (the FortiWiFi unit).

When the FortiWiFi unit receives an IPSec VPN connection request, it authenticates the VPN peers according to the phase 1 parameters. Then, depending on the source and destination addresses of the request, it starts an IPSec VPN tunnel and applies an encrypt policy.

To add a phase 1 configuration

1. Go to **VPN > IPSEC > Phase 1**.
2. Select New to add a new phase 1 configuration.

3 Type a Gateway Name for the remote VPN peer.

The remote VPN peer can be either a gateway to another network or an individual client on the Internet.

The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.

4 Select a Remote Gateway address type.

- If the remote VPN peer has a static IP address, select Static IP Address.
- If the remote VPN peer has a dynamically assigned IP address (DHCP or PPPoE), or if the remote VPN peer has a static IP address that is not required in the peer identification process, select Dialup User.

Depending on the Remote Gateway address type you selected, other fields become available.

Remote Gateway: Static IP Address

IP Address	If you select Static IP Address, the IP Address field appears. Enter the IP address of the remote IPSec VPN gateway or client that can connect to the FortiWiFi unit. This is a mandatory entry.

Remote Gateway: Dialup User

Peer Options	If you select Dialup User, the Peer Options become available under Advanced Options. Use the Peer Options to authenticate remote VPN peers with peer IDs during phase 1 negotiations.

5 Select Aggressive or Main (ID Protection) mode.

When using aggressive mode, the VPN peers exchange identifying information in the clear. When using main mode, identifying information is hidden.

The VPN peers must use the same mode.

6 Configure the P1 Proposal.

Select up to three encryption and authentication algorithm combinations to propose for phase 1.

The VPN peers must use the same P1 proposal settings.

7 Select the DH Group(s).

Select one or more Diffie-Hellman groups to propose for phase 1.

As a general rule, the VPN peers should use the same DH Group settings.

8 Enter the Keylife.

The keylife is the amount of time in seconds before the phase 1 encryption key expires. When the key expires, a new key is generated without interrupting service. P1 proposal keylife can be from 120 to 172,800 seconds.

9 For Authentication Method, select Preshared Key or RSA Signature.

- Preshared Key: Enter a key that is shared by the VPN peers. The key must contain at least 6 printable characters and should only be known by network administrators. For optimum protection against currently known attacks, make sure the key consists of a minimum of 16 randomly chosen alphanumeric characters.
- RSA Signature: Select a local certificate that has been digitally signed by the certificate authority (CA). To add a local certificate to the FortiWiFi unit, see "Obtaining a signed local certificate" on page 212.

10 Configure the Local ID the that the FortiWiFi unit sends to the remote VPN peer.
- Preshared key: If the FortiWiFi unit is functioning as a client and uses its ID to authenticate itself to the remote VPN peer, enter an ID. If no ID is specified, the FortiWiFi unit transmits its IP address.
- RSA Signature: No entry is required because the Local ID field contains the Distinguished Name (DN) of the certificate associated with this phase 1 configuration. The DN identifies the owner of the certificate and includes, as a minimum, a Common Name (CN). The DN is transmitted in place of an ID or IP address.

Configuring advanced options

To configure phase 1 advanced options

1 Select Advanced Options.

2 Select a Peer Option if you want to authenticate remote VPN peers by the ID that they transmit during phase 1.

Accept any peer ID	Select to accept any peer ID (and therefore not authenticate remote VPN peers by peer ID).
Accept this peer ID	Select to authenticate a specific VPN peer or a group of VPN peers with a shared user name (ID) and password (pre-shared key). Also add the peer ID.
Accept peer ID in dialup group	Select to authenticate each remote VPN peer with a unique user name (ID) and password (pre-shared key). Also select a dialup group (user group). Configure the user group prior to configuring this peer option.

3 Optionally, configure XAuth.

XAuth (IKE eXtended Authentication) authenticates VPN peers at the user level. If the the FortiWiFi unit (the local VPN peer) is configured as an XAuth server, it authenticates remote VPN peers by referring to a user group. The users contained in the user group can be configured locally on the FortiWiFi unit or on remotely located LDAP or RADIUS servers. If the FortiWiFi unit is configured as an XAuth client, it provides a user name and password when it is challenged.

XAuth: Enable as a Client

Name	Enter the user name the local VPN peer uses to authenticate itself to the remote VPN peer.
Password	Enter the password the local VPN peer uses to authenticate itself to the remote VPN peer.

XAuth: Enable as a Server

Encryption method	Select the encryption method used between the XAuth client, the FortiWiFi unit and the authentication server. **PAP**— Password Authentication Protocol. **CHAP**—Challenge-Handshake Authentication Protocol. **MIXED**—Select MIXED to use PAP between the XAuth client and the FortiWiFi unit, and CHAP between the FortiWiFi unit and the authentication server. Use CHAP whenever possible. Use PAP if the authentication server does not support CHAP. (Use PAP with all implementations of LDAP and some implementations of Microsoft RADIUS). Use MIXED if the authentication server supports CHAP but the XAuth client does not. (Use MIXED with the Fortinet Remote VPN Client.).
Usergroup	Select a group of users to be authenticated by XAuth. The individual users within the group can be authenticated locally or by one or more LDAP or RADIUS servers. The user group must be added to the FortiWiFi configuration before it can be selected here.

4 Optionally, configure NAT Traversal.

Enable	Select Enable if you expect the IPSec VPN traffic to go through a gateway that performs NAT. If no NAT device is detected, enabling NAT traversal has no effect. Both ends of the VPN (both VPN peers) must have the same NAT traversal setting.
Keepalive Frequency	If you enable NAT-traversal, you can change the number of seconds in the Keepalive Frequency field. This number specifies, in seconds, how frequently empty UDP packets are sent through the NAT device to ensure that the NAT mapping does not change until P1 and P2 keylife expires. The keepalive frequency can be from 0 to 900 seconds.

5 Optionally, configure Dead Peer Detection.

Use these settings to monitor the status of the connection between VPN peers. DPD allows dead connections to be cleaned up and new VPN tunnels established. DPD is not supported by all vendors.

Enable	Select Enable to enable DPD between the local and remote peers.
Short Idle	Set the time, in seconds, that a link must remain unused before the local VPN peer considers it to be idle. After this period of time expires, whenever the local peer sends traffic to the remote VPN peer it also sends a DPD probe to determine the status of the link. To control the length of time that the FortiWiFi unit takes to detect a dead peer with DPD probes, configure the Retry Count and the Retry Interval.
Retry Count	Set the number of times that the local VPN peer retries the DPD probe before it considers the channel to be dead and tears down the security association (SA). To avoid false negatives because of congestion or other transient failures, set the retry count to a sufficiently high value for your network.
Retry Interval	Set the time, in seconds, that the local VPN peer unit waits between retrying DPD probes.
Long Idle	Set the time, in seconds, that a link must remain unused before the local VPN peer pro-actively probes its state. After this period of time expires, the local peer sends a DPD probe to determine the status of the link even if there is no traffic between the local peer and the remote peer.

6 Select OK to save the phase 1 parameters.

Figure 21: Adding a phase 1 configuration (Standard options)

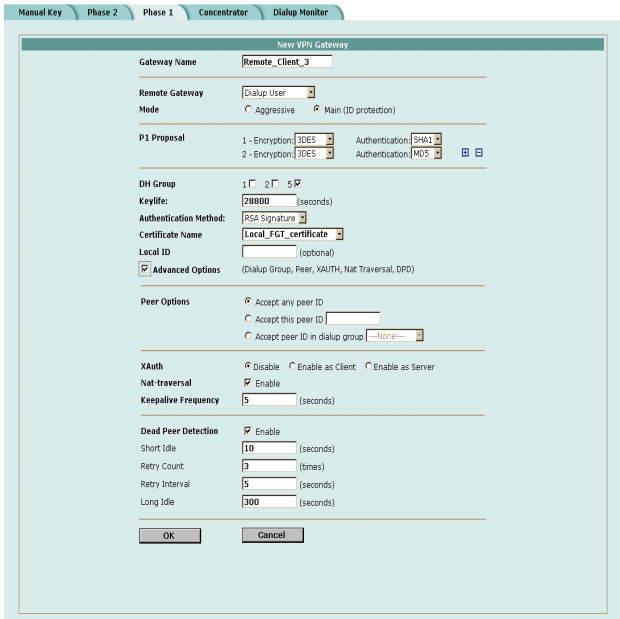
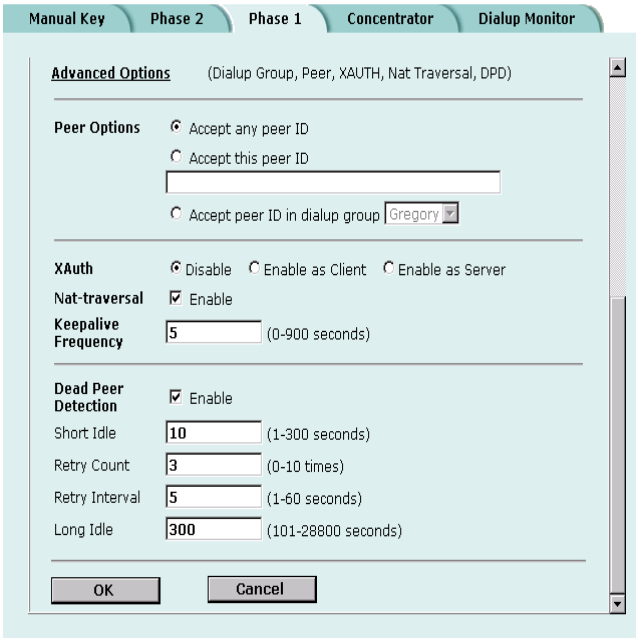


Figure 22: Adding a phase 1 configuration (Advanced options)



Adding a phase 2 configuration for an AutoIKE VPN

Add a phase 2 configuration to specify the parameters used to create and maintain a VPN tunnel between the local VPN peer (the FortiWiFi unit) and the remote VPN peer (the VPN gateway or client).

Note: Adding a Phase 2 configuration is the same for pre-shared key and certification VPNs.

To add a phase 2 configuration

1. Go to **VPN > IPSEC > Phase 2**.
2. Select New to add a new phase 2 configuration.
3. Enter a Tunnel Name.

   The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.
4. Select a Remote Gateway to associate with the VPN tunnel.

   A remote gateway can be either a gateway to another network or an individual client on the Internet. Remote gateways are added as part of the phase 1 configuration. For details, see "Adding a phase 1 configuration for an AutoIKE VPN" on page 205.

   Choose either a single DIALUP remote gateway, or up to three STATIC remote gateways. Multiple STATIC remote gateways are necessary if you are configuring IPSec redundancy.
5. Configure the P2 Proposal.

   Select up to three encryption and authentication algorithm combinations to propose for phase 2.

   The VPN peers must use the same P2 proposal settings.
6. Optionally, enable Replay Detection.

   Replay detection protects the VPN tunnel from replay attacks.

Note: Do not select replay detection if you have also selected Null Authentication for the P2 Proposal.

7. Optionally, enable Perfect Forward Secrecy (PFS).

   PFS improves security by forcing a new Diffie-Hellman exchange whenever keylife expires.
8. Select the DH Group(s).

   The VPN peers must use the same DH Group settings.
9. Enter the Keylife.

   The keylife causes the phase 2 key to expire after a specified time, after a specified number of Kbytes of data have been processed by the VPN tunnel, or both. If you select both, the key does not expire until both the time has passed and the number of Kbytes have been processed.

   When the key expires, a new key is generated without interrupting service. P2 proposal keylife can be from 120 to 172800 seconds or from 5120 to 99999 Kbytes.

10 Enable Autokey Keep Alive if you want to keep the VPN tunnel running even if no data is being processed.

11 Select a concentrator if you want the tunnel to be part of a hub and spoke VPN configuration.

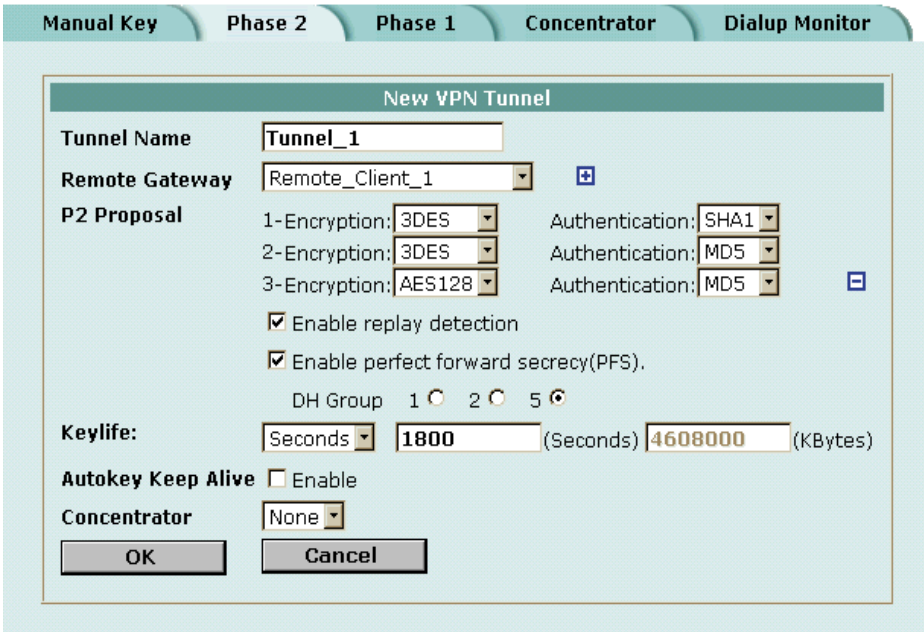
If you use the procedure, "Adding a VPN concentrator" on page 220 to add the tunnel to a concentrator, the next time you open the tunnel, the Concentrator field displays the name of the concentrator to which you added the tunnel.

12 Select a Quick Mode Identity.

Use selectors from policy	Select this option for policy-based VPNs. A policy-based VPN uses an encrypt policy to select which VPN tunnel to use for the connection. In this configuration, the VPN tunnel is referenced directly from the encrypt policy. You must select this option if both VPN peers are FortiWiFi units.
Use wildcard selectors	Select this option for routing-based VPNs. A routing-based VPN uses routing information to select which VPN tunnel to use for the connection. In this configuration, the tunnel is referenced indirectly by a route that points to a tunnel interface. You must select this option if the remote VPN peer is a non-FortiWiFi unit that has been configured to operate in tunnel interface mode.

13 Select OK to save the AutoIKE key VPN tunnel.

Figure 23: Adding a phase 2 configuration



Managing digital certificates

Use digital certificates to make sure that both participants in an IPSec communication session are trustworthy, prior to setting up an encrypted VPN tunnel between the participants.

Fortinet uses a manual procedure to obtain certificates. This involves copying and pasting text files from your local computer to the certificate authority, and from the certificate authority to your local computer.

- Obtaining a signed local certificate
- Obtaining CA certificates

Note: Digital certificates are not required for configuring FortiWiFi VPNs. Digital certificates are an advanced feature provided for the convenience of system administrators. This manual assumes the user has prior knowledge of how to configure digital certificates for their implementation.

Obtaining a signed local certificate

The signed local certificate provides the FortiWiFi unit with a means to authenticate itself to other devices.

Note: The VPN peers must use digital certificates that adhere to the X.509 standard.

Generating the certificate request

With this procedure, you generate a private and public key pair. The public key is the base component of the certificate request.

To generate the certificate request

1. Go to **VPN > Certificates > Local Certificates**.
2. Select Generate.
3. Type a Certificate Name.
   The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.
4. Configure the Subject Information that identifies the object being certified.
   Preferably use an IP address or domain name. If this is impossible (such as with a dialup client), use an email address.

Host IP	For Host IP, enter the IP address of the FortiWiFi unit being certified.
Domain Name	For Domain name, enter the fully qualified domain name of the FortiWiFi unit being certified. Do not include the protocol specification (http://) or any port number or path names.
E-Mail	For E-mail, enter the email address of the owner of the FortiWiFi unit being certified. Typically, e-mail addresses are entered only for clients, not gateways.

5. Configure the Optional Information to further identify the object being certified.

Organization Unit	Enter a name that identifies the department or unit within the organization that is requesting the certificate for the FortiWiFi unit (such as Manufacturing or MF).
Organization	Enter the legal name of the organization that is requesting the certificate for the FortiWiFi unit (such as Fortinet).
Locality	Enter the name of the city or town where the FortiWiFi unit is located (such as Vancouver).
State/Province	Enter the name of the state or province where the FortiWiFi unit is located (such as California or CA).
Country	Select the country where the FortiWiFi unit is located.
e-mail	Enter a contact email address for the FortiWiFi unit. Typically, email addresses are entered only for clients, not gateways.

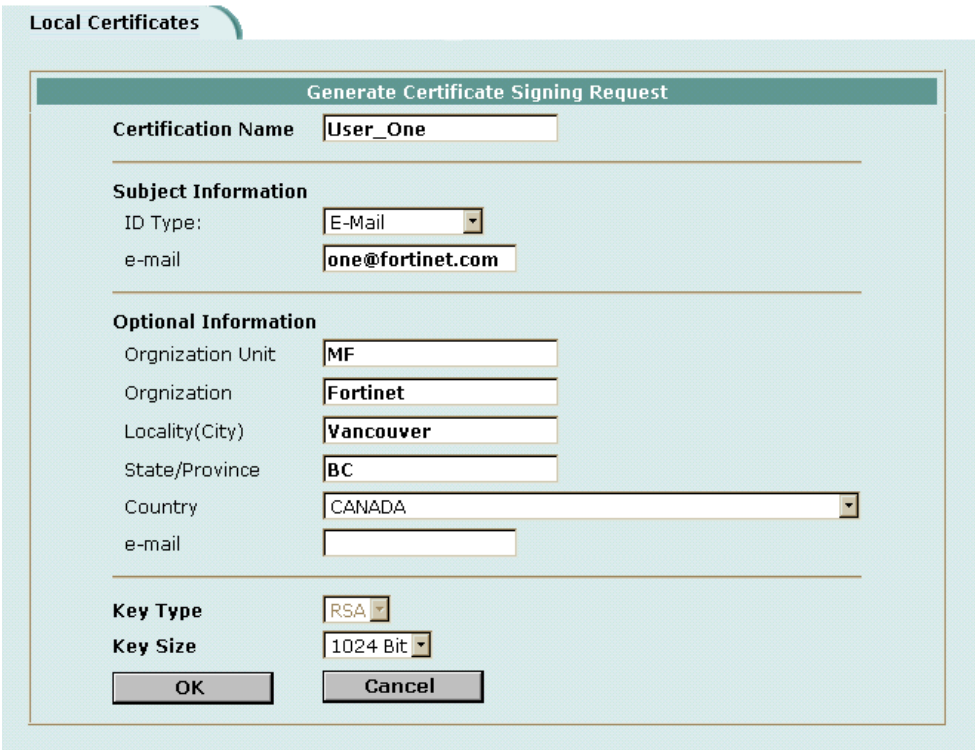
6 Configure the key.

Key Type	Select RSA as the key encryption type. No other key type is supported.
Key Size	Select 1024 Bit, 1536 Bit or 2048 Bit. Larger keys are slower to generate but more secure. Not all IPSec VPN products support all three key sizes.

7 Select OK to generate the private and public key pair and the certificate request.

The private/public key pair are generated and the certificate request is displayed on the Local Certificates list with a status of Pending.

Figure 24: Adding a Local Certificate



Downloading the certificate request

Use the following procedure to download a certificate request from the FortiWiFi unit to the management computer.

To download the certificate request

1. Go to **VPN > Certificates > Local Certificates**.
2. Select Download to download the local certificate to the management computer.
3. Select Save.
4. Name the file and save it in a directory on the management computer.

After downloading the certificate request, you can submit it tor your CA so that your CA can sign the certificate.

Importing the signed local certificate

With this procedure, you import the signed local certificate from the management computer to the FortiWiFi unit.

To import the signed local certificate

1. Go to **VPN > Certificates > Local Certificates**.
2. Select Import.
3. Enter the path or browse to locate the signed local certificate on the management computer.
4. Select OK.

The signed local certificate is displayed on the Local Certificates list with a status of OK.

Backing up and restoring the local certificate and private key

When you back up a FortiWiFi configuration that includes IPSec VPN tunnels using certificates, you must also back up the local certificate and private key in a password-protected PKCS12 file. Before restoring the configuration, you must import the PKCS12 file and set the local certificate name to the same that was in the original configuration.

Public Key Cryptography Standard 12 (PKCS12) describes the syntax for securely exchanging personal information.

Note: Use the `execute vpn certificates key` CLI command to back up and restore the local certificate and private key. For more information, see the *FortiGate CLI Reference Guide*.

Obtaining CA certificates

For the VPN peers to authenticate themselves to each other, they must both obtain a CA certificate from the same certificate authority. The CA certificate provides the VPN peers with a means to validate the digital certificates that they receive from other devices.

The FortiWiFi unit obtains the CA certificate to validate the digital certificate that it receives from the remote VPN peer. The remote VPN peer obtains the CA certificate to validate the digital certificate that it receives from the FortiWiFi unit.

Note: The CA certificate must adhere to the X.509 standard.

Importing CA certificates

Import the CA certificate from the management computer to the FortiWiFi unit.

To import the CA certificate

1. Go to **VPN > Certificates > CA Certificates**.
2. Select Import.
3. Enter the path or browse to locate the CA certificate on the management computer.
4. Select OK.

   The CA is displayed on the CA Certificates list.

   The system assigns a unique name to each CA certificate. The names are numbered consecutively (CA_Cert_1, CA_Cert_2, CA_Cert_3, and so on).

Configuring encrypt policies

A VPN connects the local, internal network to a remote, external network. The principal role of the encrypt policy is to define (and limit) which addresses on these networks can use the VPN.

A VPN requires only one encrypt policy to control both inbound and outbound connections. Depending on how you configure it, the policy controls whether users on your internal network can establish a tunnel to the remote network (the outbound connection), and whether users on the remote network can establish a tunnel to your internal network (the inbound connection). This flexibility allows one encrypt policy to do the same function as two regular firewall policies.

Although the encrypt policy controls both incoming and outgoing connections, it must always be configured as an outgoing policy. An outgoing policy has a source address on an internal network and a destination address on an external network. The source address identifies the addresses on the internal network that are part of the VPN. The destination address identifies the addresses on the remote network that are part of the VPN.

Note: The destination address can be a VPN client address on the Internet or the address of a network behind a remote VPN gateway.

In addition to defining membership in the VPN by address, you can configure the encrypt policy for services such as DNS, FTP, and POP3, and to allow connections according to a predefined schedule (by the time of the day or the day of the week, month, or year). You can also configure the encrypt policy for:

- Inbound NAT to translate the source of incoming packets.
- Outbound NAT to translate the source address of outgoing packets.
- Traffic shaping to control the bandwidth available to the VPN and the priority of the VPN.
- Content profiles to apply antivirus protection, web filtering, and email filtering to web, file transfer, and email services in the VPN.
- Logging so that the FortiWiFi unit logs all connections that use the VPN.

The policy must also include the VPN tunnel that you created to communicate with the remote FortiWiFi VPN gateway. When users on your internal network attempt to connect to the network behind the remote VPN gateway, the encrypt policy intercepts the connection attempt and starts the VPN tunnel added to the policy. The tunnel uses the remote gateway added to its configuration to connect to the remote VPN gateway. When the remote VPN gateway receives the connection attempt, it checks its own policy, gateway, and tunnel configuration. If the configuration is allowed, an IPSec VPN tunnel is negotiated between the two VPN peers.

- Adding a source address
- Adding a destination address
- Adding an encrypt policy

Adding a source address

The source address is located within the internal network of the local VPN peer. It can be a single computer address or the address of a network.

To add a source address

1. Go to **Firewall > Address**.
2. Select an internal interface.
3. Select New to add an address.
4. Enter the Address Name, IP Address, and NetMask for a single computer or for an entire subnetwork on an internal interface of the local VPN peer.
5. Select OK to save the source address.

Adding a destination address

The destination address can be a VPN client address on the Internet or the address of a network behind a remote VPN gateway.

To add a destination address

1. Go to **Firewall > Address**.
2. Select an external interface.
3. Select New to add an address.

4 Enter the Address Name, IP Address, and NetMask for a single computer or for an entire subnetwork on an internal interface of the remote VPN peer.

5 Select OK to save the destination address.

Adding an encrypt policy

To add an encrypt policy

1 Go to **Firewall > Policy**.

2 Select New to add a new policy.

3 Set Source to the source address.

4 Set Destination to the destination address.

5 Set Service to control the services allowed over the VPN connection.

You can select ANY to allow all supported services over the VPN connection or select a specific service or service group to limit the services allowed over the VPN connection.

6 Set Action to ENCRYPT.

7 Configure the ENCRYPT parameters.

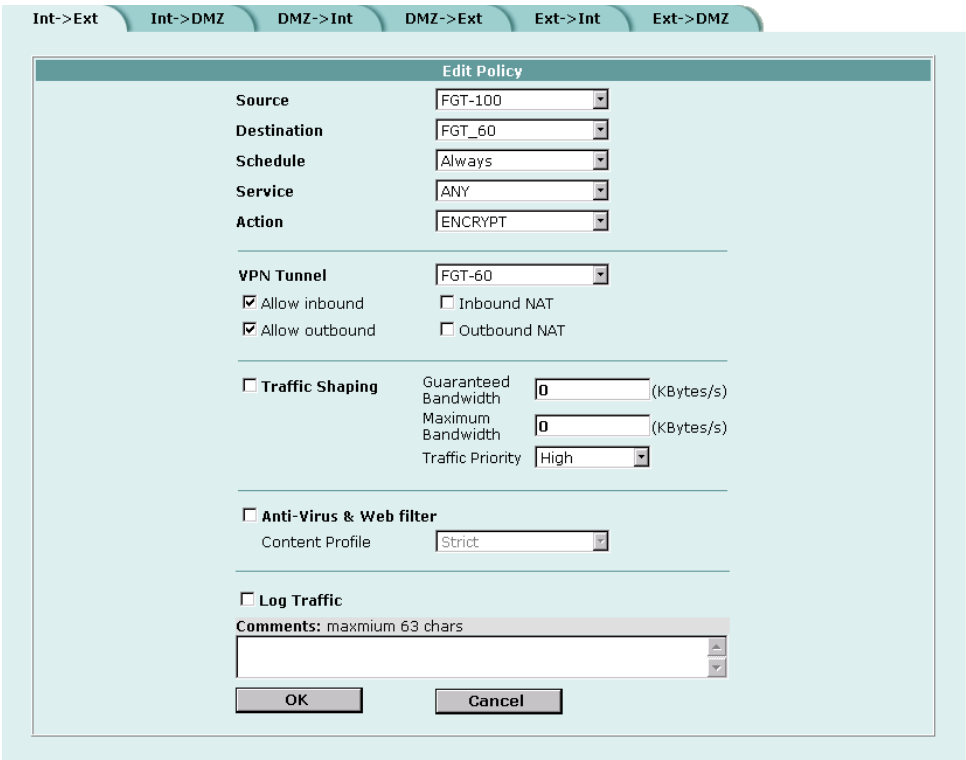
VPN Tunnel	Select an Auto Key tunnel for this encrypt policy.
Allow inbound	Select Allow inbound to enable inbound users to connect to the source address.
Allow outbound	Select Allow outbound to enable outbound users to connect to the destination address.
Inbound NAT	The FortiWiFi unit translates the source address of incoming packets to the IP address of the FortiWiFi interface connected to the source address network. Typically, this is an internal interface of the FortiWiFi unit. Inbound NAT makes it impossible for local hosts to see the IP addresses of remote hosts (hosts located on the network behind the remote VPN gateway).
Outbound NAT	The FortiWiFi unit translates the source address of outgoing packets to the IP address of the FortiWiFi interface connected to the destination address network. Typically, this is an external interface of the FortiWiFi unit. Outbound NAT makes it impossible for remote hosts to see the IP addresses of local hosts (hosts located on the network behind the local VPN gateway). If Outbound NAT is implemented, it is subject to these limitations: Configure Outbound NAT only at one end of the tunnel. The end that does not implement Outbound NAT requires an internal to external policy that specifies the remote external interface as the Destination (usually a public IP address). The tunnel, and the traffic within the tunnel, can only be initiated at the end that implements Outbound NAT.

For information about configuring the remaining policy settings, see “Adding firewall policies” on page 162.

8 Select OK to save the encrypt policy.

To make sure that the encrypt policy is matched for VPN connections, arrange the encrypt policy above other policies with similar source and destination addresses and services in the policy list.

Figure 25: Adding an encrypt policy



IPSec VPN concentrators

In a hub-and-spoke network, all VPN tunnels terminate at a single VPN peer called a hub. The peers that connect to the hub are known as spokes. The hub functions as a concentrator on the network, managing the VPN connections between the spokes.

The advantage of a hub-and-spoke network is that the spokes are simpler to configure because they require fewer policy rules. Also, a hub-and-spoke network provides some processing efficiencies, particularly on the spokes. The disadvantage of a hub-and-spoke network is its reliance on a single peer to handle management of all VPNs. If this peer fails, encrypted communication in the network is impossible.

A hub-and-spoke VPN network requires a special configuration. Setup varies depending on the role of the VPN peer.

If the VPN peer is a FortiWiFi unit functioning as the hub, or concentrator, it requires a VPN configuration connecting it to each spoke (AutoIKE phase 1 and 2 settings or manual key settings, plus encrypt policies). It also requires a concentrator configuration that groups the hub-and-spoke tunnels together. The concentrator configuration defines the FortiWiFi unit as the hub in a hub-and-spoke network.

If the VPN peer is one of the spokes, it requires a tunnel connecting it to the hub (but not to the other spokes). It also requires policies that control its encrypted connections to the other spokes and its non-encrypted connections to other networks, such as the Internet.

- VPN concentrator (hub) general configuration steps
- Adding a VPN concentrator
- VPN spoke general configuration steps

VPN concentrator (hub) general configuration steps

A central FortiWiFi that is functioning as a hub requires the following configuration:

- A tunnel (AutoIKE phase 1 and phase 2 configuration or manual key configuration) for each spoke.
- Destination addresses for each spoke.
- A concentrator configuration.
- An encrypt policy for each spoke.

To create a VPN concentrator configuration

1. Configure one of the following tunnels for each spoke:
   - A manual key tunnel consists of a name for the tunnel, the IP address of the spoke (client or gateway) at the opposite end of the tunnel, and the encryption and authentication algorithms to use for the tunnel.

     See “Manual key IPSec VPNs” on page 203.
   - An AutoIKE tunnel consists of phase 1 and phase 2 parameters. The phase 1 parameters include the name of the spoke (client or gateway), designation of how the spoke receives its IP address (static or dialup), encryption and authentication algorithms, and the authentication method (either pre-shared keys or PKI certificates). The phase 2 parameters include the name of the tunnel, selection of the spoke (client or gateway) configured in phase 1, encryption and authentication algorithms, and a number of security parameters.

     See “AutoIKE IPSec VPNs” on page 205.
2. Add a destination address for each spoke. The destination address is the address of the spoke (either a client on the Internet or a network located behind a gateway).

   See “Adding a source address” on page 216.
3. Add the concentrator configuration. This step groups the tunnels together on the FortiWiFi unit. The tunnels link the hub to the spokes. The tunnels are added as part of the AutoIKE phase 2 configuration or the manual key configuration.

   See “Adding a VPN concentrator” on page 220.

Note: Add the concentrator configuration to the central FortiWiFi unit (the hub) after adding the tunnels for all spokes.

4. Add an encrypt policy for each spoke. Encrypt policies control the direction of traffic through the hub and allow inbound and outbound VPN connections between the hub and the spokes. The encrypt policy for each spoke must include the tunnel name of the spoke. The source address must be Internal_All. Use the following configuration for the encrypt policies:

Source	Internal_All
Destination	The VPN spoke address.
Action	ENCRYPT
VPN Tunnel	The VPN spoke tunnel name.
Allow inbound	Select allow inbound.
Allow outbound	Select allow outbound
Inbound NAT	Select inbound NAT if required.
Outbound NAT	Select outbound NAT if required.

See "Adding an encrypt policy" on page 217.

5 Arrange the policies in the following order:
- encrypt policies
- default non-encrypt policy (Internal_All -> External_All)

Adding a VPN concentrator

To add a VPN concentrator configuration

1 Go to **VPN > IPSec > Concentrator**.

2 Select New to add a VPN concentrator.

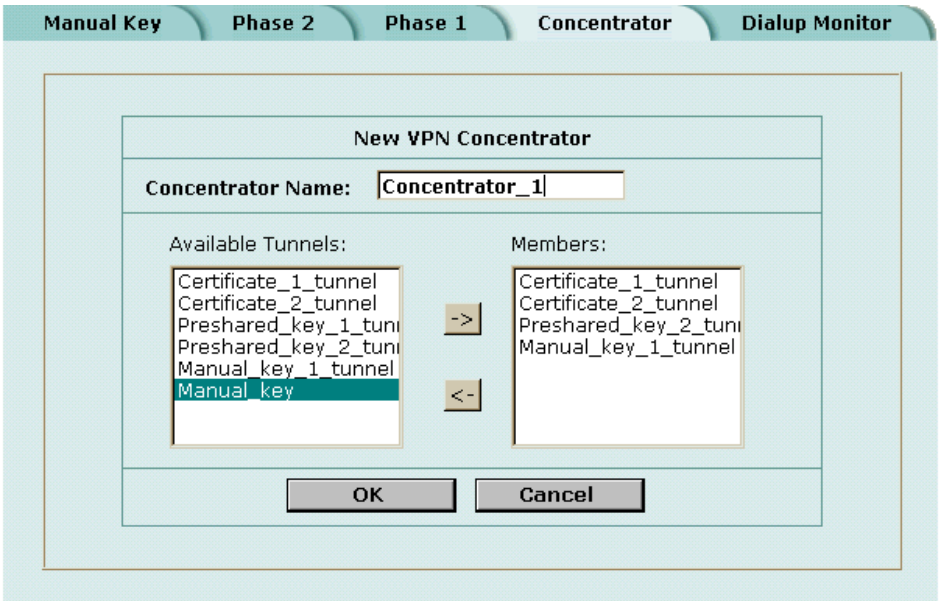
3 Enter the name of the new concentrator in the Concentrator Name field.

4 To add tunnels to the VPN concentrator, select a VPN tunnel from the Available Tunnels list and select the right arrow.

5 To remove tunnels from the VPN concentrator, select the tunnel in the Members list and select the left arrow.

6 Select OK to add the VPN concentrator.

Figure 26: Adding a VPN concentrator



VPN spoke general configuration steps

A remote VPN peer that functions as a spoke requires the following configuration:

- A tunnel (AutoIKE phase 1 and phase 2 configuration or manual key configuration) for the hub.
- The source address of the local VPN spoke.
- The destination address of each remote VPN spoke.
- A separate outbound encrypt policy for each remote VPN spoke. These policies allow the local VPN spoke to initiate encrypted connections.
- A single inbound encrypt policy. This policy allows the local VPN spoke to accept encrypted connections.

To create a VPN spoke configuration

1. Configure a tunnel between the spoke and the hub.
   Choose between a manual key tunnel or an AutoIKE tunnel.
   - To add a manual key tunnel, see "Manual key IPSec VPNs" on page 203.
   - To add an AutoIKE tunnel, see "AutoIKE IPSec VPNs" on page 205.
2. Add the source address. One source address is required for the local VPN spoke.
   See "Adding a source address" on page 216.
3. Add a destination address for each remote VPN spoke. The destination address is the address of the spoke (either a client on the Internet or a network located behind a gateway).
   See "Adding a destination address" on page 216

4 Add a separate outbound encrypt policy for each remote VPN spoke. These policies control the encrypted connections initiated by the local VPN spoke.

The encrypt policy must include the appropriate source and destination addresses and the tunnel added in step 1. Use the following configuration:

Source	The local VPN spoke address.
Destination	The remote VPN spoke address.
Action	ENCRYPT
VPN Tunnel	The VPN tunnel name added in step 1. (Use the same tunnel for all encrypt policies.)
Allow inbound	Do not enable.
Allow outbound	Select allow outbound
Inbound NAT	Select inbound NAT if required.
Outbound NAT	Select outbound NAT if required.

See "Adding an encrypt policy" on page 217.

5 Add an inbound encrypt policy. This policy controls the encrypted connections initiated by the remote VPN spokes.

The encrypt policy for the hub must include the appropriate source and destination addresses and the tunnel added in step 1. Use the following configuration:

Source	The local VPN spoke address.
Destination	External_All
Action	ENCRYPT
VPN Tunnel	The VPN tunnel name added in step 1. (Use the same tunnel for all encrypt policies.)
Allow inbound	Select allow inbound.
Allow outbound	Do not enable.
Inbound NAT	Select inbound NAT if required.
Outbound NAT	Select outbound NAT if required.

See "Adding an encrypt policy" on page 217.

6 Arrange the policies in the following order:

- outbound encrypt policies
- inbound encrypt policy
- default non-encrypt policy (Internal_All -> External_All)

Note: The default non-encrypt policy is required to allow the VPN spoke to access other networks, such as the Internet.

Monitoring and Troubleshooting VPNs

- Viewing VPN tunnel status
- Viewing dialup VPN connection status
- Testing a VPN

Viewing VPN tunnel status

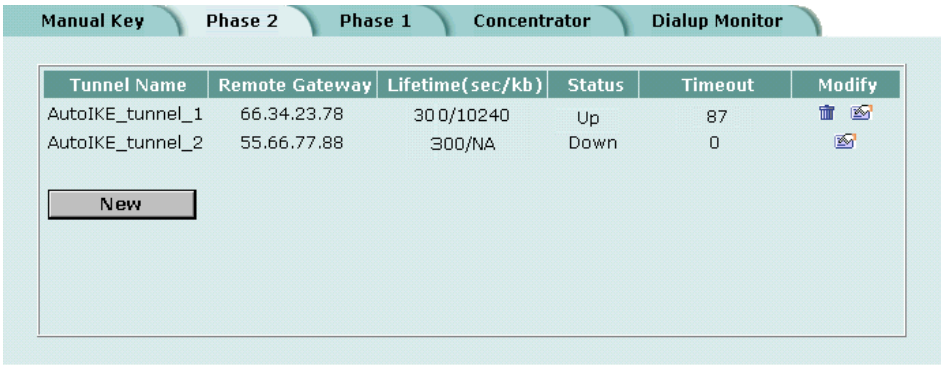
You can use the IPSec VPN tunnel list to view the status of all IPSec AutoIKE key VPN tunnels. For each tunnel, the list shows the status and the tunnel time out.

To view VPN tunnel status

1. Go to **VPN > IPSEC > Phase 2**.
2. View the status and timeout for each VPN tunnel.

Status	The status of each tunnel. If Status is Up, the tunnel is active. If Status is Down, the tunnel is not active. If Status is Connecting, the tunnel is attempting to start a VPN connection with a remote VPN gateway or client.
Timeout	The time before the next key exchange. The time is calculated by subtracting the time elapsed since the last key exchange from the keylife.

Figure 27: AutoIKE key tunnel status



Viewing dialup VPN connection status

You can use the dialup monitor to view the status of dialup VPNs. The dialup monitor lists the remote gateways and the active VPN tunnels for each gateway. The monitor also lists the tunnel lifetime, timeout, proxy ID source, and proxy ID destination for each tunnel.

To view dialup connection status

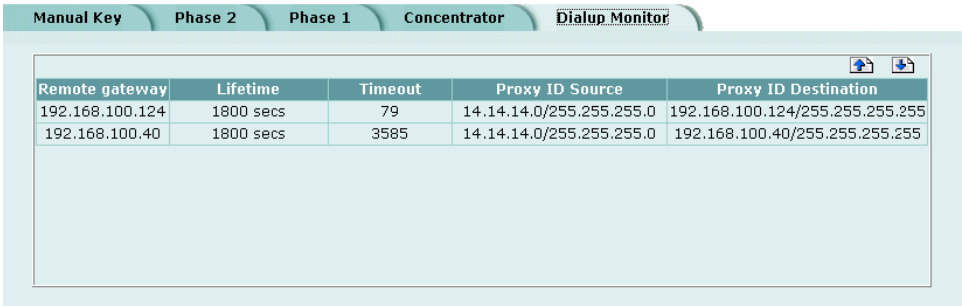
1. Go to **VPN > IPSec > Dialup Monitor**.
2. View the dialup connection status information for the FortiWiFi unit:

Remote gateway	The IP address of the remote dialup remote gateway on the FortiWiFi unit.
Lifetime	The amount of time that the dialup VPN connection has been active.
Timeout	The time before the next key exchange. The time is calculated by subtracting the time elapsed since the last key exchange from the keylife.

Proxy ID Source The actual IP address or subnet address of the remote peer.

Proxy ID Destination The actual IP address or subnet address of the local peer.

Figure 28: Dialup Monitor



Remote gateway	Lifetime	Timeout	Proxy ID Source	Proxy ID Destination
192.168.100.124	1800 secs	79	14.14.14.0/255.255.255.0	192.168.100.124/255.255.255.255
192.168.100.40	1800 secs	3585	14.14.14.0/255.255.255.0	192.168.100.40/255.255.255.255

Testing a VPN

To confirm that a VPN between two networks has been configured correctly, use the ping command from one internal network to connect to a computer on the other internal network. The IPSec VPN tunnel starts automatically when the first data packet destined for the VPN is intercepted by the FortiWiFi unit.

To confirm that a VPN between a network and one or more clients has been configured correctly, start a VPN client and use the ping command to connect to a computer on the internal network. The VPN tunnel initializes automatically when the client makes a connection attempt. You can start the tunnel and test it at the same time by pinging from the client to an address on the internal network.

PPTP and L2TP VPN

You can use PPTP and L2TP to create a virtual private network (VPN) between a remote client computer that is running Windows and your internal network. Because PPTP and L2TP are supported by Windows you do not require third-party software on the client computer. Provided your ISP supports PPTP and L2TP connections, you can create a secure connection by making some configuration changes to the client computer and the FortiWiFi unit.

This chapter provides an overview of how to configure FortiWiFi PPTP and L2TP VPN. For a complete description of FortiWiFi PPTP and L2TP, see the *FortiGate VPN Guide*.

This chapter describes:

- Configuring PPTP
- Configuring L2TP

Configuring PPTP

Point-to-Point protocol (PPTP) packages data within PPP packets and then encapsulates the PPP packets within IP packets for transmission through a VPN tunnel.

Note: PPTP VPNs are supported only in NAT/Route mode.

This section describes:

- Configuring the FortiWiFi unit as a PPTP gateway
- Configuring a Windows 98 client for PPTP
- Configuring a Windows 2000 client for PPTP
- Configuring a Windows XP client for PPTP

Configuring the FortiWiFi unit as a PPTP gateway

Use the following procedures to configure the FortiWiFi unit as a PPTP gateway:

To add users and user groups

Add a user for each PPTP client.

1 Go to **User > Local**.

2 Add and configure PPTP users.
For information about adding and configuring users, see "Adding user names and configuring authentication" on page 194.

3 Go to **User > User Group**.

4 Add and configure PPTP user groups.
For information about adding and configuring user groups, see "Configuring user groups" on page 199.

To enable PPTP and specify an address range

1 Go to **VPN > PPTP > PPTP Range**.

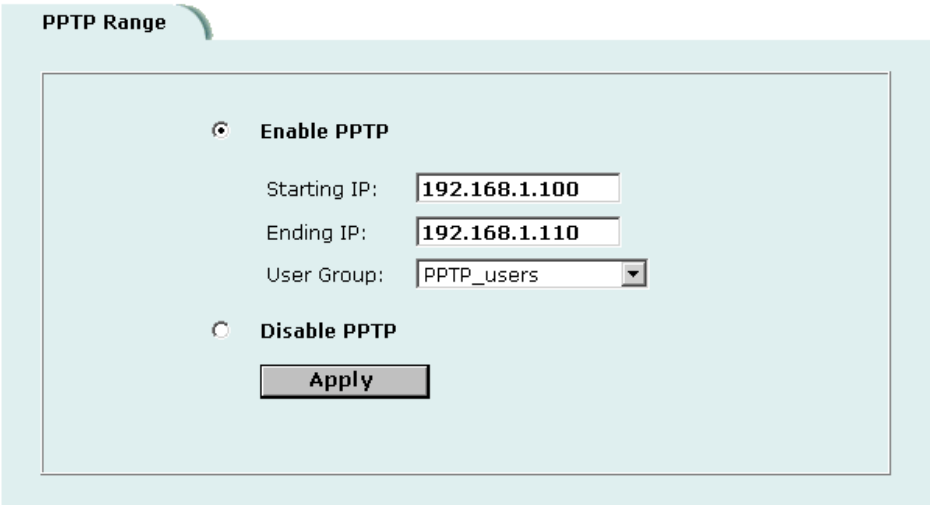
2 Select Enable PPTP.

3 Enter the Starting IP and the Ending IP for the PPTP address range.

4 Select the User Group that you added in "To add users and user groups" on page 225.

5 Select Apply to enable PPTP through the FortiWiFi unit.

Figure 29: Example PPTP Range configuration



To add a source address

Add a source address for every address in the PPTP address range.

1 Go to **Firewall > Address**.

2 Select the interface to which PPTP clients connect.

3 Select New to add an address.

4 Enter the Address Name, IP Address, and NetMask for an address in the PPTP address range.

5 Select OK to save the source address.

6 Repeat for all addresses in the PPTP address range.

Note: If the PPTP address range is comprised of an entire subnet, add an address for this subnet. Do not add an address group.

To add a source address group

Organize the source addresses into an address group.

1. Go to **Firewall > Address > Group**.
2. Add a new address group to the interface to which PPTP clients connect.
3. Enter a Group Name to identify the address group.
   The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.
4. To add addresses to the address group, select an address from the Available Addresses list and select the right arrow to add it to the Members list.
5. To remove addresses from the address group, select an address from the Members list and select the left arrow to remove it from the group.
6. Select OK to add the address group.

To add a destination address

Add an address to which PPTP users can connect.

1. Go to **Firewall > Address**.
2. Select the internal interface or the DMZ interface.
3. Select New to add an address.
4. Enter the Address Name, IP Address, and NetMask for a single computer or for an entire subnetwork on an internal interface of the local VPN peer.
5. Select OK to save the destination address.

To add a firewall policy

Add a policy which specifies the source and destination addresses and sets the service for the policy to the traffic type inside the PPTP VPN tunnel.

1. Go to **Firewall > Policy**.
2. Select New to add a new policy.
3. Set Source to the group that matches the PPTP address range.
4. Set Destination to the address to which PPTP users can connect.
5. Set Service to match the traffic type inside the PPTP VPN tunnel.
   For example, if PPTP users can access a web server, select HTTP.
6. Set Action to ACCEPT.
7. Select NAT if address translation is required.
   You can also configure traffic shaping, logging, and antivirus and web filter settings for PPTP policies.
8. Select OK to save the firewall policy.

Configuring a Windows 98 client for PPTP

Use the following procedure to configure a client computer running Windows 98 so that it can connect to a FortiWiFi PPTP VPN. To configure the Windows 98 client, you must install and configure Windows dialup networking and virtual private networking support.

To install PPTP support

1. Go to **Start > Settings > Control Panel > Network**.
2. Select Add.
3. Select Adapter.
4. Select Add.
5. Select Microsoft as the manufacturer.
6. Select Microsoft Virtual Private Networking Adapter.
7. Select OK twice.
8. Insert diskettes or CDs as required.
9. Restart the computer.

To configure a PPTP dialup connection

1. Go to **My Computer > Dial-Up Networking > Configuration**.
2. Double-click Make New Connection.
3. Name the connection and select Next.
4. Enter the IP address or host name of the FortiWiFi unit to connect to and select Next.
5. Select Finish.
   An icon for the new connection appears in the Dial-Up Networking folder.
6. Right-click the new icon and select Properties.
7. Go to Server Types.
8. Uncheck IPX/SPX Compatible.
9. Select TCP/IP Settings.
10. Uncheck Use IP header compression.
11. Uncheck Use default gateway on remote network.
12. Select OK twice.

To connect to the PPTP VPN

1. Start the dialup connection that you configured in the previous procedure.
2. Enter your PPTP VPN User Name and Password.
3. Select Connect.

Configuring a Windows 2000 client for PPTP

Use the following procedure to configure a client computer running Windows 2000 so that it can connect to a FortiWiFi PPTP VPN.

To configure a PPTP dialup connection

1. Go to **Start > Settings > Network and Dial-up Connections**.
2. Double-click Make New Connection to start the Network Connection Wizard and select Next.
3. For Network Connection Type, select Connect to a private network through the Internet and select Next.
4. For Destination Address, enter the IP address or host name of the FortiWiFi unit to connect to and select Next.
5. Set Connection Availability to Only for myself and select Next.
6. Select Finish.
7. In the Connect window, select Properties.
8. Select the Security tab.
9. Uncheck Require data encryption.
10. Select OK.

To connect to the PPTP VPN

1. Start the dialup connection that you configured in the previous procedure.
2. Enter your PPTP VPN User Name and Password.
3. Select Connect.
4. In the connect window, enter the User Name and Password that you use to connect to your dialup network connection.
   This user name and password is not the same as your VPN user name and password.

Configuring a Windows XP client for PPTP

Use the following procedure to configure a client computer running Windows XP so that it can connect to a FortiWiFi PPTP VPN.

To configure a PPTP dialup connection

1. Go to **Start > Settings > Control Panel**.
2. Select Network and Internet Connections.
3. Select Create a Connection to the network of your workplace and select Next.
4. Select Virtual Private Network Connection and select Next.
5. Name the connection and select Next.
6. If the Public Network dialog box appears, choose the appropriate initial connection and select Next.
7. In the VPN Server Selection dialog, enter the IP address or host name of the FortiWiFi unit to connect to and select Next.

8 Select Finish.

To configure the VPN connection

1 Right-click the Connection icon that you created in the previous procedure.

2 Select **Properties > Security**.

3 Select Typical to configure typical settings.

4 Select Require data encryption.

Note: If a RADIUS server is used for authentication do not select Require data encryption. PPTP encryption is not supported for RADIUS server authentication.

5 Select Advanced to configure advanced settings.

6 Select Settings.

7 Select Challenge Handshake Authentication Protocol (CHAP).

8 Make sure that none of the other settings are selected.

9 Select the Networking tab.

10 Make sure that the following options are selected:
- TCP/IP
- QoS Packet Scheduler

11 Make sure that the following options are not selected:
- File and Printer Sharing for Microsoft Networks
- Client for Microsoft Networks

12 Select OK.

To connect to the PPTP VPN

1 Connect to your ISP.

2 Start the VPN connection that you configured in the previous procedure.

3 Enter your PPTP VPN User Name and Password.

4 Select Connect.

5 In the connect window, enter the User Name and Password that you use for your dialup network connection.
This user name and password is not the same as your VPN user name and password.

Configuring L2TP

Some implementations of L2TP support elements of IPSec. These elements must be disabled when L2TP is used with a FortiWiFi unit.

Note: L2TP VPNs are only supported in NAT/Route mode.

This section describes:

- Configuring the FortiWiFi unit as an L2TP gateway
- Configuring a Windows 2000 client for L2TP
- Configuring a Windows XP client for L2TP

Configuring the FortiWiFi unit as an L2TP gateway

Use the following procedures to configure the FortiWiFi unit as an L2TP gateway:

To add users and user groups

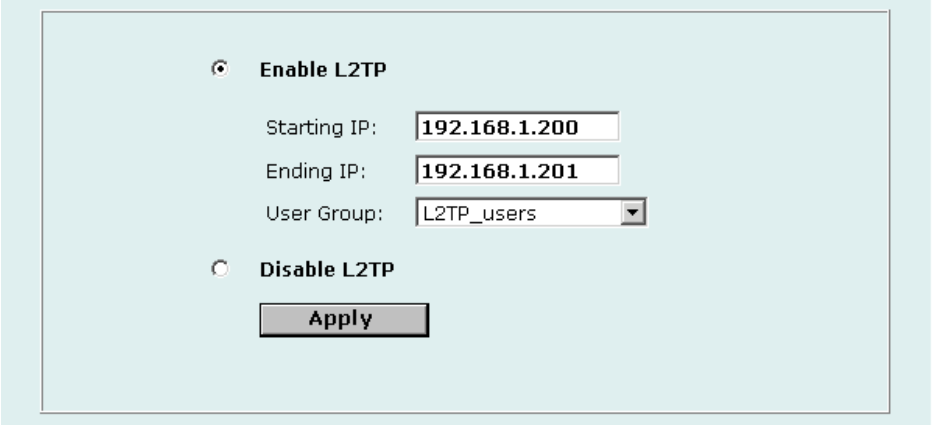
Add a user for each L2TP client.

1. Go to **User > Local**.
2. Add and configure L2TP users.
   See "Adding user names and configuring authentication" on page 194.
3. Go to **User > User Group**.
4. Add and configure L2TP user groups.
   See "Configuring user groups" on page 199.

To enable L2TP and specify an address range

1. Go to **VPN > L2TP > L2TP Range**.
2. Select Enable L2TP.
3. Enter the Starting IP and the Ending IP for the L2TP address range.
4. Select the User Group that you added in "To add users and user groups" on page 231.
5. Select Apply to enable L2TP through the FortiWiFi unit.

Figure 30: Sample L2TP address range configuration



To add source addresses

Add a source address for every address in the L2TP address range.

1 Go to **Firewall > Address**.

2 Select the interface to which L2TP clients connect.

3 Select New to add an address.

1 Enter the Address Name, IP Address, and NetMask for an address in the L2TP address range.

2 Select OK to save the source address.

3 Repeat for all addresses in the L2TP address range.

Note: If the L2TP address range is comprised of an entire subnet, add an address for this subnet. Do not add an address group.

To add a source address group

Organize the source addresses into an address group.

1 Go to **Firewall > Address > Group**.

2 Add a new address group to the interface to which L2TP clients connect.

3 Enter a Group Name to identify the address group.
The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Other special characters and spaces are not allowed.

4 To add addresses to the address group, select an address from the Available Addresses list and select the right arrow to add it to the Members list.

5 To remove addresses from the address group, select an address from the Members list and select the left arrow to remove it from the group.

6 Select OK to add the address group.

To add a destination address

Add an address to which L2TP users can connect.

1. Go to **Firewall > Address**.
2. Select the internal interface or the DMZ interface.
3. Select New to add an address.
4. Enter the Address Name, IP Address, and NetMask for a single computer or for an entire subnetwork on an internal interface of the local VPN peer.
5. Select OK to save the source address.

To add a firewall policy

Add a policy that specifies the source and destination addresses and sets the service for the policy to the traffic type inside the L2TP VPN tunnel.

1. Go to **Firewall > Policy**.
2. Select New to add a policy.
3. Set Source to the group that matches the L2TP address range.
4. Set Destination to the address to which L2TP users can connect.
5. Set Service to match the traffic type inside the L2TP VPN tunnel.
   For example, if L2TP users can access a web server, select HTTP.
6. Set Action to ACCEPT.
7. Select NAT if address translation is required.
   You can also configure traffic shaping, logging, and antivirus and web filter settings for L2TP policies.
8. Select OK to save the firewall policy.

Configuring a Windows 2000 client for L2TP

Use the following procedure to configure a client computer running Windows 2000 so that it can connect to a FortiWiFi L2TP VPN.

To configure an L2TP dialup connection

1. Go to **Start > Settings > Network and Dial-up Connections**.
2. Double-click Make New Connection to start the Network Connection Wizard and select Next.
3. For Network Connection Type, select Connect to a private network through the Internet and select Next.
4. For Destination Address, enter the address of the FortiWiFi unit to connect to and select Next.
5. Set Connection Availability to Only for myself and select Next.
6. Select Finish.
7. In the Connect window, select Properties.
8. Select the Security tab.
9. Make sure that Require data encryption is selected.

Note: If a RADIUS server is used for authentication do not select Require data encryption. L2TP encryption is not supported for RADIUS server authentication.

10 Select the Networking tab.

11 Set VPN server type to Layer-2 Tunneling Protocol (L2TP).

12 Save the changes and continue with the following procedure.

To disable IPSec

1 Select the Networking tab.

2 Select Internet Protocol (TCP/IP) properties.

3 Double-click the Advanced tab.

4 Go to the Options tab and select IP security properties.

5 Make sure that Do not use IPSEC is selected.

6 Select OK and close the connection properties window.

Note: The default Windows 2000 L2TP traffic policy does not allow L2TP traffic without IPSec encryption. You can disable default behavior by editing the Windows 2000 Registry as described in the following steps. See the Microsoft documentation for editing the Windows Registry.

7 Use the registry editor (regedit) to locate the following key in the registry:

```
HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\Rasman\
Parameters
```

8 Add the following registry value to this key:

```
Value Name: ProhibitIpSec
Data Type: REG_DWORD
Value: 1
```

9 Save the changes and restart the computer for the changes to take effect.

You must add the `ProhibitIpSec` registry value to each Windows 2000-based endpoint computer of an L2TP or IPSec connection to prevent the automatic filter for L2TP and IPSec traffic from being created. When the `ProhibitIpSec` registry value is set to 1, your Windows 2000-based computer does not create the automatic filter that uses CA authentication. Instead, it checks for a local or active directory IPSec policy.

To connect to the L2TP VPN

1 Start the dialup connection that you configured in the previous procedure.

2 Enter your L2TP VPN User Name and Password.

3 Select Connect.

4 In the connect window, enter the User Name and Password that you use to connect to your dialup network connection.

This user name and password is not the same as your VPN user name and password.

Configuring a Windows XP client for L2TP

Use the following procedure to configure a client computer running Windows XP so that it can connect to a FortiWiFi L2TP VPN.

To configure an L2TP VPN dialup connection

1. Go to **Start > Settings**.
2. Select Network and Internet Connections.
3. Select Create a connection to the network of your workplace and select Next.
4. Select Virtual Private Network Connection and select Next.
5. Name the connection and select Next.
6. If the Public Network dialog box appears, choose the appropriate initial connection and select Next.
7. In the VPN Server Selection dialog, enter the IP address or host name of the FortiWiFi unit to connect to and select Next.
8. Select Finish.

To configure the VPN connection

1. Right-click the icon that you created.
2. Select **Properties > Security**.
3. Select Typical to configure typical settings.
4. Select Require data encryption.

Note: If a RADIUS server is used for authentication do not select Require data encryption. L2TP encryption is not supported for RADIUS server authentication.

5. Select Advanced to configure advanced settings.
6. Select Settings.
7. Select Challenge Handshake Authentication Protocol (CHAP).
8. Make sure that none of the other settings are selected.
9. Select the Networking tab.
10. Make sure that the following options are selected:
    - TCP/IP
    - QoS Packet Scheduler
11. Make sure that the following options are not selected:
    - File and Printer Sharing for Microsoft Networks
    - Client for Microsoft Networks

To disable IPSec

1. Select the Networking tab.
2. Select Internet Protocol (TCP/IP) properties.
3. Double-click the Advanced tab.

4 Go to the Options tab and select IP security properties.

5 Make sure that Do not use IPSEC is selected.

6 Select OK and close the connection properties window.

Note: The default Windows XP L2TP traffic policy does not allow L2TP traffic without IPSec encryption. You can disable default behavior by editing the Windows XP Registry as described in the following steps. See the Microsoft documentation for editing the Windows Registry.

7 Use the registry editor (regedit) to locate the following key in the registry:

```
HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\Rasman\
Parameters
```

8 Add the following registry value to this key:

```
Value Name: ProhibitIpSec
Data Type: REG_DWORD
Value: 1
```

9 Save the changes and restart the computer for the changes to take effect.

You must add the `ProhibitIpSec` registry value to each Windows XP-based endpoint computer of an L2TP or IPSec connection to prevent the automatic filter for L2TP and IPSec traffic from being created. When the `ProhibitIpSec` registry value is set to 1, your Windows XP-based computer does not create the automatic filter that uses CA authentication. Instead, it checks for a local or active directory IPSec policy.

To connect to the L2TP VPN

1 Connect to your ISP.

2 Start the VPN connection that you configured in the previous procedure.

3 Enter your L2TP VPN User Name and Password.

4 Select Connect.

5 In the connect window, enter the User Name and Password that you use to connect to your dialup network connection.

This user name and password is not the same as your VPN user name and password.

Network Intrusion Detection System (NIDS)

The FortiWiFi NIDS is a real-time network intrusion detection sensor that uses attack signature definitions to both detect and prevent a wide variety of suspicious network traffic and direct network-based attacks. Also, whenever an attack occurs, the FortiWiFi NIDS can record the event in a log and send an alert email to the system administrator.

This chapter describes:

- Detecting attacks
- Preventing attacks
- Logging attacks

Detecting attacks

The NIDS Detection module detects a wide variety of suspicious network traffic and network-based attacks. Use the following procedures to configure the general NIDS settings and the NIDS Detection module Signature List.

For the general NIDS settings, you must select which interfaces you want to be monitored for network-based attacks. You also need to decide whether to enable checksum verification. Checksum verification tests the integrity of packets received at the monitored interfaces.

This section describes:

- Selecting the interfaces to monitor
- Disabling monitoring interfaces
- Configuring checksum verification
- Viewing the signature list
- Viewing attack descriptions
- Disabling NIDS attack signatures
- Adding user-defined signatures

Selecting the interfaces to monitor

To select the interfaces to monitor for attacks

1. Go to **NIDS > Detection > General**.
2. Select the interfaces to monitor for network attacks.
   You can select one or more interfaces.
3. Select Apply.

Disabling monitoring interfaces

To disable monitoring interfaces for attacks

1. Go to **NIDS > Detection > General**.
2. Clear the check box for all the interfaces that you do not want monitored.
3. Select Apply.

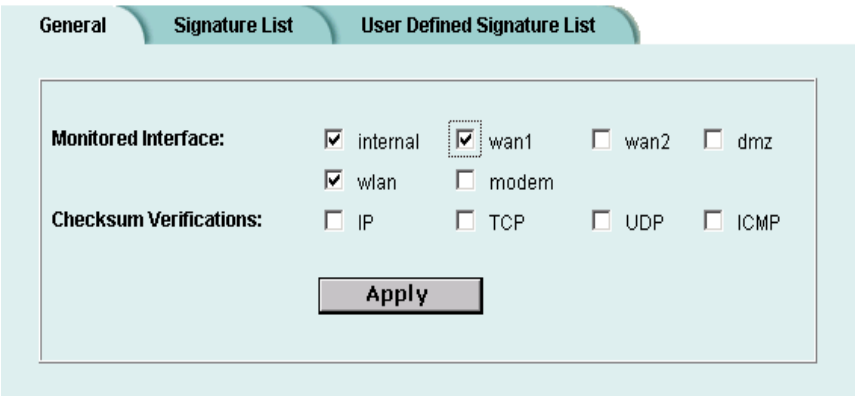
Configuring checksum verification

Checksum verification tests the files that pass through the FortiWiFi unit to make sure that they have not been changed in transit. The NIDS can run checksum verification on IP, TCP, UDP, and ICMP traffic. For maximum detection, you can turn on checksum verification for all types of traffic. However, if the FortiWiFi unit does not need to run checksum verification, you can turn it off for some or all types of traffic to improve system performance. For example, you might not need to run checksum verification if the FortiWiFi unit is installed behind a router that also does checksum verification.

To configure checksum verification

1. Go to **NIDS > Detection > General**.
2. Select the type of traffic that you want to run Checksum Verifications on.
3. Select Apply.

Figure 31: Example NIDS detection configuration



Viewing the signature list

You can display the current list of NIDS signature groups and the members of a signature group.

To view the signature list

1. Go to **NIDS > Detection > Signature List**.
2. View the names and action status of the signature groups in the list.
   The NIDS detects attacks listed in all the signature groups that have check marks in the Enable column.

Note: The user-defined signature group is the last item in the signature list. See "Adding user-defined signatures" on page 240.

3. Select View Details .to display the members of a signature group.
   The Signature Group Members list displays the attack ID, Rule Name, and Revision number for each group member.

Viewing attack descriptions

Fortinet provides online information for all NIDS attacks. You can view the FortiResponse Attack Analysis web page for an attack listed on the signature list.

To view attack descriptions

1. Go to **NIDS > Detection > Signature List**.
2. Select View Details .to display the members of a signature group.
3. Select a signature and copy its attack ID.
4. Open a web browser and enter the following URL:
   `http://www.fortinet.com/ids/ID<attack-ID>`
   Make sure that you include the attack ID.
   For example, to view the Fortinet Attack Analysis web page for the `ssh CRC32 overflow /bin/sh` attack (ID 101646338), use the following URL:
   `http://www.fortinet.com/ids/ID101646338`

Note: Each attack log message includes a URL that links directly to the FortiResponse Attack Analysis web page for that attack. This URL is available in the Attack Log messages and Alert email messages. For information about log message content and formats, and about log locations, see the *FortiGate Logging and Message Reference Guide.* For information about logging attack messages, see "Logging attacks" on page 244.

Figure 32: Example signature group members list

exploit		
ID	**Rule Name**	**Revision**
101646337	gobbles SSH exploit attempt	16
101646338	ssh CRC32 overflow /bin/sh	16
101646339	ssh CRC32 overflow NOOP	16
101646340	ssh CRC32 overflow	16
101646341	x86 linux samba overflow	16
101646342	Solaris x86 nlps overflow attempt	16
101646343	nlps x86 solaris overflow	16
101646344	LPRng overflow	16
101646345	redhat 7.0 lprd overflow	16

Disabling NIDS attack signatures

By default, all NIDS attack signatures are enabled. You can use the NIDS signature list to disable detection of some attacks. Disabling unnecessary NIDS attack signatures can improve system performance and reduce the number of IDS log messages and alert emails that the NIDS generates. For example, the NIDS detects a large number of web server attacks. If you do not provide access to a web server behind your firewall, you might want to disable all web server attack signatures.

Note: To save your NIDS attack signature settings, Fortinet recommends that you back up your FortiWiFi configuration before you update the firmware and restore the saved configuration after the update.

To disable NIDS attack signatures

1. Go to **NIDS > Detection > Signature List**.
2. Scroll through the signature list to find the signature group that you want to disable. Attack ID numbers and rule names in attack log messages and alert email match those in the signature group members list. You can scroll through a signature group members list to locate specific attack signatures by ID number and name.
3. Clear the Enable check box.
4. Select OK.
5. Repeat steps 2 to 4 for each NIDS attack signature group that you want to disable. Select Check All to enable all NIDS attack signature groups in the signature list. Select Uncheck All to disable all NIDS attack signature groups in the signature list.

Adding user-defined signatures

You can create a user-defined signature list in a text file and upload it from the management computer to the FortiWiFi unit.

Note: You cannot upload individual signatures. You must include, in a single text file, all the user-defined signatures that you want to upload. The file can contain one or more signatures.

For information about how to write user-defined signatures, see the *FortiGate NIDS Guide*.

To add user-defined signatures

1 Go to **NIDS > Detection > User Defined Signature List**.

2 Select Upload .

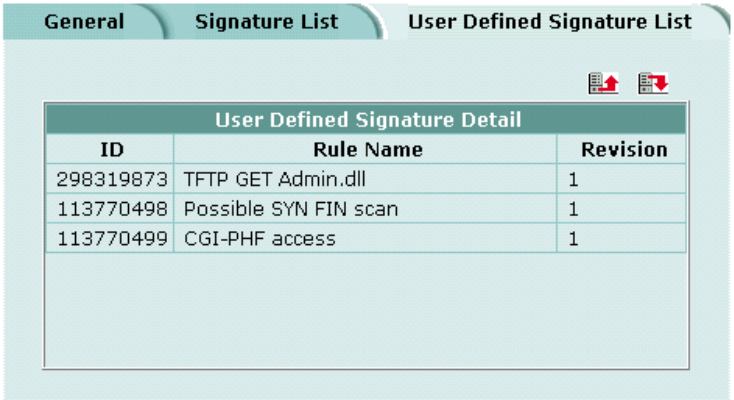
Caution: Uploading the user-defined signature list overwrites the existing file.

3 Type the path and filename of the text file for the user-defined signature list or select Browse and locate the file.

4 Select OK to upload the text file for the user-defined signature list.

5 Select Return to display the uploaded user-defined signature list.

Figure 33: Example user-defined signature list



Downloading the user-defined signature list

You can back up the user-defined signature list by downloading it to a text file on the management computer.

Note: You cannot download individual signatures. You must download the entire user-defined signature list.

To download the user-defined signature list

1 Go to **NIDS > Detection > User Defined Signature List**.

2 Select Download.

The FortiWiFi unit downloads the user-defined signature list to a text file on the management computer. You can specify a location to which to download the text file as well as a name for the text file.

Preventing attacks

NIDS attack prevention protects the FortiWiFi unit and the networks connected to it from common TCP, ICMP, UDP, and IP attacks. You can enable NIDS attack prevention to prevent a set of default attacks with default threshold values. You can also enable or disable and set the threshold values for individual attack prevention signatures.

Note: After the FortiWiFi unit reboots, NIDS attack prevention and synflood prevention are always disabled.

- Enabling NIDS attack prevention
- Enabling NIDS attack prevention signatures
- Setting signature threshold values

Enabling NIDS attack prevention

To enable NIDS attack prevention

1. Go to **NIDS > Prevention**.
2. Select the Enable Prevention check box, in the top left corner.

Enabling NIDS attack prevention signatures

The NIDS Prevention module contains signatures that are designed to protect your network against attacks. Some signatures are enabled by default, others must be enabled. For a complete list of NIDS Prevention signatures and descriptions, see the *FortiGate NIDS Guide*.

To enable attack prevention signatures

1. Go to **NIDS > Prevention**.
2. Select the Enable check box beside each signature that you want to enable.
3. Select Check All to enable all signatures in the NIDS attack prevention signature list.
4. Select Uncheck All to disable all signatures in the NIDS attack prevention signature list.
5. Select Reset to Default Values to enable only the default NIDS attack prevention signatures and return to the default threshold values.

Setting signature threshold values

You can change the default threshold values for the NIDS Prevention signatures listed in Table 20. The threshold depends on the type of attack. For flooding attacks, the threshold is the maximum number of packets received per second. For overflow attacks, the threshold is the buffer size for the command. For large ICMP attacks, the threshold is the ICMP packet size limit to pass through.

For example, setting the icmpflood signature threshold to 500 allows 500 echo requests from a source address, to which the system sends echo replies. The FortiWiFi unit drops any requests over the threshold of 500.

If you enter a threshold value of 0 or a number out of the allowable range, the FortiWiFi unit uses the default value.

Table 20: NIDS Prevention signatures with threshold values

Signature abbreviation	Threshold value units	Default threshold value	Minimum threshold value	Maximum threshold value
synflood	Threshold: Maximum number of SYN segments received per second.	2048	1	1000000
	Queue Size: Maximum proxied connections.	4096	100	1000000
	Timeout: Number of seconds for the SYN cookie to keep a proxied connection alive.	15	1	3600
portscan	Maximum number of SYN segments received per second	512	1	1000000
srcsession	Total number of TCP sessions initiated from the same source	2048	1	1000000
ftpovfl	Maximum buffer size for an FTP command (bytes)	256	32	1408
smtpovfl	Maximum buffer size for an SMTP command (bytes)	512	32	1408
pop3ovfl	Maximum buffer size for a POP3 command (bytes)	512	32	1408
udpflood	Maximum number of UDP packets received from the same source or sent to the same destination per second	2048	1	1000000
udpsrcsession	Total number of UDP sessions initiated from the same source	2048	1	1000000
icmpflood	Maximum number of ICMP packets received from the same source or sent to the same destination per second	256	1	1000000
icmpsrcsession	Total number of ICMP sessions initiated from the same source	128	1	1000000
icmpsweep	Maximum number of ICMP packets received from the same source per second	128	1	1000000
icmplarge	Maximum ICMP packet size (bytes)	32000	64	64000

To set Prevention signature threshold values

1. Go to **NIDS > Prevention**.
2. Select Modify beside the signature for which you want to set the Threshold value. Signatures that do not have threshold values do not have Modify icons.
3. Type the Threshold value.
4. Select the Enable check box.
5. Select OK.

Logging attacks

Whenever the NIDS detects or prevents an attack, it generates an attack message. You can configure the system to add the message to the attack log.

- Logging attack messages to the attack log
- Reducing the number of NIDS attack log and email messages

Logging attack messages to the attack log

To log attack messages to the attack log

1. Go to **Log&Report > Log Setting**.
2. Select Config Policy for the log locations you have set.
3. Select Attack Log.
4. Select Attack Detection and Attack Prevention.
5. Select OK.

Note: For information about log message content and formats, and about log locations, see the *FortiGate Logging and Message Reference Guide.*

Reducing the number of NIDS attack log and email messages

Intrusion attempts might generate an excessive number of attack messages. Based on the frequency that messages are generated, the FortiWiFi unit automatically deletes duplicates. If you still receive an excessive number of unnecessary messages, you can manually disable message generation for unneeded signature groups.

Automatic message reduction

The attack log and alert email messages that the NIDS produces include the ID number and name of the attack that generated the message. The attack ID number and name in the message are identical to the ID number and rule name that appear on the NIDS Signature Group Members list.

The FortiWiFi unit uses an alert email queue in which each new message is compared with the previous messages. If the new message is not a duplicate, the FortiWiFi unit sends it immediately and puts a copy in the queue. If the new message is a duplicate, the FortiWiFi unit deletes it and increases an internal counter for the number of message copies in the queue.

The FortiWiFi unit holds duplicate alert email messages for 60 seconds. If a duplicate message has been in the queue for more than 60 seconds, the FortiWiFi unit deletes the message and increases the copy number. If the copy number is greater than 1, the FortiWiFi unit sends a summary email that includes “Repeated *x* times” in the subject header, the statement “The following email has been repeated *x* times in the last *y* seconds”, and the original message.

Manual message reduction

If you want to reduce the number of alerts that the NIDS generates, you can review the content of attack log messages and alert email. If a large number of the alerts are nuisance alerts (for example, web attacks when you are not running a web server), you can disable the signature group for that attack type. Use the ID number in the attack log or alert email to locate the attack in the signature group list. See "Disabling NIDS attack signatures" on page 240.

Antivirus protection

You can enable antivirus protection in firewall policies. You can select a content profile that controls how the antivirus protection behaves. Content profiles control the type of traffic protected (HTTP, FTP, IMAP, POP3, SMTP), the type of antivirus protection and the treatment of fragmented email and oversized files or email.

This chapter describes:

- General configuration steps
- Antivirus scanning
- File blocking
- Blocking oversized files and emails
- Exempting fragmented email from blocking
- Viewing the virus list

General configuration steps

Configuring antivirus protection involves the following general steps.

1. Select antivirus protection options in a new or existing content profile. See “Adding content profiles” on page 190.
2. Select the Anti-Virus & Web filter option in firewall policies that allow web (HTTP), FTP, and email (IMAP, POP3, and SMTP) connections through the FortiWiFi unit. Select a content profile that provides the antivirus protection options that you want to apply to a policy. See “Adding content profiles to policies” on page 192.
3. Configure antivirus protection settings to control how the FortiWiFi unit applies antivirus protection to the web, FTP, and email traffic allowed by policies. See:
   - “Antivirus scanning” on page 248,
   - “File blocking” on page 249,
   - “Blocking oversized files and emails” on page 250,
   - “Exempting fragmented email from blocking” on page 250.
4. Configure the messages that users receive when the FortiWiFi unit blocks or deletes an infected file. See “Replacement messages” on page 155.
5. Configure the FortiWiFi unit to send an alert email when it blocks or deletes an infected file. See “Configuring alert email” in the *Logging and Message Reference Guide.*

Note: For information about receiving virus log messages, see “Configuring logging”, and for information about log message content and format, see “Virus log messages” in the *Logging Configuration and Reference Guide*

Antivirus scanning

Virus scanning intercepts most files (including files compressed with up to 12 layers of compression using zip, rar, gzip, tar, upx, and OLE) in the content streams for which you enable antivirus protection. Each file is tested to determine the file type and the most effective method of scanning the file for viruses. For example, binary files are scanned using binary virus scanning and Microsoft Office files containing macros are scanned for macro viruses.

FortiWiFi virus scanning does not scan the following file types:

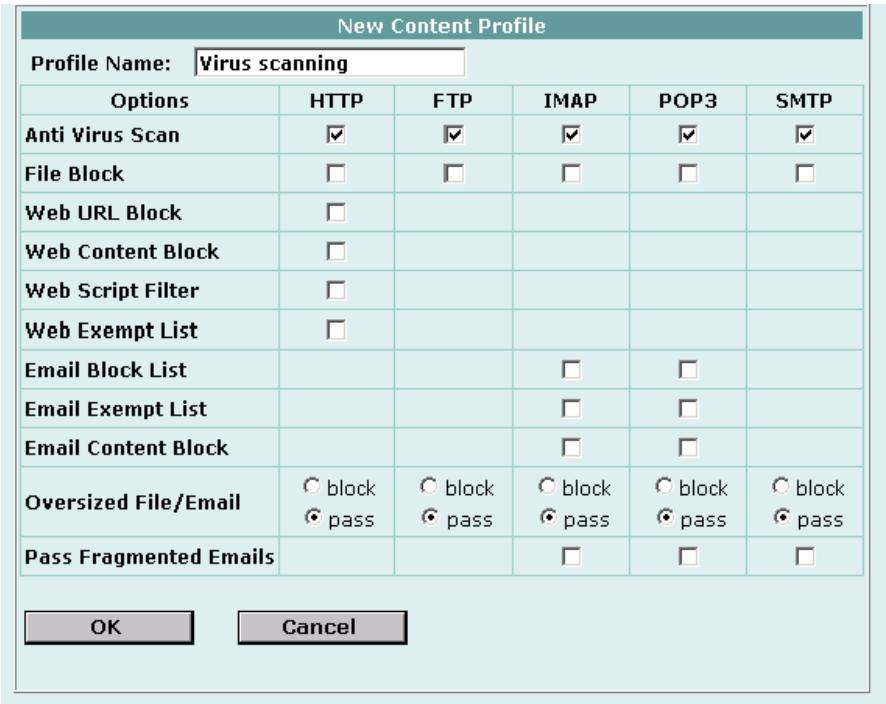
- cdimage
- floppy image
- .ace
- .bzip2
- .Tar+Gzip+Bzip2

If a file is found to contain a virus, the FortiWiFi unit removes the file from the content stream and replaces it with a replacement message.

To scan FortiWiFi firewall traffic for viruses

1. Select antivirus scanning in a content profile.
   For information about content profiles, see "Adding content profiles" on page 190.
2. Add this content profile to firewall policies to apply virus scanning to the traffic controlled by the firewall policy.
   See "Adding content profiles to policies" on page 192.

Figure 34: Example content profile for virus scanning



File blocking

Enable file blocking to remove all files that are a potential threat and to provide the best protection from active computer virus attacks. Blocking files is the only protection from a virus that is so new that antivirus scanning cannot detect it. You would not normally operate the FortiWiFi unit with blocking enabled. However, it is available for extremely high-risk situations in which there is no other way to prevent viruses from entering your network.

File blocking deletes all files that match a list of enabled file patterns. The FortiWiFi unit replaces the file with an alert message that is forwarded to the user. The FortiWiFi unit also writes a message to the virus log and sends an alert email if it is configured to do so.

Note: If both blocking and scanning are enabled, the FortiWiFi unit blocks files that match enabled file patterns and does not scan these files for viruses.

By default, when blocking is enabled, the FortiWiFi unit blocks the following file patterns:

- executable files (*.bat, *.com, and *.exe)
- compressed or archive files (*.gz, *.rar, *.tar, *.tgz, and *.zip)
- dynamic link libraries (*.dll)
- HTML application (*.hta)
- Microsoft Office files (*.doc, *.ppt, *.xl?)
- Microsoft Works files (*.wps)
- Visual Basic files (*.vb?)
- screen saver files (*.scr)

Blocking files in firewall traffic

Use content profiles to apply file blocking to HTTP, FTP, POP3, IMAP, and SMTP traffic controlled by firewall policies.

To block files in firewall traffic

1. Select file blocking in a content profile.
   See “Adding content profiles” on page 190.
2. Add this content profile to firewall policies to apply content blocking to the traffic controlled by the firewall policy.
   See “Adding content profiles to policies” on page 192.

Adding file patterns to block

To add file patterns to block

1. Go to **Anti-Virus > File Block**.
2. Select New.

3 Type the new pattern in the File Pattern field.
You can use an asterisk (*) to represent any characters and a question mark (?) to represent any single character. For example, *.dot blocks Microsoft Word template files and *.do? blocks both Microsoft Word template files and document files.

4 Select the check box beside the traffic protocols for which you want to enable blocking of this file pattern.

5 Select OK.

Blocking oversized files and emails

You can configure the FortiWiFi unit to buffer 1 to 15 percent of available memory to store oversized files and email. The FortiWiFi unit then blocks a file or email that exceeds this limit instead of bypassing antivirus scanning and sending the file or email directly to the server or receiver. The FortiWiFi unit sends a replacement message for an oversized file or email attachment to the HTTP or email proxy client.

Configuring limits for oversized files and email

To configure limits for oversized files and email

1 Go to **Anti-Virus > Config > Config**.

2 Type the size limit, in MB.

3 Select Apply.

Exempting fragmented email from blocking

A fragmented email is a large email message that has been split into smaller messages that are sent individually and recombined when they are received. By default, when antivirus protection is enabled, the FortiWiFi unit blocks fragmented emails and replaces them with an email block message that is forwarded to the receiver. It is recommended that you disable the fragmenting of email messages in the client email software.

To exempt fragmented emails from automatic antivirus blocking

Caution: The FortiWiFi unit cannot scan fragmented emails for viruses or use file pattern blocking to remove files from these email messages.

1 Enable Pass Fragmented Emails for IMAP, POP3, and SMTP traffic in a content profile.

2 Select Anti-Virus & Web filter in a firewall policy. For example, to pass fragmented emails that internal users send to the external network, select an internal to external policy.

3 Select a content profile that has Pass Fragmented Emails enabled for the traffic that you want the FortiWiFi unit to scan.

Viewing the virus list

You can view the names of the viruses and worms in the current virus definition list.

To view the virus list

1 Go to **Anti-Virus > Config > Virus List**.

2 Scroll through the virus and worm list to view the names of all viruses and worms in the list.

Web filtering

When you enable Anti-Virus & Web filter in a firewall policy, you select a content profile that controls how web filtering behaves for HTTP traffic. Content profiles control the following types of content filtering:

- blocking unwanted URLs,
- blocking unwanted content,
- removing scripts from web pages,
- exempting URLs from blocking.

You can also use the Cerberian URL filtering to block unwanted URLs. For more information, see "Configuring Cerberian URL filtering" on page 260.

This chapter describes:

- General configuration steps
- Content blocking
- URL blocking
- Configuring Cerberian URL filtering
- Script filtering
- Exempt URL list

General configuration steps

Configuring web filtering involves the following general steps:

1. Select web filtering options in a new or existing content profile. See "Adding content profiles" on page 190.
2. Select the Anti-Virus & Web filter option in firewall policies that allow HTTP connections through the FortiWiFi unit.
   - Select a content profile that provides the web filtering options that you want to apply to a policy. See "Adding content profiles to policies" on page 192.

3 Configure web filtering settings to control how the FortiWiFi unit applies web filtering to the HTTP traffic allowed by policies. See:
   - "URL blocking" on page 257,
   - "Configuring Cerberian URL filtering" on page 260,
   - "Content blocking" on page 254,
   - "Script filtering" on page 262,
   - "Exempt URL list" on page 263.

4 Configure the messages that users receive when the FortiWiFi unit blocks unwanted content or unwanted URLs. See "Replacement messages" on page 155.

5 Configure the FortiWiFi unit to record log messages when it blocks unwanted content or unwanted URLs. See "Recording logs" on page 273.

6 Configure the FortiWiFi unit to send an alert email when it blocks unwanted content or unwanted URLs. See "Configuring alert email" on page 281.

Content blocking

When the FortiWiFi unit blocks a web page, the user who requested the blocked page receives a block message and the FortiWiFi unit writes a message to the web filtering log.

You can add banned words to the list in many languages using Western, Simplified Chinese, Traditional Chinese, Japanese, or Korean character sets.

- Adding words and phrases to the Banned Word list
- Clearing the Banned Word list
- Backing up the Banned Word list
- Restoring the Banned Word list

Adding words and phrases to the Banned Word list

1 Go to **Web Filter > Content Block**.

2 Select New to add a word or phrase to the Banned Word list.

3 Choose a language or character set for the banned word or phrase.

   You can choose Western, Chinese Simplified, Chinese Traditional, Japanese, or Korean.

   Your computer and web browser must be configured to enter characters in the character set that you choose.

4 Type a banned word or phrase.

If you type a single word (for example, `banned`), the FortiWiFi unit blocks all web pages that contain that word.

If you type a phrase (for example, `banned phrase`), the FortiWiFi unit blocks web pages that contain both words. When this phrase appears on the banned word list, the FortiWiFi unit inserts plus signs (+) in place of spaces (for example, `banned+phrase`).

If you type a phrase in quotes (for example, `"banned word"`), the FortiWiFi unit blocks all web pages in which the words are found together as a phrase.

Content filtering is not case-sensitive. You cannot include special characters in banned words.

5 To enable the banned word, ensure that the Enable checkbox is selected.

6 Select OK.

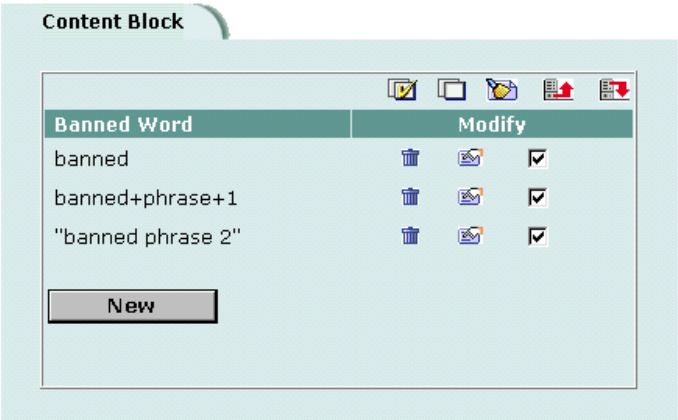
The word or phrase is added to the Banned Word list.

You can enable all the words on the banned word list by selecting Check All .

You can disable all the words on the banned word list by selecting Uncheck All .

Note: Banned Word must be selected in the content profile for web pages containing banned words to be blocked.

Figure 35: Example banned word list



Clearing the Banned Word list

1 Go to **Web Filter > Content Block**.

2 Select Clear List to remove all banned words and phrases from the banned word list.

Backing up the Banned Word list

You can back up the banned word list by downloading it to a text file on the management computer.

To back up the banned word list

1 Go to **Web Filter > Content Block**.

2 Select Backup Banned Word List .
The FortiWiFi unit downloads the list to a text file on the management computer. You can specify a location to which to download the text file as well as a name for the text file.

Restoring the Banned Word list

You can create a Banned Word list in a text editor and then upload the text file to the FortiWiFi unit. Add one banned word or phrase to each line of the text file. The word or phrase should be followed by two parameters separated by spaces. The first parameter specifies the status of the entry. The second parameter specifies the language of the entry.

Table 21: Banned Word list configuration parameters

Parameter	Setting	Description
Status	0	Disabled
	1	Enabled
Language	0	ASCII
	1	Simplified Chinese
	2	Traditional Chinese
	3	Japanese
	4	Korean

Figure 36: Example Banned Word List text file

```
banned 1 0
banned+phrase+1 1 3
"banned+phrase+2" 1 1
```

Note: All changes made to the banned word list using the web-based manager are lost when you upload a new list. However, you can download your current banned word list, add more items to it using a text editor, and then upload the edited list to the FortiWiFi unit.

To restore the banned word list

1 Go to **Web Filter > Content Block**.
2 Select Restore Banned Word List .
3 Type the path and filename of the banned word list text file, or select Browse and locate the file.
4 Select OK to upload the file to the FortiWiFi unit.
5 Select Return to display the updated Banned Word List.
6 You can continue to maintain the Banned Word List by making changes to the text file and uploading it again as necessary.

Note: Banned Word must be selected in the content profile for web pages containing banned words to be blocked.

URL blocking

You can block the unwanted web URLs using FortiWiFi Web URL blocking, FortiWiFi Web pattern blocking, and Cerberian web filtering.

- Configuring FortiWiFi Web URL blocking
- Configuring FortiWiFi Web pattern blocking
- Configuring Cerberian URL filtering

Configuring FortiWiFi Web URL blocking

You can configure FortiWiFi Web URL blocking to block all pages on a website by adding the top-level URL or IP address. You can also block individual pages on a website by including the full path and filename of the web page to block.

- Adding URLs to the Web URL block list
- Clearing the Web URL block list
- Downloading the Web URL block list
- Uploading a URL block list

Adding URLs to the Web URL block list

1. Go to **Web Filter > Web URL Block**.
2. Select New to add a URL to the Web URL block list.
3. Type the URL the you want to block.

   Type a top-level URL or IP address to block access to all pages on a website. For example, `www.badsite.com` or `122.133.144.155` blocks access to all pages at this website.

   Type a top-level URL followed by the path and filename to block access to a single page on a website. For example, `www.badsite.com/news.html` or `122.133.144.155/news.html` blocks the news page on this website.

   To block all pages with a URL that ends with `badsite.com`, add `badsite.com` to the block list. For example, adding `badsite.com` blocks access to `www.badsite.com`, `mail.badsite.com`, `www.finance.badsite.com`, and so on.

Note: Do not include `http://` in the URL that you want to block.

Note: Do not use regular expressions in the Web URL block list. You can use regular expressions in the Web Pattern Block list to create URL patterns to block. See "Configuring FortiWiFi Web pattern blocking" on page 259.

Note: You can type a top-level domain suffix (for example, "com" without the leading period) to block access to all URLs with this suffix.

Note: URL blocking does not block access to other services that users can access with a web browser. For example, URL blocking does not block access to `ftp://ftp.badsite.com`. Instead, you can use firewall policies to deny FTP connections.

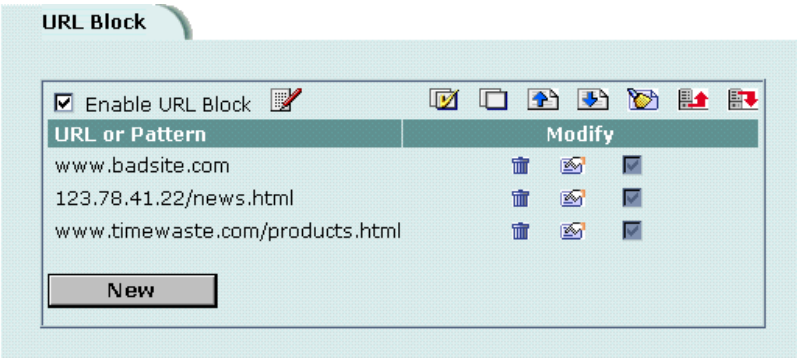
4. Ensure that the Enable checkbox has been selected and then select OK.

5 Select OK to add the URL to the Web URL block list.
You can enter multiple URLs and then select Check All to enable all items in the Web URL block list.
You can disable all of the URLs on the list by selecting Uncheck All .
Each page of the Web URL block list displays 100 URLs.

6 Use Page Up and Page Down to navigate through the Web URL block list.

Note: You must select the Web URL Block option in the content profile to enable the URL blocking.

Figure 37: Example URL block list



Clearing the Web URL block list

1 Go to **Web Filter > Web URL Block**.

2 Select Clear URL Block List to remove all URLs and patterns from the Web URL block list.

Downloading the Web URL block list

You can back up the Web URL block list by downloading it to a text file on the management computer.

To download a Web URL block list

1 Go to **Web Filter > Web URL Block**.

2 Select Download URL Block List .
The FortiWiFi unit downloads the list to a text file on the management computer. You can specify a location to which to download the text file as well as a name for the text file.

Uploading a URL block list

You can create a URL block list in a text editor and then upload the text file to the FortiWiFi unit. Add one URL or pattern to each line of the text file. You can follow the item with a space and then a 1 to enable or a zero (0) to disable the URL. If you do not add this information to the text file, the FortiWiFi unit automatically enables all URLs and patterns that are followed by a 1 or no number when you upload the text file.

Figure 38: Example URL block list text file

```
www.badsite.com/index 1
www.badsite.com/products 1
182.63.44.67/index 1
```

You can either create the URL block list or add a URL list created by a third-party URL block or blacklist service. For example, you can download the squidGuard blacklists available at http://www.squidguard.org/blacklist/ as a starting point for creating a URL block list. Three times per week, the squidGuard robot searches the web for new URLs to add to the blacklists. You can upload the squidGuard blacklists to the FortiWiFi unit as a text file, with only minimal editing to remove comments at the top of each list and to combine the lists that you want into a single file.

Note: All changes made to the URL block list using the web-based manager are lost when you upload a new list. However, you can download your current URL block list, add more items to it using a text editor, and then upload the edited list to the FortiWiFi unit.

To upload a URL block list

1. In a text editor, create the list of URLs and patterns that you want to block.
2. Using the web-based manager, go to **Web Filter > Web URL Block**.
3. Select Upload URL Block List .
4. Type the path and filename of the URL block list text file, or select Browse and locate the file.
5. Select OK to upload the file to the FortiWiFi unit.
6. Select Return to display the updated Web URL block list.
   Each page of the Web URL block list displays 100 URLs.
7. Use Page Down and Page Up to navigate through the Web URL block list.
8. You can continue to maintain the Web URL block list by making changes to the text file and uploading it again.

Configuring FortiWiFi Web pattern blocking

You can configure FortiWiFi web pattern blocking to block web pages that match a URL pattern. Create URL patterns using regular expressions (for example, `badsite.*` matches `badsite.com`, `badsite.org`, `badsite.net` and so on).

FortiWiFi web pattern blocking supports standard regular expressions. You can add up to 20 patterns to the web pattern block list.

To add patterns to the Web pattern block list

1. Go to **Web Filter > URL Block > Web Pattern Block**.
2. Select New to add an item to the Web pattern block list.
3. Type the web pattern that you want to block.
   You can use standard regular expressions for web patterns.

Note: URL blocking does not block access to other services that users can access with a web browser. For example, URL blocking does not block access to `ftp://ftp.badsite.com`. Instead, you can use firewall policies to deny FTP connections.

4 Select Enable to block the pattern.

5 Select OK to add the pattern to the Web pattern block list.

Note: You must select the Web URL Block option in the content profile to enable the URL blocking.

Configuring Cerberian URL filtering

The FortiWiFi unit supports Cerberian URL filtering. For information about Cerberian URL filtering, see www.cerberian.com.

If you have purchased the Cerberian web filtering functionality with your FortiWiFi unit, use the following configuration procedures to configure FortiWiFi support for Cerberian web filtering.

- Installing a Cerberian license key
- Adding a Cerberian user
- Configuring Cerberian web filter
- Enabling Cerberian URL filtering

Installing a Cerberian license key

Before you can use the Cerberian web filter, you must install a license key. The license key determines the number of end users allowed to use Cerberian web filtering through the FortiWiFi unit.

To install a Cerberian licence key

1 Go to **Web Filter > URL Block**.

2 Select Cerberian URL Filtering.

3 Enter the license number.

4 Select Apply.

Adding a Cerberian user

The Cerberian web policies can be applied only to user groups. You can add users on the FortiWiFi unit and then add the users to user groups on the Cerberian administration web site.

When the end user tries to access a URL, the FortiWiFi unit checks whether the user's IP address is in the IP address list on the FortiWiFi unit. If the user's IP address is in the list, the request is sent to the Cerberian server. Otherwise, an error message is sent to the user saying that the user does not have authorized access to the Cerberian web filter.

To add a Cerberian user

1. Go to **Web Filter > URL Block**.
2. Select Cerberian URL Filtering.
3. Select New.
4. Enter the IP address and netmask of the user computers.
   You can enter the IP address of a single user. For example, 192.168.100.19 255.255.255.255. You can also enter a subnet of a group of users. For example, 192.168.100.0 255.255.255.0.
5. Enter an alias for the user.
   The alias is used as the user name when you add the user to a user group on the Cerberian server. If you do not enter an alias, the user's IP is used and added to the default group on the Cerberian server.
6. Select OK.

Configuring Cerberian web filter

After you add the Cerberian web filter users on the FortiWiFi unit, you can add these users to the user groups on the Cerberian web filter server. Then you can create policies and apply these policies to the user groups.

About the default group and policy

There is a default user group, which is associated with a default policy, that exists on the Cerberian web filter server.

You can add users to the default group and apply any policies to the group.

Use the default group to add:

- All the users who are not assigned alias names on the FortiWiFi unit.
- All the users who are not assigned to other user groups.

The Cerberian web filter groups URLs into 53 categories. The default policy blocks the URLs of 12 categories. You can modify the default policy and apply it to any user groups.

To configure Cerberian web filtering

1. Add the user name, which is the alias you added on the FortiWiFi unit, to a user group on the Cerberian server.
   Web policies can be applied only to user groups. If you did not enter an alias for a user's IP address on the FortiWiFi unit, the user's IP address is automatically added to the default Cerberian group.
2. Create policies by selecting the web categories that you want to block.
3. Apply the policy to a user group that contains the user.
   For detailed procedures, see the online help on the Cerberian Web Filter web page.

Enabling Cerberian URL filtering

After you add the Cerberian users and groups and configure the Cerberian web filter, you can enable Cerberian URL filtering.

To enable cerberian URL filtering

1. Go to **Web Filter > URL Block > Cerberian URL Filtering**.
2. Select the Cerberian URL Filtering option.
3. Go to **Firewall > Content Profile**.
4. Create a new or select an existing content profile and enable Web URL Block.
5. Go to **Firewall > Policy**.
6. Create a new or select an existing policy.
7. Select Anti-Virus & Web filter.
8. Select the content profile from the Content Profile list.
9. Select OK.

Script filtering

You can configure the FortiWiFi unit to remove Java applets, cookies, and ActiveX scripts from the HTML web pages.

Note: Blocking any of these items might prevent some web pages from working properly.

- Enabling script filtering
- Selecting script filter options

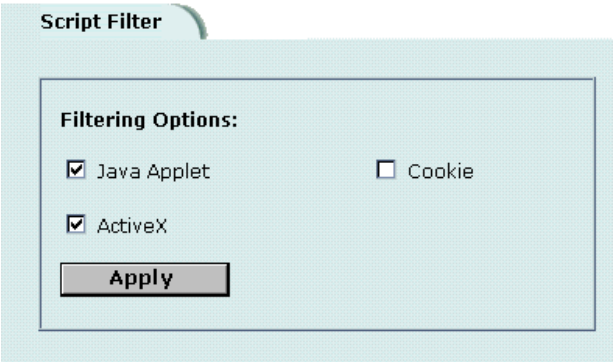
Enabling script filtering

1. Go to **Firewall > Content Profile**.
2. Select the content profile for which you want to enable script filtering.
3. Select Script Filter.
4. Select OK.

Selecting script filter options

1. Go to **Web Filter > Script Filter.**
2. Select the script filter options that you want to enable.
   You can block Java applets, cookies, and ActiveX.
3. Select Apply.

Figure 39: Example script filter settings to block Java applets and ActiveX



Exempt URL list

Add URLs to the exempt URL list to allow legitimate traffic that might otherwise be blocked by content or URL blocking. For example, if content blocking is set to block pornography-related words and a reputable website runs a story on pornography, web pages from the reputable website are blocked. Adding the address of the reputable website to the exempt URL list allows the content of the website to bypass content blocking.

Note: Content downloaded from exempt web pages is not blocked or scanned by antivirus protection.

- Adding URLs to the URL Exempt list
- Downloading the URL Exempt List
- Uploading a URL Exempt List

Adding URLs to the URL Exempt list

1. Go to **Web Filter > URL Exempt**.
2. Select New to add an item to the URL Exempt list.
3. Type the URL to exempt.

   Type a complete URL, including path and filename, to exempt access to a page on a website. For example, `www.goodsite.com/index.html` exempts access to the main page of this example website. You can also add IP addresses; for example, `122.63.44.67/index.html` exempts access to the main web page at this address. Do not include `http://` in the URL to exempt.

   Exempting a top-level URL, such as `www.goodsite.com`, exempts all requested subpages (for example, `www.goodsite.com/badpage`) from all content and URL filtering rules.

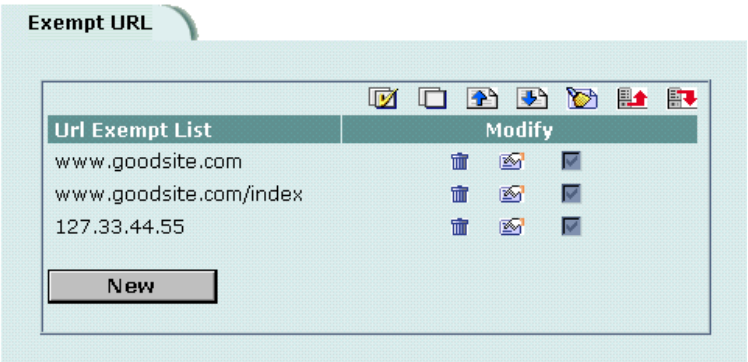
Note: Exempting a top-level URL does not exempt pages such as `mail.goodsite.com` from all content and URL filtering rules unless `goodsite.com` (without the `www`) is added to the exempt URL list.

4 Ensure that the Enable checkbox has been selected.

5 Select OK to add the URL to the exempt URL list.
You can enter multiple URLs and then select Check All to activate all items in the exempt URL list.
You can disable all the URLs in the list by selecting Uncheck All .
Each page of the exempt URL list displays 100 URLs.

6 Use Page Down and Page Up to navigate the exempt URL list.

Figure 40: Example URL Exempt list



Downloading the URL Exempt List

You can back up the URL Exempt List by downloading it to a text file on the management computer.

1 Go to **Web Filter > URL Exempt**.

2 Select Download URL Exempt List .
The FortiWiFi unit downloads the list to a text file on the management computer. You can specify a location to which to download the text file as well as a name for the text file.

Uploading a URL Exempt List

You can create a URL Exempt list in a text editor and then upload the text file to the FortiWiFi unit. Add one URL or pattern to each line of the text file. The word or phrase should be followed by a parameter specifying the status of the entry. If you do not add this information to the text file, the FortiWiFi unit automatically enables all URLs and patterns that are followed with a 1 or no number when you upload the text file.

Table 22: URL Exempt list configuration parameters

Parameter	Setting	Description
Status	0	Disabled
	1	Enabled

Figure 41: Example URL Exempt list text file

```
www.goodsite.com 1
www.goodsite.com/index 1
127.33.44.55 1
```

Note: All changes made to the URL block list using the web-based manager are lost when you upload a new list. However, you can download your current URL block list, add more items to it using a text editor, and then upload the edited list to the FortiWiFi unit.

1. In a text editor, create the list of URLs to exempt.
2. Using the web-based manager, go to **Web Filter > URL Exempt**.
3. Select Upload URL Exempt List .
4. Type the path and filename of your URL Exempt List text file, or select Browse and locate the file.
5. Select OK to upload the file to the FortiWiFi unit.
6. Select Return to display the updated URL Exempt List.
7. You can continue to maintain the URL Exempt List by making changes to the text file and uploading it again as necessary.

Email filter

Email filtering is enabled in firewall policies. When you enable Anti-Virus & Web filter in a firewall policy, you select a content profile that controls how email filtering behaves for email (IMAP and POP3) traffic. Content profiles control the following types of protection to identify unwanted email:

- filtering unwanted sender address patterns,
- filtering unwanted content,
- exempting sender address patterns from blocking.

This chapter describes:

- General configuration steps
- Email banned word list
- Email block list
- Email exempt list
- Adding a subject tag

General configuration steps

Configuring email filtering involves the following general steps:

1. Select email filter options in a new or existing content profile. See "Adding content profiles" on page 190.
2. Select the Anti-Virus & Web filter option in firewall policies that allow IMAP and POP3 connections through the FortiWiFi unit. Select a content profile that provides the email filtering options that you want to apply to a policy. See "Adding content profiles to policies" on page 192.
3. Add a subject tag to the unwanted email so that receivers can use their mail client software to filter messages based on the tag. See "Adding a subject tag" on page 272.

Note: For information about receiving email filter log messages, see "Configuring logging" in the *FortiGate Logging Configuration and Reference Guide*. For information about email filter log message categories and formats, see "Log messages" in the *FortiGate Logging Configuration and Reference Guide*.

Email banned word list

When the FortiWiFi unit detects an email that contains a word or phrase in the banned word list, the FortiWiFi unit adds a tag to the subject line of the email and writes a message to the event log. Receivers can then use their mail client software to filter messages based on the subject tag.

You can add banned words to the list in many languages using Western, Simplified Chinese, Traditional Chinese, Japanese, or Korean character sets.

- Adding words and phrases to the email banned word list
- Downloading the email banned word list
- Uploading the email banned word list

Adding words and phrases to the email banned word list

To add a word or phrase to the banned word list

1. Go to **Email Filter > Content Block**.
2. Select New.
3. Type a banned word or phrase.
   - If you type a single word (for example, `banned`), the FortiWiFi unit tags all IMAP and POP3 email that contains that word.
   - If you type a phrase (for example, `banned phrase`), the FortiWiFi unit tags email that contains both words. When this phrase appears on the banned word list, the FortiWiFi unit inserts plus signs (+) in place of spaces (for example, `banned+phrase`).
   - If you type a phrase in quotes (for example, `"banned word"`), the FortiWiFi unit tags all email in which the words are found together as a phrase.

   Content filtering is not case-sensitive. You cannot include special characters in banned words.
1. Select the Language for the banned word or phrase.

   You can choose Western, Chinese Simplified, Chinese Traditional, Japanese, or Korean.

   Your computer and web browser must be configured to enter characters in the language that you select.
2. Select OK.

   The word or phrase is added to the banned word list.

Note: Email Content Block must be selected in the content profile for IMAP or POP3 email containing banned words to be tagged.

Downloading the email banned word list

You can back up the banned word list by downloading it to a text file on the management computer:

To download the banned word list

1. Go to **Email Filter > Content Block**.
2. Select Download.

   The FortiWiFi unit downloads the banned word list to a text file on the management computer. You can specify a location to which to download the text file as well as a name for the text file.

Uploading the email banned word list

You can create or edit a banned word list in a text file and upload it from your management computer to the FortiWiFi unit.

Each banned word or phrase must appear on a separate line in the text file. Use ASCII, Western, Chinese Simplified, Chinese Traditional, Japanese, or Korean characters. Your computer and web browser must be configured to enter characters in the character set that you use.

All words are enabled by default. Optionally, you can enter a space and a 1 after the word to enable it, and another space and a number to indicate the language.

0	Western
1	Chinese Simplified
2	Chinese Traditional
3	Japanese
4	Korean

If you do not add this information to all items in the text file, the FortiWiFi unit automatically enables all banned words and phrases that are followed with a 1 or no number in the Western language when you upload the text file.

Figure 42: Example Western email banned word list text file

```
banned 1 0
banned+phrase+1 1 0
"banned phrase 2" 1 0
```

To upload the banned word list

1. Go to **Email Filter > Content Block**.
2. Select Upload.
3. Type the path and filename of the banned word list text file or select Browse and locate the file.
4. Select OK to upload the banned word list text file.

   Select Return to display the banned word list.

Email block list

You can configure the FortiWiFi unit to tag all IMAP and POP3 protocol traffic sent from unwanted email addresses. When the FortiWiFi unit detects an email sent from an unwanted address pattern, the FortiWiFi unit adds a tag to the subject line of the email and writes a message to the email filter log. Receivers can then use their mail client software to filter messages based on the subject tag.

You can tag email from a specific sender address or from all address subdomains by adding the top-level domain name. Alternatively, you can tag email sent from individual subdomains by including the subdomain to block.

- Adding address patterns to the email block list
- Downloading the email block list
- Uploading an email block list

Adding address patterns to the email block list

To add an address pattern to the email block list

1. Go to **Email Filter > Block List**.
2. Select New.
3. Type a Block Pattern.
   - To tag email from a specific email address, type the email address. For example, `sender@abccompany.com`.
   - To tag email from a specific domain, type the domain name. For example, `abccompany.com`.
   - To tag email from a specific subdomain, type the subdomain name. For example, `mail.abccompany.com`.
   - To tag email from an entire organization category, type the top-level domain name. For example, type `com` to tag email sent from all organizations that use .com as the top-level domain.

   The pattern can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - (hyphen),_ (underscore), and @. Spaces and other special characters are not allowed.
4. Select OK to add the address pattern to the Email Block list.

Downloading the email block list

You can back up the email block list by downloading it to a text file on the management computer.

To download the email block list

1. Go to **Email Filter > Block List**.
2. Select Download.

   The FortiWiFi unit downloads the list to a text file on the management computer. You can specify a location to which to download the text file as well as a name for the text file.

Uploading an email block list

You can create a email block list in a text editor and then upload the text file to the FortiWiFi unit. Add one pattern to each line of the text file. You can follow the pattern with a space and then a 1 to enable or a zero (0) to disable the pattern. If you do not add this information to the text file, the FortiWiFi unit automatically enables all patterns that are followed with a 1 or no number when you upload the text file.

Figure 43: Example email block list text file

```
mail.badsite.com 1
suredeal.org 1
user1@badsite.com 1
```

You can either create the email block list yourself, or add a block list created by a third-party email blacklist service. For example, you can subscribe to the Realtime Blackhole List service available at http://mail-abuse.org/rbl/ as a starting point for creating your own email block list. You can upload blacklists to the FortiWiFi unit as text files, with only minimal editing to remove comments at the top of each list and to combine the lists that you want into a single file.

Note: All changes made to the email block list using the web-based manager are lost when you upload a new list. However, you can download your current email block list, add more patterns to it using a text editor, and then upload the edited list to the FortiWiFi unit.

To upload the email block list

1. In a text editor, create the list of patterns to block.
2. Using the web-based manager, go to **Email Filter > Block List**.
3. Select Upload.
4. Type the path and filename of your email block list text file, or select Browse and locate the file.
5. Select OK to upload the file to the FortiWiFi unit.
6. Select Return to display the updated email block list.
7. You can continue to maintain the email block list by making changes to the text file and uploading it again.

Email exempt list

Add address patterns to the exempt list to allow legitimate IMAP and POP3 traffic that might otherwise be tagged by email or content blocking. For example, if the email banned word list is set to block email that contains pornography-related words and a reputable company sends email that contains these words, the FortiWiFi unit would normally add a subject tag to the email. Adding the domain name of the reputable company to the exempt list allows IMAP and POP3 traffic from the company to bypass email and content blocking.

Adding address patterns to the email exempt list

To add an address pattern to the email exempt list

1. Go to **Email Filter > Exempt List**.
2. Select New.
3. Type the address pattern that you want to exempt.
   - To exempt email sent from a specific email address, type the email address. For example, `sender@abccompany.com`.
   - To exempt email sent from a specific domain, type the domain name. For example, `abccompany.com`.
   - To exempt email sent from a specific subdomain, type the subdomain name. For example, `mail.abccompany.com`.
   - To exempt email sent from an entire organization category, type the top-level domain name. For example, type `net` to exempt email sent from all organizations that use .net as the top-level domain.

   The pattern can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - (hyphen),_ (underscore), and @. Spaces and other special characters are not allowed.
4. Select OK to add the address pattern to the email exempt list.

Adding a subject tag

When the FortiWiFi unit receives email from an unwanted address or email that contains an item in the email banned word list, the FortiWiFi unit adds a tag to the subject line and sends the message to the destination email address. Email users can use their mail client software to filter the messages based on the subject tag.

To add a subject tag

1. Go to **Email Filter > Config**.
2. Type the Subject Tag that you want to display in the subject line of email received from unwanted addresses or that contains banned words. For example, type `Unwanted Mail`.

Note: Do not use quotation marks in the subject tags.

3. Select Apply.
   The FortiWiFi unit adds the tag to the subject line of all unwanted email.

Logging and reporting

You can configure the FortiWiFi unit to log network activity from routine configuration changes and traffic sessions to emergency events. You can also configure the FortiWiFi unit to send alert email messages to inform system administrators about events such as network attacks, virus incidents, and firewall and VPN events.

This chapter describes:

- Recording logs
- Filtering log messages
- Configuring traffic logging
- Viewing logs saved to memory
- Configuring alert email

Recording logs

You can configure logging to record logs to one or more of:

- a computer running a syslog server,
- a computer running a WebTrends firewall reporting server,
- the console.

You can also configure logging to record event, attack, antivirus, web filter, and email filter logs to the FortiWiFi system memory, if your FortiWiFi unit does not contain a hard disk. Logging to memory allows quick access to only the most recent log entries. If the FortiWiFi unit restarts, the log entries are lost.

You can select the same or different severity levels for each log location. For example, you might want to record only emergency and alert level messages to the FortiWiFi memory and record all levels of messages on a remote computer.

For information about filtering the log types and activities that the FortiWiFi unit records, see “Filtering log messages” on page 276. For information about traffic logs, see “Configuring traffic logging” on page 277.

This section describes:

- Recording logs on a remote computer
- Recording logs on a NetIQ WebTrends server
- Recording logs in system memory
- Log message levels

Recording logs on a remote computer

You can configure the FortiWiFi unit to record log messages on a remote computer. The remote computer must be configured with a syslog server.

To record logs on a remote computer

1. Go to **Log&Report > Log Setting**.
2. Select the Log to Remote Host check box to send the logs to a syslog server.
3. Type the IP address of the remote computer running syslog server software.
4. Type the port number of the syslog server.
5. Select the severity level for which you want to record log messages.
   The FortiWiFi unit logs all levels of severity down to, but not lower than, the level you choose. For example, if you want to record emergency, alert, critical, and error messages, select Error.
   See "Log message levels" on page 275.
6. Select Config Policy.
   - Select the Log type for which you want the FortiWiFi unit to record logs.
   - For each Log type, select the activities for which you want the FortiWiFi unit to record log messages.

   For information about log types and activities, see "Filtering log messages" on page 276 and "Configuring traffic logging" on page 277.
7. Select OK.
8. Select Apply.

Recording logs on a NetIQ WebTrends server

Use the following procedure to configure the FortiWiFi unit to record logs on a remote NetIQ WebTrends firewall reporting server for storage and analysis. FortiWiFi log formats comply with WebTrends Enhanced Log Format (WELF) and are compatible with WebTrends NetIQ Security Reporting Center 2.0 and Firewall Suite 4.1. For more information, see the Security Reporting Center and Firewall Suite documentation.

Note: FortiWiFi traffic log messages include sent and received fields, which are optional but required for drawing a WebTrends graph.

To record logs on a NetIQ WebTrends server

1. Go to **Log&Report > Log Setting**.
2. Select the Log in WebTrends Enhanced Log Format check box.
3. Type the IP address of the NetIQ WebTrends firewall reporting server.
4. Select the severity level for which you want to record log messages.
   The FortiWiFi logs all levels of severity down to, but not lower than, the level you choose. For example, if you want to record emergency, alert, critical, and error messages, select Error.
   See "Log message levels" on page 275.

5 Select Config Policy.
To configure the FortiWiFi unit to filter the types of logs and events to record, use the procedures in "Filtering log messages" on page 276 and "Configuring traffic logging" on page 277.

6 Select OK.

7 Select Apply.

Recording logs in system memory

If your FortiWiFi unit does not contain a hard disk, you can configure the FortiWiFi unit to reserve some system memory for storing current event, attack, antivirus, web filter, and email filter log messages. Logging to memory allows quick access to only the most recent log entries. The FortiWiFi unit can store a limited number of messages in system memory. After all available memory is used, the FortiWiFi unit deletes the oldest messages. If the FortiWiFi unit restarts, the log entries are lost.

Note: The FortiWiFi unit can record only the event and attack log messages in system memory.

To record logs in system memory

1 Go to **Log&Report > Log Setting**.

2 Select the Log to memory check box.

3 Select the severity level for which you want to record log messages.
The FortiWiFi logs all levels of severity down to, but not lower than, the level you choose. For example, if you want to record emergency, alert, critical, and error messages, select Error.
See "Log message levels" on page 275.

4 Select Config Policy.
To configure the FortiWiFi to filter the types of logs and events to record, use the procedures in "Filtering log messages" on page 276.

5 Select Apply.

Log message levels

Table 23 lists and describes FortiWiFi log message levels.

Table 23: FortiWiFi log message levels

Levels	Description	Generated by
0 - Emergency	The system has become unstable.	Emergency messages not available.
1 - Alert	Immediate action is required.	NIDS attack log messages.
2 - Critical	Functionality is affected.	DHCP
3 - Error	An error condition exists and functionality could be affected.	Error messages not available.

Table 23: FortiWiFi log message levels

Levels	Description	Generated by
4 - Warning	Functionality could be affected.	Antivirus, Web filter, email filter, and system event log messages.
5 - Notice	Information about normal events.	Antivirus, Web filter, and email filter log messages.
6 - Information	General information about system operations.	Antivirus, Web filter, email filter log messages, and other event log messages.

Filtering log messages

You can configure the logs that you want to record and the message categories that you want to record in each log.

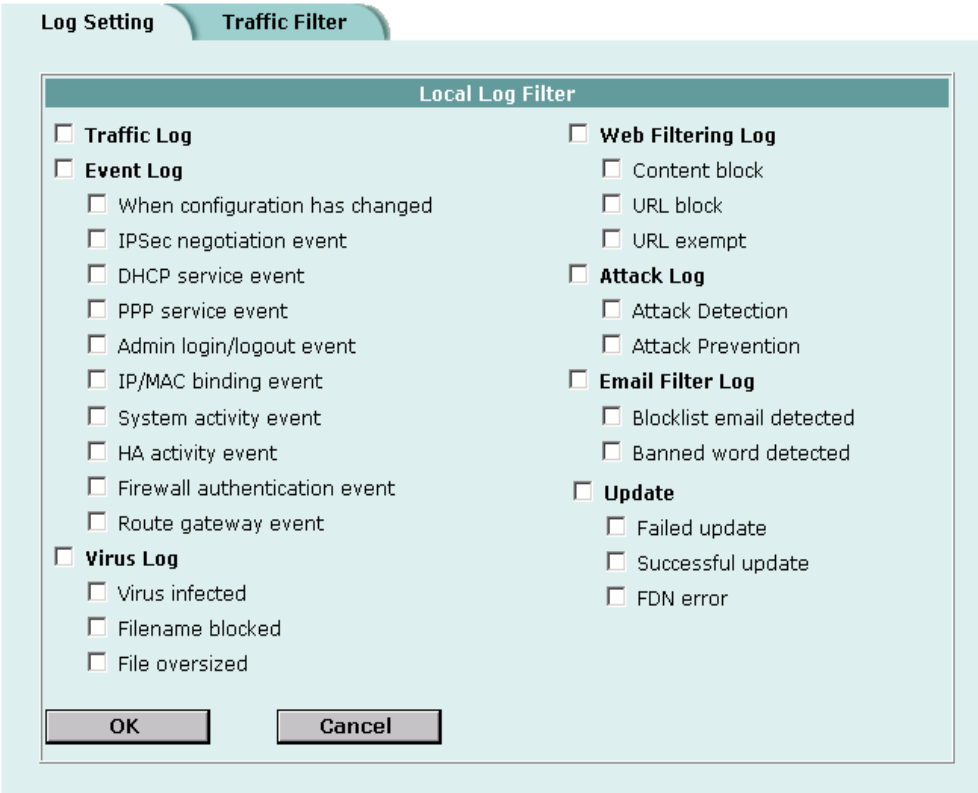
To filter log entries

1. Go to **Log&Report > Log Setting**.
2. Select Config Policy for the log location that you selected in "Recording logs" on page 273.
3. Select the log types that you want the FortiWiFi unit to record.

Traffic Log	Record all connections to and through the interface. To configure traffic filtering, see "Adding traffic filter entries" on page 279.
Event Log	Record management and activity events in the event log. Management events include changes to the system configuration as well as administrator and user logins and logouts. Activity events include system activities, such as VPN tunnel establishment and HA failover events.
Virus Log	Record virus intrusion events, such as when the FortiWiFi unit detects a virus, blocks a file type, or blocks an oversized file or email.
Web Filtering Log	Record activity events, such as URL and content blocking, and exemption of URLs from blocking.
Attack Log	Record attacks detected by the NIDS and prevented by the NIDS Prevention module.
Email Filter Log	Record activity events, such as detection of email that contains unwanted content and email from unwanted senders.
Update	Record log messages when the FortiWiFi connects to the FDN to download antivirus and attack updates.

4. Select the message categories that you want the FortiWiFi unit to record if you selected Event Log, Virus Log, Web Filtering Log, Attack Log, Email Filter Log, or Update in step 3.
5. Select OK.

Figure 44: Example log filter configuration



Configuring traffic logging

You can configure the FortiWiFi unit to record traffic log messages for connections to:

- An interface
- A firewall policy

The FortiWiFi unit can filter traffic logs for a source and destination address and service. You can also enable the following global settings:

- resolve IP addresses to host names,
- display the port number or service.

The traffic filter list displays the name, source address and destination address, and the protocol type of the traffic to be filtered.

This section describes:

- Enabling traffic logging
- Configuring traffic filter settings
- Adding traffic filter entries

Enabling traffic logging

You can enable logging on any interface and firewall policy.

Enabling traffic logging for an interface

If you enable traffic logging for an interface, all connections to and through the interface are recorded in the traffic log.

To enable traffic logging for an interface

1. Go to **System > Network > Interface**.
2. Select Edit in the Modify column beside the interface for which you want to enable logging.
3. For Log, select Enable.
4. Select OK.
5. Repeat this procedure for each interface for which you want to enable logging.

Enabling traffic logging for a firewall policy

If you enable traffic logging for a firewall policy, all connections accepted by the firewall policy are recorded in the traffic log.

To enable traffic logging for a firewall policy

1. Go to **Firewall > Policy**.
2. Select a policy tab.
3. Select Log Traffic.
4. Select OK.

Configuring traffic filter settings

You can configure the information recorded in all traffic log messages.

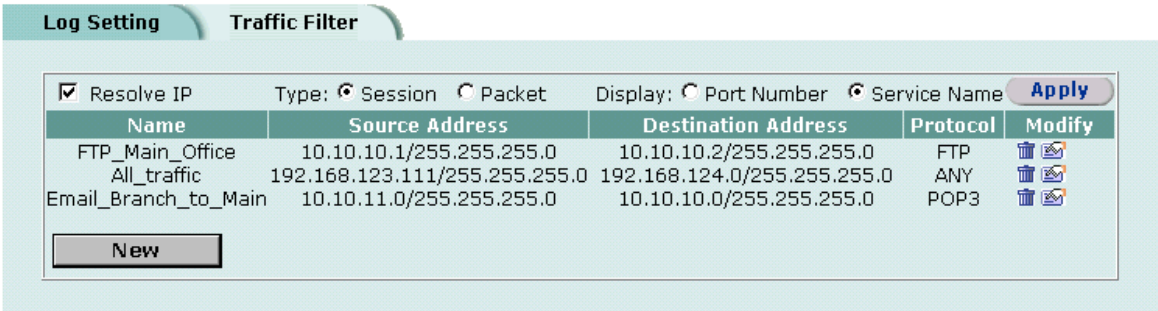
To configure traffic filter settings

1. Go to **Log&Report > Log Setting > Traffic Filter**.
2. Select the settings that you want to apply to all traffic log messages.

Resolve IP	Select Resolve IP if you want traffic log messages to list the IP address and domain name stored on the DNS server. If the primary and secondary DNS server addresses provided to you by your ISP have not already been added, go to **System > Network > DNS** and add the addresses.
Display	Select Port Number if you want traffic log messages to list the port number, for example, 80/tcp. Select Service Name if you want traffic log messages to list the name of the service, for example, TCP.

3. Select Apply.

Figure 45: Example traffic filter list



Adding traffic filter entries

Add entries to the traffic filter list to filter the messages that are recorded in the traffic log. If you do not add any entries to the traffic filter list, the FortiWiFi unit records all traffic log messages. You can add entries to the traffic filter list to limit the traffic logs that are recorded. You can log traffic with a specified source IP address and netmask, to a destination IP address and netmask, and for a specified service. A traffic filter entry can include any combination of source and destination addresses and services.

To add an entry to the traffic filter list

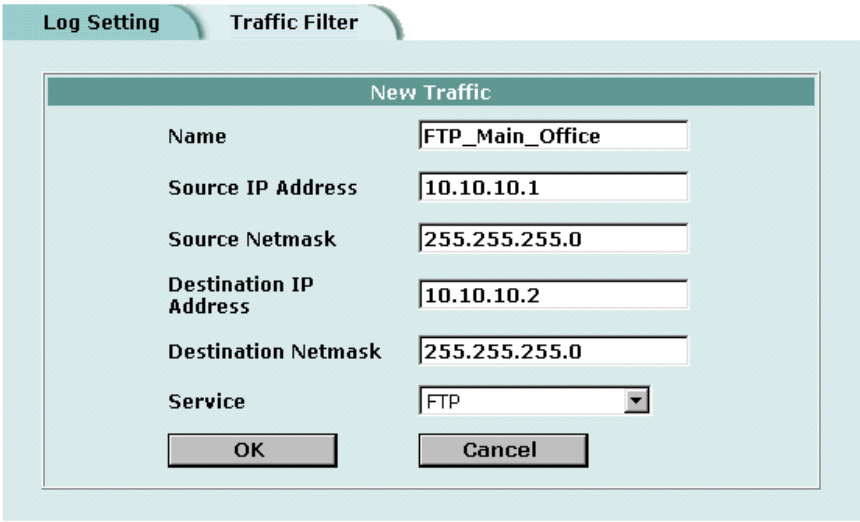
1. Go to **Log&Report > Log Setting > Traffic Filter**.
2. Select New.
3. Configure the traffic filter for the type of traffic that you want to record on the traffic log.

Name	Type a name to identify the traffic filter entry. The name can contain numbers (0-9), uppercase and lowercase letters (A-Z, a-z), and the special characters - and _. Spaces and other special characters are not allowed.
Source IP Address **Source Netmask**	Type the source IP address and netmask for which you want the FortiWiFi unit to log traffic messages. The address can be an individual computer, subnetwork, or network.
Destination IP Address **Destination Netmask**	Type the destination IP address and netmask for which you want the FortiWiFi unit to log traffic messages. The address can be an individual computer, subnetwork, or network.
Service	Select the service group or individual service for which you want the FortiWiFi unit to log traffic messages.

4. Select OK.

   The traffic filter list displays the new traffic address entry with the settings that you selected in "Enabling traffic logging" on page 278.

Figure 46: Example new traffic address entry



Viewing logs saved to memory

If the FortiWiFi unit is configured to save log messages in system memory, you can use the web-based manager to view, search, and clear the log messages. This section describes:

- Viewing logs
- Searching logs

Viewing logs

Log messages are listed with the most recent message at the top.

To view log messages saved in system memory

1. Go to **Log&Report > Logging**.
2. Select Event Log, Attack Log, Antivirus Log, Web Filter Log, or Email Filter Log. The web-based manager lists the log messages saved in system memory.
3. Scroll through the log messages to view them.
4. To view a specific line in the log, type a line number in the Go to line field and select Go.
5. To navigate through the log message pages, select Go to next page or Go to previous page.

Searching logs

To search log messages saved in system memory

1. Go to **Log&Report > Logging**.

2 Select Event Log, Attack Log, Antivirus Log, Web Filter Log, or Email Filter Log.

3 Select to search the messages in the selected log.

4 Select AND to search for messages that match all the specified search criteria.

5 Select OR to search for messages that match one or more of the specified search criteria.

6 Select either of the following search criteria:

Keyword	To search for any text in a log message. Keyword searching is case-sensitive.
Time	To search log messages created during the selected year, month, day, and hour.

7 Select OK to run the search.

The web-based manager displays the messages that match the search criteria. You can scroll through the messages or run another search.

Note: After you run a search, if you want to display all log messages again, run another search but leave all the search fields blank.

Configuring alert email

You can configure the FortiWiFi unit to send alert email to up to three email addresses when there are virus incidents, block incidents, network intrusions, and other firewall or VPN events or violations. After you set up the email addresses, you can test the settings by sending test email.

- Adding alert email addresses
- Testing alert email
- Enabling alert email

Adding alert email addresses

Because the FortiWiFi unit uses the SMTP server name to connect to the mail server, the FortiWiFi unit must look up this name on your DNS server. Before you configure alert email, make sure that you configure at least one DNS server.

To add a DNS server

1 Go to **System > Network > DNS**.

2 If they are not already there, type the primary and secondary DNS server addresses provided by your ISP.

3 Select Apply.

To add alert email addresses

1 Go to **Log&Report > Alert Mail > Configuration**.

2 Select the Authentication check box if your email server requires an SMTP password.

3 In the SMTP Server field, type the name of the SMTP server where you want the FortiWiFi unit to send email, in the format `smtp.domain.com`.
The SMTP server can be located on any network connected to the FortiWiFi unit.

4 In the SMTP User field, type a valid email address in the format `user@domain.com`.
This address appears in the From header of the alert email.

5 In the Password field, type the password that the SMTP user needs to access the SMTP server.
A password is required if you select Authentication.

6 Type up to three destination email addresses in the Email To fields.
These are the email addresses to which the FortiWiFi unit sends alert email.

7 Select Apply.

Testing alert email

You can test the alert email settings by sending a test email.

To send a test email

1 Go to **Log&Report > Alert Mail > Configuration**.

2 Select Test to send test email messages from the FortiWiFi unit to the Email To addresses.

Enabling alert email

You can configure the FortiWiFi unit to send alert email in response to virus incidents, intrusion attempts, and critical firewall or VPN events or violations. If you have configured logging to a local disk, you can enable sending an alert email when the hard disk is almost full.

To enable alert email

1 Go to **Log&Report > Alert Mail > Categories**.

2 Select Enable alert email for virus incidents.
Alert email is not sent when antivirus file blocking deletes a file.

3 Select Enable alert email for block incidents to have the FortiWiFi unit send an alert email when it blocks files affected by viruses.

4 Select Enable alert email for intrusions to have the FortiWiFi unit send an alert email to notify the system administrator of attacks detected by the NIDS.

5 Select Enable alert email for critical firewall/VPN events or violations to have the FortiWiFi unit send an alert email when a critical firewall or VPN event occurs.
Critical firewall events include failed authentication attempts.
Critical VPN events include when replay detection detects a replay packet. Replay detection can be configured for both manual key and AutoIKE Key VPN tunnels.

6 Select Send alert email when disk is full to have the FortiWiFi unit send an alert email when the hard disk is almost full.

7 Select Apply.

Glossary

Connection: A link between machines, applications, processes, and so on that can be logical, physical, or both.

DMZ, Demilitarized Zone: Used to host Internet services without allowing unauthorized access to an internal (private) network. Typically, the DMZ contains servers accessible to Internet traffic, such as Web (HTTP) servers, FTP servers, SMTP (email) servers and DNS servers.

DMZ interface: The FortiWiFi interface that is connected to a DMZ network.

DNS, Domain Name Service: A service that converts symbolic node names to IP addresses.

Ethernet: A local-area network (LAN) architecture that uses a bus or star topology and supports data transfer rates of 10 Mbps. Ethernet is one of the most widely implemented LAN standards. A newer version of Ethernet, called 100 Base-T (or Fast Ethernet), supports data transfer rates of 100 Mbps. And the newest version, Gigabit Ethernet, supports data rates of 1 gigabit (1,000 megabits) per second.

External interface: The FortiWiFi interface that is connected to the Internet. For the FortiWiFi-60 the external interface is WAN1 or WAN2.

FTP, File transfer Protocol: An application and TCP/IP protocol used to upload or download files.

Gateway: A combination of hardware and software that links different networks. Gateways between TCP/IP networks, for example, can link different subnetworks.

HTTP, Hyper Text Transfer Protocol: The protocol used by the World Wide Web. HTTP defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands.

HTTPS: The SSL protocol for transmitting private documents over the Internet using a Web browser.

Internal interface: The FortiWiFi interface that is connected to an internal (private) network.

Internet: A collection of networks connected together that span the entire globe using the NFSNET as their backbone. As a generic term, it refers to any collection of interdependent networks.

ICMP, Internet Control Message Protocol: Part of the Internet Protocol (IP) that allows for the generation of error messages, test packets, and information messages relating to IP. This is the protocol used by the ping function when sending ICMP Echo Requests to a network host.

IKE, Internet Key Exchange: A method of automatically exchanging authentication and encryption keys between two secure servers.

IMAP, Internet Message Access Protocol: An Internet email protocol that allows access to your email from any IMAP compatible browser. With IMAP, your mail resides on the server.

IP, Internet Protocol: The component of TCP/IP that handles routing.

IP Address: An identifier for a computer or device on a TCP/IP network. An IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be zero to 255.

L2TP, Layer Two (2) Tunneling Protocol: An extension to the PPTP protocol that enables ISPs to operate Virtual Private Networks (VPNs). L2TP merges PPTP from Microsoft and L2F from Cisco Systems. To create an L2TP VPN, your ISP's routers must support L2TP.

IPSec, Internet Protocol Security: A set of protocols that support secure exchange of packets at the IP layer. IPSec is most often used to support VPNs.

LAN, Local Area Network: A computer network that spans a relatively small area. Most LANs connect workstations and personal computers. Each computer on a LAN is able to access data and devices anywhere on the LAN. This means that many users can share data as well as physical resources such as printers.

MAC address, Media Access Control address: A hardware address that uniquely identifies each node of a network.

MIB, **Management Information Base**: A database of objects that can be monitored by an SNMP network manager.

Modem: A device that converts digital signals into analog signals and back again for transmission over telephone lines.

MTU, **Maximum Transmission Unit**: The largest physical packet size, measured in bytes, that a network can transmit. Any packets larger than the MTU are divided into smaller packets before being sent. Ideally, you want the MTU your network produces to be the same as the smallest MTU of all the networks between your machine and a message's final destination. If your messages are larger than one of the intervening MTUs, they get broken up (fragmented), which slows down transmission speeds.

Netmask: Also called subnet mask. A set of rules for omitting parts of a complete IP address to reach a target destination without using a broadcast message. It can indicate a subnetwork portion of a larger network in TCP/IP. Sometimes referred to as an Address Mask.

NTP, **Network Time Protocol**: Used to synchronize the time of a computer to an NTP server. NTP provides accuracies to within tens of milliseconds across the Internet relative to Coordinated Universal Time (UTC).

Packet: A piece of a message transmitted over a packet-switching network. One of the key features of a packet is that it contains the destination address in addition to the data. In IP networks, packets are often called datagrams.

Ping, Packet Internet Grouper: A utility used to determine whether a specific IP address is accessible. It works by sending a packet to the specified address and waiting for a reply.

POP3, Post Office Protocol: A protocol used to transfer e-mail from a mail server to a mail client across the Internet. Most e-mail clients use POP.

PPP, Point-to-Point Protocol: A TCP/IP protocol that provides host-to-network and router-to-router connections.

PPTP, Point-to-Point Tunneling Protocol: A Windows-based technology for creating VPNs. PPTP is supported by Windows 98, 2000, and XP. To create a PPTP VPN, your ISP's routers must support PPTP.

Port: In TCP/IP and UDP networks, a port is an endpoint to a logical connection. The port number identifies what type of port it is. For example, port 80 is used for HTTP traffic.

Protocol: An agreed-upon format for transmitting data between two devices. The protocol determines the type of error checking to be used, the data compression method (if any), how the sending device indicates that it has finished sending a message, and how the receiving device indicates that it has received a message.

RADIUS, **Remote Authentication Dial-In User Service**: An authentication and accounting system used by many Internet Service Providers (ISPs). When users dial into an ISP they enter a user name and password. This information is passed to a RADIUS server, which checks that the information is correct, and then authorizes access to the ISP system.

Router: A device that connects LANs into an internal network and routes traffic between them.

Routing: The process of determining a path to use to send data to its destination.

Routing table: A list of valid paths through which data can be transmitted.

Server: An application that answers requests from other devices (clients). Used as a generic term for any device that provides services to the rest of the network such as printing, high capacity storage, and network access.

SMTP, Simple Mail Transfer Protocol: In TCP/IP networks, this is an application for providing mail delivery services.

SNMP, **Simple Network Management Protocol**: A set of protocols for managing networks. SNMP works by sending messages to different parts of a network. SNMP-compliant devices, called agents, store data about themselves in Management Information Bases (MIBs) and return this data to the SNMP requesters.

SSH, **Secure shell**: A secure Telnet replacement that you can use to log into another computer over a network and run commands. SSH provides strong secure authentication and secure communications over insecure channels.

Subnet: A portion of a network that shares a common address component. On TCP/IP networks, subnets are defined as all devices whose IP addresses have the same prefix. For example, all devices with IP addresses that start with 100.100.100. would be part of the same subnet. Dividing a network into subnets is useful for both security and performance reasons. IP networks are divided using a subnet mask.

Subnet Address: The part of the IP address that identifies the subnetwork.

TCP, Transmission Control Protocol: One of the main protocols in TCP/IP networks. TCP guarantees delivery of data and also guarantees that packets will be delivered in the same order in which they were sent.

UDP, User Datagram Protocol: A connectionless protocol that, like TCP, runs on top of IP networks. Unlike TCP, UDP provides very few error recovery services, offering instead a direct way to send and receive datagrams over an IP network. It is used primarily for broadcasting messages over a network.

VPN, Virtual Private Network: A network that links private networks over the Internet. VPNs use encryption and other security mechanisms to ensure that only authorized users can access the network and that data cannot be intercepted.

Virus: A computer program that attaches itself to other programs, spreading itself through computers or networks by this mechanism usually with harmful intent.

Worm: A program or algorithm that replicates itself over a computer network, usually through email, and performs malicious actions, such as using up the computer's resources and possibly shutting the system down.

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